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Pages 1 to 26

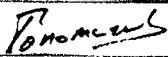

RESISTOR NETWORKS, THICK FILM,

BASED ON TYPE ENG2096

ESA/SCC Detail Specification No. 4005/002



**space components
coordination group**

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 2	August 1995		



DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
		This Issue supersedes Issue 1 and incorporates all modifications defined in Revision 'A' to Issue 1 and the changes agreed in the following DCR's:-		
		Cover Page		None
		DCN		None
		Para. 2	: Items (b) and (c) deleted	221190
		Para. 4.2.2	: Text deleted and replaced with "None"	221190
		Para. 4.2.3	: In Title, "... Tests" amended to "... and Electrical Measurements"	23758
		Para. 4.2.4	: Text deleted and replaced with "None"	221190
		Para. 4.2.5	: Text deleted and replaced with "None"	221190
		Para. 4.3.3	: Para. changed to Drying Procedure	221190
		Para. 4.5.1	: Marking requirement for small components revised and Para. 4.5.6 deleted	23758
		Table 2	: Test Method column deleted	221190
			: No. 2 amended to "Voltage Proof"	23758
		Table 3	: Test Method column deleted	221190
			: Nos. 1 and 2 amended to "4(i)" and "4(ii)"	23758
		Table 6	: Corrected and format standardised	221190/ 23758



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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 Resistor Networks, Thick Film, utilising a Ruthenium Dioxide Screen printed resistive material with Alumina substrate, encapsulated in a 14 pin or 16 pin DIL package, based on Type ENG2096. It shall be read in conjunction with ESA/SCC Generic Specification No. 4005, the requirements of which are supplemented herein.

1.2 TYPE VARIANTS AND RANGE OF COMPONENTS

The type variants and range of resistor networks 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 resistor networks specified herein, are as scheduled in Table 1(b).

1.4 PARAMETER DERATING INFORMATION (FIGURE 1)

Not applicable.

1.5 PHYSICAL DIMENSIONS

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

1.6 FUNCTIONAL DIAGRAM

The functional diagram for the resistor networks specified herein is shown in Figure 3.



TABLE 1(a) - TYPE VARIANTS AND RANGE OF COMPONENTS

VAR.	RESISTANCE RANGE		TOLERANCE		TEMPERATURE CHARACTERISTIC OF RESISTANCE (ppm/°C)	CASE FIGURE	FUNCTIONAL DIAGRAM FIGURE
	MIN (Ω)	MAX (Ω)	SELECTION	MATCHING			
01	33	10M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(a)	3(a)
02	47	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		
03	33	10M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(b)	3(b)
04	47	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		
05	15	1.0M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(a)	3(c)
06	30	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		
07	15	1.0M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(b)	3(d)
08	30	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		
09	15	1.0M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(b)	3(e)
10	30	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		
11	15	1.0M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(a)	3(f)
12	30	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		
13	15	1.0M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(a)	3(g)
14	30	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		
15	15	1.0M	$R \leq 80k = \pm 1\%$ $R > 80k = \pm 2\%$	$R \geq 47\Omega = \pm 2\%$	250	2(b)	3(h)
16	30	1.0M	$R \geq 100\Omega = \pm 1\%$ $R < 100\Omega = \pm 2\%$	$R \geq 100\Omega = \pm 1\%$	100		



TABLE 1(a) - TYPE VARIANTS AND RANGE OF COMPONENTS (CONTINUED)

VARIANT	RESISTANCE RANGE (NOTE 1)		TOLERANCE ($\pm\%$)	TEMPERATURE CHARACTERISTIC OF RESISTANCE (ppm/ $^{\circ}$ C)	CASE FIGURE	FUNCTIONAL DIAGRAM FIGURE
	R _T (Ω)	R _B (Ω)				
17	180	220	2.0	100	2(a)	3(i)
18	180	270				
19	220	330				
20	220	470				
21	270	360				
22	330	390				
23	180	220	2.0	100	2(b)	3(j)
24	180	270				
25	220	330				
26	220	470				
27	270	360				
28	330	390				

NOTES

1. The position of the resistors in the network is shown in the appropriate Figure.

TABLE 1(b) - MAXIMUM RATINGS

No.	CHARACTERISTICS	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
1	Rated Dissipation of Package	P _{tot}	0.3	W	Note 1
2	Limiting Element Voltage	U _L	30	V	-
3	Rated Voltage	U _R	$\sqrt{0.3 R}$	V	Note 2
4	Insulation Voltage	V _I	200	V	Note 3
5	Operating Temperature Range	T _{op}	-55 to +125	$^{\circ}$ C	T _{amb}
6	Storage Temperature Range	T _{stg}	-55 to +150	$^{\circ}$ C	-
7	Soldering Temperature	T _{sol}	+245	$^{\circ}$ C	Note 4

NOTES

1. At T_{amb} = +125 $^{\circ}$ C.
2. The Rated Voltage shall never exceed the Limiting Element Voltage.
3. The Insulation Voltage shall be measured between adjacent but electrically isolated resistors.
4. Duration 10 seconds maximum at a distance of not less than 1.5mm from the case.

