

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
-40V	25mΩ @ V <sub>GS</sub> = -10V	-8.0A
	45mΩ @ V <sub>GS</sub> = -4.5V	-6.0A

## Features and Benefits

- Low R<sub>DS(ON)</sub> – 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)**
- **The DMP4025LSSQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

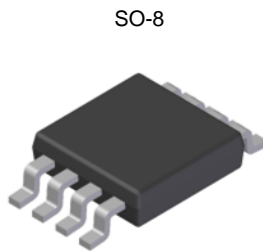
## Description and Applications

This MOSFET is 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:

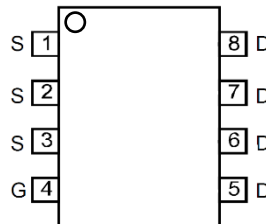
- Motor controls
- Backlighting
- DC-DC converters
- Printer equipment

## Mechanical Data

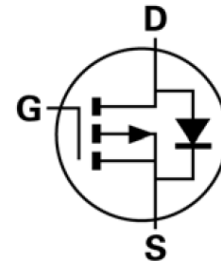
- Package: SO-8
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.074 grams (Approximate)



Top View



Pin-Out Top View



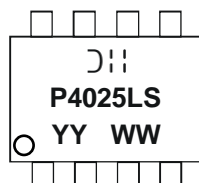
Internal Schematic

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP4025LSSQ-13	SO-8	2,500	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



D = Manufacturer's Marking  
 P4025LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 23 = 2023)  
 WW = Week (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V <sub>DSS</sub>	-40	V	
Gate-Source Voltage		V <sub>GSS</sub>	±20		
Continuous Drain Current	V <sub>GS</sub> = -10V	(Note 6)	-8.0	A	
		T <sub>A</sub> = +70°C (Note 6)	-6.9		
		(Note 5)	-6.0		
Pulsed Drain Current	V <sub>GS</sub> = -10V	(Note 7)	I <sub>DM</sub>		-30
Continuous Source Current (Body Diode)		(Note 7)	I <sub>S</sub>		-8.0
Pulsed Source Current (Body Diode)		(Note 7)	I <sub>SM</sub>	-30	

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P <sub>D</sub>	1.52	W
	(Note 6)		2.4	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	82	°C/W
	(Note 6)		52	
Thermal Resistance, Junction to Lead	(Note 8)	R <sub>θJL</sub>	48.85	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-40	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1.0	μA	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.8	-1.3	-1.8	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	18	25	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -3A
			30	45		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A
Forward Transconductance	g <sub>FS</sub>	—	16.6	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -3A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	-1.0	V	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>	—	1,640	—	pF	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	179	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	128	—		
Gate Resistance	R <sub>G</sub>	—	6.43	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	14.0	—	nC	V <sub>GS</sub> = -4.5V V <sub>GS</sub> = -10V V <sub>DS</sub> = -20V I <sub>D</sub> = -3A
Total Gate Charge	Q <sub>g</sub>	—	33.7	—		
Gate-Source Charge	Q <sub>gs</sub>	—	5.5	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	7.3	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	6.9	—	ns	V <sub>DD</sub> = -20V, V <sub>GS</sub> = -10V I <sub>D</sub> = -3A
Turn-On Rise Time	t <sub>R</sub>	—	14.7	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	53.7	—		
Turn-Off Fall Time	t <sub>F</sub>	—	30.9	—		

- Notes:
- For a device surface-mounted on minimum recommended 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.
  - Same as Note 5, except the device is surface-mounted on 25mm x 25mm x 1.6mm FR4 PCB.
  - Repetitive rating on 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300μs – pulse width by maximum junction temperature.
  - Thermal resistance from junction to solder-point (at the end of the drain lead).
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

