AMPEREX ELECTRONIC CORPORATION

JEDEC NO. 7694

E99F

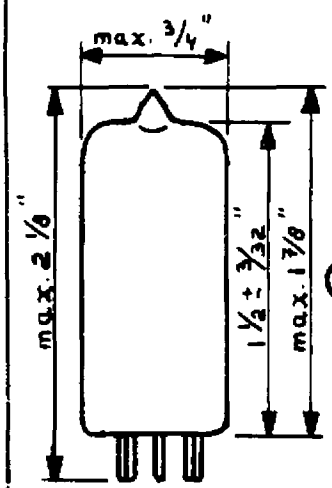
DESCRIPTION

Shock and vibration resistant special quality pentode with variable transconductance for use in mobile equipment.
Heater voltage variations of ± 20% are allowed during short periods.

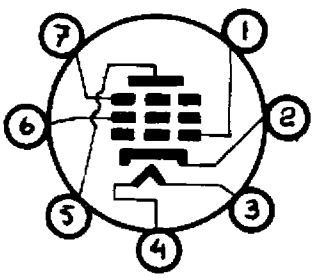
MECHANICAL DATA

Cathode	coated, unipotential
Base	E7-1
Bulb	T5 1/2
Outline	5-2
Basing	7EN
Mounting position	any

TUBE OUTLINE



BOTTOM VIEW OF BASE



BASE PIN No.	ELEMENTS
1	grid No.1
2	cathode
3	heater
4	heater
5	plate
6	grid No.2
7	grid No.3, internal screen

HEATER DATA

Heater voltage	6.3 volts[1])
Heater current	150 mamps

DIRECT INTERELECTRODE CAPACITANCES

(measured without external shield)

	min.	avg.	max.	
Plate to all other elements except grid No.1	4.4	5.0	5.6	μμF
Grid No.1 to all other elements except plate	3.9	4.5	5.1	μμF
Plate to grid No.1			0.0035	μμF

[1]) Heater voltage variations of 20% are allowed during short periods.

from JEDEC release #2833, June 13, 1960

MAXIMUM RATINGS (absolute limits)

Plate voltage	330 volts max.
Plate voltage without current	600 volts max.
Grid No.2 voltage	see curve
Grid No.2 voltage without current	600 volts max.
Negative grid No.1 voltage	55 volts max.
Positive grid No.1 voltage	0 volt max.
Plate dissipation	3.3 watts max.
Grid No.2 dissipation	see curve
Cathode current	17 mamps max.
Heater to cathode voltage	100 volts max.
Grid No.1 circuit resistance	
fixed bias	0.5 megohm max.
automatic bias	1 megohm max.
Bulb temperature	140 °C max.[2]

TYPICAL CHARACTERISTICS [3]

Heater voltage	6.3 volts
Plate supply voltage	250 volts
Grid No.3 voltage	0 volt
Grid No.2 supply voltage	100 volts
Cathode resistor	80 ohms
Plate current	9.2 mamps
Grid No.2 current	3.3 mamps
Transconductance	3800 micromhos[4]
Amplification factor of grid No.2 with respect to grid No.1	25
Plate resistance	1.0 megohms
Equivalent noise resistance	3500 ohms
Transconductance at grid No.1 voltage = -20 volts	10 micromhos

[2]) Tube life and reliability of performance will be enhanced by operation at lower temperature

[3]) Circuit operation with cathode bias is recommended.

[4]) At heater voltage = 5.0 volts the typical value of transconductance will decrease to about 3400 micromhos

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

A. Measured at:

Heater voltage = 6.3 volts
Plate supply voltage = 250 volts
Grid No.3 voltage = 0 volts
Grid No.2 supply voltage = 100 volts

	Range new tubes min.	Range new tubes max.	Data indicating end point of life	
Heater current	142	158	142-158	mamps
Plate current (cathode resistor = 80 ohms)	7.2	-11.2	6.2	mamps
Grid No.2 current (cathode resistor = 80 ohms)	2.6	4.0		mamps
Transconductance (cathode resistor = 80 ohms)	3100	4500	2800	micromhos
Transconductance (grid No.1 voltage = -20 volts)	1	50		micromhos
Grid No.1 current (cathode resistor = 80 ohms, grid No.1 supply voltage = -0.5 volt, grid No.1 series resistance = 0.5 megohm		0.2	0.5	microamp

B. Measured at:

Heater voltage = 6.3 volts
Heater to cathode voltage = 100 volts
Series resistance = 1 megohm

Leakage current between heater and cathode		15	15	microamps

C. Measured at:

Heater voltage = 6.3 volts
Voltage between two arbitrary electrodes = 300 volts
(is one of these electrodes the cathode than the polarity must be such that the cathode is positive)

Insulation resistance between two arbitrary electrodes	100		50	megohms

LIFE EXPECTANCY

The life expectancy is 1000 hours under the following life test conditions

Heater voltage	=	6.3 volts
Plate supply voltage	=	250 volts
Grid No.3 voltage	=	0 volts
Grid No.2 supply voltage	=	100 volts
Cathode resistor	=	80 ohms
Grid No.1 circuit resistance	=	0.5 megohm
Heater cathode voltage (cathode negative)	=	135 volts [5]

SHOCK RESISTANCE [6] about 500 g

Forces as applied by the NRL impact machine for electronic devices caused by 5 blows of the hammer, lifted over an angle of 30° in each of of four different positions of the tube.

