

ELECTRONIC VALVE SPECIFICATIONS.  
SPECIFICATION XCV7581  
ISSUE 1 DATED 15th JUNE, 1964  
AMENDMENT NO. 1

Page 6. Under "SPECIFIC CONDITIONS" against 7.5.2  
add:  $V_{CE} = 10V$ ,  $f = 20 \text{ Mc/s}$ .

January, 1965.  
(253560)

Ministry of Aviation/R.R.E.

MILITARY SPECIFICATION

# CV7581

SEMICONDUCTOR DEVICE, TRANSISTOR

2N1132

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

Mechanical Dimensions and Outlines:- K1007 Section B. 10.3.2.2. and 10.4.2.2.

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

Absolute Maximum Ratings:-

Rating	V <sub>CB</sub>	V <sub>EB</sub>	V <sub>CER</sub>	V <sub>CEO</sub>	P <sub>tot</sub>	P <sub>tot</sub>	P <sub>tot</sub>	T <sub>stg</sub>	T <sub>op</sub>	Shock	Vibration
Unit	V	V	V	V	W	W	W	°C	°C	g	g
Min.	-	-	-	-	-	-	-	-55	-55	-	-
Max.	50	5	50	35	2	1.0	0.6	200	175	1500	20
Notes			A		B	C	D			E	

- Notes A. R<sub>BE</sub> 10 ohms.  
B. Case temperature 25°C.  
C. Case temperature 100°C.  
D. Ambient temperature 25°C.  
E. Duration 0.5 ms.

# CV7581

## Primary Electrical Characteristics

Characteristic		$I_{CBO}$	$I_{CBO}$	$h_{FE}$	$h_{FE}$	$h_{FE}$	$h_{fe}$	$h_{fe}$	$f_T$	$C_{ob}$	$t_{on} + t_{off}$
Unit		nA	$\mu$ A						Mc/s	pF	nS
CV7581	Min.	-	-	30	25	15	25	30	60	-	
	Max.	75	50	90	-	-	100	-	-	45	50
CONDITIONS	$V_{CB}$ V	30	30	-	-	-	-	-	-	10	
	$V_{CE}$ V	-	-	10	10	10	5	10	10	-	
	$I_C$ mA	-	-	150	5	150	1	5	50	-	
	$I_E$ mA	0	0	-	-	-	-	-	-	0	
	$f$ Mc/s	-	-	-	-	-	-	-	20	-	
	$T_{amb}$ °C	25	150	25	25	-55	25	25	25	25	

See Fig 2. Page 12

Characteristics		$V_{CE}$ (sat)	$V_{BE}$ (sat)	$C_{ib}$
Unit		V	V	pF
CV7581	Min.	-	-	-
	Max.	1.5	1.3	80
CONDITIONS	$V_{EB}$ V	-	-	0.5
	$I_C$ mA	150	150	0
	$I_B$ mA	15	15	-
	$T_{amb}$ °C	25	25	25

Reliability Assurance Provisions:- Under discussion.

Requirements:-

Marking: The device shall be marked as K1007 Section B 1.3.4.1 (a), (c), (d) and (f) as space permits, any other marking shall be on the packing.

Quality Assurance Provisions:-

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

N.A.T.O. Stock Number:- 5960-99-037-3846

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

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

15th June, 1964

Page 3

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 and Mechanical Inspection	5.1	Excluding Physical Dimensions		0.65	I				
<u>SUB GROUP 2.</u> Collector-emitter sustaining Voltage	7.2.2.2	$R_{BE} = 10\Omega$ $I_C = 100mA$ Pulse width $\leq 300 \mu sec \leq 2\%$ duty cycle		1.0	II	$V_{CER}$ (sust)	50	-	V
Collector-emitter sustaining Voltage	7.2.2.2.1	$I_C = 100 mA$ $I_B = 0$ Pulse width $\leq 300 \mu sec \leq 2\%$ duty cycle				$V_{CEO}$ (sust)	35	-	V
Collector Voltage	7.2.1	$I_E = 0$ $I_C = 10 \mu A$				$BV_{CBO}$	50	-	V
Collector-Base Cut-off current	7.2.5.1	$V_{CB} = 30V$ $I_E = 0$				$I_{CBO}$	-	75	nA

