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[DMS3016SSS-13](#)

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**DMS3016SSS**

**N-CHANNEL ENHANCEMENT MODE MOSFET WITH SCHOTTKY DIODE**

**Features**

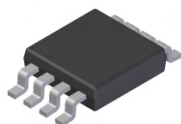
- DIOFET utilizes a unique patented process to monolithically integrate a MOSFET and a Schottky in a single die to deliver:
  - Low  $R_{DS(ON)}$  - minimizes conduction losses
  - Low  $V_{SD}$  - reducing the losses due to body diode conduction
  - Low  $Q_{rr}$  - lower  $Q_{rr}$  of the integrated 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
- **Lead Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

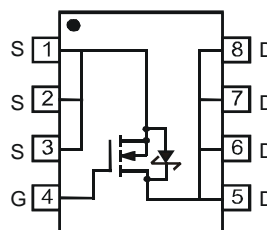
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Page 5
- Ordering Information: See Page 5
- Weight: 0.072 grams (approximate)

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**DIOFET**



Top View



Top View  
Internal Schematic

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 3) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = 25^\circ\text{C}$	$I_D$	9.8	A
		$T_A = 85^\circ\text{C}$		6.3	
Pulsed Drain Current (Note 4)			$I_{DM}$	90	A
Avalanche Current (Note 4) (Note 5)			$I_{AR}$	13	A
Repetitive Avalanche Energy (Note 4) (Note 5) $L = 0.3\text{mH}$			$E_{AR}$	25.4	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	$P_D$	1.54	W
Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ (Note 3)	$R_{\theta JA}$	81	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on minimum recommended layout. The value in any given application depends on the user's specific board design.
  4. Repetitive rating, pulse width limited by junction temperature.
  5.  $I_{AR}$  and  $E_{AR}$  rating are based on low frequency and duty cycles to keep  $T_J = 25^\circ\text{C}$

**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise stated

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	0.1	mA	$V_{DS} = 30V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 12V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	2.3	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	9	13	m $\Omega$	$V_{GS} = 10V, I_D = 9.8A$
		-	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	-
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
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	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
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 $V_{GS} = 10V$	$Q_q$	-	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	$V_{GS} = 10V, V_{DS} = 10V, R_G = 3\Omega, R_L = 1.2\Omega$
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: 6. Short duration pulse test used to minimize self-heating effect.  
 7. Guaranteed by design. Not subject to production testing.

