

The data should be read in conjunction with the Power Triode Preamble.

ABRIDGED DATA

The BY1654F is a triode of coaxial ceramic/metal construction, intended primarily for use in cathode follower stages of transmitters. The anode is vapour cooled by means of a separate boiler of the steam down type.

Anode dissipation	12	kW max
Anode voltage	7	kV max
Frequency for full ratings	30	MHz max

GENERAL

Electrical

Filament	thoriated tungsten
Filament voltage (see note 1)	8.0 V
Filament current	125 A
Peak usable cathode current	36 A
Filament cold resistance	7.2 mΩ
Amplification factor ($V_a = 2$ kV, $I_a = 0.5$ A)	16
Mutual conductance ($V_a = 2$ kV, $V_g = -87$ V)	60 mA/V
Interelectrode capacitances:	
grid to anode	52 pF
grid to filament	76 pF
anode to filament	3 pF

Characteristics

The tube has been selected for the following characteristics:

$V_a = 2$ kV, $V_g = 0$ V	$I_a = 7$ A min, 10 A max
$V_a = 3$ kV, $I_a = 0.3$ A	$V_g = -170$ V min, -230 V max

Mechanical

Overall dimensions	see outline
Net weight	4 kg approx
Mounting position	vertical, anode down

COOLING

Anode

The BY1654F anode is vapour cooled by operating the tube in a steam down boiler. The water required for maximum anode dissipation is approximately 4.5 l./min.

Filament and Grid Seals

The temperature of the filament and grid seals must not exceed 200 °C. A flow of air of 0.42 m³/min directed onto the terminals via a 25 mm diameter nozzle from a distance of 150 mm, before and during the application of any voltages, is usually adequate for limiting the temperature of the seals.

MAXIMUM RATINGS (Absolute)

Cathode Follower

Anode voltage	7	kV
Anode current	6	A
Grid voltage (negative value)	1.5	kV

Class C Oscillator

Anode voltage	7	kV
Anode current	6	A
Anode dissipation	12	kW
Grid voltage (negative value)	1.5	kV
On-load grid current	1.4	A
Grid dissipation	500	W
Frequency	30	MHz

TYPICAL OPERATING CONDITIONS

Cathode Follower

Anode voltage	5	kV
Anode current	0.5	A
Grid voltage	-325	V

Class C Oscillator

Anode voltage	6	kV
Anode current	5.6	A
Grid current	0.7	A
Anode dissipation	7.6	kW
Grid dissipation	200	W
Driving power	600	W
Feedback ratio (see note 2)	16	%
Anode output power	25	kW
Power into load (at 85% transfer)	21	kW

