

15th. October 1963.

MILITARY SPECIFICATION

CV 7447

SEMICONDUCTOR DEVICE, TRANSISTOR

Description:- This specification covers the detailed requirements for an NPN Silicon Planar Transistor which may be used in amplifying circuits at high frequencies and is in accordance with Specification K1007, except where otherwise stated.

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

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

Absolute Maximum Ratings:-

RATING	V_{CB}	V_{CE}	V_{EB}	I_C mean	I_C peak	I_B mean	I_B peak	I_E mean	I_E peak	P_{tot}
UNIT	V	V	V	mA	mA	mA	mA	mA	mA	W
MIN	-	-	-	-	-	-	-	-	-	-
MAX	30	20	3	100	200	100	200	100	200	0.3
NOTE		C		A1	A2	A1	A2	A1	A2	B

RATING	T_{stg}	T_j	Shock	Vib.
UNIT	$^{\circ}C$	$^{\circ}C$	g	g
MIN	-55	-55	-	-
MAX	+175	+175	1500	20
NOTE				

- Note**
- A1 Averaged over a period greater than 100 μ Secs.
 - A2 For a period less than 100 μ Secs.
 - B At 25 $^{\circ}C$ case temperature $P_{tot} = 1.0W$
See derating curve Fig.1, Page
 - C 300 μ Sec. pulse; maximum duty cycle $\frac{1}{2}$.
 - D Commercial equivalent BFY19.

CV 7447

Primary Electrical Characteristics

CHARACTERISTIC		I_{CBO}	h_{fe}	f_T	C_{ob}	NOISE FIGURE
UNIT		μA		Mc/s	pF	dB
MIN		-	35	300	-	-
MAX		1	200	-	4.0	18
CONDITIONS	T_{amb} °C	25	25	25	25	25
	V_{CB} V	30	-	-	6	-
	V_{CE} V	-	9	9	-	4.5
	I_C mA	-	10	10	-	0.5
	I_B mA	-	-	-	-	-
	I_E mA	0	-	-	0	-
	f Mc/s	-	1×10^{-3}	>100	1	1×10^{-3}

Reliability Assurance Requirements: Under discussion

Requirements:

Marking As K1007, Section B.1.3.4.

Quality Assurance Provisions:

Destructive Tests The tests listed in Table 2, Group B Inspection, Sub-Group 2, 3 and 4 are considered destructive.

Group C Inspection This inspection shall be conducted on the initial lot, and thereafter every ninety days or ever fifth lot, whichever occurs first.

Preparation for Delivery

Packaging The device shall be packed according to K1007, Issue 3, Section A., 1.2.(c). AIS Size 6.

Joint Service Catalogue Numbers

5960-99-037-3516.

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

THE ENGINEER-IN-CHIEF, GENERAL POST OFFICE, S BRANCH, S2/2, LONDON.

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 Visual and Mechanical Inspection		Excluding Physical Dimensions	0-65	I				
SUB GROUP 2 Collector-Base Cut-off Current (1) Breakdown Voltage Collector to Emitter Small Signal Short Circuit Forward Current Transfer Ratio	7.2.5.1.	$V_{CB} = 30V$ $I_E = 0$ $I_C = 10 \text{ mA}$ (see Note C) $I_B = 0$ $I_C = 10 \text{ mA}$ $V_{CE} = 9V$ $f = 1 \text{ kc/s}$	1-0	II	$I_{CB0(1)}$ $V(BR)_{CE0}$ h_{fe}	20 35	1 200	μA V
SUB GROUP 3 Collector Base Cut-off Current (2) Collector Emitter Cut-off Current (1) Transition Frequency Output Capacitance Emitter Base Cut-off Current	7.2.5.1. 7.2.5.2. 7.4.8 7.2.6	$V_{CB} = 9V$ $I_E = 0$ $V_{CE} = 9V$ $I_B = 0$ $I_C = 10 \text{ mA}$ $V_{CE} = 9V$ $f = 100 \text{ Mc/s MIN}$ $V_{CB} = 6V$ $I_E = 0$ $f = 1 \text{ Mc/s}$ $V_{EB} = 3V$ $I_C = 0$	4-0	I	$I_{CB0(2)}$ $I_{CE0(1)}$ f_T C_{ob} I_{EB0}	300	10 50 1	nA nA Mc/s pF μA

