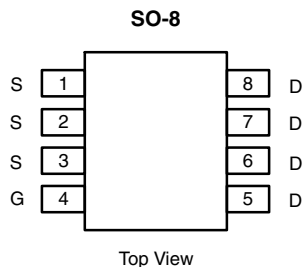




## P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) Max.	I <sub>D</sub> <sup>a</sup>	Q <sub>g</sub> (Typ.)
- 30	0.0065 at V <sub>GS</sub> = - 10 V	- 29	66 nC
	0.0082 at V <sub>GS</sub> = - 6 V	- 23	
	0.0112 at V <sub>GS</sub> = - 4.5 V	- 20	



**Ordering Information:**  
 Si4491EDY-T1-GE3 (Lead (Pb)-free and Halogen-free)

### FEATURES

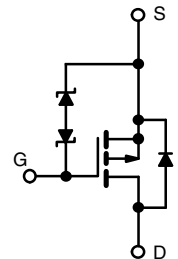
- Extended V<sub>GS</sub> range (± 25 V) for adaptor switch applications
- Extremely low R<sub>DS(on)</sub>
- TrenchFET<sup>®</sup> Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested
- Typical ESD Performance: 4000 V (HBM)
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
 COMPLIANT  
 HALOGEN  
 FREE

### APPLICATIONS

- Adaptor Switch, Load Switch
- Power Management
- Notebook Computers and Portable Battery Packs



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C, unless otherwise noted)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	- 30	V	
Gate-Source Voltage	V <sub>GS</sub>	± 25		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>C</sub> = 25 °C	- 25.8	A	
	T <sub>C</sub> = 70 °C	- 20.7		
	T <sub>A</sub> = 25 °C	- 17.3		
	T <sub>A</sub> = 70 °C	- 13.9 <sup>b, c</sup>		
Pulsed Drain Current (t = 300 μs)	I <sub>DM</sub>	- 60		
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	- 5.8 <sup>b, c</sup>		
	T <sub>A</sub> = 25 °C	- 2.6 <sup>b, c</sup>		
Single Pulse Avalanche Current	I <sub>AS</sub>	- 40		
Single Pulse Avalanche Energy	E <sub>AS</sub>	80	mJ	
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	6.9	W	
	T <sub>C</sub> = 70 °C	4.4		
	T <sub>A</sub> = 25 °C	3.1 <sup>b, c</sup>		
	T <sub>A</sub> = 70 °C	2 <sup>b, c</sup>		
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	R <sub>thJA</sub>	33	40	°C/W
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	15	17	

Notes:

- Based on T<sub>C</sub> = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 90 °C/W.

SPECIFICATIONS ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)								
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit		
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-30			V		
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-24		mV/ $^\circ\text{C}$		
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			6				
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.2		-2.8	V		
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 25\text{ V}$			$\pm 150$	$\mu\text{A}$		
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 15$			
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			-1			
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10			
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	-20			A		
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -13\text{ A}$		0.0054	0.0065	$\Omega$		
		$V_{GS} = -6\text{ V}, I_D = -10\text{ A}$		0.0068	0.0082			
		$V_{GS} = -4.5\text{ V}, I_D = -8\text{ A}$		0.0093	0.0112			
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -13\text{ A}$		44		S		
<b>Dynamic<sup>b</sup></b>								
Input Capacitance	$C_{iss}$	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		4620		$\mu\text{F}$		
Output Capacitance	$C_{oss}$			880				
Reverse Transfer Capacitance	$C_{rss}$			820				
Total Gate Charge	$Q_g$	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -17.3\text{ A}$		102	153	nC		
				66	80			
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -15\text{ V}, V_{GS} = -5\text{ V}, I_D = -17.3\text{ A}$		16				
Gate-Drain Charge	$Q_{gd}$			28				
Gate Resistance	$R_g$		$f = 1\text{ MHz}$	0.3	1.3		2.6	$\Omega$
Turn-On Delay Time	$t_{d(on)}$		$V_{DD} = 0\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		70		105	ns
Rise Time	$t_r$			70	105			
Turn-Off Delay Time	$t_{d(off)}$			45	68			
Fall Time	$t_f$			27	41			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		18	30			
Rise Time	$t_r$			15	25			
Turn-Off Delay Time	$t_{d(off)}$			52	80			
Fall Time	$t_f$			14	25			
<b>Drain-Source Body Diode Characteristics</b>								
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			-5.8	A		
Pulse Diode Forward Current	$I_{SM}$				-60			
Body Diode Voltage	$V_{SD}$	$I_S = -10\text{ A}, V_{GS} = 0\text{ V}$		-0.78	-1.2	V		
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		35	53	ns		
Body Diode Reverse Recovery Charge	$Q_{rr}$			25	38	nC		
Reverse Recovery Fall Time	$t_a$			19		ns		
Reverse Recovery Rise Time	$t_b$			16				

