B1152

R.F. POWER TRIODE

ABRIDGED DATA

R.F. power triode of glass construction, radiation cooled anode, inter primarily for industrial service.

Anode dissipation:		
continuous operation, forced-air cooling	0.5	kW
duty factor 0.2, natural cooling	1.0	kW
Anode voltage (d.c. supply)	5.0	kV
Frequency for full ratings	50	MHz
Output power (class C oscillator):		
duty factor 1.0	1.5	kW
duty factor 0.5	2.0	kW
duty factor 0.2	2.4	kW

GENERAL

Electrical

Filament	thoriated tungsten	
Filament voltage (see note 1)	5.0	V
Filament current	32.5	A
Amplification factor (V_a = 4.0kV, I_a = 120mA)	24	
Mutual conductance (V_a = 1.0kV, I_a = 2.3A)	10	mA/V
Mutual conductance (V_a = 3.3kV, I_a = 120mA)	3.3	mA/V
Inter-electrode capacitances:		
grid to anode	5.6	pF
grid to filament	9.3	pF
anode to filament	0.35	pF

Mechanical

Overall length	240mm (9.45 inches) max
Overall diameter	130mm (5.12 inches) max
Net weight	0.5kg (1.1 pounds) approx
Base (see note 2)	special
Mounting position	vertical only, base down

COOLING

The bulb and seal temperatures must not exceed the values given below:

bulb temperature	350	°C
seal temperature	220	°C

For continuous operation a low velocity air flow is necessary to limit the bulb and seal temperatures. Natural cooling is normally adequate when the valve is operated intermittently or with reduced input.

R.F. POWER OSCILLATOR (Class C, d.c. anode supply)

MAXIMUM RATINGS (Absolute values)

Duty factor	**1.0**	**0.5**	**0.2**	
Averaging time	—	10	5.0	s max
Anode voltage	5.0	5.0	5.0	kV max
Anode current	560	780	1100	mA max
Anode dissipation	500	700	1000	W max
Grid voltage (negative value)	1.25	1.25	1.25	kV max
Grid current (at maximum anode dissipation)	210	290	420	mA max
Grid dissipation	85	95	110	W max
Grid to filament resistance	15	15	15	kΩ max
Operating frequency	50	50	50	MHz max

TYPICAL OPERATING CONDITIONS

	Forced-air Cooling	**Natural Cooling**		
Duty factor	1.0	0.5	0.2	
On period	—	5.0	1.0	s
Off period	—	5.0	4.0	s
Anode voltage	4.0	4.0	4.0	kV
Grid voltage	−380	−380	−410	V
from grid resistor	2.7	2.0	1.7	kΩ
Anode current	490	650	825	mA
Grid current (approx)	140	190	240	mA
Anode dissipation	450	630	900	W
Anode load resistance	4.7	3.4	2.7	kΩ
Feedback ratio (see note 3)	0.2	0.22	0.24	
Output power	1.5	2.0	2.4	kW
Efficiency	77	76	73	%
Effective output power to load (see note 4)	1.2	1.6	1.9	kW

R.F. POWER OSCILLATOR

(Class C, anode supply from unfiltered single phase, full-wave rectifier)

MAXIMUM RATINGS (Absolute values)

Duty factor	**1.0**	**0.5**	**0.2**	
Averaging time	—	10	5.0	s max
Anode voltage	4.5	4.5	4.5	kV max
Anode current	450	630	900	mA max
Anode dissipation	500	700	1000	W max
Grid voltage (negative value)	850	850	850	V max
Grid current (at maximum anode dissipation)	190	195	380	mA max
Grid dissipation	85	95	110	W max
Grid to filament resistance	15	15	15	kΩ max
Operating frequency	50	50	50	MHz max

