VALVE ELECTRONIC

ADMIRALTY SURFACE WEAPONS ESTABLISHMENT

CV6085.

Specification AD/CV6085 Issue No. 1 dated 29.6.61 To be read in conjunction with K1001	SECURITY Specification: Unclassified Valve: Unclassified

TYPE OF VALVE: S-band travelling wave tube power amplifier with low modulation noise.	MARKING See K1001/4
CATHODE: Indirectly heated	BASE B.S.448/B80
ENVELOPE: Metal capsule	
PROTOTYPE: VX3290	

RATINGS
(All limiting values are absolute)

			Note
Heater Voltage	(V)	3.5	
Max. Heater Current	(A)	4.5	F
Max. Grid 1 Voltage	(kV)	2.5	A B
Max. Grid 1 Current	(mA)	1.5	A
Max. Helix Voltage	(kV)	2.7	A B
Max. Helix Current	(mA)	1.5	A
Max. Collector Voltage	(kV)	3	A B
Max. Collector Current	(mA)	20	A

CONNECTIONS

PIN	ELECTRODE	
1	Heater	h
2	N.C.	
3	Omitted	
4	Grid 1	g1
5	N.C.	
6	Helix	hel
7	Omitted	
8	Heater/Cathode	h,k
Case	Collector/Earth	Col

TYPICAL OPERATING CONDITIONS

			Note
Heater Voltage	(V)	3.5	H
Heater Current	(A)	3.5-4.5	
Grid 1 Voltage	(kV)	0.5-1.0	A B
Grid 1 Current	(mA)	0-1.0	A
Helix Voltage	(kV)	2.0-2.3	A B
Helix Current	(mA)	0-1.0	A
Collector Voltage	(kV)	2.0-2.5	A B
Collector Current	(mA)	14-16	A
Min. Working Saturated Power Output	(W)	0.5	G
Frequency Range	(K Mc/s)	2.5-4.1	
Min. Gain at a Power Output of 0.5 watts	(dB)	20	
Max. Noise Factor	(dB)	30	
Min. Insertion Loss	(dB)	25	

DIMENSIONS
See drawing on page

MOUNTING POSITION
Any (but see Note D re cooling)

WEIGHT
Valve only: $2\frac{1}{8}$ lbs.

Valve in solenoid mount assembly $43\frac{3}{4}$ lbs. (See note J).

NOTES

A. These figures are for operation in the approved solenoid mount assembly (see Note 2 on Page 5) and adjusted for minimum helix current. The minimum solenoid current required to focus the electron beam is 4 Amps when valve and mount are aligned for minimum helix current by means of the adjusting screws on the solenoid. The max. solenoid current is 8 Amps and the solenoid operating voltage 16 volts (approx.). Max. voltage 32 volts. All voltages are positive relative to the cathode. The collector is connected to the capsule which is normally earthed. The helix voltage should never exceed the collector voltage.

NOTES (CONT'D)

B. Adjusted in operation.

C. The v.s.w.r. of the output and input couplers, measured when I col = 0 is not greater than 3:1. The valve must be operated in an r.f. circuit presenting a v.s.w.r. not greater than 5:1.

D. The valve is designed for operation without forced air cooling when mounted in a horizontal position at an ambient temperature of 20°C. Cooling is normally effected by thermal conduction through the base plate, which must be mounted on a suitable heat sink and by thermal convection from the radiator.

When operated in other mounting positions and/or higher ambient temperatures, forced air cooling may be required. The solenoid must be so mounted and cooled that no external part of the valve capsule is at a temperature in excess of 130°C.

E. The performance of four tubes has been examined while operating and while subjected to the following tests:-

(i) Resonance Search, amplitude 0.004" frequency sweep 0–30 c/s for 2 minutes, test performed three times.

(ii) Vibration

Amplitude Inches	Frequency c/s	Time Mins.
0.030	0–11	2
0.020	11–16	1
0.010	16–21	1
0.004	21–30	2

Test performed three times.

(iii) Fatigue

Vibrated for 25 minutes with an amplitude of 0.010" at a frequency of 20 c/s.

Test performed six times.

Results

There was no measurable effect on gain, noise output and r.f. power output.

