6136

PREMIUM TYPE 6136

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount. This "premium" type is similar to the 6AU6

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage	6.3 ± 10%		ac or dc volts
Current	0.3		amp
Direct Interelectrode Capacitances:[o]			
Grid No.1 to plate	0.0035 max.		μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	6		μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	5		μμf

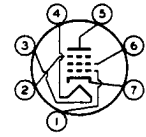
Characteristics, Class A_1 Amplifier:

Plate-Supply Voltage	100	250	volts
Grid No.3 (Suppressor Grid)	♦	♦	
Grid-No.2 (Screen-Grid) Supply Voltage	100	150	volts
Cathode Resistor	150	68	ohms
Plate Resistance (Approx.)	0.5	1	megohm
Transconductance	3900	5200	μmhos
Plate Current	5	10.6	ma
Grid-No.2 Current	2.1	4.3	ma
Grid-No.1 (Control-Grid) Voltage (Approx.) for plate current of 10 μa	-4.2	-6.5	volts

Mechanical:

Operating Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Dimensional Outline	*See General Section*
Bulb	T5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	7BK

Pin 1 - Grid No.1
Pin 2 - Grid No.3, Internal Shield
Pin 3 - Heater



Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2
Pin 7 - Cathode

AMPLIFIER — Class A_1

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE	330 max.	volts

[o], ♦: See next page.

6136

SHARP-CUTOFF PENTODE

GRID-No.3 (SUPPRESSOR-GRID) VOLTAGE.	0 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE.	165 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Positive bias value.	0 max.	volts
GRID-No.2 INPUT.	0.7 max.	watt
PLATE DISSIPATION.	3.3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	100 max.	volts
Heater positive with respect to cathode. .	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at end of tabulated data for this type

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For fixed-bias operation	0.25 max.	megohm
For cathode-bias operation	0.5 max.	megohm

° Without external shield.
♦ Connected to cathode at socket.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

Values are Initial, Unless Otherwise Specified

	Note	Min.	Max.	
Heater Current	1	0.275	0.325	amp
Direct Interelectrode Capacitances:				
Grid No.1 to plate	2	–	0.0035	μμf
Grid No.1 to cathode, grid No.3 & internal shield, grid No.2, and heater	2	4.8	7.2	μμf
Plate to cathode, grid No.3 & internal shield, grid No.2, and heater	2	3.9	5.9	μμf
Plate Current (1).	1,3	8	13.5	ma
Plate Current (2).	1,4	–	35	μa
Grid-No.2 Current.	1,3	2.6	6	ma
Transconductance, Grid No.1 to Plate:				
With heater volts = 6.3. . .	3	4150	6250	μmhos
With heater volts = 5.5. . .	3	3900	–	μmhos
At 500 hours with heater volts = 6.3.	3	3600	6250	μmhos

Notes 1 to 4: See next page.

6136

SHARP-CUTOFF PENTODE

	Note	Min.	Max.	
Difference between average transconductance initially, and average after 500 hours, expressed as a percentage of the initial average	1,3	-	17	%
Reverse Grid-No.1 Current	1,5	-	1	μa
Reverse Grid-No.1 Current at 500 hours	1,5	-	1	μa
Grid-No.1-Emission Current	6	-	-2	μa
Heater-Cathode Leakage Current:				
Heater 100 volts negative with respect to cathode	1	-	10	μa
Heater 100 volts positive with respect to cathode	1	-	10	μa
Heater-Cathode Leakage Current at 500 hours:				
Heater 100 volts negative with respect to cathode	1	-	10	μa
Heater 100 volts positive with respect to cathode	1	-	10	μa
Leakage Resistance:				
Grid No.1 to all other electrodes	1,7	100	-	megohms
Plate to all other electrodes	1,8	100	-	megohms
Leakage Resistance at 500 hours:				
Grid No.1 to all other electrodes	1,7	50	-	megohms
Plate to all other electrodes	1,8	50	-	megohms

Note 1: With 6.3 volts ac or dc on heater.

Note 2: Without external shield.

Note 3: With plate-supply voltage of 250 volts, grid-No.2 supply voltage of 150 volts, cathode resistor of 68 ohms, cathode-bypass capacitor of 1000 μf, and grid No.3 tied to cathode.

