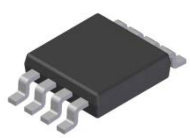
N-CHANNEL ENHANCEMENT MODE MOSFET WITH SCHOTTKY DIODE

Features

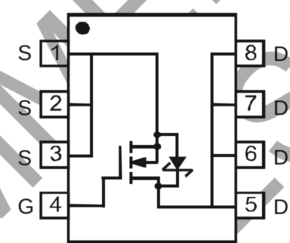
- DIOFET Utilizes a Unique Patented Process to Monolithically Integrate a MOSFET and a Schottky in a Single Die to Deliver:
  - Low $R_{DS(ON)}$—Minimizes Conduction Losses
  - Low V_{SD}—Reduces Losses Due to Body Diode Conduction
  - Low Q_{rr}—Lower Q_{rr} of the Integrated Schottky Reduces Body Diode 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
- Marking Information: See Page 5
- Weight: 0.072 grams (Approximate)



Top View



Top View
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMS3014SSS-13	SO-8	2500/Tape & Reel

Note:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) complia
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/.

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	Steady State	T_A = 25°C T_A = 85°C	I_D	10.4 6.6	A
Pulsed Drain Current (Note 6)			I_{DM}	63	A
Avalanche Current (Notes 6 & 7)			I_{AR}	30	A
Repetitive Avalanche Energy (Notes 6 & 7) L = 0.1mH			E_{AR}	45	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.55	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 5)	$R_{\theta JA}$	81.3	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on 1in × 1in FR-4 PCB with 2oz. Copper. The value in any given application depends on the user's specific board design.
6. Repetitive rating, pulse width limited by junction temperature.
7. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = 25°C.

Electrical Characteristics @ T_A = 25°C unless otherwise stated

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}	—	—	100	µA	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	-	2.2	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	9 10	13 14	mΩ	V_{GS} = 10V, I_D = 10.4A V_{GS} = 4.5V, I_D = 10.4A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	23	—	S	V_{DS} = 5V, I_D = 10.4A
Diode Forward Voltage	V_{SD}	—	0.37	0.5	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}	—	2296	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	164	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	120	—	pF	
Gate Resistance	R_g	0.26	1.3	2.34	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge V_{GS} = 4.5V	Q_g	—	19.3	—	nC	V_{DS} = 15V, V_{GS} = 10V, I_D = 10.4A
Total Gate Charge V_{GS} = 10V	Q_g	—	45.7	—	nC	
Gate-Source Charge	Q_{gs}	—	5.0	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.9	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	5.5	—	ns	V_{GS} = 10V, V_{DS} = 15V, R_G = 3Ω, R_L = 1.2Ω
Turn-On Rise Time	t_r	—	24.4	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	33.1	—	ns	
Turn-Off Fall Time	t_f	—	6.6	—	ns	

