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[SI4477DY-T1-GE3](#)

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sales@integrated-circuit.com



Si4477DY
Vishay Siliconix

P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^d	Q_g (Typ.)
- 20	0.0062 at $V_{GS} = - 4.5$ V	- 26.6	59 nC
	0.0105 at $V_{GS} = - 2.5$ V	- 20.6	

FEATURES

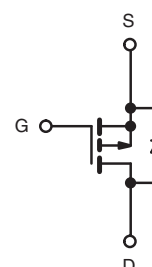
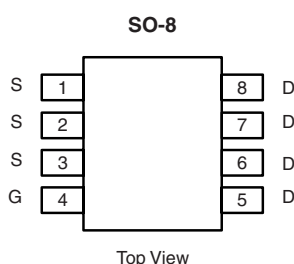
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Load Switch
- Adapter Switch
 - Notebook
 - Game Station



Ordering Information: Si4477DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 20	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	I_D	- 26.6	A
	$T_C = 70$ °C		- 21.3	
	$T_A = 25$ °C		- 18 ^{a, b}	
	$T_A = 70$ °C		- 14.5 ^{a, b}	
Pulsed Drain Current		I_{DM}	- 60	
Continuous Source-Drain Diode Current	$T_C = 25$ °C	I_S	- 5.5	
	$T_A = 25$ °C		- 2.5 ^{a, b}	
Avalanche Current		I_{AS}	30	mJ
Single-Pulse Avalanche Energy		E_{AS}	45	
Maximum Power Dissipation	$T_C = 25$ °C	P_D	6.6	W
	$T_C = 70$ °C		4.2	
	$T_A = 25$ °C		3 ^{a, b}	
	$T_A = 70$ °C		1.95 ^{a, b}	
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 ^{a, c}	$t \leq 10$ s	R_{thJA}	34	41	°C/W
Maximum Junction-to-Foot	Steady State	R_{thJF}	15	19	

Notes:

- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- Maximum under Steady State conditions is 80 °C/W.
- Based on $T_C = 25$ °C.

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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}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 13		mV/ $^{\circ}\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4.1		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 0.6		- 1.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^{\circ}\text{C}$			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}, V_{GS} = -4.5\text{ V}$	- 30			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -18\text{ A}$		0.0051	0.0062	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -14\text{ A}$		0.0085	0.0105	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -3.5\text{ A}$		10		S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		4600		pF
Output Capacitance	C_{oss}			980		
Reverse Transfer Capacitance	C_{rss}			175		
Total Gate Charge	Q_g	$V_{DS} = -10\text{ V}, V_{GS} = -10\text{ V}, I_D = -18\text{ A}$		125	190	nC
		$V_{DS} = -10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -18\text{ A}$		59	90	
Gate-Source Charge	Q_{gs}			10		
Gate-Drain Charge	Q_{gd}			19		
Gate Resistance	R_g	$f = 1\text{ MHz}$		1.3	2.6	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		13	20	ns
Rise Time	t_r			10	20	
Turn-Off DelayTime	$t_{d(off)}$			100	150	
Fall Time	t_f			25	40	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		42	60	
Rise Time	t_r			42	60	
Turn-Off DelayTime	$t_{d(off)}$			100	150	
Fall Time	t_f			42	60	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^{\circ}\text{C}$			- 5.5	A
Pulse Diode Forward Current	I_{SM}				- 60	
Body Diode Voltage	V_{SD}	$I_S = -5\text{ A}, V_{GS} = 0\text{ V}$		- 0.75	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -3.5\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^{\circ}\text{C}$		42	60	ns
Body Diode Reverse Recovery Charge	Q_{rr}			40	60	nC
Reverse Recovery Fall Time	t_a			20		ns
Reverse Recovery Rise Time	t_b			22		

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.

