

N-Channel Reduced Q_g , Fast Switching MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
30	0.0032 at $V_{GS} = 10$ V	25
	0.0036 at $V_{GS} = 4.5$ V	22

FEATURES

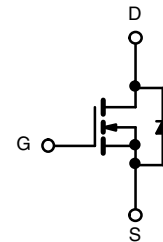
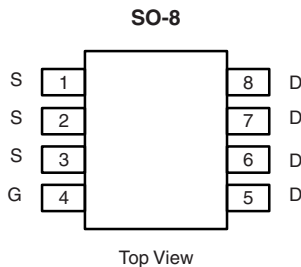
- Halogen-free According to IEC 61249-2-21 Definition
- Extremely Low Q_{gd} for Switching Losses Improvement
- TrenchFET[®] Gen II Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Low-Side DC/DC Conversion
- Notebook, Server, VRM Module
- Fixed Telecom



N-Channel MOSFET

Ordering Information: Si4368DY-T1-E3 (Lead (Pb)-free)
Si4368DY-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}	± 12		
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	25	17	A
		20	13	
Pulsed Drain Current (10 μ s Pulse Width)	I_{DM}	70		
Continuous Source Current (Diode Conduction) ^a	I_S	2.9	1.3	
Avalanch Current	I_{AS}	50		
Maximum Power Dissipation ^a	P_D	3.5	1.6	W
		2.2	1	
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	R_{thJA}	29	35	°C/W
		67	80	
Maximum Junction-to-Foot (Drain)	R_{thJF}	13	16	

Notes:

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

SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

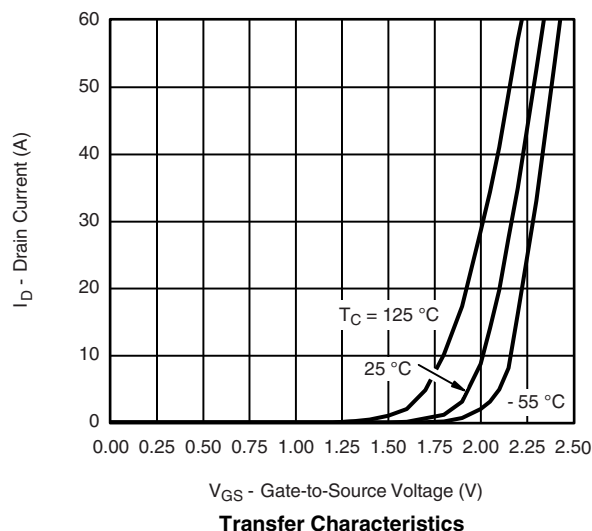
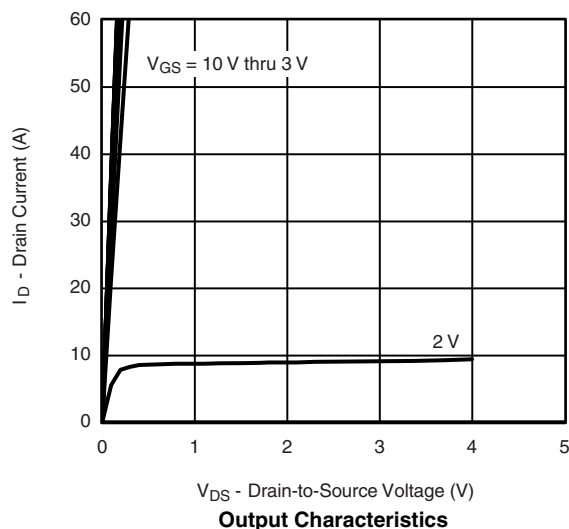
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.6		1.8	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 12\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}$, $V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 25\text{ A}$		0.0026	0.0032	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 22\text{ A}$		0.0029	0.0036	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 25\text{ A}$		150		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.9\text{ A}$, $V_{GS} = 0\text{ V}$		0.66	1.1	V
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		8340		pF
Output Capacitance	C_{oss}			850		
Reverse Transfer Capacitance	C_{rss}			355		
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 20\text{ A}$		53	80	nC
Gate-Source Charge	Q_{gs}			17.5		
Gate-Drain Charge	Q_{gd}			6.5		
Gate Resistance	R_g	$f = 1\text{ MHz}$	0.8	1.2	1.8	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\text{ }\Omega$		25	38	ns
Rise Time	t_r			20	30	
Turn-Off Delay Time	$t_{d(off)}$			172	260	
Fall Time	t_f			41	62	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 2.9\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$		42	60	

Notes:

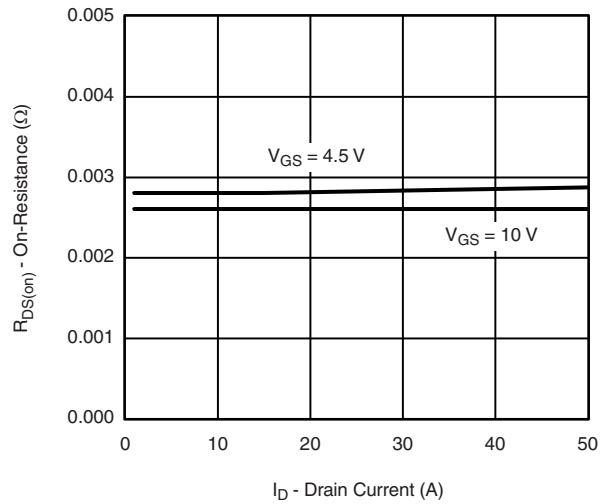
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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

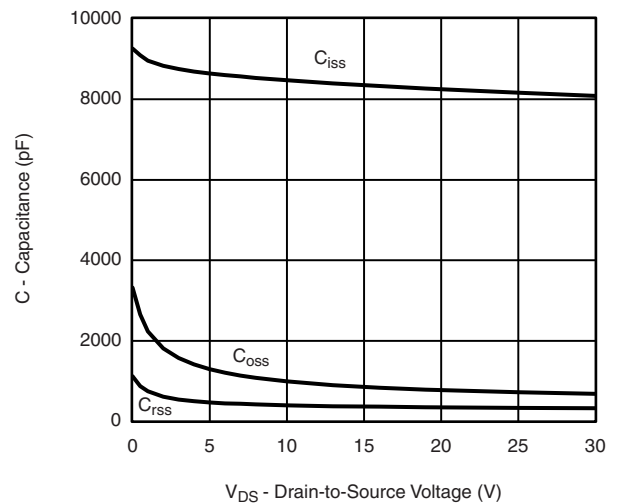
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS ($25\text{ }^{\circ}\text{C}$, unless otherwise noted)

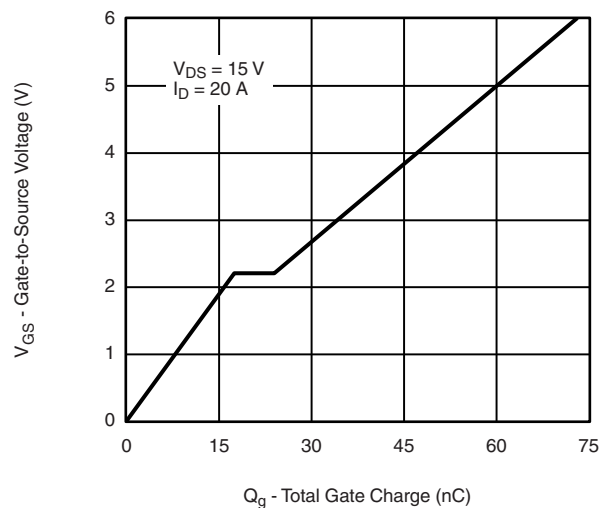
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



