6199

MULTIPLIER PHOTOTUBE

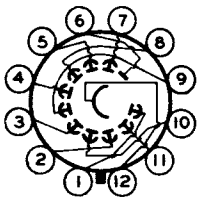
10-STAGE, HEAD-ON TYPE WITH
1.24" SEMITRANSPARENT CATHODE AND S-11 RESPONSE

DATA

General:

Spectral Response	S-11	←
Wavelength of Maximum Response	4400 ± 500 angstroms	←
Cathode, Semitransparent:		
Shape	Circular	
Window:		
Area	1.2 sq. in.	
Minimum diameter	1.24 in.	
Index of refraction	1.51	
Direct Interelectrode Capacitances (Approx.):		
Anode to dynode No.10	4 μμf	
Anode to all other electrodes	7 μμf	
Maximum Overall Length	4-9/16"	←
Seated Length	3-7/8" ± 3/16"	
Maximum Diameter	1-9/16"	
Mounting Position	Any	
Weight (Approx.)	2 oz	←
Bulb	T-12	
Base	Small-Shell Duodecal 12-Pin (JETEC No.B12-43), Non-hygroscopic	
Basing Designation for BOTTOM VIEW	12AE	←

Pin 1 - Dynode No.1	Pin 7 - Dynode No.10
Pin 2 - Dynode No.3	Pin 8 - Dynode No.8
Pin 3 - Dynode No.5	Pin 9 - Dynode No.6
Pin 4 - Dynode No.7	Pin 10 - Dynode No.4
Pin 5 - Dynode No.9	Pin 11 - Dynode No.2
Pin 6 - Anode	Pin 12 - Cathode



DIRECTION OF LIGHT: INTO END OF BULB

Maximum Ratings, *Absolute Values:*

ANODE-SUPPLY VOLTAGE (DC or Peak AC)	1250 max.	volts
SUPPLY VOLTAGE BETWEEN DYNODE No.10 AND ANODE (DC or Peak AC)	250 max.	volts ←
DYNODE-No.1 SUPPLY VOLTAGE (DC or Peak AC)	300 max.	volts
AVERAGE ANODE CURRENT•	0.75 max.	ma
AMBIENT TEMPERATURE	75 max.	°C

• Averaged over any interval of 30 seconds maximum.

← Indicates a change.

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6199

6199

MULTIPLIER PHOTOTUBE

→ **Characteristics Range Values for Equipment Design:**

Under conditions with supply voltage (E) across voltage divider providing 1/6 of E between cathode and dynode No.1; 1/12 of E for each succeeding dynode stage; and 1/12 of E between dynode No.10 and anode

With E = 1000 volts (except as noted)

	Min.	*Median*	*Max.*	
Sensitivity:				
Radiant, at 4400 angstroms. . .	–	21600	–	μamp/μwatt
Cathode radiant, at 4400 angstroms. . .	–	0.036	–	μamp/μwatt
Luminous:♦				
At 0 cps.	10	27	300	amp/lumen
With dynode No.10 as output electrode†.	–	16	–	amp/lumen
Cathode luminous:				
With tungsten light source▲ . .	30	45	–	μamp/lumen
With blue light source⊕♦.	0.028	–	–	μamp
Current Amplification .	–	600000	–	
Equivalent Anode-Dark-Current Input⊕■ . . .	–	8×10^{-10}	2.5×10^{-9}	lumen
Equivalent Noise Input★	–	4×10^{-12}	–	lumen
Dark Current to Any Electrode Except Anode (At 25°C) . . .	–	–	0.75	μamp

With E = 750 volts (except as noted)

	Min.	*Median*	*Max.*	
Sensitivity:				
Radiant, at 4400 angstroms. . .	–	2160	–	μamp/μwatt
Cathode radiant, at 4400 angstroms. . .	–	0.036	–	μamp/μwatt
Luminous:♦				
At 0 cps.	–	2.7	–	amp/lumen
With dynode No.10 as output electrode†. . . .	–	1.6	–	amp/lumen
Cathode luminous:				
With tungsten light source▲ . .	30	45	–	μamp/lumen
With blue light source⊕♦.	0.04	–	–	μamp
Current Amplification .	–	60000	–	

♦,†,▲,⊕,♦,⊕,■,★: See next page. → Indicates a change.

