N-Channel 30-V (D-S) MOSFET with Schottky Diode

MOSFET PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
30	0.016 at V_{GS} = 10 V	9.5
	0.021 at V_{GS} = 4.5 V	7.7

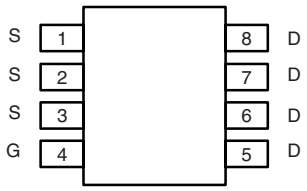
SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.50 V at 1.0 A	1.4

FEATURES

- **Halogen-free According to IEC 61249-2-21 Available**
- LITTLE FOOT® *Plus* Power MOSFET
- 100 % R_g Tested

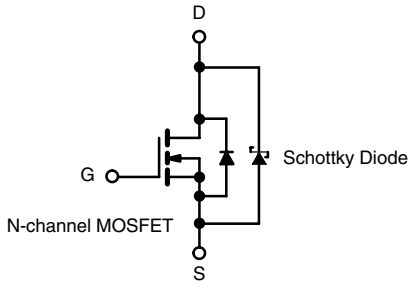
RoHS COMPLIANT
HALOGEN FREE Available

SO-8



Top View

Ordering Information: Si4812BDY-T1-E3 (Lead (Pb)-free)
Si4812BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		Symbol	Limit 10 s	Limit Steady State	Unit
Drain-Source Voltage (MOSFET)		V_{DS}	30		V
Reverse Voltage (Schottky)			30		
Gate-Source Voltage (MOSFET)		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C) (MOSFET)[a, b]	T_A = 25 °C	I_D	9.5	7.3	A
	T_A = 70 °C		7.7	5.9	
Pulsed Drain Current (MOSFET)		I_{DM}	50		
Continuous Source Current (MOSFET Diode Conduction)[a, b]		I_S	2.1	1.2	
Average Forward Current (Schottky)		I_F	1.4	0.8	
Pulsed Forward Current (Schottky)		I_{FM}	30		
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	5		
Avalanche Energy		E_{AS}	1.25		mJ
Maximum Power Dissipation (MOSFET)[a, b]	T_A = 25 °C	P_D	2.5	1.4	W
	T_A = 70 °C		1.6	0.9	
Maximum Power Dissipation (Schottky)[a, b]	T_A = 25 °C		2.0	1.2	
	T_A = 70 °C		1.3	0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter	Device	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient (t ≤ 10 s)[a]	MOSFET	R_{thJA}	40	50	°C/W
	Schottky		50	60	
Maximum Junction-to-Ambient (t = Steady State)[a]	MOSFET		72	90	
	Schottky		85	100	
Maximum Junction-to-Foot (t = Steady State)[a]	MOSFET	R_{thJF}	18	23	
	Schottky		24	30	

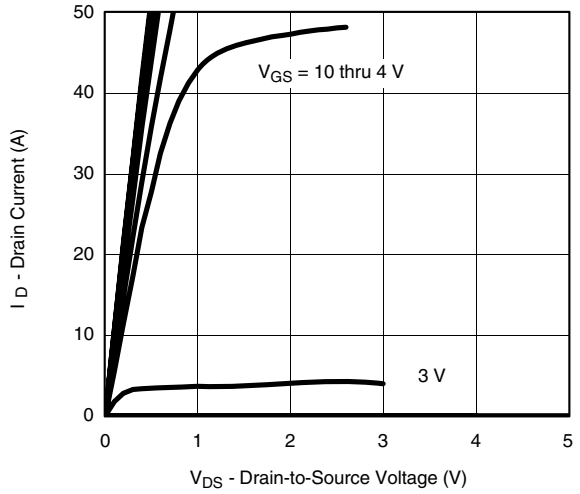
Notes:
a. Surface Mounted on FR4 board.
b. t ≤ 10 s.

