

MILITARY SPECIFICATION

**CV 7556 - 63**

SEMICONDUCTOR DEVICE, RECTIFIER DIODE

Description:- This Specification covers the detail requirements for a Silicon Power Rectifier Diode and is in accordance with K1007, Issue 3, except where otherwise stated.

Mechanical Dimensions and Outlines:- See drawing Page 18

Connections:- Stud cathode CV7556 to CV7559  
 Stud anode CV7560 to CV7563

DEVICE	RATING	$V_{RRM}$	$V_{RSM}$	$V_R$	$I_O$	$I_{FSM}$	$T_{STUD}$	$T_{STG}$	VIB.	SHOCK	MOUNTING TORQUE
	Unit	V	V	V	A	A	°C	°C	g	g	(IN. LBS.)
CV7556	MIN.							-65			180
CV7560	MAX.	200	275	160	150	2500	140	150	20	1500	216
CV7557	MIN.							-65			180
CV7561	MAX.	600	725	480	150	2500	140	150	20	1500	216
CV7558	MIN.							-65			180
CV7562	MAX.	800	950	650	150	2500	140	150	20	1500	216
CV7559	MIN.							-65			180
CV7563	MAX.	1000	1250	800	150	2500	140	150	20	1500	216
Notes		A	B	C	D	E				F	

See Page 2 for Notes.

# CV 7556-63

- Notes:-
- A. Max. Peak a.c. voltage applied to diode.  
Also equals  $V_{RWM}$
  - B. Max. non-repetitive transient voltage not exceeding 5mS in duration.
  - C. Max. d.c. blocking voltage.
  - D. See derating curve page 12
  - E.  $T_{stud} = 40^{\circ}C$ . See also curve on page 13
  - F. For max. of 0.5mS.
  - G. Commercial equivalents 45L and 45LR series.  
IN3085 series.

## Primary Electrical Characteristics

Characteristic		$V_F$	$I_{RRM}$	$I_{RRM}$
Unit		V	mA (peak)	mA (peak)
CV 7556 CV 7560	Max.	1.15	42	60
CV 7557 CV 7561	Max.	1.15	30	42
CV 7558 CV 7562	Max.	1.15	30	38
CV 7559 CV 7563	Max.	1.15	22	30
Conditions	$T_{STUD}$ °C	25	25	140
	$I_F$ A	70		
	$V_R$ V		$V_{RWM}$	$V_{RWM}$

Reliability Assurance Requirements:- Under discussion.

Requirements:-

Marking

The device shall be marked in accordance with K1007, Issue 3, Section B.1.3.4.

Quality Assurance Provisions:-

Destructive Tests

The tests listed in Table II, Group B Inspection, Sub-Group 2, 3 and 4 and in Table III, Group C Inspection, Sub-Group 2 are considered destructive.

Group C Inspection

Inspection shall be conducted on the initial lot and thereafter every 90 days or every fifth lot whichever occurs first.

Preparation of Delivery:-

Packaging:

The devices shall be packed according to K1007, Section A.1.2. (c). Nut and lock-washer to be packed with each device.

NATO Stock Numbers:-

CV7556 = 5960-99-037-3809  
CV7557 = 5960-99-037-3810  
CV7558 = 5960-99-037-3811  
CV7559 = 5960-99-037-3812  
CV7560 = 5960-99-037-3813  
CV7561 = 5960-99-037-3814  
CV7562 = 5960-99-037-3815  
CV7563 = 5960-99-037-3816

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

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

1st June, 1964

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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 & Mechanical Inspection	5.1	Excluding physical dimensions		0.65	I				
	8A.3.2	$I_F = 70$ Amps $T_{amb} = 25^\circ C$ Test to be completed within 5 secs. Diode stud to be maintained at $25^\circ C$ .		0.65	II	$V_F$	-	1.15	V
Reverse Current (1)	8A.2.2	Oscillographic Method $T_{amb} = 25^\circ C$				$I_{RRM}$	-		
		$V_R =$ CV7556 & CV7560 200V CV7557 & CV7561 600V CV7558 & CV7562 800V CV7559 & CV7563 1,000V					-	42 mA (Peak) 30 " 30 " 22 "	
<u>SUB-GROUP 3</u> Reverse Current (2)	8A.2.2	Oscillographic Method $T_{stud} = 140^\circ C$		2.5	I	$I_{RRM}$			
		$V_R =$ CV7556 & CV7560 200V CV7557 & CV7561 600V CV7558 & CV7562 800V CV7559 & CV7563 1,000V						60 mA (Peak) 42 " 38 " 30 "	

