

Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	Package	$I_D \text{ MAX}$ $T_A = +25^\circ\text{C}$
N-Channel	30V	20mΩ @ $V_{GS} = 10\text{V}$	SO-8	8.5A
		32mΩ @ $V_{GS} = 4.5\text{V}$		7.0A
		45mΩ @ $V_{GS} = -10\text{V}$		-5.5A
P-Channel	-30V	85mΩ @ $V_{GS} = -4.5\text{V}$		-4.1A

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

- DC Motor Control
- DC-AC Inverters

Features

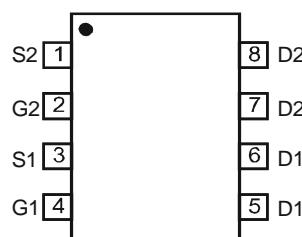
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

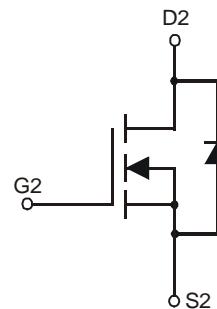
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 **(e3)**
- Weight: 0.008 grams (approximate)



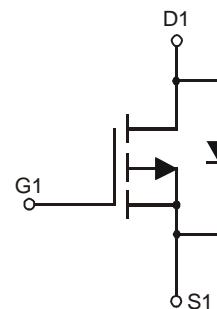
Top View



Pin Configuration



N-CHANNEL MOSFET



P-CHANNEL MOSFET

Equivalent Circuit

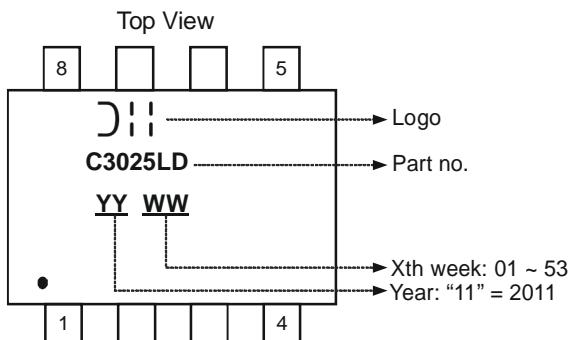
Ordering Information (Note 4)

Part Number	Case	Packaging
DMC3025LSD-13	SO-8	2500/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com>.

Marking Information



Maximum Ratings N-CHANNEL (@ $T_A = +25^\circ\text{C}$, 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) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	6.5 5.1	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	8.5 6.8	A
Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	5.3 4.1	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	7.0 5.5	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	2	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	60	A

Maximum Ratings P-CHANNEL (@ $T_A = +25^\circ\text{C}$, 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) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-4.2 -3.2	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-5.5 -4.3	A
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-3.5 -2.3	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-4.1 -3.2	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	-2	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	-30	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.2	W
	$T_A = +70^\circ\text{C}$		0.77	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	104	$^\circ\text{C/W}$
	$t < 10\text{s}$		62	
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	1.5	W
	$T_A = +70^\circ\text{C}$		0.95	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	83	$^\circ\text{C/W}$
	$t < 10\text{s}$		49	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	15	
Operating and Storage Temperature Range	T_J, T_{STG}		-55 to +150	$^\circ\text{C}$

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

Electrical Characteristics N-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$\text{V}_{\text{DS}} = 30\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 1	μA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	1.0	—	2.0	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	—	15	20	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 7.4\text{A}$
		—	23	32		$\text{V}_{\text{GS}} = 4.5\text{V}$, $\text{I}_D = 6\text{A}$
Forward Transfer Admittance	$ \text{Y}_{\text{fs}} $	—	8	—	S	$\text{V}_{\text{DS}} = 5\text{V}$, $\text{I}_D = 10\text{A}$
Diode Forward Voltage	V_{SD}	—	0.70	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	501	—	pF	$\text{V}_{\text{DS}} = 15\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	72	—		
Reverse Transfer Capacitance	C_{rss}	—	57	—		
Gate resistance	R_g	—	1.84	—		
Total Gate Charge ($\text{V}_{\text{GS}} = 4.5\text{V}$)	Q_g	—	4.6	—	nC	$\text{V}_{\text{DS}} = 0\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Total Gate Charge ($\text{V}_{\text{GS}} = 10\text{V}$)	Q_g	—	9.8	—		
Gate-Source Charge	Q_{gs}	—	1.6	—		
Gate-Drain Charge	Q_{gd}	—	2.0	—		
Turn-On Delay Time	$\text{t}_{\text{D}(\text{on})}$	—	3.9	—	ns	$\text{V}_{\text{DD}} = 15\text{V}$, $\text{V}_{\text{GS}} = 10\text{V}$, $\text{R}_G = 6\Omega$, $\text{I}_D = 1\text{A}$
Turn-On Rise Time	t_r	—	4.2	—		
Turn-Off Delay Time	$\text{t}_{\text{D}(\text{off})}$	—	16.6	—		
Turn-Off Fall Time	t_f	—	5.8	—		
Reverse Recovery Time	t_{rr}	—	5.5	—	ns	$\text{I}_F = 12\text{A}$, $\text{di/dt} = 500\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{rr}	—	2.6	—	nC	

