

ELECTRONIC VALVE SPECIFICATIONS
SPECIFICATION CV.7396
ISSUE NO. 1 DATED 1ST AUGUST, 1963

AMENDMENT NO. 1

Page 5

Transition Frequency:- Amend min. limit to 1.5 Mc/s.
Negative Spike Feed Through:- Amend T_2 max. to 800 ns.

August, 1964

Admiralty Surface Weapons Establishment

N.190446

ELECTRONIC VALVE SPECIFICATIONS
SPECIFICATION CV7396

ISSUE NO. 1 DATED 1ST AUGUST, 1963

AMENDMENT NO. 2

Page 5

= Amend f_T min. to read 1.5

Page 6

Open Resistance:- Under specific conditions
add $V_{ce} = 100$ mV

Open Capacitance:- Under specific conditions
add $V_{ce} = 100$ mV

November, 1964
N(229203)

Admiralty Surface Weapons Establishment.

MILITARY SPECIFICATION

CV 7396

SEMICONDUCTOR DEVICE, TRANSISTOR

Description:- This specification covers the detail requirements for a Silicon PNP chopper 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:- 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_C	I_B	P_{tot}	$T_{(op)}$	$T_{(stg)}$	Shock	Vib.
Unit	V	V	V	mA	mA	mW	$^{\circ}C$	$^{\circ}C$	g	g
Min.	-	-	-				-55	-55	-	-
Max.	-12	-12	-12	10	10	50	200	200	1500	20
Note	1	1	1	1	1	2			3	

- NOTES:-
1. D.C. or peak.
 2. See derating curve, Fig. 1, page 10.
 3. 0.5 mS duration.
 4. Commercial Equivalent 2S307.

Primary Electrical Characteristics

Characteristic	Unit	I_{EBX}	I_{EBX}	Spike Feed Through				V_o	V_o	r_s	r_o	f_T	C_o
				Pos.		Neg.							
				V_1	T_1	V_2	T_2						
		nA	μ A	mV	μ S	mV	nS	mV	Ω	M Ω	Mc/s	pF	
Min.										20	2.0		
Max.		10	1.0	25	15	150	600	1.0	20		10.0	80	
V_{CB}	V	-12	-12	See Fig. 5. Page 13								-3	
V_{EB}	V	-12	-12	See Fig. 5. Page 13									
I_E	mA							0		0	1.0	0	
I_B	mA							0.5	0.5	0		0	
f	Mc/s								0.001	0.001	1.0		
T	$^{\circ}$ C		25					25	25	25	25	25	

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 :- 5960-99-037-3428

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

Admiralty Surface Weapons Establishment,
Portsmouth, Hants, England.

GROUP A INSPECTION

Table I

Examination or Test	K1007/ NATO Ref.	Test Conditions Specific Conditions	AQL %	Insp. Level	Symbol	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-Emitter Off-set Voltage (1)		$I_B = 0.5 \text{ mA}$ $I_E = 0$ See Fig. 2, page 11	0.65	II	V_0	-	1.0	mV
Emitter Cut-off Current(1)		$V_{EB} = V_{CB} = -12V$			I_{EBI}	-	10	nA
Positive Spike Feed Through		See Fig. 5, page 13			V_1 T_1	-	25 15	mV μs
<u>SUBGROUP 3</u> Small Signal Common Emitter Forward Current Transfer Ratio	7.4.2.	$V_{CB} = -3V$ $I_E = 1 \text{ mA}$			h_{fe}	30	-	
Collector Base Cut-off Current	7.2.5.1.	$V_{CB} = -3V$ $I_E = 0$	2.5	I	I_{CBO}	-	100	nA

Table I GROUP A INSPECTION (Cont'd.)

