

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>A</sub> = +25°C
20V	12.5mΩ @ V <sub>GS</sub> = 4.5V	10.0A
	14.5mΩ @ V <sub>GS</sub> = 2.5V	9.2A
	19.5mΩ @ V <sub>GS</sub> = 1.8V	8.0A

## Description

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

## Applications

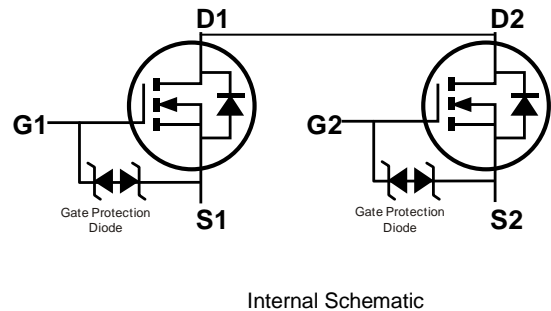
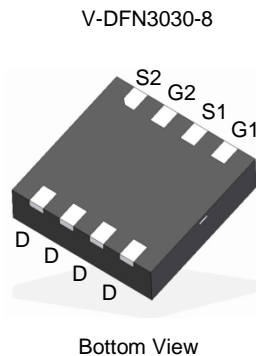
- Power Management Functions
- Load Switch

## Features

- Low On-Resistance
- Low Input Capacitance
- **ESD Protected Up To 2kV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: V-DFN3030-8
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 <sup>(e4)</sup>
- Weight: 0.02 grams (Approximate)

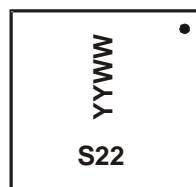


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2022UDH-7	V-DFN3030-8	3,000/Tape & Reel
DMN2022UDH-13	V-DFN3030-8	10,000/Tape & Reel

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

## Marking Information



S22 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 16 = 2016)  
 WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±10	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	10.0 8.0	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	12.6 10.1	A
Maximum Body Diode Forward Current (Note 6)			I <sub>S</sub>	2	A
Pulsed Drain Current (10µs pulse, Duty cycle = 1%)			I <sub>DM</sub>	40	A
Avalanche Current (Note 7) L = 0.1mH			I <sub>AS</sub>	15	A
Avalanche Energy (Note 7) L = 0.1mH			E <sub>AS</sub>	11.5	mJ

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

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P <sub>D</sub>	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R <sub>θJA</sub>	107	°C/W
	t < 10s		R <sub>θJA</sub>	67	
Total Power Dissipation (Note 6)			P <sub>D</sub>	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R <sub>θJA</sub>	67	°C/W
	t < 10s		R <sub>θJA</sub>	42	
Thermal Resistance, Junction to Case			R <sub>θJC</sub>	11	
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>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.4	—	1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	10.6	12.5	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4A
		—	10.8	13.0		V <sub>GS</sub> = 4.0V, I <sub>D</sub> = 4A
		—	11.3	14.0		V <sub>GS</sub> = 3.1V, I <sub>D</sub> = 4A
		—	12.1	14.5		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 4A
		—	15.5	19.5		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 4A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 5A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iSS</sub>	—	1870	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	321	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	159	—	pF	
Gate Resistance	R <sub>g</sub>	—	96	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	21	—	nC	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6.5A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	46	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	2.8	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	3.6	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	62	—	ns	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 4.5V, R <sub>G</sub> = 6Ω, R <sub>L</sub> = 1.0Ω, I <sub>D</sub> = 1A
Turn-On Rise Time	t <sub>R</sub>	—	102	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	596	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	224	—	ns	
Reverse Recovery Time	t <sub>RR</sub>	—	149	—	ns	
Reverse Recovery Charge	Q <sub>RR</sub>	—	134	—	nC	I <sub>F</sub> = 4A, di/dt = 100A/µs

