

The data to be read in conjunction with the Hydrogen Thyatron Preamble.

ABRIDGED DATA

Deuterium-filled, flange mounted tetrode thyatron featuring high peak current, high rate of rise of current, low jitter and low anode delay time drift. It has been specifically designed to switch discharge circuits for pulsed lasers and for switching long pulses. It has an internally connected reservoir operated from the cathode heater supply and an internal shield to minimise X-ray emission from the region of the anode.

The patented hollow anode structure enables the tube to cope with inverse voltage and current without consequent reduction in its high voltage hold-off capability due to electrode damage.

Peak forward anode voltage	35	kV max
Peak forward anode current	5.0	kA max
Peak reverse anode current	3.0	kA max
Average anode current	0.5	A max
Rate of rise of current	50	kA/ μ s max
Pulse repetition rate	200	pps max

GENERAL DATA

Electrical

Cathode (connected internally to mid-point of heater)	oxide coated
Heater voltage	6.3 \pm 5% V
Heater current	22 A
Tube heating time (minimum)	5.0 min

Mechanical

Seated height	304.8 mm (12.000 inches) max
Clearance required below mounting flange	44.45 mm (1.750 inches) min
Overall diameter (excluding mounting flange)	84.12 mm (3.312 inches) max
Net weight	0.7 kg (1 1/2 pounds) approx
Mounting position (see note 1)	any

Cooling (see note 2) forced-air

MAXIMUM AND MINIMUM RATINGS

(Absolute values)

	Min	Max
Anode (Pulse Laser Service)		
Peak forward anode voltage (see note 3)	-	35 kV
Peak inverse anode voltage	-	25 kV
Peak forward anode current	-	5.0 kA
Peak reverse anode current	-	3.0 kA
Average anode current	-	0.25 A
Rate of rise of anode current (see notes 4 and 5)	-	50 kA/ μ s
Pulse repetition rate	-	50 pps



	Min	Max
Anode (Pulse Modulator Service)		
Peak forward anode voltage (see note 3)	-	35 kV
Peak inverse anode voltage	-	25 kV
Peak forward anode current	-	5.0 kA
Peak reverse anode current	-	3.0 kA
Average anode current	-	0.5 A
Rate of rise of anode current (see notes 4 and 5)	-	5.0 kA/ μ s
Pulse repetition rate	-	200 pps

MAXIMUM AND MINIMUM RATINGS (Continued)

	Min	Max	
Grid 2 (See note 5)			
Unloaded grid 2 drive pulse voltage (see note 6)	600	2000	V
Grid 2 pulse duration	0.5	-	μs
Rate of rise of grid 2 pulse (see note 4)	1.0	-	kV/μs
Grid 2 pulse delay	0	3.0	μs
Peak inverse grid 2 voltage	-	450	V
Loaded grid 2 bias voltage	-50	-150	V
Forward impedance of grid 2 drive circuit	50	200	Ω

Grid 1 – Pulsed (See note 5)

Peak grid 1 drive current	0.3	1.0	A
Unloaded grid 1 drive pulse voltage (see note 6)	300	2000	V
Grid 1 pulse duration	1.0	-	μs
Rate of rise of grid 1 pulse (see note 4)	1.0	-	kV/μs
Peak inverse grid 1 voltage	-	450	V
Loaded grid 1 bias voltage	-	see note 7	

Grid 1 – DC Primed (See note 8)

DC grid 1 unloaded priming voltage	75	150	V
DC grid 1 priming current	50	100	mA

Cathode

Heater voltage	6.3 ± 5%	V
Tube heating time	5.0	min

Environmental

Ambient temperature	-50	+90	°C
Altitude	-	3	km
	-	10 000	ft

CHARACTERISTICS

	Min	Typical	Max	
Critical DC anode voltage for conduction (see note 9)	-	0.5	2.0	kV
Anode delay time (see notes 9 and 10)	-	0.15	0.25	μs
Anode delay time drift (see notes 9 and 11)	-	20	50	ns
Time jitter (see note 9)	-	1.0	5.0	ns
Heater current (at 6.3 V)	18	22	25	A

