

NSR20F30QNXT5G

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

- Very Low Forward Voltage Drop – 480 mV @ 2.0 A
- Low Reverse Current – 20 μ A @ 10 V VR
- 2.0 A of Continuous Forward Current
- Power Dissipation of 665 mW with Minimum Trace
- ESD Rating – Human Body Model: Class 3B
– Machine Model: Class C
- Very 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	2.0	A	
Forward Surge Current (60 Hz @ 1 cycle)	I_{FSM}	28	A	
ESD Rating:	Human Body Model Machine Model	ESD	> 8 > 400	kV V

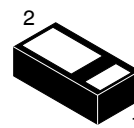
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



ON Semiconductor®

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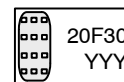
30 V SCHOTTKY BARRIER DIODE



DSN2
(0603)
CASE 152AB

MARKING DIAGRAMS

PIN 1



20F30 = Specific Device Code
YYY = Year Code

PIN 1



AH = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NSR20F30QNXT5G	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.

NSR20F30QNXT5G

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			213 586	$^\circ\text{C}/\text{W}$ mW
Thermal Resistance Junction-to-Ambient (Note 2) Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$ P_D			80 1.56	$^\circ\text{C}/\text{W}$ 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			20 150	μA
Forward Voltage ($I_F = 1.0\text{ A}$) ($I_F = 2.0\text{ A}$)	V_F			0.42 0.48	V
Reverse Recovery (Special) Switch from Forward Current to Reverse Voltage Time taken from 1 ns Transition Time to Fully Stabilized ($I_F = 1.5\text{ A}$ to $V_R = 28\text{ V}$, 25°C) ($I_F = 1.5\text{ A}$ to $V_R = 28\text{ V}$, 85°C)	T_{RR}		21.89 21.35		ns