MOSFET AND SCHOTTKY 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	1		3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current (MOSFET and Schottky)	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V		0.004	0.100	mA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 100 °C		0.7	10	
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 125 °C		3.0	20	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 9.5 A		0.013	0.016	Ω
		V_{GS} = 4.5 V, I_D = 7.7 A		0.0165	0.021	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 9.5 A		45		S
Schottky Diode Forward Voltage[a]	V_{SD}	I_S = 1.0 A, V_{GS} = 0 V		0.45	0.50	V
		I_S = 1.0 A, V_{GS} = 0 V, T_J = 125 °C		0.33	0.42	
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 5 V, I_D = 9.5 A		8.5	13	nC
Gate-Source Charge	Q_{gs}			3		
Gate-Drain Charge	Q_{gd}			2.6		
Gate Resistance	R_g		0.3	0.7	1.1	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 15 Ω $I_D \cong$ 1 A, V_{GEN} = 10 V, R_g = 6 Ω		15	25	ns
Rise Time	t_r			13	20	
Turn-Off Delay Time	$t_{d(off)}$			20	30	
Fall Time	t_f			8	15	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.0 A, dI/dt = 100 A/µs		22	35	

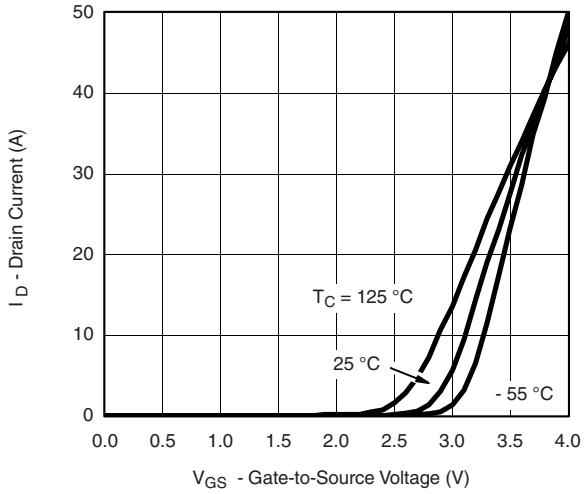
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

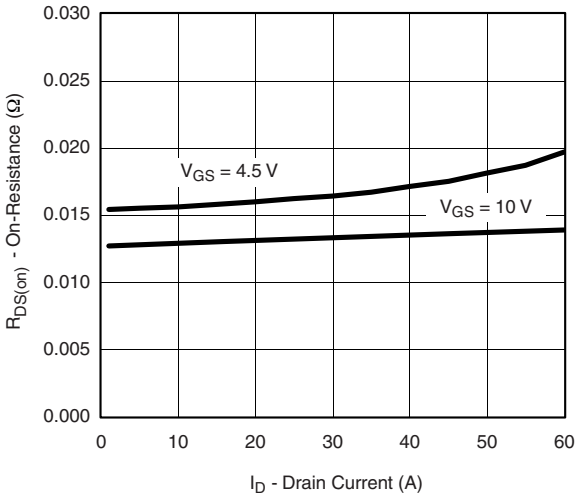
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



