DIODES, LOW NOISE, VOLTAGE REGULATOR,

BASED ON TYPES 1N4099-1 THRU 1N4135-1

ESCC Detail Specification No. 5102/007

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ESA/SCC Detail Specification No. 5102/007

space components
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APPENDICES (Applicable to specific Manufacturers only)

1. GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics, test and inspection data for Diodes, Low Noise, Voltage Regulator, based on Types 1N4099-1 thru 1N4135-1. 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 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 parameter 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 HIGH TEMPERATURE TEST PRECAUTIONS

For lead finishes Types 3 and 4, after application of lead finish, all tests which are 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 Semiconductors.

(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. In addition, the following abbreviation is used:-

N_D = Noise Density.

TABLE 1(a) - TYPE VARIANTS

(1) Variant	(2) Based on Type	(3) V_Z Min. at I_{Z1} = 250µA (V)	(4) V_Z Nom. at I_{Z1} = 250µA (V)	(5) V_Z Max. at I_{Z1} = 250µA (V)	(6) N_D at I_{Z1} = 250µA 1-3kHz (µV/√Hz)	(7) I_{ZM} (Note 1) (mA)	(8) I_{ZSM} Surge (mA)	(9) Z_Z (Note 2) (Ω)	(10) V_R (V)	(11) I_{R1} (µA)	(12) T_{CVZ} (%/°C)	(13) I_{R2} (Note 3) (µA)	(14) Lead Material and Finish
01	1N4099-1	6.46	6.80	7.14	40	56	650	200	5.2	1.0	+0.060	5.0	L2
02	1N4099-1	6.46	6.80	7.14	40	56	650	200	5.2	1.0	+0.060	5.0	L3 or L4
03	1N4100-1	7.13	7.50	7.87	40	51	650	200	5.7	1.0	+0.065	5.0	L2
04	1N4100-1	7.13	7.50	7.87	40	51	650	200	5.7	1.0	+0.065	5.0	L3 or L4
05	1N4101-1	7.79	8.20	8.61	40	46	650	200	6.3	0.5	+0.070	5.0	L2
06	1N4101-1	7.79	8.20	8.61	40	46	650	200	6.3	0.5	+0.070	5.0	L3 or L4
07	1N4102-1	8.27	8.70	9.13	40	44	650	200	6.7	0.5	+0.075	5.0	L2
08	1N4102-1	8.27	8.70	9.13	40	44	650	200	6.7	0.5	+0.075	5.0	L3 or L4
09	1N4103-1	8.65	9.10	9.50	40	42	650	200	7.0	0.5	+0.080	5.0	L2
10	1N4103-1	8.65	9.10	9.50	40	42	650	200	7.0	0.5	+0.080	5.0	L3 or L4
11	1N4104-1	9.50	10.00	10.50	40	38	650	200	7.6	0.5	+0.080	5.0	L2
12	1N4104-1	9.50	10.00	10.50	40	38	650	200	7.6	0.5	+0.080	5.0	L3 or L4
13	1N4105-1	10.45	11.00	11.55	40	35	590	200	8.5	0.05	+0.080	5.0	L2
14	1N4105-1	10.45	11.00	11.55	40	35	590	200	8.5	0.05	+0.080	5.0	L3 or L4
15	1N4106-1	11.40	12.00	12.60	40	32	540	200	9.2	0.05	+0.080	5.0	L2
16	1N4106-1	11.40	12.00	12.60	40	32	540	200	9.2	0.05	+0.080	5.0	L3 or L4
17	1N4107-1	12.35	13.00	13.65	40	29	500	200	9.9	0.5	+0.080	5.0	L2
18	1N4107-1	12.35	13.00	13.65	40	29	500	200	9.9	0.05	+0.080	5.0	L3 or L4
19	1N4108-1	13.30	14.00	14.70	40	27	464	200	10.7	0.05	+0.085	5.0	L2
20	1N4108-1	13.30	14.00	14.70	40	27	464	200	10.7	0.05	+0.085	5.0	L3 or L4
21	1N4109-1	14.25	15.00	15.75	40	25	433	100	11.4	0.05	+0.085	5.0	L2
22	1N4109-1	14.25	15.00	15.75	40	25	433	100	11.4	0.05	+0.085	5.0	L3 or L4

NOTES: See Page 9.