NSR20F30QNXT5G

TYPICAL CHARACTERISTICS

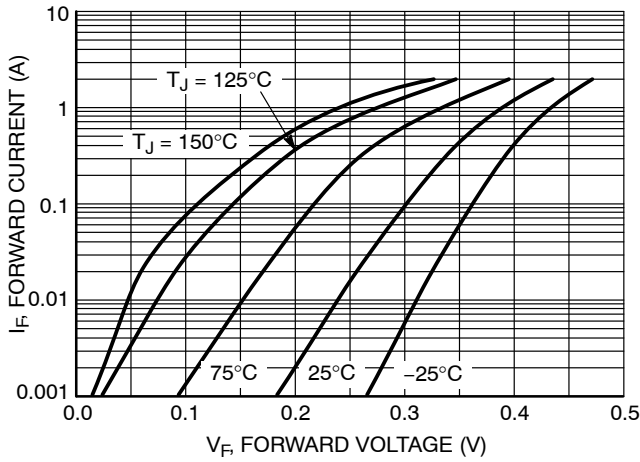


Figure 1. Forward Voltage

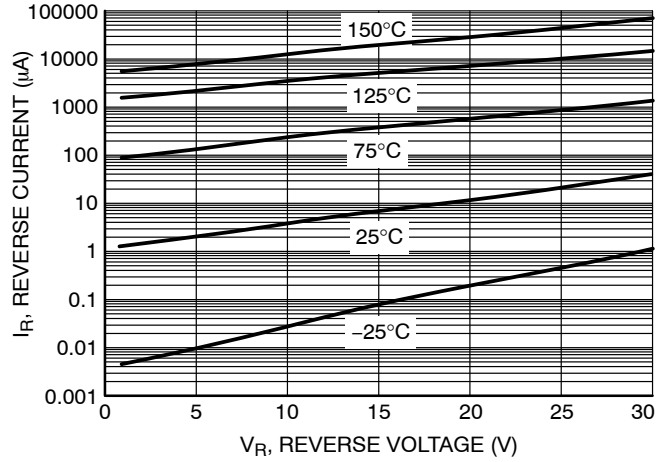


Figure 2. Typical Reverse Current

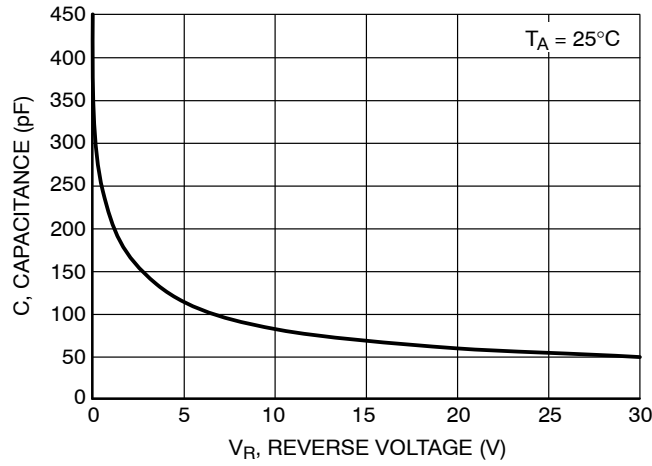


Figure 3. Typical Capacitance

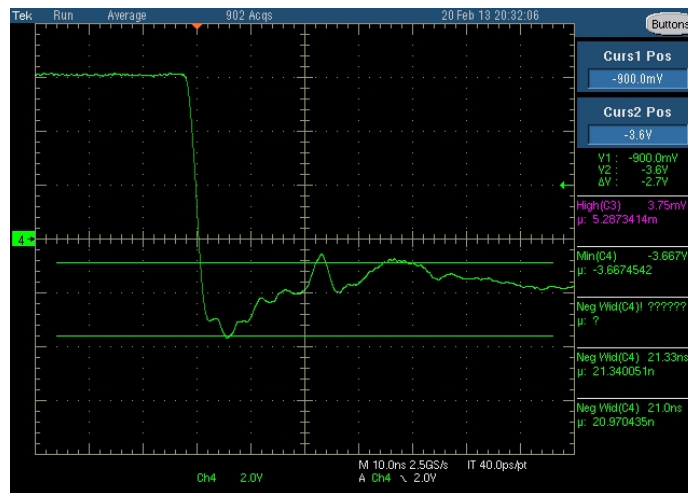


Figure 4. Typical Reverse Recovery
 $I_F = 1.5 \text{ A}$ to $V_R = 28 \text{ V}$

NSR20F30QNXT5G

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

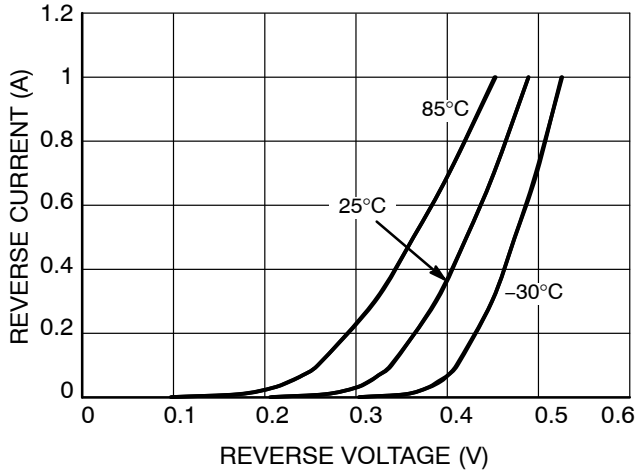


Figure 6. Reverse Leakage Characteristics

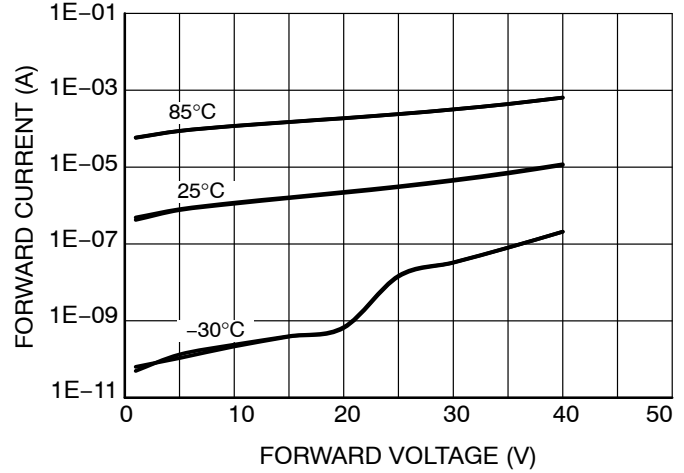


Figure 7. Forward Current Characterization

Finally these diodes were placed in the same circuit at 25°C for 1 week of continuous operation. The screen shots below in Figures 8 and 9 show the operation on the first day of continuous operation and 5 days respectively.

