CONDUCTION COOLED MICROWAVE TRIODE OXIDE COATED CATHODE

DET29

ISSUE 2

The DET29 is a commercial equivalent of the CV2397. It is primarily for use in coaxial circuits as an oscillator or amplifier up to 5000Mc/s and as a frequency multiplier up to 7000Mc/s. The heater is not connected to the cathode.

HEATER

V_h	6·3	V
I_h	0·5 (approx)	A

MAXIMUM RATINGS (Absolute)

V_a	450	V
$v_{a(pk)}$	1	kV
$I_{a(mean)}$	40	mA
$i_{a(pk)}$	500	mA
I_g	6	mA
p_a	10	W
p_g	0·25	W
$-V_g$	20	V
T_{seal}	140	°C

CAPACITANCES (Cold)

$c_{g\text{-}a}$: 1·2pF; $c_{g\text{-}k}$: 3·4pF; $c_{a\text{-}k}$: 0·025pF.

CHARACTERISTICS

I_a	10	40	mA
$-V_g$	0·5	0·5	V
g_m	16	24	ma/V
μ	55	—	—

TYPICAL OPERATION

The typical performance at various frequencies as a power amplifier and oscillator and as a small signal amplifier are shown below. Above 1000Mc/s double concentric line circuits were used, with the output line of fixed length and the input line tunable. The 2300Mc/s amplifier has a $\lambda/4$ output circuit and all others a $3\lambda/4$ output circuit. The h.t. supply in all cases is 250V at 40mA.

Detailed descriptions of the circuits including line lengths for any frequency are given in the DET29 Application Report. Further information concerning the DET29 as a low noise amplifier is contained in the booklet 'Low Noise Amplifier Design'. Both publications are available upon request.

Frequency (Mc/s)	Operation	Output (W)	Gain (dB)	Noise Factor (dB)
400	Amplifier (<10mW drive)	—	16*	6·6
2300	Oscillator	3·5	—	—
	Amplifier (<10mW drive)	—	14†	12
	Amplifier (0·5—1W drive)	1·75†	—	—
		3·0‡	—	—
3800	Oscillator	1·5	—	—
	Amplifier (<10mW drive)	—	12†	17
	Amplifier (250—500mW drive)	1·5†	—	—

*Measured at 14Mc/s bandwidth.
†Measured at 50Mc/s bandwidth.
‡Measured at 20Mc/s bandwidth.

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COOLING

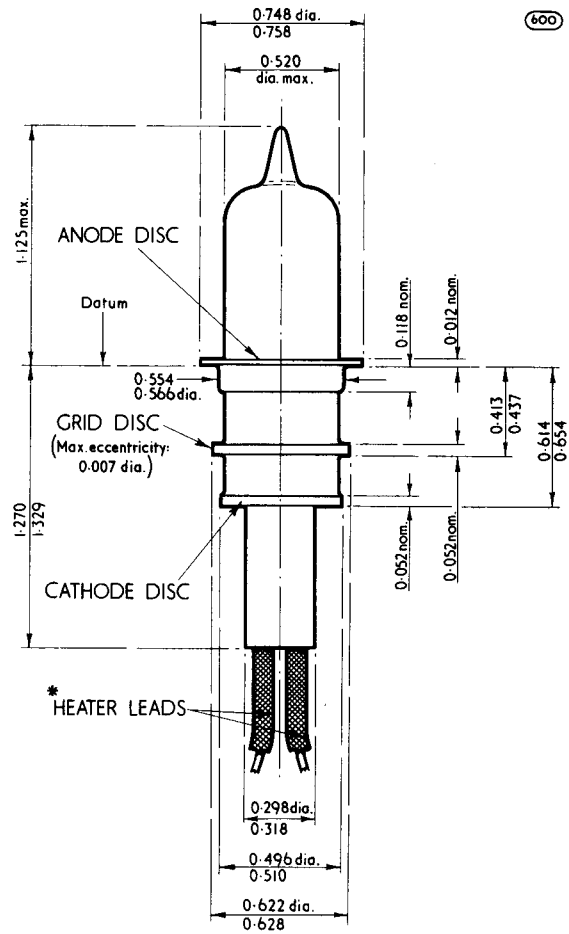
The maximum temperature of the glass to metal seals must not exceed 140°C.

