

MILITARY SPECIFICATION

CV 7390

SEMICONDUCTOR DEVICE, TRANSISTOR TYPE

Description:- This specification covers the detail requirements for a Germanium PNP Diffused Base Mesa U.H.F. Transistor and is in accordance with K1007 except as otherwise stated.

Mechanical Dimensions and Outlines:- K1007 Section B, 10.3.2.2 and 10.4.2.2 except that dimension 1 shall be 7.62 mm (min) and 12.70 mm (max).

Connections:- Lead 1, Emitter. Lead 2, Base. Lead 3 Collector and Case.

Absolute Maximum Ratings:-

Rating	V_{CB}	V_{CE}	V_{EB}	I_C	$I_B(pk)$	P_{tot}	T_{opn}	T_{stg}	Shock	Vibration
Unit	V	V	V	mA	mA	mW	°C	°C	g	g
Min	-	-	-	-	-		-55	-55	-	-
Max	-15	-15	-1	20	10	100	+85	+100	1500	20
Note						A			B	

Note A. See derating curve, Page 10.

B. Duration 0.5 mS.

C. Commercial prototype 2G102.

CV7390

Primary Electrical Characteristics:-

Characteristic		I_{CB0} (1)	I_{CB0} (2)	I_{EB0}	h_{fe}	h_{fe}	f_T	C_{ob}	F
Unit		μA	μA	μA			Mc/s	pF	dB
Min		-	-	-	30	18	200	-	-
Max		5	50	100	90	48	800	6	7.5
CONDITIONS	V_{CB} V	-15	-15	-	-	-	-	-	-
	V_{CE} V	-	-	-	-5	-5	-5	-5	-5
	V_{EB} V	-	-	-1	-	-	-	-	-
	I_C mA	-	-	0	-	-	-	-	-
	I_E mA	0	0	-	2	2	2	-	2
	f Mc/s	-	-	-	-	-	100	1	100
	T_{amb} °C	25	+55	25	25	-55	25	25	25

Reliability Assurance Requirements:-

Under discussion.

Requirements

Marking K.1007, Section B 1.3.4.

Quality Assurance Provisions

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

Joint Service Catalogue Number

5960-99-037-3360

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

Ministry of Aviation, Signals Research and Development Establishment,
Christchurch, Hampshire, England.

1st May, 1963.

GROUP A INSPECTION

Table 1

Examination or Test	Test Conditions		AQL %	Insp. Level	Sym-bol	Limits		Units
	K1007// NATO Ref.	Specific Conditions				Min	Max	
<u>SUB GROUP 1</u> Visual and Mechanical Inspection.	5.1	Excluding Physical Dimensions	0.65	I				
<u>SUB GROUP 2</u> Collector - Base Cut-Off Current (1)	7.2.5.1	$V_{CB} = -15V$ $I_E = 0$	0.65	II	I_{CB0}	-	5	μA
Small-Signal Short-Circuit Forward Current Transfer Ratio.	7.4.2	$V_{CE} = -5V$ $I_E = 2 \text{ mA}$ $f = 1Kc/s$			h_{fe}	30	90	
Transition Frequency	7.5.2	$V_{CE} = -5V$ $I_E = 2 \text{ mA}$ $f = 100 \text{ Mc/s}$			f_T	200	800	Mc/s
<u>SUB GROUP 3</u> Collector - Base Cut-Off Current (2)	7.2.5.1	$V_{CB} = -15V$ $I_E = 0$ $T_{amb} = +55^\circ C$	2.5	I	I_{CB0}	-	50	μA

Table 1 GROUP A INSPECTION (Cont'd)

Examination or Test	K1007/ NATO Ref.	Test Conditions Specific Conditions	AQL %	Insp. Level	Sym- bol	Limits		Units
						Min	Max	
SUB GROUP 3 (Cont'd) Collector - Base Time Constant.		$V_{CE} = -5V$ $I_E = 2 \text{ mA}$ $f = 31.9 \text{ Mc/s}$ (See Fig. 2 Page 11)			$r_{bb}'C_{oc}$	-	50	ps
	7.4.8	$V_{CE} = -5V$ $I_E = 0$ $f = 1 \text{ Mc/s}$			C_{ob}	-	6	pF
			$V_{EB} = -1V$ $I_C = 0$ $V_{CE} = -5V$ $I_E = 2 \text{ mA}$ $f = 100 \text{ Mc/s}$ (See Figs. 3 & 4 Pages 12 and 13)	4.0	IA	I_{EBO}	-	100
SUB GROUP 4 Emitter - Base Cut-Off Current.	7.2.6							
Noise Figure	7.6.3				F			dB