TABLE 1(a) - TYPE VARIANTS (CONT'D)

(1) Variant	(2) Based on Type	(3) V_Z Min. at I_{Z1} = 250µA (V)	(4) V_Z Nom. at I_{Z1} = 250µA (V)	(5) V_Z Max. at I_{Z1} = 250µA (V)	(6) N_D at I_{Z1} = 250µA 1-3kHz (µV/√Hz)	(7) I_{ZM} (Note 1) (mA)	(8) I_{ZSM} Surge (mA)	(9) Z_Z (Note 2) (Ω)	(10) V_R (V)	(11) I_{R1} (µA)	(12) T_{CVZ} (%/°C)	(13) I_{R2} (Note 3) (µA)	(14) Lead Material and Finish
23	1N4110-1	15.20	16.00	16.80	40	24	406	100	12.2	0.05	+0.085	5.0	L2
24	1N4110-1	15.20	16.00	16.80	40	24	406	100	12.2	0.05	+0.085	5.0	L3 or L4
25	1N4111-1	16.15	17.00	17.85	40	22	382	100	13.0	0.05	+0.090	5.0	L2
26	1N4111-1	16.15	17.00	17.85	40	22	382	100	13.0	0.05	+0.090	5.0	L3 or L4
27	1N4112-1	17.10	18.00	18.90	40	21	361	100	13.7	0.05	+0.090	5.0	L2
28	1N4112-1	17.10	18.00	18.90	40	21	361	100	13.7	0.05	+0.090	5.0	L3 or L4
29	1N4113-1	18.05	19.00	19.95	40	20	342	150	14.5	0.05	+0.090	2.5	L2
30	1N4113-1	18.05	19.00	19.95	40	20	342	150	14.5	0.05	+0.090	2.5	L3 or L4
31	1N4114-1	19.00	20.00	21.00	40	19	325	150	15.2	0.01	+0.090	2.5	L2
32	1N4114-1	19.00	20.00	21.00	40	19	325	150	15.2	0.01	+0.090	2.5	L3 or L4
33	1N4115-1	20.90	22.00	23.10	40	17	295	150	16.8	0.01	+0.090	2.5	L2
34	1N4115-1	20.90	22.00	23.10	40	17	295	150	16.8	0.01	+0.090	2.5	L3 or L4
35	1N4116-1	22.80	24.00	25.20	40	16	271	150	18.3	0.01	+0.090	2.5	L2
36	1N4116-1	22.80	24.00	25.20	40	16	271	150	18.3	0.01	+0.090	2.5	L3 or L4
37	1N4117-1	23.75	25.00	26.25	40	15	260	150	19.0	0.01	+0.090	2.5	L2
38	1N4117-1	23.75	25.00	26.25	40	15	260	150	19.0	0.01	+0.090	2.5	L3 or L4
39	1N4118-1	25.65	27.00	28.35	40	14	240	150	20.5	0.01	+0.090	2.5	L2
40	1N4118-1	26.65	27.00	28.35	40	14	240	150	20.5	0.01	+0.090	2.5	L3 or L4
41	1N4119-1	26.60	28.00	29.40	40	14	232	200	21.3	0.01	+0.095	2.5	L2
42	1N4119-1	26.60	28.00	29.40	40	14	232	200	21.3	0.01	+0.095	2.5	L3 or L4
43	1N4120-1	28.50	30.00	31.50	40	13	216	200	22.8	0.01	+0.095	2.5	L2
44	1N4120-1	28.50	30.00	31.50	40	13	216	200	22.8	0.01	+0.095	2.5	L3 or L4

NOTES: See Page 9.

