30V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
-30V	6.8mΩ @ V_{GS} = -10V	-50A
	13mΩ @ V_{GS} = -4.5V	-36A

Description and Applications

This MOSFET has been designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

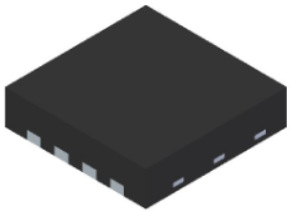
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

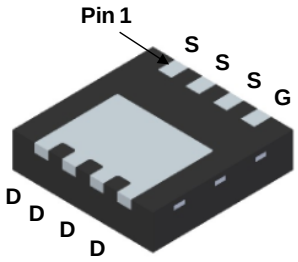
- Low $R_{DS(ON)}$ – Ensures On State Losses are Minimized
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- 100% Unclamped Inductive Switching (Test in Production)– Ensures More Reliability
- HBM ESD Protection Level of 8kV Typical
- **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**
- **PPAP Capable (Note 4)**

Mechanical Data

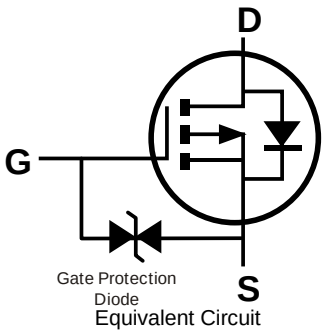
- Case: V-DFN3333-8 (Type B)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Below Diagram
  Terminals: Finish –NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.030 grams (Approximate)



Top View



Bottom View



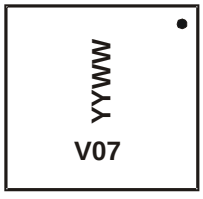
Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP3007SCGQ-7	V-DFN3333-8 (Type B)	2,000/Tape & Reel
DMP3007SCGQ-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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to https://www.diodes.com/quality/.
5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



V07= Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 18 = 2018)
WW = Week Code (01 to 53)

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±25	V
Continuous Drain Current (Note 8) V_{GS} = -10V	Steady State	T_C = +25°C T_C = +70°C	I_D	-50 -40	A
Maximum Continuous Body Diode Forward Current (Note 8)			I_S	-40	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-100	A
Avalanche Current (Note 9) L = 1mH			I_{AS}	-16	A
Avalanche Energy (Note 9) L = 1mH			E_{AS}	130	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	124	°C/W
Total Power Dissipation (Note 7)	T_A = +25°C	P_D	2.4	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	52	°C/W
Thermal Resistance, Junction to Case (Note 8)		$R_{\theta JC}$	4.0	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 10)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 10)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	-3.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	5.7	6.8	mΩ	V_{GS} = -10V, I_D = -11.5A
		—	8.0	13		V_{GS} = -4.5V, I_D = -8.5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{iss}	—	2,826	—	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	606	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	305	—	pF	
Gate Resistance	R_g	—	23	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	31.2	—	nC	V_{DS} = -15V, I_D = -11.5A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	64.2	—	nC	
Gate-Source Charge	Q_{gs}	—	10.6	—	nC	
Gate-Drain Charge	Q_{gd}	—	11.6	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.8	—	ns	V_{DD} = -15V, V_{GS} = -10V, R_g = 6Ω, I_D = -11.5A
Turn-On Rise Time	t_R	—	4.3	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	306	—	ns	
Turn-Off Fall Time	t_F	—	125	—	ns	
Reverse Recovery Time	t_{RR}	—	19	—	ns	I_S = -11.5A, dI/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	9.8	—	nC	

Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
8. Thermal resistance from junction to soldering point (on the exposed drain pad).
9. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
10. Short duration pulse test used to minimize self-heating effect.
11. Guaranteed by design. Not subject to product testing.

