COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON)\ max}$	Package	I_D T_A = +25°C
N-CH	30V	36mΩ @ V_{GS} = 10V	SO-8	6.9A
		61mΩ @ V_{GS} = 4.5V		5.1A
P-CH	-30V	36mΩ @ V_{GS} = -10V		-6.0A
		64mΩ @ V_{GS} = -4.5V		-5.0

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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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.

Mechanical Data

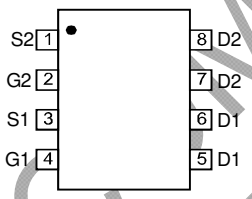
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072g (approximate)

Applications

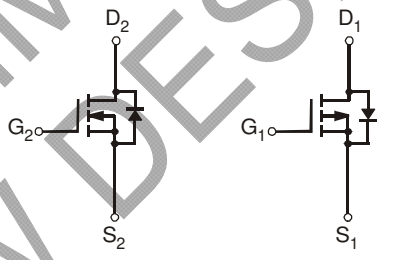
- Motor control
- Power Management Functions
- DC-DC Converters
- Inverter

SO-8

Top View



Top View
Internal Schematic



N-Channel MOSFET P-Channel MOSFET

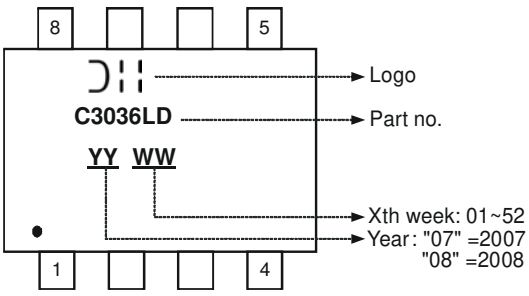
Ordering Information (Note 4)

Part Number	Case	Packaging
DMC3036LSD-13	SO-8	2500/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

(Top View)



Maximum Ratings N-CHANNEL (@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 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	5.0 4.0	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	6.9 5.8	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	2	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	24	A

Maximum Ratings P-CHANNEL (@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 5) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-4.5 -3.5	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	-6 -5	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	-2	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	-21	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	Steady State	P_D	1.5	W
	t<10s		2.5	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	83	°C/W
	t<10s		49	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	15	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

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

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
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} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	1	—	2.1	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	— —	28 51	36 61	mΩ	V_{GS} = 10V, I_D = 6.9A V_{GS} = 4.5V, I_D = 5.0A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	7.7	—	S	V_{DS} = 5V, I_D = 6.9A
Diode Forward Voltage	V_{SD}	0.5	—	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	431	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	55	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	48	—	pF	
Gate Resistance	R_G	—	1.3	—	Ω	V_{GS} = 0V V_{DS} = 0V, f = 1MHz
SWITCHING CHARACTERISTICS (Note 7)						
Total Gate Charge	Q_g	—	3.8 7.9	—	nC	V_{DS} = 10V, V_{GS} = 4.5V, I_D = 10A V_{DS} = 10V, V_{GS} = 10V, I_D = 10A
Gate-Source Charge	Q_{gs}	—	1.4	—		V_{DS} = 10V, V_{GS} = 10V, I_D = 10A
Gate-Drain Charge	Q_{gd}	—	1.7	—		V_{DS} = 10V, V_{GS} = 10V, I_D = 10A

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	µA	V_{DS} = -24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	-1	—	-2.2	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	— —	30 53	36 64	mΩ	V_{GS} = -10V, I_D = -6A V_{GS} = -4.5V, I_D = -5A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	8.8	—	S	V_{DS} =-5V, I_D = -6A
Diode Forward Voltage	V_{SD}	-0.5	—	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	977	—	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	129	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	116	—	pF	
Gate Resistance	R_G	—	13.1	—	Ω	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz
SWITCHING CHARACTERISTICS (Note 7)						
Total Gate Charge	Q_g	—	10.1 21.1	—	nC	V_{DS} = 15V, V_{GS} = -4.5V, I_D = 6A V_{DS} = 15V, V_{GS} = -10V, I_D = 6A
Gate-Source Charge	Q_{gs}	—	2.8	—		V_{DS} = 15V, V_{GS} = -10V, I_D = 6A
Gate-Drain Charge	Q_{gd}	—	3.2	—		V_{DS} = 15V, V_{GS} = -10V, I_D = 6A

