

MILITARY SPECIFICATION

CV7366

SEMICONDUCTOR DEVICE, TRANSISTOR, 2S305

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

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

Connections:- 1. Emitter. 2. Base. 3. Collector. The case shall be insulated from all leads.

Absolute Maximum Ratings:-

Rating	V_{CB}	V_{CE}	V_{EB}	I_{CM}	I_{CAV}	I_{EM}	I_{EAV}	I_{BM}	I_{BAV}	P_{tot}
Unit	-V	-V	-V	mA	mA	mA	mA	mA	mA	mW
Min.	-	-	-	-	-	-	-	-	-	-
Max.	125	125	50	100	50	150	65	50	15	300
Note										1

Rating	T_{amb}	$T_{(stg)}$	Shock	Vibration
Unit	$^{\circ}C$	$^{\circ}C$	g	g
Min.	-55	-55	-	-
Max.	200	200	1500	20
Note			2	

NOTES:-

1. See derating curve on Page 9.
2. 0.5 ms duration.

Primary Electrical Characteristics

Characteristic	I_{CBO} /uA	I_{CEO} /uA	I_{EBO} /uA	V_{CEsat} mV	V_{BE} mV	h_{fe}	h_{fe}	F dB	f_T Mc/s	r_{bb} ohms	C_{ob} pF
Unit											
Minimum						10	7		0.3		
Typical	0.001	0.25	0.1	130	650	15		6	0.75	200	40
Maximum	0.1	10	1.0	200	750	30		12	3.0		
V_{CB}	-10	-10							-6		
V_{CE}			-125		-5	-6		-2			
V_{EB}											
I_C					10	1.0	1.0	0.5	1.0		
I_E	0	0									
I_B			0	1.5							
f											
T_{amb}	25	100	25	25	25	25	-55	25	25	25	25

Conditions

REQUIREMENTS:-

Marking. K1007, Section B, 1.3.4.

QUALITY ASSURANCE PROVISIONS:-

Destructive Tests. The tests listed in Table II Group B Inspection, Subgroups 2, 3, and 4 and in Table III Group C Inspection, Subgroup 2 are considered destructive.

Group C Inspection. Inspection shall be conducted on the initial lot and thereafter every 90 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:- 5960-99-037-3151

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

Admiralty Surface Weapons Establishment,
Portsmouth, Gosport,
Portsmouth, Hants., England.

GROUP A INSPECTION

Table I

Examination or Test	K1007/ NATO Ref.	Test Conditions	AQL %	Insp. Level	Sym- bol	Limits		Units
						Min.	Max.	
<u>SUBGROUP 1</u> Visual and Mechanical Inspection.	5.1	Excluding Physical Dimensions	0.65	I				
<u>SUBGROUP 2</u> Collector Base Cut-off Current (1)	7.2.5.1	$V_{CB} = -10V$ $I_E = 0$	0.65	II	I_{CBO}	0.1		μA
Collector Emitter Cut-off Current.	7.2.5.5	$V_{CE} = -125V$ $I_B = 0$			I_{CEO}	1.0		μA
Common Emitter Small Signal Forward Current Transfer Ratio (1)	7.4.2	$V_{CE} = -6V$ $I_C = 1\text{ mA}$			h_{fe}	10	30	
<u>SUBGROUP 3</u> Collector Emitter Saturation Voltage	7.3.3	$I_C = 10\text{ mA}$ $I_B = 1.5\text{ mA}$	4-0	I	$V_{CE(sat)}$			mV
Base Emitter Voltage	7.3.2	$V_{CE} = -5V$ $I_C = 10\text{ mA}$			V_{BE}			mV

Table I GROUP A INSPECTION

Examination or Test	Test Conditions		AQL %	Insp. Level	Sym-bol	Limits		Units
	K1007/ NATO Ref.	Specific Conditions				Min.	Max.	
<u>SUBGROUP 3</u> (cont'd.) Emitter Base Cut-off Current.	7.2.6	$V_{EB} = -50V$ $I_C = 0$			I_{EBO}		10	μA
Transition Frequency	7.5.2	$V_{CB} = -6V$ $I_E = 1 \text{ mA}$ $f = 300 \text{ kc/s}$			FT	0.3	3.0	Mc/s
Noise Figure	7.6.3.1	$V_{CE} = -2V$ $I_C = 0.5 \text{ mA}$ Z source = 500 Ω $f = 1 \text{ kc/s}$			F		12	dB
<u>SUBGROUP 4</u> Collector Base Cut-off Current (2)	7.2.5.1	$T_{amb} = 100^\circ C$ $V_{CB} = -10V$ $I_E = 0$	4.0	IA	I_{CBO}		10	μA
Common Emitter Small Signal Forward Current Transfer Ratio (2)	7.4.2	$T_{amb} = -55^\circ C$ $V_{CE} = -6V$ $I_C = 1 \text{ mA}$			h_{fe}	7		