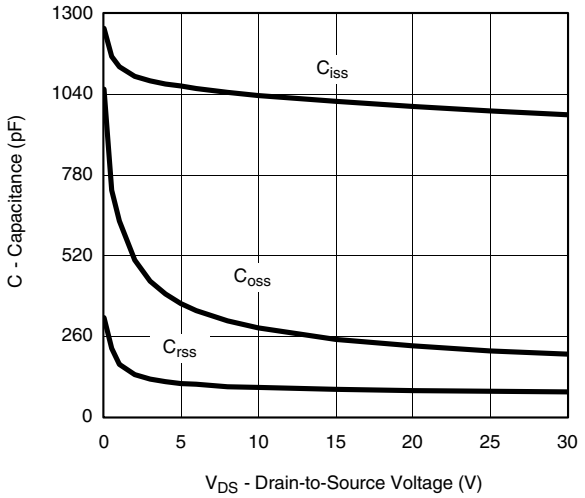
Output Characteristics



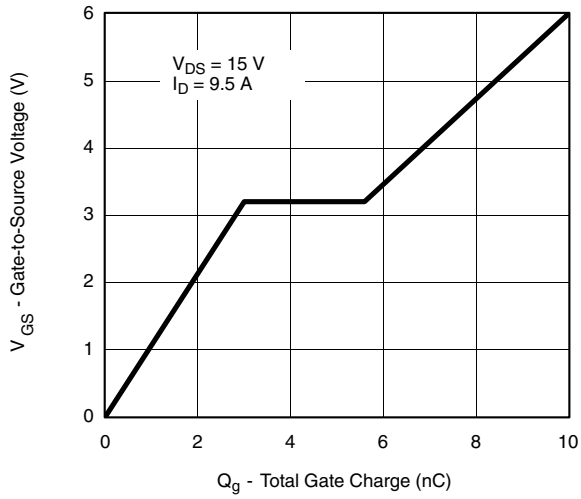
Transfer Characteristics



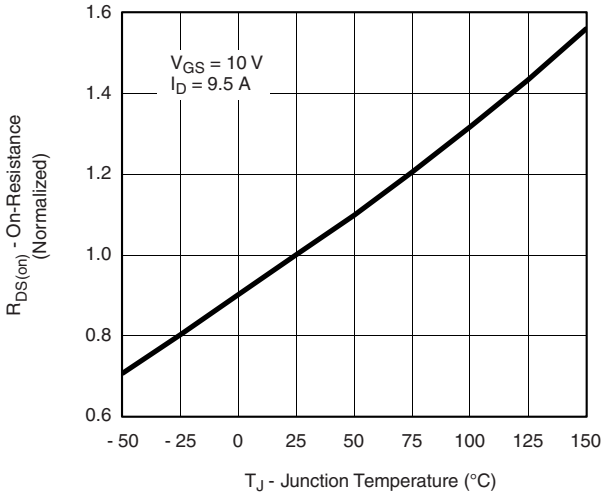
On-Resistance vs. Drain Current



Capacitance

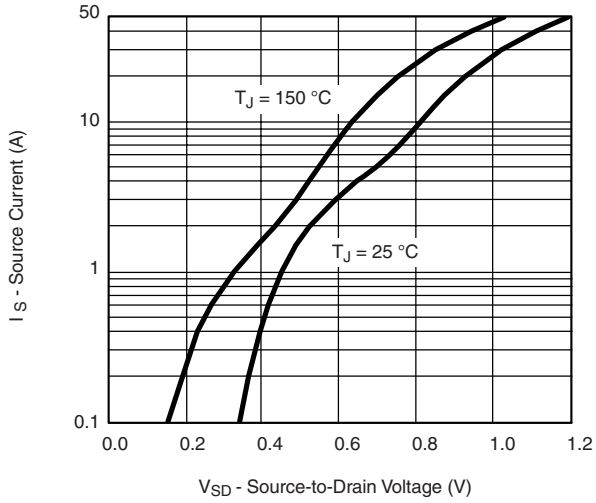


Gate Charge

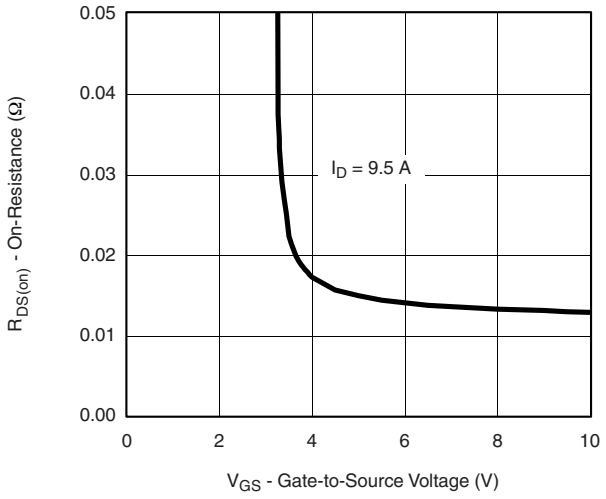