 Electrical Characteristics P-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$\text{V}_{\text{DS}} = -30\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	-1.0	—	-2.0	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	—	38	45	$\text{m}\Omega$	$\text{V}_{\text{GS}} = -10\text{V}$, $\text{I}_D = -5.2\text{A}$
		—	65	85		$\text{V}_{\text{GS}} = -4.5\text{V}$, $\text{I}_D = -4\text{A}$
Forward Transfer Admittance	$ \text{Y}_{\text{fs}} $	—	5	—	S	$\text{V}_{\text{DS}} = -5\text{V}$, $\text{I}_D = -5.2\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	590	—	pF	$\text{V}_{\text{DS}} = -25\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	69	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	53	—	pF	
Gate resistance	R_g	—	11	—	Ω	
Total Gate Charge ($\text{V}_{\text{GS}} = 4.5\text{V}$)	Q_g	—	5.1	—	nC	$\text{V}_{\text{DS}} = -15\text{V}$, $\text{I}_D = -6\text{A}$
Total Gate Charge ($\text{V}_{\text{GS}} = 10\text{V}$)	Q_g	—	10.5	—	nC	
Gate-Source Charge	Q_{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.9	—	nC	
Turn-On Delay Time	$\text{t}_{\text{D}(\text{on})}$	—	6.8	—	ns	$\text{V}_{\text{DD}} = -15\text{V}$, $\text{V}_{\text{GS}} = -10\text{V}$, $\text{R}_G = 6\Omega$, $\text{I}_D = -1\text{A}$
Turn-On Rise Time	t_r	—	4.9	—	ns	
Turn-Off Delay Time	$\text{t}_{\text{D}(\text{off})}$	—	28.4	—	ns	
Turn-Off Fall Time	t_f	—	12.4	—	ns	
Reverse Recovery Time	t_{rr}	—	14	—	ns	$\text{I}_F = 12\text{A}$, $\text{di/dt} = 500\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{rr}	—	11	—	nC	

