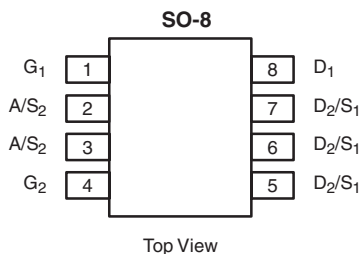


## Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY				
	V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)
Channel-1	30	0.0185 at V <sub>GS</sub> = 10 V	6.8	7.8
		0.0225 at V <sub>GS</sub> = 4.5 V	6.0	
Channel-2		0.0115 at V <sub>GS</sub> = 10 V	11.4	11.6
		0.016 at V <sub>GS</sub> = 4.5 V	9.5	

SCHOTTKY PRODUCT SUMMARY		
V <sub>DS</sub> (V)	V <sub>SD</sub> (V) Diode Forward Voltage	I <sub>F</sub> (A)
30	0.50 V at 1.0 A	2.0



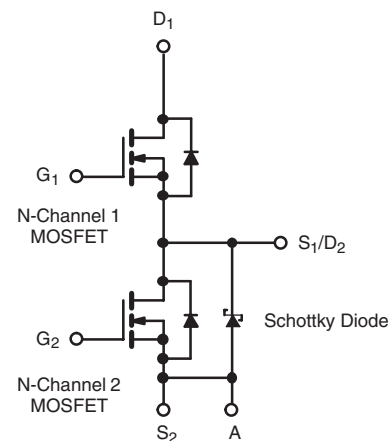
Ordering Information: Si4816BDY-T1-E3 (Lead (Pb)-free)  
Si4816BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)

### FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT® Plus Power MOSFET
- 100 % R<sub>g</sub> Tested



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available



ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		10 s	Steady State	10 s	Steady State		
Drain-Source Voltage	V <sub>DS</sub>	30				V	
Gate-Source Voltage	V <sub>GS</sub>	20					
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	6.8	5.8	11.4	8.2	A
		T <sub>A</sub> = 70 °C	5.5	4.6	9.0	6.5	
Pulsed Drain Current	I <sub>DM</sub>	30		40		mJ	
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	1	0.9	2.2	1.15		
Single Pulse Avalanche Current	I <sub>AS</sub>	L = 0.1 mH	10		20		
Avalanche Energy			E <sub>AS</sub>	5		20	
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	1.4	1.0	2.4	1.25	W
		T <sub>A</sub> = 70 °C	0.9	0.64	1.5	0.8	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150				°C	

THERMAL RESISTANCE RATINGS									
Parameter	Symbol	Channel-1		Channel-2		Schottky		Unit	
		Typ.	Max.	Typ.	Max.	Typ.	Max.		
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 s	72	90	43	53	48	60	°C/W
		Steady State	100	125	82	100	80	100	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	51	63	25	30	28	35		

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted								
Parameter	Symbol	Test Conditions		Min.	Typ. <sup>a</sup>	Max.	Unit	
<b>Static</b>								
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch-1	1.0		3.0	V	
			Ch-2	1.0		3.0		
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$	Ch-1			100	nA	
			Ch-2			100		
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	Ch-1			1	$\mu\text{A}$	
			Ch-2			100		
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^\circ\text{C}$	Ch-1			15		
			Ch-2			2000		
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	Ch-1	20			A	
			Ch-2	30				
Drain-Source On-State Resistance <sup>b</sup>	$R_{DS(on)}$		Ch-1		0.0155	0.0185	$\Omega$	
			Ch-2		0.0093	0.0115		
			Ch-1		0.0185	0.0225		
			Ch-2		0.013	0.016		
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 6.8\text{ A}$	Ch-1		30		S	
			Ch-2		31			
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_S = 1\text{ A}, V_{GS} = 0\text{ V}$	Ch-1		0.73	1.1	V	
			Ch-2		0.47	0.5		
<b>Dynamic<sup>a</sup></b>								
Total Gate Charge	$Q_g$	Channel-1 $V_{DS} = 15\text{ V}, V_{GS} = 5\text{ V}, I_D = 6.8\text{ A}$	Ch-1		7.8	10	nC	
			Ch-2		11.6	18		
Gate-Source Charge	$Q_{gs}$	Channel-2 $V_{DS} = 15\text{ V}, V_{GS} = 5\text{ V}, I_D = -11.4\text{ A}$	Ch-1		2.9			
			Ch-2		4.8			
Gate-Drain Charge	$Q_{gd}$		Ch-1		2.3			
			Ch-2		3.7			
Gate Resistance	$R_g$		Ch-1	1.5	3.0	4.5	$\Omega$	
			Ch-2	0.9	1.8	2.7		
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$	Ch-1		11	17	ns	
Rise Time	$t_r$		Ch-1		9	15		
			Ch-2		9	15		
Turn-Off Delay Time	$t_{d(off)}$		Channel-2 $V_{DD} = 15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$	Ch-1		24		40
				Ch-2		31		50
Fall Time	$t_f$			Ch-1		9		15
				Ch-2		11		17
Source-Drain Reverse Recovery Time	$t_{rr}$		$I_F = 1.3\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$	Ch-1		20		35
		Ch-2			25	40		

## Notes:

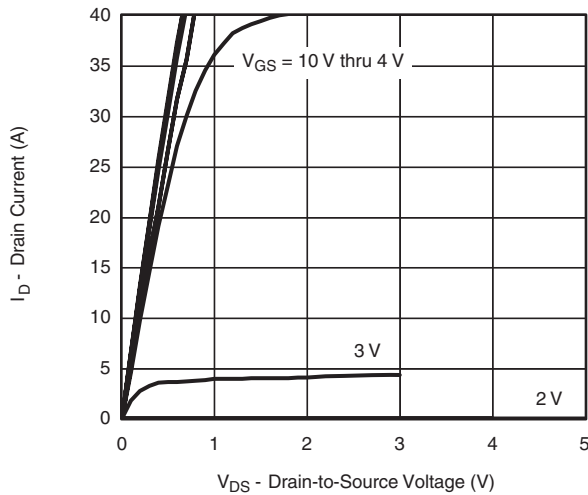
- a. Guaranteed by design, not subject to production testing.  
b. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .



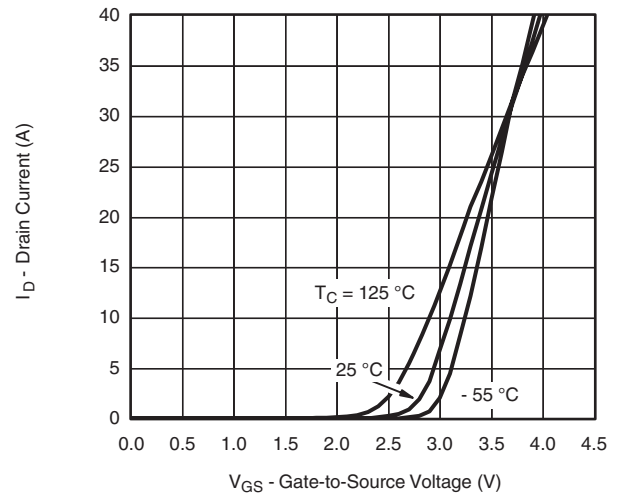
<b>SCHOTTKY SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	$V_F$	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}, T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	$I_{rm}$	$V_R = 30\text{ V}$		0.004	0.100	mA
		$V_R = 30\text{ V}, T_J = 100\text{ }^\circ\text{C}$		0.7	10	
		$V_R = -30\text{ V}, T_J = 125\text{ }^\circ\text{C}$		3.0	20	
Junction Capacitance	$C_T$	$V_R = 10\text{ V}$		50		pF

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

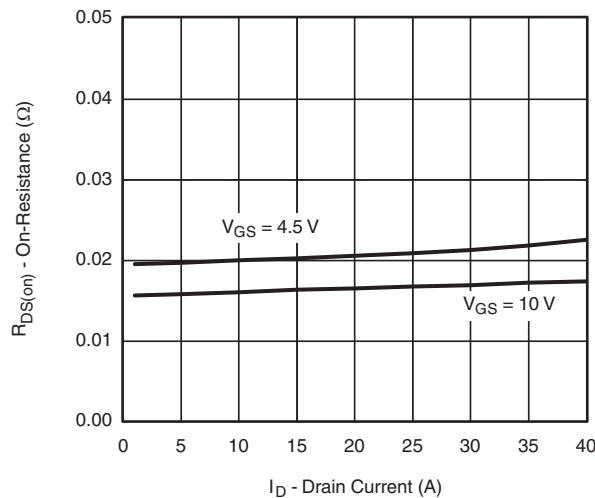
**CHANNEL-1 TYPICAL CHARACTERISTICS**  $25\text{ }^\circ\text{C}$ , unless otherwise noted