TABLE 1(a) - TYPE VARIANTS (CONT'D)

(1) Variant	(2) Based on Type	(3) V_Z Min. at I_{Z1} = 250µA (V)	(4) V_Z Nom. at I_{Z1} = 250µA (V)	(5) V_Z Max. at I_{Z1} = 250µA (V)	(6) N_D at I_{Z1} = 250µA 1-3kHz (µV/√Hz)	(7) I_{ZM} (Note 1) (mA)	(8) I_{ZSM} Surge (mA)	(9) Z_Z (Note 2) (Ω)	(10) V_R (V)	(11) I_{R1} (µA)	(12) T_{CVZ} (%/°C)	(13) I_{R2} (Note 3) (µA)	(14) Lead Material and Finish
45	1N4121-1	31.35	33.00	34.65	40	12	197	200	25.1	0.01	+0.095	2.5	L2
46	1N4121-1	31.35	33.00	34.65	40	12	197	200	25.1	0.01	+0.095	2.5	L3 or L4
47	1N4122-1	34.20	36.00	37.80	40	11	180	200	27.4	0.01	+0.095	2.5	L2
48	1N4122-1	34.20	36.00	37.80	40	11	180	200	27.4	0.01	+0.095	2.5	L3 or L4
49	1N4123-1	27.05	39.00	40.95	40	9.8	166	200	29.7	0.01	+0.095	2.5	L2
50	1N4123-1	37.05	39.00	40.95	40	9.8	166	200	29.7	0.01	+0.095	2.5	L3 or L4
51	1N4124-1	40.85	43.00	45.15	40	8.9	151	250	32.7	0.01	+0.095	2.5	L2
52	1N4124-1	40.85	43.00	45.15	40	8.9	151	250	32.7	0.01	+0.095	2.5	L3 or L4
53	1N4125-1	44.65	47.00	49.35	40	8.1	138	250	35.8	0.01	+0.095	4.0	L2
54	1N4125-1	44.65	47.00	49.35	40	8.1	138	250	35.8	0.01	+0.095	4.0	L3 or L4
55	1N4126-1	48.45	51.00	53.55	40	7.5	127	300	38.8	0.01	+0.100	5.0	L2
56	1N4126-1	48.45	51.00	53.55	40	7.5	127	300	38.8	0.01	+0.100	5.0	L3 or L4
57	1N4127-1	53.20	56.00	58.80	40	6.7	116	300	42.6	0.01	+0.100	5.0	L2
58	1N4127-1	53.20	56.00	58.80	40	6.7	116	300	42.6	0.01	+0.100	5.0	L3 or L4
59	1N4128-1	57.00	60.00	63.00	40	6.4	108	400	45.6	0.01	+0.100	5.0	L2
60	1N4128-1	57.00	60.00	63.00	40	6.4	108	400	45.6	0.01	+0.100	5.0	L3 or L4
61	1N4129-1	58.90	62.00	65.10	40	6.1	105	500	47.1	0.01	+0.100	5.0	L2
62	1N4129-1	58.90	62.00	65.10	40	6.1	105	500	47.1	0.01	+0.100	5.0	L3 or L4
63	1N4130-1	64.60	68.00	71.40	40	5.6	95	700	51.7	0.01	+0.100	7.0	L2
64	1N4130-1	64.60	68.00	71.40	40	5.6	95	700	51.7	0.01	+0.100	7.0	L3 or L4
65	1N4131-1	71.25	75.00	78.75	40	5.1	86	700	57.0	0.01	+0.100	7.0	L2
66	1N4131-1	71.25	75.00	78.75	40	5.1	86	700	57.0	0.01	+0.100	7.0	L3 or L4

NOTES: See Page 9.

