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[SI4390DY-T1-E3](#)

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sales@integrated-circuit.com



Si4390DY
 Vishay Siliconix

N-Channel Q_g, Fast Switching MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
30	0.0095 at V _{GS} = 10 V	12.5
	0.0135 at V _{GS} = 4.5 V	10.5

FEATURES

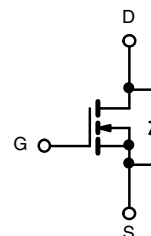
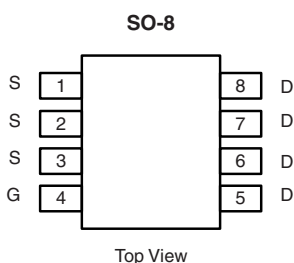
- Halogen-free According to IEC 61249-2-21 Definition
- Extremely Low Q_{gd} for Switching Losses
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
 COMPLIANT
 HALOGEN
FREE
 Available

APPLICATIONS

- High-Side DC/DC Conversion
 - Notebook
 - Server



N-Channel MOSFET

Ordering Information: Si4390DY-T1-E3 (Lead (Pb)-free)
 Si4390DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
Parameter	Symbol	10 s	Steady State	Unit
Drain-Source Voltage	V _{DS}	30		V
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	12.5	A
		T _A = 70 °C	10	
Pulsed Drain Current	I _{DM}	20		A
Continuous Source Current (Diode Conduction) ^a	I _S	2.7	1.3	
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	3.0	W
		T _A = 70 °C	1.9	
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	t ≤ 10 s	R _{thJA}	32	42	°C/W
	Steady State		68	90	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	15	20	

Notes:

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

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SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.8		2.8	V
Gate-Body 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			5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 12.5 A		0.0075	0.0095	Ω
		V _{GS} = 4.5 V, I _D = 10.5 A		0.0105	0.0135	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 12.5 A		38		S
Diode Forward Voltage ^a	V _{SD}	I _S = 2.7 A, V _{GS} = 0 V		0.7	1.1	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 12.5 A		10	15	nC
Gate-Source Charge	Q _{gs}			3.5		
Gate-Drain Charge	Q _{gd}			2.1		
Gate Resistance	R _g		0.2	0.8	1.4	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω		16	30	ns
Rise Time	t _r			6	12	
Turn-Off Delay Time	t _{d(off)}			43	70	
Fall Time	t _f			14	25	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 2.7 A, dI/dt = 100 A/μs		35	60	

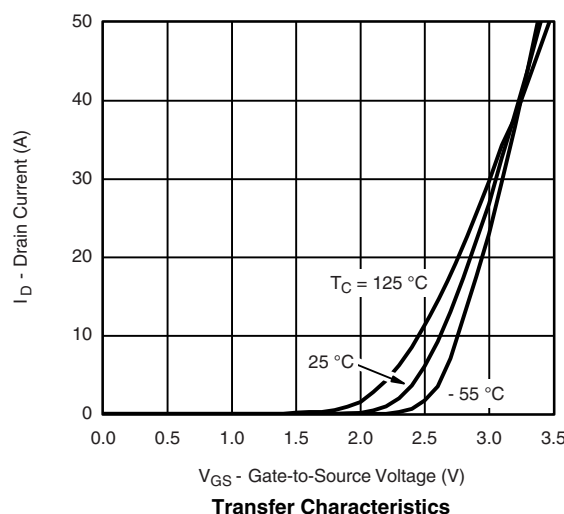
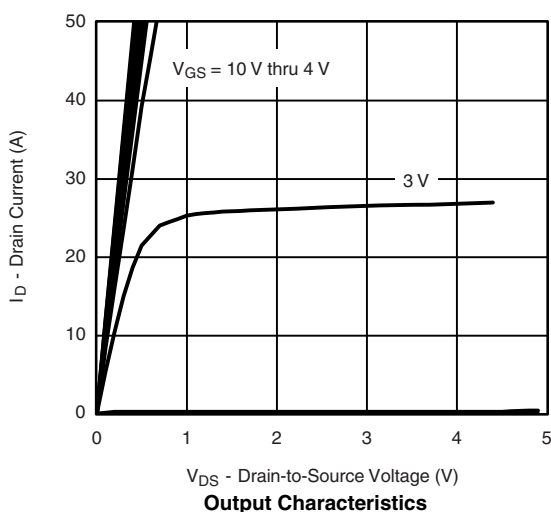
Notes:

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.

