

## Product Summary

Device	BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
Q2	30V	21mΩ @ V <sub>GS</sub> = 10V	8.5A
		32mΩ @ V <sub>GS</sub> = 4.5V	7.2A
Q1	-30V	39mΩ @ V <sub>GS</sub> = -10V	-7A
		53mΩ @ V <sub>GS</sub> = -4.5V	-5.6A

## Description and

This MOSFET has been designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

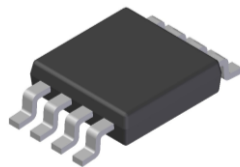
- Power Management Functions
- Analog Switch
- Load Switch

## Features

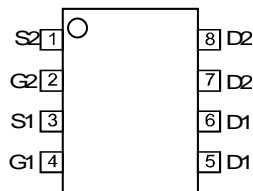
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMC3021LSDQ](#))**

## 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 208e3
- Weight: 0.072 grams (Approximate)

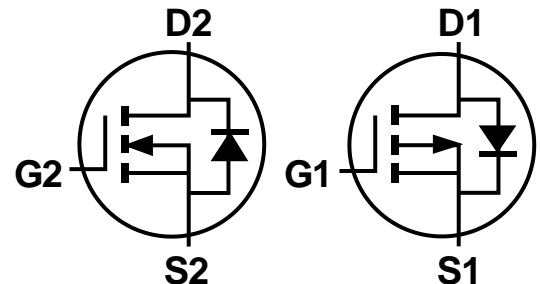


Top View



Top View

SO-8



N-Channel MOSFET

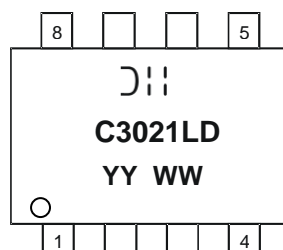
P-Channel MOSFET

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMC3021LSD-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



DII = Manufacturer's Marking  
 C3021LD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Year (ex: 18 = 2018)  
 WW = Week (01 to 53)

**Maximum Ratings N-CHANNEL – Q2** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5)	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	8.5	A
		$T_A = +85^\circ\text{C}$		7.1	
Pulsed Drain Current (Note 6)			$I_{DM}$	26	A

**Maximum Ratings P-CHANNEL – Q1** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	-30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5)	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	-7.0	A
		$T_A = +85^\circ\text{C}$		-4.5	
Pulsed Drain Current (Note 6)			$I_{DM}$	-25	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	2.5	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	50	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics N-CHANNEL – Q2** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 30V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	1	1.45	2.1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	14	21	m $\Omega$	$V_{GS} = 10V, I_D = 7A$
		—	18	32		$V_{GS} = 4.5V, I_D = 5.6A$
Forward Transfer Admittance	$ Y_{fs} $	—	8.1	—	S	$V_{DS} = 5V, I_D = 7A$
Diode Forward Voltage (Note 7)	$V_{SD}$	—	0.7	1.0	V	$V_{GS} = 0V, I_S = 1A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	767	—	pF	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	110	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	105	—	pF	
Gate Resistance	$R_g$	—	1.4	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5V$ )	$Q_g$	—	7.8	—	nC	$V_{DS} = 15V, I_D = 9A$
Total Gate Charge ( $V_{GS} = 10V$ )	$Q_g$	—	16.1	—	nC	
Gate-Source Charge	$Q_{gs}$	—	1.8	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	2.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.0	—	ns	$V_{GS} = 10V, V_{DS} = 15V, R_G = 6\Omega, I_D = 1A$
Turn-On Rise Time	$t_R$	—	4.5	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	26.3	—	ns	
Turn-Off Fall Time	$t_F$	—	8.55	—	ns	

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout.
  - Repetitive rating, pulse width limited by junction temperature.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