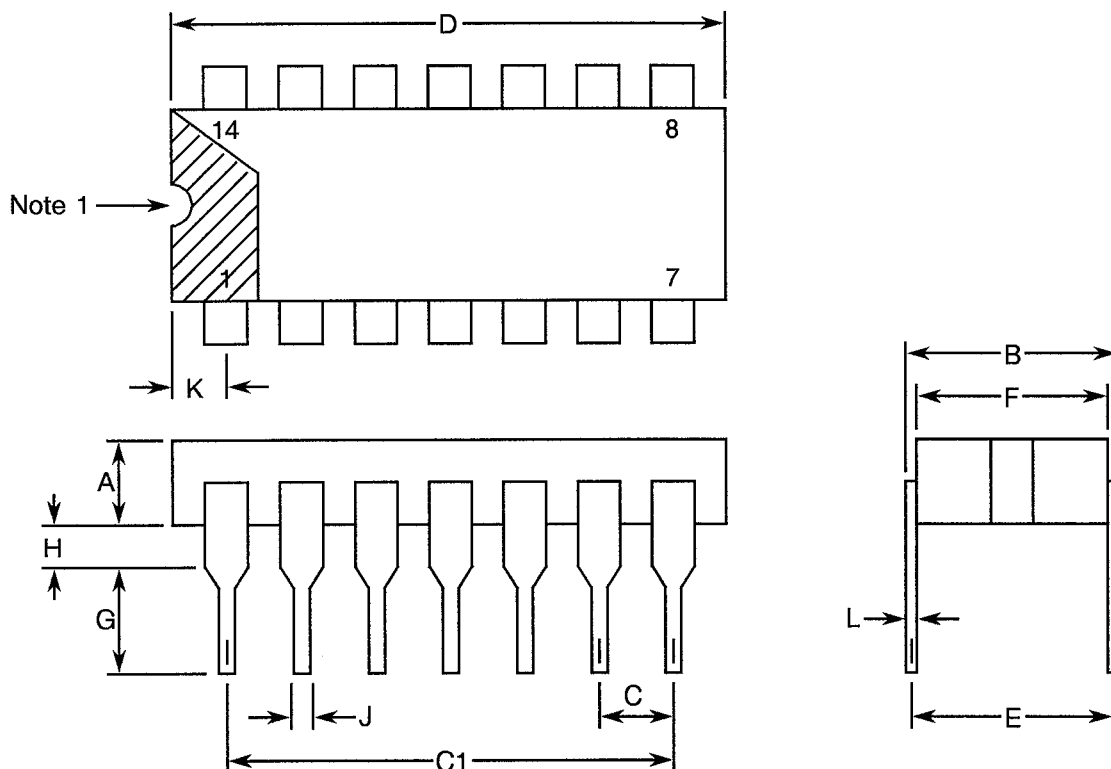


FIGURE 1 - PARAMETER DERATING INFORMATION

Not applicable.

FIGURE 2 - PHYSICAL DIMENSIONS

**FIGURE 2(a) - DUAL-IN-LINE PACKAGE, 14 PIN
VARIANTS 01, 02, 05, 06, 11, 12, 13, 14, 17, 18, 19, 20, 21, 22**



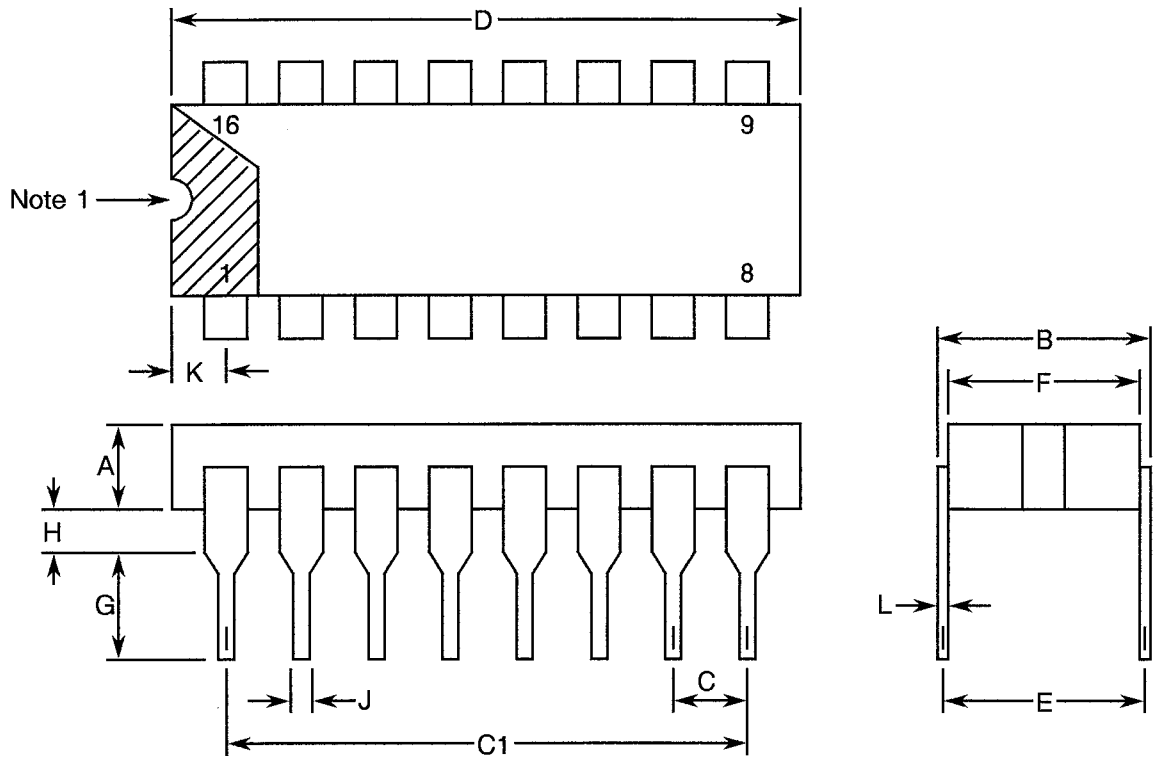
SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	-	4.46	
B	-	8.13	
C	2.29	2.79	4
C1	14.99	15.49	
D	-	19.94	
E	7.50	7.74	
F	-	7.62	
G	3.00	-	
H	0.64	-	2
J	0.41	0.51	3
K	-	2.30	
L	0.22	0.28	3

NOTES: See Page 9.



