

Pages 1 to 123

CRYSTAL UNITS IN METAL HOLDER, BASED ON TYPE T807, FREQUENCY RANGE 4.0 - 140MHZ ESCC Detail Specification No. 3501/001

ISSUE 4 November 2010





PAGE

ISSUE

LEGAL DISCLAIMER AND COPYRIGHT

European Space Agency, Copyright © 2010. All rights reserved.

The European Space Agency disclaims any liability or responsibility, to any person or entity, with respect to any loss or damage caused, or allleged to be caused, directly or indirectly by the use and application of this ESCC publication.

This publication, without the prior permission of the European Space Agency and provided that it is not used for a commercial purpose, may be:

- copied in whole in any medium without alteration or modification.
- copied in part, in any medium, provided that the ESCC document identification, comprising the ESCC symbol, document number and document issue, is removed.



PAGE

ISSUE 4

2

DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
582	Specification upissued to incorporate technical changes per DCR.
Lás L	



PAGE

ISSUE 4

3

TABLE OF CONTENTS

		<u>Page</u>
1.	GENERAL	5
1.1	Scope	5
1.2	Component Type Variants	5
1.3	Maximum Ratings	5
1.4	Physical Dimensions	5
1.5	Functional Diagram	5
2.	APPLICABLE DOCUMENTS	14
3.	TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS	14
4.	REQUIREMENTS	14
4.1	General	14
4.2	Deviations from Generic Specification	14
4.2.1	Deviations from Special In-process Controls	14
4.2.2	Deviations from Final Production Tests	14
4.2.3	Deviations from Burn-in Tests	14
4.2.4	Deviations from Qualification Tests	14
4.2.5	Deviations from Lot Acceptance Tests	14
4.3	Mechanical Requirements	15
4.3.1	Dimension Check	15
4.3.2	Weight	15
4.3.3	Robustness of Terminations	15
4.4	Materials and Finishes	15
4.4.1	Case	15
4.4.2	Lead Material and Finish	15
4.5	Marking State of the Control of the	15
4.5.1	General	15
4.5.2	The ESCC Component Number	15
4.5.3	Characteristics	16
4.5.4	Traceability Information	16
4.5.5	Manufacturer's Name, Symbol and Code	16
4.6	Electrical Measurements	16
4.6.1	Electrical Measurements at Reference Temperature	16
4.6.2	Electrical Measurements at High and Low Temperatures	16
4.6.3	Circuits for Electrical Measurements	16
4.7	Burn-in Tests	16
4.7.1	Parameter Drift Values	16
4.7.2	Conditions for Burn-in	16
4.7.3	Electrical Circuits for Burn-in	16
4.8	Environmental and Endurance Tests	19
4.8.1	Measurements and Inspections on Completion of Environmental Tests	19
4.8.2 4.8.3	Measurements and Inspections at Intermediate Points and on Completion of Endurance Tests Conditions for Operating Life Test	19
~ •.♥.♥	Commons of Charatiff flag (22)	19



PAGE 4 ISSUE 4

		<u>Page</u>
TABLI	<u>is</u>	
1(a)	Type Variant Summary	6
	Type Variant Detailed Information	23
1(b)	Maximum Ratings	9
1(c)	Format for Individual Tables 1(a)	10
2	Electrical Measurements at Reference Temperature	17
3	Electrical Measurements at High and Low Temperatures	18
4	Parameter Drift Values	18
5	Conditions for Burn-in and Life Test	18
6	Measurements and Inspections on Completion of Environmental Tests and	20
	at Intermediate Points and on Completion of Endurance Testing	
FIGUI	RES	
1	Parameter Derating Information	N/A
2	Physical Dimensions	13
3	Functional Diagram	13
4	Circuits for Electrical Measurements	N/A
5	Electrical Circuit for Burn-in and Life Test	N/A
APPE	NDICES (Applicable to specific Manufacturers only)	
Α	RAKON (F)	122
В	KVG Quartz Crystal Technology GmbH (D)	123



PAGE

ISSUE 4

5

GENERAL

1.1 SCOPE

This specification details the values, physical and electrical characteristics, test and inspection data for Crystal Units in Metal Holder, based on Type 807, Frequency Range 4.0 - 140MHz.

It shall be read in conjunction with ESCC Generic Specification No. 3501, the requirements for which are supplemented herein.

1.2 TYPE VARIANTS

A list of the type variants of the crystal units specified herein, which are also covered by this specification, is given in "Table 1(a) - Type Variant Summary".

For each type variant, the full electrical and physical characteristics are given in individual Tables 1(a) - "Type Variant Detailed Information" at the end of this specification.

The contents of the individual Tables 1(a) shall be as shown in Table 1(c) and the characteristics therein listed shall relate to the design parameters of the individual crystal units, optimised for the intended application.

The specific characteristics shall be negotiated between the Manufacturer and the Orderer. The Manufacturer shall then apply to the ESCC Secretariat for a type variant number for each individual crystal unit concerned, by sending a finalised Table 1(a) which shall also be copied to the ESCC Executive.

1.3 MAXIMUM RATINGS

The maximum ratings, which shall not be exceeded at any time during use or storage, applicable to the crystal units specified herein, are as scheduled in Table 1(b).

1.4 PHYSICAL DIMENSIONS

The physical dimensions of the crystal units specified herein are shown in Figure 2.

1.5 <u>FUNCTIONAL DIAGRAM</u>

The functional diagram showing lead identification of the crystal units specified herein is shown in Figure 3.

PAGE

ISSUE 4

TABLE 1(a) - TYPE VARIANT SUMMARY

Variant	Resonance Frequency	Load Capacitance	Reference Temp.	Operating Temp.	Lead Length (Dim. L mm)	
	(MHz)	(C _L pF)	(T₀ °Ċ)	(T _{op} °C)	Min.	Max.
01	65,34375	96	+ 25	-25 to +70	12.7	-
02	68.4373		+ 25	-20 to +70	12.7	~
03	71.9686	∞	+ 25	-20 to +70	12.7	*
04	82.53		+ 25	-20 to +70	12.7	-
05	83.07	>>	+25	-20 to +70	12.7	-
06	83.335	40	+ 25	-20 to +70	12.7	-
07	84.210526		+ 25	-20 to +70	12.7	•
08	84.868421	∞	+25	-20 to +70	12.7	-
09	85.087737	×	+ 25	-20 to +70	12.7	-
10	85.964947	*	+25	-20 to +70	12.7	T .
11	36.866968	. x	+25	-20 to +70	12.7	*
12	37.166667	×	+25	-20 to +70	12.7	†
13	65.052865	30	+25	-20 to +70	12.7	*
14	70.0	∞	+ 25	-20 to +70	12.7	†
15	102.083333	- xx	+ 25	-20 to +50	12.7	†
16	15.0	50	+40	-20 to +80	12.7	~
17	16.0	50	+60	-30 to +70	12.7	-
18	15.84	50	+ 25	-55 to +105	12.7	-
19	16.0 -16.384	22	+60	-20 to +70	12.7	+
20	16.35	30	+ 25	-20 to +70	12.7	*
21	18.84		+ 25	-20 to +55	12.7	-
22	18.84	32	+ 25	-20 to +55	12.7	-
23	15.0	32	+ 25	-30 to +70	12.7	†
24	20.0	22	+60	-20 to +70	12.7	~
25	36.693333	·	+25	-20 to +70	12.7	-
26	20.8333	10	+ 25	-10 to +60	12.7	-
27	22.841667	30	+ 25	-25 to +65	12.7	-
28	22.856667	44	+ 25	-20 to +50	12.7	
29	22.861667	30	+ 25	-20 to +65	12.7	*
30	24.184	32	+ 25	-10 to +50	12.7	*
31	24.5	30	+ 25	-20 to +60	12.7	*
32	24.5	32	+ 25	-20 to +55	12.7	-
33	36.666 -38.333	20	+ 25	-20 to +60	12.7	1 -
34	38.25618	55	+22	0 to +40	12.7	-
35	55.46875	20	+ 45	+ 43 to + 47	12.7	+
36	62.5 - 68.125	10	+25	-10 to +60	12.7	-
37	71.859475	57.5	+25	-20 to +50	12.7	-
38	75.36015	57.5	+25	-20 to +50	12.7	-

PAGE 7

ISSUE 4

TABLE 1(a) - TYPE VARIANT SUMMARY (Continued)

Variant	Resonance Frequency	Load Capacitance	Reference Temp.	Operating Temp. Range		Length L mm)
	(MHz)	(C _L pF)	(T ₀ °C)	(T _{op} °C)	Min.	Max.
39	79.516319	26.5	+ 30	-10 to +70	12.7	-
40	80.381944	26.5	+ 25	-25 to +65	12.7	-
41	81.847222	26.5	+ 25	-25 to +65	12.7	-
42	99.1	∞	+ 25	-20 to +60	12.7	-
43	105.0	10	+25	-10 to +60	12.7	-
44	120.796	- o	+ 25	-10 to +50	12.7	-
45	61.805555	00	+ 25	-20 to +70	12.7	, ·
46	62.5		+ 25	-20 to +70	12.7	-
47	62.03125	×	+ 25	-20 to +70	12.7	-
48	62,109375	× ×	+ 25	-20 to +70	12.7	-
49	69.559524	∞	+ 25	-20 to +70	12.7	-
50	69.619048	GC GC	+ 25	-20 to +70	12.7	T *
51	24.68617	30	+ 25	-20 to +70	12.7	*
52	82.53	∞	+ 25	-20 to +70	12.7	-
53	83.07	90	+ 25	-20 to +70	12.7	~
54	37.063617	∞	+ 25	-20 to +70	12.7	-
55	37.083333	× ×	+ 25	-20 to +70	12.7	~
56	61.1875					*
57	65.00311	œ	+ 25	-20 to +70	12.7	
58	85.48	x	+ 25	-20 to +70	12.7	~
59	46.08005	12	+ 25	-20 to +70	12.7	~
60	16.0	22	+ 60	-20 to +70	12.7	~
61	38.3117284	· «»	+ 25	-20 to +60	12.7	-
62	15.0	35	+60	-30 to +70	12.7	-
63	16.0	22	+ 60	-20 to +70	12.7	~
64	16.384	22	+60	-20 to +70	12.7	-
65	65.0047	∞	+ 25	-20 to +70	12.7	-
66	65.0513	20	+ 25	-20 to +70	12.7	*
67	69.9992	×.	+ 25	-20 to +70	12.7	-
68	85.4792	φ. (φ.	+ 25	-20 to +70	12.7	-
69	50.0	30	+ 25	-5 to +55	12.7	~
70	20.0	22	+ 60	-20 to +70	12.7	-
71	8.0	30	+ 25	-35 to +105	12.7	*
72	37.74375	96	+ 25	-20 to +70	12.7	~
73	37.827083	30	+ 25	-20 to +70	12.7	*
74	5.24288	30	+ 25	-25 to +105	12.7	-
75	4.096	30	+ 25	-25 to +75	12.7	-
76	5.12	30	+ 25	-35 to +105	12.7	~
77	6.5536	30	+ 25	-35 to +105	12.7	~
78	65.04974		+ 25	-20 to +70	12.7	-



PAGE

ISSUE 4

8

TABLE 1(a) - TYPE VARIANT SUMMARY (Continued)

Variant	Resonance Frequency	Load Capacitance	Reference Temp.	Operating Temp. Range	Lead Length (Dim. L mm)	
	(MHz)	(C _L pF)	(T _o °C)	(Τ _{ορ} °C)	Min.	Max.
79	65.005555	×	+ 25	-20 to +70	12.7	-
80	62.5	\$ \$2.00	+ 25	-20 to +70	12.7	~
81	70.0	40	+ 25	-20 to +70	12.7	+
82	4.1379	30	+ 25	-25 to +75	12.7	~
83	65.03639	×	+ 25	-20 to +70	12.7	~
84	36.811767	œ	+ 25	-25 to +70	12.7	~
85	20.0	4	+ 25	-30 to +70	12.7	~
86	20.0	32	+ 25	-30 to +70	12.7	-
87	81.506849	· · · · · · · · · · · · · · · · · · ·	+ 70	-20 to +80	12.7	-
88	121.5	· · · · · · · · · · · · · · · · · · ·	+ 25	-30 to +80	12.7	-
89	50.0	· · · · · · · · · · · · · · · · · · ·	+ 25	-30 to +80	12.7	~
90	37.75625	· · · · ·	+ 25	-20 to +70	12.7	~
91	24.6827	(6)	+ 25	-20 to +70	12.7	~
92	37.839583	₩	+ 25	-20 to +70	12.7	*
93	90.875794		+ 25	-20 to +70	12.7	
94	90.881675	∞	+ 25	-20 to +70	12.7	-
95	90.88754	w w	+ 25	-20 to +70	12.7	*
96	90.893413		+ 25	-20 to +70	12.7	~
97	99.53704	∞	+ 25	-20 to +70	12.7	*
98	20.0	∞	+ 25	-55 to +105	12.7	-
99	24.5	32	+ 25	-20 to +70	12.7	~

NOTES

1. Full electrical and physical characteristics are given in the individual Tables 1(a) at the end of this specification.



PAGE

ISSUE 4

TABLE 1(b) - MAXIMUM RATINGS

No.	Characteristic	Symbol	Values	Unit	Remarks
1	Nominal Frequency Range	f	4.0 to 140	MHz	Note 1
2	Drive Level Range	P	Note 1	mW	
3	Operating Temperature Range	Тор		°C	Note 2
4	Storage Temperature Range	T _{stQ}	-65 to +125	°C	Note 3
5	Soldering Temperature	T _{sol}	+ 260	°C	Note 4

NOTES

1. ____

ŧ	undamental and Overtone Order	Approx. Frequency Range (MHz)	Drive Level Range (mW)
	Fundamental	4 - 35	0.05 to 0.2
	3	30 - 100	0.05 to 0.25
	5	80 - 140	0.05 to 0.25

- 2. See Table 1(a).
- 3. The duration at maximum storage temperature shall not exceed 16 hours.
- 4. Duration 10 seconds maximum at a distance of not less than 3.0mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.



PAGE 10

ISSUE 4

TABLE 1(c) - FORMAT FOR INDIVIDUAL TABLES 1(a) TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION TYPE VARIANT NO.

			Lin	nits		
No.	Characteristic	Symbol	Min.	Max	Unit	Remarks
1	Resonance Frequency	f,			MHz	AT Cut
2	Reference Temperature	To			°C	
3	Overtone Order	~				
4	Load Capacitance	C _L			pF	
5	Rated Drive Level	Po			mW	
6	Frequency Adjustment Tolerance	윆			10-6	At T _o °C
7	Resonance Resistance	R,			Ω	At T _o *C
8	Frequency Variation with Temperature over T _{op}	<u>∆ f</u>			10-\$	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>Δ R</u> R			% Ω	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}			°C	
11	Frequency Variation with Drive Level				10-8	From $P_{S1} = 0.5 \text{mW}$ to $P_{S2} = 0.5 \text{mW}$
12	Resistance Variation with Drive Level	<u>∆ R</u> R			%	From $P_{S1} = 0.5 \text{mW}$ to $P_{S2} = 0.5 \text{mW}$
13	Motional Inductance	L ₁			mH	
14	Motional Capacitance	C ₁			fF .	
15	Static Capacitance	Co			pF	
16	Q Factor	٥			•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	R _e /R or Z _p //R				In the frequency range: f _r -10% to f _r +10%
18	Ageing	A.L			10-6	
19	Physical Dimensions		: 1			
20	Intended Application					



PAGE 11

ISSUE 4

NOTES TO TABLE 1(c)

- 1. (a) If C_L is not specified, Symbol and measurement shall be f_r.
 - (b) If C_L is specified, Symbol and measurement shall be f_L.

2. Reference Temperature To

- (a) For a crystal unit functioning in a non-controlled temperature environment, the reference temperature is normally +25 ±2 °C.
- (b) For a crystal unit functioning in a controlled temperature environment, the reference temperature shall normally be the mid-point of the temperature range of the controlled environment.

3. Load Capacitance CL

- (a) When a crystal unit must function at its series resonance frequency, C_L shall be infinite.
- (b) When a crystal must function with a load capacitance, the C_L value shall be specified. The standard values of load capacitance are as follows:
- Fundamental Frequency Operation: 20pF, 30pF, 50pF and 100pF.
- Overtone Operation: 8pF, 12pF, 15pF, 20pF and 30pF.

