

# Trench-based Schottky Diode, 500 mA, 30 V

## NSR05301MX4

These Schottky 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 space saving micro-packaging ideal for space constrained applications.

### Features

- Smallest Package Available (01005); 0.445mm x 0.24mm
- 500 mA of Continuous Forward Current
- Low Forward Voltage Drop – 430 mV (Typical) @  $I_F = 200$  mA
- Low Reverse Current – 25  $\mu$ A (Typical) @  $V_R = 30$  V
- Low Reverse Recovery Time – 9 ns Typical
- Low Capacitance – 19 pF Typical

### Typical Applications

- Mobile and Wearable Devices
- LED Boost Converters
- Buck and Boost dc–dc Converters
- Reverse Voltage and Current Protection
- Clamping & Protection

### MAXIMUM RATINGS

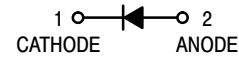
Rating	Symbol	Value	Unit	
Forward Current (DC)	$I_F$	500	mA	
Reverse Voltage	$V_R$	30	V	
Repetitive Peak Forward Current (Pulse Wave = 1 sec, Duty Cycle = 66%)	$I_{FRM}$	1.0	A	
ESD Rating:	Human Body Model Machine Model	ESD	>8.0 >400	kV V

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®**

[www.onsemi.com](http://www.onsemi.com)



### MARKING DIAGRAM



**X4DFN2**  
**CASE 718AA**



D = Specific Device Code  
M = Date Code

### ORDERING INFORMATION

Device	Package	Shipping†
NSR05301MX4T5G	X4DFN2 (Pb-Free)	10000 / 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.

# NSR05301MX4

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction-to-Ambient (Note 1) Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$ $P_D$	614.9 203	$^\circ\text{C/W}$ mW
Thermal Resistance Junction-to-Ambient (Note 2) Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$ $P_D$	239.4 522	$^\circ\text{C/W}$ mW
Junction Temperature Range	$T_J$	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 to +150	$^\circ\text{C}$
Lead Solder Temperature - Maximum (10 seconds)	$T_L$	260	$^\circ\text{C}$

1. Mounted onto a 4 in<sup>2</sup> FR-4 board 10 mm<sup>2</sup> 1 oz. Cu 0.06" thick single-sided. Operating to steady state.
2. Mounted onto a 4 in<sup>2</sup> FR-4 board 2 cm<sup>2</sup> 1 oz. Cu 0.06" thick single-sided. Operating to steady state.

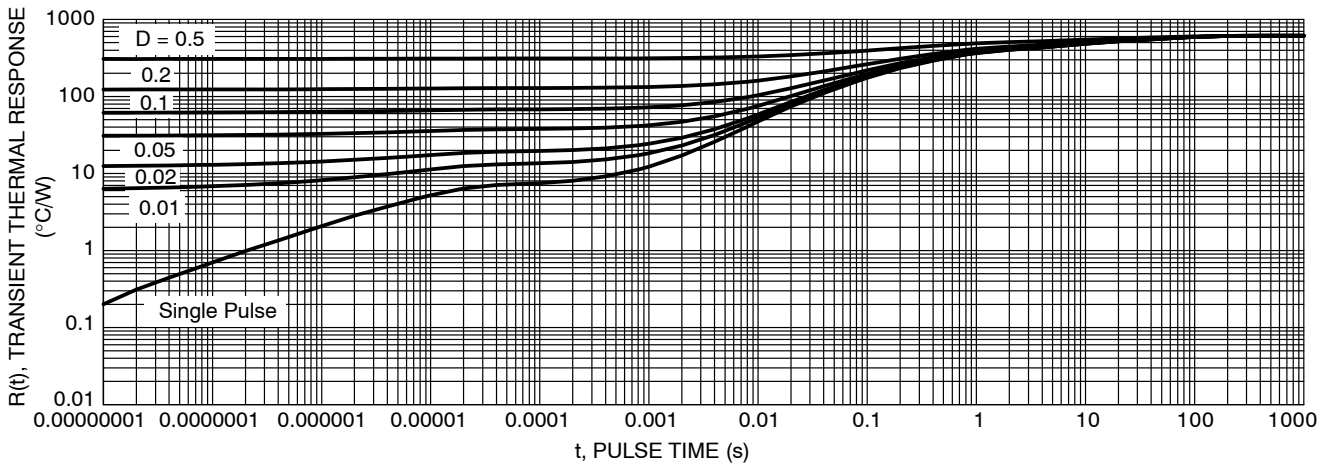


Figure 1. Thermal Response (Note 1)