**Thermal Characteristics**

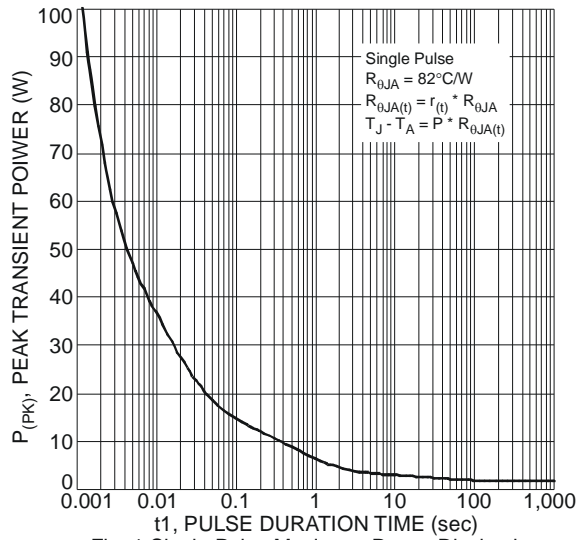


Fig. 1 Single Pulse Maximum Power Dissipation

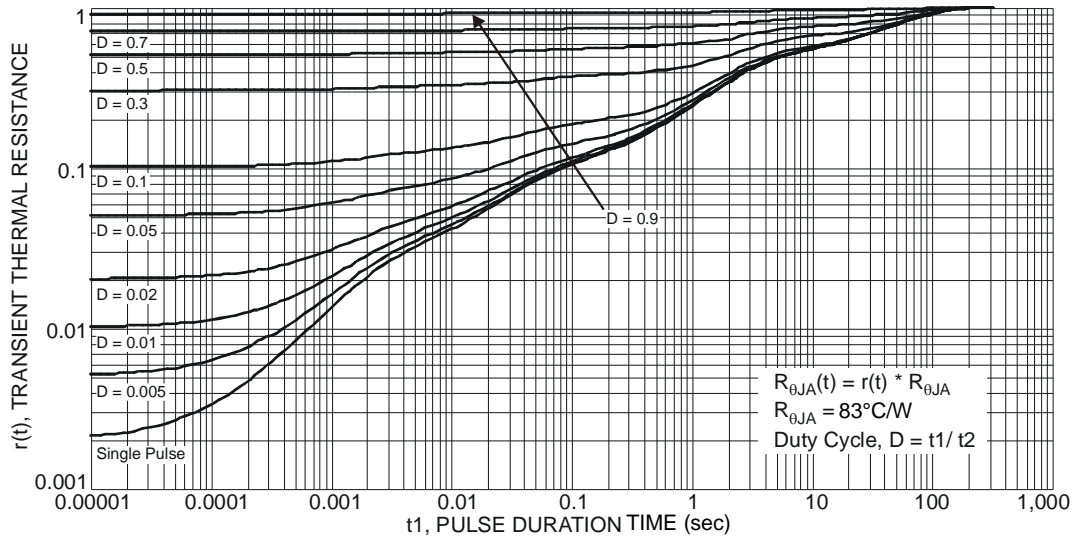


Fig. 2 Transient Thermal Resistance

**Typical Characteristics**

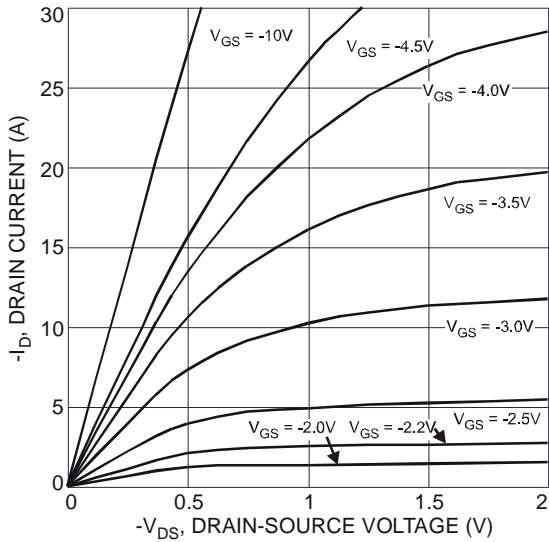


Fig. 3 Typical Output Characteristic

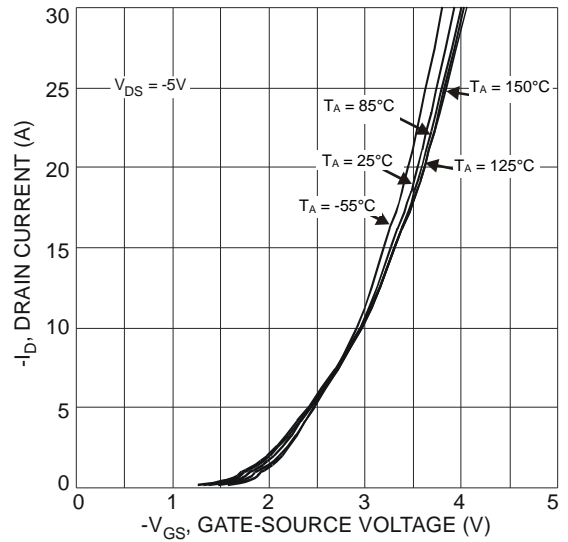


Fig. 4 Typical Transfer Characteristic