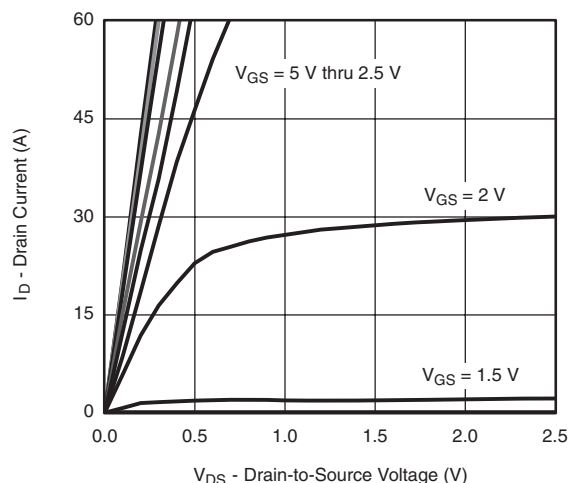
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



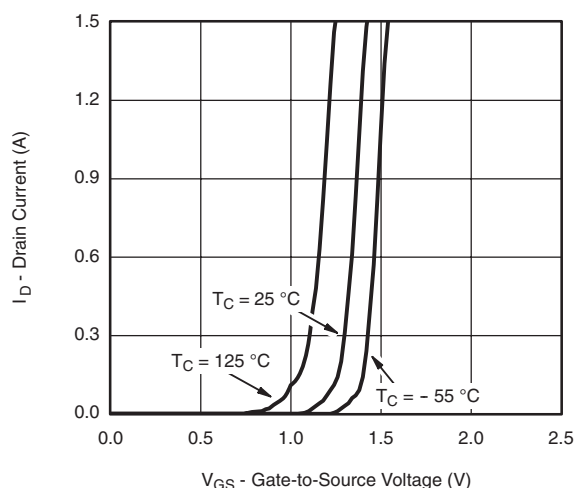
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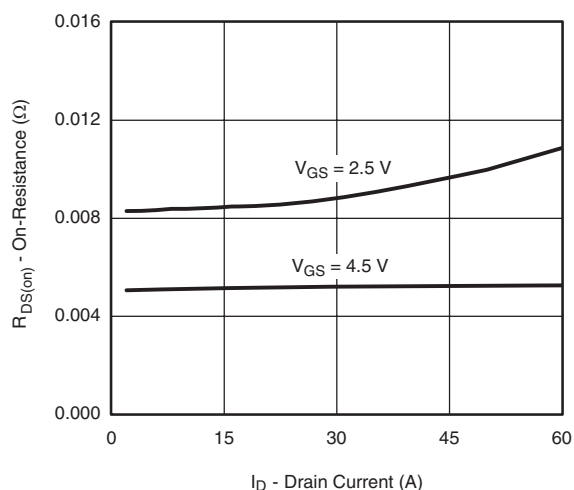
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



