



ELECTRONIC TUBE REFERENCE

TH293

Power - Tetrode (NOT beam) electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

TETRODE

Coaxial transmitting tetrode designed for continuous-wave oscillator or grounded-grid RF power-amplifier service, with particular application to broadband television transmitters.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 7.5 A	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Tetrode

No fixed ratings recorded.

Published electrical data audited and retained in parameter table.

The TH293 is a coaxial transmitting tetrode usable as a continuous-wave oscillator or grounded-grid RF power amplifier, particularly for broadband television transmitter service.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1972 Thomson CSF

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

1972 THOMSON CSF

Section 1 · Tetrode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
fier at frequencies up to	1000 MHz	fier at frequencies up to 1000 MHz, The anode is capable
Heater voltage ([1]	1 V	Heater voltage (1) (2) 5 + 2%
Heater voltage ([2]	2 V	Heater voltage (1) (2) 5 + 2%
Heater voltage ([3]	5 V	Heater voltage (1) (2) 5 + 2%
Heater voltage ([4]	2 V	Heater voltage (1) (2) 5 + 2%
Heater current, approx. T	47 A	Heater current, approx. T 47
Peak cathode current	9 A	Peak cathode current 9
~ input (g2 tled to g1)	32	~ input (g2 tled to g1) 32 pF
output (g2 tled to g1)	7.5	- output (g2 tled to g1) 7.5 pF
cathode-anode	0.03	- cathode-anode 0.03 pF
Transconductance , [1]	30	Transconductance ,..... 30 000 umhos
Transconductance , [2]	0	Transconductance ,..... 30 000 umhos
Maximum inlet air temperature,	45	Maximum inlet air temperature, . 45 °C
Maximum outlet air temperature	100	Maximum outlet air temperature. 100 °C
Maximum temperature ([1]	4	Maximum temperature (4)..... 250: °C
Maximum temperature ([2]	250	Maximum temperature (4)..... 250: °C
([1]	1 V	(1) - For heater voltage application, see note page 4
([2]	4 V	(1) - For heater voltage application, see note page 4

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
(	2	(2) - In high frequency operation, the cathode is subjected to considerable back bombardment, which
([1]	3 kW	(3) - 30°C incoming air temperature 4.5 kW anode dissipation.
([2]	30 kW	(3) - 30°C incoming air temperature 4.5 kW anode dissipation.
([3]	4.5 kW	(3) - 30°C incoming air temperature 4.5 kW anode dissipation.
D, C. anode voltage [1]	5 kW	D, C. anode voltage 5 kv Anode dissipation..... 4,5 kW
D, C. anode voltage [2]	45 kW	D, C. anode voltage 5 kv Anode dissipation..... 4,5 kW
D.C. grid g2 voltage [1]	400 W	D.C. grid g2 voltage 400 v Grid g2 dissipation 25 w
D.C. grid g2 voltage [2]	25 W	D.C. grid g2 voltage 400 v Grid g2 dissipation 25 w
D.C. grid g1 voltage [1]	-250 W	D.C. grid g1 voltage -250 v Grid g1 dissipation 15 w
D.C. grid g1 voltage [2]	15 W	D.C. grid g1 voltage -250 v Grid g1 dissipation 15 w
Peak cathode current [1]	9 MHz	Peak cathode current 9 A Frequency 1000 MHz
Peak cathode current [2]	1000 MHz	Peak cathode current 9 A Frequency 1000 MHz
D.C. anode current	2.5 A	D.C. anode current..... 2.5 A
D.C. anode voltage [1]	45 V	D.C. anode voltage 4,5 kv D.C. anode current..... 1,15 A
D.C. anode voltage [2]	115 V	D.C. anode voltage 4,5 kv D.C. anode current..... 1,15 A
D.C. grid g2 voltage [1]	300 W	D.C. grid g2 voltage 300 v Driving power..... 200 W
D.C. grid g2 voltage [2]	200 W	D.C. grid g2 voltage 300 v Driving power..... 200 W
D.C. grid g1 voltage [1]	-80 kW	D.C. grid g1 voltage -80 v Anode dissipation 2.5 kw
D.C. grid g1 voltage [2]	2.5 kW	D.C. grid g1 voltage -80 v Anode dissipation 2.5 kw
Peak R. F. driving voltage [1]	100 kW	Peak R. F. driving voltage..... 100 v Load output power (1) 2.5 kW

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak R. F. driving voltage [2]	1 kW	Peak R. F. driving voltage..... 100 v Load output power (1) 2.5 kW
Peak R. F. driving voltage [3]	2.5 kW	Peak R. F. driving voltage..... 100 v Load output power (1) 2.5 kW
D.C. anode voltage	6 V	D.C. anode voltage 6 kV
D.C. grid g2 voltage, [1]	800 kW	D.C. grid g2 voltage,..... 800 v Anode dissipation..... 4.5 kW
D.C. grid g2 voltage, [2]	4.5 kW	D.C. grid g2 voltage,..... 800 v Anode dissipation..... 4.5 kW
D.C. grid g1 voltage [1]	-250 W	D.C. grid g1 voltage..... -250 \4 Grid g2 dissipation 25 W
D.C. grid g1 voltage [2]	4 W	D.C. grid g1 voltage..... -250 \4 Grid g2 dissipation 25 W
D.C. grid g1 voltage [3]	25 W	D.C. grid g1 voltage..... -250 \4 Grid g2 dissipation 25 W
Average anode current at peak Frequency	1000 MHz	Average anode current at peak Frequency 1000 MHz
D.C. anode voltage	5.7 V	D.C. anode voltage 5.7 kv Average grid g2 current at peak
D.C. grid g2 voltage [1]	700 V	D.C. grid g2 voltage..... 700 v ofenvelope 45 mA
D.C. grid g2 voltage [2]	45 V	D.C. grid g2 voltage..... 700 v ofenvelope 45 mA
D.C. grid g1 voltage [1]	-80 V	D.C. grid g1 voltage..... -80 A\ Average grid g2 current..... 30 mA
D.C. grid g1 voltage [2]	30 V	D.C. grid g1 voltage..... -80 A\ Average grid g2 current..... 30 mA
Zero signal anode current [1]	500 mA	Zero signal anode current 0.5 A Load impedance 1800 Q
Zero signal anode current [2]	1800 A	Zero signal anode current 0.5 A Load impedance 1800 Q
Average anode current at peak Circuit efficiency	20 A	Average anode current at peak Circuit efficiency 20 %
ofenvelope [1]	1.6 kW	ofenvelope 1.6 A Average load power 2 kW
ofenvelope [2]	2 kW	ofenvelope 1.6 A Average load power 2 kW
Average anode current [1]	1.15 kW	Average anode current 1.15 A Load peak envelope power 4 kw