N.B

The tolerance on the load capacitance shall be that value which results in a frequency change not exceeding 10% of the frequency tolerance at T₀ or 1% of the nominal load capacitance, whichever is smaller.

4. Rated Drive Level Po

The rated drive level shall be selected from the standard drive levels specified below:

- Preferred values: 2mW, 1mW, 0.5mW, 0.2mW, 0.1mW, 0.05mW, 0.02mW, 0.01mW, 0.001mW or 0.0001mW at ±20%.
- Non-preferred values: 10mW, 5mW and 4mW all at ±20%.

5. Frequency Adjustment Tolerance

- (a) When a crystal must function at its series resonance frequency, the standard value of the adjustment tolerance shall be \pm 10 x 10-6.
- (b) When a crystal has to function with a load capacitance, the standard value of the adjustment tolerance shall also be ±10 x 10⁻⁶. However, if the load capacitance is adjustable, it is preferable to specify that the nominal frequency be obtained with a load capacitance value between the minimum and maximum value when the crystal is functioning in its fundamental mode.

6. Resonance Resistance

(a) Generally, the maximum value only is specified.

(b)
$$R_L$$
 may be calculated by $R_L = R_r \left(1 + \frac{C_0}{C_L}\right)^2$

7. Frequency and Resistance Variation with Temperature

These values shall be specified such that they are consistent with the operating temperature range.

8. Frequency and Resistance Variation with Drive Level

These limits and the Drive Level range (P_{S1} to P_{S2}) shall be specified for very special crystals only (i.e. crystals used in very high stability oscillators).



PAGE 12

ISSUE 4

NOTES TO TABLE 1(c) (Continued)

9. Electrical Values

The electrical values shall be specified only when required for the correct functioning of the equipment in which the crystal is used.

10. Motional Inductance L₁

Because the inductance value may be restricted by other chosen parameters, the Manufacturer shall propose the value of L₁ in accordance with the Customer's requirements.

11. 'Q' Factor

If 'R' and 'L' have been already specified, it will not be necessary to specify the minimum value of the 'Q' factor.

The maximum value of the 'Q' factor is never specified.

12. Ratio of Unwanted Response Resistance to Resonance Resistance

The standard minimum value is 2, but it is possible to obtain higher values.

The frequency range within which the minimum value of the ratio is required shall also be specified.

13. Ageing

Specify limits under appropriate column and ageing period under "Remarks".

14. Terminal Lengths

To be specified if different from Figure 2 dimensions. If dimensions are as per Figure 2 then "Figure 2" to be entered in the Limits column.

15. Not applicable Items

For all items where limits are not specified, "Not applicable" shall be entered in the Limits column.

16. Intended Application

For definitions of the selected symbol to be added, see ESCC Generic Specification No. 3501, Para. 3.

PAGE 13

ISSUE 4

FIGURE 1 - PARAMETER DERATING INFORMATION

Not applicable.

FIGURE 2 - PHYSICAL DIMENSIONS

Symbol	Millim	Remarks	
y y y y y y y y y y y y y y y y y y y	Min.	Max.	
ØA	*	10.70	÷
C	*	6.80	
H	4.83	5.33	Pitch 5.08mm
ØK	0.40	0.48	*
L L	12.70	~	*
P.	. Hājani.	0.90	Note 2
Q		0.95	Note 2

NOTES

- 1. Lead No. 3 is grounded to case.
- 2. The tag's position or presence is optional.

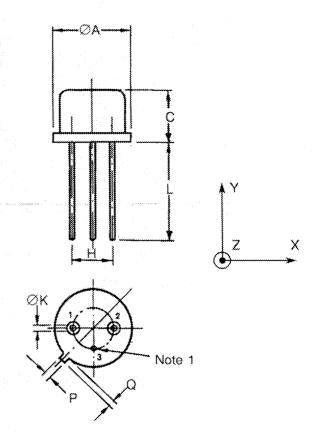
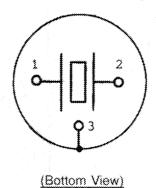


FIGURE 3 - FUNCTIONAL DIAGRAM





PAGE 14

ISSUE 4

2. APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:-

(a) ESCC Generic Specification No. 3501 for Quartz Crystal Units.

3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply. In addition, the following symbols are used:-

Resonance Frequency = f, Load Resonance Frequency = fL $= T_0$ Reference Temperature Resonance Resistance $= R_r$ Load Resonance Resistance $= R_1$ Rated Drive Level $= P_0$ Static Capacitance $= C_o$ Load Capacitance = C $= C_1$ Motional Capacitance Motional Inductance = L1 $= R_p$ Response Resistance Response Impedance $= |Z_p|$ Insulation Resistance = Ri

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the crystal units specified herein shall be as stated in this specification and ESCC Generic Specification No. 3501 for Quartz Crystal Units. Deviations from the Generic Specification applicable to this specification only, are detailed in Para. 4.2.

Deviations from the applicable Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

4.2 <u>DEVIATIONS FROM GENERIC SPECIFICATION</u>

4.2.1 <u>Deviations from Special In-process Controls</u>

None.

4.2.2 Deviations from Final Production Tests (Chart II)

None.

4.2.3 Deviations from Burn-in Tests (Chart III)

None.

4.2.4 Deviations from Qualification Tests (Chart IV)

None.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

None.



PAGE 15

ISSUE 4

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

The dimensions of the crystal units specified herein shall be checked. They shall conform to those shown in Figure 2.

4.3.2 Weight

The maximum weight of the crystal units specified herein shall be 2.0 grammes.

4.3.3 Robustness of Terminations

The requirements for robustness of termination testing are specified in Section 9 of ESCC Generic Specification No. 3501.

4.4 MATERIALS AND FINISHES

The materials and finishes shall be as specified herein. Where a definite material is not specified, a material which will enable the crystal units specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material does not guarantee acceptance of the finished product.

4.4.1 <u>Case</u>

4.4.1.1 Cap

Copper, nickel plated or nickel and gold plated.

4.4.1.2 Base

Kovar, nickel plated and gold plated.

4.4.2 Lead Material and Finish

The lead material shall be Type 'D' with Type '2' finish in accordance with the requirements of ESCC Basic Specification No. 23500.

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and the following paragraphs. When the component is too small to accommodate all of the marking specified, as much as space permits shall be marked and the marking information, in full, shall accompany the component in its primary package.

The information to be marked and the order of precedence, shall be as follows:-

- (a) The ESCC Component Number.
- (b) Characteristics.
- (c) Traceability Information.

4.5.2 The ESCC Component Number

Each component shall bear the ESCC Component Number, which shall be constituted and marked as follows:-

Detail Specification Number		***************************************
Type Variant (See Table 1(a)	}	į
Testing Level (B or C, as app	olicable)	



PAGE 16

ISSUE 4

4.5.3 Characteristics

The resonance frequency of the crystal units shall be clearly specified in MHz. Where necessary, it shall be specified to 6 decimal places.

4.5.4 Traceability Information

Each component shall be marked in respect of traceability information in accordance with the requirements of ESCC Basic Specification No. 21700.

4.5.5 Manufacturer's Name, Symbol or Code

The Manufacturer's marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 <u>Electrical Measurements at Reference Temperature</u>

The parameters to be measured in respect of electrical characteristics are scheduled in Table 2. The measurements shall be performed at the temperatures specified in the individual Tables 1(a), Item 2.

4.6.2 Electrical Measurements at High and Low Temperatures

The parameters to be measured at high and low temperatures are scheduled in Table 3. These measurements shall only be performed if values are specified in Table 1(a) Items 8 and/or 9.

4.6.3 Circuits for Electrical Measurements (Figure 4)

Not applicable.

4.7 BURN-IN TESTS

4.7.1 Parameter Drift Values

The parameter drift values applicable to burn-in are specified in Table 4 of this specification. Unless otherwise stated, measurements shall be performed at $T_{amb} = T_0 \pm 2$ °C. The parameter drift values (Delta) applicable to the scheduled parameters shall not be exceeded. In addition to these drift value requirements for a given parameter, the appropriate limit value specified in Table 2 shall not be exceeded.

4.7.2 Conditions for Burn-in

The requirements for burn-in are specified in Section 7 of ESCC Generic Specification No. 3501. The conditions for burn-in shall be as specified in Table 5 of this specification.

4.7.3 <u>Electrical Circuits for Burn-in (Figure 5)</u>

Not applicable.



PAGE 17

ISSUE 4

TABLE 2 - ELECTRICAL MEASUREMENTS AT REFERENCE TEMPERATURE

	TABLE 2 - ELECTRICAL IVI	-ASUNEWEN I	3 AT HEFENEIVE	ICIVIFERMIC	INC
No.	Characteristics	Symbol	ESCC 3501 Test Method	Limits	Unit
1	Resonance frequency at reference temperature and rated drive level - with C _O - with C _L	f _r (T _o , P _o) f _L (T _o , P _o)	Para. 9.2.1.1	Table 1(a), Item 1 ± Item 6	MHz
2	Resonance resistance at reference temperature and rated drive level - with C _O - with C _L	R _r (T _o , P _o) R _L (T _o , P _o)	Para. 9.2.1.1	Table 1(a), Item 7	Ω
3	Frequency variation with Drive Level	<u>Δ f</u> (T _o , ΔP)	Para. 9.2.1.1	Table 1(a), Item 11	10-6
4	Resistance variation with Drive Level	$\frac{\Delta R}{R} (T_0, \Delta P)$	Para. 9.2.1.1	Table 1(a), Item 12	%
5	Motional Inductance	L ₁	Para. 9.2.1.3	Table 1(a), Item 13	mH
6	Static Capacitance	Co	Para. 9.2.1.4	Table 1(a), Item 15	ρF
7	Unwanted response	R _P /R or IZ _P I/R	Para. 9.2.1.5	Table 1(a), Item 17	-
8	Insulation Resistance	Ri	Para. 9.2.1.6	500 Min.	MΩ

PAGE 18

ISSUE 4

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	Characteristics	Symbol	ESCC 3501 Test Method	Limits	Unit
9	Frequency variation with Temperature over Top	<u>Δ f</u> (ΔΤ, P ₀)	Para. 9.2.1.2	Table 1(a) Item 8	10-6
10	Resistance variation with Temperature over Top	<u>Δ R</u> (ΔT, P ₀)	Para. 9.2.1.2	Table 1(a) Item 9	%

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

Not applicable.

TABLE 4 - PARAMETER DRIFT VALUES

N	lo.	Characteristics	Symbol	Spec. and/or Test Method	Test Conditions	Change Limits (Δ)	Unit
	1	Resonance frequency drift	$\frac{\Delta f}{f}$	As per Table 2	As per Table 2	± 2.0	10-6
	2	Resonance resistance drift	ΔR R	As per Table 2	As per Table 2	± 10 or (1) ± 1.0	% Ω

NOTES 1. Whichever is the highest value.

TABLE 5 - CONDITIONS FOR BURN-IN AND LIFE TEST

No.	Characteristics	Symbol	Condition	Unit
1	Ambient Temperature	T _{amb}	+85 ±5	°C

FIGURE 5 - ELECTRICAL CIRCUIT FOR BURN-IN AND LIFE TEST

Not applicable.



PAGE 19

ISSUE 4

4.8 <u>ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESCC GENERIC SPECIFICATION NO. 3501)</u>

4.8.1 Measurements and Inspections on Completion of Environmental Tests

The parameters to be measured and inspections to be performed on completion of environmental tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = T_0 \pm 2$ °C.

4.8.2 Measurements and Inspections at Intermediate Points and on Completion of Endurance Tests

The parameters to be measured and inspections to be performed at intermediate points and on completion of endurance tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = T_0 \pm 2$ °C.

4.8.3 Conditions for Operating Life Test (Part of Endurance Testing)

The requirements for the operating life test are specified in Section 9 of ESCC Generic Specification No. 3501. The test shall be performed as a high temperature storage test and the temperature to be applied shall be the maximum operating temperature specified in the individual Tables 1(a) given in this specification.



PAGE 20

ISSUE 4

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING

	ESCC GENERIC SP	EC. NO. 3501	MEASUREMENTS AN	ID INSPECTIONS		LIN	IITS	
NO.	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS	SYMBOL	Min.	Max.	UNIT
01	Electrical Measurements at Reference Temperature	Para. 9.2.4	Electrical Measurements	Table 2		Tabl	e 1(a)	
02	Shock	Para. 9.3	Initial Measurements Resonance Frequency Resonance Resistance Final Measurements Resonance Frequency Drift Resonance Resistance Drift	Table 2 Item 1 Table 2 Item 2 Table 2 Item 1 Table 2 Item 2	β Δ! † Δ R R ΔR		2 Item 1 2 Item 2 +1.0 +10 +1.0	10-6 % Ω
03	Vibration	Para. 9.4	Initial Measurements Resonance Frequency Resonance Resistance Final Measurements Resonance Frequency Drift Resonance Resistance Drift	Table 2 Item 1 Table 2 Item 2 Table 2 Item 1 Table 2 Item 1	1 R <u>A1</u> 1 <u>AR</u> R AR	\$	2 Item 1 2 Item 2 + 1.0 + 10 + 1.0	10·6 %
04	Seal Test	Para. 9.5	Fine Leak Gross Leak	Para. 9.5.1 Para. 9.5.2			ı. 9.5.1 ı. 9.5.2	
05	Permanence of Marking	Para. 9.8	Final Measurements Visual Examination	No corrosion or obliteration of marking		v	~	^
06	External Visual Inspection	Para. 9.9	Final Measurements Visual Inspection	ESCC No. 20500	*			
07	Solderability	Para. 9.13		•				-

NOTES

- 1. The tests in this table refer to either Chart IV or V, and shall be used as applicable.
- 2. Whichever is the highest value.



PAGE 21

ISSUE 4

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING (Cont.)

	ESCC GENERIC SP	EC. NO. 3501	MEASUREMENTS AN	ID INSPECTIONS		LIMITS		INIT
NO.	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS	SYMBOL	Min.	Max.	UNIT
	Climatic Sequence	Para. 9.14						
08	Dry Heat	Para. 9.14.1	Initial Measurements					
			Resonance Frequency	Table 2 Item 1			2 Item 1	
			Resonance Resistance	Table 2 Item 2	. R	Table :	2 Item 2	
			Final Measurements					
			Resonance Frequency	Table 2 Item 1	L AJ	- 2.0	+ 2.0	10-6
	ua de la composição de la La composição de la compo		Drift Resonance Resistance	Takin Bitani A	1 1	**	+10	%
			Orift	Table 2 Item 2	AB R	10 or (2)	* 10	76
			V		ΔR	~ 1.0	+ 1.0	Ω
09	Cold	Para. 9.14.3	Initial Measurements		" "	7.0	. ,,,	
		3 7	Resonance Frequency	Table 2 Item 1	1	Para.	3.14.1.3	
			Resonance Resistance	Table 2 Item 2	R		surements	
			Final Measurements					
			Resonance Frequency Drift	Table 2 Item 1	41	- 2.0	+ 2.0	10-6
			Resonance Resistance	Table 2 Item 2	AB R	~10	+10	%
	n a 2 anno		Drift			or (2)		
					ΔR	-1.0	+1.0	Ω
10	Damp Heat (Acclerated)	Para. 9.14.4	Initial Measurements	44° . 5 5				
	Remaining Cycles		Resonance Frequency Resonance Resistance	Table 2 Item 1	R		9.14.3.2 surements	
			Final Measurements	Table 2 Item 2	l n	THE SECTION	1800 en en en es 1	
			Resonance Frequency	Table 2 Item 1	Af	~ 2.0	+2.0	10-6
			Drift	(1000) 1000	<u></u>	• • • • • • • • • • • • • • • • • • • •	*****	,,,
			Resonance Resistance	Table 2 Item 2	<u>AB</u>	~ 10	+10	%
			Drift		R	or (2)		
l				·	ΔR	~1.0	+1.0	Ω
			Insulation Resistance	Table 2 Item 8	Ri	500	_	MΩ
11	Rapid Change of	Para, 9.15	Initial Measurements					
1 ''	Temperature	1 0000 0.10	Resonance Frequency	Table 2 Item 1	f	Para	ı 9.14.4.2	
			Resonance Resistance		R	3	asurements	
			Final Measurements	After minimum				
				Recovery of 2 hours				
			Resonance Frequency	Table 2 Item 1	<u>LA</u>	-2.0	+ 2.0	10-6
			Drift		1			
			Resonance Resistance	Table 2 Item 2	<u>A.B</u>	- 10	+10	%
			Drift		l B	or (2)		
ļ					ΔR	- 1.0	+1.0	Ω
12	Robustness of	Para. 9.16	Tensile Strength	Gen. 3501				
	Terminations			Para. 9.16.1				
			Visual Examination	No visible damage				
			Bending	Gen. 3501				
			Wand Evenhatian	Para. 9.16.2				
L			Visual Examination	No visible damage		<u> </u>		1

NOTES

- 1. The tests in this table refer to either Chart IV or V, and shall be used as applicable.
- 2. Whichever is the highest value.