TABLE II. GROUP B INSPECTION

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
<u>SUB-GROUP 1</u> Physical Dimensions	5.1	In accordance with SO-29C See page	6.5	IC				
<u>SUB-GROUP 2</u> Temperature Cycling	5.5	-65°C to +150°C	6.5	IA				
Moisture Resistance	5.3							
<u>SUB-GROUP 3</u> Vibration Fatigue	5.15.1	20g : Non-operating	6.5	IA				
<u>SUB-GROUP 4</u> Torque	5.12 5.12.1	Non-operating	6.5	IC			216	lb. ins
<u>SUB-GROUP 5, 6</u> Omitted								
<u>SUB-GROUP 7</u> High Temperature Life	6.2.1 6.6.1.2.2	Non-operating T <sub>amb</sub> = 150°C t = 1,000 hours	6.5	IA				
<u>SUB-GROUP 8</u> Operation Life	6.3.3.2	I <sub>F</sub> = 150 AMPS, T <sub>STUD</sub> = 85°C OR on derating curve at a current not less than 25 AMPS	Appendix A					

TABLE II GROUP B INSPECTION (Cont'd)

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
<u>Post Test End Points for Sub-Groups 2, 3, 7 and 8</u> Forward voltage Reverse Current (1)	8A.3.2	As for Group A			V <sub>F</sub>	-	1.2	V
	8A.2.2/2	As for Group A			I <sub>RRM</sub>	-	84	mA(Peak)
		V <sub>R</sub> = CV7556 & CV7560					60	"
		CV7557 & CV7561					60	"
	CV7558 & CV7562					60	"	
	CV7559 & CV7563					44	"	

TABLE III GROUP C INSPECTION

Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
<u>SUB-GROUP 1</u>								
Omitted								
<u>SUB-GROUP 2</u>			6.5	10				
Shock	5.17	Non-operating. 5 blows in each of two directions Y <sub>2</sub> and X <sub>1</sub>						
Constant Acceleration	5.14	Non-operating: In the Y <sub>2</sub> direction (along axis, stud outwards) 5000 g.						
<u>Post test end points for Sub-Group 2</u>		As for Post Test End Points for Group B Inspection.	Note 1					

Inspection Level

For lot sizes up to 200, at least one rectifier shall be taken from each lot and life tested for 1000 hours. For lot sizes 201 and over, at least two rectifiers shall be taken from each lot and life tested for 1000 hours.

Merit Life

Merit Life is defined as the ratio of the actual life hours for one or more rectifiers to the total life hours that would have occurred had there been no failures, expressed as a percentage:-

$$\text{Merit Life} = \frac{\text{Actual hours run}}{\text{Total possible hours}} \times 100\%$$

Classification of failures

Electrical inoperatives shall be the only criterion of failure, and the life test positions shall be so arranged as to indicate a failure when it occurs. If a failure occurs, the number of hours run when the rectifier was last recorded as operating shall be taken as the actual life. At the end of the 1000 hours period the sample shall pass the post test end point limits.

Procedure of continuous production

When 1000 hours have elapsed since the sample drawn from the first lot was placed on life test, there should be at least four additional samples undergoing life test, with various numbers of hours on test. The Merit Life shall be computed for the first five lots. If the Merit Life exceeds 90% the first lot is acceptable. When 1000 hours have elapsed since the sample from the second lot was placed on life test, the merit life shall be computed using the test results from the first five lots. If this exceeds 90% the second lot is acceptable. The acceptability of the third, fourth and fifth lots is determined from the first five lots.

If, when the sample from one of the first five lots have been life tested for 1000 hours, the computed Merit Life is 90% or less, the lot from which the sample was drawn shall be held in store. If when the sample from the subsequent lot has been life tested for 1000 hours, the computed Merit Life exceeds 90%, both lots shall be accepted. If the Merit Life is 90% or less, both lots shall be held. When the sample from the fifth lot has been life tested for 1000 hours, if the computed Merit Life for all five samples exceed 90% all lots being held shall be accepted. If the Merit Life is 90% or less, all lots being held shall be rejected.

When the sample from the sixth lot has been life tested for 1000 hours, the Merit Life shall be computed for the samples from lots 2 to 6. If this exceeds 90%, lot 6 shall be accepted; If it is 90% or less, lot 6 shall be rejected. A similar procedure shall apply for subsequent lots, the Merit Life being computed on the combined results of the completed life test of the lot under consideration and the previous consecutive lots.

When any sample has passed the prescribed life test period or has failed it shall be removed from test.



Reduced Duration

When five consecutive lots have been accepted without any of them having been held due to failure to meet the 90% merit life requirement, reduced duration life testing is applicable, and the Merit Life shall then be computed after the sample from a lot has been life tested for 240 hours. If when a sample from a given lot has been life tested for 240 hours the computed Merit Life is 90% or less, the lot shall be held in store and the life test of that sample and subsequent samples shall continue to 1000 hours, the Merit Life being computed after 1000 hours for each sample. Reduced duration testing shall be again applicable after five consecutive lots have been accepted.

Single Lot or non-continuous production

If production is not continuous (see section 6.6) the above procedure cannot be used. In this case the manufacturer shall place at least five rectifiers on life test from a given lot. After 1000 hours the Merit Life for the sample shall be computed and if this exceeds 90% the lot shall be accepted. If it is 90% or less the lot shall be rejected.

If production is continuous, (section 6.6), but an interval of more than one week occurs between any two lots at the start of a production run, either the manufacturer shall place additional rectifiers on life test from one or more lots, or lots shall be held in store for a period after the sample has completed 1000 hours of life test, so that the Merit Life is computed from the results of life test on not less than five rectifiers before a determination of acceptability is made.