In order to limit the rate of change of temperature of the anode seal, it is necessary for the mass of metal in close thermal contact with the anode disc to have a thermal capacity of not less than 5·5cal/°C. 60gm of brass or 26gm of aluminium are suitable. The anode disc must be clamped uniformly round its circumference in order that the rate of rise of temperature shall be uniformly distributed. To limit the maximum temperature of the anode seal, the loss of heat from the metal in contact with the seal must be adequate.

The seal temperature may be conveniently measured with a temperature sensitive paint.

INSTALLATION

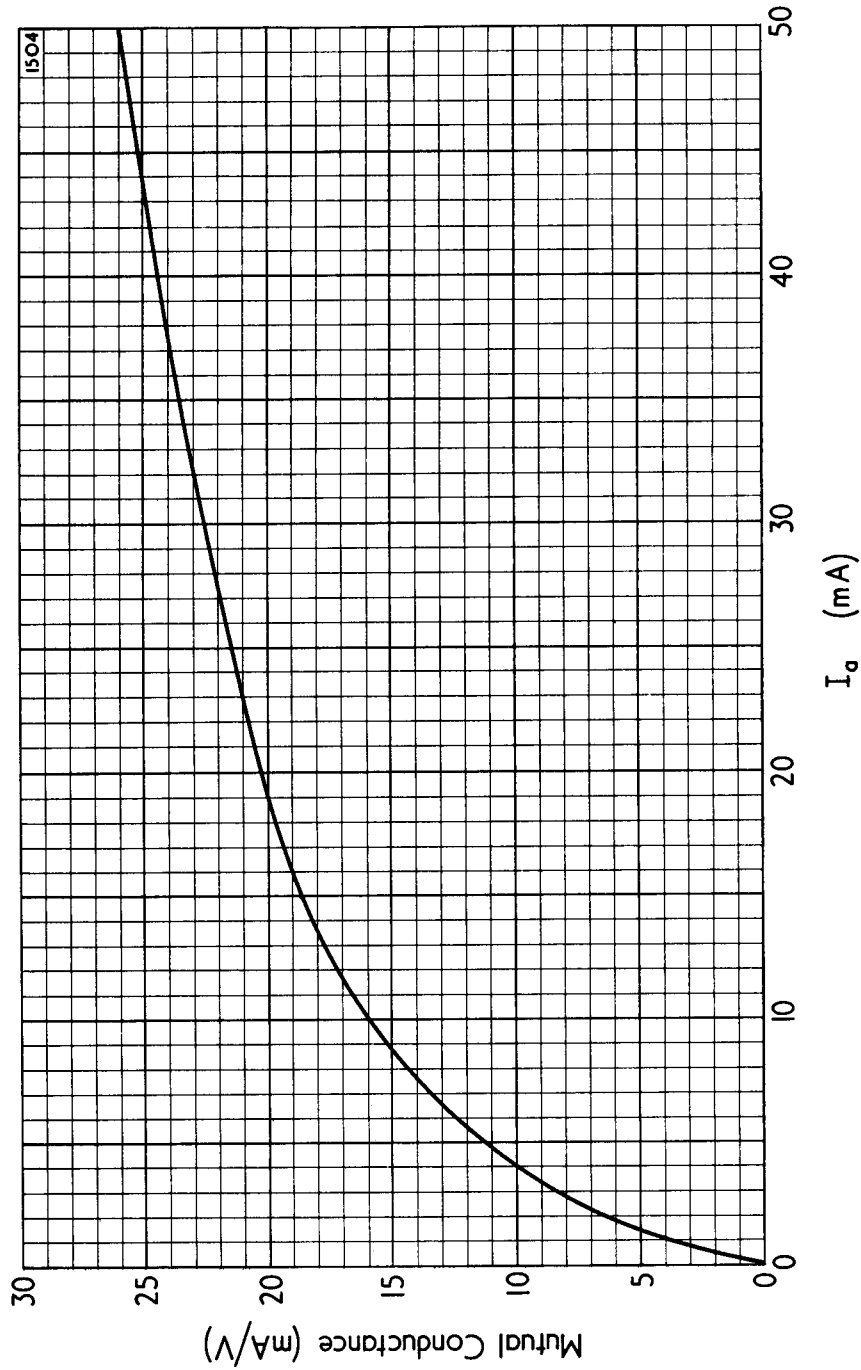
The valve may be mounted in any position. Rigid connection must be made to one electrode only.