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

N-CHANNEL

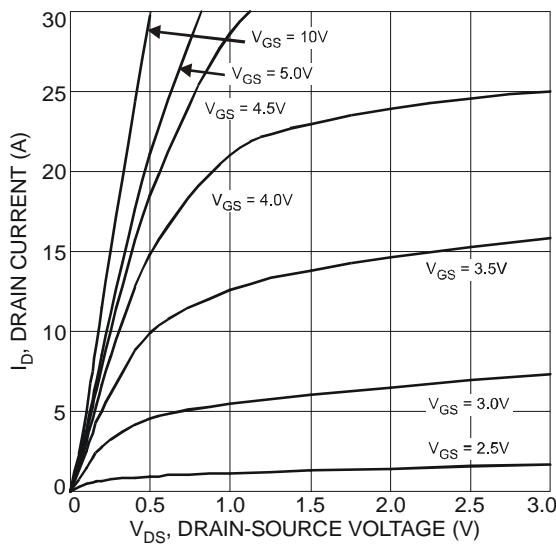


Figure 1. Typical Output Characteristic

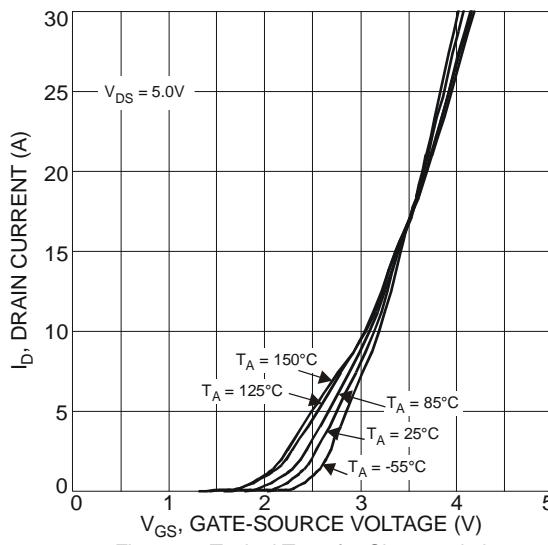


Figure 2. Typical Transfer Characteristics

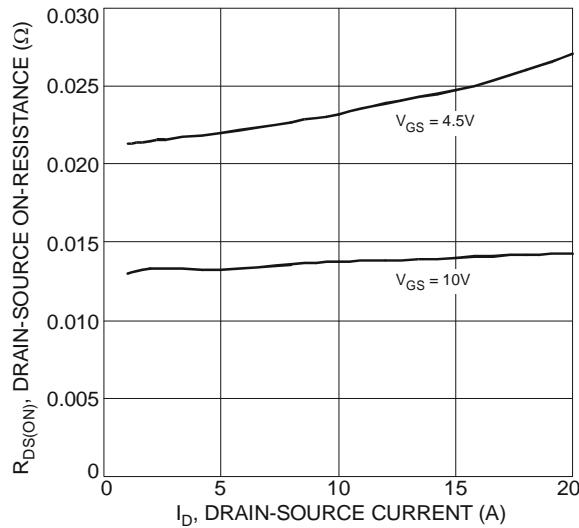