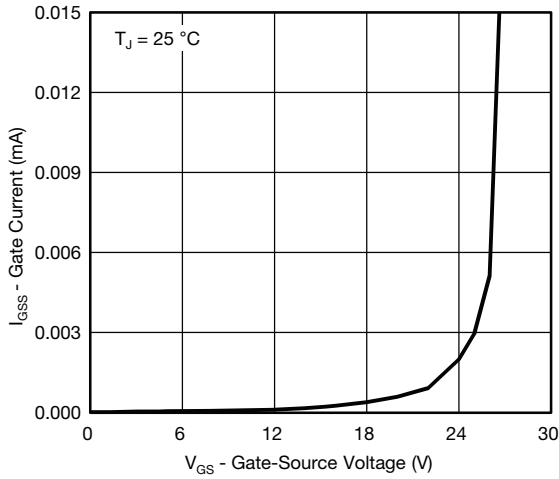
## Notes:

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

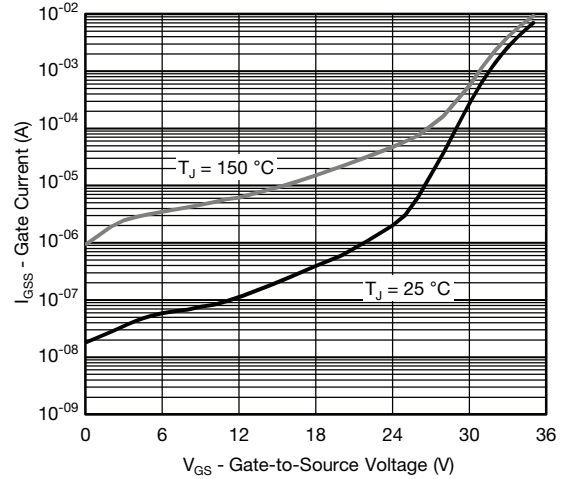
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



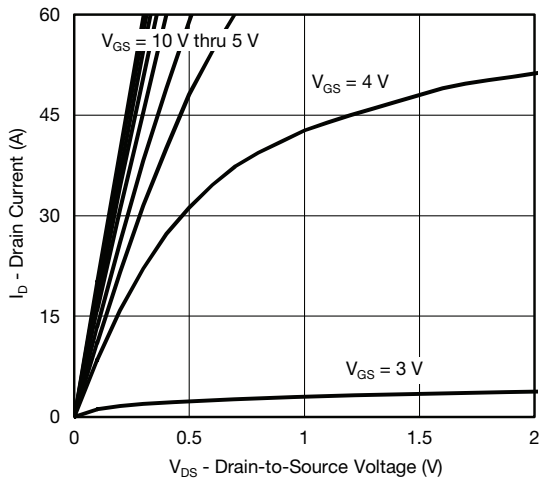
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



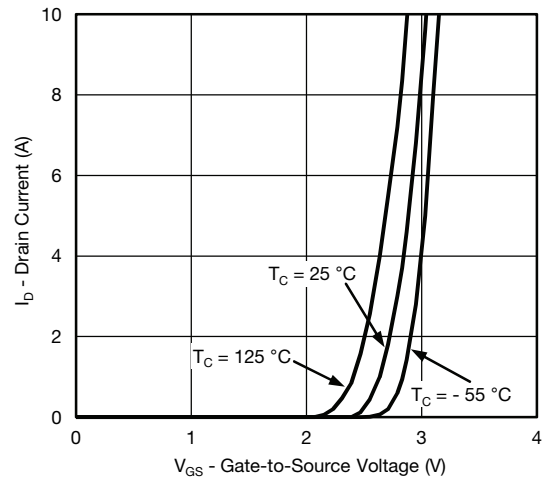
**Gate Current vs. Gate-Source Voltage**