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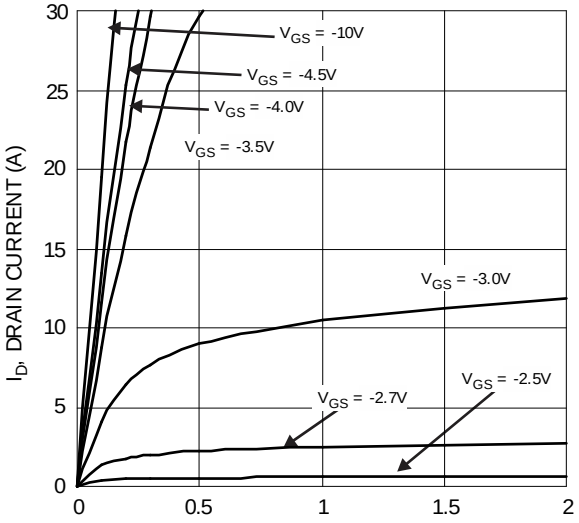

Figure 1 Typical Output Characteristics

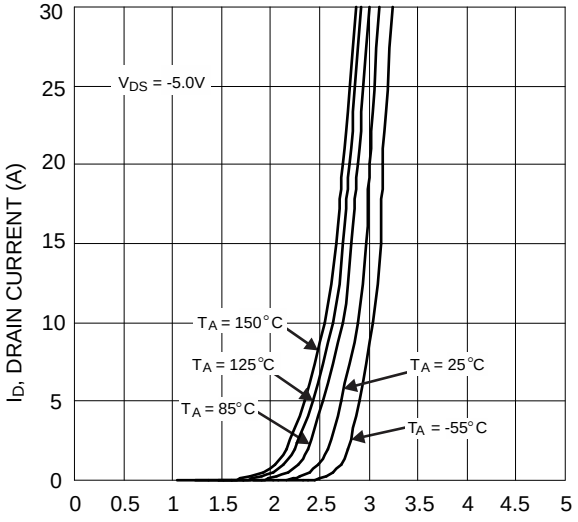

Figure 2 Typical Transfer Characteristics

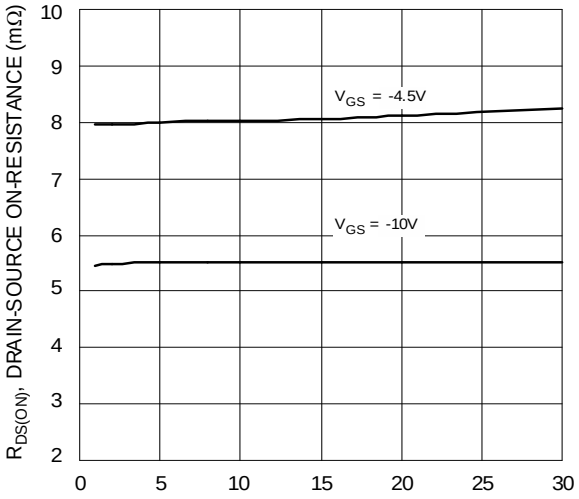

Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

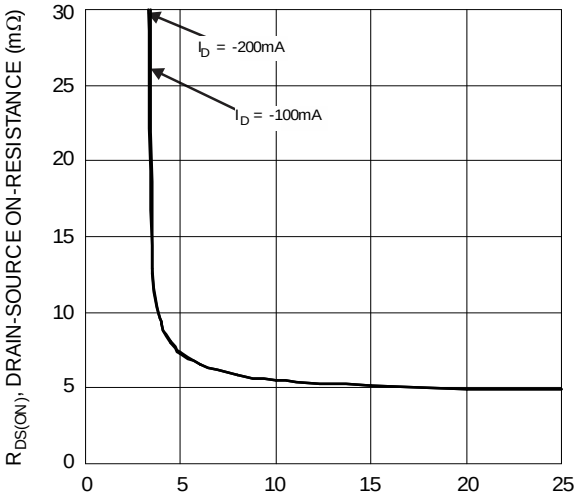

Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

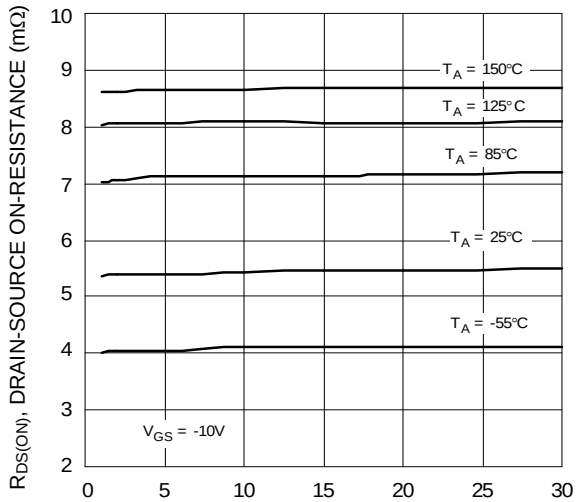

Figure 5 Typical On-Resistance vs. Drain Current and Temperature

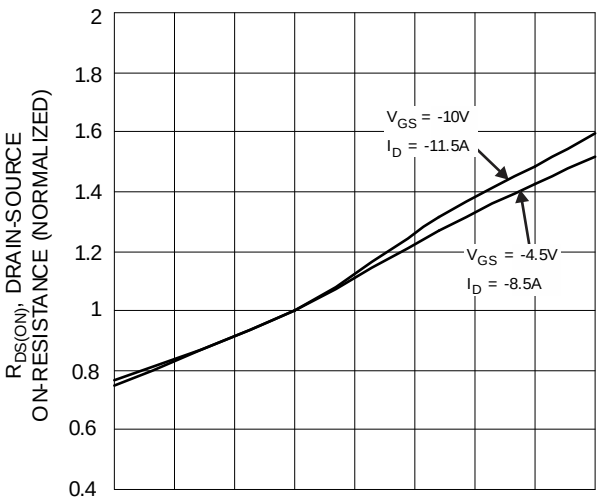

Figure 6 On-Resistance Variation with Temperature

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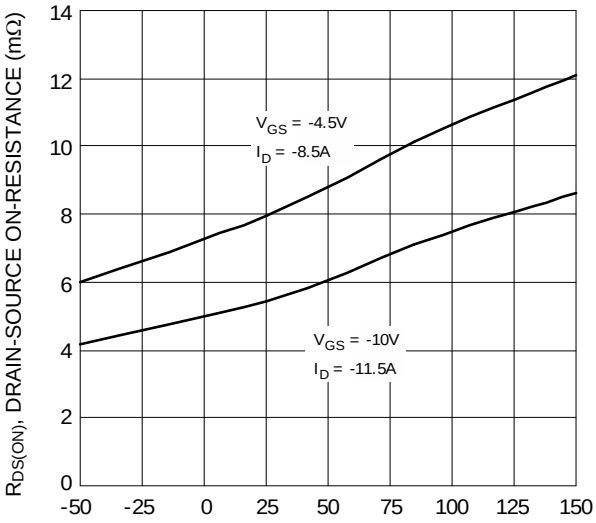

