15V12

VAPOUR COOLED TRIODE

Directly heated

TENTATIVE

GENERAL

The 15V12 is a directly heated vapour cooled triode intended for use in r.f. heating equipment. It has a thoriated tungsten filament and a maximum operating frequency at full ratings of 60 Mc/s.

RATING

Filament Voltage	V_f	6·3	V
Filament Current	I_f	32·5	A
Maximum Anode Voltage	$V_{a(max)}$	7·0	kV
Maximum Anode Dissipation	$p_{a(max)}$	1·3	kW
Maximum Operating Frequency at Full Ratings	f(max)	60	Mc/s

INTER-ELECTRODE CAPACITANCES

Grid/Filament	c_{g-f}	13	pF
Anode/Grid	c_{a-g}	11	pF
Anode/Filament	c_{a-f}	0·6	pF

CHARACTERISTICS

Anode Voltage	V_a	4·0	kV
Anode Current	I_a	190	mA
Mutual Conductance	gm	5·1	mA/V
Amplification Factor	μ	22	

TYPICAL OPERATION—Maximum operating conditions per valve

Class B1 audio amplifier—push pull operation

Anode Voltage	V_a	6·0	kV
Anode Current R.M.S.	$I_{a(r.m.s.)}$	0·6	A
Power Input	P_{in}	2·2	kW
Power Output	P_{out}	0·9	kW
Anode Dissipation	p_a	1·3	kW
Anode Efficiency		40	%
Negative Grid Bias Voltage	V_g	−225	V
Peak Signal Voltage	$v_{sig(pk)}$	225	V

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TYPICAL OPERATION—Maximum operating conditions

Class C—single phase full wave (no smoothing)

		Mean	R.M.S.	Peak	
Anode Voltage	V_a	3·8	4·25	6·0	kV
Negative Grid Bias Voltage	V_g	−80			V
Positive Grid Voltage	V_{sig}	154			V
Grid Resistance	R_g	0·7			kΩ
Mean Anode Current	$I_{a(av)}$	730			mA
Mean Grid Current	$I_{g(av)}$	120			mA
Peak Cathode Current	$i_{k(pk)}$	2·5	2·8	4·0	A
Peak Anode Current	$i_{a(pk)}$	1·9			A
Peak Grid Current	$i_{g(pk)}$	0·6			A
Anode Dissipation	P_a	1·3			kW
Grid Drive Power		30			W
Grid Dissipation	P_g	20			W
Anode Efficiency		61			%
Power Output (amplifier)	P_{out}	2·1			kW
Power Output (oscillator) at 100% Transfer Efficiency	P_{out}	2·1			kW
Power Output (oscillator) at 85% Transfer Efficiency	P_{out}	1·8			kW

TYPICAL OPERATION—Maximum operating conditions

Class C—3-phase rectified or d.c.

Anode Voltage	V_a	4·0	5·0	6·0	kV
Negative Grid Bias Voltage	V_g	−140	−220	−300	V
Positive Grid Voltage	V_{sig}	270	270	270	V
Grid Resistance	R_g	553	982	1400	Ω
Mean Anode Current	$I_{a(av)}$	1068	993	930	mA
Mean Grid Current	$I_{g(av)}$	253	224	204	mA
Peak Cathode Current	$i_{k(pk)}$	4·0	4·0	4·0	A
Peak Anode Current	$i_{a(pk)}$	3·0	3·0	3·0	A
Peak Grid Current	$i_{g(pk)}$	1·0	1·0	1·0	A
Anode Dissipation	P_a	1·3	1·3	1·3	kW
Grid Drive Power		104	100	108	W
Grid Dissipation	P_g	60	50	48	W
Anode Efficiency		69	73	76	%
Power Output (amplifier)	P_{out}	2·9	3·6	4·2	kW
Power Output (oscillator) at 100% Transfer Efficiency	P_{out}	2·8	3·5	4·1	kW
Power Output (oscillator) at 85% Transfer Efficiency	P_{out}	2·4	3·0	3·5	kW

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DIMENSIONS

Maximum overall length	200 mm
Maximum diameter	80 mm

MOUNTING POSITION—Vertical, base up

BASE—Special

Operating Instructions

Installation

The valve should be mounted vertically with anode downwards in a specially designed boiler (type LM287). Connections should always make good electrical contact to prevent overheating of pins and seals, particularly by r.f. current.

It is essential that connections be made to both grid pins when running at higher frequencies so as to reduce current taken by each pin.

Cooling

The valve is immersed in water and at the higher frequencies, a low velocity air blast must also be directed on to the filament and grid pins.

Operation

The operating data list conditions for maximum output for respective classes of service at the relevant anode voltage.

Linear interpolation between anode voltage steps is admissible. As these conditions utilize some or all of the maximum valve ratings, close control of conditions has to be maintained. In Class C self oscillator service precautions should be taken against excessive mains voltage variations. Current overload trips should be included in anode and grid circuits as well as an under current trip in the grid circuit.

In industrial r.f. heating it is not usual that all precautions can be taken, and under these conditions some reductions in operating conditions have to be made so that widely fluctuating loads, poor h.t. regulation, and mains variations can be accommodated. Each type of variation brings its own problems and no set rules are practicable.

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