Additional samples

The manufacturer may place on life test any number of additional samples from each lot, provided the minimum requirement of 1, 2 or 5 as the case may be is met. In addition, after the life test has started for any lot, the manufacturer may add an additional quantity to the initial life test sample, but this may be done once only for any life test lot.

NOTES

Note 1. For lot sizes up to 200, at least two rectifiers shall be taken from each lot. For lot sizes 201 and over, at least four rectifiers shall be taken from each lot. At the end of the test the sample shall pass the post test end point limits.

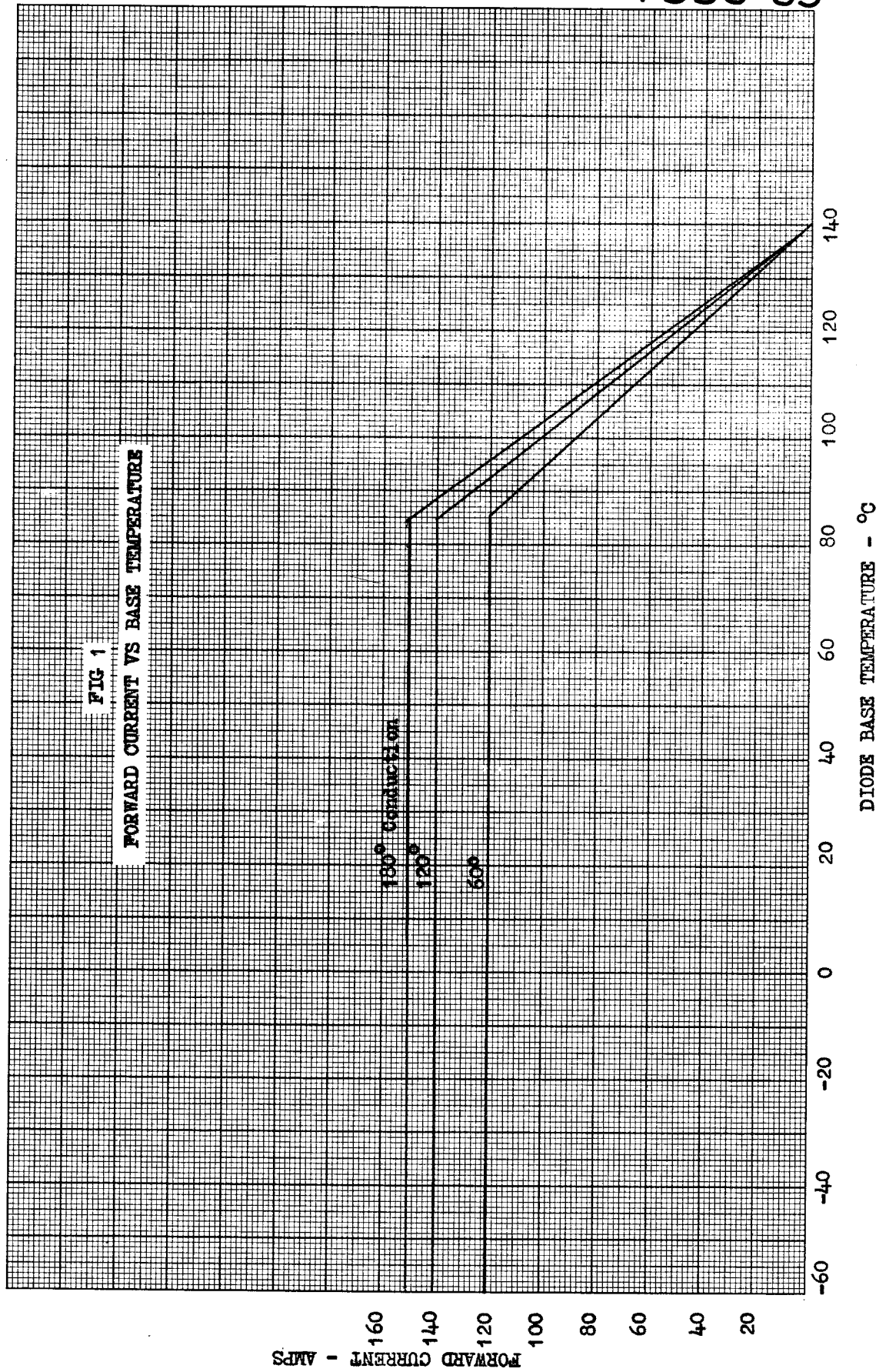
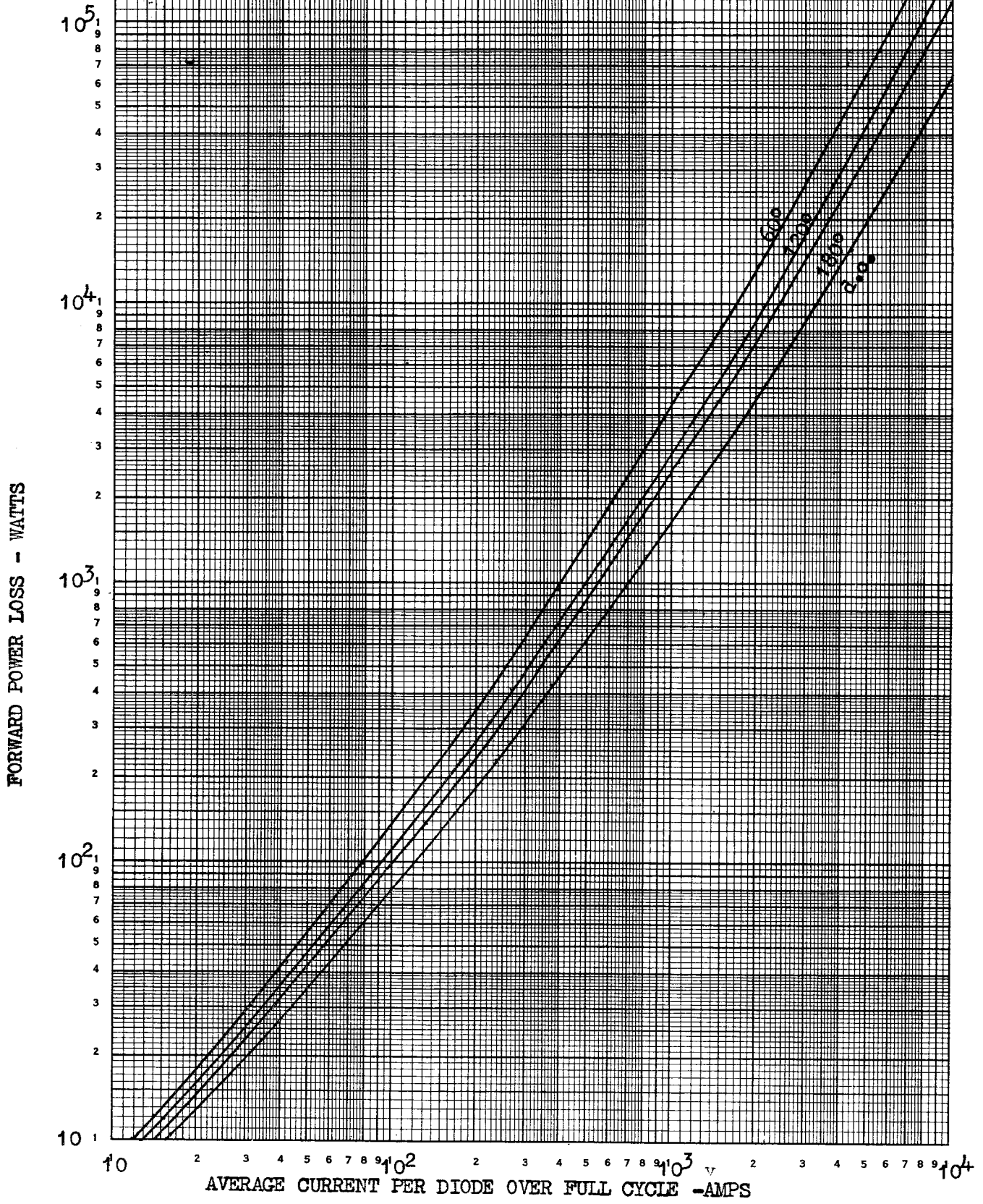
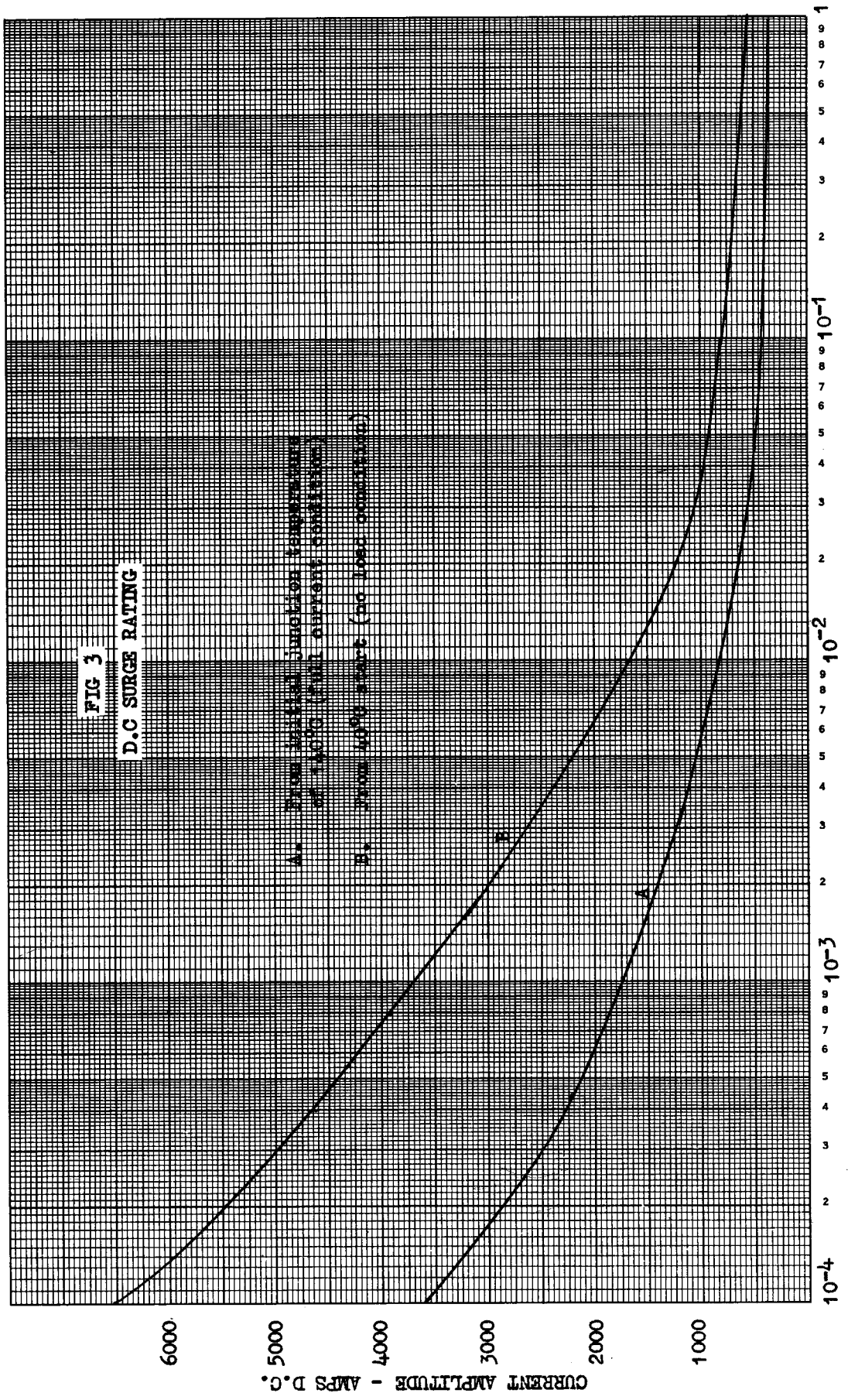
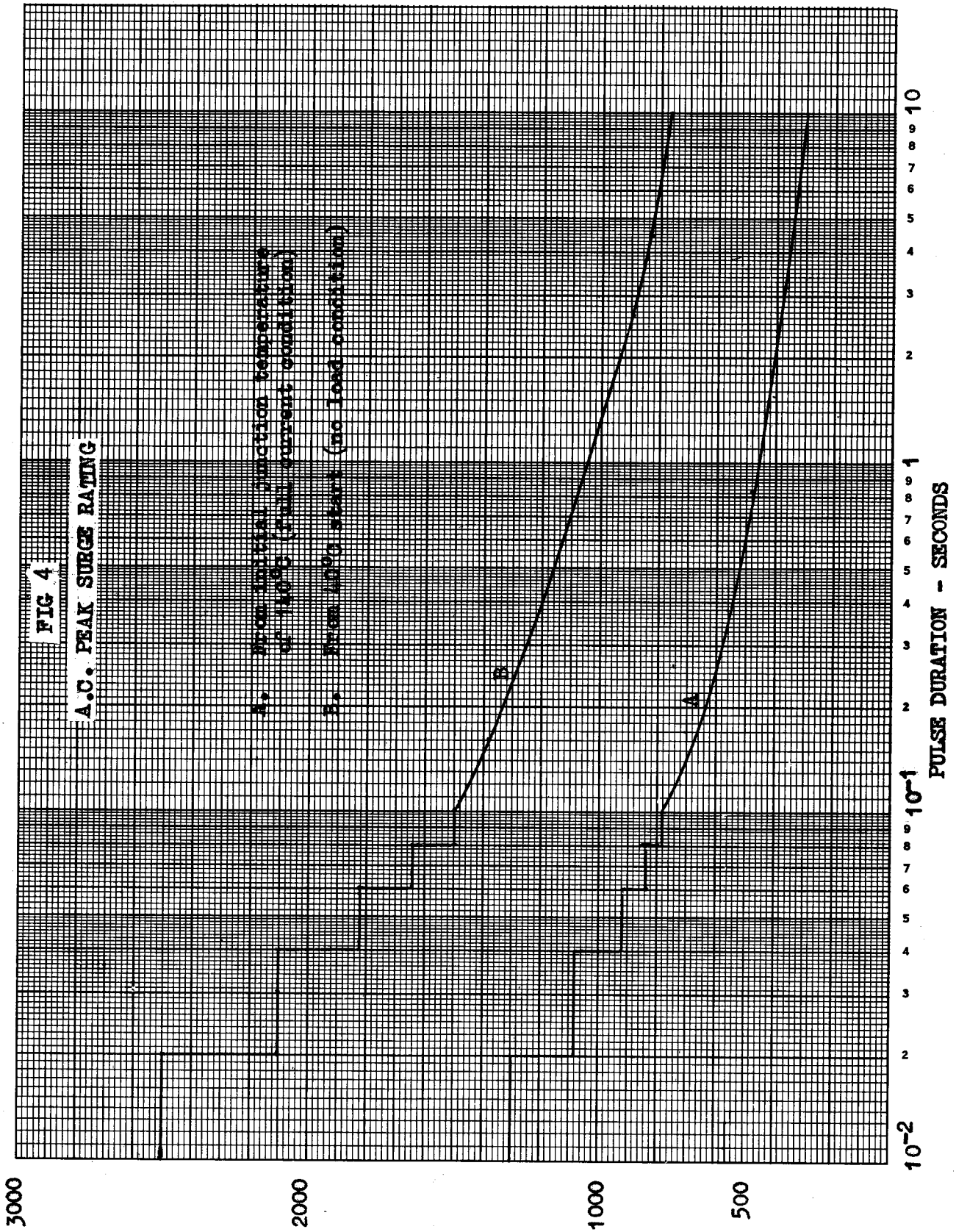