Examination or Test	K1007/ NATO Ref.	Test Conditions Specific Conditions	AQL %	Insp. Level	Symbol	Limits		Units
						Min.	Max.	
<u>SUBGROUP 3</u> (Cont'd.) Transition Frequency	7.5.2.	$V_{CB} = -3V$ $I_E = 1 \text{ mA}$ $f = 1 \text{ Mc/s}$ See Fig. 5, page 13			f_T	2.0	10	Mc/s
Negative Spike Feed Through					V_2 T_2	-	150 600	mV nS
<u>SUBGROUP 4</u> Collector-Emitter Off- set Voltage (2)		$T_{amb.} = 55^\circ C$ $I_B = 0.5 \text{ mA}$ $I_E = 0$ See Fig. 2, page 11	4.0	IA	V_0	-	1.05	mV
Emitter Cut-off Current (2)		$T_{amb.} = 100^\circ C$ $V_{EB} = V_{CB} = -12V$ $I_B = 0.5 \text{ mA}$ $I_E = 0$ See Fig. 4, page 12			I_{EBI}		1.0	/uA
Closed Resistance					r_S	-	20	Ω

GROUP A INSPECTION (Cont'd.)

Table I

Examination or Test	K1007/ NATO Ref.	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
		Specific Conditions					Min.	Max.	
<u>SUBGROUP 4 (Cont'd.)</u> Open Resistance		$I_B = 0$ $I_E = 0$				r_0	20	-	MΩ
		See Fig. 3, page 11							
Open Capacitance		$I_B = 0$ $I_E = 0$				C_0	-	80	pF
		See Fig. 3, page 11							

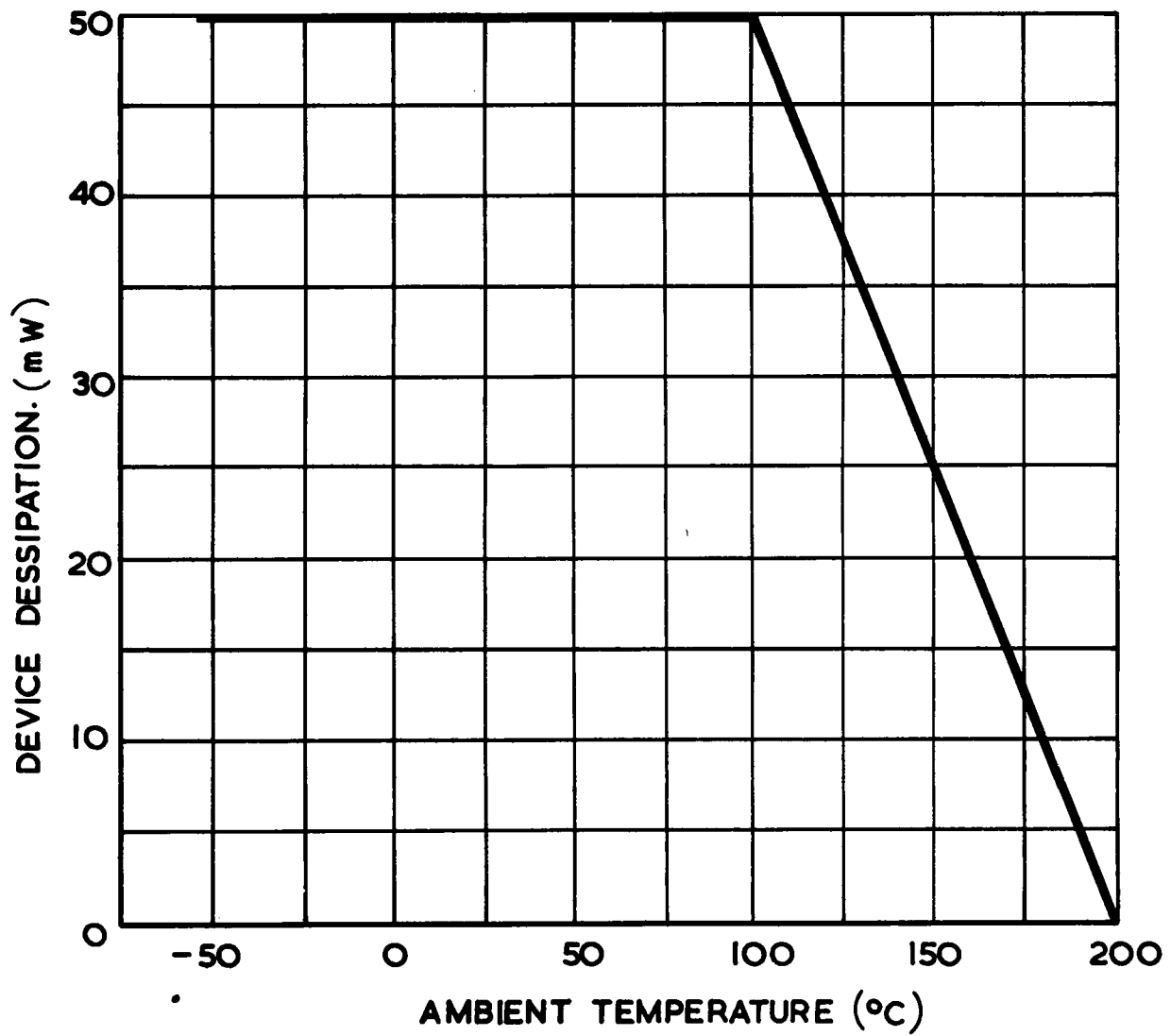
Table II **GROUP B INSPECTION**
 See Page 3, Quality Assurance Provisions

