

## Product Summary

BV <sub>SSS</sub>	R <sub>SS(ON)</sub> Typ	I <sub>S</sub> Max T <sub>A</sub> = +25°C
12V	1.34mΩ @ V <sub>GS</sub> = 3.8V	34A

## Description

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>SS(ON)</sub>) yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- Battery Management
- Load Switch
- Battery Protection

## Features

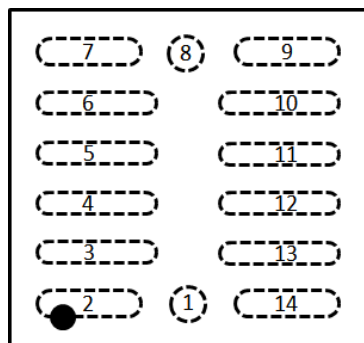
- CSP with Footprint 3.00mm × 2.74mm
- Height = 0.275mm (Typical) for Low Profile
- ESD Protection of Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.

## Mechanical Data

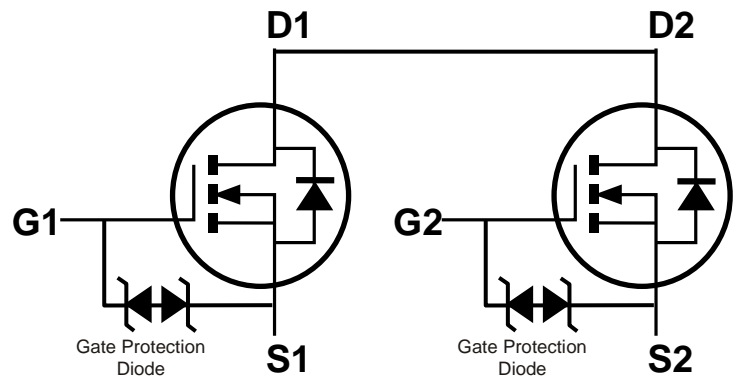
- Case: X2-TSN3027-14
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiAu. Solderable per MIL-STD-202, Method 208 <sup>(4)</sup>
- Weight: 0.0066 grams (Approximate)



Top View



Source 1: 2, 3, 4, 5, 6, 7  
 Gate1: 1  
 Source 2: 9, 10, 11, 12, 13, 14  
 Gate 2: 8



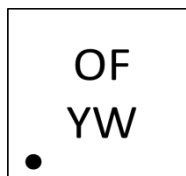
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN11M2UCA14-7	X2-TSN3027-14	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  - See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



OF = Product Type Marking Code  
 YW = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: 1 = 2021)  
 W or  $\bar{W}$  = Week (ex: a = Week 27; z Represents Week 52 and 53)

### Date Code Key

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	1	2	3	4	5	6	7	8	9	0	1	2

Week	1-26	27-52	53
Code	A-Z	a-z	z

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Source-Source Voltage			V <sub>SSS</sub>	12	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Source Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>S</sub>	34	A
		T <sub>A</sub> = +70°C		27.5	
Continuous Source Current (Note 5) V <sub>GS</sub> = 2.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>S</sub>	25.5	A
		T <sub>A</sub> = +70°C		20	
Pulsed Source Current (Note 6)			I <sub>SM</sub>	80	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P <sub>D</sub>	0.95	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 7)	R <sub>θJA</sub>	132	°C/W
Power Dissipation (Note 5)	P <sub>D</sub>	3.3	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5)	R <sub>θJA</sub>	38	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Source -Source Breakdown Voltage	BV <sub>SSS</sub>	12	—	—	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1mA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>SSS</sub>	—	—	1	μA	V <sub>SS</sub> = 10V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10 ±1	μA	V <sub>GS</sub> = ±8V, V <sub>SS</sub> = 0V V <sub>GS</sub> = ±5V, V <sub>SS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.35	0.75	1.4	V	V <sub>SS</sub> = 10V, I <sub>S</sub> = 0.87mA
Static Source-Source On-Resistance	R <sub>SS(ON)</sub>	0.70	1.28	1.85	mΩ	V <sub>GS</sub> = 4.5V, I <sub>S</sub> = 9.8A
		0.75	1.34	2.0		V <sub>GS</sub> = 3.8V, I <sub>S</sub> = 9.8A
		0.80	1.45	2.38		V <sub>GS</sub> = 3.1V, I <sub>S</sub> = 9.8A
		0.90	1.65	3.40		V <sub>GS</sub> = 2.5V, I <sub>S</sub> = 9.8A
Diode Forward Voltage	V <sub>SS</sub>	—	—	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 9.8A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>ISS</sub>	—	6083	—	pF	V <sub>SS</sub> = 6V, V <sub>GS</sub> = 0V, f = 1.0kHz
Output Capacitance	C <sub>OSS</sub>	—	1421	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	304	—		
Total Gate Charge	Q <sub>g</sub>	—	71	—	nC	V <sub>DD</sub> = 6V, V <sub>GS</sub> = 4V, I <sub>S</sub> = 9.8A
Gate-Source Charge	Q <sub>gs</sub>	—	12	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	17	—		
Gate Charge at V <sub>TH</sub>	Q <sub>g(TH)</sub>	—	7	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	0.9	—	μs	V <sub>DD</sub> = 6V, V <sub>GS</sub> = 4V, I <sub>S</sub> = 9.8A
Turn-On Rise Time	t <sub>R</sub>	—	1.7	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	4.0	—		
Turn-Off Fall Time	t <sub>F</sub>	—	3.6	—		

