ITL12-1 Industrial Triode

The **Marshall Components ITL12-1** is a medium-power triode designed specifically for industrial applications.

- Uses a coaxial design and metal-ceramic technology.
- May be operated in CW or pulsed modes. In pulse mode, the duty cycle may be 0.25 providing the pulse width is less than 1 ms.
- The tube is forced-air cooled. The cooling curve is presented for air inlet temperatures of 25°C and 45°C. The anode voltage is 12kV.
- Output power is 33kW in CW mode.
- Output power is 50 kW peak in pulsed mode.
- Peak cathode current is 28A in CW mode. The max anode dissipation is 12kW in air inlet at 25^0C.

- The max anode dissipation is 10kW in air inlet at 45^0C.
- The frequency up to 120MHz.

General Characteristics

Electrical

Filament	Thoriated-tungsten mesh
Filament voltage	(+5%, -10%) 5.8V
Filament Current	145A
Surge current (max)	600A
Cold resistance	5mΩ
Amplification factor	(approx) 22
Capacitances:	
Grid to anode	21.0pF
Grid to catode	55.0pF
Catode to anode	1pF
Transconductance (Ua:4kV,Ia:4A)(approx)	50mA/V

Mechanical

Operating position	Vertical, Anode up or down
Maximum dimensions:	see outline drawing
Net weight	6. 5 kg

Maximum ratings

Frequency	120MHz
Anode voltage	
up to 30MHz	12kV
up to 30 to 60MHz	9kV
up to 60 to 90MHz	7kV
from 90 to 160MHz	6kV
Control-grid voltage	-1.5kV
Anode current, CW	5A
Control-grid current:	
at full load	0.8A
at no load	1.5A
Peak cathode current, CW	28A
Peak cathode current, pulse mode	38A
Anode dissipation	
Inlet air temperature, 25℃	8.5kW
Inlet air temperature, 45℃	5kW
Grid dissipation:	
up to 30MHz	350W
up to 30 to 60MHz	320W
up to 60 to 90MHz	300W
from 90 to 160MHz	280W
Grid resistance (at blocked tube)	10kΩ

Cooling

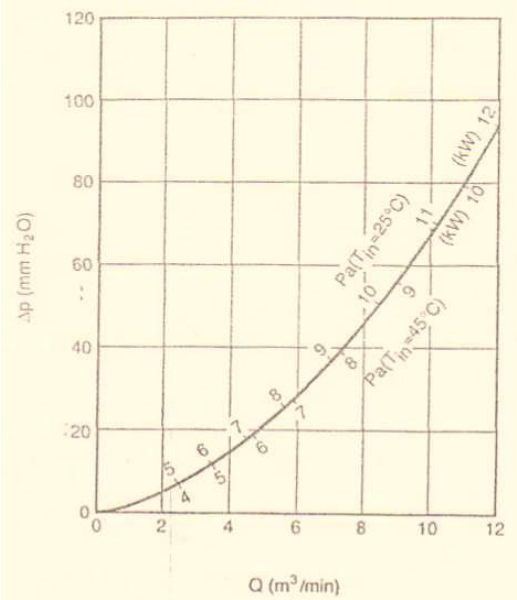
Anode cooling	forced air
Cooling air flow	2 m^3/min
Inlet air temperature	45℃ max
Temperature at any point on tube envelope	220℃max

