

## Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON) \text{ max}}$	$I_{D \text{ MAX}}$ $T_A = +25^\circ\text{C}$
N-Channel	30V	20m $\Omega$ @ $V_{GS} = 10\text{V}$	7.3A
		24m $\Omega$ @ $V_{GS} = 4.5\text{V}$	6.7A

## Description

This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

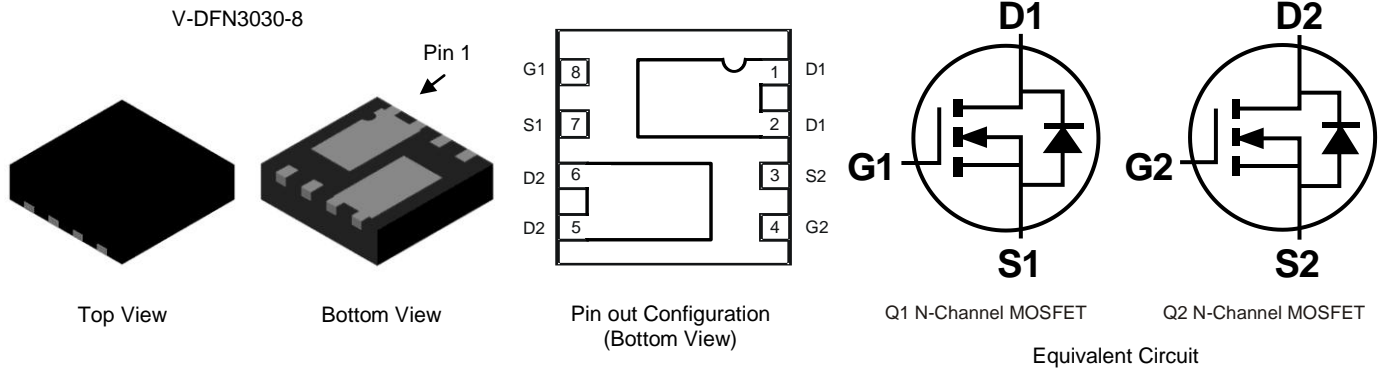
- DC Motor Control
- DC-AC Inverters

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## 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
- Weight: 0.02 grams (Approximate)

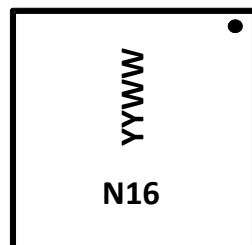


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3016LDN-7	V-DFN3030-8	3000/Tape & Reel
DMN3016LDN-13	V-DFN3030-8	10000/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



N16 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Digit of Year (ex: 13 for 2013)  
WW = Week Code (01 ~ 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	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>	7.3 5.8	A
	t<10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	9.2 7.3	A
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	2.5	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	45	A
Avalanche Current (Note 7) L = 0.1mH			I <sub>AS</sub>	22	A
Avalanche Energy (Note 7) L = 0.1mH			E <sub>AS</sub>	24	mJ

