



**DIODES, MICROWAVE, SILICON,
HYPER-ABRUPT JUNCTION TUNING VARACTOR,
BASED ON TYPES DH733 THRU DH739
ESCC Detail Specification No. 5512/022**

**ISSUE 1
October 2002**



	ESCC Detail Specification		PAGE ii ISSUE 1
--	---------------------------	--	--------------------

LEGAL DISCLAIMER AND COPYRIGHT

European Space Agency, Copyright © 2002. 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 alleged 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.



**europaean space agency
agence spatiale européenne**

Pages 1 to 22

**DIODES, MICROWAVE, SILICON,
HYPER-ABRUPT JUNCTION TUNING VARACTOR,
BASED ON TYPES DH733 THRU DH739**

ESA/SCC Detail Specification No. 5512/022



**space components
coordination group**

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 1	December 1998	<i>Sam Mitchell</i>	<i>John</i>



ESA/SCC Detail Specification
No. 5512/022

PAGE 2

ISSUE 1

DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.



TABLE OF CONTENTS

	<u>Page</u>
1. <u>GENERAL</u>	5
1.1 Scope	5
1.2 Component Type Variants	5
1.3 Maximum Ratings	5
1.4 Parameter Derating Information	5
1.5 Physical Dimensions	5
1.6 Functional Diagram	5
1.7 Handling Precautions	5
2. <u>APPLICABLE DOCUMENTS</u>	5
3. <u>TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS</u>	5
4. <u>REQUIREMENTS</u>	14
4.1 General	14
4.2 Deviations from Generic Specification	14
4.2.1 Deviations from Production Control	14
4.2.2 Deviations from Final Production Tests	14
4.2.3 Deviations from Burn-in and Electrical Measurements	14
4.2.4 Deviations from Qualification Tests	14
4.2.5 Deviations from Lot Acceptance Tests	14
4.3 Mechanical and Environmental Requirements	14
4.3.1 Dimension Check	14
4.3.2 Weight	14
4.3.3 Terminal Strength	15
4.3.4 Bond Strength	15
4.3.5 Die Shear	15
4.4 Materials and Finishes	15
4.4.1 Case	15
4.4.2 Lead Materials and Finish	15
4.5 Marking	16
4.5.1 General	16
4.5.2 Cathode Identification	16
4.5.3 The SCC Component Number	16
4.5.4 Traceability Information	16
4.6 Electrical Measurements	16
4.6.1 Electrical Measurements at Room Temperature	16
4.6.2 Electrical Measurements at High and Low Temperatures	16
4.7 Burn-in Tests	17
4.7.1 Parameter Drift Values	17
4.7.2 Conditions for High Temperature Reverse Bias Burn-in	17
4.7.3 Conditions for Power Burn-in	17
4.7.4 Electrical Circuits for High Temperature Reverse Bias Burn-in	17
4.7.5 Electrical Circuits for Power Burn-in	17
4.8 Environmental and Endurance Tests	20
4.8.1 Electrical Measurements on Completion of Environmental Tests	20
4.8.2 Electrical Measurements at Intermediate Points and on Completion of Endurance Tests	20
4.8.3 Conditions for Operating Life Tests	20
4.8.4 Electrical Circuit for Operating Life Tests	20
4.9 Total Dose Irradiation Testing	20
4.10 Special Testing	20



TABLES

	<u>Page</u>
1(a) Type Variants	6
1(b) Maximum Ratings	8
2 Electrical Measurements at Room Temperature - D.C. Parameters	18
Electrical Measurements at Room Temperature - A.C. Parameters	18
3 Electrical Measurements at High and Low Temperatures	18
4 Parameter Drift Values	19
5(a) Conditions for High Temperature Reverse Bias Burn-in and Operating Life Tests	19
5(b) Conditions for Power Burn-in	19
6 Electrical Measurements at Intermediate Points and on Completion of Endurance Testing	21
7 Electrical Measurements During and on Completion of Irradiation Testing	N/A

FIGURES

1 Parameter Derating Information	8
2 Physical Dimensions	9
3 Functional Diagram	13
4 Circuits for Electrical Measurements	N/A
5(a) Electrical Circuit for High Temperature Reverse Bias Burn-in and Operating Life Tests	19
5(b) Electrical Circuit for Power Burn-in	N/A
6 Bias Conditions for Irradiation Testing	N/A

APPENDICES (Applicable to specific Manufacturers only)

'A' Agreed Deviations for TEKELEC (F)	22
---------------------------------------	----



1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for a Diode, Microwave, Silicon, Hyper-Abrupt Junction Tuning Varactor, based on Types DH733 thru DH739. It shall be read in conjunction with ESA/SCC Generic Specification No. 5010, the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

Variants of the basic diodes specified herein, which are also covered by this specification are given in Table 1(a).

1.3 MAXIMUM RATINGS

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

1.4 PARAMETER DERATING INFORMATION

The derating information applicable to the diodes specified herein is shown in Figure 1.

1.5 PHYSICAL DIMENSIONS

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

1.6 FUNCTIONAL DIAGRAM

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

1.7 HANDLING PRECAUTIONS

These devices are susceptible to damage by electrostatic discharge. Therefore, suitable precautions shall be employed for protection during all phases of manufacture, testing, packaging, shipment and any handling.

These components are categorised as Class 2 with a Minimum Critical Path Failure Voltage of 2 500V for Variants 01 to 45 and 55 to 63 and 5 000V for Variants 46 to 54.

2. APPLICABLE DOCUMENTS

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

- (a) ESA/SCC Generic Specification No. 5010 for Discrete Microwave Semiconductor Components.
- (b) MIL-STD-750, Test Methods for Semiconductor Devices.

3. TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESA/SCC Basic Specification No. 21300 shall apply.



TABLE 1(a) - TYPE VARIANTS

(1) VARIANT	(2) BASED ON TYPE	(3) FIGURE	(4) TOTAL CAPACITANCE C _T (pF)	(5) TUNING RATIO C _{T0} /C _{T20}	(6) QUALITY FACTOR (Q)	(7) BODY-LID AND LEAD MATERIAL AND FINISH
01	DH733	2(a)	0.74	5.0	180	D7-E2
02	DH733	2(b)	0.74	5.0	180	D7
03	DH733	2(c)	0.74	5.0	180	D7-E2
04	DH733	2(d)	0.74	5.0	180	D7-E2
05	DH733	2(e)	0.74	5.0	180	D7-E2
06	DH733	2(f)	0.74	5.0	180	D7-E2
07	DH733	2(g)	0.80	5.0	180	A7-D7
08	DH733	2(h)	0.87	5.0	180	D7
09	DH733	2(i)	0.87	5.0	180	D7-E2
10	DH734	2(a)	1.14	5.0	160	D7-E2
11	DH734	2(b)	1.14	5.0	160	D7
12	DH734	2(c)	1.14	5.0	160	D7-E2
13	DH734	2(d)	1.14	5.0	160	D7-E2
14	DH734	2(e)	1.14	5.0	160	D7-E2
15	DH734	2(f)	1.14	5.0	160	D7-E2
16	DH734	2(g)	1.20	5.0	160	A7-D7
17	DH734	2(h)	1.27	5.0	160	D7
18	DH734	2(i)	1.27	5.0	160	D7-E2
19	DH735	2(a)	1.74	5.0	150	D7-E2
20	DH735	2(b)	1.74	5.0	150	D7
21	DH735	2(c)	1.74	5.0	150	D7-E2
22	DH735	2(d)	1.74	5.0	150	D7-E2
23	DH735	2(e)	1.74	5.0	150	D7-E2
24	DH735	2(f)	1.74	5.0	150	D7-E2
25	DH735	2(g)	1.80	5.0	150	A7-D7
26	DH735	2(h)	1.87	5.0	150	D7
27	DH735	2(i)	1.87	5.0	150	D7-E2
28	DH736	2(a)	2.64	6.0	100	D7-E2
29	DH736	2(b)	2.64	6.0	100	D7
30	DH736	2(c)	2.64	6.0	100	D7-E2
31	DH736	2(d)	2.64	6.0	100	D7-E2
32	DH736	2(e)	2.64	6.0	100	D7-E2
33	DH736	2(f)	2.64	6.0	100	D7-E2
34	DH736	2(g)	2.70	6.0	100	A7-D7
35	DH736	2(h)	2.77	6.0	100	D7
36	DH736	2(i)	2.77	6.0	100	D7-E2
37	DH737	2(a)	3.84	6.0	85	D7-E2
38	DH737	2(b)	3.84	6.0	85	D7
39	DH737	2(c)	3.84	6.0	85	D7-E2
40	DH737	2(d)	3.84	6.0	85	D7-E2
41	DH737	2(e)	3.84	6.0	85	D7-E2
42	DH737	2(f)	3.84	6.0	85	D7-E2
43	DH737	2(g)	3.90	6.0	85	A7-D7
44	DH737	2(h)	3.97	6.0	85	D7
45	DH737	2(i)	3.97	6.0	85	D7-E2



TABLE 1(a) - TYPE VARIANTS

(1) VARIANT	(2) BASED ON TYPE	(3) FIGURE	(4) TOTAL CAPACITANCE C_T (pF)	(5) TUNING RATIO C_{T0}/C_{T20}	(6) QUALITY FACTOR (Q)	(7) BODY-LID AND LEAD MATERIAL AND FINISH
46	DH738	2(a)	4.64	6.0	70	D7-E2
47	DH738	2(b)	4.64	6.0	70	D7
48	DH738	2(c)	4.64	6.0	70	D7-E2
49	DH738	2(d)	4.64	6.0	70	D7-E2
50	DH738	2(e)	4.64	6.0	70	D7-E2
51	DH738	2(f)	4.64	6.0	70	D7-E2
52	DH738	2(g)	4.70	6.0	70	A7-D7
53	DH738	2(h)	4.77	6.0	70	D7
54	DH738	2(i)	4.77	6.0	70	D7-E2
55	DH739	2(a)	7.87	6.0	10	D7-E2
56	DH739	2(b)	7.87	6.0	10	D7
57	DH739	2(c)	7.87	6.0	10	D7-E2
58	DH739	2(d)	7.87	6.0	10	D7-E2
59	DH739	2(e)	7.87	6.0	10	D7-E2
60	DH739	2(f)	7.87	6.0	10	D7-E2
61	DH739	2(g)	7.93	6.0	10	A7-D7
62	DH739	2(h)	8.0	6.0	10	D7
63	DH739	2(i)	8.0	6.0	10	D7-E2

**TABLE 1(b) - MAXIMUM RATINGS**

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Maximum Reverse Voltage	V_R	-20	V	Note 1
2	Operating Temperature Range	T_{op}	-55 to +150	°C	T_{amb}
3	Storage Temperature Range	T_{stg}	-65 to +175	°C	
4	Soldering Temperature	T_{sol}	+230	°C	Note 2

NOTES

1. Measured at $I_R = 10\mu A$ and $T_{amb} = +25^\circ C$. For derating at $T_{amb} > +25^\circ C$, see Figure 1.
2. Duration 5 seconds maximum at a distance of not less than 1.5mm from the device body and the same termination shall not be resoldered until 3 minutes have elapsed. Not applicable to Variants 02, 07, 08, 11, 16, 17, 20, 25, 26, 29, 34, 35, 38, 43, 44, 47, 52, 53, 56, 61 and 62.

