

## P-Channel 1.8-V (G-S) MOSFET

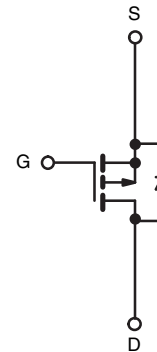
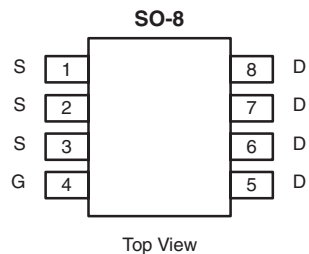
PRODUCT SUMMARY			
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>b</sup>	$Q_g$ (Typ.)
- 8	0.009 at $V_{GS} = - 4.5$ V	- 13.7	55 nC
	0.011 at $V_{GS} = - 2.5$ V	- 12.4	
	0.016 at $V_{GS} = - 1.8$ V	- 10	

### FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET<sup>®</sup> Power MOSFET
- 1.8 V Rated
- 100 %  $R_g$  Tested



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



P-Channel MOSFET

Ordering Information: Si4465ADY-T1-E3 (Lead (Pb)-free)  
Si4465ADY-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	- 8	V	
Gate-Source Voltage	$V_{GS}$	$\pm 8$		
Continuous Drain Current ( $T_J = 150$ °C) <sup>a, b</sup>	$I_D$	$T_A = 25$ °C	- 13.7	A
		$T_A = 70$ °C	- 11	
		$T_C = 25$ °C	- 20	
		$T_C = 70$ °C	- 16	
Pulsed Drain Current	$I_{DM}$	- 40		
Continuous Source Current (Diode Conduction) <sup>a, b</sup>	$I_S$	- 2.5		
	$I_{SM}$	40		
Maximum Power Dissipation <sup>a, b</sup>	$P_D$	$T_A = 25$ °C	3.0	W
		$T_A = 70$ °C	1.95	
		$T_C = 25$ °C	6.5	
		$T_C = 70$ °C	4.2	
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 (MOSFET) <sup>a</sup>	$R_{thJA}$	$t \leq 10$ s	34	41	°C/W
		Steady State	67	80	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	15	19		

Notes:

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

b.  $t \leq 10$  s.

<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\text{ }\mu\text{A}$	- 0.45		- 1.0	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -8\text{ V}$ , $V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -8\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 55\text{ }^\circ\text{C}$			- 5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq -5\text{ V}$ , $V_{GS} = -4.5\text{ V}$	- 20			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$ , $I_D = -14\text{ A}$		0.0075	0.009	$\Omega$
		$V_{GS} = -2.5\text{ V}$ , $I_D = -12\text{ A}$		0.0092	0.011	
		$V_{GS} = 1.8\text{ V}$ , $I_D = 10\text{ A}$		0.013	0.016	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}$ , $I_D = -14\text{ A}$		58		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -2.1\text{ A}$ , $V_{GS} = 0\text{ V}$		- 0.57	- 1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -4\text{ V}$ , $V_{GS} = -4.5\text{ V}$ , $I_D = -14\text{ A}$		55	85	nC
Gate-Source Charge	$Q_{gs}$			6		
Gate-Drain Charge	$Q_{gd}$			10		
Gate Resistance	$R_g$			2.5	3.8	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4\text{ V}$ , $R_L = 4\text{ }\Omega$ $I_D \cong -10\text{ A}$ , $V_{GEN} = -4.5\text{ V}$ , $R_g = 6\text{ }\Omega$		33	50	ns
Rise Time	$t_r$			170	255	
Turn-Off Delay Time	$t_{d(off)}$			168	255	
Fall Time	$t_f$			112	170	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -2.1\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$		85	130	nC
Body Diode Reverse Recovery Charge	$Q_{rr}$			81	125	

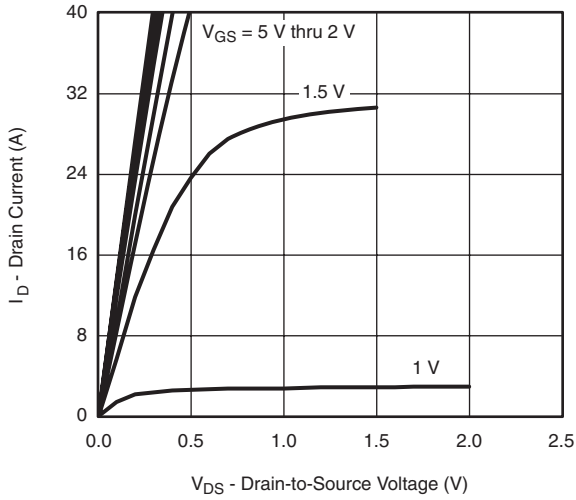
Notes:

a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

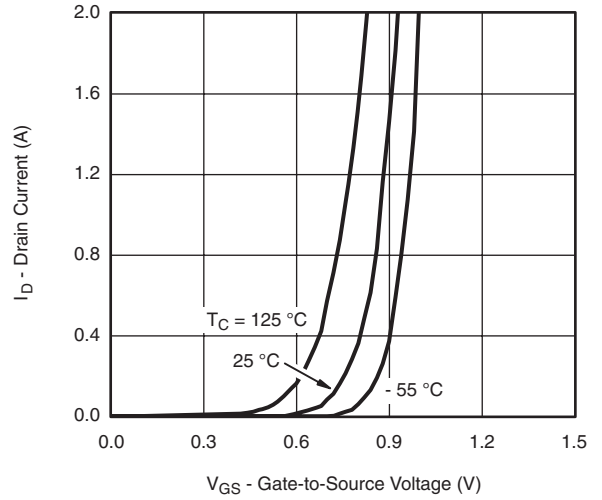
b. Guaranteed by design, not subject to production testing.

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.

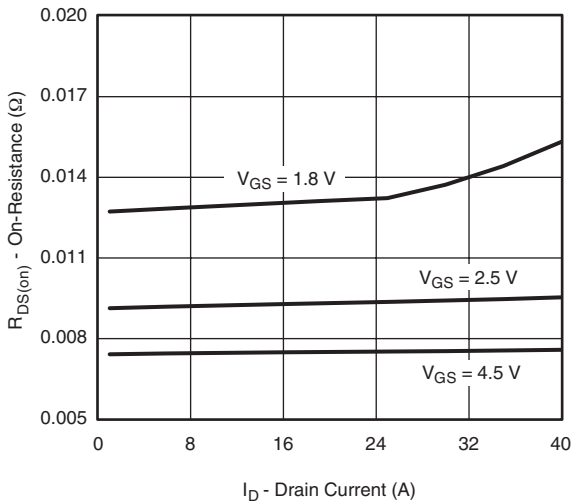
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



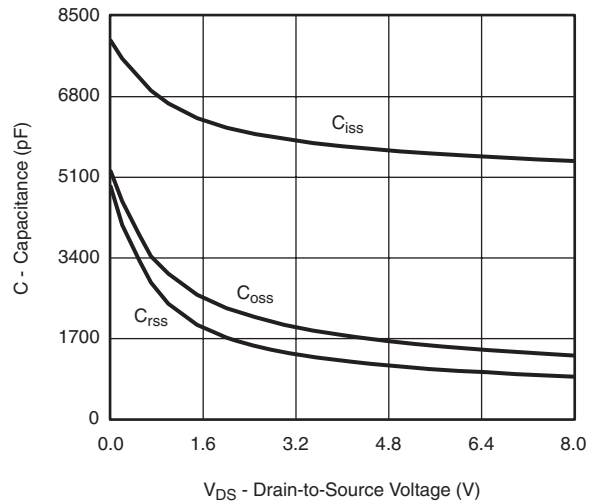
$V_{DS}$  - Drain-to-Source Voltage (V)  
**Output Characteristics**



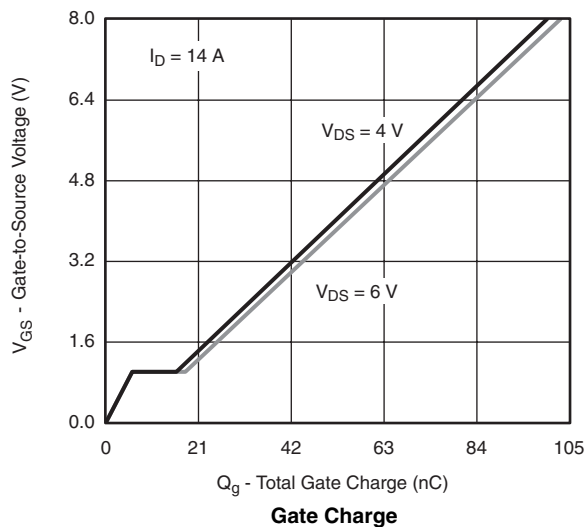
$V_{GS}$  - Gate-to-Source Voltage (V)  
**Transfer Characteristics**