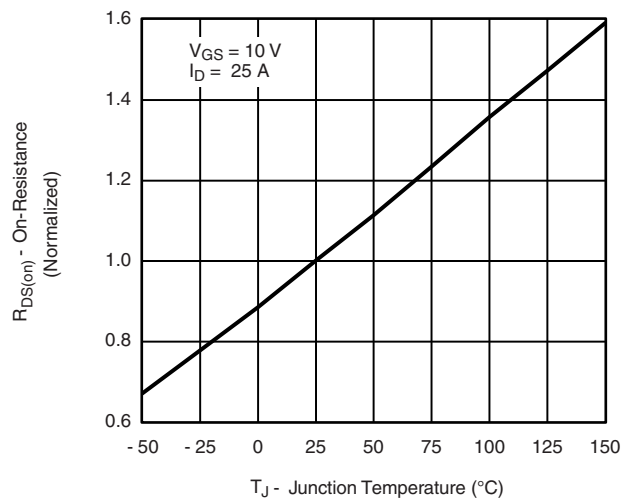
On-Resistance vs. Drain Current



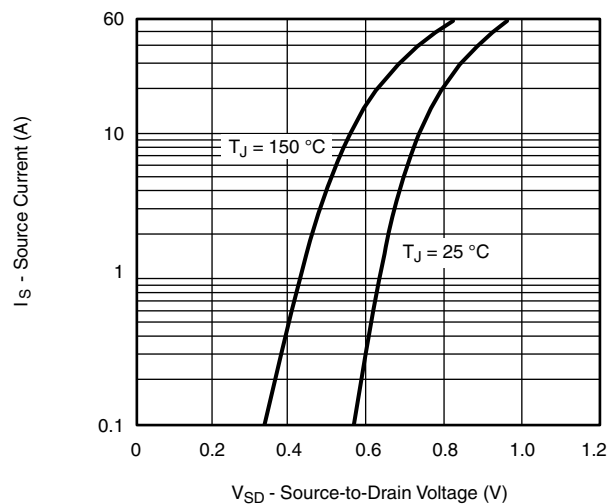
Capacitance



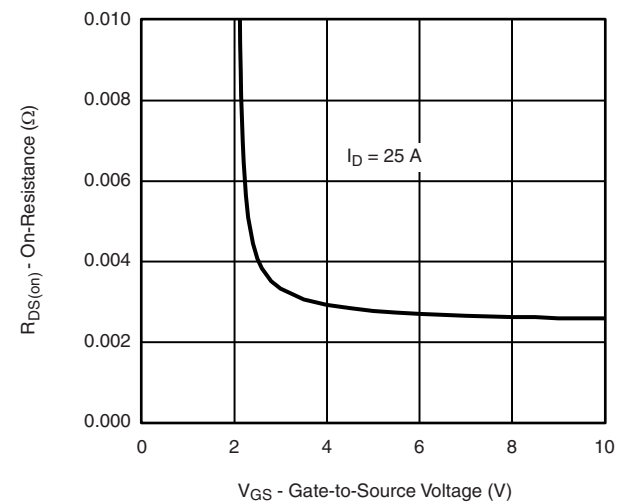
Gate Charge



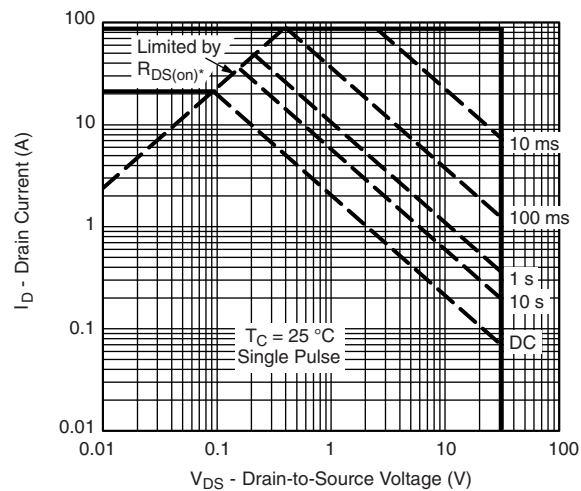
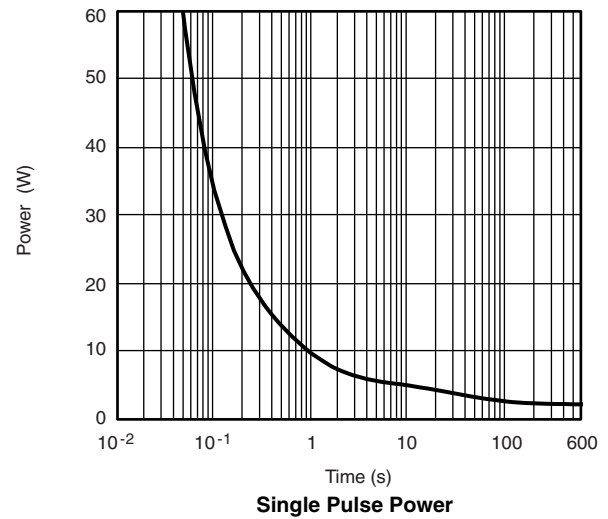
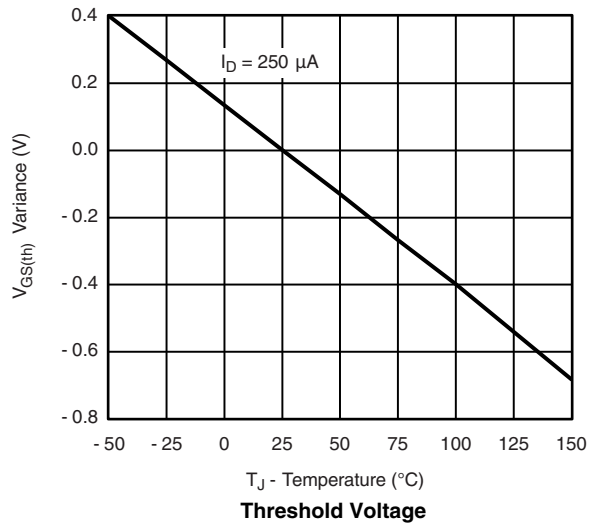
On-Resistance vs. Junction Temperature