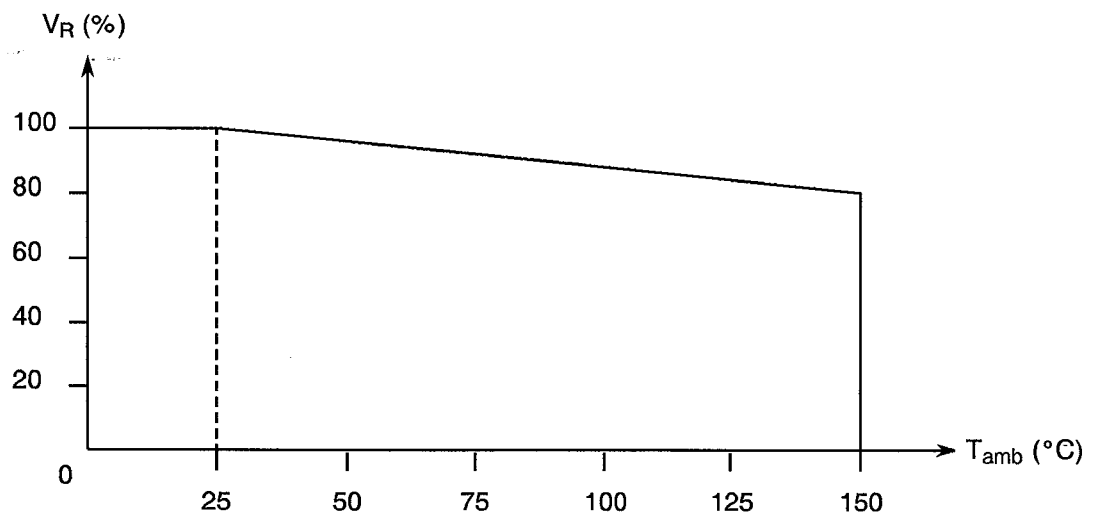
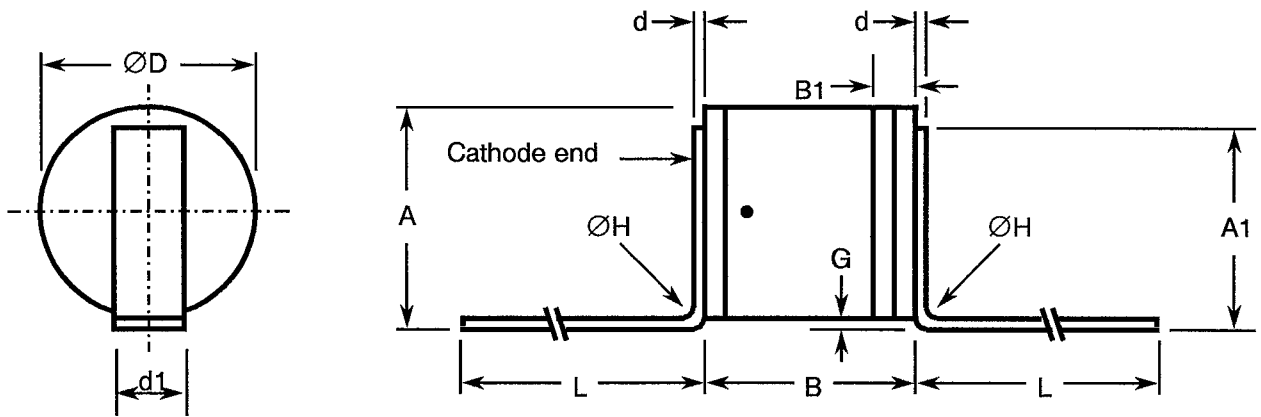
FIGURE 1 - PARAMETER DERATING INFORMATION**Reverse Voltage versus Temperature**



FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2(a) - VARIANTS 01, 10, 19, 28, 37, 46, 55



SYMBOL	MILLIMETRES	
	MIN.	MAX.
A	1.30	1.90
A1	1.22	1.82
B	0.95	1.35
B1	0.23	0.33
d	0.06	0.10
d1	0.55	0.65
ØD	1.07	1.47
G	0.10	0.50
ØH	0.10	0.50
L	2.50	-

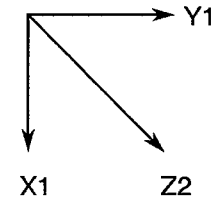
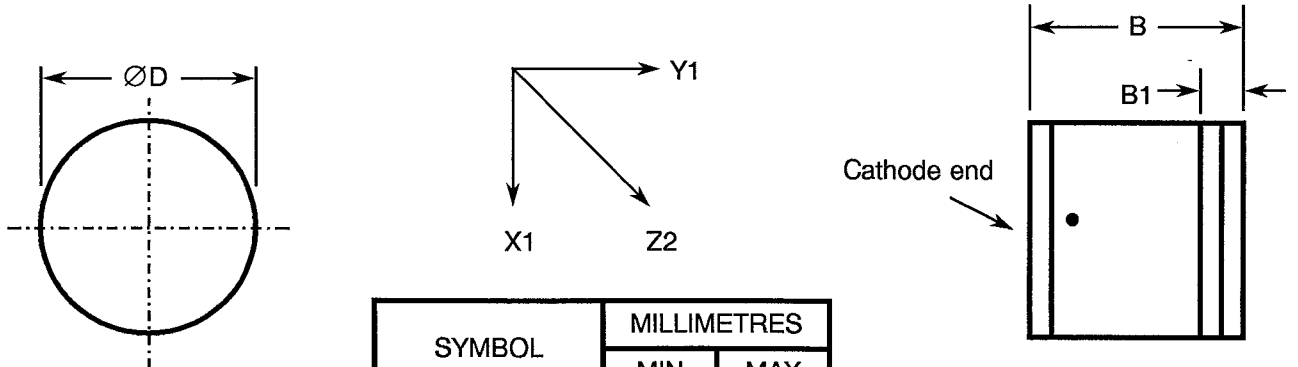


FIGURE 2(b) - VARIANTS 02, 11, 20, 29, 38, 47, 56



SYMBOL	MILLIMETRES	
	MIN	MAX
B	0.95	1.35
B1	0.23	0.33
ØD	1.07	1.47



FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(c) - VARIANTS 03, 12, 21, 30, 39, 48, 57