On-Resistance vs. Junction Temperature

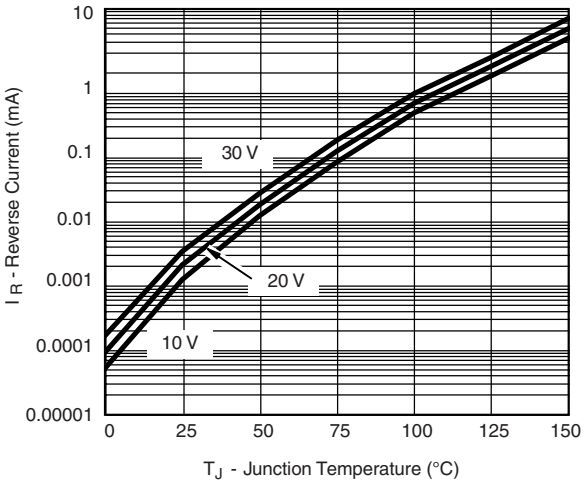
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



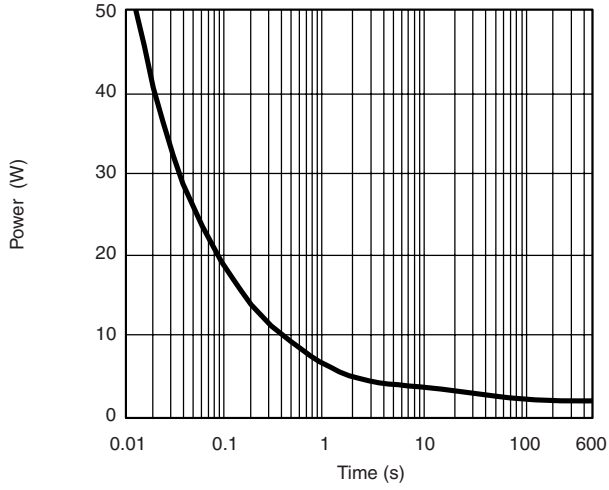
Source-Drain Diode Forward Voltage



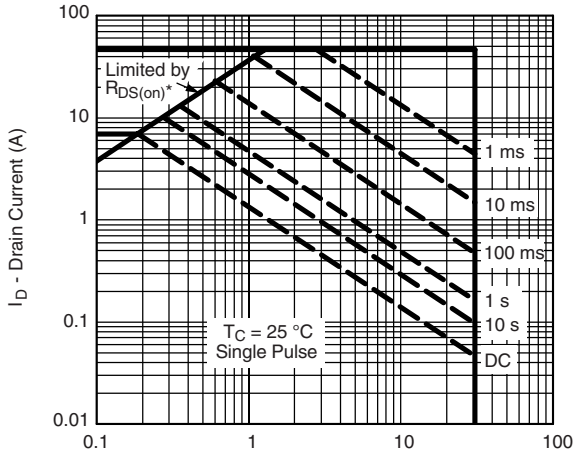
On-Resistance vs. Gate-to-Source Voltage



Reverse Current (Schottky)



