CV7013

VALVE ELECTRONIC
(SEMICONDUCTOR)
(DEVICE)

ADMIRALTY SURFACE WEAPONS ESTABLISHMENT

Specification AD/CV7013 Issue No. 2A dated 1.6.62. To be read in conjunction with K1007 Mandatory Sections - 1,2,3,4,5.1,5.2,5.3,9,15. Other Sections and Appendices as called up by this Specification	SECURITY	
	Specification	Valve
	Unclassified	Unclassified

→ Indicates a change

TYPE OF VALVE - Silicon Power Diode

PROTOTYPE - 1S113

MARKING

CV7013 or coloured bands denoting CV number. Polarity marking

DIMENSIONS

K1007/A1/D9

MOUNTING POSITION

Any

PACKAGING

K1007. Section 14

RATINGS AND CHARACTERISTICS
(Not for Inspection Purposes)

ALL LIMITING VALUES ARE ABSOLUTE

			Note
Max. Peak Inverse Voltage at -55°C to +150°C	(V)	400	A
→ Max. Average Rectified Forward Current at 25°C	(mA)	400	
→ Current derating above 25°C (See Fig. 1 on page 2)	(mA/°C)	2.0	
Max. Reverse Current at 25°C at V_R = 400V d.c.	(μA)	0.2	
Max. Reverse Current at 100°C at V_R = 400V d.c.	(μA)	20	
→ Max. Recurrent peak forward current (See Fig. 2 on page 2)			
→ Overload current (See Fig. 3 on page 3)			
→ Max. frequency of operation without derating	(kc/s)	10.0	
Max. operating ambient temperature range -55°C to +150°C			
Capacitance (nom.) at V_R = 12V	(pF)	9	

NOTES

A. This rating applies to all wave forms including very short transients.

B. The Joint Services Catalogue No. is 5960-99-037-2000.

(40644)

TEMPERATURE DERATING AT MAX. P.I.V.

FIG. 1.

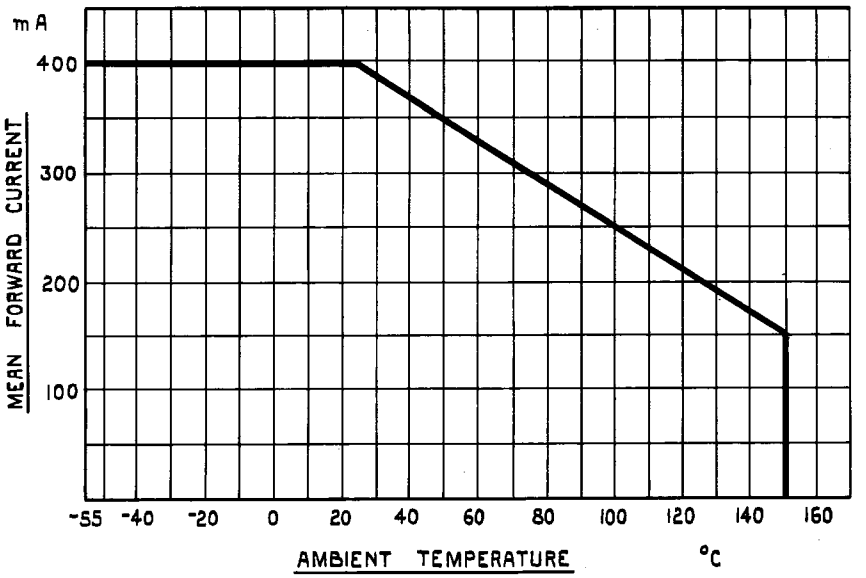
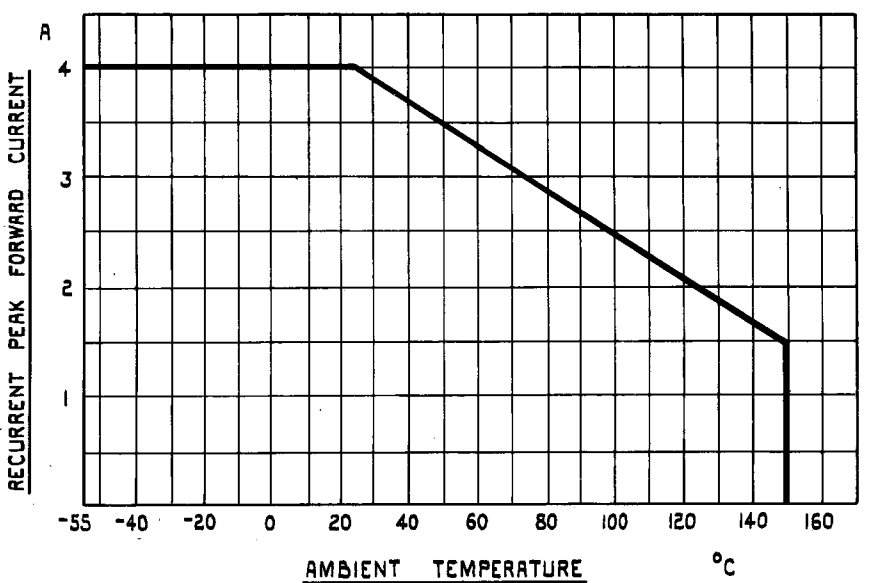


