

30V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$ $T_A = +25^\circ\text{C}$
30V	35mΩ @ $V_{GS} = 10\text{V}$	5.5A
	45mΩ @ $V_{GS} = 4.5\text{V}$	4.9A

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

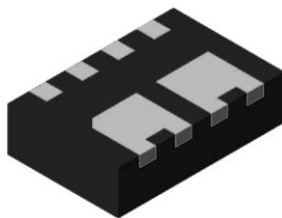
Features

- 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)**

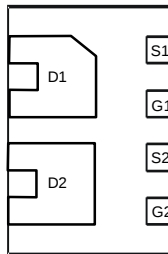
Mechanical Data

- Case: V-DFN3020-8
- 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
- Terminals: Finish – NiPdAu Annealed over Copper Leadframe.
Solderable per MIL-STD-202, Method 208 
- Weight: 0.011 grams (Approximate)

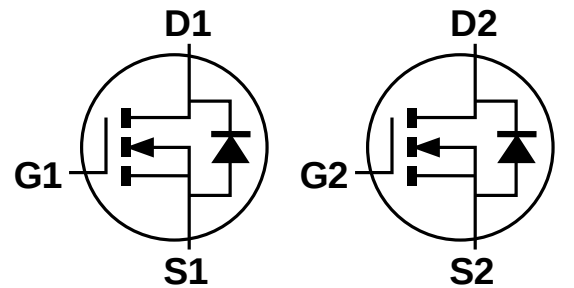
V-DFN3020-8



Bottom View



Bottom View
Pin Configuration



Q1 N-Channel MOSFET

Q2 N-Channel MOSFET

Equivalent Circuit

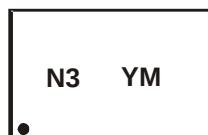
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3035LWN-7	V-DFN3020-8	3,000/Tape & Reel
DMN3035LWN-13	V-DFN3020-8	10,000/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/quality/lead_free.html.

Marking Information

V-DFN3020-8



N3 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: B = 2014)
M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	5.5 4.4	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	1	A
Pulsed Drain Current			I _{DM}	30	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	13	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	9.0	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T _A = 25°C	P _D	0.77	W
	T _A = 70°C		0.49	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	162	°C/W
	t < 10s		116	
Total Power Dissipation (Note 6)	T _A = 25°C	P _D	1.78	W
	T _A = 70°C		1.10	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	71	°C/W
	t < 10s		50	
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	10.7	°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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1.0	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)}	1.0	—	2.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	26	35	mΩ	V _{GS} = 10V, I _D = 4.8A
			34	45		V _{GS} = 4.5V, I _D = 4.3A
Diode Forward Voltage	V _{SD}	—	0.75	1.1	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	399	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	57	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	50	—	pF	
Gate Resistance	R _g	—	1.36	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	4.5	—	nC	V _{DS} = 15V, I _D = 5.8A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	9.9	—	nC	
Gate-Source Charge	Q _{gs}	—	1.2	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.8	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.0	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _L = 2.6Ω, R _G = 3Ω
Turn-On Rise Time	t _R	—	3.3	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	10.6	—	ns	
Turn-Off Fall Time	t _F	—	2.0	—	ns	
Reverse Recovery Time	t _{RR}	—	7.9	—	ns	I _F = 4.8A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	2.4	—	nC	I _F = 4.8A, di/dt = 100A/μs

- 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.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