Notes: 6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

N-CHANNEL

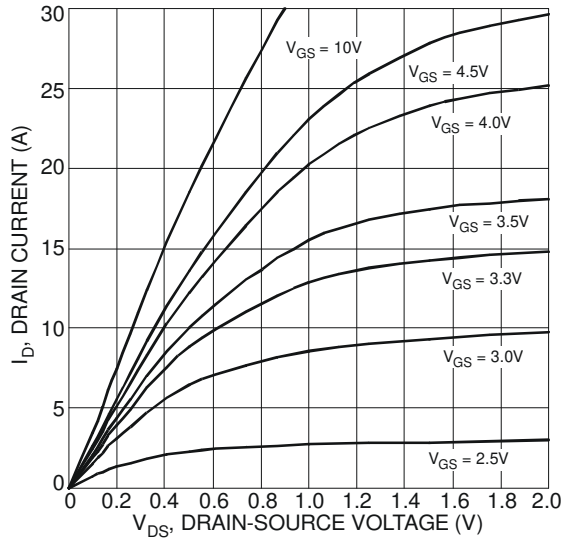


Figure 1 Typical Output Characteristic

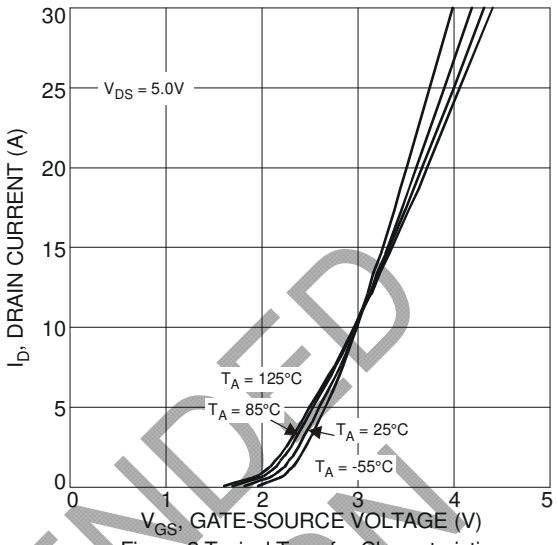


Figure 2 Typical Transfer Characteristics

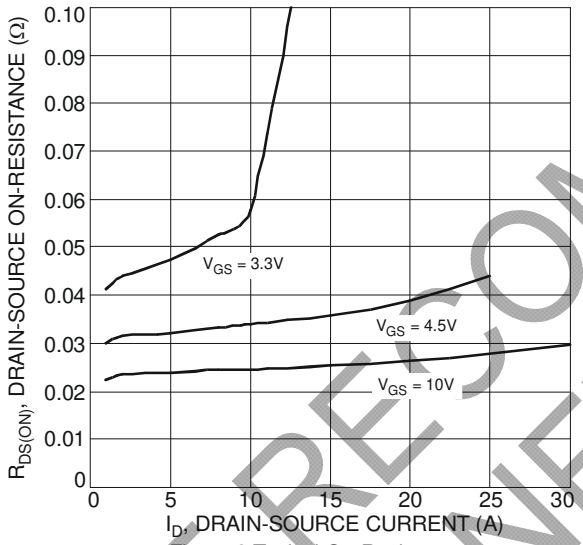


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

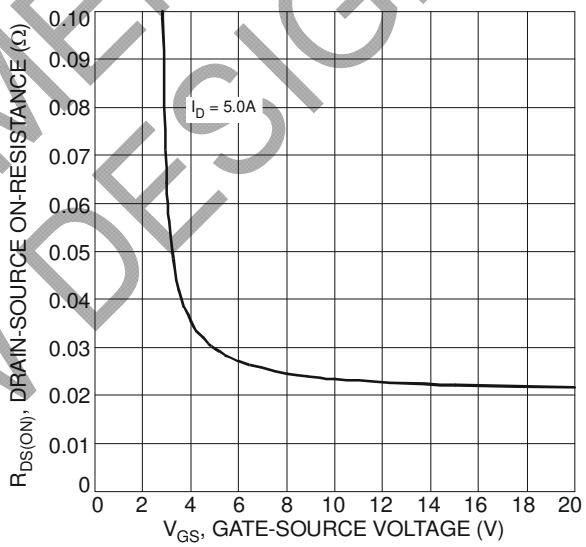


