european space agency
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Pages 1 to 24

DIODES, LOW NOISE, VOLTAGE-REGULATOR,

BASED ON TYPES 1N4614 THROUGH 1N4627

AND 1N4614-1 THROUGH 1N4627-1

ESA/SCC Detail Specification No. 5102/019

space components
coordination group

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Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
'A'	July '93	P1. Cover page		None
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		P15. Para. 4.2.2	: PIND deviation amended	21043
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		P2. DCN		None
		P20. Table 3	: In Test Conditions header, reference to Note 1 deleted	23638
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'C'	July '96	P1. Cover page		None
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		P3. T of C	: Para. 1.7 entry added	21083
		P5. Para. 1.7	: Paragraph added	21083

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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 Diodes, Low Noise, Voltage Regulator, based on Types 1N4614 through 1N4627 and 1N4614-1 through 1N4627-1.

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 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 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 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.

TABLE 1(a) - TYPE VARIANTS

Variant	Lead Material and Finish	Based on Type	V_Z Min. (V)	V_Z Nom. (V)	V_Z Max. (V)	N_D ($\mu V/\sqrt{Hz}$)	I_Z (mA) See Note 1	Z_Z (Ω) See Note 2	V_R (V)	I_R (μAdc)	TCV_Z (%/°C)	I_R (μAdc)	I_R (μAdc) See Note 3	Figure
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
01	C2	1N4614	1.71	1.80	1.89	1.0	120	1200	1.0	3.5	+0 −0.075	7.0	10	2(a)
02	C3 or C4	1N4614	1.71	1.80	1.89	1.0	120	1200	1.0	3.5	+0 −0.075	7.0	10	2(a)
03	C2	1N4615	1.90	2.00	2.10	1.0	110	1250	1.0	2.5	+0 −0.075	5.0	8.0	2(a)
04	C3 or C4	1N4615	1.90	2.00	2.10	1.0	110	1250	1.0	2.5	+0 −0.075	5.0	8.0	2(a)
05	C2	1N4616	2.09	2.20	2.31	1.0	100	1300	1.0	2.0	+0 −0.075	4.0	6.0	2(a)
06	C3 or C4	1N4616	2.09	2.20	2.31	1.0	100	1300	1.0	2.0	+0 −0.075	4.0	6.0	2(a)
07	C2	1N4617	2.28	2.40	2.52	1.0	95	1400	1.0	1.0	+0 −0.075	2.0	4.0	2(a)
08	C3 or C4	1N4617	2.28	2.40	2.52	1.0	95	1400	1.0	1.0	+0 −0.075	2.0	4.0	2(a)
09	C2	1N4618	2.57	2.70	2.83	1.0	90	1500	1.0	0.5	+0 −0.075	1.0	2.0	2(a)
10	C3 or C4	1N4618	2.57	2.70	2.83	1.0	90	1500	1.0	0.5	+0 −0.075	1.0	2.0	2(a)
11	C2	1N4619	2.85	3.00	3.15	1.0	87	1600	1.0	0.4	+0 −0.075	0.8	1.0	2(a)
12	C3 or C4	1N4619	2.85	3.00	3.15	1.0	87	1600	1.0	0.4	+0 −0.075	0.8	1.0	2(a)

NOTES: See Page 10.

