

SPECIAL QUALITY U.H.F. TRIODE

M8248

Special quality triode for use as a grounded grid amplifier in equipment where mechanical vibration and shocks are unavoidable and where statistically controlled major electrical characteristics are required.

This data should be read in conjunction with the GENERAL NOTES—SPECIAL QUALITY VALVES which precede this section of the handbook and the index numbers are used to indicate where reference should be made to a specific note.

HEATER

Suitable for parallel operation a.c. or d.c.

V_h^1	6.3	V
I_h	400	mA

CAPACITANCES² (measured with external shield)

C_{a-k}	80	mpF
C_{a-k} max.	150	mpF
C_{h-k}	3.8	pF
C_{a-g}	2.8	pF
$C_{k-g+h+sh}$	8.8	pF
$C_{a-g+h+sh}$	4.0	pF

CHARACTERISTICS³

V_a	150	V
I_a	13.5	mA
V_g	-1.35	V
g_m	13.5	mA/V
r_a	3.7	k Ω
μ	50	
R_k	0	Ω
V_g ($I_a \leq 60\mu A$)	-15	V

ABSOLUTE MAXIMUM RATINGS⁴

V_h max.	6.6	V
V_h min.	6.0	V
$V_{a(b)}$ max.	330	V
V_a max.	165	V
p_a max.	2.7	W
$+V_g$ max.	0	V
$-V_g$ max.	55	V
I_k max.	20	mA
I_g max.	3.5	mA
R_{g-k} max.	250	k Ω
V_{h-k} max.	90	V
Maximum acceleration (continuous operation)	50	g
Maximum shock (short duration)	500	g
T_{bulb} max.	120	$^{\circ}C$

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TEST CONDITIONS (unless otherwise specified)

V_h	V_{a-e}	V_{g1-e}	R_k	C_k
(V)	(V)	(V)	(Ω)	(μF)
6.3	150	0	100	1000

TESTS

A.Q.L. ⁵	Individuals ⁶			Lot average ⁷		Lot standard deviation ⁸	
(%)	Bogey ⁹	Min.	Max.	Min.	Max.	Max.	

GROUP A

Heater current	0.65	400	375	425	—	—	—	mA
Heater-cathode leakage current $V_{h-k} \pm 100V$	0.65	—	—	10	—	—	—	μA
Reverse grid current $V_{a-e} 175V, R_k 150\Omega, R_{g1} 250k\Omega$	0.65	—	—	0.5	—	—	—	μA
Anode current	{ 0.65	13.5	9.0	18.0	—	—	—	mA
	—	—	—	—	11.8	15.2	1.35	mA
Anode current $V_g = -15V, R_k = 0\Omega$	0.65	—	—	60	—	—	—	μA
Mutual conductance	{ 0.65	13.5	11.0	16.0	—	—	—	mA/V
	—	—	—	—	12.6	14.4	0.73	mA/V
Sub-group quality level ¹⁰	1.0	—	—	—	—	—	—	
Inoperatives ¹⁶	0.4	—	—	—	—	—	—	

GROUP B

Insulation

a-rest measured at -300V }	2.5	{ — 200	—	—	—	—	MΩ
g-rest measured at -100V }		{ — 200	—	—	—	—	MΩ

Change in mutual conductance. $V_h = 5.7V$	2.5	—	—	15	—	—	%
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Amplification factor	6.5	—	40	65	—	—	
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Capacitances ² (shielded). No applied voltages	6.5						
c_{a-k} shield to earth		—	—	150	—	—	mpF
c_{h-k} shield to earth		—	2.5	5.0	—	—	pF
c_{a-g} shield to earth		—	2.3	3.3	—	—	pF
c_{k-g+h} shield to grid		—	8.0	11.0	—	—	pF
c_{a-g+h} shield to grid		—	—	5.0	—	—	pF

Low pressure voltage breakdown pressure

55±5mm Hg, voltage 500V o.c.

No other applied voltages	6.5	—	—	—	—	—	
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Microphone noise at the anode at 50c/s,

2.0g minimum peak acceleration,

$R_a = 2000\Omega$	6.5	—	—	200	—	—	mV (r.m.s.)
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TESTS

GROUP C

Fatigue¹⁴

$V_h = 6.3V$. No other voltages applied.
2.5g minimum peak acceleration, fixed
frequency. $f = 25c/s$ min., $60c/s$ max. for
32 hours in each of 3 mutually perpendicular
planes.

