

# Medium-Mu Twin Triode

## 9-PIN MINIATURE TYPE

For Computer and other "On-Off" Control  
Applications Involving Long Periods of  
Operation under Cutoff Conditions

### GENERAL DATA

#### Electrical:

Heater, for Unipotential Cathodes:

	<i>Series</i>	<i>Parallel</i>	
Heater arrangement			
Voltage (AC or DC) . . . . .	12.6 ± 5%	6.3 ± 5%	volts
Current . . . . .	0.45	0.9	amp
Direct Interelectrode Capacitances (Approx.): <sup>a</sup>			
Grid to plate (Each unit) . . . . .		6	μf
Grid to cathode and heater (Each unit) . . . . .		4.8	μf
Plate to cathode and heater (Unit No.1) . . . . .		0.65	μf
Plate to cathode and heater (Unit No.2) . . . . .		0.55	μf
Grid to grid. . . . .		0.1	μf
Plate to plate. . . . .		1.4	μf
Heater to cathode (Each unit) . . . . .		6	μf

#### Characteristics (Each Unit):

Plate Voltage . . . . .	90	120	volts
Grid Voltage . . . . .	<sup>b</sup> -	-2	volts
Amplification Factor . . . . .	-	21	
Plate Resistance (Approx.) . . . . .	-	1750	ohms
Transconductance . . . . .	-	12000	μmhos
Plate Current . . . . .	47	36	ma
Grid Current . . . . .	250	-	μa
Grid Voltage (Approx.) for plate volts = 150 and plate μa = 200. . . . .	-	-11	volts

#### Mechanical:

Operating Position . . . . .	Any, but for the utmost in service, tube should be vertical with base down or up, or horizontal with pins 5 and 9 in vertical plane		
Maximum Overall Length . . . . .	2-5/8"		
Maximum Seated Length . . . . .	2-3/8"		
Length, Base Seat to Bulb Top (Excluding tip) . . . . .	2" ± 3/32"		
Diameter . . . . .	0.750" to 0.875"		
Dimensional Outline . . . . .	See <i>General Section</i>		
Bulb . . . . .	T6-1/2		
Base . . . . .	Small-Button Noval 9-Pin (JEDEC No.E9-1)		

← Indicates a change.



Basing Designation for BOTTOM VIEW. . . . .9H

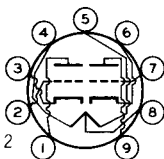
Pin 1 - Plate of  
Unit No.2

Pin 2 - Grid of  
Unit No.2

Pin 3 - Cathode of  
Unit No.2

Pins 4 & 8 - Heater of  
Unit No.2

Pins 5 & 8 - Heater of  
Unit No.1



Pin 6 - Cathode of  
Unit No.1

Pin 7 - Grid of  
Unit No.1

Pin 8 - Heater  
Mid-Tap

Pin 9 - Plate of  
Unit No.1

## COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

*Unless Otherwise Specified, Values are for Each Unit*

### Maximum Ratings, Absolute-Maximum Values:

#### PLATE VOLTAGE:

Average. . . . . 300 max. volts  
Peak positive-pulse<sup>c</sup> . . . . . 600 max. volts

#### GRID VOLTAGE:

DC negative. . . . . 100 max. volts  
DC positive. . . . . 1 max. volt  
Peak negative-pulse<sup>c</sup> . . . . . 300 max. volts  
Peak positive-pulse<sup>c</sup> . . . . . 30 max. volts

#### GRID CURRENT:

Average. . . . . 5 max. ma  
Peak<sup>c</sup>. . . . . 200 max. ma

#### CATHODE CURRENT:

Average. . . . . 50 max. ma  
Peak<sup>c</sup>. . . . . 400 max. ma

#### PLATE DISSIPATION:

Either plate . . . . . 4.5 max. watts  
Both plates (Both units operating) . . . . . 8 max. watts

#### PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. 200 max. volts  
Heater positive with respect to cathode. 200<sup>d</sup> max. volts

#### BULB TEMPERATURE (At hottest point

on bulb surface) . . . . . 160 max. °C

### Maximum Circuit Values:

#### Grid-Circuit Resistance:

For fixed-bias operation . . . . . 0.1 max. megohm  
For cathode-bias operation . . . . . 0.5 max. megohm

<sup>a</sup> Without external shield.

<sup>b</sup> Adjusted for indicated grid current.

<sup>c</sup> Under the following conditions: rectangular pulse; pulse duration, 10 microseconds; pulse-repetition rate,  $1 \times 10^3$  pps; and duty factor,  $0.010 \pm 0.001$ . The rise time shall be less than 1 microsecond, fall time less than 2 microseconds, overshoot less than 5 per cent and droop less than 10 per cent.

<sup>d</sup> The dc component must not exceed 100 volts.



## CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

*Unless Otherwise Specified, Values are for Each Unit*

	Note	Min.	Max.	
Heater Current. . . . .	1	0.41	0.49	amp
Plate Current (1) . . . . .	1,2	26	45	ma
Plate Current (2) . . . . .	1,3	34	60	ma ←
Plate Current (3) . . . . .	1,4	-	200	μa
Reverse Grid Current. . . . .	1,2	-	-1.5	μa
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode. . . . .	1,5	-	30	μa
Heater positive with respect to cathode. . . . .	1,5	-	30	μa
Leakage Resistance:				
Between plate and all other electrodes tied together. . . .	1,6	50	-	megohms
Between grid and all other electrodes tied together. . . .	1,7	50	-	megohms

Note 1: With heater volts = 12.6 ac or dc (Series arrangement).

