30V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

NEW PRODUCT

Product Summary

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

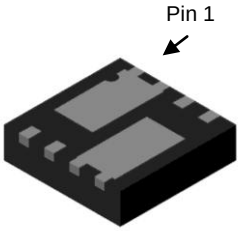
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

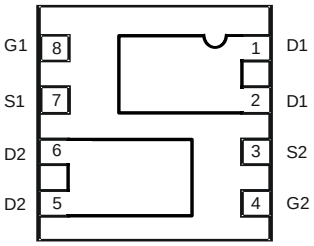
- Case: V-DFN3030-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Weight: 0.02 grams (Approximate)

V-DFN3030-8

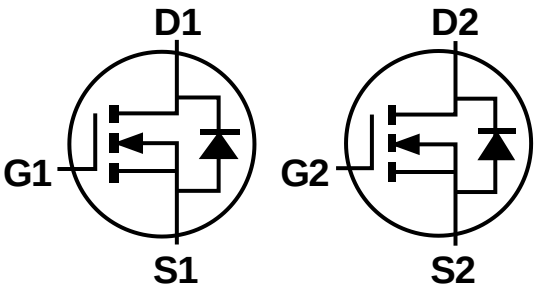
Top View



Bottom View



Pin out Configuration
(Bottom View)



Q1 N-Channel MOSFET

Q2 N-Channel MOSFET

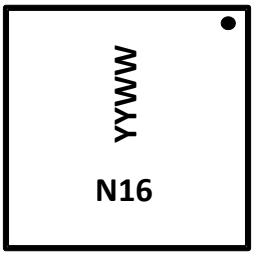
Equivalent Circuit

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 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)

NEW PRODUCT

Maximum Ratings (@T_A = +25°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 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	7.3 5.8	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	9.2 7.3	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	2.5	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	45	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	22	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	24	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.1	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	119	°C/W
	t<10s		75	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	78	°C/W
	t<10s		49	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	13.5	
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 8)						
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} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.4	-	2.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	-	20	mΩ	V_{GS} = 10V, I_D = 11A
		-	-	24		V_{GS} = 4.5V, I_D = 9A
Diode Forward Voltage	V_{SD}	-	0.70	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	1415	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	119	-		
Reverse Transfer Capacitance	C_{rss}	-	82	-		
Gate Resistance	R_g	-	2.6	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	-	11.3	-	nC	V_{DS} = 15V, I_D = 12A
Total Gate Charge (V_{GS} = 10V)	Q_g	-	25.1	-		
Gate-Source Charge	Q_{gs}	-	3.5	-		
Gate-Drain Charge	Q_{gd}	-	3.6	-		
Turn-On Delay Time	$t_{D(ON)}$	-	4.8	-	ns	V_{DD} = 15V, V_{GS} = 10V, R_L = 1.25Ω, R_G = 3Ω
Turn-On Rise Time	t_R	-	16.5	-		
Turn-Off Delay Time	$t_{D(OFF)}$	-	26.1	-		
Turn-Off Fall Time	t_F	-	5.6	-		
Reverse Recovery Time	t_{RR}	-	12.3	-	ns	I_F = 12A, di/dt = 500A/µs
Reverse Recovery Charge	Q_{rr}	-	10.4	-	nC	

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1in. square copper plate.
7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

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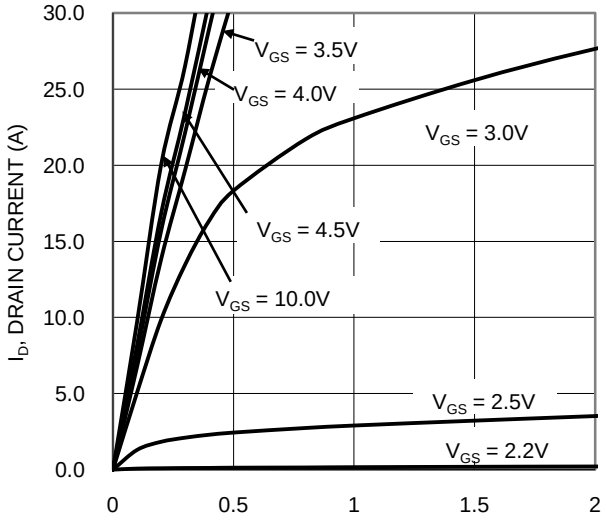