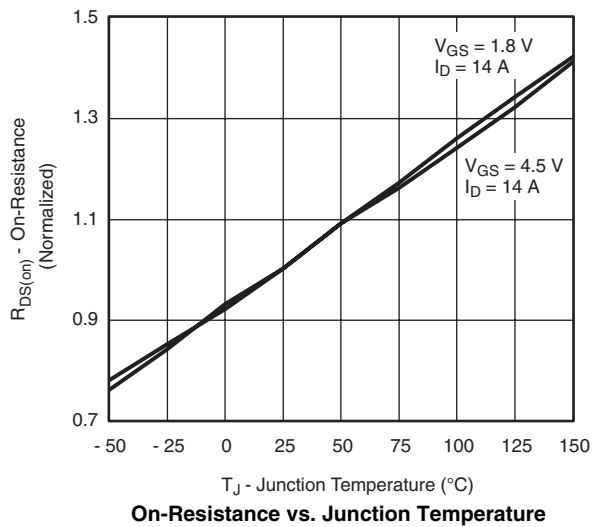
$I_D$  - Drain Current (A)  
**On-Resistance vs. Drain Current**



$V_{DS}$  - Drain-to-Source Voltage (V)  
**Capacitance**

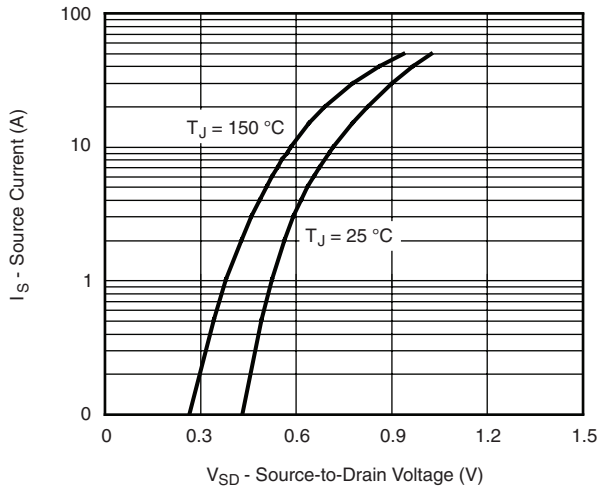


$Q_g$  - Total Gate Charge (nC)  
**Gate Charge**

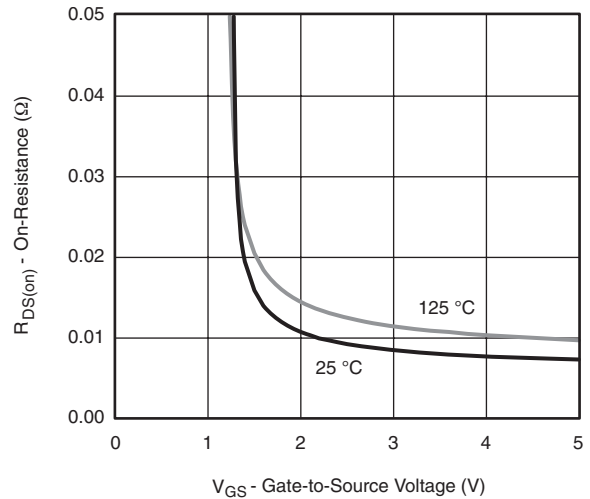


$T_J$  - Junction Temperature ( $^{\circ}C$ )  
**On-Resistance vs. Junction Temperature**

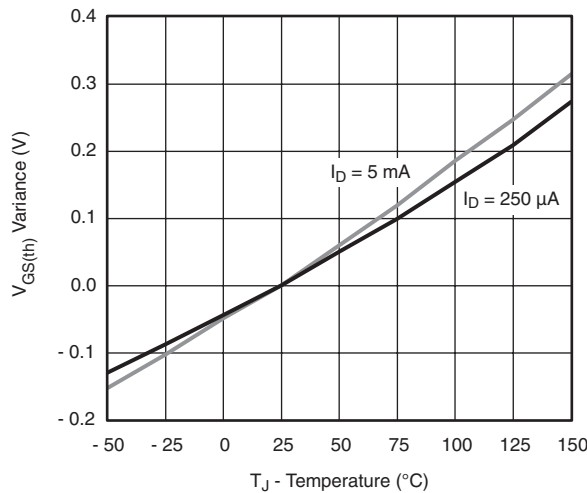
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