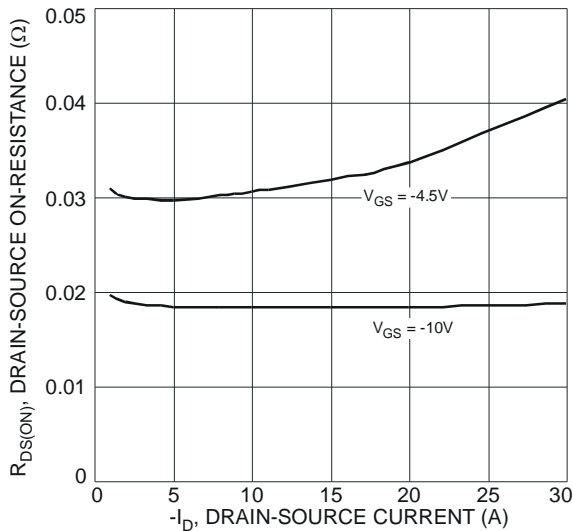


Fig. 5 Typical On-Resistance vs. Drain Current and Gate Voltage

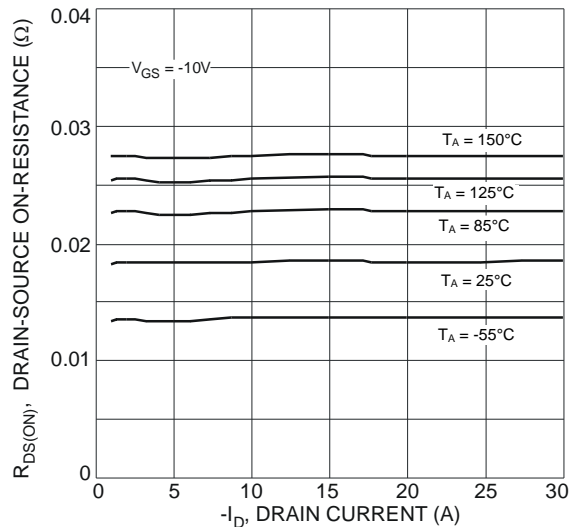


Fig. 6 Typical On-Resistance vs. Drain Current and Temperature

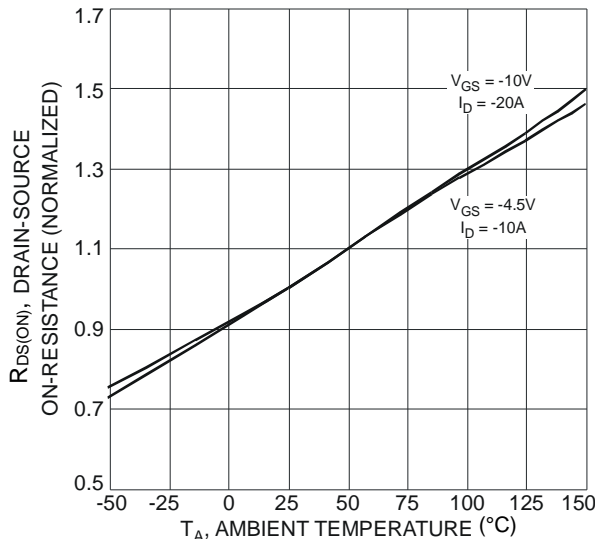


Fig. 7 On-Resistance Variation with Temperature

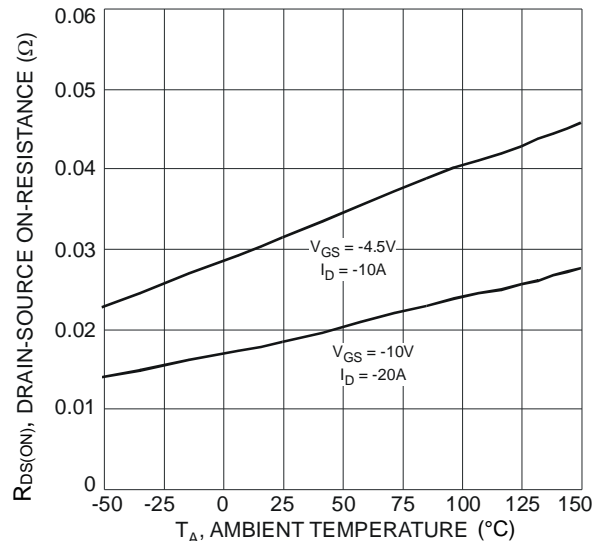


Fig. 8 On-Resistance Variation with Temperature

