

ELECTRONIC VALVE SPECIFICATIONS
SPECIFICATION CV7484-89
ISSUE 1. DATED 21st JANUARY, 1964.
AMENDMENT No. 1.

Page 1. Mechanical Dimensions and Outlines K1007/NATO Ref.

Delete: 10.3.2.4. Insert: 10.3.2.3.

Delete: 10.4.2.4. Insert: 10.4.2.3.

Page 9. Sub Group 7 K1007/NATO Ref.

Delete: 6.6.1.2.2.

Insert: 6.6.1.2.1.

Sub Group 8 K1007/NATO Ref.

Delete: 6.6.1.2.2.

Insert: 6.6.1.2.1.

Ministry of Aviation/R.R.E.

March, 1965.

MILITARY SPECIFICATION
CV 7484-89
SEMICONDUCTOR DEVICE, TRANSISTOR

Description:- This specification covers the detail requirements for PNP Silicon, Transistors suitable for High Frequency, Medium Power applications, and is in accordance with K1007, Issue No. 3, except as otherwise stated.

Mechanical Dimensions and Outlines:- K1007, Section B.10.3.1, 10.3.2.4, 10.4.1, 10.4.2.4. Long lead

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

Absolute Maximum Ratings:-

Device	Rating	V _{CB}	V _{CE}	V _{EB}	I _C	I _E	P _{tot}	T _{stg}	T _{opn}	Shock	Vibration
	Unit	V	V	V	mA	mA	mW	°C	°C	g	g
CV 7484	Min.							- 65	- 65		
	Max.	-30	-30	-5	50	50	300	+200	+175	1500	20
CV 7485	Min.							- 65	- 65		
	Max.	-30	-30	-5	50	50	300	+200	+175	1500	20
CV 7486	Min.							- 65	- 65		
	Max.	-40	-40	-5	50	50	300	+200	+175	1500	20
CV 7487	Min.							- 65	- 65		
	Max.	-40	-40	-5	50	50	300	+200	+175	1500	20
CV 7488	Min.							-65	-65		
	Max.	-30	-30	-5	50	50	300	+200	+175	1500	20
CV 7489	Min.							- 65	- 65		
	Max.	-50	-50	-5	50	50	300	+200	+175	1500	20
	Note						A			B	

CV 7484-89

Notes: A. See Derating Curve Fig. 1, Page 11,

B. 0.5 mSecs duration.

C. Commercial Equivalents 2H1254/5/6/7/8/9

Primary Electrical Characteristics:

Characteristic		I_{CBO}			V_{CE} (Sat)	h_{FE}	h_{fe}	C_{OB}	t_{on}	t_{off}	t_s	Thermal Resist- ance
Unit		uA			Volts			pf	nS	nS	nS	$^{\circ}C/mW$
CV 7484	Min.					25	1.5					0.5 $^{\circ}$
	Max.	0.2			0.3	50		10	25	40		
CV 7485	Min.					40	2.5					0.5 $^{\circ}$
	Max.	0.2			0.3	80		10	25	60		
CV 7486	Min.					25	1.5					0.5 $^{\circ}$
	Max.		0.2		0.3	50		10	25	40		
CV 7487	Min.					40	2.5					0.5 $^{\circ}$
	Max.		0.2		0.3	80		10	25	60		
CV 7488	Min.					75	2.0					0.5 $^{\circ}$
	Max.	0.2			0.3	150		10	25	80		
CV 7489	Min.					25	2.0					0.5 $^{\circ}$
	Max.			0.2	0.3	100		10	25	60		
CONDITIONS	T_{case} $^{\circ}C$	25	25	25	25	25	25	25	25	25	25	
	V_{CB} V	-25	-35	-40				-10	-10			
	V_{CE} V					-1.0						
	I_C mA				-10	-10						
	I_E mA						10					
	f Mc/s						20	0.14		See Figure 2 Page 12	See Figure 2 Page 12	
	I_B mA				-2							

Reliability Assurance Requirements:- Under discussion

Applicable DocumentsRequirements

Marking: The device shall be marked according to K1007, Issue No. 3, Section B.1.3.4.1 Minimum requirements 1.3.4.1(a)(c).

Quality Assurance Provisions

Destructive Tests: The tests listed in Table 2, Group B Inspection, Sub-Group 2, 3 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 No. 3, Section A.1.2 (c).