Figure 3. Typical On-Resistance vs.
Drain Current and Gate Voltage

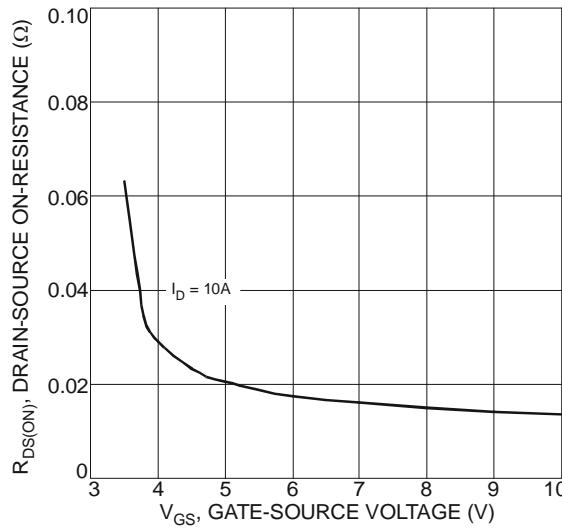


Figure 4. Typical On-Resistance vs.
Drain Current and Gate Voltage

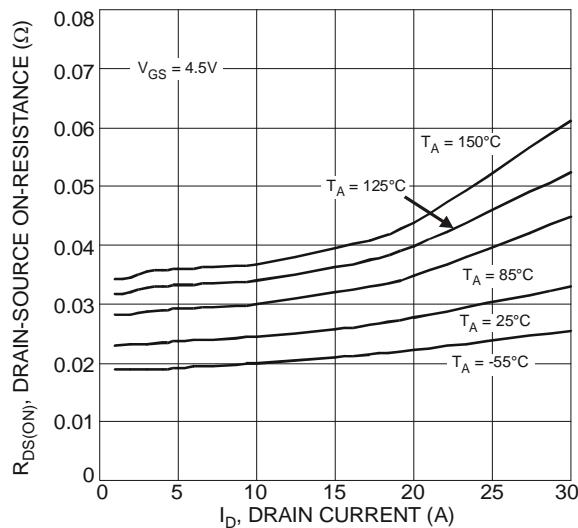


Figure 5. Typical On-Resistance vs.
Drain Current and Temperature