TYPICAL OPERATING CONDITIONS

	Forced-air Cooling	**Natural Cooling**		
Duty factor	1.0	0.5	0.2	
On period	—	5.0	1.0	s
Off period	—	5.0	4.0	s
Output voltage (r.m.s.) from transformer	4.5	4.5	4.5	kV
Anode voltage	4.05	4.05	4.05	kV
Grid voltage	−340	−365	−355	V
from grid resistor	2.7	2.2	1.7	kΩ
Anode current	400	530	675	mA
Grid current (approx)	125	165	210	mA
Anode dissipation	450	630	900	W
Anode load resistance	5.9	4.3	3.5	kΩ
Feedback ratio (see note 3)	0.16	0.17	0.18	
Output power	1.53	2.0	2.46	kW
Efficiency	77	76	73	%
Effective output power to load (see note 4)	1.25	1.5	2.0	kW

R.F. POWER OSCILLATOR

(Class C, anode supply from unfiltered three phase, half-wave rectifier)

MAXIMUM RATINGS (Absolute values)

Duty factor	**1.0**	**0.5**	**0.2**	
Averaging time	—	10	5.0	s max
Anode voltage	5.0	5.0	5.0	kV max
Anode current	560	780	1100	mA max
Anode dissipation	500	700	1000	W max
Grid voltage (negative value)	1.25	1.25	1.25	kV max
Grid current (at maximum anode dissipation)	210	290	420	mA max
Grid dissipation	85	95	110	W max
Grid to filament resistance	15	15	15	kΩ max
Operating frequency	50	50	50	MHz max

TYPICAL OPERATING CONDITIONS

	Forced-air Cooling	**Natural Cooling**		
Duty factor	1.0	0.5	0.2	
On period	—	5.0	1.0	s
Off period	—	5.0	4.0	s
Output voltage (r.m.s.) from transformer	3.4	3.4	3.4	kV
Anode voltage	4.0	4.0	4.0	kV
Grid voltage	−380	−380	−410	V
from grid resistor	2.7	2.0	1.7	kΩ
Anode current	480	640	820	mA
Grid current (approx)	140	190	240	mA
Anode dissipation	450	630	900	W
Anode load resistance	4.7	3.4	2.7	kΩ
Feedback ratio (see note 3)	0.2	0.22	0.24	
Output power	1.5	2.0	2.4	kW
Efficiency	77	76	73	%
Effective output power to load (see note 4)	1.2	1.6	1.9	kW

R.F. POWER OSCILLATOR

(Class C, anode supply unrectified a.c.)

MAXIMUM RATINGS (Absolute values)

Duty factor	**1.0**	**0.5**	**0.2**	
Averaging time	—	10	5.0	s max
Output voltage (r.m.s.) from transformer	5.0	5.0	5.0	kV max
Anode current	320	450	640	mA max
Anode dissipation	500	700	1000	W max
Grid voltage (negative value)	−850	−850	−850	V max
Grid current (at maximum anode dissipation)	110	155	220	mA max
Grid dissipation	85	95	110	W max
Grid to filament resistance	15	15	15	kΩ max
Operating frequency	50	50	50	MHz max

TYPICAL OPERATING CONDITIONS

	Forced-air Cooling	**Natural Cooling**		
Duty factor	1.0	0.5	0.2	
On period	—	5.0	1.0	s
Off period	—	5.0	4.0	s
Output voltage (r.m.s.) from transformer	4.5	4.5	4.5	kV
Grid voltage	−215	−215	−220	V
from grid resistor	2.7	1.8	1.3	kΩ
Anode current (see note 5)	280	420	600	mA
Grid current (approx) (see note 5)	80	120	170	mA
Anode dissipation	380	500	800	W
Anode load resistance	4.3	2.9	2.0	kΩ
Feedback ratio (see note 3)	0.18	0.22	0.25	
Output power	1.08	1.6	2.2	kW
Efficiency	77	76	73	%
Effective output power to load (see note 4)	0.9	1.3	1.7	kW

