

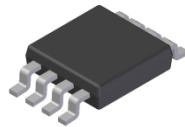
N-CHANNEL ENHANCEMENT MODE MOSFET WITH SCHOTTKY DIODE

Features

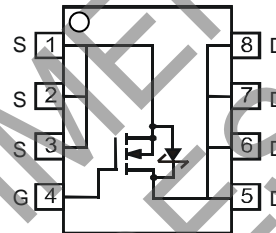
- DIOFET Utilizes a Unique Patented Process to Monolithically Integrate a MOSFET and a Schottky in a Single Die to Deliver:
 - Low $R_{DS(ON)}$ - Minimizes Conduction Losses
 - Low V_{SD} - Reducing the Losses Due to Body Diode Conduction
 - Low Q_{rr} - Lower Q_{rr} of the Integrated Schottky Reduces 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
- Weight: 0.072 grams (Approximate)



Top View



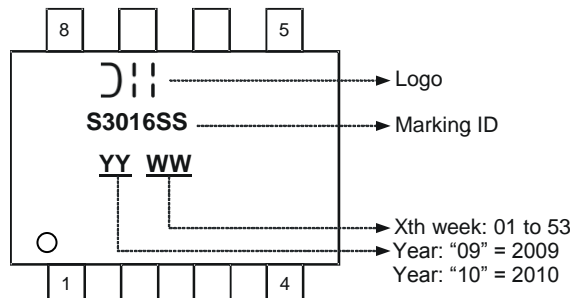
Top View Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMS3016SSS-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



Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	30	V
Gate-Source Voltage	V _{GSS}	±12	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	I _D	T _A = +25°C	9.8
Steady State		T _A = +85°C	6.3
Pulsed Drain Current (Note 6)	I _{DM}	90	A
Avalanche Current (Note 6) (Note 7)	I _{AR}	13	A
Repetitive Avalanche Energy (Note 6) (Note 7) L = 0.3mH	E _{AR}	25.4	mJ

