

ELECTRONIC VALVE SPECIFICATIONS  
SPECIFICATION FOR CV7591-2  
ISSUE NO. 1 DATED 1ST OCTOBER, 1964  
AMENDMENT NO. 1

Page 2.

Amend  $S_F$  max. to read  $-3 \text{ mV}/^{\circ}\text{C}$  for both  
CV7591 and CV7592.

Page 4.

Amend max. limit for  $S_F$  to read  $-3 \text{ mV}/^{\circ}\text{C}$ .

December 1964.  
N.253569

Admiralty Surface Weapons Establishment.

MILITARY SPECIFICATION

CV7591-2

SEMICONDUCTOR DEVICE

Description:- This specification covers the detail requirements for Silicon forward conductance diodes and is in accordance with K1007, Issue 3, except as otherwise stated.

Mechanical Dimensions and Outlines:- K1007, Section D A1/D9.

Connections:- K1007, Section B, 1.3.4.4.

Absolute Maximum Ratings:-

Device	Rating	$V_R$	$I_o$	$I_{FSM}$	$I_{FRM}$	$T_{opr}$	$T_{stg}$	Shock	Vibration
	Unit	V	mA	A	A	$^{\circ}C$	$^{\circ}C$	g	g
CV7591	Min.	-	-	-	-	-55	-55	-	-
	Max.	10	250	1.5	1.0	150	150	1500	20
CV7592	Min.	-	-	-	-	-55	-55	-	-
	Max.	6	150	0.5	0.5	150	150	1500	20
	Note		A	B				C	

Notes:- A. See derating curve Fig. 1.

B. Max. duration = 1 sec.

C. Duration = 0.5 ms.

D. Commercial equivalents:- CV7591 - G129  
 CV7592 - G130

# CV7591-2

## Primary Electrical Characteristics

Characteristics		$I_R$	$I_R$	$V_F$	$V_F$	$Z_F$	$S_F$
Unit		$\mu A$	$\mu A$	V	V	$\Omega$	mV/ $^{\circ}C$
CV7591	Min.	-	-	0.50		-	
	Max.	0.1	100	0.62	1.0	60	-2
CV7592	Min.	-	-	0.57		-	
	Max.	0.1	100	0.71	1.0	60	-2
Conditions	$V_R$	V	2	Max. Rated			
	$I_F$	mA			1.0	100	1.0
	$T_{amb}$	$^{\circ}C$	25	25	25	25	25

Reliability Assurance Requirements:- Under discussion.

## REQUIREMENTS:-

Marking K1007, Section B, 1.3.4. Minimum requirements 1.3.4.1. (a) and (b).

## QUALITY ASSURANCE PROVISIONS:-

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

Group C Inspection 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, Section A 1.2(c).

## NATO STOCK NUMBERS:-

CV7591 5960-99-037-3923  
CV7592 5960-99-037-3924

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

Admiralty Surface Weapons Establishment,  
Portsmouth, Hants, England.

GROUP A INSPECTION

Examination or Test	K1007/ NATO Ref.	Test Conditions		AQL %	Insp. Level	Symbol	Limits		Units
		Specific Conditions					Min.	Max.	
<u>SUB-GROUP 1</u> Visual and Mechanical Inspection	5.1.1.			0.65	I				
<u>SUB-GROUP 2</u> Forward Voltage (1)	8A.3.2.	$I_F = 1 \text{ mA}$ CV7591 CV7592		0.65	II	$V_F$ $V_F$	0.50 0.57	0.62 0.71	V V
Reverse Current (1)	8A.2.2.	$V_R = 2V$				$I_R$		0.1	$\mu\text{A}$
<u>SUB-GROUP 3</u> Forward Voltage (2)	8A.3.2.	$I_F = 100 \text{ mA}$		2.5	I	$V_F$		1.0	V
<u>SUB-GROUP 4</u> Reverse Current (2)	8A.2.2.	$V_R = 10V$ (CV7591) $V_R = 6V$ (CV7592)		4.0	IA			100 100	$\mu\text{A}$ $\mu\text{A}$
Temp. Coeff of Forward Voltage		$I_F = 1 \text{ mA}$ , Temp. range $+25^\circ\text{C}$ to $+60^\circ\text{C}$				$S_F$	-1	-2	mV/ $^\circ\text{C}$
Small-signal Forward Impedance	8A.4.2.	$I_F = 1 \text{ mA}$				$Z_F$	-	60	$\Omega$

Table II  
GROUP B INSPECTION  
 (See Page 3 Quality Assurance Provisions)