FIG. 2.



OVERLOAD CURRENT AT MAX. P.I.V. AND 25°C

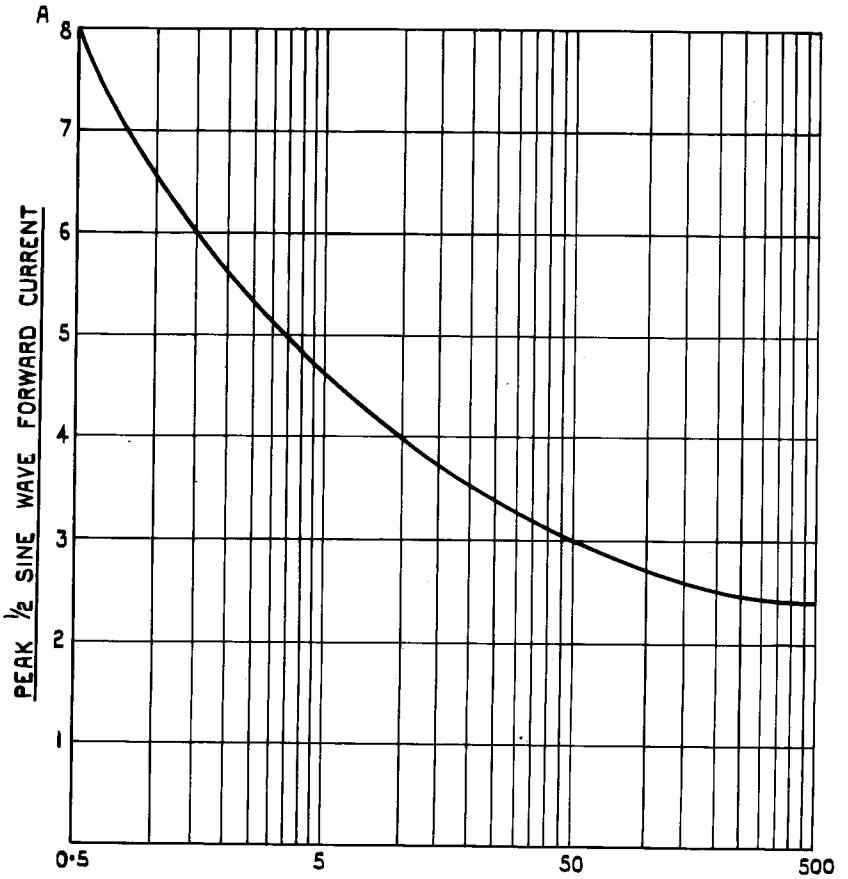


FIG / 3

Note 2

The overload current curve applies to the diode conducting half sine waves of forward current followed by half sine waves of reverse voltage. The diode may be on full load before the overload current and may continue at full load afterwards. The reverse voltage may be maintained at the P.I.V. during the overload period. The safe overload current is reduced by 5% from the value indicated on Fig. 3 for every 3°C rise in ambient temperature above 25°C. It should be noted that the overload current curve specifies the peak values of half sine waves. The full cycle mean overload current may be obtained by dividing by π

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TEST CONDITIONS

Unless otherwise specified Ambient Temperature within the range +15°C to +30°C.

