

COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

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

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.

Applications

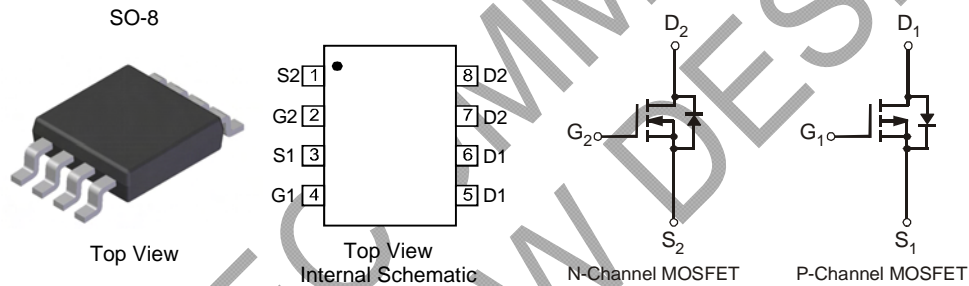
- Motor control
- Power Management Functions
- DC-DC Converters
- Inverter

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**

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)

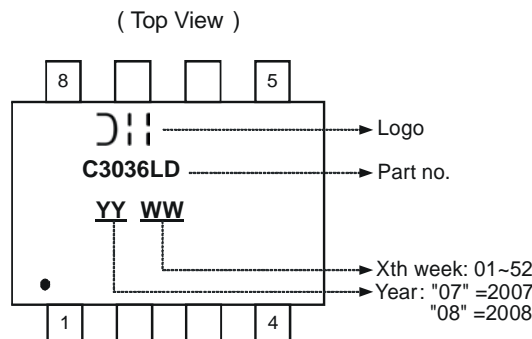


Ordering Information (Note 4)

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



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 _{θJA}	83	°C/W
	t < 10s		49	
Thermal Resistance, Junction to Case (Note 5)		R _{θJC}	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