TABLE 1. GROUP A INSPECTION (Contd)

Examination or Test	K1007/ NATOR Ref.	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
		Specific Conditions					Min	Max	
<u>SUB GROUP 4</u> Noise Factor	7.6.3.	$I_C = 0.5 \text{ mA}$ $V_{CE} = 4.5V$ $f = 1 \text{ kc/s}$ $R_S = 600 \Omega$		4.0	1A	N		18	dB
Collector Emitter Cut-off Current (2)	7.2.5.1.	$V_{CE} = 9V$ $I_B = 0$ $T_{amb} = +150^\circ C$				$I_{CEO(2)}$		100	μA

TABLE 2 GROUP B INSPECTION

EXAMINATION OR TEST	TEST CONDITIONS		AQL %	INSP. LEVEL	SYMBOL	LIMITS		UNITS
	K 1007/ NATO Ref.	SPECIFIC CONDITIONS				MIN.	MAX.	
<u>SUB GROUP 1</u> Physical Dimensions	5.1	Check dimensions to drawings 10.3.2.4 and 10.4.2.4	6.5	1C				
<u>SUB GROUP 2</u> Solderability Temperature Cycling Moisture Resistance	5.13 5.5 5.3	-55°C to +175°C	4.0	1A				
<u>SUB GROUP 3</u> Vibration Fatigue	5.15.1		4.0	1A				
<u>SUB GROUP 4</u> Lead Fragility	5.10.2	3 cycles	6.5	1A				
<u>SUB GROUP 5</u> Omitted								
<u>SUB GROUP 6</u> Omitted								
<u>SUB GROUP 7</u> High Temperature Life (Non Operating)	6.2.1 6.6 6.6.1.2.2	T _{stg} +175°C Duration 1000 hrs.	4.0	I See Note 1				
<u>SUB GROUP 8</u> Operating Life	6.3 6.6 6.6.1.2.2	VC8 = 15V Duration 1000 hrs. T _{amb} may be at any single temperature between +25°C and +125°C with P _{tot} corresponding to that given on the derating curve Fig.1 Page	6.5	1A				

TABLE 2 GROUP B INSPECTION (Contd.)

Examination or Test	K1007/ NATO Ref.	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
		Specific Conditions	Min				Max		
Post Test End Points for SUB GROUPS 2, 3, 5, 6, 7 & 8									
Collector Base Cut-off Current	7.2.5.1.	$V_{CB} = 9V$ $I_E = 0$				I_{CB0}		12	nA
Small Signal Short Circuit Forward Current Transfer Ratio	7.4.2.	$I_C = 10 \text{ mA}$ $V_{CE} = 9V$ $f = 1 \text{ kc/s}$				h_{fe}	28		

Note 1. Max sample size limited to 125

TABLE 3 GROUP C INSPECTION

Examination or Test	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
	K1007/ MATO Ref.	Specific Conditions				Min	Max	
SUB GROUP 1 Omitted								
SUB GROUP 2 Shock	5.17.1 5.17.2	Non-operating	6.5	IA				
Post Test End Paints for SUB GROUP 2								
Collector Base Cut-off	7.2.5.1.	$V_{CB} = 9V$ $I_E = 0$			I_{CB0}		12	mA
Small Signal Short Circuit Forward Current Transfer Ratio	7.4.2.	$I_C = 10 \text{ mA}$ $V_{CE} = 9V$ $f = 1 \text{ kc/s}$			h_{fe}		28	

DERATING CURVE

