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TRANSISTORS, MATCHED DUAL, PNP

BASED ON TYPE 2N3350

ESA/SCC Detail Specification No. 5207/003

space components
coordination group

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 3	January 1999		
Revision 'A'	July 1999		
Revision 'B'	November 1999		
Revision 'C'	February 2000		

DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
		This Issue supersedes Issue 2 and incorporates all modifications defined in Revisions 'A' and 'B' to Issue 2 and the changes agreed by the following DCRs:-		
		Cover Page		None
		DCN		None
		Para. 1.2	: "See Table 1(a)" deleted and new text added	221490
		Para. 2	: Item (c) deleted	221490
		Table 1(a)	: Lead Material Column heading amended	221490
			: "(a)" added to "2" in Figure Column	221490
			: Variant 04 added	221490
		Table 1(b)	: Nos. 1 to 3 , "Breakdown" deleted from Characteristics	221490
			, "(BR)" deleted from Symbol	221490
			: No. 4, "(Continuous)" added to Characteristics	221490
			: No. 5 , Variants added to existing Characteristics	221490
			, Symbol amended	221490
			, Variant 04 entry added	221490
			: No. 6 , Variants added to Characteristics	221490
			, Symbol amended	221490
			: No. 7 , Remarks added	221490
			: No. 9 , Variants added to Characteristics	221490
			, Maximum Ratings amended	221490
			, Remarks deleted and new Remarks added	221490
			: Notes 1 and 2 extended	221490
			: Notes 3 to 5 added	221490
		Figure 1	: In the Graph, temperature designation amended	221490
			: Existing Notes deleted and new Notes added	221490
		Figure 2	: Subtitle added and Imperial Dimensions deleted from the Table and Notes	221490
		Figure 2(b)	: New Figure added	221490
		Para. 4.3.2	: Text extended	221490
		Para. 4.3.3	: "For Variants 01 to 03," added to the beginning of the second sentence	221490
		Para. 4.4.1	: Existing text deleted and new text added	221490
		Para. 4.5.1	: Existing text deleted and new text added	221490
		Para. 4.5.5	: Deleted in toto	221490
		Para. 4.6.3	: Title amended, text deleted and "Not applicable" added	221490
		Para. 4.7.2	: Existing paragraph renumbered to "4.7.3" and amended	221490
			: New paragraph added	221490
		Para. 4.7.3	: Existing paragraph renumbered to "4.7.5" and amended	221490
		Para. 4.7.4	: New paragraph added	221490
		Table 2 d.c.	: No. 5, In Test Conditions, V_{EB} amended to "5.0V"	221490
		Table 2 a.c.	: Tests renumbered as "11 to 17" respectively	221490
		Table 3	: No. 1, Renumbered as "4"	221490
			: No. 2, Renumbered as "6" and Symbol amended	221490
			: No. 3, Renumbered as "10(a)"	221490
			: No. 4, Renumbered as "9" and moved before 10(a)	221490
		Figure 4	: Title amended	221490

DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
		Table 4	: In the Table, Spec. and Test Conditions replaced by "As per Table 2"	221490
			: No. 1, Renumbered as "4"	221490
			: No. 2, Renumbered as "6" and Symbol amended	221490
			: No. 3, Renumbered as "7"	221490
			: Where necessary " ± " added to Limits	221490
		Table 5	: Main Title deleted	221490
			: First Subtitle amended	221490
			: Table and Note amended	221490
			: Second Subtitle amended and Tables reversed in sequence	221490
		Figure 5	: Main Title deleted	221490
			: Both Subtitles amended and Figures reversed in sequence	221490
		Para. 4.8.1	: "Unless otherwise stated," added at the beginning of the second sentence	221490
		Para. 4.8.2	: Second sentence added	221490
		Para. 4.8.3	: Second sentence amended	221490
		Para. 4.8.4	: Text amended	221490
		Table 6	: Nos. 1 to 5, In the Table, Spec. and Test Conditions replaced by "As per Table 2"	221490
			: No. 6, In the Table, Spec. and Test Conditions replaced by "As per Table 3"	221490
			: No. 1, Renumbered as "4"	221490
			: No. 2, Renumbered as "6" and Symbol amended	221490
			: No. 3, Renumbered as "7"	221490
			: No. 4, Renumbered as "9"	221490
			: No. 5, Renumbered as "10"	221490
			: No. 6, Renumbered as "10(a)"	221490
'A'	Jul. '99	P1. Cover page		None
		P2A. DCN		None
		P9. Figure 2(b)	: In the Table, Dimension 'C' amended	23911
'B'	Nov. '99	P1. Cover page		None
		P2A. DCN		None
		P6. Table 1(a)	: Variant 05 added	221535
		Table 1(b)	: Nos. 5 and 9, Variant numbers amended	221535
		P7. Figure 1	: Legend changed to "Variants 04 and 05"	221535
		P9. Figure 2(b)	: Title amended	221535
		Figure 3	: Changed to "Variants 04 and 05"	221535
		P10. Para. 4.3.2	: Sentence amended	221535
		P11. Para. 4.4.1	: Text amended	221535
		Para. 4.4.2	: New sentence added	221535
'C'	Feb. '00	P1. Cover page		None
		P2A. DCN		None
		P6. Table 1(a)	: Variant 04, Based on Type corrected to "2N3350"	23920

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TABLES

FIGURES

APPENDICES (Applicable to specific Manufacturers only)
None.

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Transistors, Matched Dual, PNP, based on Type 2N3350. It shall be read in conjunction with ESA/SCC Generic Specification No. 5000, the requirements of which are supplemented herein.

1.2 COMPONENT TYPE VARIANTS

Variants of the basic type transistors 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 transistors specified herein, are scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION

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

1.5 PHYSICAL DIMENSIONS

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

1.6 FUNCTIONAL DIAGRAM

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

1.7 HIGH TEMPERATURE TEST PRECAUTIONS

For tin-lead plated or solder-dipped lead finish, all tests to be performed at a temperature that exceeds +125°C shall be carried out in a 100% inert atmosphere.

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. 5000 for Discrete Semiconductor Components.

(b) MIL-STD-750, Test Methods and Procedures 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

VARIANT	BASED ON TYPE	CASE	FIGURE	LEAD MATERIAL AND/OR FINISH
01	2N3350	TO77	2(a)	D2
02	2N3350	TO77	2(a)	D3 or D4
03	2N3350	TO77	2(a)	D7
04	2N3350	LCCC6	2(b)	2
05	2N3350	LCCC6	2(b)	4

