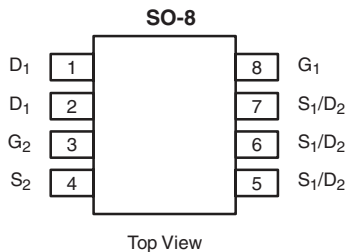


Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY				
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
Channel-1	30	0.018 at V _{GS} = 10 V	10	6.6
		0.023 at V _{GS} = 4.5 V	8.5	
Channel-2		0.018 at V _{GS} = 10 V	10.5	8.9
		0.022 at V _{GS} = 4.5 V	9.3	

SCHOTTKY PRODUCT SUMMARY		
V _{DS} (V)	V _{SD} (V) Diode Forward Voltage	I _F (A)
30	0.50 V at 1.0 A	2.0



Ordering Information: Si4916DY-T1-E3 (Lead (Pb)-free)
Si4916DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

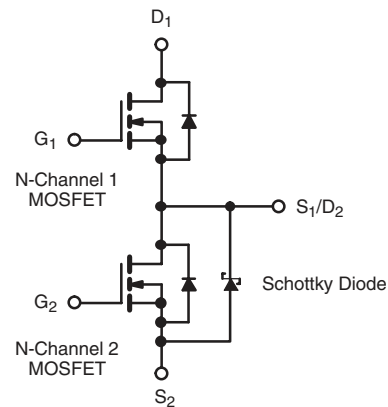
- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT[®] Plus Integrated Schottky
- 100 % R_g Tested

APPLICATIONS

- DC/DC Converters
- Notebook



RoHS
COMPLIANT
HALOGEN
FREE
Available



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter	Symbol	Channel-1	Channel-2	Unit	
Drain-Source Voltage	V _{DS}	30		V	
Gate-Source Voltage	V _{GS}	20			
Continuous Drain Current (T _J = 150 °C) ^{a, b}	I _D	T _C = 25 °C	10	10.5	A
		T _C = 70 °C	8	8.3	
		T _A = 25 °C	7.5 ^{a, b, c}	7.8 ^{a, b, c}	
		T _A = 70 °C	6 ^{a, b, c}	6.3 ^{a, b, c}	
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	40	40	A	
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	3		3.2
		T _A = 25 °C	1.7 ^{a, b, c}	1.8 ^{a, b, c}	
PulseD Source-Drain Current	I _{SM}	40	40	A	
Single-Pulse Avalanche Current	I _{AS}	15			
Single-Pulse Avalanche Energy	E _{AS}	11.2		mJ	
Maximum Power Dissipation ^{a, b}	P _D	T _C = 25 °C	3.3	3.5	W
		T _C = 70 °C	2.1	2.2	
		T _A = 25 °C	1.9 ^{a, b, c}	2.0 ^{a, b, c}	
		T _A = 70 °C	1.2 ^{a, b, c}	1.3 ^{a, b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	

Notes:

a. Based on T_C = 25 °C.

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

c. t = 10 s.

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Channel-1		Channel-2		Unit
			Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient ^a	$t \leq 10$ s	R_{thJA}	54	65	47	60	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	32	38	30	35	

Notes:

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

b. Maximum under Steady State conditions is 112 °C/W for Channel 1 and 107 °C/W for Channel 2.

MOSFET SPECIFICATIONS $T_J = 25$ °C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0$ V, $I_D = 250$ μ A	Ch-1 30 Ch-2 30			V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250$ μ A	Ch-1 Ch-2	24 25		mV/°C	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		Ch-1 Ch-2	-6 -6			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	Ch-1 Ch-2	1.5 1.5	3.0 2.7		
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = 20$ V	Ch-1 Ch-2		100 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30$ V, $V_{GS} = 0$ V	Ch-1 Ch-2		1 100	μ A	
		$V_{DS} = 30$ V, $V_{GS} = 0$ V, $T_J = 85$ °C	Ch-1 Ch-2		15 2000		
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5$ V, $V_{GS} = 10$ V	Ch-1 Ch-2	20 20		A	
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 10$ A	Ch-1		0.0145	0.018	Ω
		$V_{GS} = 10$ V, $I_D = 10.5$ A	Ch-2		0.015	0.018	
		$V_{GS} = 4.5$ V, $I_D = 8.5$ A	Ch-1		0.019	0.023	
		$V_{GS} = 4.5$ V, $I_D = 9.3$ A	Ch-2		0.018	0.022	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15$ V, $I_D = 10$ A	Ch-1		30	S	
		$V_{DS} = 15$ V, $I_D = 10.5$ A	Ch-2		35		
Diode Forward Voltage ^b	V_{SD}	$I_S = 1.7$ A, $V_{GS} = 0$ V	Ch-1		0.75	1.1	V
		$I_S = 1$ A, $V_{GS} = 0$ V	Ch-2		0.47	0.5	
Dynamic^a							
Total Gate Charge	Q_g	Channel-1 $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 10$ A	Ch-1 Ch-2		6.6 8.9	10 14	nC
Gate-Source Charge	Q_{gs}		Ch-1 Ch-2		2.9 3.4		
Gate-Drain Charge	Q_{gd}	Channel-2 $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = -10.5$ A	Ch-1 Ch-2		2.3 2.4		
			Ch-1 Ch-2		0.5 0.5	1.9 2.3	
Gate Resistance	R_g					Ω	



MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Dynamic^a							
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}$, $R_L = 15\ \Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\ \Omega$	Ch-1	8	15	ns	
Rise Time	t_r		Ch-2	9	15		
Turn-Off Delay Time	$t_{d(off)}$	Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 15\ \Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\ \Omega$	Ch-1	11	18		
			Ch-2	13	20		
Fall Time	t_f		Ch-1	21	32		
			Ch-2	27	40		
Source-Drain Reverse Recovery Time	t_{rr}		$I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	Ch-1	28		40
			$I_F = 2.2\text{ A}$, $dI/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	24		35
Body Diode Reverse Recovery Charge	Q_{rr}		$I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	Ch-1	17		nC
			$I_F = 2.2\text{ A}$, $dI/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	12		
Reverse Recovery Fall Time	t_a	$I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	Ch-1	12		ns	
		$I_F = 2.2\text{ A}$, $dI/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	11			
Reverse Recovery Rise Time	t_b	$I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	Ch-1	16			
		$I_F = 2.2\text{ A}$, $dI/dt = 100\ \mu\text{A}/\mu\text{s}$	Ch-2	13			

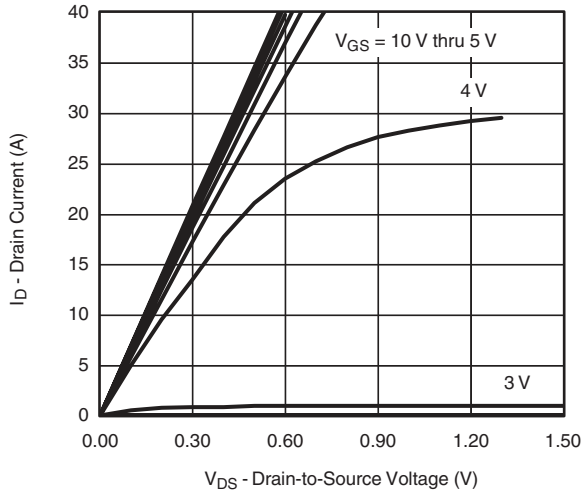
Notes:

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

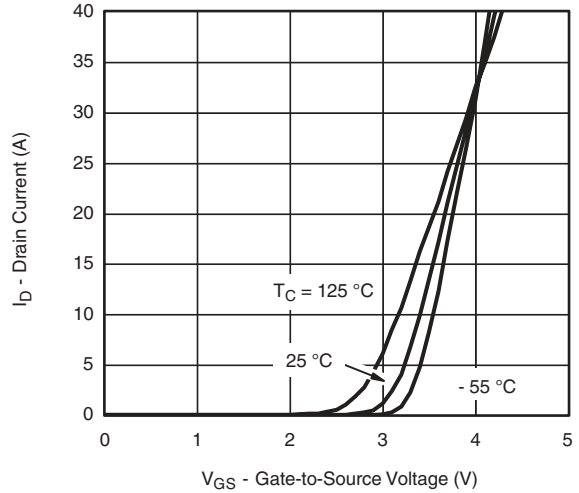
SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}$, $T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	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.

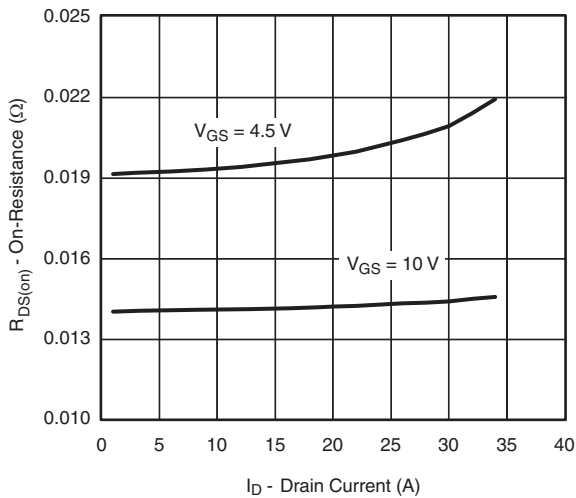
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