PAGE 22 ISSUE 4

TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING (Cont.)

•••	ESCC GENERIC SP	EC. NO. 3501	MEASUREMENTS AND IN	Namo	LIM	ITS	UNIT	
NO.	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS	SYMBOL	Min.	Max.	UNII
13	Life Test	Para. 9.17	Initial Measurements				-	
	1941		Resonance Frequency	Table 2 Item 1	1	Table 2	! Item 1	
			Resonance Resistance	Table 2 Item 2	R	Table 2	Item 2	1
			Intermediate Measurements	At 500 hours			1	
			Resonance Frequency	Table 2 Item 1	<u>A</u> J	~ 2.0	+ 2.0	10-6
			Drift		1			
			Resonance Resistance	Table 2 Item 2	<u> </u>	10	+10	%
			Drift		R	or (2)		
	er tigar e				ΔR	~ 1.0	+ 1.0	Ω
			Intermediate Measurements	At 1000 hours				
			(Chart IV) and Final					
			Measurements (Chart V)					
			Resonance Frequency Drift	Table 2 Item 1	4	- 2.5	+2.5	10-6
	No. of the second second		Resonance Resitance	Table 2 Item 2	AB	-10	+10	%
			Drift		R	or (2)		
	1.1				ΔR	- 1.0	+1.0	Ω
		ala e	Final Measurements (Chart IV)	At 2000 hours				
			Resonance Frequency Drift	Table 2 Item 1	<u>4</u> 1	~3.0	+3.0	10-6
			Resonance Resistance	Table 2 Item 2	<u> </u>	- 10	+10	%
			Drift		R	or (2)		
					ΔR	-1.0	+1.0	Ω

NOTES

- 1. The tests in this table refer to either Chart IV or V, and shall be used as applicable.
- 2. Whichever is the highest value.

PAGE 23

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION TYPE VARIANT NO. 01

			(/3) ((/3) %)			······
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	65.3	4375	MHz	Swept
2	Reference Temperature	Τ _ο	+ 23	+ 27	°C	
3	Overtone Order	*		3		
4	Load Capacitance	CL	٥		ρF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R _r	•	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ f f	-7.5	+ 7.5	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	ΔR R	-10	+10	% '	From resistance measured at T _o *C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	ſF	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	Not ap	plicable	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	<u>Δ1</u>	-3.0	+3.0	10-6	After burn-in and per year
19	Terminal Length	L	Figu	ıre 2	mm	

PAGE 24

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim	·····	Unit	Remarks
		Ž	Min.	Max.		
1	Resonance Frequency	fr	68.4	373	MHz	Swept
2	Reference Temperature	Τo	+ 23	+ 27	°C	
3	Overtone Order	•	3			
4	Load Capacitance	CL	×	3* 1 1 1 1 1 1 1	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R,	*	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆f</u> f	-7.5	+ 7.5	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	AR R	-10	+ 10	. %	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not app	olicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	olicable	%	
13	Motional Inductance	L ₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	Not ap	olicable	1F	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	a	Not ap	plicable		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1			In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L.	Figu	ıre 2	mm	



PAGE 25

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION TYPE VARIANT NO. 03

No.	Characteristics	Symbol	Lim Min.	Max.	Unit	Remarks
1	Resonance Frequency	f,	71.9	686	MHz	Swept
2	Reference Temperature	То	+23	+27	°C	
3	Overtone Order	•	3	3		
4	Load Capacitance	CL	٥		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆ 1</u>	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R,		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ'f'</u> f'''	-7.5	+ 7.5	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	∆R R	-10	+ 10	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	<u>Δ1</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	AR R	Not ap	plicable	%	
13	Motional Inductance	L ₋₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	ſF	
15	Static Capacitance	Co	~	7.0	pF	
16	Q Factor	Q	Not ap	plicable	* .	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	Δ <u>f</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Fig	ure 2	mm	

PAGE 26

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol		nits	Unit	Remarks
140.	Citaracteristics	Oymbor	Min.	Max.		riomains
1	Resonance Frequency	f _r	82	.53	MHz	Swept
2	Reference Temperature	То	+ 23	+27	°C	
3	Overtone Order			3		
4	Load Capacitance	C_L		0	ρF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R,	*	40	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	∆ f f	-10	+10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆.B</u> R	-20	+20	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	∆ f f	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	***************************************	7.0	pF	
16	Q Factor	Q	Not a	pplicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	<u>Δ.t</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L.	Fig	ure 2	mm	

PAGE 27

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f,	83.	07	MHz	Swept
2	Reference Temperature	To	+23	+ 27	°C	
3	Overtone Order	-	(:
4	Load Capacitance	C _L	٥	٥.	pF	
5	Rated Drive Level	Po	0.	.1	mW	*.
6	Frequency Adjustment Tolerance	Δ <u>1</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R _r	•	40	Ω	At To °C
8	Frequency Variation with Temperature over T _{op}	<u>Δ</u> 1	-10	+ 10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	AR R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	f F	
15	Static Capacitance	Co	~	7.0	pF	
16	Q Factor	Q	Not ap	plicable	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1			In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	<u> </u>	-3.0	+ 3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ure 2	mm	

PAGE 28

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		,	* * * * * * * * * * * * * * * * * * * *	······································		,
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f,	83.3	35	MHz	Swept
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	*				
4	Load Capacitance	CL	٥	>	рF	
5	Rated Drive Level	Po	0.	1	mW	:
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+ 5.0	10-6	At To *C
7	Resonance Resistance	R,		60	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆</u> f f	-7.0	+ 7.0	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	10.8	13.2	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	1F	
15	Static Capacitance	C _o	*	7.0	pF	
16	Q Factor	Q	Not a	pplicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	<u>Δ1</u>	-5.0	+5.0	10-6	After burn-in, and per year
19	Terminal Length	L.	Figi	ure 2	mm	

PAGE 29

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		, , , , , , , , , , , , , , , , , , , ,	MINIMI	*****		
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	fr	84.210526		MHz	Swept
2	Reference Temperature	To	+ 24	+ 26	°C	
3	Overtone Order	*	3			
4	Load Capacitance	CL	α		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R _r	•	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δt	-8.0	+8.0	10-6	From frequency measured at T _a °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	ener and
14	Motional Capacitance	C ₁	Not ap	plicable	1F	
15	Static Capacitance	Co	~	7.0	pF	
16	Q Factor	Q	Not a	oplicable	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	<u>∆</u> f f	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ure 2	mm	

PAGE 30

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fr	84.86	8421	MHz	Swept
2	Reference Temperature	To	+24	+ 26	*C	
3	Overtone Order			3		
4	Load Capacitance	C _L			pF	
5	Rated Drive Level	Po	0		mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-5.0	+ 5.0	10-6	At To *C
7	Resonance Resistance	Rr		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>A</u> !	-8.0	+ 8.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	Δ <u>Β</u> R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	*C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	Not a	pplicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	∆ f	-3.0	+3.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Fig	ure 2	mm	

PAGE 31

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _r	85.087737		MHz	Swept
2	Reference Temperature	Τ _o	+24	+26	°C	
3	Overtone Order	-	3			
4	Load Capacitance	CL	30		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	Rr	~	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆f</u>	-8.0	+ 8.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆.B</u> R	-20	+20	%	From resistance measured at T _o *C
10	Operating Temperature Range	Тср	-20	+70	°C	
11	Frequency variation with Drive Level	<u>Δ1</u>	Not applicable		10 ⁻⁶	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	C _o	-	7.0	pF	
16	Q Factor	Q	Not a	pplicable	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	<u>Δ1</u>	-3.0	+3.0	10-5	After burn-in, and per year
19	Terminal Length	L	Fig	jure 2	mm	



PAGE 32

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

ο.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
7	Resonance Frequency	f,	85.964947		MHz	Swept
2	Reference Temperature	To	+24	+ 26	°C	
3	Overtone Order	-	3			
4	Load Capacitance	CL	×		pF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R _r	*	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	-8.0	+8.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at T _o *C
10	Operating Temperature Range	Тор	-20	+70	*C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not applicable		10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L-1	Not a	oplicable	mH	
14	Motional Capacitance	C ₁	Not a	oplicable	1F	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	Not applicable		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	~		In the frequency range: f _r -50kHz to f _r + 50kHz
1	8 Ageing	Δf	-3.	0 +3.0	10-6	After burn-in, and per year
-	9 Terminal Length		Fi	gure 2	mm	



PAGE 33

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

40.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	fr	36.866968		MHz	Swept
2	Reference Temperature	То	+ 23	+27	°C	
3	Overtone Order	~	2			
4	Load Capacitance	CL	ø)	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	∆ f f	-10	+10	10-6	At To °C
7	Resonance Resistance	Rr	-	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ1</u>	-9.0	+9.0	10-6	From frequency measured at T _o *C
9	Resistance Variation with Temperature over Top	ΔR R	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+70	°C	
1 1	Frequency variation with Drive Level	<u>∆ f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not as	plicable	%	
13	Motional Inductance	L ₁	17.7	21.7	mH	
14	Motional Capacitance	C ₁	Not a	oplicable	fF	
15	Static Capacitance	Co	*	7.0	pF	
16	Q Factor	Q	Not :	applicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
11	B Ageing	<u>∆1</u>	-3.	0 +3.0	10-5	After burn-in, and per year
1	9 Terminal Length	L	Fi	gure 2	mm	



PAGE 34

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f,	37.166667		MHz	Swept
2	Reference Temperature	To	+23	+27	°C	
3	Overtone Order	*	3			
4	Load Capacitance	CL	α	,	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R _r	•	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ t</u> f	-9.0	+9.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆R R	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	<u>Δ1</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	17.3	21.3	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF.	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	Not a	applicable	-	<u> </u>
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/F	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	3 Ageing	Δf	-3.0	+3.0	10-6	After burn-in, and per year
15	Terminal Length	L.	Fi	gure 2	mm	



PAGE 35

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f,	62.05	2865	MHz	Swept
2	Reference Temperature	То	+ 23	+ 27	٠c	
3	Overtone Order	*	3			
4	Load Capacitance	CL	×		pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R,	#	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>\$</u> f	-9.0	+9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over T _{op}	∆R R	-10	+ 10	%	From resistance measured at T _o *C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	Δf f	Not a	oplicable	10-6	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not a	oplicable	%	
13	Motional Inductance	L ₁	3.4	4.8	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	~	7.0	pF	
16	Q Factor	Q	30 000	-	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f, -50kHz to f _r + 50kHz
18	3 Ageing	Δ <u>1</u>	-3	0 +3.0	10-6	After burn-in, and per year
1:	9 Terminal Length	L	F	igure 2	mm	

PAGE 36

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	íts Max.	Unit	Remarks
1	Resonance Frequency	f _r	70.0		MHz	
2	Reference Temperature	То	+ 23	+ 27	*C	
3	Overtone Order	•	3			
4	Load Capacitance	C_L	ð)	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆</u> †	-10	+10	10-6	At To °C
7	Resonance Resistance	Rr	*	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆ f f	-9.0	+9.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆ R R	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+70	*C	
11	Frequency variation with Drive Level	Δ <u>f</u> f	Not an	plicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not a	oplicable	%	
13	Motional Inductance	L ₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	ſF	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	35 000	~	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	3 Ageing	∆ f f	-3.	0 +3.0	10-6	After burn-in, and per year
19	9 Terminal Length	L.	Fi	gure 2	mm	



PAGE 37

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

				••••••		
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f.	102.08	33333	MHz	
2	Reference Temperature	Τo	+ 22	+28	°C	
3	Overtone Order	*	ŧ	5		
4	Load Capacitance	CL	11.9	12.1	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R _L	^	70	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>∆ f</u> f	-5.0	+5.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	Тор	-20	+50	°C	
11	Frequency variation with Drive Level	∆ f f	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not a	oplicable	%	
13	Motional Inductance	L ₁	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	~	0.37	fF.	
15	Static Capacitance	Co	~	3.0	pF	
16	Q Factor	Q	60 000	-		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1	*		In the frequency range: f _L -100kHz to f _L + 100kHz
18	3 Ageing	$\frac{\Delta f}{f}$	-10	+10	10-6	After burn-in, over 10 years
15	Terminal Length	L	F	igure 2	mm	



PAGE 38

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

Vo.	Characteristics	Symbol	Limi Min.	its Max.	Unit	Remarks
1	Resonance Frequency	fL	15.0		MHz	
2	Reference Temperature	То	+4	10	°C	
3	Overtone Order	~	Fundar	nental		
4	Load Capacitance	CL	5(ρF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	RL	•	13	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	∆ f f	-15	+ 15	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>AB</u> R	Not applicable		%	
10	Operating Temperature Range	Top	-20	+80	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	Not ap	oplicable	ρF	
16	Q Factor	۵	50 000		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Ap/R IZpl/R	3:1	~		In the frequency range: f _L -200kHz to f _L + 200kHz
18	Ageing	<u>Af</u>	-3.0	+3.0	10-6	
15	Terminal Length	L	Fig	gure 2	mm	



PAGE 39

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	f_	16.	0	MHz	
2	Reference Temperature	To	+6	0	°C	
3	Overtone Order	~	Fundan	nental		
4	Load Capacitance	C _L	20	50	pF	
5	Rated Drive Level	Po	0.	1	mΨ	
6	Frequency Adjustment Tolerance	<u>1.Δ</u> 1	-10	+10	10-6	At T _o °C
7	Resonance Resistance	RL		20	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆ f</u> f	-10	+10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>A</u> R R	-10 +10 or -1.5 +1.5		% Ω	From resistance measured at T $_{ m o}$ $^{\circ}$ C If R < 10 Ω
10	Operating Temperature Range	Тор	-30	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not app	olicable	10-5	
12	Resistance variation with Drive Level	∆R R	Not ap	olicable	%	
13	Motional Inductance	Li	,	9.5	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	ſF	
15	Static Capacitance	Co	*	7.0	pF	
16	Q Factor	Q	70 000	-	ж	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		in the frequency range: f _L -200kHz to f _L +200kHz
18	Ageing	Δ <u>t</u>	-10	+ 10	10-6	After burn-in, and per year
19	Terminal Length	L.	Fig	ure 2	mm	

PAGE 40

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	fL	15.84		MHz	
2	Reference Temperature	То	+;	25	°C	
3	Overtone Order	*	Fundan	nental		
4	Load Capacitance	CL	50		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u> f	-20	+20	10-6	At To °C
7	Resonance Resistance	R_L		20	Ω	Over Top °C
8	Frequency Variation with Temperature over T _{cp}	∆f 1	-30	+30	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆R R	Not applicable		%	
10	Operating Temperature Range	Тор	-55	+105	°C	
11	Frequency variation with Drive Level	∆ f f	Not app	olicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	12.24	16.56	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	*	5.0	pF	
16	Q Factor	Q	70 000	•	. ~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	3:1	*		In the frequency range: ft1.0MHz to ft_+1.0MHz
18	Ageing	<u>∆1</u>	-7.5	+7.5	10-6	After burn-in, and per year
19	Terminal Length	L	Fig	ure 2	mm	