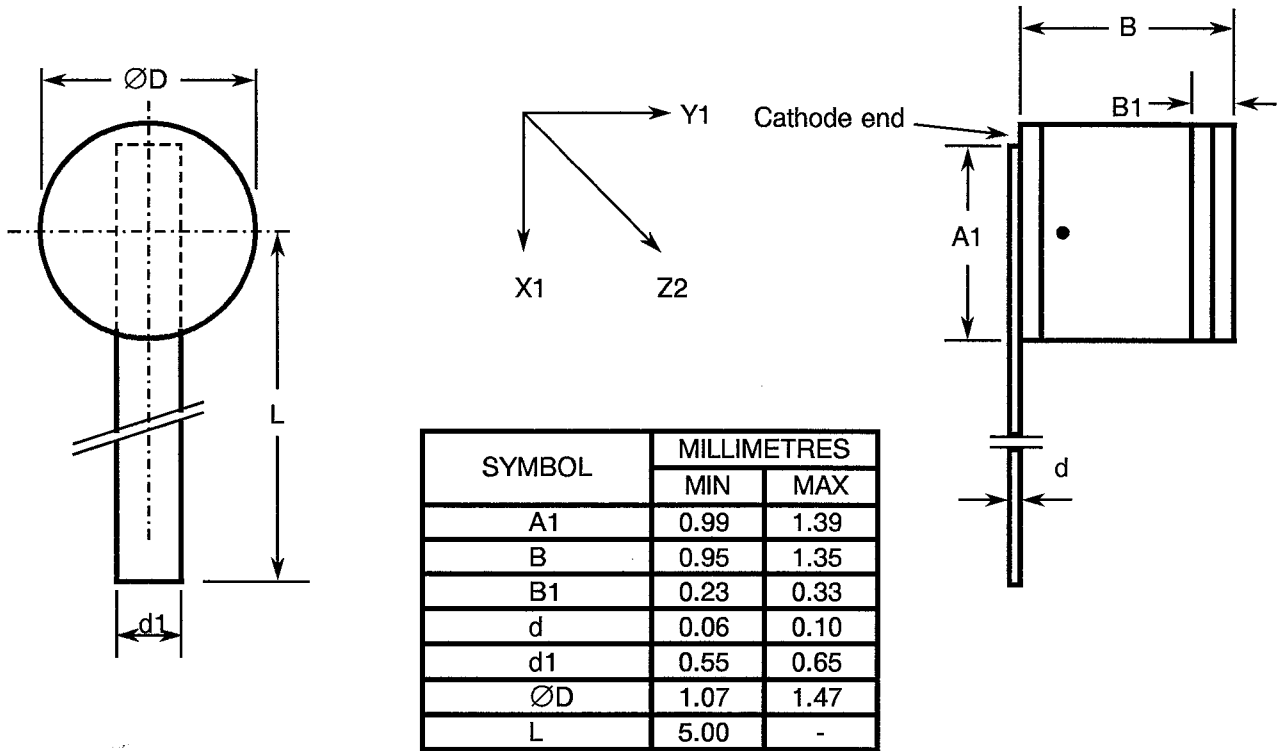


FIGURE 2(d) - VARIANTS 04, 13, 22, 31, 40, 49, 58

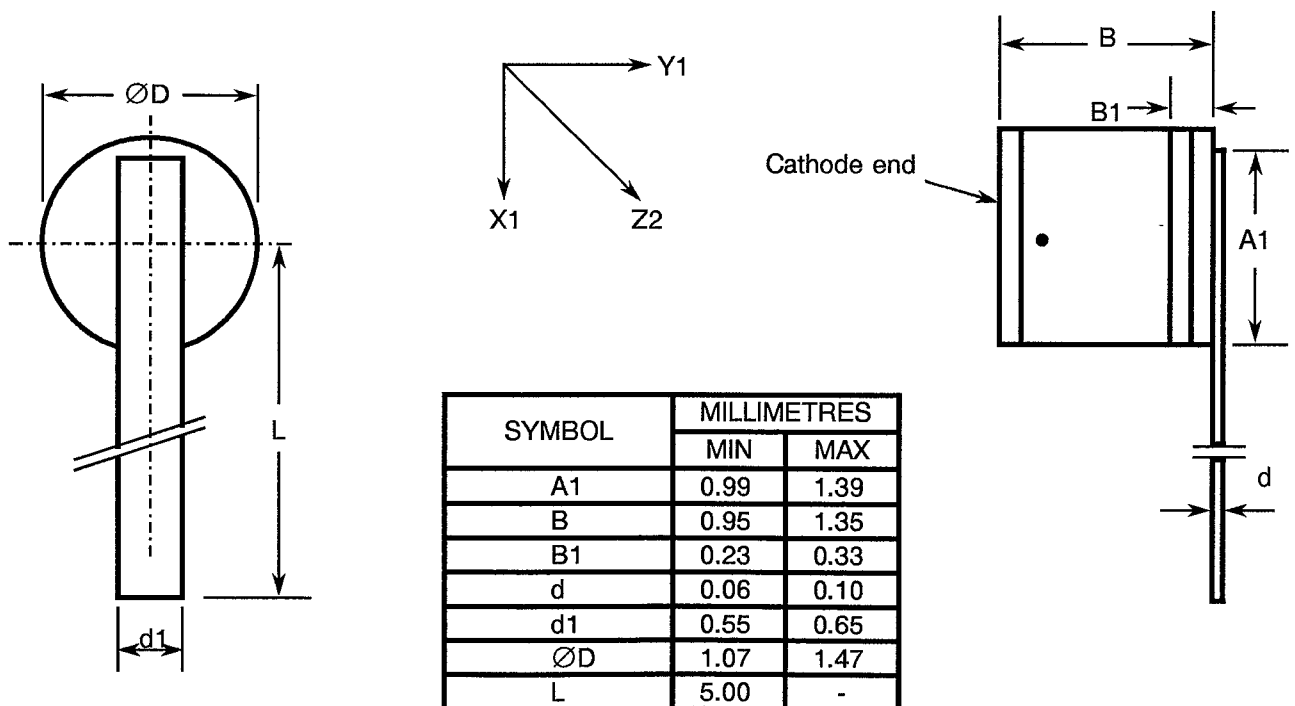




FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(e) - VARIANTS 05, 14, 23, 32, 41, 50, 59

