MILITARY SPECIFICATION

CV 7589-90

SEMICONDUCTOR DEVICE, SILICON HIGH VOLTAGE DIODE

Description: This specification covers the detail requirements for a Silicon High Voltage diode and is in accordance with K1007, except where otherwise stated.

Mechanical Dimensions and Outlines: K1007, Section 'D' Appendix 1, Dwg.9

Connections: Cathode end marked as clause 1.3.4.4

Absolute Maximum Ratings:

Device	Rating	P.R.V.	Mean Power	Recurrent Peak I_F	Rise time of Reverse Waveform	T_{op}	T_{stg}	Shock	Vibration
	Unit	k.Volts	mW	mA	V/μSec	°C	°C	g	g
CV7589	Min	-	-	-		-55	-55	-	-
	Max	2.0	300	350		+150	+150	1500	20
CV7590	Min	-	-	-		-55	-55	-	-
	Max	3.0	300	350		+150	+150	1500	20
Notes:				A	B			C	

Notes:

A. See derating curve Fig. 1.

B. The maximum rise time of a reverse voltage waveform which can be applied to the diode is defined by the empirical formula

$$\frac{dv}{dt} \text{ (max)} = \frac{5000}{I_F \text{ Pk}}$$

where I_F peak is measured in milliamps and is the forward current in the diode immediately preceding the applied reverse voltage and

$\frac{dv}{dt}$ (max) is measured in volts per μSec.

C. Duration 0.5 milliseconds.

D. See surge rating curve Fig. 2.

E. Commercial Equivalents CV 7589 = ZHS103
CV 7590 = ZHS106

CV 7589-90

Primary Electrical Characteristics

Characteristic			I_R	I_R	I_R	I_R	V_F
Unit			uA	uA	uA	uA	V
CV 7589		Min	-	-	-	-	-
		Max	.10	-	10.0	-	4.5
CV7590		Min	-	-	-	-	-
		Max	-	.10		10.0	4.5
CONDITIONS	T_{amb}	°C	25	25	100	100	25
	V_R	V	2000	3000	2000	3000	
	I_F	mA					100

Reliability Assurance Requirements:- Under discussion

Requirements:

Marking The device shall be marked as K1007, Section B, 1.3.4 Essential marking, 1.3.4.1(a) and 1.3.4.1(b).

Quality Assurance Provisions:-

Destructive Tests: The tests listed in Table 2, Group B Inspection, Sub Groups 2, 3 and 4 and in Table 3 Group C Inspection, Sub Groups 2 are considered destructive.

Group C Inspection: This inspection shall be conducted on the initial lot and thereafter every ninety days or every fifth lot, whichever occurs first.

Preparation for Delivery:

Packaging: The device shall be packed according to K1007, Section A 1.2.(c).

NATO Stock Number: CV7589 = 5960-99-037-3917
CV7590 = 5960-99-037-3918

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

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

TABLE 1. GROUP 'A' INSPECTION

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Symbol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
SUB GROUP 1			.65	I				
Visual and Mechanical Inspection	5.1							
SUB GROUP 2			.65	II				
Forward Voltage Drop	8A.3.2	I_F = 100mA, T_{amb} = 25°C			V_F	3.0	4.5	V
Reverse Current (1)	8A.2.2	CV7589 V_R = 2kV) T_{amb} = 25°C CV7590 V_R = 3kV)			I_R	-	0.1	µA
SUB GROUP 3			2.5	I				
Reverse Current (2)	8A.2.2	CV7589 V_R = 2kV) CV7590 V_R = 3kV) T_{amb} = 100°C			I_R	-	10.0	µA
SUB GROUP 4			4.0	IA				
Capacitance	8A.5.1	V_R = -10V f = 1 Mc/s				-	3.3	pF

GROUP 'B' INSPECTION

TABLE II. (See Quality Assurance Provisions, Page 3)

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Symbol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
SUB GROUP 1			6.5	IC				
Physical Dimensions	5.1	According to Drg.K1007/A1/D9						
SUB GROUP 2			4.0	IA				
Solderability	5.13							
Temperature Cycling	5.5	-55°C to +150°C						
Moisture Resistance	5.3							
SUB GROUP 3			4.0	IA				
Vibration Fatigue	5.15.1	Non-operating						
SUB GROUP 4			6.5	IA				
Lead Fatigue	5.10.2	2 cycles						
SUB GROUPS 5 & 6								
Omitted								
SUB GROUP 7			4.0	I Note 1				
High Temperature Life	6.2.1 6.6.1.2.2	T_{stg} = 150°C t = 1000 hrs.						
SUB GROUP 8			4.0	IA				
Operating Life	6.3 6.5 6.6 6.6.1.2.2	P.R.V. = 2kV (CV7589), 3kV (CV7590) T_{amb} between 25°C and 100°C with not less than corresponding mean rectified current given on the derating curve Fig.1 Duration 1000 hours.						

