



**MOTOROLA**

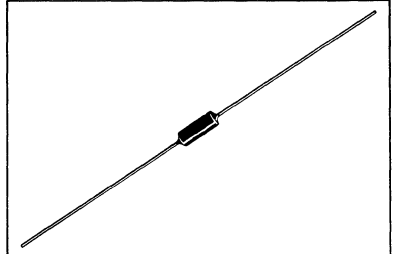
**MZ600 Series**  
6.2 VOLTS

**PRECISION REFERENCE DIODES**

... designed, manufactured and tested for applications requiring a precision voltage reference with ultra-high stability of voltage with time and temperature change.

Special test laboratory uses precision measurement equipment, four-terminal (separate contacts for current and voltage) measurement techniques and voltage standards to provide calibration directly traceable to the National Bureau of Standards.

**PRECISION REFERENCE DIODES**  
with  
**CERTIFIED ZENER VOLTAGE-TIME STABILITY**

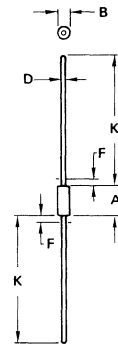


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*Certified* **TEST DATA**

Every Precision Reference Diode is individually serialized and its test data recorded on a Certificate of Precision that accompanies the device when shipped. This data shows:

- Actual device voltage at 168 hour intervals during verification test
- Voltage stability throughout the entire 1000 hour test period
- Certification of Precision
- All diodes are marked with the device type number and polarity band



- NOTES:
1. PACKAGE CONTOUR OPTIONAL WITHIN DIA B AND LENGTH A. HEAT SLUGS, IF ANY, SHALL BE INCLUDED WITHIN THIS CYLINDER, BUT SHALL NOT BE SUBJECT TO THE MIN LIMIT OF DIA B.
  2. LEAD DIA NOT CONTROLLED IN ZONES F, TO ALLOW FOR FLASH, LEAD FINISH BUILDUP, AND MINOR IRREGULARITIES OTHER THAN HEAT SLUGS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	5.84	7.62	0.230	0.300
B	2.16	2.72	0.085	0.107
D	0.46	0.56	0.018	0.022
F	-	1.27	-	0.050
K	25.40	38.10	1.000	1.500

All JEDEC dimensions and notes apply

**CASE 51-02**  
**DO-204AA**  
**(DO-7)**

# MZ600 Series

**OPERATING TEMPERATURE RANGE:** \* 25 to 100 °C.

**MZ600 SERIES** (Voltage 6.2V  $\pm$  5%,  $I_{ZT} = 7.5$  mAdc†,  $\Delta V_Z = 2.5$  mVdc\*\*)

Type No.	Voltage-Time Stability ( $\mu$ V/1000 Hours)	Parts Per Million Change (ppm/1000 Hours)
MZ605	31 Maximum	< 5
MZ610	62 Maximum	<10
MC620	124 Maximum	<20
MZ640	248 Maximum	<40

**DYNAMIC IMPEDANCE:** 10 Ohms at  $I_{ZT} = 7.5$  mAdc,  $I_{AC} = 0.75$  mA.

## NOTES

### †TEST CURRENT

For certification testing of time stability, Motorola maintains  $I_{ZT}$  constant and repeatable to  $\pm 0.05$   $\mu$ A tolerance. For voltage tolerance, impedance and voltage temperature stability  $I_{ZT}$  needs to be held to 0.01 tolerance only.

\*Maximum limits for use as a precision reference device. Limits are well below the maximum thermal limits.

\*\*VOLTAGE-TEMPERATURE STABILITY: Maximum allowable voltage change between voltages recorded at 25, 75 and 100°C ambient.

### VOLTAGE-TIME STABILITY ( $\Delta V_Z/1000$ Hours).

The device voltage is read and recorded initially and at 168 hour intervals through 1000 hours. The maximum change of voltage between readings, taken at any of the seven points, must be less than the maximum voltage change per 1000 hour specified as Voltage-Time Stability.

### TURN-ON CHARACTERISTICS

Precision Reference Diodes have been tested to determine the behavior of the device under interrupted power operation.

To insure specified performance, adequate time must be allowed for the device and its environment to reach thermal equilibrium. "Warm-up" time may range from 8 to 24 hours. Thermal equilibrium is reached when the chamber is cycling at the required temperature with the device energized.

After this "warm-up" period, the device voltage will be between the minimum and the maximum voltage of those recorded at the seven points of the Voltage-Time Stability certification.

### MOUNTING

Excellent results have been obtained by using a mechanical mounting. If necessary, the device may be soldered into a circuit using a heat sink between the heat source and the body of the diode. A low thermal EMF solder is recommended.

### SPECIAL NOTE

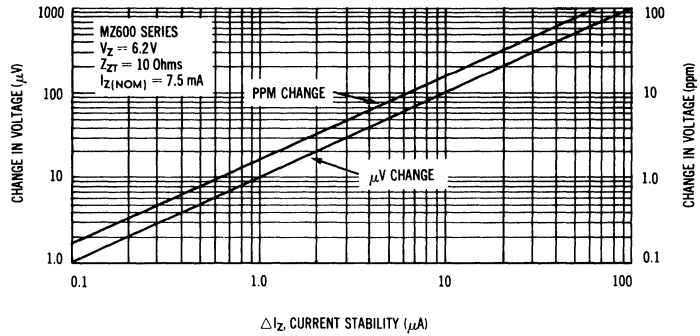
Voltage tolerance less than 5.0% is available upon special request.

Precision Reference Diodes capable of meeting special requirements for standard voltages regardless of required test current, temperature range, or test temperatures are available. Custom requirements of particular devices for specific applications are also available.

## VOLTAGE-CURRENT STABILITY CHARACTERISTICS

For verification of time stability, and for repeatable operation,  $I_{ZT}$  should be maintained with a tolerance of  $\pm 0.1 \mu\text{A}$ . Figure 1 will assist in design where the supply current stability cannot be maintained to better than  $0.2 \mu\text{A}$  deviation.

FIGURE 1 – MAXIMUM VOLTAGE CHANGE, IN  $\mu\text{V}$  AND PPM, DUE TO CURRENT SUPPLY STABILITY



## VOLTAGE-TEMPERATURE CHARACTERISTICS

### CHOICE OF OPERATING TEMPERATURE

The stability certification is performed at  $65^\circ\text{C} \pm 0.02^\circ\text{C}$ . The operating temperature can be selected within the operating temperature range. If the desired temperature is not  $65^\circ\text{C}$ , the precise voltage of the device will be different but the certified stability will still be observed.

### VOLTAGE TEMPERATURE STABILITY

For verification of time stability and/or repeatable operation, the ambient temperature should be controlled to  $\pm 0.1^\circ\text{C}$ .

Figure 2 will assist in designs where ambient temperature cannot be controlled to better than  $0.2^\circ\text{C}$  deviation.

FIGURE 2 – TYPICAL VOLTAGE CHANGE, IN  $\mu\text{V}$  AND PPM, DUE TO AMBIENT TEMPERATURE STABILITY

