

# 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 (60 Hz @ 1 cycle)	$I_{FSM}$	3.0	A
Repetitive Peak Forward Current (Pulse Wave = 1 sec, Duty Cycle = 66%)	$I_{FRM}$	1.5	A
ESD Rating: Human Body Model Charged Device Model	ESD	> 8 > 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 (Pb-Free)	8000 / Tape & 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 Junction-to-Ambient (Note 1) Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$ $P_D$			489 250	$^\circ\text{C/W}$ mW
Thermal Resistance Junction-to-Ambient (Note 2) Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$ $P_D$			358 350	$^\circ\text{C/W}$ 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.

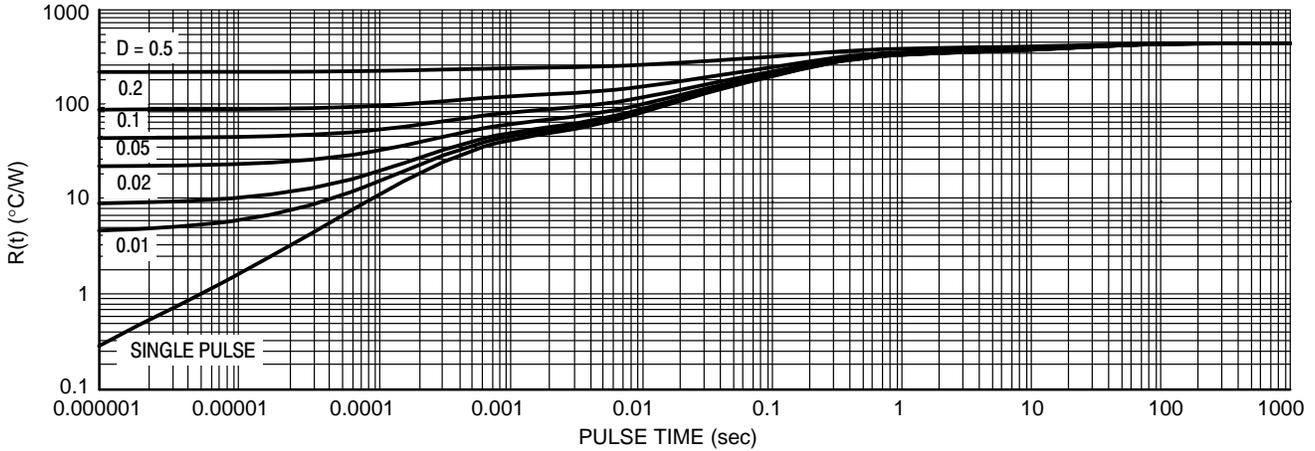


Figure 1. Thermal Response (Note 1)

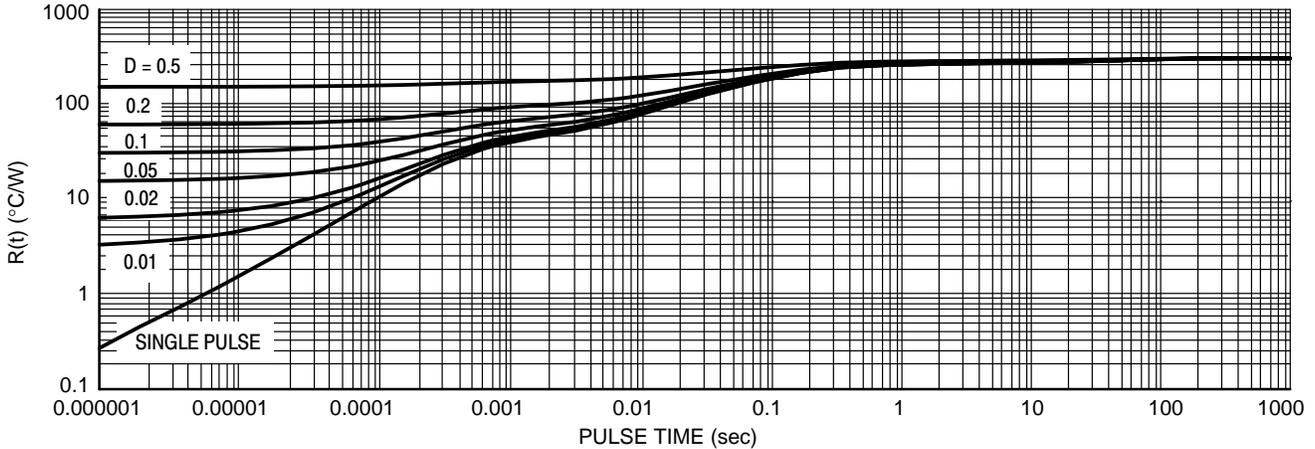
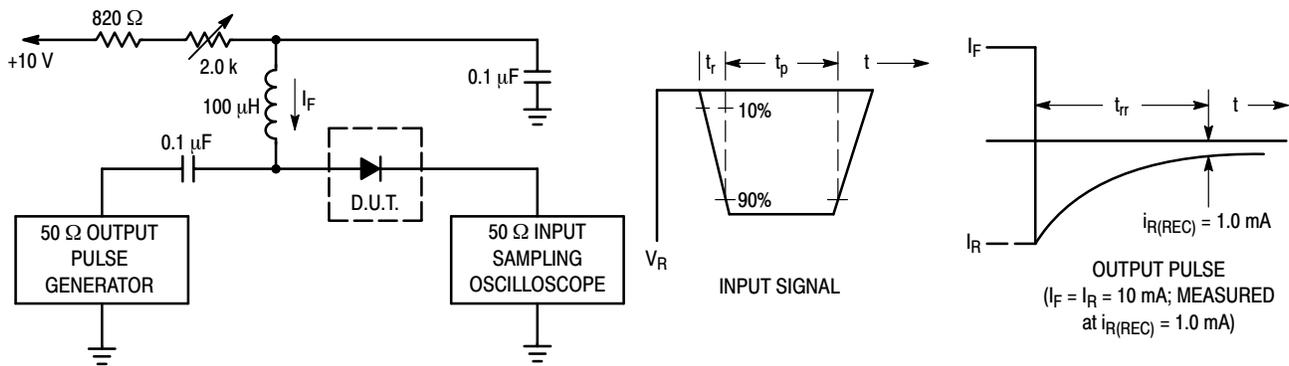


