

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-40V	25mΩ @ V _{GS} = -10V	-7.6A
	45mΩ @ V _{GS} = -4.5V	-6.0A

Description and Applications

This MOSFET has been designed to minimize the on-state resistance yet maintain superior switching performance, making it ideal for high efficiency power management applications.

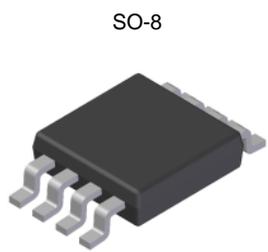
- Motor Control
- Backlighting
- DC-DC Converters
- Printer Equipment

Features and Benefits

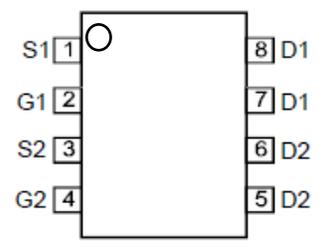
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low R_{DS(ON)} – Minimizes Conduction Losses
- Fast Switching Speed – Minimizes Switching Losses
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

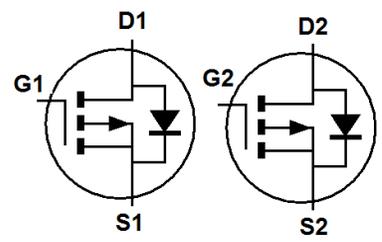
- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.074 grams (Approximate)



Top View



Top View Pin-Out



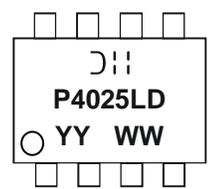
Device symbol

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP4025LSD-13	SO-8	2500 / 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



- ⌋⌋ = Manufacturer's Marking
- P4025LD = Product Type Marking Code
- YYWW = Date Code Marking
- YY = Year (ex: 21 = 2021)
- WW = Week (01 to 53)

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

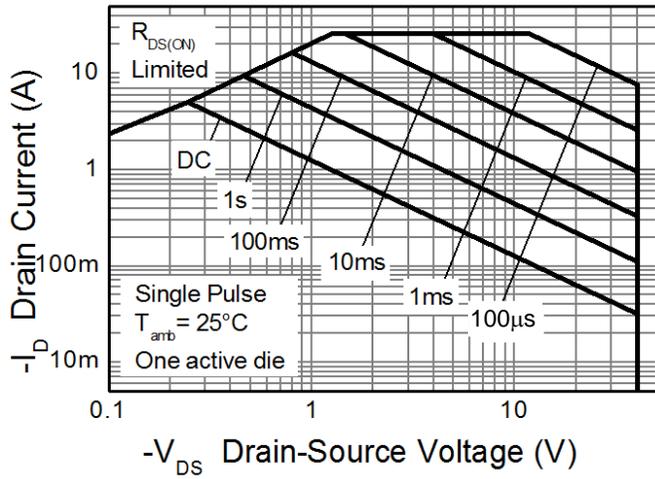
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-40	V
Gate-Source Voltage			V _{GSS}	±20	
Continuous Drain Current	V _{GS} = -10V	(Notes 6 & 8)	I _D	-7.6	A
		T _A = +70°C (Notes 6 & 8)		-6.1	
		(Notes 5 & 8)		-5.8	
		(Notes 5 & 9)		-6.9	
Pulsed Drain Current	V _{GS} = -10V	(Notes 7 & 8)	I _{DM}	-28.0	
Continuous Source Current (Body Diode)			I _S	-7.6	
Pulsed Source Current (Body Diode)			I _{SM}	-28.0	
Avalanche Current (Note 8) L = 0.3mH			I _{AS}	-23	A
Avalanche Energy (Note 8) L = 0.3mH			E _{AS}	79	mJ