TABLE II (Cont'd) GROUP 'B' INSPECTION

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Symbol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
Post Test end Points for SUB GROUPS 2, 3, 7 and 8								
Forward Voltage Drop	8A.3.2	As in Group A, Sub Group 2			V_F	-	4.5	V
Reverse Current (2)	8A.2.2	As in Group A, Sub Group 3			I_R	-	15.0	µA

GROUP 'C' INSPECTION

TABLE III (See Quality Assurance Provisions, Page 3, Group C Inspection)

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Sym-bol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
SUB GROUP 1								
Omitted								
SUB GROUP 2			6.5	IA				
Shock	5.17.1	Non-operating. 5 blows in each of directions X1, Y1, Y2 and Z1						
Post Test End Points for Sub Group 2								
Forward Voltage Drop	8A.3.2	As in Group A. Sub Group 2			V_F		4.5	V
Reverse Current (2)	8A.2.2	As in Group A, Sub Group 3			I_R		15.0	µA

NOTES

1. Maximum sample size 125.

FIG 1

DERATING CURVE

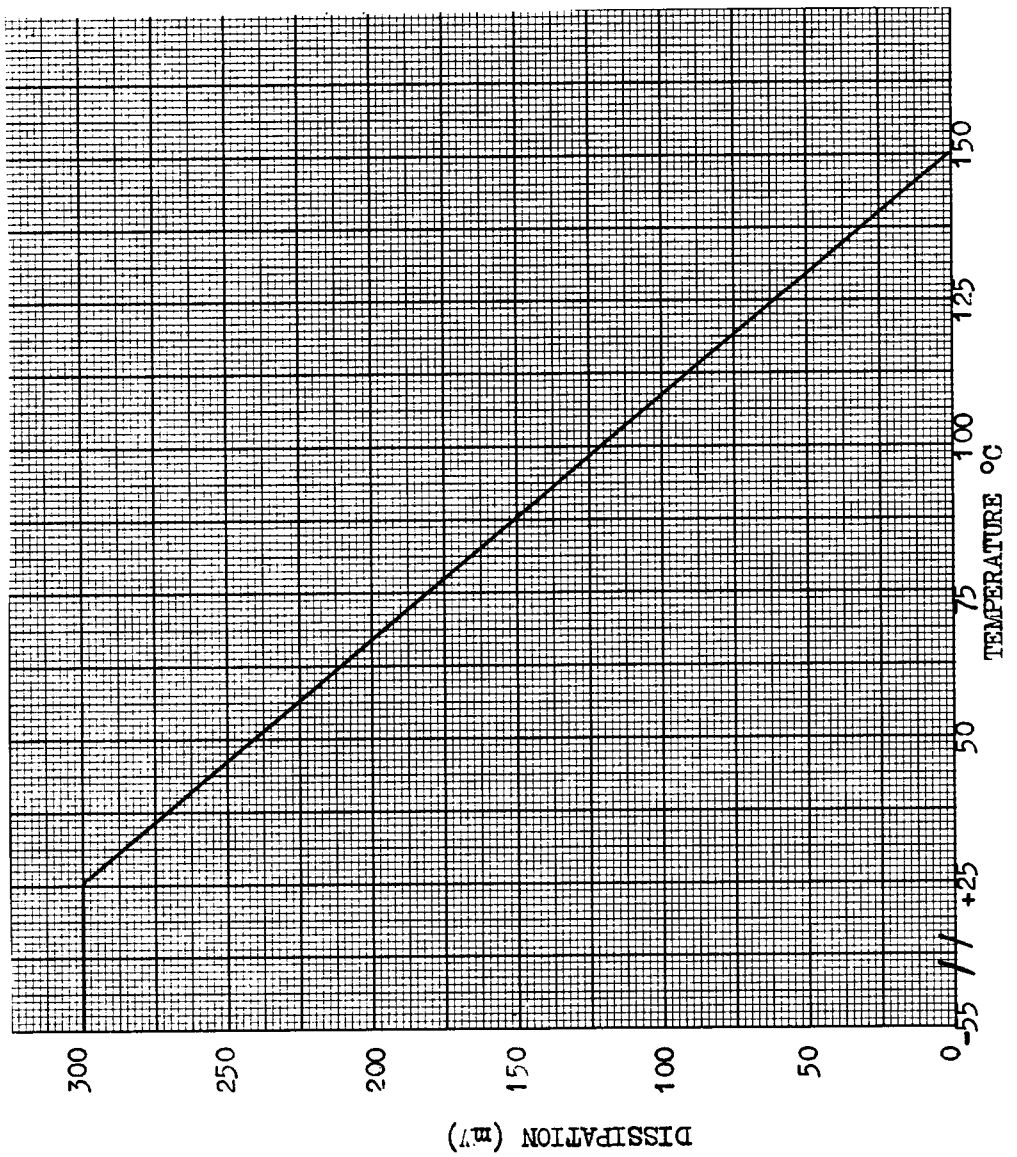

FIG 2

SURGE CURRENT RATING BASED ON A RECTANGULAR
PULSE IN A FORWARD DIRECTION
FULL P.R.V. IN THE REVERSE DIRECTION