

Dual N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY				
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
Channel 1	30	0.0153 at V _{GS} = 10 V	8 ^e	8.4
		0.0184 at V _{GS} = 4.5 V	8 ^e	
Channel 2	30	0.0280 at V _{GS} = 10 V	8	3.6
		0.0340 at V _{GS} = 4.5 V	7.1	

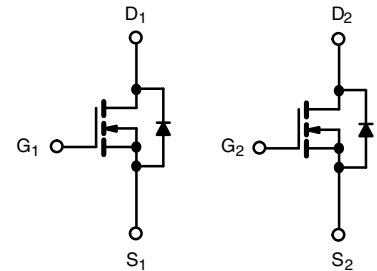
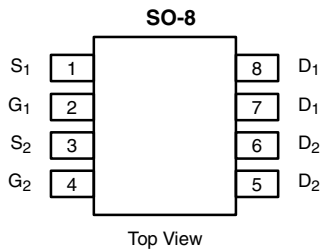
FEATURES

- TrenchFET[®] Power MOSFET
- 100 % R_G Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC


RoHS
COMPLIANT

APPLICATIONS

- DC/DC for Notebook PC



N-Channel MOSFET N-Channel MOSFET

Ordering Information: Si4276DY-T1-E3 (Lead (Pb)-free)

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)	I _D	T _C = 25 °C	8 ^e	8	
		T _C = 70 °C	8 ^e	6.4	
		T _A = 25 °C	8 ^{b, c, e}	6.8 ^{b, c}	
		T _A = 70 °C	7.6 ^{b, c}	5.5 ^{b, c}	
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	50	30	A	
Source-Drain Current Diode Current	I _S	T _C = 25 °C	3.0		2.3
		T _A = 25 °C	1.7 ^{b, c}		1.7 ^{b, c}
Single Pulse Avalanche Current	I _{AS}	20	10		mJ
Avalanche Energy	E _{AS}	20	5		
Maximum Power Dissipation	P _D	T _C = 25 °C	3.6	2.8	
		T _C = 70 °C	2.3	1.8	
		T _A = 25 °C	2.1 ^{b, c}	2.0 ^{b, c}	
		T _A = 70 °C	1.3 ^{b, c}	1.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Channel 1		Channel 2		Unit	
		Typical	Maximum	Typical	Maximum		
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	47	60	58	62.5	°C/W
Maximum Junction-to-Foot (Drain)	Steady	R _{thJF}	30	35	38	45	

Notes:

- Based on T_C = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 107 °C/W (Ch 1) and 110 °C/W (Ch 2).
- Package limited.

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	Ch 1	30			V
		$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	Ch 2	30			
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	Ch 1		29		mV/ $^\circ\text{C}$
		$I_D = 250\text{ }\mu\text{A}$	Ch 2		30		
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250\text{ }\mu\text{A}$	Ch 1		- 5.2		
		$I_D = 250\text{ }\mu\text{A}$	Ch 2		- 4.4		
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch 1	1.2		2.5	V
		$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch 2	1.2		2.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	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	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	Ch 2			1	
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	Ch 1			10	
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	Ch 2			10	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	Ch 1	10			A
		$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	Ch 2	10			
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 9.5\text{ A}$	Ch 1		0.0127	0.0153	Ω
		$V_{GS} = 10\text{ V}, I_D = 6.8\text{ A}$	Ch 2		0.0230	0.0280	
		$V_{GS} = 4.5\text{ V}, I_D = 8.7\text{ A}$	Ch 1		0.0146	0.0184	
		$V_{GS} = 4.5\text{ V}, I_D = 6.1\text{ A}$	Ch 2		0.0280	0.0340	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 9.5\text{ A}$	Ch 1		43		S
		$V_{DS} = 15\text{ V}, I_D = 6.8\text{ A}$	Ch 2		17		
Dynamic^a							
Input Capacitance	C_{iss}	Channel 1 $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ Channel 2 $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	Ch 1		1000		μF
			Ch 2		366		
Output Capacitance	C_{oss}		Ch 1		215		
			Ch 2		82		
Reverse Transfer Capacitance	C_{rss}		Ch 1		85		
			Ch 2		45		
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 9.5\text{ A}$	Ch 1		17.2	26	nC
		$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 6.8\text{ A}$	Ch 2		7.3	15	
		Channel 1 $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 9.5\text{ A}$	Ch 1		8.4	17	
			Ch 2		3.6	8	
Gate-Source Charge	Q_{gs}	Channel 2 $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 6.8\text{ A}$	Ch 1		3		
			Ch 2		1.1		
Gate-Drain Charge	Q_{gd}	Ch 1		2.6			
		Ch 2		1.3			
Gate Resistance	R_g	$f = 1\text{ MHz}$	Ch 1	0.6	3.1	6.2	Ω
			Ch 2	0.5	2.6	5.2	