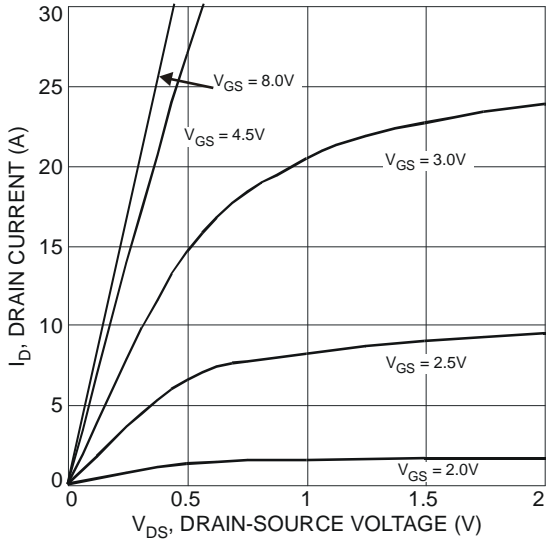


Fig. 1 Typical Output Characteristics

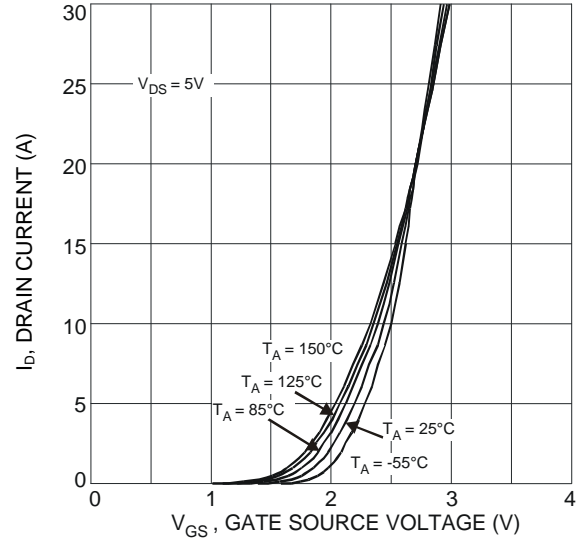


Fig. 2 Typical Transfer Characteristics

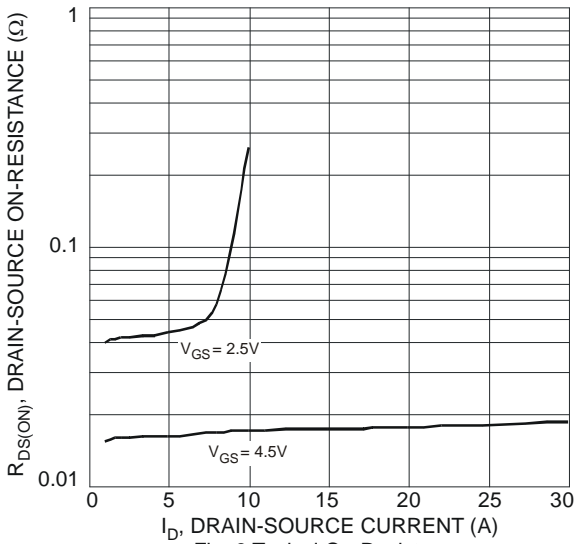


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

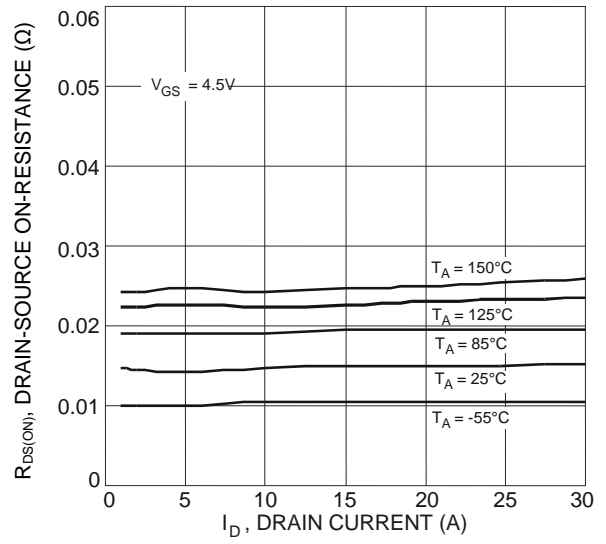