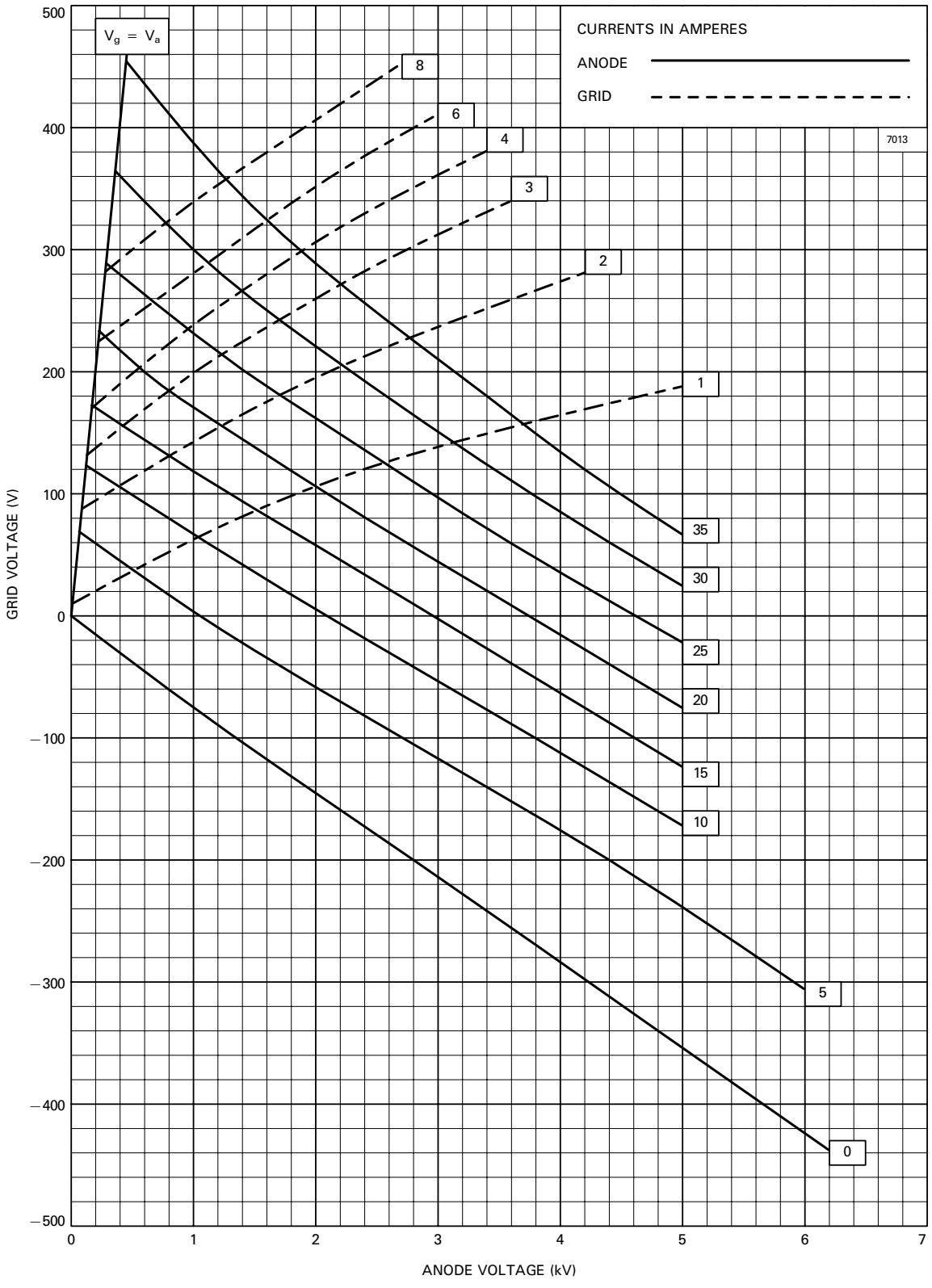
NOTES

- The tube must be operated at the stated filament voltage. Fluctuation in filament voltage must not exceed $\pm 5\%$. The filament may be switched on at its operating voltage and no surge limiting devices need be incorporated in the filament circuit. The voltage drop in the integral filament leads is less than 1% of the filament voltage.
- The feedback ratio is defined as:

$$\frac{V_g(\text{pk})}{V_a(\text{pk})} \times 100$$

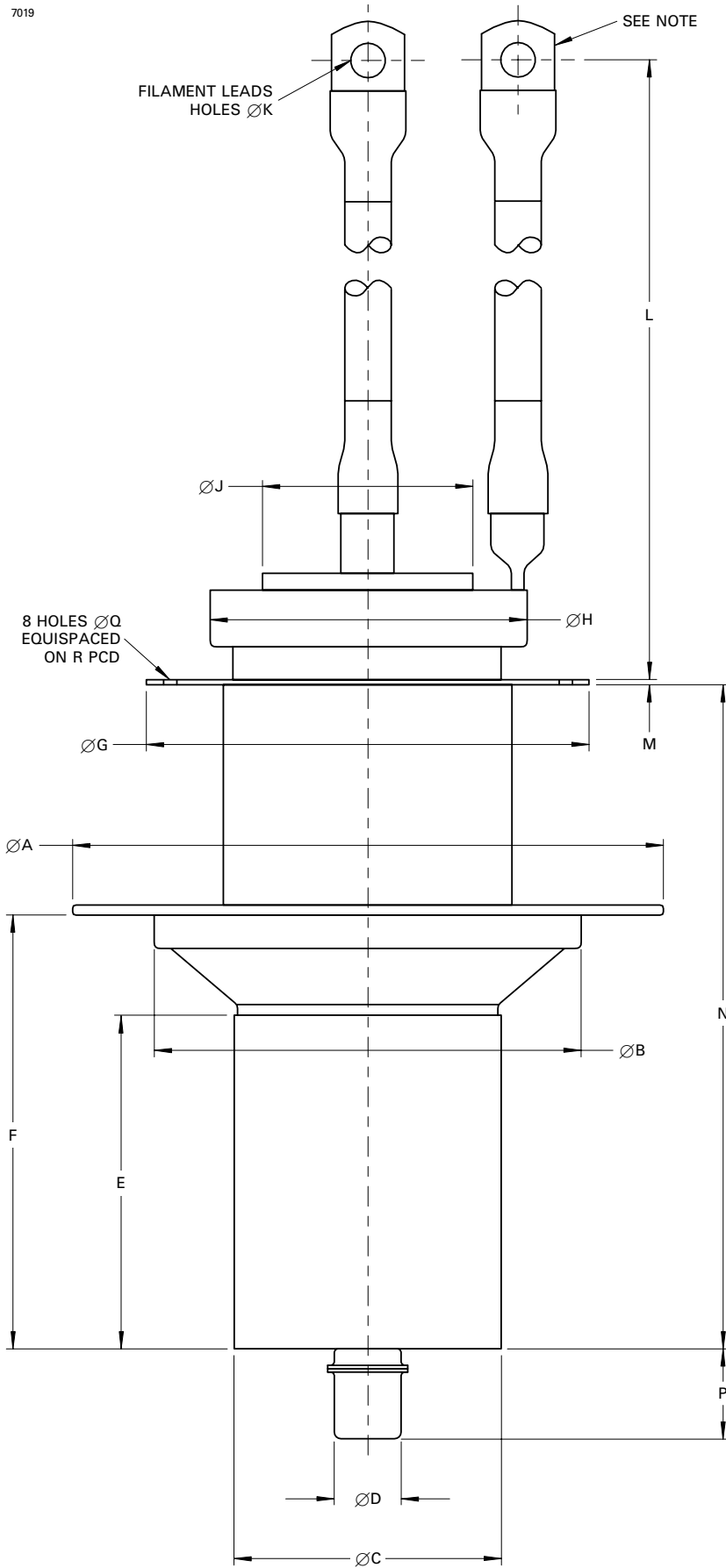
where $V_g(\text{pk})$ = peak RF grid voltage in volts.
and $V_a(\text{pk})$ = peak RF anode voltage in volts.

CONSTANT CURRENT CHARACTERISTICS



OUTLINE (All dimensions without limits are nominal)

7019



Ref	Millimetres
A	178.00 \pm 0.25
B	128.40 \pm 0.25
C	80.0
D	19.05 \pm 0.25
E	100.0
F	134.0
G	133.25 \pm 0.50
H	96.0 \pm 0.2
J	63.0
K	10.75 \pm 0.25
L	338.0 + 26.0 - 0.0
M	1.5
N	200.0
P	27.0
Q	6.5
R	119.0

Outline Note

This filament lead should be used as the cathode return connection.

HEALTH AND SAFETY HAZARDS

e2v technologies electronic devices are safe to handle and operate, provided that the precautions stated are observed. e2v technologies does not accept responsibility for damage or injury resulting from the use of electronic devices it produces. Equipment manufacturers and users must ensure that adequate precautions are taken. Appropriate warning labels and notices must be provided on equipments incorporating e2v technologies devices and in operating manuals.



High Voltage

Equipment must be designed so that personnel cannot come into contact with high voltage circuits. All high voltage circuits and terminals must be enclosed and fail-safe interlock switches must be fitted to disconnect the primary power supply and discharge all high voltage capacitors and other stored energy before allowing access. Interlock switches must not be bypassed to allow operation with access doors open.



RF Radiation

Personnel must not be exposed to excessive RF radiation. A properly designed equipment cabinet with good RF electrical connection between panels will normally provide sufficient protection.



X-Ray Radiation

This device, when operating at voltages above 5 kV, produces progressively more dangerous X-rays as the voltage is increased; the radiation varies greatly during life. The device envelope provides only limited protection and further shielding may be required. A metal equipment cabinet with overlapping joints will usually provide sufficient shielding, but if there is any doubt an expert in this field should perform an X-ray survey of the equipment.



Implosion

This tube stores potential energy by virtue of its vacuum. The energy level is low, but there is some hazard from flying fragments if the tube is dropped or subjected to violent impact. The tube must be stored and transported in its approved pack. During installation or replacement the tube must not be scratched or damaged in any way likely to reduce the strength of the envelope.

References

1. BS 3192. Specification for safety requirements for radio (including television) transmitting apparatus.
2. TEPAC Publication no. 181. Recommended practice on X-radiation detection and measurement for high power tubes.

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