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

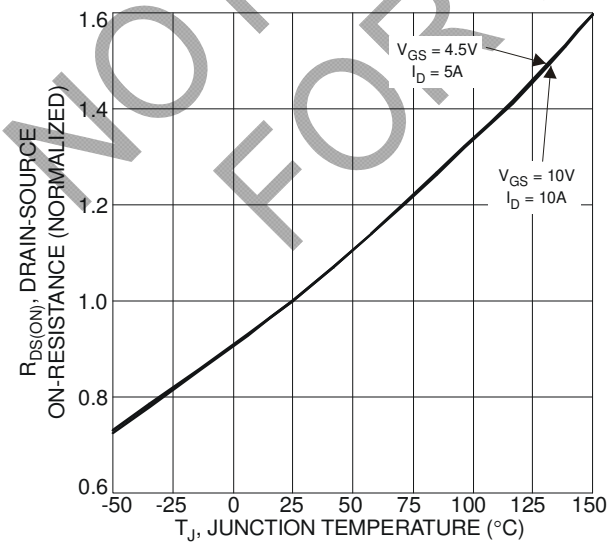


Figure 5 On-Resistance Variation with Temperature

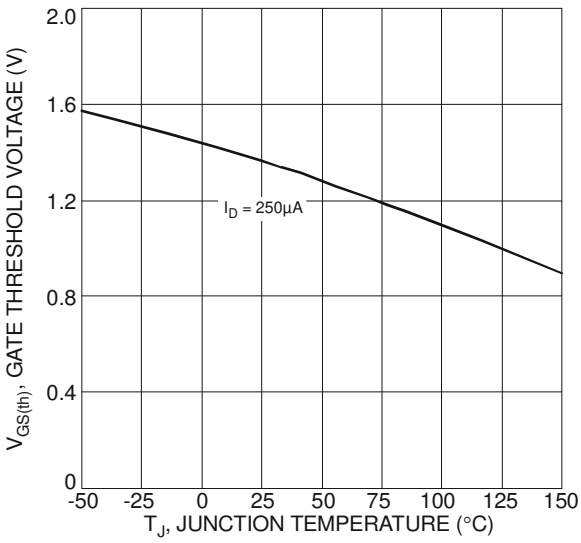


Figure 6 Gate Threshold Variation vs. Ambient Temperature

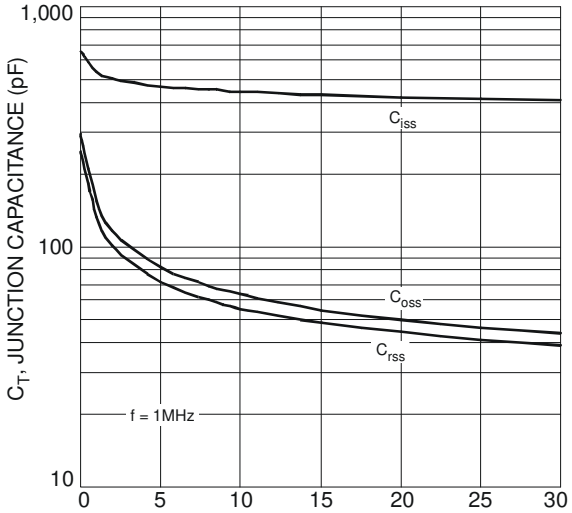


Figure 7 Typical Junction Capacitance

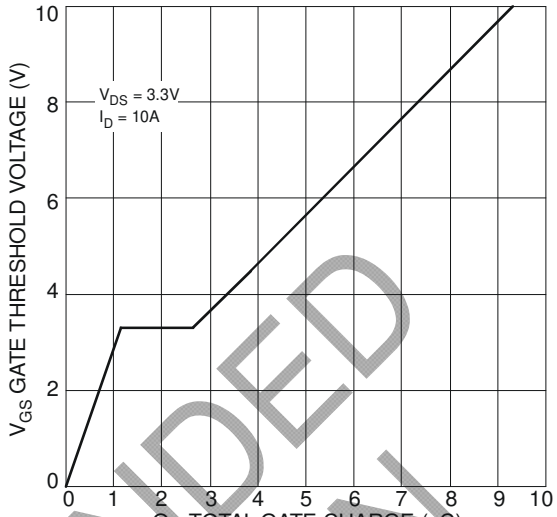


Figure 8 Gate Charge