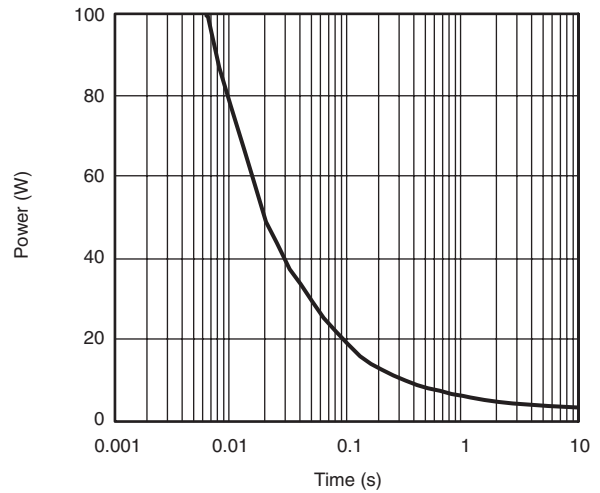
**Source-Drain Diode Forward Voltage**



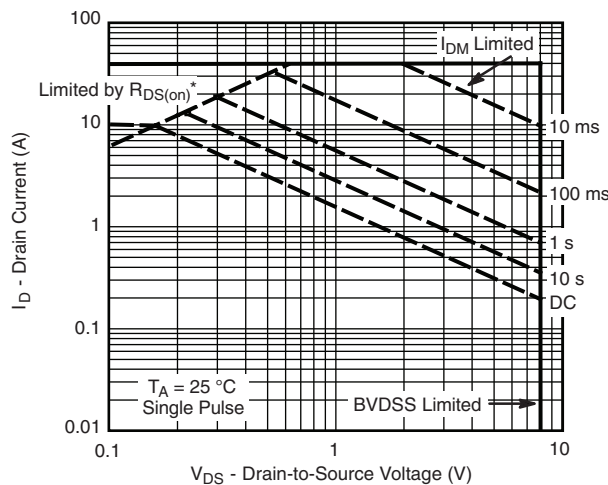
**On-Resistance vs. Gate-to-Source Voltage**



**Threshold Voltage**



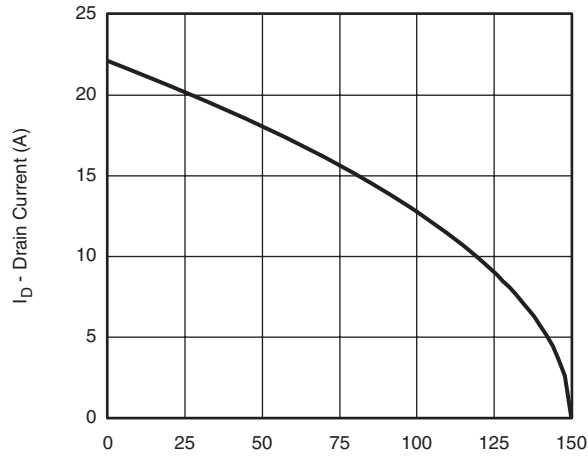
**Single Pulse Power, Junction-to-Ambient**



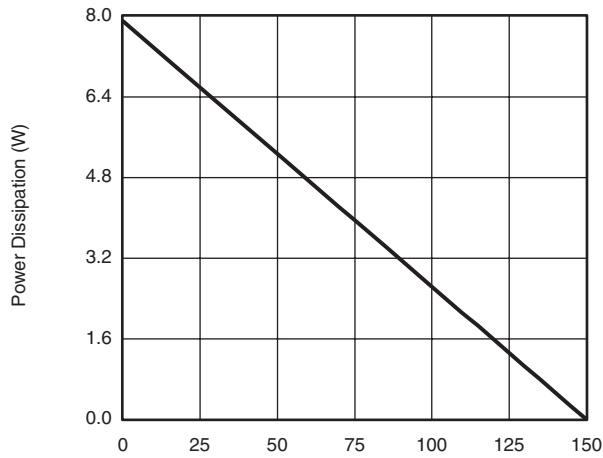
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**Safe Operatin Area**

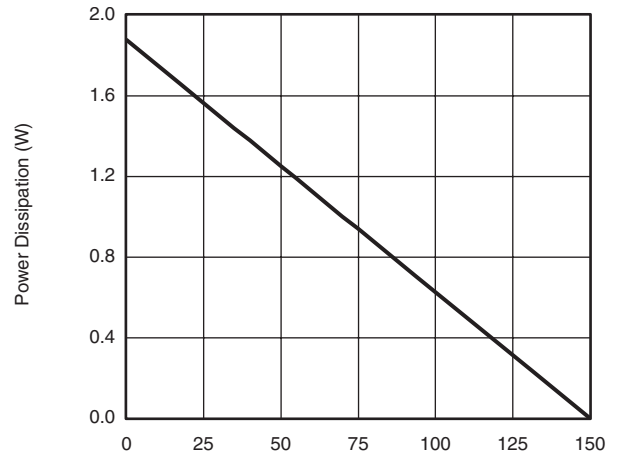
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