NOTES

1. The tube must be fitted using its mounting flange.
2. Cooling of the anode stem is necessary under conditions of high voltage and high anode dissipation in order to avoid damage to the tube.
3. The maximum permissible peak forward voltage for instantaneous starting is 25 kV and there must be no overshoot.
4. This rate of rise refers to that part of the leading edge of the pulse between 10% and 90% of the pulse amplitude.
5. For applications requiring the highest rate of rise of anode current, grid 1 should be pulse driven. Maximum grid drives should be used, the rate of rise of grid 2 trigger pulse should be as high as possible and the grid 2 pulse delay should be 0.2 μs min.

For less severe applications, good results can be obtained by driving both grids from a single pulse using the circuit shown in Fig. 1.

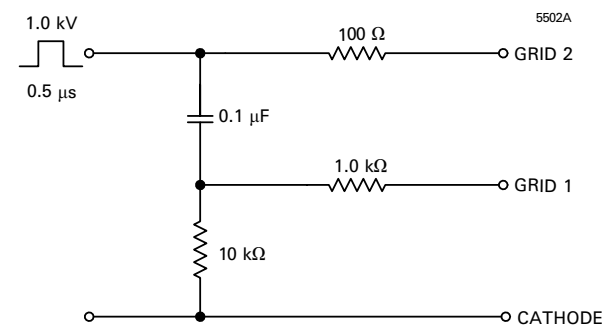


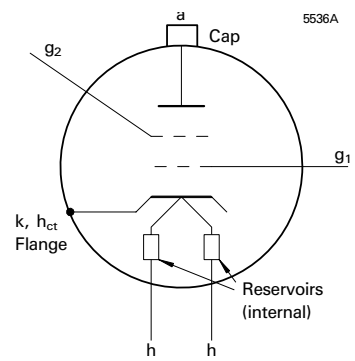
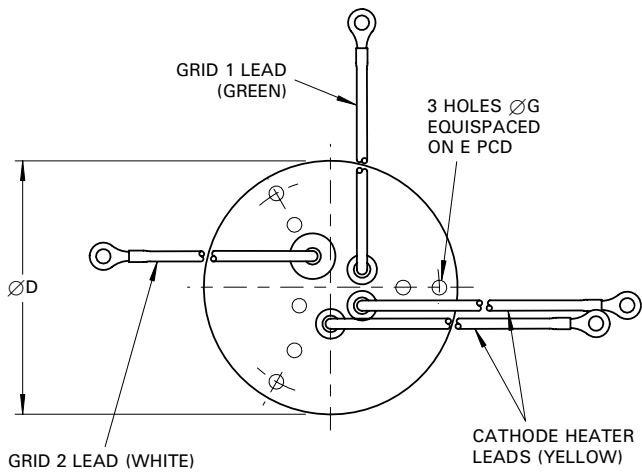
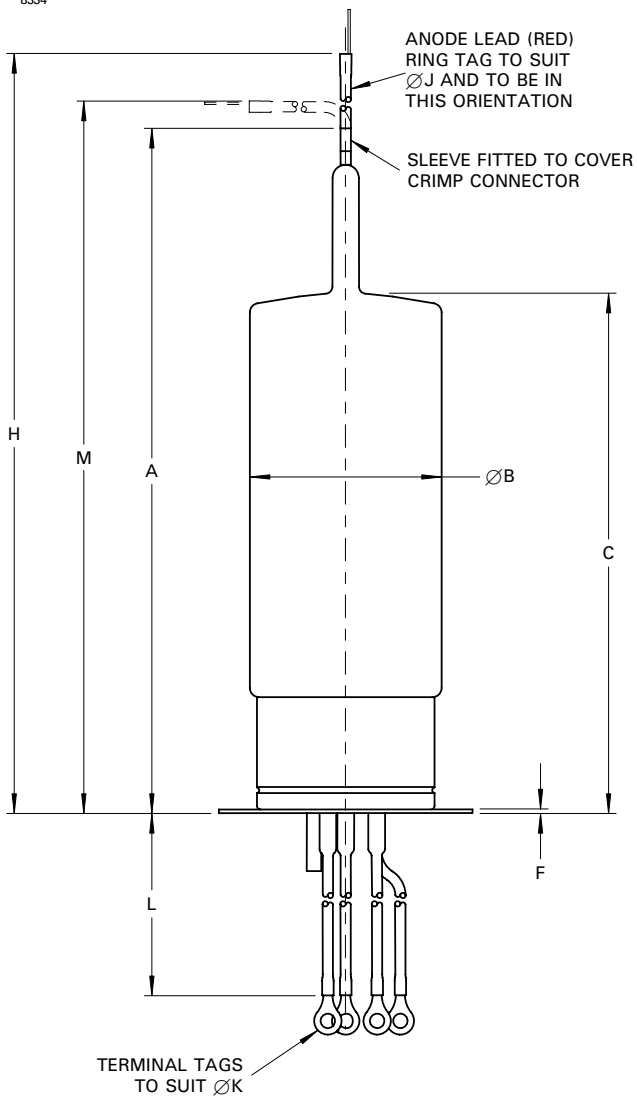
Fig. 1 Circuit for single pulse drive