Table II
GROUP B 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>SUBGROUP 1</u> Physical Dimensions		According to Drawings 10.3.2.2 and 10.4.2.2.	6.5	IC				
<u>SUBGROUP 2</u> Solderability	5.13		4.0	IA				
Temperature Cycling	5.5	-55°C to +100°C						
Moisture Resistance	5.3							
<u>SUBGROUP 3</u> Vibration Fatigue	5.15	Non-operating	4.0	IA				
<u>SUBGROUP 4</u> Lead Fatigue	5.10.1	1 cycle	6.5	IA				
<u>SUBGROUP 5</u> Omitted								
<u>SUBGROUP 6</u> Omitted								

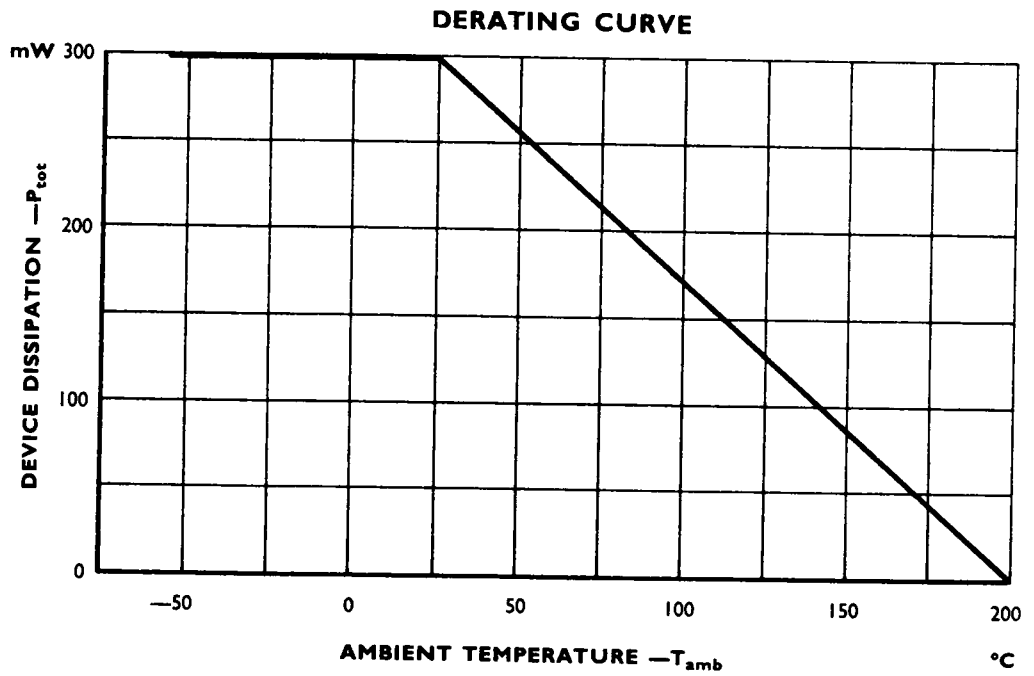
Table II

GROUP B INSPECTION

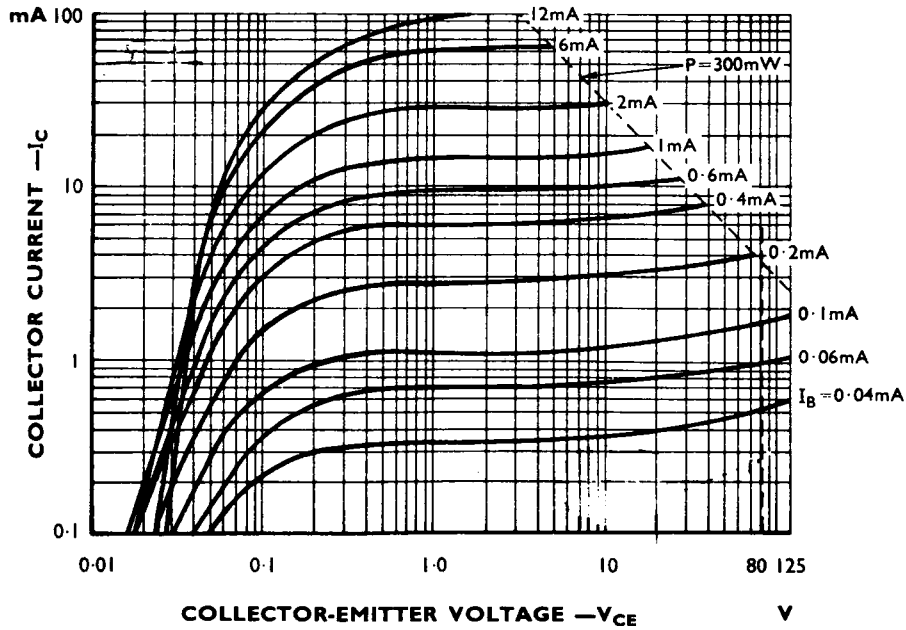
Examination or Test	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
	K1007/ NATO Ref.	Specific Conditions				Min.	Max.	
<u>SUBGROUP 7</u> High Temperature Life (Non-operating)	6.2.1	$T_{amb} = +100^{\circ}C$	4.0	I				
	6.6.1.2.2	$t = 1000$ hrs						
<u>SUBGROUP 8</u> Operating Life	6.3	T_{amb} between $25^{\circ}C$ and $175^{\circ}C$	4.0	IA				