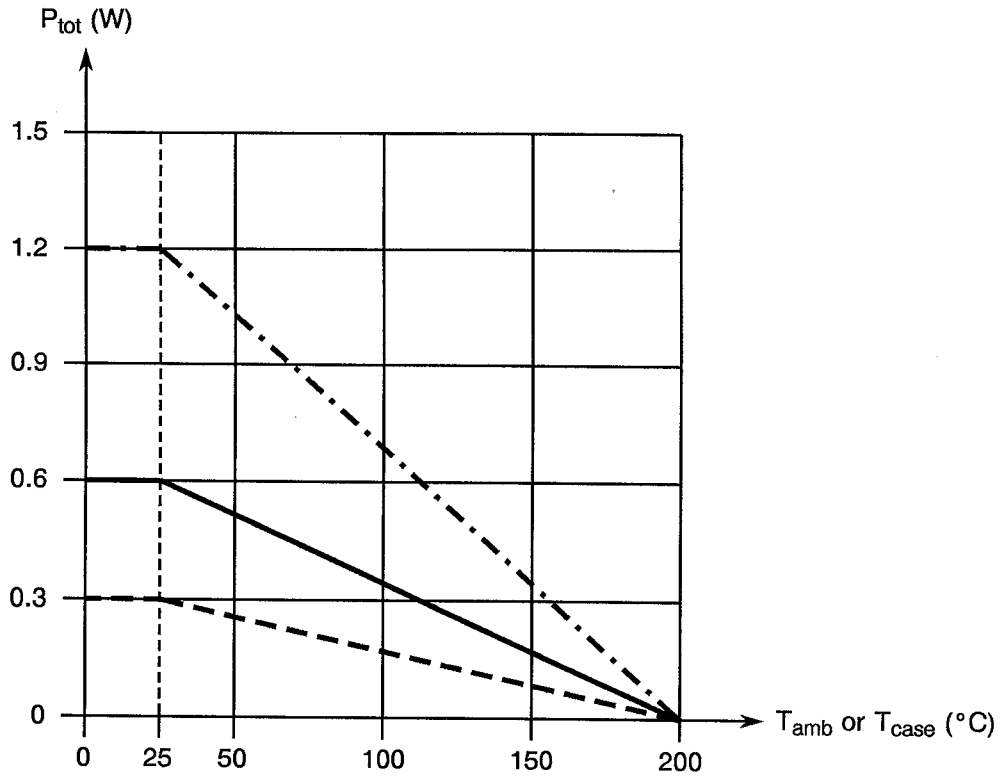
TABLE 1(b) - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Collector-Base Voltage	V_{CBO}	−60	V	
2	Collector-Emitter Voltage	V_{CEO}	−45	V	
3	Emitter-Base Voltage	V_{EBO}	−6.0	V	
4	Collector Current (Continuous)	I_C	30	mA	
5	Power Dissipation 1 All Variants	P_{tot1}	0.3 (Note 1) 0.6 (Note 2)	W	T_{amb} = +25°C
	Variants 04 and 05		0.6 (Notes 1 and 3) 1.2 (Notes 2 and 3)		
6	Power Dissipation 2 Variants 01 to 03	P_{tot2}	0.6 (Note 1) 1.2 (Note 2)	W	T_{case} = +25°C
7	Operating Temperature Range	T_{amb}	−55 to +200	°C	T_{amb} or T_{case}
8	Storage Temperature Range	T_{stg}	−65 to +200	°C	
9	Soldering Temperature Variants 01 to 03 Variants 04 and 05	T_{sol}	+260 +245	°C	Note 4 Note 5

NOTES

1. One section. For derating at T_{amb} or T_{case} > +25°C, see Figure 1.
2. Both sections. For derating at T_{amb} or T_{case} > +25°C, see Figure 1.
3. When mounted on a 15 x 15 x 0.6 mm ceramic substrate.
4. Duration 10 seconds maximum at a distance of not less than 1.5mm from the device body, and the same lead shall not be resoldered until 3 minutes have elapsed.
5. Duration 5 seconds maximum and the same terminal shall not be resoldered until 3 minutes have elapsed.