K1007	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
	GROUP A							
5C.4	Forward Voltage Drop	If = 400 mA		100%	Vf		1.0	V
5C.2	Reverse Current (1)	Vr = 400V		100%	Ir		0.2	µA
	GROUP B Omitted							
	GROUP C							
5C.2	Reverse Current (2)	T amb. = +100°C min. Vr = 400V	2.5	I	Ir		20	µA
	GROUP D Omitted							
	Group E							
10.1	Lead Fragility	No voltages Note 1	6.5	IA				
11.5	Soldering	No voltages	6.5	IC				
10.2	Temperature Cycling	No voltages Three cycles -55°C to +150°C Note 2		IC				
10.3	Climatic Cycling	No voltages Note 2						
	Post Temperature Cycling and Climatic Cycling Tests	Combined AQL	10					
5C.4	Forward Voltage Drop	As in Group A	6.5		Vf		1.1	V
5C.2	Reverse Current (2)	As in Group C	6.5		Ir		22	µA
11.3	Fatigue	No voltages		IA				
	Post Fatigue Tests	Combined AQL	10					
5C.4	Forward Voltage Drop	As in Group A	6.5		Vf		1.1	V
5C.2	Reverse Current (2)	As in Group C	6.5		Ir		22	µA
11.4	Shock	No voltages Hammer angle = 60°		T.A.				
	Post Shock Tests	Combined AQL	10					
5C.4	Forward Voltage Drop	As in Group A	6.5		Vf		1.1	V
5C.2	Reverse Current (2)	As in Group C	6.5		Ir		2.2	µA
11.6	Centrifuge	No voltages 10,000g		T.A.				
	Post Centrifuge Tests	Combined AQL	10					
5C.4	Forward Voltage Drop	As in Group A	6.5		Vf		1.1	V
5C.2	Reverse Current (2)	As in Group C	6.5		Ir		22	µA

TESTS (Cont'd)

K1007	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
	GROUP F							
13	Operating Life (1)	Half-wave circuit with resistive load at max. rated P.I.V. T amb. not greater than +150°C. f = 50 c/s Forward current not less than the value corresponding to the chosen T amb. according to the derating curve, Fig. 2 on page 2. Note 3. t = 72 hrs. min.		III				
13.3	Post Life Test (1) end Points							
5C.4	Forward Voltage Drop	As in Group A	0.65		V_F		1.1	V
5C.2	Reverse Current (2)	As in Group C	0.65		I_R		22	µA
13	Operating Life (2) Notes 5 and 6	As for Operating Life (1) except t = 1,000 hours.		IA				
	Post Life Test (2) end Points							
5C.4	Forward Voltage Drop	As in Group A	4.0		V_F		1.1	V
	Reverse Current (2)	As in Group C	4.0		I_R		22	µA
13.4	Storage Life (1)	No voltages t = 150 hours T amb = 55°C		I				
13.5	Storage Life (2)	No voltages t = 150 hours T amb. = +150°C		I				
	Post Storage Life Tests	Combined AQL for each Storage Life.	4.0					
5C.4	Forward Voltage drop	As in Group A			V_F		1.1	V
5C.2	Reverse Current (2)	As in Group C			I_R		22	µA
	GROUP G							
5.3.2.11	Retest after 28 days holding period.							
8	Inoperatives		0.5	100%				
5C.4	Forward Voltage Drop	As in Group A	0.5	100%	V_F		1.0	V
5C.2	Reverse Current (1)	As in Group A	0.5	100%	I_R		0.2	µA

NOTES

1. Rectifiers used for this test must have undergone at least 28 cycles of climatic cycling in accordance with K1007/10.3.1. or K1007/10.3.2, or 6 cycles of climatic cycling in accordance with K1007/10.3.3.

