

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C
60V	8.3mΩ @ V <sub>GS</sub> = 10V	52.1A
	12.5mΩ @ V <sub>GS</sub> = 4.5V	42.4A

## Features and Benefits

- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub> – Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- **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/contact-us) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

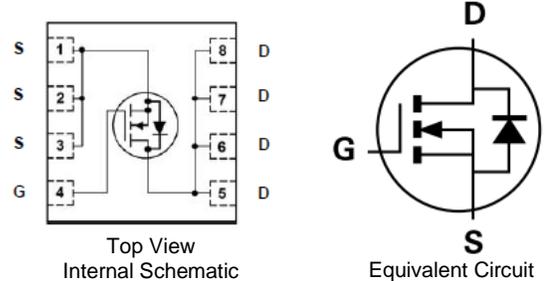
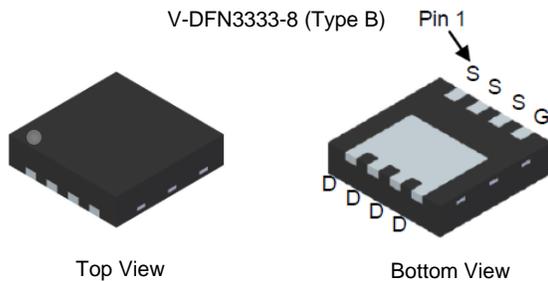
## Description and Applications

This new generation N-channel enhancement mode MOSFET is designed to minimize R<sub>DS(ON)</sub> yet maintain superior switching performance. This device is ideal for use in notebook battery power management and load switch.

- Synchronous Rectifier
- Power Management Functions
- DC-DC Converters

## Mechanical Data

- Case: V-DFN3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Below Diagram
- Terminals: Finish—NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208④
- Weight: 0.027 grams (Approximate)

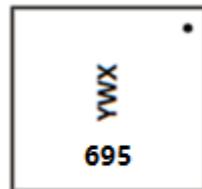


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMT69M5LCG-7	V-DFN3333-8 (Type B)	2,000/Tape & Reel
DMT69M5LCG -13	V-DFN3333-8 (Type B)	3,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. 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.
  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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



695 = Product Type Marking Code  
 YWX = Date Code Marking  
 Y = Year (ex: 0 = 2020)  
 W = Week (ex: a = week 27; z represents week 52 and 53)  
 X = Internal Code (ex: U = Monday)

### Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	0	1	2	3	4	5	6	7	8	9	0	1
Week	1-26				27-52				53			
Code	A-Z				a-z				z			
Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat					
Code	T	U	V	W	X	Y	Z					

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	60	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	14.6	A
		T <sub>A</sub> = +70°C		11.7	
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 7)		T <sub>C</sub> = +25°C	I <sub>D</sub>	52.1	A
		T <sub>C</sub> = +70°C		41.7	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	208	A
Maximum Continuous Body Diode Forward Current (Note 7)			I <sub>S</sub>	52	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)			I <sub>SM</sub>	208	A
Avalanche Current, L = 0.1mH			I <sub>AS</sub>	27.4	A
Avalanche Energy, L = 0.1mH			E <sub>AS</sub>	37.5	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.37	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	91	°C/W
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.64	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	47.3	°C/W
Thermal Resistance, Junction to Case (Note 7)		R <sub>θJC</sub>	3.7	°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>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	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> = 48V, 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	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	6.1	8.3	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 13.5A
		—	8.7	12.5		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 11.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	1406	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	540	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	52	—		
Gate Resistance	R <sub>g</sub>	—	1.85	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	28.4	—	nC	V <sub>DS</sub> = 30V, I <sub>D</sub> = 13.5A
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	15.4	—		
Gate-Source Charge	Q <sub>gs</sub>	—	2.4	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	9.0	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	10.5	—	ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 13.5A, R <sub>G</sub> = 6Ω
Turn-On Rise Time	t <sub>r</sub>	—	49.0	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	30.9	—		
Turn-Off Fall Time	t <sub>f</sub>	—	79.5	—		
Reverse Recovery Time	t <sub>RR</sub>	—	26.7	—	ns	I <sub>F</sub> = 13.5A, di/dt = 300A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	44.8	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