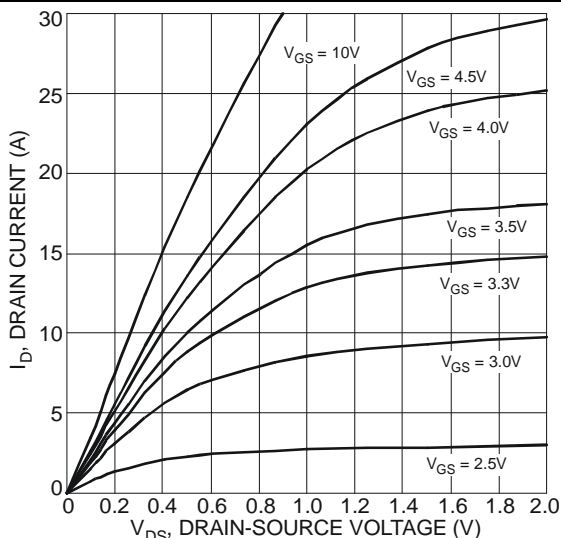


Figure 1 Typical Output Characteristic

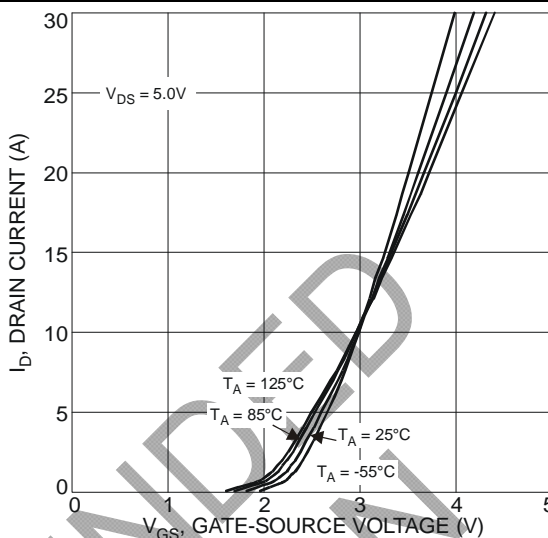


Figure 2 Typical Transfer Characteristics

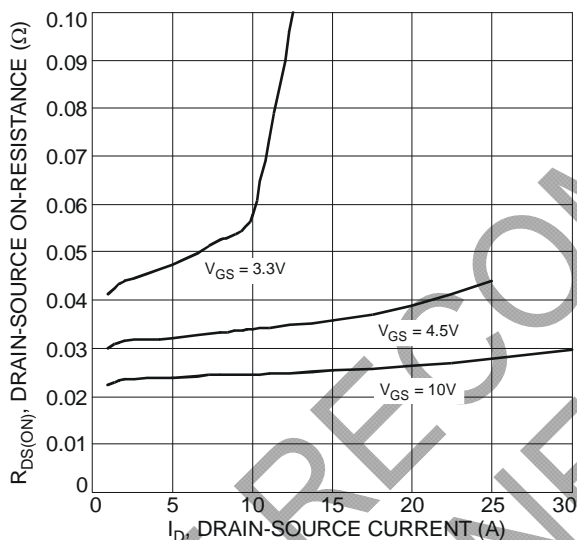


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

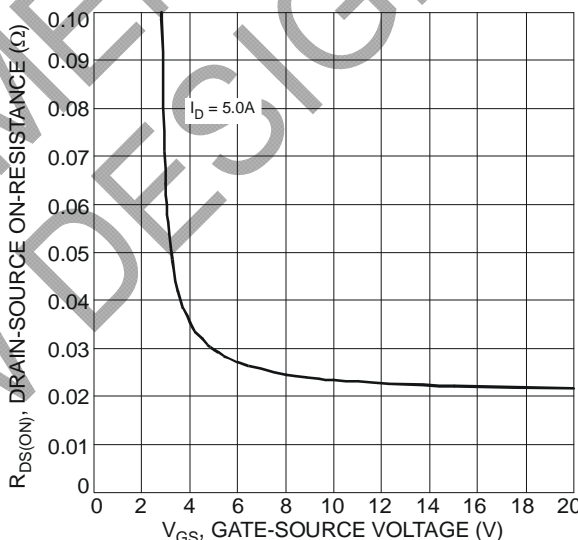


