

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ Max}$	$I_D \text{ Max}$ $T_A = +25^\circ\text{C}$
30V	18mΩ @ $V_{GS} = 10\text{V}$	7.5A
	28mΩ @ $V_{GS} = 4.5\text{V}$	6.1A

Description

This MOSFET has been 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

- Backlighting
- Power Management Functions
- DC-DC Converters

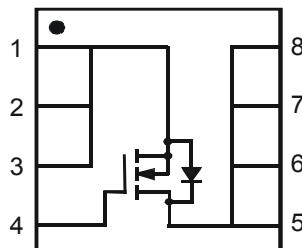
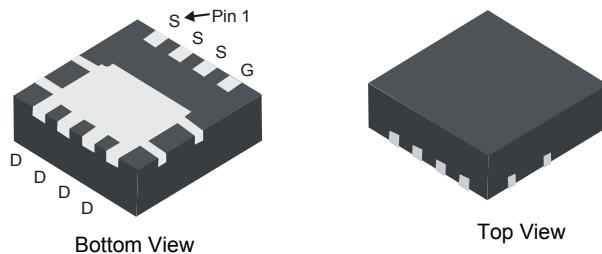
Features

- 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 Switch (UIS) test in production
- **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: POWERDI3333-8
- 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 diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.072 grams (approximate)

POWERDI3333-8



Top View
Internal Schematic

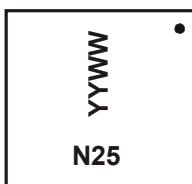
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3025LFG-7	POWERDI3333-8	2000/Tape & Reel
DMN3025LFG-13	POWERDI3333-8	3000/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> 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>.

Marking Information



N25 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last digit of year (ex: 11 = 2011)
WW = Week code (01 ~ 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	I_D	7.5	A
		$T_A = +70^\circ\text{C}$		6.1	
$t < 10\text{s}$		$T_A = +25^\circ\text{C}$	I_D	10	A
		$T_A = +70^\circ\text{C}$		7.8	
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	2.5	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	60	A
Avalanche Current (Note 6) $L = 0.1\text{mH}$			I_{AR}	14	A
Avalanche Energy (Note 6) $L = 0.1\text{mH}$			E_{AR}	10	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	2.0	W
	$T_A = +70^\circ\text{C}$		1.3	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	61	$^\circ\text{C/W}$
	$t < 10\text{s}$		37	
Thermal Resistance, Junction to Case		$R_{\theta JC}$	6.4	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 1	μA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.8	—	2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	14	18	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 7.8\text{A}$
		—	23	28		$V_{GS} = 4.5\text{V}, I_D = 7.0\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	9	-	S	$V_{DS} = 10\text{V}, I_D = 7.8\text{A}$
Diode Forward Voltage	V_{SD}	—	0.70	1.0	V	$V_{GS} = 0\text{V}, I_S = 6.3\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	605	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	74	—		
Reverse Transfer Capacitance	C_{rss}	—	58	—		
Gate resistance	R_g	—	1.5	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	5.3	—	nC	$V_{DS} = 15\text{V}, I_D = 7.8\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	11.6	—		
Gate-Source Charge	Q_{gs}	—	2	—		
Gate-Drain Charge	Q_{gd}	—	2.4	—	ns	$V_{DD} = 15\text{V}, V_{GS} = 4.5\text{V}, R_L = 2.4\Omega, R_G = 1\Omega,$
Turn-On Delay Time	$t_{D(on)}$	—	3.8	—		
Turn-On Rise Time	t_r	—	4.1	—		
Turn-Off Delay Time	$t_{D(off)}$	—	17.9	—		
Turn-Off Fall Time	t_f	—	4.7	—	nC	$I_F = 12\text{A}, di/dt = 500\text{A}/\mu\text{s}$
Reverse Recovery Time	t_{rr}	—	5.5	—		
Reverse Recovery Charge	Q_{rr}	—	2.6	—		