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6199

MULTIPLIER PHOTOTUBE

For conditions where the light source is a tungsten-filament lamp operated at a color temperature of 2870°K. A light input of 10 microlumens is used. The load resistor has a value of 0.01 megohm.

† An output current of opposite polarity to that obtained at the anode may be provided by using dynode No.10 as the output electrode. With this arrangement, the load is connected in the dynode-No.10 circuit and the anode serves only as collector.

▲ For conditions the same as shown under (•) except that the value of light flux is 0.01 lumen and 150 volts are applied between cathode and all other electrodes connected together as anode.

⊕ Under the following conditions: Light incident on the cathode is transmitted through a blue filter (Corning, Glass Code No.5113 polished to 1/2 stock thickness) from a tungsten-filament lamp operated at a color temperature of 2870°K. The value of light flux on the filter is 0.01 lumen. The load resistor has a value of 0.01 megohm, and 150 volts are applied between cathode and all other electrodes connected together as anode.

♦ For spectral characteristic of this source, see sheet SPECTRAL CHARACTERISTIC OF 2870°K LIGHT SOURCE AND SPECTRAL CHARACTERISTIC OF LIGHT FROM 2870°K SOURCE AFTER PASSING THROUGH INDICATED BLUE FILTER at front of this section.

⊕ Measured at a tube temperature of 25°C and with the supply voltage (E) adjusted to give a luminous sensitivity of 20 amperes per lumen. Dark current caused by thermionic emission and ion feedback may be reduced by the use of a refrigerant.

■ For maximum signal-to-noise ratio, operation with a supply voltage (E) below 1000 volts is recommended.

★ Under the following conditions: Supply voltage (E) is 1000 volts, 25°C tube temperature, ac-amplifier bandwidth of 1 cycle per second, tungsten light source at color temperature of 2870°K interrupted at a low audio frequency to produce incident radiation pulses alternating between zero and the value stated. The "on" period of the pulse is equal to the "off" period. The output current is measured through a filter which passes only the fundamental frequency of the pulses.

OPERATING CONSIDERATIONS

The *operating stability* of the 6199 is dependent on the magnitude of the anode current and its duration. When the 6199 is operated at high values of anode current, a drop in sensitivity (sometimes called fatigue) may be expected. The extent of the drop below the tabulated sensitivity values depends on the severity of the operating conditions. After a period of idleness, the 6199 usually recovers a substantial percentage of such loss in sensitivity.

The use of an average anode current well below the maximum rated value of 0.75 milliampere is recommended when stability of operation is important. When maximum stability is required, the anode current should not exceed 100 microamperes.

Electrostatic and/or *magnetic shielding* of the 6199 may be necessary.

SPECTRAL-SENSITIVITY CHARACTERISTIC
of Phototube having S-11 Response
is shown at the front of this Section

← Indicates a change.

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6199

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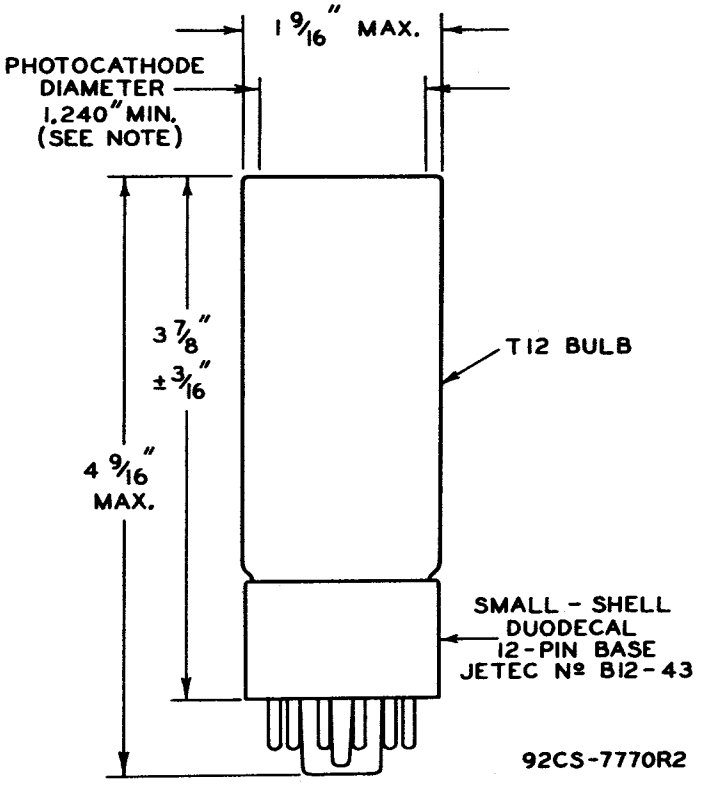