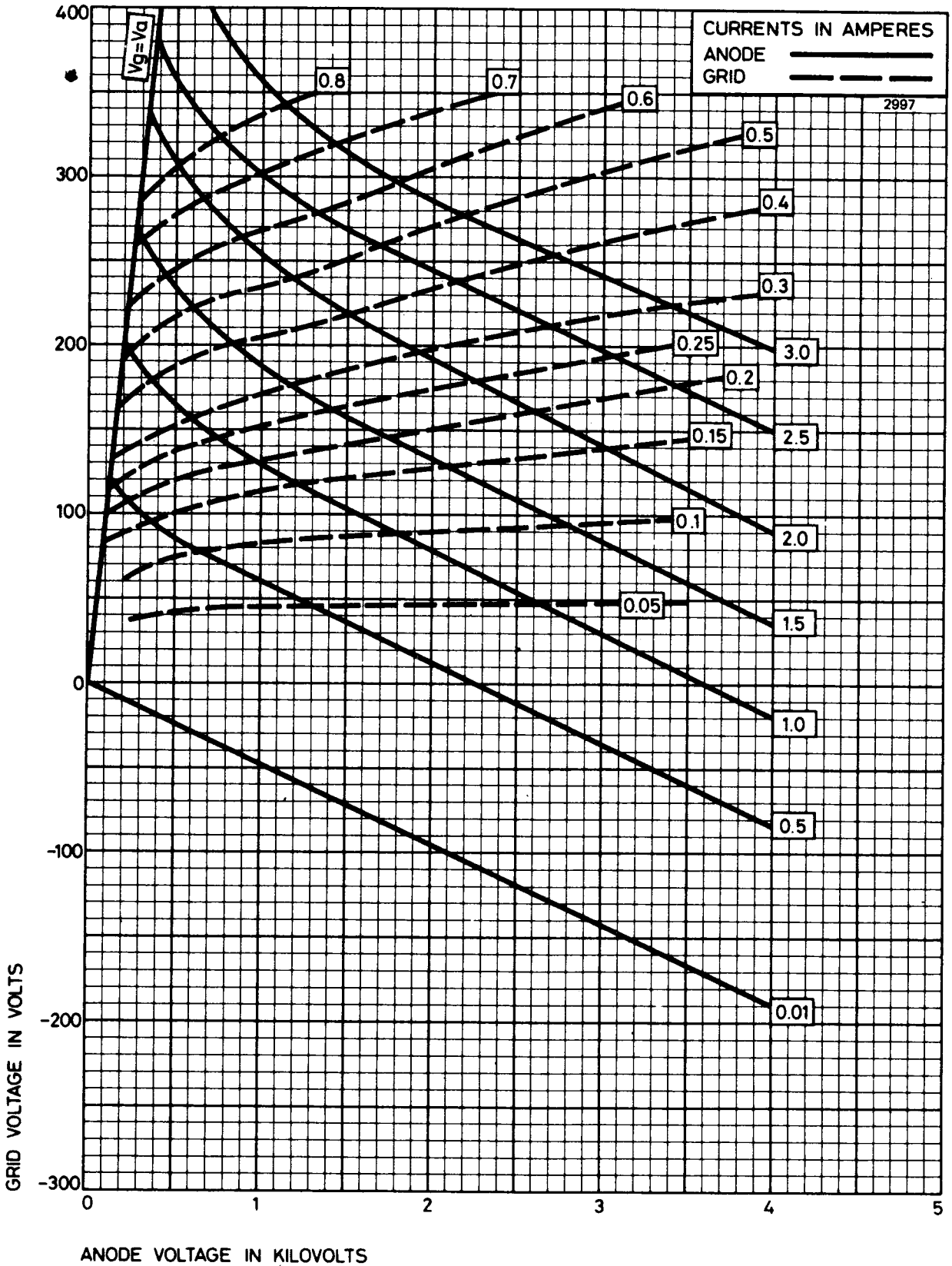
NOTES

1. Temporary fluctuations up to +5% or −10% in filament voltage are permissible.
2. The design of the base socket must ensure that no strain is applied to the glass to metal seals. Where clamps are used for connecting to the base pins or top cap, the leads must be flexible. Allowance must be made for variations of up to 3% in the specified pin positions in any direction.
3. The feedback ratio is defined as $\frac{V_{g(pk)}}{V_{a(pk)}}$