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

6. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$

7. Short duration pulse test used to minimize self-heating effect.

8. Guaranteed by design. Not subject to product testing.

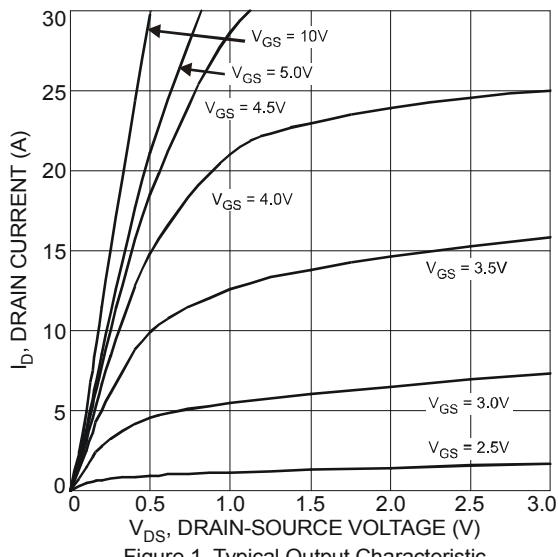


Figure 1 Typical Output Characteristic

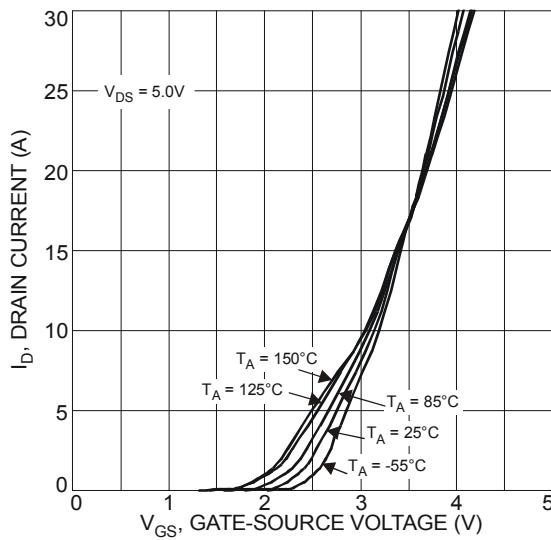


Figure 2 Typical Transfer Characteristics