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

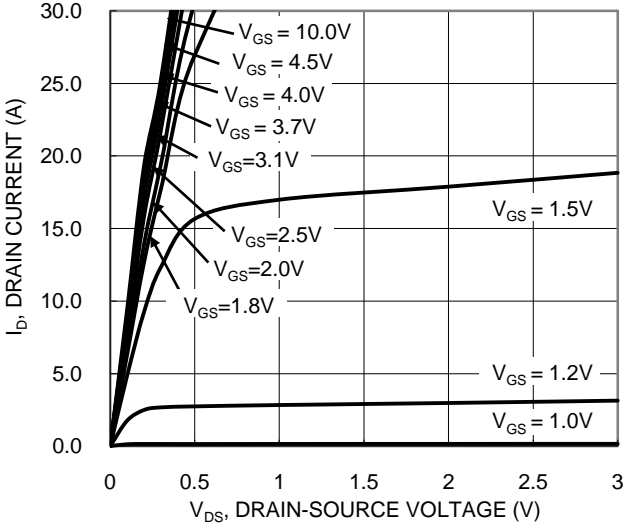


Figure 1. Typical Output Characteristic

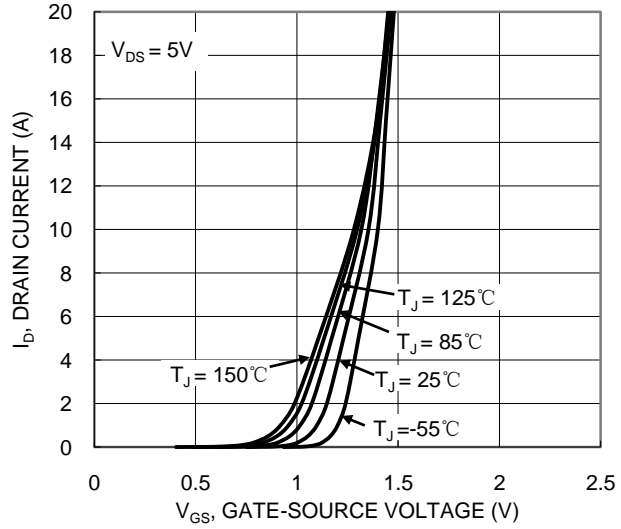


Figure 2. Typical Transfer Characteristic

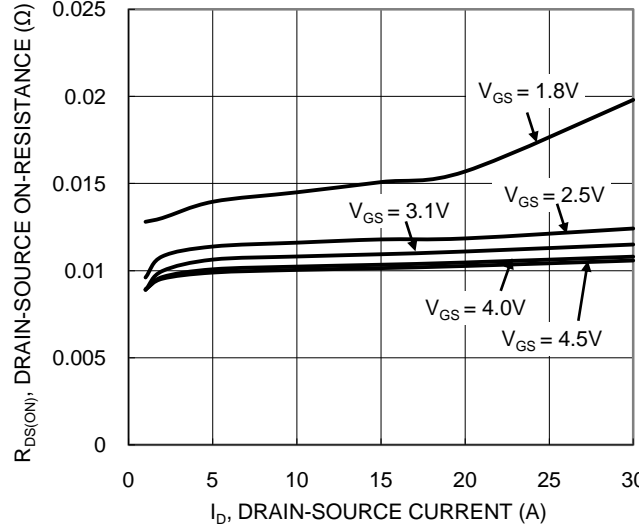


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

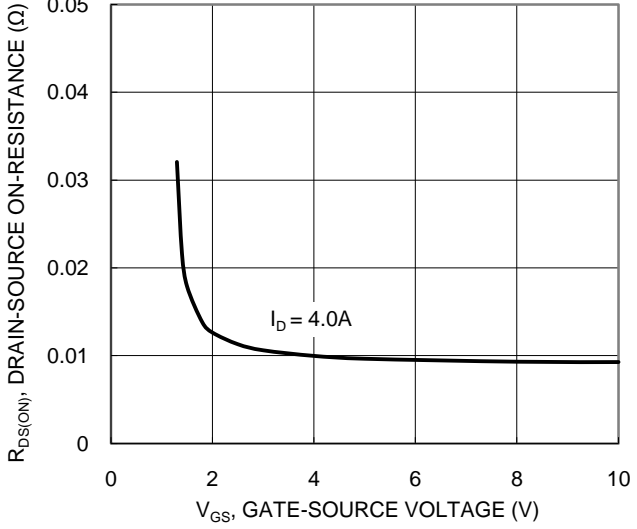


Figure 4. Typical Transfer Characteristic