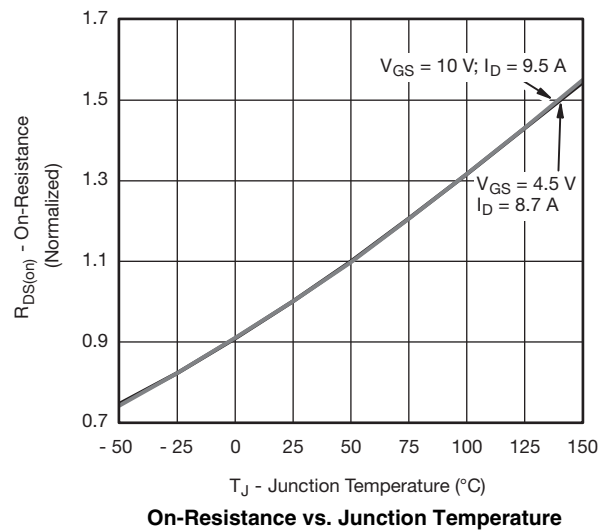
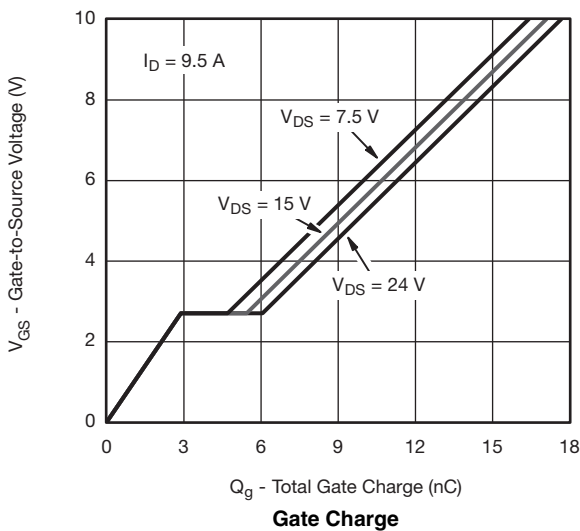
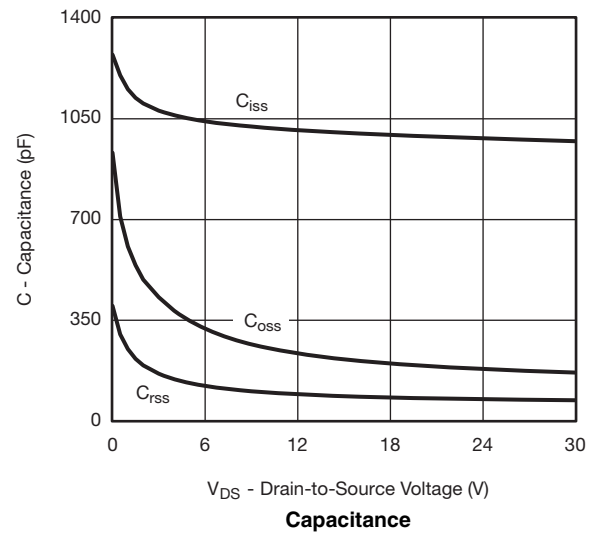
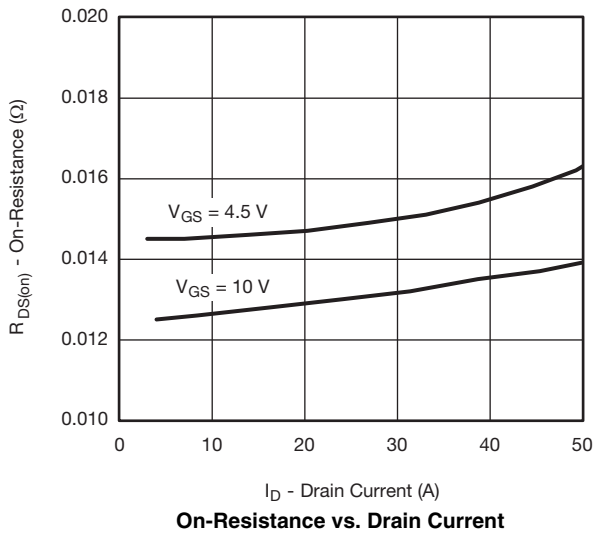
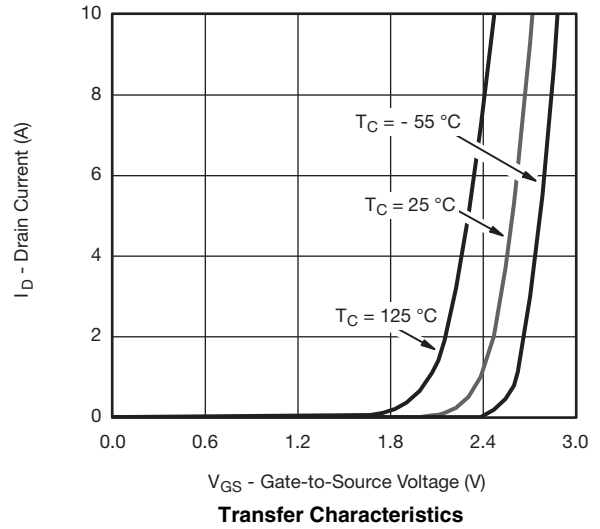
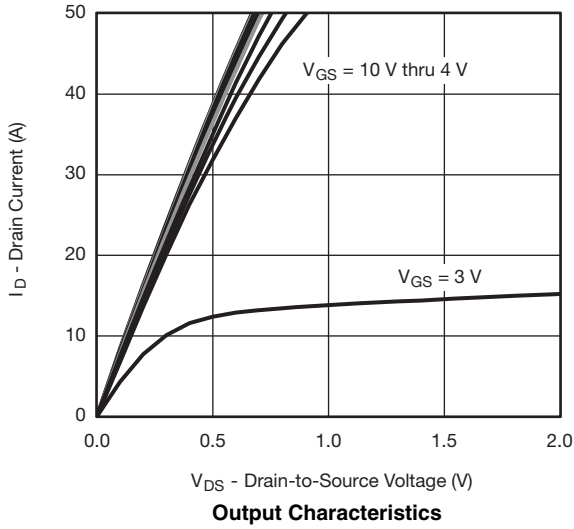
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Dynamic^a							
Turn-On Delay Time	t _{d(on)}	Channel 1 V _{DD} = 15 V, R _L = 2 Ω I _D ≅ 7.6 A, V _{GEN} = 10 V, R _g = 1 Ω	Ch 1		8	16	ns
			Ch 2		4	8	
Rise Time	t _r		Ch 1		10	20	
			Ch 2		8	16	
Turn-Off Delay Time	t _{d(off)}	Channel 2 V _{DD} = 15 V, R _L = 2.7 Ω I _D ≅ 5.5 A, V _{GEN} = 10 V, R _g = 1 Ω	Ch 1		20	30	
			Ch 2		11	20	
Fall Time	t _f		Ch 1		7	14	
			Ch 2		7	14	
Turn-On Delay Time	t _{d(on)}	Channel 1 V _{DD} = 15 V, R _L = 2 Ω I _D ≅ 7.6 A, V _{GEN} = 4.5 V, R _g = 1 Ω	Ch 1		14	21	
			Ch 2		8	16	
Rise Time	t _r		Ch 1		11	20	
			Ch 2		10	20	
Turn-Off Delay Time	t _{d(off)}	Channel 2 V _{DD} = 15 V, R _L = 2.7 Ω I _D ≅ 5.5 A, V _{GEN} = 4.5 V, R _g = 1 Ω	Ch 1		18	27	
			Ch 2		10	20	
Fall Time	t _f		Ch 1		7	14	
			Ch 2		7	14	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	Ch 1			3	A
			Ch 2			2.3	
Pulse Diode Forward Current ^a	I _{SM}		Ch 1			50	
			Ch 2			30	
Body Diode Voltage	V _{SD}	I _S = 7.6 A	Ch 1		0.82	1.2	V
		I _S = 5.5 A	Ch 2		0.85	1.2	
Body Diode Reverse Recovery Time	t _{rr}	Channel 1 I _F = 7.7 A, di/dt = 100 A/μs, T _J = 25 °C	Ch 1		20	30	ns
			Ch 2		13	20	
Body Diode Reverse Recovery Charge	Q _{rr}		Ch 1		12	20	nC
			Ch 2		6	12	
Reverse Recovery Fall Time	t _a	Channel 2 I _F = 5.5 A, di/dt = 100 A/μs, T _J = 25 °C	Ch 1		11		ns
			Ch 2		7		
Reverse Recovery Rise Time	t _b		Ch 1		9		
			Ch 2		6		

