

ELECTRONIC TUBE REFERENCE

8846

Power - Triode (over 1000V 100W) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

TRIODE

Massive water-cooled ceramic-metal triode for dielectric and induction heating, pulse modulation, and high-power RF service. Rated around 140 kW plate dissipation, with pulse switching capability approaching 8 MW at tens of kilovolts.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	16.5 V / 325 A	PARALLEL HEATER	— / —
HEATING	Direct	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Triode	
AMPLIFICATION FACTOR	30
MAXIMUM PLATE VOLTAGE	40000 V
MAXIMUM PLATE DISSIPATION	140000 W
MAXIMUM GRID DISSIPATION	25000 W
MAXIMUM CATHODE CURRENT	360 mA
Promoted ratings/characteristics mapped from printed headings; device/service-specific values retained in parameters.	

The ML-8846 is a general-purpose high-power triode suit- water-jacket coupling. The heavy-wall anode will dissipate able for use in dielectric and induction heating, pulse modu- up to 140 kW with a water flow of 60 gpm. The maximum lation and similar applications. This tube features rugged, CW plate-voltage rating of 16 kV applies at frequencies up ceramic-and-metal, coaxial construction with high-dissipation, to 30 MHz. The tube may be operated up to 88 MHz with a low-inductance rf terminals. The cathode consists of sturdy, reduction in ratings. In pulse service the tube is capable of stress-free, thoriated-

tungsten filaments. This tube is suitable switching up to 8 Mw with plate voltages up to 35 kV. for cavity operation and its low plate impedance adapts it to Except for minor dimensional differences, the ML-8846 can

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1971 Machlette Laboratories

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1971 MACHLETTE LABORATORIES

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Published value	8	8 Mw Pulse Power
The ML	8846	The ML-8846 is a general-purpose high-power triode suit- water-jacket coupling. The heavy-wall anode will dissipate
able for use in dielectric and induction heating, pulse modu- up to [1]	140 mA	able for use in dielectric and induction heating, pulse modu- up to 140 kW with a water flow of 60 gpm. The maximum
able for use in dielectric and induction heating, pulse modu- up to [2]	60 mA	able for use in dielectric and induction heating, pulse modu- up to 140 kW with a water flow of 60 gpm. The maximum
lation and similar applications. This tube features rugged, CW plate-voltage rating of	16	lation and similar applications. This tube features rugged, CW plate-voltage rating of 16 kV applies at frequencies up
ceramic-and-metal, coaxial construction with high-dissipation, to [1]	30 mA	ceramic-and-metal, coaxial construction with high-dissipation, to 30 MHz. The tube may be operated up to 88 MHz with a
ceramic-and-metal, coaxial construction with high-dissipation, to [2]	88 mA	ceramic-and-metal, coaxial construction with high-dissipation, to 30 MHz. The tube may be operated up to 88 MHz with a
stress-free, thoriated-tungsten filaments. This tube is suitable switching up to [1]	8	stress-free, thoriated-tungsten filaments. This tube is suitable switching up to 8 Mw with plate voltages up to 35 kV.
stress-free, thoriated-tungsten filaments. This tube is suitable switching up to [2]	35	stress-free, thoriated-tungsten filaments. This tube is suitable switching up to 8 Mw with plate voltages up to 35 kV.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
for cavity operation and its low plate impedance adapts it to Except for minor dimensional differences, the ML	8846	for cavity operation and its low plate impedance adapts it to Except for minor dimensional differences, the ML-8846 can
Filament Voltage	165	Filament Voltage 165 V
Filament Current at [1]	16.5 V	Filament Current at 16.5 volts 325 A
Filament Current at [2]	325 V	Filament Current at 16.5 volts 325 A
Filament Starting Current, maximum	800 mA	Filament Starting Current, maximum 800 A
Filament Cold Resistance	0.0052	Filament Cold Resistance 0.0052 ohm
Amplification Factor	30	Amplification Factor 30
Maximum Water Pressure	75 mA	Maximum Water Pressure 75 psi
Maximum Outlet Water Temperature	70 mA	Maximum Outlet Water Temperature 70 °C
Air Flow on Envelope and Seals, approximate	250 mA	Air Flow on Envelope and Seals, approximate 250 cfm
Maximum Envelope Temperature	200 mA	Maximum Envelope Temperature 200 °C
WARNING: This electron tube when operating at peak voltages in excess of	15 mA	WARNING: This electron tube when operating at peak voltages in excess of 15 kv may give off x-rays, which can be harmful unless adequately
Item Part No. D C Plate Voltage [1]	35	Item Part No. D C Plate Voltage ... 35 35 kV
Item Part No. D C Plate Voltage [2]	35	Item Part No. D C Plate Voltage ... 35 35 kV
D C Grid Voltage ..o [1]	-2000	D C Grid Voltage ..o -2000 -2000 V
D C Grid Voltage ..o [2]	-2000	D C Grid Voltage ..o -2000 -2000 V
Pulse Positive Grid Voltage [1]	2000	Pulse Positive Grid Voltage 2000 2400 v
Pulse Positive Grid Voltage [2]	2400	Pulse Positive Grid Voltage 2000 2400 v
Pulse Plate Current [1]	200	Pulse Plate Current ... 200 300 2
Pulse Plate Current [2]	300	Pulse Plate Current ... 200 300 2
Pulse Plate Current [3]	2	Pulse Plate Current ... 200 300 2
Pulse Grid Current [1]	100	Pulse Grid Current 100 60 a