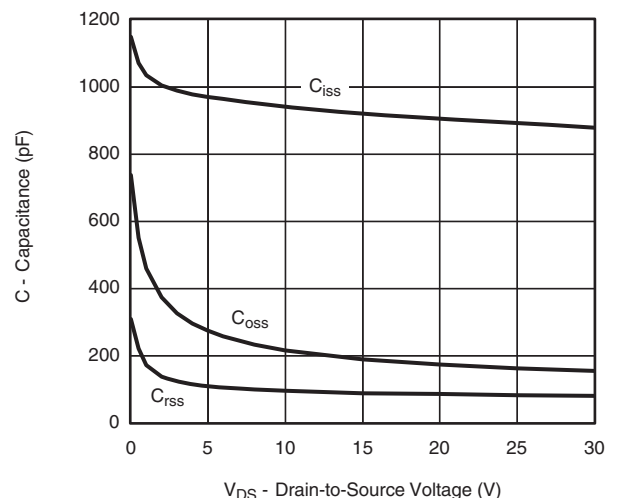
**Output Characteristics**



**Transfer Characteristics**

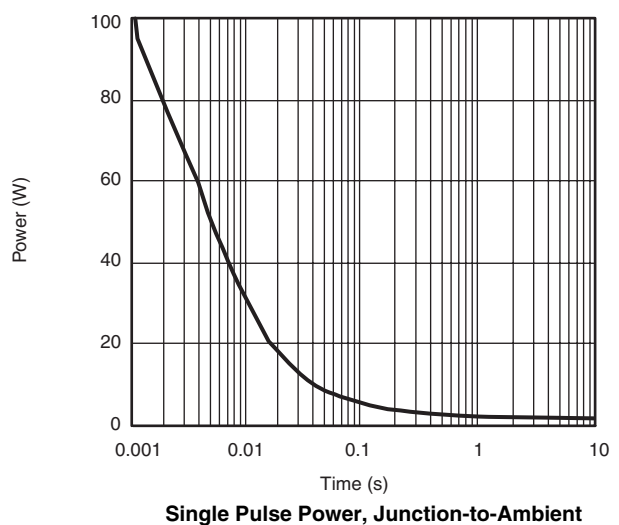
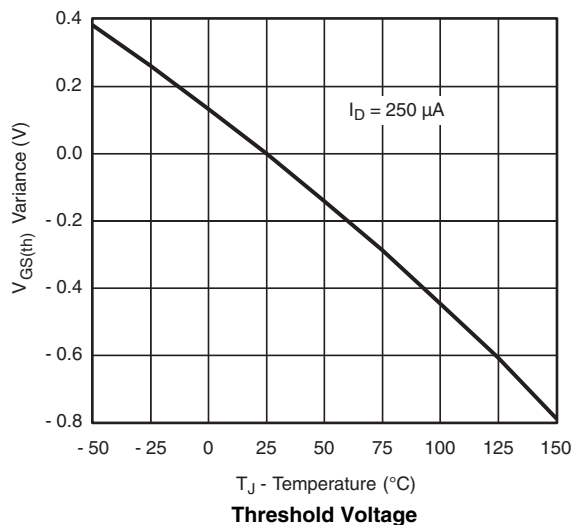
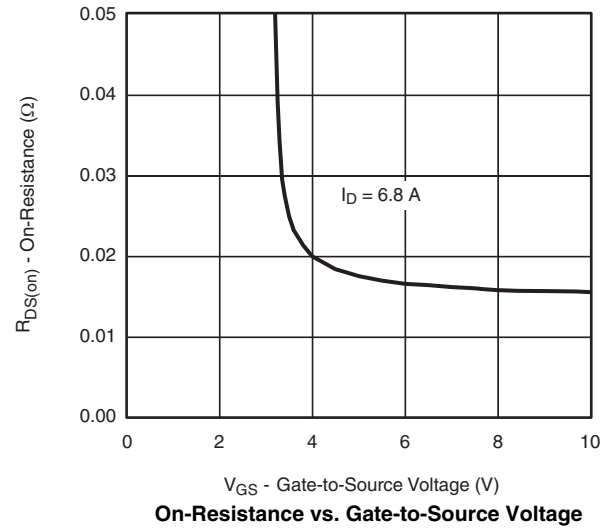
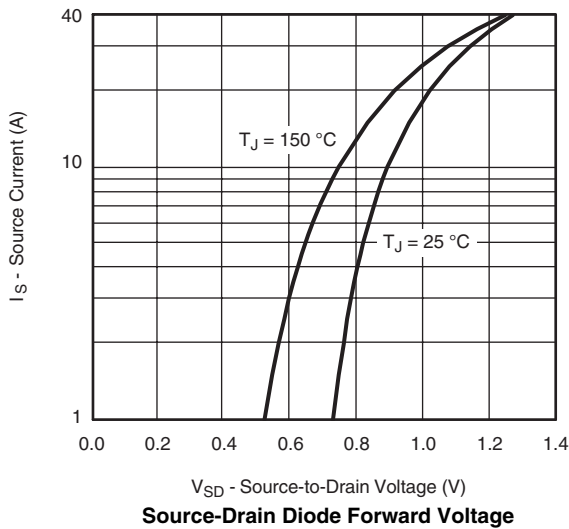
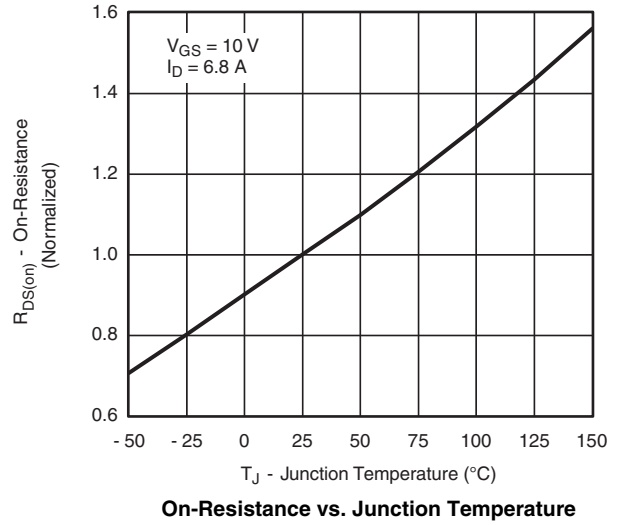
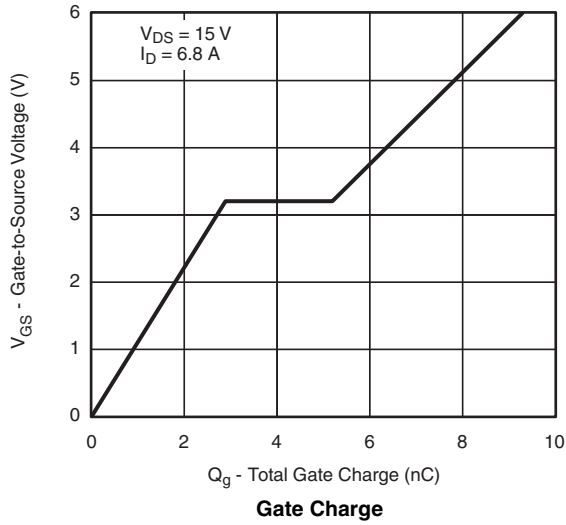