FIGURE 2 - PHYSICAL DIMENSIONS (CONTINUED)

FIGURE 2(b) - DUAL-IN-LINE PACKAGE, 16 PIN
VARIANTS 03, 04, 07, 08, 09, 10, 15, 16, 23, 24, 25, 26, 27, 28



SYMBOL	MILLIMETRES		NOTES
	MIN.	MAX.	
A	-	4.46	
B	-	8.13	
C	2.29	2.79	4
C1	17.53	18.03	
D	-	19.94	
E	7.50	7.74	
F	-	7.62	
G	3.00	-	
H	0.64	-	2
J	0.41	0.51	3
K	-	1.48	
L	0.22	0.28	3

NOTES

1. Index area: a notch, letter or dot shall be located adjacent to Pin 1 and shall be within the shaded area shown.
2. The dimension shall be measured from the seating plane to the base plane.
3. All leads or terminals.
4. 14 pin packages : 12 spaces.
16 pin packages : 14 spaces.



FIGURE 3 - FUNCTIONAL DIAGRAM

FIGURE 3(a) - DUAL-IN-LINE PACKAGE, 14 PIN
VARIANTS 01, 02

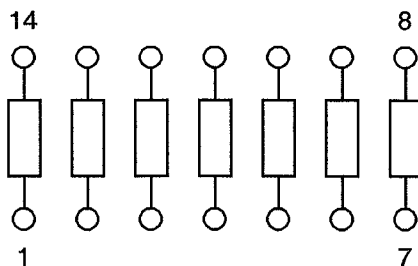


FIGURE 3(b) - DUAL-IN-LINE PACKAGE, 16 PIN
VARIANTS 03, 04

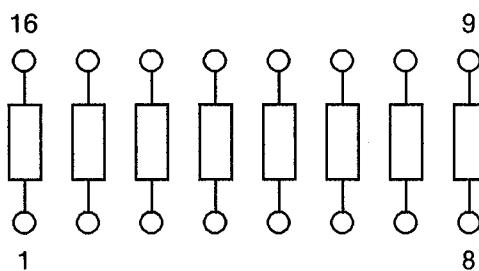


FIGURE 3(c) - DUAL-IN-LINE PACKAGE, 14 PIN
VARIANTS 05, 06

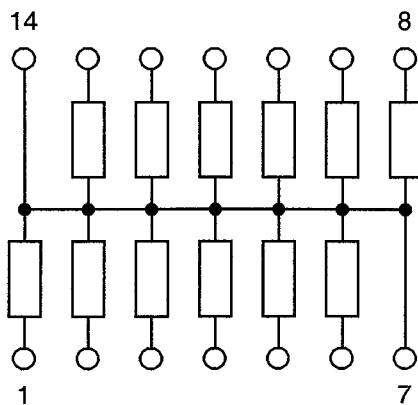




FIGURE 3 - FUNCTIONAL DIAGRAM (CONTINUED)

FIGURE 3(d) - DUAL-IN-LINE PACKAGE, 16 PIN
VARIANTS 07, 08

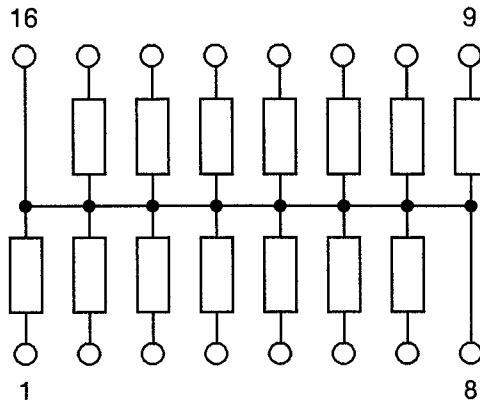


FIGURE 3(e) - DUAL-IN-LINE PACKAGE, 16 PIN
VARIANTS 09, 10

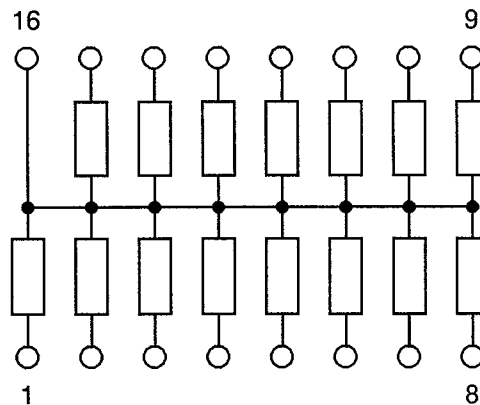


FIGURE 3(f) - DUAL-IN-LINE PACKAGE, 14 PIN
VARIANTS 11, 12

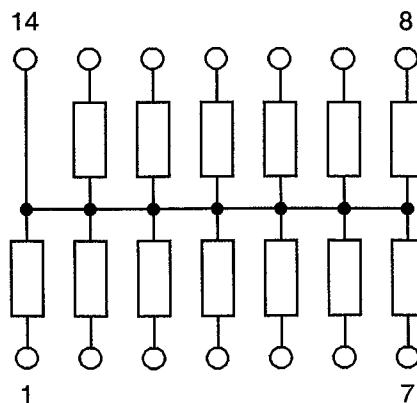




FIGURE 3 - FUNCTIONAL DIAGRAM (CONTINUED)