Examination or Test	K1007/ NATO Ref.	Test Conditions Specific Conditions	AQL %	Insp. Level	Symbol	Limits		Units
						Min.	Max.	
<u>SUB-GROUP 1</u> Physical Dimensions	5.1.2.	According to K1007/A1/D9	6.5	IC				
<u>SUB-GROUP 2</u> Solderability	5.13.		4.0	IA				
Temperature Cycling	5.5.	-55°C to +100°C						
Moisture Resistance	5.3.							
<u>SUB-GROUP 3</u> Vibration Fatigue	5.15.	Non-operating	4.0	IA				
<u>SUB-GROUP 4</u> Lead Fatigue	5.10.2.	1 cycle	6.5	IA				
<u>SUB-GROUP 5</u>		Omitted						
<u>SUB-GROUP 6</u>		Omitted						
<u>SUB-GROUP 7</u> High Temperature Life	6.2.1. 6.6.1.2.2.	T <sub>amb</sub> = 150°C t = 1000 hours	4.0	I				

GROUP B INSPECTION

Table II

Examination or Test	K1007/ NATO Ref.	Test Conditions  Specific Conditions	AQL %	Insp. Level	Symbol	Limits		Units
						Min.	Max.	
<u>SUB-GROUP 8</u> Operating Life (d.c. or rectified a.c.)	6.3.	$T_{amb}$ between 25°C and 120°C $I_F$ = max. value given by derating curve Fig. 1 corresponding to the chosen $T_{amb}$	4.0	IA				
	6.5.							
	6.6.1. 6.6.1.2.2.							
<u>Post Test End Points</u> <u>Sub-groups 2, 3, 7 and 8</u>	8A.3.2.	As in Group A, Sub-group 2			$V_F$			
		CV7591 CV7592				0.48 0.55	0.64 0.73	V V
Reverse Current	8A.2.2.	As in Group A, Sub-group 2			$I_R$		0.50	$\mu A$

Table III  
GROUP C INSPECTION  
 (See Page 3 Quality Assurance Provisions)

Examination or Test	K1007/ NATO Ref.	Test Conditions Specific Conditions	AQL %	Insp. Level	Symbol	Limits		Units
						Min.	Max.	
<u>SUB-GROUP 1</u>		Omitted						
<u>SUB-GROUP 2</u>								
Shock	5.17.1.	Five blows in each of three mutually perpendicular directions	6.5	IA				
<u>Post Test End Points</u>		As for Group B, Sub-groups 2, 3, 7 and 8						