Figure1 Typical Output Characteristic

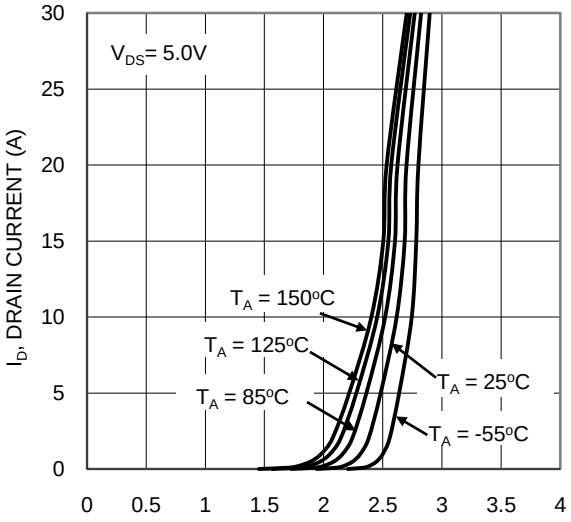

Figure 2 Typical Transfer Characteristic

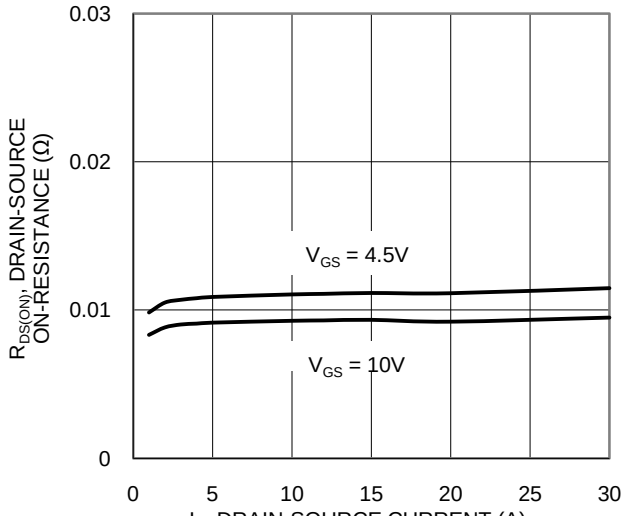

Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

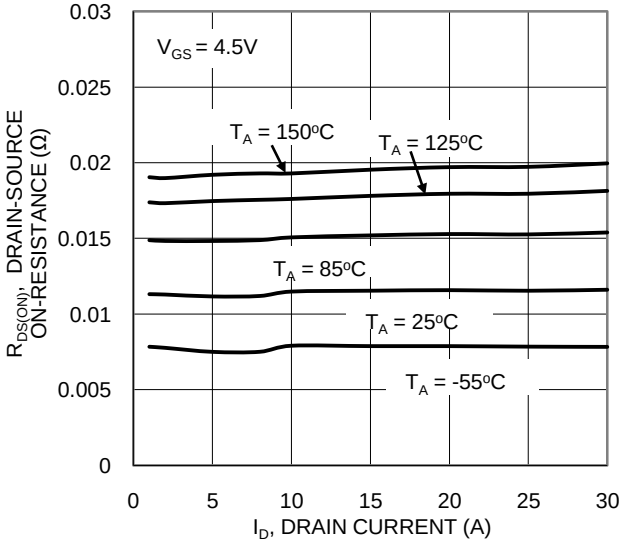

Figure 4 Typical On-Resistance vs Drain Current and Temperature