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

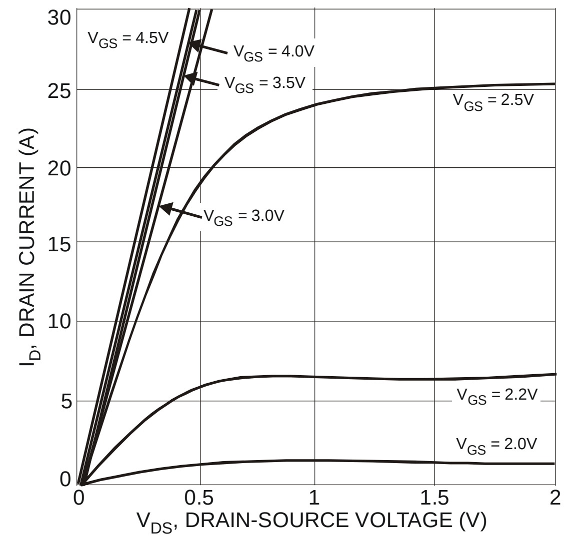


Fig. 1 Typical Output Characteristic

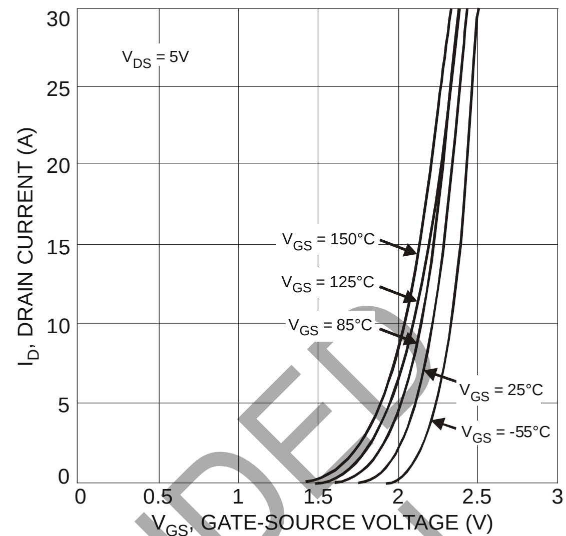


Fig. 2 Typical Transfer Characteristic

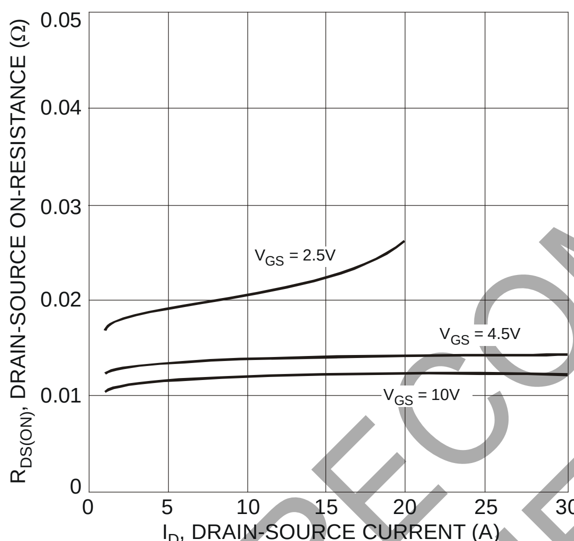


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

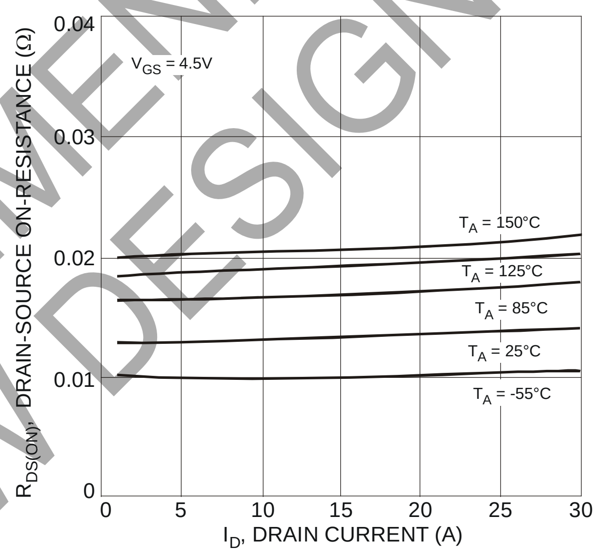