Typical operation

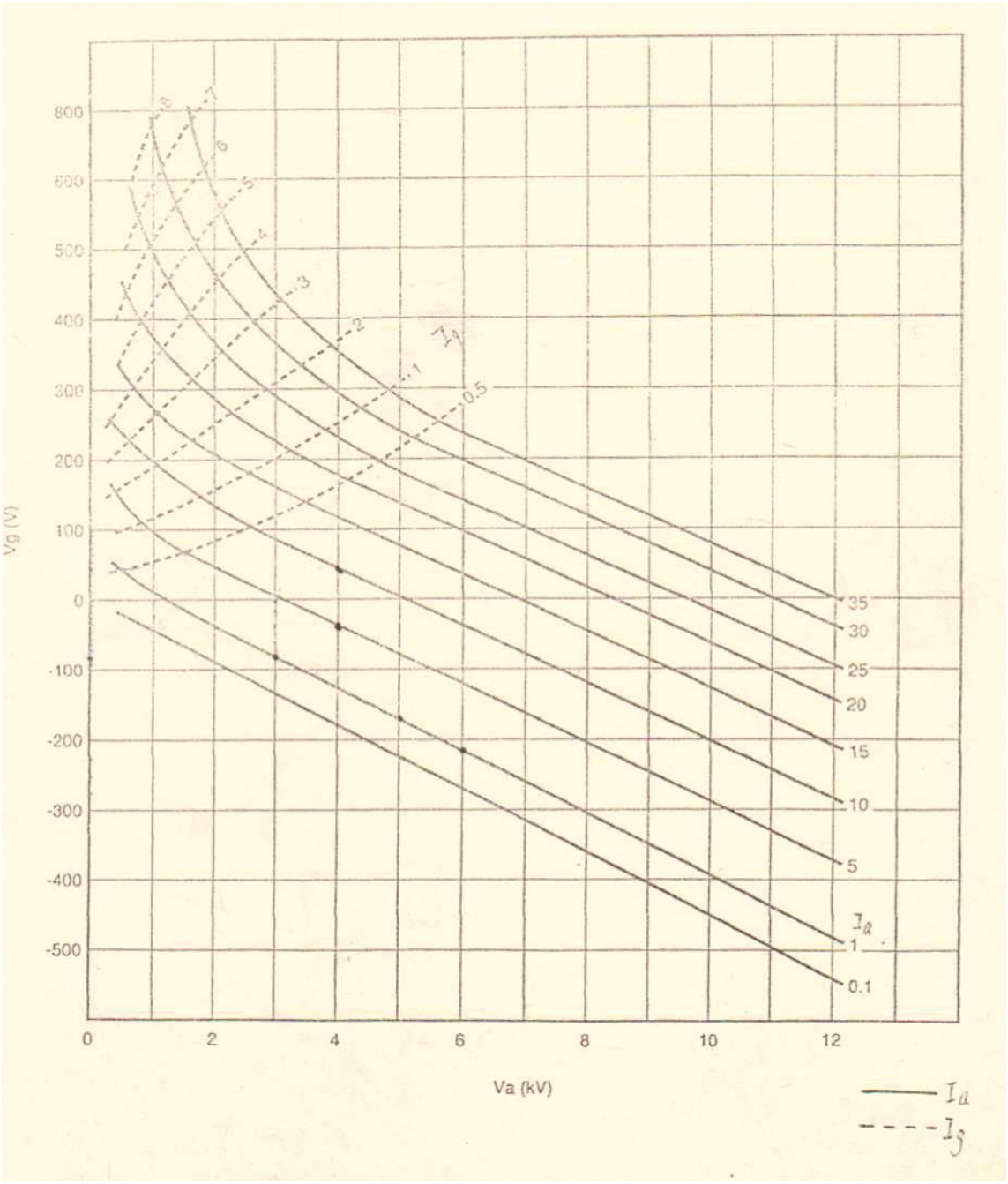
Class C RF oscillator for industrial applications			
Examples	**1**	**2**	
Frequency	30	30	MHz
Anode voltage	10	8	kV
Grid bias	-610	-520	V
Grid voltage	960	900	V
Anode current	4.3	4.8	A
Grid current on load	0.53	0.40	A
Anode input power	33	0.72	kW
Anode output power	24.7	19	kW
Anode dissipation	9.6	8.6	kW
Grid dissipation	145	220	W
Grid resistance	1210	790	Ω
Feedback ratio	10.5	12.9	%
Oscillator efficiency	76.5	76	%
Class C RF oscillator or in pulsed operation			
Frequency	30	60	MHz
Anode voltage	10	8	kV
Grid bias	-455	360	V
Grid voltage	880	885	V
Anode current	1.8	2	A
Grid current	0.23	0.30	A
Anode input power	18	16	kW
Peak output power	50	45	kW
Anode dissipation		4.8	kW
Grid dissipation	85	138	W
Grid resistor	490	300	Ω
Feedback ratio	9.8	12.3	%
Duty(pulsewidth ＜1 ms	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)