	6.5	$V_{CB} = -6V$						
	6.6.1.1	P_{tot} = max. value given by derating curve on Page 9 corresponding to the chosen T_{amb} .						
	6.6.1.2.2							
<u>Post Test Ends Points for Subgroups 2, 3, 7, and 8.</u>	7.2.5.1	As in Group A, Subgroup 2			I_{CBO}		0.15	μA
	7.4.2	As in Group A, Subgroup 2.			h_{fe}		9	35

Table III
GROUP C INSPECTION
See Page 3, Quality Assurance Provisions

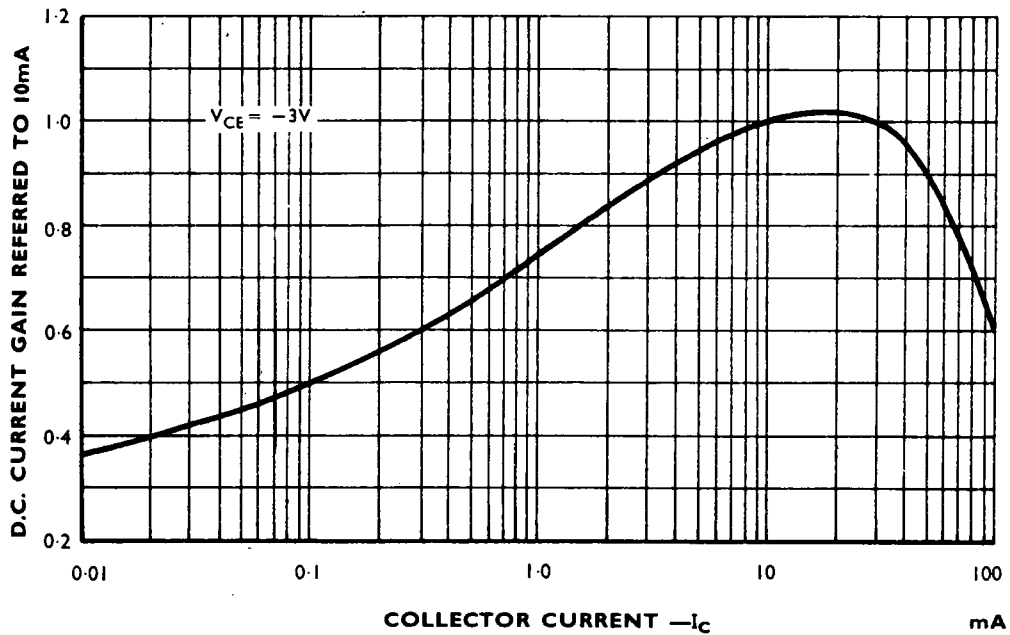
Examination or Test	K1007/ NATO Ref.	Test Conditions Specific Conditions	AQL %	Insp. Level	Sym- bol	Limits		Units
						Min.	Max.	
<u>SUBGROUP 1</u> Omitted								
<u>SUBGROUP 2</u> Shock	5.17	Non-operating. Five blows each orientation: Y1, Y2, X and Z.	6.5	IA				
<u>Post Test End Points for Subgroup 2</u> Collector Base Cut-off Current (1)	7.2.5.1	As in Group A, Subgroup 2			I _{CBO}	9	0.12	/uA
Common Emitter Small Signal Forward Current Transfer Ratio.	7.4.2	As in Group A, Subgroup 2.			h _{fe}	32		