Joint Service Catalogue Numbers

CV7484	=	5960-99-037-3694
CV7485	=	5960-99-037-3695
CV7486	=	5960-99-037-3696
CV7487	=	5960-99-037-3697
CV7488	=	5960-99-037-3698
CV7489	=	5960-99-037-3699

This specification has been prepared by, and the Qualification Authority is:-
Ministry of Aviation, Royal Radar Establishment, Malvern, Worcs., England.

TABLE 1 GROUP A INSPECTION

Examination or Test	TEST CONDITIONS		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	I				
		$V_{CB} = -25V$ $I_E = 0$ $V_{CB} = -25V$ $I_E = 0$ $V_{CB} = -35V$ $I_E = 0$ $V_{CB} = -35V$ $I_E = 0$ $V_{CB} = -25V$ $I_E = 0$ $V_{CB} = -40V$ $I_E = 0$					
<u>SUB-GROUP 2</u> Collector Base Cut-off Current	7.2.5.1	CV7484	II	I_{CBO}	-	0.2	μA
		CV7485		I_{CBO}	-	0.2	μA
Static Forward Current Transfer Ratio (1)	7.3.4	CV7486		I_{CBO}	-	0.2	μA
		CV7487		I_{CBO}	-	0.2	μA
		CV7488		I_{CBO}	-	0.2	μA
		CV7489		I_{CBO}	-	0.2	μA
		CV7484		h_{FE}	25	50	-
		CV7485		h_{FE}	40	80	-
		CV7486		h_{FE}	25	50	-
		CV7487		h_{FE}	40	80	-
		CV7488		h_{FE}	75	150	-
		CV7489		h_{FE}	25	100	-

TABLE 1 GROUP A INSPECTION (Cont'd)

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp. Level	Sym-bol	LIMITS		Units
		Specific Conditions					Min.	Max.	
<u>SUB-GROUP 2 Cont'd</u> Collector Emitter Saturation Voltage (1)	7.3.3	I _C = -10mA I _B = 2mA				V _{CE} (Sat)	-	-0.3	V
		V _{EB} = -3V					-	-0.2	µA
Emitter Base Cut-Off Current	7.2.5.1					I _{EBO}			
<u>SUB-GROUP 3</u> Base Emitter Saturation Voltage	7.3.1	I _C = -10mA I _B = -2mA		4.0	I	V _{BE} (Sat)	-	-1.0	V
		V _{CC} = -15V V _{BB} = +1.5V							nSec
Switching Times		V _P = -7.5V Pulse length = 150 nSec				t _d +t _r	25	25	nSec
		CV7484				t _s +t _f	40	40	nSec
		"				t _d +t _r	25	25	nSec
		CV7485				t _s +t _f	60	60	nSec
		"				t _d +t _r	25	25	nSec
		CV7486				t _s +t _f	40	40	nSec
		"				t _d +t _r	25	25	nSec
		CV7487				t _s +t _f	60	60	nSec
		"				t _d +t _r	25	25	nSec
		CV7488				t _s +t _f	80	80	nSec
	"				t _d +t _r	25	25	nSec	
	CV7489				t _s +t _f	60	60	nSec	
	"				t _d +t _r	25	25	nSec	

Figure 2
Page 12

TABLE 1 GROUP A INSPECTION

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
		Specific Conditions					Min.	Max.	
SUB-GROUP 3 Cont'd Small Signal Forward Current Transfer Ratio	7.5.2	V_{CE}	= -10V	CV7484		h_{FE}	1.5	7.5	-
		I_E	= 10mA	CV7485		h_{FE}	2.5	10	-
		f	= 20Mc/s	CV7486		h_{FE}	1.5	7.5	-
Collector Base Cut-Off Current	7.2.5.1	T	= 100°C	2H125A/5/6/7/8/9		h_{FE}	2.5	10	-
		V_{CB}	= -25V			h_{FE}	2.5	10	-
		I_E	= 0			h_{FE}	2.0	10	-
Static Forward Current Transfer Ratio	7.3.4	T	= -55°C	CV7484		I_{CBO}	-	50	μA
		V_{CE}	= 1V	CV7485		h_{FE}	20	50	
		I_C	= 10mA	CV7487		h_{FE}	30	80	
				CV7488		h_{FE}	20	50	
				CV7489		h_{FE}	30	80	
						h_{FE}	60	150	
						h_{FE}	20	100	

TABLE 1 GROUP A INSPECTION (Cont'd)