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

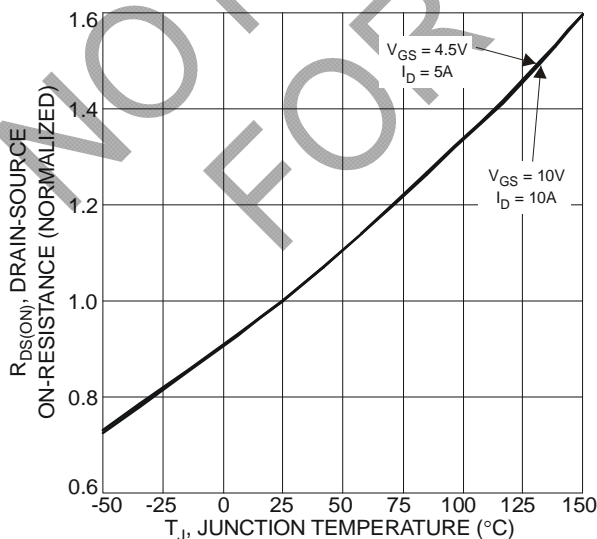


Figure 5 On-Resistance Variation with Temperature

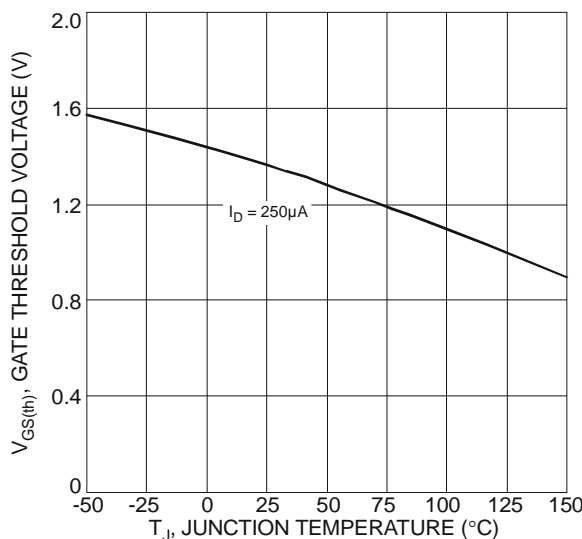
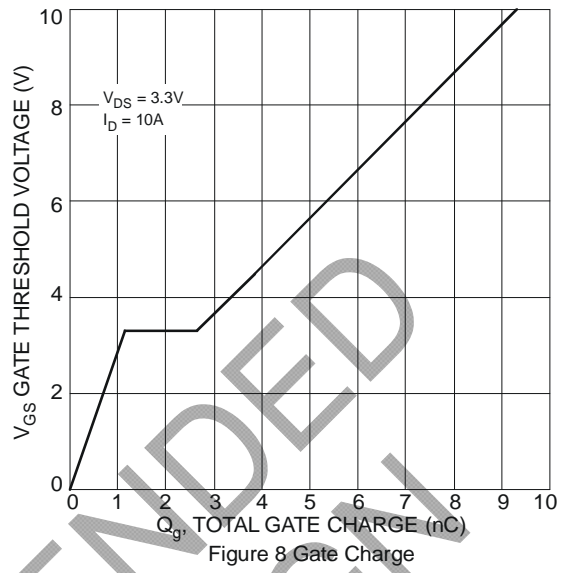
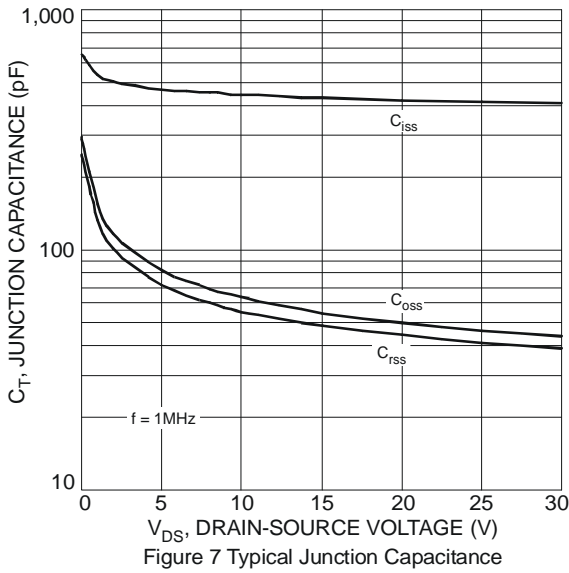