NOTE: DEVIATION FROM FLATNESS WITHIN THE 1.240"-DIAMETER AREA WILL NOT EXCEED 0.010" FROM PEAK TO VALLEY.

℄ OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM THE PERPENDICULAR ERECTED AT THE CENTER OF BOTTOM OF THE BASE.

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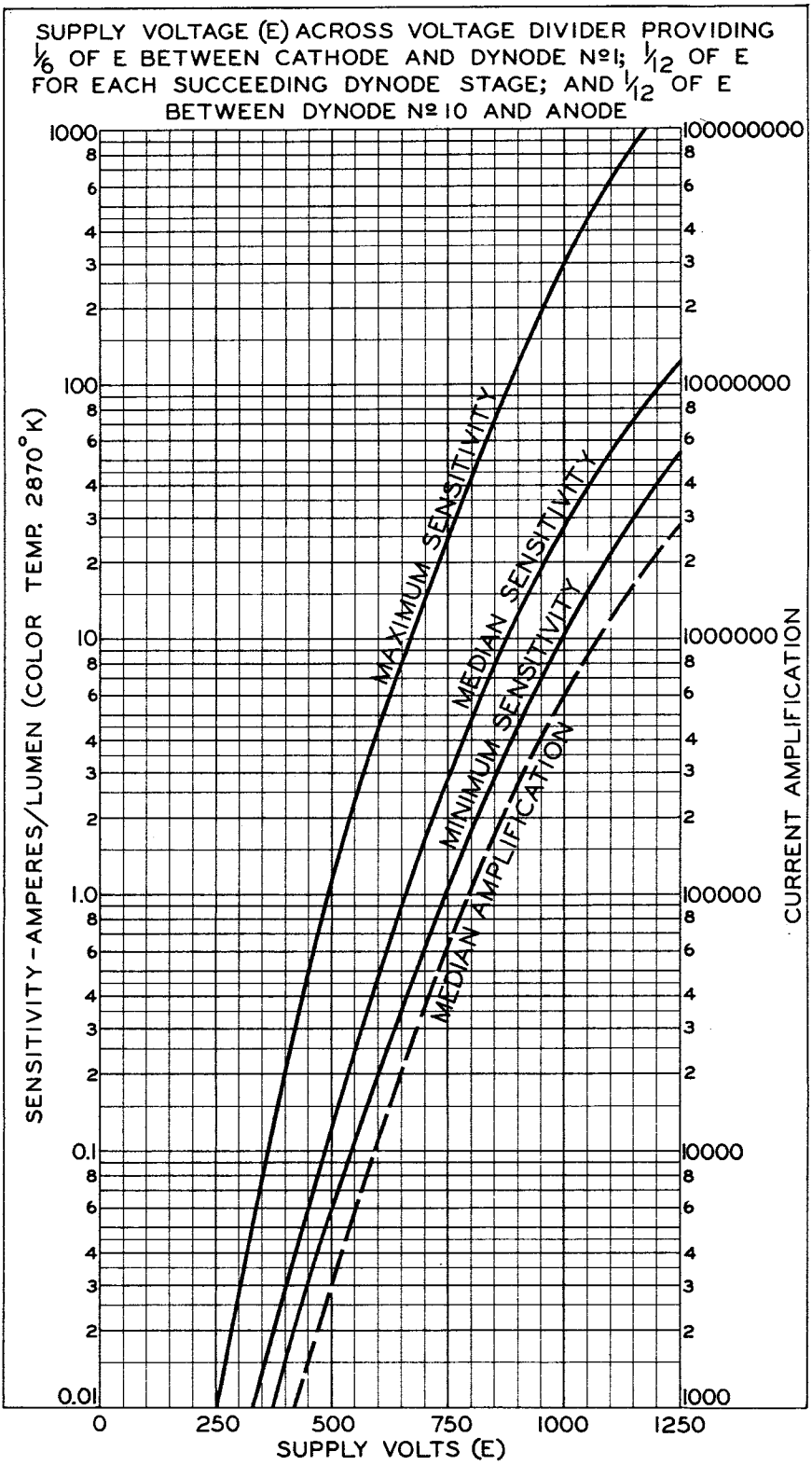
6199