- Notes:
5. Device mounted on FR-4 material with 1inch<sup>2</sup> (6.45cm<sup>2</sup>), 2oz. (0.071mm thick) Cu.
  6. Repetitive rating, pulse width limited by junction temperature.
  7. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to production testing.

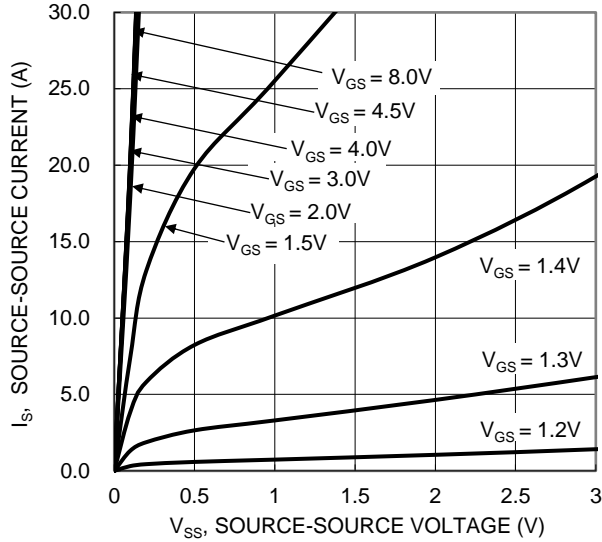


Figure 1. Typical Output Characteristic

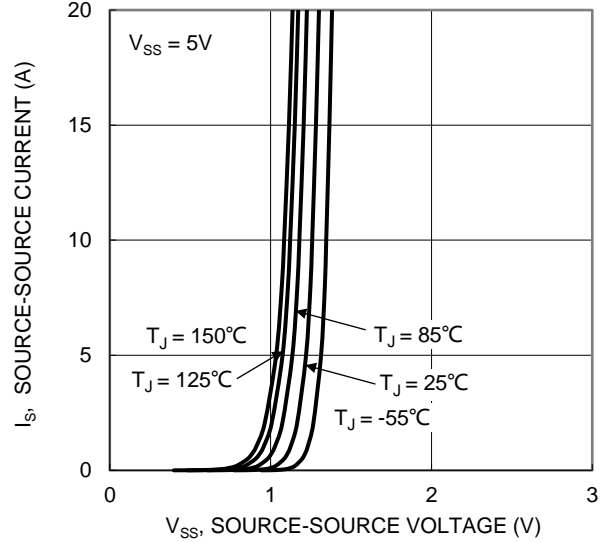