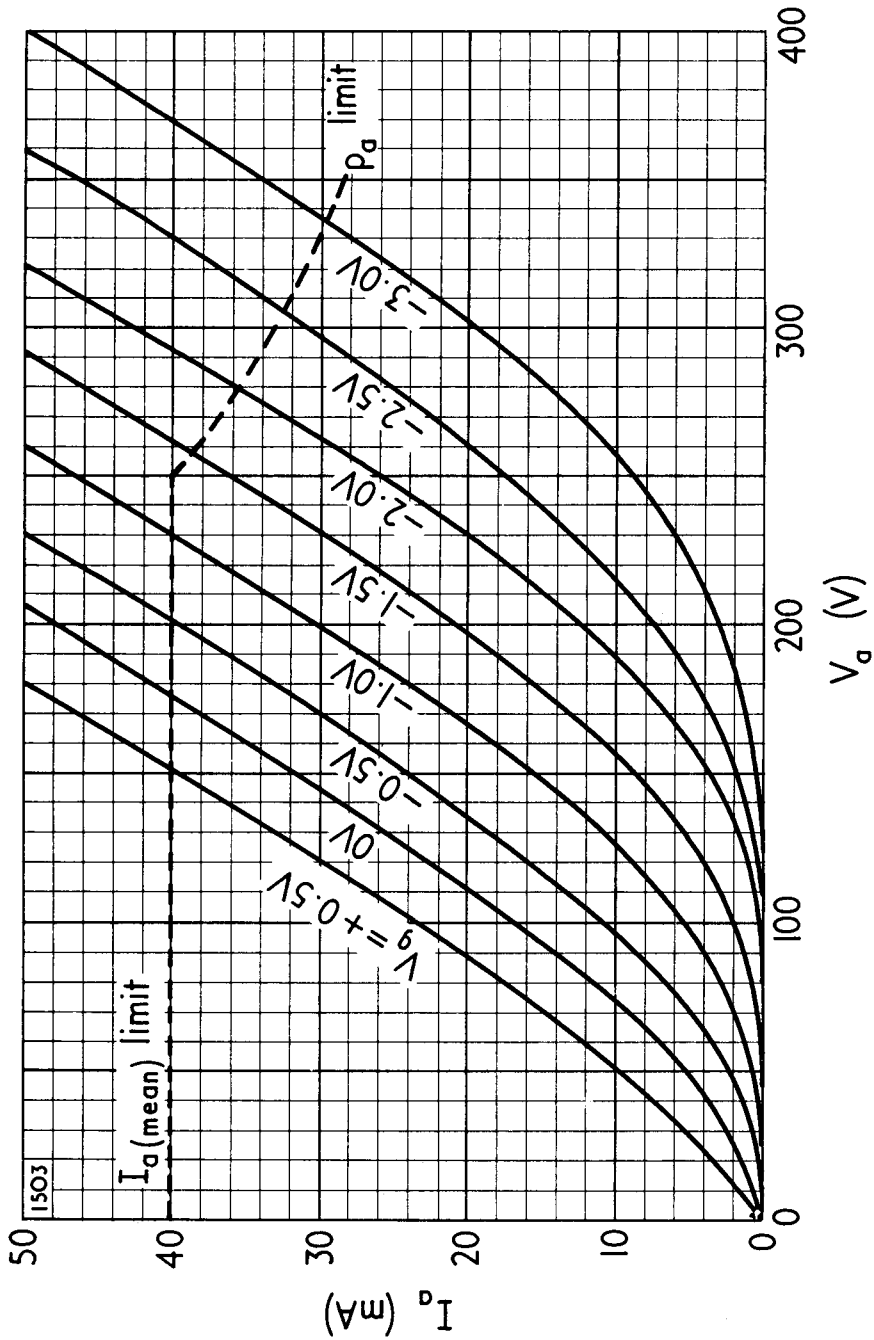
Dimensions in inches.

The heater wires should not be bent nearer than 0·2in. from the valve.

*The standard heater leads are 12in. long. An identical valve but with 18in. heater leads is available under the reference DET29M.


1504
Mutual Conductance (mA/V)
30
25
20
15
10
5
0
0
10
20
30
40
50
I_a (mA)

DET29


I_a (mA)
50
40
30
20
10
0
0
100
200
300
400
V_a (V)
$I_{a(mean)}$ limit
P_a limit
V_g = +0.5V
0V
−0.5V
−1.0V
−1.5V
−2.0V
−2.5V
−3.0V
1503