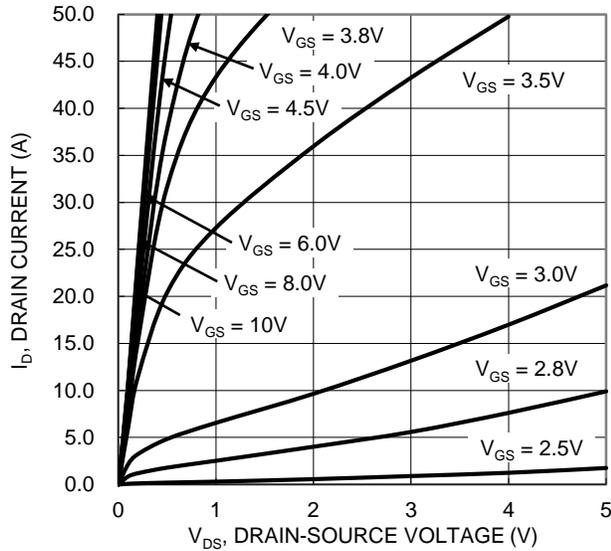


Figure 1. Typical Output Characteristic

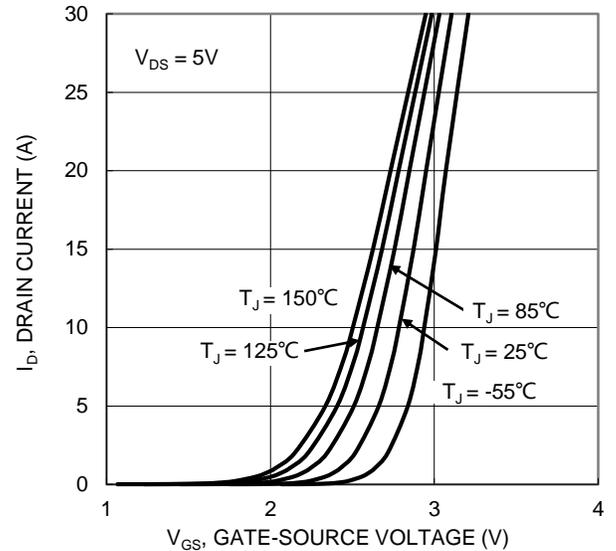


Figure 2. Typical Transfer Characteristic

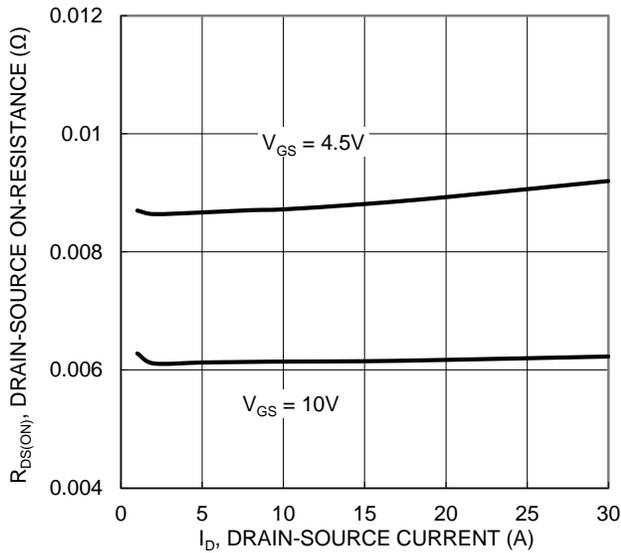


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

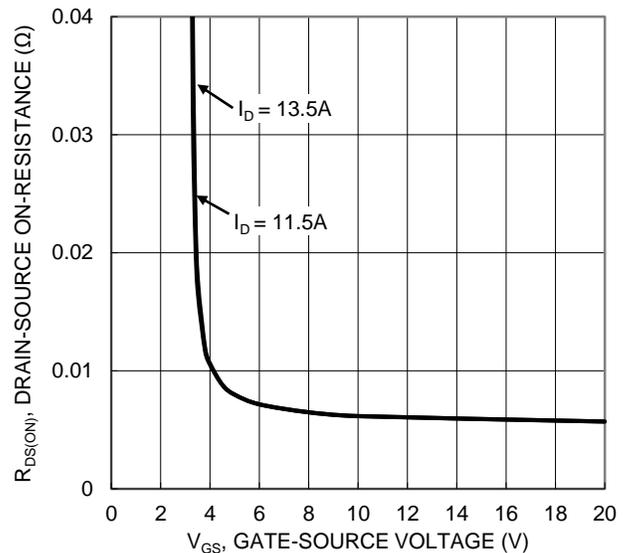


Figure 4. Typical Transfer Characteristic