Figure 2. Typical Transfer Characteristic

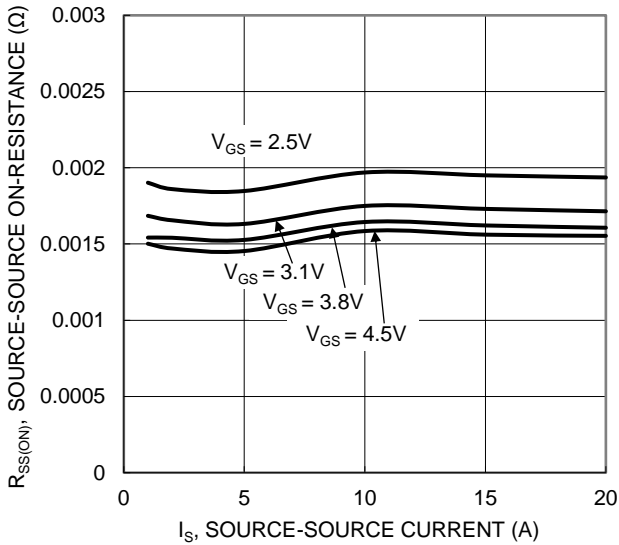


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

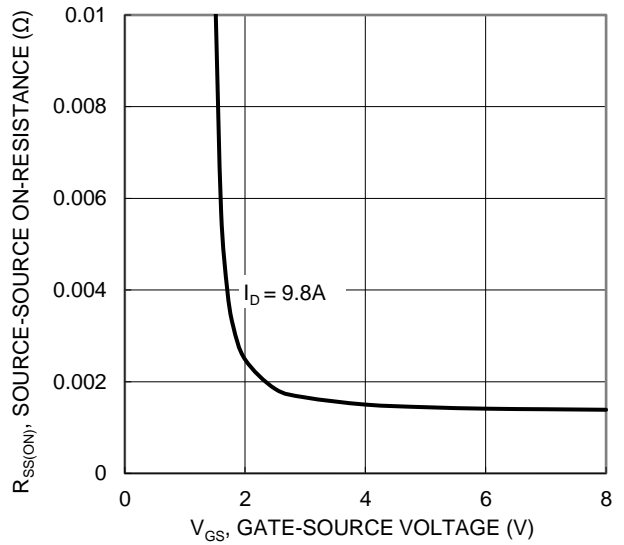


Figure 4. Typical Transfer Characteristic

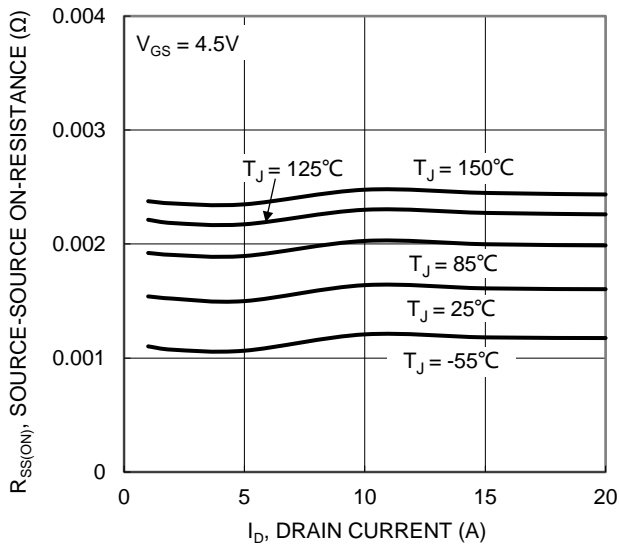


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

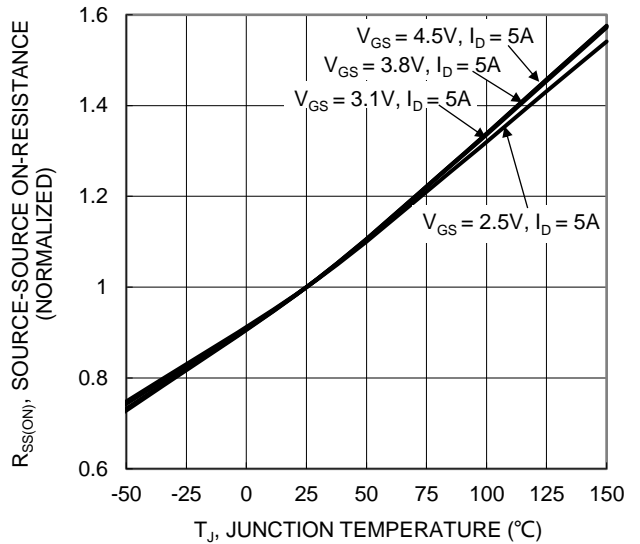


Figure 6. On-Resistance Variation with Junction Temperature

