ELECTRONIC VALVE SPECIFICATIONS

SPECIFICATION CV7464

ISSUE 1. DATED 28th January 1964

Amendment No. 1

Page 1. Note A should read $R_{BE} \leq 10$ ohm

Page 4. Against 7.4.8 in max. col.
Delete: 5pF
Insert: 6pF

Page 7. Against 6.6.1.2.2
Delete: $V_{CB} = 25V$
Insert: $V_{CB} = 15V$

Ministry of Aviation/R.R.E.

December 1964

310250

MILITARY SPECIFICATION

CV 7464

SEMICONDUCTOR DEVICE, TRANSISTOR

Description:- This specification covers the detail requirements for Silicon Planar NPN transistor and is in accordance with K1007, Issue 3 except as otherwise stated.

Mechanical Dimensions and Outlines:- K1007 Section B 10.3.2.4 and 10.4.2.4

Connections:- Collector connected to case, Lead 1. Emitter, Lead 2. Base, Lead 3. Collector.

Absolute Maximum Ratings:-

Rating	V_{CB}	V_{CER}	V_{CEO}	V_{EB}	I_C	I_B	P_{tot}	T_{op}	T_{stg}	Shock	Vibration
Unit	V	V	V	V	mA	mA	mW	°C	°C	g	g
Min.	-	-	-	-	-	-	-	-65	-65	-	-
Max.	25	20	15	5	200	50	300	+175	+200	1500	20
Notes		A					B			C	

Notes

A. This rating applies when R_{BE} < 10 ohm

B. See derating curve Fig. 1 Page 9

C. Duration 0.5 mSec.

D. Commercial equivalent 2N706A.

CV7464

PRIMARY ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	I_{CBO}	I_{CBO}	V_{CE} (sat)	V_{BE} (sat)	T_{on}	T_{off}	h_{FE}	h_{FE}	h_{fe}	I_{EBO}	C_{ob}	t_s
UNIT	µA	µA	V	V	nS	nS	-	-	-	µA	pF	nS
MIN	-	-	-	0.7	-	-	10	20	2	-	-	-
MAX	10	30	0.6	0.9	30	30	-	60	7	10	5	20
V_{CB} (V)	25	15	-	-	-	-	-	-	-	-	5	-
V_{CE} (V)	-		-	-	-	-	1	1	10	-	-	-
V_{EB} (V)	-		-	-	-	-	-	-	-	5	-	-
I_C (mA)	-		10	10	10	10	10	10	-	0	-	10
I_E (mA)	0	0	-	-	-	-	-	-	10	-	0	-
I_B (mA)	-		1	1	-	-	-	-	-	-	-	-
f (Mc/s)	-		-	-	-	-	-	-	100	-	-	-
T_{amb} °C	25	150	25	25	25	25	-55	25	25	25	25	25

Reliability Assurance Provisions:- Under discussion

28th January, 1964

Requirements:-

Marking: The device shall be marked as K1007, Section B 1.3.4. Minimum requirements are 1.3.4.1 (a) and (c).

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 devices shall be packed according to K1007, Section A, 1.2 (C)

N.A.T.O. Stock Number:- 5960-99-037-3671

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	II				
Visual and Mechanical Inspection	5.1	Excluding Physical Dimensions						
SUB GROUP 2			1.0	II				
Collector Base Cut-off Current (1)	7.2.5.1	V_{CB} = 25V I_E = 0			I_{CBO}	-	10	µA
Static Forward Current Transfer Ratio	7.3.4	I_C = 10mA V_{CE} = 1V			h_{FE}	20	60	
Switching Times		I_C = 10mA. See Fig. 2 Page10						
Turn On Time					t_{on}	-	30	nSec
Turn Off Time					t_{off}	-	30	nSec
Charge Storage Time Conslant		I_C = 10mA. See Fig. 2 Page 10			t_s	-	20	nSec
Collector Base Capacitance	7.4.8	V_{CB} = 5V I_E = 0 f = 1 Mc/s			C_{ob}	-	5	pF