FIGURE 1 - PARAMETER DERATING INFORMATION



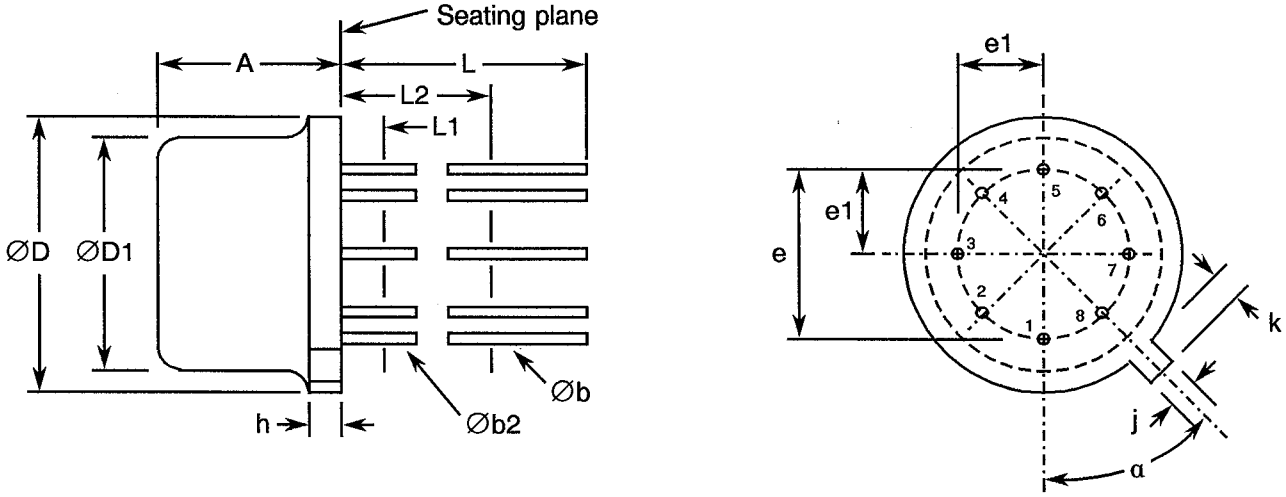
Power Dissipation versus Temperature

Legend

- Variants 01 to 03, T_{case} one section.
- Variants 01 to 03, T_{case} both sections.
- Variants 01 to 04, T_{amb} both sections.
- Variants 01 to 04, T_{amb} one section.
- Variants 04 and 05, T_{amb} one section, when mounted on a 15 x 15 x 0.6 mm ceramic substrate.
- Variants 04 and 05, T_{amb} both sections, when mounted on a 15 x 15 x 0.6 mm ceramic substrate.

FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2(a) - VARIANTS 01 TO 03



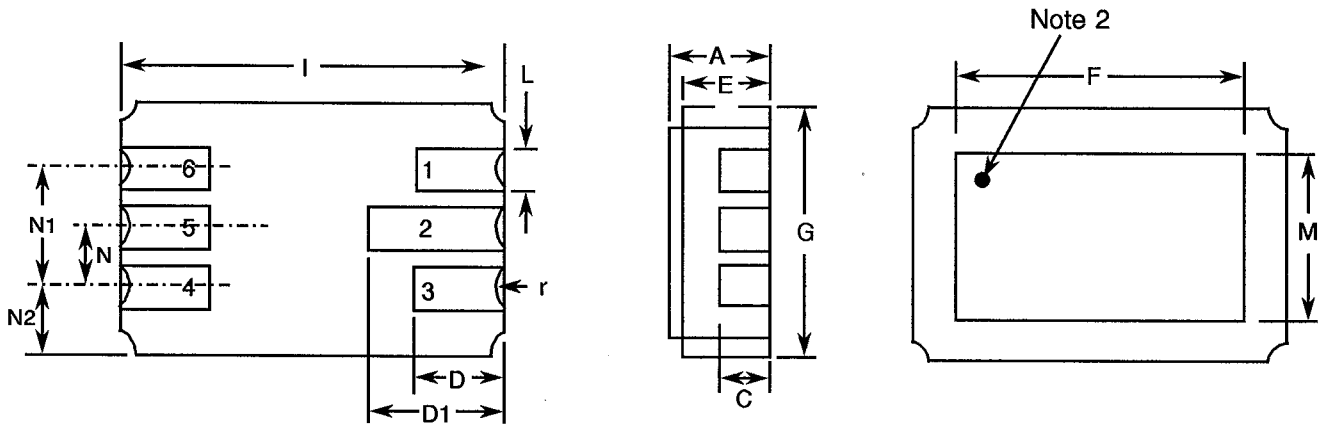
SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	6.10	6.60	
Øb	0.406	0.533	2
Øb2	0.406	0.483	2
ØD	8.51	9.40	
ØD1	7.75	8.51	
e	5.08 T.P.		4
e1	2.54 T.P.		4
h	-	1.02	
j	0.711	0.864	
k	0.737	1.14	3
L	12.70	-	2
L1	-	1.27	2
L2	6.35	-	2
α	45° T.P.		4, 6

