



**THE DATASHEET OF  
DMS3017SSD-13**



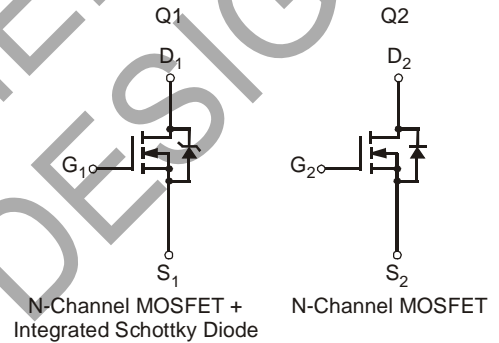
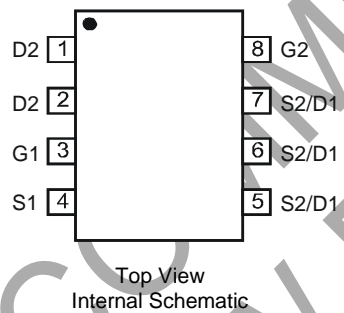
**ASYMMETRIC DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**

### Features

- DIOFET Utilizes a Unique Patented Process to Monolithically Integrate a MOSFET and a Schottky in a Single die to Deliver:
  - Low  $R_{DS(on)}$ —Minimizes Conduction Loss
  - Low  $V_{SD}$ —Reduces Losses due to Body Diode Construction
  - Low  $Q_{rr}$ —Lower  $Q_{rr}$  of Integrated Schottky Reduces Body Diode Switching Losses
  - Low Gate Capacitance ( $Q_g/Q_{gs}$ ) Ratio—Reduces Risk of Shoot-Through or Cross Conduction Currents at High Frequencies
  - Avalanche Rugged— $I_{AR}$  and  $E_{AR}$  Rated
- **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: See Diagram Below
- WTSSOP-16EP (Type DX) Eight: 0.072 grams (Approximate)

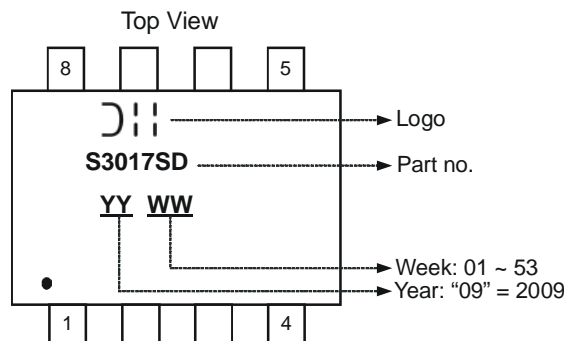


### Ordering Information (Note 3)

Part Number	Case	Packaging
DMS3017SSD-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 <http://www.diodes.com/>.

### Marking Information



**Maximum Ratings – Q1** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 4) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	8.0	A
		T <sub>A</sub> = 70°C		6.5	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	10	A
		T <sub>A</sub> = 70°C		7.8	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	8.7	A
		T <sub>A</sub> = 70°C		7.0	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	60	A
Avalanche Current (Notes 6 & 7)			I <sub>AR</sub>	16	A
Repetitive Avalanche Energy (Notes 6 & 7) L = 0.1mH			E <sub>AR</sub>	12.8	mJ

**Maximum Ratings – Q2** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 4) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	6.0	A
		T <sub>A</sub> = 70°C		4.7	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	7.2	A
		T <sub>A</sub> = 70°C		6.0	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	6.0	A
		T <sub>A</sub> = 70°C		5.0	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	60	A
Avalanche Current (Notes 6 & 7)			I <sub>AR</sub>	16	A
Repetitive Avalanche Energy (Notes 6 & 7) L = 0.1mH			E <sub>AR</sub>	12.8	mJ