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Pulse Grid Current [2]	60	Pulse Grid Current 100 60 a
Pulse Driving Power [1]	400 kW	Pulse Driving Power .. 400 300 kw
Pulse Driving Power [2]	300 kW	Pulse Driving Power .. 400 300 kw
Pulse Power QOutput [1]	6.6	Pulse Power QOutput 6.6 8.4 Mw
Pulse Power QOutput [2]	8.4	Pulse Power QOutput 6.6 8.4 Mw
Plate Output Voltage [1]	33	Plate Output Voltage . 33 28 kv
Plate Output Voltage [2]	28	Plate Output Voltage . 33 28 kv
Small Gasket for Mounting Socket ccocvininiin. P	12272 mA	Small Gasket for Mounting Socket ccocvininiin. P-12272 +For applications requiring longer pulse duration or higher duty
Data Sheet No. ST	1006 mA	Data Sheet No. ST-1006. MAXIMUM FREQUENCY RATINGS
OPERATING CONDITIONS Frequency in Megahertzes [P R [1]	30 MHz	OPERATING CONDITIONS Frequency in Megahertzes [P R 30 60 88
OPERATING CONDITIONS Frequency in Megahertzes [P R [2]	60 MHz	OPERATING CONDITIONS Frequency in Megahertzes [P R 30 60 88
OPERATING CONDITIONS Frequency in Megahertzes [P R [3]	88 MHz	OPERATING CONDITIONS Frequency in Megahertzes [P R 30 60 88
Percent Maximum Rated Plate Voltage and Plate Input [1]	100 mA	Percent Maximum Rated Plate Voltage and Plate Input 100 78 56
Percent Maximum Rated Plate Voltage and Plate Input [2]	78 mA	Percent Maximum Rated Plate Voltage and Plate Input 100 78 56
Percent Maximum Rated Plate Voltage and Plate Input [3]	56 mA	Percent Maximum Rated Plate Voltage and Plate Input 100 78 56
Frequency c.000000vviiiiiii, [1]	88	Frequency c.000000vviiiiiii, 88 30 MH: properly controlled. The tube must, therefore, be protected by
Frequency c.000000vviiiiiii, [2]	30	Frequency c.000000vviiiiiii, 88 30 MH: properly controlled. The tube must, therefore, be protected by
D C Plate Voltage ccccooevein [1]	9000	D C Plate Voltage ccccooevein. 9000 16000 V
D C Plate Voltage ccccooevein [2]	16000	D C Plate Voltage ccccooevein. 9000 16000 V

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
D C Grid Voltage coocooveiin [1]	-3200	D C Grid Voltage coocooveiin. -3200 3200 V
D C Grid Voltage coocooveiin [2]	3200	D C Grid Voltage coocooveiin. -3200 3200 V
D C Plate Current [1]	20	D C Plate Current 20 20 A to diverting the energy from the tube, as well as the amount of
D C Plate Current [2]	20	D C Plate Current 20 20 A to diverting the energy from the tube, as well as the amount of
D C Grid Current [1]	2.5	D C Grid Current ... 2.5 40 A energy expended in the tube during this interval.
D C Grid Current [2]	40	D C Grid Current ... 2.5 40 A energy expended in the tube during this interval.
Plate Input [1]	170 mA	Plate Input ... 170 300 kW In addition to the normal circuit breakers and overload re-
Plate Input [2]	300 mA	Plate Input ... 170 300 kW In addition to the normal circuit breakers and overload re-
Plate Dissipation [1]	140 kW	Plate Dissipation 140 140 kW lays, it is necessary that a fast-acting electronic protective
Plate Dissipation [2]	140 kW	Plate Dissipation 140 140 kW lays, it is necessary that a fast-acting electronic protective
Power Amplifier and Oscillator, Grid-Drive Circuit –	30 MHz	Power Amplifier and Oscillator, Grid-Drive Circuit — 30 MHz output of the plate supply filter, if used, to dissipate the filer-
D C Plate Voltage [1]	8000	D C Plate Voltage 8000 12000 15000 V circuit energy as well as the rectifier output. The complete
D C Plate Voltage [2]	12000	D C Plate Voltage 8000 12000 15000 V circuit energy as well as the rectifier output. The complete
D C Plate Voltage [3]	15000	D C Plate Voltage 8000 12000 15000 V circuit energy as well as the rectifier output. The complete
D C Grid Voltage [1]	-750	D C Grid Voltage -750 -1100 -1400 V
D C Grid Voltage [2]	-1100	D C Grid Voltage -750 -1100 -1400 V
D C Grid Voltage [3]	-1400	D C Grid Voltage -750 -1100 -1400 V
Peak R F Grid Voltage [1]	1210	Peak R F Grid Voltage 1210 1750 2200 v
Peak R F Grid Voltage [2]	1750	Peak R F Grid Voltage 1210 1750 2200 v

