



## ELECTRONIC TUBE REFERENCE

## 10D2

Diode (NOT rectifier) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

DIODE-DIODE

Double-diode valve for radio detection and related signal rectification. Its two diode sections permit multiple detector or control-voltage functions, while the 19 V heater suits series-string receiver operation.

## GENERAL CHARACTERISTICS

|                     |                   |                      |         |
|---------------------|-------------------|----------------------|---------|
| BASE DESIGNATION    | —                 | BASE PINS            | 7       |
| NOMINAL HEATER      | 19 V / 100 mA     | PARALLEL HEATER      | — / —   |
| HEATING             | Indirect          | SERIES OPERATION     | Capable |
| CATHODE ARRANGEMENT | Separate cathodes | SECTION CONSTRUCTION | Similar |

## SECTION RATINGS

|                                                                                                                                                                                                                                                                                                                                                                                                                   |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| SECTION1 Diode                                                                                                                                                                                                                                                                                                                                                                                                    |       |
| MAXIMUM CATHODE CURRENT                                                                                                                                                                                                                                                                                                                                                                                           | 9 mA  |
| PEAK INVERSE VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                              | 500 V |
| NOMINAL OUTPUT CURRENT                                                                                                                                                                                                                                                                                                                                                                                            | 9 mA  |
| PEAK FORWARD CURRENT                                                                                                                                                                                                                                                                                                                                                                                              | 50 mA |
| <i>Mazda 10D2 series-heater double diode with separate indirectly heated cathodes. First physical diode: maximum mean anode current 9 mA, peak anode current 50 mA and peak inverse anode voltage 500 V. The 500 V peak inverse limit is not a continuous forward anode voltage. Heater 19 V at 0.10 A. Manufacturer supplies interelectrode capacitance data. Separate physical diode sections are retained.</i> |       |

|                                                                                                                                                                                                                                                                                                                     |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| SECTION2 Diode                                                                                                                                                                                                                                                                                                      |      |
| MAXIMUM CATHODE CURRENT                                                                                                                                                                                                                                                                                             | 9 mA |
| <i>Second physical diode of Mazda 10D2. Each diode has its own separate cathode, with shared series heater 19 V, 0.10 A. Maximum mean diode current 9 mA, peak diode current 50 mA and peak inverse voltage 500 V. Peak inverse voltage is not a DC forward anode rating. Both sections represented separately.</i> |      |

# 10D2 — Double Diode Vacuum Tube

The **10D2** is an indirectly heated double diode vacuum tube featuring separate cathodes, designed specifically for series heater operation. It is housed in a compact glass envelope with a miniature seven-pin base. The tube is engineered for applications requiring two independent diode sections, such as detection, low-current rectification, or full-wave rectification circuits.

## Heater and Electrical Ratings

The 10D2 is designed with an indirectly heated cathode configuration optimized for series-string heater loops. The heater operates at a nominal voltage of 19 V and a constant current of 0.1 A.

The absolute maximum ratings for each diode section and the heater-to-cathode insulation must be strictly observed to ensure reliable operation:

| Parameter                                                    | Symbol      | Maximum Rating |
|--------------------------------------------------------------|-------------|----------------|
| Mean Anode Current (per anode)                               | Ia(av)max   | 9 mA           |
| Peak Anode Current (per anode)                               | Ia(pk)max   | 50 mA          |
| Peak Inverse Anode Voltage                                   | P.I.V.(max) | 500 V          |
| Potential Heater/Cathode (D.C. + A.C. peak, heater negative) | Vh-k(max)   | 150 V          |

## Physical Characteristics and Pinout

The 10D2 utilizes a clear glass bulb and a standard B7G miniature seven-pin base. The physical dimensions and weight of the device are as follows:

- **Maximum Overall Length:** 54 mm
- **Maximum Seated Height:** 47.5 mm
- **Maximum Diameter:** 19 mm
- **Approximate Net Weight:** 1/4 oz
- **Approximate Packed Weight:** 1/2 oz
- **Mounting Position:** Unrestricted

The B7G base pin connections, viewed from the free end of the pins, are configured as follows:

| Pin Number | Electrode Connection | Symbol |
|------------|----------------------|--------|
| 1          | Cathode 1            | k'     |
| 2          | Anode 2              | a''    |

| Pin Number | Electrode Connection | Symbol |
|------------|----------------------|--------|
| 3          | Heater               | h      |
| 4          | Heater               | h      |
| 5          | Cathode 2            | k''    |
| 6          | Internal Shield      | s      |
| 7          | Anode 1              | a'     |

The inclusion of an internal shield connected to pin 6 helps minimize capacitive coupling between the two independent diode sections.

## Inter-electrode Capacitances

The inter-electrode capacitances of the 10D2 are specified under two distinct measurement conditions, both utilizing a closely fitting metal can connected to earth:

- 1. **Balanced-out Condition (□):** Inter-electrode capacitance measured with the external socket/holder capacitance balanced out.
- 2. **Total Condition (†):** Total capacitance including a Benjamin B7G ceramic holder (Type [75/833](#)) and a cylindrical screen (Type [75/832](#)). This specific holder incorporates a radial shield positioned between pins 1 and 7.