F. The surge current shall not exceed 8 Amps.

G. Conditions as in test clause f on page 3.

H. A data sheet giving operating conditions is supplied with each valve.

J. The solenoid mount assembly is not supplied with the valve.
An outline drawing showing the valve in the solenoid mount assembly is shown on page 6.

K. The Joint Services Catalogue number is 5960-99-037-2411.

TESTS

CV6085

To be performed in addition to those applicable in K1001

Tests are to be performed in the specified order unless otherwise agreed with the Inspecting Authority.

Test Conditions - Unless Otherwise Specified

Vh (V)	V Col (kV)
3.5	2.4

Clause	Test	Test Conditions	AQL %	Insp. Level	Symbol	Limits Min.	Limits Max.	Units
a	Heater Current	No voltages except Vh		100%	Ih	3.5	4.5	A
b	Grid 1 Voltage	Vhel = 2.3kV Increase Vg1 from zero until ICol = 15 mA. Note 2.		100%	Vg1	0.5	1.0	kV
c	Grid 1 Current	Conditions as in test b. Note 2.		100%	Ig1	-	1.0	mA
d	Helix Current	Conditions as in test b. Note 2.		100%	Ihel	-	1.0	mA
e	Helix Voltage	Increase Vg1 from zero until I Col = 15 mA. Apply a signal of r.f. power 5 ± 0.5 mW, frequency 3,300 ± 50 Mc/s to the input. Adjust Vhel to give max. r.f. power output. Note 2.		100%	Vhel	2.0	2.3	kV
f	R.F. Power Output.	(i) Increase Vg1 from zero until I Col. = 15 mA Vhel = as obtained in test (e). Apply a signal of r.f. power 5 ± 0.5 mW to the input at frequencies 2500 ± 20 Mc/s 3300 ± 20 Mc/s 4100 ± 20 Mc/s Note 2.		 100% 100% 100%		 0.5 0.5 0.5		 W W W
		(ii) As in f(i). Increase the r.f. power input until the output falls beyond saturation to 500 mW. Notes 2 and 4.		100%		Record the R.F. power input		

Clause	Test	Test Conditions	AQL %	Insp. Level	Sym-bol	Limits Min.	Limits Max.	Units
f	R.F. Power Output (Cont.)	(iii) As in f(i). Increase the r.f. power input to 70 mW. Notes 2 and 4.		100%		Record the r.f. power output.		
		(iv) As f(i) at frequency intervals of 100 Mc/s ± 20 Mc/s over the band 2500 to 4100 Mc/s.		T.A.			0.5	W
g	High Level Noise Factor	Conditions as in test f(i). Frequency of r.f. signal = 3300 ± 20 Mc/s. Notes 2 and 3.		100%		-	30	dB
h	Cold v.s.w.r.	No voltages. Measured over the frequency range 2.5 to 4.1 KMc/s.		100%		-		
		(a) Input				-	3:1	Ratio
		(b) Output.				-	3:1	Ratio
j	Hot v.s.w.r.	D.C. conditions as in f(i). Measured over the frequency range 2.5 to 4.1k Mc/s.						
		(a) Input				Record		
		(b) Output				Record		
		Notes 2 and 4.						