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

Variant (1)	Lead Material and Finish (2)	Based on Type (3)	V_Z Min. (V) (4)	V_Z Nom. (V) (5)	V_Z Max. (V) (6)	N_D ($\mu V/\sqrt{Hz}$) (7)	I_Z (mA) See Note 1 (8)	Z_Z (Ω) See Note 2 (9)	V_R (V) (10)	I_R (μAdc) (11)	TCV_Z (%/°C) (12)	I_R (μAdc) (13)	I_R (μAdc) See Note 3 (14)	Figure (15)
13	C2	IN4620	3.14	3.30	3.46	1.0	85	1650	1.5	3.5	+0 −0.075	7.0	7.0	2(a)
14	C3 or C4	IN4620	3.14	3.30	3.46	1.0	85	1650	1.5	3.5	+0 −0.075	7.0	7.0	2(a)
15	C2	IN4621	3.42	3.60	3.78	1.0	83	1700	2.0	3.5	+0 −0.065	7.0	10	2(a)
16	C3 or C4	IN4621	3.42	3.60	3.78	1.0	83	1700	2.0	3.5	+0 −0.065	7.0	10	2(a)
17	C2	IN4622	3.71	3.90	4.09	1.0	80	1650	2.0	2.5	+0 −0.060	5.0	5.0	2(a)
18	C3 or C4	IN4622	3.71	3.90	4.09	1.0	80	1650	2.0	2.5	+0 −0.060	5.0	5.0	2(a)
19	C2	IN4623	4.09	4.30	4.51	1.0	77	1600	2.0	2.0	+0 −0.050	4.0	4.0	2(a)
20	C3 or C4	IN4623	4.09	4.30	4.51	1.0	77	1600	2.0	2.0	+0 −0.050	4.0	4.0	2(a)
21	C2	IN4624	4.47	4.70	4.93	1.0	75	1550	3.0	5.0	+0.020 −0.040	10	10	2(a)
22	C3 or C4	IN4624	4.47	4.70	4.93	1.0	75	1550	3.0	5.0	+0.020 −0.040	10	10	2(a)
23	C2	IN4625	4.85	5.10	5.35	2.0	70	1500	3.0	5.0	+0.030 −0.045	10	10	2(a)
24	C3 or C4	IN4625	4.85	5.10	5.35	2.0	70	1500	3.0	5.0	+0.030 −0.045	10	10	2(a)

NOTES: See Page 10.

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

Variant	Lead Material and Finish	Based on Type	V_Z Min. (V)	V_Z Nom. (V)	V_Z Max. (V)	N_D ($\mu V/\sqrt{Hz}$)	I_Z (mA) See Note 1	Z_Z (Ω) See Note 2	V_R (V)	I_R (μAdc)	TCV_Z (%/°C)	I_R (μAdc)	I_R (μAdc) See Note 3	Figure
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
25	C2	IN4626	5.32	5.60	5.88	4.0	65	1400	4.0	5.0	+0.040 −0.020	10	10	2(a)
26	C3 or C4	IN4626	5.32	5.60	5.88	4.0	65	1400	4.0	5.0	+0.040 −0.020	10	10	2(a)
27	C2	IN4627	5.89	6.20	6.51	5.0	61	1200	5.0	5.0	+0.050 −0.010	10	10	2(a)
28	C3 or C4	IN4627	5.89	6.20	6.51	5.0	61	1200	5.0	5.0	+0.050 −0.010	10	10	2(a)
29	C2	IN4614-1	1.71	1.80	1.89	1.0	120	1200	1.0	3.5	+0 −0.075	7.0	10	2(b)
30	C3 or C4	IN4614-1	1.71	1.80	1.89	1.0	120	1200	1.0	3.5	+0 −0.075	7.0	10	2(b)
31	C2	IN4615-1	1.90	2.00	2.10	1.0	110	1250	1.0	2.5	+0 −0.075	5.0	8.0	2(b)
32	C3 or C4	IN4615-1	1.90	2.00	2.10	1.0	110	1250	1.0	2.5	+0 −0.075	5.0	8.0	2(b)
33	C2	IN4616-1	2.09	2.20	2.31	1.0	100	1300	1.0	2.0	+0 −0.075	4.0	6.0	2(b)
34	C3 or C4	IN4616-1	2.09	2.20	2.31	1.0	100	1300	1.0	2.0	+0 −0.075	4.0	6.0	2(b)
35	C2	IN4617-1	2.28	2.40	2.52	1.0	95	1400	1.0	1.0	+0 −0.075	2.0	4.0	2(b)
36	C3 or C4	IN4617-1	2.28	2.40	2.52	1.0	95	1400	1.0	1.0	+0 −0.075	2.0	4.0	2(b)

NOTES: See Page 10.