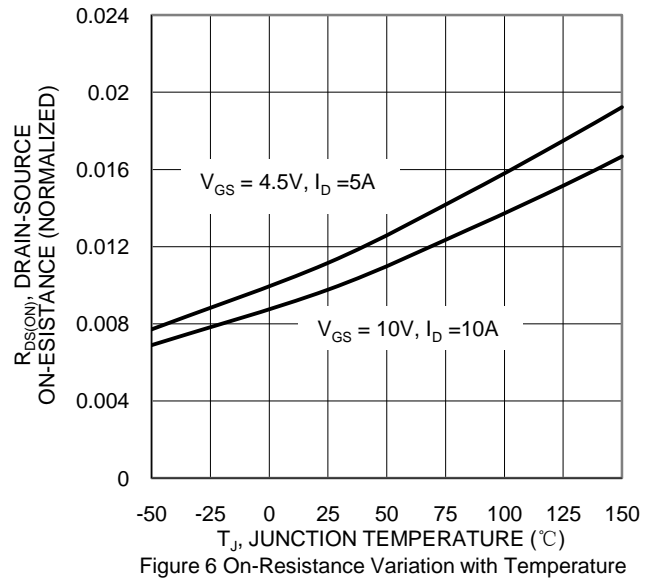
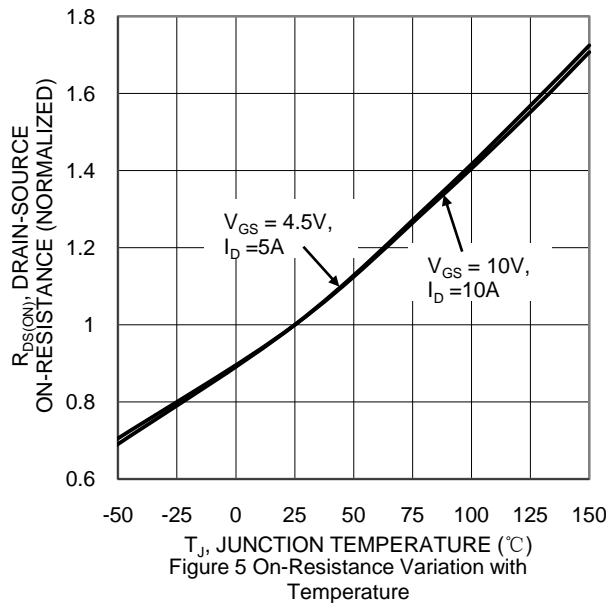
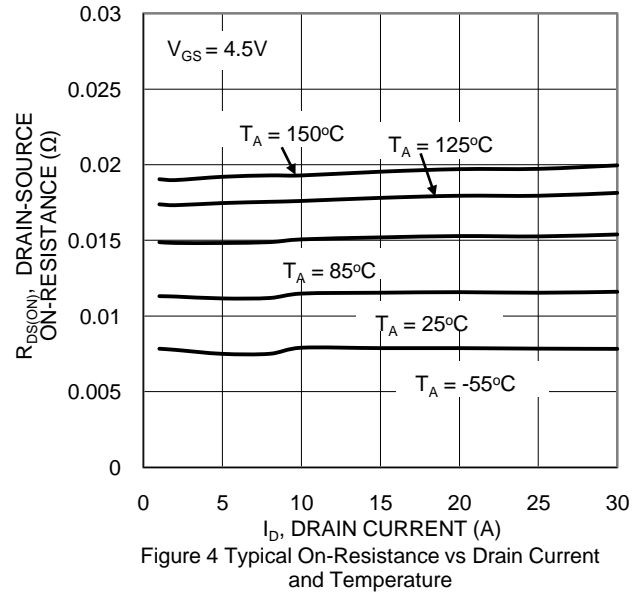
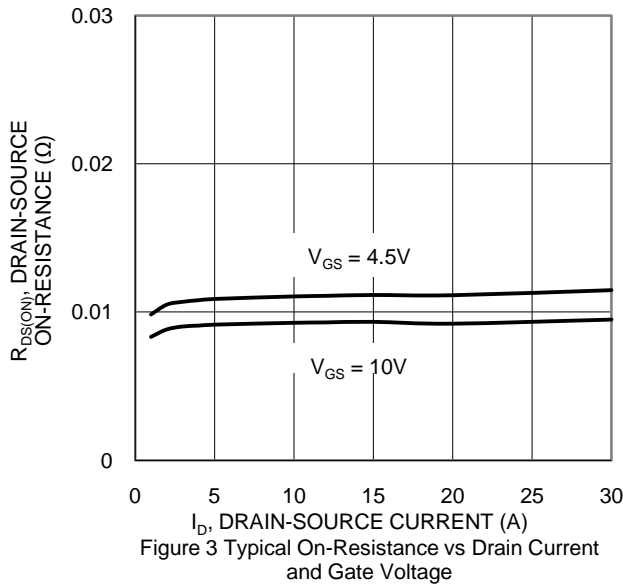
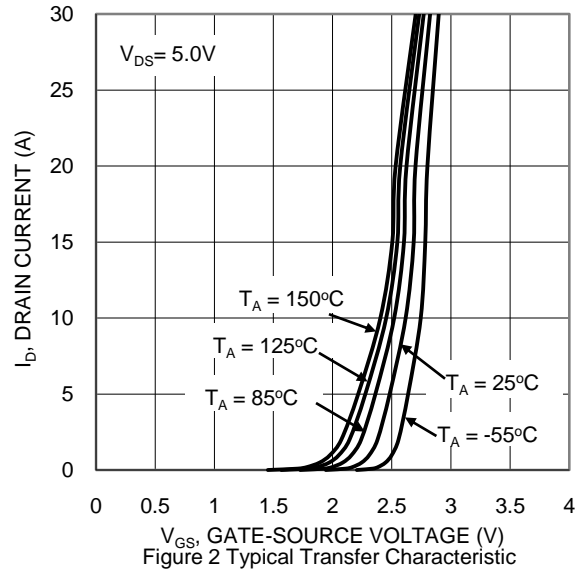
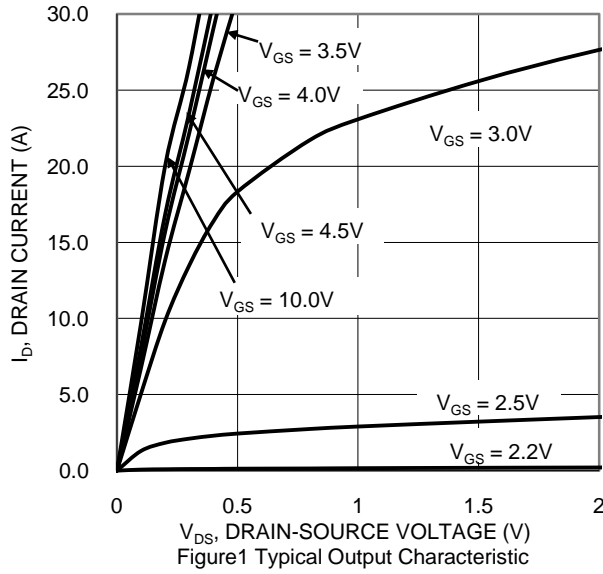
**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.1	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	119	°C/W
	t < 10s		75	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	78	°C/W
	t < 10s		49	
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	13.5	
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>	30	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	µA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.4	-	2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	-	20	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 11A
		-	-	24		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 9A
Diode Forward Voltage	V <sub>SD</sub>	-	0.70	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	-	1415	-	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	119	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	82	-		
Gate Resistance	R <sub>g</sub>	-	2.6	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	-	11.3	-	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 12A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	25.1	-		
Gate-Source Charge	Q <sub>gs</sub>	-	3.5	-		
Gate-Drain Charge	Q <sub>gd</sub>	-	3.6	-		
Turn-On Delay Time	t <sub>D(ON)</sub>	-	4.8	-	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 1.25Ω, R <sub>G</sub> = 3Ω
Turn-On Rise Time	t <sub>R</sub>	-	16.5	-		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	26.1	-		
Turn-Off Fall Time	t <sub>F</sub>	-	5.6	-		
Reverse Recovery Time	t <sub>RR</sub>	-	12.3	-	ns	I <sub>F</sub> = 12A, di/dt = 500A/µs
Reverse Recovery Charge	Q <sub>rr</sub>	-	10.4	-	nC	