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak R F Grid Voltage [3]	2200	Peak R F Grid Voltage 1210 1750 2200 v
Peak R F Plate Voltage [1]	6600	Peak R F Plate Voltage 6600 10300 12800 v the inception of a “fault”, and in most cases the time interval
Peak R F Plate Voltage [2]	10300	Peak R F Plate Voltage 6600 10300 12800 v the inception of a “fault”, and in most cases the time interval
Peak R F Plate Voltage [3]	12800	Peak R F Plate Voltage 6600 10300 12800 v the inception of a “fault”, and in most cases the time interval
D C Plate Current [1]	9.7 mA	D C Plate Current 9.7 14.3 184 A should not be allowed to exceed approximately ten micro-
D C Plate Current [2]	14.3 mA	D C Plate Current 9.7 14.3 184 A should not be allowed to exceed approximately ten micro-
D C Plate Current [3]	184 mA	D C Plate Current 9.7 14.3 184 A should not be allowed to exceed approximately ten micro-
D C Grid Current [1]	2.1 s	D C Grid Current 2.1 2.9 3.0 A seconds. For some basic electronic-crowbar fault-protection
D C Grid Current [2]	2.9 s	D C Grid Current 2.1 2.9 3.0 A seconds. For some basic electronic-crowbar fault-protection
D C Grid Current [3]	3 s	D C Grid Current 2.1 2.9 3.0 A seconds. For some basic electronic-crowbar fault-protection
R F Load Resistance [1]	380 ohm	R F Load Resistance 380 400 380 ohms
R F Load Resistance [2]	400 ohm	R F Load Resistance 380 400 380 ohms
R F Load Resistance [3]	380 ohm	R F Load Resistance 380 400 380 ohms
Driving Power, approximate [1]	2.5 mA	Driving Power, approximate .. 2.5 49 7.2 kW
Driving Power, approximate [2]	49 mA	Driving Power, approximate .. 2.5 49 7.2 kW
Driving Power, approximate [3]	7.2 mA	Driving Power, approximate .. 2.5 49 7.2 kW
Power Output, approximate [1]	58 mA	Power Output, approximate .. 58 132 215 kW protection device, refer to the references listed.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Power Output, approximate [2]	132 mA	Power Output, approximate .. 58 132 215 kW protection device, refer to the references listed.
Power Output, approximate [3]	215 mA	Power Output, approximate .. 58 132 215 kW protection device, refer to the references listed.
D C Plate Voltage	35	D C Plate Voltage ... 35 kV
Peak Plate Voltage	40	Peak Plate Voltage ... 40 kv
Peak Negative Grid Voltage	-7000	Peak Negative Grid Voltage .. -7000 v
Pulse Cathode Current	360	Pulse Cathode Current ... 360 a
Grid Dissipation	25 kW	Grid Dissipation 25 kW
Published value	1	1. W. N. Parker and M. V. Hoover, "Gas Tubes Protect High Power
Plate Dissipation ccooooeoiii [1]	140 kW	Plate Dissipation ccooooeoiii 140 kW Transmitters", Electronics, 29, 144, January 1956.
Plate Dissipation ccooooeoiii [2]	29 kW	Plate Dissipation ccooooeoiii 140 kW Transmitters", Electronics, 29, 144, January 1956.
Plate Dissipation ccooooeoiii [3]	144 kW	Plate Dissipation ccooooeoiii 140 kW Transmitters", Electronics, 29, 144, January 1956.
Plate Dissipation ccooooeoiii [4]	1956 kW	Plate Dissipation ccooooeoiii 140 kW Transmitters", Electronics, 29, 144, January 1956.
Pulse Duration, approXimate ccocooeer oo [1]	1000 mA	Pulse Duration, approXimate ccocooeer oo 1000 pst 2. H. D. Doolittle, "High Power Hydrogen Thyratrons", Cathode
Pulse Duration, approXimate ccocooeer oo [2]	2 mA	Pulse Duration, approXimate ccocooeer oo 1000 pst 2. H. D. Doolittle, "High Power Hydrogen Thyratrons", Cathode