

# NSR05T40XV2

## 500 mA, 40 V Schottky Barrier Diode

These Schottky barrier diodes are optimized for low forward voltage drop and low leakage current that offers the most optimal power dissipation in applications. They are housed in spacing saving micro-packaging ideal for space constraint applications.

### Features

- Low Forward Voltage Drop – 530 mV (Typ.) @  $I_F = 500$  mA
- Low Reverse Current – 3.0  $\mu$ A (Typ.) @  $V_R = 40$  V
- 500 mA of Continuous Forward Current
- ESD Rating: – Human Body Model: Class 3B  
– Charged Device Model: Class IV
- High Switching Speed
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### Typical Applications

- LCD and Keypad Backlighting
- Camera Photo Flash
- Buck and Boost dc-dc Converters
- Reverse Voltage and Current Protection
- Clamping & Protection

### MAXIMUM RATINGS

| Rating  | Symbol    | Value      | Unit |
|---|-----------|------------|------|
| Reverse Voltage   | $V_R$     | 40         | V    |
| Forward Current (DC)  | $I_F$     | 500        | mA   |
| Forward Surge Current<br>(60 Hz @ 1 cycle)                                | $I_{FSM}$ | 3.0        | A    |
| Repetitive Peak Forward Current<br>(Pulse Wave = 1 sec, Duty Cycle = 66%) | $I_{FRM}$ | 1.5        | A    |
| ESD Rating: Human Body Model<br>Charged Device Model                      | ESD       | > 8<br>> 1 | kV   |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



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### MARKING DIAGRAM



YK = Specific Device Code  
M = Date Code



### ORDERING INFORMATION

| Device         | Package              | Shipping†             |
|----------------|----------------------|-----------------------|
| NSR05T40XV2T5G | SOD-523<br>(Pb-Free) | 8000 / Tape &<br>Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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## THERMAL CHARACTERISTICS

| Characteristic   | Symbol                   | Min         | Typ | Max        | Unit                     |
|--|--------------------------|-------------|-----|------------|--------------------------|
| Thermal Resistance<br>Junction-to-Ambient (Note 1)<br>Total Power Dissipation @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$<br>$P_D$ |             |     | 489<br>250 | $^\circ\text{C/W}$<br>mW |
| Thermal Resistance<br>Junction-to-Ambient (Note 2)<br>Total Power Dissipation @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$<br>$P_D$ |             |     | 358<br>350 | $^\circ\text{C/W}$<br>mW |
| Junction and Storage Temperature Range   | $T_J, T_{stg}$           | -55 to +150 |     |            | $^\circ\text{C}$         |

1. Mounted onto a 4 in square FR-4 board 50 mm sq. 1 oz. Cu 0.06" thick single sided. Operating to steady state.
2. Mounted onto a 4 in square FR-4 board 650 mm sq. 1 oz. Cu 0.06" thick single sided. Operating to steady state.