CHARACTERISTICS



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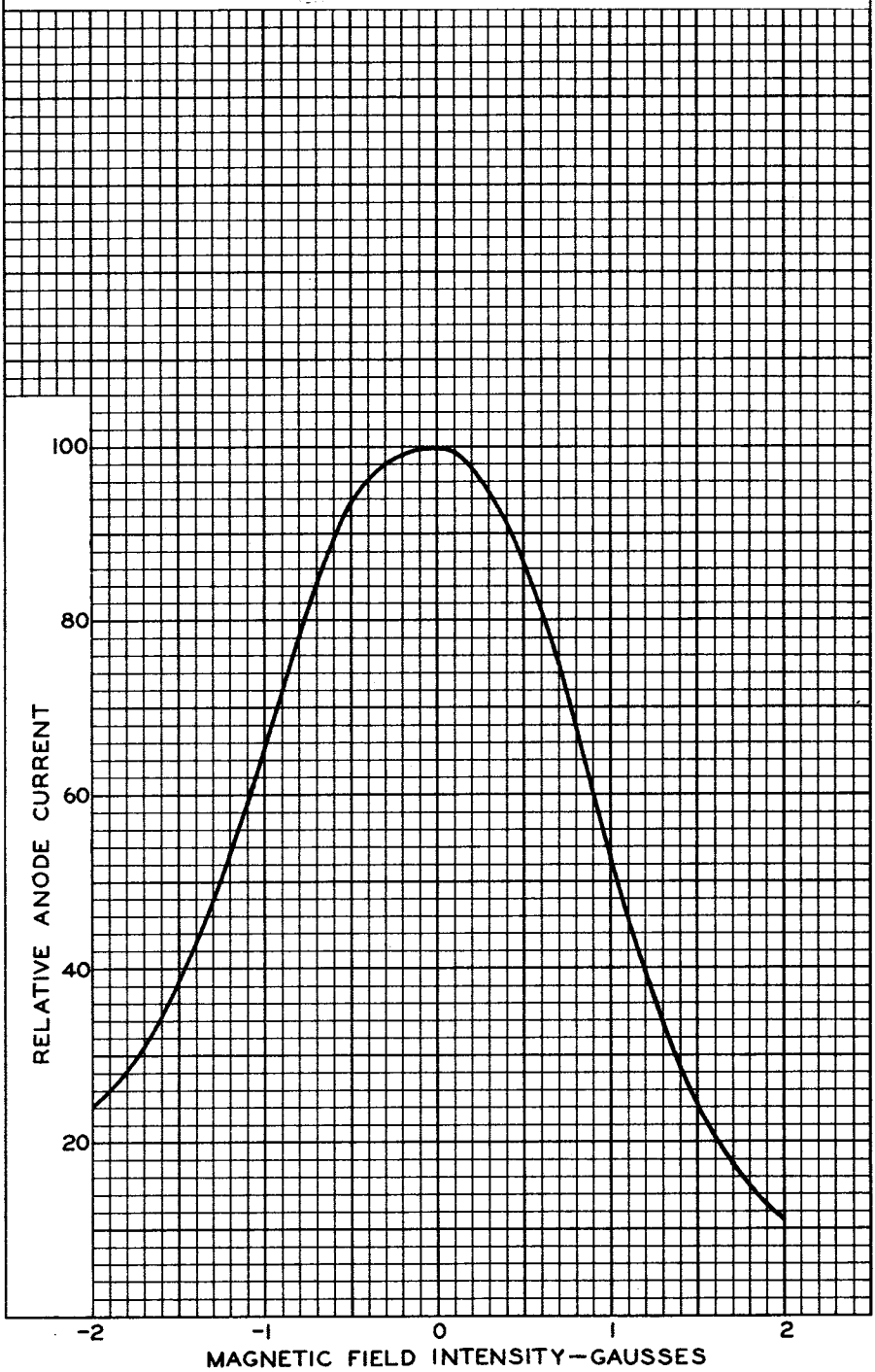
92CL-7812RI