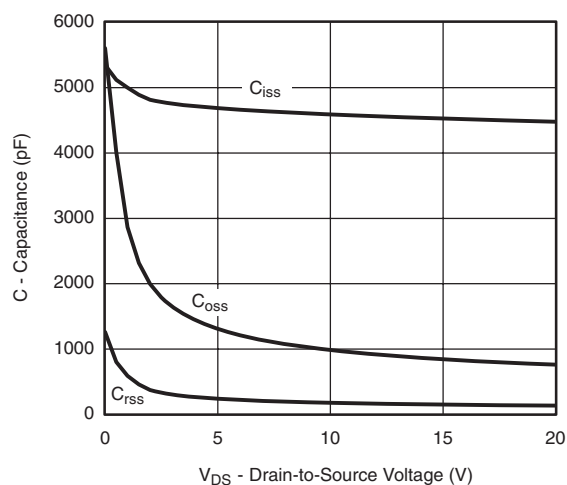
Output Characteristics



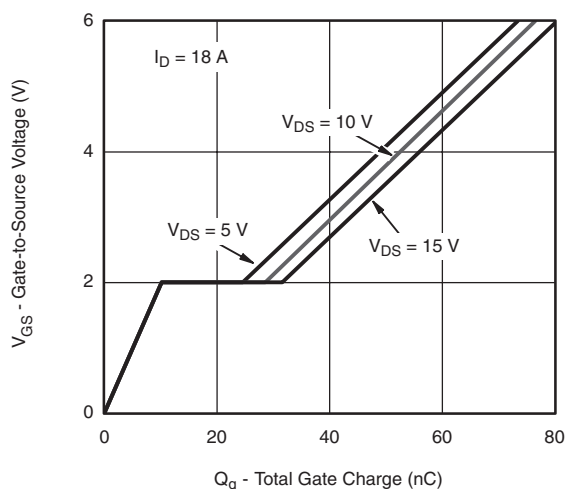
Transfer Characteristics



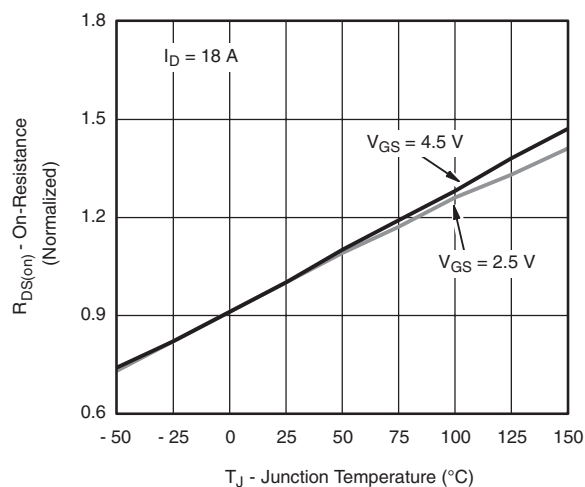
On-Resistance vs. Drain Current



Capacitance



Gate Charge



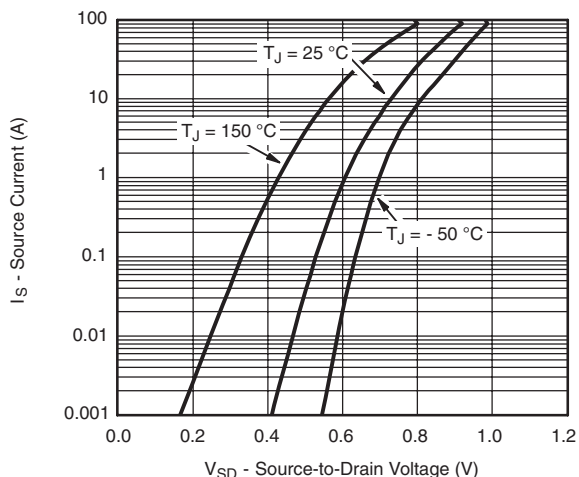
On-Resistance vs. Junction Temperature

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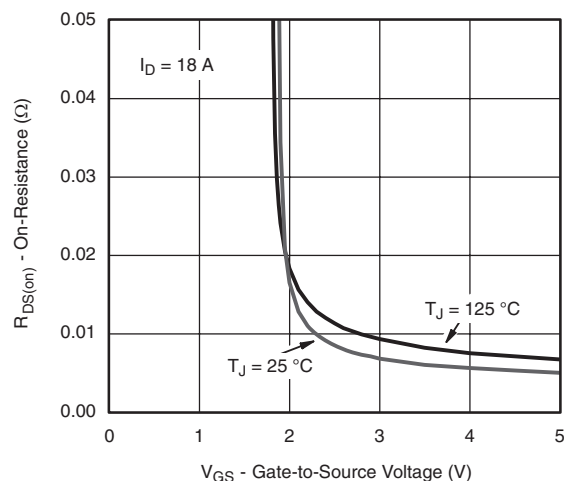
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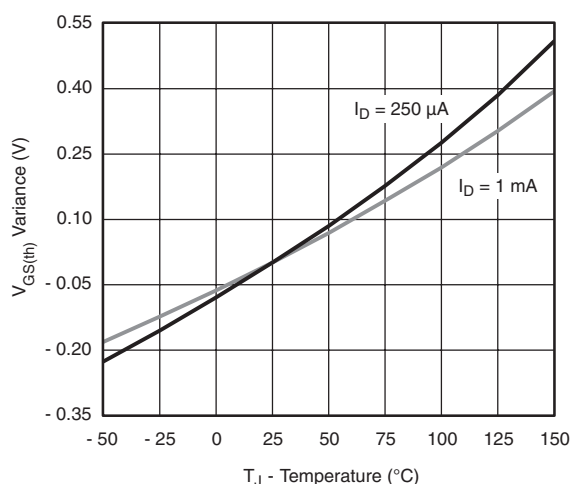
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