Post Fatigue Tests

Heater to cathode leakage current

 $V_{h-k} \pm 100V$

Change in mutual conductance

Reverse grid current

Microphonic noise as in Group B

A.Q.L.⁵

(%)

Individuals⁶Bogey⁹

Min.

Max.

Lot average⁷

Min.

Max.

Lot standard
deviation⁸

Max.

6.5

—

—

20

—

—

—

 μA

%

—

—

20

—

—

—

 μA

—

—

1.0

—

—

—

 μA

—

—

300

—

—

—

mV

(r.m.s.)

Shock¹⁵ $V_{h-k} = 100V$ (cathode negative) $V_g = -1.5V$ d.c. $R_g = 100k\Omega$, 500g.

Post Shock Tests

Heater-cathode leakage current

 $V_{h-k} \pm 100V$

Change in mutual conductance

Reverse grid current

Microphonic noise as in Group B

20

—

—

20

—

—

—

 μA

—

—

20

—

—

—

 μA

—

—

1.0

—

—

—

 μA

—

—

300

—

—

—

mV

(r.m.s.)

Base strain¹². No applied voltagesGlass strain^{11A}. No applied voltages

2.5

—

—

—

—

—

—

GROUP D

Heater cycling life test

 $V_h = 7.0V$. $V_{h-k} + 100V$ d.c.

1 minute on 4 minutes off. No other voltages.

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Heater cycling life end points

Heater to cathode leakage

$V_{h-k} \pm 100V$ d.c.	1.0	—	—	20	—	—	—	μA
Insulation as in Group B	2.5	—	30	—	—	—	—	$M\Omega$

Stability life test¹⁴Running conditions, $V_{h-k} + 100V$ d.c. $R_g = 250 k\Omega$ $T_{ambient} =$ Room temperature.**Stability life end point**

Change in mutual conductance after 1 hour	1.0	—	—	10	—	—	—	%
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Survival rate life test¹⁴Running conditions. $V_{h-k} + 100V$ d.c. $R_g = 250 k\Omega$ $T_{ambient} =$ room temperature**Survival rate end points (100 hours)**

Inoperatives ¹⁶	0.65	—	—	—	—	—	—	
Mutual conductance	1.0	—	10	—	—	—	—	mA/V

Intermittent life test

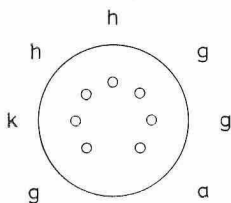
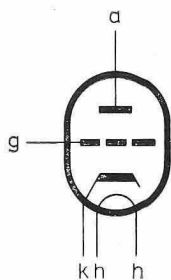
Running conditions

 $V_{h-k} + 100V$ d.c. $R_g = 250 k\Omega$ T_{bulb} min. = $120^\circ C$ **Intermittent life test end points (500 hours)**

Inoperatives ¹⁶	2.5	—	—	—	—	—	—	mA
Heater current	2.5	—	370	460	—	—	—	μA
Reverse grid current	2.5	—	—	2.0	—	—	—	%
Change in mutual conductance. $V_h = 5.7V$	4.0	—	—	15	—	—	—	%
Change in mutual conductance (individuals)	2.5	—	—	20	—	—	—	%
Heater to cathode leakage	—	—	—	—	—	—	—	
$V_{h-k} = \pm 100V$ d.c.	2.5	—	—	20	—	—	—	μA
Insulation as in Group B	2.5	—	100	—	—	—	—	$M\Omega$
Average change in mutual conductance	—	—	—	10	—	—	—	%
Sub-group quality level ¹⁰	10.0	—	—	—	—	—	—	