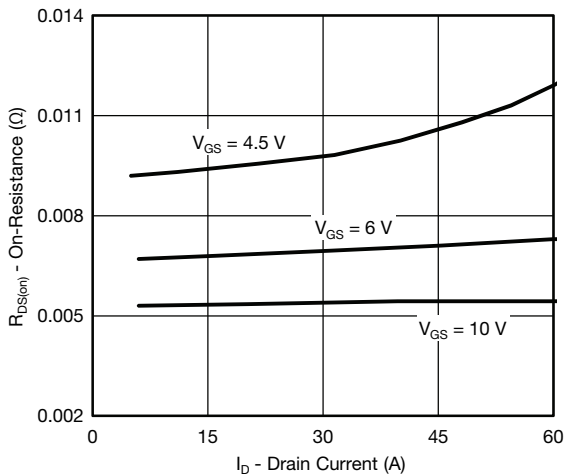
**Gate Current vs. Gate-Source Voltage**



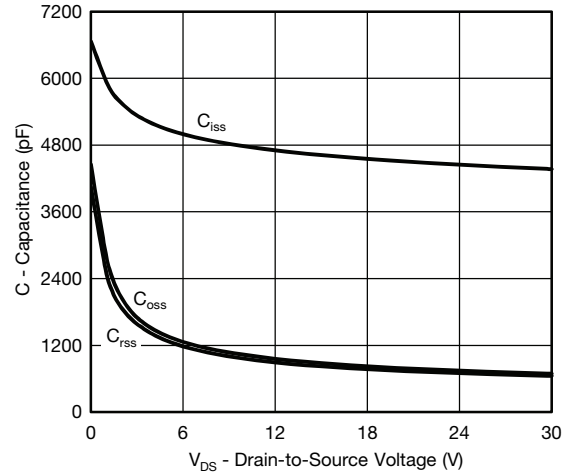
**Output Characteristics**



**Transfer Characteristics**



**On-Resistance vs. Drain Current**



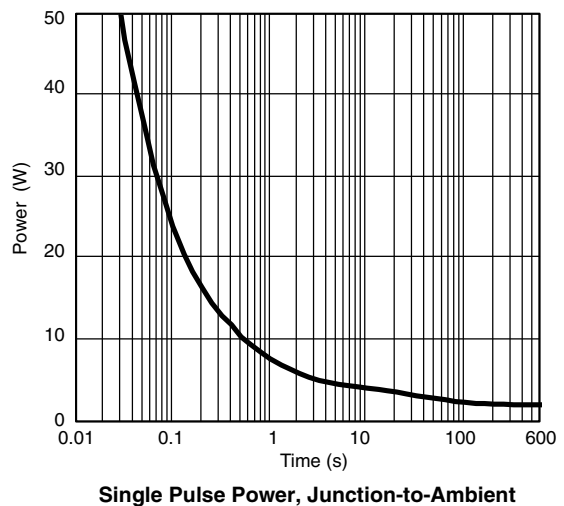