Figure 6 Gate Threshold Variation vs. Ambient Temperature



NOT RECOMMENDED FOR NEW DESIGN

P-CHANNEL

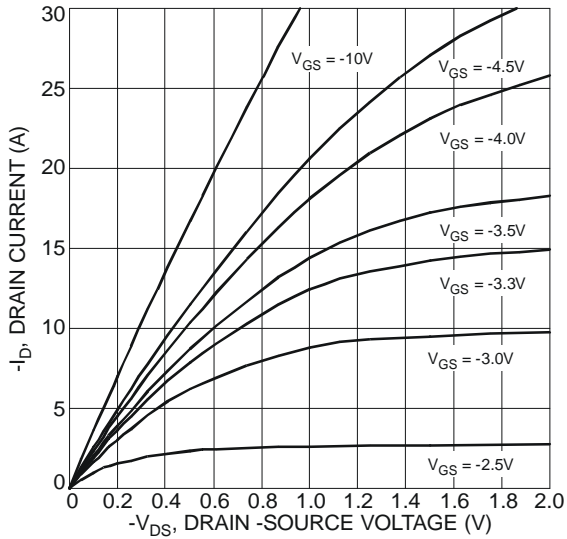


Figure 9 Typical Output Characteristics

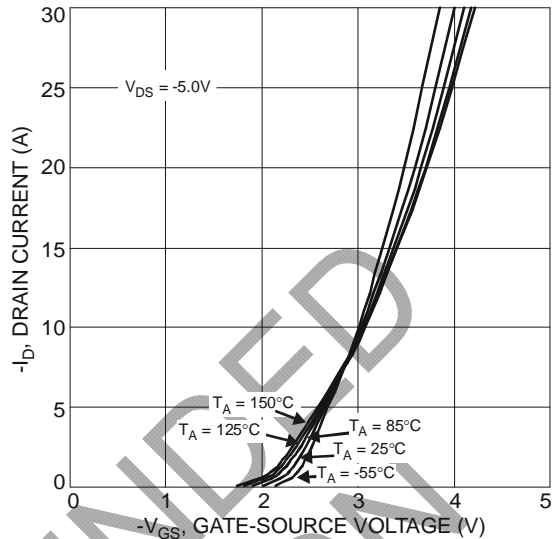


Figure 10 Typical Transfer Characteristics

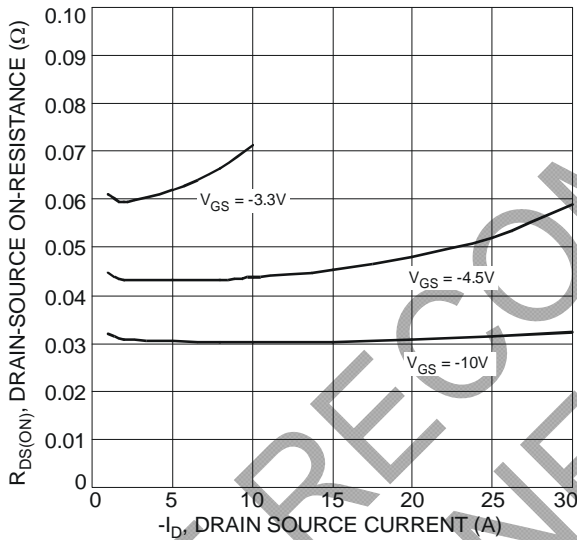


Figure 11 Typical On-Resistance vs. Drain Current and Gate Voltage

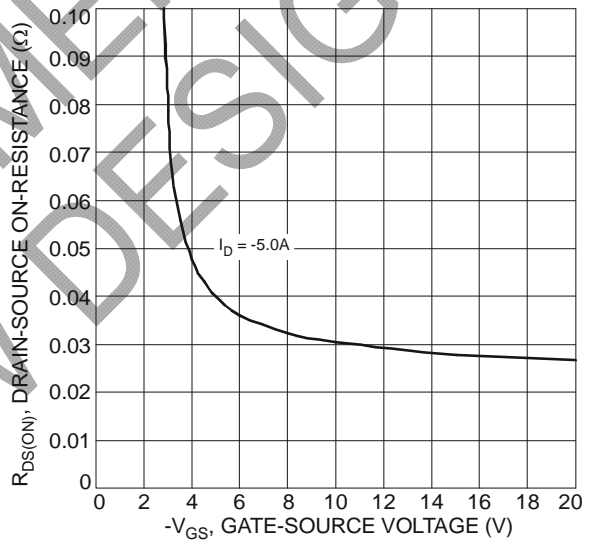


Figure 12 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

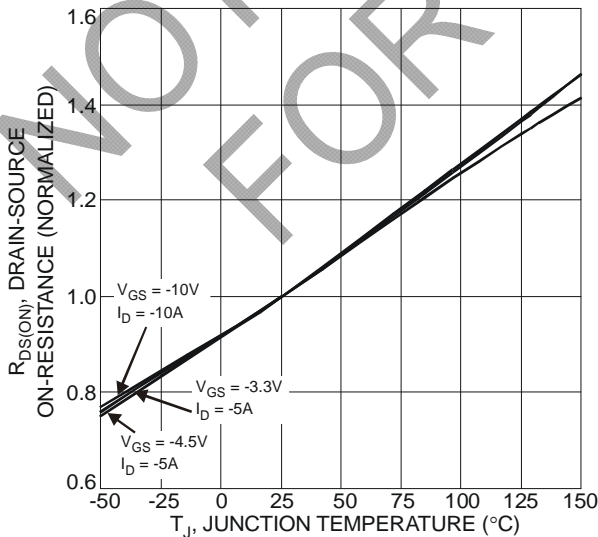