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

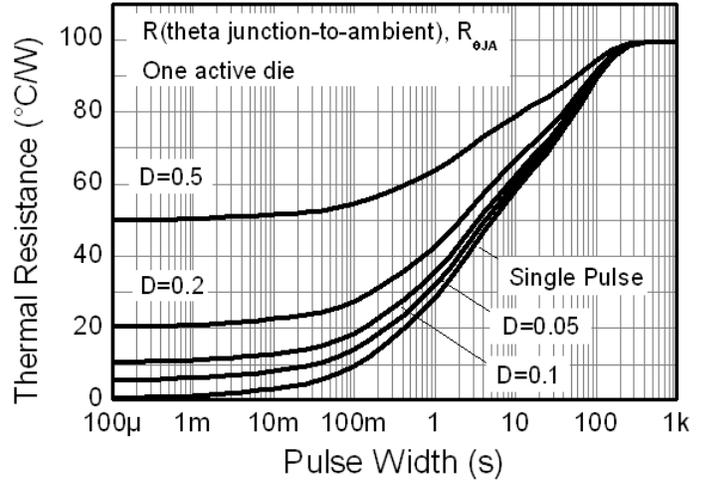
Characteristic			Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 8)		P _D	2.14	W
	(Notes 5 & 8)			1.25	
	(Notes 5 & 9)			1.8	
Thermal Resistance, Junction to Ambient	(Notes 6 & 8)		R _{θJA}	58	°C/W
	(Notes 5 & 8)			100	
	(Notes 5 & 9)			70	
Thermal Resistance, Junction to Lead			R _{θJL}	51	
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

- Notes:
5. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 6. Same as note (5), except the device is measured at t ≤ 10 sec.
 7. Same as note (5), except the device is pulsed with D = 0.02 and pulse width 300μs.
 8. For a dual device with one active die.
 9. For a device with two active die running at equal power.
 10. Thermal resistance from junction to solder-point (at the end of the drain lead).
 11. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

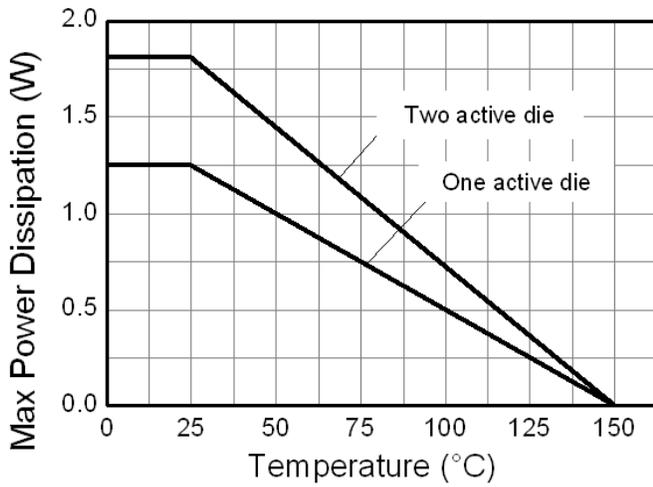
Thermal Characteristics



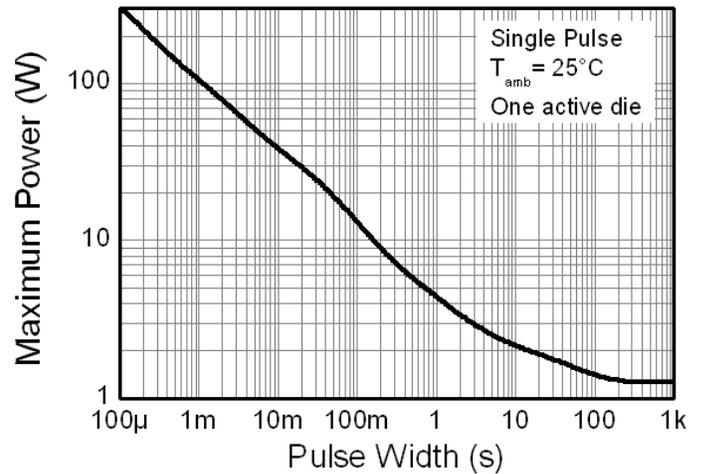
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve



Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	-40	—	—	V	I _D = -250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	-0.8	-1.3	-1.8	V	I _D = -250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 12)	R _{DS(ON)}	—	18	25	mΩ	V _{GS} = -10V, I _D = -3A
			30	45		V _{GS} = -4.5V, I _D = -3A
Forward Transconductance (Notes 12 & 13)	g _{FS}	—	16.6	—	S	V _{DS} = -5V, I _D = -3A
Diode Forward Voltage (Note 12)	V _{SD}	—	-0.7	-1.0	V	I _S = -1A, V _{GS} = 0V
DYNAMIC CHARACTERISTICS (Note 13)						
Input Capacitance	C _{iss}	—	1640	—	pF	V _{DS} = -20V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	179	—		
Reverse Transfer Capacitance	C _{rss}	—	128	—		
Gate Resistance	R _g	—	6.43	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (Note 14)	Q _g	—	14.0	—	nC	V _{GS} = -4.5V V _{DS} = -20V I _D = -3A
Total Gate Charge (Note 14)	Q _g	—	33.7	—		
Gate-Source Charge (Note 14)	Q _{gs}	—	5.5	—		
Gate-Drain Charge (Note 14)	Q _{gd}	—	7.3	—		
Turn-On Delay Time (Note 14)	t _{D(ON)}	—	6.9	—	ns	V _{DD} = -20V, V _{GS} = -10V I _D = -3A
Turn-On Rise Time (Note 14)	t _R	—	14.7	—		
Turn-Off Delay Time (Note 14)	t _{D(OFF)}	—	53.7	—		
Turn-Off Fall Time (Note 14)	t _F	—	30.9	—		

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
13. For design aid only, not subject to production testing.
14. Switching characteristics are independent of operating junction temperatures.