Table 2 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	According to drawings 10.3.2.2 and 10.4.2.2 except that dimension '1' shall be 7.62mm (min) and 12.70mm (max).	6.5	IC				
<u>SUB GROUP 2</u> Solderability	5.13		4.0	IA				
Temperature Cycling	5.5	-55°C to +75°C						
Moisture Resistance	5.3.1							
<u>SUB GROUP 3</u> Vibration Fatigue	5.15.1		4.0	I				
<u>SUB GROUP 4</u> Lead Fatigue	5.10.2	2 cycles	6.5	IA				
<u>SUB GROUP 5</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 6</u> Omitted.								
<u>SUB GROUP 7</u> High Temperature Life (non operating)	6.2.1 6.6.1.2.2	$T_{stg} = +100^{\circ}C$ Duration 1000 hours	4.0	I				
<u>SUB GROUP 8</u> Operating Life	6.3 6.5 6.6.1.1 6.6.1.2.2	$V_{CE} = -5V(\text{min})$ to $-12V$ (max) T_{amb} at any single temperature between $25^{\circ}C$ and $55^{\circ}C$ with the corresponding P_{tot} given on the derating curve Fig.1 Page 10. Duration 1000 hours.	4.0	IA				

Table 2 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</u> <u>for SUB GROUPS 2, 3,</u> <u>7 and 8.</u>								
Collector - Base Cut-Off Current (1)	7.2.5.1	As in Group A Sub-Group 2.			I _{CBO}	-	7.5	μA
Small-Signal Short- circuit Forward Current Transfer Ratio.	7.4.2	As in Group A Sub-Group 2.			h _{fe}	25	100	

Table 3 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	IA				
Shock (non operating)	5.17.1	5 blows in each of three mutually perpendicular directions.						
<u>Post Test End Points for SUB GROUP 2</u>								
Collector - Base Cut-Off Current.	7.2.5.1	As in Group A Sub-Group 2.			I_{CBO}	-	7.5	μA
Small-Signal Short-Circuit Forward Current Transfer Ratio.	7.4.2	As in Group A Sub-Group 2.			h_{fe}	25	100	

