

# NSR05F30QNXT5G

## Schottky Diode Optimized for High Frequency Switching Power Supplies

These Schottky barrier diodes are optimized for low forward voltage drop and low leakage current and are offered in a Chip Scale Package (CSP) to reduce board space. The low thermal resistance enables designers to meet the challenging task of achieving higher efficiency and meeting reduced space requirements.

### Features

- Low Forward Voltage Drop – 400 mV @ 500 mA
- Low Reverse Current – 15  $\mu$ A @ 10 V VR
- 500 mA of Continuous Forward Current
- ESD Rating – Human Body Model: Class 3B  
– Machine Model: Class C
- 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

### Markets

- Mobile Handsets
- MP3 Players
- Digital Camera and Camcorders
- Notebook PCs & PDAs
- GPS

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Reverse Voltage	$V_R$	30	V
Forward Current (DC)	$I_F$	500	mA
Forward Surge Current (60 Hz @ 1 cycle)	$I_{FSM}$	10	A
Repetitive Peak Forward Current (Pulse Wave = 1 sec, Duty Cycle = 66%)	$I_{FRM}$	4.0	A
ESD Rating: Human Body Model Machine Model	ESD	> 8 > 400	kV V

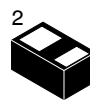
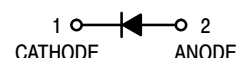
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



ON Semiconductor®

<http://onsemi.com>

## 30 V SCHOTTKY BARRIER DIODE



DSN2  
(0402)  
CASE 152AC

### MARKING DIAGRAM

PIN 1



05F30 = Specific Device Code  
YYY = Year Code

### ORDERING INFORMATION

Device	Package	Shipping†
NSR05F30QNXT5G	DSN2 (Pb-Free)	5000 / 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.

# NSR05F30QNXT5G

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Thermal Resistance Junction-to-Ambient (Note 1) Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$ $P_D$			240 521	$^\circ\text{C/W}$ mW
Thermal Resistance Junction-to-Ambient (Note 2) Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$ $P_D$			94 1.3	$^\circ\text{C/W}$ W
Storage Temperature Range	$T_{stg}$			-40 to +125	$^\circ\text{C}$
Junction Temperature	$T_J$			+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 1 in sq. 1 oz. Cu 0.06" thick single sided. Operating to steady state.

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

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Leakage ( $V_R = 10\text{ V}$ ) ( $V_R = 30\text{ V}$ )	$I_R$			15 75	$\mu\text{A}$
Forward Voltage ( $I_F = 100\text{ mA}$ ) ( $I_F = 500\text{ mA}$ )	$V_F$		0.320 0.400	0.360 0.430	V

