

MILITARY SPECIFICATION

**CV 7534**

SEMI-CONDUCTOR DEVICE, DIODE

Description: This Specification covers the detail requirements for a Silicon Coaxial Resistive Switching Diode and is in accordance with K1007 except where otherwise stated.

Mechanical Dimensions and Outline: See Page 11 (Also Note A)

Polarity: Red mark on body indicates positive polarity of pin for forward bias.

Absolute Maximum Ratings:

Device	Rating	T <sub>amb</sub>	T <sub>stg</sub>	V <sub>R</sub>	I <sub>R</sub>	I <sub>F</sub>	P <sub>tot</sub>	P <sub>pk</sub>	Shock	Vib
	Unit	°C	°C	V	mA	mA	W	W	g	g
CV7534	Min.	-	-55	-	-	-	-	-	-	-
	Max.	100	120	-50	-5	75	1	50	100	10
Note							B	C		

- NOTES:
- A. When plugged into a holder contact is made to the open face shown in plane AA of the diode outline drawing Page 11.
  - B. The maximum value quoted is the total power dissipation inclusive of that contributed by the d.c. switching.
  - C. The quoted value is the maximum value of incident power which may be applied to the diode when the mismatch in the coaxial mount presents a v.s.w.r. greater than 10:1 and when the r.f. pulse width does not exceed 10µsecs.

It is recommended that a small negative bias of about 5 volts be applied to the diode when it is used to switch power values which approach the maximum in order to reduce the effect of possible admittance changes.

Where the mismatch provides a v.s.w.r. less than 10:1 the maximum power value or pulse width must be reduced, for example, should the diode present a matched condition the pulse width must not exceed 4µsecs for an incident power level of 50watts.

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## Primary Electrical Characteristics:-

Characteristic	$I_F$	$V_R$	$I_R$	$V_F$	Freq. Range	$t_p$	v.s.w.r.	v.s.w.r.
Unit	mA	V	mA	V	Mc/s	/ $\mu$ s	Ratio	Ratio
Min	-	-	-	-	1000	-	-	-
Max	75	-50	-5	1.2	11,000	0.5	0.1	0.1
Note				D.	E.	F.	G,H	G,J

Note D. At 50mA. (A typical value at 50mA forward current is 0.85 volts.)

- E. The actual frequency band over which the diode operates will depend on the design of the mount used. With a suitable mount, switching discrimination greater than 20dB may be obtained. Typical operating characteristics are given on page 10.
- F. The switching time quoted is that obtained when switching over 15dB range with diode set up in a suitable holder.
- G. As measured in a coaxial-type holder previously adjusted for unity v.s.w.r. when terminated by a matched 67 Ohms coaxial load.
- H. At zero bias.
- J. At 50mA  $I_F$ .

Reliability Assurance Requirements:- Under discussion

Requirements

Marking The device shall be marked first with the CV number and a polarity marking. The date code shall appear on multiple packs of 100 or more and the manufacturers code on individual packs. Additional marking as K1007, Issue 3, Section B, 1.3.4 shall be on the packing.

Quality Assurance Provisions

Destructive Tests The tests listed in Table 2, Group B Inspection, Sub Group 3 are considered destructive.

Preparation for Delivery

Packaging The device shall be packed according to K1007 Issue 3. Section A 1.2.(c). No lead shield is required.

Joint Services Catalogue Number

CV7534 = 5960-99-037-3784

This specification has been prepared by, and the Qualification Approval Authority is:-

Ministry of Aviation, Royal Radar Establishment, Malvern, Worcestershire, England.

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TABLE 1 GROUP A. INSPECTION

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
		SPECIFIC CONDITIONS					Min.	Max.	
<u>SUB GROUP 1</u> Visual and Mechanical Inspection	5.1			0.65	I				
<u>SUB GROUP 2</u> Reverse Current	8A.2.2	$P(r.f.) = 0$ $V_R = -50V$ Notes 1 and 3		0.65	II	$I_R$	-	5	mA
v.s.w.r. (1)	8B.3.6	$f = 9375 \text{ Mc/s} \pm 25 \text{ Mc/s.}$ $V = 0, P(r.f.) \leq 100 \text{ mW}$ Notes 1 and 3					-	0.1	Ratio
v.s.w.r. (2)	8B.3.6	$f = 9375 \text{ Mc/s.} \pm 25 \text{ Mc/s.}$ $I_0 = 50 \text{ mA}, P(r.f.) \leq 100 \text{ mW}$ Notes 1 and 3					-	0.1	Ratio
<u>SUB GROUP 3</u> Omitted									
<u>SUB GROUP 4</u> Forward Voltage	8A.3.2	$I_F = 50 \text{ mA}, P(r.f.) = 0$		6.5	IA	$V_F$	-	1.2	V

TABLE 1. GROUP A. INSPECTION (Cont'd)