Note 4: With plate voltage of 250 volts, grid-No.2 voltage of 150 volts, grid-No.1 voltage of -9 volts, plate load resistor of 0.1 megohm, and grid No.3 tied to cathode.

Note 5: With plate voltage of 250 volts, grid-No.3 voltage of 0 volts, grid-No.2 voltage of 150 volts, grid-No.1 voltage of -1 volt, and grid-No.1 resistor of 0.25 megohm.

Note 6: With 7.5 volts ac or dc on heater, plate voltage of 250 volts, grid-No.3 voltage of 0 volts, grid-No.2 voltage of 150 volts, grid-No.1 voltage of -10 volts, and grid-No.1 resistor of 0.25 megohm.

Note 7: With grid No.1 100 volts negative with respect to all other electrodes tied together.

Note 8: With plate 300 volts negative with respect to all other electrodes tied together.

6136

SHARP-CUTOFF PENTODE

SPECIAL RATINGS AND PERFORMANCE DATA

Shock Rating:

Impact Acceleration. . . . . 450 max. g

This test is performed on a sample lot of tubes from each production run. Tubes are held rigid and are tested in four different positions. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for low-frequency vibration, heater-cathode leakage current, reverse grid-No.1 current and transconductance.

Fatigue Rating:

Vibrational Acceleration . . . . . 2.5 max. g

This test is performed on a sample lot of tubes from each production run. Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 60 cycles per second for 32 hours. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for low-frequency vibration, heater-cathode leakage current, reverse grid-No.1 current, and transconductance.

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . . 300 max. mv

This test is performed on a sample lot of tubes from each production run under the following conditions: Heater voltage of 6.3 volts, plate-supply voltage of 250 volts, grid No.3 tied to cathode, grid-No.2 supply voltage of 150 volts, cathode resistor of 68 ohms, cathode-bypass capacitor of 1000 μf, plate load resistor of 2000 ohms and vibrational acceleration of 2.5 g at 25 cps.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . . . 2000 min. cycles

Under the following conditions: Heater voltage of 7.5 volts cycled one minute on and one minute off, heater 135 volts positive with respect to cathode, and all other elements connected to ground.

Shorts and Continuity Test:

This test is performed on a sample lot of tubes from each production run. In this test a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid-No.1 current in excess of 1.0 microampere under the conditions specified in the Characteristics Range Values for reverse grid-No.1 current.

6136

SHARP-CUTOFF PENTODE

1-Hour Stability Life Performance:

This test is performed on a sample lot of tubes from each production run to insure that the tubes have been properly stabilized. Tubes are checked for transconductance under conditions specified under 500-Hour Intermittent Life Performance. At the end of 1 hour, the value of transconductance is read. The variation in transconductance from the 0-hour reading will not exceed 10 per cent.

100-Hour Survival Life Performance:

This test is performed on a sample lot of tubes from each production run under conditions specified under 500-Hour Intermittent Life Performance to insure a low percentage of early inoperatives. At the end of 100 hours, a tube is considered inoperative if it shows a permanent or temporary short or open circuit or a value of reverse grid-No.1 current in excess of 1.0 microampere under the conditions specified in Characteristics Range Values.

500-Hour Intermittent Life Performance:

This test is performed on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures of any of the characteristics indicated below. Life testing is conducted under the following conditions: Heater voltage of 6.3 volts, plate-supply voltage of 300 volts, grid No.3 tied to cathode, grid-No.2 supply voltage of 150 volts, heater-cathode voltage of 135 volts (heater positive with respect to cathode), cathode resistor of 80 ohms and grid-No.1 resistor of 0.5 megohm. At the end of 500 hours, tube will not show permanent shorts or open circuits and will be criticized for the total number of defects in the sample lot and for the number of tubes failing to pass established initial limits of heater current, and 500 hour limits for reverse grid-No.1 current, heater-cathode leakage current, leakage resistance, transconductance range, and the difference in transconductance between the initial value and average value shown under Characteristics Range Values.