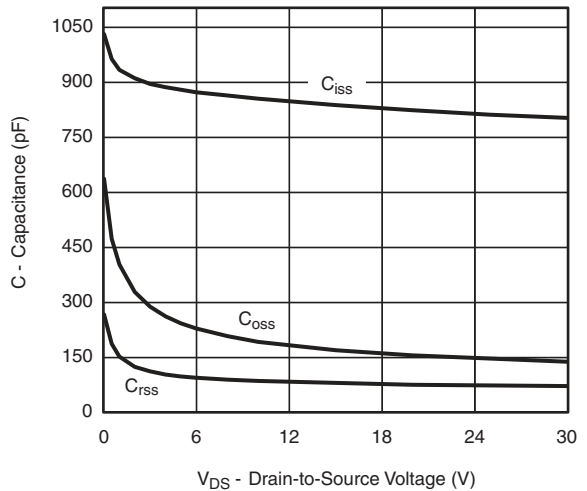
Output Characteristics



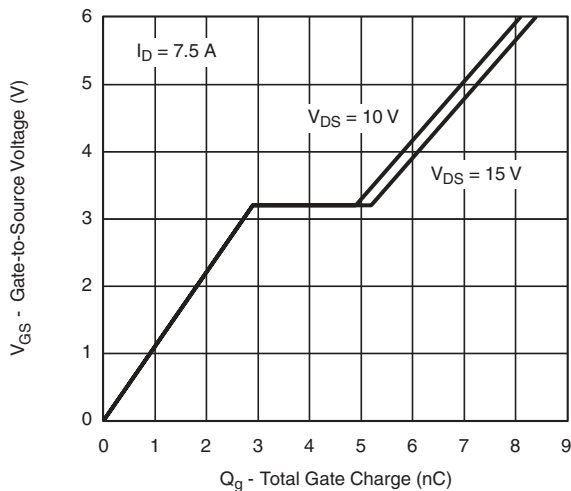
Transfer Characteristics



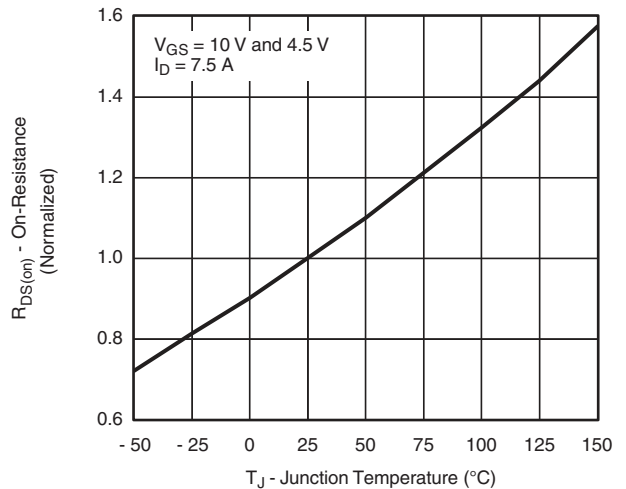
On-Resistance vs. Drain Current



Capacitance

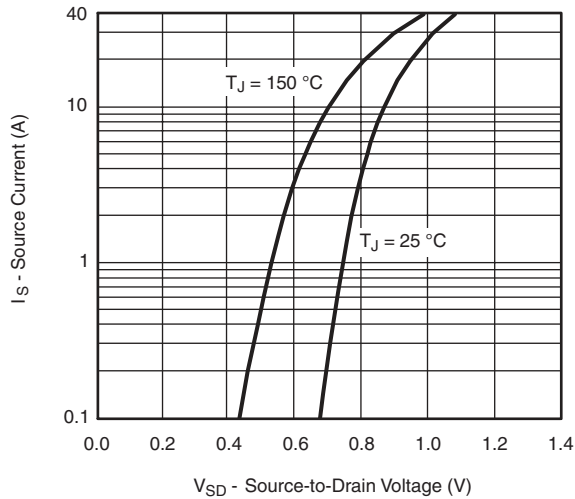


Gate Charge

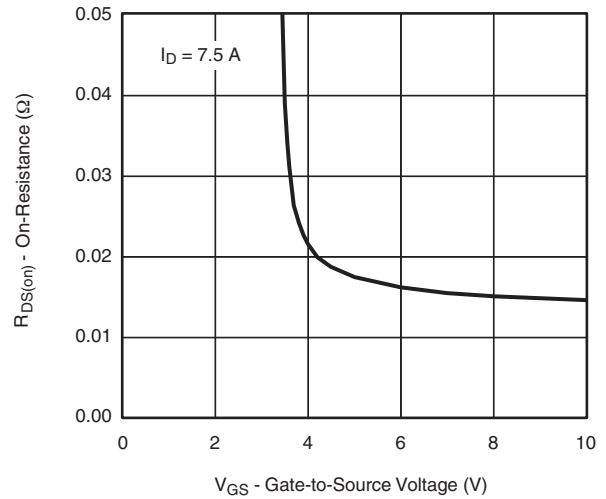


On-Resistance vs. Junction Temperature

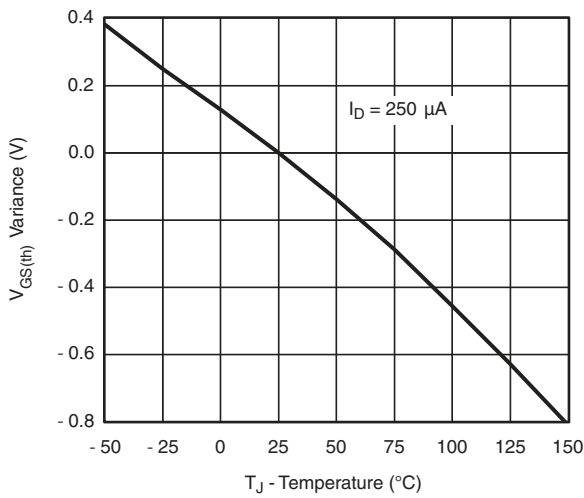
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



