MILITARY SPECIFICATION

CV 7498

SEMICONDUCTOR DEVICE, DIODE

Description:- This specification covers the detail requirements for a High Speed gold bonded Germanium diode and is in accordance with K1007, Issue 3, except as otherwise stated.

Mechanical Dimensions and Outlines:- K1007, Section B 10.3.3.4

Polarity:- Cathode end marked as K1007, Section B clause 1.3.4.1 (b)

Absolute Maximum Ratings:-

RATING	V_R	I_{FRM}	I_F	P_{tot}	T_{opr}	T_{stg}	Shock	Vibration
UNIT	V	mA	mA	mW	°C	°C	g	g
MIN	-	-	-	-	-	-55	-	-
MAX	15	240	100	80	+90	+90	1500	20
NOTE	A			B			C	

Notes
A DC or peak.
B See derating curve, Fig. 1 Page 10.
C Duration 0.5 mSec.
D Commercial equivalent HD1870.

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Primary Electrical Characteristics:-

CHARACTERISTIC		$V_{F(1)}$	$V_{F(2)}$	I_R	I_R	Q_S	t_{fr}	t_{rr}	V_{FSM}	C
UNIT		V	V	µA	µA	PC	nS	nS	V	pF
MIN		0.29	0.35	-	-	15	-	-	-	-
MAX		0.35	0.42	15	100	80	1.2	12.0	0.75	1.0
CONDITIONS	T_{amb} °C	25	25	25	60	25	25	25	25	25
	I_F mA	3	10	-	-	10	30	10	30	-
	V_R V	-	-	10	10	-	-	-	-	10
	f mc/s	-	-	-	-	-	-	-	-	1

Reliability Assurance Requirements Under discussion.

Requirements:

Marking: The device shall be marked as K1007, Section B 1.3.4 omitting all except 1.3.4.1 (a) and (b). The date code shall appear on multiple packs of 100 or more and the manufacturers code on individual packs.

Quality Assurance Provisions:

Destructive Tests: The tests listed in Table 2 Group B Inspection, Sub Groups 2, 3 and 4 and Group C Inspection, Sub Group 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, Issue 3, Section A 1.2 (C).

Joint Service Catalogue Number: 5960-99-037-3731

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			0.65	I				
Visual and Mechanical Inspection	5.1	Excluding Physical Dimensions						
SUB GROUP 2			0.65	II				
Forward Voltage drop (1)	8A.3.2	I_F = 3 mA			V_F	0.29	0.35	V
Reverse Current (1)	8A.2.2	V_R = 10V			I_R	-	15	µA
Forward Voltage drop (2)	8A.3.2	I_F = 10 mA			V_F	0.35	0.42	V
Stored Charge	8A.6.2	I_F = 10 mA C_1 = 0.04 µF D_1 = CV7110 or CV2290 D_2 = CV7050 t_r = 10nS Pulse width = 2 µS R_1 = dependent on source voltage. Note 1			Q	15	80	pC

TABLE 1 GROUP A INSPECTION (Cont'd)

Examination or Test	TEST CONDITIONS		AQL %	Insp Level	Symbol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
SUB GROUP 3			2.5	I				
Forward Voltage drop (3)	8A.3.2	I_F = 30 mA			V_F	0.43	0.51	V
Reverse Current (2)	8A.2.2	T_{amb} = 60°C V_R = 10V			I_R	-	100	µA
SUB GROUP 4			4.0	IA				
Capacitance	8A.5.1	V_R = 10V f = 1Mc/s			C	-	1.0	pF

TABLE 2 GROUP B INSPECTION

See Page 3, Quality Assurance Provisions

Examination or Test	TEST CONDITIONS		AQL %	Insp Level	Symbol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
SUB GROUP 1			6.5	IA				
Physical Dimensions	5.1.2	According to Drawing 10.3.3.4						
SUB GROUP 2			4.0	IA				
Solderability	5.13							
Temperature Cycling	5.5	$-55^{\circ}C$ to $+90^{\circ}C$						
Moisture Resistance	5.3.1.2							
SUB GROUP 3			4.0	IA				
Vibration Fatigue	5.15							
SUB GROUP 4			6.5	IA				
Lead Fatigue	5.10.2	3 cycles						
SUB GROUP 5 & 6								
Omitted								
SUB GROUP 7			4.0	I				
High Temperature	6.2.1	$T_{stg} = +90^{\circ}C$		Note 3				
Life	6.6.1.2.2	Duration 1000 hours						