**On-Resistance vs. Drain Current**

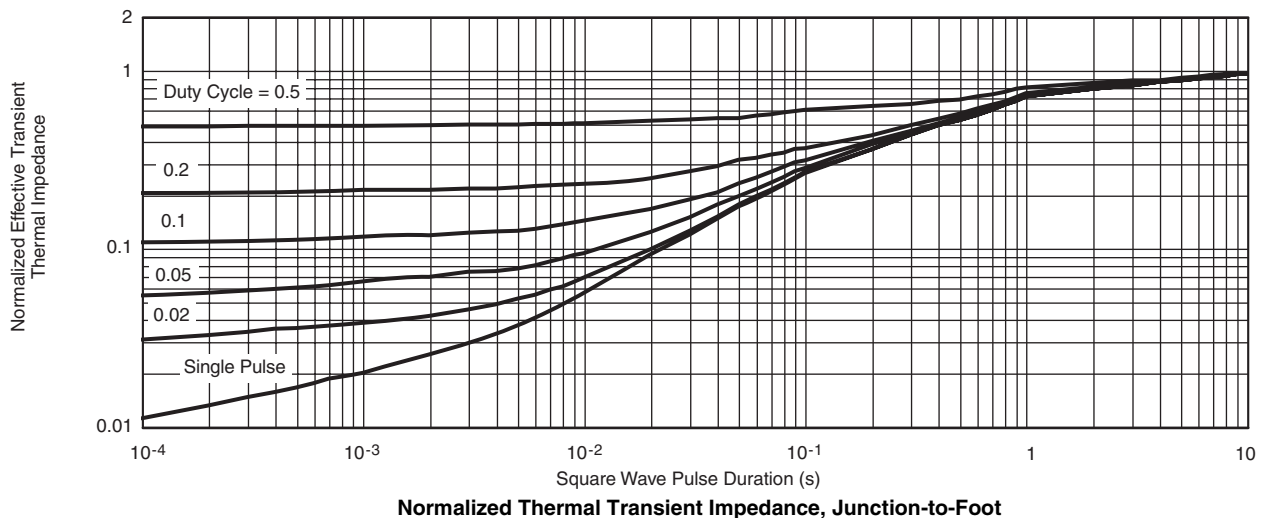
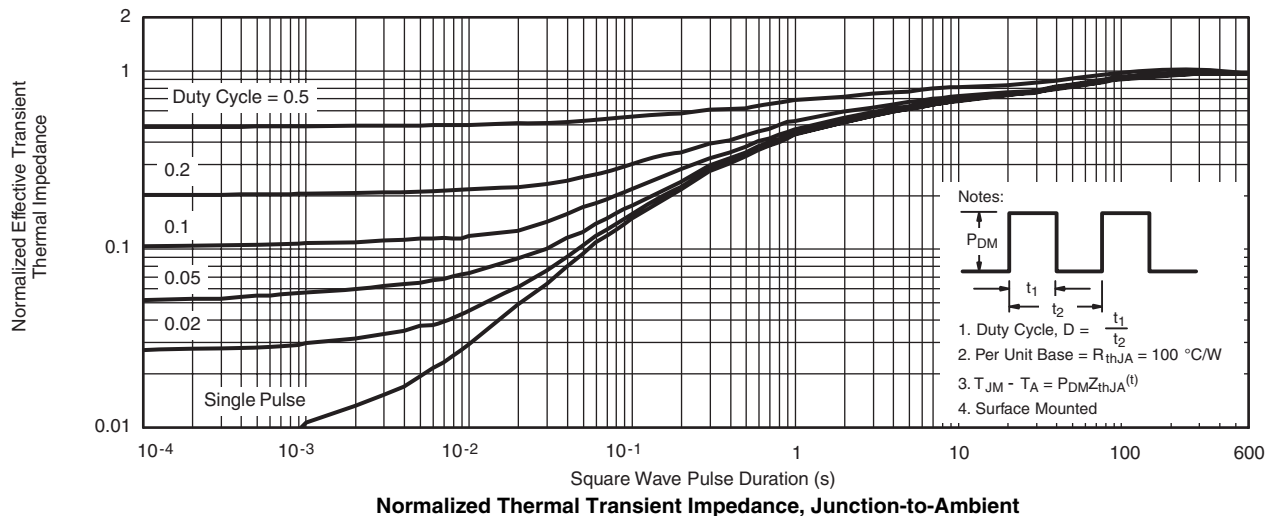
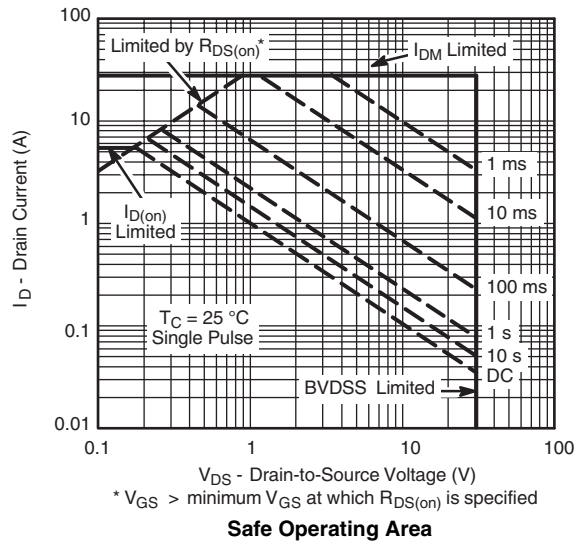