FIGURE 3(g) - DUAL-IN-LINE PACKAGE, 14 PIN
VARIANTS 13, 14

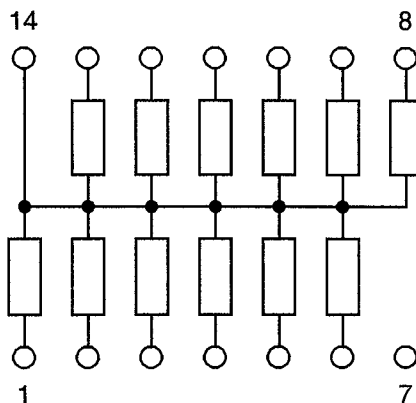


FIGURE 3(h) - DUAL-IN-LINE PACKAGE, 16 PIN
VARIANTS 15, 16

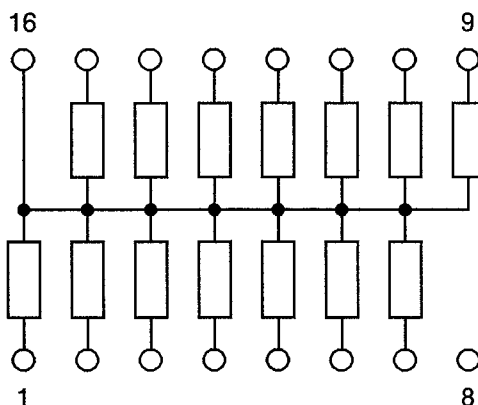


FIGURE 3(i) - DUAL-IN-LINE PACKAGE, 14 PIN
VARIANTS 17, 18, 19, 20, 21, 22

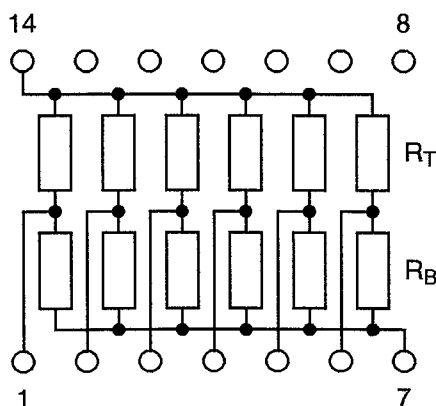
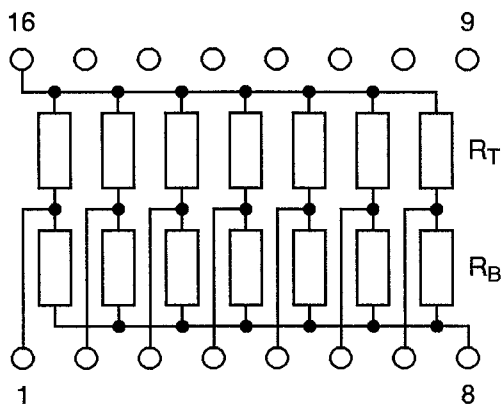




FIGURE 3 - FUNCTIONAL DIAGRAM (CONTINUED)

FIGURE 3(i) - DUAL-IN-LINE PACKAGE, 16 PIN
VARIANTS 23, 24, 25, 26, 27, 28



**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. 4005, Resistor Networks, Thick Film.

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 abbreviations are used:-

V_T = Test Voltage.

V_I = Insulation Voltage.

4. REQUIREMENTS**4.1 GENERAL**

The complete requirements for procurement of the resistor networks specified herein are stated in this specification and ESA/SCC Generic Specification No. 4005 for Resistor Networks, Thick Film. 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 resistor networks specified herein shall be checked. They shall conform to those shown in Figure 2.



4.3.2 Weight

The maximum weight of the resistor networks specified herein shall be 2.5 grammes.

4.3.3 Drying Procedure

When required, the resistor networks shall be dried using Procedure I described in Para. 9.7.1 of ESA/SCC Generic Specification No. 4005.

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 resistor networks 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 side brazed ceramic body and the lids shall be welded, brazed or preform soldered.

4.4.2 Lead Material and Finish

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

4.4.3 Films

Films shall be uniformly deposited. They shall be free from blisters, thin spots, areas inadequately bonded to the substrate, discoloured spots or other blemishes likely to cause flaking when trimmed.

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) Lead Identification.
- (b) The SCC Component Number.
- (c) Electrical Characteristics and Ratings.
- (d) Traceability Information.

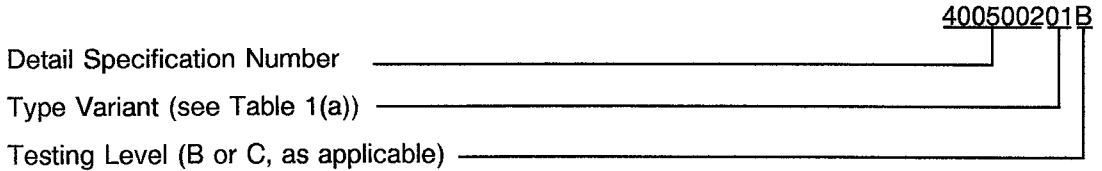
4.5.2 Lead Identification

An index shall be located at the top of the package in the position defined in Note 1 to Figure 2 or, alternatively, a tab may be used to identify Pin No. 1. The pin numbering must be read with the index or tab on the left-hand side.