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
		Specific Conditions					Min.	Max.	
<u>SUB-GROUP 4</u> Output Capacitance	7.4.8	$V_{CB} = -10V$	$f = 0.14 \text{ Mc/s min.}$	4.0	1A	C_{ob}	-	10	pF
		$I_E = 0$							
Input Impedance		$V_{CB} = -10V$	$f = 1 \text{ Kc/s}$			h_{ib}		30	ohms
		$I_E = -2mA$							

TABLE 2 GROUP B INSPECTION
See Quality Assurance Provisions Page 4 Destructive Tests

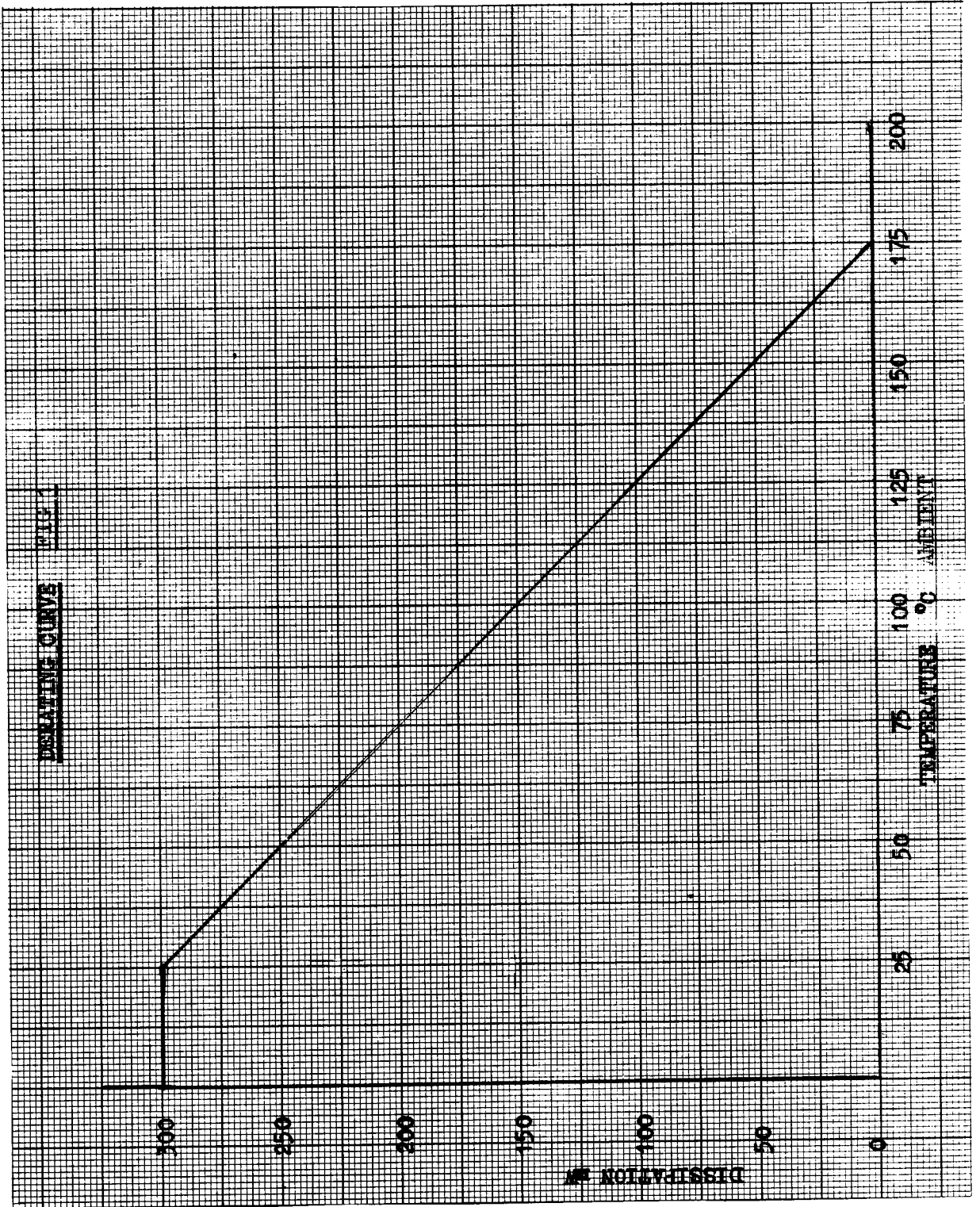
Examination or Test	TEST CONDITIONS		AQL %	Insp. Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions				Min.	Max.	
<u>SUB GROUP 1</u> Physical	5.1	According to K1007, Section B, 10.3.3.1., 10.3.2.4., 10.4.1., 10.4.2.4.	6.5	1A				
<u>SUB GROUP 2</u> Solderability	5.13	230° ± 5°c	4.0	1A				
Temperature Cycling	5.5	-65° to +150°c						
Moisture Resistance	5.3							
<u>SUB GROUP 3</u> Vibration Fatigue	5.15.1	20G	4.0	1A				
<u>SUB GROUP 4</u> Lead Fatigue	5.10.2	2 cycles	6.5	1A				
<u>SUB GROUP 5</u> Omitted								
<u>SUB GROUP 6</u> Omitted								