Examination or Test	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
	K1007/ NATO Ref	Specific Conditions				Min.	Max.	
<u>SUBGROUP 1</u> Physical Dimensions		According to drawings 10.3.2.2. and 10.4.2.2.	6.5	IG				
<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	5.10.2	1 Cycle	6.5	IA				
<u>SUBGROUP 5</u> Omitted								

Table II
GROUP B INSPECTION (Cont'd.)

Examination or Test	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
	K1007/ NATO Ref.	Specific Conditions				Min.	Max.	
<u>SUBGROUP 6</u> Omitted								
<u>SUBGROUP 7</u> High Temperature Life (Non-operating)	6.2.1. 6.6.1.2.2	$T_{amb.} = 100^{\circ}C$ $t = 1000$ hrs.	4.0	I				
<u>SUBGROUP 8</u> Operating Life	6.3 6.5 6.6.1.1. 6.6.1.2.2	$V_{CB} = -6V$ $T_{amb.}$ between $25^{\circ}C$ and $175^{\circ}C$ $P_{tot} = \text{max. value given by derating curve on page 10 corresponding to the chosen } T_{amb.}$	4.0	IA				
<u>Post Test End Points for Subgroups 2, 3, 7, and 8</u> Collector-Emitter Off-set Voltage (1) Emitter Cut-off Current (1)		As in Group A, Subgroup 2 As in Group A, Subgroup 2			V_0 I_{EBX}	-	12 20	mV mA

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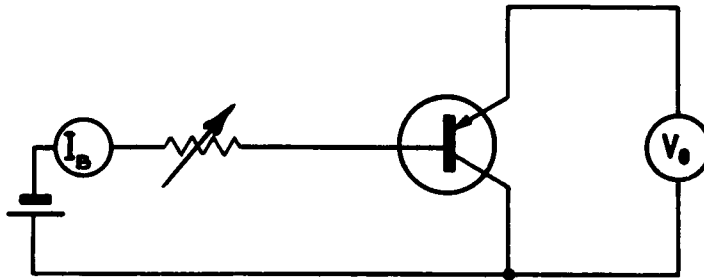