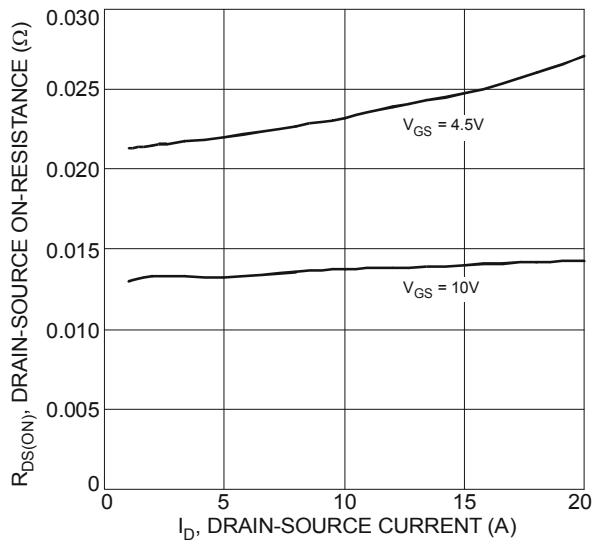


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

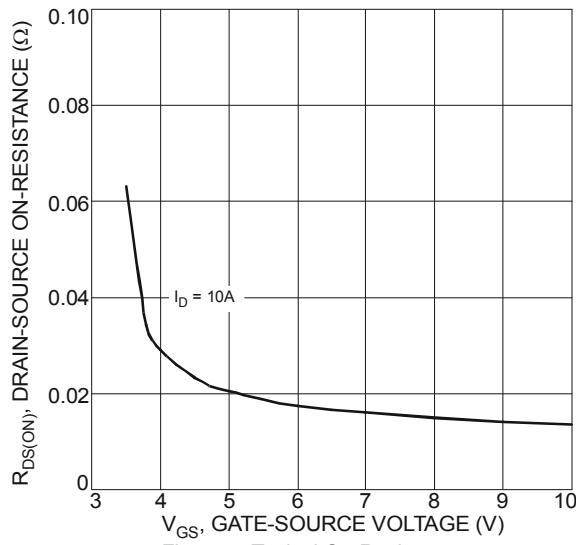


Figure 4 Typical On-Resistance vs.
Drain Current and Gate Voltage

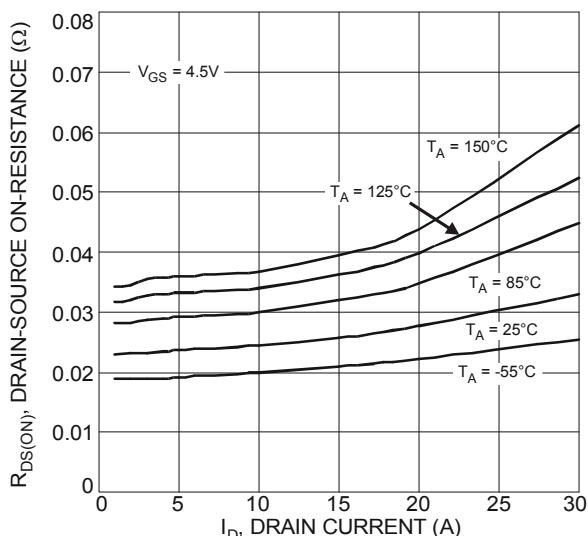


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

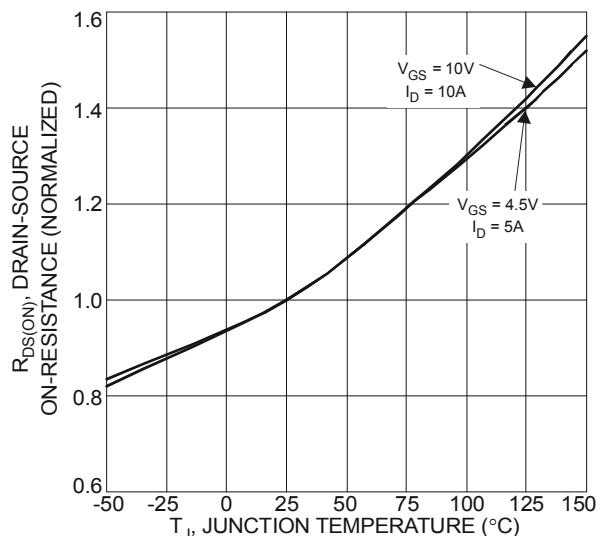


Figure 6 On-Resistance Variation with Temperature

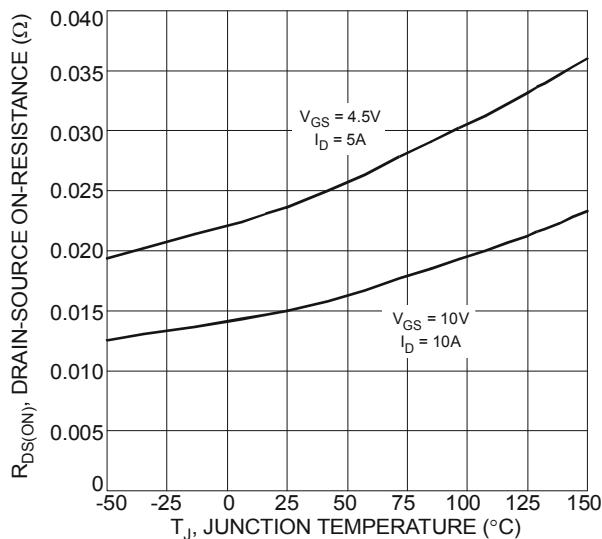