Notes:

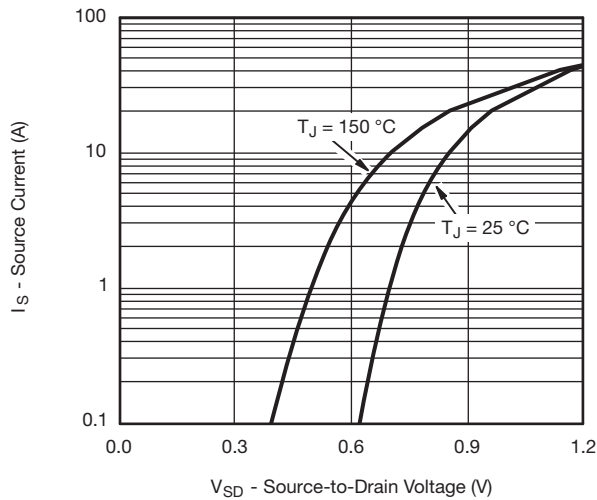
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

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.

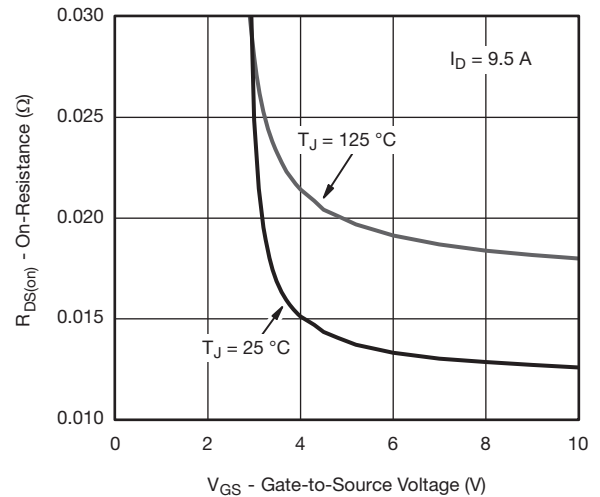
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



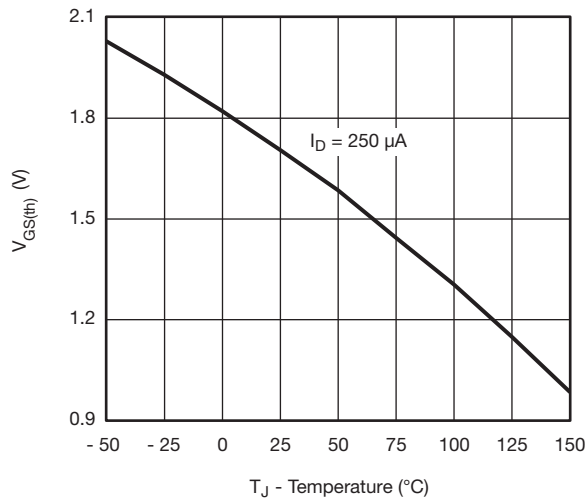
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