TABLE 2 GROUP B INSPECTION (Cont'd)

Examination or Test	TEST CONDITIONS		AQL %	Insp Level	Symbol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
SUB GROUP 8			4.0	IA				
Operating Life	6.3.2 6.6.1.2.2	Operation at an ambient temperature between 25°C and 90°C. Forward current not less than the value corresponding to the chosen T_{amb} according to the derating Curve Fig. 1 V_R = 15V Duration = 1000 hours						
Post Test End Points for Sub Groups 2, 3, 7 and 8								
Forward Voltage Drop (1)	8A.3.2	I_F = 3 mA			V_F	-	0.37	V
Reverse Current (2)	8A.2.2	V_R = 10V T_{amb} = 60°C			I_R	-	130	µA

TABLE 3 GROUP C INSPECTION

See Page 3, Quality Assurance Provisions

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Symbol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
SUB GROUP 1			4.0	IA				
Breakdown Voltage	8A.2.4	I_R = 100 µA			$V_R(BV)$	15	-	V
Forward Voltage Drop (4)	8A.3.2	I_F = 100 mA			V_F	0.50	0.70	V
Reverse Recovery Time	8A.6.1.2	Note 1 I_F = 10mA to I_R = 10mA $V_f \geqslant 1V$ Recovery to 1 mA Figure 2. Page 11.			t_{rr}	-	12.0	nS
Forward Recovery Time	8A.6.1.1	I_f = 30mA pulse Rise Time = 1.0 nS Pulse duration 20 nS nominal CRT rise time 0.4 nS nominal Note 2 and Fig. 3			t_{fr}		2.0	nS
Forward Transient Voltage	8A.6.1.1	As for Forward Recovery Time			V_{FSM}		1.0	V
SUB GROUP 2			6.5	IA				
Shock	5.17.1	Non-operating, 5 blows in each of three mutually perpendicular directions.						
Post Test End Points								
Forward Voltage Drop (1)	8A.3.2	I_F = 3 mA			V_F	-	0.37	V
Reverse Current (2)	8A.2.2	V_R = 10V T_{amb} = 60°C			I_R	-	130	µA

NOTES

1. Unless otherwise stated the values quoted for these conditions shall be considered to have a tolerance of not more than ± 5%

2. Measure from 10% V_f to the earliest point beyond which the recovery waveform is entirely within the 100% ± 10% V_f band, where V_f is the steady state.

   See Figure 3.