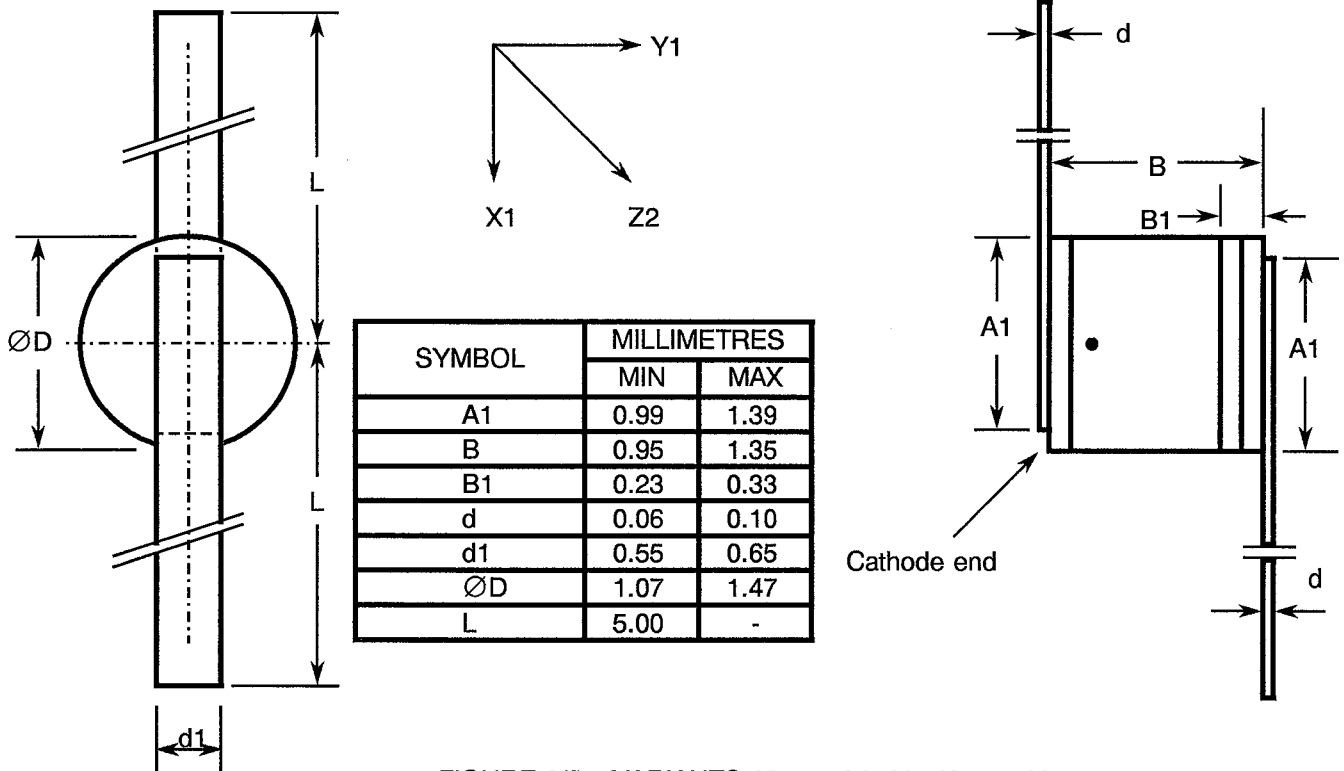


FIGURE 2(f) - VARIANTS 06, 15, 24, 33, 42, 51, 60

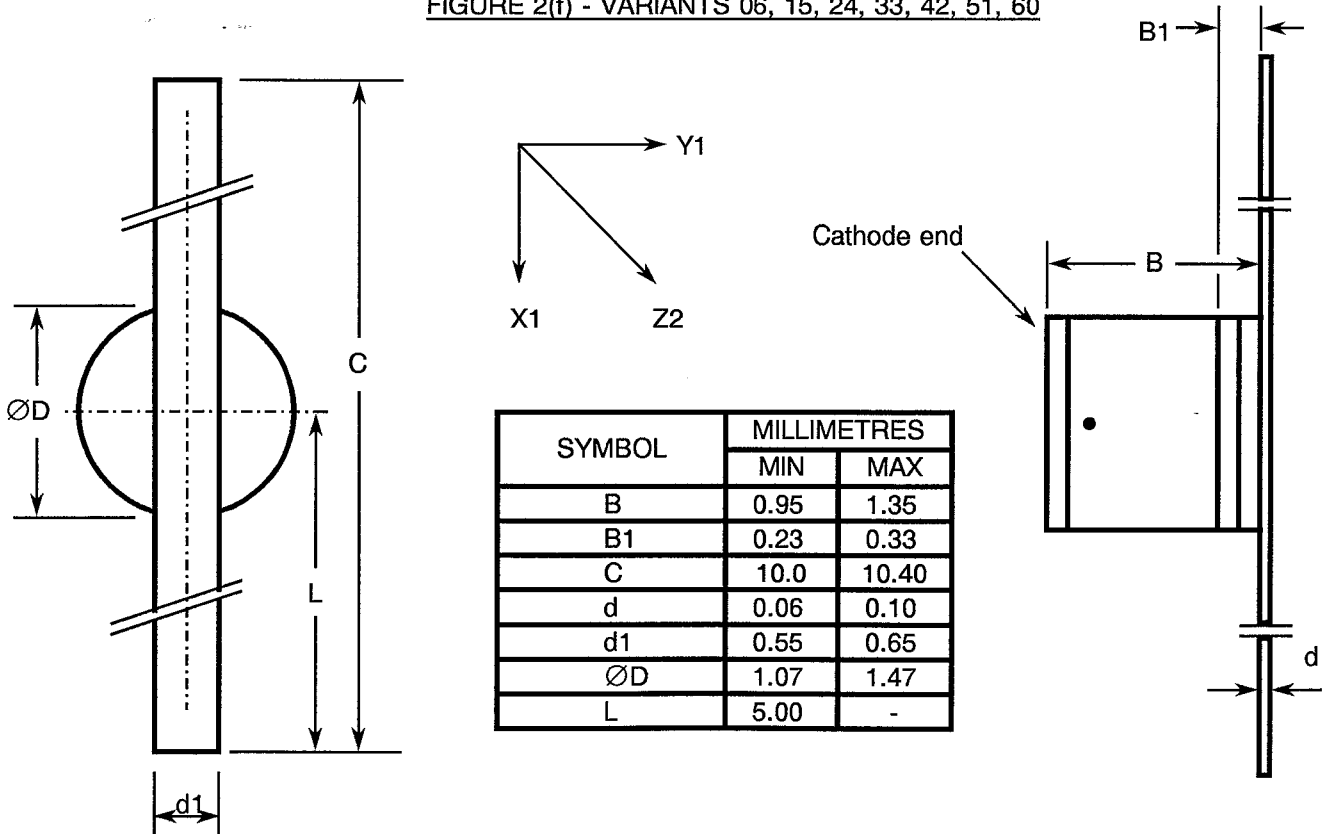
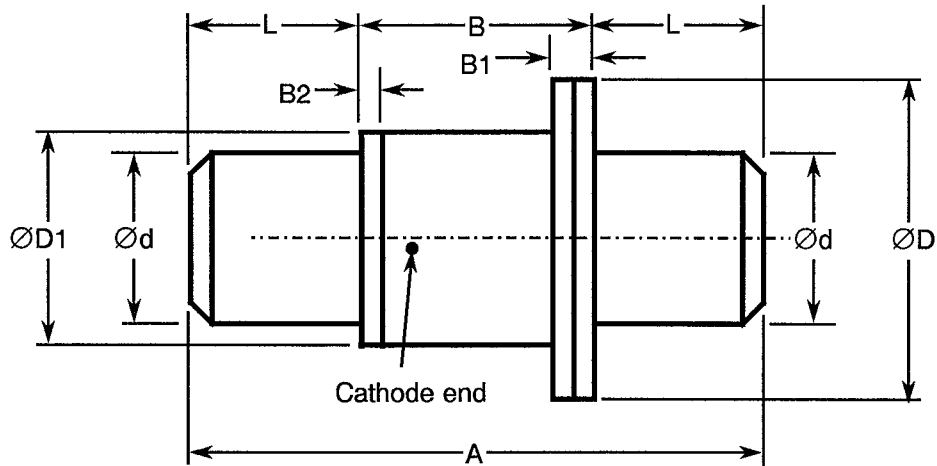




FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(g) - VARIANTS 07, 16, 25, 34, 43, 52, 61



SYMBOL	MILLIMETRES	
	MIN	MAX
A	5.20	5.72
B	2.16	2.46
B1	0.41	0.61
B2	0.15	0.25
Ød	1.52	1.63
ØD	3.00	3.23
ØD1	1.95	2.11
L	1.52	1.63

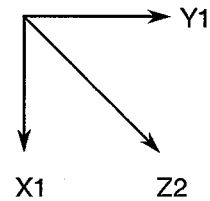
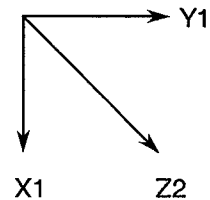
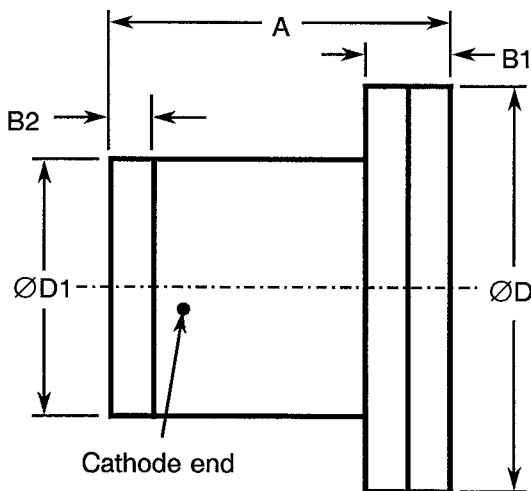


FIGURE 2(h) - VARIANTS 08, 17, 26, 35, 44, 53, 62



SYMBOL	MILLIMETRES	
	MIN	MAX
A	1.40	1.60
B1	0.40	0.60
B2	0.15	0.25
ØD	2.94	3.14
ØD1	1.93	2.13



FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(i) - VARIANTS 09, 18, 27, 36, 45, 54, 63

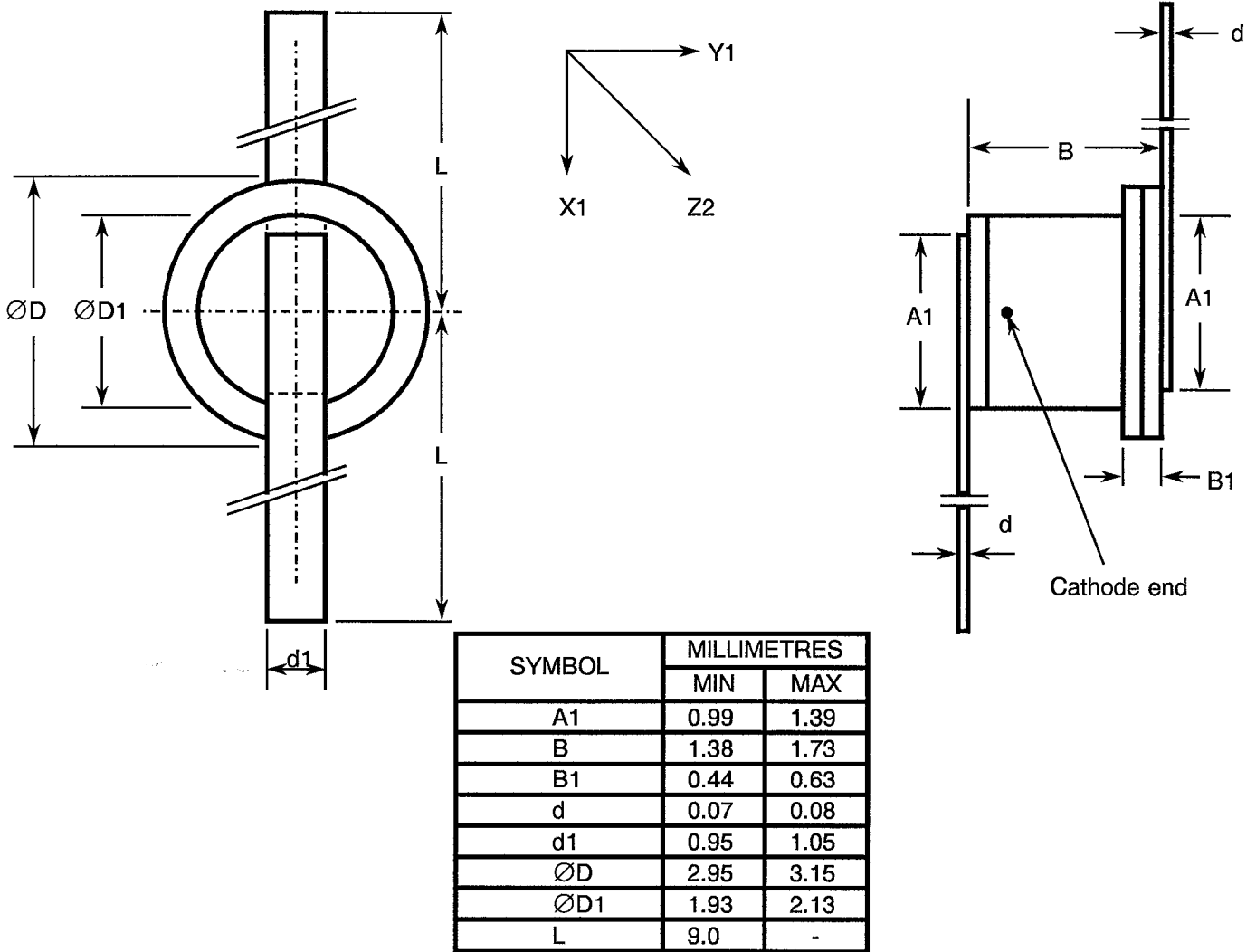


FIGURE 3 - FUNCTIONAL DIAGRAM

- 1. Anode
- 2. Cathode





4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the diodes specified herein shall be as stated in this specification and ESA/SCC Generic Specification No. 5010 for Discrete Microwave Semiconductor Components. Deviations from the Generic Specification applicable to this specification only, are listed 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 ESA/SCC requirements and do not affect the components' reliability, are listed in the appendices attached to this specification.