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

Variant	Lead Material and Finish	Based on Type	V_Z Min. (V)	V_Z Nom. (V)	V_Z Max. (V)	N_D ($\mu V/\sqrt{Hz}$)	I_Z (mA) See Note 1	Z_Z (Ω) See Note 2	V_R (V)	I_R (μAdc)	TCV_Z (%/°C)	I_R (μAdc)	I_R (μAdc) See Note 3	Figure
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
37	C2	IN4618-1	2.57	2.70	2.83	1.0	90	1500	1.0	0.5	+0 −0.075	1.0	2.0	2(b)
38	C3 or C4	IN4618-1	2.57	2.70	2.83	1.0	90	1500	1.0	0.5	+0 −0.075	1.0	2.0	2(b)
39	C2	IN4619-1	2.85	3.00	3.15	1.0	87	1600	1.0	0.4	+0 −0.075	0.8	1.0	2(b)
40	C3 or C4	IN4619-1	2.85	3.00	3.15	1.0	87	1600	1.0	0.4	+0 −0.075	0.8	1.0	2(b)
41	C2	IN4620-1	3.14	3.30	3.46	1.0	85	1650	1.5	3.5	+0 −0.075	7.0	7.0	2(b)
42	C3 or C4	IN4620-1	3.14	3.30	3.46	1.0	85	1650	1.5	3.5	+0 −0.075	7.0	7.0	2(b)
43	C2	IN4621-1	3.42	3.60	3.78	1.0	83	1700	2.0	3.5	+0 −0.065	7.0	10	2(b)
44	C3 or C4	IN4621-1	3.42	3.60	3.78	1.0	83	1700	2.0	3.5	+0 −0.065	7.0	10	2(b)
45	C2	IN4622-1	3.71	3.90	4.09	1.0	80	1650	2.0	2.5	+0 −0.060	5.0	5.0	2(b)
46	C3 or C4	IN4622-1	3.71	3.90	4.09	1.0	80	1650	2.0	2.5	+0 −0.060	5.0	5.0	2(b)
47	C2	IN4623-1	4.09	4.30	4.51	1.0	77	1600	2.0	2.0	+0 −0.050	4.0	4.0	2(b)
48	C3 or C4	IN4623-1	4.09	4.30	4.51	1.0	77	1600	2.0	2.0	+0 −0.050	4.0	4.0	2(b)

NOTES: See Page 10.

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

Variant	Lead Material and Finish	Based on Type	V_Z Min. (V)	V_Z Nom. (V)	V_Z Max. (V)	N_D ($\mu V/\sqrt{Hz}$)	I_Z (mA) See Note 1	Z_Z (Ω) See Note 2	V_R (V)	I_R (μAdc)	TCV_Z (%/°C)	I_R (μAdc)	I_R (μAdc) See Note 3	Figure
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
49	C2	1N4624-1	4.47	4.7	4.93	1.0	75	1550	3.0	5.0	+0.020 −0.040	10	10	2(b)
50	C3 or C4	1N4624-1	4.47	4.7	4.93	1.0	75	1550	3.0	5.0	+0.020 −0.040	10	10	2(b)
51	C2	1N4625-1	4.85	5.1	5.35	2.0	70	1500	3.0	5.0	+0.030 −0.045	10	10	2(b)
52	C3 or C4	1N4625-1	4.85	5.1	5.35	2.0	70	1500	3.0	5.0	+0.030 −0.045	10	10	2(b)
53	C2	1N4626-1	5.32	5.6	5.88	4.0	65	1400	4.0	5.0	+0.040 −0.020	10	10	2(b)
54	C3 or C4	1N4626-1	5.32	5.6	5.88	4.0	65	1400	4.0	5.0	+0.040 −0.020	10	10	2(b)
55	C2	1N4627-1	5.89	6.2	6.51	5.0	61	1200	5.0	5.0	+0.050 −0.010	10	10	2(b)
56	C3 or C4	1N4627-1	5.89	6.2	6.51	5.0	61	1200	5.0	5.0	+0.050 −0.010	10	10	2(b)

