

ITL5-1 Air-cooled Triode



The **Marshall Components ITL5-1** is a medium-power triode designed specifically for industrial applications.

- Uses a coaxial design and metal-ceramic technology
- May operate in CW or pulse mode. For operation in pulse mode, the duty cycle is 0.25 providing the pulse width is less than 1 ms.
- It is an air cooled triode.
- The anode voltage is 7.2kV.
- Output power is 13kW in CW mode, Output power is 22kW peak in pulse mode. Peak cathode current is 15A in CW mode.
- The max anode dissipation is 6kW in air inlet at 25°C.
- The max anode dissipation is 5kW in air inlet at 45°C.
- The frequency up to 150MHz.

General Characteristics

Electrical

Filament	Thoriated-tungsten mesh
Filament voltage	(+5%, -10%) 6.3V
Filament Current	65A
Surge current (max)	250A
Cold resistance	12m Ω
Amplification factor	(approx) 20
Direct interelectrode capacitances:	
Grid to filament	21.0pF
Grid to anode	16.0pF
Filament to anode	0.6pF
Transconductance(Ua:4kV,Ia:4A)(approx)	23mA/V

Mechanical

Operating position	Vertical, Anode up or down
Maximum operating temperature	220° C
Maximum dimensions:	see outline drawing
Net weight	2. 9 kg (6.38 lb)

Maximum ratings

Frequency	150MHz
Anode voltage	
up to 85MHz	7.2kV
from 85 to 160MHz	6kV
Control-grid voltage	-1.0kV
Anode current, CW	2.5A
Control-grid current:	
at full load CW	0.55A
at no load CW	0.75A
Peak cathode current	
CW	15A
Pulse operation	20A
Anode dissipation	
Inlet air temperature, 25°C	6kW
Inlet air temperature, 45°C	5kW
Grid dissipation:	
up to 85MHz	200W
from 85 to 160MHz	170W
Grid resistance (at blocked tube)	20k Ω

Cooling

Anode cooling	forced air
Cooling	see cooling curves
Cooling air flow	1 m ³ /min
Inlet air temperature	45°C max
Temperature at any point on tube envelope	220°Cmax

Typical operation

Class C RF oscillator for industrial applications

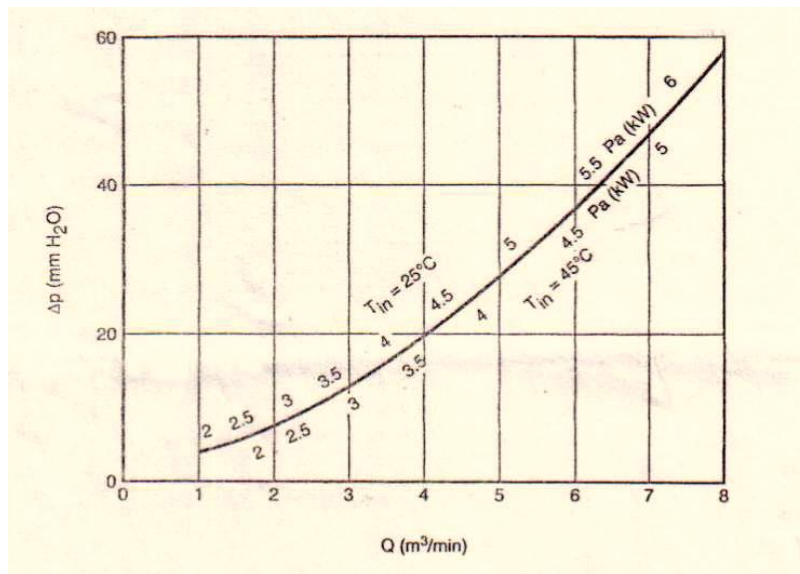
Examples	1	2	
Frequency	30	30	MHz
Anode voltage	6.8	5.5	kV
Grid bias	-540	-450	V
Grid voltage	890	780	V
Anode current	2.5	2.3	A
Grid current on load	0.43	0.43	A
Anode input power	17	12.7	kW
Anode output power	12.9	9.5	kW
Anode dissipation	3.9	3.0	kW
Grid dissipation	142	127	W
Grid resistance	1250	1050	Ω
Feedback ratio	15	16	%
Oscillator efficiency	75.8	74.3	%