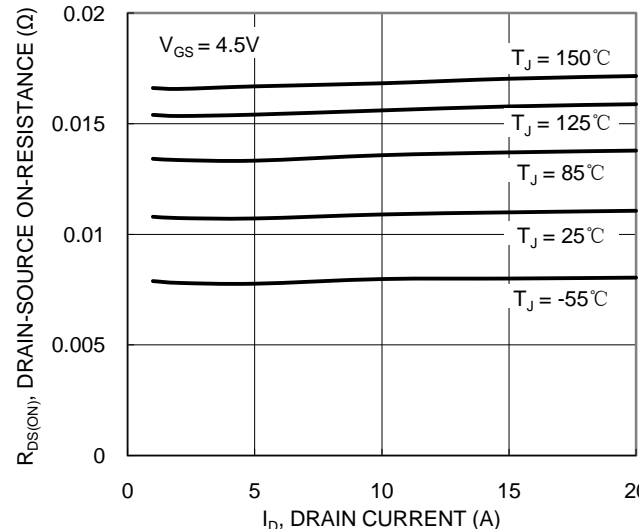


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

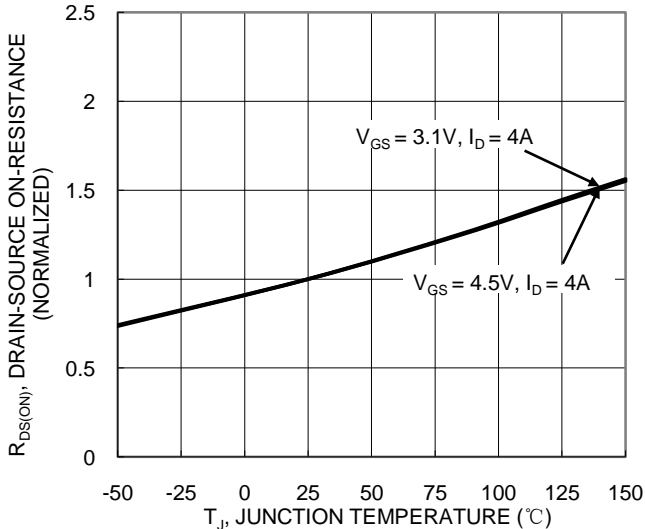


Figure 6. On-Resistance Variation with Junction Temperature

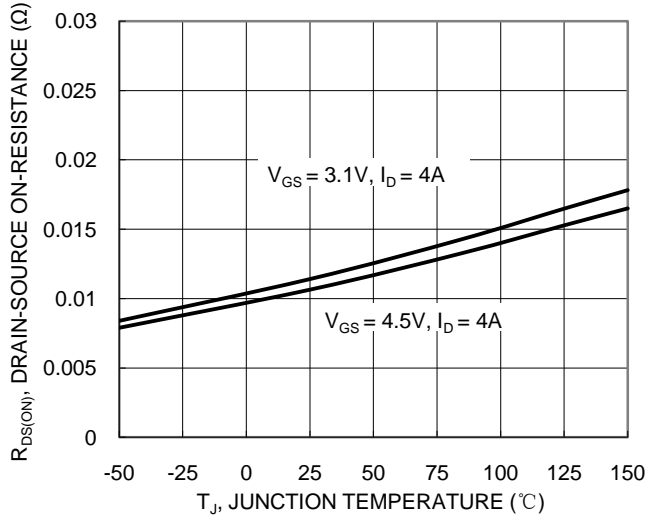


Figure 7. On-Resistance Variation with Junction Temperature

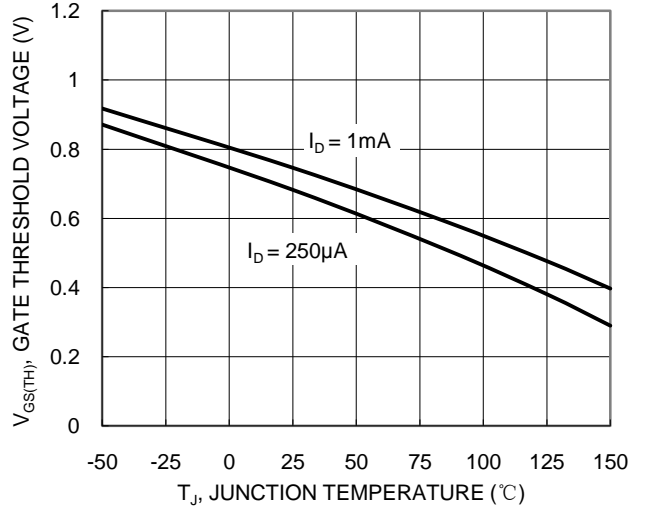


Figure 8. Gate Threshold Variation vs. Junction Temperature

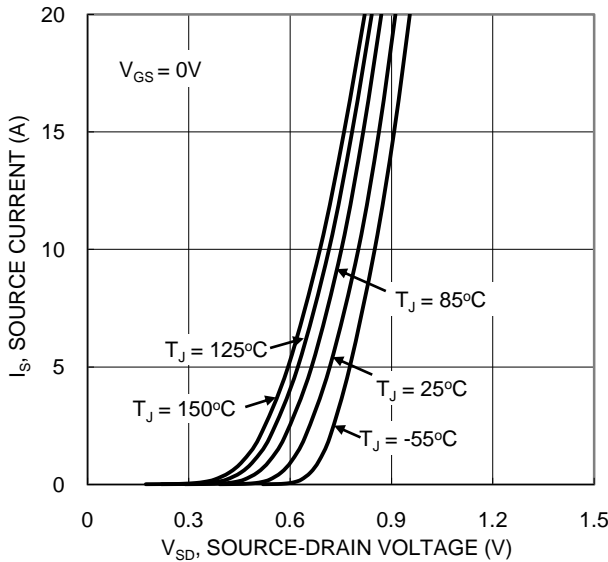