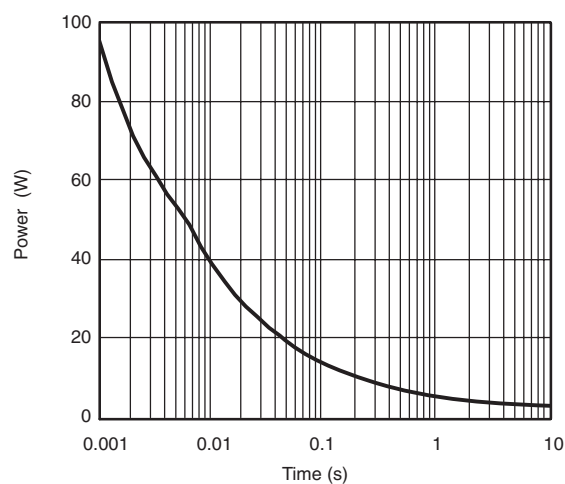
Source-Drain Diode Forward Voltage



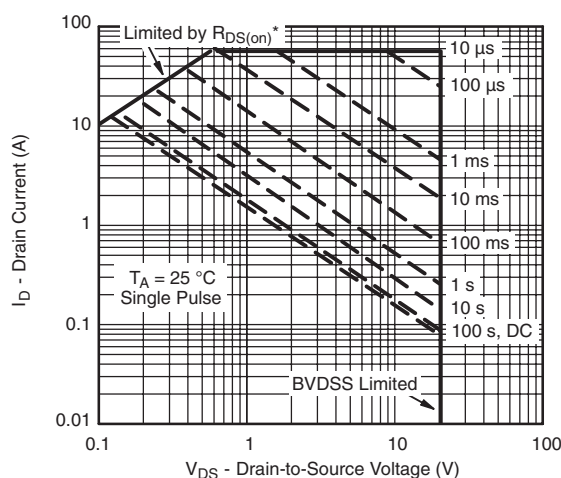
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



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

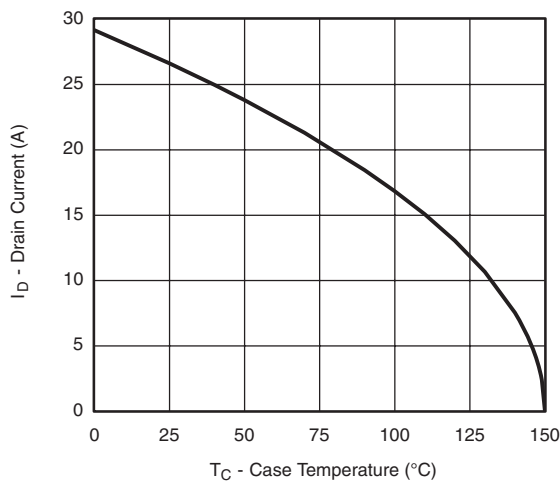
Safe Operating Area



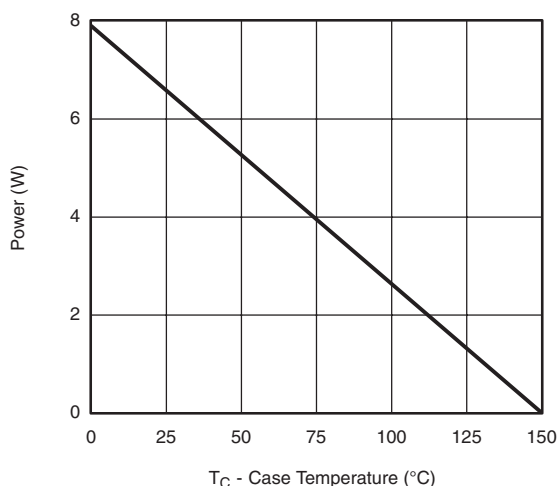
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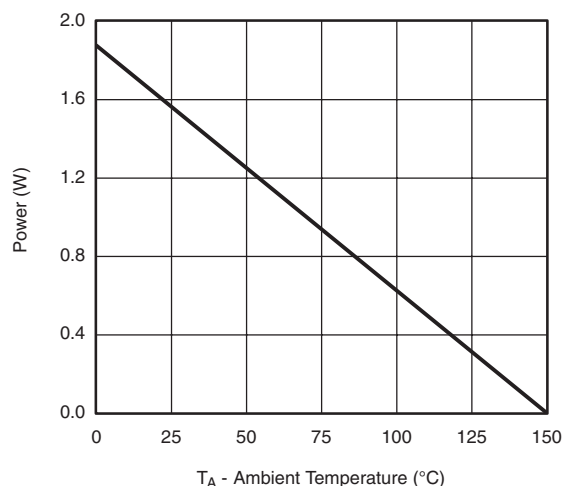
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*