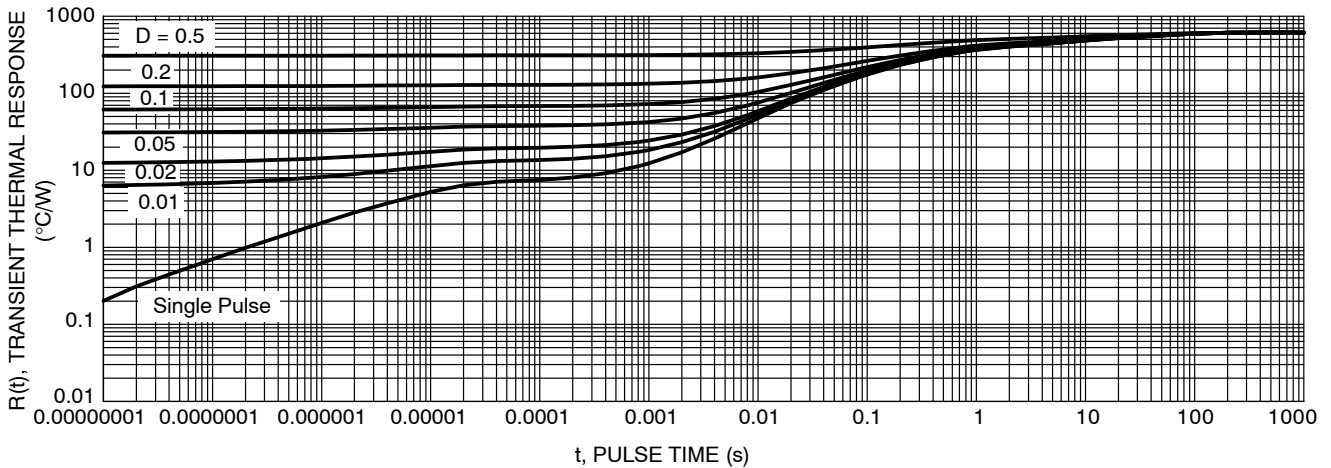


Figure 2. Thermal Response (Note 2)

# NSR05301MX4

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Leakage (V <sub>R</sub> = 10 V) (V <sub>R</sub> = 30 V)	I <sub>R</sub>		15 25	50 100	μA
Forward Voltage (I <sub>F</sub> = 100 mA) (I <sub>F</sub> = 200 mA) (I <sub>F</sub> = 500 mA)	V <sub>F</sub>		355 430 640	480 540 800	mV
Total Capacitance (V <sub>R</sub> = 5.0 V, f = 1 MHz)	C <sub>T</sub>		19		pF
Reverse Recovery Time (I <sub>F</sub> = I <sub>R</sub> = 10 mA, I <sub>R(REC)</sub> = 1.0 mA)	t <sub>rr</sub>		9.0	11	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## TYPICAL CHARACTERISTICS