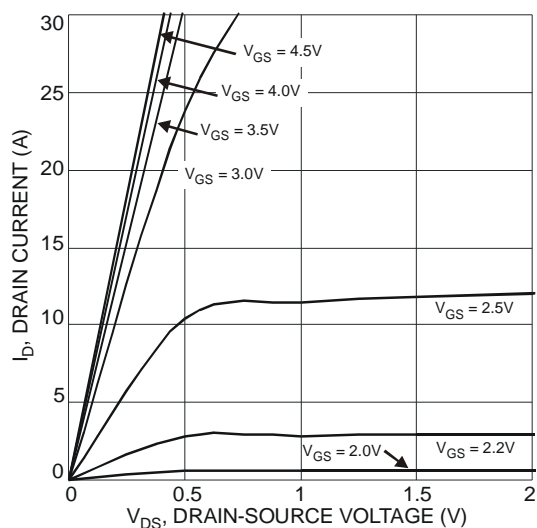


Fig. 1 Typical Output Characteristic

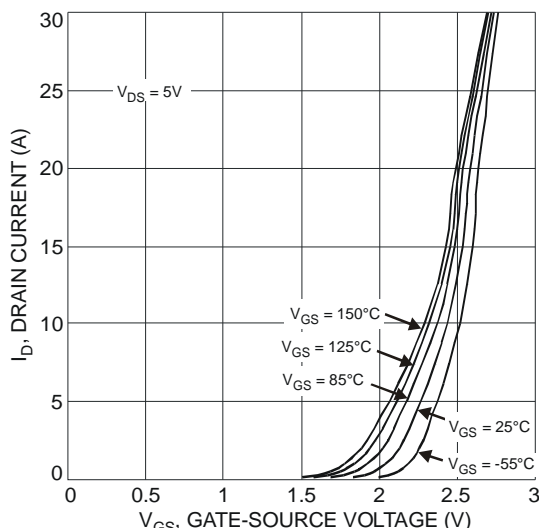


Fig. 2 Typical Transfer Characteristic



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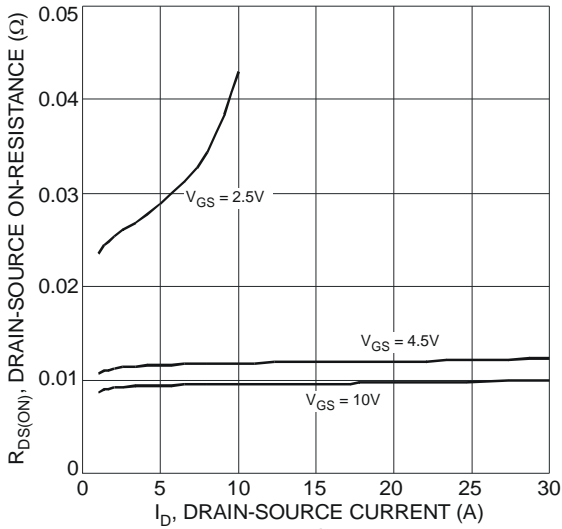