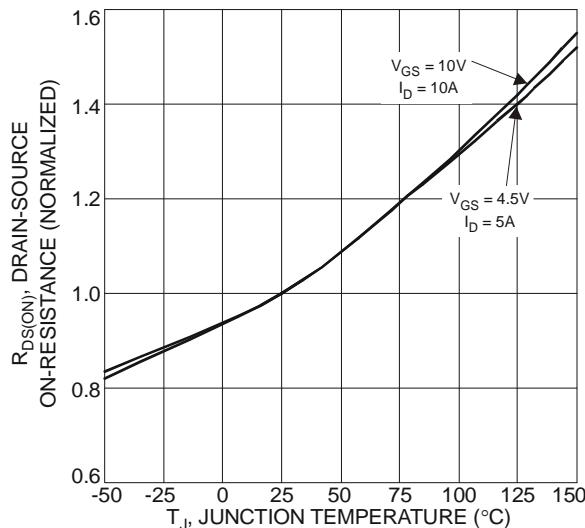
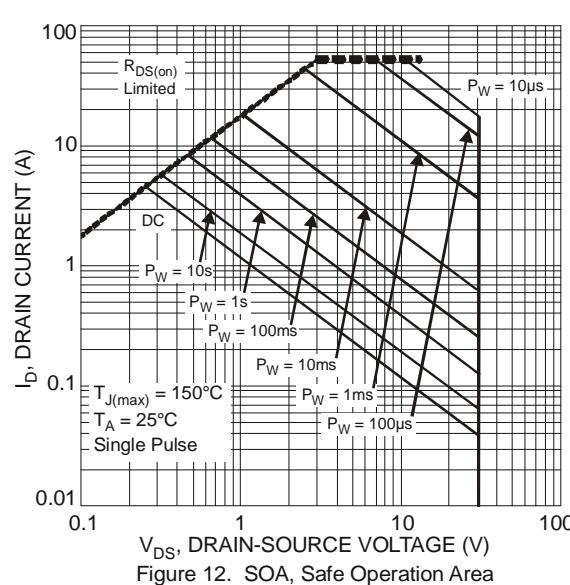
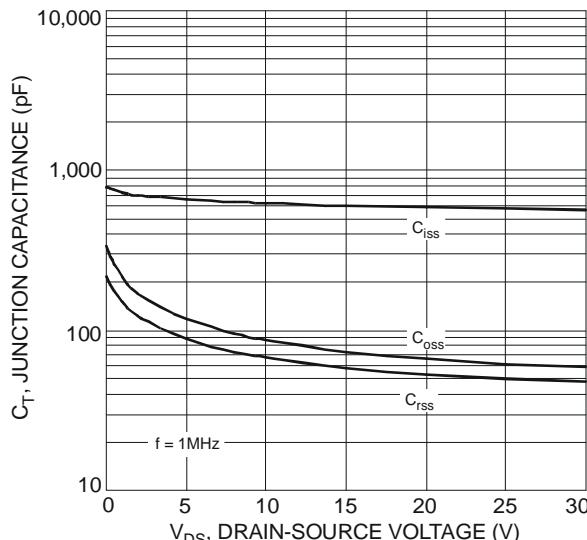
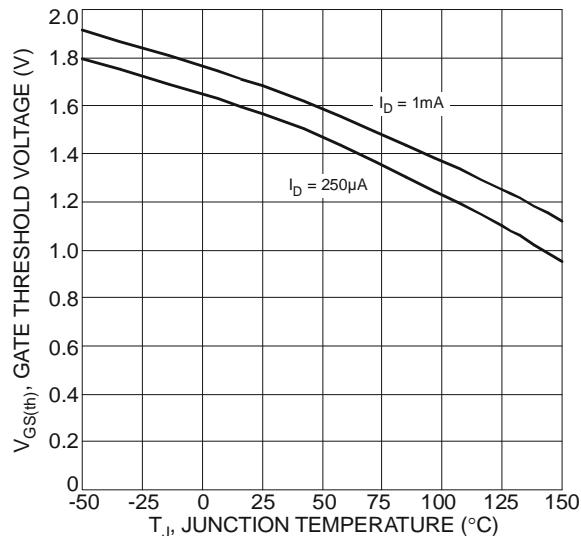
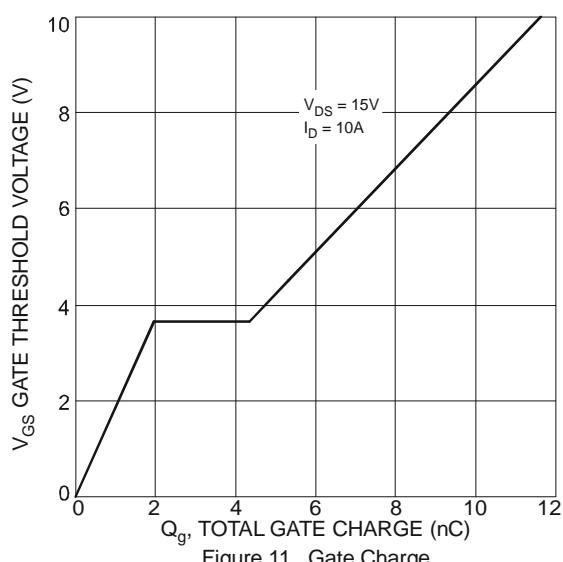
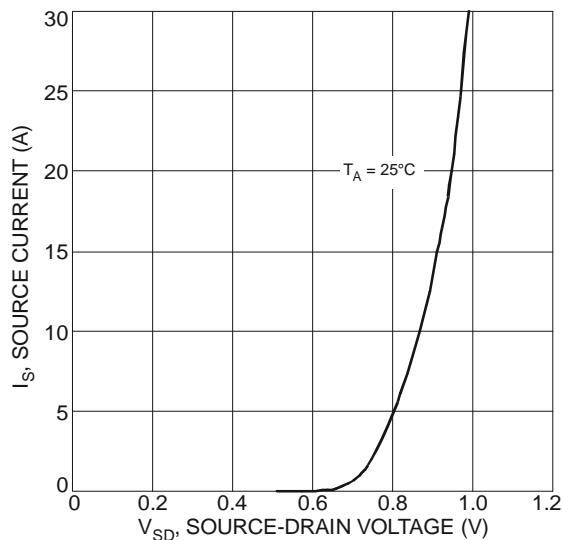
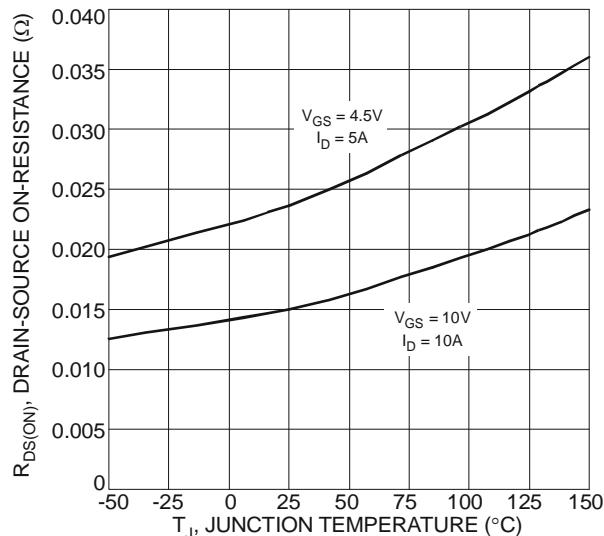


