

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

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
30	0.032 at V _{GS} = 10 V	6.8	9.2 nC
	0.045 at V _{GS} = 4.5 V	5.8	

FEATURES

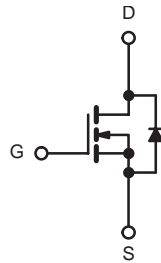
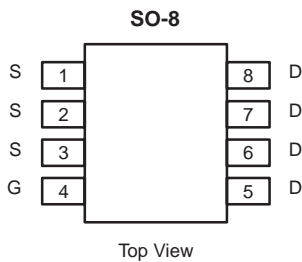
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Notebook Load Switch
- Low Current dc-to-dc



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	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	6.8 ^a	A
		T _C = 70 °C	5 ^a	
		T _A = 25 °C	6.5 ^{b,c}	
		T _A = 70 °C	4.9 ^{b,c}	
Pulsed Drain Current	I _{DM}	30		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	2.7	
		T _A = 25 °C	1.7 ^{b,c}	
Maximum Power Dissipation	P _D	T _C = 25 °C	4.1	W
		T _C = 70 °C	2.6	
		T _A = 25 °C	2 ^{b,c}	
		T _A = 70 °C	1.25 ^{b,c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{b, d}	R _{thJA}	45	62.5	°C/W	
Maximum Junction-to-Foot	R _{thJF}	25	30		

Notes:

- Package Limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 5 s.
- Maximum under Steady State conditions is 110 °C/W.

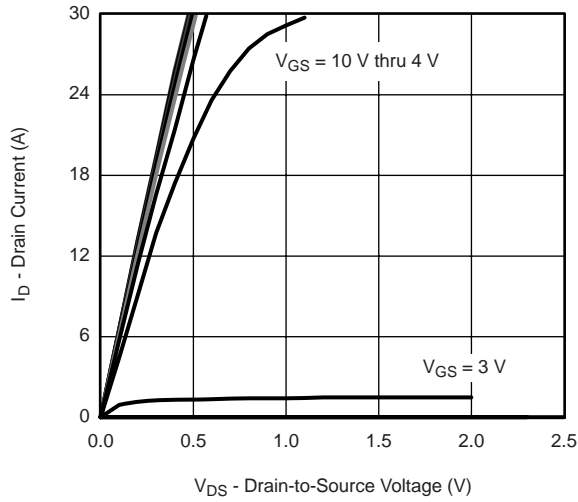
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted								
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit		
Static								
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V		
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		33		mV/ $^\circ\text{C}$		
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 6.2				
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	V		
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA		
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA		
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10			
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	20			A		
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$		0.016	0.032	Ω		
		$V_{GS} = 4.5\text{ V}, I_D = 4\text{ A}$		0.029	0.045			
Forward Transconductance ^a	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 5\text{ A}$		24		S		
Dynamic^b								
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1295		pF		
Output Capacitance	C_{oss}			170				
Reverse Transfer Capacitance	C_{rss}			72				
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 5\text{ A}$		21.8	33	nC		
Gate-Source Charge	Q_{gs}	$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$		9.2	14			
Gate-Drain Charge	Q_{gd}			3.8				
Gate Resistance	R_g			2.5				
Turn-On Delay Time	$t_{d(on)}$	$f = 1\text{ MHz}$		2.4		Ω		
Rise Time	t_r		$V_{DD} = 15\text{ V}, R_L = 3\text{ }\Omega$ $I_D \cong 5\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		21		40	ns
Turn-Off DelayTime	$t_{d(off)}$				14		25	
Fall Time	t_f				20		40	
Turn-On Delay Time	$t_{d(on)}$			9	18			
Rise Time	t_r			10	20			
Turn-Off DelayTime	$t_{d(off)}$			8	16			
Fall Time	t_f			21	35			
				8	16			
Drain-Source Body Diode Characteristics								
Continous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			2.7	A		
Pulse Diode Forward Current	I_{SM}				30			
Body Diode Voltage	V_{SD}	$I_S = 1.7\text{ A}, V_{GS} = 0\text{ V}$		0.77	1.2	V		
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 3\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		21	40	ns		
Body Diode Reverse Recovery Charge	Q_{rr}			15	30	nC		
Reverse Recovery Fall Time	t_a			13		ns		
Reverse Recovery Rise Time	t_b			8				

Notes:

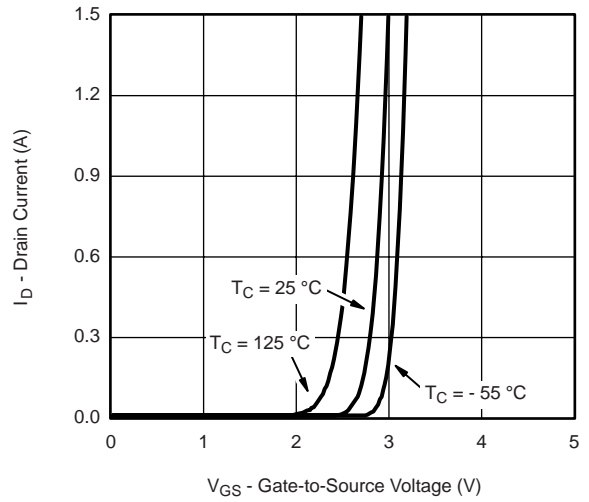
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

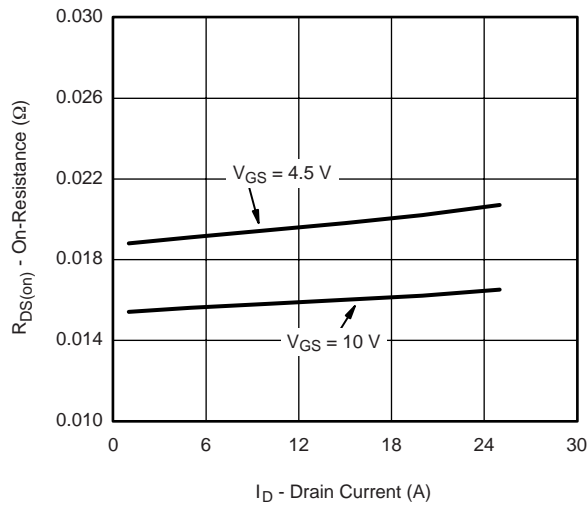
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



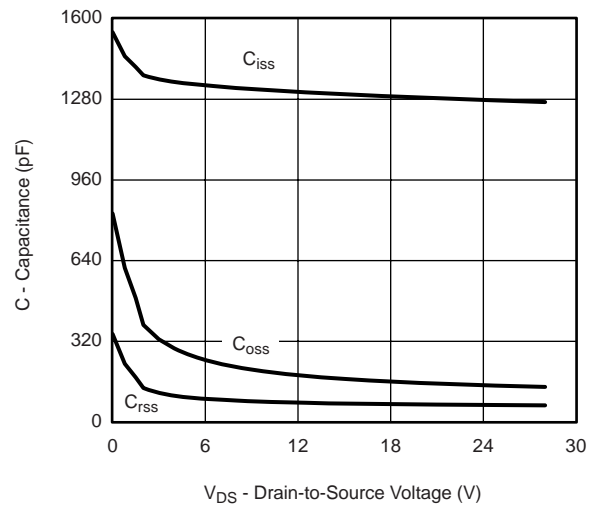
V_{DS} - Drain-to-Source Voltage (V)
Output Characteristics



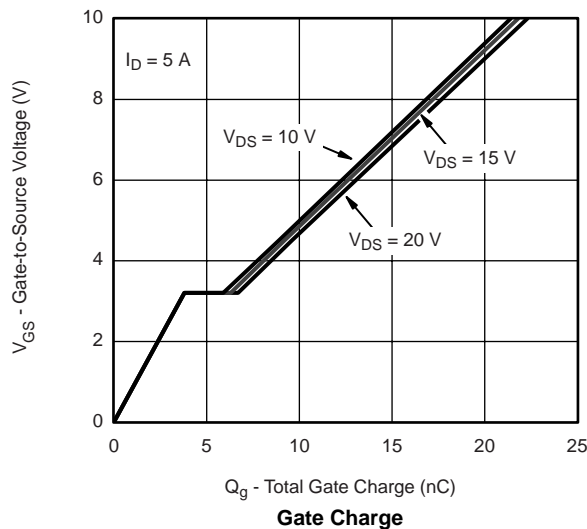
V_{GS} - Gate-to-Source Voltage (V)
Transfer Characteristics