TABLE 1(a) - TYPE VARIANTS (CONT'D)

(1) Variant	(2) Based on Type	(3) V_Z Min. at I_{Z1} = 250µA (V)	(4) V_Z Nom. at I_{Z1} = 250µA (V)	(5) V_Z Max. at I_{Z1} = 250µA (V)	(6) N_D at I_{Z1} = 250µA 1-3kHz (µV/√Hz)	(7) I_{ZM} (Note 1) (mA)	(8) I_{ZSM} Surge (mA)	(9) Z_Z (Note 2) (Ω)	(10) V_R (V)	(11) I_{R1} (µA)	(12) T_{CVZ} (%/°C)	(13) I_{R2} (Note 3) (µA)	(14) Lead Material and Finish
67	1N4132-1	77.90	82.00	86.10	40	4.6	79	800	62.4	0.01	+0.100	8.0	L2
68	1N4132-1	77.90	82.00	86.10	40	4.6	79	800	62.4	0.01	+0.100	8.0	L3 or L4
69	1N4133-1	82.65	87.00	91.35	40	4.4	75	1 000	66.2	0.01	+0.100	8.0	L2
70	1N4133-1	82.65	87.00	91.35	40	4.4	75	1 000	66.2	0.01	+0.100	8.0	L3 or L4
71	1N4134-1	86.45	91.00	95.55	40	4.2	71	1 200	69.2	0.01	+0.100	10.0	L2
72	1N4134-1	86.45	91.00	95.55	40	4.2	71	1 200	69.2	0.01	+0.100	10.0	L3 or L4
73	1N4135-1	95.00	100.00	105.00	40	3.8	65	1 600	76.0	0.01	+0.100	10.0	L2
74	1N4135-1	95.00	100.00	105.00	40	3.8	65	1 600	76.0	0.01	+0.100	10.0	L3 or L4

NOTES

1. Based on 400mW maximum power dissipation at T_{amb} = +25°C.
2. Zener impedance is derived by superimposing an rms current at 60Hz of $I_{Z1/10}$ (25µA a.c.) on I_{Z1}.
3. Measured at T_{amb} = +150°C.

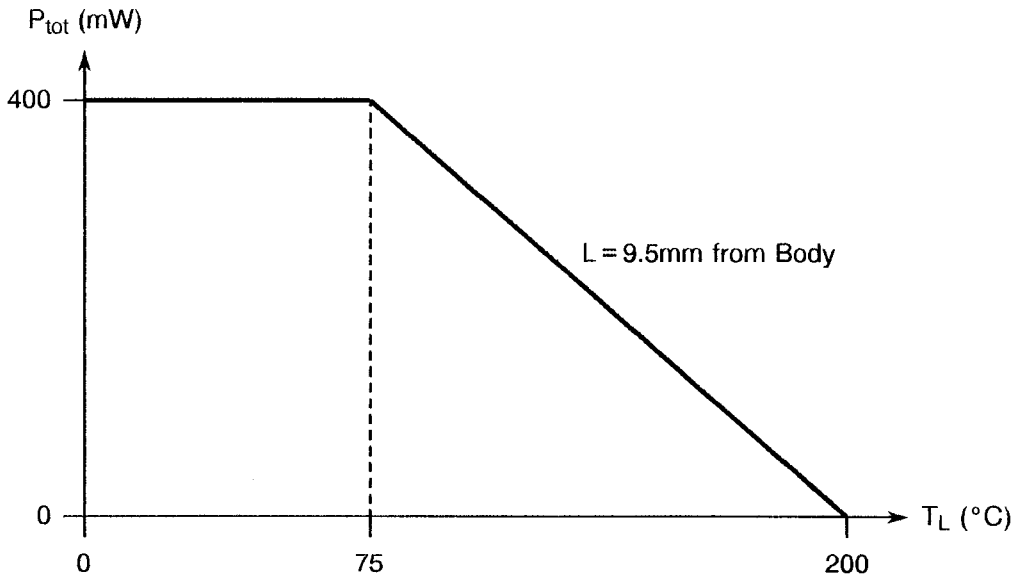
TABLE 1(b) - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Power Dissipation	P_{tot}	400	mW	Note 1
2	Operating Temperature Range	T_{op}	− 65 to + 200	°C	T_L
3	Storage Temperature Range	T_{stg}	− 65 to + 200	°C	-
4	Soldering Temperature	T_{sol}	+ 265	°C	Note 2