**Thermal Characteristics**

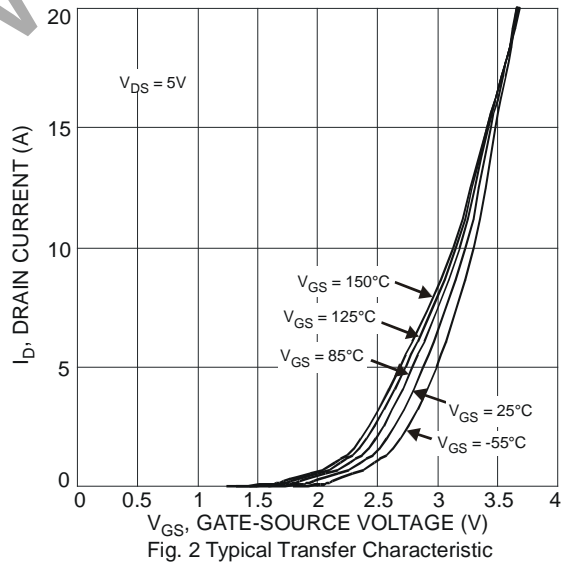
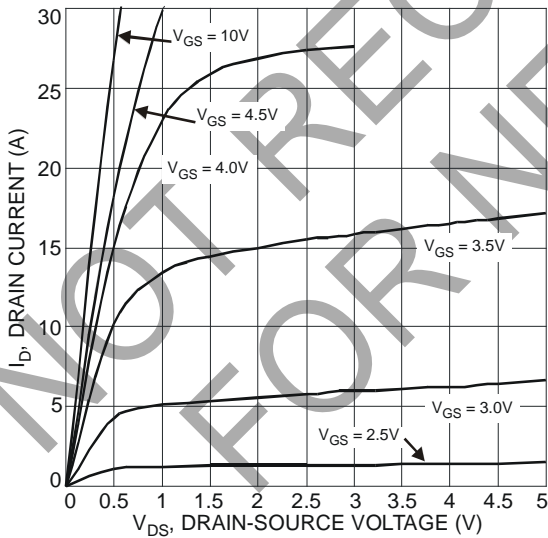
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P <sub>D</sub>	1.19	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = 25°C (Note 4)	R <sub>θJA</sub>	107	°C/W
Power Dissipation (Note 5)	P <sub>D</sub>	1.79	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = 25°C (Note 5)	R <sub>θJA</sub>	70	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