Power, Junction-to-Foot



Power Derating, Junction-to-Ambient

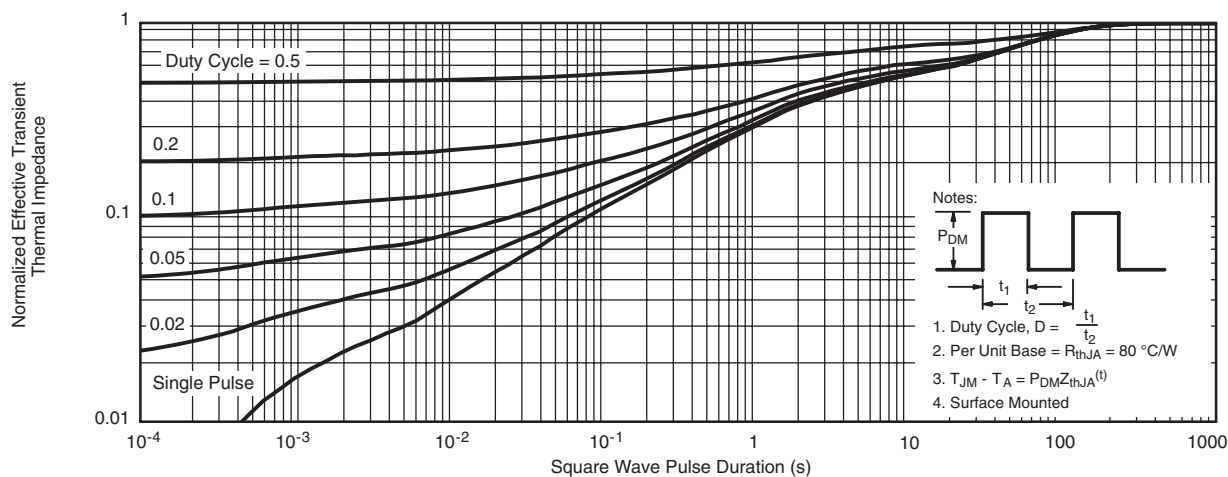
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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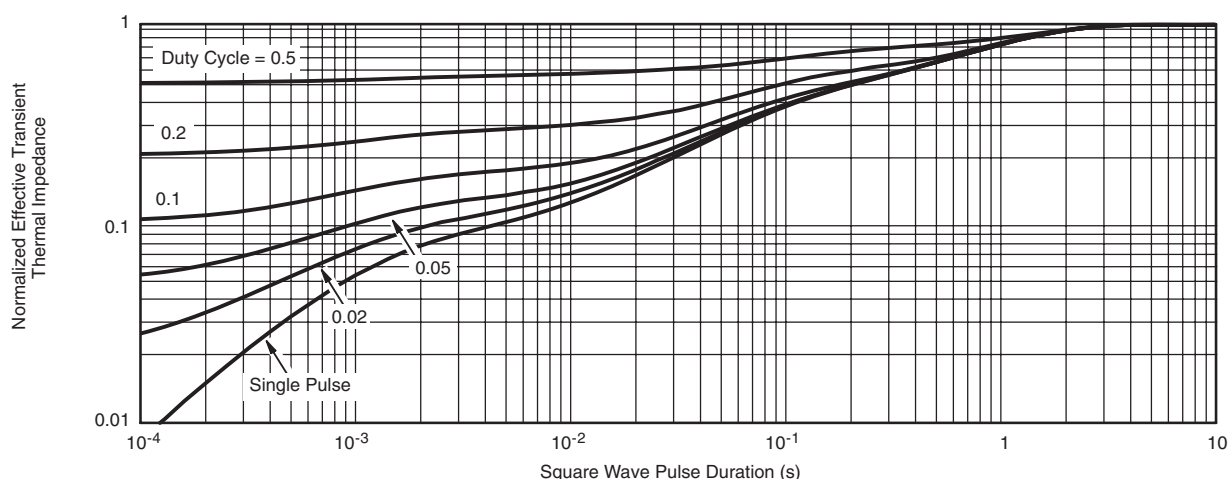
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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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/ppg264829.

