3E29

TWIN-UNIT BEAM POWER TUBE

Unless Otherwise Specified, Values are on a Per Tube Basis

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

	Parallel	*Series*	
Arrangement			
Voltage (AC or DC)	6.3 $^{+10\%}_{-5\%}$	12.6 $^{+10\%}_{-5\%}$	volts
Current at 6.3 volts	2.25	–	amp
Current at 12.6 volts	–	1.125	amp

Transconductance (Each Unit):

With plate volts = 250, grid-No.2 volts = 175, and plate ma. = 60 . . . . 8500 μmhos

Mu-Factor, Grid No.2 to Grid No.1 (Each Unit):

With plate volts = 225, grid-No.2 volts = 225, and plate ma. = 60 9

Direct Interelectrode Capacitances (Each Unit): ←

Grid No.1 to plate (with external shield□)	0.12 max.	μμf
Input	14	μμf
Output	7	μμf

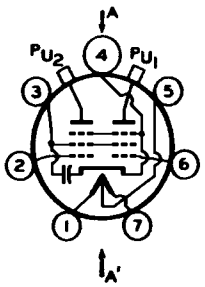
Mechanical:

Mounting Position	Vertical, base up or down; Horizontal, plane of each plate vertical
Overall Length	4-1/8" ± 3/16"
Seated Length	3-11/16" ± 3/16"
Maximum Diameter	2-3/8"
Bulb	T-16
Bulb Terminals (Two)	See Dimensional Outline
Weight (Approx.)	3.5 oz.
Base	Medium Molded-Flare Septar 7-Pin (JETEC No.E7-2)

BOTTOM VIEW

Pin 1 – Heater
Pin 2 – Grid No.1 of Unit No.2
Pin 3 – Grid No.2 of Both Units
Pin 4 – Cathode, Grid No.3 of Both Units
Pin 5 – Heater Center-Tap
Pin 6 – Grid No.1 of Unit No.1
Pin 7 – Heater

P_{U1} – Plate Terminal of Unit No.1
P_{U2} – Plate Terminal of Unit No.2



PLANE OF ELECTRODES OF EACH UNIT IS PARALLEL TO PLANE THROUGH AXIS OF TUBE AND AA'

□: See next page.

←Indicates a change

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TWIN-UNIT BEAM POWER TUBE

MODULATOR—Rectangular-Wave Modulation

Values are for Units in Parallel

Maximum CCS● Ratings, *Absolute Values:*

For Duty Factor between 0.0001 and 1.0 and Maximum Averaging Time of 1200 μsec in Any Interval*

DC PLATE SUPPLY VOLTAGE▲	5000 max.	volts
INSTANTANEOUS PLATE VOLTAGE	5750 max.	volts
DC GRID-No.2 (SCREEN) SUPPLY VOLTAGE▲	850 max.	volts
DC GRID-No.1 (CONTROL-GRID) SUPPLY VOLTAGE▲	-225 max.	volts
INSTANTANEOUS GRID-No.1 VOLTAGE	-600 max.	volts
PEAK POSITIVE GRID-No.1 VOLTAGE	250 max.	volts
PEAK PLATE CURRENT	See Rating Chart	
PEAK GRID-No.2 CURRENT	3.5 max.	amp
PEAK GRID-No.1 CURRENT	4 max.	amp
PLATE INPUT	85 max.	watts
GRID-No.2 INPUT	3 max.	watts
GRID-No.1 INPUT	1 max.	watt
PLATE DISSIPATION#	15 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Typical Operation with Rectangular-Wave Shapes in Accompanying Test Circuit:

With Duty Factor of*	*0.002*	*0.001*	
DC Plate Supply Voltage	2000	5000	volts
DC Grid-No.2 Supply Voltage	650	850	volts
DC Grid-No.1 Supply Voltage	-175	-200	volts
Peak Positive Grid-No.1 Voltage	50	150	volts

□ Having length of 3/4" and inside diameter of 2-3/8". Shield is placed around base end of tube and is connected to cathode.

● Continuous Commercial Service.

▲ For tube protection, it is essential that sufficient dc resistance be used in the plate supply circuit, the grid-No.2 supply circuit, and the grid-No.1 supply circuit so that the short-circuit current is limited to 0.5 ampere in each circuit.

* *Duty Factor* for the 3E29 is defined as the "on" time in microseconds divided by 1200 microseconds.

"On" Time is defined as the sum of the durations of all the individual pulses which occur during any 1200-microsecond interval.