FIG.2

CIRCUIT FOR MEASURING OFF-SET VOLTAGE

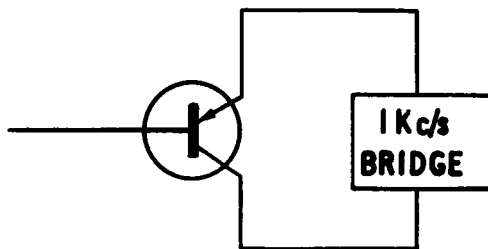
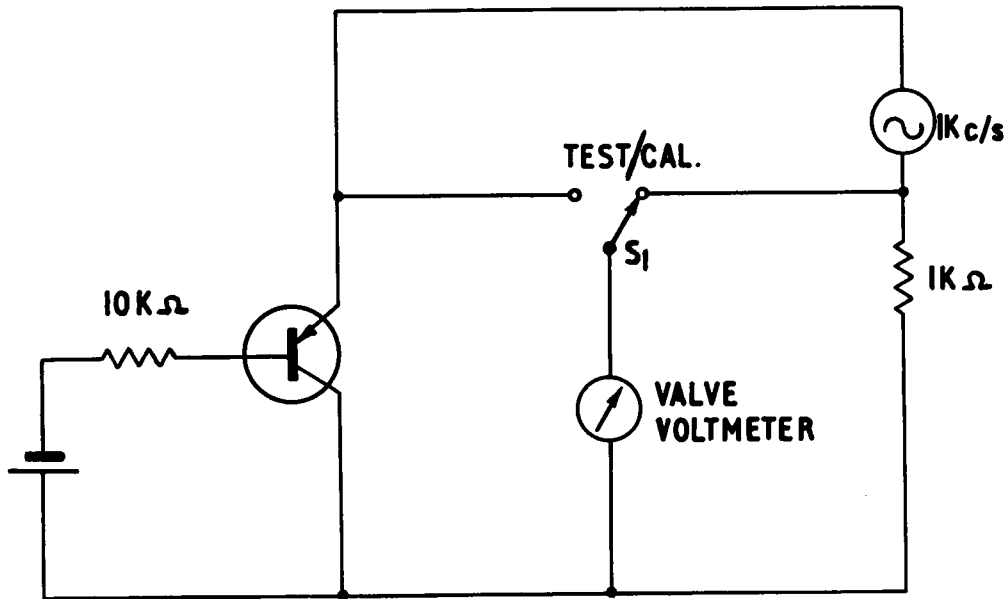


FIG.3

CIRCUIT FOR MEASURING OPEN RESISTANCE
AND CAPACITANCE.



1. WITH S_1 IN CAL. POSITION ADJUST $1Kc/s$ OUTPUT TO GIVE $10mV$ DEFLECTION ($=10\mu A$ THROUGH TRANSISTOR).
2. WITH S_1 IN TEST POSITION MEASURE VOLTAGE ACROSS TRANSISTOR AND CALCULATE τ_s .

FIG.4

CIRCUIT FOR MEASURING CLOSED RESISTANCE.