PAGE 41

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limit Min.	s Max.	Unit	Remarks
1	Resonance Frequency	fL	16.0 -16.384		MHz	
2	Reference Temperature	То	+6	0	°C	
3	Overtone Order	*	Fundam	iental		
4	Load Capacitance	CL	22		pF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	<u>Δ.</u> t	-10	+10	10-6	At To °C
7	Resonance Resistance	RL	~	20	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>Δ f</u>	-15	+15	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not app	olicable	%	
10	Operating Temperature Range	Тор	-20	+ 70	*C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	AR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	٠	5.0	pF	
16	Q Factor	Q	Not a	pplicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	•		In the frequency range: f _L -200kHz to f _L + 200kHz
18	3 Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10-6	After burn-in, and per year
1	9 Terminal Length	L	Fiç	jure 2	mm	



PAGE 42

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			MAIMINI			
No.	Characteristics	Symbol	Limit Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	f _L	16.35		MHz	
2	Reference Temperature	То	+ 2	5	°C	
3	Overtone Order	-	Fundan	nental		
4	Load Capacitance	CL	30)	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-15	+15	10-6	At To °C
7	Resonance Resistance	RL	*	30	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	∆ f f	-15	+15	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆R R	Not ap	plicable	%	
10	Operating Temperature Range	Top	-20	+70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta 1}{1}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	oplicable	%	
13	3 Motional Inductance	L ₁	Not a	pplicable	mH	
14	4 Motional Capacitance	. C ₁	Not a	pplicable	fF	
1!	5 Static Capacitance	Co	*	4.0	pF	
1	6 Q Factor	Q	Not	applicable	· .	
1	7 Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _L -1.0MHz to f _L + 1.0MHz
	18 Ageing	1 <u>4</u>	-5.	.0 +5	.0 10-6	After burn-in, and per year
-	19 Terminal Length	L	F	igure 2	mm	



PAGE 43

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			33 337 33 3 1			*
lo.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _r	18.84		MHz	
	Reference Temperature	Τ _o	+;	25	°C	
3	Overtone Order	~	Funda	mental		
4	Load Capacitance	CL		o	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+ 5.0	10 ⁻⁶	At To °C
7	Resonance Resistance	R _r	~	17.5	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	∆ f f	-7.0	+ 7.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR	-2.0	+2.0	Ω	From resistance measured at To °C
10	Operating Temperature Range	Тор	-20	+ 55	°C	
11	Frequency variation with Drive Level	<u>Δ1</u>	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	L ₁	8.	1 9.	9 mH	
14	Motional Capacitance	C ₁	Not a	pplicable	ı fF	
15	Static Capacitance	Co	~	4.0	pF	
16	Q Factor	a	70 00	0 -	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1		-	In the frequency range: f _r -200kHz to f _f + 200kHz
1	8 Ageing	$\frac{\Delta f}{f}$	-5	i.0 +	5.0 10-6	After burn-in, and over 3 years
1	9 Terminal Length	L		Figure 2	mm	



PAGE 44

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	f _L	18.84		MHz	
2	Reference Temperature	To	+2	5	°C	
3	Overtone Order	-	Fundan	rental		
4	Load Capacitance	CL	32	<u>}</u>	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ1</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	ЯL		26	Ω	At T _o *C
8	Frequency Variation with Temperature over Top	<u>4</u>	-7.0	+ 7.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR	-2.0	+2.0	Ω	From resistance measured at To °C
10	Operating Temperature Range	Тор	-20	+ 55	°C	
11	Frequency variation with Drive Level	∆ f f	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	13.68	16.72	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF.	
15	Static Capacitance	Co	*	3.0	pF	
16	Q Factor	Q	80 000	-	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	~		In the frequency range: f _L -500kHz to f _L + 500kHz
18	Ageing	<u>∆1</u>	-5.0	+5.0	10-6	
19	Terminal Length	L	Fig	jure 2	mm	
x			·····			



PAGE 45

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

T			••••••			
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	fL	15.0		MHz	
2	Reference Temperature	To	+;	25	°C	
3	Overtone Order	•	Funda	mental		
4	Load Capacitance	C _L	31	33	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R _L	*	20	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆f f	-20	+20	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔB R	-10 -1.5	+ 10 or + 1.5	% Ω	From resistance measured at T _o °C If R<10Ω
10	Operating Temperature Range	Тор	-30	+70	°C	
11	Frequency variation with Drive Level	<u> </u>	Not a	oplicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not a	pplicable	%	
13	Motional Inductance	L ₁	8.8	3 12	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	80 000		* .	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3	applicable		
18	B Ageing	Δ <u>f</u>	-10	+10	10-6	After burn-in, and per year
1:	9 Terminal Length	L	F	igure 2	mm	



PAGE 46

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limit Min.	s Max.	Unit	Remarks
1	Resonance Frequency	f _L	20.0		MHz	
2	Reference Temperature	Τ _o	+59	+61	°C	
3	Overtone Order	+	Fundam	iental		
4	Load Capacitance	CL	22		pF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	RL	-	20	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	-15	+ 15	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>AR</u> R	Not app	olicable	%	
10	Operating Temperature Range	Top	-20	+70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	~	4.5	pF	
71	3 Q Factor	Q	50 000	•	-	
***	7 Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	*		In the frequency range: f _L -200kHz to f _L + 200kHz
1	8 Ageing	<u> </u>	-3.1	0 +3.0	10-6	After burn-in, and per year
-	19 Terminal Length	L	Fi	gure 2	mm	



PAGE 47

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	f _r	36.69	3333	MHz	
2	Reference Temperature	То	+ 23	+27	°C	
3	Overtone Order	~	3			
4	Load Capacitance	C _L	(X		pF	
5	Rated Drive Level	Ро	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> !	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R _r	+	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf	-9.0	+9.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	AR R	-10	+10	%	From resistance measured at To °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	∆ f f	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	$\frac{\Delta R}{R}$	Not ap	plicable	%	
13	Motional Inductance	L-1	17.7	21.7	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	ſF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	19 000	-	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	3 Ageing	<u>∆ f</u>	-3.0	+3.0	10-6	After burn-in, and per year
15	Terminal Length	L	Fi	gure 2	mm	



PAGE 48

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

Vo.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _L	20.8333		MHz	
2	Reference Temperature	То	+2	25	°C	
3	Overtone Order	+	Fundar	mental		
4	Load Capacitance	CL	1	0	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta 1}{1}$	-10	+10	10-6	At To °C
7	Resonance Resistance	R _L	*	20	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> 1	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	Тар	-10	+60	°C	
11	Frequency variation with Drive Level	<u>Δf</u>	Not as	oplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	oplicable	%	
13	Motional Inductance	Li	Not	applicable	mH	
14	Motional Capacitance	G ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	Not a	pplicable	pF	
16	Q Factor	a	Not	applicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R	4:1	*		In the frequency range: f _L -10% to f _L + 10%
18	3 Ageing	Δ <u>†</u>	Not	applicable	10-6	
1	Terminal Length	L	F	igure 2	mm	



PAGE 49

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

Vo.	Characteristics	Symbol	Lin Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	fL	22.841667		MHz	
2	Reference Temperature	T _o	+	25	*C	
3	Overtone Order	, 0		mental		
4	Load Capacitance	CL		30	pF	
5	Rated Drive Level	Po		.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	RL	*	15	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	<u>\(\Delta t \\ t \) \]</u>	-10	+10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	Тор	-25	+ 65	°C	
11	Frequency variation with Drive Level	∆ f f	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not a	pplicable	%	
13	Motional Inductance	L ₁	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF.	
15	Static Capacitance	Co	-	3.0	pF	
16	Q Factor	Q	Not	applicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	*		In the frequency range: f _L -200kHz to f _L + 200kHz
18	3 Ageing	<u>∆ f</u>	Not applicable		10-6	
1:	9 Terminal Length	L	F	igure 2	mm	



PAGE 50

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _L	22.856667		MHz	
2	Reference Temperature	Ta	+;	25	*C	
3	Overtone Order	•	Funda	mental		
4	Load Capacitance	CL	22	56	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	Not ap	plicable	10-6	
7	Resonance Resistance	R _L	*	40	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> 1	-7.0	+7.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>A</u> R R	Not applicable		%	
10	Operating Temperature Range	Тор	-20	+50	"C	
11	Frequency variation with Drive Level	삵	Not ap	oplicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not a	oplicable	%	
13	Motional Inductance	L ₁	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	Not a	pplicable	pF	
16	Q Factor	Q	80 000	^	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	3:1	*		In the frequency range: f _L -200kHz to f _L + 200kHz
18	3 Ageing	<u>∆ f</u>	-10	+10	10-6	After burn-in, over 8 years
15	Terminal Length	L	F	igure 2	mm	



PAGE 51

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		2				
√o.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	fL	22.861667		MHz	
2	Reference Temperature	То	+.	25	°C	
3	Overtone Order	-	Funda	mental		
4	Load Capacitance	CL	3	0	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	RL	*	15	Ω	Over T _{cp} °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	-10	+10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	Тор	-20	+65	°C	
11	Frequency variation with Drive Level	∆ f f	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	L ₁	Not	applicable	mH	
14	Motional Capacitance	C ₁	Not a	ipplicable	fF.	
15	Static Capacitance	Co	-	4.0	pF	
16	Q Factor	Q	Not	applicable		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	-		In the frequency range: f _L -200kHz to f _L + 200kHz
1	8 Ageing	<u> </u>	Not applicable		10-6	
1	9 Terminal Length	L.	F	igure 2	mm	



PAGE 52

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			······································		***************************************	
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _L	24.184		MHz	
2	Reference Temperature	То	+ ;	25	°C	
3	Overtone Order	•	Fundar	nental		
4	Load Capacitance	C _L	3	2	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R _L	*	26	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>Δ f</u>	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>A</u> R R	Not applicable		%	
10	Operating Temperature Range	Тор	-10	+50	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	oplicable	%	
13	Motional Inductance	L ₁	Not a	applicable	mH	
14	Motional Capacitance	C ₁	Not a	oplicable	fF	
15	Static Capacitance	Co	*	3.5	pF	
16	Q Factor	Q	50 000	~	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	10:1	~		In the frequency range: f _L -2.0MHz to f _L + 2.0MHz
18	3 Ageing	4	-5.	0 +5.	0 10-6	After burn-in, and per year
1	9 Terminal Length		F	gure 2	mm	



PAGE 53

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		4				
No.	Characteristics	Symbol	Limit Min.	s Vlax.	Unit	Remarks
1	Resonance Frequency	f.	24.5		MHz	
2	Reference Temperature	To	+ 25	5	°C	
3	Overtone Order	-	Fundam	ental		
4	Load Capacitance	CL	30		ρF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	RL	-	25	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	<u> </u>	-7.0	+7.0	10-5	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	Top	-20	+60	°C	
11	Frequency variation with Drive Level	Δf	Not app	licable	10-6	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	olicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	~	5.0	pF	
16	Q Factor	Q	80 000	*	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	*		In the frequency range: f _L -200kHz to f _L + 200kHz
1	8 Ageing	<u>∆ f</u>	-5.0	+5.0	10-6	After burn-in, and per year
1	9 Terminal Length	L	Fig	ure 2	mm	

PAGE 54

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	fL	24.5		MHz	
2	Reference Temperature	То	+2	5	°C	
3	Overtone Order	-	Fundam	nental		
4	Load Capacitance	CL	32		ρF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	RL	-	21	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆</u> f	-7.0	+ 7.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR	-2.0	+2.0	Ω	From resistance measured at To *C
10	Operating Temperature Range	Тор	-20	+ 55	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	6.23	7.62	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	~	3.0	pF	
16	Q Factor	Q	80 000	-	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	*		in the frequency range: f _L -500kHz to f _L + 500kHz
18	3 Ageing	<u>∆f</u>	-5.0	+5.0	10-6	After burn-in, and ove 3 years
1!	9 Terminal Length	L	Fic	ure 2	mm	



PAGE 55

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			MESIMINI IN			
do.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	fr	36.666 -38.333		MHz	
2	Reference Temperature	To	+2	5	°C	
3	Overtone Order	~	3			
4	Load Capacitance	CL	00		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R _r	•	40	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	<u>∆</u> † †	-7.0	+ 7.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	AR R	Not applicable		9/0	
10	Operating Temperature Range	Тор	-20	+60	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	oplicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	5.0	ρF	
16	Q Factor	Q	Not a	pplicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1	5		In the frequency range: f _r -50kHz to f _r + 50kHz
18	3 Ageing	∆ f f	-3.	0 +3,0	10-6	After burn-in, and per year
11	3 Terminal Length	L	Fi	gure 2	mm	



PAGE 56

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limit Min.	s Max.	Unit	Remarks
1	Resonance Frequency	fL	38.25618		MHz	
2	Reference Temperature	То	+2	2	*C	
3	Overtone Order	·	3			
4	Load Capacitance	CL	10	100	pF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-8.0	+8.0	10-6	At To *C
7	Resonance Resistance	RL	+	75	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	1 <u>A</u>	-4.0	+4.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>∆ B</u> R	Not applicable		%	
10	Operating Temperature Range	Тор	0	+40	°C	
11	Frequency variation with Drive Level	∆ f f	Not app	olicable	10 ⁻⁶	
12	Resistance variation with Drive Level	∆R R	Not app	olicable	%	
13	Motional Inductance	L-1	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	2.0	pF	
16	Q Factor	Q	200 000	-	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R	3:1	\$		In the frequency range: f _L -1.0MHz to f _L + 1.0MHz
18	Ageing	<u>Δ1</u>	-2.0	+2.0	10-6	Per year
19	Terminal Length	L	Fig	ure 2	mm	



PAGE 57

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _L	55.46	875	MHz	
2	Reference Temperature	To	+ 4	45	°C	
3	Overtone Order	~	3			
4	Load Capacitance	CL	2	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	RL	+	40	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	<u>∆</u> <u>f</u>	-0.4	+0.4	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	Not applicable		%	
10	Operating Temperature Range	Тор	-43	+47	°C	
11	Frequency variation with Drive Level	<u>∆f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	$\frac{\Delta R}{R}$	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	oplicable	mH	
14	Motional Capacitance	C ₁	Not a	oplicable	1F	
15	Static Capacitance	Co	2.5	3,5	pF	
16	Q Factor	Q	100 000	~	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	10:1	-		In the frequency range: f _L -50kHz to f _L + 50kHz
18	Ageing	∆ t f	-1,	5 +1.5	10-6	Per year after burn-in
15	Terminal Length	L.	Fi	gure 2	mm	



PAGE 58

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			·····		T	
No.	Characteristics	Symbol	Lim Min.	Max.	Unit	Remarks
1	Resonance Frequency	fL	62.5 -68.125		MHz	
2	Reference Temperature	То	+ 2	25	*C	
3	Overtone Order	-	9			
4	Load Capacitance	GL	1	0	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	RL	*	40	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	-10	+10	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	AR R	Not applicable		%	
10	Operating Temperature Range	Top	-10	+60	°C	
11	Frequency variation with Drive Level	<u>∆ f</u>	Not ap	pplicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not a	applicable	%	
13	Motional Inductance	Lı	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	Not a	pplicable	pF	
16	Q Factor	Q	Not a	pplicable	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/F	4:1	*		In the frequency range: f _L -10% to f _L + 10%
11	B Ageing	Δ <u>!</u>	Not	applicable	10-6	
1	9 Terminal Length	L	F	igure 2	mm	



PAGE 59

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		4				
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f	71.859475		MHz	
2	Reference Temperature	To	+ 2	25	°C	
3	Overtone Order		5			
4	Load Capacitance	CL	15	100	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆</u> <u>†</u>	-2.0	+2.0	10-6	At To °C
7	Resonance Resistance	RL	70	130	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	-7.0	+ 7.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>∆R</u> R	Not applicable		%	
10	Operating Temperature Range	Тор	-20	+50	°C	
11	Frequency variation with Drive Level	<u>Δ</u> <u>f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not a	oplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	~	2.0	pF	
16	Q Factor	Q	100 000	•	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1	-		In the frequency range: f _L -50kHz to f _L + 50kHz
18	Ageing Samuel Ageing	<u>\</u>	-2.	0 +2.0	10-6	After burn-in, and per year
19	Terminal Length	L.	Fi	gure 2	mm	