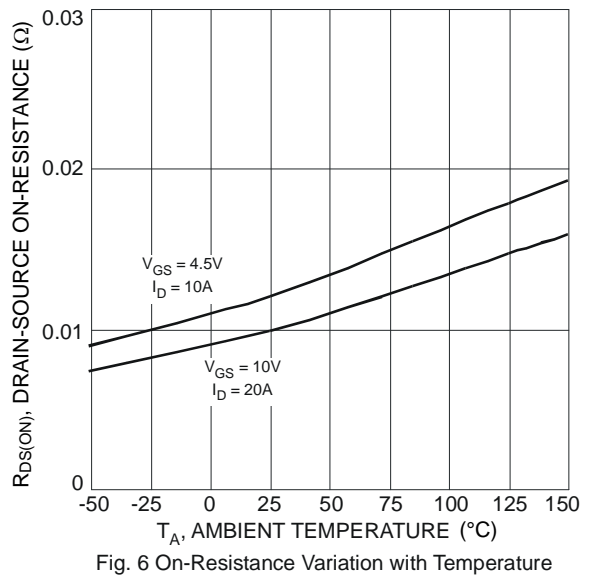
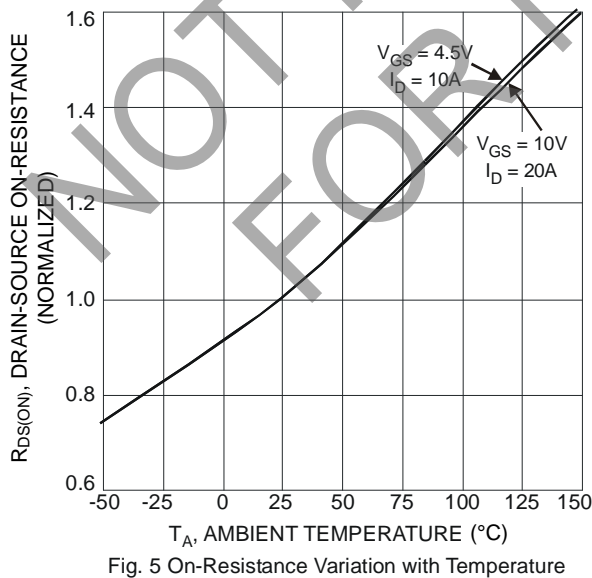
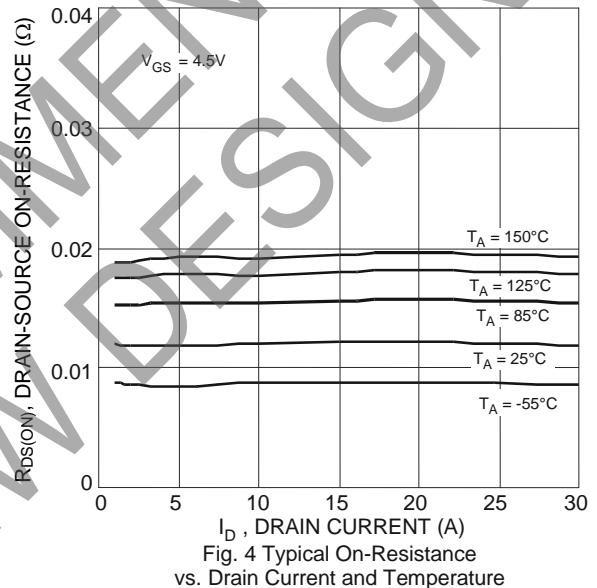
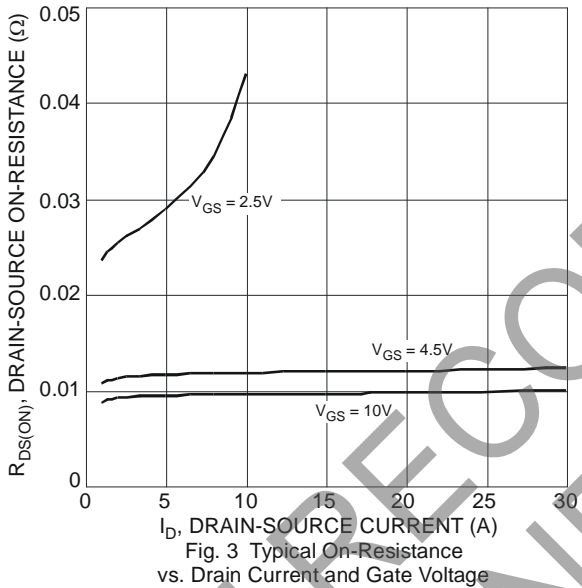
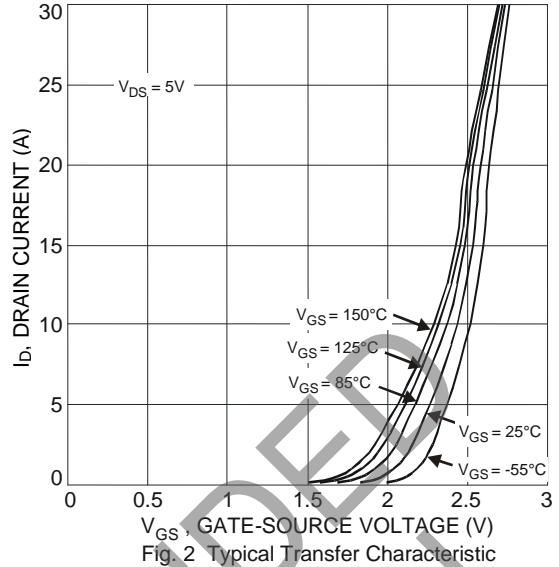
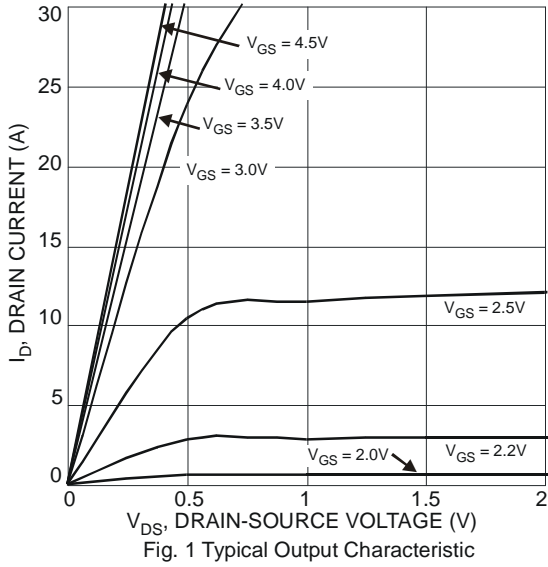
Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1.54	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	81	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	-	-	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	0.1	mA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	-	2.3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	-	9	13	mΩ	V _{GS} = 10V, I _D = 9.8A
		-	11	16		V _{GS} = 4.5V, I _D = 9.8A
Forward Transfer Admittance	Y _{fs}	-	5	-	S	V _{DS} = 5V, I _D = 9.8A
Diode Forward Voltage	V _{SD}	-	0.4	1	V	V _{GS} = 0V, I _S = 1A
Maximum Body-Diode + Schottky Continuous Current	I _S	-	-	5	A	-
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	-	1849	-	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	158	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	123	-	pF	
Gate Resistance	R _g	0.53	2.68	4.82	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge V _{GS} = 4.5V	Q _g	-	18.5	-	nC	V _{DS} = 15V, V _{GS} = 10V, I _D = 9.8A
Total Gate Charge V _{GS} = 10V	Q _g	-	43	-	nC	
Gate-Source Charge	Q _{gs}	-	4.7	-	nC	
Gate-Drain Charge	Q _{gd}	-	4.0	-	nC	
Turn-On Delay Time	t _{D(ON)}	-	6.62	-	ns	V _{GS} = 10V, V _{DS} = 10V, R _g = 3Ω, R _L = 1.2Ω
Turn-On Rise Time	t _r	-	8.73	-	ns	
Turn-Off Delay Time	t _{D(OFF)}	-	36.41	-	ns	
Turn-Off Fall Time	t _f	-	4.69	-	ns	