TABLE 2. GROUP B INSPECTION (Cont'd)

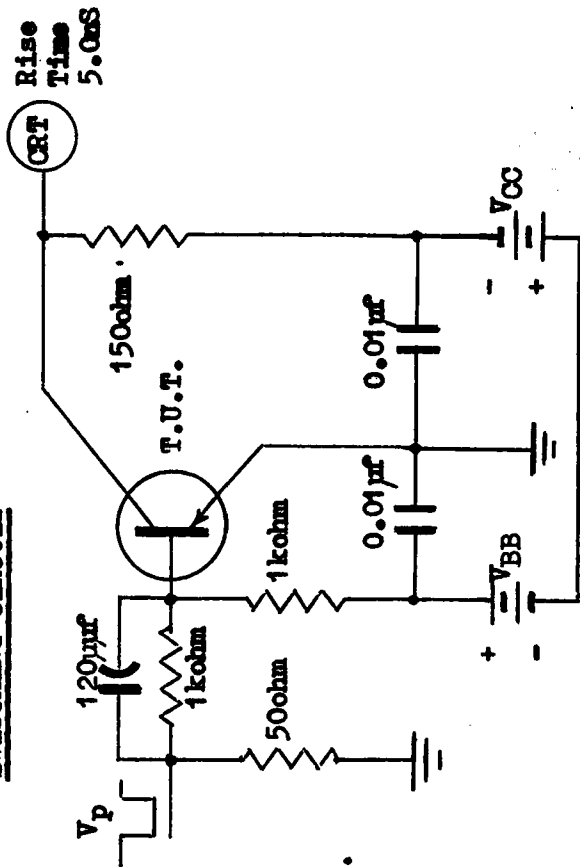
Examination or Test	TEST CONDITIONS		Insp. Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	Specific Conditions			Min.	Max.	
<u>SUB-GROUP 7</u> High Temperature Life (non-operating)	6.2.1 6.6.1.2.2	T _{stg} = +200°C Duration = 1000 hours	1				
<u>SUB-GROUP 8</u> Operating Life	6.3 6.6.1.2.2	T _{amb} at any single temp. between 25°C and 150°C with the corresponding P _{tot} given on the derating curve Fig. 1, Page 11. V _{CE} max. for device Duration 1000 hours	1A				
<u>Post Test End Points for Sub-Group 2, 3, 7 and 8</u> Collector Base Cut-off current Static Forward Current Transfer Ratio	7.2.5.1 7.3.4	As in Group A, Sub-Group 2 As in Group A, Sub-Group 2 CV7484 CV7485 CV7486 CV7487 CV7488 CV7489		I _{CBO}	0.5	20 35 20 35 70 20	uA - - - - -

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> Shock (Non operating)	5.17.1	5 blows in each of 3 mutually perpendicular directions	6.5	1A				
<u>Post Test End Points</u>								
Collector Base Cut-off current	7.2.5.1	As in Group A, Sub-Group 2			I _{CBO}		0.5	μA
Static Forward Current Transfer Ratio	7.3.4	As in Group A, Sub-Group 2 CV7484			h _{FE}	20	55	-
		CV7485			h _{FE}	35	85	-
		CV7486			h _{FE}	20	55	-
		CV7487			h _{FE}	35	85	-
		CV7488			h _{FE}	70	155	-
		CV7489			h _{FE}	20	105	-



SWITCHING CIRCUIT



Conditions:-

$V_{CC} = -15V$

$V_{BB} = +1.5V$

$V_p = -7.5V$

Pulse Length = 150ns-300ns

Rise Time = 3.0ns Max

P.R.F. \leq 150 p.p.s

DETERMINATION OF SWITCHING TIMES FROM OSCILLOSCOPE DISPLAY