VIBRATION RESISTANCE [6] 2.5 g

Vibrational forces for a period of 32 hours at a frequency of 25 c/s in each of 3 positions of the tube.

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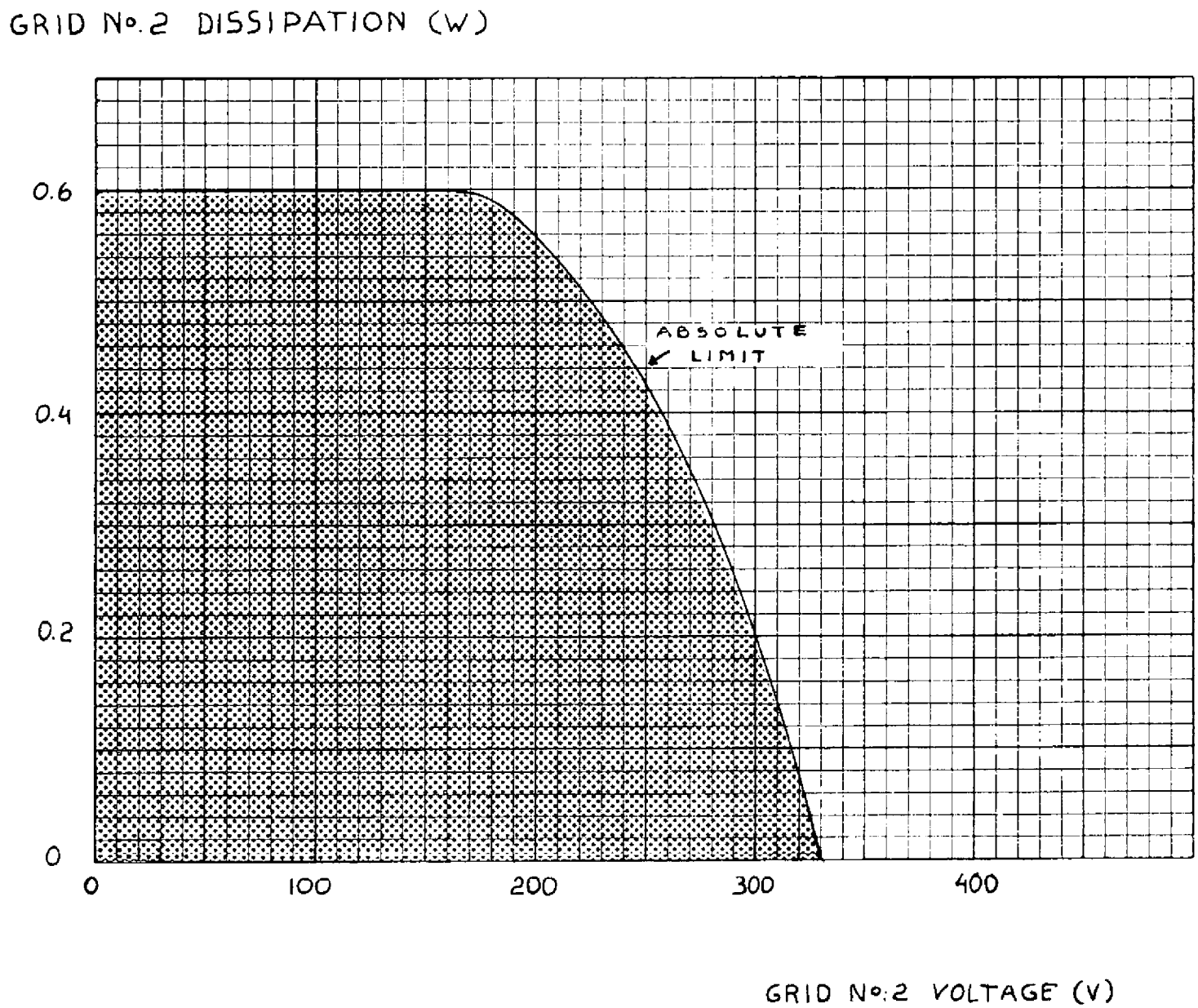
5) The value of 135 volts for the heater to cathode voltage should not be interpreted as a suitable operating condition.

6) These test conditions are only given for evaluation of the ruggedness of the tube. They are by no means to be interpreted as suitable operating conditions.


GRID No. 2 DISSIPATION (W)
0.6
0.4
0.2
0
ABSOLUTE LIMIT
0
100
200
300
400
GRID No. 2 VOLTAGE (V)