**Capacitance**

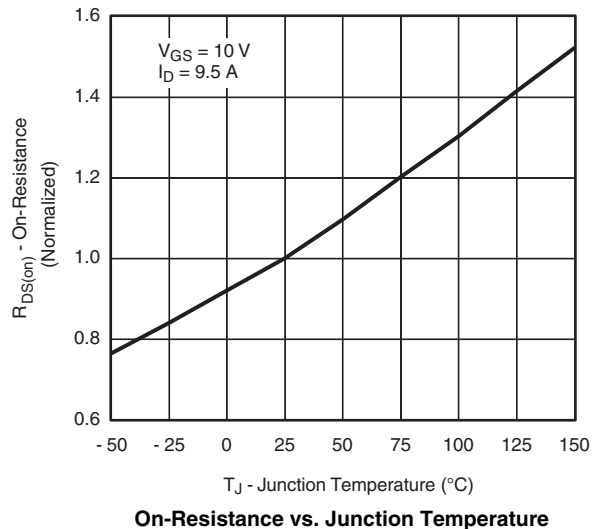
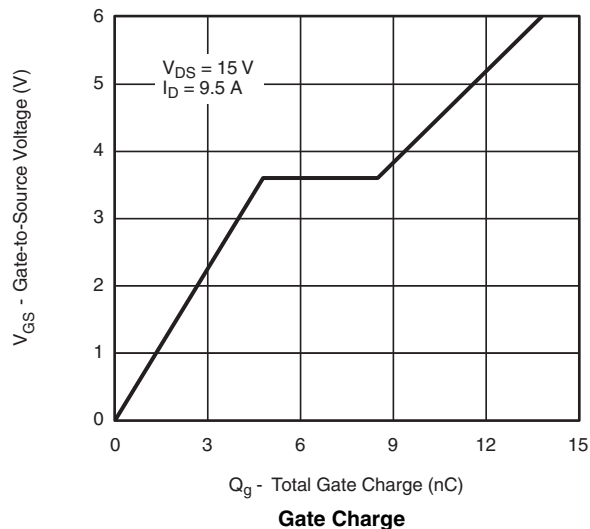
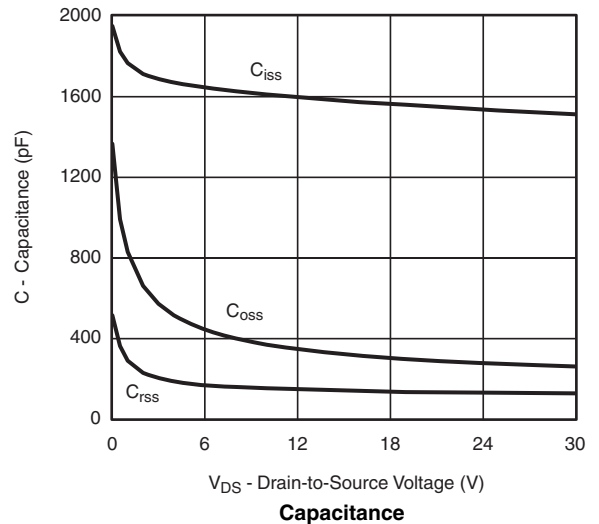
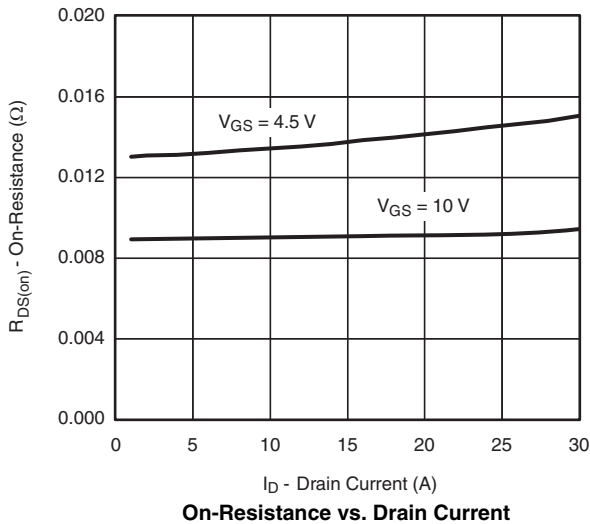
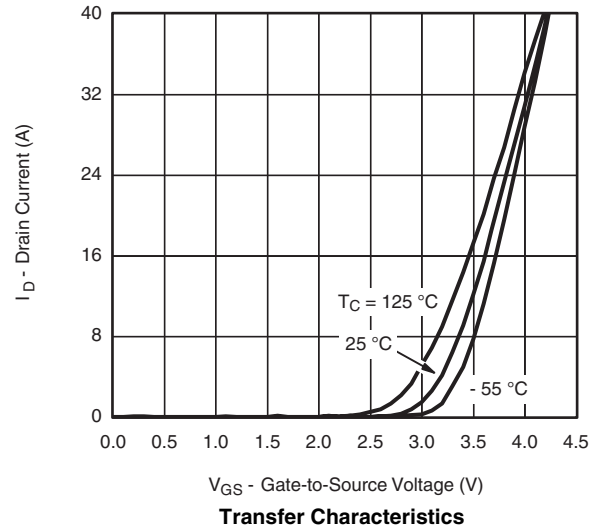
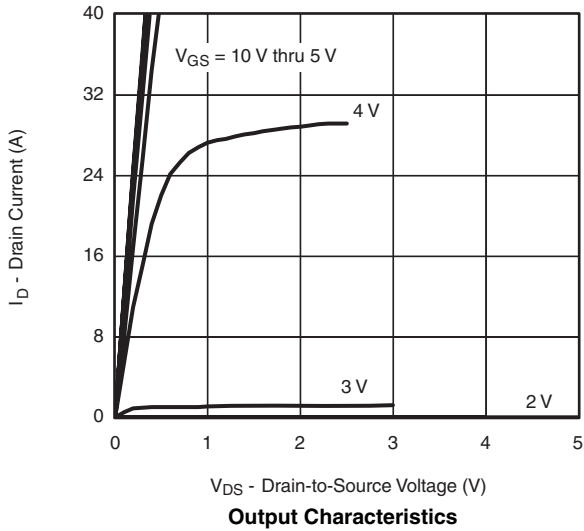
## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