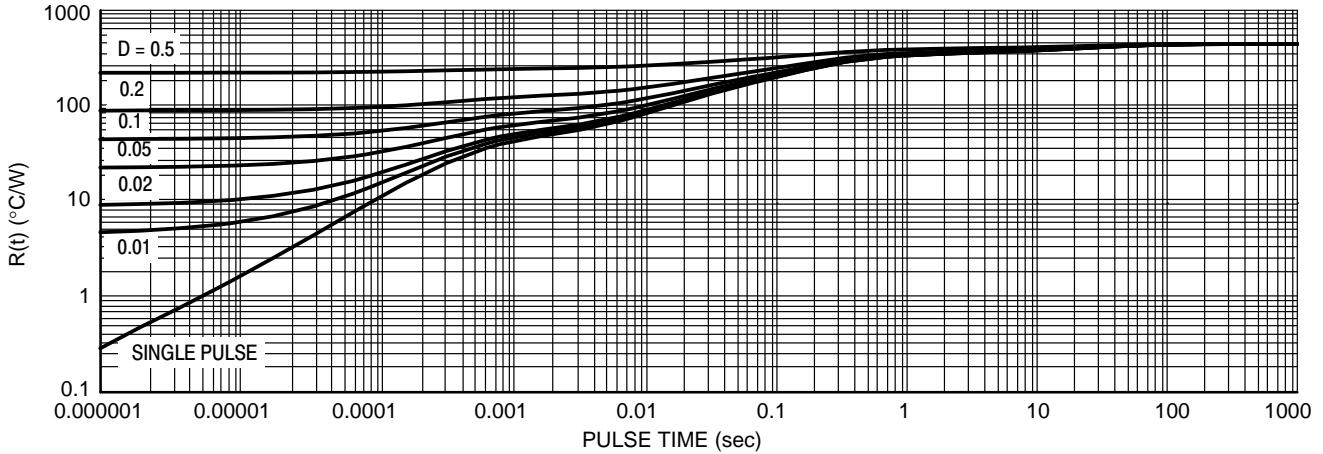


Figure 1. Thermal Response (Note 1)

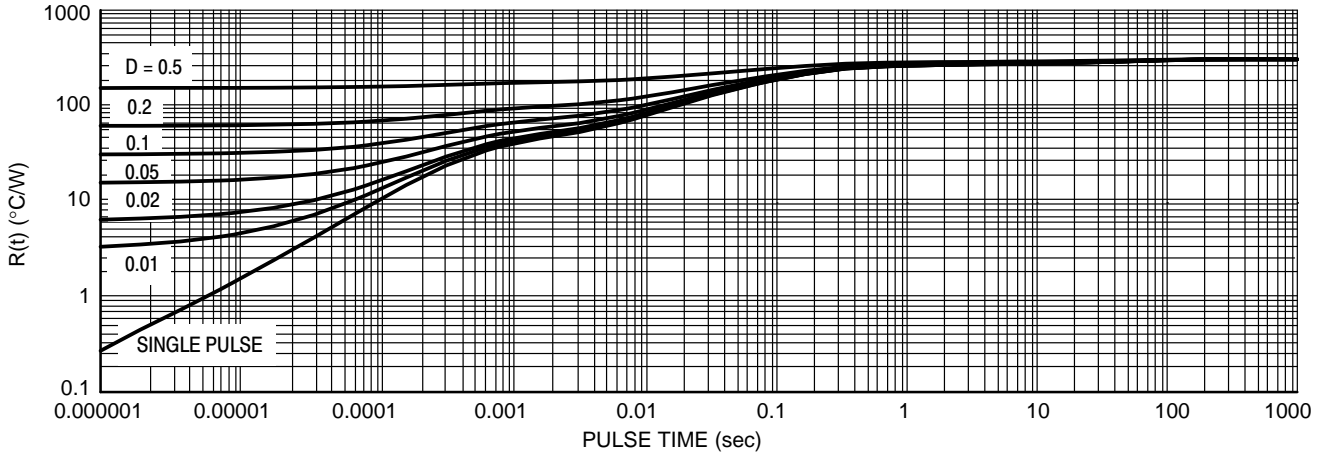
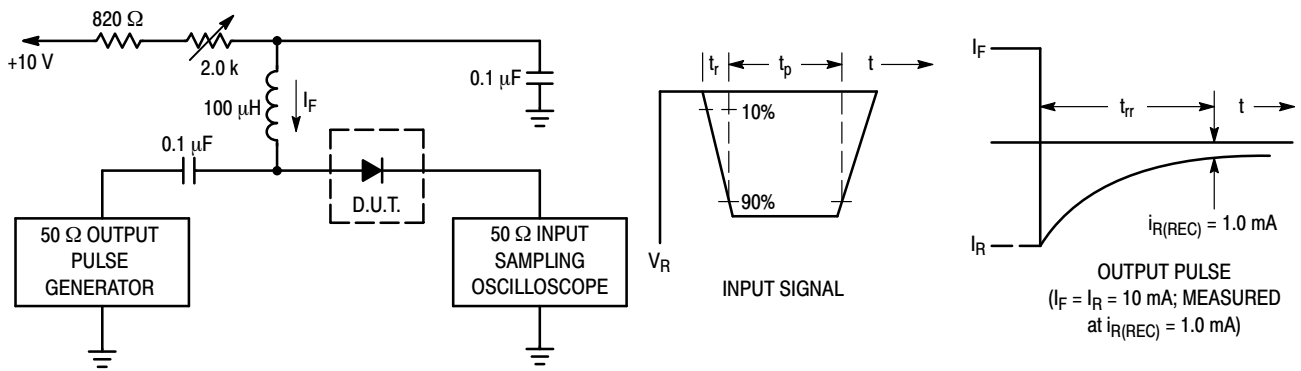