$T_C$  - Case Temperature (°C)  
**Current Derating**



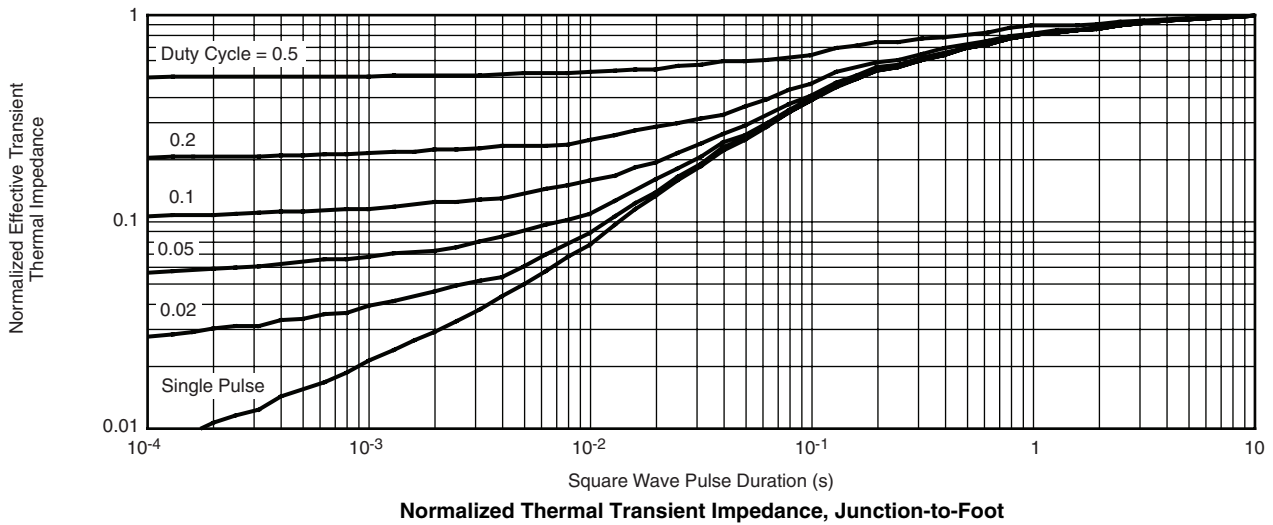
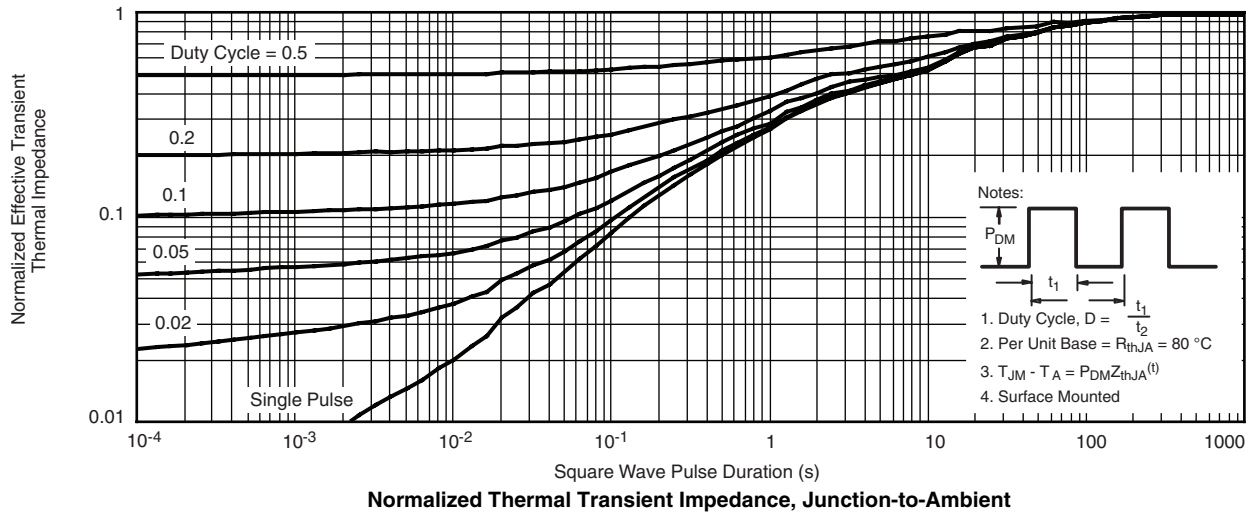
$T_C$  - Case Temperature (°C)  
**Power, Junction-to-Foot**



$T_A$  - Ambient Temperature (°C)  
**Power, Junction-to-Ambient**

\* 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



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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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