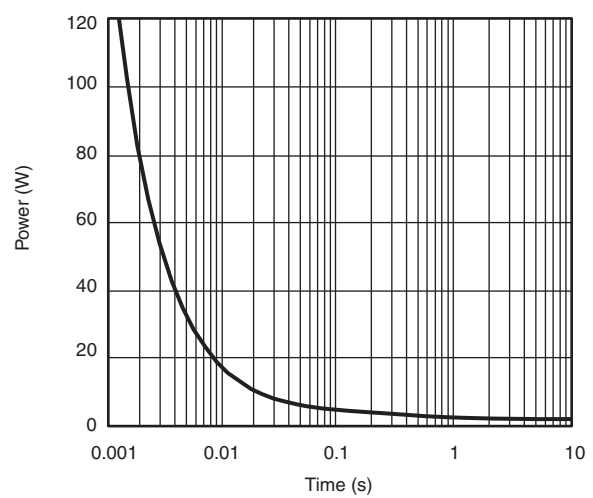
Source-Drain Diode Forward Voltage



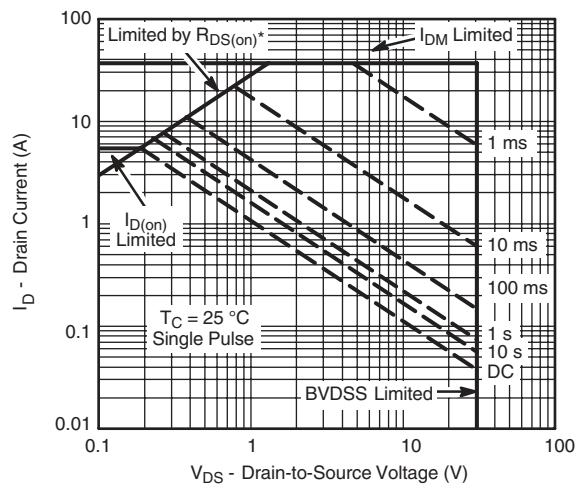
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



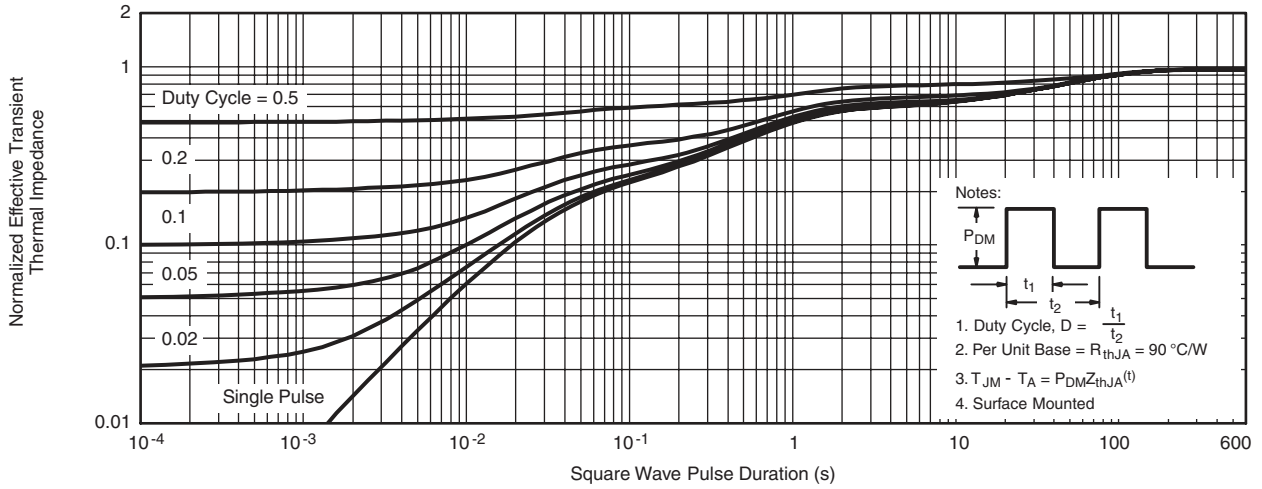
Single Pulse Power, Junction-to-Ambient



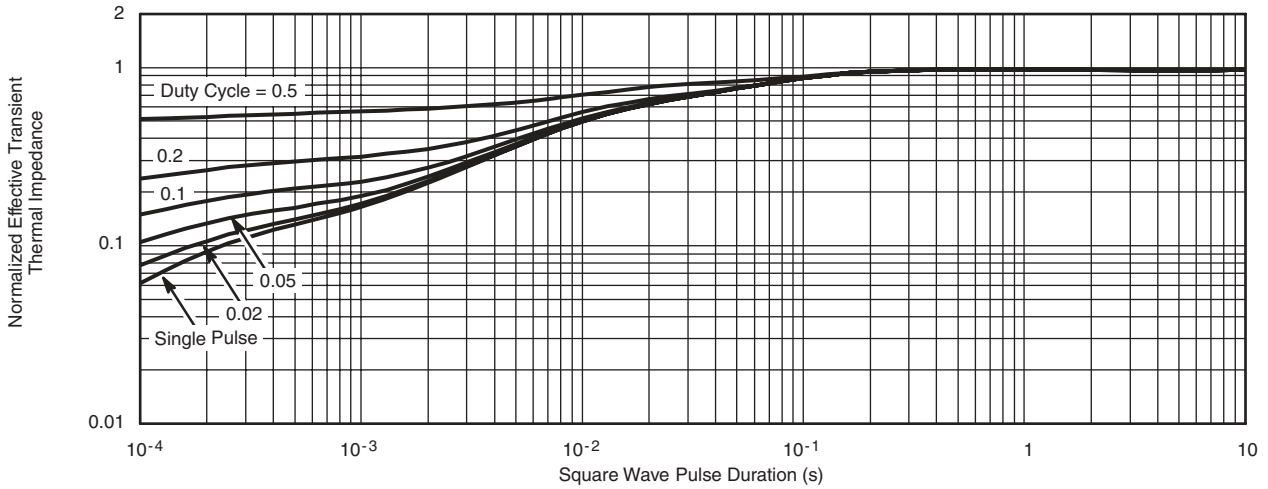
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