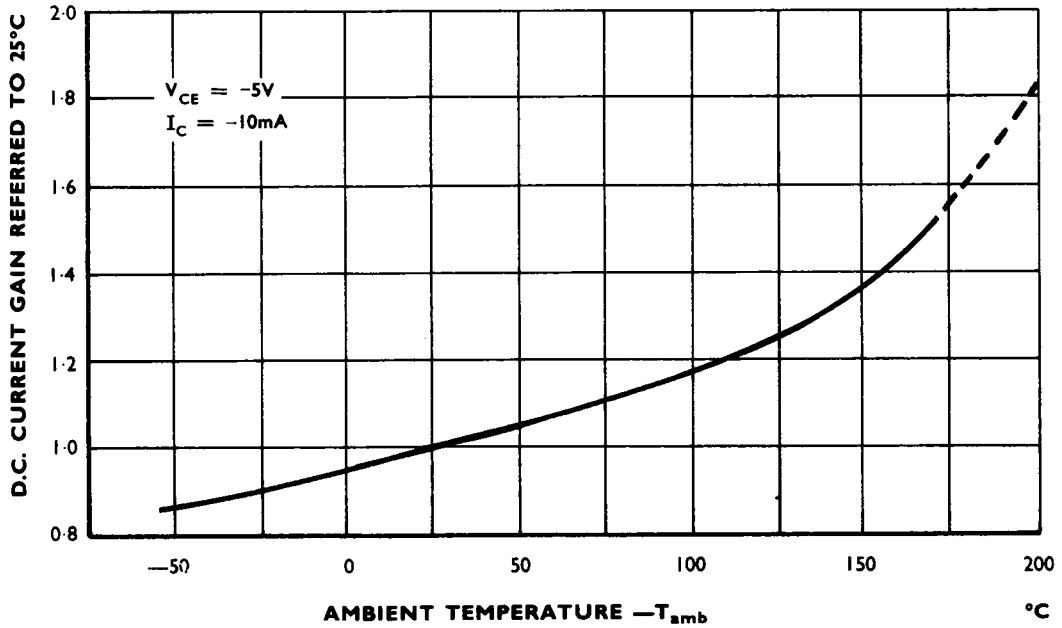
TYPICAL COMMON-EMITTER OUTPUT CHARACTERISTICS



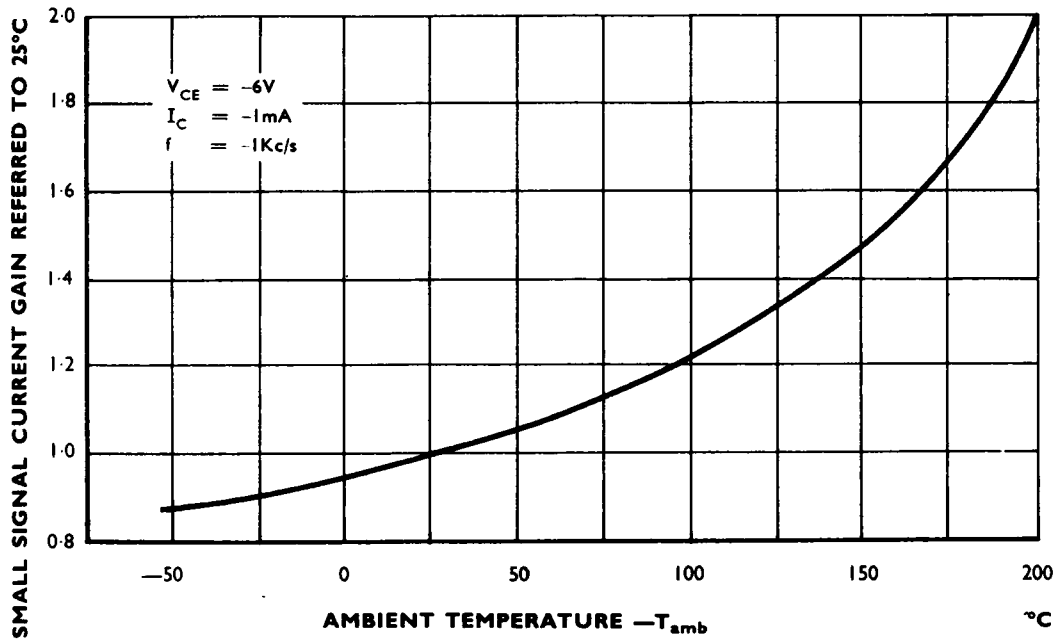
TYPICAL VARIATION OF h_{FE} WITH COLLECTOR CURRENT



TYPICAL VARIATION OF h_{FE} WITH TEMPERATURE



TYPICAL VARIATION OF h_{fe} WITH TEMPERATURE



TYPICAL COMMON-EMITTER TRANSFER CHARACTERISTICS