NOTES

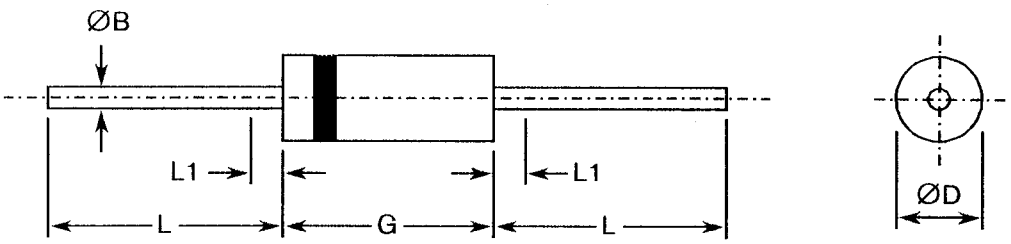
1. At T_L = + 75°C. For derating at T_L > + 75°C, see Figure 1.
2. Duration 10 seconds maximum at a distance of not less than 15mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.

FIGURE 1 - PARAMETER DERATING INFORMATION



Power Dissipation versus Lead Temperature

FIGURE 2 - PHYSICAL DIMENSIONS



SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
ØB	0.458	0.558	-
ØD	1.53	2.28	1
G	3.05	5.08	1
L	12.70	-	-
L1	-	1.27	2

NOTES

1. Package contour optional within cylinder of ØD and G. Slugs, if any, shall be included within this cylinder, but shall not be subject to the minimum limit of ØD.
2. Lead diameter not controlled in this zone to allow for flash, lead finish build-up and minor irregularities other than slugs.

FIGURE 3 - FUNCTIONAL DIAGRAM

1. Anode
2. Cathode

NOTES

1. The cathode end shall be marked with a coloured dot or band.

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the integrated circuits specified herein are 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)

(a) Para. 9.2.1, "Bond Strength": Shall not be performed.

(b) Para. 9.2.2, "Die Shear Test": Shall not be performed.

(c) Para. 9.7, "Particle Impact Noise Detection (PIND) Test": Shall not be performed.

(d) Para. 9.8.1, "Seal Test, Fine Leak": Shall not be performed.

(e) Para. 9.8.2, "Seal Test, Gross Leak": Shall be performed in accordance with MIL-STD-750, Method 1071, Test Condition 'E'.

(f) Immediately following Para. 9.3.3, Electrical Measurements at Room Temperature, a Surge Current test shall be performed in accordance with MIL-STD-750, Test Method 4066. The peak currents shown in column 10 of Table 1(a) shall be applied in the reverse direction and shall be superimposed on an I_{R1} of 250μA, a total of 5 times, at 1.0 minute intervals. Each surge shall be a ½ square wave pulse of 1/120 seconds duration or equivalent ½ sinewave with the same effective rms current. Immediately following completion, Table 2 Items 1, 2, 3 and 7 shall be measured on a go-no-go basis.

4.2.3 Deviations from Burn-in Tests (Chart III)

(a) Para. 7.1.1(a), "High Temperature Reverse Bias (H.T.R.B.) Test": Shall not be performed for devices with V_Z (nom.) ≤ 10V.

(b) Para. 9.8.1, "Seal Test, Fine Leak": Shall not be performed.

(c) Para. 9.8.2, "Seal Test, Gross Leak": Shall be performed in accordance with MIL-STD-750, Method 1071, Test Condition 'E'.

4.2.4 Deviations from Qualification Tests (Chart IV)

(a) Para. 9.2.3, "Bond Strength": Shall not be performed.

(b) Para. 9.2.4, "Die Shear Test": Shall be replaced by a Thermal Resistance Test in accordance with MIL-STD-750, Method 3101 or 4081.

(c) Para. 9.8.1, "Seal Test, Fine Leak": Shall not be performed.

(d) Para. 9.8.2, "Seal Test, Gross Leak": Shall be performed in accordance with MIL-STD-750, Method 1071, Test Condition 'E'.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

(a) Para. 9.8.1, "Seal Test, Fine Leak": Shall not be performed.