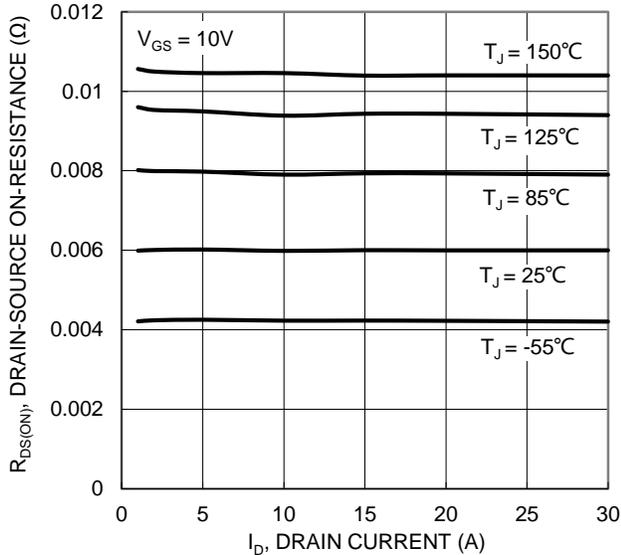


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

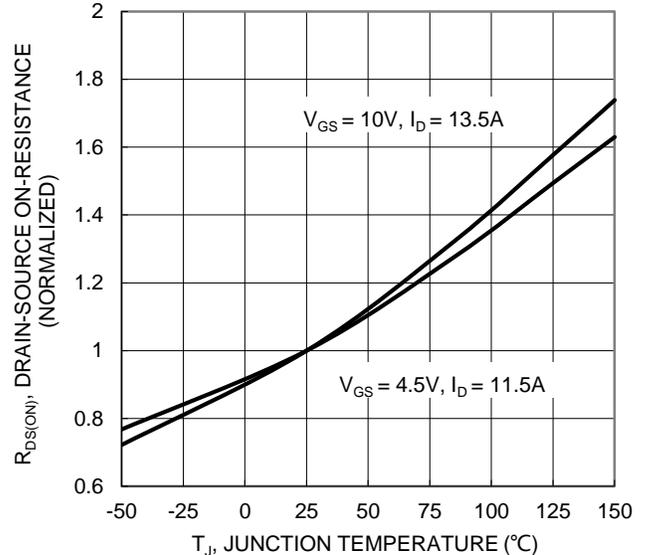


Figure 6. On-Resistance Variation with Junction Temperature

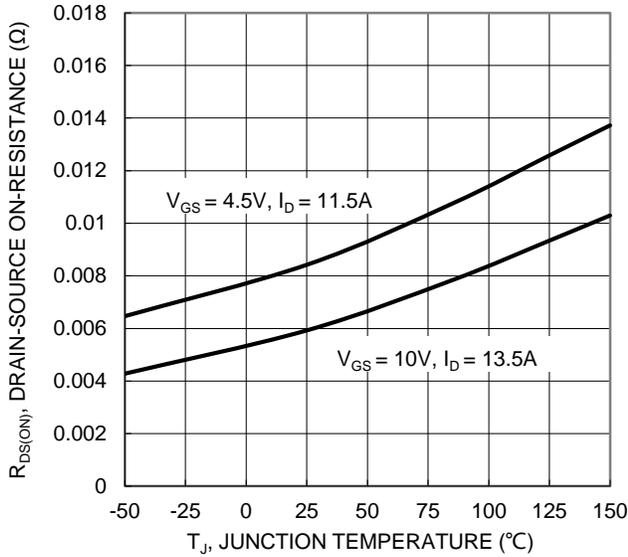


Figure 7. On-Resistance Variation with Junction Temperature

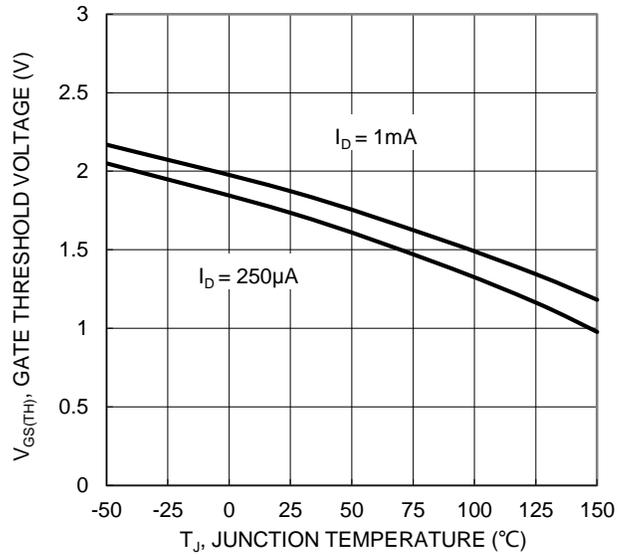