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.	
Emitter-Base out-off current		$V_{EB} = 5V$ $I_C = 0$				$I_{EBO}$	-	10	$\mu A$
Static-Forward Current Transfer Ratio	7.3.4	$I_C = 150mA$ $V_{CE} = 10V$ Pulse width $\leq 300 \mu S \leq 2\%$ duty cycle.				$h_{FE}$	30	90	
Collector-Emitter Saturation Voltage	7.3.5	$I_C = 150mA$ $I_B = 15mA$				$V_{CE} (sat)$	-	1.5	V
<u>SUB GROUP 3.</u>									
Small Signal Forward Current Transfer Ratio	7.4.2.	$I_C = 1mA$ $V_C = 5V$ $f = 1Kc$		4.0	I	$h_{fe}$	25	100	
	7.4.2.	$I_C = 5mA$ $V_C = 10V$ $f = 1Kc.$				$h_{fe}$	30	-	

TABLE 1. GROUP A INSPECTION (Cont'd)

Examination or Test	TEST CONDITIONS		AQL %	Insp Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	SPECIFIC CONDITIONS				Min.	Max.	
Transition Frequency	7.5.2	$I_C = 50\text{mA}$	6.5	IA	$f_T$	60	-	Mc/s
	7.3.4	$I_C = 5\text{mA}$				25	-	
		$V_{CE} = 10\text{V}$						
Static Forward Current Transfer Ratio	7.2.5.1	$T_{amb} = 150^\circ\text{C} \pm 3^\circ\text{C}$	6.5	IA	$I_{CBO}$	-	50	$\mu\text{A}$
		$V_{CB} = 30\text{V}$						
Collector-Base Cut-off Current	7.3.4	$I_E = 0$	6.5	IA	$h_{FE}$	15	-	-
		$T_{amb} = 55^\circ\text{C}$						
Static Forward Current Transfer Ratio	7.3.4	$V_{CE} = 10\text{V}$	6.5	IA	$t_{on} + t_{off}$	-	50	ns.
		$I_C = 150\text{mA}$						
Switching Time		See Fig. 2. Page 12.						

TABLE 1. GROUP A INSPECTION (Cont'd)

Examination or Test	TEST CONDITIONS		AQL %	Insp Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	SPECIFIC CONDITIONS				Min.	Max.	
Output Capacitance	7.4.8.	$V_{CB} = 10V.$ $I_E = 0$			$C_{ob}$	-	45	pF
Input Capacitance		$V_{EB} = 0.5V$ $I_C = 0$			$C_{ib}$	-	80	pF



TABLE 2. GROUP B INSPECTION  
See Page 3. Quality Assurance Provisions

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp Level	Sym- bol	LIMITS		Units
		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.		6.5	IC				
<u>SUB GROUP 2.</u> Solderability	5.13			4.0	IA				
Temperature Cycling	5.5	3 cycles - 55°C to + 200°C							
Moisture Resistance	5.3								
<u>SUB GROUP 3.</u> Vibration Fatigue	5.15	Non operating		4.0	IA				
Constant Acceleration	5.14.1	20000g							
<u>SUB GROUP 4.</u> Lead Fatigue	5.10.2	2 cycles		6.5	IA				
<u>SUB GROUP 5.</u> Omitted									
<u>SUB GROUP 6.</u> Omitted									

TABLE 2. GROUP B INSPECTION (Cont'd)  
See Page 3. Quality Assurance Provisions

Examination or Test	TEST CONDITIONS		AQL %	Insp Level	Sym- bol	LIMITS		Units
	K1007/NATO Ref.	SPECIFIC CONDITIONS				Min.	Max.	
<u>SUB GROUP 7.</u> High Temperature Storage	6.2.1. 6.6.1.2.2	$T_{stg} = +200^{\circ}\text{C}$ Duration 1000 hours	4.0	I Note 1				
<u>SUB GROUP 8.</u> Operating Life	6.3 6.6.2.2	$V_{CB} = 30\text{V. minimum}$ $T_{amb} = \text{any temperature}$ between $25^{\circ}\text{C}$ and $175^{\circ}\text{C}$ $P_{tot}$ according to that shown on the derating curve, Fig. 1 Page 12 against the chosen temperature Duration = 1000 hours.	4.0	IA				
<u>Post test end points</u> <u>for Sub Groups 2.</u> <u>and 3.</u> Collector-Base Cut-off Current	7.2.5.1	$V_{CB} = -30\text{V}$ $I_E = 0$			$I_{CBO}$	-	100	nA