4.2 DEVIATIONS FROM GENERIC SPECIFICATION

4.2.1 Deviations from Production Control

None.

4.2.2 Deviations from Final Production Tests (Chart II(b))

None.

4.2.3 Deviations from Burn-in and Electrical Measurements (Chart III)

None.

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.14, Vibration Test: Shall not be performed.

(b) Para. 9.15, Constant Acceleration: Shall not be performed.

(c) Para. 9.19, Terminal Strength: Shall not be performed for Variants 02, 07, 08, 11, 16, 17, 20, 25, 26, 29, 34, 35, 38, 43, 44, 47, 52, 53, 56, 61 and 62.

(d) Para. 9.23, Special Testing: Shall not be performed.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.14, Vibration Test: Shall not be performed.

(b) Para. 9.15, Constant Acceleration: Shall not be performed.

(c) Para. 9.19, Terminal Strength: Shall not be performed for Variants 02, 07, 08, 11, 16, 17, 20, 25, 26, 29, 34, 35, 38, 43, 44, 47, 52, 53, 56, 61 and 62.

(d) Para. 9.23, Special Testing: Shall not be performed.

4.3 MECHANICAL AND ENVIRONMENTAL REQUIREMENTS

4.3.1 Dimension Check

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

4.3.2 Weight

The maximum weight of the diodes specified herein shall be as follows:

- Variants 01 to 06, 10 to 15, 19 to 24, 28 to 33, 37 to 42, 46 to 51 and 55 to 60: 0.02g.
- Variants 07, 16, 25, 34, 43, 52 and 61: 0.15g.
- Variants 08, 09, 17, 18, 26, 27, 35, 36, 44, 45, 53, 54, 62 and 63.: 0.06g.



4.3.3 Terminal Strength

The requirements for terminal strength are specified in Section 9 of ESA/SCC Generic Specification No. 5010. The test conditions shall be as follows:-

(a) **Condition:** 'A' (Tension).

Variants 01, 03 to 06, 09, 10, 12 to 15, 18, 19, 21 to 24, 27, 28, 30 to 33, 36, 37, 39 to 42, 45, 46, 48 to 51, 54, 55, 57 to 60 and 63.

- Force: 1.25N
- Duration: 10 seconds.

4.3.4 Bond Strength

The requirements for bond strength are specified in Section 9 of ESA/SCC Generic Specification No. 5010. The test conditions shall be as follows:-

(a) **Condition:** 'A'.

4.3.5 Die Shear

The requirements for die shear are specified in Section 9 of ESA/SCC Generic Specification No. 5010.

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 diodes specified herein to meet the performance requirements of this specification shall be used. Acceptance or approval of any constituent material shall not guarantee acceptance of the finished product.

4.4.1 Case

The case shall be hermetically sealed and have a ceramic body. The lid shall be welded or preform soldered.

4.4.2 Lead Materials and Finish

- (a) For Variants 01, 03 to 06, 09, 10, 12 to 15, 18, 19, 21 to 24, 27, 28, 30 to 33, 36, 37, 39 to 42, 45, 46, 48 to 51, 54, 55, 57 to 60 and 63, the body material shall be Type 'D' with Type '7' finish and the lid material shall be Type 'E' with Type '2' finish, in accordance with the requirements of ESA/SCC Basic Specification No. 23500.
- (b) For Variants 02, 08, 11, 17, 20, 26, 29, 35, 38, 44, 47, 53, 56 and 62, the body and lid material shall be Type 'D' with Type '7' finish, in accordance with the requirements of ESA/SCC Basic Specification No. 23500.
- (c) For Variants 07, 16, 25, 34, 43, 52 and 61, the body material shall be Type 'A' with Type '7' finish and the lid material shall be Type 'D' with Type '7' finish, in accordance with the requirements of ESA/SCC 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 ESA/SCC 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:-

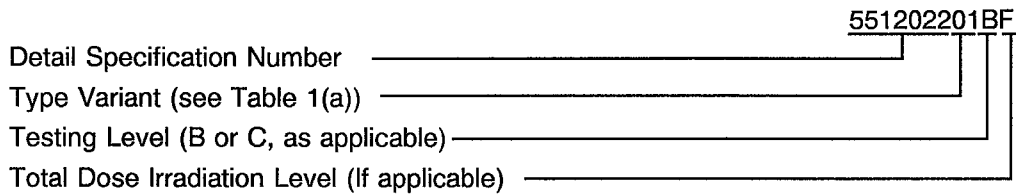
- (a) Cathode Identification.
- (b) The SCC Component Number.
- (c) Traceability Information.

4.5.2 Cathode Identification

Cathode identification shall be as shown in Figures 2 and 3 of this specification.

4.5.3 The SCC Component Number

Each component shall bear the SCC Component Number which shall be constituted and marked as follows:



The Total Dose Irradiation Level designation shall be added for those devices for which a sample has been successfully tested to the level in question. For these devices, a code letter shall be added in accordance with the requirements of ESA/SCC Basic Specification No. 22900.

4.5.4 Traceability Information

Each component shall be marked in respect of traceability information as defined in ESA/SCC Basic Specification No. 21700.

4.6 ELECTRICAL MEASUREMENTS

4.6.1 Electrical Measurements at Room Temperature

The parameters to be measured at room temperature are scheduled in Table 2. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

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. Unless otherwise specified, the measurements shall be performed at $+150(+0-3)$ °C.



4.7 BURN-IN TESTS

Burn-in shall be Category 1 of Chart III(a).

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, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C. The parameter drift values (Δ) 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 High Temperature Reverse Bias Burn-in

The requirements for the high temperature reverse bias burn-in are specified in Section 9 of ESA/SCC Generic Specification No. 5010. The conditions for high temperature reverse bias burn-in shall be as specified in Table 5(a) of this specification.