Figure 2. Thermal Response (Note 2)

# NSR05T40XV2

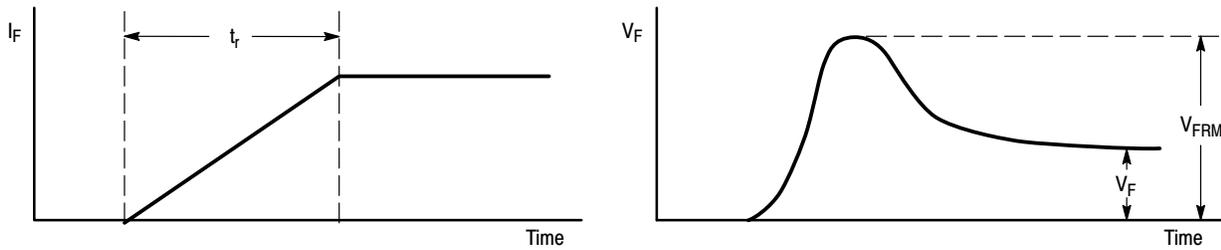
## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

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

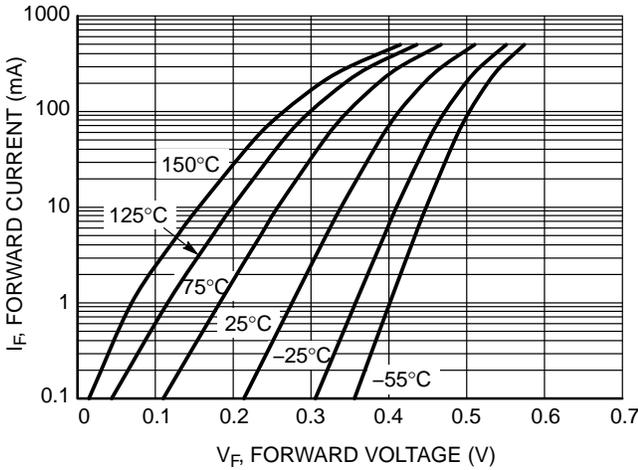


Figure 5. Forward Voltage

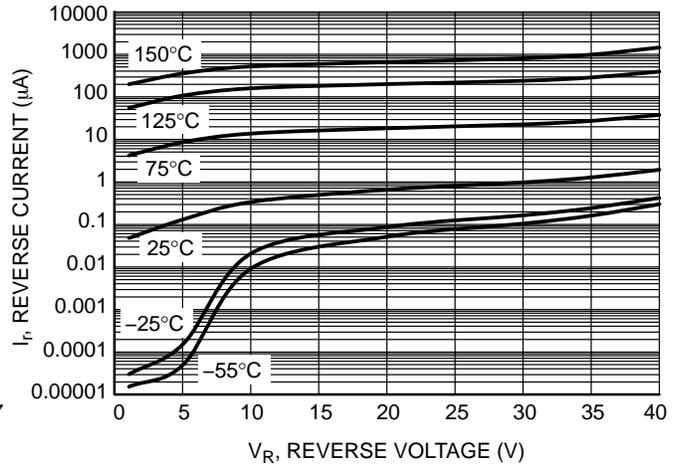


Figure 6. Leakage Current

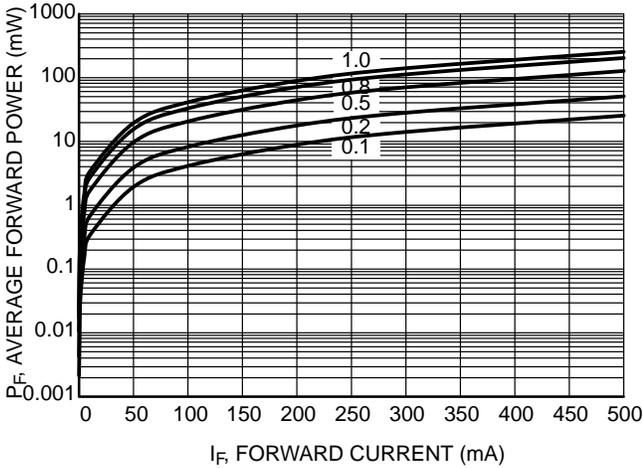


Figure 7. Average Forward Power Dissipation

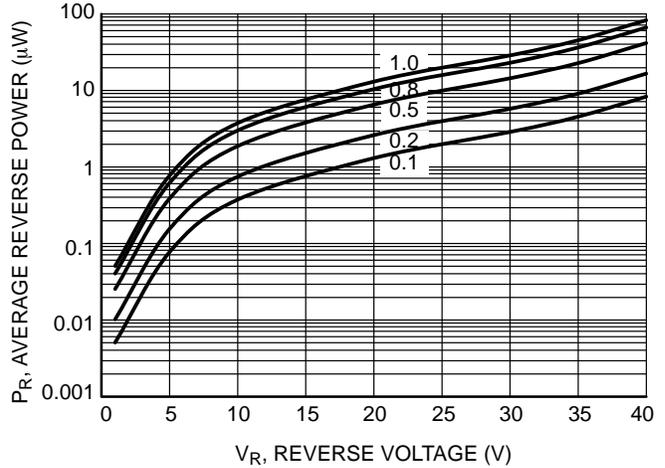


Figure 8. Average Reverse Power Dissipation

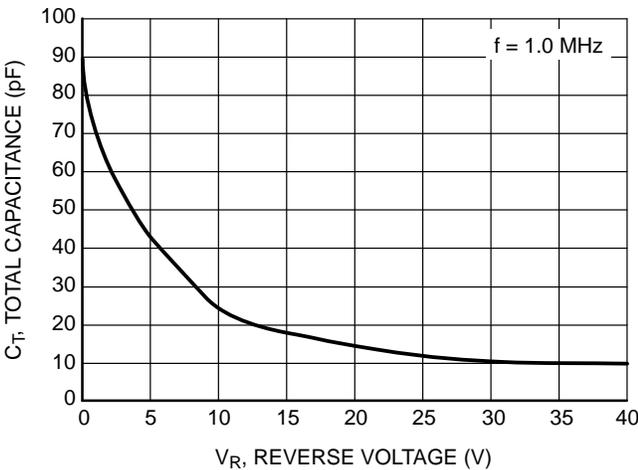