3. Maximum Sample size 125.

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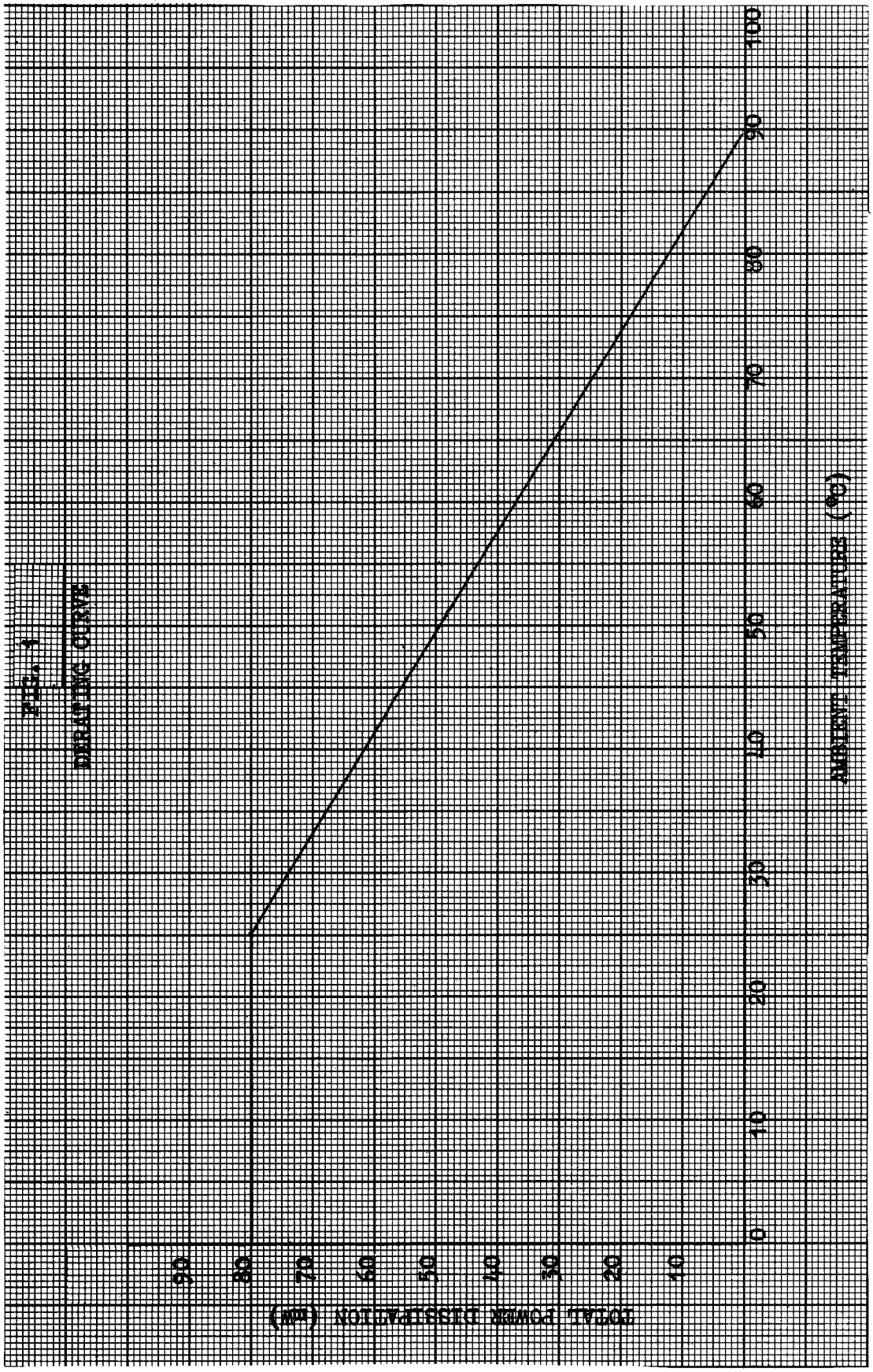
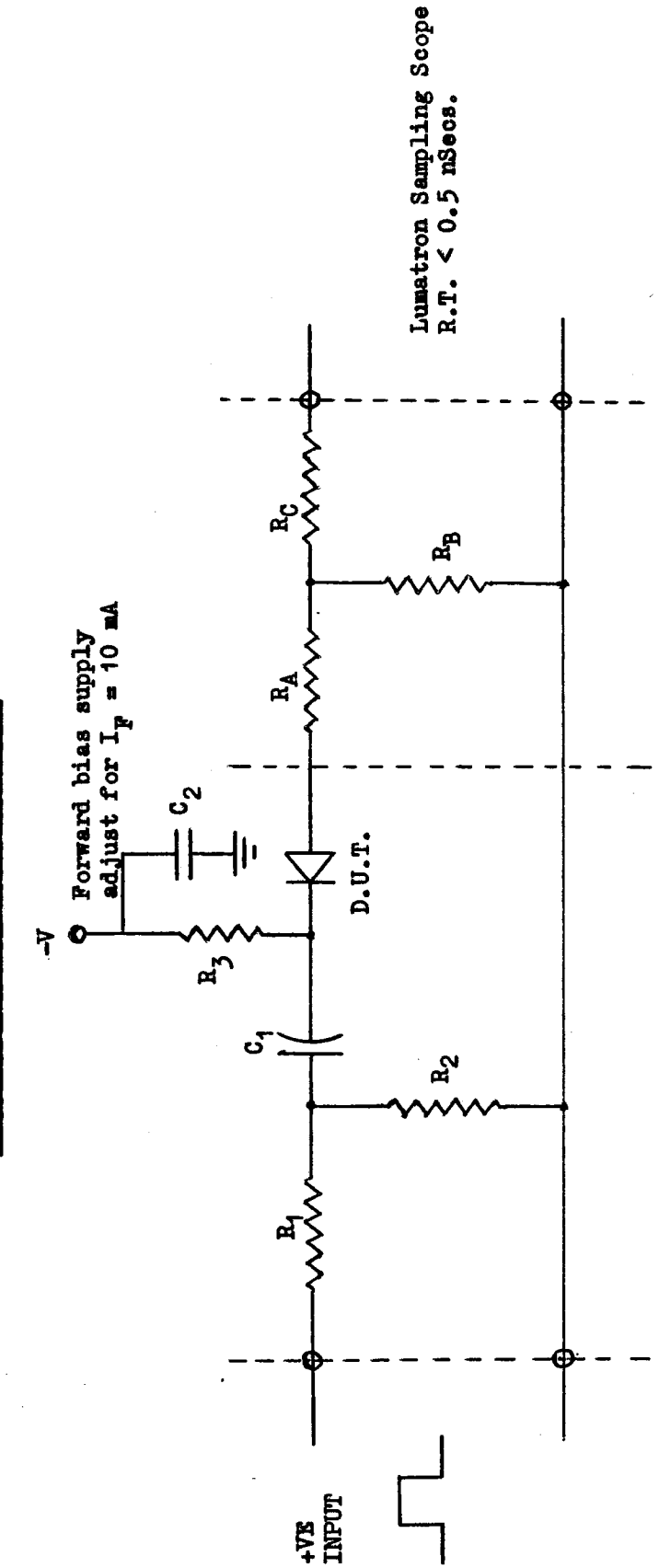