Supersedes

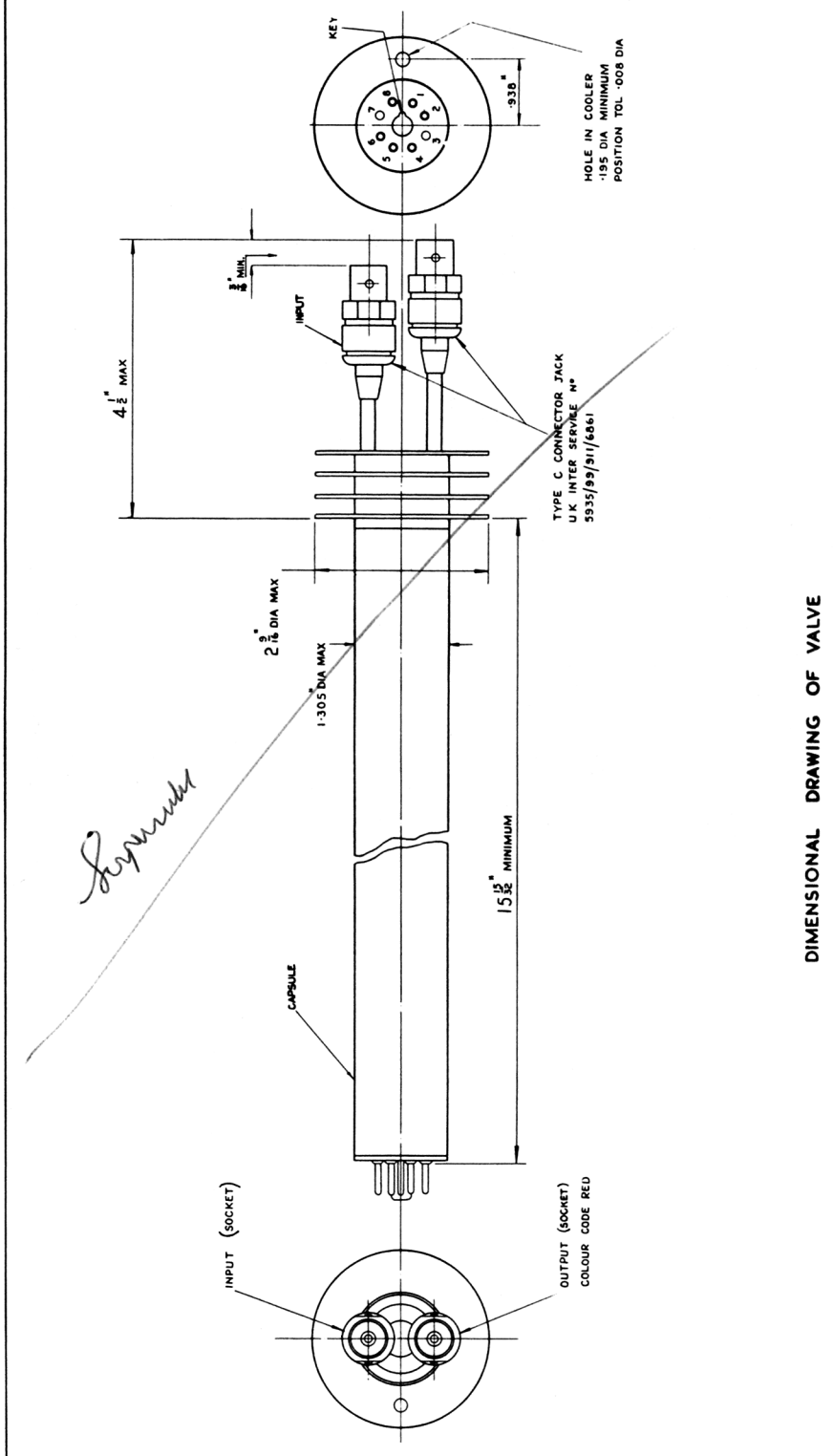
NOTES

1. The surge current shall not exceed 8 Amps.

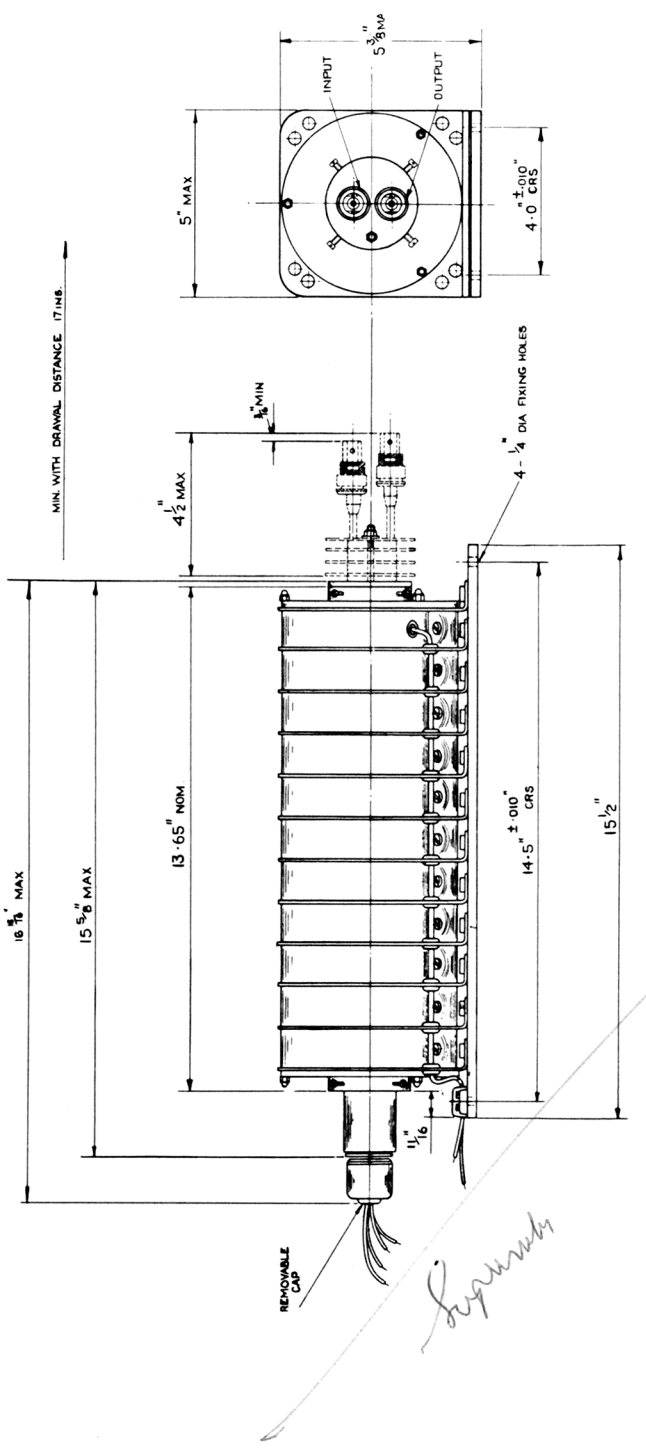
2. Measured with the valve operating in a solenoid mount assembly which has been approved by comparison with the reference standard held by the Type Approval Authority. During adjustment and test the helix current must not exceed 1.5 mA.

3. The noise factor is measured by comparing the noise with that from a standard noise source, the detector being a broad band crystal and receiver having a pass band 5-50 Mc/s.