FIG. I
DERATING CURVE

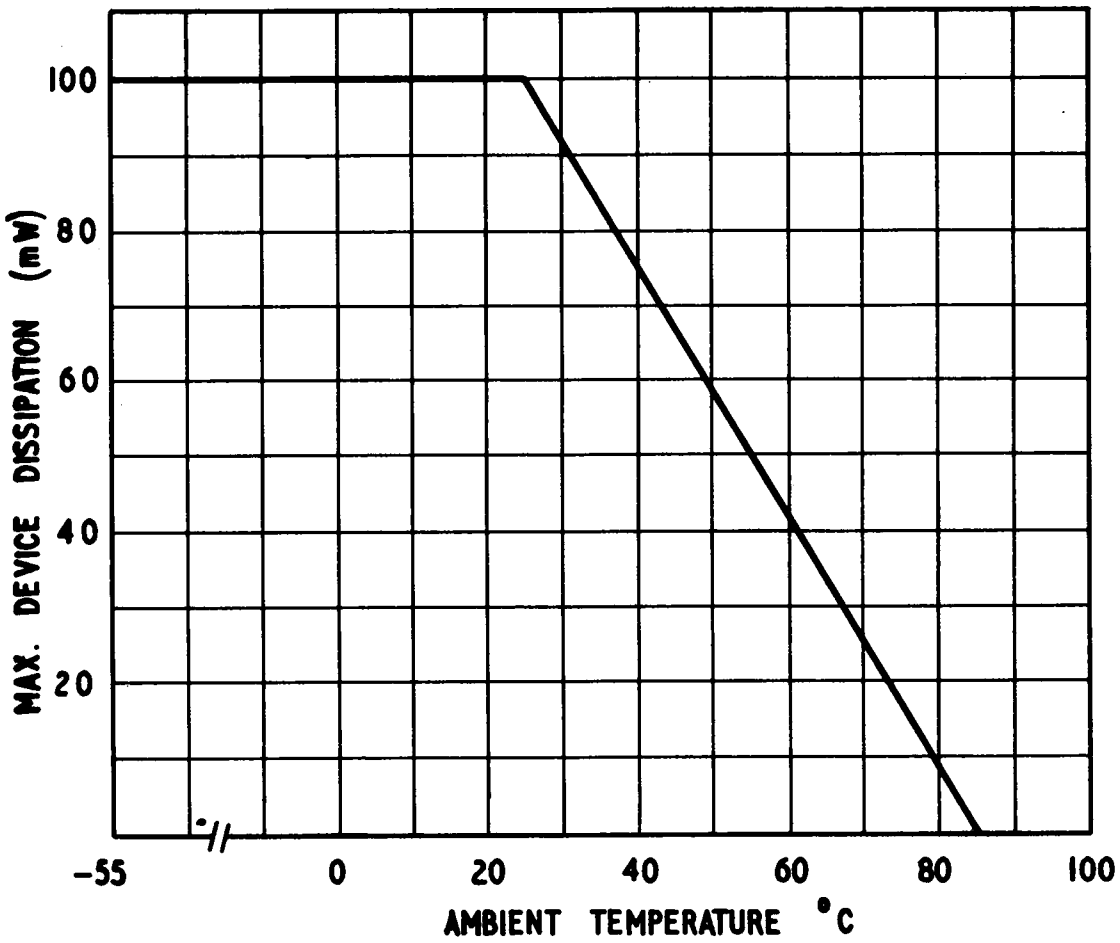


FIG. 2.
TEST CIRCUIT FOR COLLECTOR-BASE TIME CONSTANT.