NOTES

1. (8 leads) Maximum number of leads omitted in this outline, "three" (3). The number and position of leads actually present are indicated in the product registration. Outline designation determined by the location and minimum angular or linear spacing of any two adjacent leads.
2. (All leads) Øb2 applies between L1 and L2. Øb applies between L2 and 12.70mm from seating plane. Diameter is uncontrolled in L1 and beyond 12.70mm from seating plane.
3. Measured from maximum diameter of the product.
4. Leads having maximum diameter 0.483mm measured in gauging plane 1.37mm + 0.025mm − 0.000mm below the seating plane of the product shall be within 0.178mm of their true positions relative to a maximum-width tab.
5. The product may be measured by direct methods or by gauge.
6. Tab centreline.

FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(b) - VARIANTS 04 AND 05



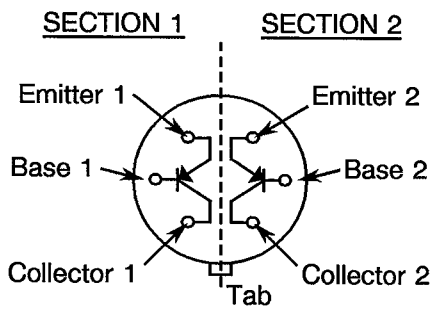
SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	1.53	1.96	
C	0.89 TYP.		1
D	1.52	1.78	
D1	2.09	2.49	
E	1.25	1.55	
F	5.76	5.91	
G	4.19	4.45	
I	6.09	6.35	
L	0.55	0.71	1
M	3.86	4.01	
N	1.14	1.4	
N1	2.41	2.67	
N2	0.89 TYP.		
r	0.23 TYP.		

NOTES

1. Dimensions are the same for the 6 leads.
2. From topside view, pin 1 is indicated by a black ink dot.

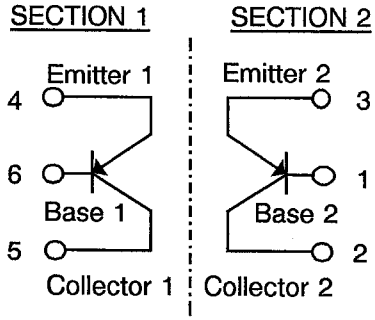
FIGURE 3 - FUNCTIONAL DIAGRAM

VARIANTS 01 TO 03



CONNECTION DIAGRAM

VARIANTS 04 AND 05



CONNECTION DIAGRAM

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the transistors specified herein shall be as stated in this specification and ESA/SCC Generic Specification No. 5000 for Discrete Semiconductors. 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 Special In-process Controls

None.

4.2.2 Deviations from Final Production Tests (Chart II)

None.

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

None.

4.2.4 Deviations from Qualification Tests (Chart IV)

None.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

None.

4.3 MECHANICAL REQUIREMENTS

4.3.1 Dimension Check

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

4.3.2 Weight

The maximum weight of the transistors specified herein shall be 0.95 grammes for Variants 01 to 03 and 0.2 grammes for Variants 04 and 05.

4.3.3 Terminal Strength

The requirements for terminal strength testing are specified in Section 9 of ESA/SCC Generic Specification No. 5000. For Variants 01 to 03, the test conditions shall be as follows:-

Test Condition: 'E', Lead Fatigue.
Applied Force: 2.5 ± 0.1 Newtons.

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 transistors 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 Case

For Variants 01 to 03, the case shall be hermetically sealed and have a metal body with hard glass seals and the lid shall be welded, brazed, preform soldered or glass frit sealed.

For Variants 04 and 05, the case shall be hermetically sealed and have a ceramic body with a kovar lid.

4.4.2 Lead Material and Finish

For Variants 01 to 03, the lead material shall be Type 'D' with either Type '2', Type '3 or 4' or Type '7' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. (See Table 1(a) for Type Variants).