PAGE 60

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			* Y 12.			
No.	Characteristics	Symbol	Limite Min. 1	s Max.	Unit	Remarks
1	Resonance Frequency	ſ.	75.360	115	MHz	
2	Reference Temperature	To	+ 25	õ	°C	
3	Overtone Order	-	5			
4	Load Capacitance	CL	15	100	pF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	<u>Δ.t</u>	-2.0	+2.0	10-6	At To °C
7	Resonance Resistance	RL	70	130	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>∆</u> † f	-7.0	+7.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	Тор	-20	+50	*C	
11	Frequency variation with Drive Level	Δf	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	1F	
18	5 Static Capacitance	Co	*	2.0	pF	
11	6 Q Factor	Q	100 00	•	+	
1	7 Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1	×		In the frequency range: f _L -50kHz to f _L + 50kHz
1	8 Ageing	<u>Δ1</u>	-2.0	0 +2.0	10-6	After burn-in, and per year
-	19 Terminal Length	L.	Fi	gure 2	mm	



PAGE 61

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

NO.	Characteristics	Symbol	Lim Min.	Max.	Unît	Remarks
1	Resonance Frequency	fL	79.516319		MHz	
2	Reference Temperature	Τo	+5	30	°C	
3	Overtone Order	*	3			
4	Load Capacitance	CL	20	33	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	Not app	olicable	10-6	
7	Resonance Resistance	RL	*	50	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>∆</u> f	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>∆R</u> R	Not applicable		%	
10	Operating Temperature Range	Тор	-10	+70	°C	
11	Frequency variation with Drive Level	<u>∆ †</u>	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	∆ R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not a	oplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	C _o	-	4.0	pF	
16	Q Factor	Q	Not	applicable	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	*		In the frequency range: f _L -50kHz to f _L +50kHz
18	3 Ageing	$\frac{\Delta f}{f}$	-5.	0 +5.0	10-5	After burn-in, over 3 years
15	9 Terminal Length	L	F	gure 2	mm	



PAGE 62

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

······································				T		
No.	Characteristics	Symbol	Limits Min. Max.		Unit	Remarks
1	Resonance Frequency	fL	80.381944		MHz	
2	Reference Temperature	То	+ ;	25	°C	
3	Overtone Order	•	3	3		
4	Load Capacitance	C_{L}	21.6	31.4	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	Not ap	plicable	10-6	
7	Resonance Resistance	RL	*	50	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> †	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆R R	Not applicable		%	
10	Operating Temperature Range	Тор	-25	+65	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	Lı	Not a	ipplicable	mH	
14	Motional Capacitance	C ₁	Not a	applicable	fF	
18	5 Static Capacitance	Co	-3.6	4.4	pF	
11	6 Q Factor	Q	Not	applicable) -	
*	7 Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Ap/A	2:1	~		In the frequency range: f _L -50kHz to f _L + 50kHz
1	8 Ageing	<u>\</u>	Not	applicable	10-6	
	19 Terminal Length	L		Figure 2	mm	



PAGE 63

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

Jo.	Characteristics	Symbol	Lim Min.	Limits Min. Max.		Remarks
1	Resonance Frequency	fL	81.847222		MHz	
2	Reference Temperature	To	+:	25	°C	
3	Overtone Order	-	(3		
4	Load Capacitance	C _L	20	33	pϜ	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>†</u>	Not ap	plicable	10-6	
7	Resonance Resistance	RL	Not ap	plicable	Ω	
8	Frequency Variation with Temperature over Top	Δf f	-10	+ 10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>A</u> R R	Not applicable		%	
10	Operating Temperature Range	Тор	-25	+ 65	°C	
11	Frequency variation with Drive Level	<u>Δ1</u>	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	L ₁	Not a	applicable	mH	
14	Motional Capacitance	C ₁	Not a	applicable	fF	
15	Static Capacitance	Co	Not a	applicable	pF	
16	G Factor	Q	Not	applicable	*	
**	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/Fl	Not applicable			
1	8 Ageing	Δ <u>f</u>	Not	applicable	10-6	
1	9 Terminal Length	L	1	Figure 2	mm	

PAGE 64

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			MINIMI I			***
No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	f,	99.1		MHz	
2	Reference Temperature	То	+2	25	°C	
3	Overtone Order	,	5			
4	Load Capacitance	CL	×.		рF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> <u>f</u>	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R,	•	50	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆ f</u> f	-5.0	+5.0	10 ⁻⁶	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	ΔR R	-10	+ 10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+60	°C	
11	Frequency variation with Drive Level	<u> </u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	Lı	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	*	3.5	pF	
16	Q Factor	Q	Not a	applicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	3:1	*		In the frequency range: f _r -20% to f _r +20%
18	3 Ageing	<u>∆</u> <u>f</u>	-3.0	+3.0	10-6	After burn-in, over 3 years
19	Terminal Length	L	Fig	gure 2	mm	



PAGE 65

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lin Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	105.0		MHz	
2	Reference Temperature	Τ _o	+	25	°C	
3	Overtone Order	~		5		
4	Load Capacitance	Ct	1	0	ρF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+10	10-6	At T _o °C
7	Resonance Resistance	R _L	٠	60	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	-10	+ 10	10⁻6	From frequency measured at T ₀ *C
9	Resistance Variation with Temperature over Top	<u>Δ R</u> R	Not applicable		%	
10	Operating Temperature Range	Тор	-10	+60	°C	
11	Frequency variation with Drive Level	<u>Δ f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	$\frac{\Delta R}{R}$	Not a	oplicable	%	
13	Motional Inductance	L ₁	Not a	oplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	Not a	pplicable	pF	
16	Q Factor	Q	Not a	pplicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1	*		In the frequency range: f _L -10% to f _L + 10%
18	Ageing	<u>∆1</u>	Not a	ipplicable	10-6	
15	Terminal Length	L	Fi	gure 2	mm	



PAGE 66

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	1,	120.796		MHz	
2	Reference Temperature	То	+;	25	°C	
3	Overtone Order	-	ŧ	j		
4	Load Capacitance	CL	٥	,	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u> f	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R_{r}	*	55	Ω	Over T _{cp} °C
8	Frequency Variation with Temperature over Top	∆f f	-10	+10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>AR</u> R	Not applicable		%	
10	Operating Temperature Range	Тор	-10	+50	°C	
11	Frequency variation with Drive Level	∆ f f	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not a	oplicable	%	
13	Motional Inductance	L-1	Not a	oplicable	mH	*
14	Motional Capacitance	C ₁	Not a	oplicable	fF	
15	Static Capacitance	Co	•	3.5	pF	
16	Q Factor	Q	70 000	•	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZp!/R	Not applicable			
18	3 Ageing	Δ <u>t</u>	-5.	0 +5.0	10-6	After burn-in, per year
15	9 Terminal Length	L	Fi	gure 2	mm	



PAGE 67

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			Lim	its		
No.	Characteristics	Symbol	Min.	Max.	Unit	Remarks
1	Resonance Frequency	fr	61.805555		MHz	f _s = 61.8047MHz
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order	•	3			
4	Load Capacitance	CL	α	>	pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	Rr	-	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆ f f	-10	+10	10-5	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Top	-20	+70	°C	
11	Frequency variation with Drive Level	Δf	Not ap	plicable	10-5	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	oplicable	mH	
14	Motional Capacitance	C ₁	Not a	oplicable	fF	
15	Static Capacitance	Co	*	7.0	pF	
16	Q Factor	Q	Not a	applicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	-		In the frequency range: f _r -60kHz to f _r +60kHz
18	Ageing Ageing	<u>∆_f</u>	-3.	0 +3.0	10-5	
15	Terminal Length	L.	Fi	gure 2	mm	



PAGE 68

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit /	Remarks
1	Resonance Frequency	f _r	62.5		MHz	f _s = 62.4992MHz
2	Reference Temperature	Τ _α	+ 23	+27	°C	
3	Overtone Order	*		3		
4	Load Capacitance	CL	Ç	ro l	ρF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>t</u>	-5.0	+5.0	10-6	At To *C
7	Resonance Resistance	R _r		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆f</u> †	-10	+10	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	ΔR R	-20	+20	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	∆ f f	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	Li	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	*	7.0	pF	
16	Q Factor	Q	Not a	applicable	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	•		In the frequency range: f _r -60kHz to f _r +60kHz
1:	8 Ageing	<u>A</u> !	-3	.0 +3.0	10-6	After burn-in, and per year
1	9 Terminal Length	L	F	igure 2	mm	

PAGE 69

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

						r
No.	Characteristics	Symbol	Lin Min.	its Max.	Unît	Remarks
1	Resonance Frequency	f _r	62.03125		MHz	f _s = 62.03045MHz
2	Reference Temperature	To	+23	+27	°C	
3	Overtone Order	•	(3		
4	Load Capacitance	C _L	C	ro .	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R,	•	40	Ω	At To *C
8	Frequency Variation with Temperature over Top	<u>\(\Delta f \) \(\text{f} \) \(\text{T} \)</u>	-10	+10	10-6	From frequency measured at To *C
9	Resistance Variation with Temperature over Top	<u>A</u> R R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тар	-20	+ 70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not a	oplicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not a	pplicable	%	
13	Motional Inductance	L ₁	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Ca	-	7.0	pF	
16	Q Factor	Q	Not	applicable	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R	2:1	*		In the frequency range: f _r -60kHz to f _r + 60kHz
18	3 Ageing	Δ <u>f</u>	-3.	.0 +3.0	10-6	After burn-in, and per year
15	Terminal Length	L	F	igure 2	mm	



PAGE 70

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

Vo.	Characteristics	Symbol	Lim Min,	its Max.	Unit	Remarks
1	Resonance Frequency	ŧ,	62.109375		MHz	f _s = 62.108575MHz
2	Reference Temperature	T _o	+23	+ 27	°C	
3	Overtone Order	-				
4	Load Capacitance	CL	٥	0	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ1</u>	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R,	•	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>∆ R</u> R	-20	+20	%	From resistance measured at To °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	∆ f f	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	$\frac{\Delta R}{R}$	Not a	pplicable	%	
13	Motional Inductance	L ₁	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	•	7.0	pF	
16	Q Factor	Q	Not a	upplicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/F	2:1	\$		In the frequency range: f _r -60kHz to f _r +60kHz
1	8 Ageing	<u>∆!</u>	-3	.0 +3.	0 10-6	After burn-in, and per year
1	9 Terminal Length	L.	F	igure 2	mm	



PAGE 71

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f,	69.55	9524	MHz	f _s = 69.5587MHz
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order		3	}		
4	Load Capacitance	C _L	ŏ	Ö	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	₽ _r	~	40	Ω	At To *C
8	Frequency Variation with Temperature over Top	Δ f	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at T ₀ *C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	<u>Δ 1</u>	Not as	plicable	10-6	
12	Resistance variation with Drive Level	AR R	Not a	oplicable	%	
13	Motional Inductance	L ₁	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	•	7.0	pF	
16	Q Factor	Q	Not a	pplicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	*		in the frequency range: f _r -60kHz to f _r + 60kHz
18	3 Ageing	<u>∆ f</u>	-3.	0 +3.0	10-6	After burn-in, and per year
15	3 Terminal Length	L	F	igure 2	mm	



PAGE 72

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		<u> </u>			······	
No.	Characteristics	Symbol	Limi Min.	its Max.	Unit	Remarks
1	Resonance Frequency	fr	69.61	9048	MHz	f _s = 69.6182MHz
2	Reference Temperature	то	+23	+27	°C	
3	Overtone Order	-	3			
4	Load Capacitance	CL	Q.	3	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta_{\cdot} 1}{1}$	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R _r	*	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆ f f	-10	+10	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over T _{CP}	∆R R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+70	*C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	oplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	opticable	%	
13	Motional Inductance	L,	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	ſF	
15	Static Capacitance	Co	*	7.0	pF	
16	Q Factor	Q	Not	applicable		
~	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R (Zpi/F	2:1	\$		In the frequency range: f _r -60kHz to f _r +60kHz
1	8 Ageing	<u>\$</u>	-3.	.0 +3.1	10-6	After burn-in, and per year
1	9 Terminal Length	L	F	igure 2	mm	



PAGE 73

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
2 Reference Temperature T ₀ +23 +27 °C 3 Overtone Order - Fundamental 4 Load Capacitance C _L 30 pF 5 Rated Drive Level P ₀ 0.1 mW 6 Frequency Adjustment Tolerance T Resonance Resistance R _L - 25 Ω At T ₀ °C 8 Frequency Variation with Temperature over T _{0p} 9 Resistance Variation with Temperature over T _{0p} 10 Operating Temperature Range 11 Frequency variation Δ f Not applicable 10 Not applicable 10 PF Fundamental At T ₀ °C From resistance At T ₀ °C From frequency measured at T ₀ C C	1
2 Reference Temperature T ₀ +23 +27 °C 3 Overtone Order - Fundamental 4 Load Capacitance C _L 30 pF 5 Rated Drive Level P ₀ 0.1 mW 6 Frequency Adjustment Tolerance T Resonance Resistance R _L - 25 Ω At T ₀ °C 8 Frequency Variation with Temperature over T _{0p} 9 Resistance Variation with Temperature over T _{0p} 10 Operating Temperature Pange 11 Frequency variation Δ f Not applicable 10 Not applicable 10 Not applicable 10 PF Fundamental At T ₀ °C PF At T ₀ °C At T ₀ °C From frequency measured at T ₀ C C	
3 Overtone Order 4 Load Capacitance C _L 30 pF 5 Rated Drive Level P _O 0.1 mW 6 Frequency Adjustment Tolerance 7 Resonance Resistance R _L - 25 Ω At T _O °C 8 Frequency Variation with Temperature over T _{OP} 9 Resistance Variation with Temperature over T _{OP} 10 Operating Temperature 11 Frequency variation A f Not applicable 10-6 Fundamental P _O 0.1 mW At T _O °C At T _O °C From frequency measured at T _O Prom resistance measured at T _O ODER TO PO C 10 Operating Temperature Range Not applicable 10-6	
4 Load Capacitance	
5 Rated Drive Level P _o 0.1 mW 6 Frequency Adjustment Tolerance	
6 Frequency Adjustment Tolerance	
Tolerance f $Resonance Resistance$ R_L - 25 Ω At T_0 °C $Resonance Resistance$ R_L - 25 Ω At T_0 °C $Resonance Resistance Resistance \Omega \Omega \Omega \Omega \Omega \Omega \Omega \Omega \Omega \Omega$	
8 Frequency Variation with Temperature over T_{op} 9 Resistance Variation with Temperature over T_{op} 10 Operating Temperature Range 11 Frequency variation $\frac{\Delta R}{R}$ $\frac{-20}{R}$ $\frac{-20}{R$	
with Temperature over Top f desistance Variation ΔR/R -20 +20 % From resistance measured at To	
with Temperature over Top 10 Operating Temperature Top -20 +70 °C Range 11 Frequency variation Δf Not applicable 10-6	
Range 11 Frequency variation Δ f Not applicable 10-6	
in tedactory remoters	
12 Resistance variation ΔR Not applicable % with Drive Level R	
13 Motional Inductance L ₁ Not applicable mH	
14 Motional Capacitance C ₁ Not applicable fF	
15 Static Capacitance Co - 7.0 pF	
16 Q Factor Q Not applicable -	
Resonance Resistance Ro/R	cy 00kHz 200kHz
18 Ageing Δf -3.0 +3.0 10-6 After burn-in, year	ZUUNTE
19 Terminal Length L Figure 2 mm	



PAGE 74

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

	·					,
VO.	Characteristics	Symbol	Lin Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f _r	82.53		MHz	f _s = 82.5292MHz
2	Reference Temperature	Tc	+23	+27	°C	
3	Overtone Order	~		3		
4	Load Capacitance	C _L		x)	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R,	-	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆1</u> f	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	AR R	-20	+20	%	From resistance measured at T _o *C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	<u>∆f</u>	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	Lı	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	ipplicable	ſF	
15	Static Capacitance	Co	•	7.0	ρF	
16	Q Factor	Q	Not	applicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		in the frequency range: f, -70kHz to f, +70kHz
18	3 Ageing	$\frac{\Delta t}{f}$	-3	.0 +3.	0 10-6	After burn-in, and per year
1:	9 Terminal Length	L	F	igure 2	mm	



