Dual N-Channel Enhancement Mode Field Effect Transistor with Schottky Diode

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
30	0.008 at V_{GS} = 10 V	8	15 nC
	0.012 at V_{GS} = 4.5 V	6.8	

FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- Trench Power MOSFET
- 100 % UIS Tested
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

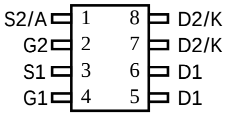
Pb-free

RoHS COMPLIANT

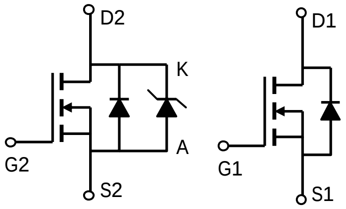
HALOGEN FREE

APPLICATIONS

- Set Top Box
- Low Current DC/DC



SOIC-8



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	MOSFET	Schottky	Units
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	±12		V
Continuous Drain Current[A]	T_A=25°C	I_D	8		A
	T_A=70°C		6.8		
Pulsed Drain Current[B]		I_{DM}	40		
Schottky reverse voltage		V_{KA}		30	V
Continuous Forward Current[A]	T_A=25°C	I_F		3	A
	T_A=70°C			2	
Pulsed Forward Current[B]		I_{FM}		40	
Power Dissipation	T_A=25°C	P_D	2	2	W
	T_A=70°C		1.44	1.44	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	°C

Parameter: Thermal Characteristics MOSFET		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient[A]	t ≤ 10s	$R_{\theta JA}$	48	62.5	°C/W
Maximum Junction-to-Ambient[A]	Steady-State		74	110	
Maximum Junction-to-Lead[C]	Steady-State	$R_{\theta JL}$	35	40	
Thermal Characteristics Schottky					
Maximum Junction-to-Ambient[A]	t ≤ 10s	$R_{\theta JA}$	47.5	62.5	°C/W
Maximum Junction-to-Ambient[A]	Steady-State		71	110	
Maximum Junction-to-Lead[C]	Steady-State	$R_{\theta JL}$	32	40	

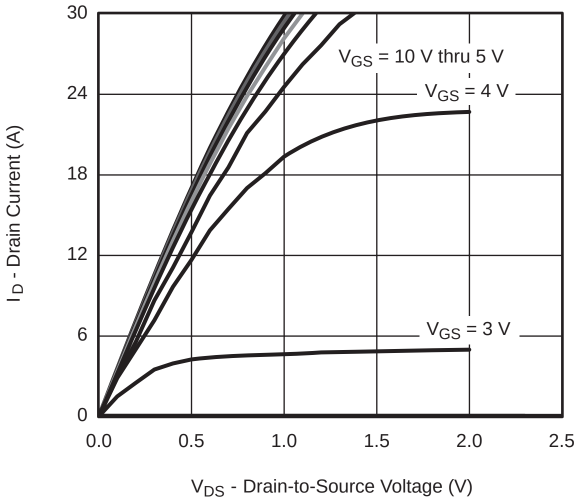
SPECIFICATIONS T_J = 25 °C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA		32		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.0		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 µA	1.0		2.5	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1	µA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq 5$ V, V_{GS} = 10 V	10			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 5 A		0.008		Ω
		V_{GS} = 4.5 V, I_D = 4 A		0.012		
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 5 A		16		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		586		pF
Output Capacitance	C_{oss}			117		
Reverse Transfer Capacitance	C_{rss}			55		
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 5 A		15		nC
		V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 5 A		3.7	5.6	
Gate-Source Charge	Q_{gs}			1.4		
Gate-Drain Charge	Q_{gd}			1.05		
Gate Resistance	R_g	f = 1 MHz	0.8	4.3	8.6	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 3 Ω $I_D \cong 5$ A, V_{GEN} = 4.5 V, R_g = 1 Ω		12	24	ns
Rise Time	t_r			55	100	
Turn-Off Delay Time	$t_{d(off)}$			11	22	
Fall Time	t_f			8	16	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 3 Ω $I_D \cong 5$ A, V_{GEN} = 10 V, R_g = 1 Ω		4	8	
Rise Time	t_r			9	18	
Turn-Off Delay Time	$t_{d(off)}$			10	20	
Fall Time	t_f			6	12	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			2.25	A
Pulse Diode Forward Current	I_{SM}				24	
Body Diode Voltage	V_{SD}	I_S = 2 A, V_{GS} = 0 V		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 5 A, dI/dt = 100 A/µs, T_J = 25 °C		11	20	ns
Body Diode Reverse Recovery Charge	Q_{rr}			4	8	nC
Reverse Recovery Fall Time	t_a			7		ns
Reverse Recovery Rise Time	t_b			4		

