

# Diode

## 3DR3

**FOR TV HIGH-VOLTAGE  
RECTIFIER APPLICATIONS**

- COLOR TV TYPE
- 30000 VOLTS DC
- 2.0 MILLIAMPERES DC
- X-RADIATION RATING

The 3DR3 is a heater-cathode type diode designed for use in color television receivers as the high voltage rectifier to supply power to the anode of the picture tube.

Features of the tube include a protective shield of X-radiation absorbing material to reduce the X-radiation output to very low levels even under failure mode conditions of equipment misadjustment and/or circuit failure mode operation.

### GENERAL

#### ELECTRICAL

Cathode - Coated Unipotential

Heater Characteristics and Ratings

Heater Voltage, AC or DC *	3.15±0.5	Volts
Heater Current ●	0.3	Amperes

Direct Interelectrode Capacitances, approximate ▲

Plate to Heater, Cathode and Internal Shield:		
p to (h+k+i.s.)	1.9	pf

#### MECHANICAL

Operating Position - Any

Envelope - T-11, Glass with Bonded Shield

Base - Base - B8-264, Small-Wafer Octal 8-Pin

Top Cap - C1-51, Small

Outline Drawing

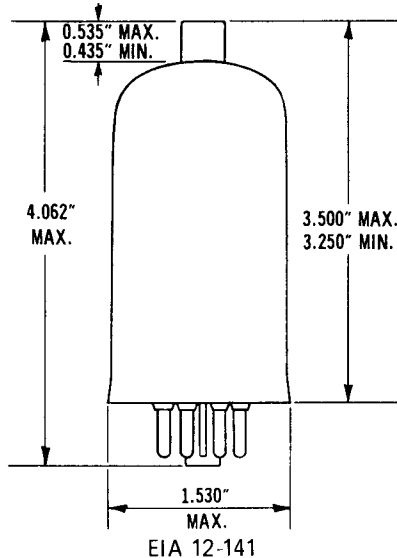
Maximum Envelope Diameter	1.530	Inches
Maximum Over all Length	4.062	Inches
Maximum Seated Height	3.500	Inches
Minimum Seated Height	3.250	Inches

### MAXIMUM RATINGS

#### FLYBACK RECTIFIER SERVICE §—DESIGN-MAXIMUM VALUES UNLESS OTHERWISE STATED

Peak Inverse Voltage		
DC Component (Absolute-Maximum Value)	30000	Volts
Total DC and Peak (Absolute-Maximum Value) †	38000	Volts
Steady-State Peak Plate Current	100	Milliamperes
DC Output Current	2.0	Milliamperes
Heater Voltage, AC or DC (Absolute-Maximum Value) ‡	3.65	Volts
Heater Voltage, AC or DC (Absolute-Minimum Value)	2.65	Volts

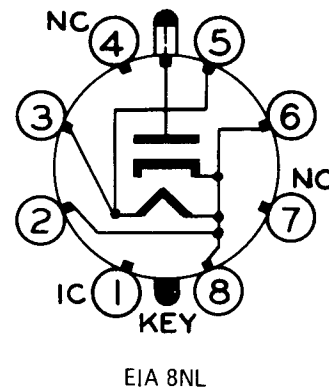
#### PHYSICAL DIMENSIONS



#### TERMINAL CONNECTIONS ♦

- Pin 1 - Internal Connection - Do Not Use
- Pin 2 - Heater, Cathode and Internal Shield
- Pin 3 - Heater
- ♦ Pin 4 - No Connection
- Pin 5 - Heater
- Pin 6 - Heater, Cathode and Internal Shield
- ♦ Pin 7 - No Connection
- Pin 8 - Heater, Cathode and Internal Shield
- Cap - Plate

#### BASING DIAGRAM



**MAXIMUM RATINGS (Cont'd)**

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

Absolute-Maximum ratings are limiting values of operating and environmental conditions applicable to any electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making no allowance for equipment variations, environmental variations, and the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration and of

all other electron devices in the equipment.

The equipment manufacturer should design so that initially and throughout life no absolute-maximum value for the intended service is exceeded with any tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of the tube under consideration and of all other electron devices in the equipment.

**AVERAGE CHARACTERISTICS**

Tube Voltage Drop, approximate

I<sub>b</sub> = 7.0 Milliampères ..... 70 Volts

**X-RADIATION RATING §**

**MAXIMUM RATED OPERATING CONDITIONS**

**Total DC and  
Peak Inverse Voltage**

⊕ 38 KV .....

**Maximum  
X-Radiation Output**

0.5 mR/hr

Based on accumulated sample test data taken initially and during life test, tubes do not exceed the maximum rating limit of 0.5 mR/hr at any time throughout their useful life, when operated within the maximum ratings, including heater voltage, specified on this data sheet.