Figure 7 On-Resistance Variation with Temperature

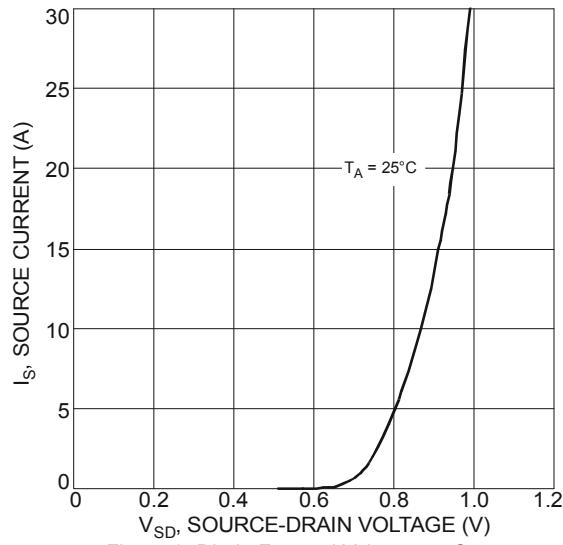


Figure 9 Diode Forward Voltage vs. Current

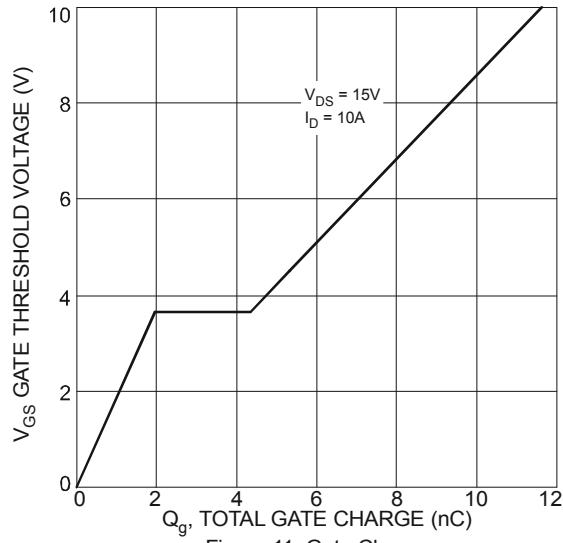


Figure 11 Gate Charge

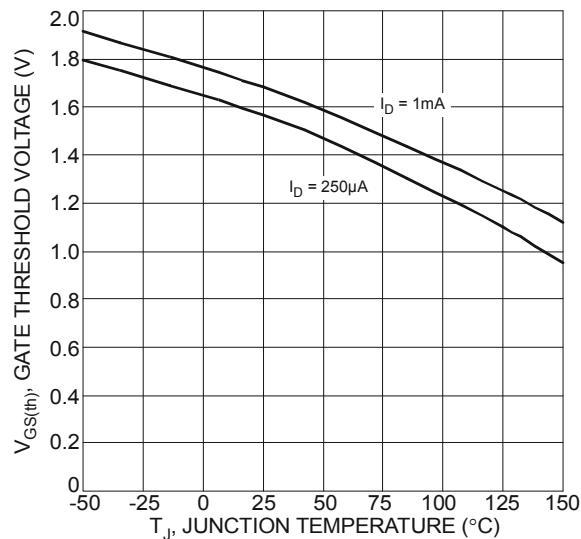


Figure 8 Gate Threshold Variation vs. Ambient Temperature

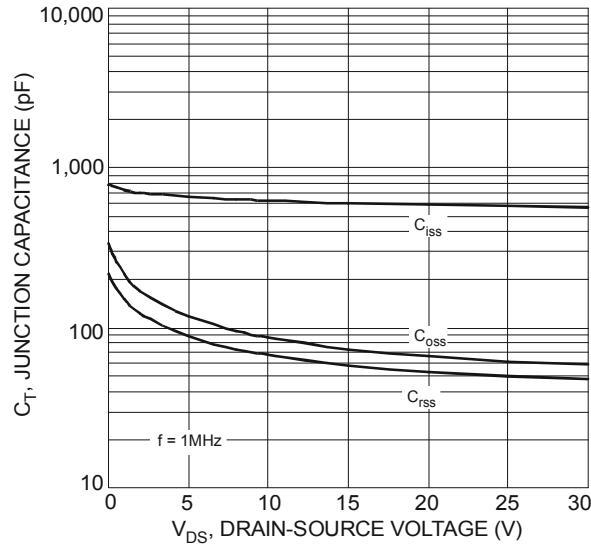


Figure 10 Typical Junction Capacitance