Figure 7 On-Resistance Variation with Temperature

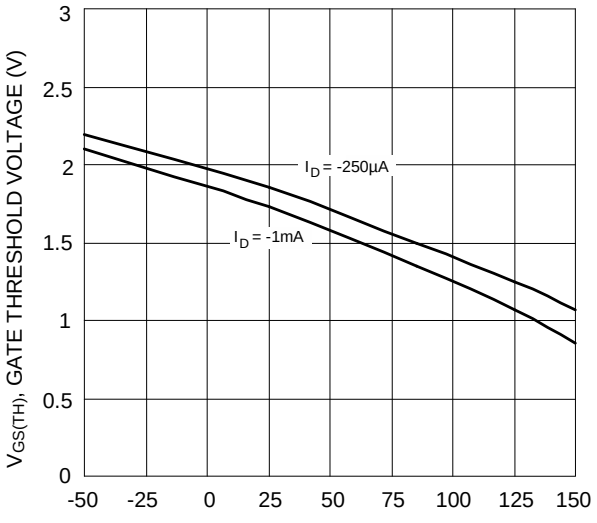

Figure 8 Gate Threshold Variation vs. Junction Temperature

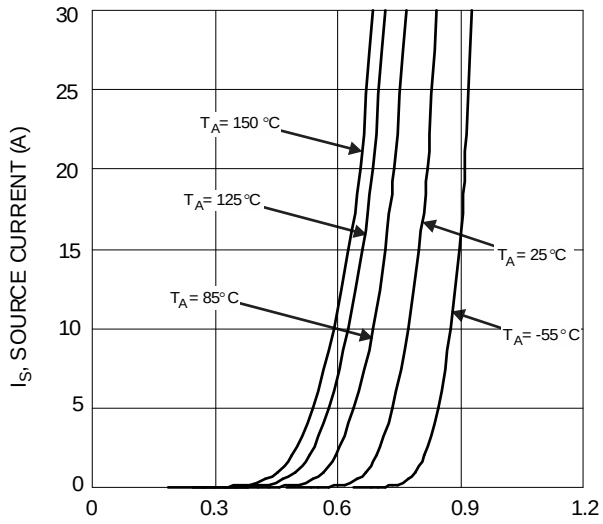

Figure 9 Diode Forward Voltage vs. Current

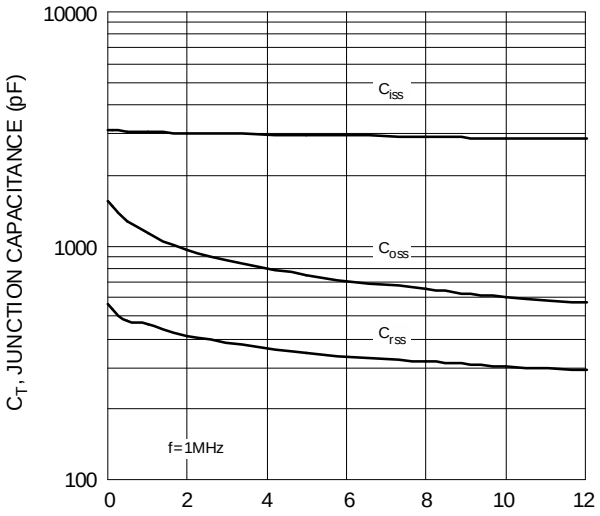

Figure 10 Typical Junction Capacitance

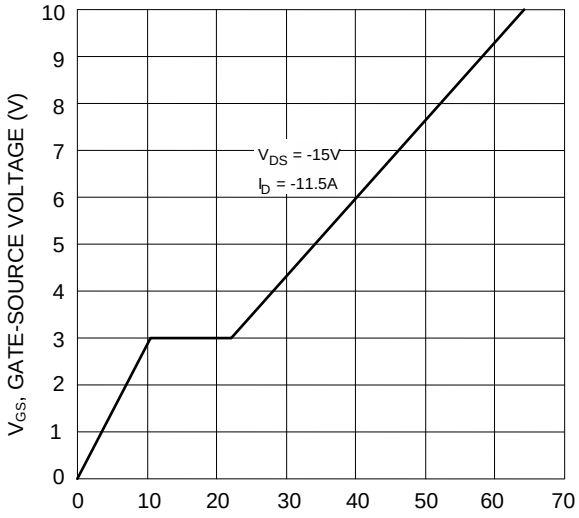

Figure 11 Gate Charge

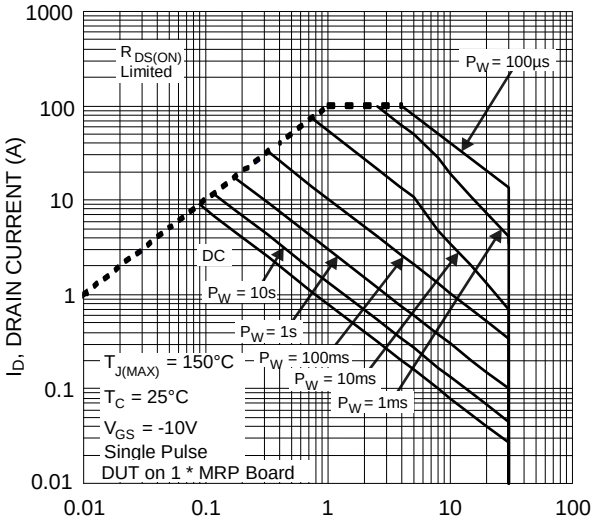

Figure 12 SOA, Safe Operation Area

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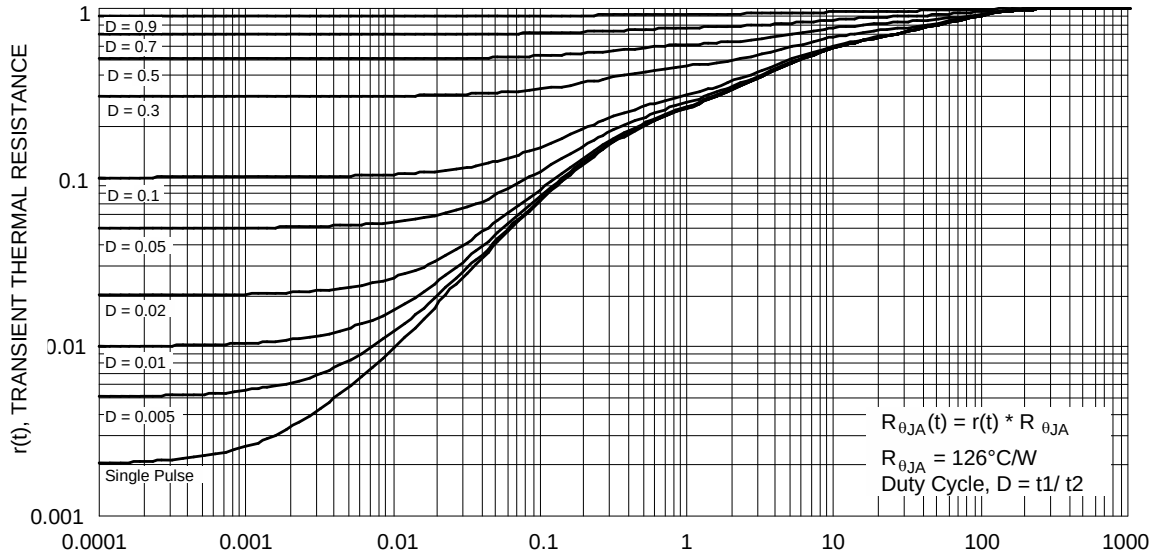

Figure 13 Transient Thermal Resistance