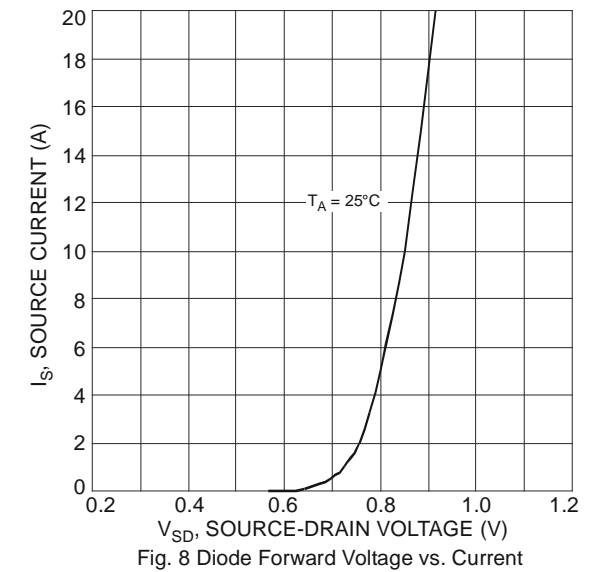
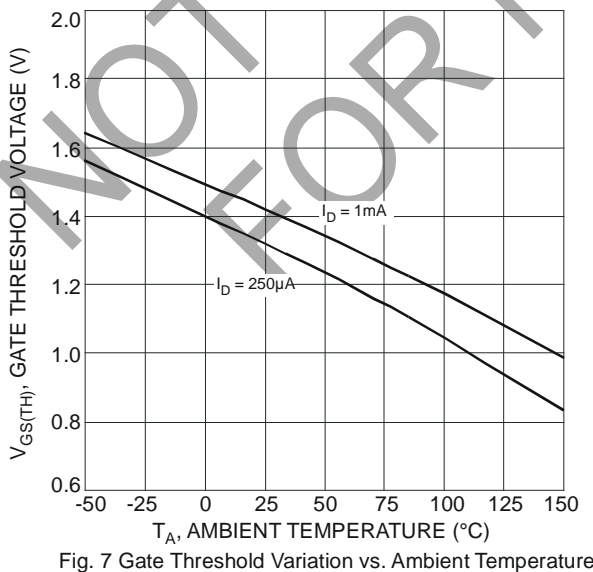
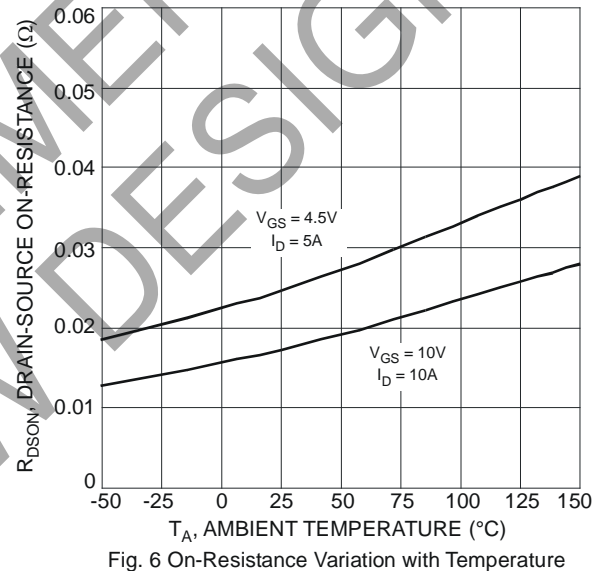
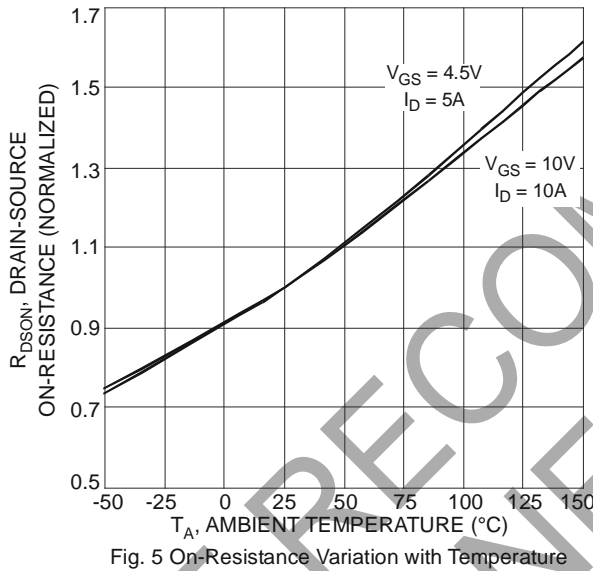
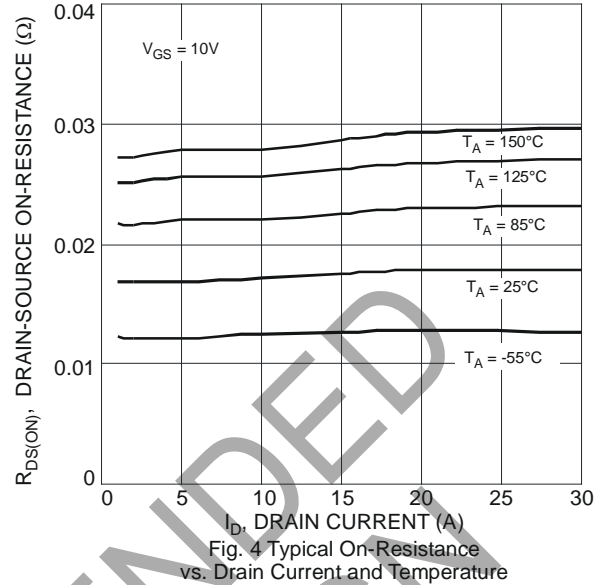
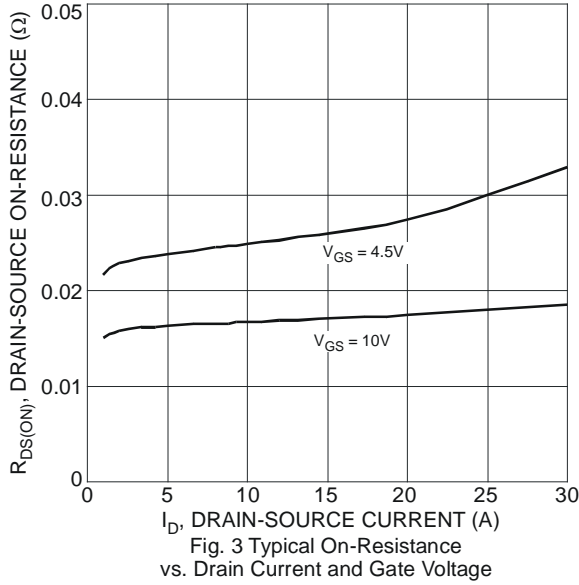
- Notes:
- Device mounted on FR-4 substrate PCB, with minimum recommended pad layout. The value in any given application depends on the user's specific board design. Device contains two active die running at equal power.
  - Device mounted on 1 inch x 1 inch FR4 PCB with high coverage of single sided 1oz copper, in still air conditions. Device contains two active die running at equal power.
  - Repetitive rating, pulse width limited by junction temperature.
  - I<sub>AR</sub> and E<sub>AR</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = 25°C