FIG 2

Forward Power Loss Vs Load Current







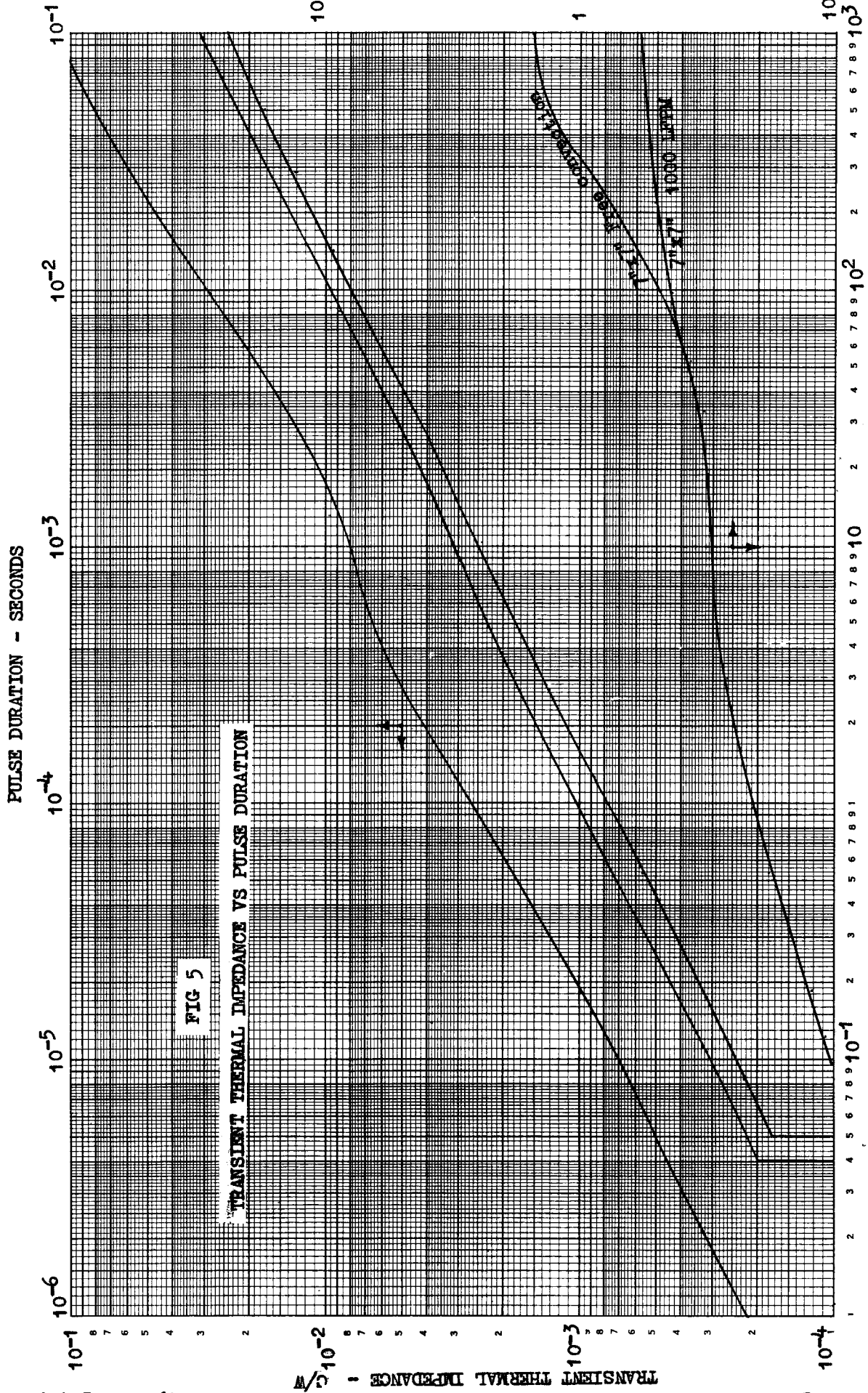


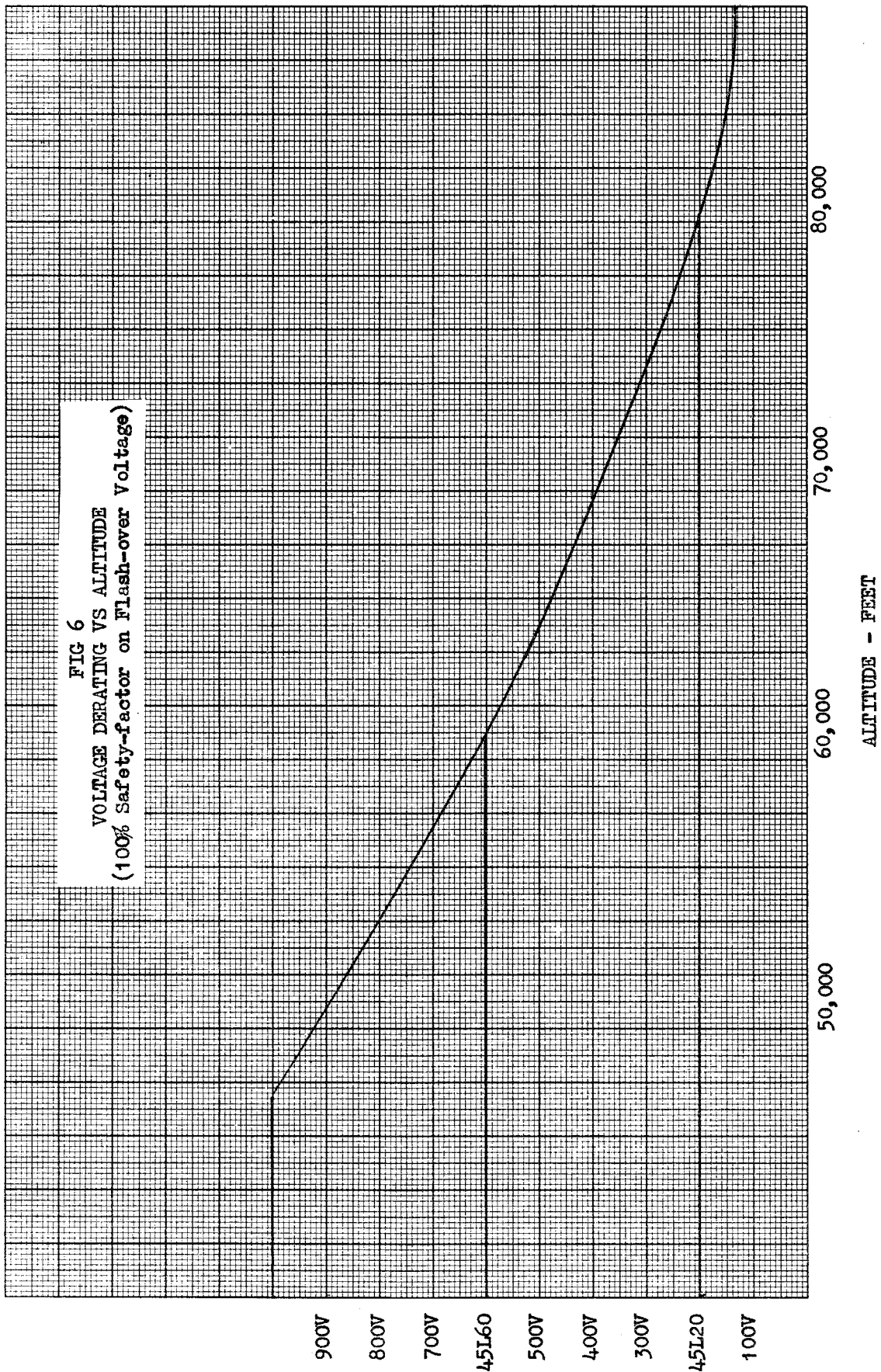
FIG 5

TRANSIENT THERMAL IMPEDANCE VS PULSE DURATION

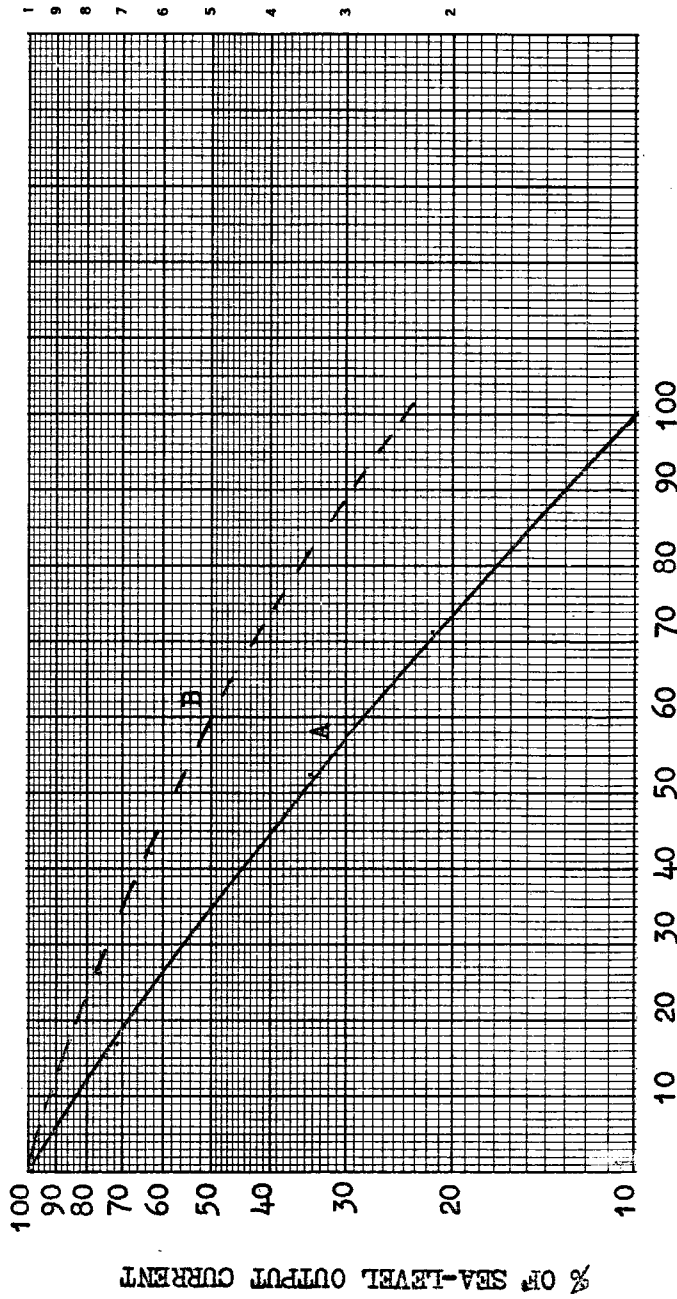
PULSE DURATION - SECONDS

(NOTE. THE STEADY STATE, JUNCTION TO BASE THERMAL IMPEDANCE IS 0.10-0.25°C/WATT)

FIG 6  
 VOLTAGE DERATING VS ALTITUDE  
 (100% Safety-factor on Flash-over Voltage)







ALTITUDE - THOUSANDS OF FEET

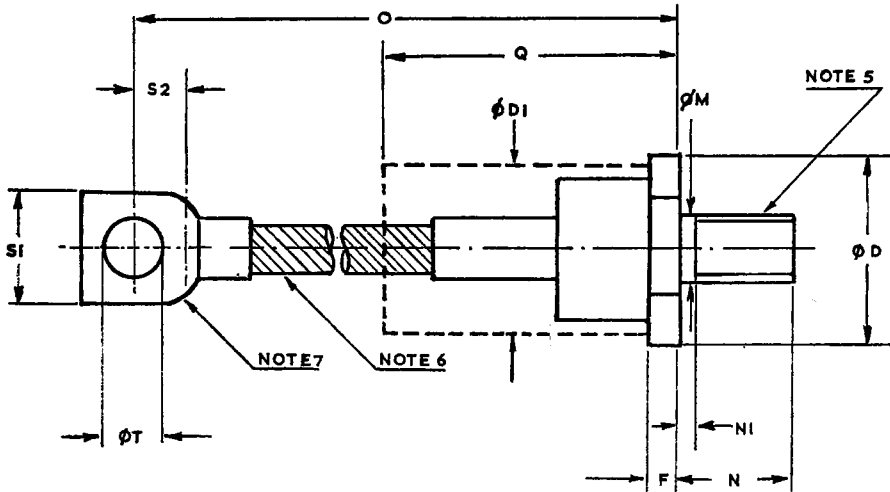
Curve 'A' - Convective heat transfer