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average anode current [2]	4 kW	Average anode current 1.15 A Load peak envelope power 4 kw
D, C. anode voltage [1]	5 V	D, C. anode voltage 5 kv D.C. anode current..... 2 A
D, C. anode voltage [2]	2 V	D, C. anode voltage 5 kv D.C. anode current..... 2 A
D.C. grid g2 voltage [1]	650 kW	D.C. grid g2 voltage..... 650 v Anode dissipation..... 4,5 kW
D.C. grid g2 voltage [2]	45 kW	D.C. grid g2 voltage..... 650 v Anode dissipation..... 4,5 kW
D.C. grid g1 voltage [1]	-250 W	D.C. grid g1 voltage..... -250 v Grid g2 dissipation 25 w
D.C. grid g1 voltage [2]	25 W	D.C. grid g1 voltage..... -250 v Grid g2 dissipation 25 w
Peak cathode current [1]	6 MHz	Peak cathode current 6 A Frequency ccovveuns 1000 MHz
Peak cathode current [2]	1000 MHz	Peak cathode current 6 A Frequency ccovveuns 1000 MHz
Frequency cocovevveens [1]	780 MHz	Frequency cocovevveens 780 MHz D.C. anode current..... 1 A
Frequency cocovevveens [2]	1 MHz	Frequency cocovevveens 780 MHz D.C. anode current..... 1 A
Heater voltage [1]	4.7 V	Heater voltage 4.7 v Gain ,..... 00ttt 13 dB
Heater voltage [2]	0 V	Heater voltage 4.7 v Gain ,..... 00ttt 13 dB
Heater voltage [3]	13 V	Heater voltage 4.7 v Gain ,..... 00ttt 13 dB
D.C. anode voltage [1]	3.5 W	D.C. anode voltage 3.5 4% Videopower 400 W
D.C. anode voltage [2]	4 W	D.C. anode voltage 3.5 4% Videopower 400 W
D.C. anode voltage [3]	400 W	D.C. anode voltage 3.5 4% Videopower 400 W
D.C, grid g2 voltage [1]	550 V	D.C, grid g2 voltage..... 550 v Crossmodulation level (3 tones
D.C, grid g2 voltage [2]	3 V	D.C, grid g2 voltage..... 550 v Crossmodulation level (3 tones
D.C, grid g1 voltage [1]	-45 V	D.C, grid g1 voltage..... -45 v test) ...l <52 dB *

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
D.C, grid gl voltage [2]	52 V	D.C, grid gl voltage..... -45 v test) ...l <52 dB *
Published value [1]	1 V	1. - % Vi (filament voltage) during 60 seconds
Published value [2]	60 V	1. - % Vi (filament voltage) during 60 seconds
Published value	3	3. - Grid bias
Published value	4 V	4. ~ Anode voltage
Published value	5 V	5. - Screen voltage
Published value	6 V	6. - Driving voltage
Published value	11 A	11 - SECURITY DEVICES AGAINST ANODE, SCREEN, GRID OVERCURRENTS -
Published value [1]	1 A	1. ~ Overcurrents due to improper utilisation conditions : the protection can be achieved by 3 relays
Published value [2]	3 A	1. ~ Overcurrents due to improper utilisation conditions : the protection can be achieved by 3 relays
operate when a current equal to	1.5 A	operate when a current equal to 1.5 I _{max} . is attained, I _{max} , being the normal current used in the
Published value	2 A	2. - Overcurrent due to stray oscillations or electrode arcings : the protection can be made by the
use of [1]	3 A	use of 3 rapid cut-off security devices (grid, screen, anode), acting for a current equal to 5 I _{max} .,
use of [2]	5 A	use of 3 rapid cut-off security devices (grid, screen, anode), acting for a current equal to 5 I _{max} .,
I _{max} being the normal current used in the considered operating conditions, Each of these	3 A	I _{max} being the normal current used in the considered operating conditions, Each of these 3 systems
acting on the	2 V	acting on the 2 others should short-circuit driving, screen and anode voltages and eventually grid
bias voltage with a total delay lower than	30 V	bias voltage with a total delay lower than 30 microseconds.
The temperature of outlet air coming from the anode cavity must not exceed	100	The temperature of outlet air coming from the anode cavity must not exceed 100°C,

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
D.C. anode voltage [1]	5 kW	D.C. anode voltage 5 KV Anode dissipation..... 4.5 kw
D.C. anode voltage [2]	4.5 kW	D.C. anode voltage 5 KV Anode dissipation..... 4.5 kw
D.C. grid g2 voltage [1]	400 W	D.C. grid g2 voltage 400 v Grid g2 dissipation 25 W
D.C. grid g2 voltage [2]	25 W	D.C. grid g2 voltage 400 v Grid g2 dissipation 25 W