The capacitance values for both conditions are detailed below:

| Capacitance Parameter             | Symbol   | Balanced-out (□) | Total with Holder/Screen (†) |
|-----------------------------------|----------|------------------|------------------------------|
| Anode 1 to All other Electrodes   | ca'-all  | 3.4 pF           | 4.5 pF                       |
| Anode 1 to Anode 2                | ca'-a''  | 0.018 pF         | 0.021 pF                     |
| Anode 1 to Cathode 1              | ca'-k'   | 1.65 pF          | 1.68 pF                      |
| Anode 2 to All other Electrodes   | ca''-all | 3.4 pF           | 4.5 pF                       |
| Anode 2 to Cathode 2              | ca''-k'' | 1.65 pF          | 1.65 pF                      |
| Cathode 1 to All other Electrodes | ck'-all  | 4.0 pF           | 5.1 pF                       |
| Cathode 1 to Cathode 2            | ck'-k''  | 0.009 pF         | 0.011 pF                     |

| Capacitance Parameter             | Symbol   | Balanced-out ( $\square$ ) | Total with Holder/Screen ( $\dagger$ ) |
|-----------------------------------|----------|----------------------------|----------------------------------------|
| Cathode 2 to All other Electrodes | ck''-all | 4.1 pF                     | 5.2 pF                                 |
| Cathode 2 to Heater               | ck''-h   | 2.5 pF                     | 2.8 pF                                 |
| Cathode 1 to Heater               | ck'-h    | 2.27 to 2.47 pF            | 2.3 pF                                 |

*Note: The balanced-out capacitance between Cathode 1 and Heater (ck'-h) exhibits a minor variation between 2.27 pF and 2.47 pF across different production documentation issues.*

## Operating Characteristics and Curves

The electrical behavior of the 10D2 is characterized by its anode current response to applied anode voltage and its performance in full-wave rectification circuits.

### Anode Current vs. Anode Voltage ( $I_a$ / $V_a$ )

The relationship between the anode current ( $I_a$ ) and anode voltage ( $V_a$ ) for a single diode section is documented across two operating ranges:

- **Low-Voltage Range:** At very low anode potentials, conduction begins near -0.6 V. The anode current rises to approximately 0.5 mA at 0 V bias, 2.2 mA at 1.0 V, and reaches about 5.2 mA at 1.8 V.
- **High-Voltage Range:** When higher anode voltages are applied, the current increases significantly, reaching approximately 6 mA at 2 V, 27 mA at 6 V, and 53 mA at 10 V.

### Full-Wave Rectification Regulation

When operated as a full-wave rectifier, the typical regulation performance is defined under the following circuit conditions:

- **Limiting Resistance ( $R_{lim}$ ):** 300 $\Omega$  per anode
- **Filter Capacitance (C):** 8 $\mu$ F
- **Supply Frequency (f):** 50 c/s

Under these conditions, the direct current (D.C.) output voltage varies with the load current for three standard transformer secondary voltages:

- **150-0-150 V RMS Supply:** The D.C. output voltage is approximately 210 V at 0 mA load, dropping smoothly to about 185 V at a full load of 20 mA.
- **100-0-100 V RMS Supply:** The D.C. output voltage starts at approximately 140 V at 0 mA load and decreases to about 115 V at 20 mA.
- **50-0-50 V RMS Supply:** The D.C. output voltage begins at approximately 70 V at 0 mA load and drops to about 50 V at 20 mA.

## Technical Summary

The **10D2** is a versatile, indirectly heated double diode featuring separate cathodes and an internal shield, designed for series-string heater operation at 19 V, 0.1 A. Housed in a clear glass B7G miniature envelope, it offers unrestricted mounting flexibility and a compact physical profile. With a maximum peak inverse voltage rating of 500 V and a peak anode current capability of 50 mA per section, the 10D2 is well-suited for low-current power supplies, full-wave rectification, and signal detection. Its low inter-electrode capacitances—particularly the extremely low anode-to-anode and cathode-to-cathode values—ensure excellent isolation between the two diode sections when operated with appropriate shielding.



## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1960 Mazda

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

1960 MAZDA

## Section 1 · Diode

**CHARACTERISTICS**

| PARAMETER                  | PUBLISHED VALUE | CONDITION / NOTE |
|----------------------------|-----------------|------------------|
| Cathode-heater capacitance | 2.8 pF          | —                |



## SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

# 1973 Mazda Valves Binder 2

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

1973 MAZDA VALVES BINDER 2

## Section 1 · Diode

**CHARACTERISTICS**

| PARAMETER                  | PUBLISHED VALUE | CONDITION / NOTE        |
|----------------------------|-----------------|-------------------------|
| Heater or filament voltage | 19 V            | Published nominal value |
| Heater or filament current | 100 mA          | Published nominal value |

**OTHER**

| PARAMETER                            | PUBLISHED VALUE | CONDITION / NOTE |
|--------------------------------------|-----------------|------------------|
| Maximum mean anode current per diode | 9 mA            | Published        |

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