NOTES

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

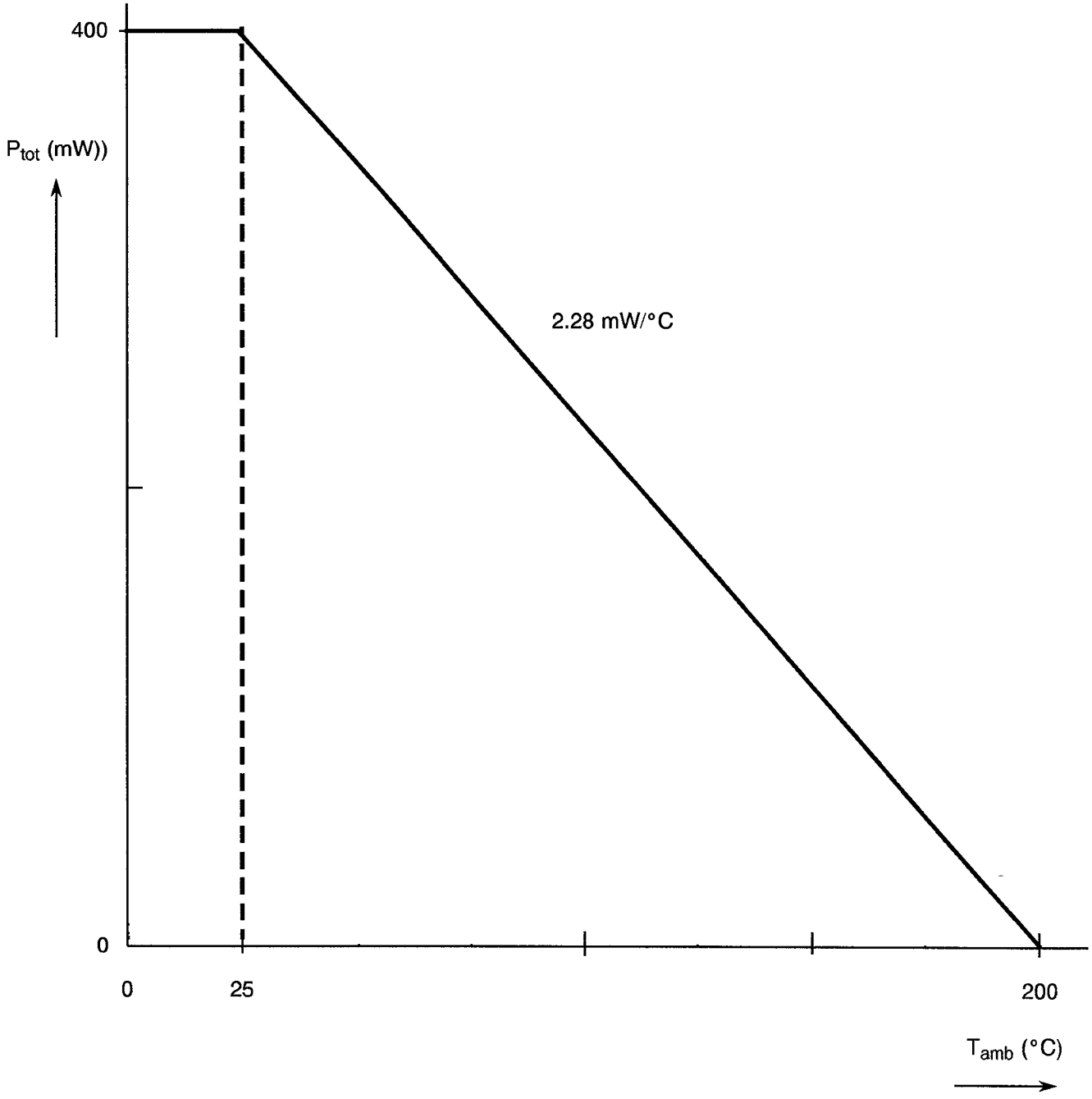
TABLE 1(b) - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Power Dissipation	P_{tot}	400	mW	See Note 1
2	Operating Temperature Range	T_{op}	−65 to +150	°C	T_{amb}
3	Storage Temperature Range	T_{stg}	−65 to +150	°C	
4	Soldering Temperature	T_{sol}	+260	°C	Time: ≤10 seconds; Distance from case: ≥ 1.5mm
5	Thermal Resistance	$R_{TH(J-C)}$	+300	°C/W	Typical