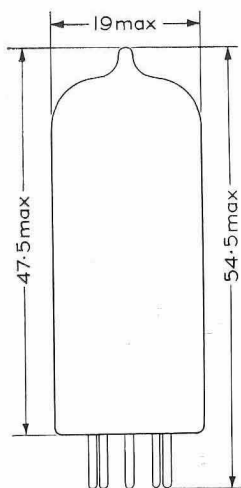
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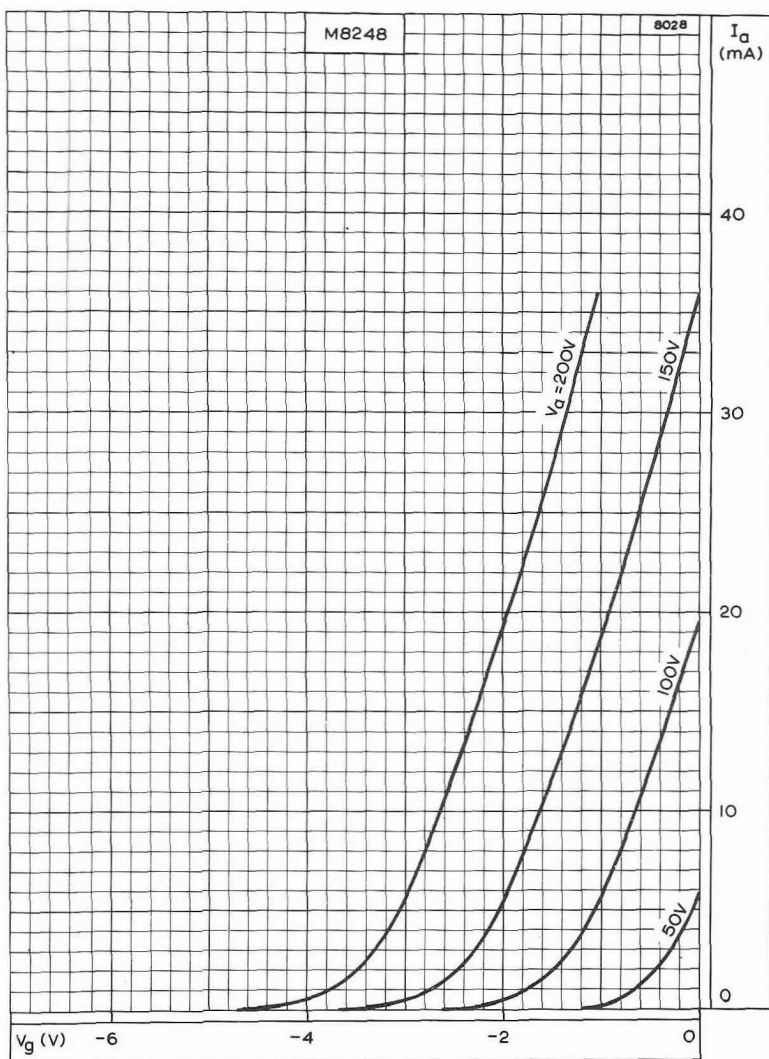