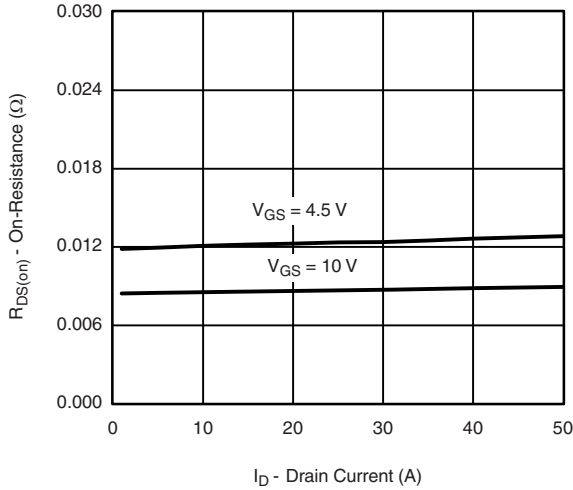
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



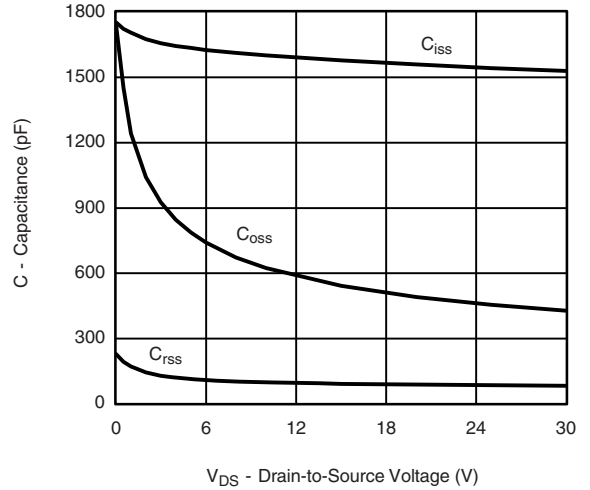


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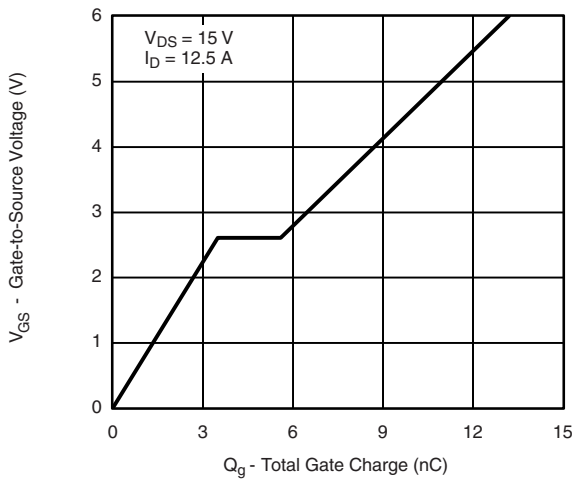
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