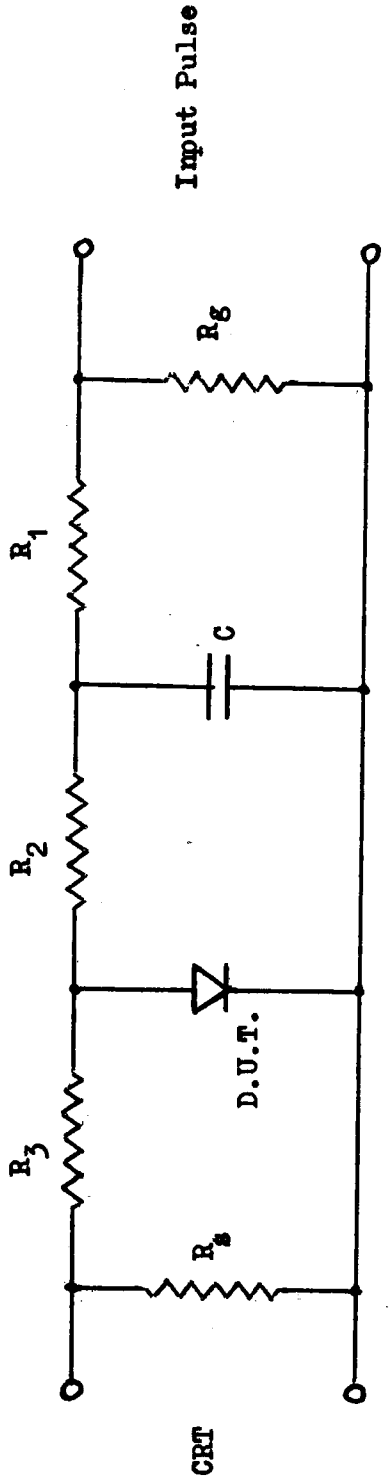
16th November 1964

FIGURE 2. REVERSE RECOVERY TIME



R_1 = 25 ohm 1%
R_2 = 25 ohm 1%
R_3 = 1.0Kohm ± 10% ½ wt.
R_A = R_C = 45 ohm 1%
R_B = 5.0 ohm 1%
C_1 = 5000 pF (Feed through)
C_2 = 0.01 µF

Input Pulses:
Pulse Width = 75 nSec
Rise Time <0.3 nSec.
Lumatron 112 Pulse Generator



R_1 = 330 ohm
R_2 = 470 ohm
R_3 = 470 ohm

R_g = 50 ohm
R_s = 50 ohm
C ≒ 3 pF

FIGURE 3. FORWARD RECOVERY TIME