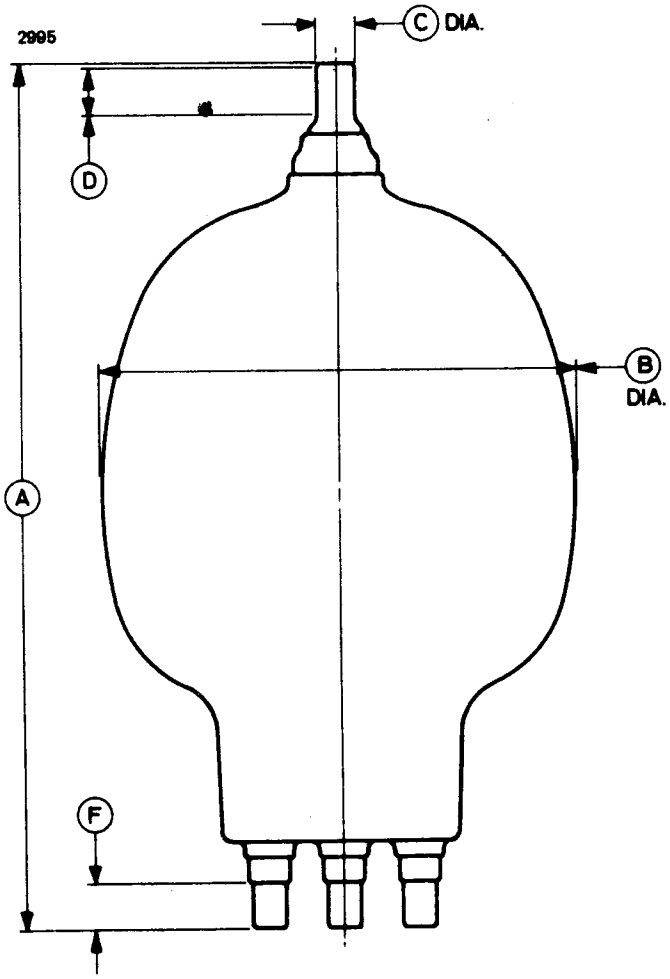
   where $V_{g(pk)}$ = peak r.f. grid voltage in volts
   and $V_{a(pk)}$ = peak r.f. anode voltage in volts.
4. Effective output power to load = $\eta_a (P_{out} - P_{drive})$

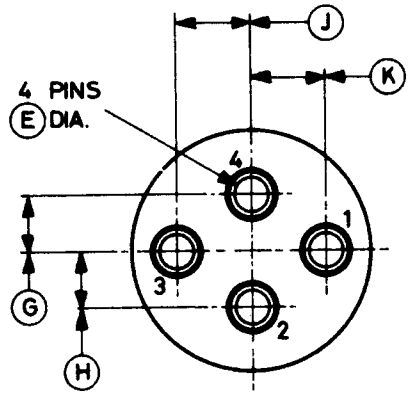
   where η_a = efficiency of anode circuit = 85%
   P_{out} = output power of valve to anode circuit
   P_{drive} = drive power fed back to grid circuit.
5. Averaged over one cycle of supply frequency.

TYPICAL CONSTANT CURRENT CHARACTERISTICS



OUTLINE (All dimensions without limits are nominal)





Pin	Element
1	Grid
2	Filament
3	Grid
4	Filament
Cap	Anode

Ref	Millimetres	Inches
A	240.0 max	9.450 max
B	130.0 max	5.118 max
C	9.50	0.374
D	12.70 min	0.500 min
E	9.00	0.354

Ref	Millimetres	Inches
F	12.00	0.472
G*	15.00	0.591
H*	15.00	0.591
J*	20.00	0.787
K*	20.00	0.787

Inch dimensions have been derived from millimetres.

* Allowance must be made for variations of up to 3% in the specified pin positions in any direction.