C INCLUDES 6A0 INPUT CAPACITANCE

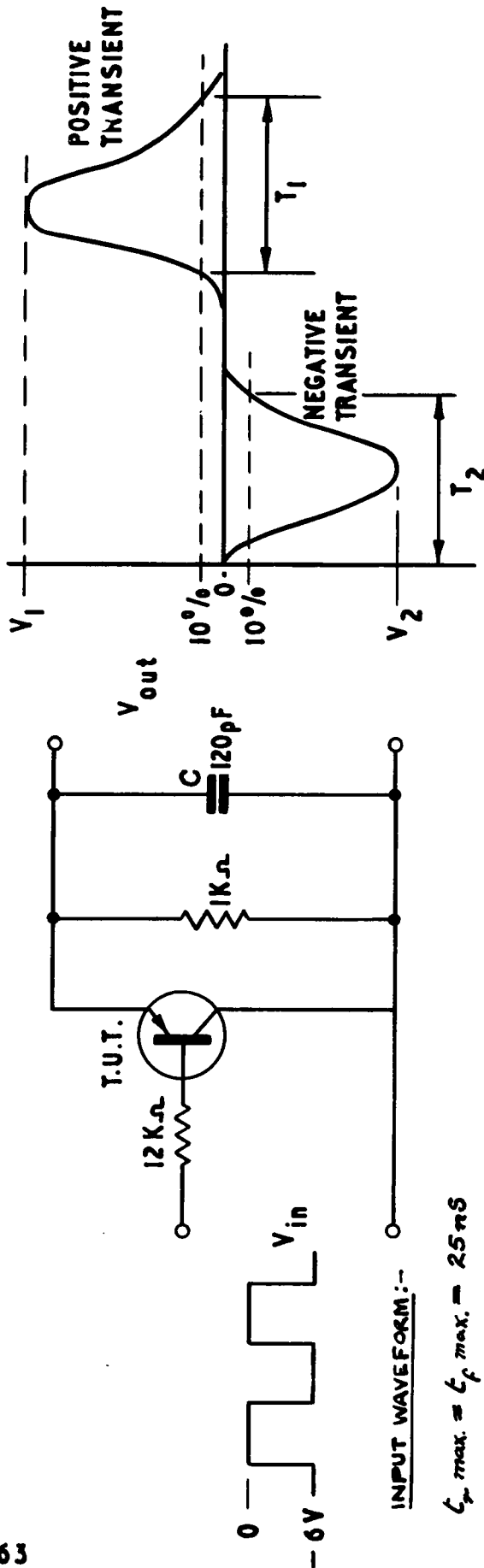
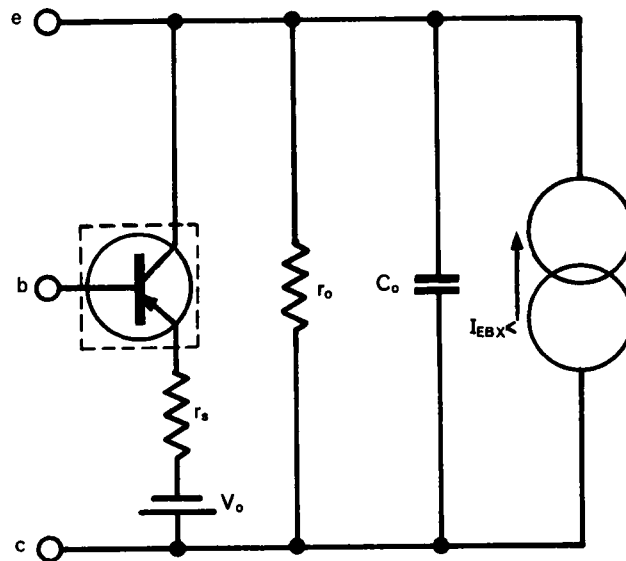


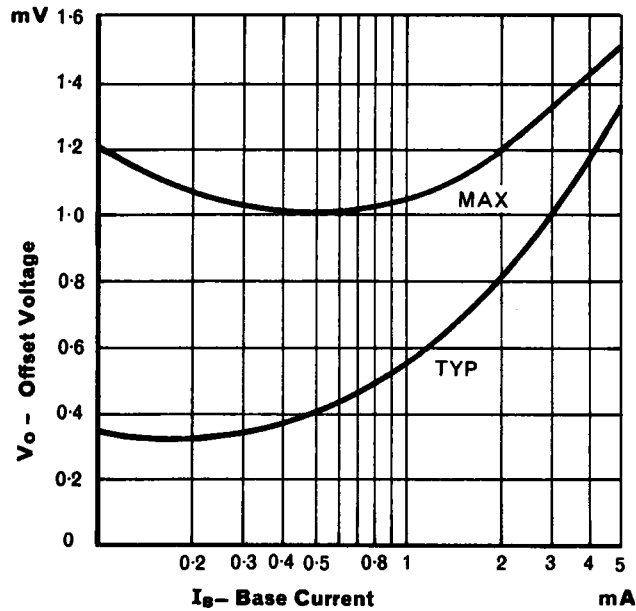
FIG. 5

CIRCUIT FOR SPIKE FEED THROUGH MEASUREMENTS.