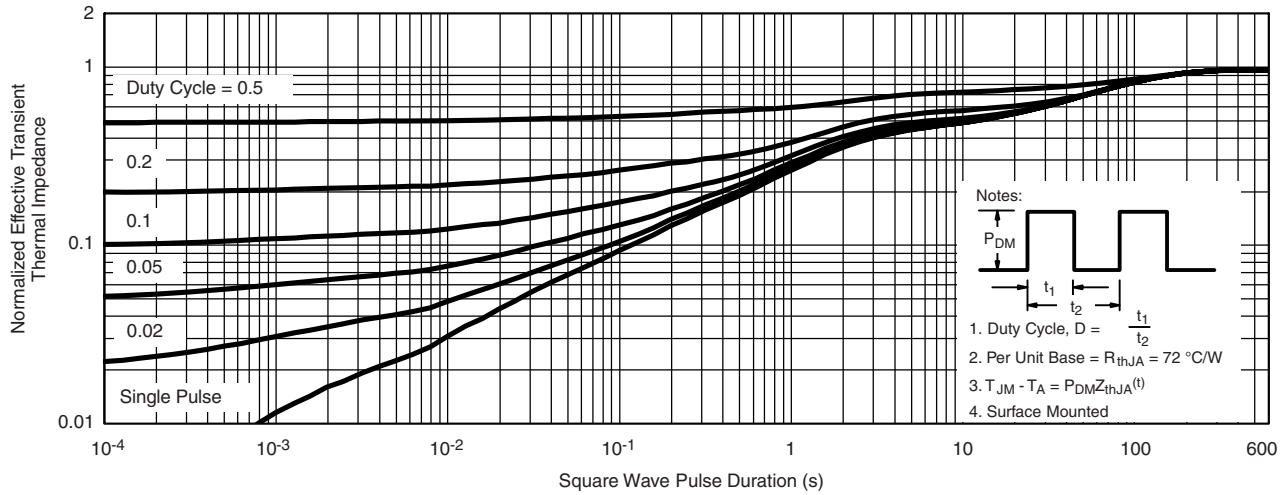
Single Pulse Power (MOSFET)



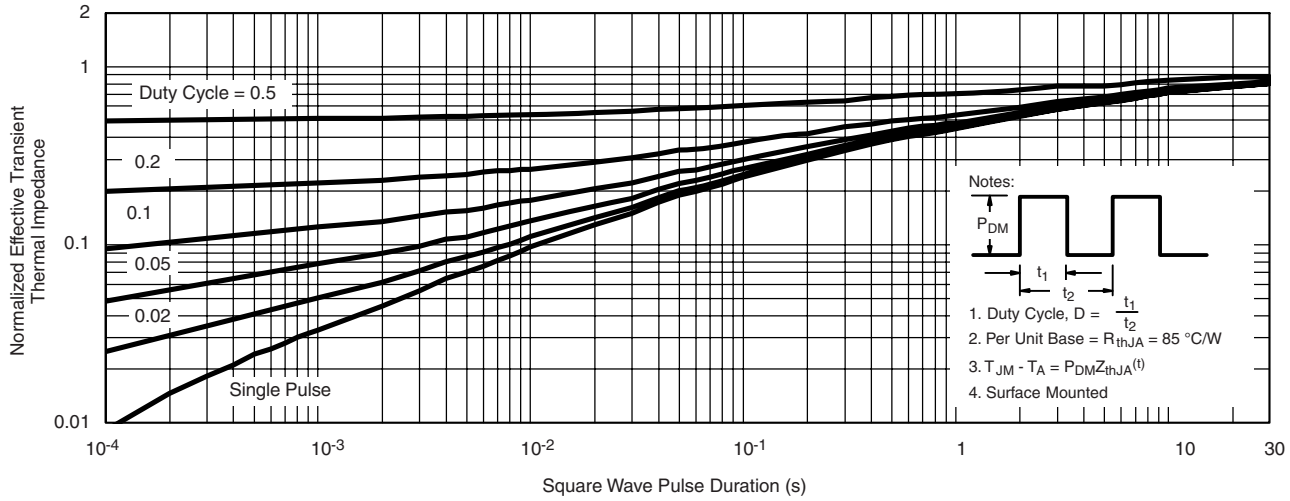
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient (MOSFET)



Normalized Thermal Transient Impedance, Junction-to-Ambient (Schottky)