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

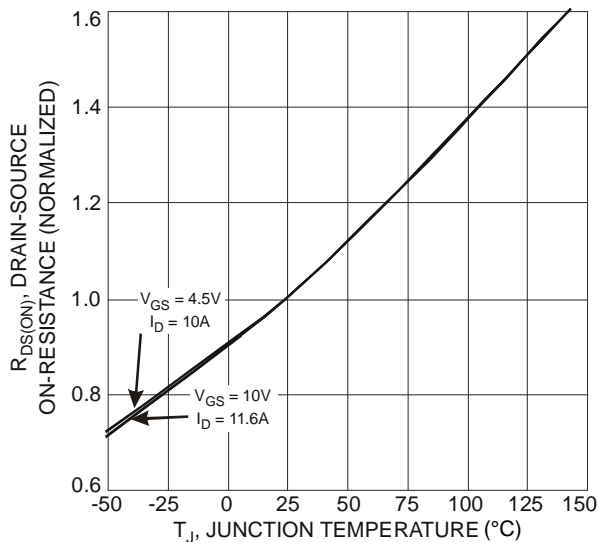


Fig. 5 On-Resistance Variation with Temperature

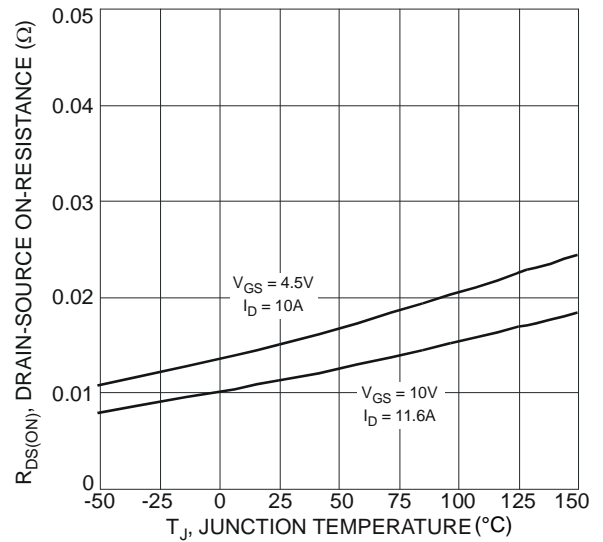


Fig. 6 On-Resistance Variation with Temperature

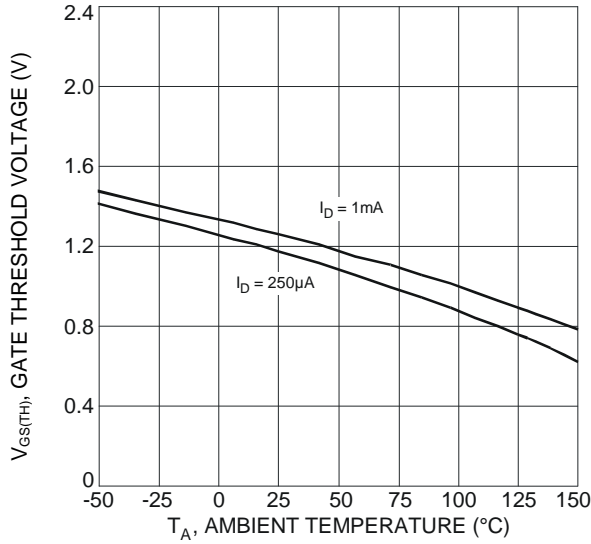


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