Pulse Duration is defined as the time interval between the two points on the pulse at which the instantaneous value is 70% of the peak value. The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

Averaged over any interval not exceeding 1200 microseconds. Care should be used in determining the plate dissipation. A calculated value based on rectangular pulses can be considerably in error when the actual pulses have a finite rise and fall time. Plate dissipation should preferably be determined by measuring the bulb temperature under actual operating conditions; then, with the tube in the same socket and under the same ambient-temperature conditions, apply to the tube sufficient dc input to obtain the same bulb temperature. This value of dc input is a measure of the plate dissipation.

→ Indicates a change

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Plate Current:			
Peak	5	10	amp
DC	0.010	0.010	amp
DC Grid-No.2 Current	0.0011	0.002	amp
DC Grid-No.1 Current	0.001	0.001	amp
Load Resistance	300	400	ohms

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current (Parallel connection)	1	2.00	2.50	amp
Heater Current (Series connection)	2	1.00	1.25	amp
Grid-No.1-to-Plate Capacitance (Each unit)	3	-	0.12	μμf
Input Capacitance (Each unit)	-	12.8	16.2	μμf
Output Capacitance (Each unit)	-	5.25	8.75	μμf
Plate Current (Each unit)	1,4	38	82	ma
Grid-No.1 Voltage	1,5	-	-55	volts
Grid-No.2 Current (Each unit)	1,4	-	10	ma
Peak Plate Current	1,6	9	-	amp

Note 1: With 6.3 volts on heater.

Note 2: With 12.6 volts on heater.

Note 3: With external shield having length of 3/4" and inside diameter of 2-3/8". Shield is placed around base end of tube and is connected to cathode.

Note 4: With dc plate voltage of 250 volts, dc grid-No.2 voltage of 175 volts, and dc grid-No.1 voltage of -11 volts. Grid No.1 of unit not under test is biased -100 volts with respect to its cathode.

Note 5: With units in parallel, dc plate voltage of 400 volts, dc grid-No.2 voltage of 225 volts, and dc grid-No.1 voltage adjusted to give dc plate current of 200 microamperes.

Note 6: With the units in parallel in the accompanying test circuit under the following conditions: rectangular-wave modulation applied to grid No.1; pulse duration of 1 microsecond approx; pulse repetition rate of 1500 cps approx; dc plate-supply voltage of 5000 volts; dc grid-No.2 voltage of 850 volts; dc grid-No.1 volts of -225 volts; peak positive grid-No.1 swing of 150 volts; and dc ◄ plate current of 15 ma. minimum obtained by adjusting the pulse repetition rate.

DIMENSIONAL OUTLINE
shown under Type 829B also applies to the 3E29

◄ Indicates a change.

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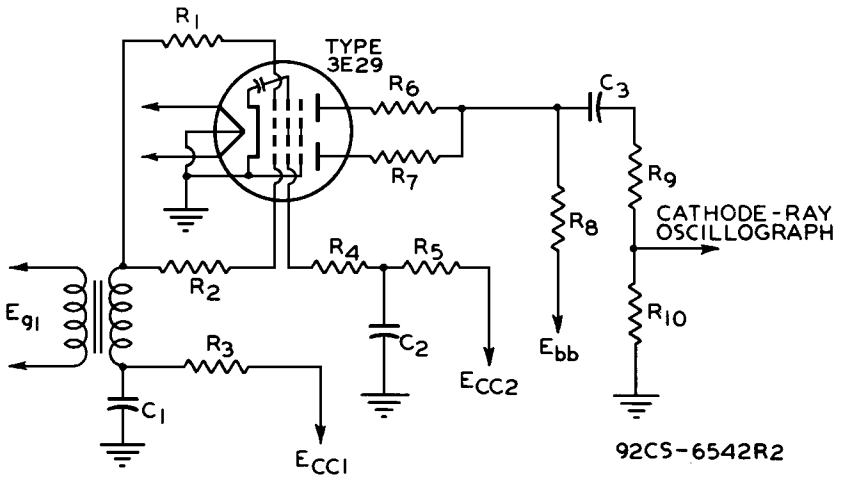
TEST CIRCUIT



R1 R2: 20 ohms, 1 watt non-inductive
R3: 15000 ohms, 1 watt
R4: 25 ohms, 1 watt, non-inductive
R5: 10000 ohms, 1 watt
R6 R7: 10 ohms, 5 watts, non-inductive
R8: 10000 ohms, 50 watts
R9: 400 ± 5% ohms, 50 watts non-inductive
R10: 10 ± 1% ohms, 5 watts
C1: 0.1 μf, 600 v dc
C2: 0.1 μf, 1000 v dc
C3: 0.1 μf, 5000 v dc
Ecc1: Grid-No.1 Supply Voltage
Ecc2: Grid-No.2 Supply Voltage
Ebb: Plate Supply Voltage
Eg1: Signal Voltage

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Harrison, N. J.