4.5.3 The SCC Component Number

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

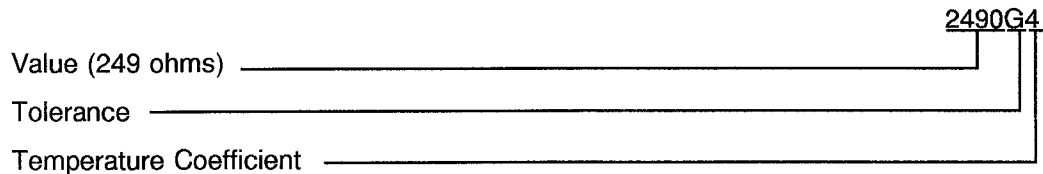


4.5.4 Electrical Characteristics and Ratings

The electrical characteristics and ratings to be marked in the following order of precedence are:-

- (a) Resistance Value.
- (b) Tolerance.
- (c) Temperature Coefficient of Resistance.

The information shall be constituted and marked as follows:-



4.5.4.1 Resistance Values

Resistance values shall be expressed by means of the following codes. The unit quantity for marking shall be Ohms.

RESISTANCE VALUE	CODE
XX.X	XXRX
XXX	XXX0
XXX 10 ¹	XXX1
XXX 10 ²	XXX2
XXX 10 ³	XXX3

For values of 100 and above, the first three digits (X) represent significant figures and the last digit specifies the number of zeros to follow.

When values of less than 100 are required, the letter 'R' is used to indicate the decimal point.

When the letter is used, all succeeding digits represent significant figures.



4.5.4.2 Tolerance

The tolerance on resistance values shall be indicated by the code letters specified hereafter.

TOLERANCE ($\pm\%$)	CODE LETTER
1.0	F
2.0	G

4.5.4.3 Temperature Characteristic of Resistance

The temperature characteristic of resistance shall be indicated by the code number specified hereafter.

DIGIT	TEMPERATURE CHARACTERISTIC OF RESISTANCE (\pm ppm/ $^{\circ}$ C)
4	100
7	250

4.5.5 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 $T_{amb} = +22 \pm 3$ $^{\circ}$ 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. The measurements shall be performed between $T_{amb} = +125(+5-0)$ and $-55(+0-5)$ $^{\circ}$ C respectively. The distribution of the sample shall be as follows:

- 1/3 with lowest resistance values.
- 1/3 with median resistance values.
- 1/3 with highest resistance values.

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 for a given parameter, the appropriate limit value specified in Table 2 shall not be exceeded.

4.7.2 Conditions for Burn-in

The requirements for burn-in are specified in Section 7 of ESA/SCC Generic Specification No. 4005. The conditions for burn-in shall be as specified in Table 5 of this specification.

4.7.3 Electrical Circuits for Burn-in

The circuit for use in performing the burn-in tests is shown in Figure 5 of this specification.

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

No.	CHARACTERISTICS	SYMBOL	ESA/SCC 4005 TEST METHOD AND CONDITION	LIMITS		UNIT
				MIN.	MAX.	
1	d.c. Resistance (Each Element)	R	Para. 9.5.1.1	Table 1(a)		Ω
2	Voltage Proof	VP	Para. 9.5.1.2	200	-	V
3	Insulation Resistance	Ri	Para. 9.5.1.3	100	-	MΩ

TABLE 3 - ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURES

No.	CHARACTERISTICS	SYMBOL	ESA/SCC 4005 TEST METHOD AND CONDITION (NOTE 1)	LIMITS		UNIT
				MIN.	MAX.	
4(i)	Resistance Change between -55(+3-0) °C and +22±3 °C	$\frac{\Delta R}{R}$	Para. 9.5.1.1 Note 2 Note 3	- -	±0.75 ±1.88	%
4(ii)	Resistance Change between +22±3 °C and +125(+0-3) °C	$\frac{\Delta R}{R}$	Para. 9.5.1.1 Note 2 Note 3	- -	±1.05 ±2.63	%

NOTES

1. Measurements performed on a sample basis, LTPD7 or less.
2. Applicable to Variants 02, 04, 06, 08, 10, 12, 14, 16, 17 to 28.
3. Applicable to Variants 01, 03, 05, 07, 09, 11, 13, 15.

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
1	d.c. Resistance (Each Element)	$\frac{\Delta R}{R}$	As per Table 2	As per Table 2	± 0.3	%

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

No.	CHARACTERISTICS	SYMBOL	CONDITION	UNIT
1	Ambient Temperature	T_{amb}	+ 125(+ 0 - 3)	$^{\circ}\text{C}$
2	Test Voltage	V_T	$\sqrt{\frac{0.3 R}{N}}$ Note 1	V

NOTES

- N = Number of Resistance Elements.