4. Records shall be submitted to the Specification Authority with the aim of establishing test limits.



DIMENSIONAL DRAWING OF VALVE

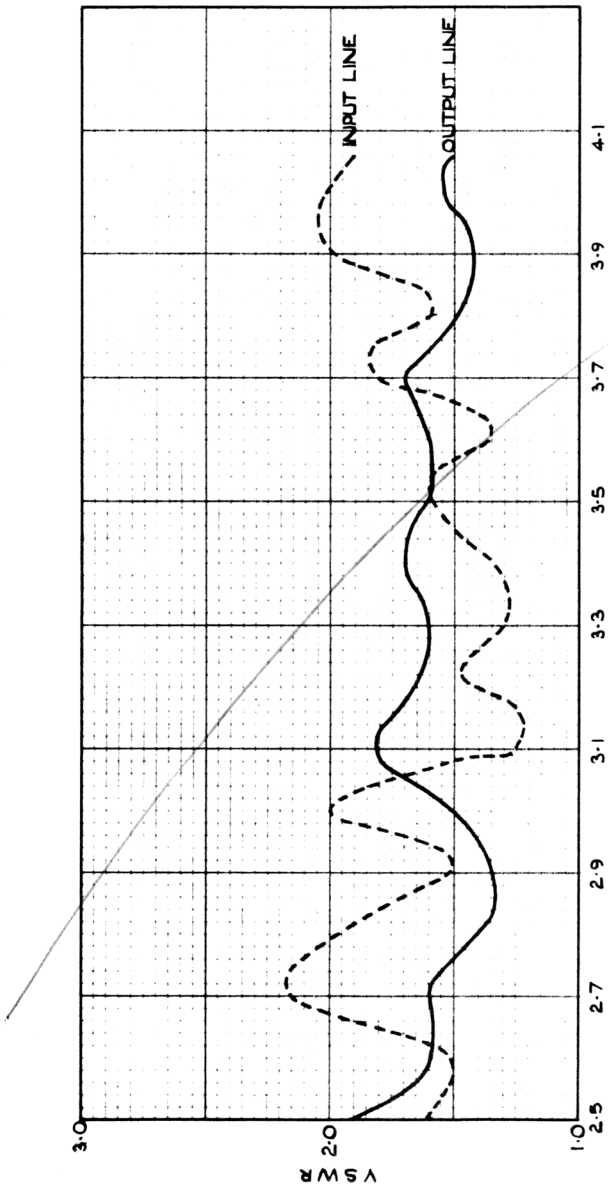


OUTLINE DRAWING OF VALVE IN SOLENOID MOUNT ASSEMBLY

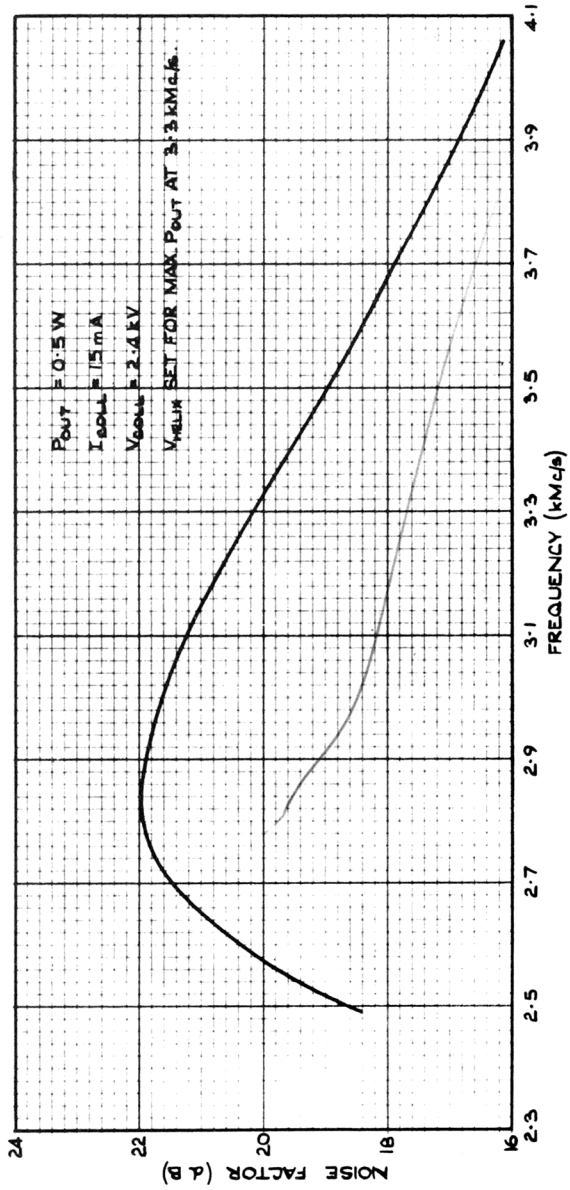
(FOR THE INFORMATION OF EQUIPMENT DESIGNERS)

DATA SHEET

CV6085



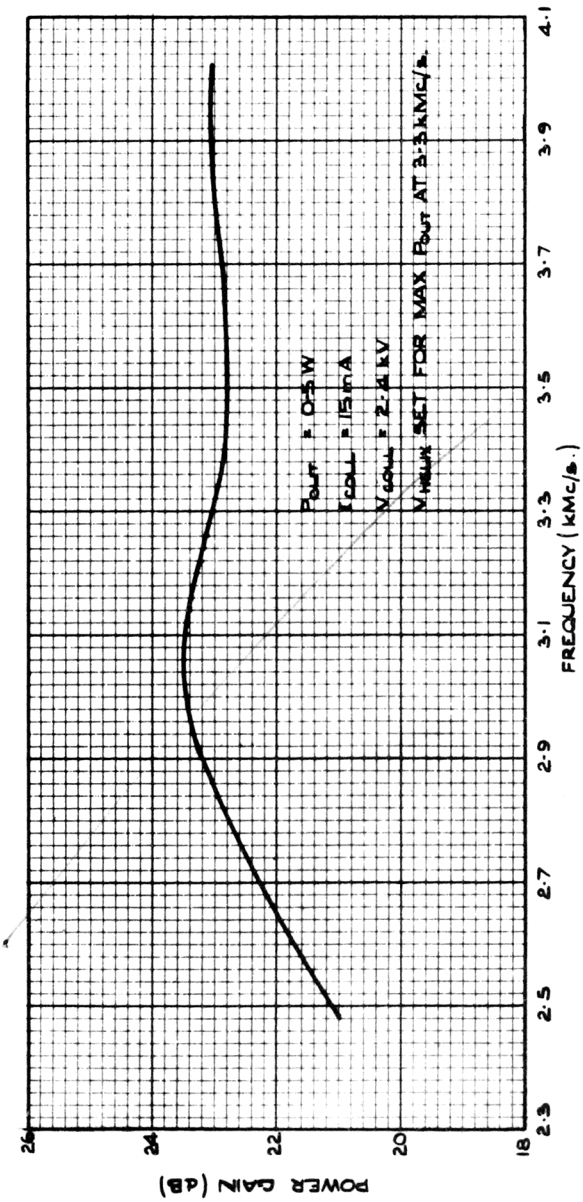
VARIATION OF MATCH WITH FREQUENCY
(MEASURED COLD)