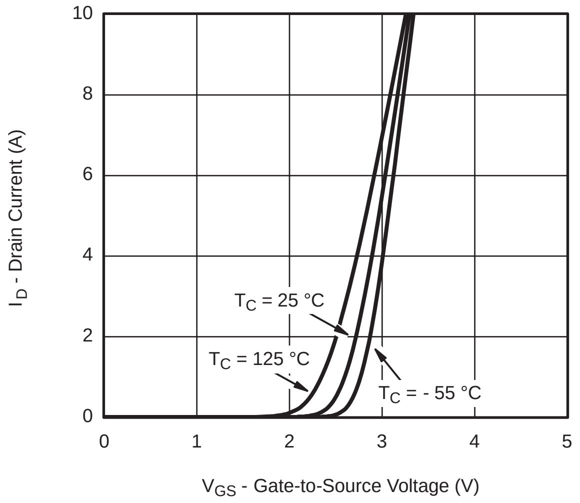
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing.

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.

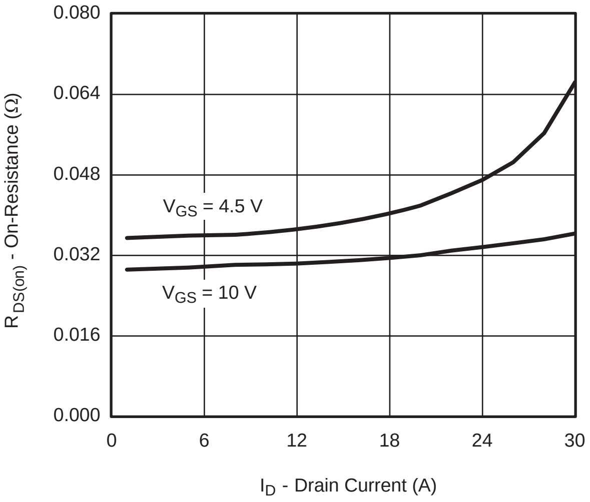
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