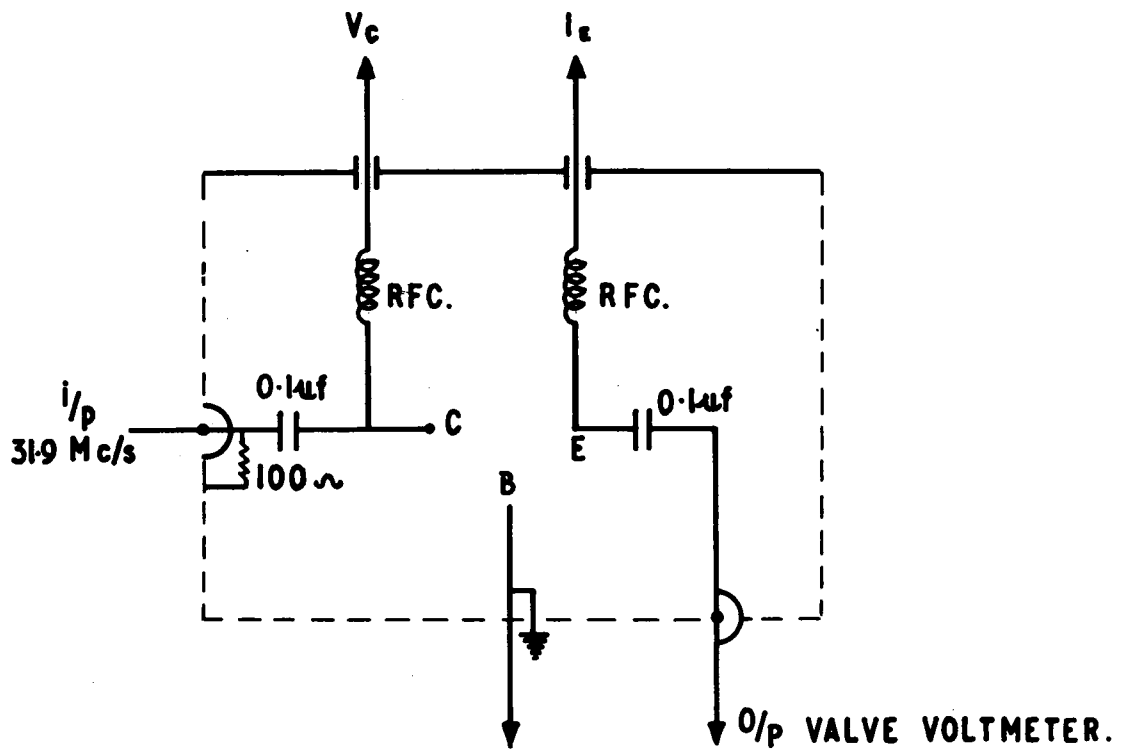


FIG. 3
NOISE FIGURE MEASUREMENT

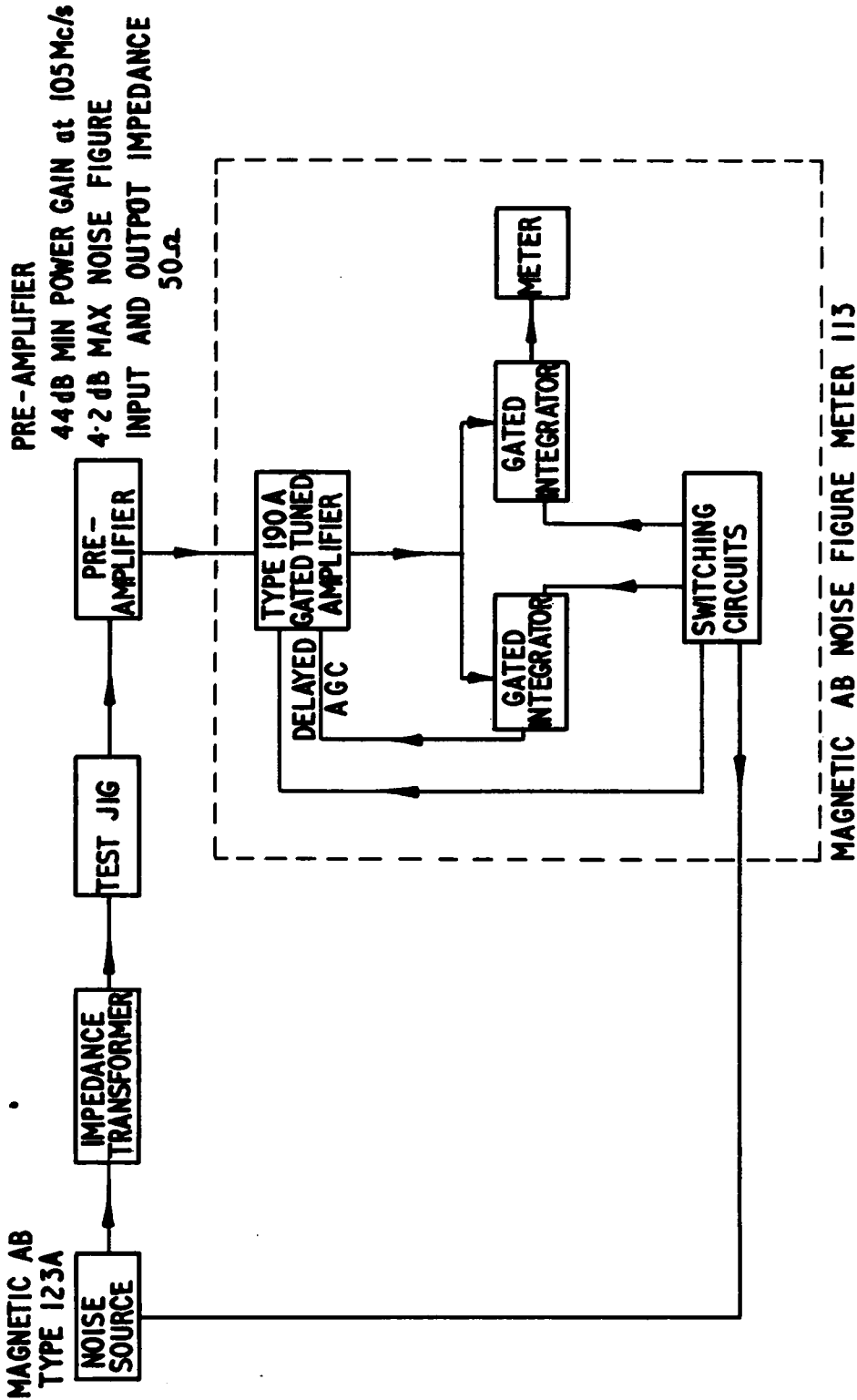
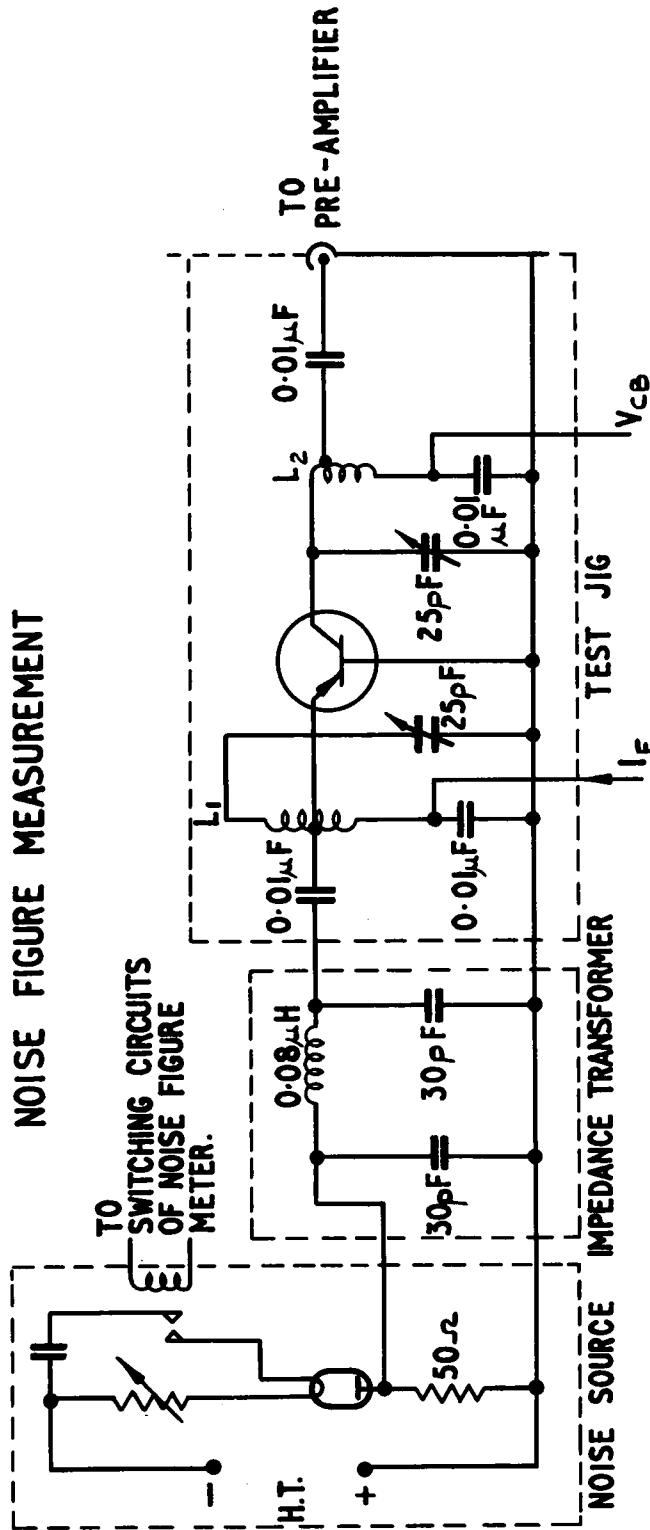


FIG. 4
NOISE FIGURE MEASUREMENT



L₁ 7 TURNS CENTRE TAPPED. NO 20 S.W.G. SILVER PLATED COPPER WIRE SPACED 1.5 TURNS ON 5/8" DIAMETER FORMER.

L₂ 4 TURNS OF NO. 20 S.W.G. SILVER PLATED COPPER WIRE ON 5/8" DIAMETER FORMER TAPPED 1/2 TURN FROM THE TOP.