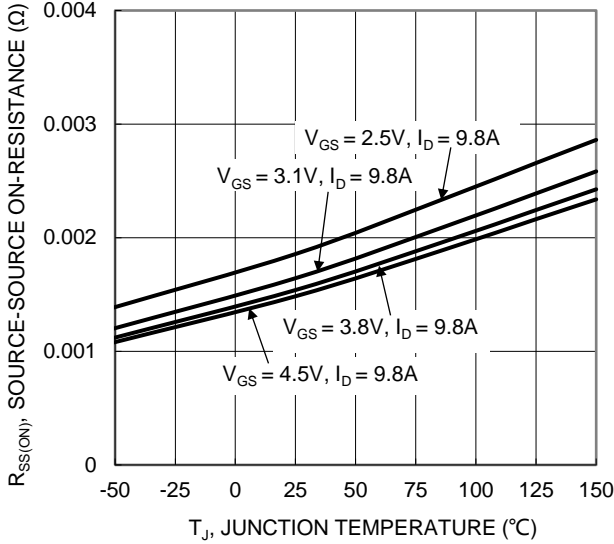


Figure 7. On-Resistance Variation with Junction Temperature

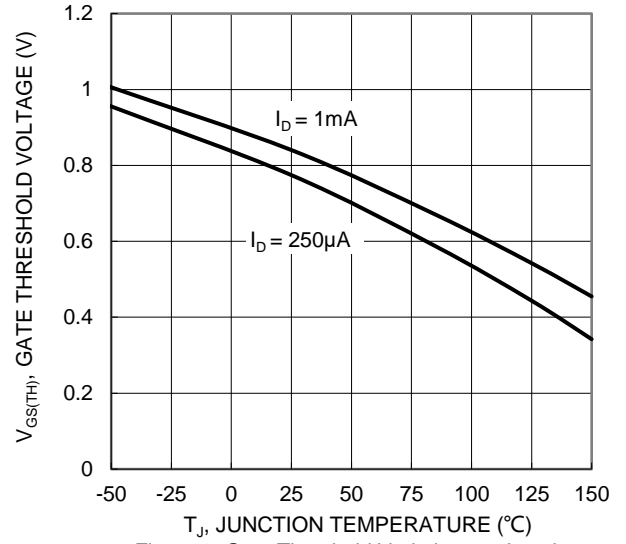


Figure 8. Gate Threshold Variation vs. Junction Temperature

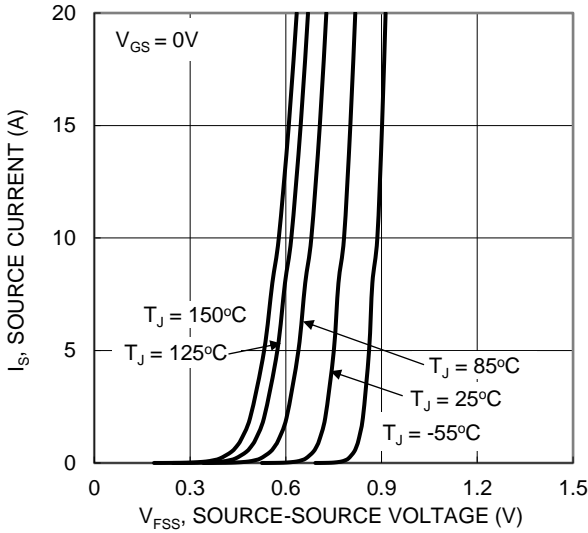


Figure 9. Diode Forward Voltage vs. Current

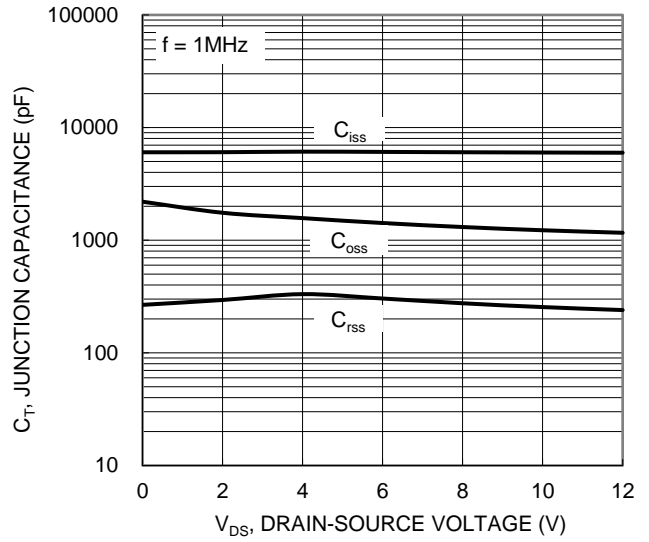


Figure 10. Typical Junction Capacitance

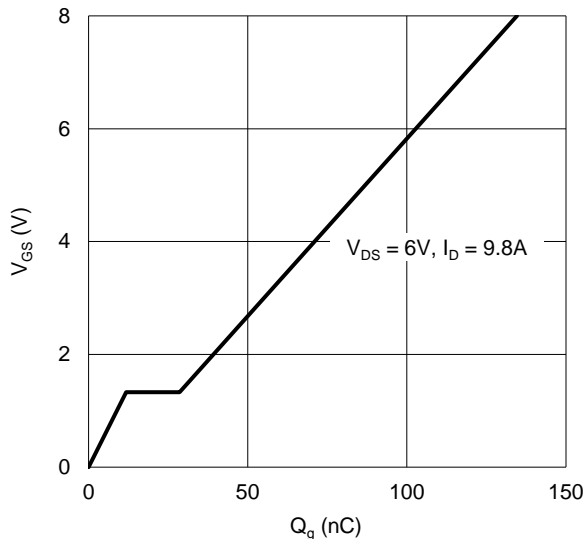