Class B RF oscillator in pulsed operation

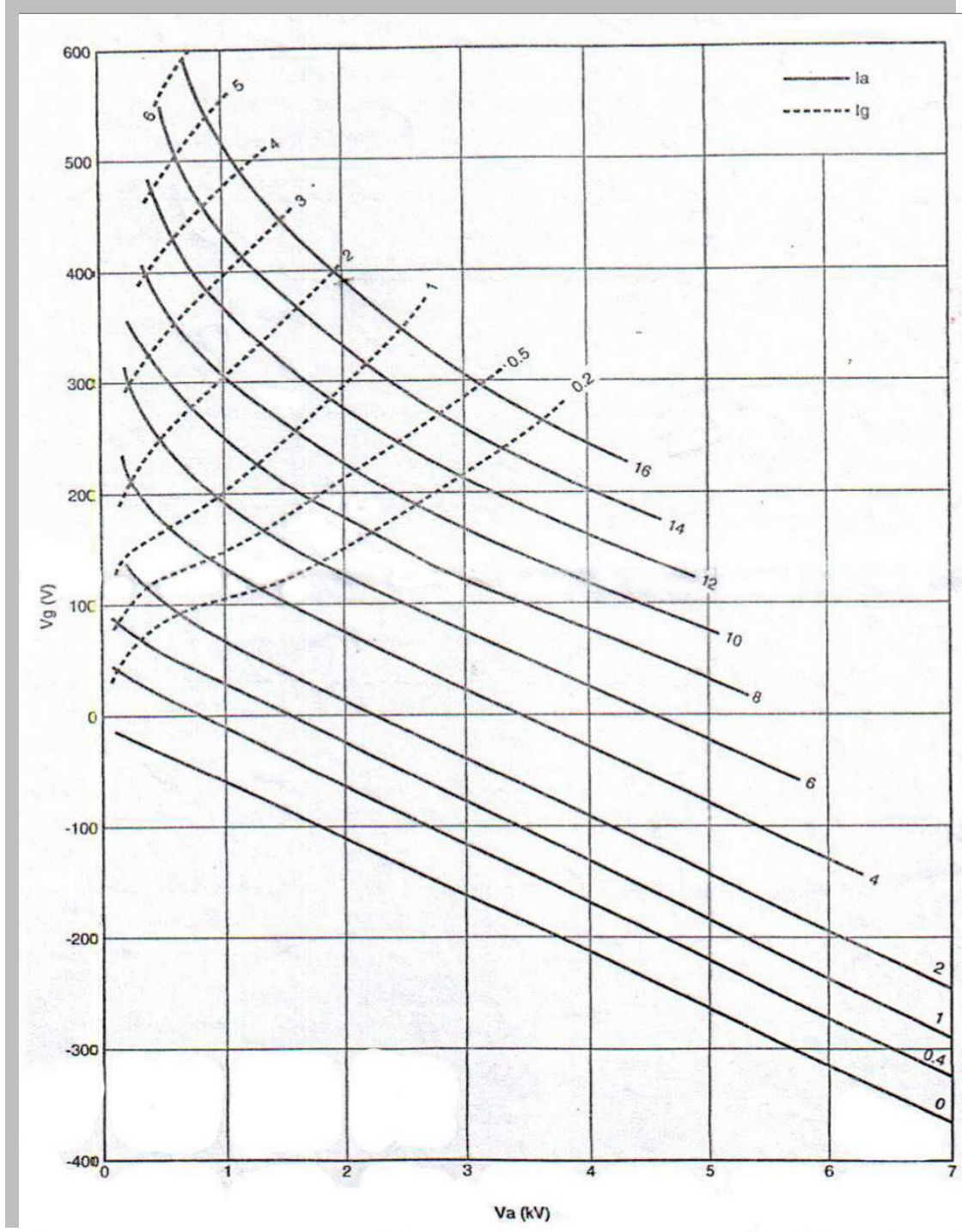
Examples	1	2	
Frequency	30	30	MHz
Anode voltage	6.8	5.5	kV
Grid bias	-350	-275	V
Grid voltage	910	805	V
Anode current	1.2	1.12	A
Grid current	0.26	0.27	A
Anode input power	32.6	24.7	kW
Anode output power	22	16.5	kW
Anode dissipation	2.5	1.8	kW
Grid dissipation	126	124	W
Grid resistance	335	225	Ω
Feedback ratio	17.6	16.4	%
Duty(pulsewidth <1ms)	0.25	0.25	

Cooling curves

- The required flow rates and pressures drop may be read off the cooling curve.
- This is valid for both air-flow directions. The maximum values given for the inlet-air temperature, the cooler temperature the metal-ceramic solder points must be respected.
- Pa: anode dissipation
- Δp : pressure drop across the cooler fins Q: air flow rate
- T_{in} : inlet air temperature



CONSTANT CURRENT CHARACTERISTICS



OUTING DRAWING (MM)