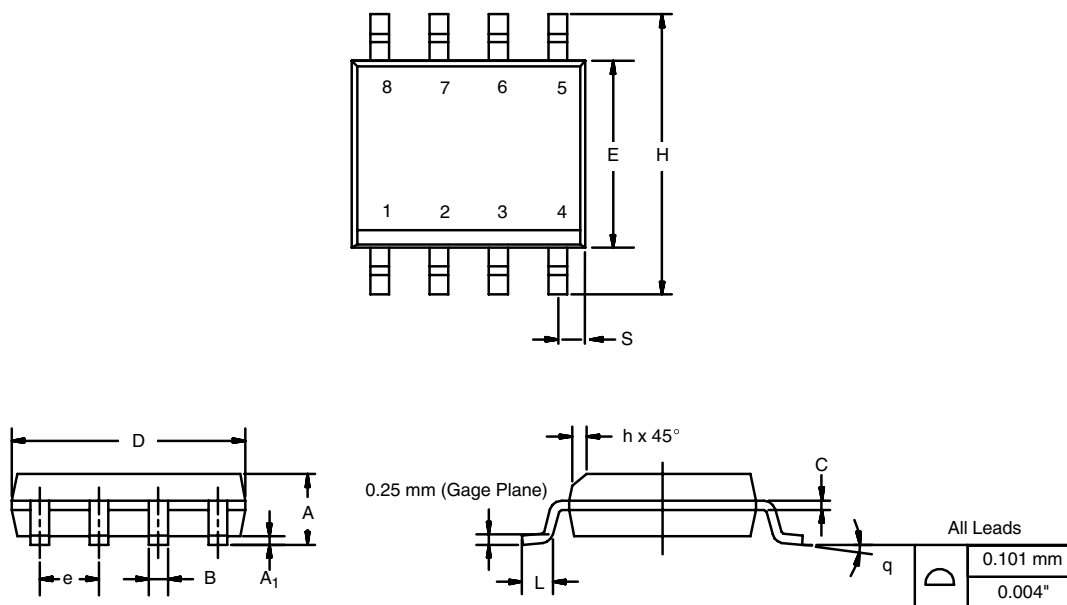


Package Information

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SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



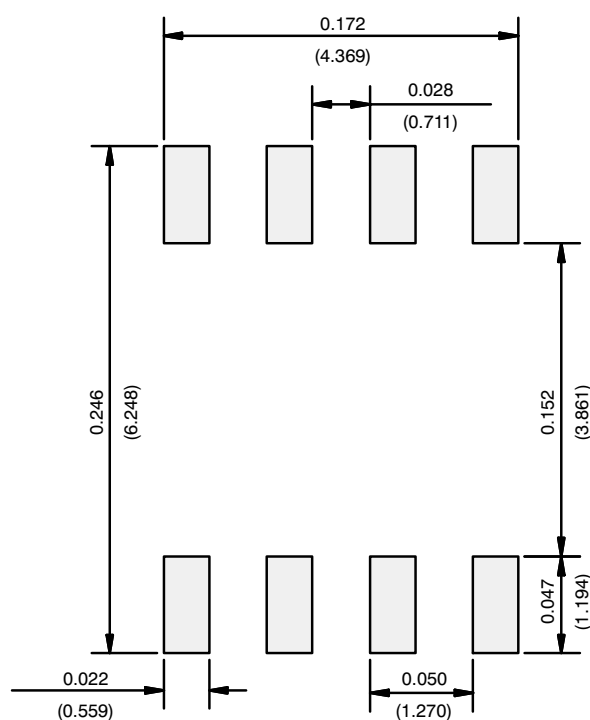
DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026
ECN: C-06527-Rev. I, 11-Sep-06				
DWG: 5498				

Application Note 826

Vishay Siliconix



RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

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