NOTES

1. At T_{amb} = +25°C. For derating at T_{amb} > +25°C, see Figure 1.

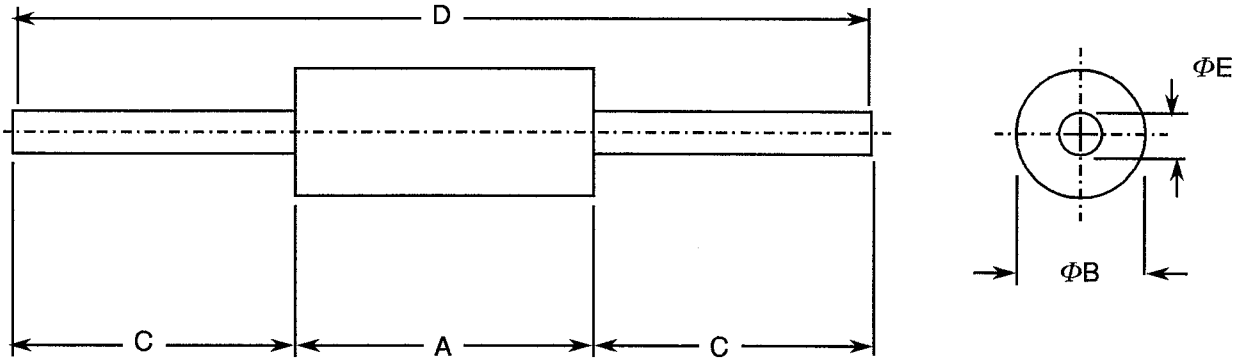
FIGURE 1 - PARAMETER DERATING INFORMATION



Power Dissipation versus Temperature

FIGURE 2 - PHYSICAL DIMENSIONS

FIGURE 2(a) - VARIANTS 01 TO 28



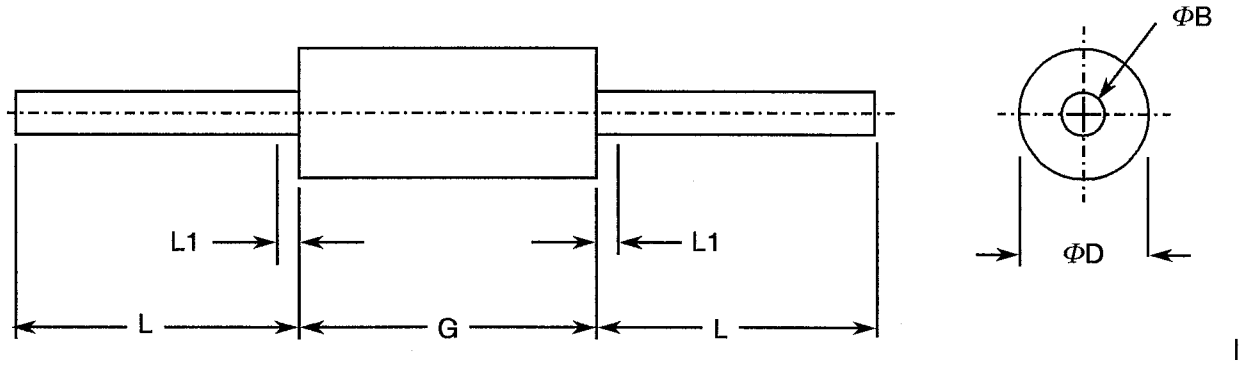
SYMBOL	MILLIMETRES		INCHES (1)		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	5.84	7.62	0.230	0.300	-
ΦB	2.16	3.30	0.085	0.130	2
C	25.40	38.10	1.00	1.50	-
D	58.42	-	2.30	-	-
ΦE	0.46	0.56	0.018	0.022	3

NOTES

1. Imperial equivalents (to the nearest 0.001 inch) are given for general information only and are based upon 25.4mm = 1 inch.
2. The minimum body diameter shall apply over 0.38mm (0.15 inch) of body length.
3. The specified lead diameters apply in the zone between 1.27mm (0.050 inch) from the diode body to the end of the lead. Outside of this zone, the lead diameter shall not exceed the maximum of ΦB.