**Electrical Characteristics – Q1** @ T<sub>A</sub> = 25°C unless otherwise stated

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</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	I <sub>DSS</sub>	—	—	100	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 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	8.5	12	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 9.5A
			9.5	15		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 8.8A
Forward Transfer Admittance	Y <sub>fs</sub>	—	18	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 9.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.45	0.60	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	1276	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	160	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	136	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Gate Resistance	R <sub>g</sub>	—	1.48	2.7		
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	14.3	—	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 8.8A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	30.6	—		
Gate-Source Charge	Q <sub>gs</sub>	—	3.4	—	ns	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 8.8A
Gate-Drain Charge	Q <sub>gd</sub>	—	4.3	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	15.8	—	ns	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 15V, R <sub>G</sub> = 1.8Ω, I <sub>D</sub> = 8.8A
Turn-On Rise Time	t <sub>r</sub>	—	27.8	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	29.7	—		
Turn-Off Fall Time	t <sub>f</sub>	—	13.6	—		

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





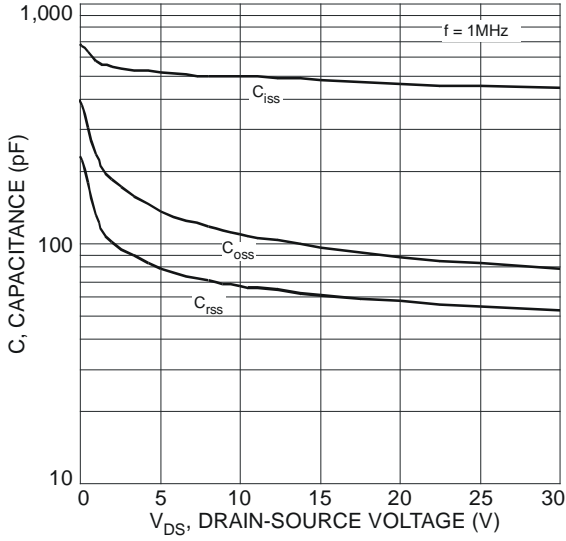


Fig. 9 Typical Total Capacitance

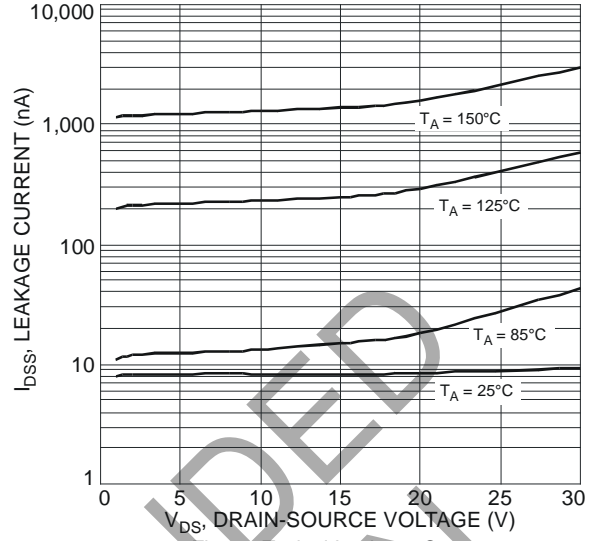


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

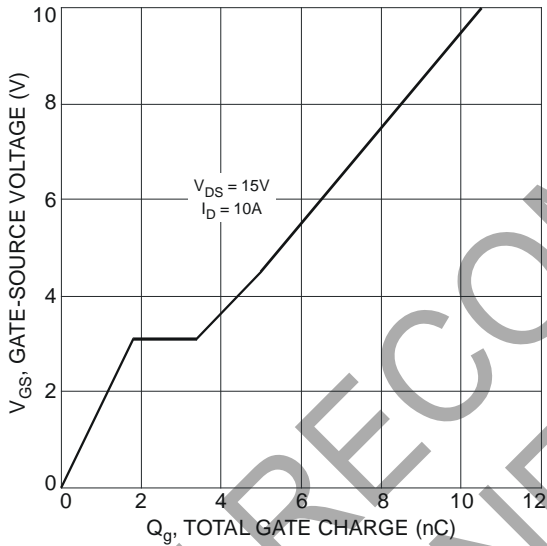


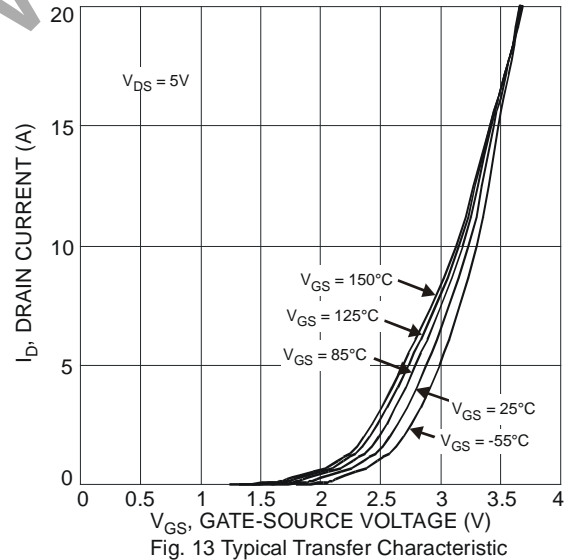
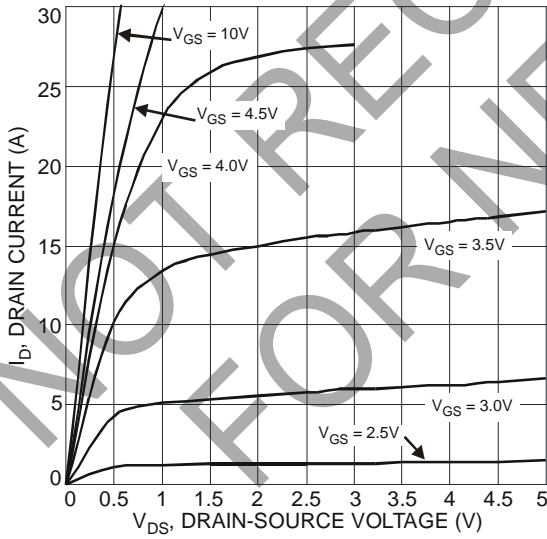
Fig. 11 Gate-Charge Characteristics