Figure 6. On-Resistance Variation with Temperature



P-CHANNEL

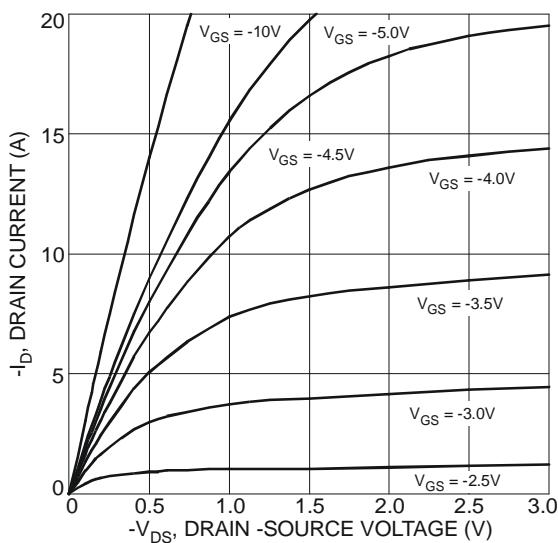


Figure 13. Typical Output Characteristics

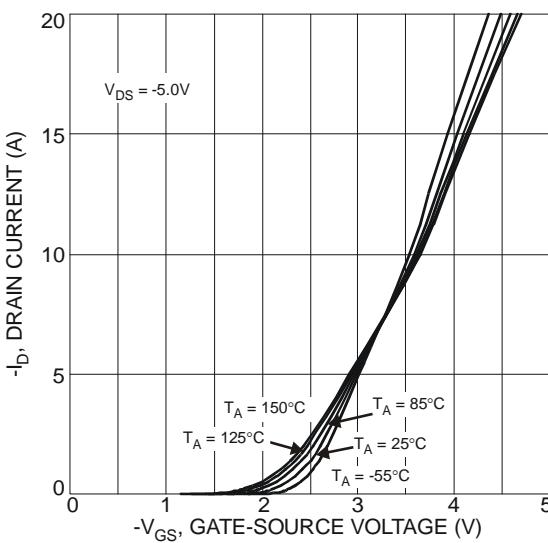


Figure 14. Typical Transfer Characteristics

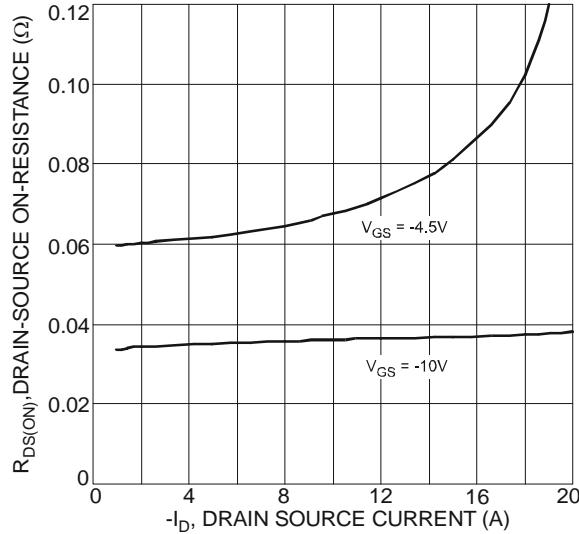


Figure 15. Typical On-Resistance vs.
Drain Current and Gate Voltage

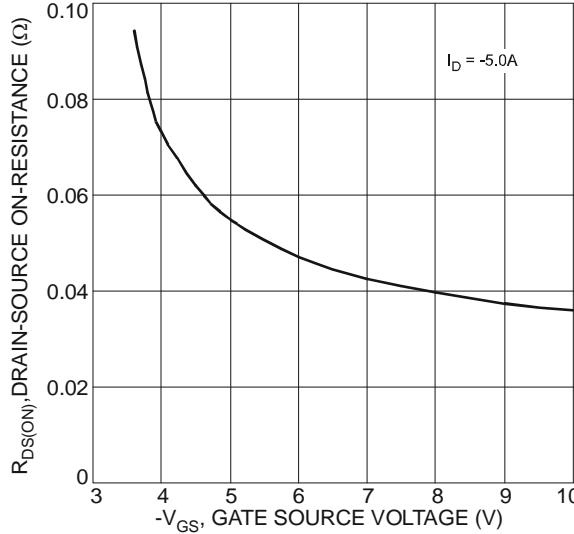


Figure 16. Typical On-Resistance vs.