**Typical Characteristics** (continued)

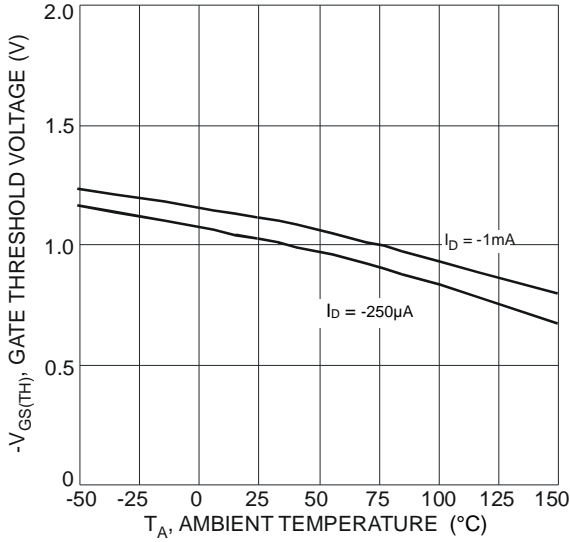


Fig. 9 Gate Threshold Variation vs. Ambient Temperature

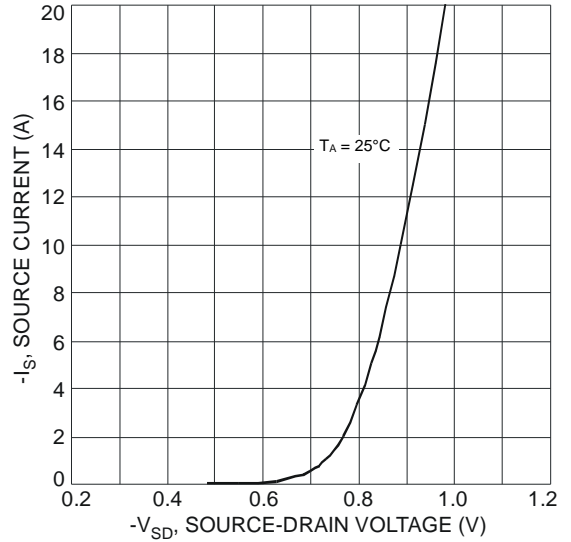


Fig. 10 Diode Forward Voltage vs. Current

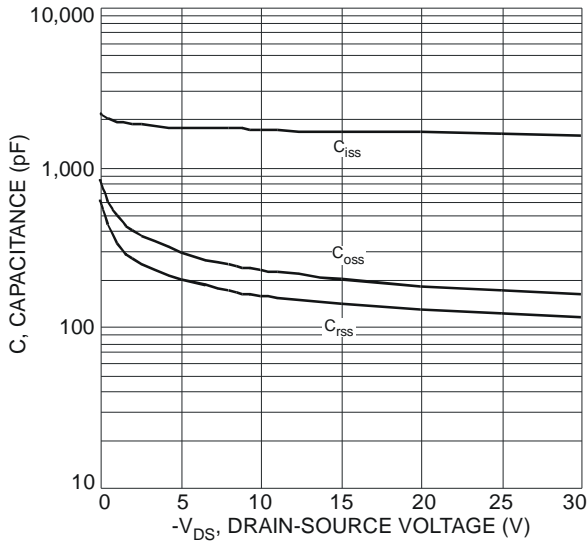


Fig. 11 Typical Total Capacitance

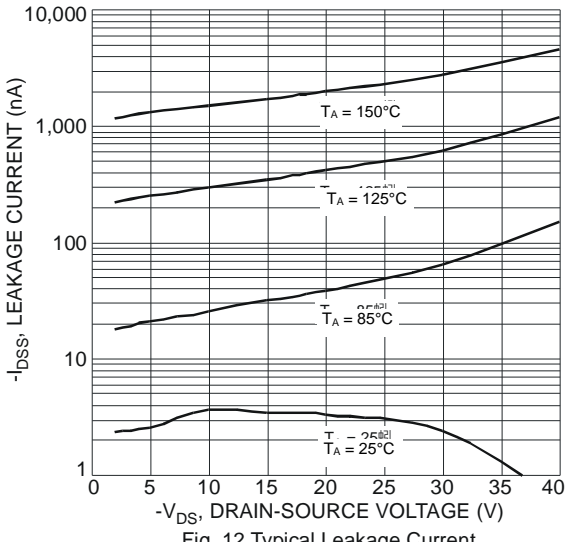


Fig. 12 Typical Leakage Current vs. Drain-Source Voltage