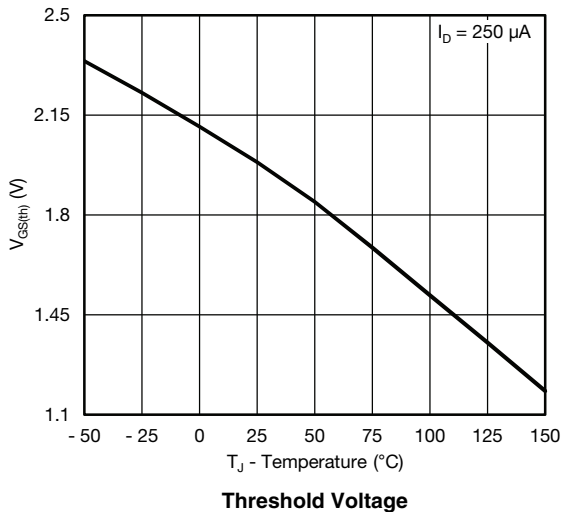
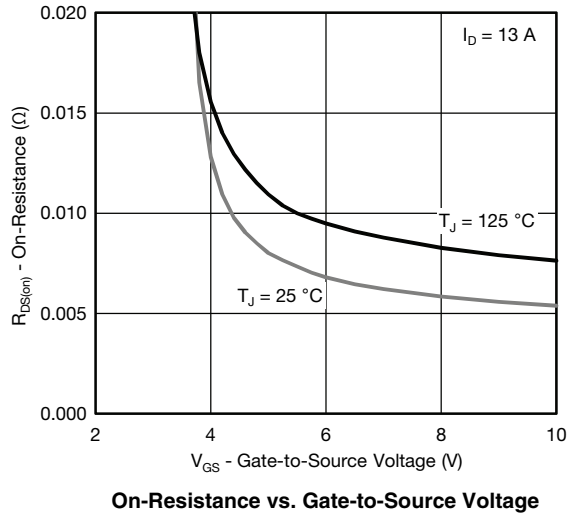
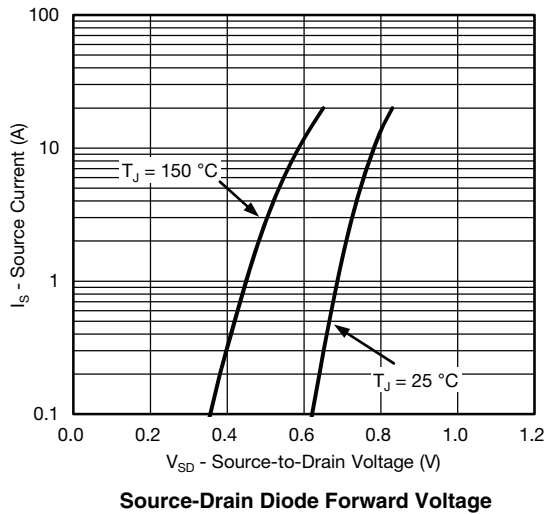
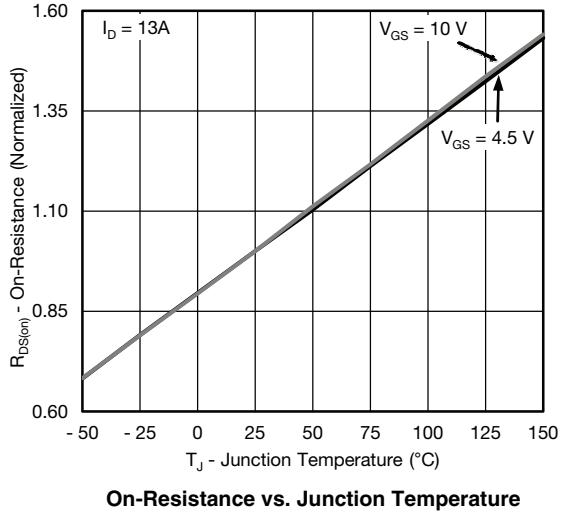
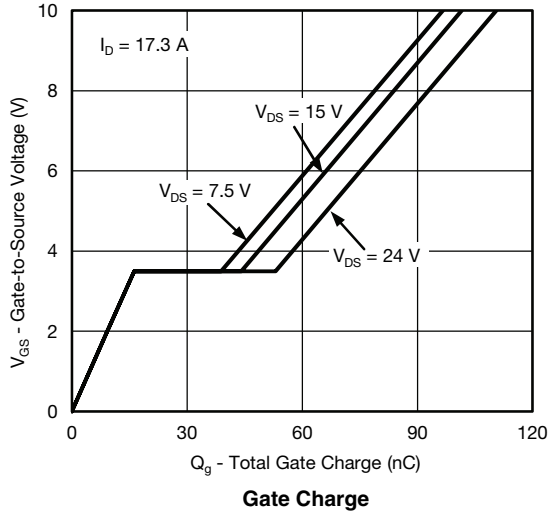
**Capacitance**