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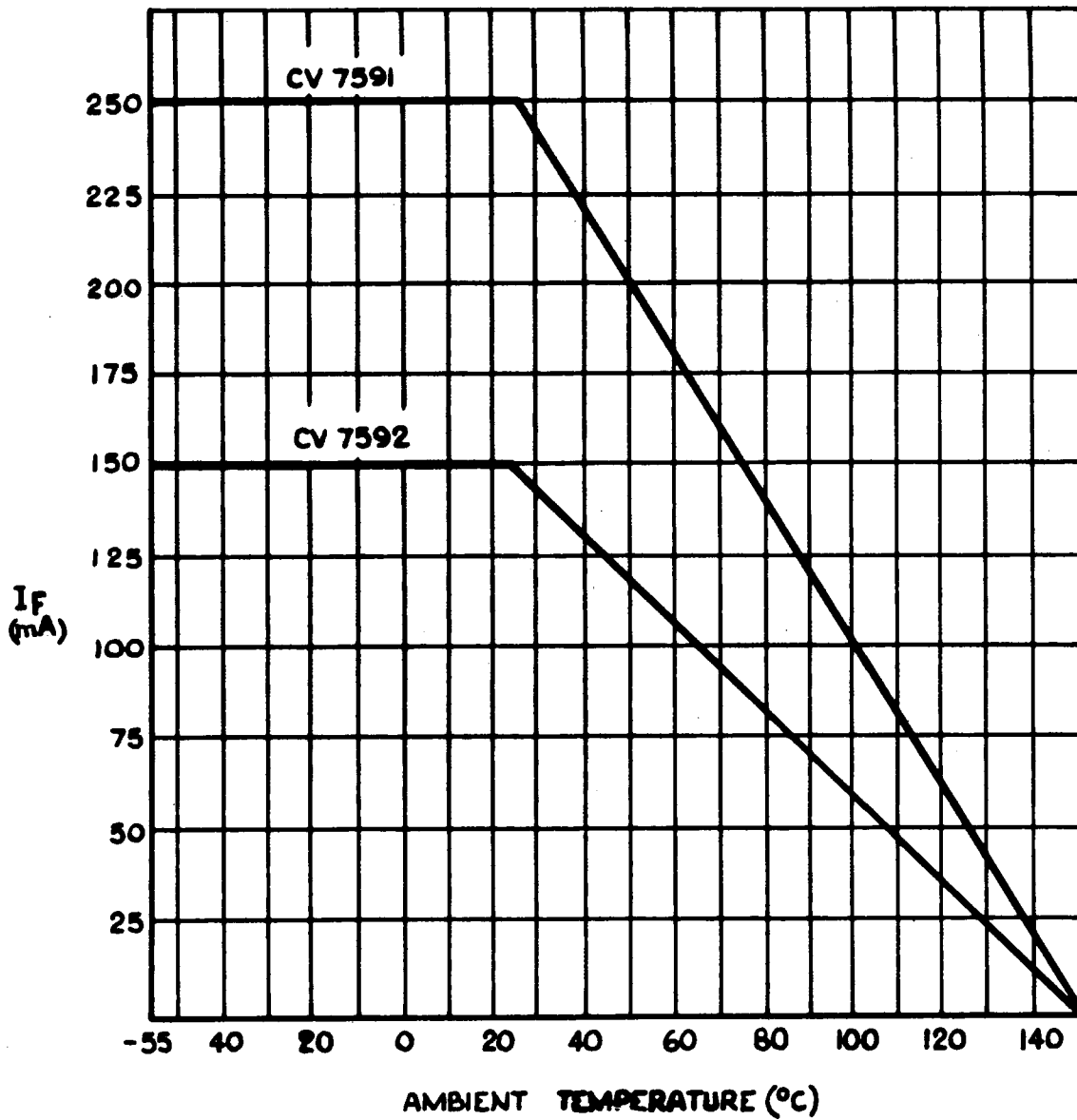
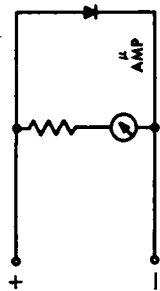
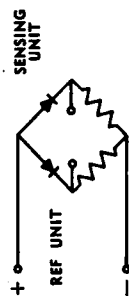


FIG. 1. DERATING CURVE



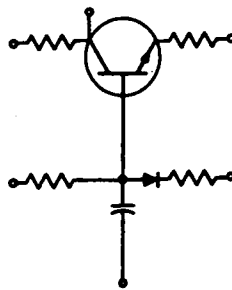
**METER PROTECTION**

The low saturation voltage of the stabistor will allow normal operation of a sensitive microammeter, while protecting it from overvoltage.



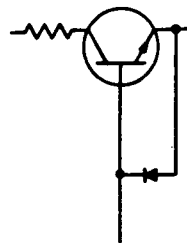
**TEMPERATURE SENSING BRIDGE**

The temperature coefficient of the stabistor makes it well suited to bridge circuit sensing applications.



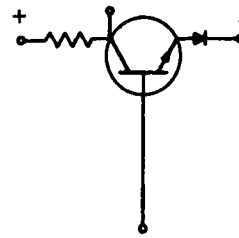
**STABILIZED TRANSISTOR BIAS**

The stabistor provides temperature compensation equal to the temperature coefficient of the base-emitter diode of the transistor.



**BASE CLAMPING DIODE**

The stabistor in this circuit provides protection for transistors having low  $V_{BE0}$ , by clamping the reverse base voltage. This type of protection allows high collector currents and does not require additional base bias.



**TRANSISTOR EMITTER VARISTOR**

The stabistor, acting as a variable emitter resistor for switching applications, presents a high impedance for no signal and low impedance for on signal. This circuit should be used only in applications where the transistor is held firmly off because of the effect of temperature on the emitter voltage with the stabistor in the circuit.

## LOGARITHMIC ATTENUATORS

The characteristic of the stabistor approximates a log function according to the equation:

$$V_D \approx \frac{AKT}{q} \ln \frac{I}{I_S}$$

where:  $K$  = Boltzmann's Constant  
 $T$  = Ambient Temperature in °Kelvin  
 $q$  = Charge on an Electron  
 $I$  = Forward Diode Current  
 $I_S$  = Diode Saturation Current  
 ( $\approx 10^{-12}$  amps)

$$\text{for } V > \frac{KT}{q}$$

and  $\frac{KT}{q} \approx 25.8$  mv at room temperature