This X-radiation maximum rating is based on the the use of the Victoreen 440 RF/C survey meter as the standard instrument for X-radiation measurement. X-radiation is measured with the plastic spacer of the 440 RF/C survey meter at a distance of four (4) inches from the external surface of the tube under test. This rating information is not necessarily applicable when a different radiation measuring instrument is used.

Operation at voltages outside of the Absolute-Maximum Ratings will cause permanent damage to the tube resulting in short life and/or catastrophic failure. Any tube known to have operated above 38 KV peak inverse voltage and/or 3.65 V heater voltage should be replaced with the latest version of the same tube type.

The X-radiation characteristics are measured in accordance with JEDEC Publication No. 67A, "Recommended Practice for Measurement of X-Radiation from Receiving Tubes," and controlled in accordance with JEDEC Publication No. 73A, "Recommended Practice for Quality Control of X-Radiation from High Voltage Rectifier and Shunt Regulator Receiving Tubes."

The General Electric Company makes no representation concerning the X-radiation output from these tubes when operated beyond the maximum ratings set forth herein, except as noted under "X-Radiation Characteristics."

## X-RADIATION CHARACTERISTICS

### EQUIPMENT MISADJUSTMENT AND/OR CIRCUIT FAILURE MODE OPERATION

The 3DR3 is designed to limit X-radiation to 0.5 mR/hr provided its protective shield has not been removed or damaged. Based on known attenuation factors of tube construction materials and accumulated sample test data taken initially and during life test, X-radiation output is not expected to exceed the indicated value under equipment misadjustment and/or circuit failure mode operations of plate and heater voltage listed below.

Total DC and Peak Inverse Voltage	Maximum Heater Voltage	Maximum Expected X-Radiation Output
⊕41 KV .....	⊕4.8 V .....	0.5 mR/hr

The General Electric Company makes no representation concerning the X-radiation output from these tubes when operated with total DC and peak inverse voltage above 41 KV.

Operation at voltages outside of the Absolute-Maximum Ratings will cause permanent damage to the tube resulting in short life and/or catastrophic failure. Any tube known to have operated above 38 KV peak inverse voltage and/or 3.65 V heater voltage should be replaced with the latest version of the same tube type.

### WARNING

#### X-RADIATION

X-radiation in excess of 0.5 mR/hr may constitute a health hazard on prolonged exposure at close range. Therefore, equipment design must provide for adequate shielding.

Operation of the 3DR3 with total DC and peak inverse voltage greater than 41 KV may result in radiation in excess of the "Maximum Expected X-Radiation Output" listed under "X-Radiation Characteristics."

Precautions must be exercised during servicing of equipment employing the 3DR3 to assure that the high voltage is adjusted to the recommended value and that the tube's protective shield is not damaged. **IF THE PROTECTIVE SHIELD IS REMOVED OR DAMAGED IN ANY WAY, THE 3DR3 MUST BE REPLACED WITH THE LATEST VERSION OF THE SAME TUBE TYPE.**

#### SHOCK HAZARD

The high voltages at which the 3DR3 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of and in the servicing and adjustment of any high voltage circuit.

Precautions must be exercised during the replacement or servicing of the 3DR3 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while connecting or disconnecting the top cap connector.

#### ARC TEST FOR HIGH VOLTAGE

The practice of checking for high voltage by drawing an arc from the top cap can permanently damage the protective shield which will necessitate replacing the tube.

**THE EQUIPMENT MANUFACTURER SHOULD PROVIDE A WARNING LABEL IN AN APPROPRIATE POSITION ON THE EQUIPMENT TO ADVISE THE SERVICEMAN OF ALL PRECAUTIONS HEREIN.**

### NOTES

- \* The equipment designer should design the equipment so that heater voltage is centered at the specified bogey value, with heater supply variations restricted to maintain heater voltage within the specified tolerance.
- Heater current of a bogey tube at  $E_f = 3.15$  volts.
- ▲ Without external shield.
- ◆ Socket terminals 4 and 7 may be used as tie points for components at or near heater potential.
- § For operation in a 525-line, 30-frame television system as de-

scribed in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission. The duty cycle of the voltage pulse must not exceed 15 percent of one scanning cycle.

- ‡ **CAUTION** - Operation at voltages outside of the Absolute-Maximum Ratings will cause permanent damage to the tube resulting in short life and/or catastrophic failure. Any tube known to have operated above 38 KV peak inverse voltage and/or 3.65 V heater voltage should be replaced with the latest version of the same tube type.

The tubes and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an

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**3DR3**

Page 4  
8-71

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**GENERAL  ELECTRIC**