For Variant 04, the terminal material shall have Type '2' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. (See Table 1(a) for Type Variants).

For Variant 05, the terminal material shall have Type '4' finish in accordance with the requirements of ESA/SCC Basic Specification No. 23500. (See Table 1(a) for Type Variants).

4.5 MARKING

4.5.1 General

The marking of all components delivered to this specification shall be in accordance with 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) Lead Identification.

(b) The SCC Component Number.

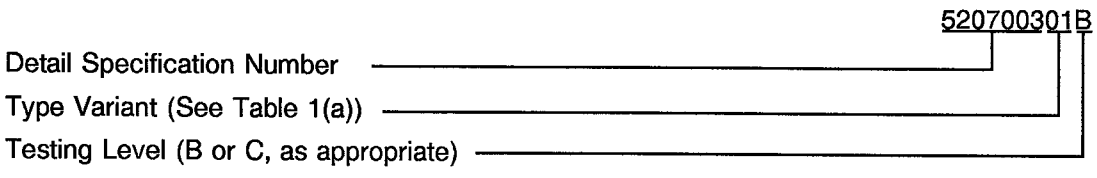
(c) Traceability Information.

4.5.2 Lead Identification

Lead identification shall be as shown in Figures 2 and 3.

4.5.3 The SCC Component Number

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



4.5.4 Traceability Information

Each component shall be marked in respect of traceability information in accordance with the requirements of 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. 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.

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 $T_{amb} = +22 \pm 3$ °C. The parameter drift values (Δ) applicable to the parameters scheduled, shall not be exceeded. In addition to these drift value requirements, the appropriate limit value specified for a given parameter in Table 2 shall not be exceeded.

4.7.2 Conditions for High Temperature Reverse Bias Burn-in

The requirements for high temperature reverse bias burn-in are specified in Section 7 of ESA/SCC Generic Specification No. 5000. 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 7 of ESA/SCC Generic Specification No. 5000. 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 are shown in Figure 5(a) of this specification.

4.7.5 Electrical Circuits Power for Burn-in

Circuits for use in performing the power burn-in tests are shown in Figure 5(b) of this specification.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - d.c. PARAMETERS

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
1	Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	MIL-STD-750 Method 3001	$I_C = 10\mu A$ $I_E = 0A$	−60	-	V
2	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	MIL-STD-750 Method 3011	$I_C = 10mA$ $I_B = 0A$ Note 1	−45	-	V
3	Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	MIL-STD-750 Method 3026	$I_E = 10\mu A$ $I_C = 0A$	−6.0	-	V
4	Collector-Base Cut-off Current	I_{CBO}	MIL-STD-750 Method 3036	$V_{CB} = 45V$ $I_E = 0A$	-	−10	nA
5	Emitter-Base Cut-off Current	I_{EBO}	MIL-STD-750 Method 3061	$V_{EB} = 5.0V$ $I_C = 0A$	-	−2.0	nA
6	D.C. Forward Current Transfer Ratio	h_{FE1}	MIL-STD-750 Method 3076	$I_C = 10\mu A$ $V_{CE} = 5.0V$	100	300	-
		h_{FE2}		$I_C = 1.0mA$ $V_{CE} = 5.0V$	150	-	
7	Collector Saturation Voltage	$V_{CE(SAT)}$	MIL-STD-750 Method 3071	$I_C = 10mA$ $I_B = 0.5mA$	-	−0.5	V
8	Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	MIL-STD-750 Method 3066	$I_C = 10mA$ $I_B = 1.0mA$	-	−0.9	V
9	D.C. Current Gain Ratio	$\frac{h_{FE1}}{h_{FE2}}$	MIL-STD-750 Method 3076-1	$I_C = 10\mu A$ $V_{CE} = 5.0V$	0.9	1.1	-
10	Base-Emitter Voltage Differential	$\lvert V_{BE1} - V_{BE2} \rvert$		$I_C = 10\mu A$ $V_{CE} = 5.0V$	-	5.0	mV