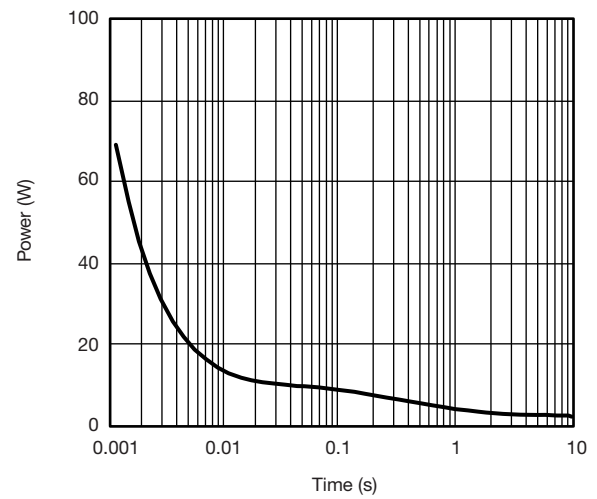
Source-Drain Diode Forward Voltage



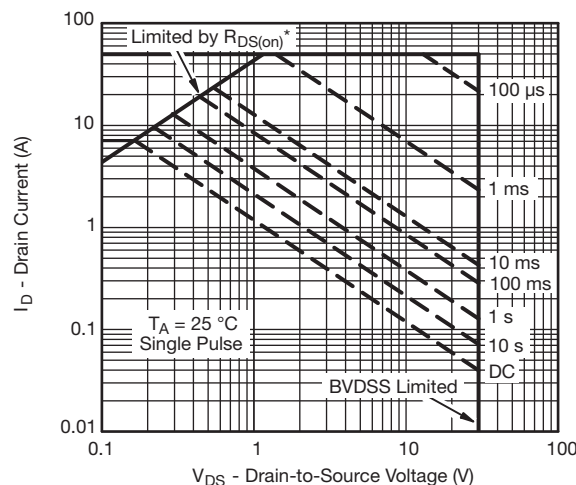
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

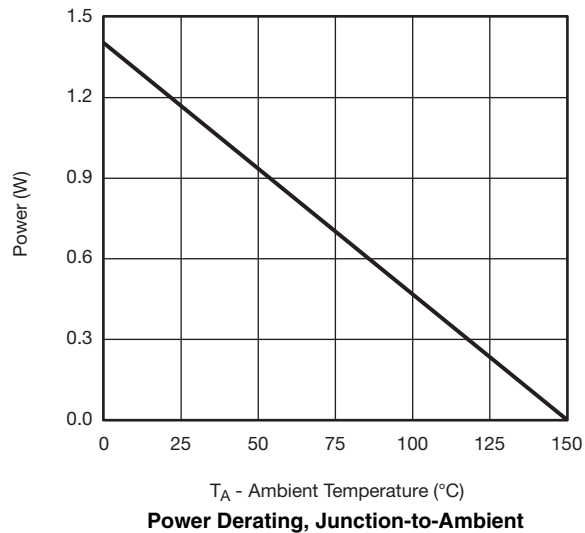
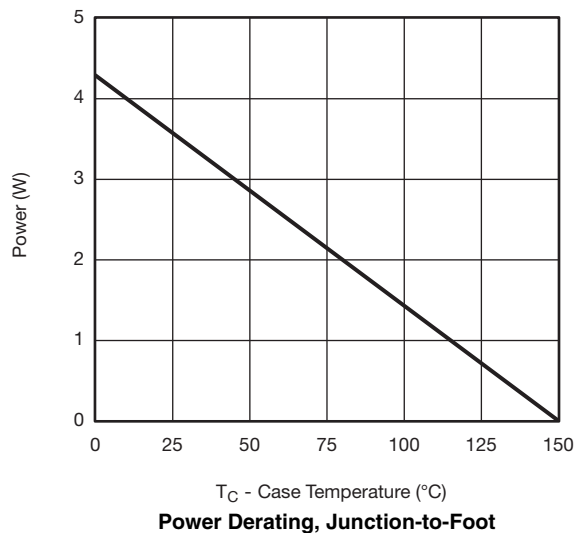
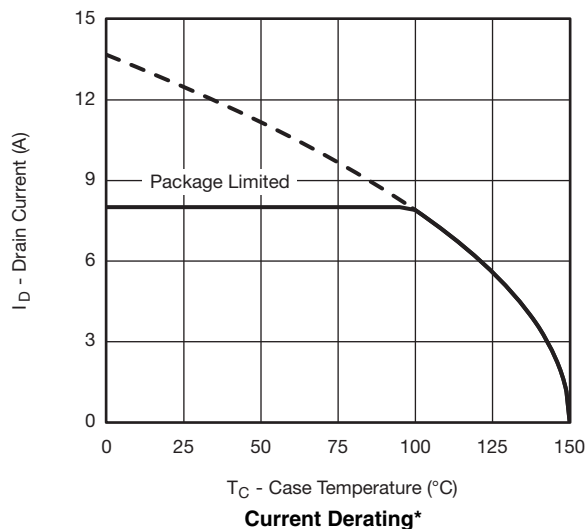