# NSR05F30QNX5G

## TYPICAL CHARACTERISTICS

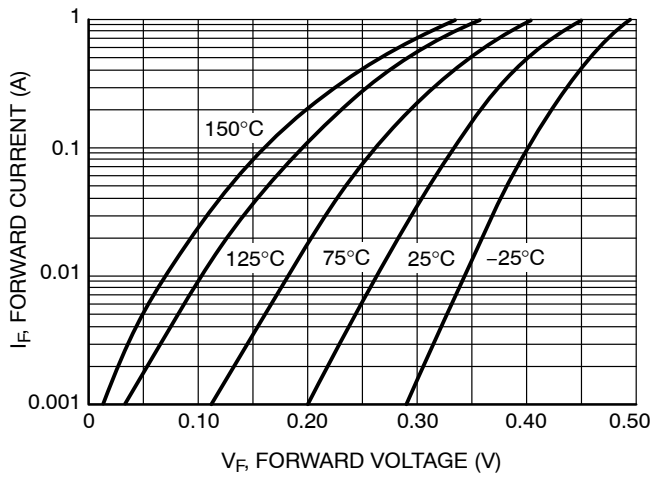


Figure 1. Forward Voltage

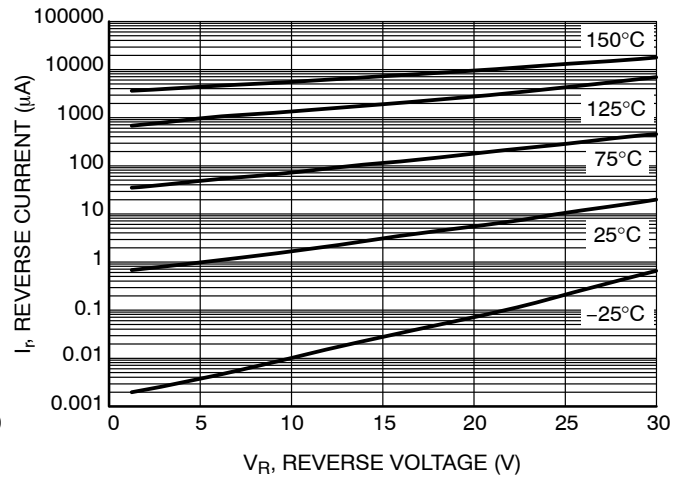


Figure 2. Leakage Current

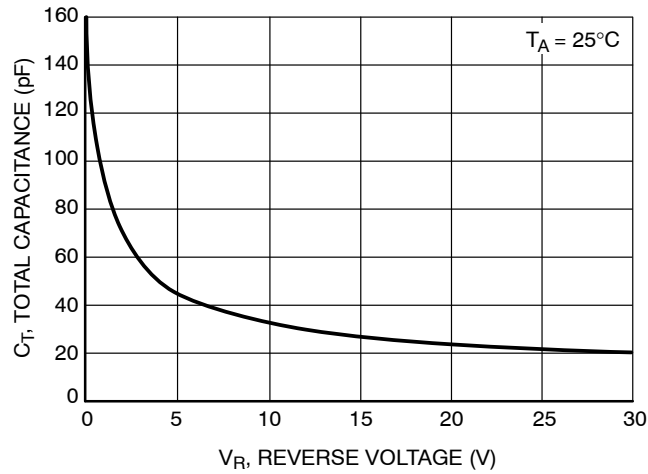


Figure 3. Total Capacitance

## 4

## NSR05F30QNXT5G

analysis. This analysis showed that there was no shift in any of the parameters, forward voltage, reverse leakage current, and capacitance.

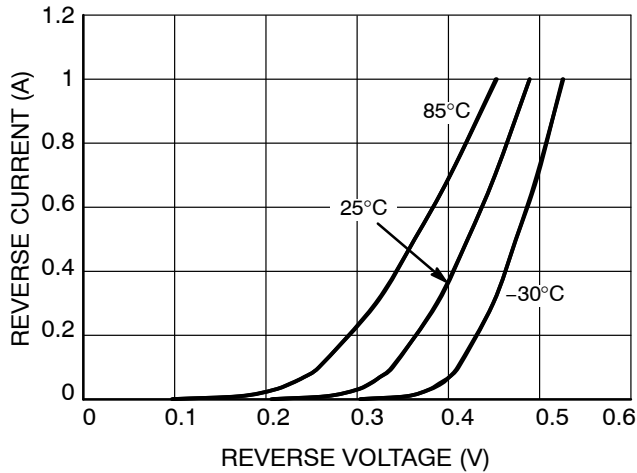


Figure 5. Reverse Leakage Characteristics

Finally these diodes were placed in the same circuit at 25°C for 1 week of continuous operation. The screen shots below in Figures 7 and 8 show the operation on the first day of continuous operation and 5 days respectively.

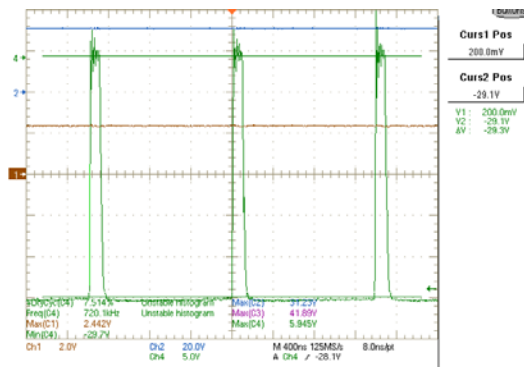


Figure 7. NSR05F30QNXT5G on Day 1 at 25°C

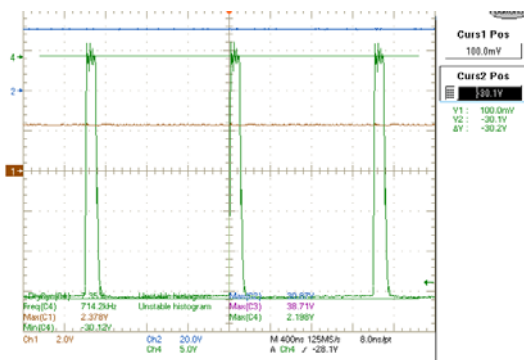


Figure 8. NSR05F30QNXT5G on Day 5 at 25°C

The graphs below shown below demonstrate the Pre and Post-Stress characterization graphs and how that there was no change in the part performance.