6136

SHARP-CUTOFF PENTODE

OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER

Plate-Supply Voltage	90			volts
Plate Load Resistor	0.1	0.22	0.47	megohm
Grid-No.2 Resistor	0.09	0.26	0.75	megohm
Grid-No.1 Resistor (Of following stage)	0.22	0.47	1	megohm
Cathode Resistor	2100	3200	6500	ohms
Peak Output Voltage●	32	32	32	volts
Voltage Gain■	72	99	126	
Plate-Supply Voltage	180			volts
Plate Load Resistor	0.1	0.22	0.47	megohm
Grid-No.2 Resistor	0.15	0.43	1	megohm
Grid-No.1 Resistor (Of following stage)	0.22	0.47	1	megohm
Cathode Resistor	900	1700	3400	ohms
Peak Output Voltage●	82	67	65	volts
Voltage Gain■	116	171	232	
Plate-Supply Voltage	300			volts
Plate Load Resistor	0.1	0.22	0.47	megohm
Grid-No.2 Resistor	0.24	0.5	1.1	megohm
Grid-No.1 Resistor (Of following stage)	0.22	0.47	1	megohm
Cathode Resistor	600	1000	1900	ohms
Peak Output Voltage●	103	108	105	volts
Voltage Gain■	145	230	318	

● Obtained across grid-No.1 resistor of following stage and is for the condition where the signal level is adequate to swing the grid-No.1 of the resistance-coupled amplifier tube to the point where its grid-No.1 starts to draw current.

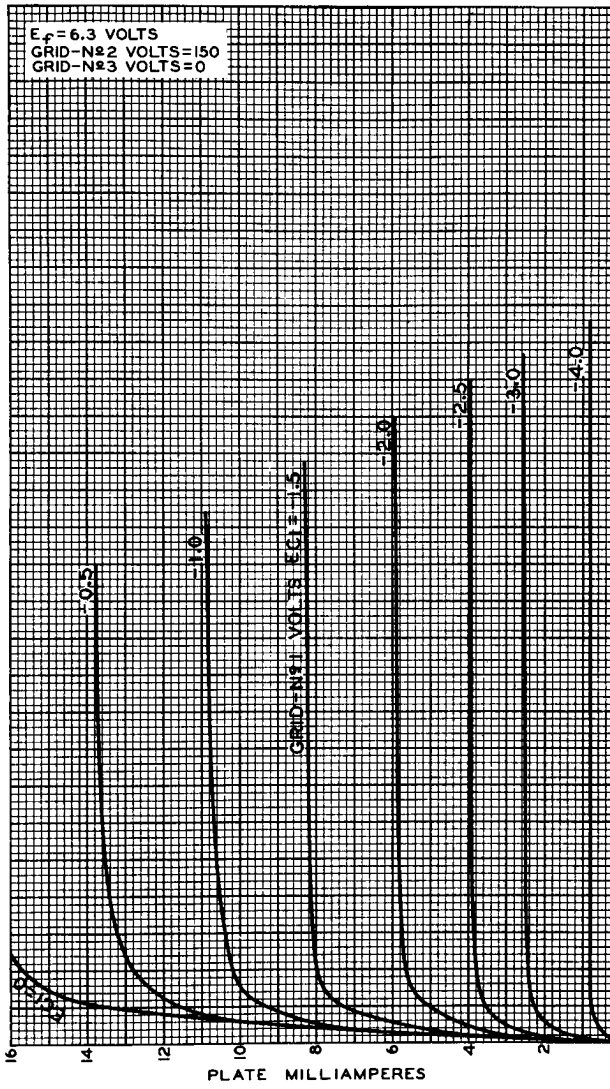
■ At 5 volts (RMS) output.

Note: Coupling capacitors should be selected to give desired frequency response. Cathode and grid-No.2 resistors should be adequately bypassed.