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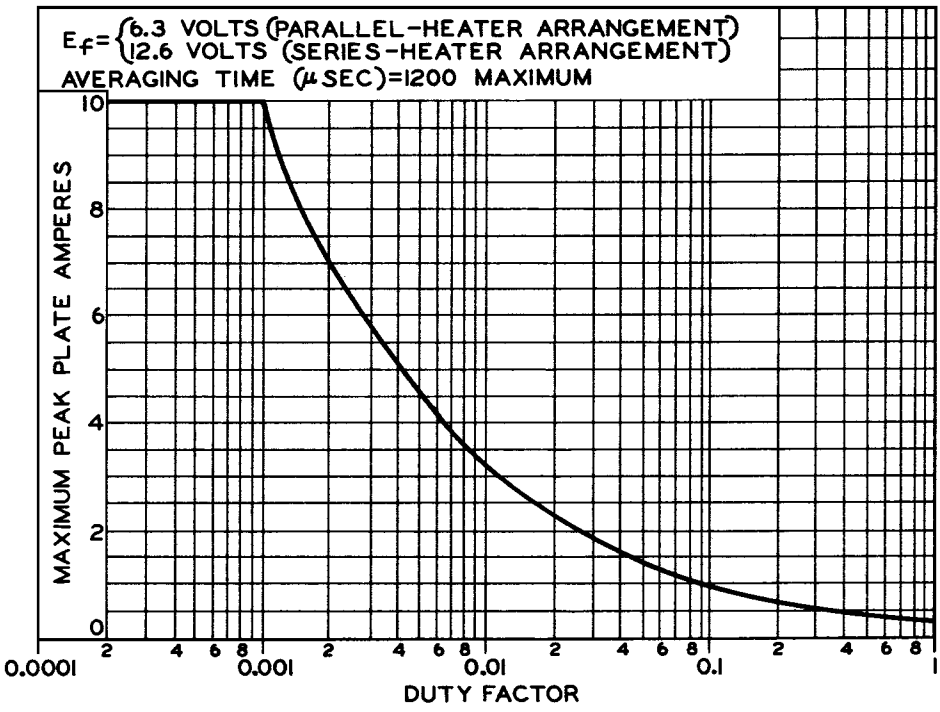
RATING CHART



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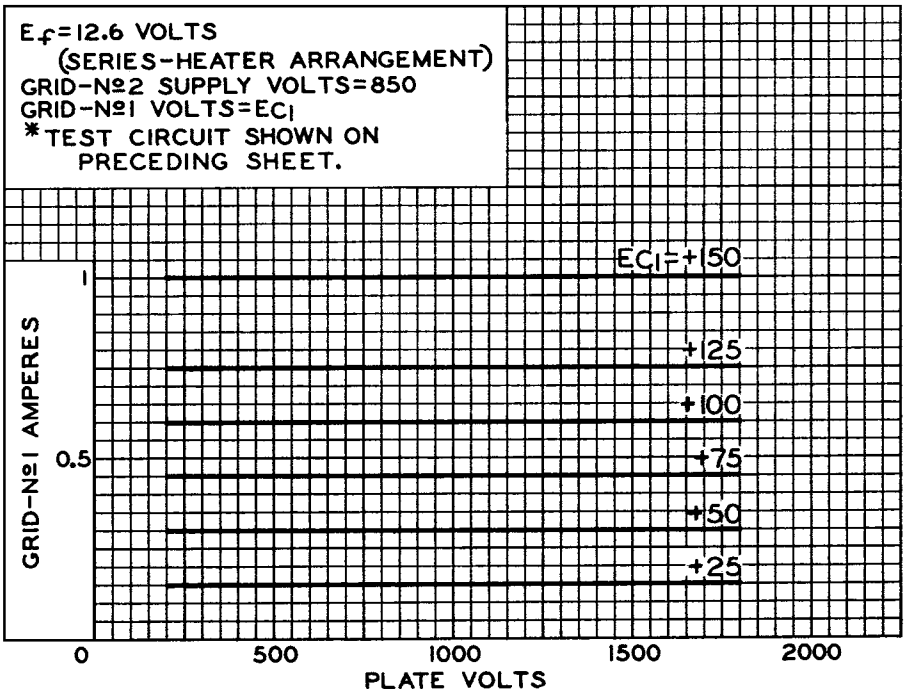
AVERAGE CHARACTERISTICS
UNITS IN PARALLEL IN TEST CIRCUIT *