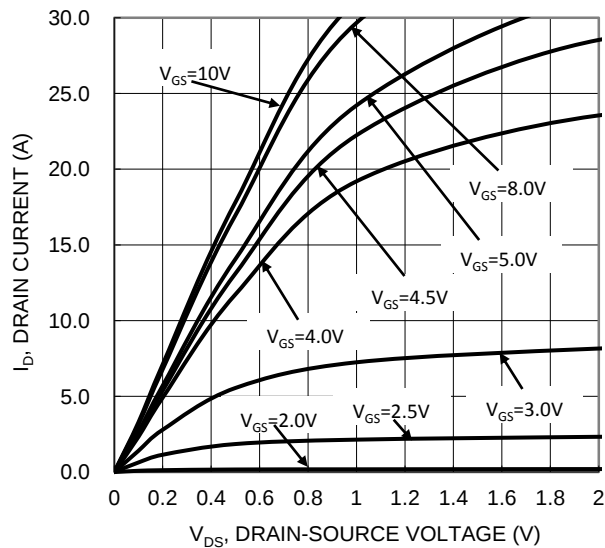


Figure 1 Typical Output Characteristic

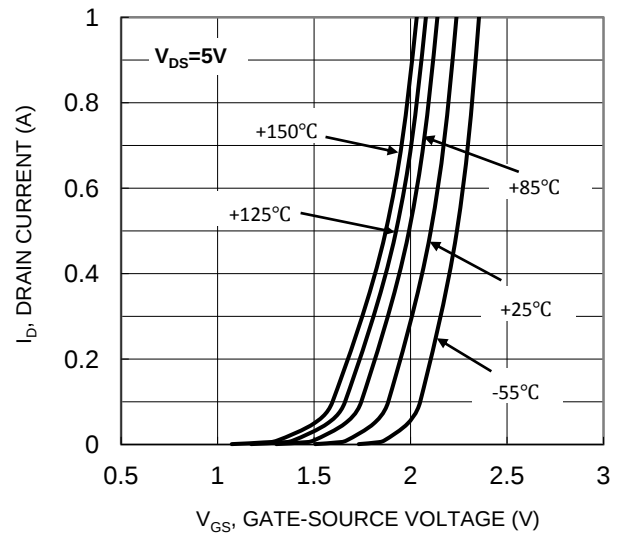


Figure 2 Typical Transfer Characteristic

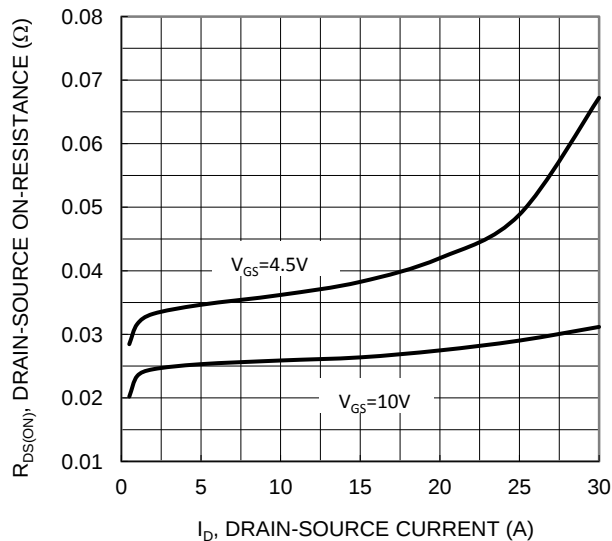


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

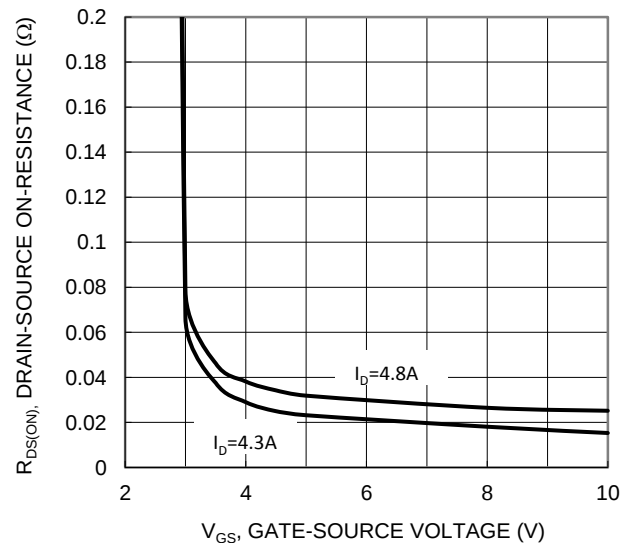


Figure 4 Typical Transfer Characteristic

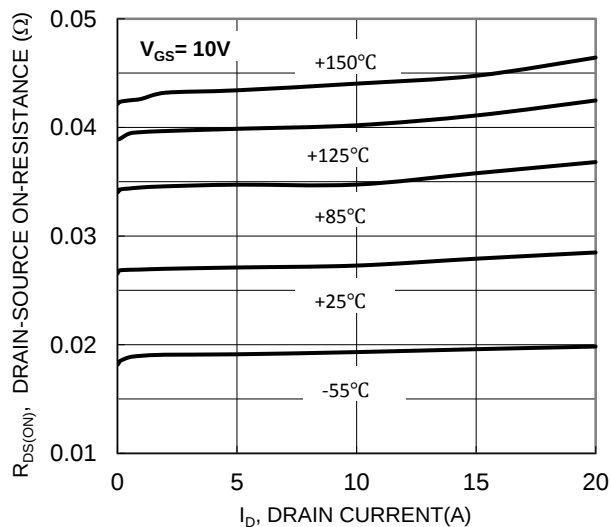