Figure 13 On-Resistance Variation with Temperature

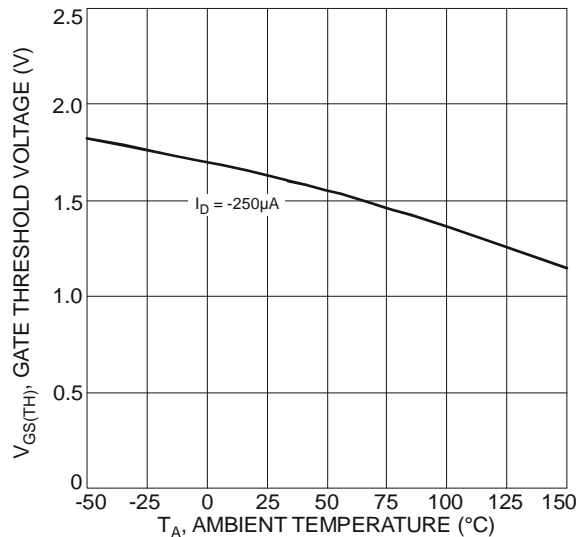
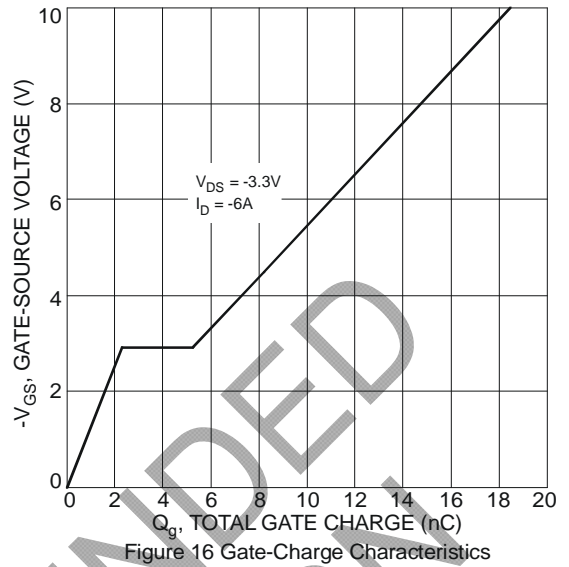
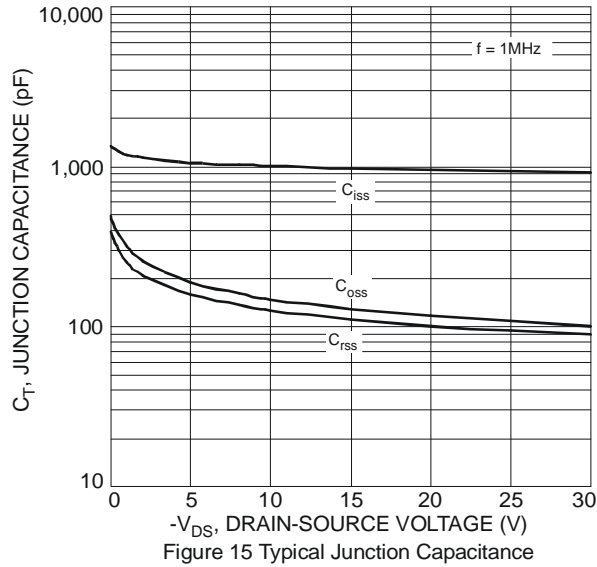
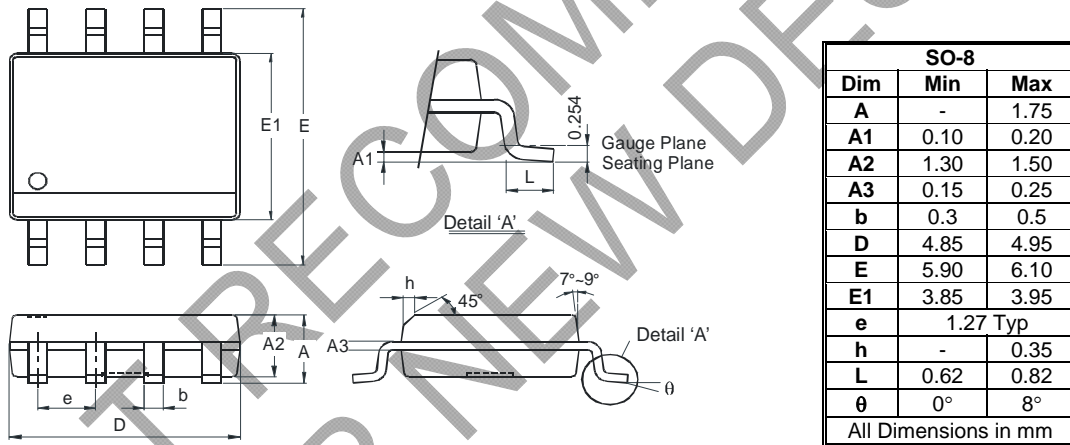


Figure 14 Gate Threshold Variation vs. Ambient Temperature



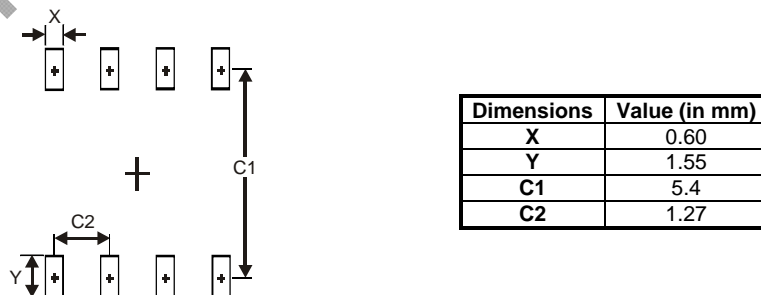
Package Outline Dimensions

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



Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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