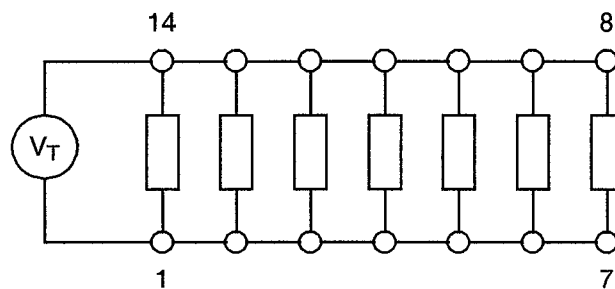
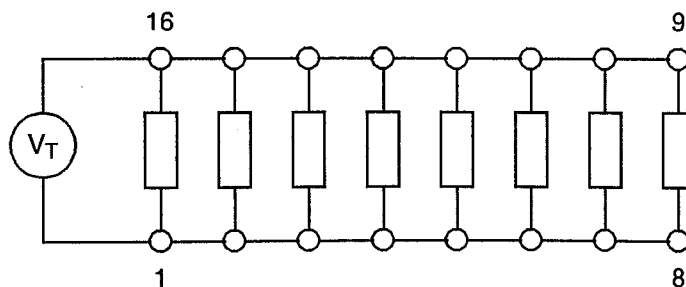
FIGURE 5 - ELECTRICAL CIRCUITS FOR BURN-IN AND OPERATING LIFE TESTS**FIGURE 5(a) - VARIANTS 01, 02****FIGURE 5(b) - VARIANTS 03, 04**



FIGURE 5 - ELECTRICAL CIRCUITS FOR BURN-IN AND OPERATING LIFE TESTS (CONTINUED)

FIGURE 5(c) - VARIANTS 05, 06

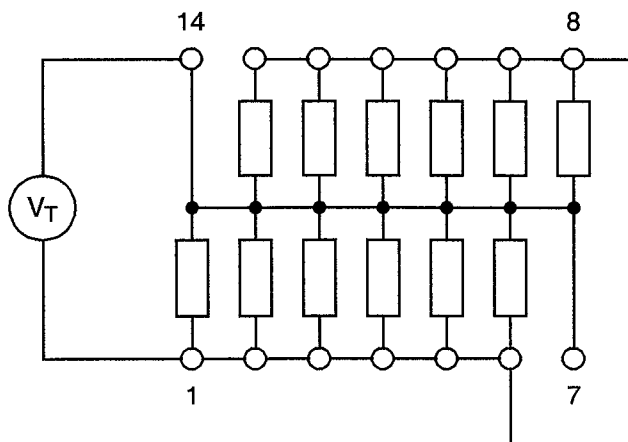


FIGURE 5(d) - VARIANTS 07, 08

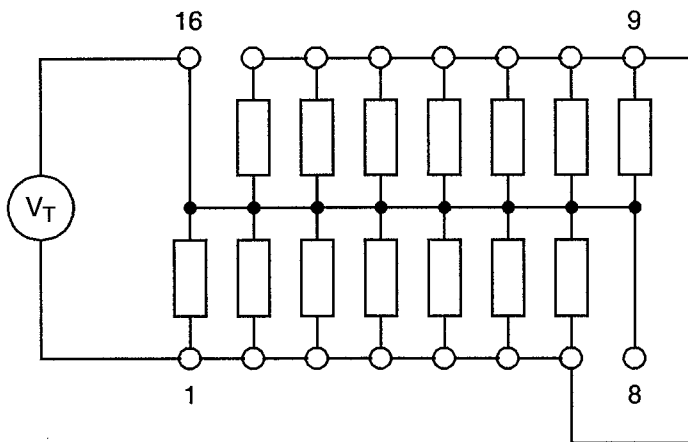


FIGURE 5(e) - VARIANTS 09, 10

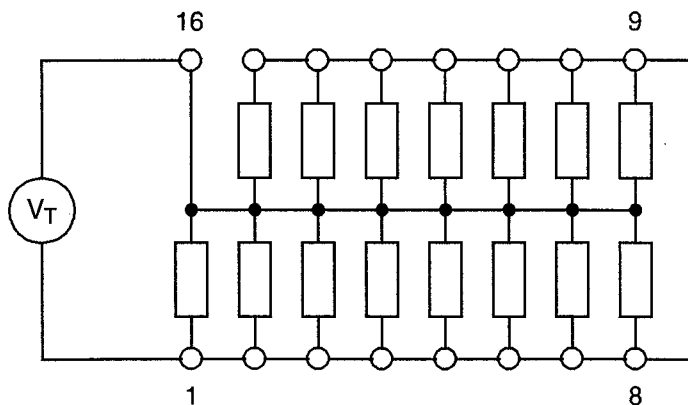




FIGURE 5 - ELECTRICAL CIRCUITS FOR BURN-IN AND OPERATING LIFE TESTS (CONTINUED)