NOTES

1. Pulse measurement: Pulse length ≤300μs, Duty Cycle ≤2%.

TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - a.c. PARAMETERS

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
11	Current Gain Bandwidth Product	f_T	MIL-STD-750 Method 3206	$I_C = 1.0mA$ $V_{CE} = 5.0V$ $f = 30MHz$	60	240	MHz
12	Small Signal Common Emitter Forward Current Transfer Ratio	h_{FE}	MIL-STD-750 Method 3206	$I_C = 1.0mA$ $V_{CB} = 5.0V$ $f = 1.0kHz$	150	600	-
13	Noise Figure	N_F	MIL-STD-750 Method 3246-1	$I_C = 10\mu A$ $V_{CE} = 5.0V$ $R_S = 10k\Omega$ $B_W = 15.7kHz$	-	4.0	dB
14	Small Signal Input Impedance	h_{ie}	MIL-STD-750 Method 3201	$I_C = 1.0mA$ $V_{CE} = 5.0V$ $f = 1.0kHz$	3.7	20	kΩ
15	Small Signal Output Impedance	h_{oe}	MIL-STD-750 Method 3216	$I_C = 1.0mA$ $V_{CE} = 5.0V$ $f = 1.0kHz$	-	100	µmho
16	Output Capacitance	C_{obo}	MIL-STD-750 Method 3236	$V_{CB} = 5.0V$ $I_E = 0A$ $f = 1.0MHz$	-	6.0	pF
17	Input Capacitance	C_{ib}	MIL-STD-750 Method 3240	$V_{EB} = 0.5V$ $I_C = 0A$ $f = 1.0MHz$	-	12	pF

NOTES

1. If more than 20 units have to be measured, the a.c. parameter measurements shall be made on a sample basis in accordance with Para. 7.4.2 of ESA/SCC Generic Specification No. 5000. Inspection Level II with an AQL = 2.5%.

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
4	Collector-Base Cut-off Current	I_{CBO}	MIL-STD-750 Method 3036	V_{CB} = 45V I_E = 0A T_{amb} = +150°C	-	10	µA
6	D.C. Forward Current Transfer Ratio	h_{FE2}	MIL-STD-750 Method 3076	I_C = 1.0mA V_{CE} = 5.0V T_{amb} = −55°C	70	-	-
9	D.C. Current Gain Ratio	$\frac{h_{FE1}}{h_{FE2}}$	MIL-STD-750 Method 3076	I_C = 10µA V_{CE} = 5.0V T_{amb} = −55 to +125 °C	0.9	1.1	-
10(a)	Base-Emitter Voltage Differential Change	$\lvert \frac{\Delta(V_{BE1} - V_{BE2})}{\Delta T_{amb}} \rvert$	MIL-STD-750 Method 3066	I_C = 10µA V_{CE} = 5.0V T_{amb} = −55 to +25 °C	-	0.8	mV
				I_C = 10µA V_{CE} = 5.0V T_{amb} = +25 to +125 °C	-	1.0	

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
4	Collector-Base Cut-off Current	I_{CBO}	As per Table 2	As per Table 2	±1.5	nA
6	D.C. Current Gain Ratio	h_{FE1}	As per Table 2	As per Table 2	±15	%
7	Collector Saturation Voltage	$V_{CE(SAT)}$	As per Table 2	As per Table 2	±15 or (1) ±15	mV %

NOTES

1. Whichever is greater.

TABLE 5(a) - CONDITIONS FOR HIGH TEMPERATURE REVERSE BIAS BURN-IN

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Case Temperature	T_{case}	+150	°C
2	Collector-Base Voltage	V_{CB}	−60	V
3	Emitter-Base Voltage	V_{EB}	−6.0	V
4	Duration	t	72	Hrs

TABLE 5(b) - CONDITIONS FOR POWER BURN-IN AND OPERATING LIFE TESTS

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	+25 ± 3	°C
2	Collector-Emitter Voltage	V_{CE}	−30	V
3	Power Dissipation 1	P_{tot1}	Maximum rating at T_{amb} according to derating curve (Note 1)	W