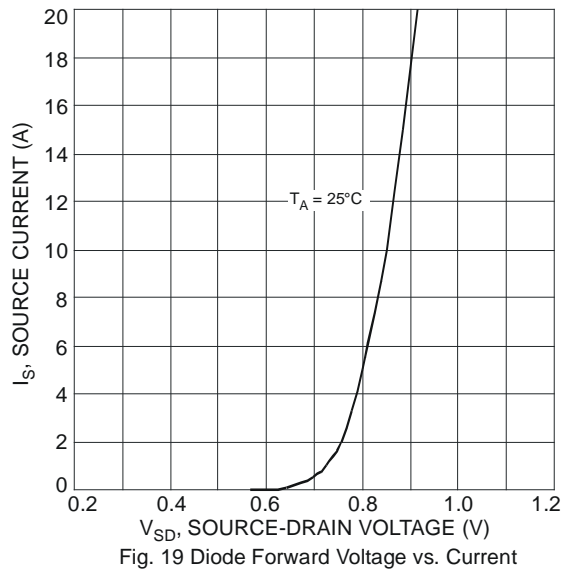
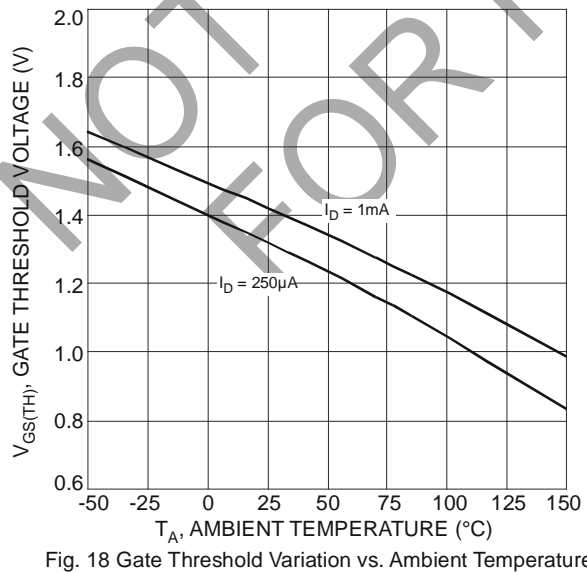
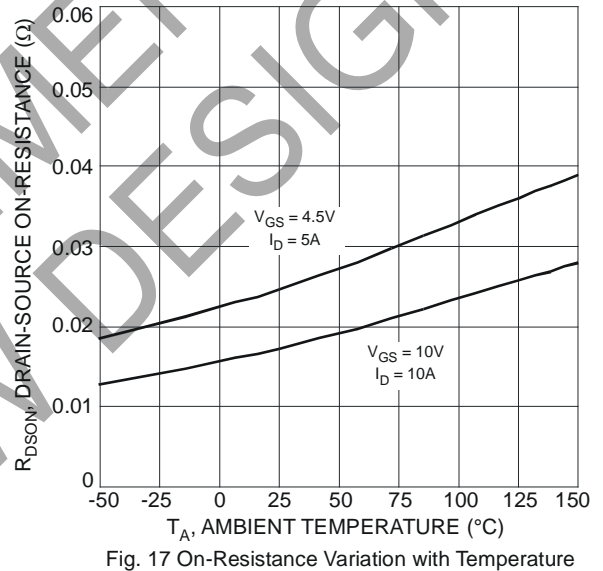
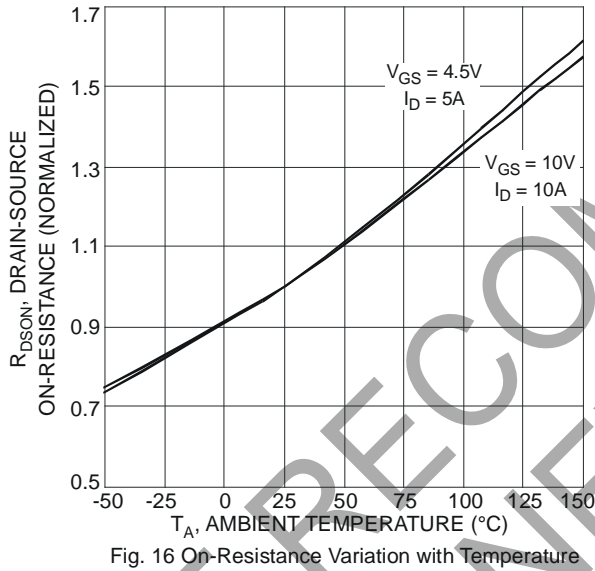
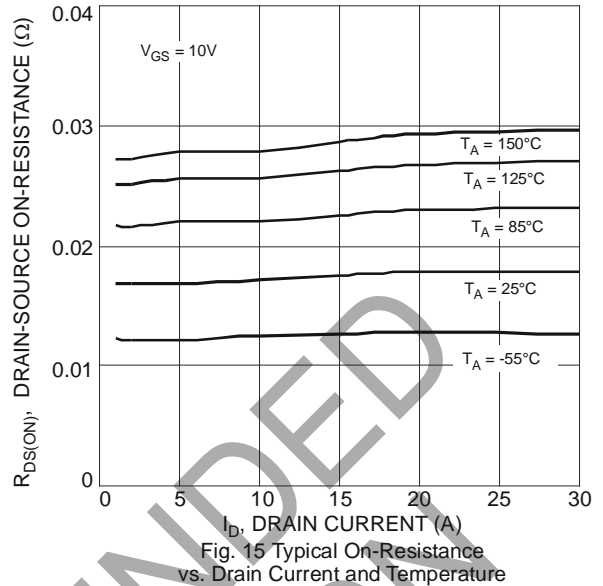
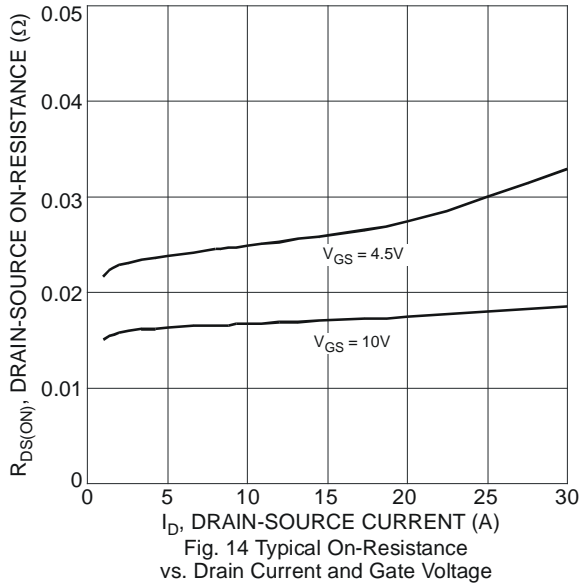
NOT RECOMMENDED FOR NEW DESIGN