P-CHANNEL

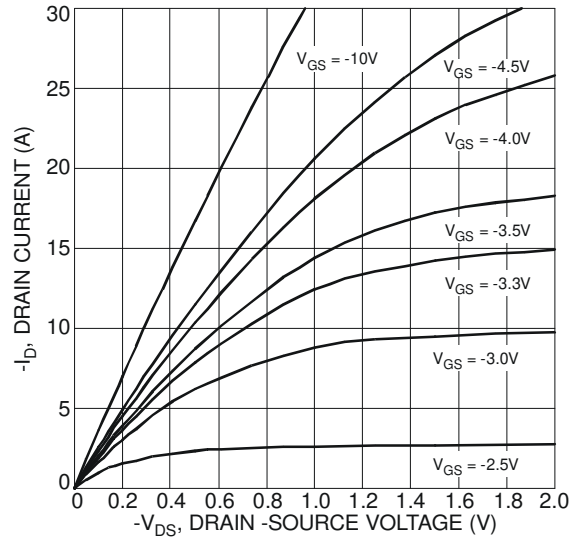


Figure 9 Typical Output Characteristics

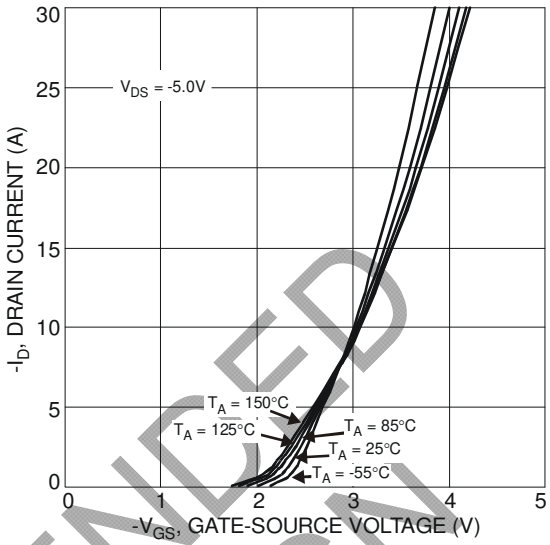


Figure 10 Typical Transfer Characteristics

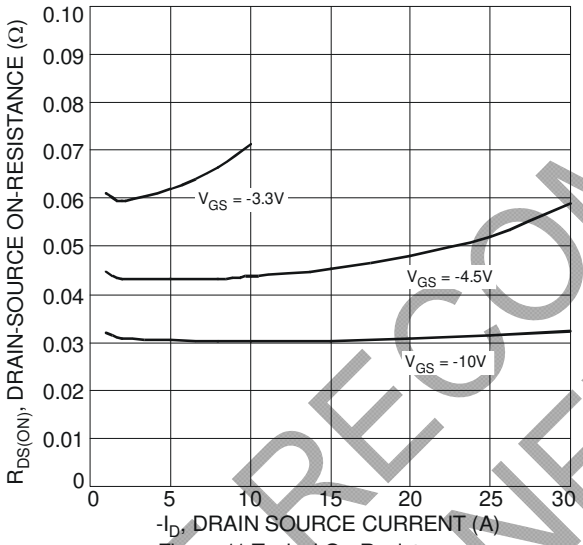


Figure 11 Typical On-Resistance vs. Drain Current and Gate Voltage

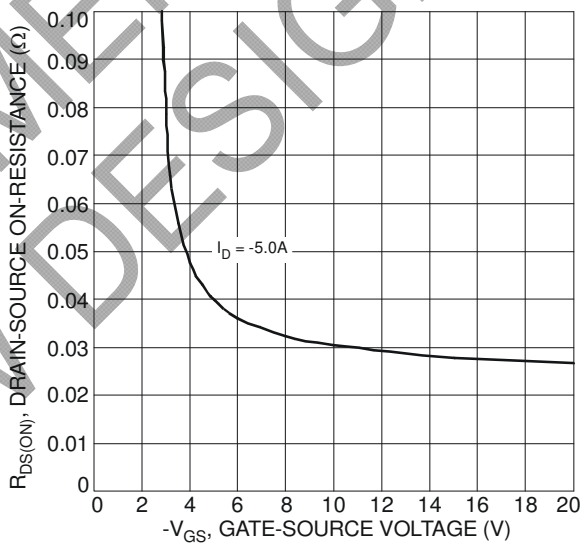


Figure 12 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