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

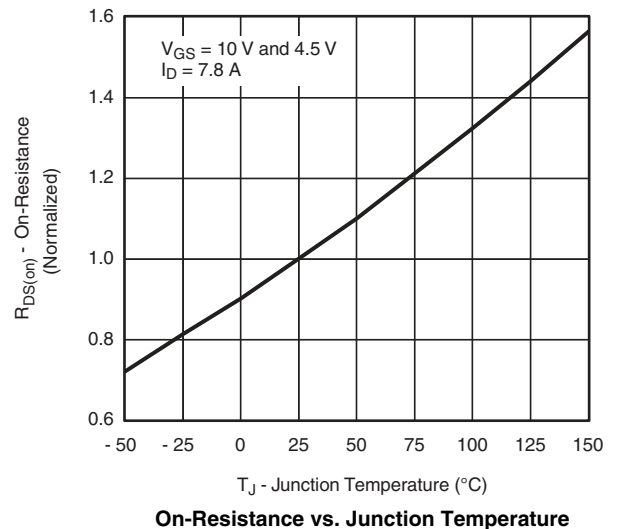
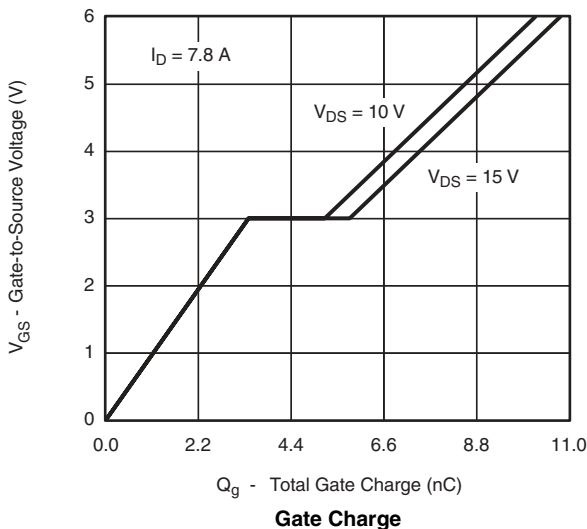
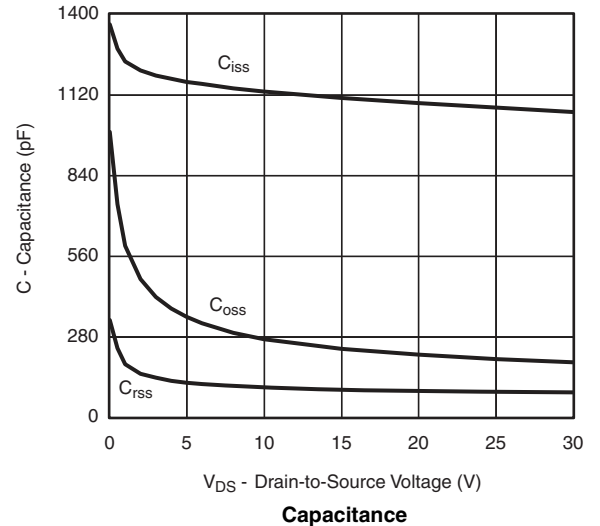
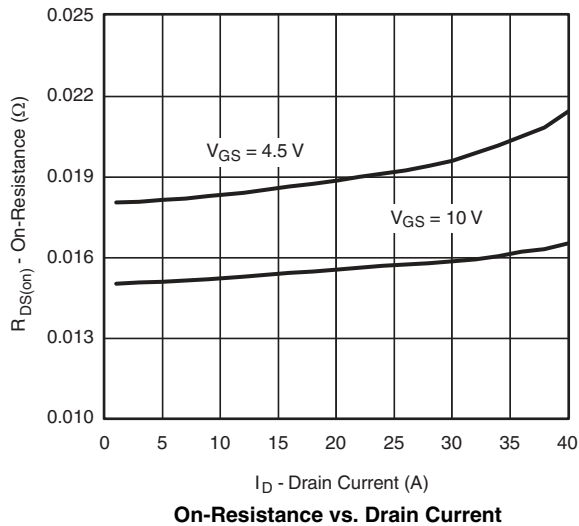
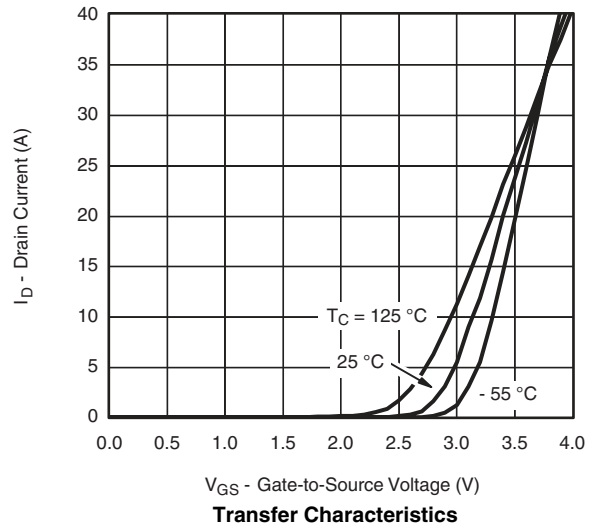
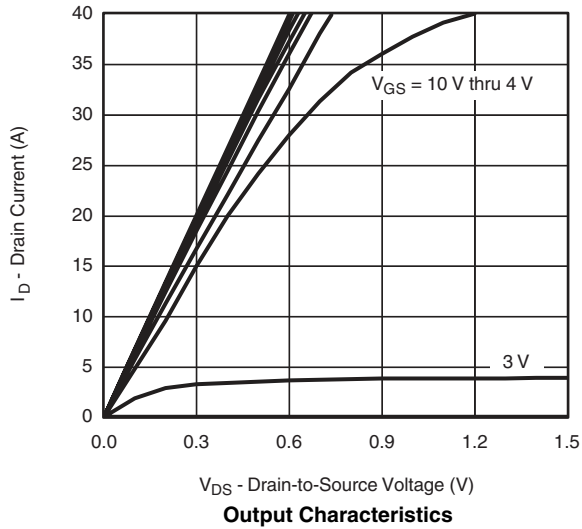