Figure 2. Thermal Response (Note 2)

# NSR05T40XV2

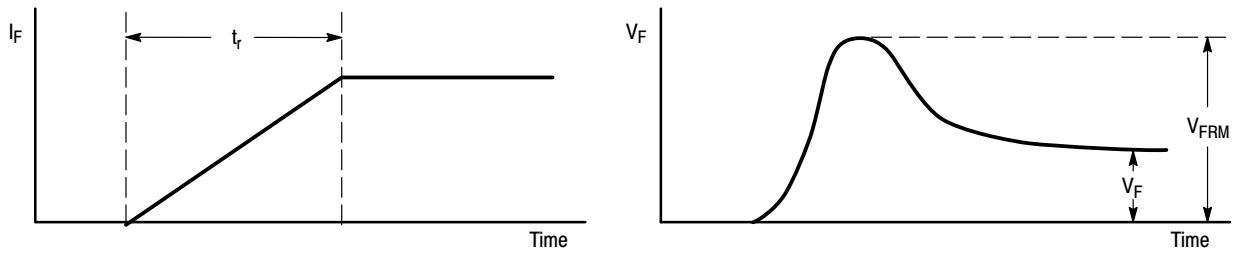
## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic   | Symbol    | Min | Typ                      | Max                      | Unit          |
|--|-----------|-----|--------------------------|--------------------------|---------------|
| Reverse Leakage<br>( $V_R = 10\text{ V}$ )<br>( $V_R = 40\text{ V}$ )  | $I_R$     |     | 0.5<br>3.0               | 5.0<br>55                | $\mu\text{A}$ |
| Forward Voltage<br>( $I_F = 10\text{ mA}$ )<br>( $I_F = 100\text{ mA}$ )<br>( $I_F = 200\text{ mA}$ )<br>( $I_F = 500\text{ mA}$ ) | $V_F$     |     | 360<br>420<br>450<br>530 | 400<br>465<br>525<br>640 | mV            |
| Total Capacitance<br>( $V_R = 1.0\text{ V}$ , $f = 1.0\text{ MHz}$ )   | $C_T$     |     | 70                       |                          | pF            |
| Reverse Recovery Time<br>( $I_F = I_R = 10\text{ mA}$ , $I_{R(\text{REC})} = 1.0\text{ mA}$ , Figure 3)                            | $t_{rr}$  |     | 20                       |                          | ns            |
| Peak Forward Recovery Voltage<br>( $I_F = 100\text{ mA}$ , $t_r = 20\text{ ns}$ , Figure 4)  | $V_{FRM}$ |     | 540                      |                          | mV            |



- Notes: 1. A 2.0 kΩ variable resistor adjusted for a Forward Current ( $I_F$ ) of 10 mA.  
 2. Input pulse is adjusted so  $I_{R(\text{peak})}$  is equal to 10 mA.  
 3.  $t_p \gg t_{rr}$