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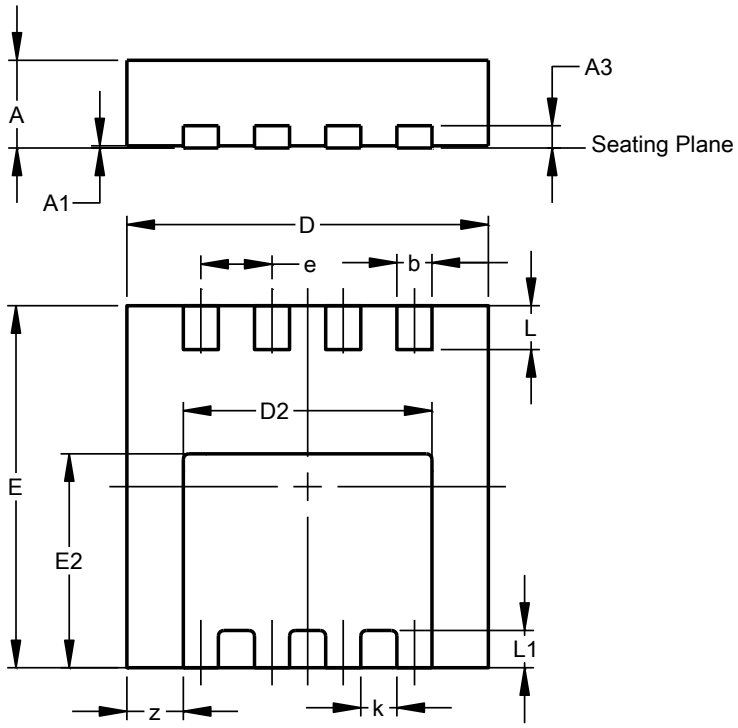
Package Outline Dimensions

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

V-DFN3333-8 (Type B)

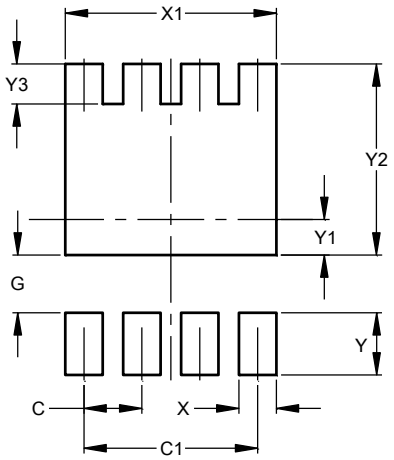


V-DFN3333-8 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	--	--	0.203
b	0.27	0.37	0.32
D	3.25	3.35	3.30
D2	2.17	2.37	2.27
E	3.25	3.35	3.30
E2	1.85	2.05	1.95
e	--	--	0.65
k	--	--	0.33
L	0.35	0.45	0.40
L1	--	--	0.34
z	--	--	0.515
All Dimensions in mm			

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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