NOTES

1. See Item 5 of Table 1(a).

FIGURE 5(a) - ELECTRICAL CIRCUIT FOR HIGH TEMPERATURE REVERSE BIAS BURN-IN

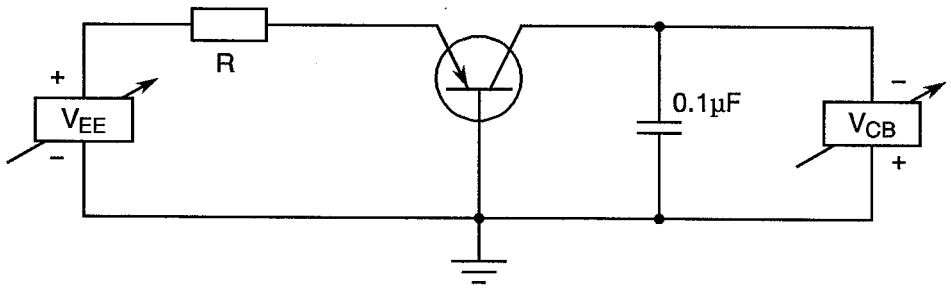
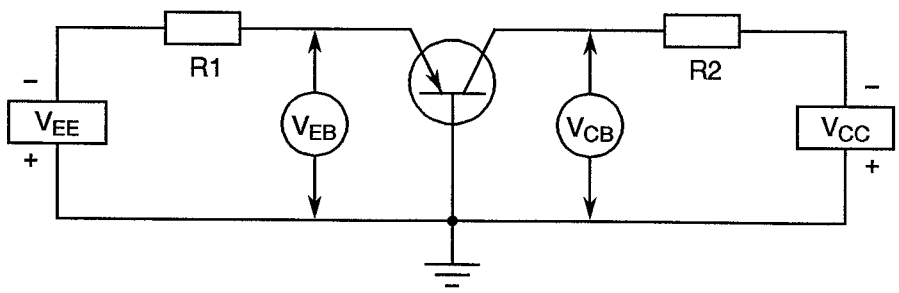


FIGURE 5(b) - ELECTRICAL CIRCUIT FOR POWER BURN-IN AND OPERATING LIFE TESTS



4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION No. 5000)

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 $T_{amb} \triangleq +22 \pm 3$ °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. 5000. The conditions for operating life testing shall be the same as specified in Table 5(b) for the power burn-in test.

4.8.4 Electrical Circuits 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(b) for power burn-in.

4.8.5 Conditions for High Temperature Storage Test (Part of Endurance Testing)

The requirements for the high temperature storage test are specified in ESA/SCC Generic Specification No. 5000. The temperature to be applied shall be the maximum storage temperature specified in Table 1(b) of this specification.

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.	
4	Collector-Base Cut-off Current	I_{CBO}	As per Table 2	As per Table 2	-	10	nA
6	D.C. Forward Current Transfer Ratio	h_{FE1}	As per Table 2	As per Table 2	100	300	-
7	Collector Saturation Voltage	$V_{CE(SAT)}$	As per Table 2	As per Table 2	-	0.5	V
9	D.C. Current Gain Ratio	$\frac{h_{FE1}}{h_{FE2}}$	As per Table 2	As per Table 2	0.85	1.15	-
10	Absolute Value of Base-Emitter Voltage Differential	$\lvert V_{BE1} - V_{BE2} \rvert$	As per Table 2	As per Table 2	-	5.0	mV
10(a)	Base-Emitter Voltage Differential Change	$\lvert \frac{\Delta(V_{BE1} - V_{BE2})}{\Delta T_{amb}} \rvert$	As per Table 3	As per Table 3 (Note 1)	-	1.0	mV
				As per Table 3 (Note 1)	-	1.2	

NOTES

1. Only to be measured once, at completion of endurance tests.