Curve 'B' - Practical limit including effect of radiation and direct conduction

FIG 7

FORWARD CURRENT VS ALTITUDE

FIG 8



ORIGINAL INCH DIMENSIONS

Ref	MILLIMETRES			INCHES			Notes
	Min	Nom	Max	Min	Nom	Max	
$\phi D$	-	-	33.02	-	-	1.300	
$\phi D_1$	-	-	-	-	-	-	1,2
F	4.4	-	8.8	0.170	-	0.350	3
$\phi M$	10.5	-	12.70	0.415	-	0.500	4
N	15.50	-	16.25	0.610	-	0.640	
$N_1$	-	-	3.17	-	-	0.125	9,4
O	127.0	-	-	5.00	-	-	
Q	-	-	63.5	-	-	2.50	8
$S_1$	-	-	16.51	-	-	0.650	7
$S_2$	6.35	-	-	0.250	-	-	7,10
$\phi T$	6.35	-	8.40	0.250	-	0.331	

- Notes: 1. The Device with exception of the hexagon thread lies within zone of  $\phi D_1$  and length Q.  
 2.  $\phi D_1$  must not be greater than the actual across flats dimension of the hexagon used.  
 3. This zone includes a standard hexagon  
 4.  $\phi M$  refers to length  $N_1$   
 5. Thread  $\frac{1}{2}$ " - 20 UNF - 2A.  
 6. This lead is flexible.  
 7. Contour and orientation of the terminal is undefined.  
 8. Dimension Q allows the lead to be bent at right angles.  
 9. Dimension to end of full thread.