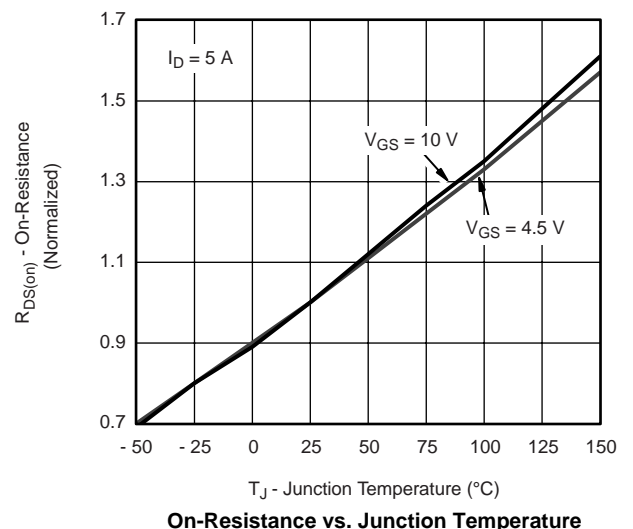
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

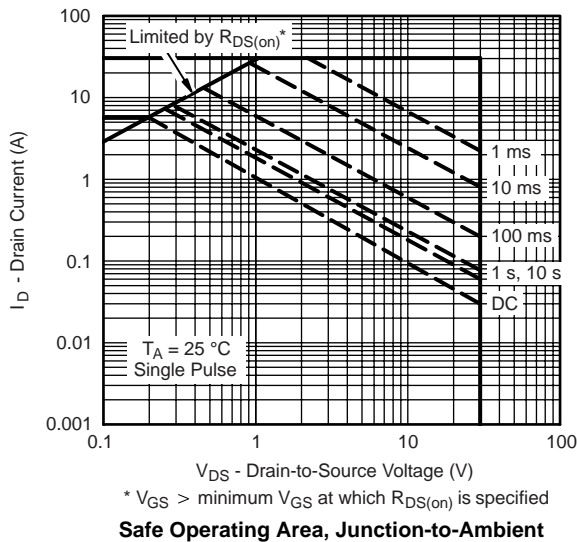
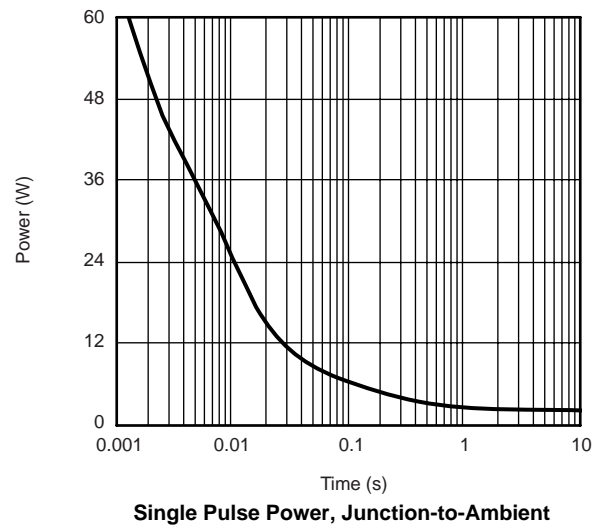
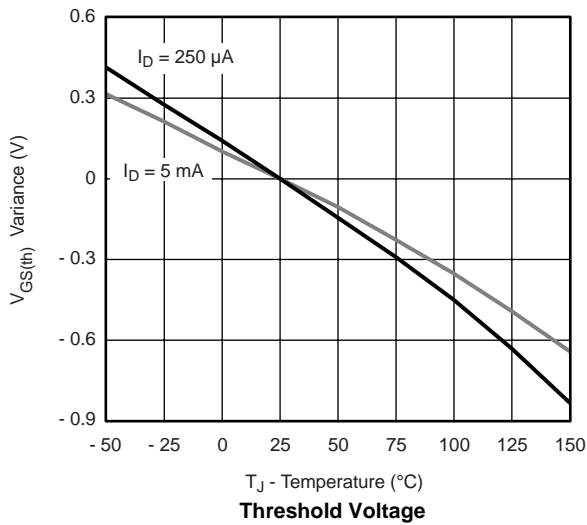
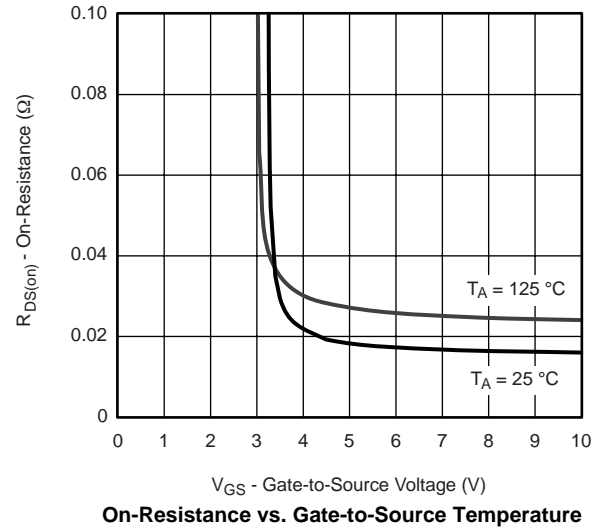
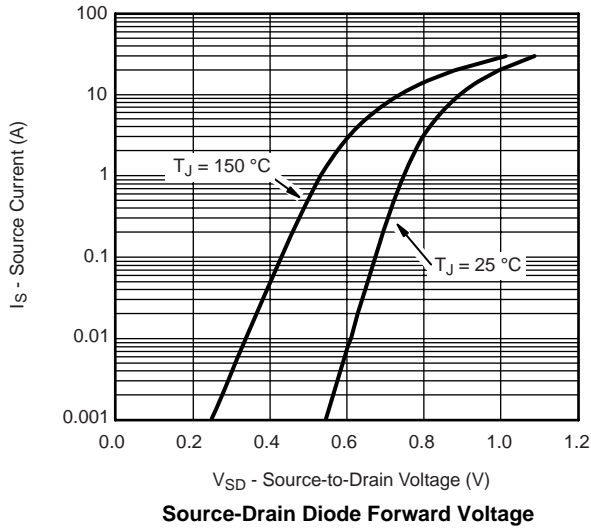