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				
Collector-Emitter Saturation Voltage	7.3.3	I_C = 10 mA I_B = 1mA			V_{CE} (sat)	-	0.6	V
Base Emitter Voltage	7.3.1	I_C = 10mA I_B = 1mA			V_{BE} (sat)	0.7	0.9	V
High Frequency Forward Current Transfer Ratio	7.5.2	V_{CE} = 10V I_E = 10mA f = 100 Mc/s			$\lvert h_{fe} \rvert$	2	6	
Emitter-Base Cut-off Current	7.2.6	V_{EB} = 5V I_C = 0			I_{EBO}	-	10	µA
SUB GROUP 4			4.0	IA				
Static Forward Current Transfer Ratio	7.3.4	T_{amb} = -55°C V_{CE} = 1V I_C = 10mA			h_{FE}	10	-	
Collector Base Cut-off Current	7.2.5.1	T_{amb} = 150°C V_{CB} = 15V I_E = 0			I_{CBO}	-	30	µA

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				
Mechanical Dimensions	5.1	According to 10.3.2.4 and 10.4.2.4						
SUB GROUP 2			4.0	IA				
Solderability	5.13							
Temperature Cycling	5.5	-55°C to +150°C						
Moisture Resistance	5.3.1							
SUB GROUP 3			4.0	IA				
Vibration Fatigue	5.15							
Constant Acceleration	5.14	20000 g.						
SUB GROUP 4			6.5	IA				
Lead Fatigue	5.10.2	3 cycles						
SUB GROUP 5								
Omitted								
SUB GROUP 6								
Omitted								
SUB GROUP 7			4.0	I				
High Temperature	6.2.1	T_{stg} = 150°C						
Life	6.6.1.2.2	Duration 1000 hours						

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.	
SUB GROUP 8			.65	III				
Operating Life (1)	6.3 6.6.1.2.2	Duration = 72 hours V_{CB} = 25V T_{amb} At any single point of case or ambient temperature between +25°C and + 125°C. P_{tot} See derating curve Fig. 1 Page 9 according to the chosen temperature.						
Post Test End Points for Sub Group 2, 3, 7 and 8								
Collector-Base Cut-off current (1)	7.2.5.1	V_{CB} = 25V I_E = 0			I_{CBO}	-	12	µA
Static Forward Current Transfer Ratio	7.3.4	I_C = 10mA V_{CE} = 1V			h_{FE}	18	72	

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			0.65	IA				
Collector-Emitter Breakdown Voltage	7.2.2.1	I_C = 10mA			BV_{CEO}	15	-	V
SUB GROUP 2			6.5	IA				
Shock	5.17.1	Non operating. 5 blows in each of 3 mutually perpendicular directions						
Post Test End Points								
Collector-Base Cut-off Current (1)	7.2.5.1	V_{CB} = 25V I_E = 0			I_{CBO}	-	12	µA
Static Forward Current Transfer Ratio	7.3.4	I_C = 10mA V_{CE} = 1V			h_{FE}	18	72	