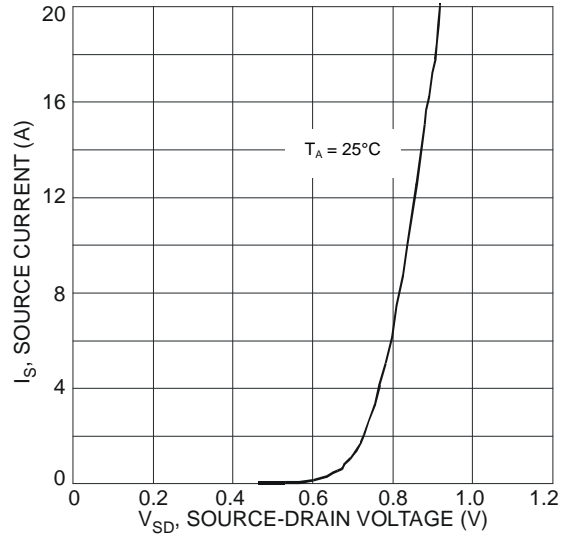


Fig. 8 Diode Forward Voltage vs. Current

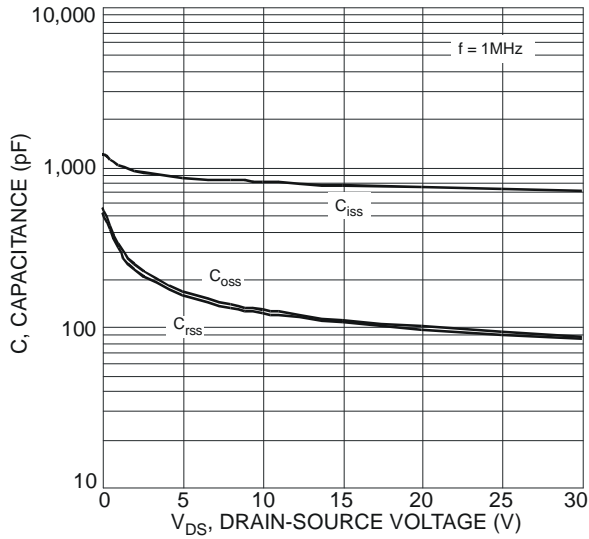


Fig. 9 Typical Capacitance

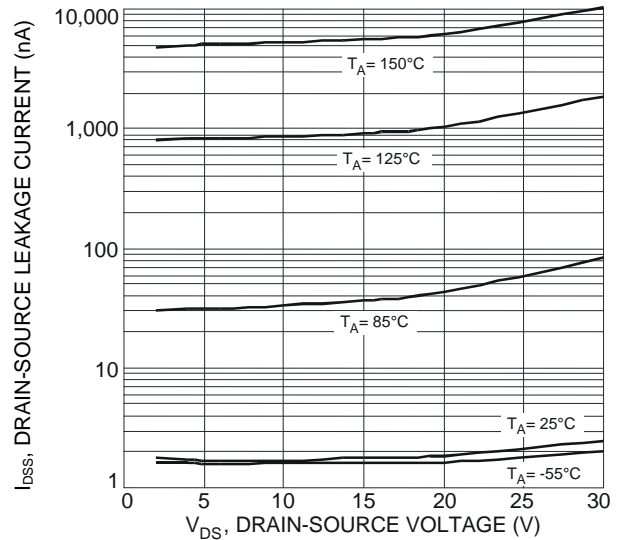
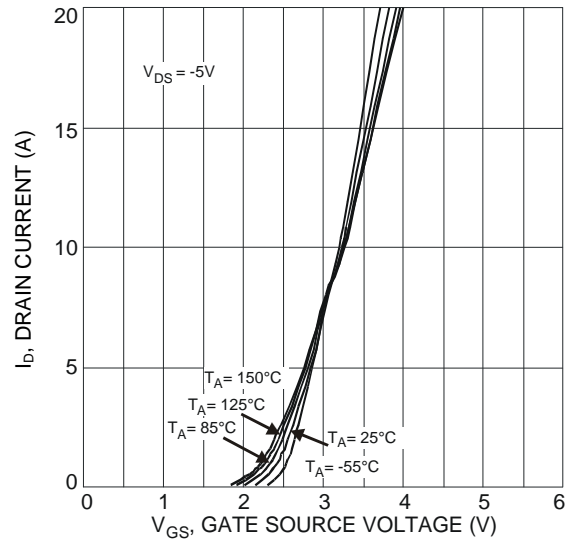
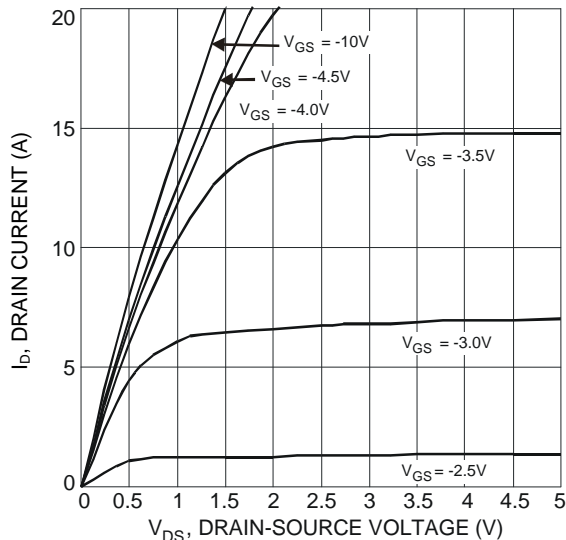