TABLE 2. GROUP B INSPECTION (Cont'd)

Examination or Test	K1007/NATO Ref.	TEST CONDITIONS		AQL %	Insp Level	Sym- bol	LIMITS		Units
		SPECIFIC CONDITIONS					Min.	Max.	
Collector-Emitter Saturation Voltage	7.3.5	$I_C = 150\text{mA}$				$V_{CE}(\text{sat})$	-	1.65	V
		$I_B = 15\text{mA}$					-	1.45	
Base-Emitter Saturation Voltage	7.3.1	$I_C = 150\text{mA}$				$V_{BE}(\text{sat})$	-	1.45	V
		$I_B = 15\text{mA}$					-	1.45	
<u>Post test end points for Sub Groups 7 and 8.</u>	7.2.5.1	$V_{CB} = 30\text{V}$				$I_{CBO}$	-	75	nA
		$I_E = 0$					-	75	
Collector Base Cut-off Current.	7.3.4	$I_C = 150\text{mA}$				$h_{FE}$	22.5	100	
		$V_{CE} = 10\text{V}$					Pulse width $\leq 300 \mu\text{s}$ duty cycle $\leq 2\%$		

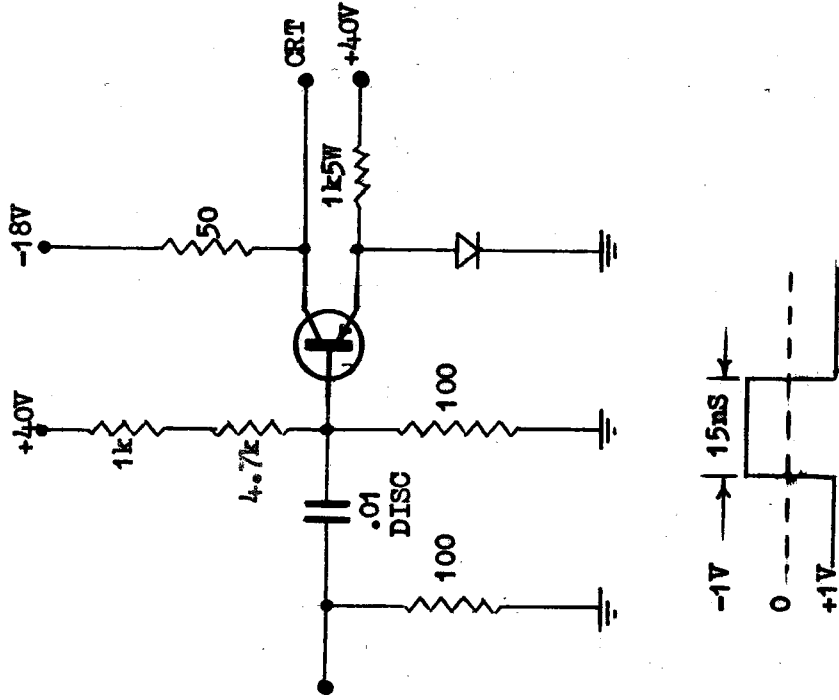
**TABLE 3. GROUP C INSPECTION**

See Page 3. Quality Assurance Provisions

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	5.17.1	Non operating 5 blows in each of three mutually perpendicular directions.	6.5	1A				
<u>Post Test End Points</u> Collector-Base Cut-off Current.	7.2.5.1	$V_{CB} = 30V$ $I_E = 0$			$I_{CBO}$	-	100	nA
Static Forward Current Transfer Ratio	7.3.4	$I_C = 150mA$ $V_{CE} = 10V$ Pulse width $\leq 300 \mu s$ duty cycle $\leq 2\%$			$h_{FE}$	22.5	100	

**FIG. 2**

**SWITCHING TIME CIRCUIT**



**FIG. 1**