6199

6199

EFFECT OF MAGNETIC FIELD ON ANODE CURRENT

MAGNETIC FIELD IS PARALLEL TO DYNODE-CAGE AXIS
POSITIVE VALUES ARE FOR LINES OF FORCE FROM LEFT TO RIGHT WITH BASE DOWN AND BASE KEY TOWARD OBSERVER
VOLTS PER STAGE = 100



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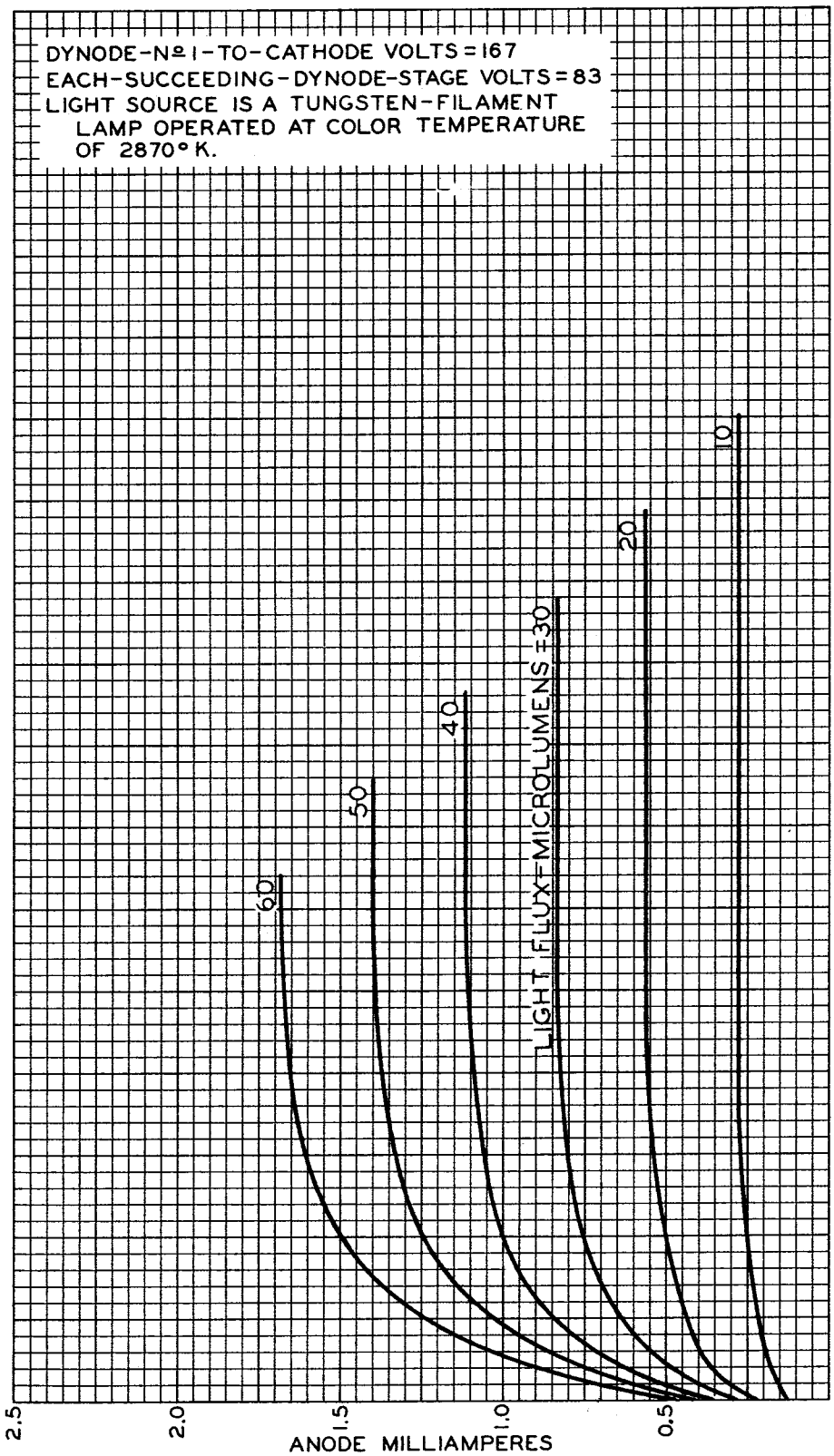
6199