# Si4491EDY

Vishay Siliconix

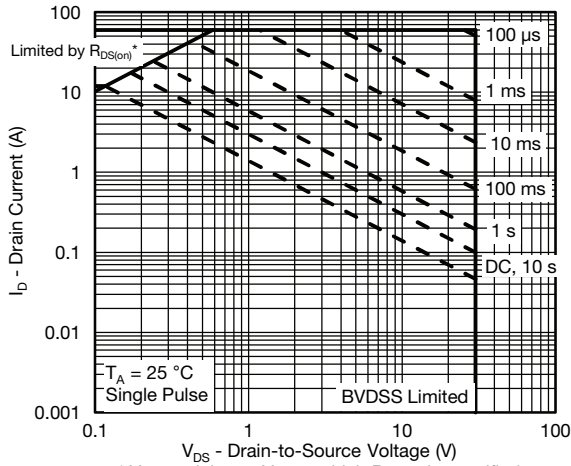


## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

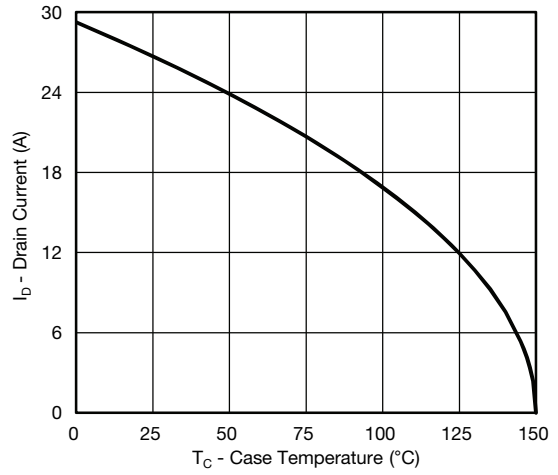




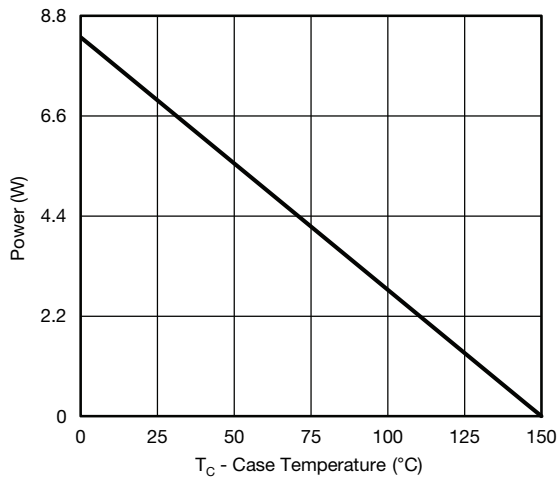
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



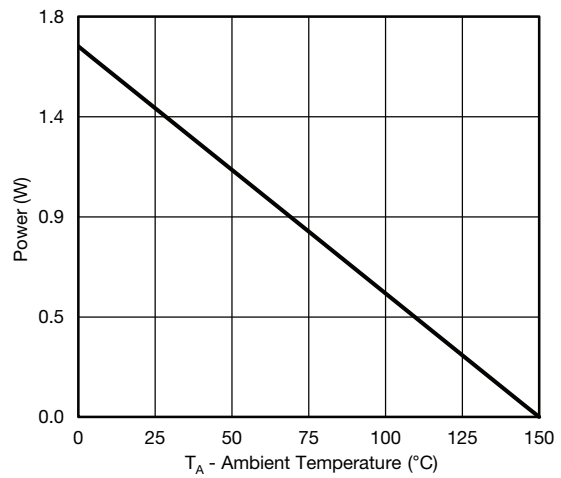
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified  
**Safe Operating Area, Junction-to-Ambient**