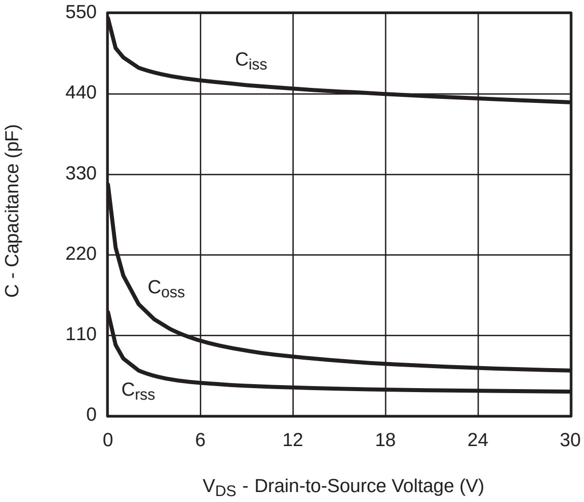
Output Characteristics



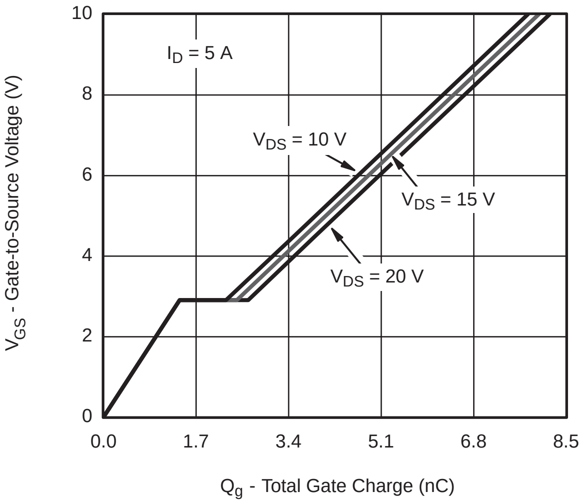
Transfer Characteristics



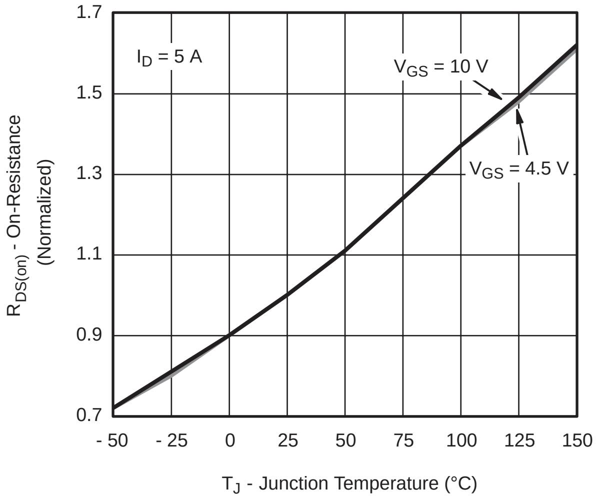
On-Resistance vs. Drain Current



Capacitance

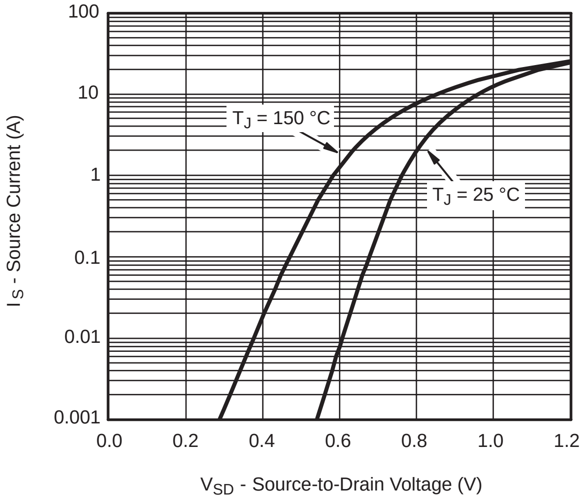


Gate Charge

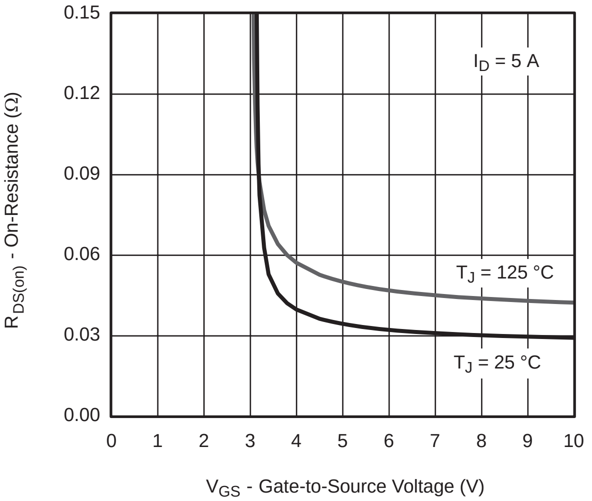


On-Resistance vs. Junction Temperature

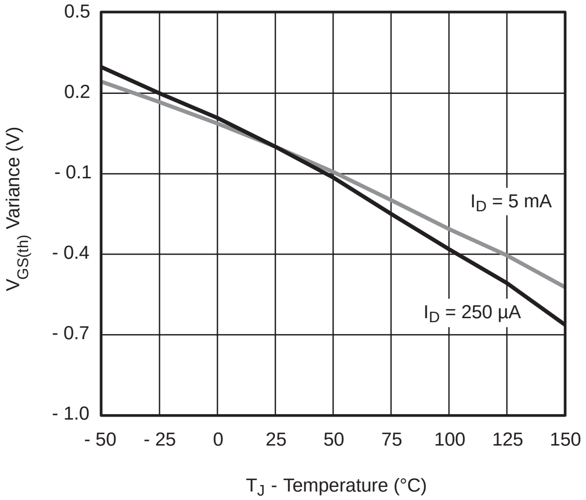
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