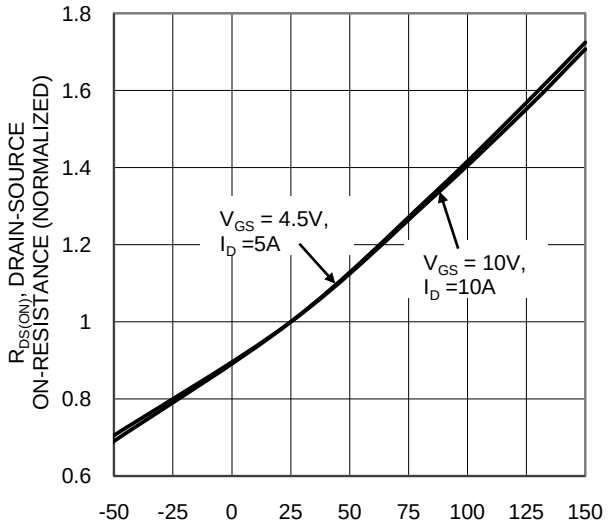

Figure 5 On-Resistance Variation with Temperature

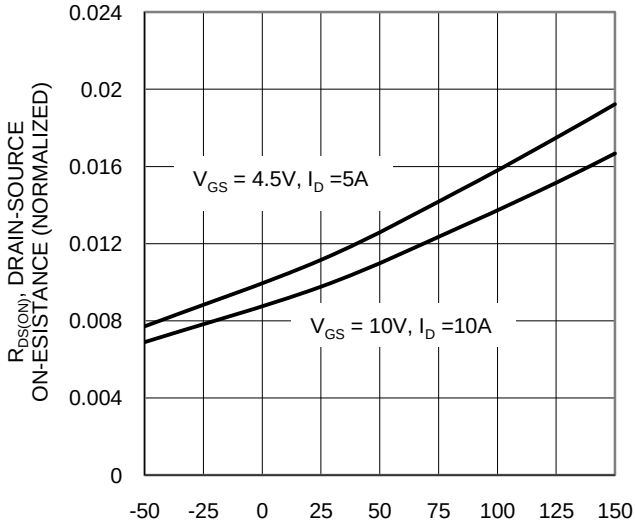

Figure 6 On-Resistance Variation with Temperature

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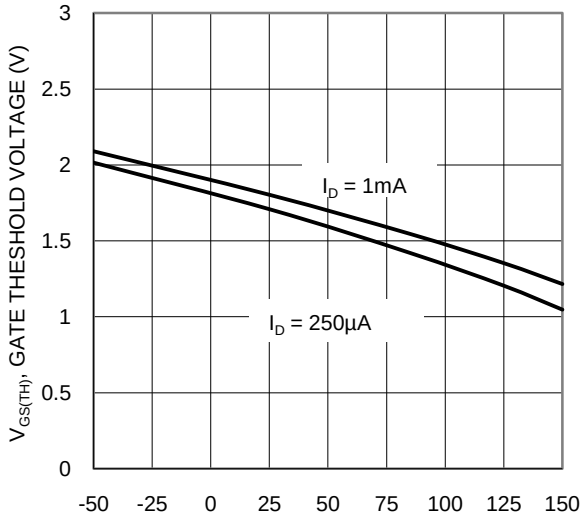