Notes

1. Maximum sample size 125.

Fig 1

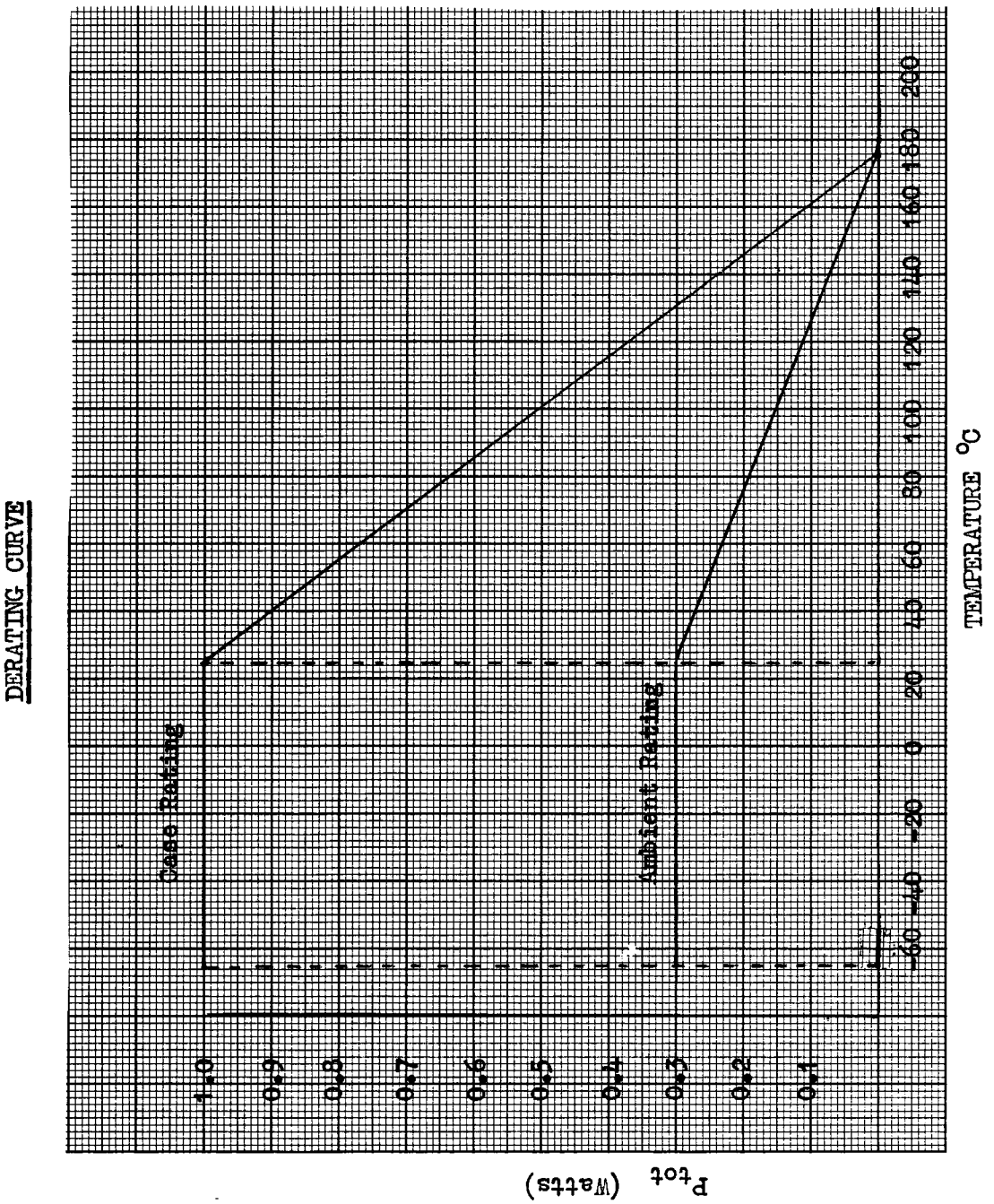

DERATING CURVE
Case Rating
Ambient Rating
TEMPERATURE °C
-60 -40 -20 0 20 40 60 80 100 120 140 160 180 200
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1
P_{tot} (Watts)