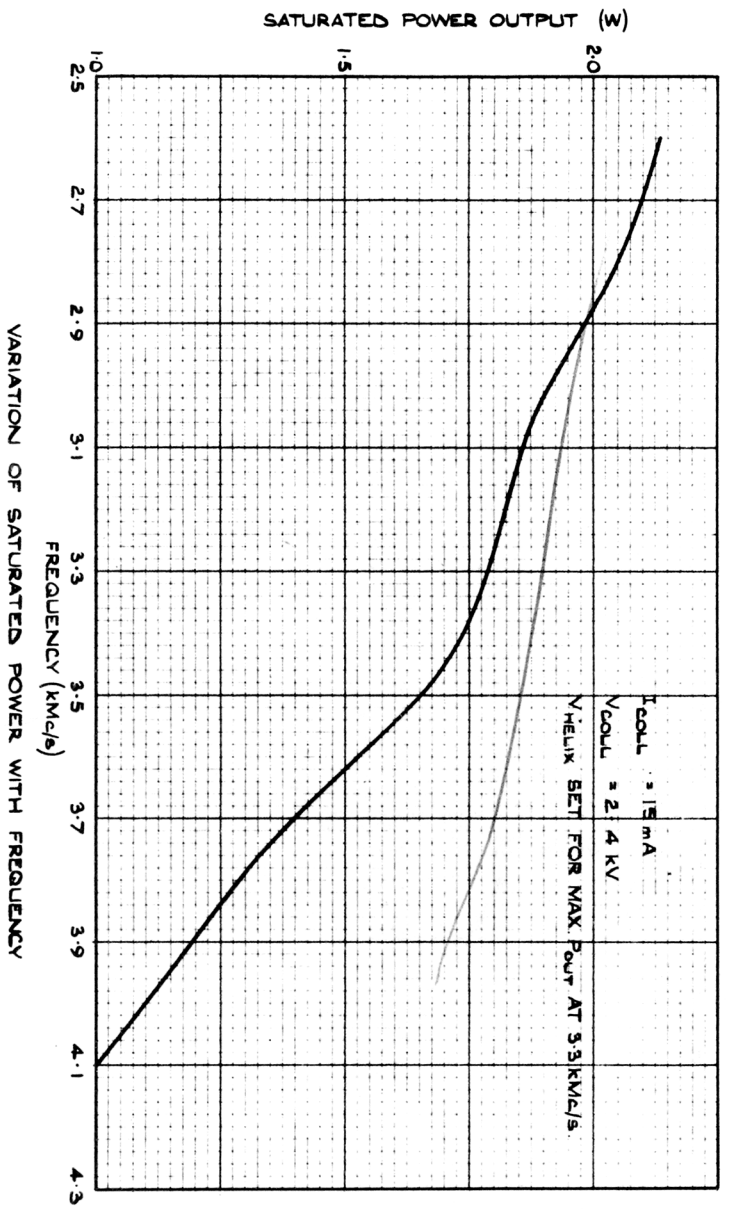
VARIATION OF NOISE FACTOR WITH FREQUENCY

DATA SHEET

CV6085



VARIATION OF POWER GAIN WITH FREQUENCY



VARIATION OF SATURATED POWER WITH FREQUENCY