Figure 11. Gate Charge

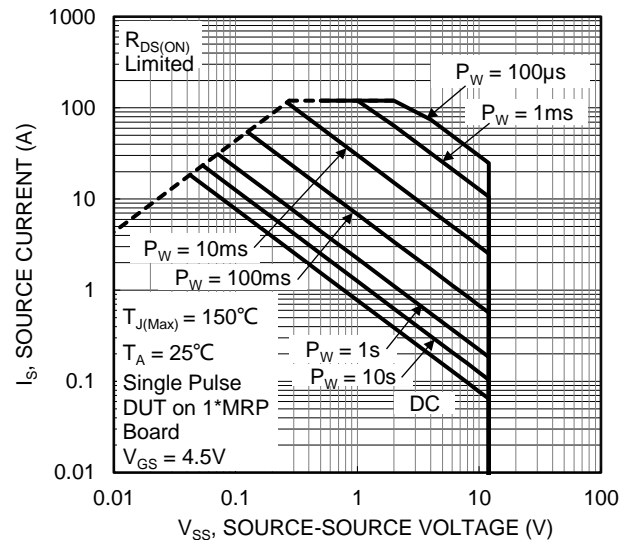


Figure 12. SOA, Safe Operation Area

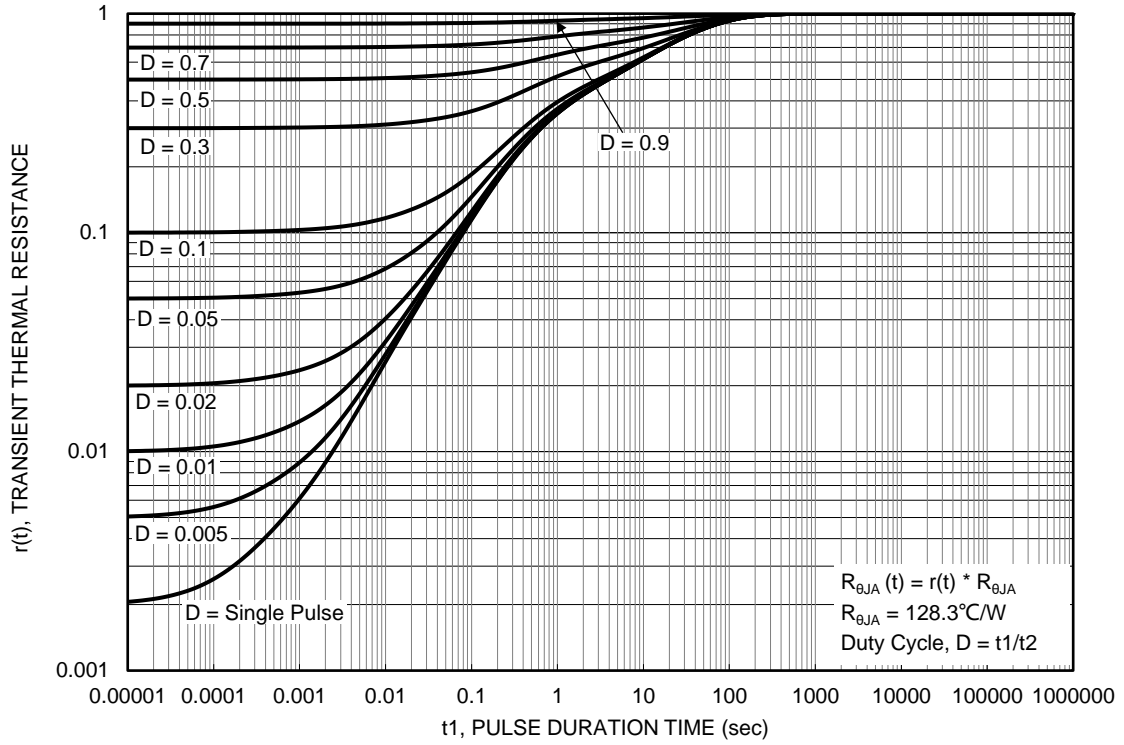
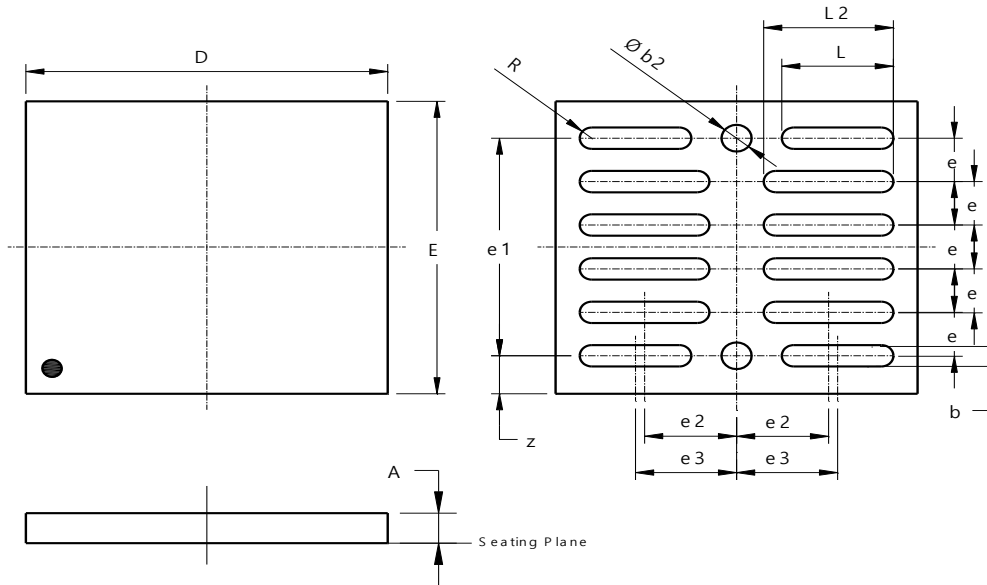


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**X2-TSN3027-14**

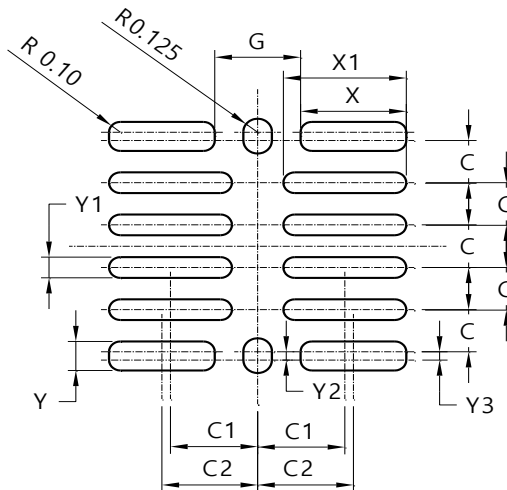


X2-TSN3027-14			
Dim	Min	Max	Typ
A	0.245	0.305	0.275
b	0.17	0.23	0.20
b2	0.22	0.28	0.25
D	2.95	3.05	3.00
E	2.69	2.79	2.74
e	--	--	0.406
e1	--	--	2.03
e2	--	--	0.7625
e3	--	--	0.8375
L	0.895	0.955	0.925
L2	1.045	1.105	1.075
z	--	--	0.355
R	0.10REF		
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**X2-TSN3027-14**



Dimensions	Value (in mm)
C	0.406
C1	0.7625
C2	0.8375
G	0.450
X	0.925
X1	1.075
Y	0.280
Y1	0.200
Y2	0.085
Y3	0.080

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