**Figure 3. Recovery Time Equivalent Test Circuit**



**Figure 4. Peak Forward Recovery Voltage Definition**

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## TYPICAL CHARACTERISTICS

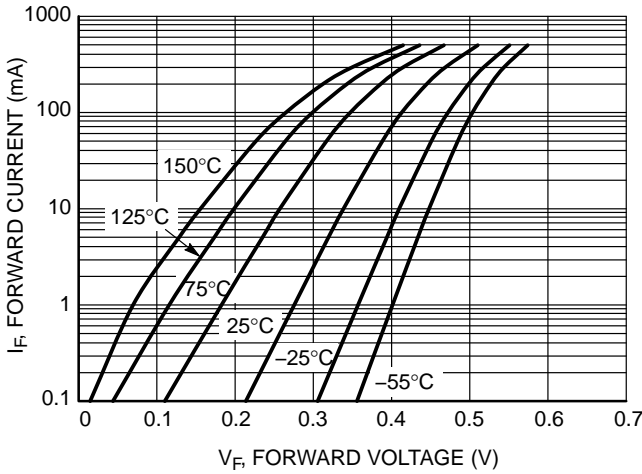


Figure 5. Forward Voltage

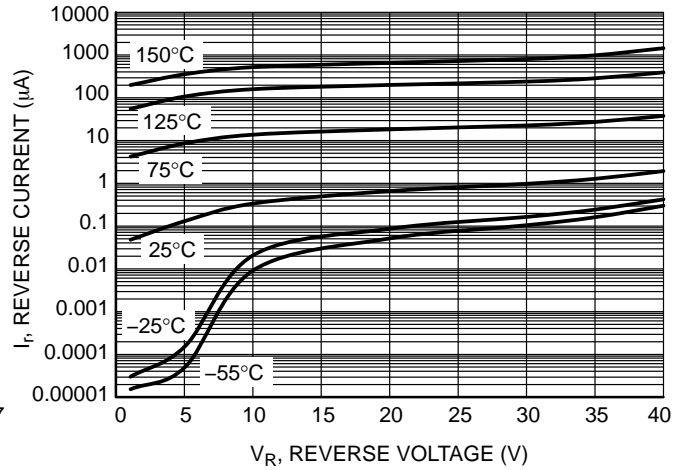


Figure 6. Leakage Current

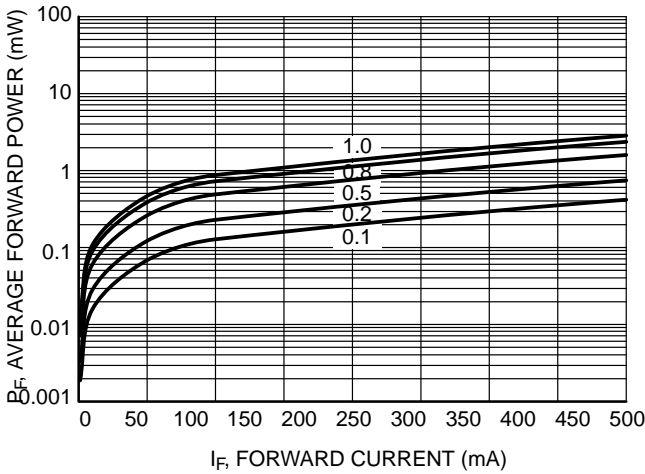


Figure 7. Average Forward Power Dissipation

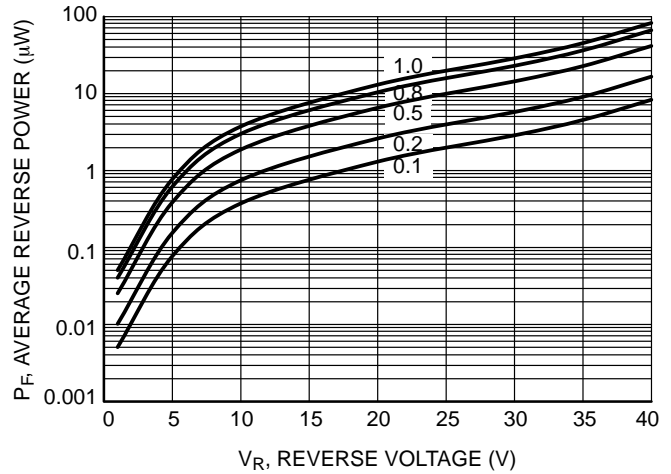


Figure 8. Average Reverse Power Dissipation

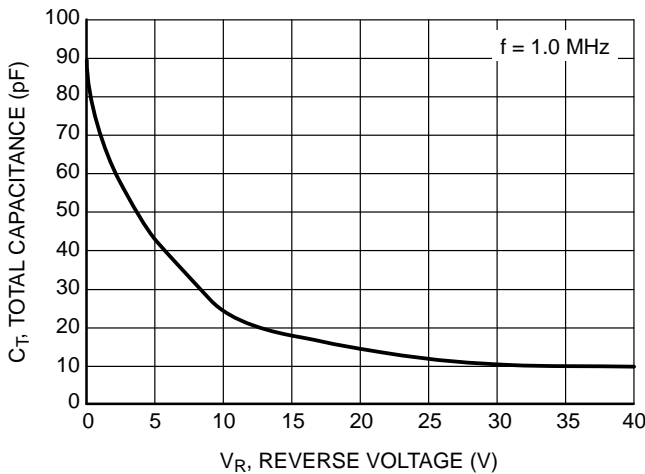


Figure 9. Total Capacitance

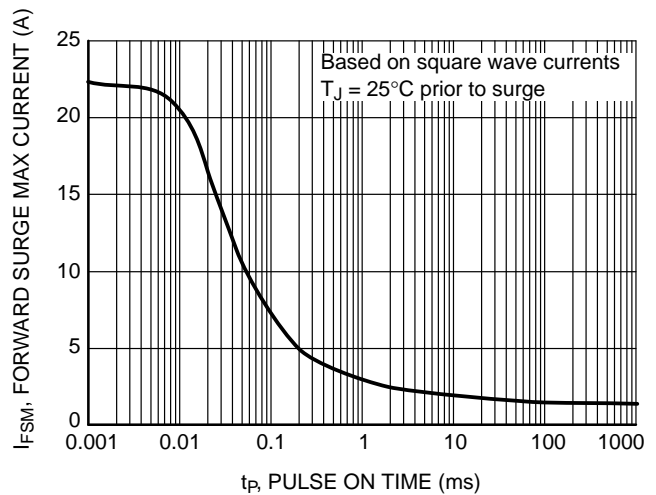
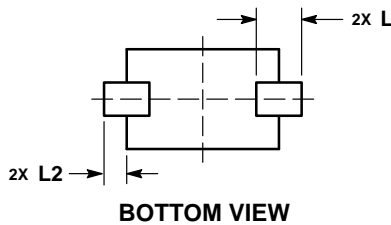
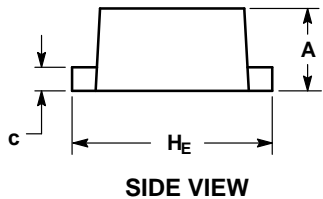