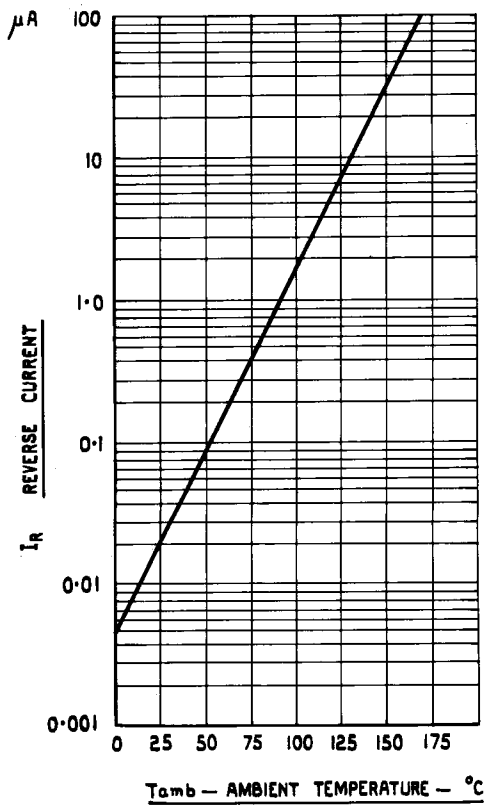
2. A sample of rectifiers shall first be subjected to temperature cycling followed by climatic cycling, and shall then pass the post temperature cycling and climatic cycling tests.

3. The connections to the rectifier shall be made at least 20 mm from the body.

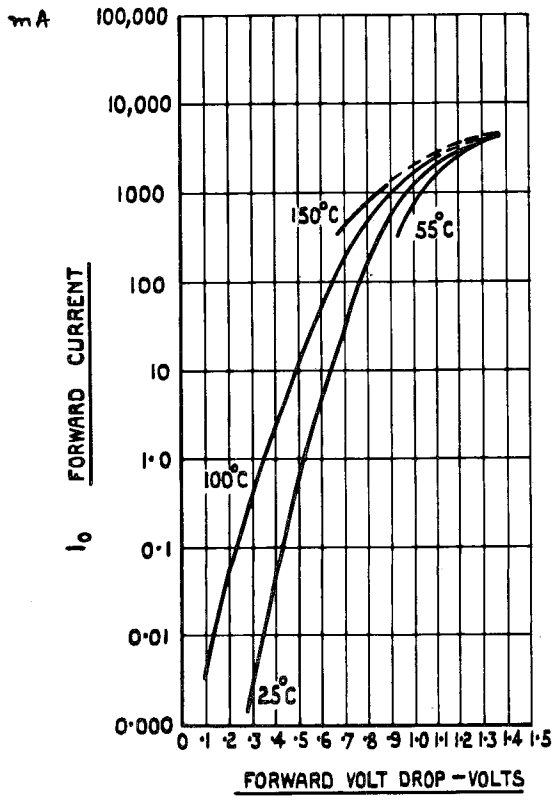
5. K1007, Section B Clause 4.5.3.3 will not apply. However, the Inspectorate will inform the Qualification Approval Authority if and when the requirements of Operation Life (2) have not been met.

6. This test shall be conducted on the initial lot and thereafter every ninety days or every fifth lot, whichever occurs first.

TYPICAL VARIATION OF REVERSE CURRENT AT MAX. P.I.V. WITH TEMPERATURE



TYPICAL VARIATION OF FORWARD VOLTAGE DROP WITH FORWARD CURRENT



TYPICAL VARIATION OF CAPACITANCE WITH VOLTAGE AT 25°C