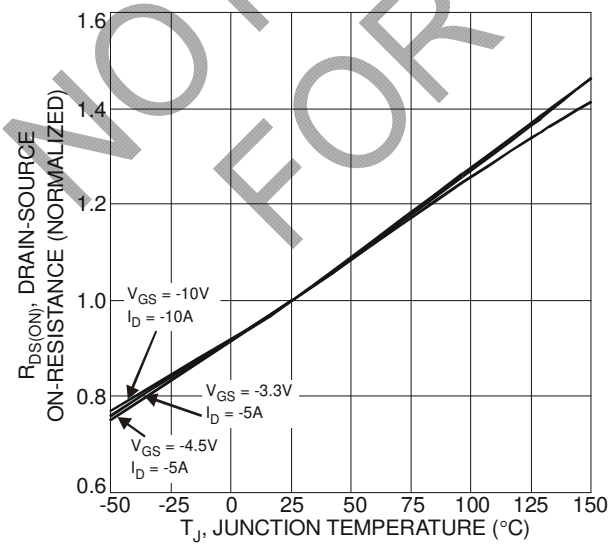


Figure 13 On-Resistance Variation with Temperature

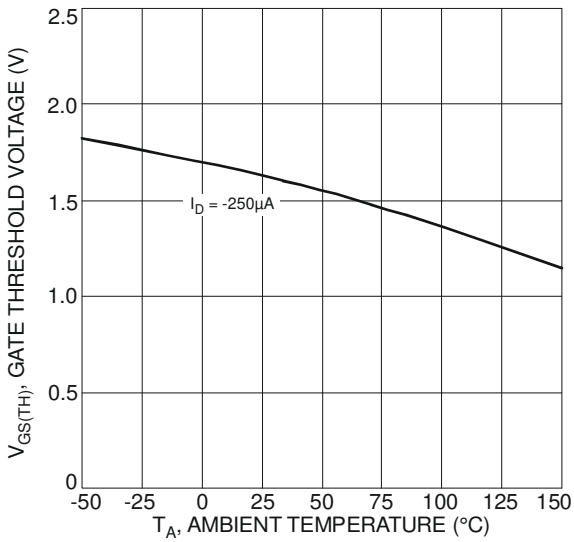


Figure 14 Gate Threshold Variation vs. Ambient Temperature

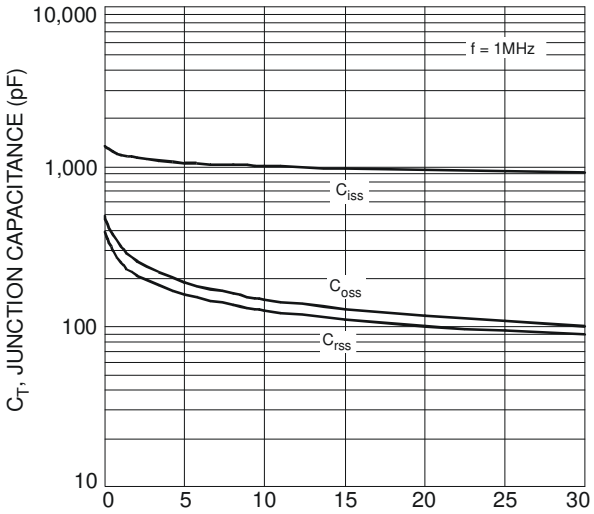


Figure 15 Typical Junction Capacitance

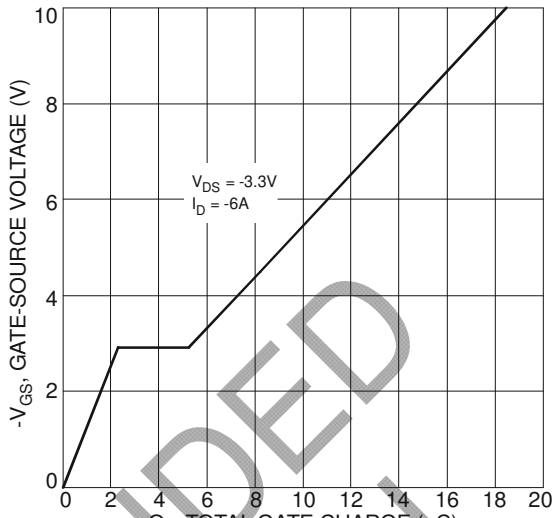
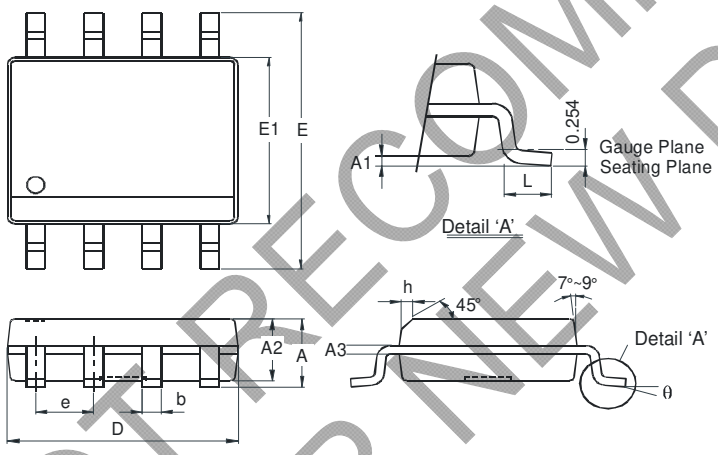


Figure 16 Gate-Charge Characteristics

Package Outline Dimensions

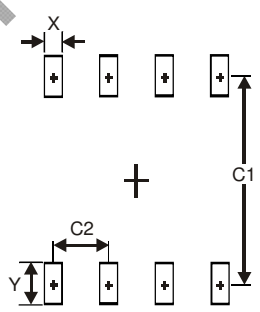
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SO-8		
Dim	**Min**	**Max**
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
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)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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