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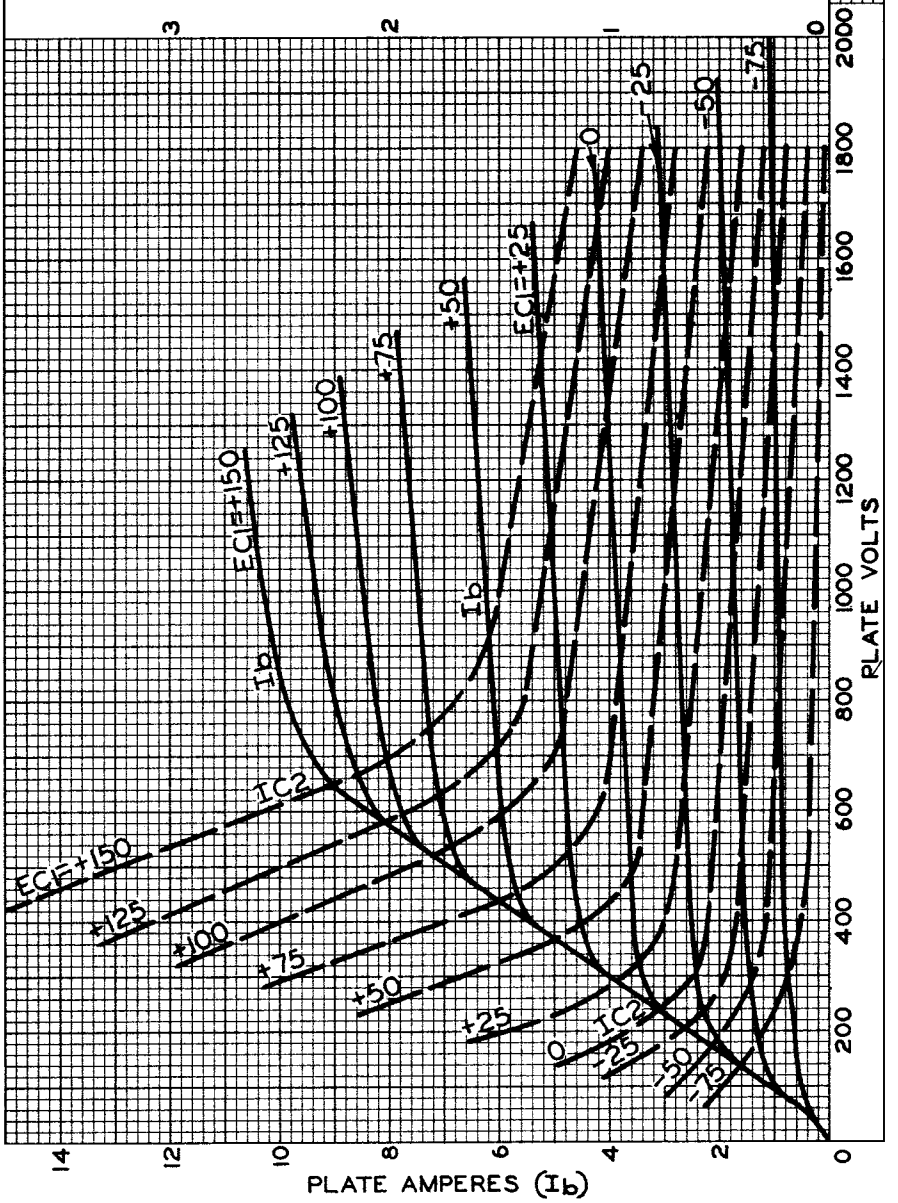
AVERAGE CHARACTERISTICS
UNITS IN PARALLEL IN TEST CIRCUIT*

E_f=12.6 VOLTS (SERIES-HEATER ARRANGEMENT)
GRID-№2 SUPPLY VOLTS=850
GRID-№1 VOLTS=E_{C1}
*TEST CIRCUIT SHOWN ON PRECEDING SHEET.



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