(b) Para. 9.8.2, "Seal Test, Gross Leak": Shall be performed in accordance with MIL-STD-750, Method 1071, Test Condition 'E'.

4.3 MECHANICAL 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 0.25 grammes.

4.3.3 Terminal Strength

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

Test Condition : 'A' (Tension).
Applied Force : 5.0 Newtons.
Duration : 10 seconds

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 does not guarantee acceptance of the finished product.

4.4.1 Case

The case shall be hermetically sealed and have a glass body with glass seals.

4.4.2 Lead Material and Finish

The material shall be Type 'L' with Type '2' or Type '3 or 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 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 as 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.

(d) Traceability Information.

4.5.2 Lead Identification

Lead 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:

5102007001B

Detail Specification Number

Type Variant (see Table 1(a))

Testing Level (B or C, as applicable)

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. 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 $T_{amb} = +125(+0-5)$ °C.

4.6.3 Circuits for Electrical Measurements

Circuits for use in performing the electrical measurements listed in Tables 2 and 3 of this specification are shown in Figure 4.

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 (Figure 5(a))

Not applicable

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	Zener Voltage	V_Z	4002	I_{Z1} = 250µA	Note 1	Note 2	V
2	Forward Voltage	V_F	4011	I_F = 200mA	-	1.1	V
3	Reverse Current	I_R	4016	V_R = Note 3 d.c. Method	-	Note 4	µA
4	Thermal Resistance	$R_{TH(J-L)}$	3101 or 4081	I_H = 200mA to 400mA t_H = 25s minimum I_M = 1.0mA to 10mA t_{MD} = 70µs maximum Lead Spacing = 9.53mm Note 5	-	250	°C/W

NOTES

1. See Column 3 of Table 1(a).
2. See Column 5 of Table 1(a).
3. See Column 10 of Table 1(a).
4. See Column 11 of Table 1(a).
5. To be performed instead of the Die Shear Test in Chart IV only.

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

No.	CHARACTERISTICS	SYMBOL	MIL-STD-750 TEST METHOD	TEST CONDITIONS (NOTE 1)	LIMITS		UNIT
					MIN.	MAX.	
5	Small Signal Breakdown Impedance	Z_Z	4051	I_{Z1} = 250 ± 10µA I_{sig} = 25µAac	-	Note 2	Ω
6	Noise Density	N_D	-	I_{Z1} = 250µA See Figure 4	-	Note 3	µV/√Hz
7	Thermal Impedance	$Z_{TH(J-X)}$	3101	I_H = 0.5A to 1.0A t_H = 10ms I_M = 1.0mA to 10mA t_{MD} = 70µs maximum Note 4	-	35	°C/W

NOTES

1. Tests to be performed on a sample basis, LTPD 7 or less.
2. See Column 9 of Table 1(a).
3. See Column 6 of Table 1(a).
4. To be performed in Chart II only.

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

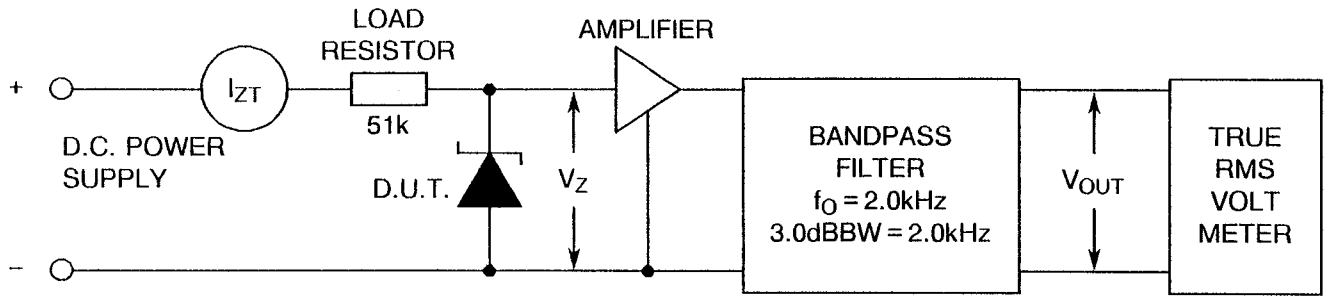
No.	CHARACTERISTICS	SYMBOL	MIL-STD-750 TEST METHOD	TEST CONDITIONS (NOTE 1)	LIMITS		UNIT
					MIN.	MAX.	
3	Reverse Current	I_R	4016	T_{amb} = +150°C V_R = Note 2 d.c. Method	-	Note 3	µA
8	Temperature Coefficient of Zener Voltage	T_{CVZ}	4071	I_Z = 250µA T_1 = +25 ± 5°C T_2 = +125°C Note 4	-	Note 5	%/°C