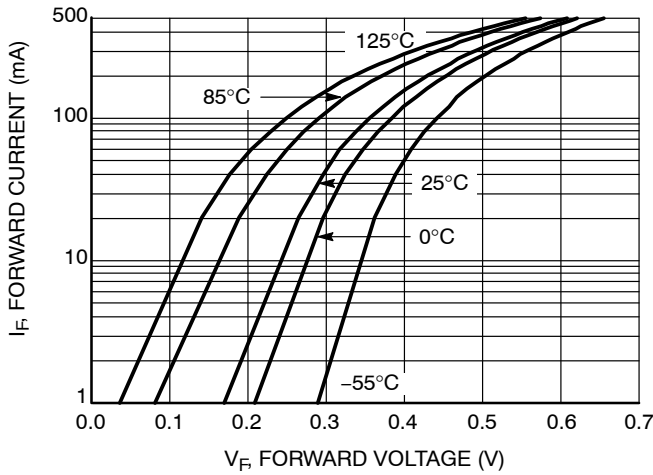


Figure 3. Forward Voltage

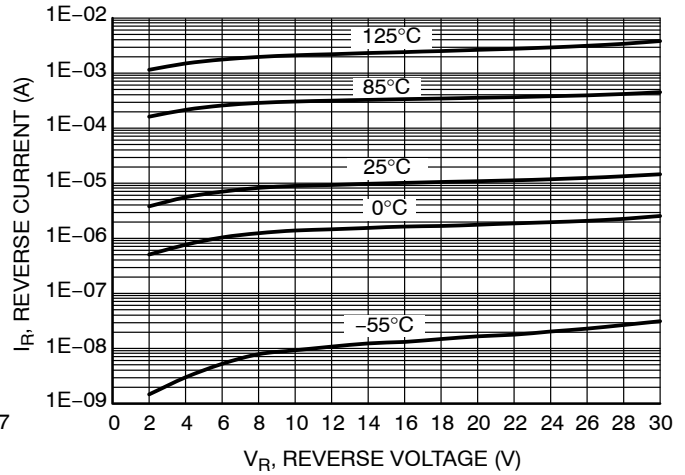


Figure 4. Leakage Current

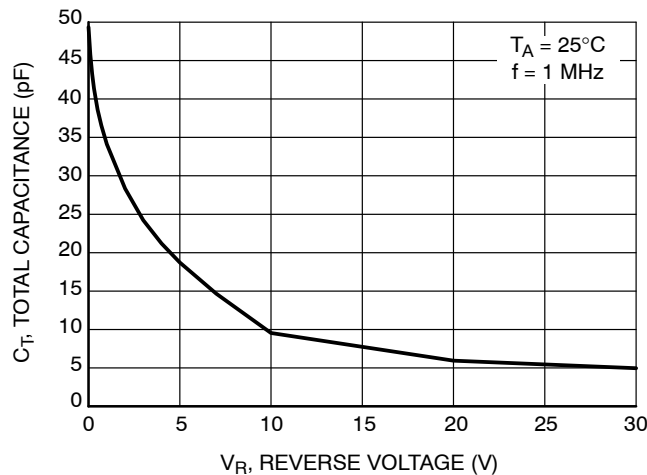


Figure 5. Total Capacitance

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

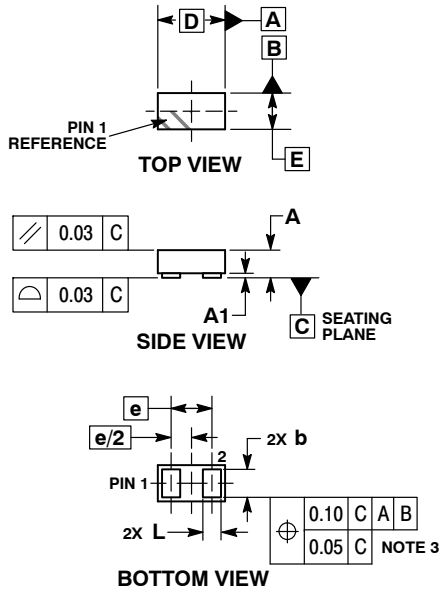
ON Semiconductor®



SCALE 10:1

**X4DFN2, 0.445x0.24, 0.27P**  
**CASE 718AA**  
**ISSUE A**

DATE 21 MAR 2017



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. EXPOSED COPPER ALLOWED AS SHOWN.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.15	0.18	0.21
A1	---	---	0.03
b	0.170	0.185	0.200
D	0.415	0.445	0.475
E	0.210	0.240	0.270
e	0.270 BSC		
L	0.105	0.120	0.135

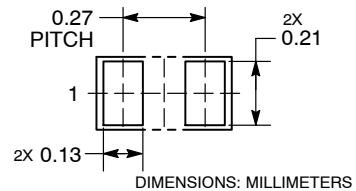
**GENERIC MARKING DIAGRAMS\***



X = Specific Device Code

\*This information is generic. Please refer to device data sheet for actual part marking. Some products may not follow the Generic Marking.

**RECOMMENDED MOUNTING FOOTPRINT\***



See Application Note AND8398/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, SOLDERM/D.

<b>DOCUMENT NUMBER:</b>	<b>98AON29067G</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>X4DFN2, 0.445X0.24, 0.27P</b>	<b>PAGE 1 OF 1</b>

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)