Figure 7 Gate Theshold Variation vs Junction Temperature

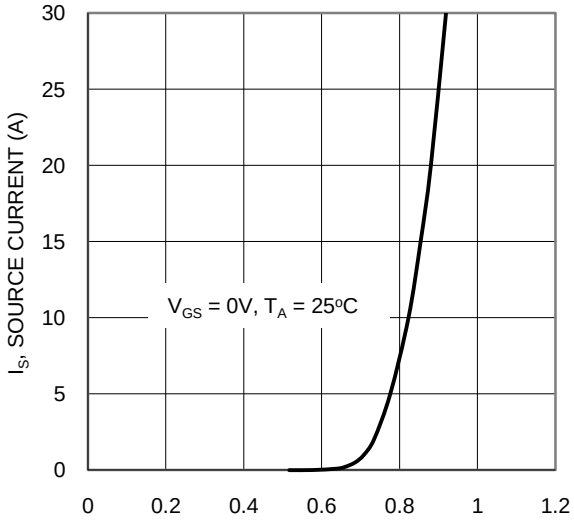

Figure 8 Diode Forward Voltage vs Current

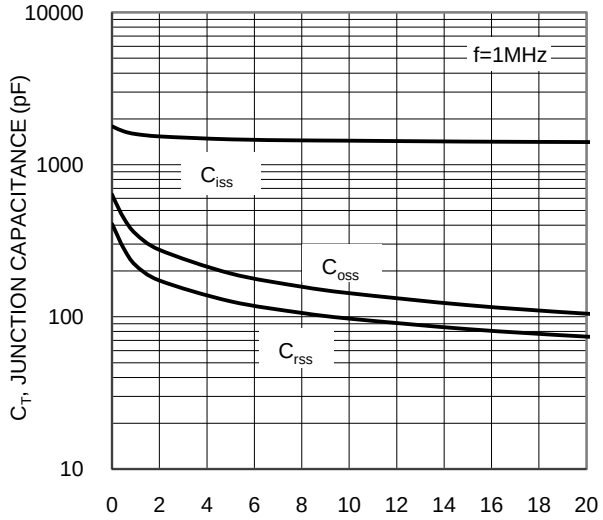

Figure 9 Typical Junction Capacitance

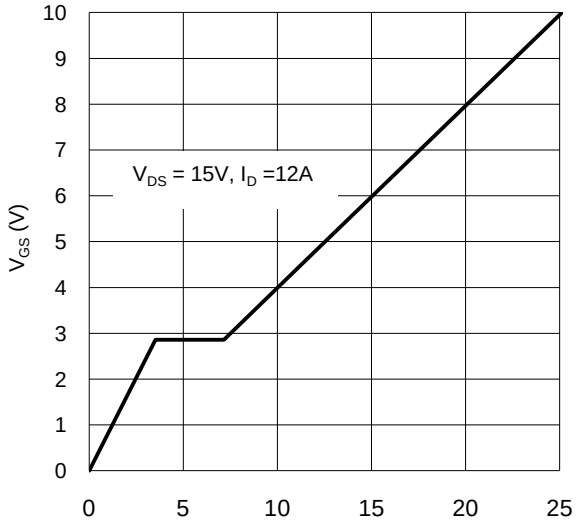

Figure 10 Gate Charge

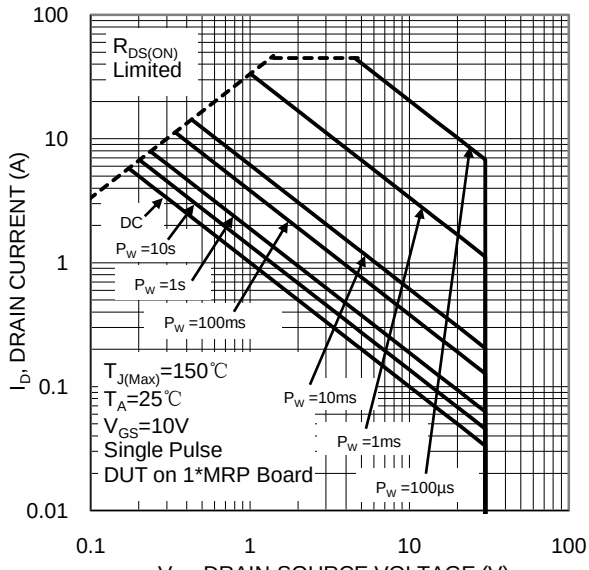

Figure 11 SOA, Safe Operation Area

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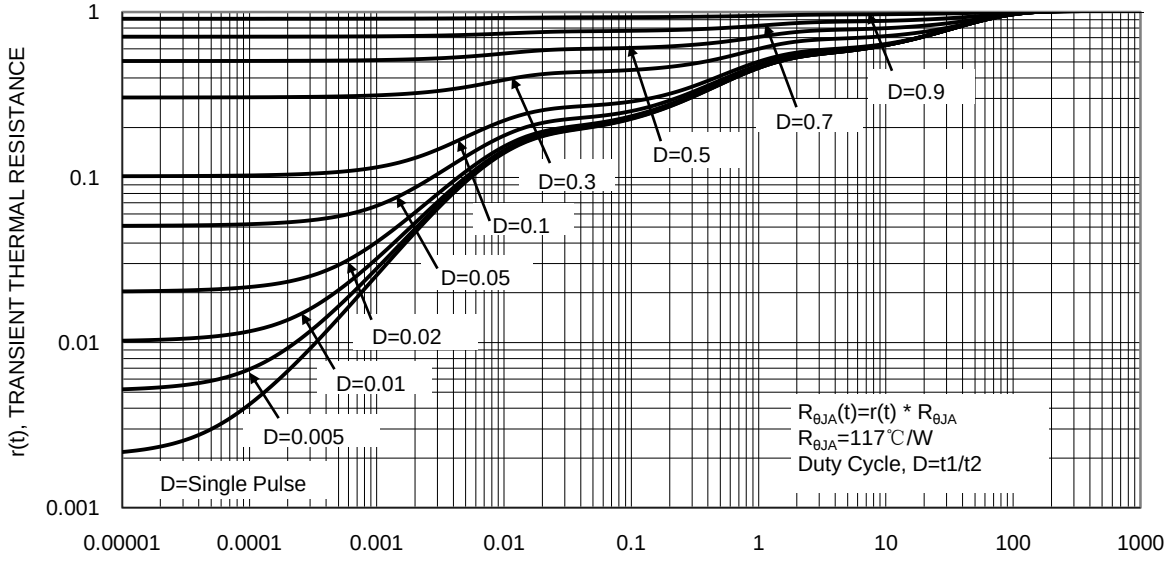

