

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

16AQ3

1 SECTION
CONSTRUCTION
RECTIFIER

Rectifier - Damper Diode electronic tube

Miniature high-voltage booster diode designed for line-time-base circuits of transformerless television receivers, with exceptionally high heater-cathode pulse-voltage capability.

GENERAL CHARACTERISTICS

BASE DESIGNATION	9CB	BASE PINS	9
NOMINAL HEATER	16.4 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

9CB - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN1 – IC	–	–	IC
PIN2 – IC	–	–	IC
PIN3 – IC	–	–	IC
PIN4 – H	–	H – Heater	CONNECTED
PIN5 – H	–	H – Heater	CONNECTED
PIN6 – IC	–	–	IC
PIN7 – IC	–	–	IC
PIN8 – IC	–	–	IC
PIN9 – P	A	P – Plate (Anode)	CONNECTED
CAP1 – K	A	K – Cathode	CONNECTED

SECTION RATINGS

SECTION 1 Rectifier	
MAXIMUM PLATE DISSIPATION	5 W
PEAK INVERSE VOLTAGE	5000 V
NOMINAL OUTPUT CURRENT	150 mA
PEAK FORWARD CURRENT	800 mA
MAXIMUM HEATER-CATHODE VOLTAGE	5000 V
<i>Published ratings and characteristics promoted from the supplied Rogers/Rogers Majestic source.</i>	

16AQ3 — Booster Diode Vacuum Tube

An indirectly heated, single-diode miniature vacuum tube designed for service as a booster or damper diode in the line-timebase circuits of transformerless television receivers.

Overview

The **16AQ3** (also designated as **16AQ3/XY88**) is a high-voltage miniature diode designed specifically for television receiver applications. It functions as a booster or damper diode in line-timebase circuits, where it must withstand high peak voltages and carry substantial currents. The tube is characterized by its unipotential coated cathode, high heater-to-cathode voltage rating, and a 9-pin miniature construction with a top-cap connection.

The 16AQ3/XY88 is described as a 600 mA heater version of the **6AL3/EY88** damper diode. Additionally, it is closely related to the **20AQ3/LY88**, which shares identical electrical characteristics and physical construction but utilizes a different heater rating.

Mechanical Construction and Pinout

The 16AQ3 is constructed in a miniature T-6½ glass envelope with a button 9-pin (E9-1) base. It features a top cap (C1-2) to provide high-voltage isolation for the cathode connection, which is critical for booster diode service where the cathode experiences high-voltage pulses. The tube requires a miniature 9-contact socket, corresponds to outline section 7D, and can be mounted in any position.

Physical Dimensions

- **Maximum Diameter:** 0.875 inches (7/8")
- **Maximum Seated Height:** 3.250 inches (3¼")
- **Maximum Overall Height:** 3.500 inches (3½")

Pin Connection Diagram (Basing 9CB)

The 16AQ3 uses the **9CB** basing arrangement. When viewed from the bottom of the base, the pin connections are assigned as follows:

Pin Number	Element
Pin 1	Internally connected (do not use)
Pin 2	Internally connected (do not use)
Pin 3	Internally connected (do not use)
Pin 4	Heater
Pin 5	Heater
Pin 6	Internally connected (do not use)
Pin 7	Internally connected (do not use)
Pin 8	Internally connected (do not use)
Pin 9	Anode (Plate)
Top Cap	Cathode

The multiple internally connected pins (Pins 1, 2, 3, 6, 7, and 8) must not be used as tie points for external circuit wiring to prevent internal breakdown or capacitive coupling.

Heater and Interelectrode Capacitances

The 16AQ3 features an indirectly heated, coated unipotential cathode. The heater is designed for series-string operation in transformerless television receivers.

Heater Specifications

- **Heater Voltage (AC or DC):** 16.4 V
- **Heater Current:** 0.6 A (600 mA)

For comparison, the identical [20AQ3/LY88](#) variant operates with a heater voltage of 20.2 V and a heater current of 0.45 A (450 mA).

Direct Interelectrode Capacitances

The direct capacitances of the tube elements, measured without an external shield, are:

- **Plate to all other elements:** 8.6 pF
- **Cathode to heater:** 2.0 pF

Maximum Ratings and Operating Limits

The ratings for the 16AQ3 are established under the Design-Center Rating System. These limits represent the maximum values that the tube can safely withstand under typical operating variations.

Voltage and Current Limits

- **Supply Voltage at Zero Current (Max.):** 550 V
- **Supply Voltage (Max.):** 250 V
- **Average Plate Current (Max.):** 220 mA
- **Peak Plate Current (Max.):** 550 mA
- **Plate Dissipation (Max.):** 5 W
- **Voltage Between Heater and Earth (Max.):** 220 V r.m.s.

Pulsed and High-Voltage Limits

In line-timebase circuits, the booster diode is subjected to high-voltage pulses during horizontal retrace. The 16AQ3 is rated to handle these extreme conditions within specified duty cycle limits:

- **Peak Negative-Pulse Plate Voltage (Max.):** 6000 V
- **Peak Heater-Cathode Voltage (Max.):** 6600 V

These pulsed ratings are subject to strict timing constraints: the pulse duration must not exceed 22% of a single horizontal scanning cycle, with an absolute maximum duration of 18 microseconds. Under no circumstances should the absolute maximum plate voltage exceed 7500 V.

Technical Summary

The **16AQ3** (16AQ3/XY88) is a specialized miniature booster diode housed in a T-6½ envelope with a 9-pin button base and a top-cap cathode connection. Operating with a 16.4 V, 0.6 A heater, it is optimized for series-string transformerless television receivers. The tube is capable of handling an average plate current of 220 mA, a peak plate current of 550 mA, and a plate dissipation of 5 W. Its robust design allows it to withstand peak negative-pulse plate voltages of up to 6000 V (with an absolute limit of 7500 V) and peak heater-cathode voltages of up to 6600 V, making it highly suited for demanding horizontal damper service.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1959 Rogers

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1959 ROGERS

Section 1 · Rectifier

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterOrFilamentVoltage	16.4 V	—
HeaterOrFilamentCurrent	600 mA	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1975 RCA RC30

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1975 RCA RC30

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage (ac/dc) 16.4	20.2 V	Published in approved XY88 target datasheet entry; Section1
Heater Current 0.6	450 mA	Published in approved XY88 target datasheet entry; Section1
Peak Heater-Cathode Voltage 6600	6600 V	Published in approved XY88 target datasheet entry; Section1
Supply Voltage at zero current	550 V	Published in approved XY88 target datasheet entry; Section1
Supply Voltage	250 V	Published in approved XY88 target datasheet entry; Section1
Peak Plate Current	550 mA	Published in approved XY88 target datasheet entry; Section1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average Plate Current	220 mA	Published in approved XY88 target datasheet entry; Section1
Plate Dissipation	5 W	Published in approved XY88 target datasheet entry; Section1
* Under no conditions should an absolutemaximum value of	7500 V	Published in approved XY88 target datasheet entry; Section1
# The pulse duration must not exceed	22 %	Published in approved XY88 target datasheet entry; Section1
# The pulse duration must not exceed 22 per cent of a cycle, or a maximum of	18 microseconds	Published in approved XY88 target datasheet entry; Section1

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