Figure 5 Typical On-Resistance vs Drain Current and Temperature

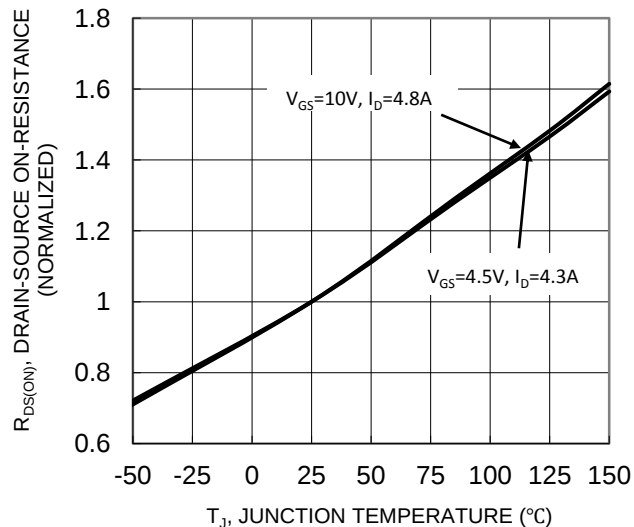


Figure 6 On-Resistance Variation with Temperature

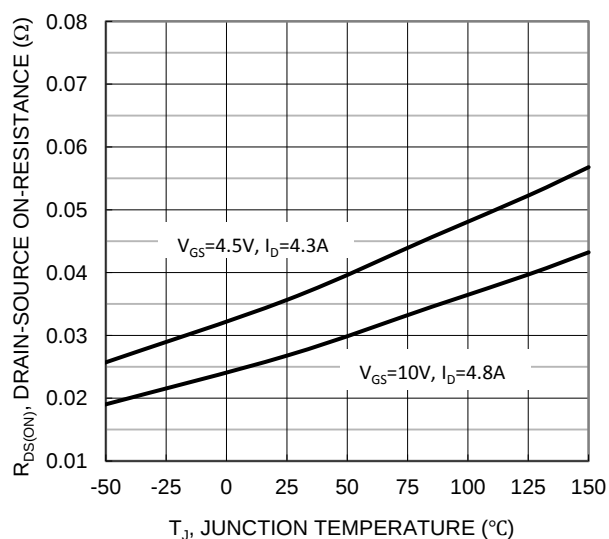


Figure 7 On-Resistance Variation with Temperature

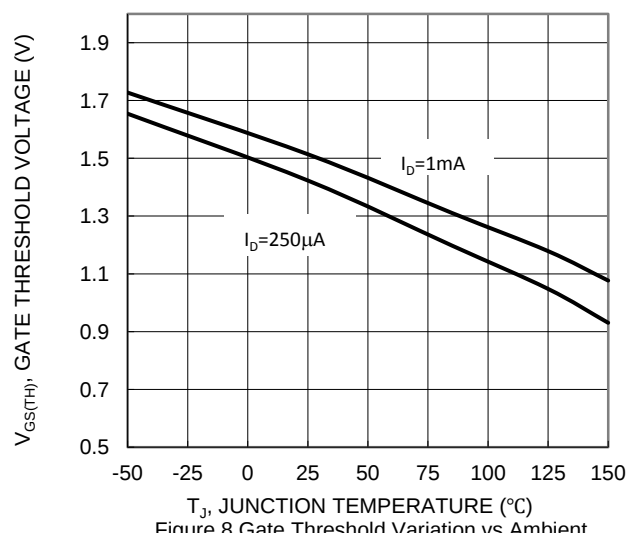


Figure 8 Gate Threshold Variation vs Ambient Temperature

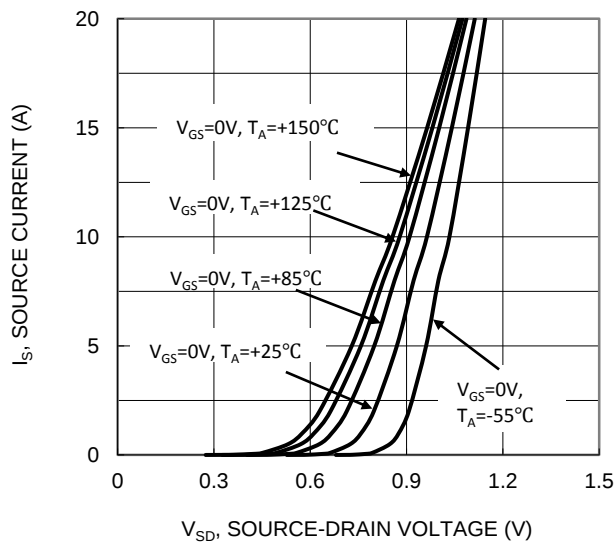


Figure 9 Diode Forward Voltage vs. Current