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

**Electrical Characteristics P-CHANNEL – Q1** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	-1.0	μA	V <sub>DS</sub> = -30V, 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 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1	-1.7	-2.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	30	39	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.3A
		—	42	53		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.7A
Forward Transfer Admittance	Y <sub>fs</sub>	—	7	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -4.3A
Diode Forward Voltage (Note 7)	V <sub>SD</sub>	—	-0.75	-1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1.7A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	1002	—	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	125	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	118	—	pF	
Gate Resistance	R <sub>g</sub>	—	13	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	—	10.1	—	nC	V <sub>DS</sub> = -15V, I <sub>D</sub> = -6A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	21.1	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	2.8	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	3.2	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	10.1	—	ns	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V, R <sub>G</sub> = 6Ω, I <sub>D</sub> = -1A
Turn-On Rise Time	t <sub>R</sub>	—	6.5	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	50.1	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	22.2	—	ns	

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



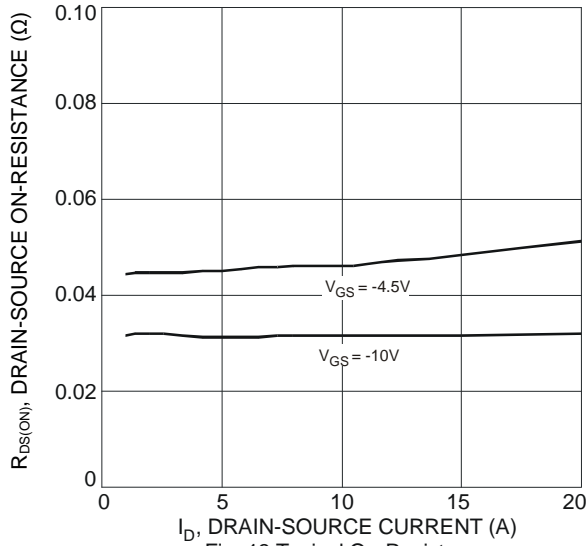


Fig. 13 Typical On-Resistance vs. Drain Current and Gate Voltage

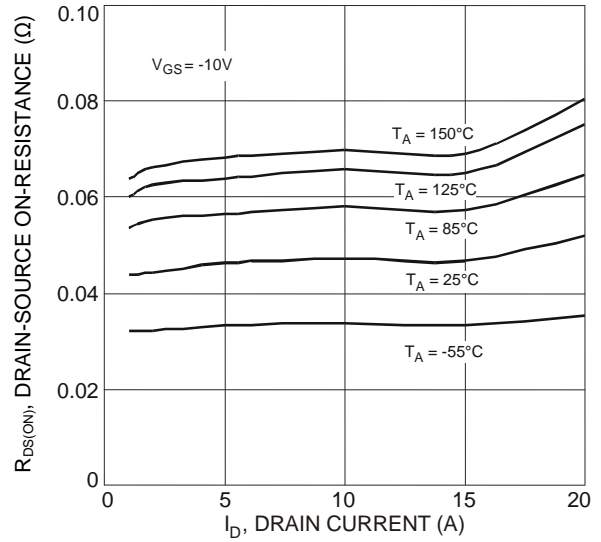