Typical Characteristics

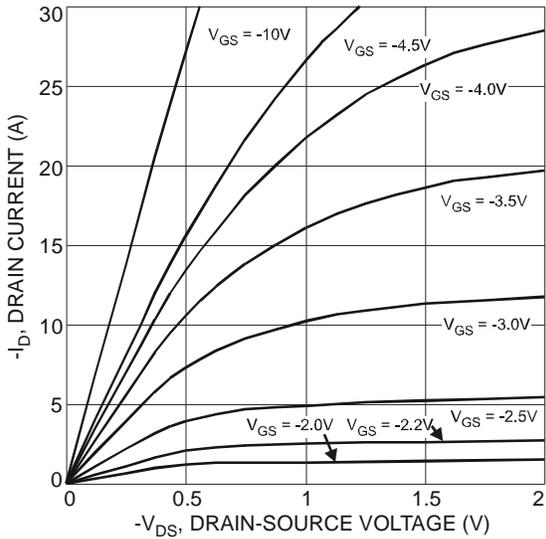


Fig. 1 Typical Output Characteristic

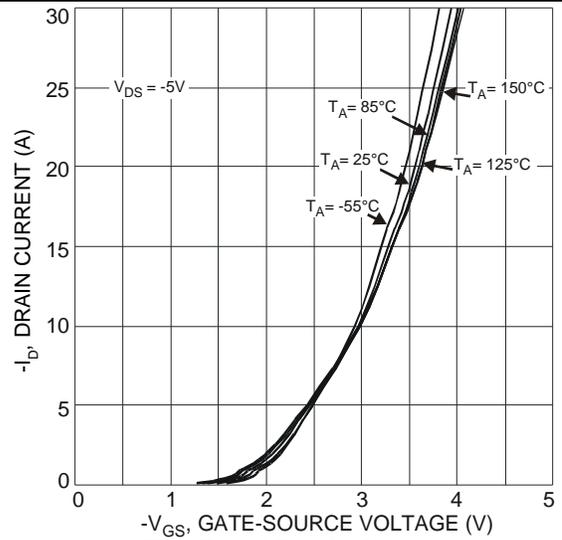


Fig. 2 Typical Transfer Characteristic

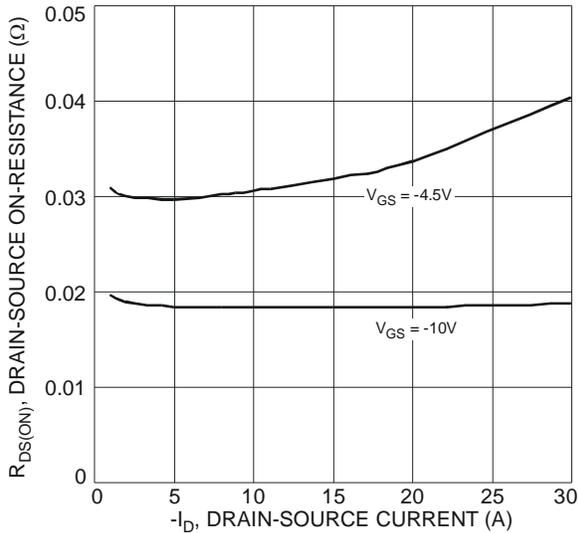


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

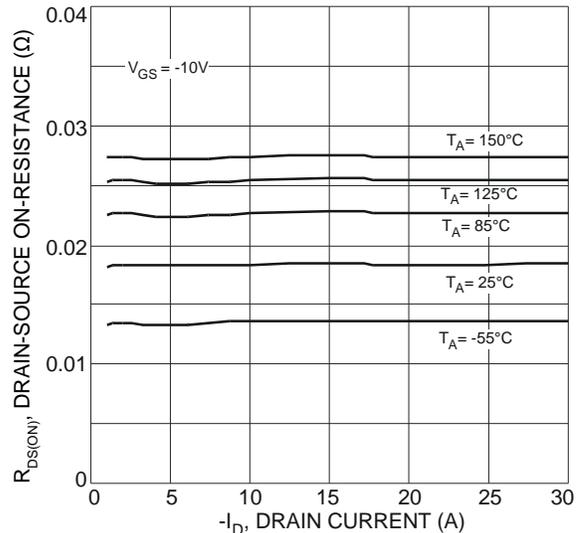


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

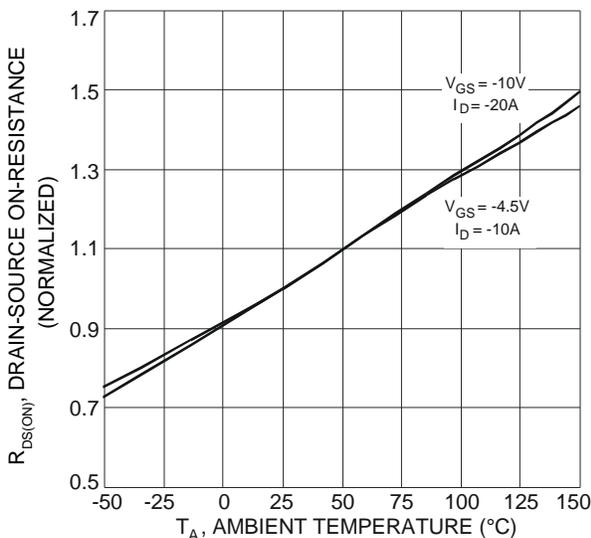


Fig. 5 On-Resistance Variation with Temperature