- 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 1in. 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 product testing.



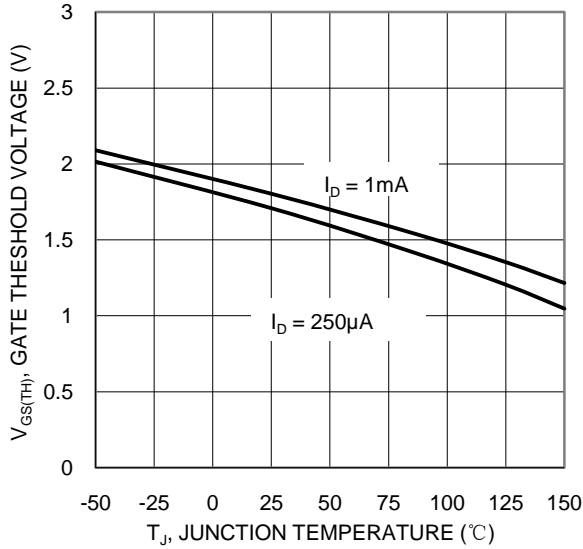


Figure 7 Gate Threshold Variation vs Junction Temperature

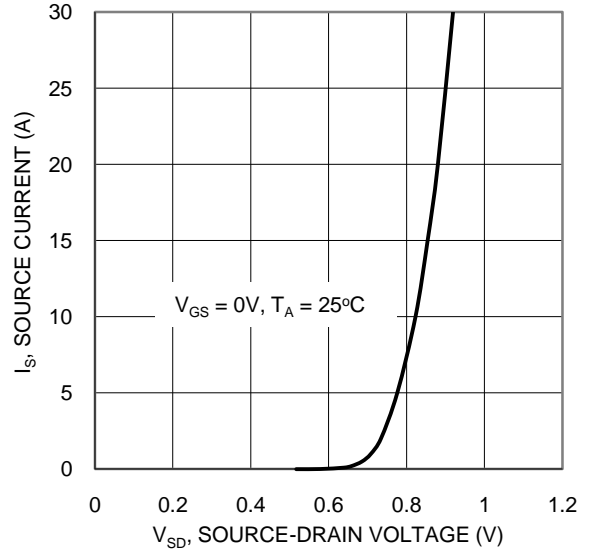


Figure 8 Diode Forward Voltage vs Current

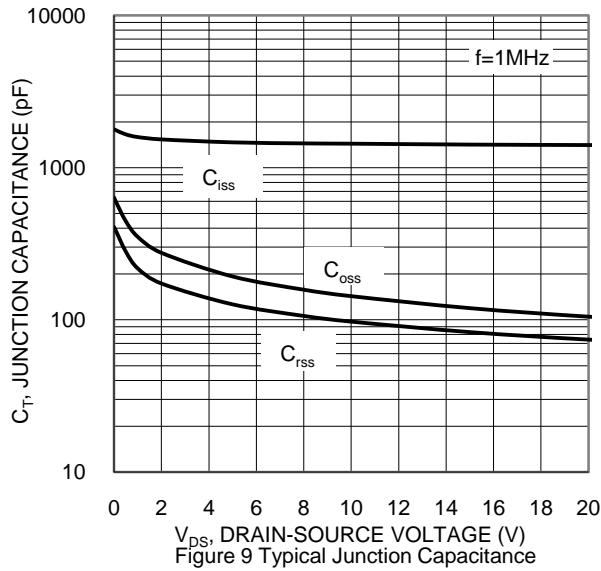


Figure 9 Typical Junction Capacitance

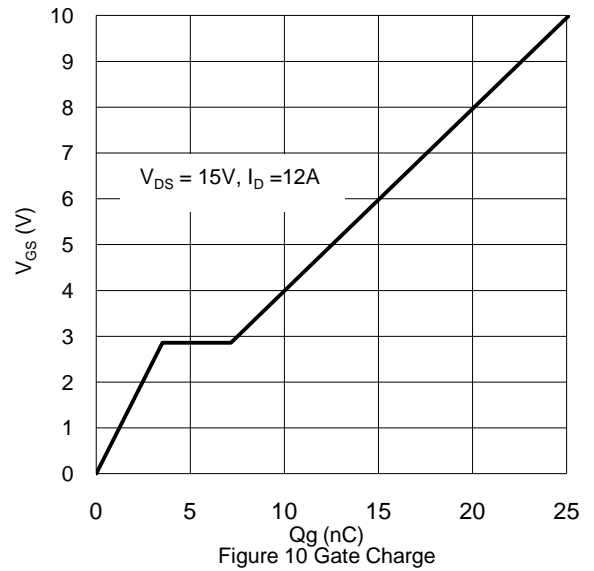