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

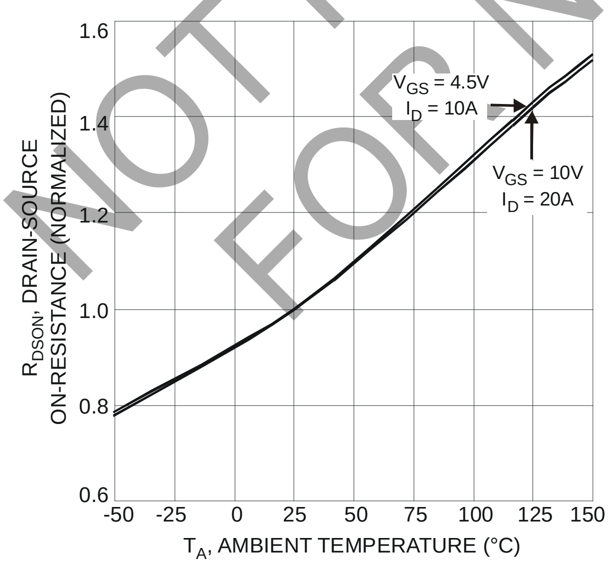


Fig. 5 On-Resistance Variation with Temperature

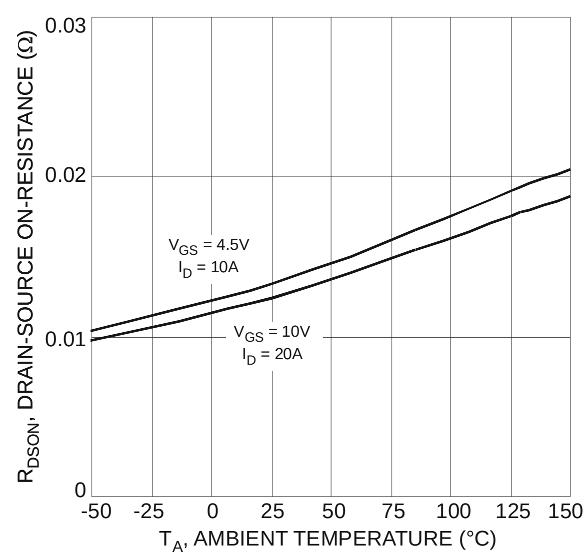


Fig. 6 On-Resistance Variation with Temperature

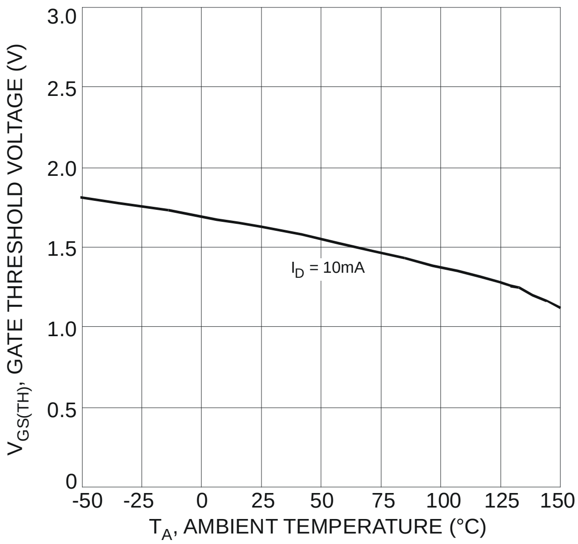


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

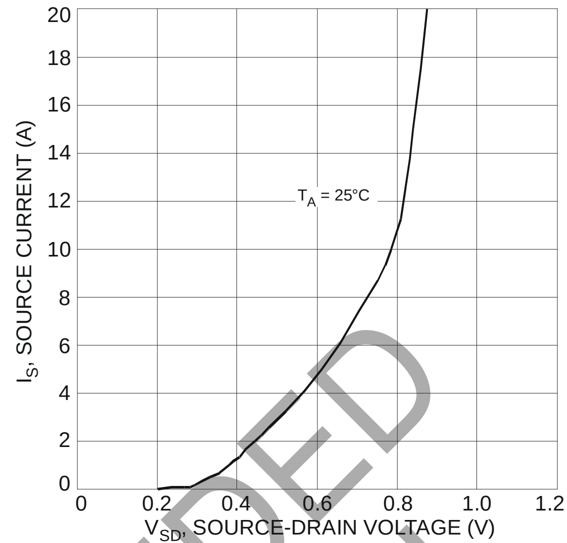


Fig. 8 Diode Forward Voltage vs. Current