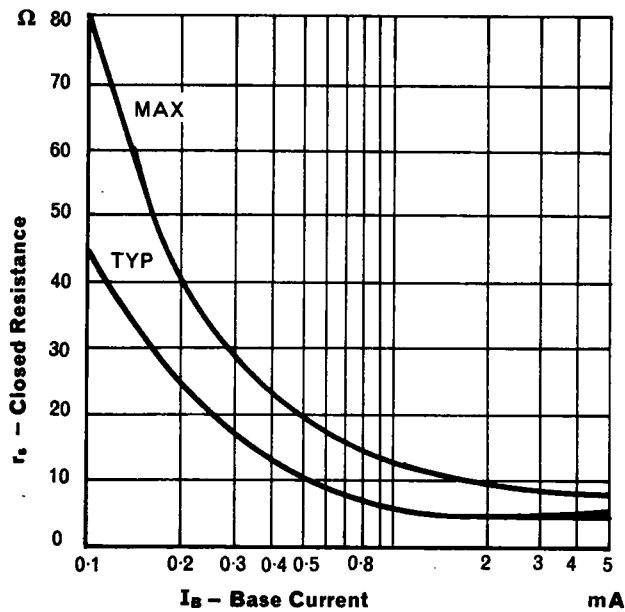


EQUIVALENT CIRCUIT

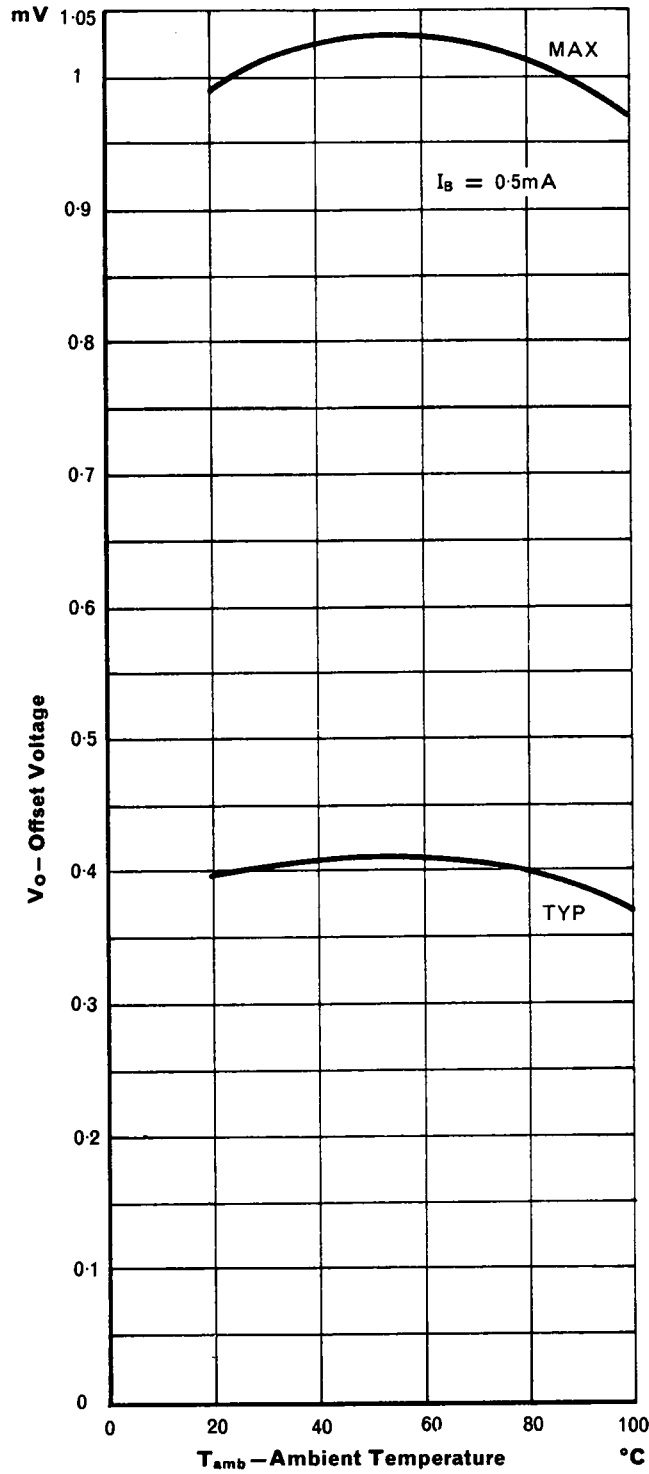
**VARIATION OF OFFSET VOLTAGE
WITH BASE CURRENT**



**VARIATION OF CLOSED RESISTANCE
WITH BASE CURRENT**



VARIATION OF OFFSET VOLTAGE WITH TEMPERATURE



1st AUGUST 1963

APPLICATION DATA 4 CV 7396