Single Pulse Power, Junction-to-Ambient

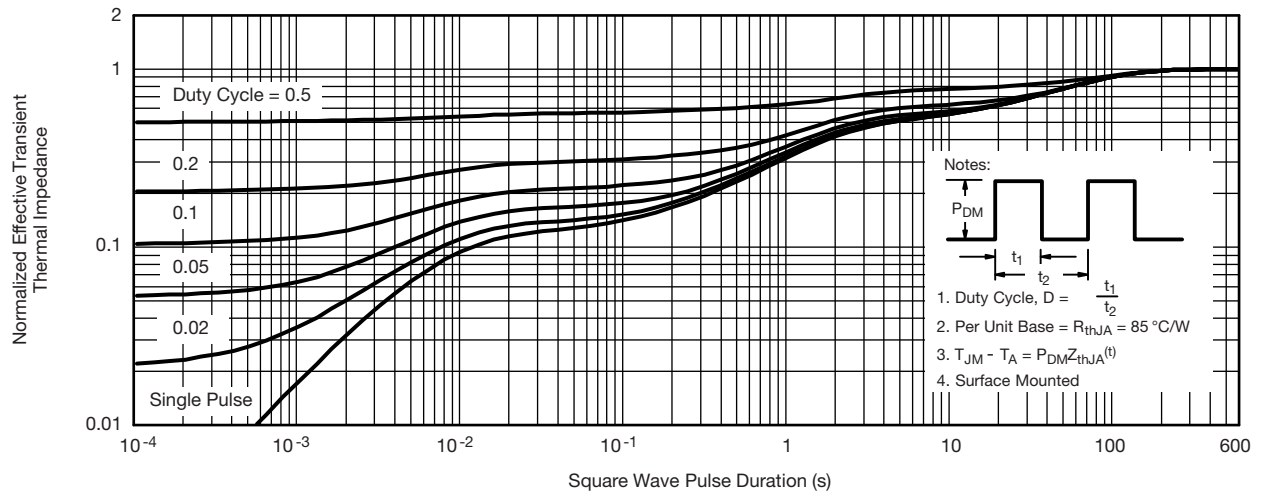
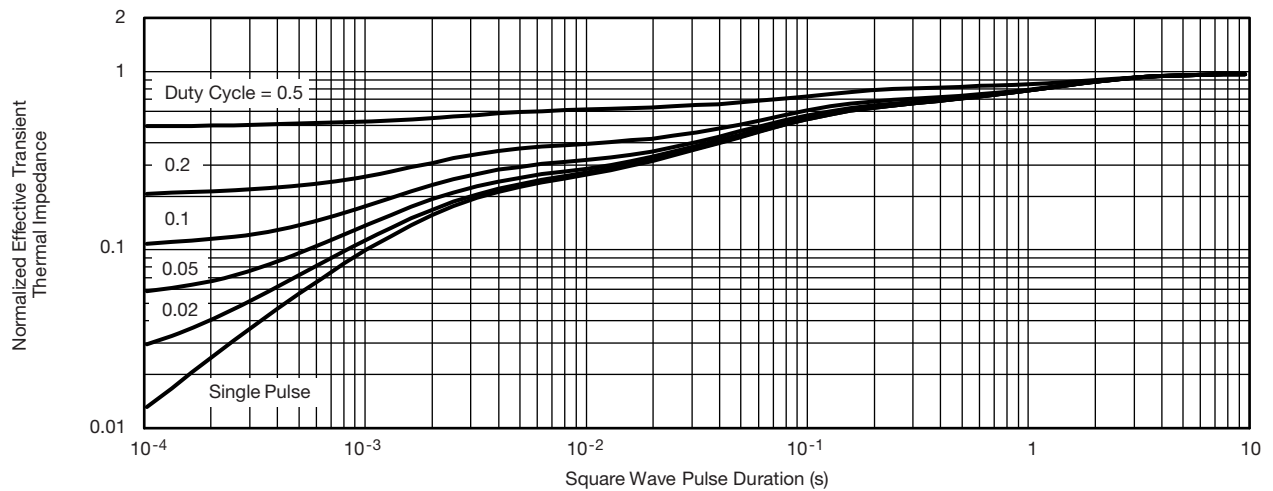


Safe Operating Area, Junction-to-Ambient

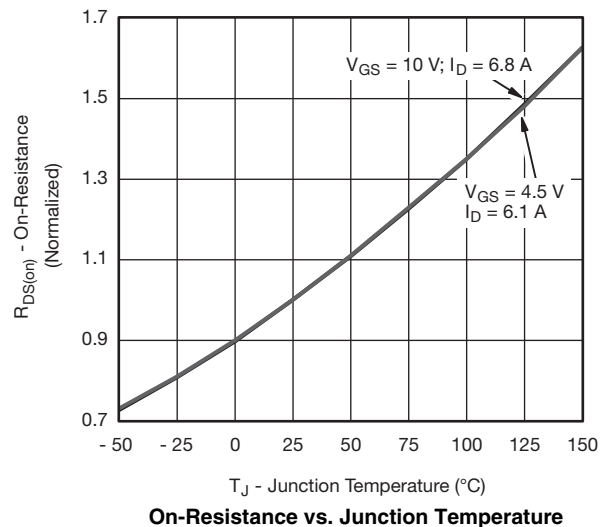
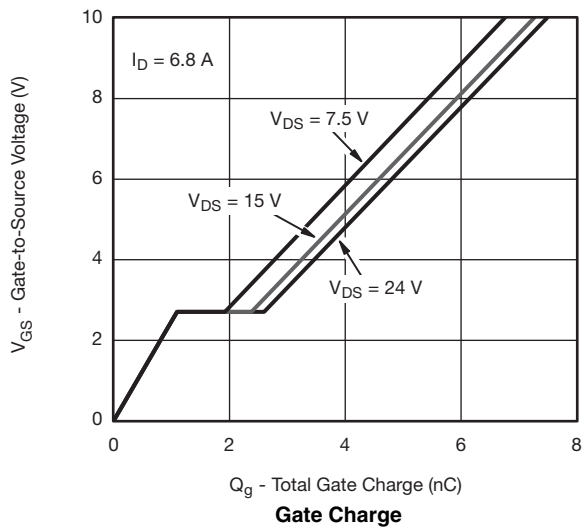
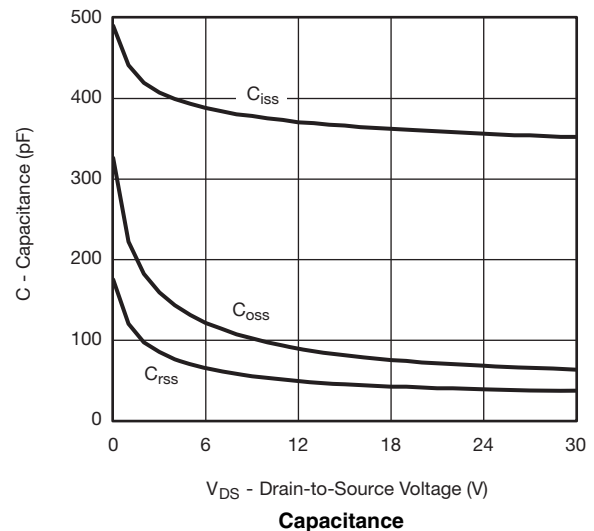
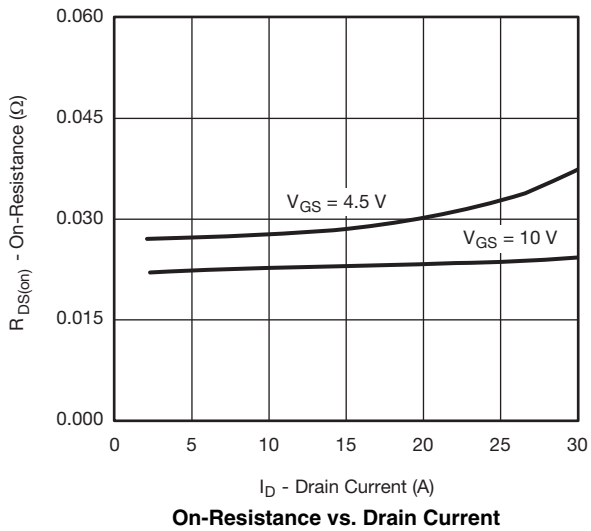
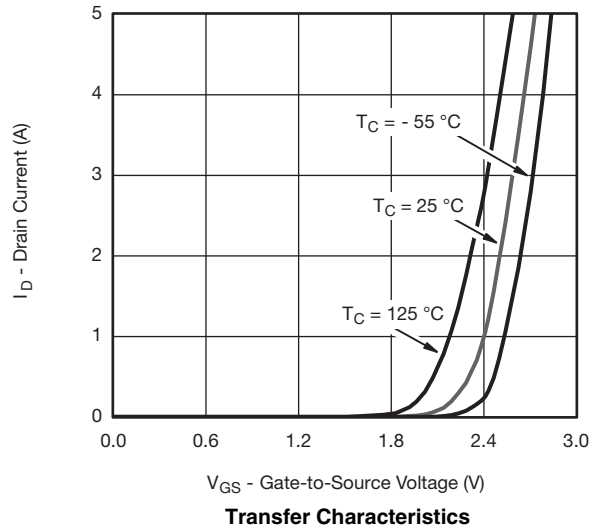
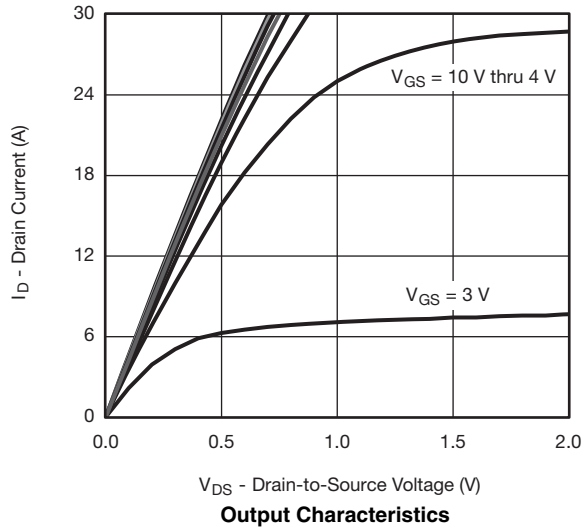
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