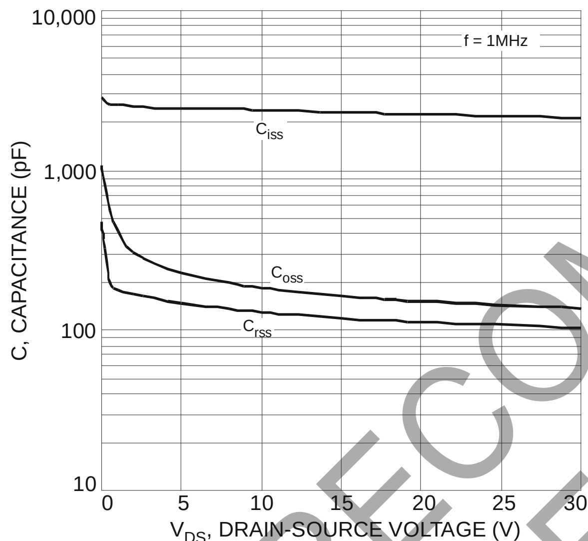


Fig. 9 Typical Total Capacitance

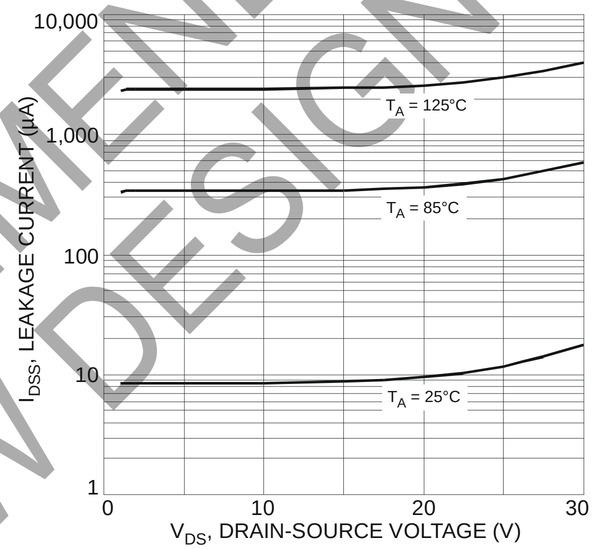


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

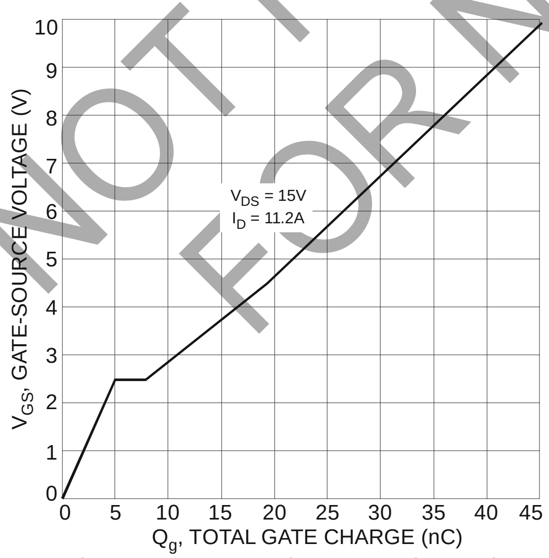


Fig. 11 Gate-Source Voltage vs. Total Gate Charge

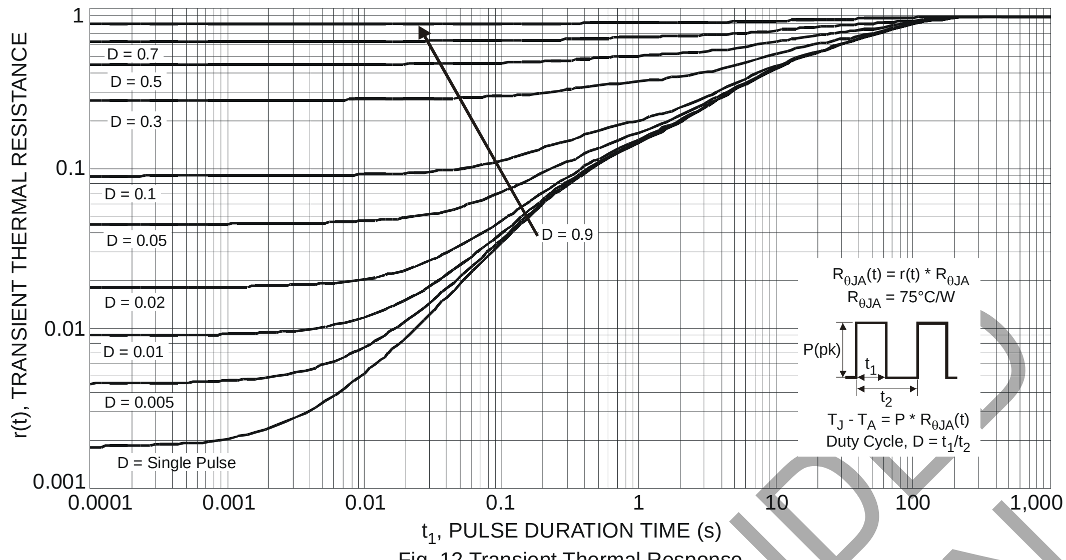
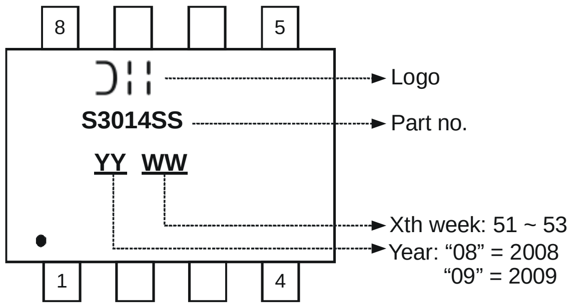


Fig. 12 Transient Thermal Response