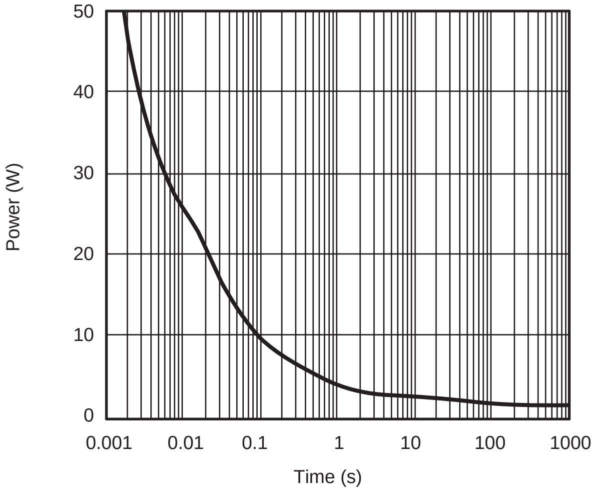
Source-Drain Diode Forward Voltage



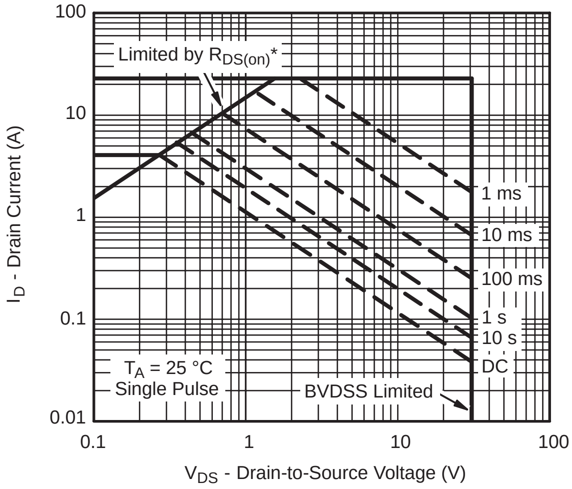
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



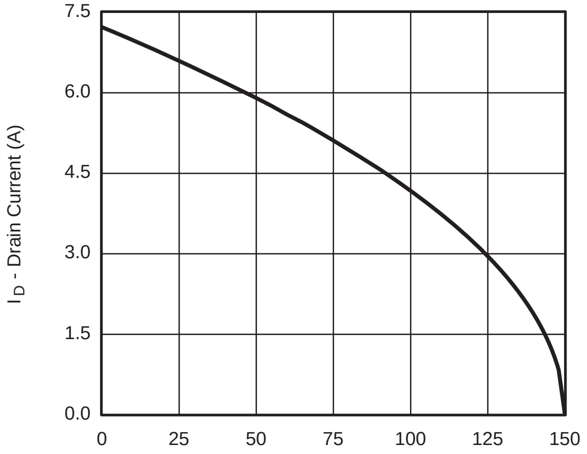
Single Pulse Power



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

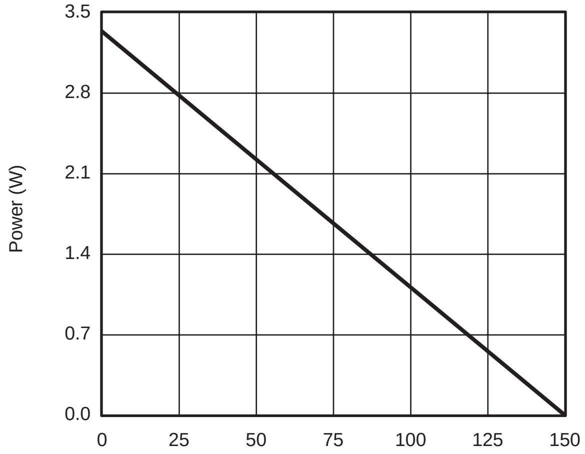
Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