Fig. 14 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

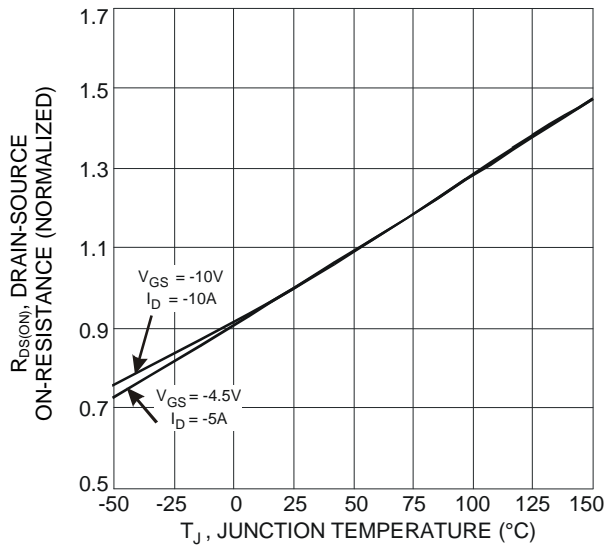


Fig. 15 On-Resistance Variation with Temperature

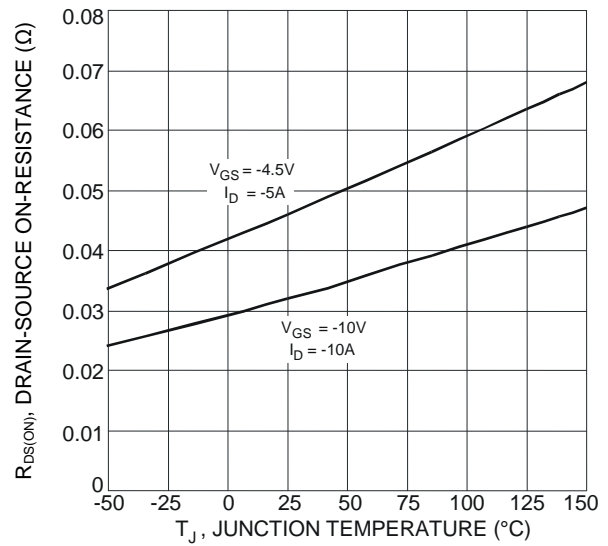


Fig. 16 On-Resistance Variation with Temperature

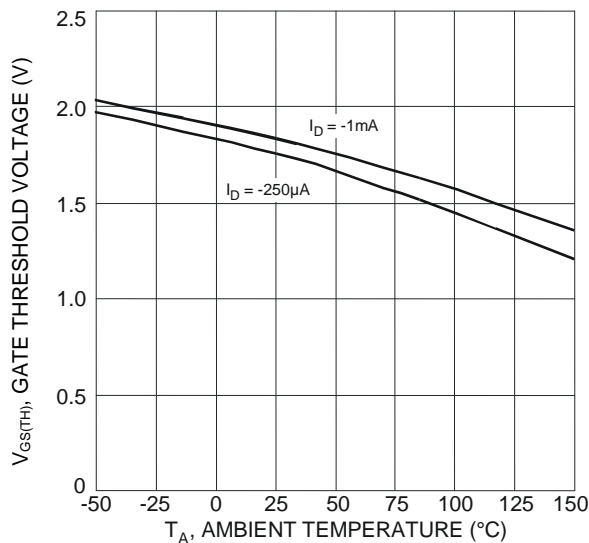


Fig. 17 Gate Threshold Variation vs. Ambient Temperature

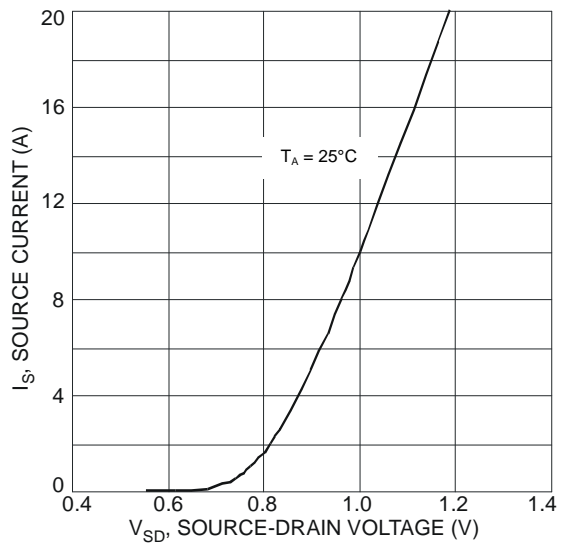
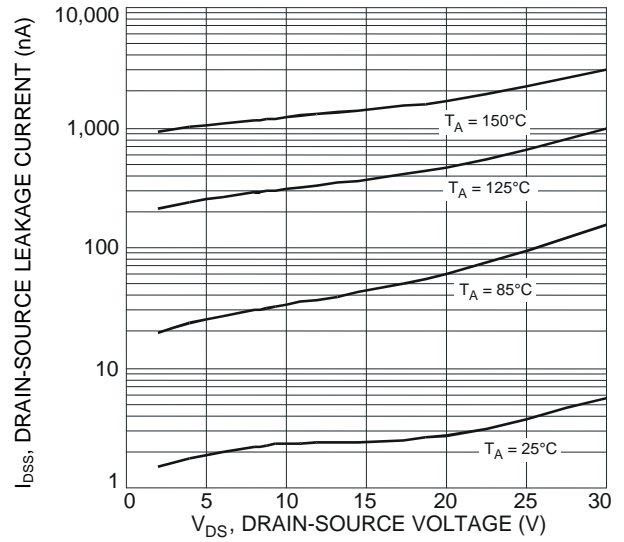
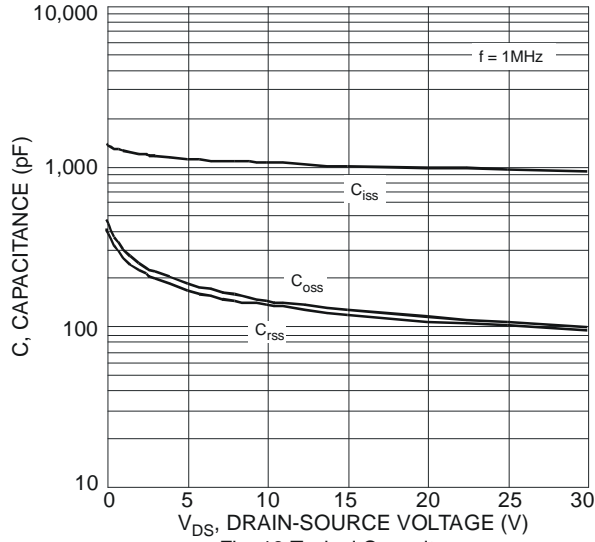


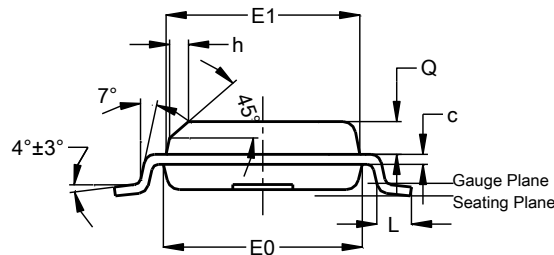
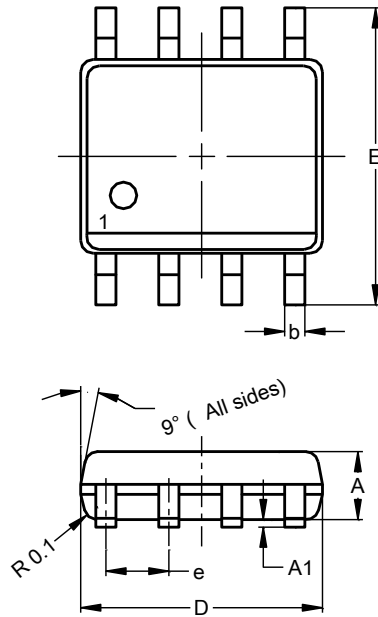
Fig. 18 Diode Forward Voltage vs. Current



**Package Outline Dimensions**

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

**SO-8**

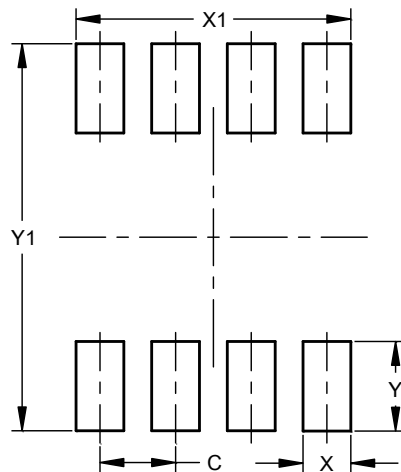


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

**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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