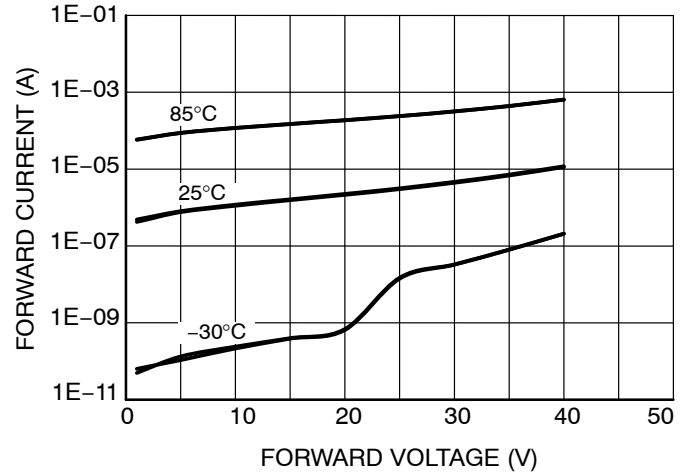


Figure 6. Forward Current Characterization

To further evaluate the performance, a thermal camera was used to take pictures of the NSR05F30QNXT5G during heavy load operation and 25°C. As seen in Figure 9 the case only got to 29.2°C. This translates to less than 20mW of total power dissipation.

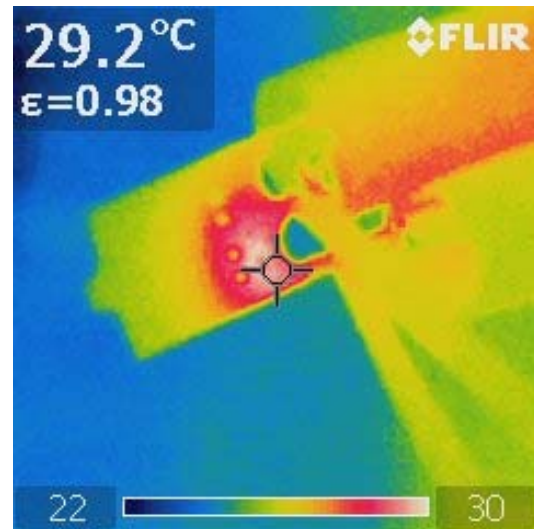


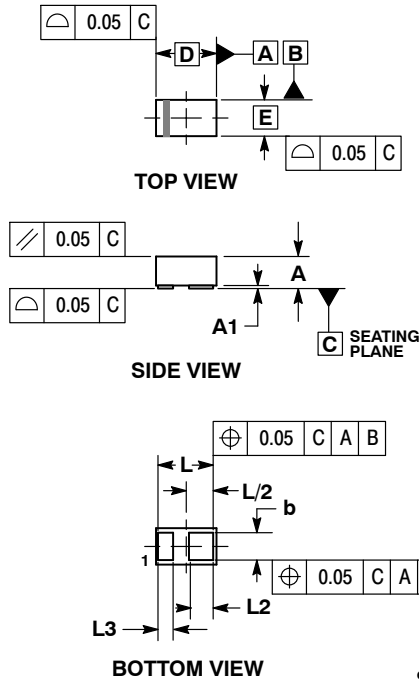
Figure 9. Case Temperature of NSR05F30QNXT5G in Operation at 25°C, 150 mA 34 V Output

With a heavy load condition (up to 1.2 A) through the NSR05F30QNXT5G on a minimum pad size the ambient temperature can rise up to 145°C and not degrade the performance. Using ON Semiconductor's new ultra low profile Wireless Boost Application Optimized Schottky diodes will increase the overall efficiency and battery life while reducing board size and cost associated with thermal pads.

# NSR05F30QNXT5G

## PACKAGE DIMENSIONS

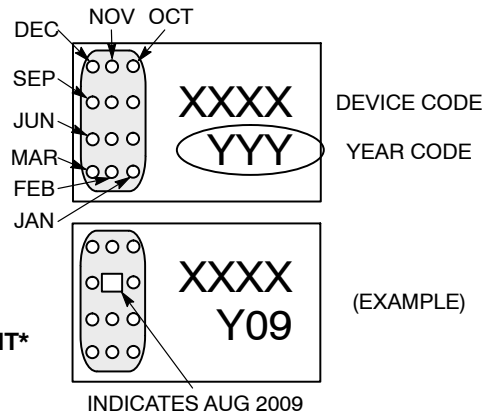
DSN2, 1.0x0.6, 0.575P, (0402)  
CASE 152AC-01  
ISSUE C



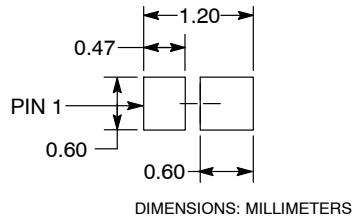
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.

MILLIMETERS		
DIM	MIN	MAX
A	0.25	0.31
A1	---	0.05
b	0.45	0.55
D	1.00 BSC	
E	0.60 BSC	
L	0.85	0.95
L2	0.35	0.45
L3	0.20	0.30

### CATHODE BAND MONTH CODING



### RECOMMENDED SOLDER FOOTPRINT\*



See Application Note AND8464/D for more mounting details

\*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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NSR05F30Q/D

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