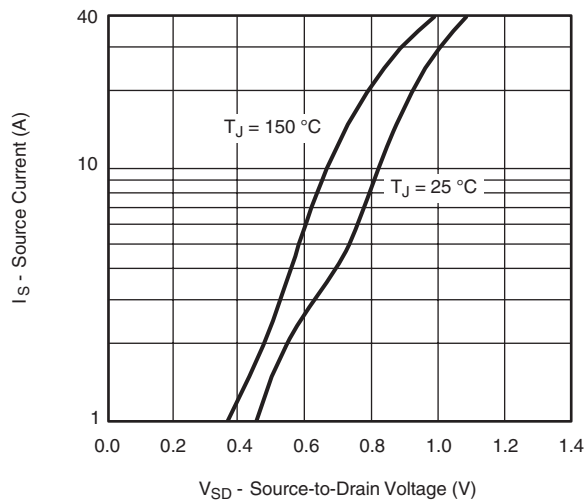
**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



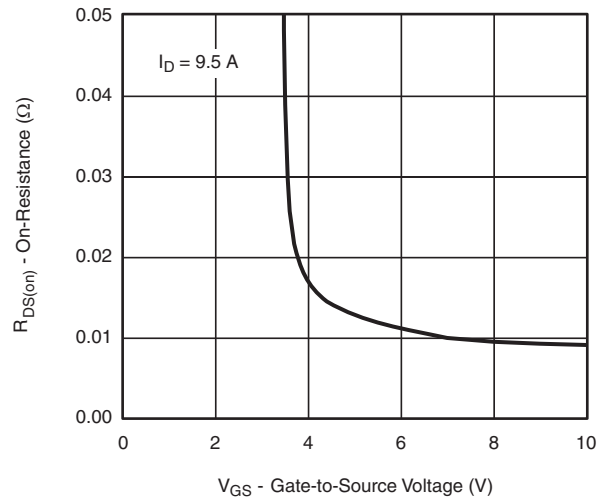
## CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



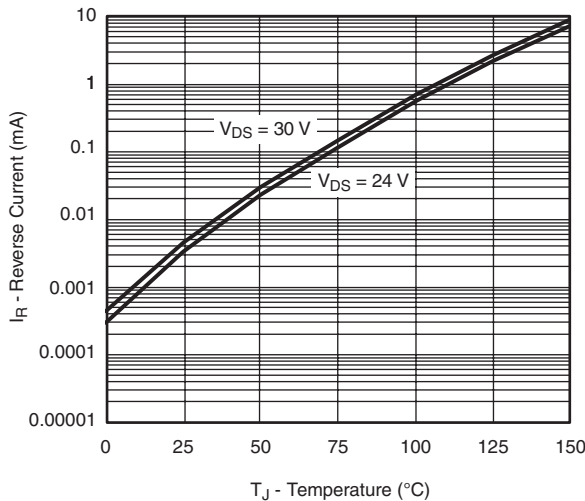
**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



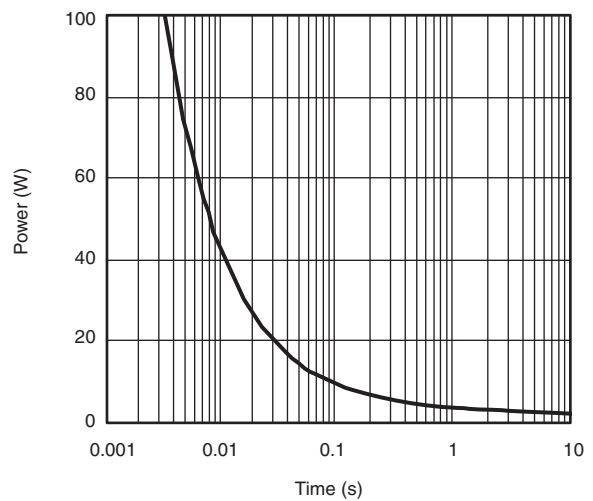
**Source-Drain Diode Forward Voltage**



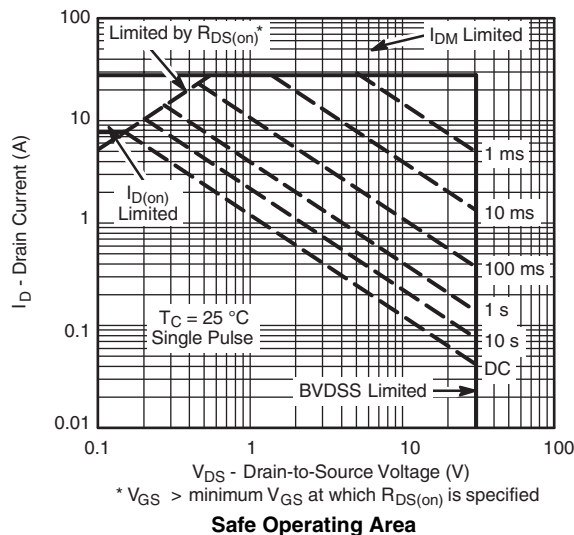
**On-Resistance vs. Gate-to-Source Voltage**