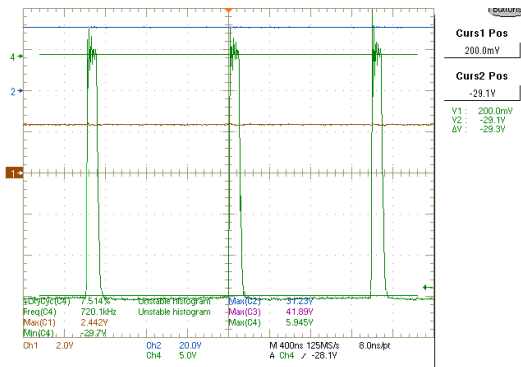


Figure 8. NSR20F30QNXT5G on Day 1 at 25°C

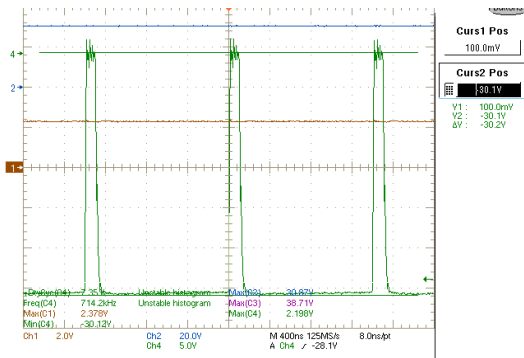


Figure 9. NSR20F30QNXT5G on Day 5 at 25°C

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

To further evaluate the performance, a thermal camera was used to take pictures of the NSR20F30QNXT5G during heavy load operation and 25°C. As seen in Figure 10 the case only got to 29.2°C. This translates to less than 20 mW of total power dissipation.

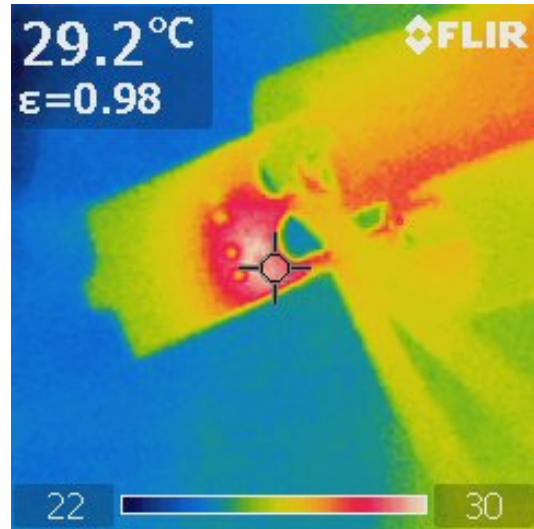


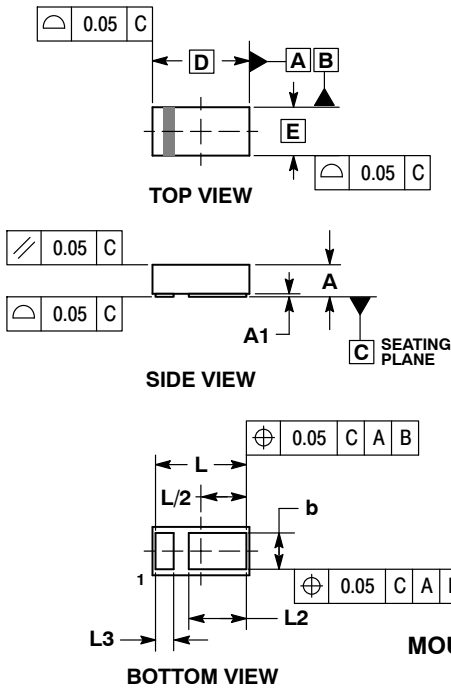
Figure 10. Case Temperature of NSR20F30QNXT5G in Operation at 25°C, 150 mA 34 V Output

With a heavy load condition (up to 1.2 A) through the NSR20F30QNXT5G 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.

NSR20F30QNXT5G

PACKAGE DIMENSIONS

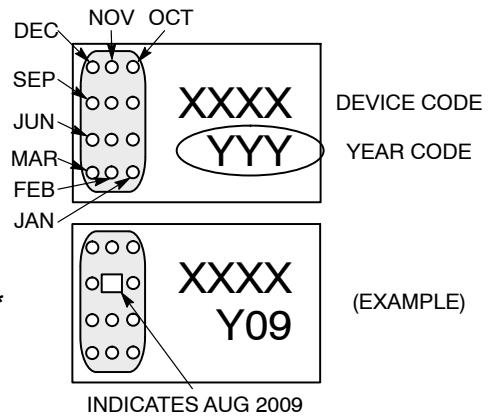
DSN2, 1.6x0.8, 0.9P, (0603)
CASE 152AB
ISSUE C



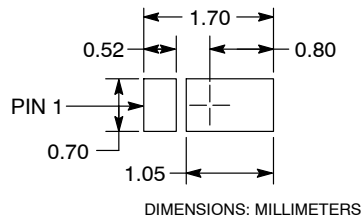
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS.

MILLIMETERS		
DIM	MIN	MAX
A	0.25	0.31
A1	---	0.05
b	0.55	0.65
D	1.60 BSC	
E	0.80 BSC	
L	1.45	1.55
L2	0.90	1.00
L3	0.25	0.35

CATHODE BAND MONTH CODING



MOUNTING 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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