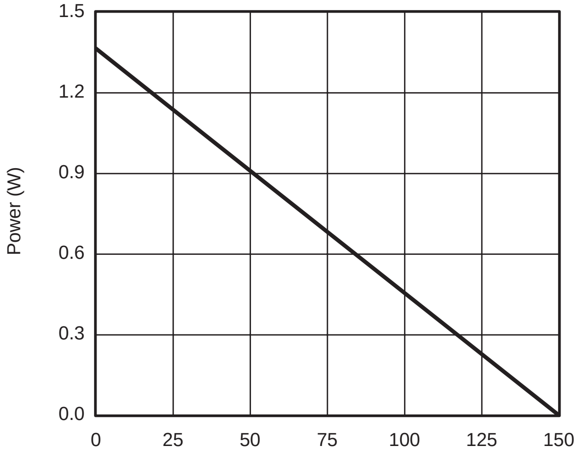
T_C - Case Temperature (°C)

Current Derating*



T_C - Case Temperature (°C)

Power, Junction-to-Foot



T_A - Ambient Temperature (°C)

Power, Junction-to-Ambient

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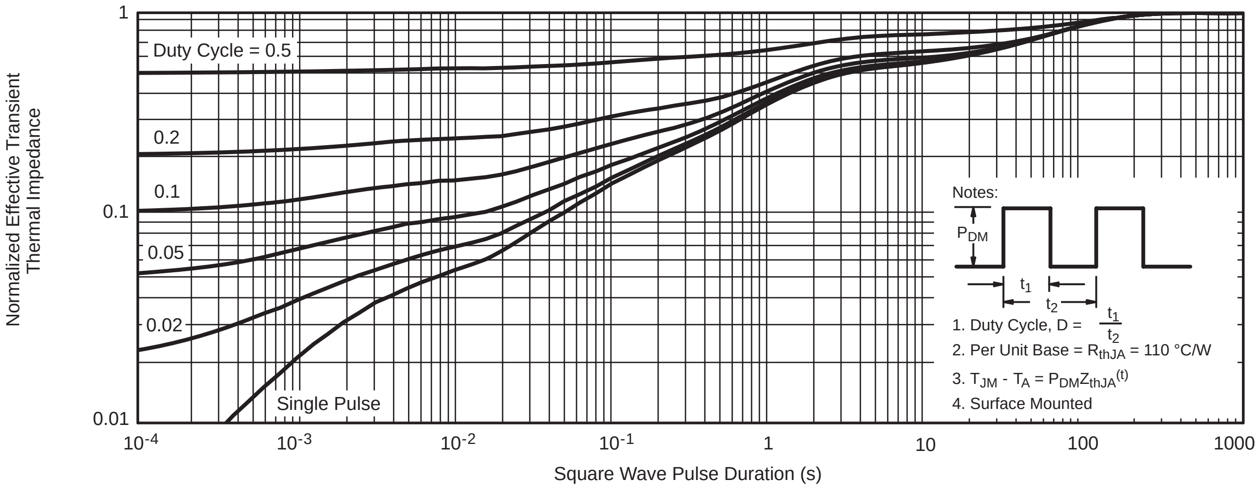
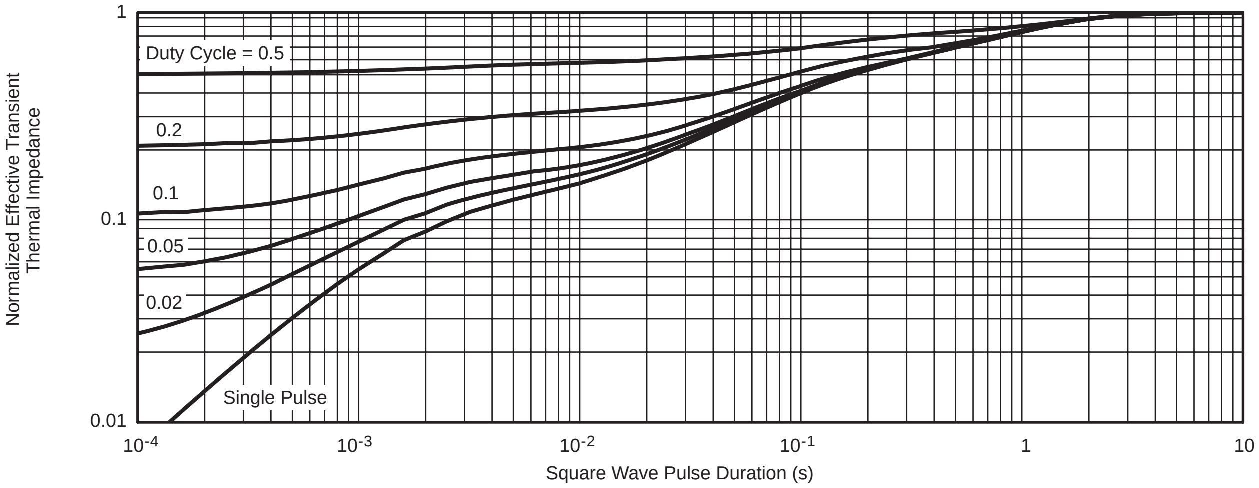
* The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