- Notes:
- Device mounted on minimum recommended layout. The value in any given application depends on the user's specific board design.
 - Repetitive rating, pulse width limited by junction temperature.
 - I_{AR} and E_{AR} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.



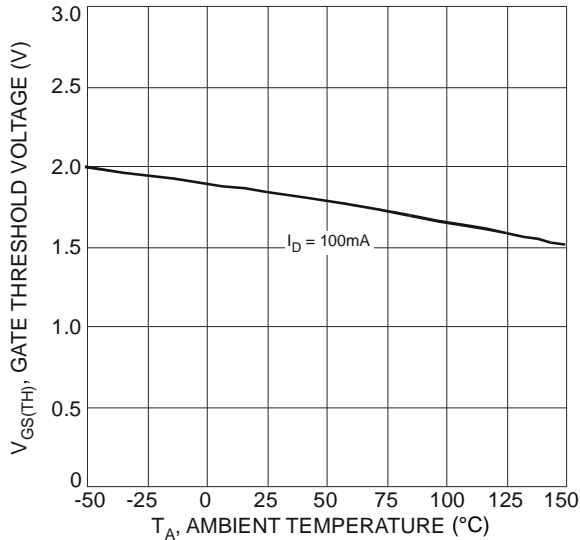


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

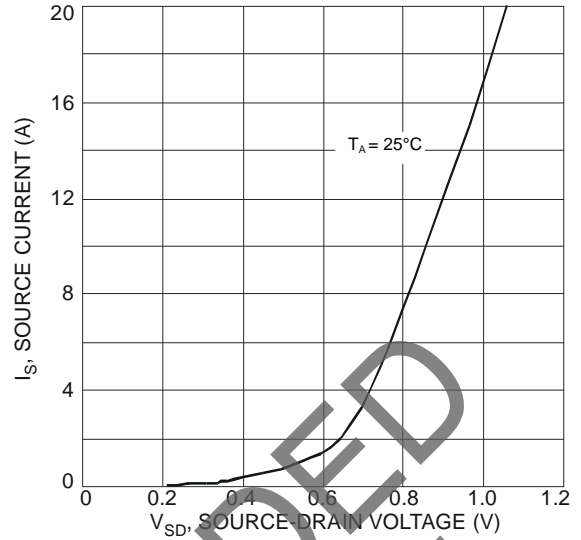


Fig. 8 Diode Forward Voltage vs. Current

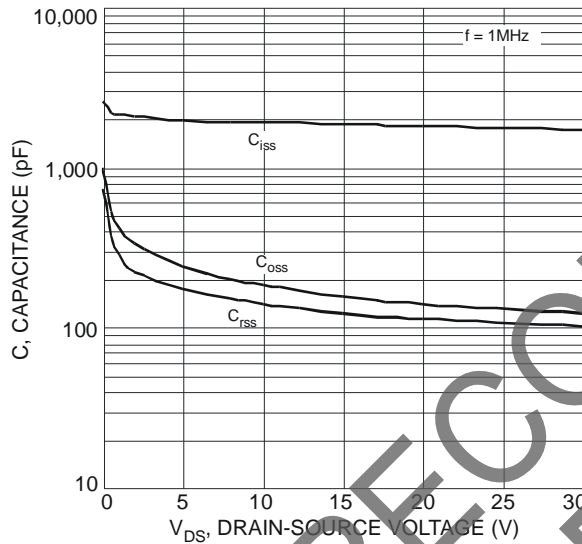


Fig. 9 Typical Total Capacitance

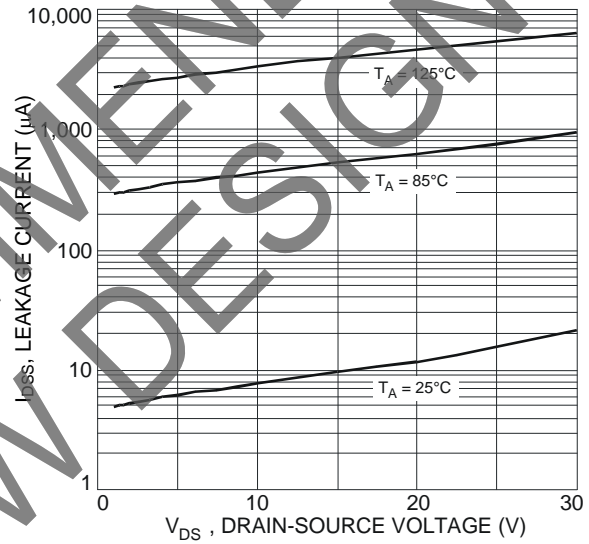


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