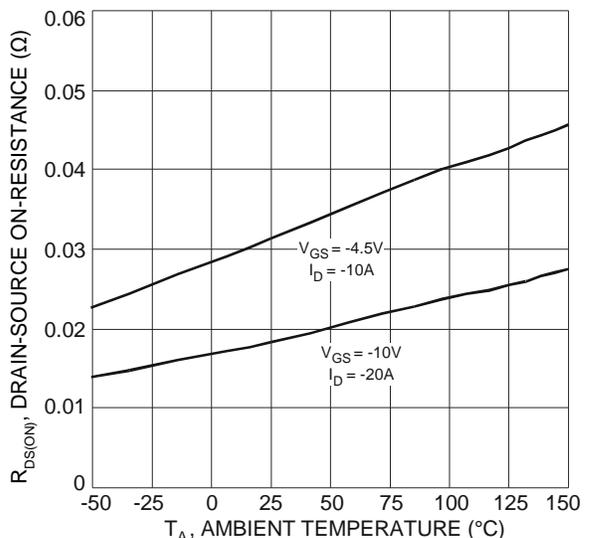


Fig. 6 On-Resistance Variation with Temperature

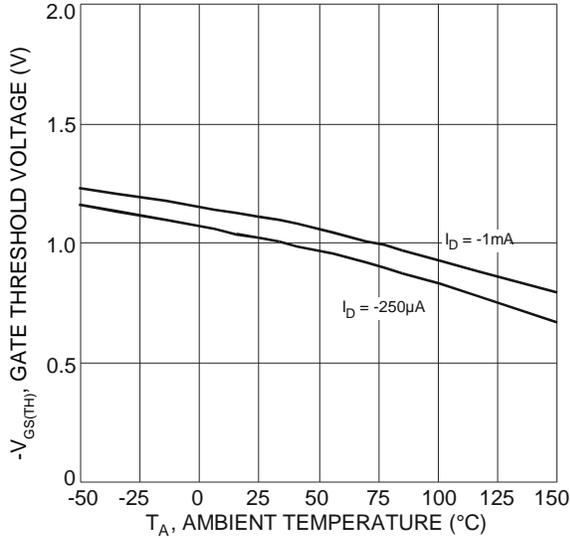


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

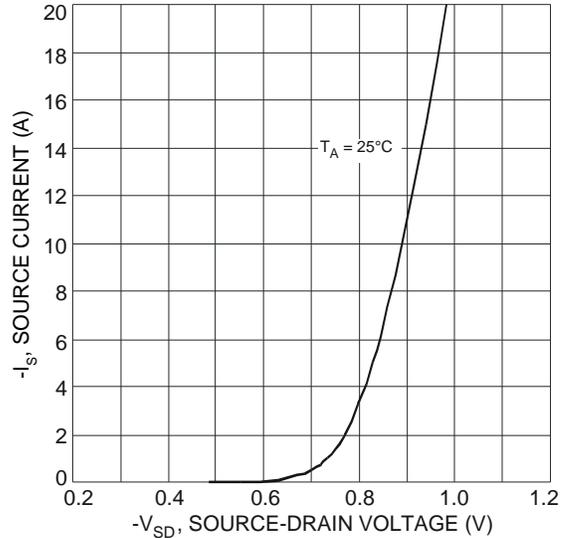


Fig. 8 Diode Forward Voltage vs. Current

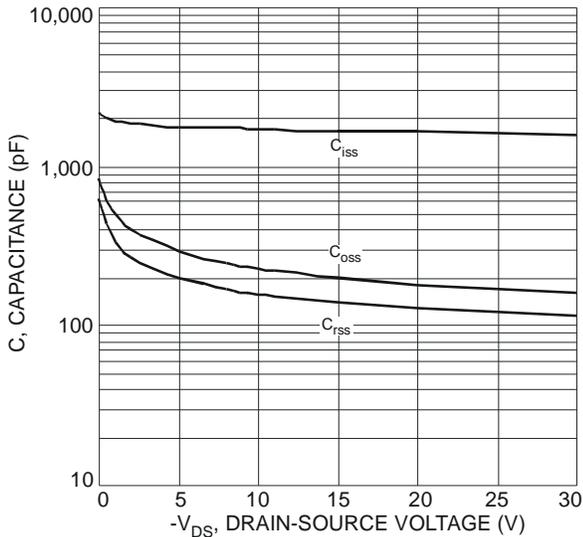


Fig. 9 Typical Total Capacitance

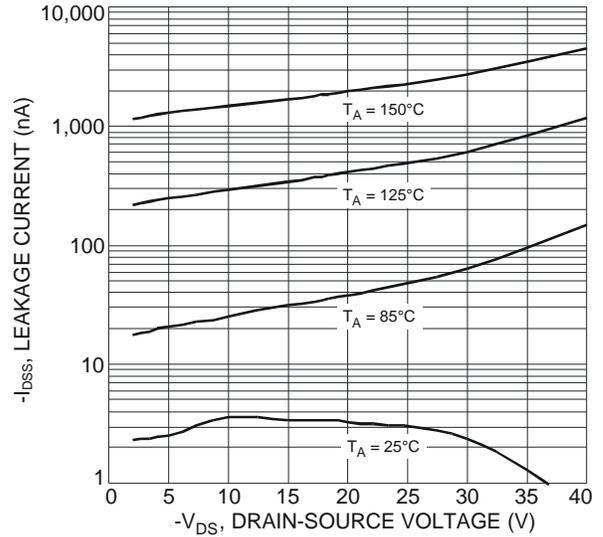


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