Figure 8. Gate Threshold Variation vs. Junction Temperature

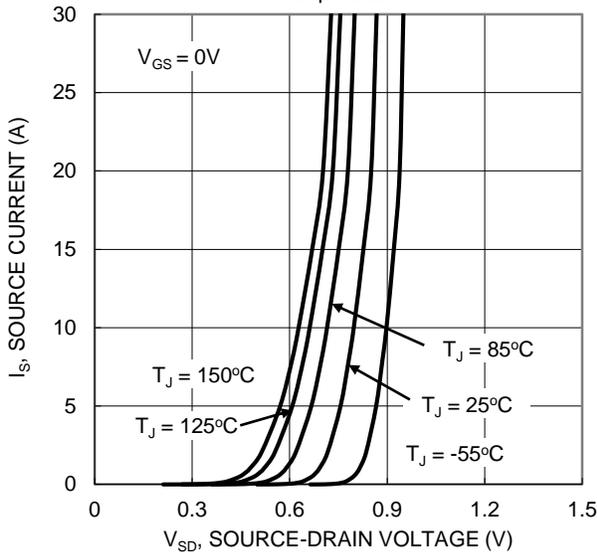


Figure 9. Diode Forward Voltage vs. Current

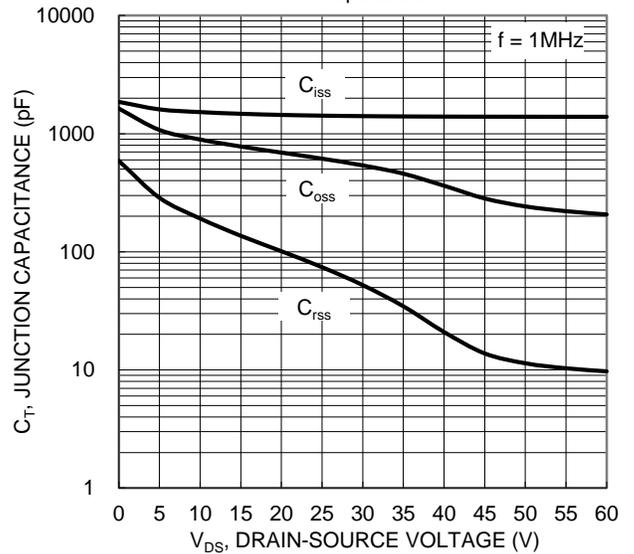


Figure 10. Typical Junction Capacitance

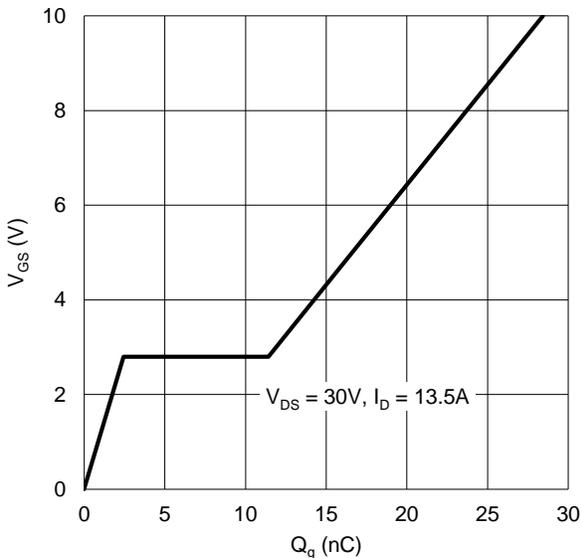


Figure 11. Gate Charge

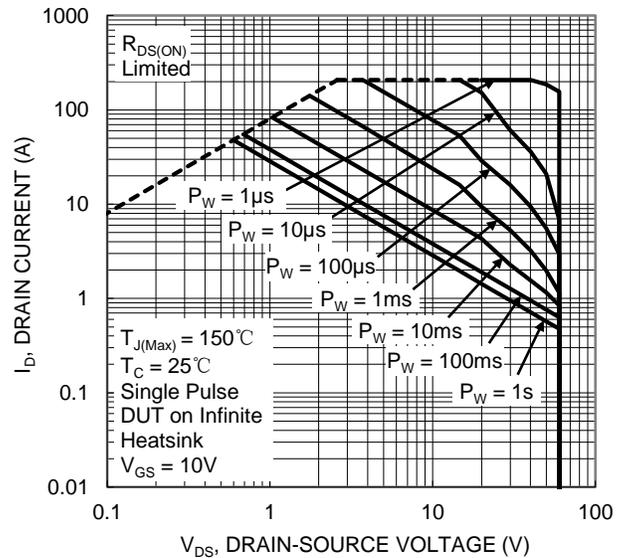


Figure 12. SOA, Safe Operation Area