Normalized Thermal Transient Impedance, Junction-to-Ambient

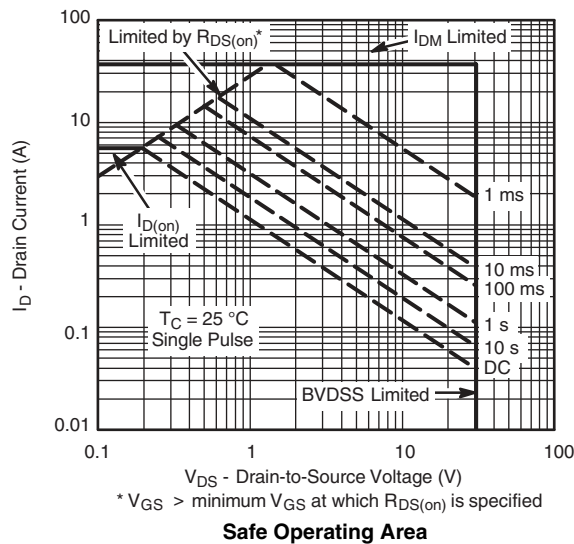
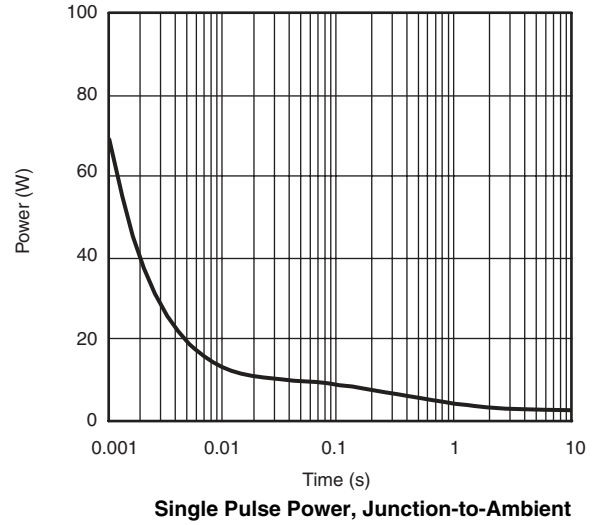
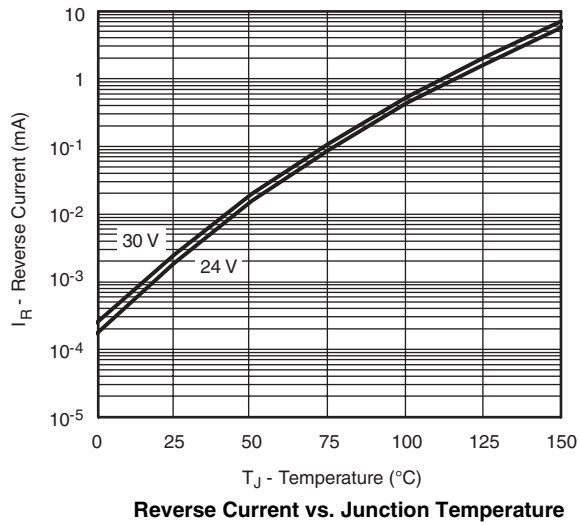
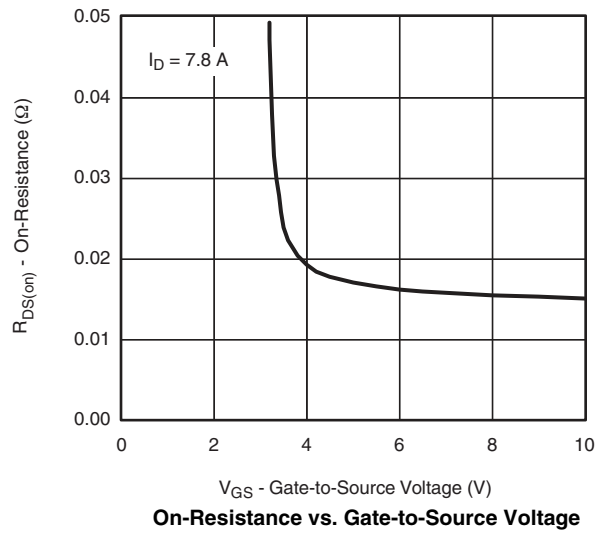
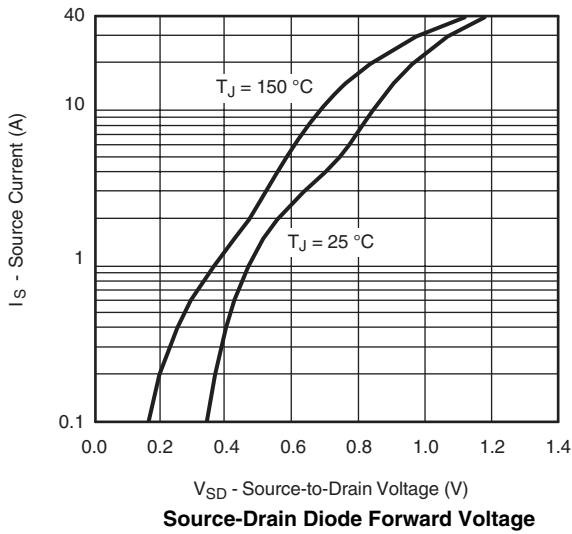