RCA

6136

AVERAGE PLATE CHARACTERISTICS



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6136

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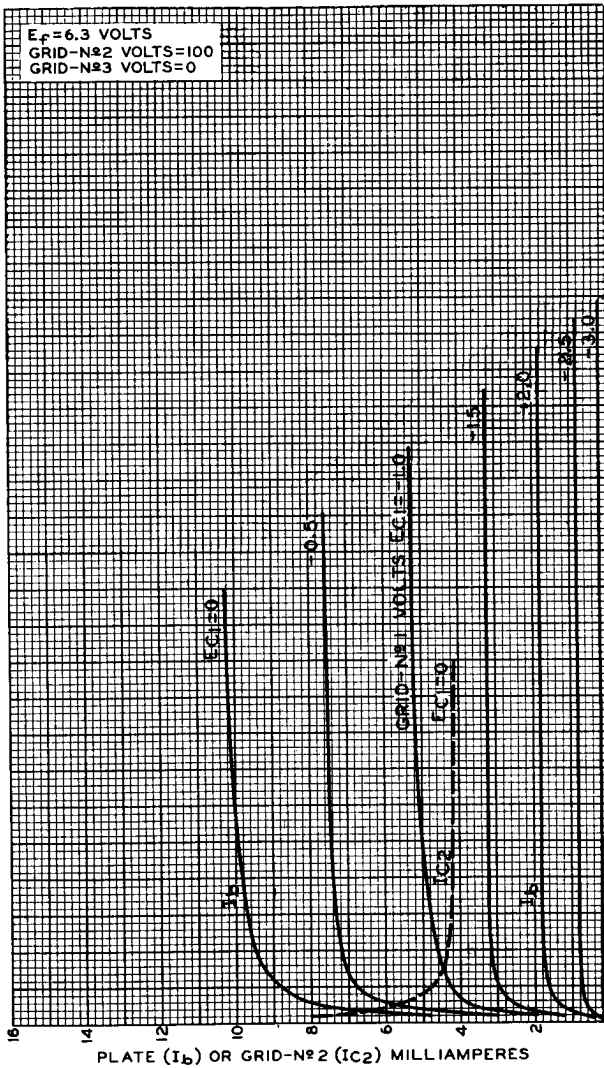

6136

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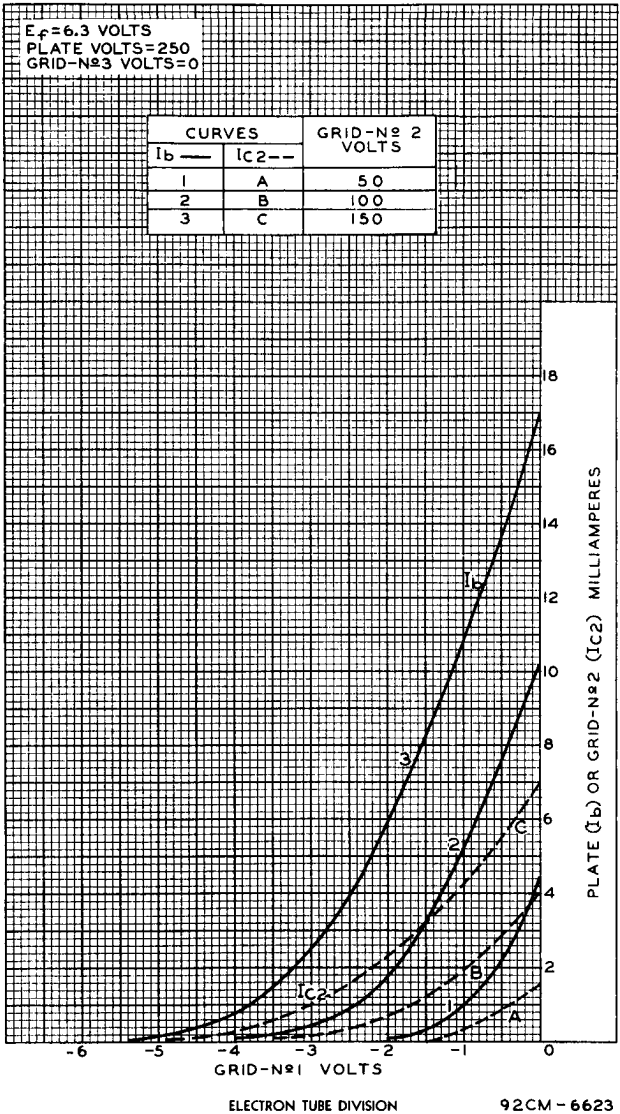

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6136

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