Drain Current and Gate Voltage

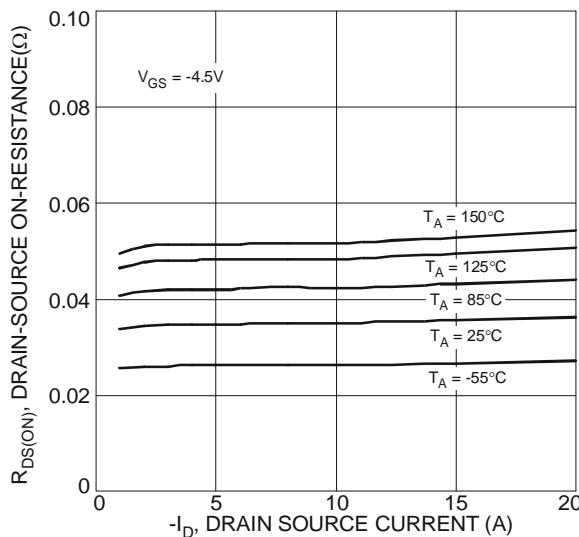


Figure 17. Typical On-Resistance vs.
Drain Current and Temperature

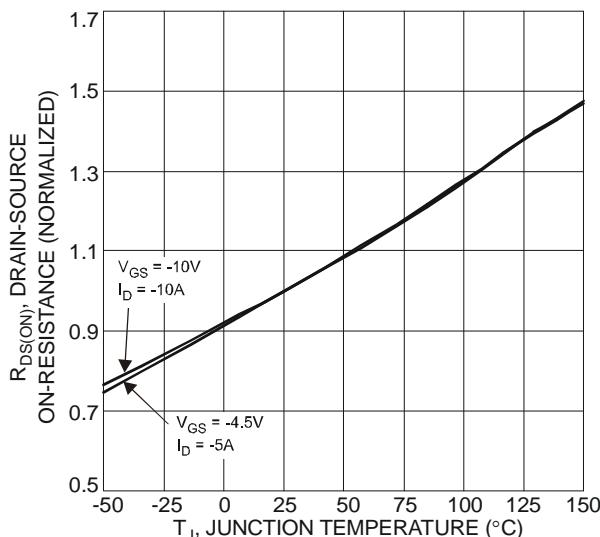
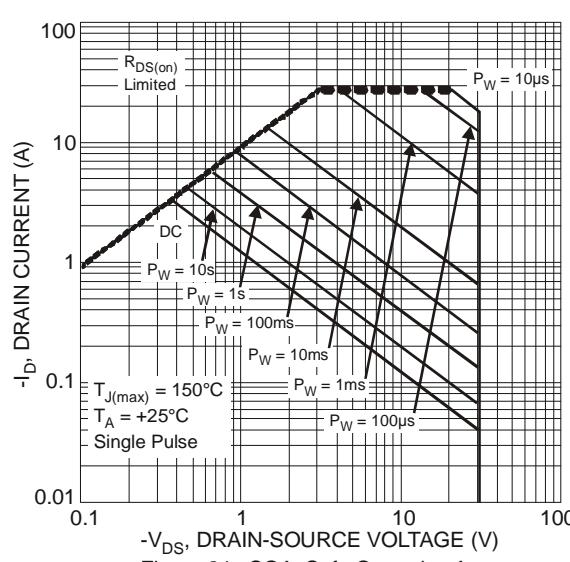
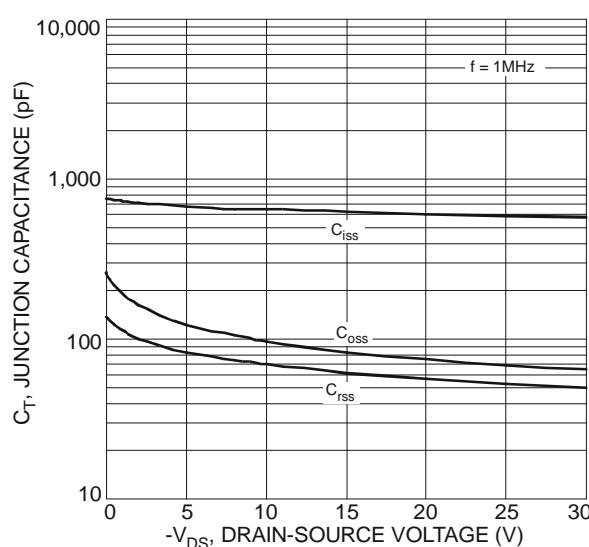
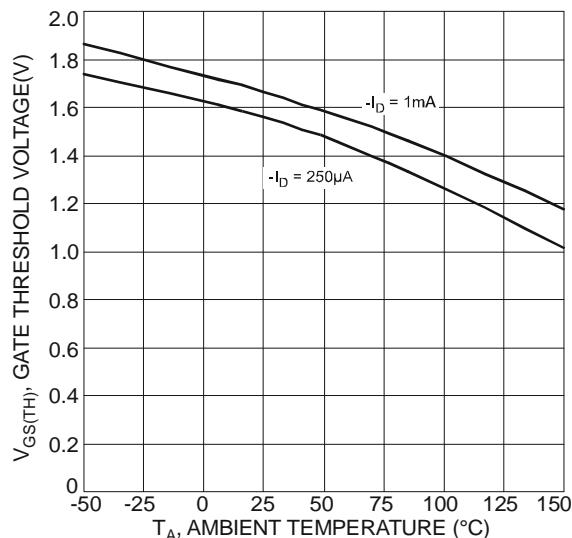
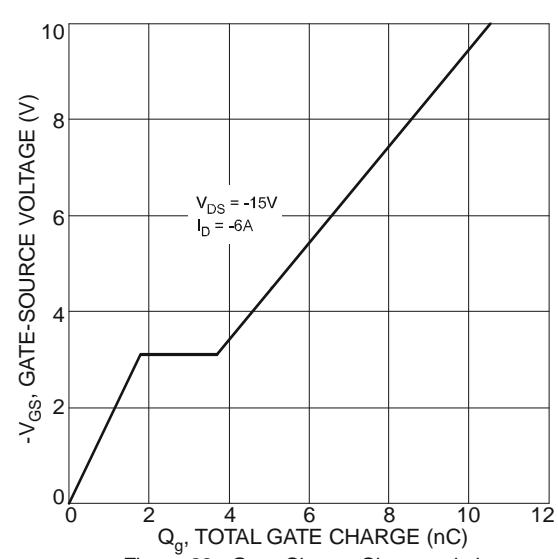
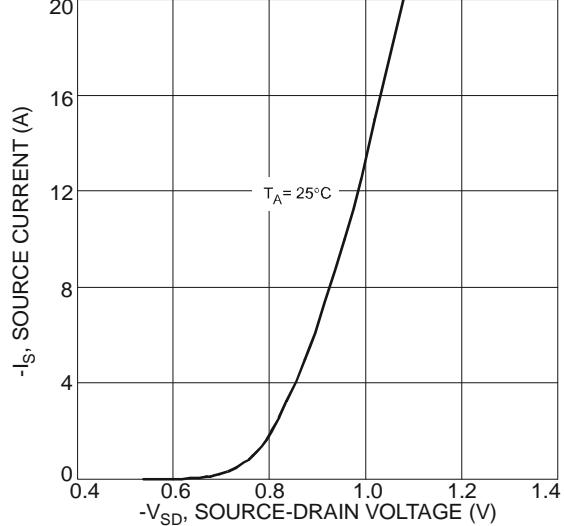