Normalized Thermal Transient Impedance, Junction-to-Foot

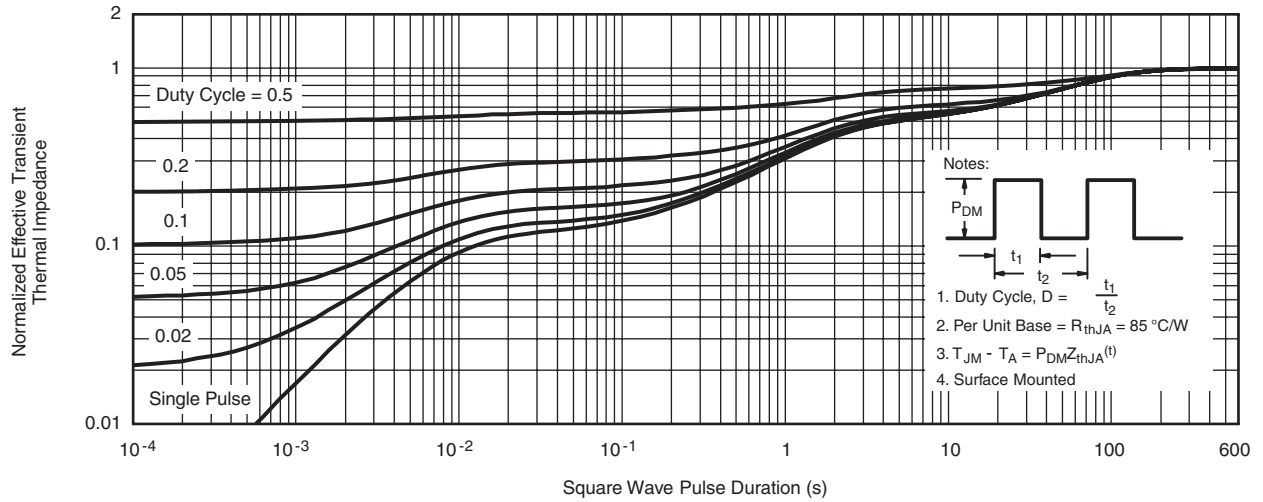
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