FIGURE 5(f) - VARIANTS 11, 12

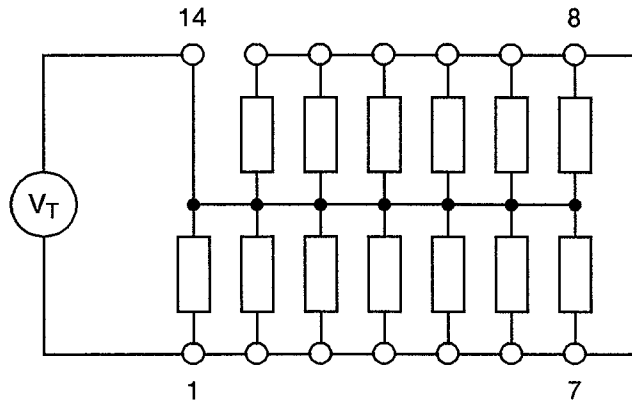


FIGURE 5(g) - VARIANTS 13, 14

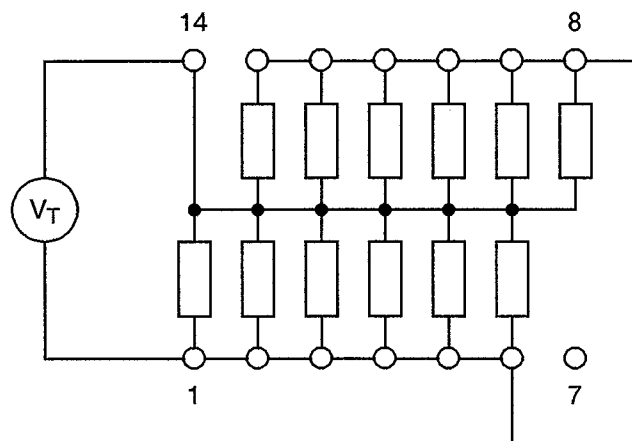


FIGURE 5(h) - VARIANTS 15, 16

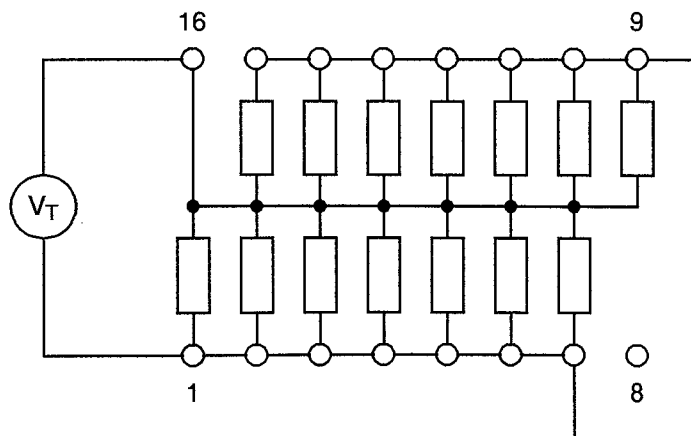




FIGURE 5 - ELECTRICAL CIRCUITS FOR BURN-IN AND OPERATING LIFE TESTS (CONTINUED)

FIGURE 5(i) - VARIANTS 17, 18, 19, 20, 21, 22

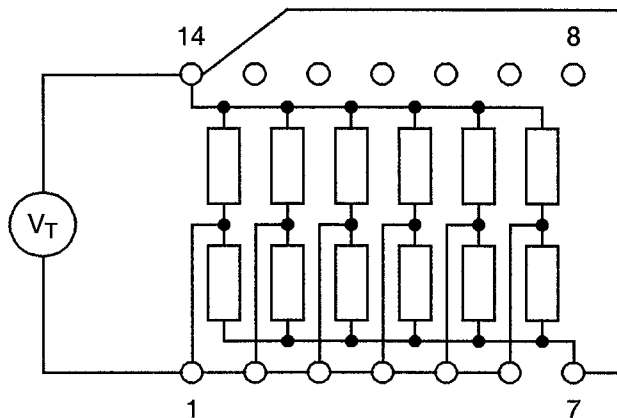
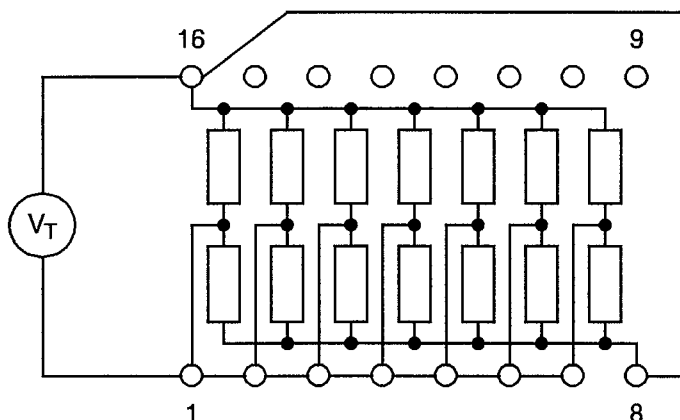


FIGURE 5(i) - VARIANTS 23, 24, 25, 26, 27, 28





4.8 ENVIRONMENTAL AND ENDURANCE TESTS (CHARTS IV AND V OF ESA/SCC GENERIC SPECIFICATION NO. 4005)

4.8.1 Measurements and Inspections on Completion of Environmental Tests

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

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

The parameters to be measured and inspections to be performed at intermediate points and on completion of endurance tests are scheduled in Table 6. Unless otherwise stated, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °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. 4005. The conditions for operating life testing shall be as specified in Table 5 for the burn-in test.

4.8.4 Electrical Circuits for Operating Life Tests

Circuits for use in performing the operating life test are shown in Figure 5 of this specification.

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

The requirements for the high temperature storage test are specified in Section 9 of ESA/SCC Generic Specification No. 4005. The temperature to be applied shall be the maximum storage temperature specified in Table 1(b) of this specification.