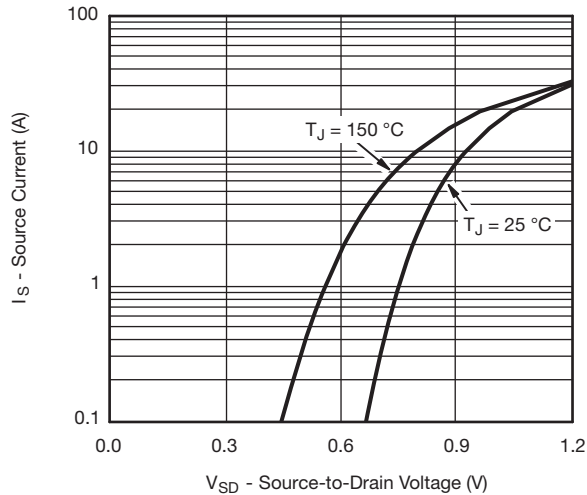
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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

Normalized Thermal Transient Impedance, Junction-to-Ambient

Normalized Thermal Transient Impedance, Junction-to-Foot

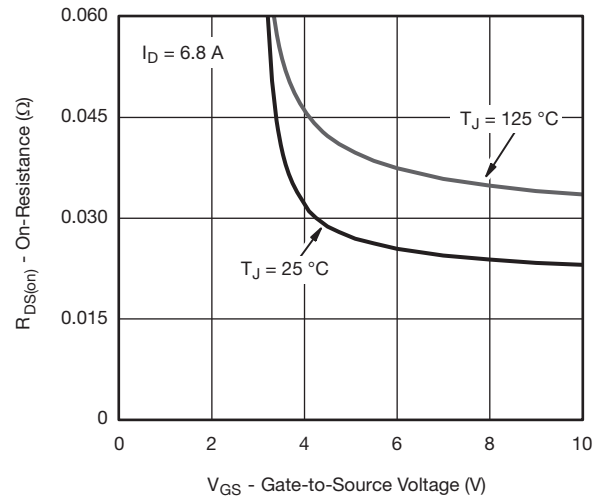
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



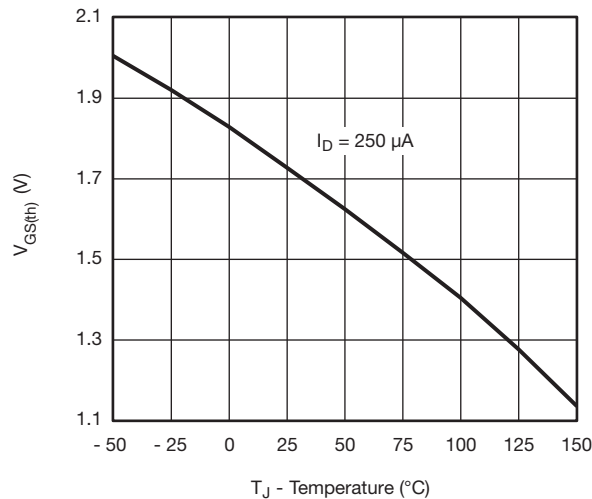
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