Figure 12 Transient Thermal Resistance

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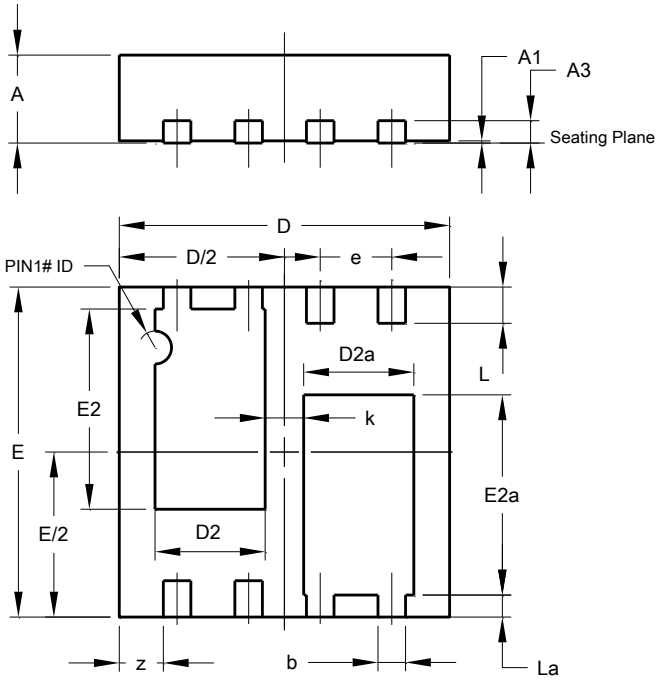
Package Outline Dimensions

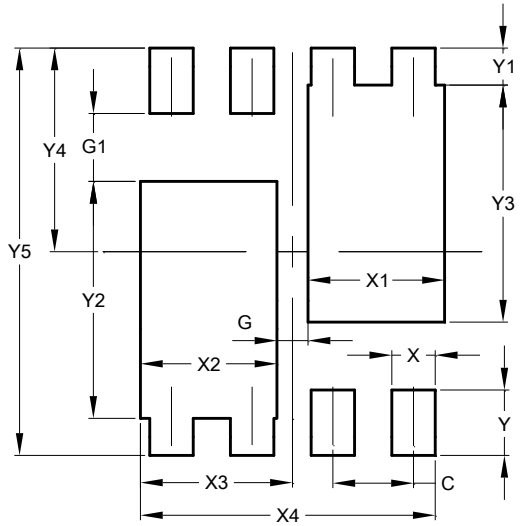
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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

NEW PRODUCT

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