NOTES

1. Tests to be performed on a sample basis, LTPD 7 or less.
2. See Column 10 of Table 1(a).
3. See Column 13 of Table 1(a).
4. Temperature coefficient of zener voltage. The device shall be temperature stabilised with current applied prior to reading breakdown voltage at the specified ambient temperature.
5. See Column 12 of Table 1(a).

FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS

CIRCUIT FOR DETERMINATION OF NOISE DENSITY



NOTES

1. Input voltage and load resistance should be high so that the zener can be driven from a constant current source.
2. Input impedance of band pass filter should be high compared with dynamic impedance of the diode under test.
3. Filter bandwidth characteristics shall be as follows:

   F_O = 2000Hz.
   Shape factor, −40dB to −3.0dB, approximately 2.
   Passband at the −3.0db point is 1000 ± 50Hz to 3000 ± 150Hz.
   Passband at the −40db point is 500 ± 50Hz to 6000 ± 150Hz.

TABLE 4 - PARAMETER DRIFT VALUES

No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	CHANGE LIMITS (Δ)	UNIT
1	Zener Voltage	V_Z	As per Table 2	As per Table 2	± 2.0	%
3	Reverse Current	I_R	As per Table 2	As per Table 2	0.01 or (1) 100	nA %

NOTES

1. Whichever is greater, referred to the initial value.

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

No.	CHARACTERISTIC	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	+125(+0−5)	°C
2	Reverse Voltage	V_R	Note 1	V
3	Duration	t	48	Hrs

NOTES

1. 80% of Table 1(a), Column 4 for devices where V_Z (nom.) > 10V.

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

No.	CHARACTERISTIC	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	+25 ± 5	°C
2	Working Current	I_{ZM}	Note 1	mA
3	Mounting Conditions	-	As per MIL-STD-750, Test Method 1038	-

NOTES

1. See Column 7 of Table 1(a).

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

Not applicable.

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

Not applicable.

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 as scheduled in Table 6 of this specification. 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. 5000. The conditions for operating life testing shall be as specified in Table 5(b) for power burn-in.

4.8.4 Electrical Circuits for Operating Life Tests (Figure 5(b))

Not applicable.

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	MIL-STD-750 TEST METHOD	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
1	Zener Voltage	V_Z	As per Table 2	As per Table 2	Note 1	Note 2	V
3	Reverse Current	I_R	As per Table 2	As per Table 2	-	Note 3	µA
5	Small Signal Breakdown Impedance	Z_Z	As per Table 2	As per Table 2	-	Note 4	Ω

NOTES

1. See Column 3 of Table 1(a).
2. See Column 5 of Table 1(a).
3. See Column 11 of Table 1(a).
4. See Column 9 of Table 1(a).

APPENDIX 'A'

AGREED DEVIATIONS FOR MICROSEMI (U.S.A.)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
General deviations from ESA/SCC Generic Specification No. 5000	Para. 9.1, Internal Visual Inspection: Test Methods 2073 and 2074 of MIL-STD-750 may be used. Para. 9.10, External Visual Inspection: Test Method 2071 of MIL-STD-750 may be used. Para. 9.18, Permanence of Marking: Test Method 1022 of MIL-STD-750 may be used.