**Electrical Characteristics – Q2** @ T<sub>A</sub> = 25°C unless otherwise stated

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	—	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 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	-	2.4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	15 25	22 32	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 8.8A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7A
Forward Transfer Admittance	Y <sub>fs</sub>	—	2.5	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 8.8A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	478.9	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	96.7	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	61.4	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Gate Resistance	R <sub>g</sub>	—	1.1	—		
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	5.0	—	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	10.5	—		
Gate-Source Charge	Q <sub>gs</sub>	—	1.8	—	ns	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A
Gate-Drain Charge	Q <sub>gd</sub>	—	1.6	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	2.9	—	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, R <sub>G</sub> = 3Ω, R <sub>L</sub> = 1.5Ω
Turn-On Rise Time	t <sub>r</sub>	—	7.9	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	14.6	—		
Turn-Off Fall Time	t <sub>f</sub>	—	3.1	—		

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





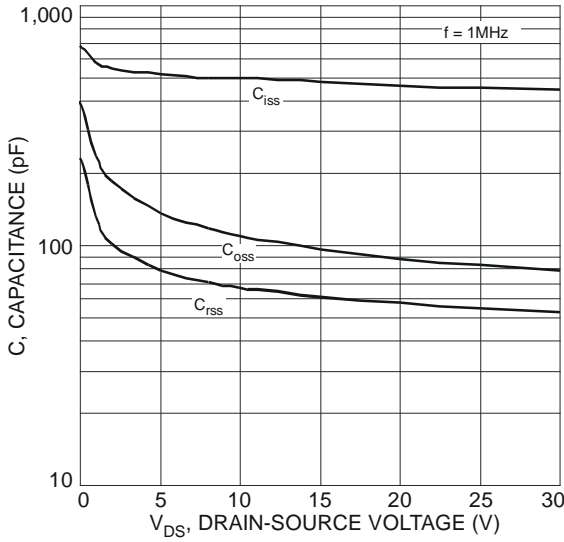


Fig. 20 Typical Total Capacitance

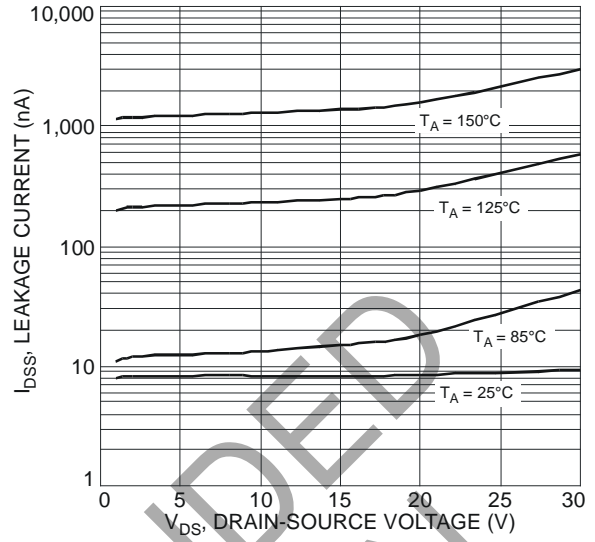


Fig. 21 Typical Leakage Current vs. Drain-Source Voltage

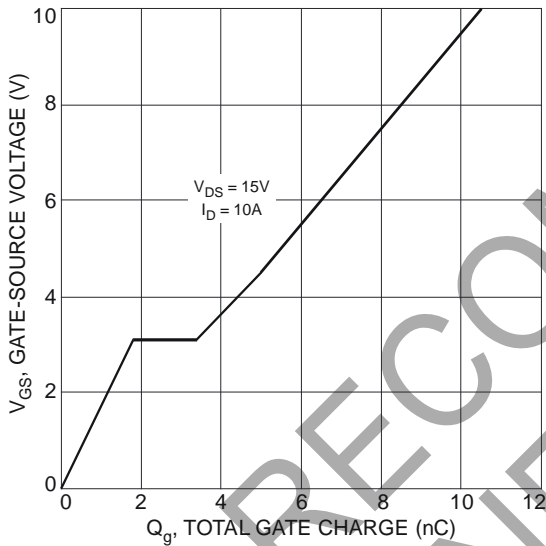


Fig. 22 Gate-Charge Characteristics

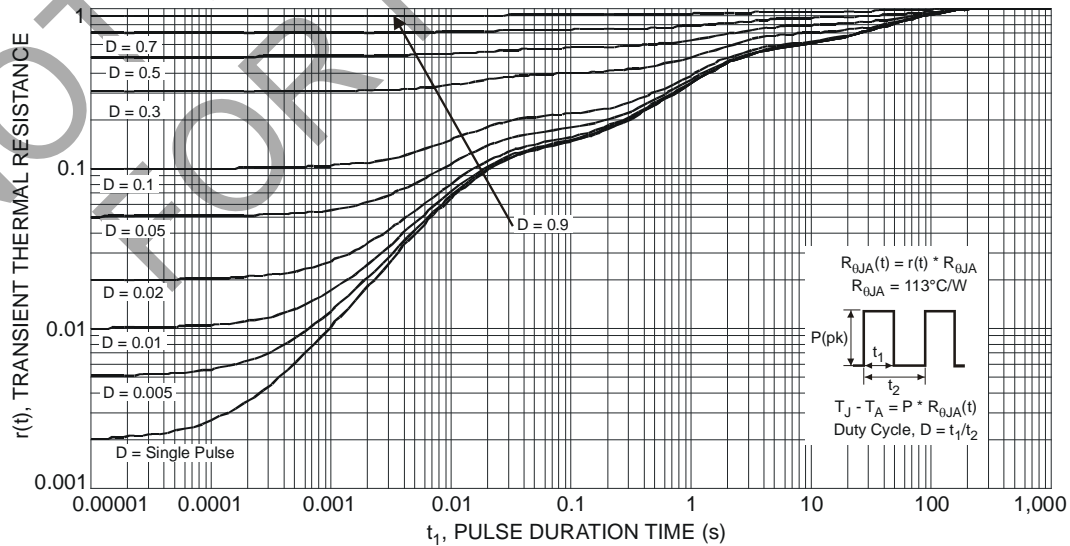
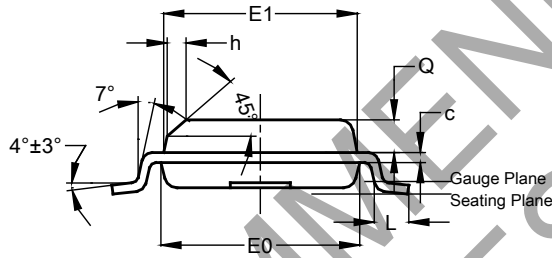
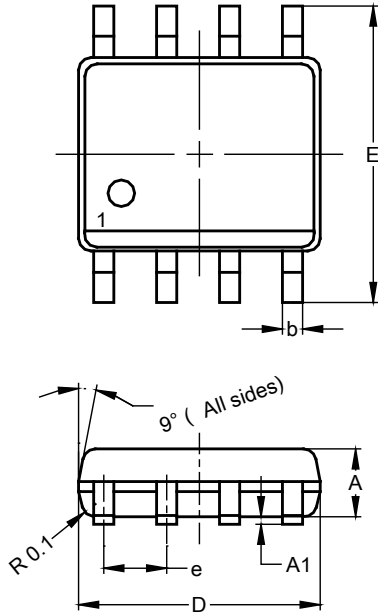


Fig. 23 Transient Thermal Response

**Package Outline Dimensions**

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

**SO-8**



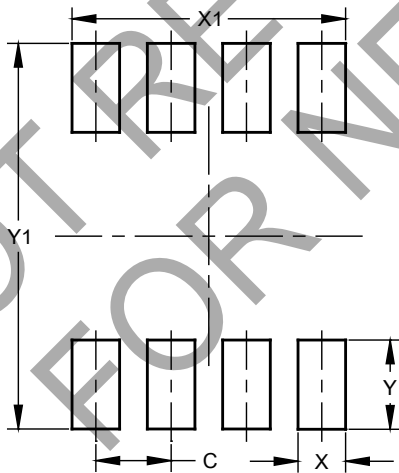
SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	-	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65

**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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