**Current Derating\***



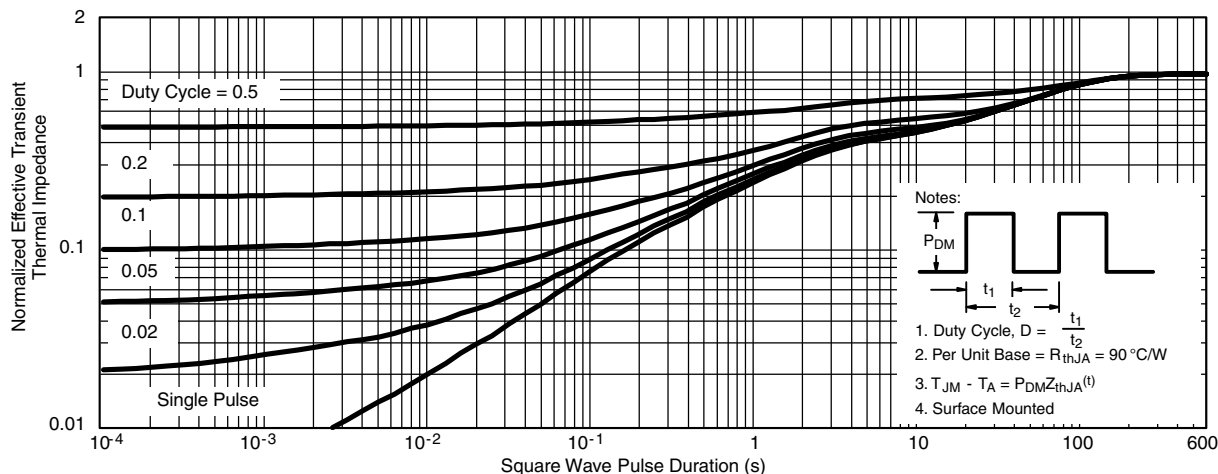
**Power Junction-to-Foot**



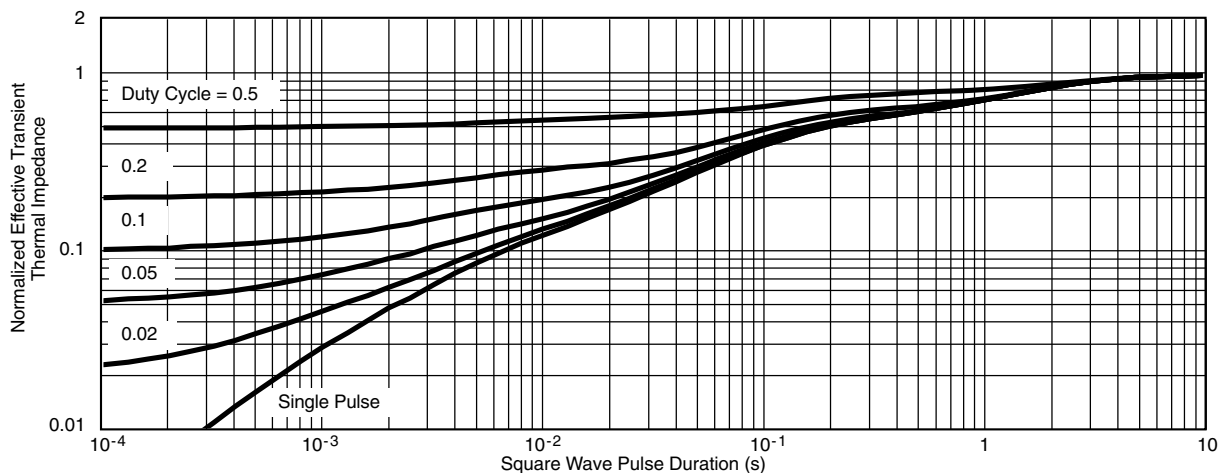
**Power Junction-to-Ambient**

\* The power dissipation  $P_D$  is based on  $T_{J(max.)} = 150\text{ }^\circ\text{C}$ , using junction-to-case thermal resistance, and is more useful in settling the upper power 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**

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. For related documents such as package/tape drawings, part marking, and reliability data, see [www.vishay.com/ppg?63866](http://www.vishay.com/ppg?63866).



**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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