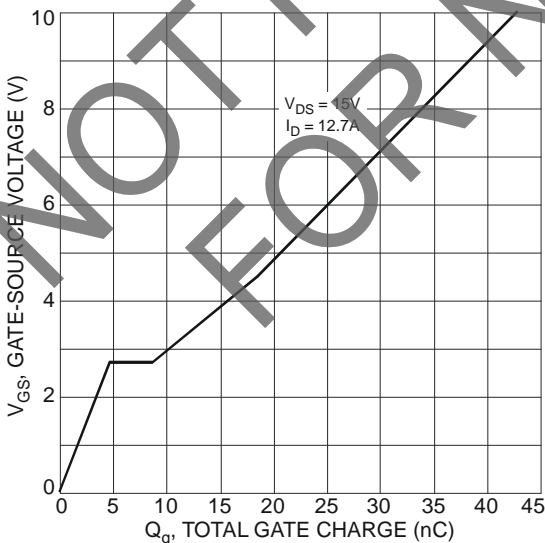


Fig. 11 Gate-Charge Characteristics

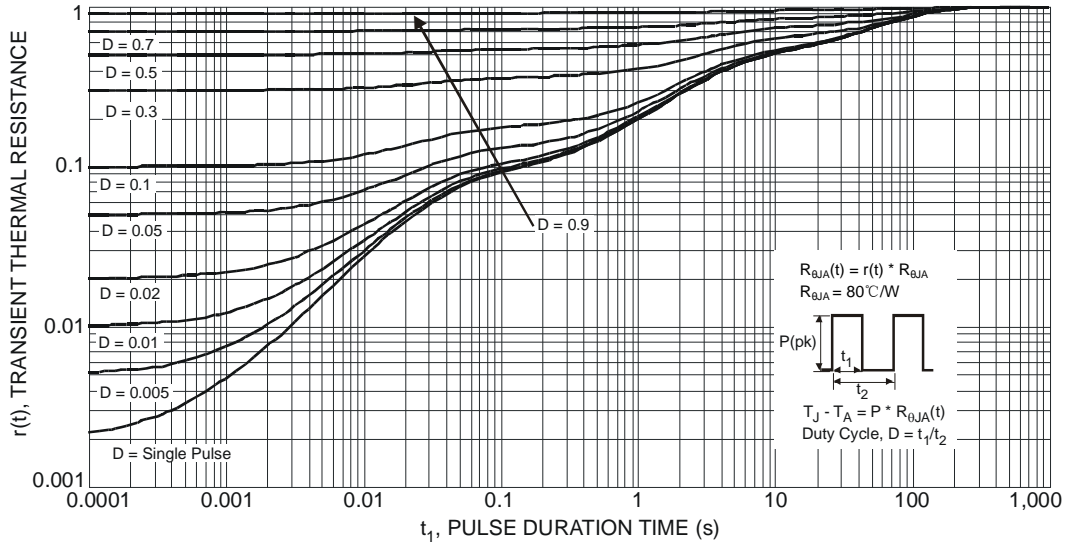
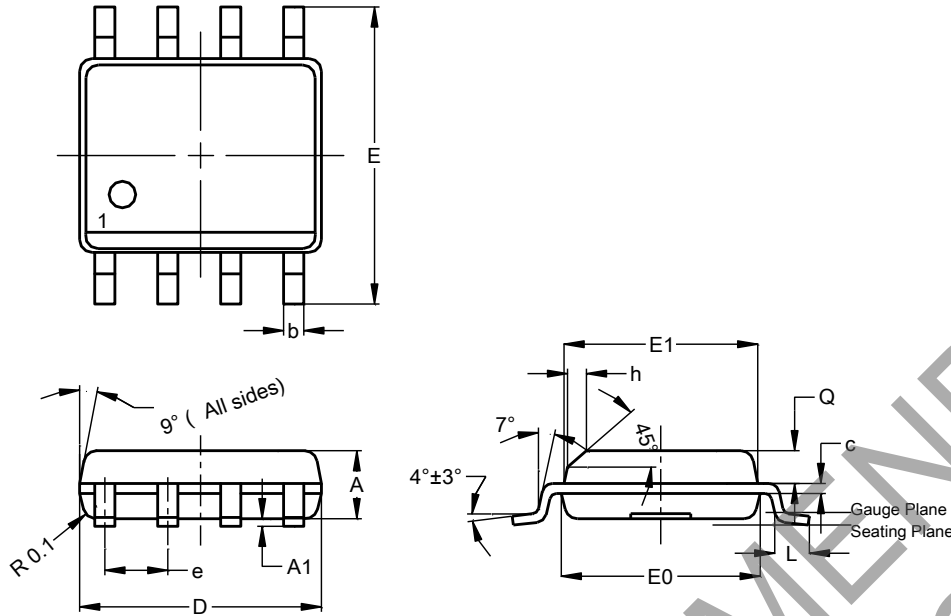


Fig. 12 Transient Thermal Response

Package Outline Dimensions

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

SO-8

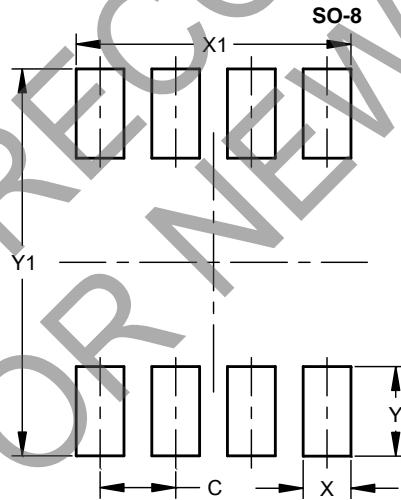


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65

All Dimensions in mm

Suggested Pad Layout

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



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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