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	SPECIFIC CONDITIONS				Min.	Max.	
<u>SUB GROUP 4</u> (Cont'd)			6.5	IA				
Minimum v.s.w.r	8B.3.6	$f = 9375 \text{ Mc/s} \pm 25 \text{ Mc/s}$ $P(\text{r.f.}) \leq 100\text{mW}$ $I_0 = 0$ Notes 1, 2, 3			L <sub>1</sub>	1.73	1.97	oms
Test (1) Position		$I_0 = 50 \text{ mA}$ Notes 1, 2, 3			L <sub>2</sub>	0.93	1.17	oms
Test (2) Position		Note 4			L <sub>1</sub> , L <sub>2</sub>	160	200	degs
<u>Electrical Angle</u> Differential between minima positions L <sub>1</sub> and L <sub>2</sub>								

**TABLE 2 GROUP B INSPECTION**  
 (See Page 3, Quality Assurance Provisions, Destructive Tests)

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS	AQL %	Insp. Level	Sym- bol	LIMITS		Units
						Min.	Max.	
<u>SUB GROUP 1</u>								
Physical	5.1	As in Drawing Page 11	6.5	IA				
<u>SUB GROUP 2</u>								
Temperature Cycling	5.5	3 cycles -55°C to 100°C	6.5	IA				
Thermal Shock	5.6.2	0°C to 100°C						
Moisture Resistance	5.3.1	Max Temp. 33°C ± 2°C						
<u>Post Sub-Group 2 Tests</u>								
Reverse Current	8A.2.2	As in Group A, Sub-Group 2.			I <sub>R</sub>	-	5	mA
Forward Voltage	8A.3.2	As in Group A, Sub-Group 4.			V <sub>F</sub>	-	1.2	V
<u>SUB GROUP 3</u>								
Vibration Fatigue	5.15.1		6.5	I				
<u>POST SUB-GROUP 3 Tests</u>								
Reverse Current	8A.2.2	As in Group A, Sub-Group 2			I <sub>R</sub>	-	5	mA
Forward Voltage	8A.3.2	As in Group A, Sub-Group 4			V <sub>F</sub>	-	1.2	V
<u>SUB GROUPS 4, 5 &amp; 6</u>								
Omitted								

TABLE 2 GROUP B INSPECTION (Cont'd)

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS Specific Conditions	AQL %	Insp. Level	Sym- bol	LIMITS		Units
						Min.	Max.	
<u>SUB GROUP 7</u>			6.5	I				
<u>High and Low Temperature Life (Non operating)</u>								
High Temperature	6.2.1	No Voltages. T <sub>amb</sub> = 120°C				150	-	Hours
Low Temperature	6.2.2	No Voltages. T <sub>amb</sub> = -55°C				150	-	Hours
<u>Post High and Low Temperature Tests</u>								
v.s.w.r. (1)	8B.3.6	As in Group A. Sub-Group 2				-	0.1	Ratio
v.s.w.r. (2)	8B.3.6	As in Group A. Sub-Group 2					0.1	Ratio
<u>Electrical Angle Differential between minima positions L<sub>1</sub> and L<sub>2</sub></u>					∅ L <sub>1</sub> L <sub>2</sub>	160	200	degs
<u>SUB GROUP 8</u>								
<u>Operating Life</u>	6.3	I <sub>0</sub> = 80 mA, V <sub>R</sub> 40V pk f = 50 c/s T <sub>amb</sub> at any single temperature between 25°C and 120°C	6.5	IA		1000	-	Hours
<u>Life Test end points 500 hours</u>								
<u>Post Life Tests</u>								
v.s.w.r. (1)	8B.3.6	As in Group A. Sub-Group 2				-	0.1	Ratio
v.s.w.r. (2)	8B.3.6	As in Group A. Sub-Group 2				-	0.1	Ratio

TABLE 3 GROUP D INSPECTION

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp Level	Sym- bol	LIMITS		Units
		SPECIFIC CONDITIONS	GROUP C OMITTED				Min.	Max.	
<u>SUB GROUP 1</u> Retest after 28 days holding period v.s.w.r (1) v.s.w.r (2)	8B.3.6 8B.3.6	As in Group A Sub-Group 2 As in Group A Sub-Group 2	GROUP C OMITTED	100%	100%	$\phi$ $L_1, L_2$	-	0.1	Ratio
							-	0.1	Ratio
							160	200	Degs.
<u>Electrical Angle</u> <u>Differential</u> between measured minima positions $L_1$ and $L_2$		As in Group A Sub-Group 4							



NOTES

1. All r.f. measurements shall be made in a coaxial type holder which has previously been adjusted to unity v.s.w.r. when terminated by a matched 67 ohm coaxial load.
2. The minimum position to be measured in a direction towards the load from the plane 'AA' as given in the outline drawing page 11.
3. Applied d.c. source resistance not greater than 50 ohms.
4. This is defined as the phase variation of v.s.w.r. minima which is obtained when the d.c. current applied to the diode is changed from that when  $I_0 = 0$  to a value of  $I_0 = 50\text{mA}$ . It is expressed as the electrical angle which corresponds to the difference between the measured values of v.s.w.r. position  $L_1$  and  $L_2$ .

# CV7534

BEHAVIOUR OF TYPICAL DIODES OVER FREQUENCY BAND