**Reverse Current vs. Junction Temperature**

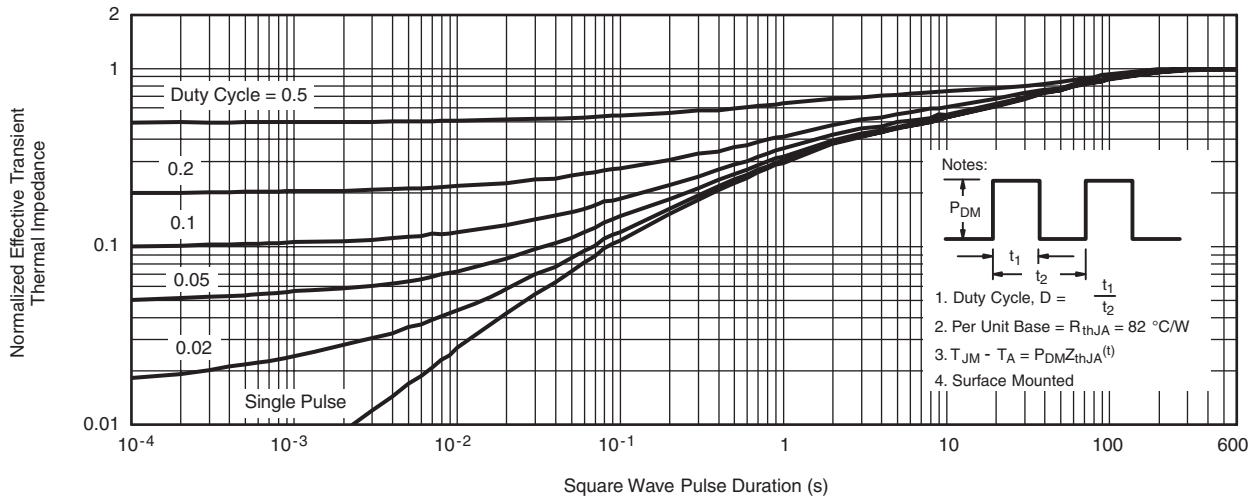


**Single Pulse Power, Junction-to-Ambient**

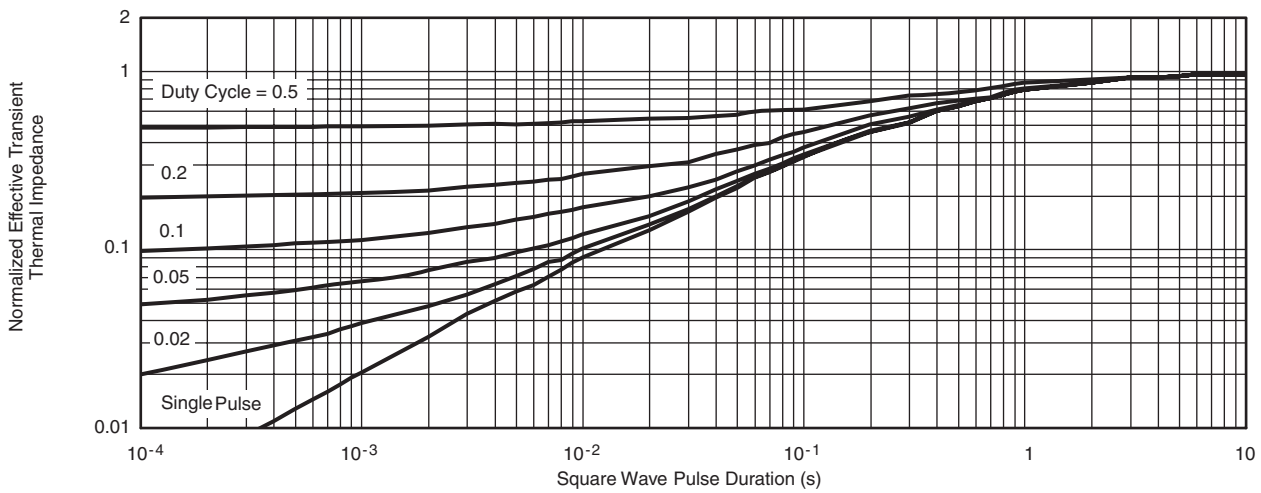


\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



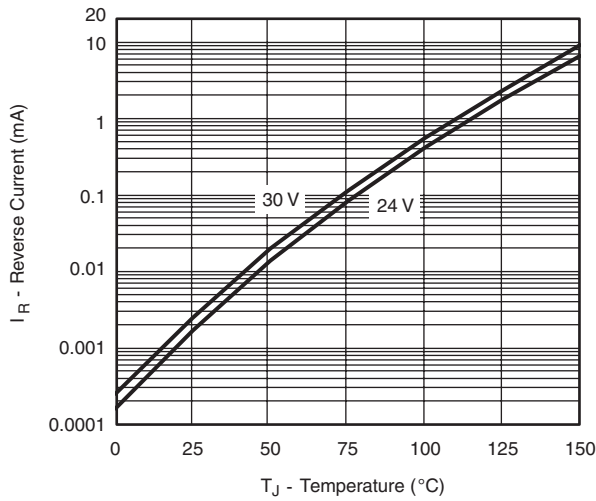
**Normalized Thermal Transient Impedance, Junction-to-Ambient**



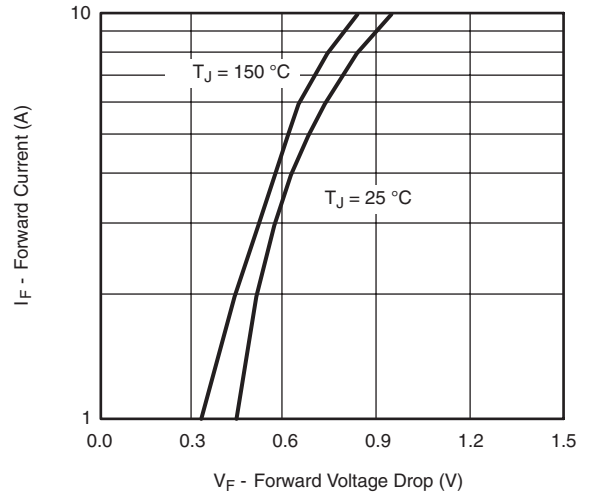
**Normalized Thermal Transient Impedance, Junction-to-Foot**