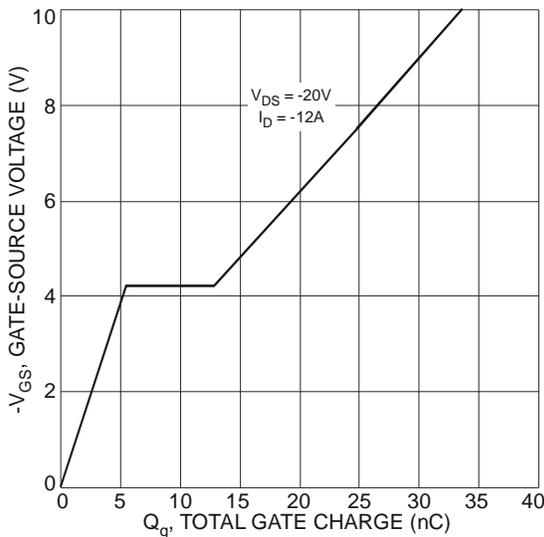
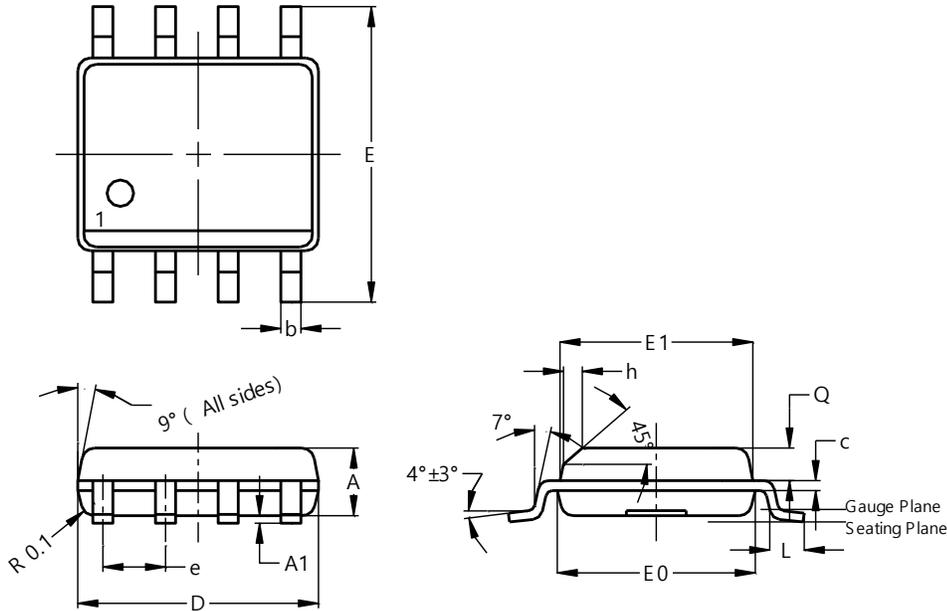


Fig. 11 Gate-Charge Characteristics

Package Outline Dimensions

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

SO-8

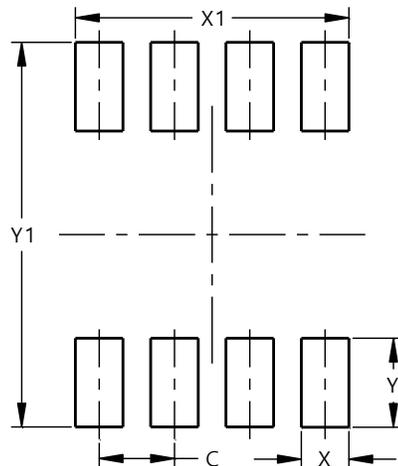


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

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

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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