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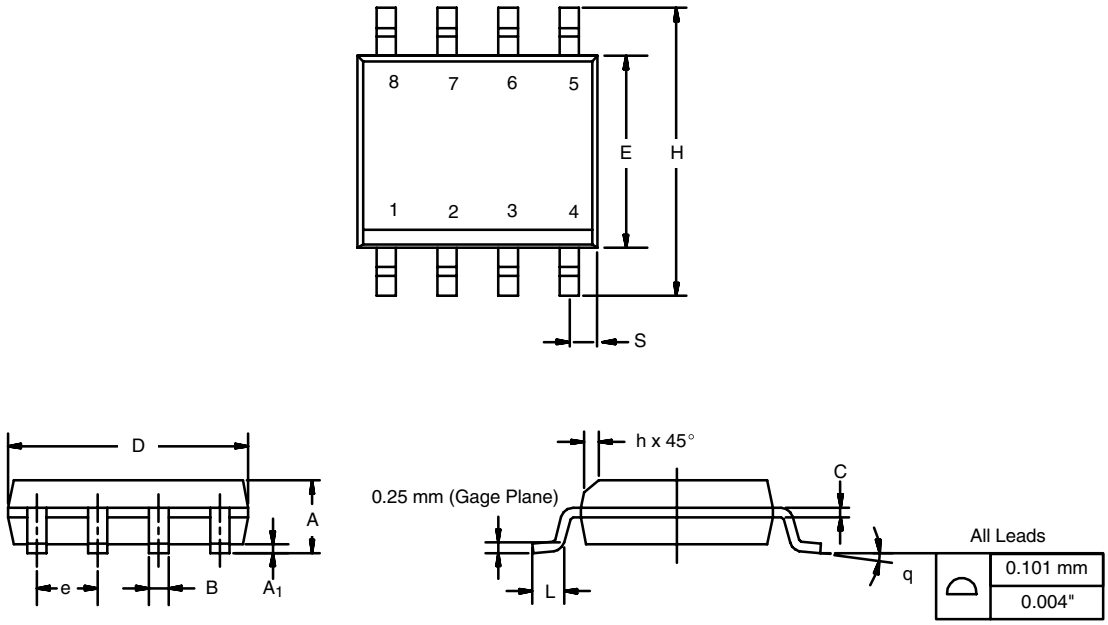
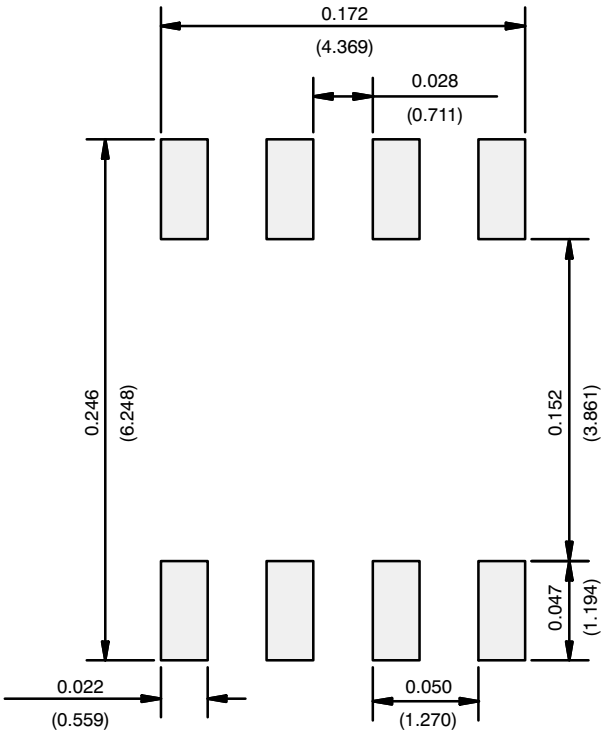
SOIC (NARROW): 8-LEAD
JEDEC Part Number: MS-012



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				

RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

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