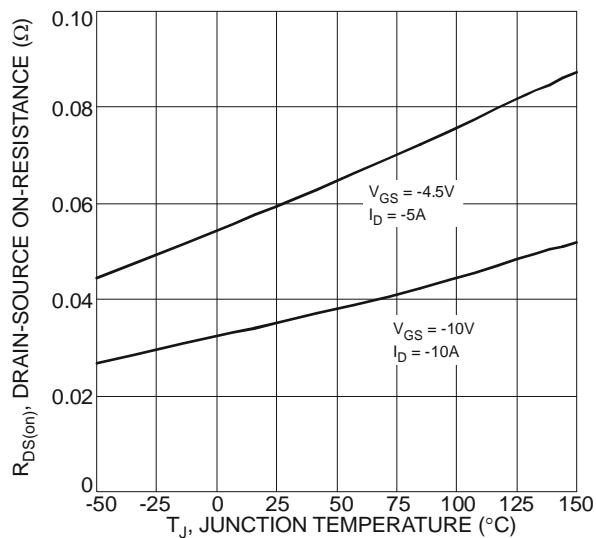
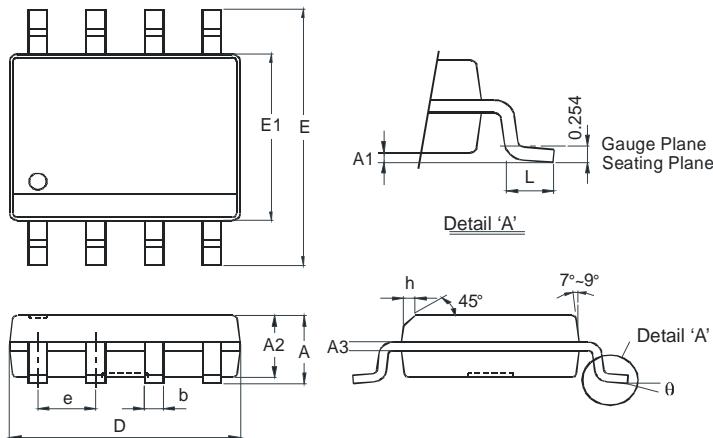


Figure 18. On-Resistance Variation with Temperature



Package Outline Dimensions

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

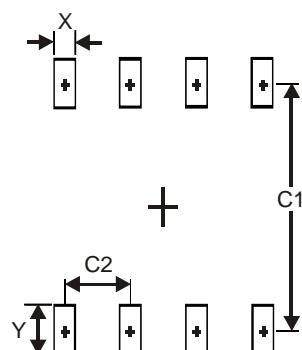


SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°

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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