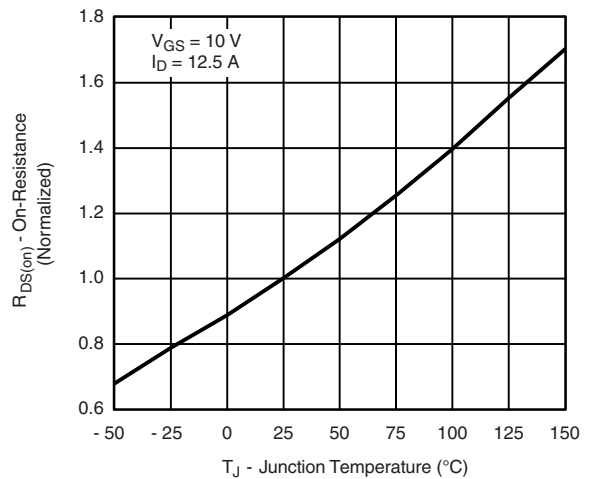
On-Resistance vs. Drain Current



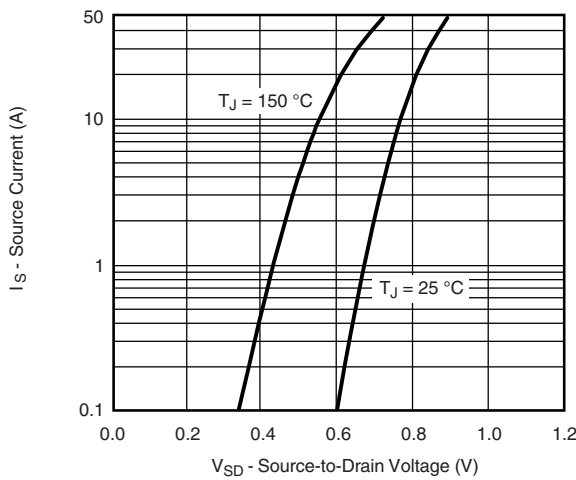
Capacitance



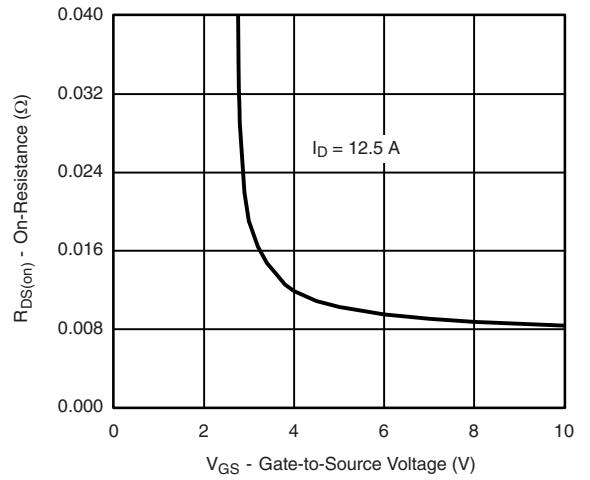
Gate Charge



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



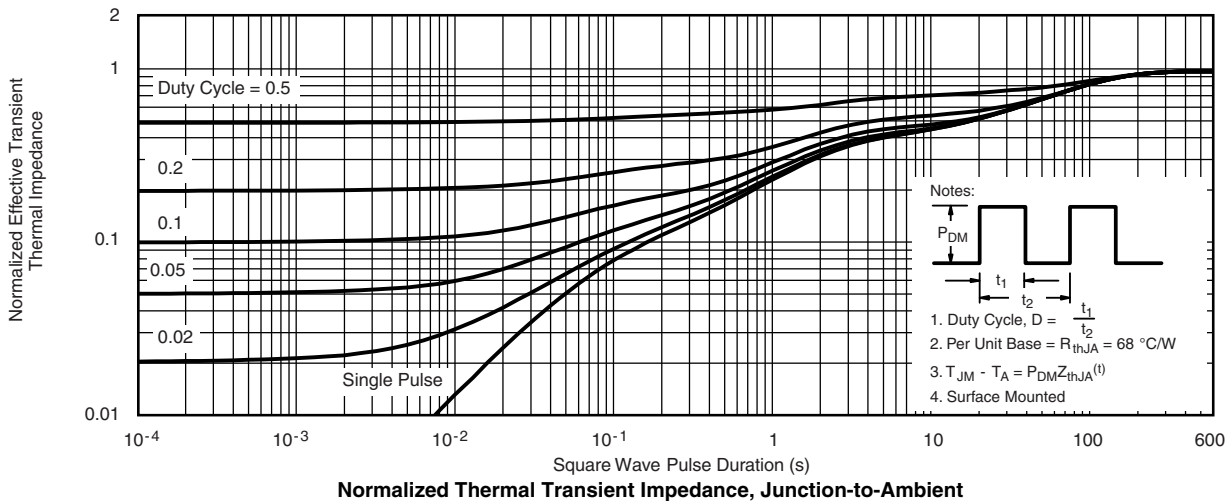
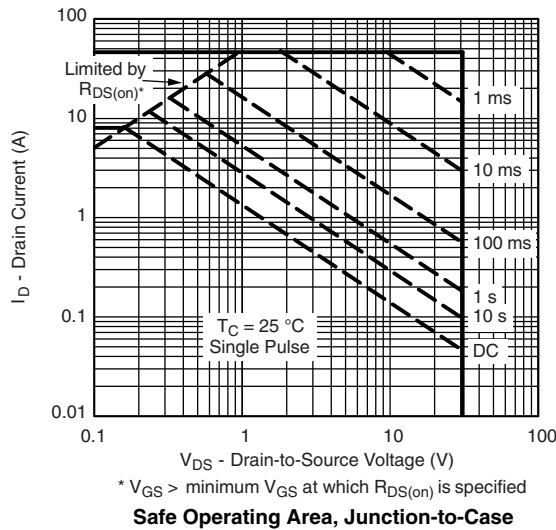
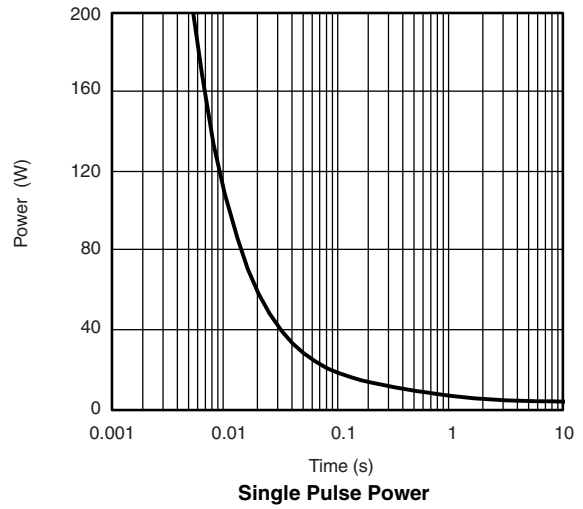