Figure 10 Gate Charge

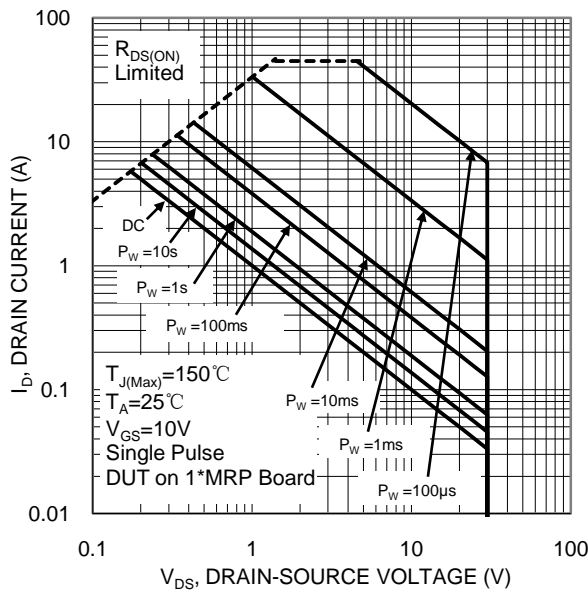


Figure 11 SOA, Safe Operation Area

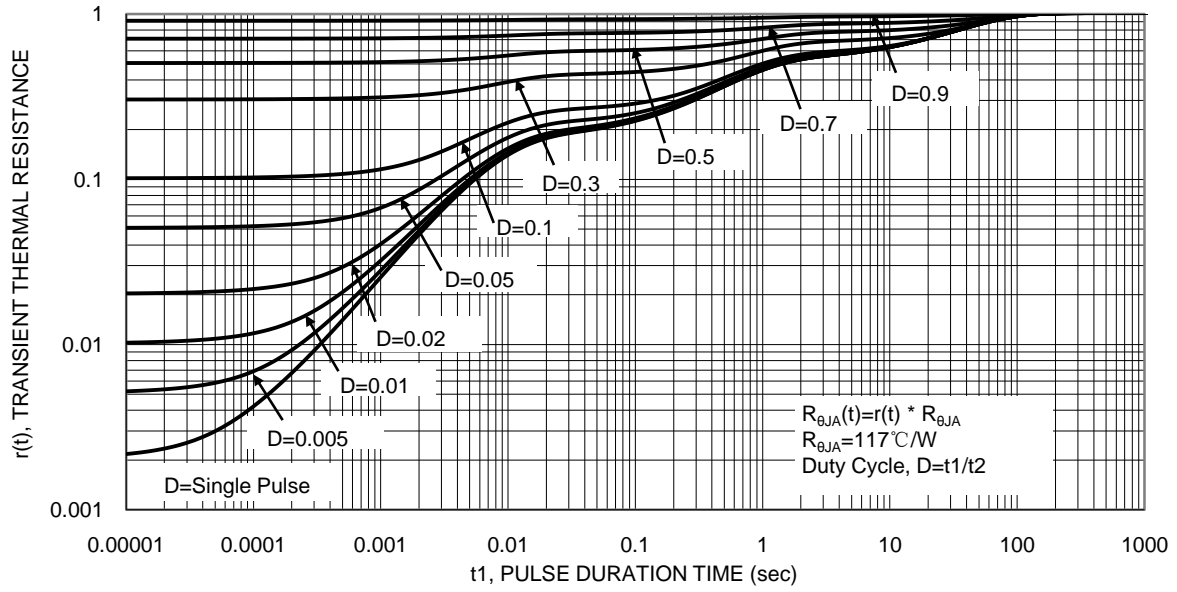
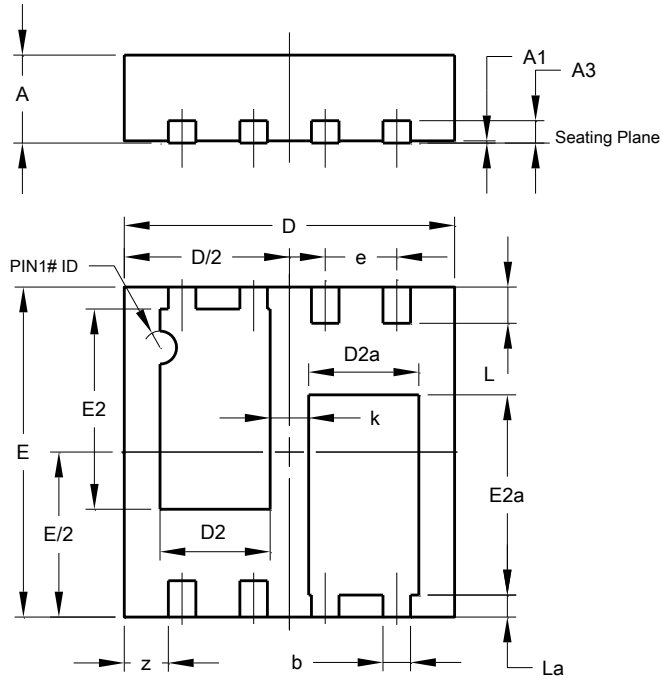


Figure 12 Transient Thermal Resistance

## Package Outline Dimensions

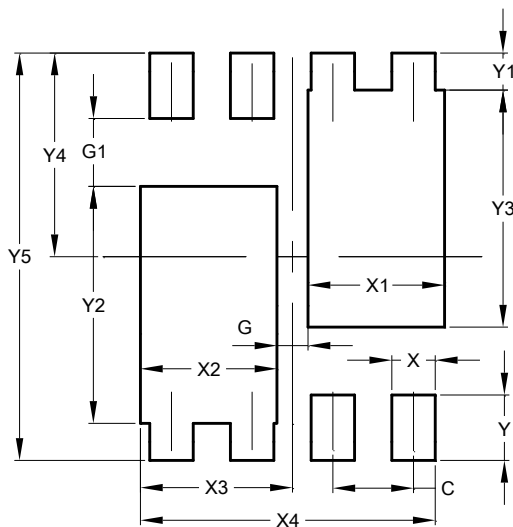
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



V-DFN3030-8 (Type J)			
Dim	Min	Max	Typ
A	0.77	0.83	0.80
A1	0.00	0.05	0.02
A3	0.203 BSC		
b	0.20	0.30	0.25
D	2.95	3.050	3.00
D2	0.90	1.10	1.00
D2a	0.90	1.10	1.00
E	2.95	3.050	3.00
E2	1.72	1.92	1.82
E2a	1.72	1.92	1.82
e	0.65BSC		
L	0.27	0.38	0.33
La	0.15	0.25	0.20
k	0.35 TYP		
z	0.40 BSC		
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	0.650
G	0.250
G1	0.550
X	0.350
X1	1.100
X2	1.100
X3	1.225
X4	2.375
Y	0.530
Y1	0.300
Y2	1.920
Y3	1.920
Y4	1.650
Y5	3.300

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