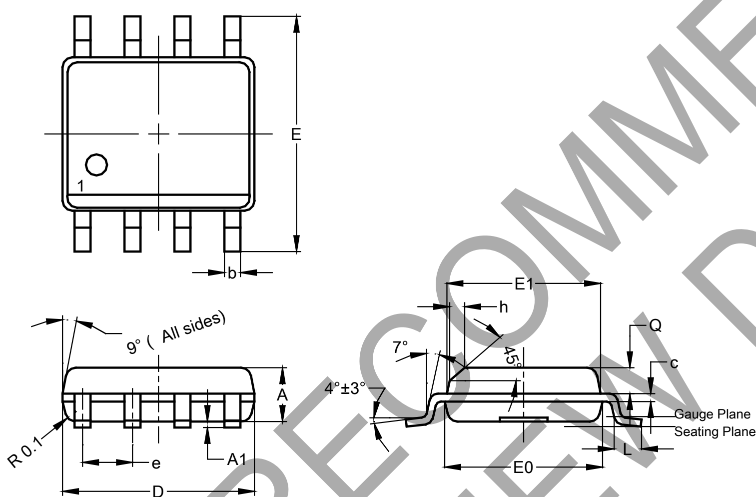
Marking Information



Package Outline Dimensions

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

SO-8

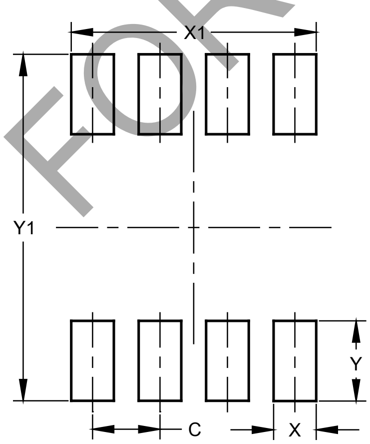


SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	—	—	1.27
h	—	—	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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