PAGE 75

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		3 1 3 2 2 2	MANAGERIA			
No.	Characteristics	Symbol	Limit Min.	s Max.	Unit	Remarks
1	Resonance Frequency	f _r	83.0	17	MHz	f _s = 83.0692MHz
2	Reference Temperature	To	+23	+27	°C	
3	Overtone Order	-	3			
4	Load Capacitance	CL	90		pF	
5	Rated Drive Level	Po	0.1	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> <u>f</u>	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R,	•	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	-10	+10	10 ⁻⁶	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆ R R	-20	+20	%	From resistance measured at To *C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	Δf f	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	$\frac{\Delta R}{R}$	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	Not a	oplicable	. *	
***	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -70kHz to f _r +70kHz
1	8 Ageing	<u>∆1</u>	-3.	0.8+	10-6	After burn-in, and per year
1	9 Terminal Length	L	Fi	gure 2	mm	



PAGE 76

ISSUE 4

TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency		37.063617		MHz	Swept
2	Reference Temperature	To	+ 23	+27	°C	
3	Overtone Order			}		
4	Load Capacitance	CL	Ġ	o .	ρF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>∆</u> 1 1	-10	+10	10-6	At To °C
7	Resonance Resistance	Rr		40	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	∆f f	-9.0	+9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	AR R	-10	+10	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тар	-20	+ 70	*C	
11	Frequency variation with Drive Level	<u>∆ t</u>	Not a	oplicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	Li	17.3	3 21.3	) mH	
14	Motional Capacitance	C ₁	Not a	pplicable	1F	
15	Static Capacitance	Co	*	7.0	pF	
16	Q Factor	Q	19 000	)	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	3 Ageing	<u>∆</u> <u>f</u>	-3	.0 +3.	0 10-6	After burn-in, and per year
1	9 Terminal Length	L.	F	igure 2	mm	



PAGE 77

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	1,	37.08	3333	MHz	
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	*	3			
4	Load Capacitance	C _L	۵	>	ρF	:: ;
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R,	~	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ.</u> !	-9. <b>0</b>	+9.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	ΔR R	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Top	-20	+70	*C	
11	Frequency variation with Drive Level	Δ f f	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	17.3	21.3	mH	
14	Motional Capacitance	C ₁	Not ap	oplicable	ſF	
15	Static Capacitance	C _o	*	7.0	pF	
16	Q Factor	Q	19 000		-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	3 Ageing	<u>A.f.</u>	-3.0	0 +3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Fi	gure 2	mm	
			·····		***************************************	



PAGE 78

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol		nits	Unit	Remarks
wo.	Andra de Carrolles	Oymoor	Min.	Max.		
1	Resonance Frequency	fr	61.	1875	MHz	
2	Reference Temperature	То			°C	
3	Overtone Order	•				
4	Load Capacitance	CL			pF	
5	Rated Drive Level	Po			mW	
6	Frequency Adjustment Tolerance	1 <u>A</u>			10-6	At To °C
7	Resonance Resistance	Rr			Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ1</u>			10-6	From frequency measured at To *C
9	Resistance Variation with Temperature over Top	<u>AB</u> R			%	From resistance measured at To °C
10	Operating Temperature Range	Тор			*C	
11	Frequency variation with Drive Level	Δ f			10-6	From $P_{S1} = mW$ to $P_{S2} = mW$
12	Resistance variation with Drive Level				%	From $P_{S1} = mW$ to $P_{S2} = mW$
13	Motional Inductance	L ₁			mH	
14	Motional Capacitance	C ₁			ſF	
15	Static Capacitance	Co	-		pF	
16	3 Q Factor	Q		-		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R			•	In the frequency range: f _r - kHz to f _r + kHz
1	8 Ageing	<u>∆ †</u>			10-6	
1	9 Terminal Length	L			mm	



PAGE 79

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.		Unit	Remarks
	Resonance Frequency	f,	<u>_</u> 65.00	)311	+	MHz	Swept
	Reference Temperature	т,	+23	+ 27		°C	
2	Overtone Order			3			
3 4	Load Capacitance	GL		»	_	pF	
	Rated Drive Level	Po	0	.1		mW	
5 6	Frequency Adjustment Tolerance	<u> </u>	-10	+10		10-6	At To °C
7	Resonance Resistance	R _r		40		Ω	At To *C
8	Frequency Variation with Temperature over Top	<u>Δ f</u>	-10	+10		10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	AR R	-10	+10	}	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 71	)	°C	
11	Frequency variation with Drive Level	<u>∆ f</u>	Not a	ipplic <b>a</b> b	le	10-6	
12	Resistance variation with Drive Level	ΔR	Not a	applicab	le	%	
13	Motional Inductance	L ₁	3.	.2	4.8	mH	
14	Motional Capacitance	C ₁	Not	applicat	ole	fF	
15	5 Static Capacitance	C _o	~		7.0	pF	
11	6 Q Factor	Q	70 00	0	*		
***	7 Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:		•		In the frequency range: t _r -50kHz to t _r + 50kHz
	18 Ageing	Δ <u>f</u>	*	3.0	+ 3.0	10-6	After burn-in, and per year
-	19 Terminal Length	L		Figure	2	mm	



PAGE 80

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		1115		<del></del> -		
No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	f _r	85.4	85.48		Swept
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order	•	5			
4	Load Capacitance	CL	00		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ.1</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	Rr	~	60	Ω	Al To °C
8	Frequency Variation with Temperature over Top	∆ f f	-7.5	+7.5	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-10	+10	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	pticable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L-1	12	*	mH	
14	Motional Capacitance	Cı	Not a	oplicable	fF	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	Not a	pplicable		
1	7 Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/F	2:1	\$		In the frequency range: f _r -50kHz to f _r +50kHz
1	8 Ageing	<u>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>	-2.	0 +2.	0 10-6	After burn-in, and pe year
1	9 Terminal Length	L	Fi	gure 2	mm	



PAGE 81

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	f _L	46.0	3005	MHz	Swept
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	*		3		
4	Load Capacitance	CL	1	2	pF	
5	Rated Drive Level	Pa	0	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+5.0	10 ⁻⁶	At To °C
7	Resonance Resistance	RL	*	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	-10	+10	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	유	-10	+10	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+ 70	*C	
11	Frequency variation with Drive Level	<u>∆ f</u>	Not a	oplicable	10 ⁻⁶	
12	Resistance variation with Drive Level	ΔR R	Not a	pplicable	%	
13	Motional Inductance	L,	17.42	23.57	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	50 000	)		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	*		In the frequency range: f _L -50kHz to f _L +50kHz
11	3 Ageing	At t	-3	.0 +3.	0 10-6	After burn-in, and per year
-	9 Terminal Length	L	F	igure 2	mm	



PAGE 82

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		111111111111111111111111111111111111111	ALIWIA: 14	×1××		
No.	Characteristics	Symbol	Limit Min.	s Max.	Unit	Remarks
1	Resonance Frequency	f _L	16.0		MHz	
2	Reference Temperature	To	+60		°C	
3	Overtone Order	•	Fundam	ental		
4	Load Capacitance	C _L	22		pF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u> f	-10	+ 10	10-6	At To °C
7	Resonance Resistance	RL	-	13	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	-15	+15	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	ΔB R	Not app	licable	%	
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	∆ f	Not app	olicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	*	5.0	pF	
16	Q Factor	Q	50 000		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1	•		In the frequency range: f _L -200kHz to f _L + 200kHz
11	3 Ageing	<u>∆</u> 1	-3.0	+3.0	10-6	After burn-in, and per year
1	9 Terminal Length	L.	Fig	jure 2	mm	



PAGE 83

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

				·····		,
No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	fr	38.311	7284	MHz	
2	Reference Temperature	то	+2	+25		
3	Overtone Order	•	3			
4	Load Capacitance	CL	oc		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R.	-	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ <u>1</u>	+ 7.0	-7.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	AR R	-20	+20	%	From resistance measured at To °C
10	Operating Temperature Range	Тор	-20	+60	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	\$/₀	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	*	5.0	pF	
16	Q Factor	۵	Not ap	oplicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R		*		In the frequency range: f _r -60kHz to f _r + 60kHz
18	3 Ageing	Δ <u>1</u>	-3.0	0.6+	10-6	After burn-in, and per year
15	Terminal Length	L	Fig	jure 2	mm	



PAGE 84

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lin Min,	iits Max.	Unit	Remarks
1	Resonance Frequency	ft.	15.0		MHz	
2	Reference Temperature	Τo	+	60	°C	
3	Overtone Order	~	Funda	mental		
4	Load Capacitance	G _L	20	50	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+10	10-6	At To °C
7	Resonance Resistance	R _L	*	20	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> <u>1</u>	-10	+ 10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	유	-10 -1,5	+10 or +1.5	% Ω	From resistance measured at T ₀ °C If R<10Ω
10	Operating Temperature Range	Тор	-30	+70	°C	
11	Frequency variation with Drive Level	<u>Δ</u> †	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	<u>∆R</u> R	Not a	pplicable	%	
13	Motional Inductance	L ₁	10.	2 13.8	mH	
14	Motional Capacitance	C ₁	Not a	upplicable	fF	
15	Static Capacitance	C _o	-	7.0	pF	
16	Q Factor	a	70 000	-	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	~		In the frequency range: f _L -200kHz to f _L + 200kHz
11	3 Ageing	Δ <u>f</u>	-5	.0 +5.0	10-6	After burn-in, and per year
1	9 Terminal Length	T L	F	igure 2	mm	



PAGE 85 ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

ło.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	f _L	16	.0	MHz	
2	Reference Temperature	Та	+59	+61	۰c	
3	Overtone Order	*	Funda	mental		
4	Load Capacitance	CL	2	2	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>Δ 1</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R _L		13	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>1</u> Δ 1	-15	+ 15	10⁻⁵	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	A₽ R	-10 -1.6	+ 10 or + 1.5	% Ω	From resistance measured at T _o °C If R<10Ω
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not a	pplicable	*/0	
13	Motional Inductance	L ₁	Not a	ipplicable	mH	
14	Motional Capacitance	C ₁	Not a	ipplicable	fF	
15	Static Capacitance	Co	-	5.0	pF	
16	Q Factor	Q	50 00	-	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1	~		In the frequency range: f _L -200kHz to f _L + 200kHz
11	3 Ageing	<u>Δ</u>	-3	.0 +3.	0 10-6	After burn-in and per year
1	9 Terminal Length	L	F	igure 2	mm	



PAGE 86

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.   Characteristics   Symbol   Limits   Max.   Unit   Remarks				33 32 33 33 3			
2 Reference Temperature	No.	Characteristics	Symbol		***************************************	Unit	Remarks
A   Covertone Order   Cover	1	Resonance Frequency	T _L	16.384		MHz	Swept
4 Load Capacitance	2	Reference Temperature	То	+ 59	+61	°C	
Sacroscience   Po   Po   D.1   mW	3	Overtone Order	-	Fundar	nental		
6 Frequency Adjustment Tolerance	4	Load Capacitance	CL	23	2	pF	
Tolerance  7 Resonance Resistance  R _L - 13 Ω At T _o °C  8 Frequency Variation with Temperature over T _{op} 9 Resistance Variation with Temperature over T _{op} 10 Operating Temperature Range  11 Frequency variation with Drive Level  12 Resistance variation with Drive Level  13 Motional Inductance  14 Motional Capacitance  15 Static Capacitance  16 Q Factor  17 Ratio of Unwanted: Response Resistance to Resonance Resistance Response Impedance to Resonance Resistance Response Impedance to Resonance Resistance Response	5	Rated Drive Level	Po	0.	1	mW	
Second   Frequency Variation   A f   f   f   f   f   f   f   f   f	6	1	$\frac{\Delta f}{f}$	-10	+10	10-6	At To °C
Not applicable   Static Capacitance   C1   Not applicable   FF	7	Resonance Resistance	RL		13	Ω	At To °C
Not applicable   Part	8	with Temperature	∆ f f	-15	+15	10-6	
Panage	9	with Temperature	ΔR R	(	or		measured at To °C
with Drive Level       f         12       Resistance variation with Drive Level       Δ R R       Not applicable       %         13       Motional Inductance       L₁       Not applicable       mH         14       Motional Capacitance       C₁       Not applicable       fF         15       Static Capacitance       C₀       -       5.0       pF         16       Q Factor       Q       50 000       -       -         17       Ratio of Unwanted: Response Resistance or Resistance or Resonance Resistance or Resonance Resistance or Resonance Resistance       Rp/R 3:1       -       In the frequency range: f _L -200kHz to f _L +200kHz         18       Ageing       Δ f / f       -3.0       +3.0       10-6       After burn-in and per year	10	· · · · · · · · · · · · · · · · · · ·	Тор	-20	+ 70	°C	
With Drive Level   R   R   R   R   R   R   R   R   R	11		Δ <u>f</u>	Not ap	plicable	10-6	
14 Motional Capacitance	12		<u>Δ B</u> R	Not ap	oplicable	%	
15 Static Capacitance C ₀ - 5.0 pF  16 Q Factor Q 50 000  17 Ratio of Unwanted: Response Resistance of Resonance Resistance of Resonance Resistance  18 Ageing Δf -3.0 +3.0 10-6 After burn-in and per year	13	Motional Inductance	L-1	Not a	oplicable	mH	
16 Q Factor Q 50 000	14	Motional Capacitance	Cı	Not a	pplicable	fF	
17 Ratio of Unwanted: Response Resistance to Resonance Resistance or Resonance Resistance  18 Ageing  Ratio of Unwanted: Response Resistance to Resonance Resistance  19 Ageing  Ratio of Unwanted: Rp/R  3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:1  - 3:	15	Static Capacitance	Co	~	5.0	pF	
Response Resistance to Resonance Resistance or Resonance Resistance  18 Ageing  Ageing  Response Resistance  Rp/R  3:1	16	Q Factor	Q	50 000	-	-	
76 Agenty year	17	Response Resistance to Resonance Resistance or Response Impedance to		1	*		range: f _L -200kHz to
19 Terminal Length L Figure 2 mm	1:	B Ageing	Δ <u>f</u>	-3.	0 +3.0	10-6	1
	1	9 Terminal Length	L	Fi	gure 2	mm	



PAGE 87

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limi Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	f,	65.0047		MHz	Swept
2	Reference Temperature	то	+23	+27	°C	
3	Overtone Order	~	3			
4	Load Capacitance	CL	90		pF	
5	Rated Drive Level	Pa	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R _f	•	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf	-10	+10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at To °C
10	Operating Temperature Range	Тор	-20	+70	*C	
11	Frequency variation with Drive Level	<u>\</u>	Not ap	plicable	10⁻⁵	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	oplicable	fF	
15	Static Capacitance	Co	-	7.0	pF	
16	Q Factor	Q	Not a	pplicable	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R (Zpi/F	2:1	,		In the frequency range: f _r -60kHz to f _r + 60kHz
11	B Ageing	<u>\\ \Delta \text{f} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\</u>	-3.4	0 +3.0	10-6	After burn-in, and per year
1	9 Terminal Length	L	Fi	gure 2	mm	



PAGE 88

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	ts Max.	Unit	Remarks
1	Resonance Frequency	fr	65.0513		MHz	
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order	~	3			
4	Load Capacitance	CL	.00		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	$R_r$	*	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ f</u> f	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10 ⁻⁶	
12	Resistance variation with Drive Level	<u>Δ Β</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	+	7.0	pF	
16	Q Factor	Q	Not ap	plicable	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	<u>∆</u> <u>f</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Fig	ure 2	mm	



PAGE 89

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	f _r	69.9992		MHz	
2	Reference Temperature	Τ _ο	+ 23	+27	°C	
3	Overtone Order	-		3		
4	Load Capacitance	C _L	0	r	ρF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	At To *C
7	Resonance Resistance	R _r	-	40	Ω	At T₀ °C
8	Frequency Variation with Temperature over Top	<u>A</u> †	-10	+10	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at To °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not a	oplicable	10-6	
12	Resistance variation with Drive Level	∆ B R	Not a	pplicable	%	
13	Motional Inductance	L ₁	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	•	7.0	pF	
16	Q Factor	Q	Not a	ipplicable	•	
7.7	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/F	2:1	~		in the frequency range: f _r -60kHz to f _r +60kHz
1	8 Ageing	<u> </u>	-3	.0 +3.0	10-6	After burn-in, and per year
1	9 Terminal Length	L	F	igure 2	mm	