6. Measured with respect to cathode. When grid 1 is pulse driven, the last 0.25 μs of the top of the grid 1 pulse must overlap the corresponding first 0.25 μs of the top of the delayed grid 2 pulse.
7. DC negative bias voltages must not be applied to grid 1. The potential of grid 1 may vary between -10 V and +5 V with respect to cathode potential during the period between the completion of recovery and the commencement of the succeeding grid pulse.
8. When DC priming is used on grid 1, a negative bias of 100 V to 150 V must be applied to grid 2 to ensure anode voltage hold-off.
9. Typical figures are obtained on test using conditions of minimum grid drive. Improved performance can be expected by increasing grid drive.
10. The time interval between the instant at which the rising unloaded grid 2 pulse reaches 25% of its pulse amplitude and the instant when anode conduction takes place.
11. The drift in delay time over a period from 10 seconds to 10 minutes after reaching full voltage.

OUTLINE

(All dimensions without limits are nominal)

8334



Ref	Millimetres	Inches
A	288.0 ± 13.0	11.339 ± 0.512
B	84.12 max	3.312 max
C	216.0 ± 13.0	8.500 ± 0.512
D	111.1	4.375
E	95.25	3.750
F	1.6	0.063
G	6.5	0.256
H	425.0 ± 5.0	16.322 ± 0.197
J	5.0	0.197
K	4.0	0.157
L	230.0 ± 10.0	9.055 ± 0.394
M	318.0 max	12.520 max

Inch dimensions have been derived from millimetres.

HEALTH AND SAFETY HAZARDS

e2v technologies hydrogen thyratrons are safe to handle and operate, provided that the relevant precautions stated herein 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 charges before allowing access. Interlock switches must not be bypassed to allow operation with access doors open.



X-Ray Radiation

All high voltage devices produce X-rays during operation and may require shielding. The X-ray radiation from hydrogen thyratrons is usually reduced to a safe level by enclosing the equipment or shielding the thyatron with at least 1.6 mm ($\frac{1}{16}$ inch) thick steel panels.

Users and equipment manufacturers must check the radiation level under their maximum operating conditions.

Whilst e2v technologies has taken care to ensure the accuracy of the information contained herein it accepts no responsibility for the consequences of any use thereof and also reserves the right to change the specification of goods without notice. e2v technologies accepts no liability beyond that set out in its standard conditions of sale in respect of infringement of third party patents arising from the use of tubes or other devices in accordance with information contained herein.