Note 2: With plate volts = 120 and grid volts = -2. Each unit tested separately. Unit not under test connected to ground.

Note 3: With plate volts = 90 and grid voltage adjusted for grid μa = 250. Each unit tested separately. Unit not under test connected to ground.

Note 4: With plate volts = 150 and grid volts = -14. Each unit tested separately. Unit not under test connected to ground.

Note 5: With 100 volts dc between heater and cathode.

Note 6: With plate volts = -500.

Note 7: With grid volts = -300.

## SPECIAL RATINGS & PERFORMANCE DATA

### Heater-Cycling Life Performance:

This test is performed on a sample lot of tubes from each production run. A minimum of 2000 cycles of intermittent operation is applied under the following conditions: heater volts = 15 (Series heater arrangement) cycled one minute on and four minutes off, heater 180 volts positive with respect to cathode, and all other elements connected to ground. At the end of this test, tubes are checked for heater-cathode shorts and open circuits.

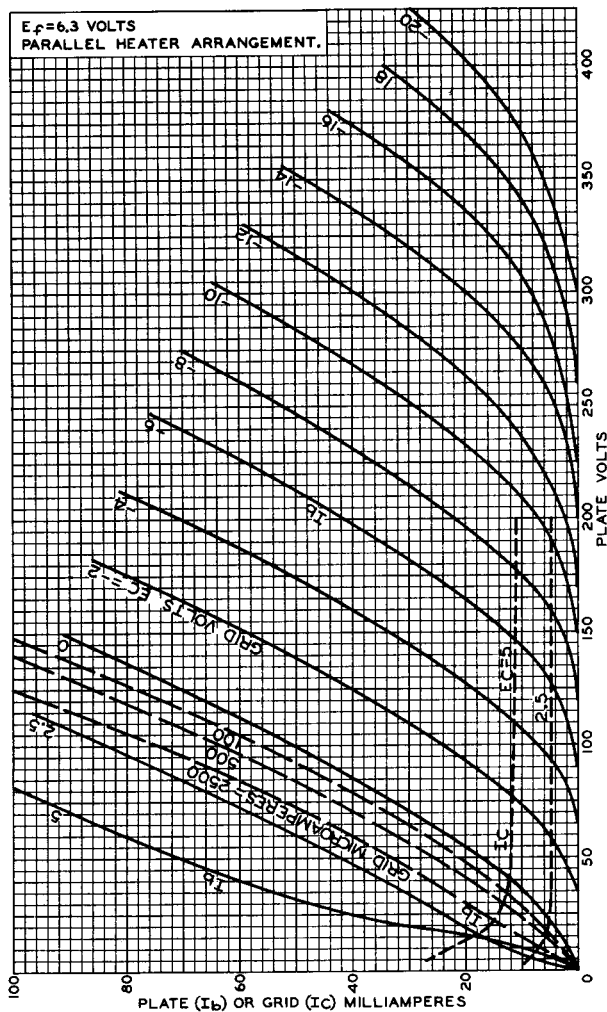
### Cathode-Interface-Resistance Life Test: ←

A sample lot of tubes from each production run is life tested at heater volts = 12.6 (Series heater arrangement) and with zero cathode current. At the end of 1000 hours, tubes will not show a cathode-interface resistance in excess of 25 ohms when measured in accordance with Method B, the Complementary Network Method, of ASTM Standard F 300-57T at heater volts = 11.4, plate volts = 75, plate current adjusted to 6.5 milliamperes, and 50-kc, square-wave signal voltage of 0.2 volt.

← Indicates a change.



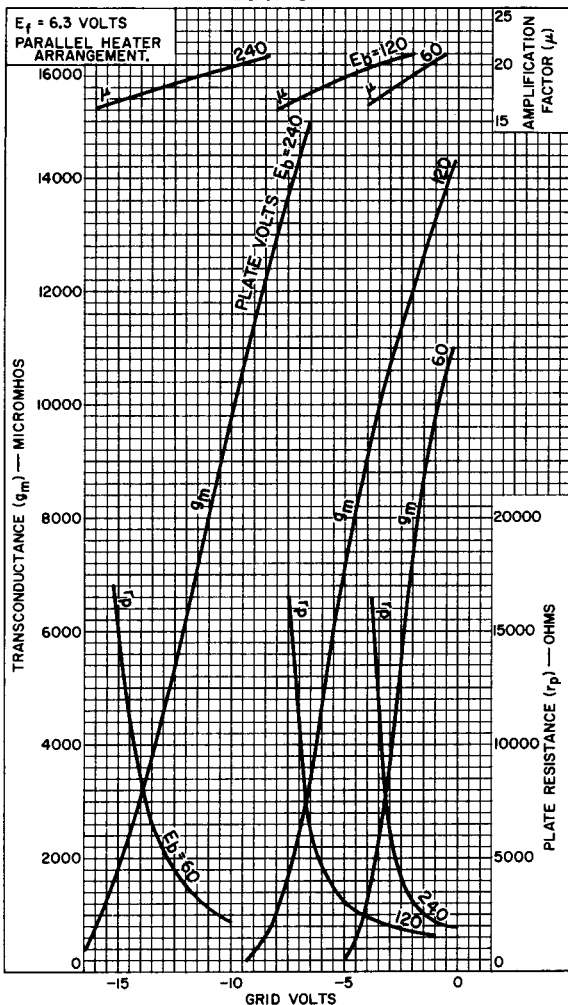
## AVERAGE CHARACTERISTICS Each Unit



92CM-9856



## AVERAGE CHARACTERISTICS Each Unit



92CM-9857RI