FIG 2

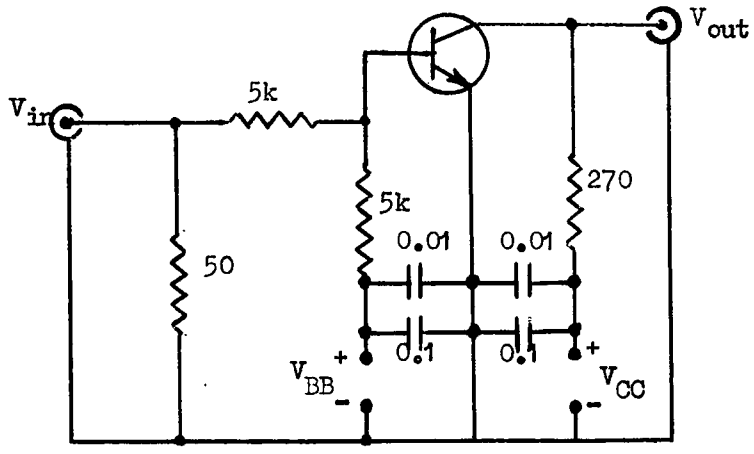
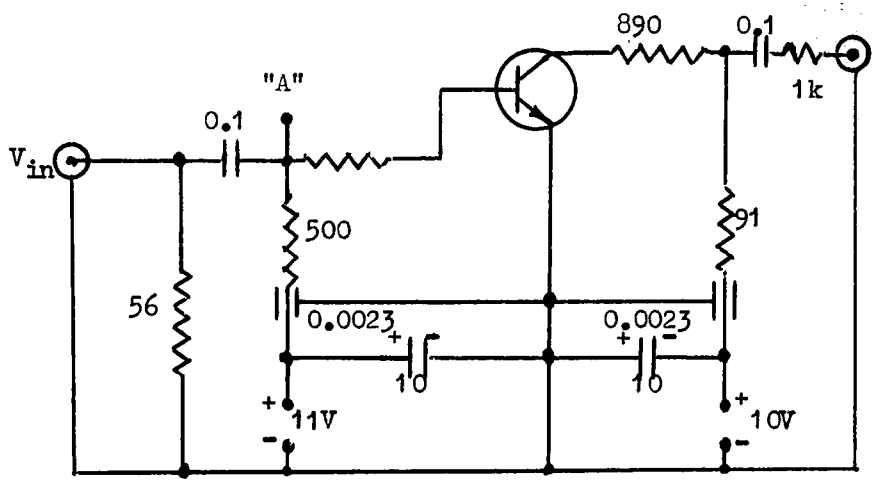
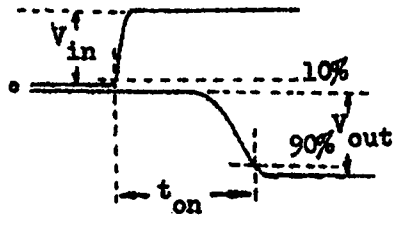
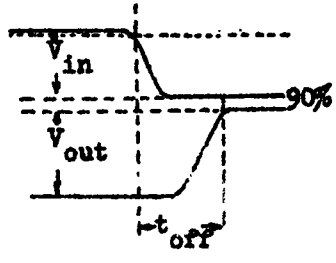
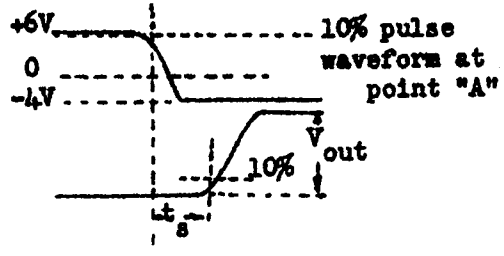


FIG 3









INPUT AND OUTPUT PULSE WAVEFORMS

		I_C mA	I_{b1} mA	I_{b2} mA	$V_{BE(o)}$ V	V_{CC} V	V_{BB} V	V_{in} pk-pk	R_L ohms
t_{on}	Turn on time	10	3	-1	-0.9	+3	-4	+21	1k
t_{off}	Turn off time	10	3	-1	-	+3	+17	+20	1k
t_s	Charge storage time	10	10	10	-	+10	+11	-10	270

I_C, I_{b1} and I_{b2} are approximate values