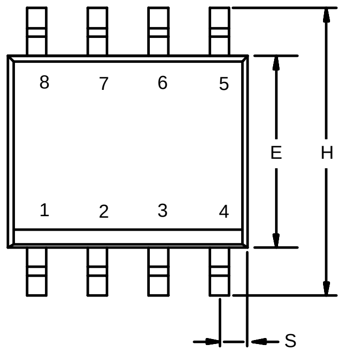
Normalized Thermal Transient Impedance, Junction-to-Ambient

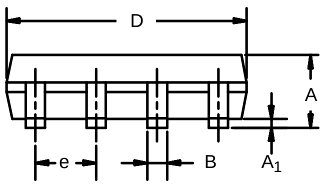


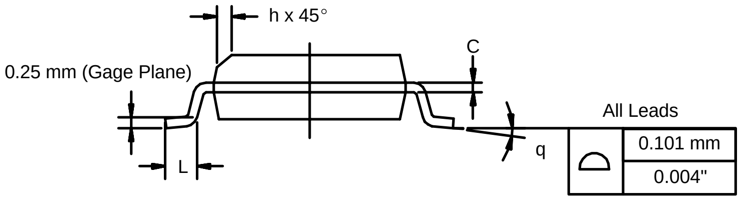
Normalized Thermal Transient Impedance, Junction-to-Foot

SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012

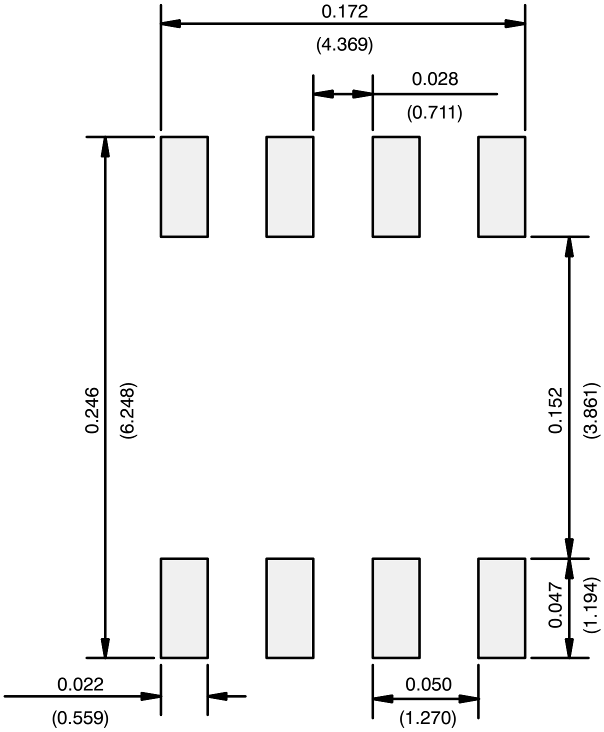






DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A_1	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	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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