FIGURE 2 - PHYSICAL DIMENSIONS (CONT'D)

FIGURE 2(b) - VARIANTS 29 TO 56



SYMBOL	MILLIMETRES		INCHES (1)		NOTES
	MIN.	MAX.	MIN.	MAX.	
ΦB	0.46	0.58	0.018	0.023	-
ΦD	1.52	2.71	0.060	0.107	2
G	3.05	7.62	0.120	0.300	2
L	25.40	38.10	1.0	1.5	-
L1	-	1.27	-	0.050	3

NOTES

1. Imperial equivalents (to the nearest 0.001 inch) are given for general information only and are based upon 25.4mm = 1 inch.
2. Package contour optional within cylinder of diameter ΦD and length G. Heat slugs, if any, shall be included within this cylinder but shall not be subject to the minimum limit of ΦD.
3. Within this zone, lead diameter may vary to allow for lead finishes and irregularities, other than heat slugs.

FIGURE 3 - FUNCTIONAL DIAGRAM

1. Anode
2. Cathode

NOTES

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

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.

4. REQUIREMENTS

4.1 GENERAL

The complete requirements for procurement of the diodes 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 Test: 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: Not applicable.

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

None.

4.2.4 Deviations from Qualification Tests (Chart IV)

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

(b) Para. 9.2.4, Die Shear Test: Shall not be performed.

4.2.5 Deviations from Lot Acceptance Tests (Chart V)

None.

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.

4.3.4 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 : 20 Newtons.
Duration : 15 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 lead material shall be Type 'C' with either 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 all components delivered to this specification shall be in accordance with the requirements of ESA/SCC Basic Specification No. 21700. Each component shall be marked in respect of:-

(a) Lead Identification.

(b) The SCC Component Number.

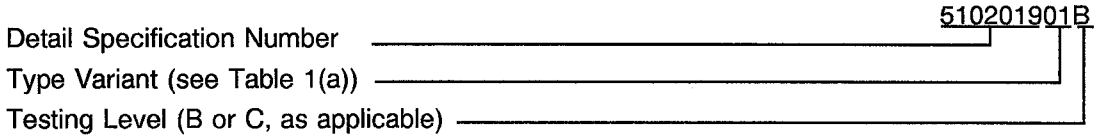
(c) Traceability Information.

4.5.2 Lead Identification

Lead identification shall be as shown in Figure 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.

4.5.5 Marking of Small Components

When it is considered that the component is too small to accommodate the marking as specified above, as much as space permits shall be marked. The order of precedence shall be as follows:-

(a) Lead Identification.

(b) The SCC Component Number.

(c) Traceability Information.

The marking information in full shall accompany each component in its primary package.

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 $T_{amb} = +25 \pm 3$ °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

A circuit for use in performing the electrical measurements listed in Table 2 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, the measurements shall be performed at $T_{amb} = +25 \pm 3$ °C. The parameter drift value (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

Not applicable.

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 of this specification.

4.7.4 Electrical Circuit for Power Burn-in (Figure 5)

Not applicable.

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

No.	CHARACTERISTICS	SYMBOL	TEST METHOD MIL-STD-750	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
1	Zener Voltage	V_Z	4022	I_Z = 250μAdc	Note 1	Note 2	Vdc
2	Forward Voltage	V_F	4011	I_F = 200mAdc Variants 01 to 28 Variants 29 to 56	 - -	 1.0 1.1	Vdc
3	Reverse Current	I_R	4016	V_R = See Note 3 D.C. Method	-	Note 4	μAdc

NOTES

1. See Column 4 of Table 1(a).
2. See Column 6 of Table 1(a).
3. See Column 10 of Table 1(a).
4. See Column 11 of Table 1(a).