Gate Charge

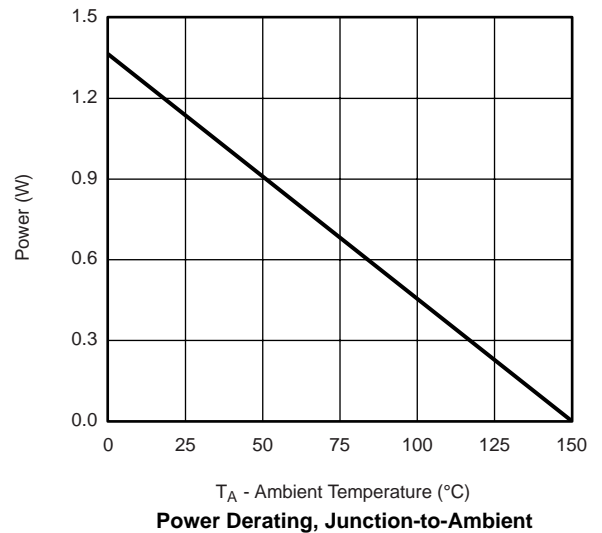
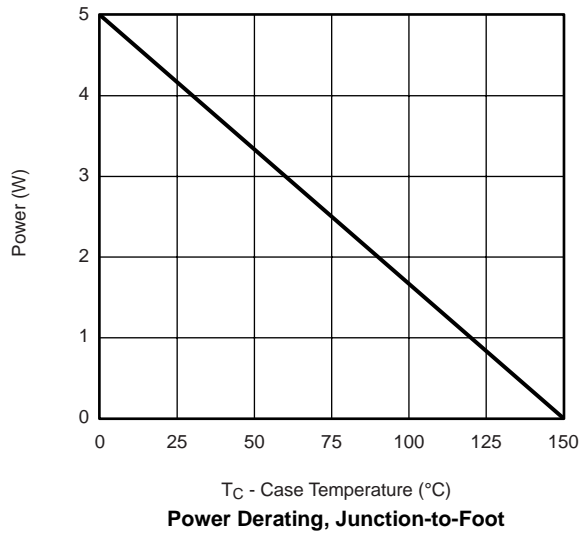
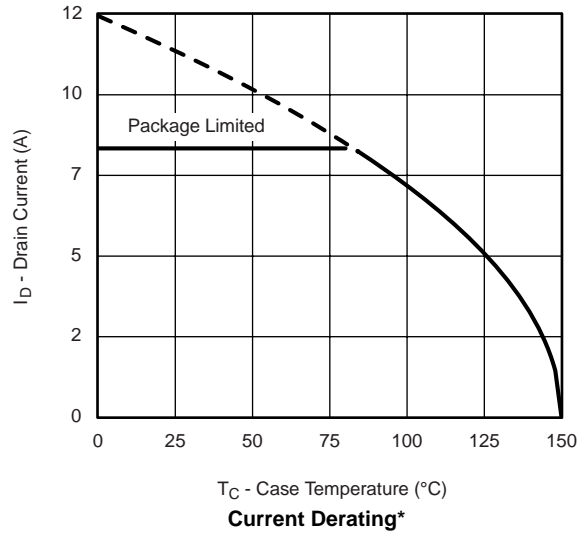