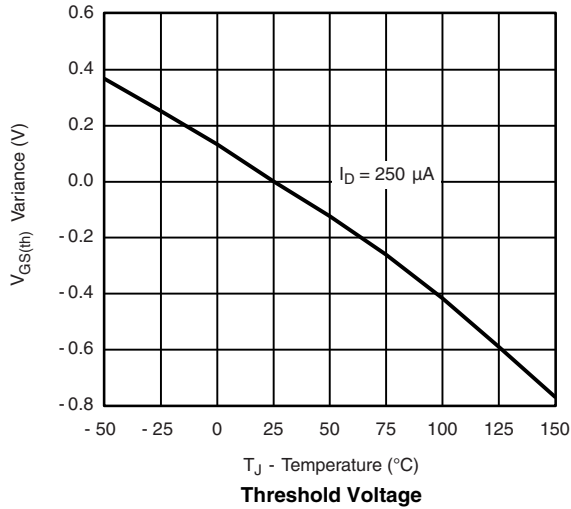
On-Resistance vs. Gate-to-Source Voltage

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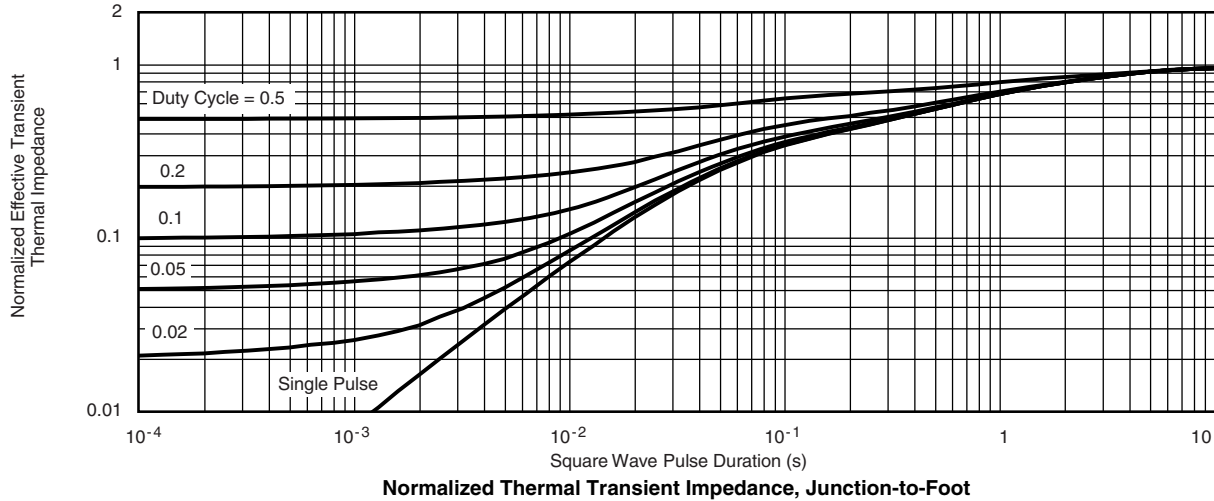
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)





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TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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?72150.