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

No.	CHARACTERISTICS	SYMBOL	TEST METHOD MIL-STD-750	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
4	Small Signal Breakdown Impedance	Z_Z	4051	I_Z = 250 ± 10μAdc I_{sig} = 25μA ac	-	Note 1	Ω
5	Noise Density	N_D	-	I_Z = 250μAdc See Figure 4	-	Note 2	$\mu V/\sqrt{Hz}$

NOTES

1. See Column 9 of Table 1(a).
2. See Column 7 of Table 1(a).

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH TEMPERATURE

No.	CHARACTERISTICS	SYMBOL	TEST METHOD MIL-STD-750	TEST CONDITIONS	LIMITS		UNIT
					MIN.	MAX.	
3	Reverse Current	I_R	4016	T_{amb} = +150°C V_R = See Note 1 DC Method	-	Note 2	µAdc
6	Temperature Coefficient of Zener Voltage	TCV_Z	4017	IZ = 250µAdc T1 = +25°C T2 = +125°C	-	Note 3	%/°C

NOTES

1. See Column 10 of Table 1(a).
2. See Column 14 of Table 1(a).
3. See Column 12 of Table 1(a).

TABLE 4 - PARAMETER DRIFT VALUES

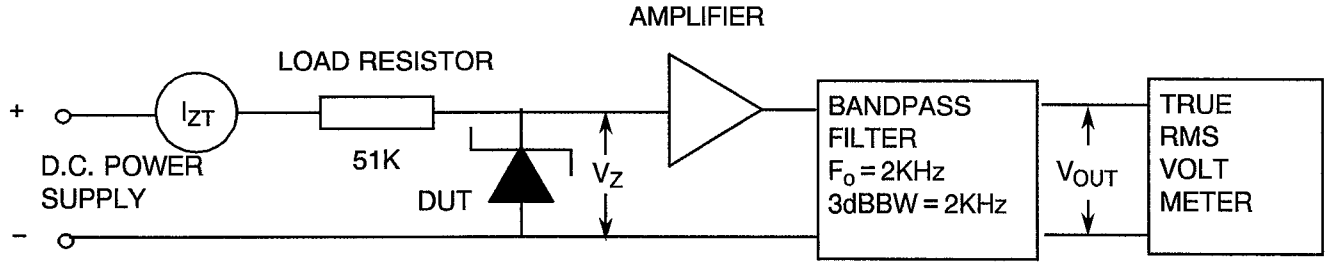
No.	CHARACTERISTICS	SYMBOL	SPEC. AND/OR TEST METHOD	TEST CONDITIONS	CHANGE LIMITS (Δ)	UNIT
1	Zener Voltage	V_Z	As per Table 2	As per Table 2	±2.0	%
3	Reverse Current	I_R	As per Table 2	As per Table 2	0.01 or (1) 100	µA %

NOTES

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

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 the dynamic impedance of the diode under test.
3. Filter bandwidth characteristics shall be as follows:-
   f_o = 2000Hz.
   Shape factor, -40dB to -3dB, approximately 2.
   Passband at the -3dB point is 1000Hz ±50Hz to 3000Hz ±150Hz.
   Passband at the -40dB point is 500Hz ±50Hz to 6000Hz ±600Hz.

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

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	+25	°C
2	Zener Current	I_Z	I_Z = See Note 1	mAdc

NOTES

1. See Column 8 of Table 1(a).

FIGURE 5 - 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 $T_{amb} = +25 \pm 3$ °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 testing are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +25 \pm 3$ °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 for the power burn-in.

4.8.4 Electrical Circuits for Operating Life Tests

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	SPEC. AND/OR 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	Vdc
3	Reverse Current	I_R	As per Table 2	As per Table 2	-	Note 3	µAdc
4	Small Signal Breakdown Impedance	Z_Z	As per Table 2	As per Table 2	-	Note 4	Ω

NOTES

1. See Column 4 of Table 1(a).
2. See Column 6 of Table 1(a).
3. See Column 13 of Table 1(a).
4. See Column 9 of Table 1(a).