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

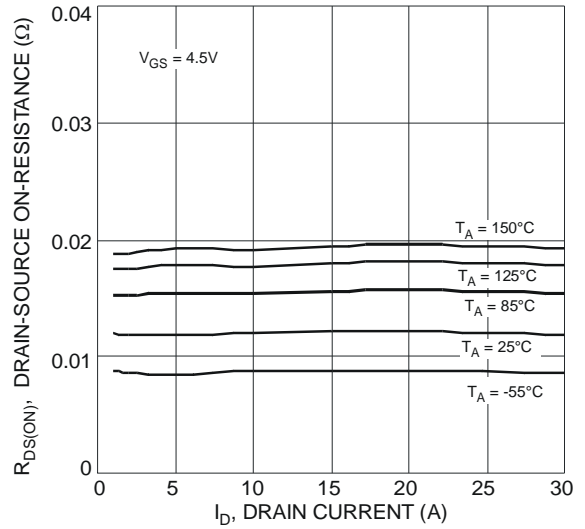


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

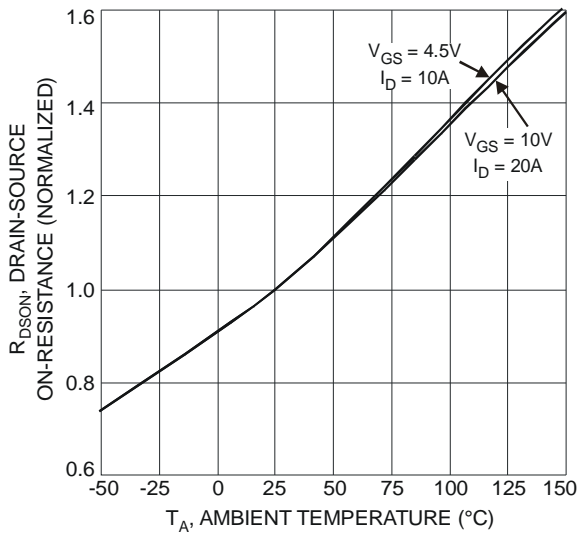


Fig. 5 On-Resistance Variation with Temperature

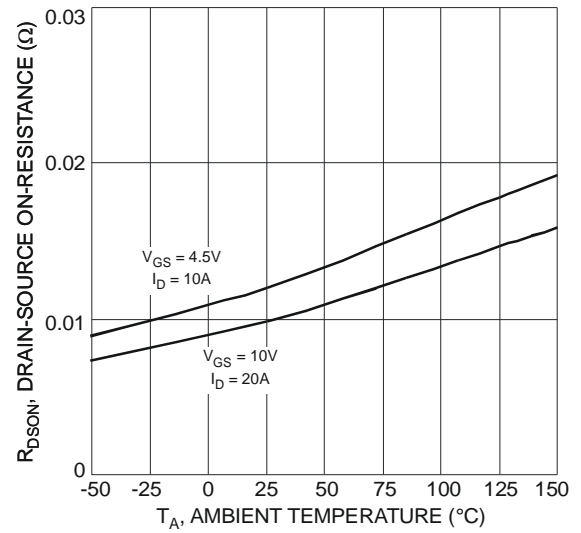


Fig. 6 On-Resistance Variation with Temperature

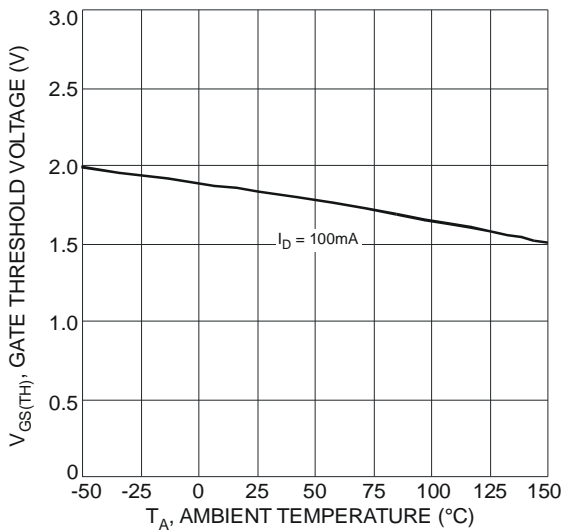


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

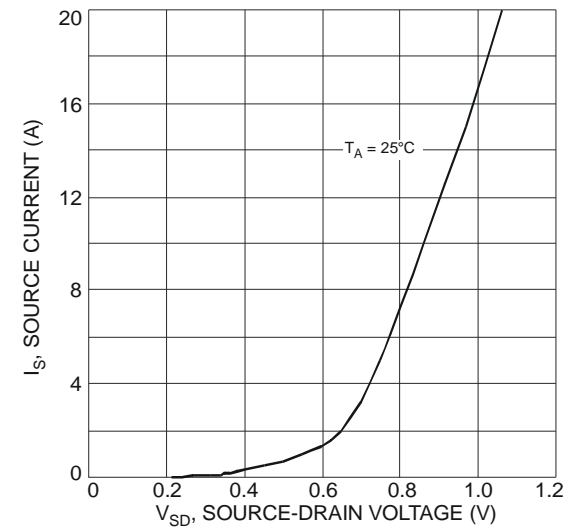


Fig. 8 Diode Forward Voltage vs. Current

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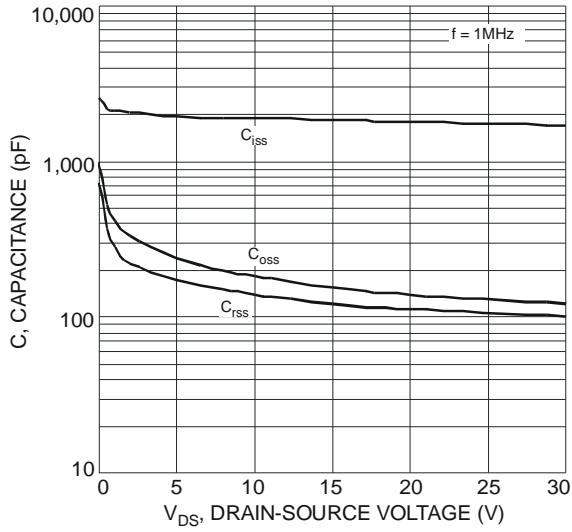