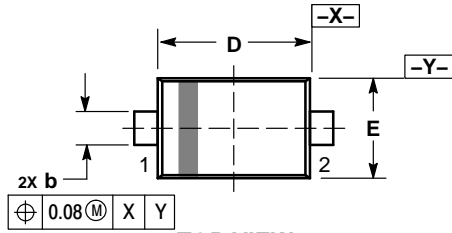


Figure 10. Forward Surge Current

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## PACKAGE DIMENSIONS

**SOD-523**  
CASE 502  
ISSUE E

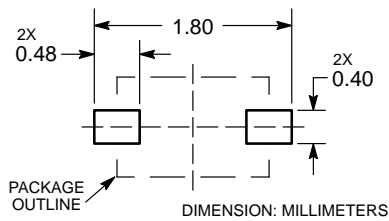


**NOTES:**


1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN         | NOM  | MAX  |
| A   | 0.50        | 0.60 | 0.70 |
| b   | 0.25        | 0.30 | 0.35 |
| c   | 0.07        | 0.14 | 0.20 |
| D   | 1.10        | 1.20 | 1.30 |
| E   | 0.70        | 0.80 | 0.90 |
| H E | 1.50        | 1.60 | 1.70 |
| L   | 0.30 REF    |      |      |
| L2  | 0.15        | 0.20 | 0.25 |

### RECOMMENDED SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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