PAGE 90

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characterístics	Symbol	Lin Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	† _r	85.4	85.4792		
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order	*		3		
4	Load Capacitance	Q	1	×	pF	
5	Rated Drive Level	Po	O	.1	mW	
6	Frequency Adjustment Tolerance	<u>1</u> Δ	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R _r		40	Ω	At To *C
8	Frequency Variation with Temperature over Top	Δf f	+10	-10	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	-20	+70	°C	
11	Frequency variation with Drive Level	<u>∆ f</u>	Not a	pplicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not a	pplicable	.%	
13	Motional Inductance	L1	Not a	pplicable	mH	
14	Motional Capacitance	C ₁	Not a	pplicable	fF	
15	Static Capacitance	Co	~	7.0	pF	
16	Q Factor	Q	Not a	applicable	•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	~		in the frequency range: f _r -60kHz to f _r +60kHz
1	B Ageing	<u>∆f</u>	-3	.0 +3.6	10-6	After burn-in, and per year
1	9 Terminal Length	L	F	igure 2	mm	

PAGE 91

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION TYPE VARIANT NO. 69

		TYPE \	ARIANT N	VO. 69		
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f	50.	0	MHz	
2	Reference Temperature	To	+24.9	+ 25.1	°C	
3	Overtone Order		3			
4	Load Capacitance	CL	3(	)	pF	
5	Rated Drive Level	Po	1	0	mW	
6	Frequency Adjustment Tolerance	<u>λ f</u>	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	RL	*	50	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	Δf f	-5.0	+5.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>AR</u> R	Not ap	olicable	<b>%</b>	
10	Operating Temperature Range	Тор	-5	+ 55	°C	
11	Frequency variation with Drive Level	<u>Δ</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	∆ R R	Not ap	plicable	%	
13	Motional Inductance	L,	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	0.7	0.86	fF	
15	Static Capacitance	Co		3.0	pF	
16	Q Factor	Q	100 000	~	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	8:1	*		In the frequency range: f _L - 10MHz to f _L + 10MHz
18	Ageing	Δ <u>f</u>	-10	+ 10	10-6	After a run-in time of 680 hours, over 7 years
19	Terminal Length	L	Fig	ure 2	mm	

PAGE 92

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		IITC.	ZAHIAN I I	YU. 10		·
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f.	20	.0	MHz	
2	Reference Temperature	To	+ 59	+ 61	°C	
3	Overtone Order		Fundar	nental		
4	Load Capacitance	CL	2:	2	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ1</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R _L		13	Ω	At To *C
8	Frequency Variation with Temperature over Top	$\frac{\Delta f}{f}$	-15	+ 15	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆R</u> R	-10 c -1.5	+ 10 r + 1.5	%	From resistance measured at T ₀ °C If R < 10Ω
10	Operating Temperature Range	Тар	-20	+ 70	°C	
11	Frequency variation with Drive Level	Δ <u>†</u>	Not ap	plicable	10-6	) 
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L-1	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	°fF ,	
15	Static Capacitance	Co	*	4.5	pF	
16	Q Factor	Q	50 000	*	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	3:1			In the frequency range: f _L -200kHz to f _L +200kHz
18	Ageing	<u>A</u> f	-3.0	+3.0	10-6	After burn-in and per year
19	Terminal Length	L	Figi	ure 2	mm	180 m mm

PAGE 93

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	f.	8.	0	MHz	
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order		Funda	mental		
4	Load Capacitance	CL	29.7	30.3	pF	
5	Rated Drive Level	Po	0.	j	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	RL	*	30	Ω	At To °C
8	Frequency Variation with Temperature over Top	∆ f f	-30	+30	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	Δ <u>R</u> R	-10 -1.5	+ 10 or + 1.5	%	From resistance measured at T _o °C If R<10Ω
10	Operating Temperature Range	Тор	-35	+ 105	°C	
11	Frequency variation with Drive Level	¹ ∆f f	-2.0	+2.0	10-6	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
12	Resistance variation with Drive Level		-25	+ 25	%	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
13	Motional Inductance	L ₁	45	55	mH	
14	Motional Capacitance	C ₁	7.2	8.8	fF	
15	Static Capacitance	Co	2.75	3.75	pF	
16	Q Factor	Q	92 100	-	÷	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	*		In the frequency range: f _L -500kHz to f _L + 500kHz
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+ 5.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Fiai	ure 2	mm	

PAGE 94

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limi		Unit	Remarks
IVO.	Citaracteristics	Symbor	Min.	Max.	O.M.	1101100110
1	Resonance Frequency	fr	32.74	375	MHz	
2	Reference Temperature	To	+24	+26	°C	
3	Overtone Order		3			
4	Load Capacitance	CL	*		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u> f	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	$R_r$		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ f</u>	-9.0	+9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	-20	+ 70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u> f	Not app	olicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not app	olicable	%	
13	Motional Inductance	L	15	22	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	1F	
15	Static Capacitance	Co	***	7.0	pF	
16	Q Factor	Q	90 000	~	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	Δ <u>f</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ıre 2	mm	

PAGE 95

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _r	37.82	7083	MHz	
2	Reference Temperature	To	+24	+26	°C	
3	Overtone Order		3			
4	Load Capacitance	CL	4	,	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>1 Δ</u>	-5.0	+5.0	10-6	At To *C
7	Resonance Resistance	R _r		40	Ω	At To *C
8	Frequency Variation with Temperature over Top	<u>Δ1</u>	-9.0	+ 9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	$\frac{\Delta R}{R}$	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	T _{op}	-20	+70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	olicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not app	olicable	%	
13	Motional Inductance	L ₁	15	22	mH	
14	Motional Capacitance	C ₁	Not ap	olicable	1F	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	90 000		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1			In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	Δ <u>1</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ire 2	mm	

PAGE 96

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limits		Unit	Remarks
IVO.	Citalacteristics	Gymuon	Min.	Max.	O: iii	Heimana
1	Resonance Frequency	fL	5.24	288	MHz	
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	*	Fundar	nental		
4	Load Capacitance	CL	29.7	30.3	ρF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>A</u> f	-10	+10	10-6	At To °C
7	Resonance Resistance	Rι	*	110	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆</u>	+30	-30	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-25	+ 25	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-25	+ 105	°C	
11	Frequency variation with Drive Level	∆ f f	-2.0	+2.0	10-6	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
12	Resistance variation with Drive Level	∆R R	-25	+ 25	% %	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
13	Motional Inductance	L	138	168	mH	
14	Motional Capacitance	C ₁	5.42	6.62	fF	
15	Static Capacitance	Co	1.84	2.24	pF	
16	Q Factor	Q	41 300	*		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	*		In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	<u>∆f</u>	-3.0	+ 3.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Fig	ure 2	mm	

PAGE 97

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		TYPE	/ARIANT	NO. 75		
No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	f _L	4.0	96	MHz	
2	Reference Temperature	T _o	+23	+27	°C	
3	Overtone Order	*	Fundai	mental	e de la companya de l	
4	Load Capacitance	CL	29.7	30.3	ρF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	RL		75	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf	-25	+25	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-25	+ 25	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-25	+ 75	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	-2.0	+2.0	10.6	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
12	Resistance variation with Drive Level	ΔR R	-25	+25	%	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
13	Motional Inductance	L ₁	313	348	mH	
14	Motional Capacitance	C ₁	4.34	4.82	fF of	
15	Static Capacitance	C _o	1,66	2.04	pF.	itik massa Y
16	Q Factor	Q g	107 000		•	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R iZpi/R	2:1			In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	<u>∆f</u>	-5.0	+5.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Figu	re 2	mm	

PAGE 98

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		IYPE	/ARIANT I	NU. 76		
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f,	5.1	12	MHz	
2	Reference Temperature	То	+23	+27	°C	
3	Overtone Order		Fundar	nental		
4	Load Capacitance	CL	29.7	30.3	pF	
5	Rated Drive Level	Po	0.		mW	
6	Frequency Adjustment Tolerance	<u>∆f</u> f	-10	+10	10-6	At To °C
7	Resonance Resistance	RL		110	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> <u>f</u>	-30	+30	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-25	+ 25	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-35	+ 105	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	-2.0	+2.0	10-6	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
12	Resistance variation with Drive Level	∆R R	-25	+ 25	%	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
13	Motional Inductance	L ₁	146.7	179.3	mH .	
14	Motional Capacitance	Cı	5.3	6.5	fF	
15	Static Capacitance	Co	1.8	2.2	pF	
16	Q Factor	Q	47 896		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1			In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	<u>∆ f</u>	-5.0	+5.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Figu	re 2	mm	

PAGE 99

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
			141111	wax.		
1	Resonance Frequency	fL	6.5	536	MHz	
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order	~	Fundai	mental		
4	Load Capacitance	CL	29.7	30.3	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> <u>f</u>	-10	+ 10	10-6	At To °C
7	Resonance Resistance	RL	~	70	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>\$ f</u>	-30	+30	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>∆R</u> R	-25	+25	<b>%</b>	From resistance measured at T _o °C
10	Operating Temperature Range	Top	-35	+ 105	*C	
11	Frequency variation with Drive Level	<u> </u>	-2.0	+2.0	10-6	From $P_{S1} = ?mW$ to $P_{S2} = ?mW$
12	Resistance variation with Drive Level	∆R R	-25	+25	%	From $P_{S1} = ?mW$ to $P_{S2} = ?mW$
13	Motional Inductance	L ₁	64.6	79.0	. mH	
14	Motional Capacitance	C ₁	7.47	9.13	fF.	
15	Static Capacitance	Co	2.28	2.78	pF	
16	Q Factor	Q	48 860		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1			In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Figu	ire 2	mm	

PAGE 100

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _r	65.04	1974	MHz	Swept
2	Reference Temperature	To	+23	+ 27	°C	
3	Overtone Order	~				
4	Load Capacitance	CL	4		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+10	106	At To *C
7	Resonance Resistance	R _r		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆ f</u> f	-9.0	+ 9.0	10-6	From frequency measured at T _o *C
9	Resistance Variation with Temperature over Top	∆R R	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	<u>∆</u>	Not ap	olicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L-1	3.2	4.8	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	1F	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	Not ap	plicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R	2:1			In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	<u>A</u> f	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ire 2	mm	

PAGE 101

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION TYPE VARIANT NO. 79

			(MINIMIN I	, , w		
No.	Characteristics	Symbol	Lin Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	fr	65.00	)5555	MHz	Swept
2	Reference Temperature	Та	+ 23	+ 27	°C	
3	Overtone Order	~ 1		3		
4	Load Capacitance	CL		Ø.	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-10	+ 10	10-6	At To *C
7	Resonance Resistance	R _r	*	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	+9.0	-9.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	≜R R	-10 ⁻ )	+ 10	% ************************************	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+ 70	, °C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	AR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co		7.0	ρF	
16	Q Factor	۵	Not ap	plicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	<u>\</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figi	ire 2	mm	

PAGE 102

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lím Min,	nits Max.	Unit	Remarks
1	Resonance Frequency	fr	62	.5	MHz	Swept
2	Reference Temperature	Ta	+ 23	+27	°C	
3	Overtone Order	•		3		
4	Load Capacitance	CL		•	pF	
5	Rated Drive Level	Po	0	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ1</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R _r		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf f	-9.0	+ 9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-10	+ 10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	1.5 T	ypical	fF	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	Not ap	plicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1			In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	<u>_</u>	-3.0	+3.0	10-6	After burn-in, and per year
	3			.t	£	3

PAGE 103

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

			/ARIANT			
No.	Characteristics	Symbol	Lim Min.	Max.	Unit	Remarks
1	Resonance Frequency	fy	70	.0	MHz	Swept
2	Reference Temperature	To	+23	+ 27	°C	
3	Overtone Order	•	3			
4	Load Capacitance	CL	٥		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> f	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R _r	~	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ1</u>	-9.0	+9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	$\frac{\Delta R}{R}$	~10	+ 10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	olicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	1.5 T	ypical	fF	
15	Static Capacitance	Co		7.0	ρF	
16	Q Factor	Q	Not ap	plicable	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	***************************************		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	<u>A</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ire 2	mm	

PAGE 104 ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		11114	/ARIAN I I	VU. UZ.		·
No.	Characteristics	Symbol	Lim Min.	íts Max.	Unit	Remarks
1	Resonance Frequency	fL	4.13	79	MHz	
2	Reference Temperature	То	+ 23	+27	*C	
3	Overtone Order		Fundar	nental		
4	Load Capacitance	CL	29.7	30.3	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>1</u>	-10	+10	10-6	At To *C
7	Resonance Resistance	RL		75	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆ f</u> f	-25	+25	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	유	-50	+50	%	From resistance measured at T _o *C
10	Operating Temperature Range	Тор	-25	+ 75	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	-2.0	+2.0	10-6	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
12	Resistance variation with Drive Level	ΔR R	-40	+ 40	%	From $P_{S1} = 20$ nW to $P_{S2} = 0.2$ mW
13	Motional Inductance	L ₁	310	345	mH	
14	Motional Capacitance	C ₁	4.39	4.87	fF	
15	Static Capacitance	Co	1.67	2.06	pF	
16	Q Factor	Q	105 000		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to	Rp/R IZpl/R	2:1			In the frequency range: f _L -500kHz to f _L +500kHz
18	Resonance Resistance Ageing	Δ <u>f</u>	-5.0	+5.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Fiau	ле 2	mm	

PAGE 105

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	unit .	Remarks
1	Resonance Frequency	f _r	65.03	639	MHz	Swept
2	Reference Temperature	То	+ 23	+ 27	°C	
3	Overtone Order		3			
4	Load Capacitance	C _L	×		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆</u> <u>f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R,		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>A</u> 1	-9.0	+ 9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	AR R	-10	+ 10	%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	∆ f f	Not app	olicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not app	olicable	% <b>%</b>	
13	Motional Inductance	L ₁	3.2	4.8	mH	
14	Motional Capacitance	C ₁	1.5 T	ypical	ſF	
15	Static Capacitance	Co	*	7.0	ρF	
16	Q Factor	Q	Not app	olicable	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1			In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	Δ <u>f</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L.	Figu	re 2	mm	

PAGE 106

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		IYPE	/ARIANT	NO. 84	3	
No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	f _r	36.81	1767	MHz	
2	Reference Temperature	Τ _α	+	25	°C	
3	Overtone Order	*	(	3		
4	Load Capacitance	C _L	٥		pF	
5	Rated Drive Level	Po	0.	.1	mW	
6	Frequency Adjustment Tolerance	<u>∆ f</u>	-5.0	+ 5.0	10-6	At T _o °C
7	Resonance Resistance	R _r	*	40	Ω	Over T _{op} °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> !	+7.0	-7.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	Not applicable		%	
10	Operating Temperature Range	Тор	-25	+70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u> f	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	:
14	Motional Capacitance	C ₁	Not ap	plicable	fF:	
15	Static Capacitance	Co	-	5.0	pF	
16	Q Factor	Q	Not ap	plicable	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	*		In the frequency range: f _r -60kHz to f _r +60kHz
18	Ageing	$\frac{\Delta f}{f}$	-7.0	+7.0	10-6	After burn-in, over 7 years
19	Terminal Length	L	Figu	re 2	mm	

PAGE 107

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Limits		Unit	Remarks
VO.	Characteristics	Symbol	Min.	Max.	Orne	nemarks
1	Resonance Frequency	f _r	20	.0	MHz	
2	Reference Temperature	To	+ 23	+27	°C	
3	Overtone Order	•	Funda	mental		
4	Load Capacitance	CL		*	ρF	
5	Rated Drive Level	Po	0	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ1</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R,		30	Ω	Over T _{op} °C
- 8	Frequency Variation with Temperature over Top	<u> </u>	-20	+20	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u>Δ R</u> R	-10 or -2	+ 10 or +2	% Ω	From resistance measured at T _o *C
10	Operating Temperature Range	Тор	-30	+ 70	*C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	r
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	•	7.0	pF	
16	Q Factor	Q	100 000		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1	· · · · · ·		In the frequency range: f _r - 200kHz to f _r + 200kHz
18	Ageing	Δ <u>f</u>	-2	+2	10-6	After burn-in per year
19	Terminal Length	L	Fia	ire 2	mm	