Figure 9. Diode Forward Voltage vs. Current

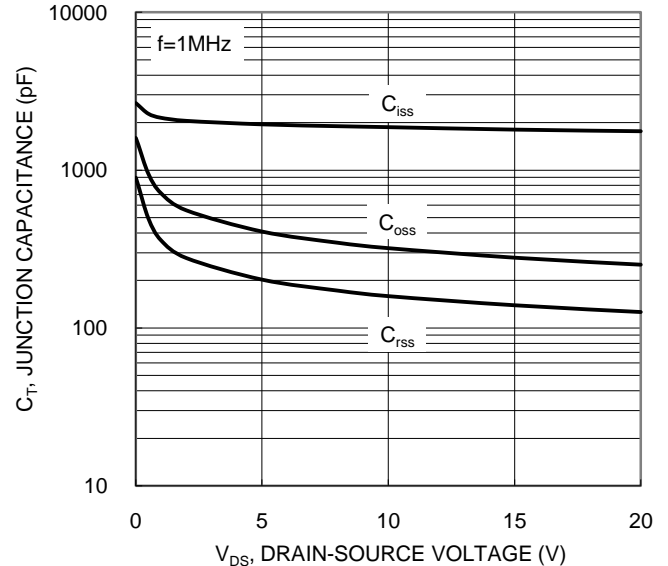


Figure 10. Typical Junction Capacitance

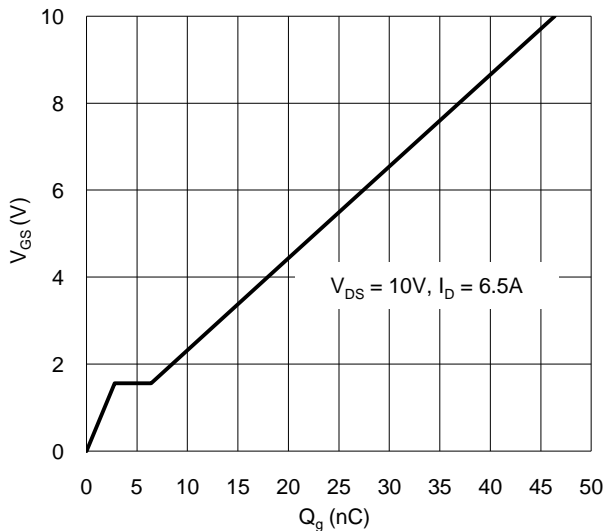


Figure 11. Gate Charge

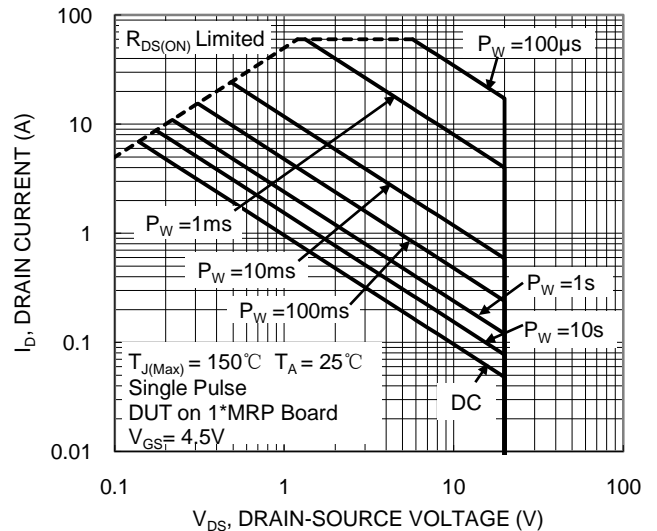


Figure 12. SOA, Safe Operation Area

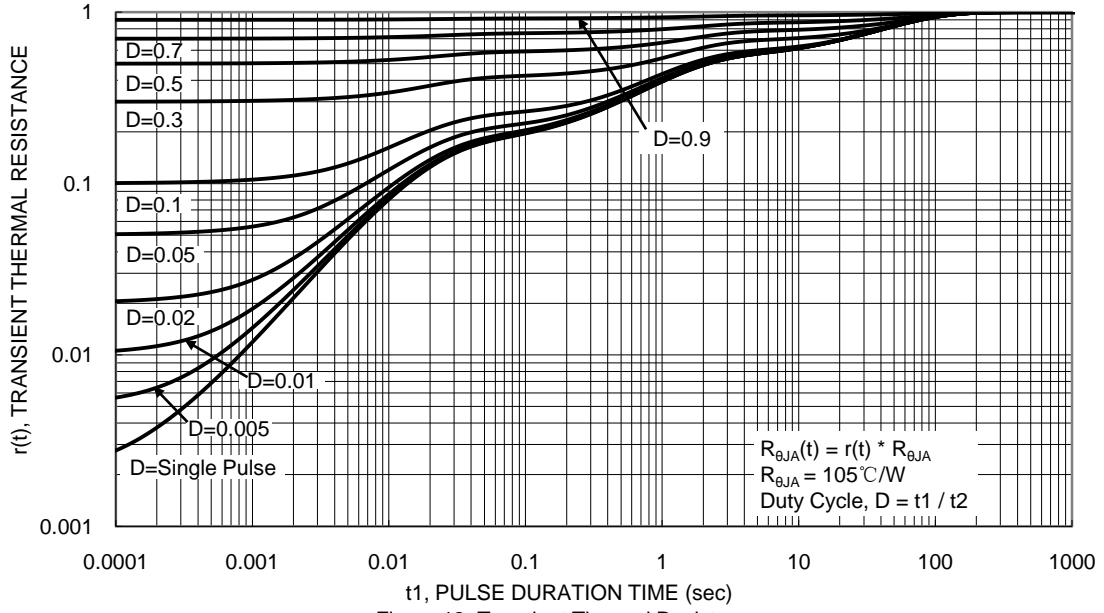
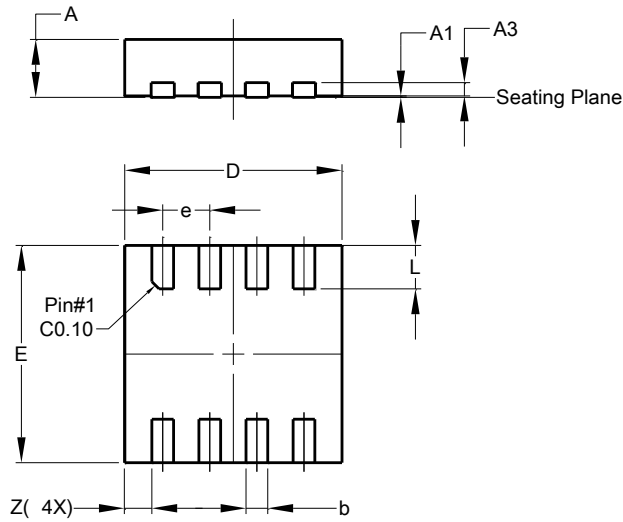


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### V-DFN3030-8

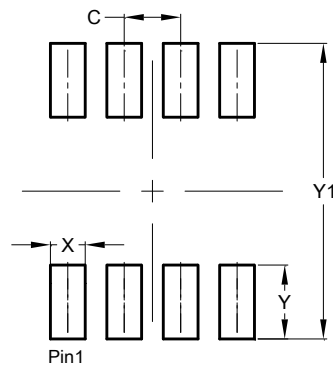


V-DFN3030-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.25	0.35	0.30
D	2.95	3.05	3.00
E	2.95	3.05	3.00
e	-	-	0.65
L	0.55	0.65	0.60
Z	-	-	0.375
All Dimensions in mm			

## Suggested Pad Layout

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

### V-DFN3030-8



Dimensions	Value (in mm)
C	0.650
X	0.400
Y	0.850
Y1	3.400

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