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

No.	ESA/SCC GENERIC SPECIFICATION NO. 4005		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
01	Rapid Change of Temperature	Para. 9.2	Initial Measurements Resistance Final Measurements Resistance Change (R ≤ 100Ω) Resistance Change (R > 100Ω)	Table 2 Item 1 Within 3 hours of completion of cycling Table 2 Item 1 Table 2 Item 1	R $\frac{\Delta R}{R}$ $\frac{\Delta R}{R}$	Table 2 -0.8 -0.2	+0.8 +0.2	Ω % %
02	Seal Test	Para. 9.4	Fine Leak Gross Leak	Para. 9.4.1 of ESA/SCC 4005 Para. 9.4.2 of ESA/SCC 4005		Para. 9.4.1 Para. 9.4.2		
03	Temperature Characteristic of Resistance	Para. 9.7	Measurements during Test Resistance Changes	Table 3 Items 4(i) & (ii)	TCR	Table 1(a)		ppm/°C
04	Shock	Para. 9.9	Initial Measurements Resistance Final Measurements Resistance Change (R ≤ 100Ω) Resistance Change (R > 100Ω) Visual Examination	Table 2 Item 1 Table 2 Item 1 Table 2 Item 1 -	R $\frac{\Delta R}{R}$ $\frac{\Delta R}{R}$ -	Table 2 -0.8 -0.2 -	+0.8 +0.2 -	Ω % % -
05	Vibration	Para. 9.10	Initial Measurements Resistance Final Measurements Resistance Change (R ≤ 100Ω) Resistance Change (R > 100Ω)	Table 2 Item 1 Table 2 Item 1 Table 2 Item 1	R $\frac{\Delta R}{R}$ $\frac{\Delta R}{R}$	Table 2 -0.8 -0.2	+0.8 +0.2	Ω % %
06	Resistance to Soldering Heat	Para. 9.11	Initial Measurements Resistance Final Measurements Resistance Change (R ≤ 100Ω) Resistance Change (R > 100Ω) Visual Examination	Table 2 Item 1 After 10 ± 1 sec recovery Table 2 Item 1 Table 2 Item 1 -	R $\frac{\Delta R}{R}$ $\frac{\Delta R}{R}$ -	Table 2 -0.6 -0.2 -	+0.6 +0.2	Ω % % -
07	Climatic Sequence	Para. 9.12	Initial Measurements Resistance Final Measurements Resistance Change (R ≤ 100Ω) Resistance Change (R > 100Ω) Visual Examination Insulation Resistance	After Drying Table 2 Item 1 Within 1 to 2 hrs of completion of D.C. Load test Table 2 Item 1 Table 2 Item 1 Table 2 Item 3	R $\frac{\Delta R}{R}$ $\frac{\Delta R}{R}$ - R _i	Table 2 -0.6 -0.2 - 100	+0.6 +0.2	Ω % % - MΩ

NOTES

1. The tests in this table refer to either Chart IV or V and shall be used as applicable.



TABLE 6 - MEASUREMENTS AND INSPECTIONS ON COMPLETION OF ENVIRONMENTAL TESTS AND AT INTERMEDIATE POINTS AND ON COMPLETION OF ENDURANCE TESTING (CONT'D)

No.	ESA/SCC GENERIC SPECIFICATION NO. 4005		MEASUREMENTS AND INSPECTIONS		SYMBOL	LIMITS		UNIT
	ENVIRONMENTAL AND ENDURANCE TESTS (1)	TEST METHOD AND CONDITIONS	IDENTIFICATION	CONDITIONS		MIN.	MAX.	
08	Robustness of Terminations	Para. 9.13	Initial Measurements	Table 2 Item 1	R	Table 2		Ω
			Resistance					
			Final Measurements	Table 2 Item 1	$\frac{\Delta R}{R}$	-0.8	+0.8	%
			Resistance Change (R ≤ 100Ω)					
			Resistance Change (R > 100Ω)	Table 2 Item 1	$\frac{\Delta R}{R}$	-0.2	+0.2	%
			Visual Examination	-	-	-	-	-
09	Operating Life	Para. 9.14	Initial Measurements	Table 2 Item 1	R	Table 2		Ω
			Resistance					
			Intermediate Measurements	Table 2 Item 1	$\frac{\Delta R}{R}$	-1.2	+1.2	%
			Resistance Change (R ≤ 100Ω)					
			Resistance Change (R > 100Ω)	Table 2 Item 1	$\frac{\Delta R}{R}$	-0.4	+0.4	%
			Insulation Resistance	Table 2 Item 3	R _i	100	-	MΩ
			Final Measurements	Table 2 Item 1	$\frac{\Delta R}{R}$	-1.6	+1.6	%
			Resistance Change (R ≤ 100Ω)					
			Resistance Change (R > 100Ω)	Table 2 Item 1	$\frac{\Delta R}{R}$	-0.6	+0.6	%
			Insulation Resistance	Table 2 Item 3	R _i	100	-	MΩ
10	High Temperature	Para. 9.15	Initial Measurements	Table 2 Item 1	R	Table 2		Ω
			Resistance					
			Intermediate Measurements	Table 2 Item 1	$\frac{\Delta R}{R}$	-1.2	+1.2	%
			Resistance Change (R ≤ 100Ω)					
			Resistance Change (R > 100Ω)	Table 2 Item 1	$\frac{\Delta R}{R}$	-0.4	+0.4	%
			Insulation Resistance	Table 2 Item 3	R _i	100	-	MΩ
			Final Measurements	Table 2 Item 1	$\frac{\Delta R}{R}$	-1.6	+1.6	%
			Resistance Change (R ≤ 100Ω)					
			Resistance Change (R > 100Ω)	Table 2 Item 1	$\frac{\Delta R}{R}$	-0.6	+0.6	%
			Insulation Resistance	Table 2 Item 3	R _i	100	-	MΩ
11	Solderability	Para. 9.16	Final Measurements	Para. 9.16 of ESA/SCC 4005	-	-	-	-
			Visual Examination					

NOTES: See Page 25.