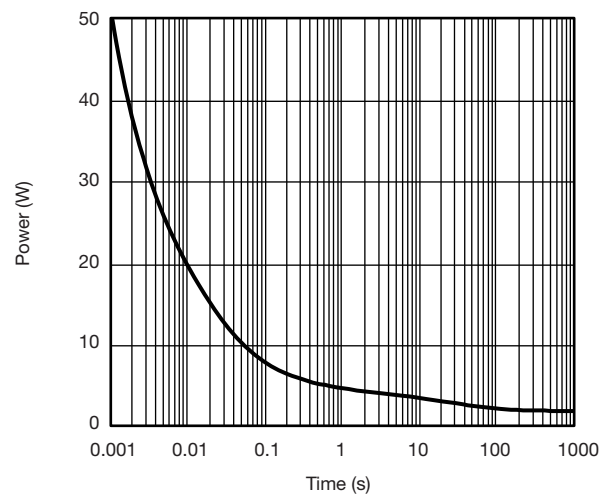
Source-Drain Diode Forward Voltage



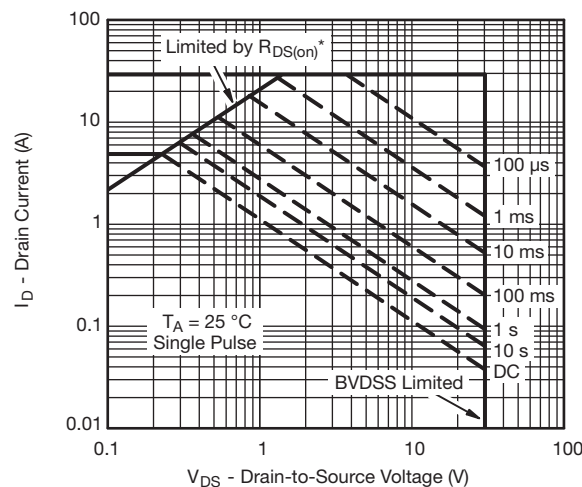
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



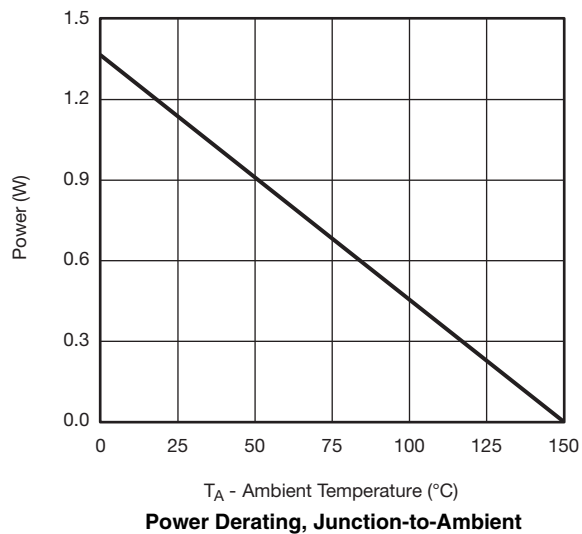
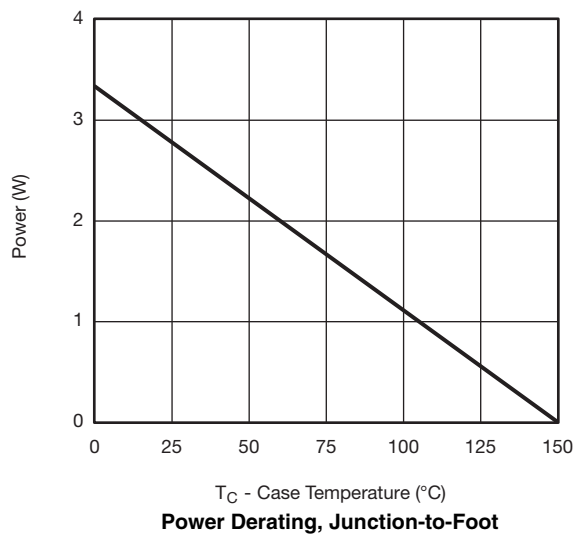
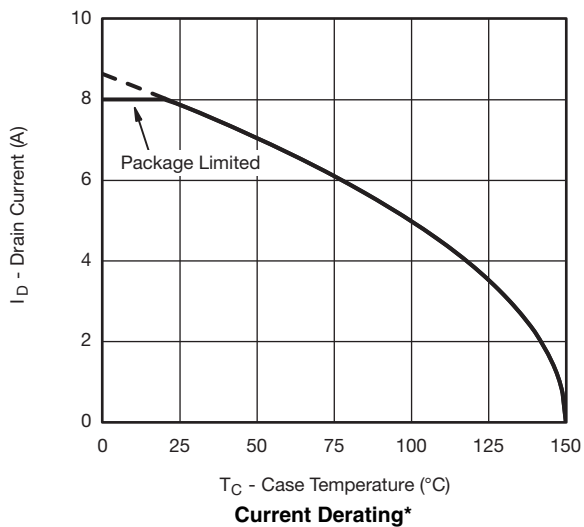
Single Pulse Power, Junction-to-Ambient