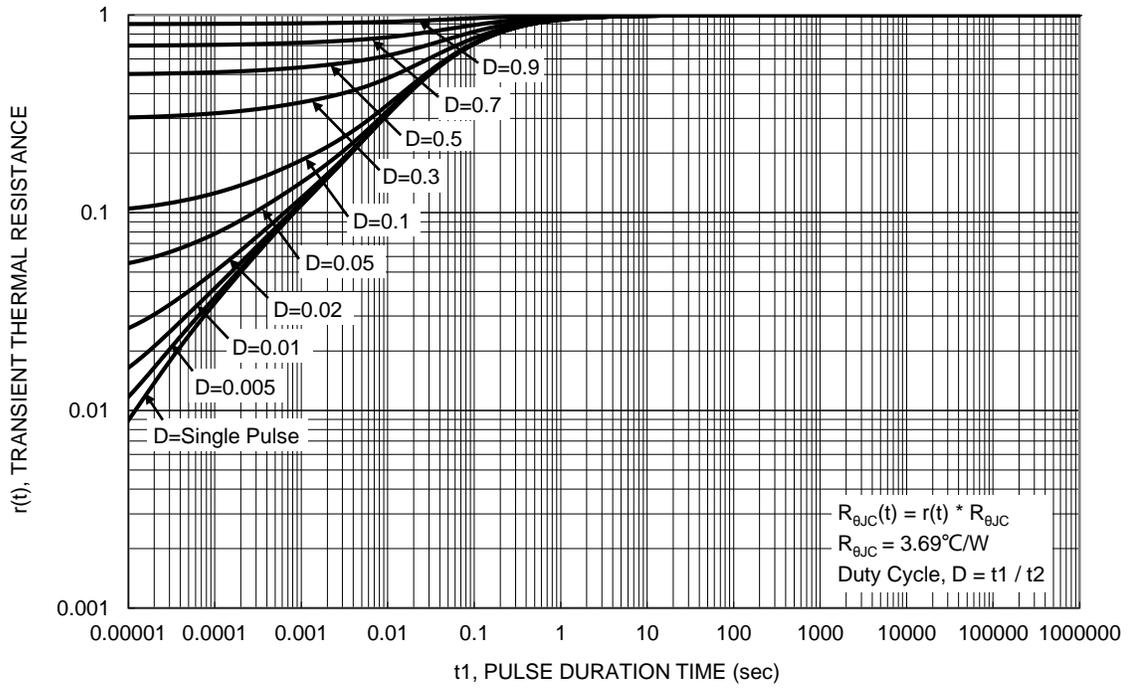
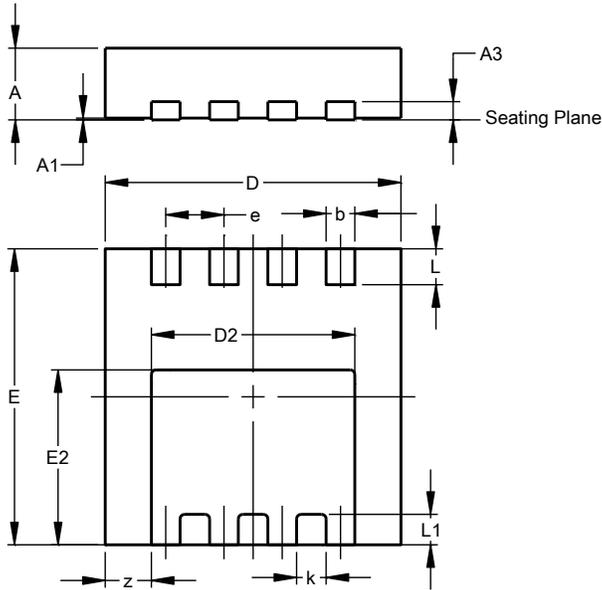


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### V-DFN3333-8 (Type B)

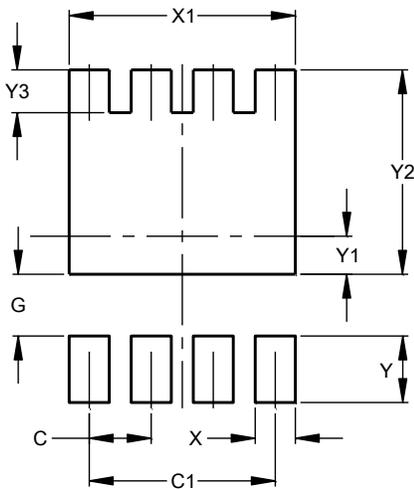


V-DFN3333-8 (Type B)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	--	--	0.203
b	0.27	0.37	0.32
D	3.25	3.35	3.30
D2	2.17	2.37	2.27
E	3.25	3.35	3.30
E2	1.85	2.05	1.95
e	--	--	0.65
k	--	--	0.33
L	0.35	0.45	0.40
L1	--	--	0.34
z	--	--	0.515
All Dimensions in mm			

## Suggested Pad Layout

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

### V-DFN3333-8 (Type B)



Dimensions	Value (in mm)
C	0.650
C1	1.950
G	0.650
X	0.420
X1	2.370
Y	0.700
Y1	0.400
Y2	2.150
Y3	0.450

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