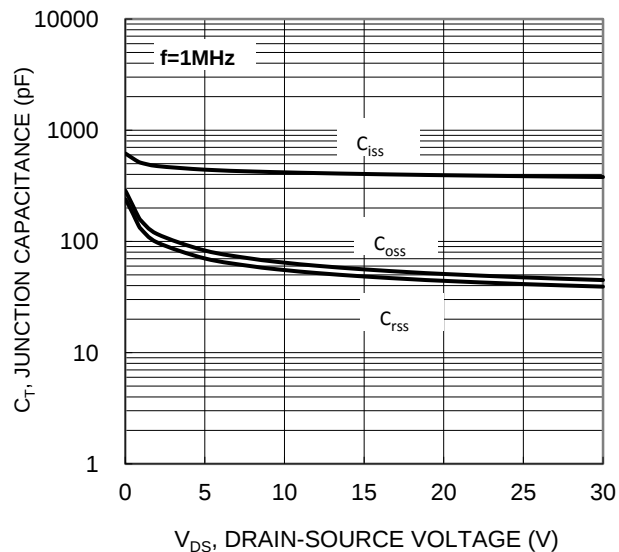


Figure 10 Typical Junction Capacitance

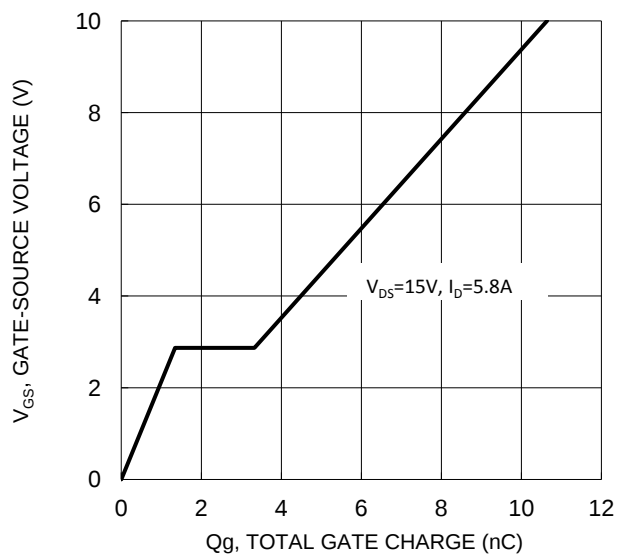


Figure 11 Gate Charge

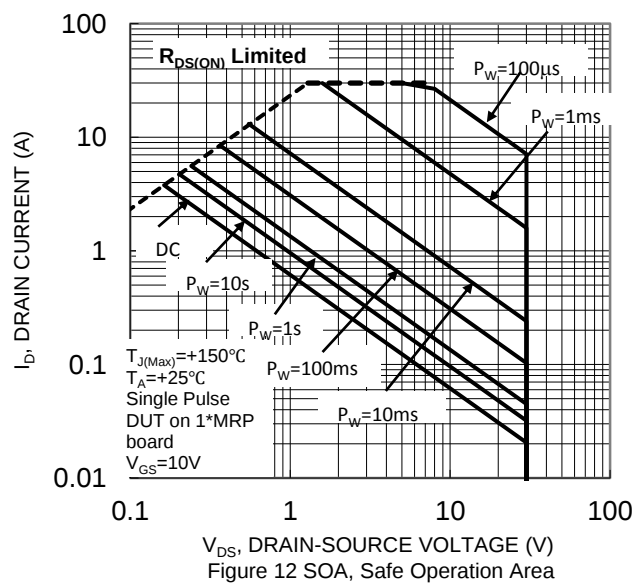
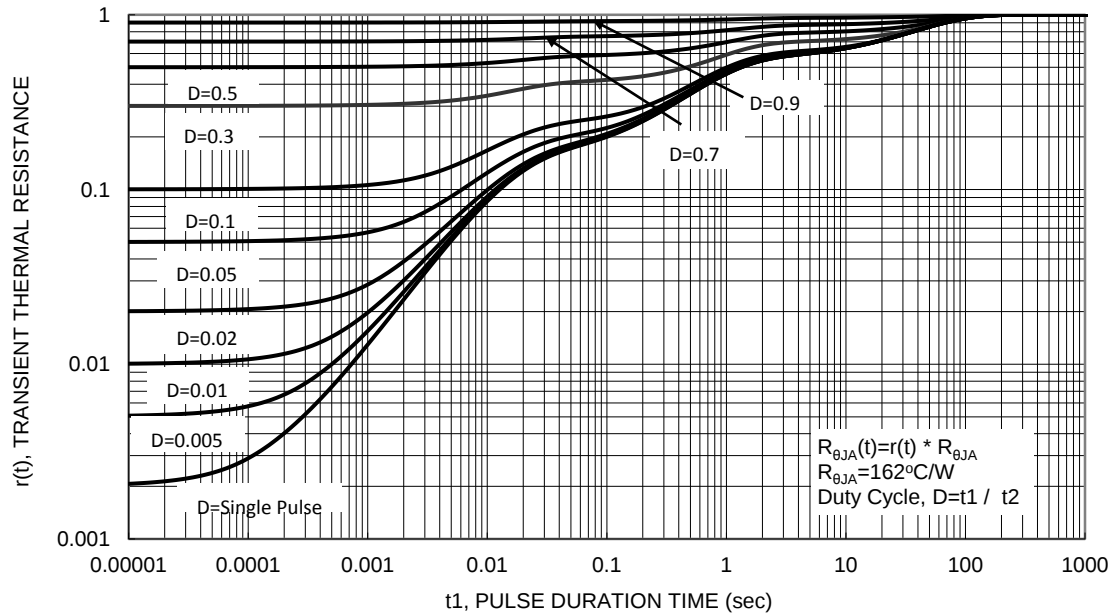
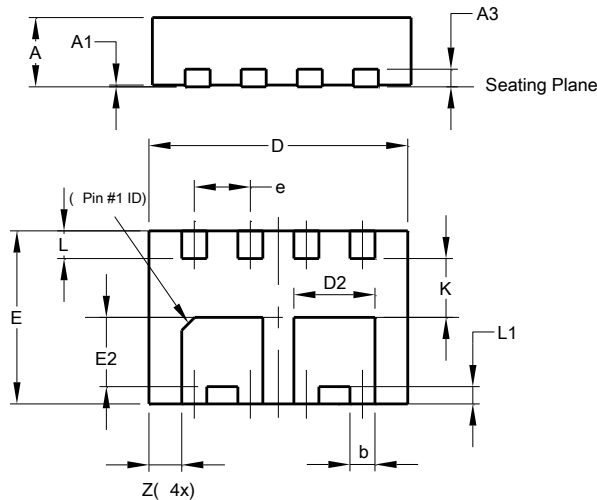


Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

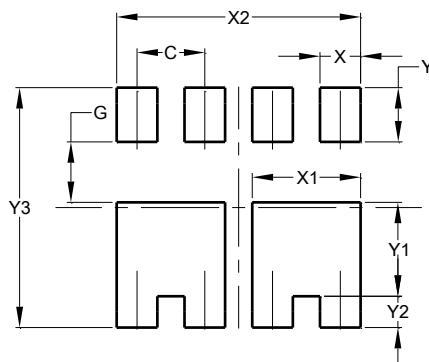


V-DFN3020-8 (Type N)			
Dim	Min	Max	Typ
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.203
b	0.24	0.34	0.29
D	2.95	3.05	3.00
D2	0.84	1.04	0.94
e	-	-	0.65
E	1.95	2.05	2.00
E2	0.70	0.90	0.80
L	0.27	0.37	0.32
L1	0.15	0.25	0.20
K	-	-	0.68
Z	-	-	0.38

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	0.580
X	0.390
X1	1.040
X2	2.340
Y	0.520
Y1	0.900
Y2	0.300
Y3	2.300

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