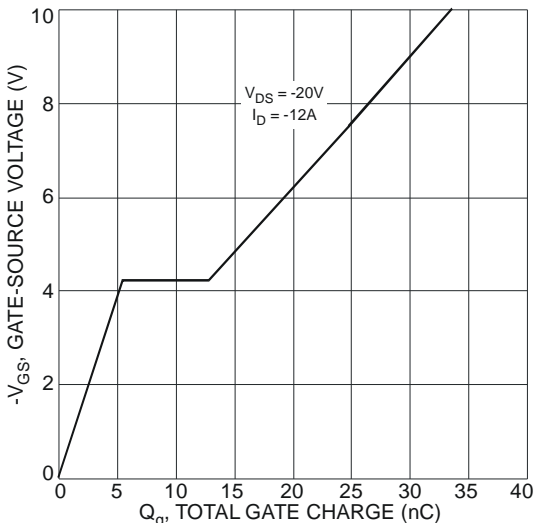
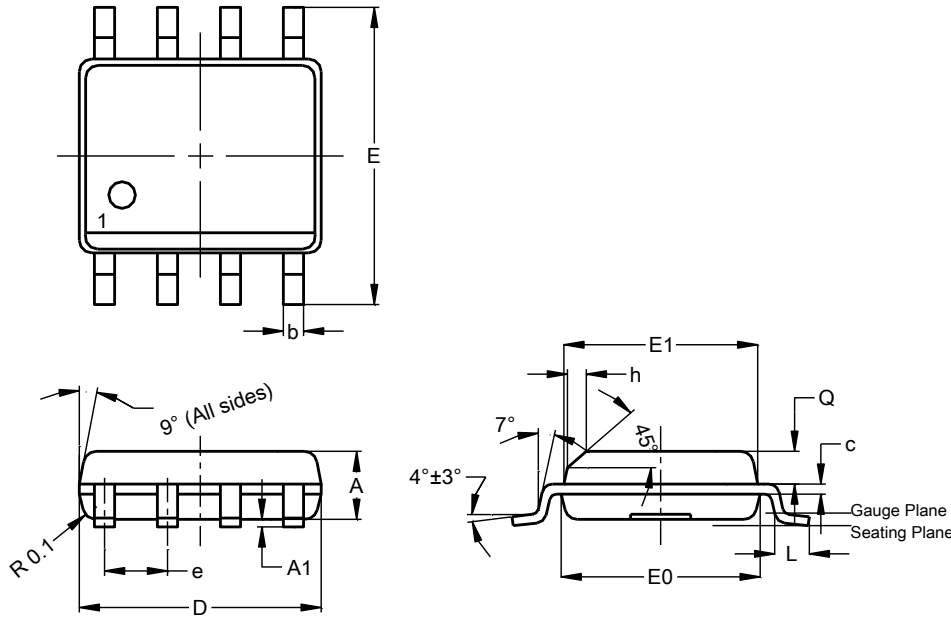


Fig. 13 Gate-Charge Characteristics

**Package Outline Dimensions**

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

SO-8

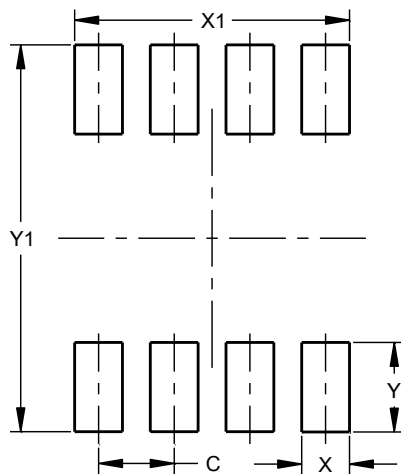


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

**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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