On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

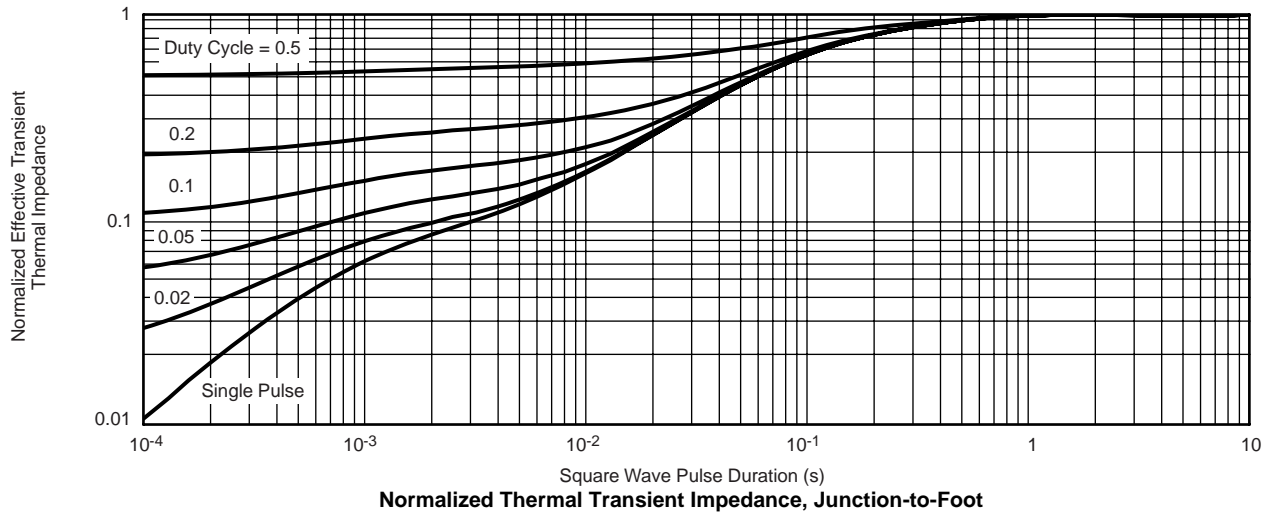
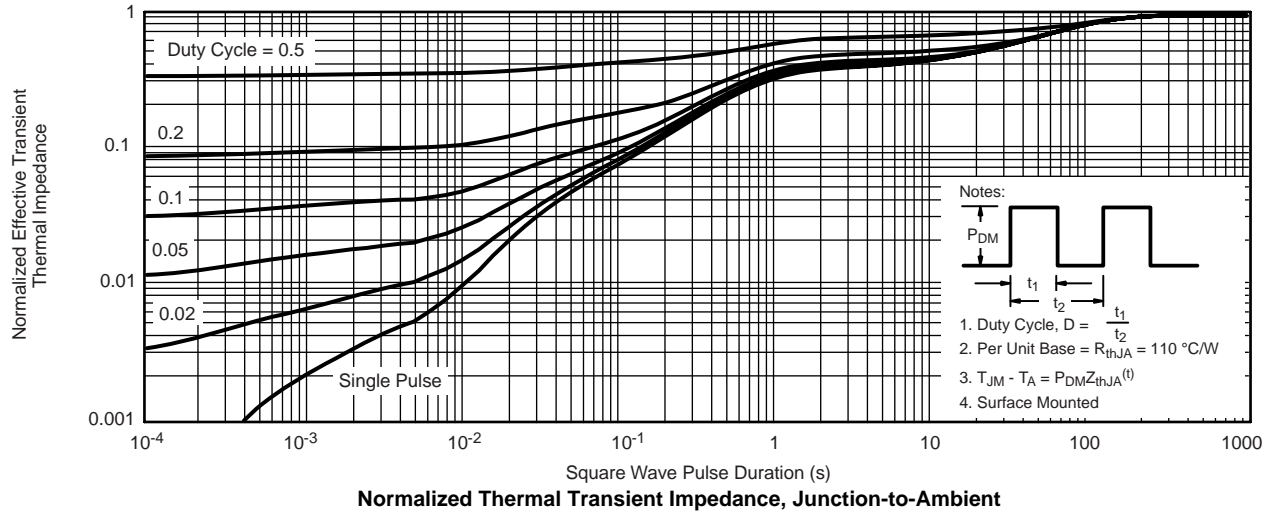


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



* 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.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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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