PAGE 108

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		TYPE	/ARIANT	NO. 86		
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	20	.0	MHz	
2	Reference Temperature	To	+23	+27	°C	
3	Overtone Order	-	Fundar	mental		
4	Load Capacitance	CL	3	2	pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+10	10-6	At To *C
7	Resonance Resistance	R _r	**************************************	30	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>41</u>	-20	+20	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-10 or -2.0	+ 10 or + 2.0	% Ω	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-30	+ 70	*C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	AR R	Not ap	plicable	%	
13	Motional Inductance	L ₁	Not ap	plicable	mH	
14	Motional Capacitance	C ₁	-	7.0	fF	
15	Static Capacitance	Co	•	7.0	pF	
16	Q Factor	Q	80 000	*		
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1			In the frequency range: f _L - 200kHz to f _L + 200kHz
18	Ageing	<u>4</u>	-2.0	+2.0	10-6	After burn-in and per year
19	Terminal Length		Figu	ire 2	mm	

PAGE 109

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _r	81.50	6849	MHz	PQ. Swept
2	Reference Temperature	To	+ 65	+ 75	°C	Turn-on Point
3	Overtone Order	*	3			
4	Load Capacitance	GL			pF	
5	Rated Drive Level	Po	0.		mW	
6	Frequency Adjustment Tolerance	<u>1</u> Δ 1	-50	+50	10-6	At To °C
7	Resonance Resistance	R _r		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ f	Not app	olicable	10-6	
9	Resistance Variation with Temperature over Top	ΔR R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+80	°C	
11	Frequency variation with Drive Level	$\frac{\Delta^{\prime}f}{f}$	Not ap	olicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not apı	olicable	%	
13	Motional Inductance	L ₁	2.0	*	mH	
14	Motional Capacitance	C ₁	Not ap	olicable	fF	
15	Static Capacitance	Co		5.0	ρF	
16	Q Factor	Q	70 000	: :: ::	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R	2:1	**************************************		In the frequency range: f _r -8100kHz to f _r +8100kHz
18	Ageing	<u>Δ</u> !	-5.0	+ 5.0	10-6	After burn-in and over 10 years
19	Terminal Length	L.	Fini	ire 2	mm	

PAGE 110

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	f,	12	1.5	MHz	
2	Reference Temperature	То	+23	+27	°C	
3	Overtone Order	-				
4	Load Capacitance	GL			pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-10	+10	10-6	At To °C
7	Resonance Resistance	R,		60	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	-20	+20	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	∆R R	-25	+25	%	From resistance measured at T _o °C
10	Operating Temperature Range	Top	-30	+80	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	olicable	%	
13	Motional Inductance	L ₁	1.44	2.16	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co	**************************************	6.0	pF	
16	Q Factor	Q	Not ap	plicable	*	
- 17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1			In the frequency range: f _r -500kHz to f _r +500kHz
18	Ageing	Δ f	-5.0	+ 5.0	10-6	After burn-in, over 10 years
19	Terminal Length	L.	Figu	ire 2	mm	

PAGE 111

ISSUE 4

# TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION TYPE VARIANT NO. 89

	······		***************************************		***************************************	·•····································
No.	Characteristics	Symbol	Lin Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fr	50	0.0	MHz	
2	Reference Temperature	To	+ 23	+ 27	°C	
3	Overtone Order	*		3		
4	Load Capacitance	CL			pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-10	+ 10	10-6	At To °C
7	Resonance Resistance	R _r	-	40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δf f	-20	+20	10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	AR R	-20	+ 20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-30	+80	*C	
11	Frequency variation with Drive Level	<u> </u>	Not applicable		10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	2.97	4,45	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	C _o		6.0	pF	
16	Q Factor	Q	Not ap	plicable	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -500kHz to f _r +500kHz
18	Ageing	<u>A</u> f	-10	+10	10-6	After burn-in, over 10 years
19	Terminal Length	L	Figi	ure 2	mm	

PAGE 112

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		TYPE \	VARIANT	NO. 90		
No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	fr	37.7	5625	MHz	Swept
2	Reference Temperature	To	+24	+26	°C	
3	Overtone Order	*		}		: : : : : : : : : : : : : : : : : : :
4	Load Capacitance	CL		¢.	ρF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta_{\mathbf{f}}}{\mathbf{f}}$	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R _r		40	Ω	At To °C
-8	Frequency Variation with Temperature over Top	Δ <u>f</u> f	-9.0	+ 9.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u>Δ R</u> R	-10	+ 10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Top	-20	+ 70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	olicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	olicable	%	
13	Motional Inductance	Li	15	22	mH	
14	Motional Capacitance	C ₁	Not ap	olicable	fF.	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	90 000		~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1			In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	<u>Δ1</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Fiau	ıre 2	mm	

PAGE 113

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _r	24.6	827	MHz	Swept
2	Reference Temperature	То	+ 24	+26	°C	
3	Overtone Order	~	Fundar	nental		
4	Load Capacitance	CL	ø.		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ</u> <u>1</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	P,		10	Ω	At To °C
8	Frequency Variation with Temperature over Top	± ± ±	-7.0	+ 7.0	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	ΔR R	-10 0 -1.5	+10 r +1.5	% Ω	From resistance measured at T ₀ °C If R<10Ω
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	<u>∆</u> !	Not app	olicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not app	olicable	%	
13	Motional Inductance	L ₁	Not app	olicable	mH	
14	Motional Capacitance	C ₁	Not app	olicable	fF	
15	Static Capacitance	Co	+	5.0	ρF	
16	Q Factor	Q	130 000		. *	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -200kHz to f _r + 200kHz
18	Ageing	<u>∆ f</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ire 2	mm	

PAGE 114

ISSUE 4

## TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		TYPE \	/ARIANT I	VO. 92		
No.	Characteristics	Symbol	Lim Min.	its Max.	Unit	Remarks
1	Resonance Frequency	f _r	37.83	9583	MHz	Swept
2	Reference Temperature	To	+ 24	+ 26	°C	
3	Overtone Order	*	3			
4	Load Capacitance	CL	α.		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>Δ f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R,		40	Ω	At To °C
8	Frequency Variation with Temperature over Top	Δ <u>f</u>	+ 9.0	-9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-10	+10	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	<u>A</u> !	Not app	olicable	10-6	
12	Resistance variation with Drive Level	∆R R	Not ap	olicable	%	
13	Motional Inductance	L ₁	15	22	mН	
14	Motional Capacitance	C ₁	Not ap	olicable	fF ¹	
15	Static Capacitance	Co		7.0	pF	
16	Q Factor	Q	90 000	*	*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Fiat	ıre 2	mm	

PAGE 115

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	t _r	90.87	5794	MHz	Swept
2	Reference Temperature	To	+24	+ 26	*C	
3	Overtone Order	*	ŧ			
4	Load Capacitance	CL	٠		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	<u>∆</u> <u>f</u>	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R,		45	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Af</u>	-9.0	+9.0	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	<u> </u>	-20	+ 20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10-6	
12	Resistance variation with Drive Level	∆ R R	Not ap	olicable	%	
13	Motional Inductance	L ₁	6.5	-	mH	
14	Motional Capacitance	C ₁	Not app	olicable	1F	
15	Static Capacitance	C _o	*	3.0	ρF	
16	Q Factor	a	105 000		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1			In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	Δ <u>f</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L.	Figu	ire 2	mm	

PAGE 116

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		,	x y (4 34y (3 % )		,	<del>,</del>
No.	Characteristics	Symbol	Lim Min.	uts Max.	Unit	Remarks
1	Resonance Frequency	f _r	90.88	1675	MHz	Swept
2	Reference Temperature	То	+24	+26	°C	
3	Overtone Order	•		5		
4	Load Capacitance	C _L	٥	¢	pF	
5	Rated Drive Level	Po	0	.1	mW	
6	Frequency Adjustment Tolerance	<u>∆</u> <u>f</u>	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	$R_r$		45	Ω	At T _o °C
8	Frequency Variation with Temperature over T _{op}	<u>1                                    </u>	-9.0	+9.0	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over T _{op}	∆R R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	, *C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	plicable	10-6	
12	Resistance variation with Drive Level	Δ <u>R</u> R	Not ap	plicable	%	
13	Motional Inductance	L ₁	6.5	~	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF ¹	
15	Static Capacitance	Co		3.0	pF	
16	Q Factor	Q	105 000		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	2:1	~		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	Δ. f	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ire 2	mm	:

PAGE 117

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

		TYPE	VARIANT	NO. 95		
No.	Characteristics	Symbol	Lim Min.	iits Max.	Unit	Remarks
1	Resonance Frequency	$f_r$	90.88	3754	MHz	Swept
2	Reference Temperature	To	+ 24	+ 26	°C	A CONTRACTOR OF THE CONTRACTOR
3	Overtone Order	•		;		
4	Load Capacitance	C _L	0		pF	
5	Rated Drive Level	Po	0.	1	mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-5.0	+5.0	10-6	At T ₀ °C
7	Resonance Resistance	Rr	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	45	Ω	At To *C
8	Frequency Variation with Temperature over Top	<u>∆</u> t f	-9.0	+9.0	. 10 ⁻⁶	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	ΔR R	-20	+20	% '	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	Δ <u>f</u>	Not ap	olicable	10-6	
12	Resistance variation with Drive Level	<u>Δ R</u> R	Not ap	plicable	% Ya	
13	Motional Inductance	L ₁	6.5	*	mH	
14	Motional Capacitance	C ₁	Not ap	plicable	fF	
15	Static Capacitance	Co		3.0	ρF	
16	Q Factor	Q	105 000	*	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpl/R	2:1	~		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	<u>∆f</u> f	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ire 2	mm	

PAGE 118

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lim	***************************************	Unit	Remarks
		~,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Min.	Max.		2 20,000 0 20,000 20,000
1	Resonance Frequency	f _r	90.89	3413	MHz	Swept
2	Reference Temperature	To	+24	+ 26	°C	
3	Overtone Order	¥				
4	Load Capacitance	CL			pF	
5	Rated Drive Level	P _o	0.	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	R _r	*	45	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>∆</u> f	-9.0	+ 9.0	10-6	From frequency measured at T ₀ °C
9	Resistance Variation with Temperature over Top	AR R	-20	+20	%	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not ap	olicable	10-6	
12	Resistance variation with Drive Level	ΔR R	Not ap	olicable	%	
13	Motional Inductance	L ₁	6.5	~	mH	
14	Motional Capacitance	C ₁	Not ap	olicable	fF	:
15	Static Capacitance	Co	*	3.0	pF	
16	Q Factor	Q	105 000	*	+	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpi/R	2:1	***************************************		In the frequency range: f _r -50kHz to f _r + 50kHz
18	Ageing	$\frac{\Delta f}{f}$	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	re 2	mm	

PAGE 119

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

	·····	I 2 2 4	VALIMINI	(4427 07		
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fr	99.5	3704	MHz	Swept
2	Reference Temperature	To	+ 24	+26	°C	
3	Overtone Order	-		,		
4	Load Capacitance	C _L		» ·	pF	
5	Rated Drive Level	Po	0	1	mW	
6	Frequency Adjustment Tolerance	$\frac{\Delta f}{f}$	-5.0	+5.0	10-6	At To °C
7	Resonance Resistance	Rr	*	45	Ω	At T _o °C
8	Frequency Variation with Temperature over Top	<u>Δ.f.</u>	+ 9.0	-9.0	10-6	From frequency measured at To °C
9	Resistance Variation with Temperature over Top	<u> </u>	-20	+20	Ÿ <b>6</b>	From resistance measured at T _o °C
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10-6	
12	Resistance variation with Drive Level	<u>∆R</u> R	Not ap	plicable	%	
13	Motional Inductance	Li	4.9		mH	
14	Motional Capacitance	C ₁	Not ap	olicable	fF.	
15	Static Capacitance	C _o	*	3.0	pF	
16	Q Factor	Q	95 000	+	~	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	2:1	*		In the frequency range: f _r -50kHz to f _r +50kHz
18	Ageing	Δ <u>1</u>	-3.0	+3.0	10-6	After burn-in, and per year
19	Terminal Length	L	Figu	ire 2	mm	

PAGE 120

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

	······································	······			·····	,
No.	Characteristics	Symbol	Lim Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fr	20	.0	MHz	in the second of
2	Reference Temperature	То	+ 25		°C	
3	Overtone Order		Fundamental			:
4	Load Capacitance	CL	<b>\$</b>		pF	
5	Rated Drive Level	Po	0.1		mW	
6	Frequency Adjustment Tolerance	Δ <u>f</u>	-50	+50	10-6	At To °C
7	Resonance Resistance	R,	~	30	Ω	Over Top °C
8	Frequency Variation with Temperature over Top	Δf	-50	+50	10-6	From frequency measured at T _o °C
9	Resistance Variation with Temperature over Top	<u>AR</u> R	Not applicable		%	From resistance measured at T ₀ °C
10	Operating Temperature Range	Тор	-55	+ 105	°C	
11	Frequency variation with Drive Level	$\frac{\Delta f}{f}$	Not applicable		10-6	
12	Resistance variation with Drive Level	∆R R	Not applicable		%	
13	Motional Inductance	L ₁	Not applicable		mH	
14	Motional Capacitance	C ₁	Not applicable		fF	
15	Static Capacitance	Co	*	7.0	pF	
16	Q Factor	Q	Not applicable		*	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R IZpI/R	7:1			In the frequency range: f _r -1.0MHz to f _r +1.0MHz
18	Ageing	<u>∆f</u>	-7.5	+7.5	10-6	After burn-in, per year
19	Terminal Length	L	Figure 2		mm	

PAGE 121

ISSUE 4

#### TABLE 1(a) - TYPE VARIANT DETAILED INFORMATION

No.	Characteristics	Symbol	Lin Min.	nits Max.	Unit	Remarks
1	Resonance Frequency	fL	24	1.5	MHz	
2	Reference Temperature	To	+20	+ 30	°C	
3	Overtone Order	-	Funda	mental		
4	Load Capacitance	C _L	32		pF	
5	Rated Drive Level	Po	0.2		mW	
6	Frequency Adjustment Tolerance	<u>1</u> 4	-5.0	+ 5.0	10-6	At To °C
7	Resonance Resistance	R _L		21	Ω	At To °C
8	Frequency Variation with Temperature over Top	<u>Δ</u> <u>f</u>	-7.0	+7.0	10-6	From frequency measured at T _o *C
9	Resistance Variation with Temperature over Top	AR R	-10 -1.5	+ 10 or + 1.5	% Ω	From resistance measured at T _o °C If R<10Ω
10	Operating Temperature Range	Тор	-20	+ 70	°C	
11	Frequency variation with Drive Level	<u>∆</u> . <u>f</u>	Not applicable		10.6	
12	Resistance variation with Drive Level	AR R	-10	+ 10	%	From $P_{S1} = 0.01 \text{mW}$ to $P_{S2} = 0.5 \text{mW}$
13	Motional Inductance	L ₁	*	6.93	mH	
14	Motional Capacitance	C1	Not ap	plicable	fF.	
15	Static Capacitance	Co	*	3.0	pF	
16	Q Factor	Q	60 000	-	-	
17	Ratio of Unwanted: Response Resistance to Resonance Resistance or Response Impedance to Resonance Resistance	Rp/R	3:1	~	# 1	In the frequency range: f _L -500kHz to f _L +500kHz
18	Ageing	$\frac{\Delta f}{f}$	-50	+5.0	10-6	After burn-in, over 10 years
19	Terminal Length	L	Figure 2		mm	



PAGE 122

ISSUE 4

#### APPENDIX 'A'

Page 1 of 1

#### AGREED DEVIATIONS FOR RAKON (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATION
Para. 4.2.2	Para. 9.3, Shock: Shall not be performed.
Para. 4.2.3	Para. 9.11, Radiographic Inspection: Shall not be performed.



PAGE 123 ISSUE 4

#### APPENDIX 'B'

Page 1 of 1

#### AGREED DEVIATIONS FOR KVG Quartz Crystal Technology GmbH (D)

ITEMS AFFECTED	DESCRIPTION OF DEVIATION
Para. 4.2.2 Para. 4.2.3 Para. 4.2.4 Para. 4.2.5	Para. 9.5.1, Seal Test Fine Leak: The crystal units shall be subjected to MIL-STD-202, Method 112, Procedure Illa.