Fig. 9 Typical Total Capacitance

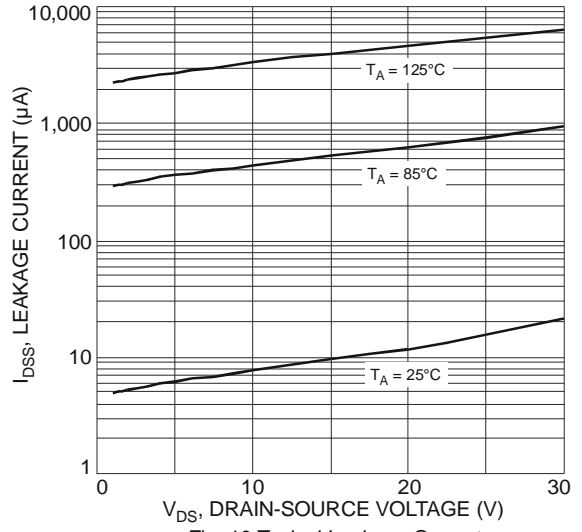


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

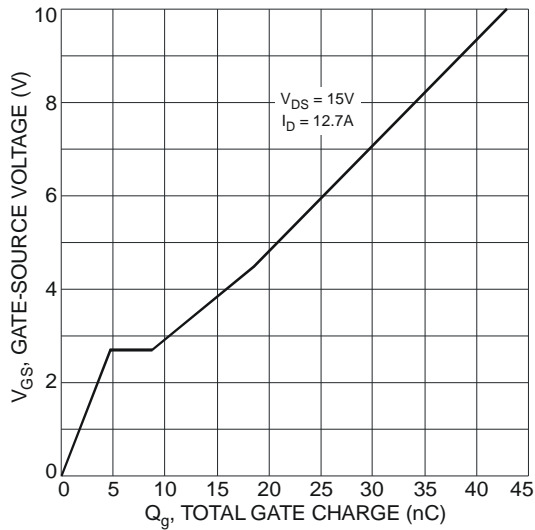


Fig. 11 Gate-Charge Characteristics

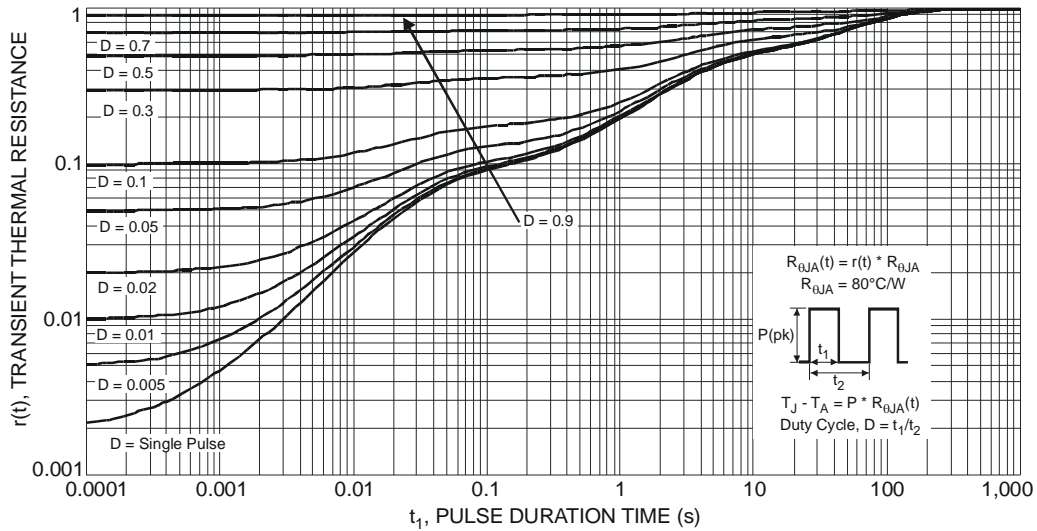


Fig. 12 Transient Thermal Response

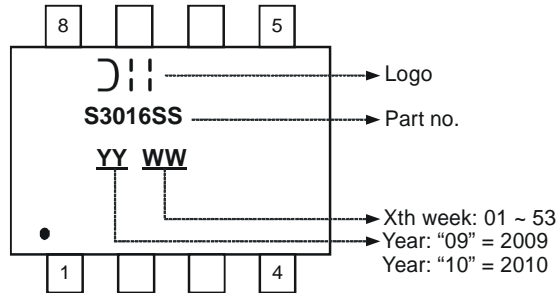
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**Ordering Information** (Note 8)

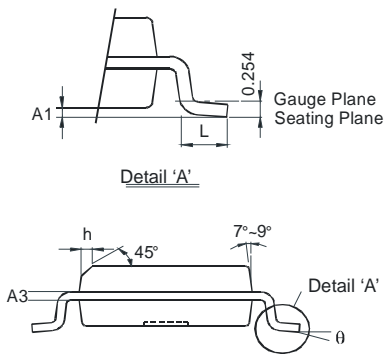
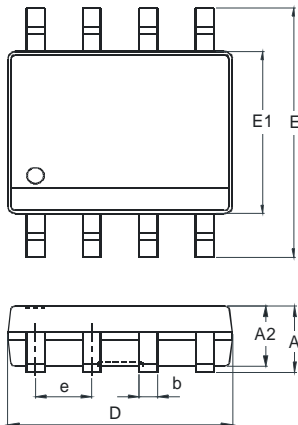
Part Number	Case	Packaging
DMS3016SSS-13	SO-8	2500 / Tape & Reel

Notes: 8. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**

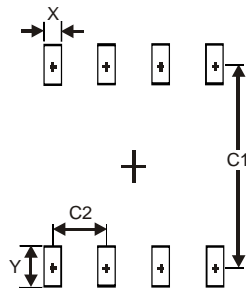


**Package Outline Dimensions**



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**



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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