B7G Base

All dimensions in mm



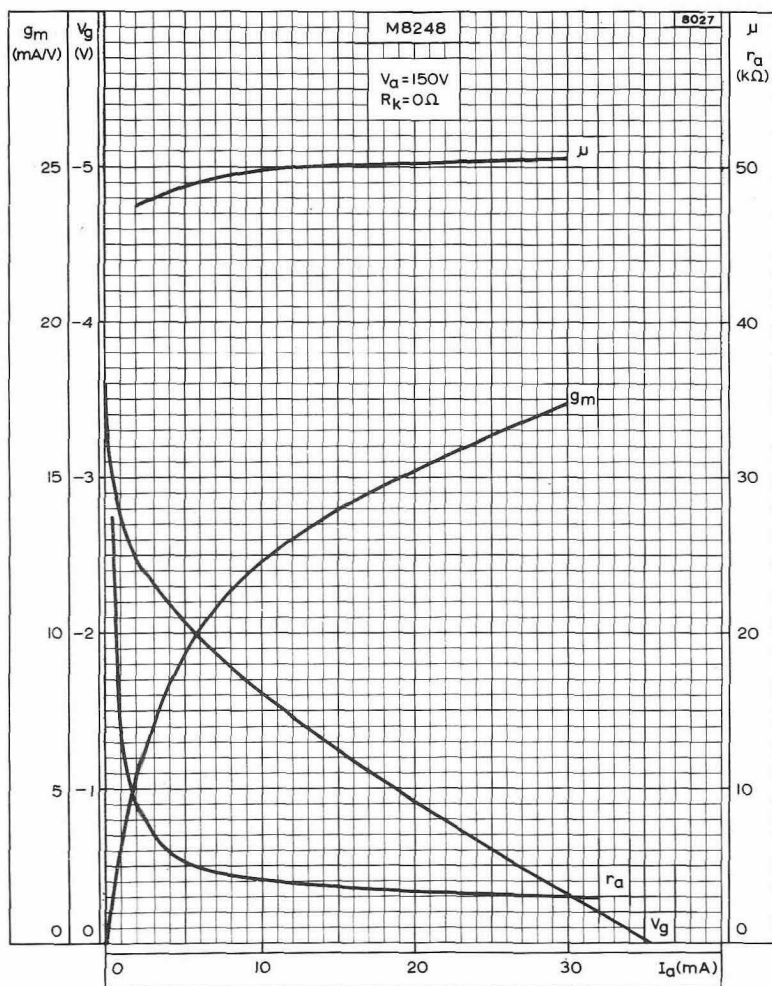
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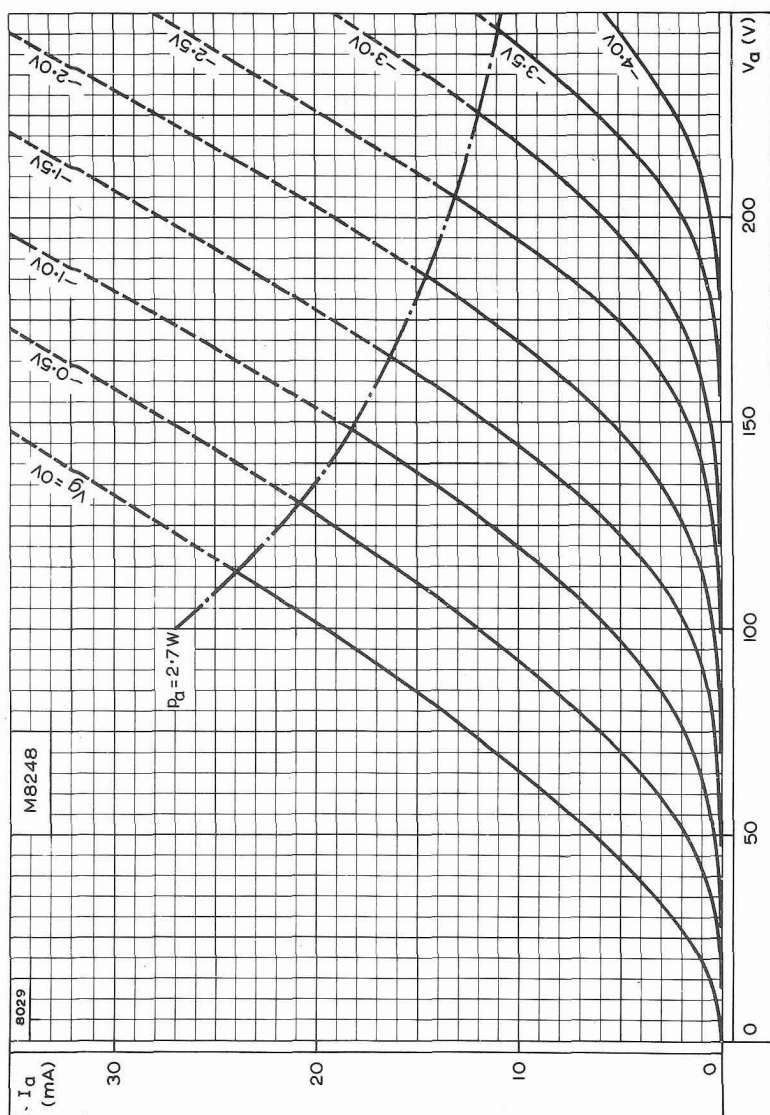
ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE WITH
ANODE VOLTAGE AS PARAMETER

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ANODE IMPEDANCE, MUTUAL CONDUCTANCE, AMPLIFICATION FACTOR AND CONTROL-GRID VOLTAGE PLOTTED AGAINST ANODE CURRENT



ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-
GRID VOLTAGE AS PARAMETER