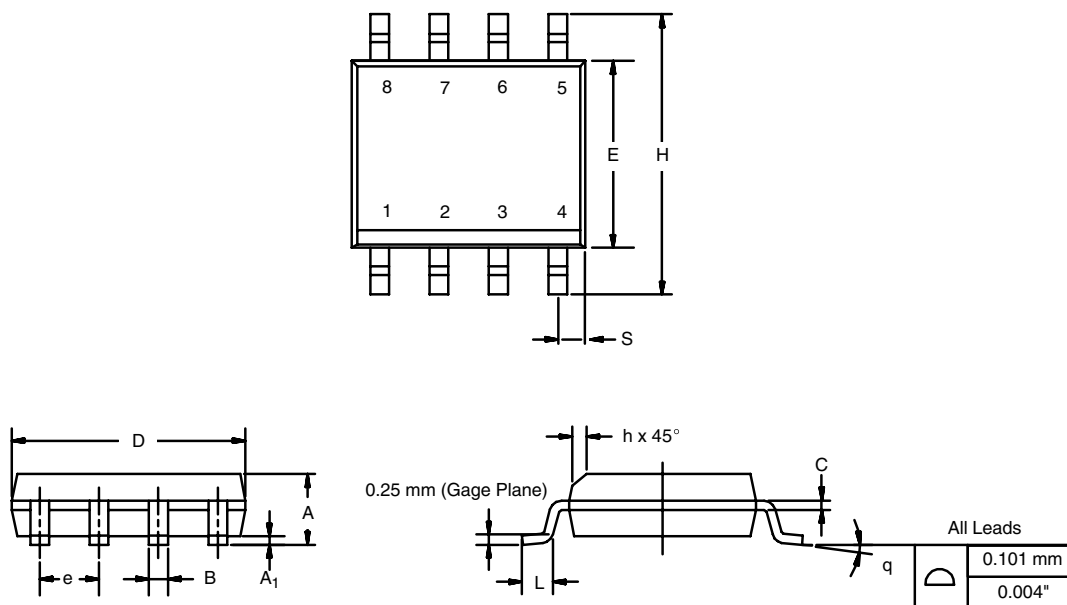


Package Information

Vishay Siliconix

SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



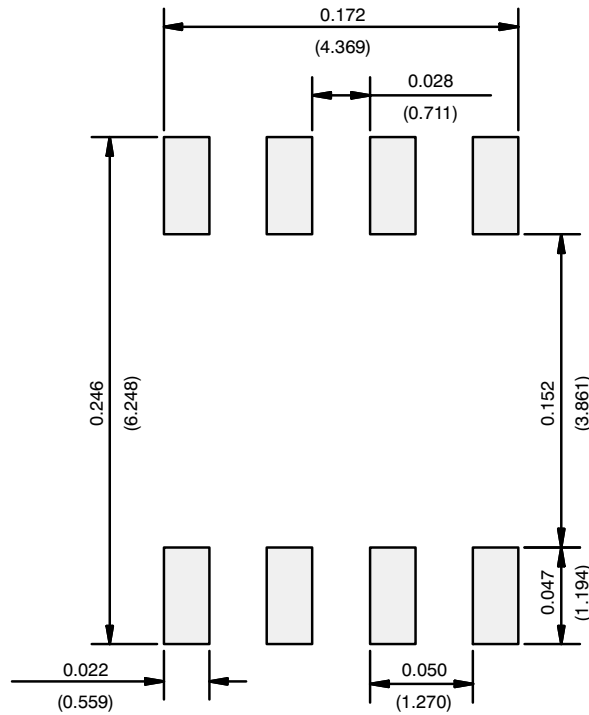
DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	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)

[Return to Index](#)

APPLICATION NOTE



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