Figure 9. Total Capacitance

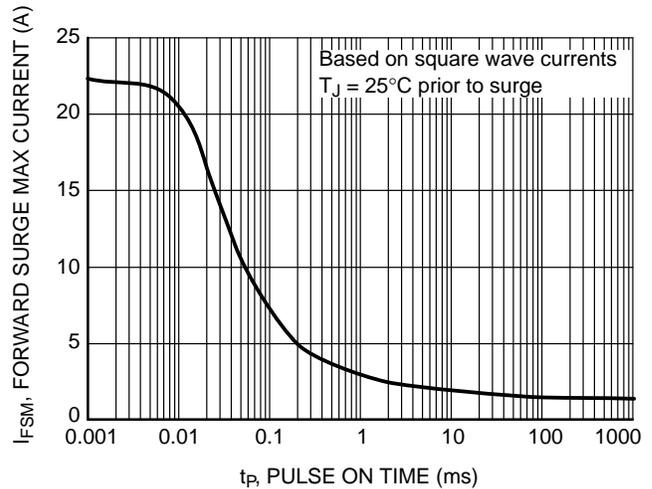
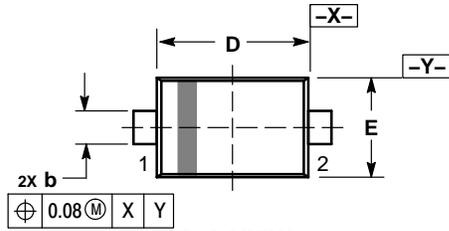


Figure 10. Forward Surge Current

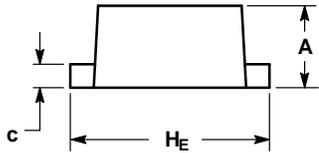
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## PACKAGE DIMENSIONS

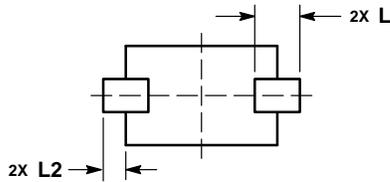
**SOD-523**  
CASE 502  
ISSUE E



TOP VIEW



SIDE VIEW



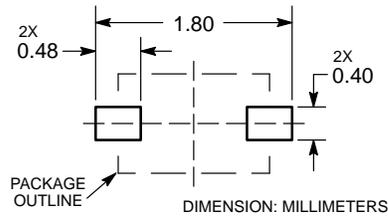
BOTTOM VIEW

**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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