4.7.3 Conditions for Power Burn-in

The requirements for power burn-in are specified in Section 9 of ESA/SCC Generic Specification No. 5010. The conditions for power burn-in shall be as specified in Table 5(b) of this specification.

4.7.4 Electrical Circuits for High Temperature Reverse Bias Burn-in

Circuits for use in performing the high temperature reverse bias burn-in test are shown in Figure 5(a) of this specification.

4.7.5 Electrical Circuits for Power Burn-in (Figure 5(b))

Not applicable.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - D.C. PARAMETERS**

No.	CHARACTERISTICS	SYMBOL	MIL-STD-750 TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
1	Reverse Current 1	I_{R1}	4016	$V_R = -20V$	-	10	μA
2	Reverse Current 2	I_{R2}	4016	$V_R = -16V$	-	50	nA
3	Forward Voltage	V_F	4011	$I_F = 10mA$	-	1.0	V

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - A.C. PARAMETERS

No.	CHARACTERISTICS	SYMBOL	MIL-STD-750 TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
4	Total Capacitance	C_T	4001	$V_R = -6.0V$ $f = 1.0MHz$	-	Note 1	pF
5	Tuning Ratio	C_{T0}/C_{T20}	4001	$V_R = 0V$ $V_R = -20V$ $f = 1.0MHz$ Note 2	Note 3	-	-
6	Quality Factor	Q	-	$V_R = -6.0V$ $f = 1.0GHz$	Note 4	-	-

NOTES

1. See Column 4 of Table 1(a).
2. Ratio = C_T at $V_R = 0V$
 C_T at $V_R = -20V$
3. See Column 5 of Table 1(a).
4. See Column 6 of Table 1(a). Guaranteed but not tested.

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
2	Reverse Current 2	I_{R2}	4016	$V_R = -16V$	-	10	μA

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

Not applicable.



TABLE 4 - PARAMETER DRIFT VALUES

No.	CHARACTERISTICS	SYMBOL	SPEC.AND/OR TEST METHOD	TEST CONDITIONS	CHANGE LIMITS (Δ)	UNIT
2	Reverse Current 2	I_{R2}	As per Table 2	As per Table 2	± 100 or (1) ± 10	% nA
3	Forward Voltage	V_F	As per Table 2	As per Table 2	± 5.0	%
4	Total Capacitance	C_T	As per Table 2	As per Table 2	± 5.0 (2)	%

NOTES

1. Whichever is greater, referred to the initial measurement.
2. Rounded upwards to the nearest 0.01pF. If $C_T < 0.25\text{pF}$, then $\Delta = \pm 10\%$.

TABLE 5(a) - CONDITIONS FOR HIGH TEMPERATURE REVERSE BIAS BURN-IN AND OPERATING LIFE TESTS

No.	CHARACTERISTICS	SYMBOL	CONDITIONS	UNIT
1	Ambient Temperature	T_{amb}	+ 150(- 0 + 3)	$^{\circ}\text{C}$
2	Reverse Voltage	V_R	- 16	V
3	Duration	t	For Testing Level 'B': 240(+ 8 - 0) For Testing Level 'C': 168(+ 8 - 0)	Hours

TABLE 5(b) - CONDITIONS FOR POWER BURN-IN

No.	CHARACTERISTICS	SYMBOL	CONDITIONS	UNIT
1	Ambient Temperature	T_{amb}	+ 125(- 0 + 3)	$^{\circ}\text{C}$
2	Forward Current	I_F	50	mA
3	Duration	t	48(+ 8 - 0)	Hours

FIGURE 5(a) - ELECTRICAL CIRCUIT FOR HIGH TEMPERATURE REVERSE BIAS BURN-IN AND OPERATING LIFE TESTS

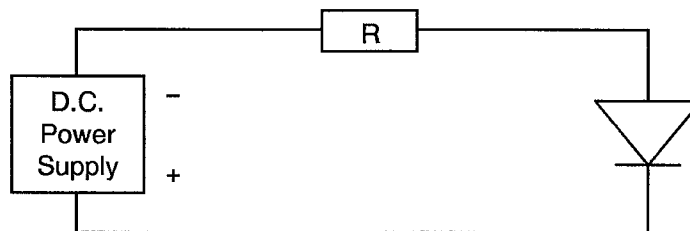


FIGURE 5(b) - ELECTRICAL CIRCUIT FOR POWER BURN-IN

Not applicable.



4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION NO. 5010)

4.8.1 Electrical Measurements on Completion of Environmental Tests

The parameters to be measured on completion of environmental tests are scheduled in Table 2. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

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

The parameters to be measured at intermediate points and on completion of endurance tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

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

The requirements for operating life testing are specified in Section 9 of ESA/SCC Generic Specification No. 5010. The conditions for operating life testing are specified in Table 5(a) of this specification, except that the duration shall be as specified in ESA/SCC Generic Specification No. 5010, Para. 9.20.

4.8.4 Electrical Circuit for Operating Life Tests

The circuit to be used for performance of the operating life tests shall be the same as shown in Figure 5(a) for high temperature reverse bias burn-in.

4.9 TOTAL DOSE IRRADIATION TESTING

Not applicable.

4.10 SPECIAL TESTING

Not applicable.



TABLE 6 - ELECTRICAL MEASUREMENTS AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
1	Reverse Current 2	I_{R2}	As per Table 2	As per Table 2	-	20	μ A
2	Total Capacitance	C_T	As per Table 2	As per Table 2	-	Note 1	pF
3	Forward Voltage	V_F	As per Table 2	As per Table 2	-	1.0	V

NOTES



1. See Column 4 of Table 1(a).

FIGURE 6 - BIAS CONDITIONS FOR IRRADIATION TESTING

Not applicable.

TABLE 7 - ELECTRICAL MEASUREMENTS DURING AND ON COMPLETION OF IRRADIATION TESTING

Not applicable.

		<p>ESA/SCC Detail Specification No. 5512/022</p>	<p>PAGE 22 ISSUE 1</p>
---	---	--	----------------------------

APPENDIX 'A'

Page 1 of 1

AGREED DEVIATIONS FOR TEKELEC (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 4.2.2	Para. 9.12, Radiographic Inspection of Chart III(a): May be performed after Para. 9.7, PIND test.
Para. 4.2.3	Para. 9.12, Radiographic Inspection: May be performed after Para. 9.7, PIND test of Chart II(b).