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

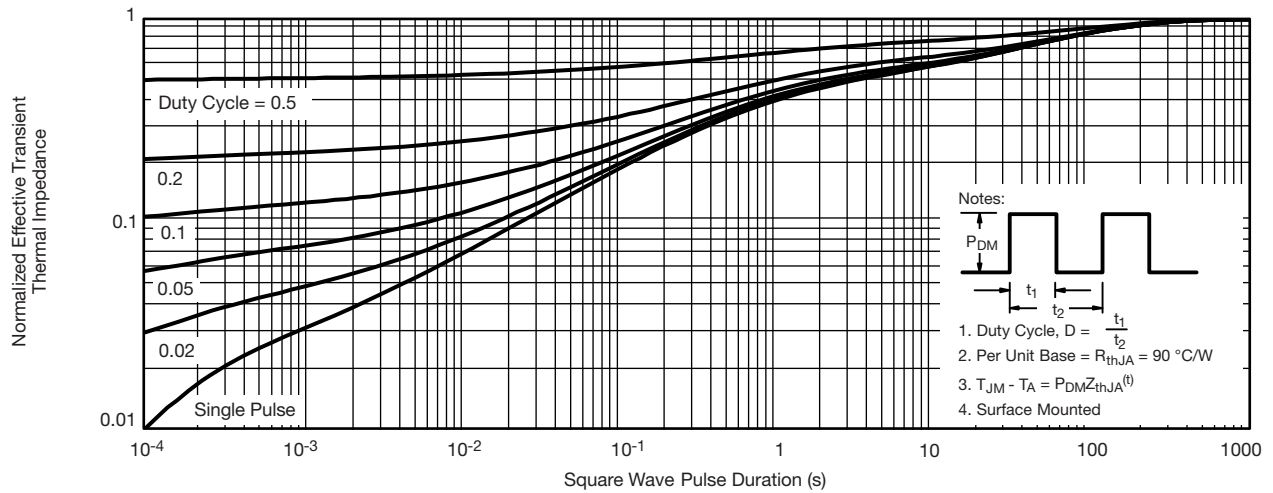
Safe Operating Area, Junction-to-Ambient

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

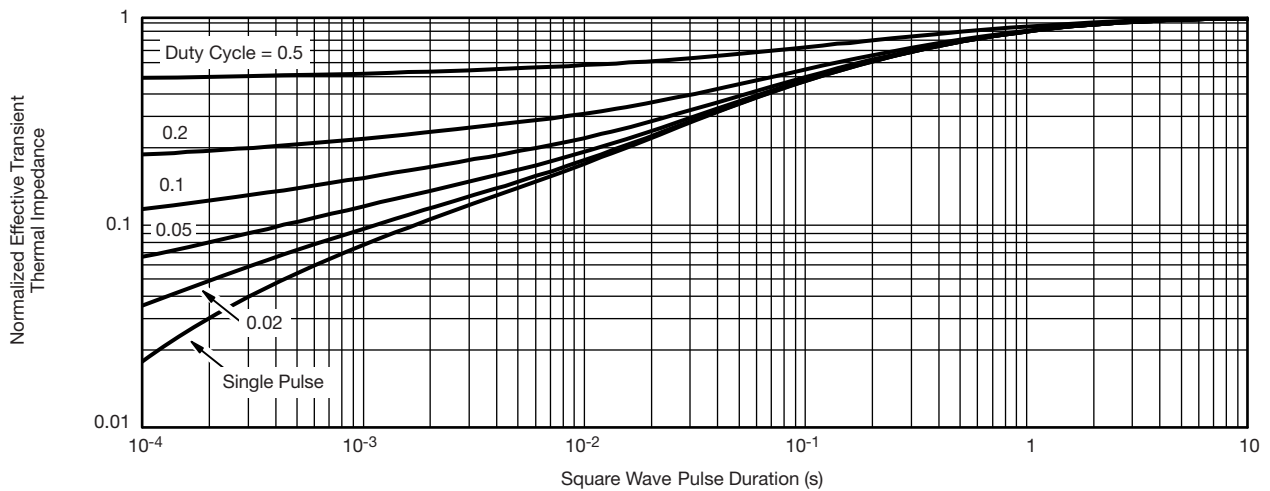


* The power dissipation P_D is based on $T_{J(max)} = 150\text{ °C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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



Normalized Thermal Transient Impedance, Junction-to-Ambient

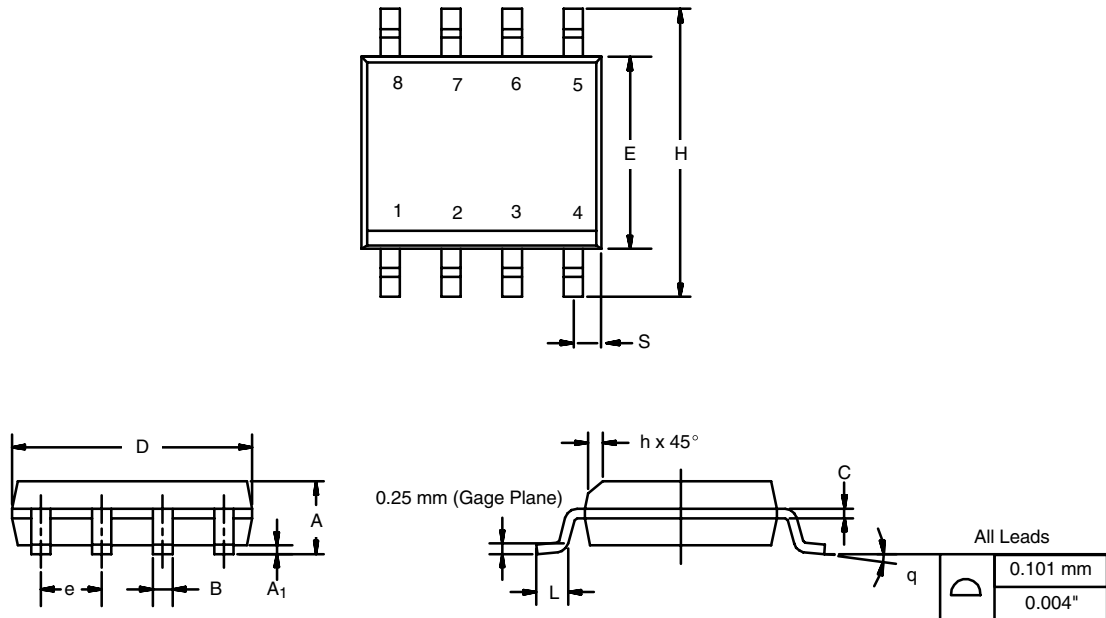


Normalized Thermal Transient Impedance, Junction-to-Foot

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations.

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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