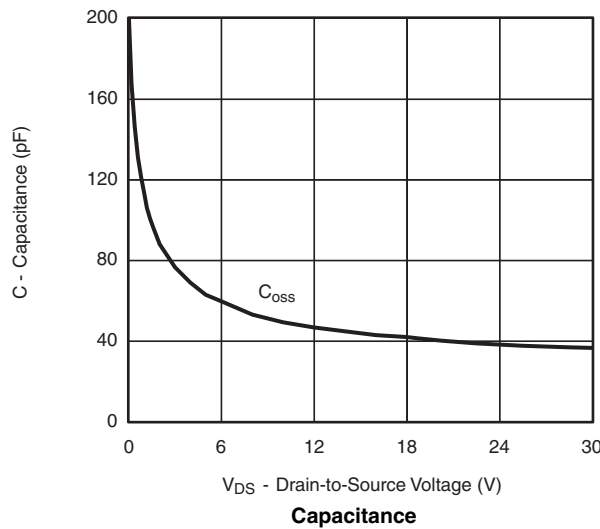
**SCHOTTKY TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Reverse Current vs. Junction Temperature**



**Forward Voltage Drop**

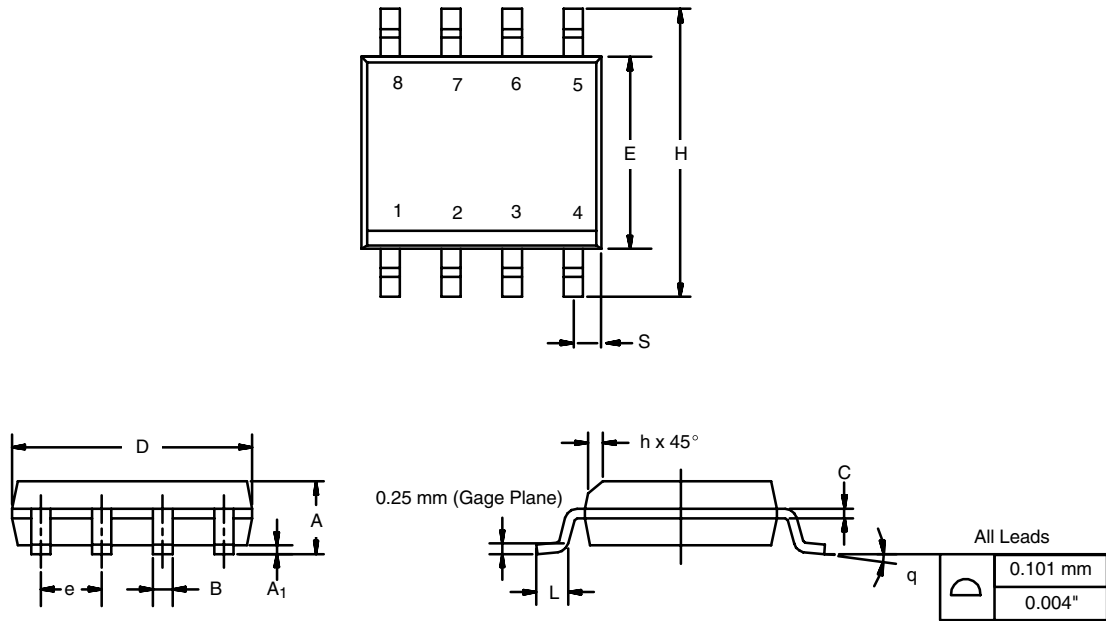


**Capacitance**

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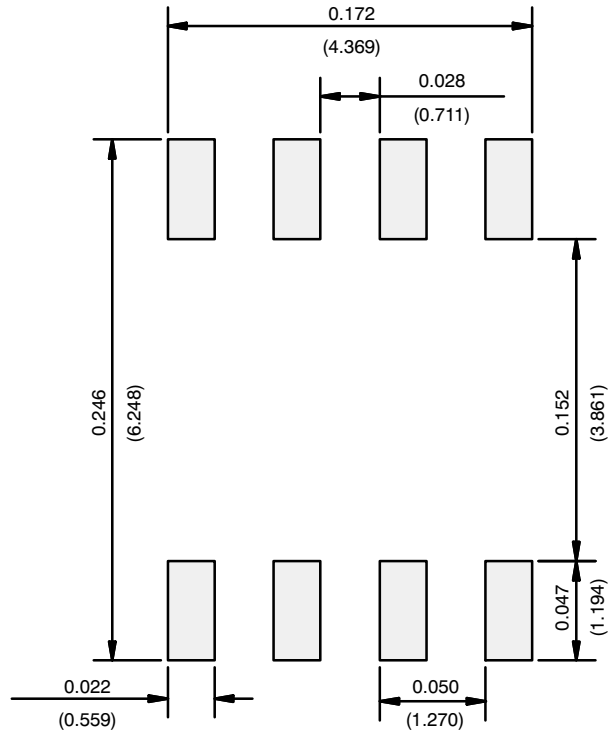
## SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A <sub>1</sub>	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026
ECN: C-06527-Rev. I, 11-Sep-06				
DWG: 5498				

## RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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