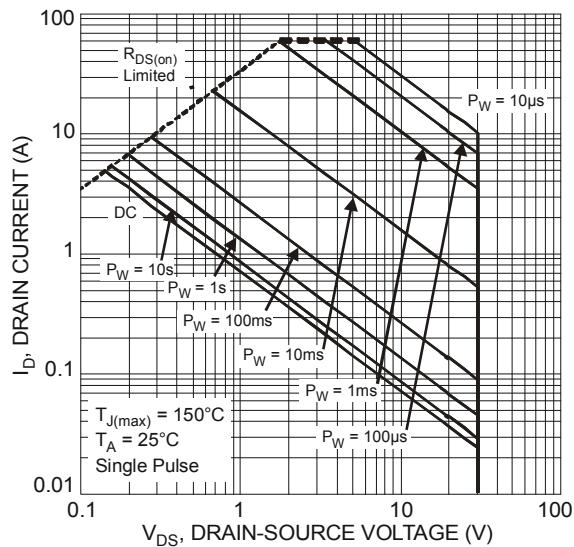
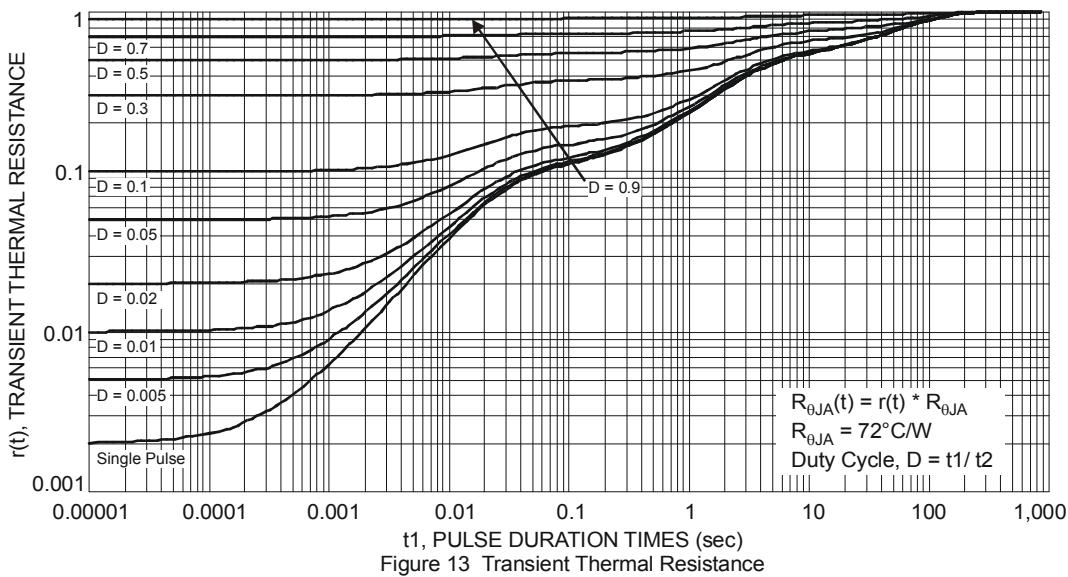
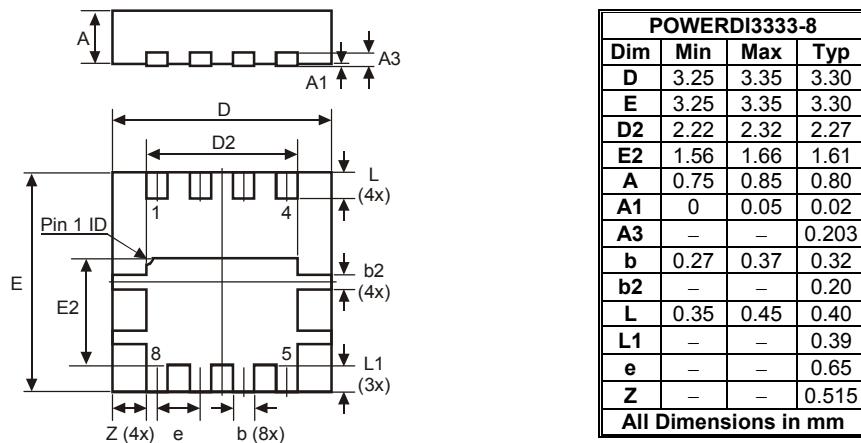


Figure 12 SOA, Safe Operation Area



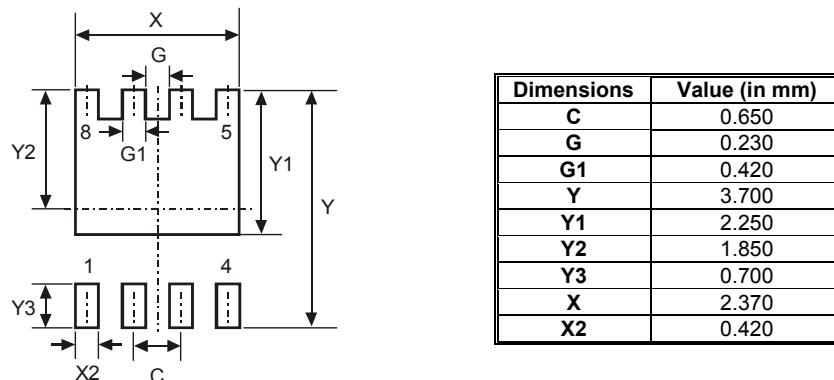
Package Outline Dimensions

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



Suggested Pad Layout

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



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