AVERAGE ANODE CHARACTERISTICS



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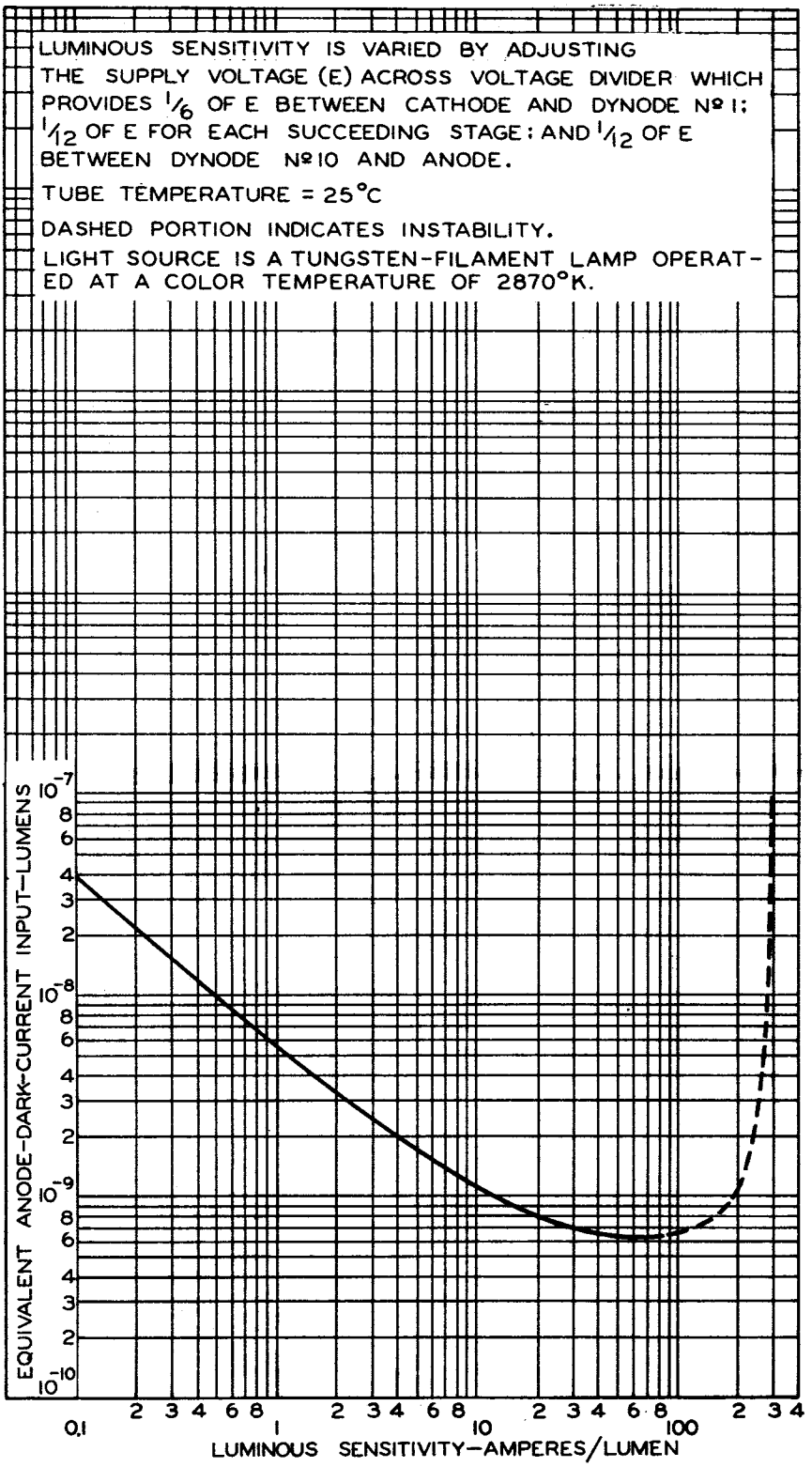
6199

TYPICAL ANODE-DARK-CURRENT CHARACTERISTIC



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92CM-7814R2