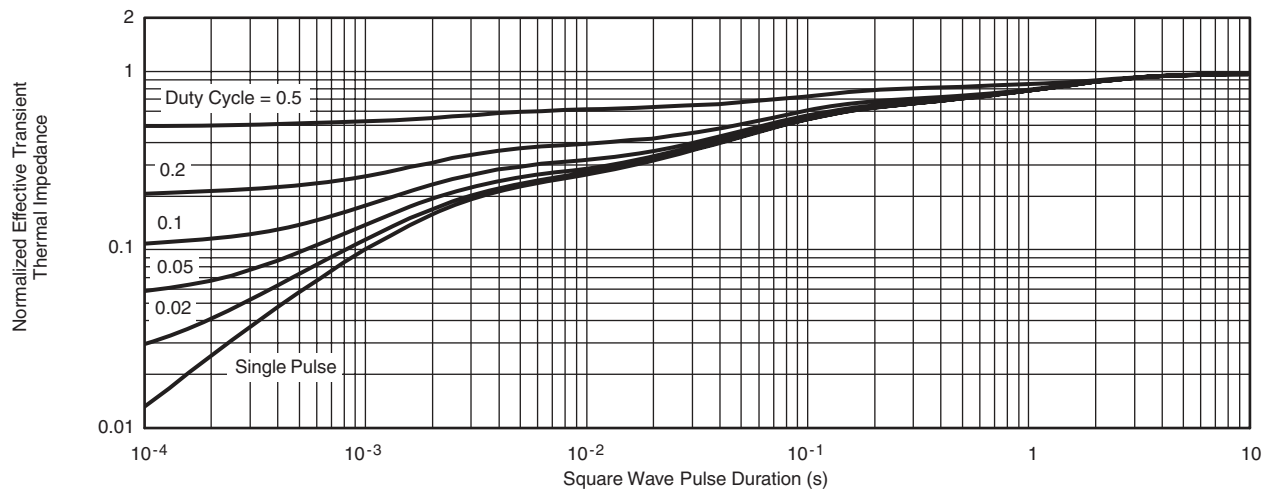
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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



Normalized Thermal Transient Impedance, Junction-to-Ambient

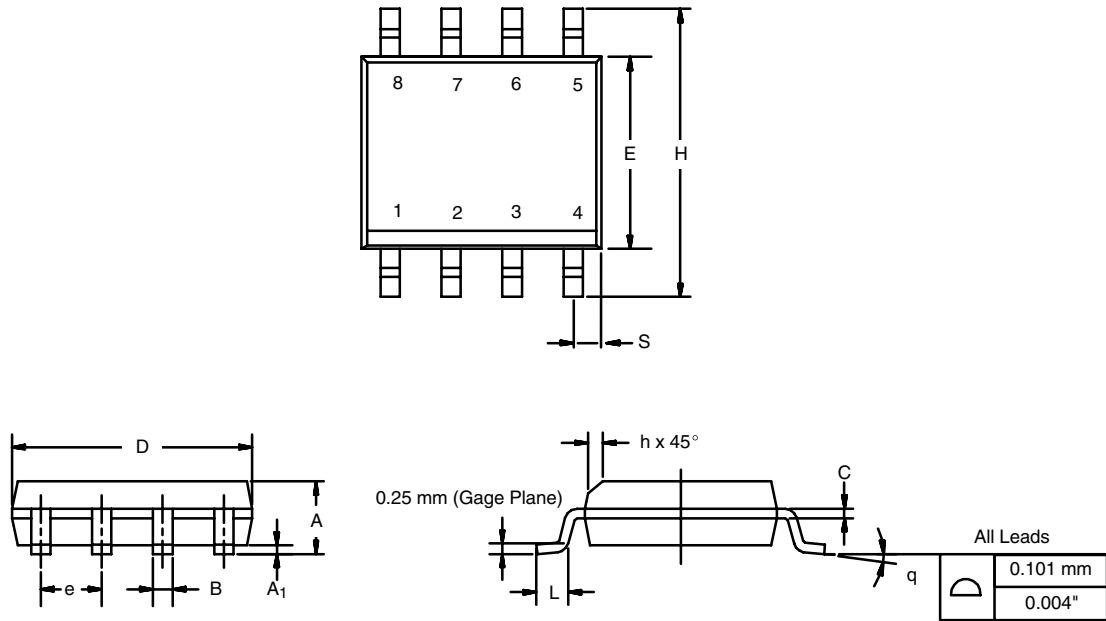


Normalized Thermal Transient Impedance, Junction-to-Foot

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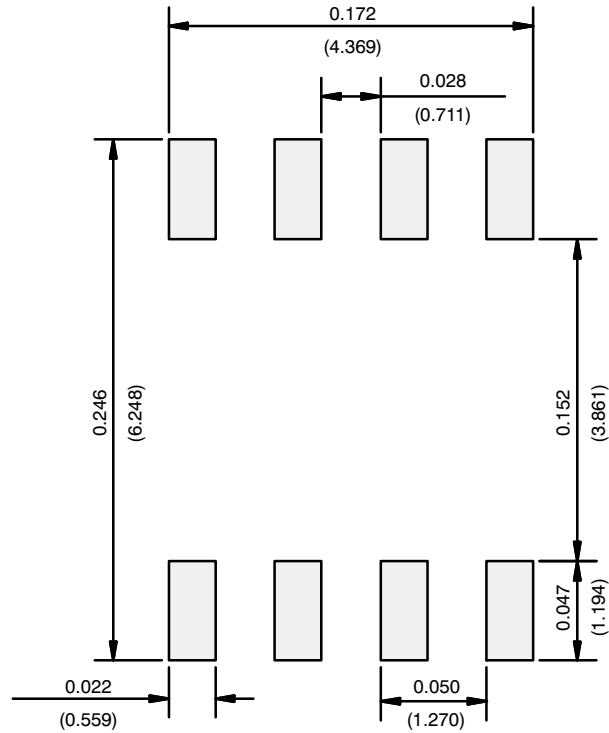
SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	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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