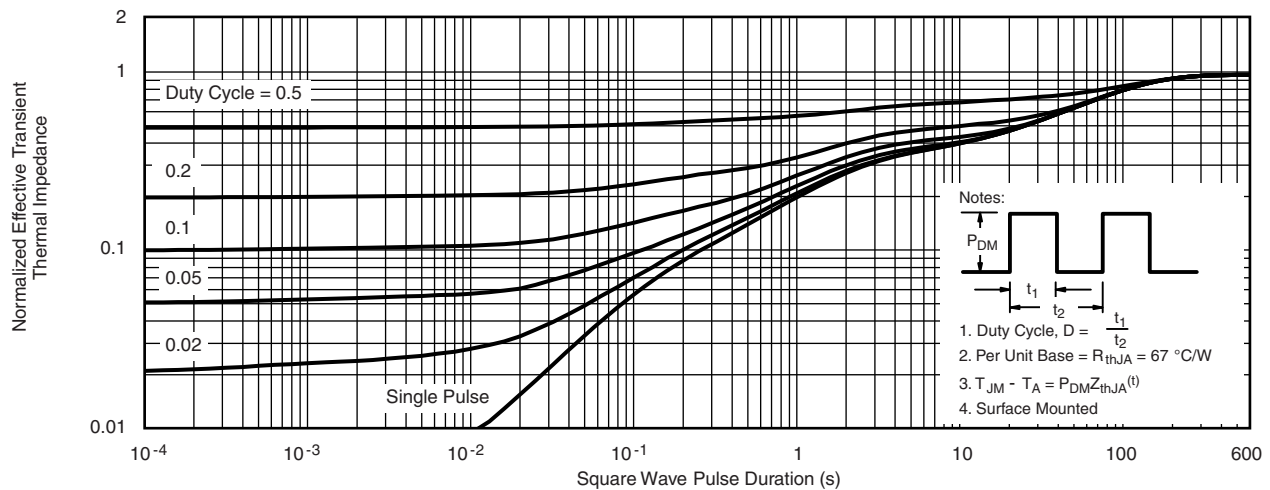
Source-Drain Diode Forward Voltage



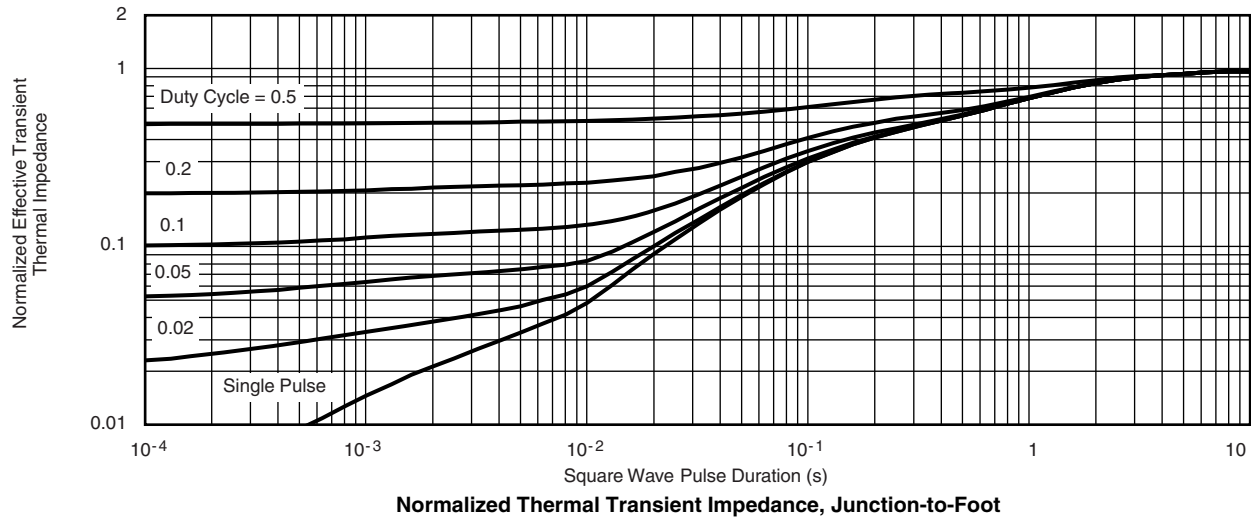
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

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

Safe Operating Area, Junction-to-Case**Normalized Thermal Transient Impedance, Junction-to-Ambient**

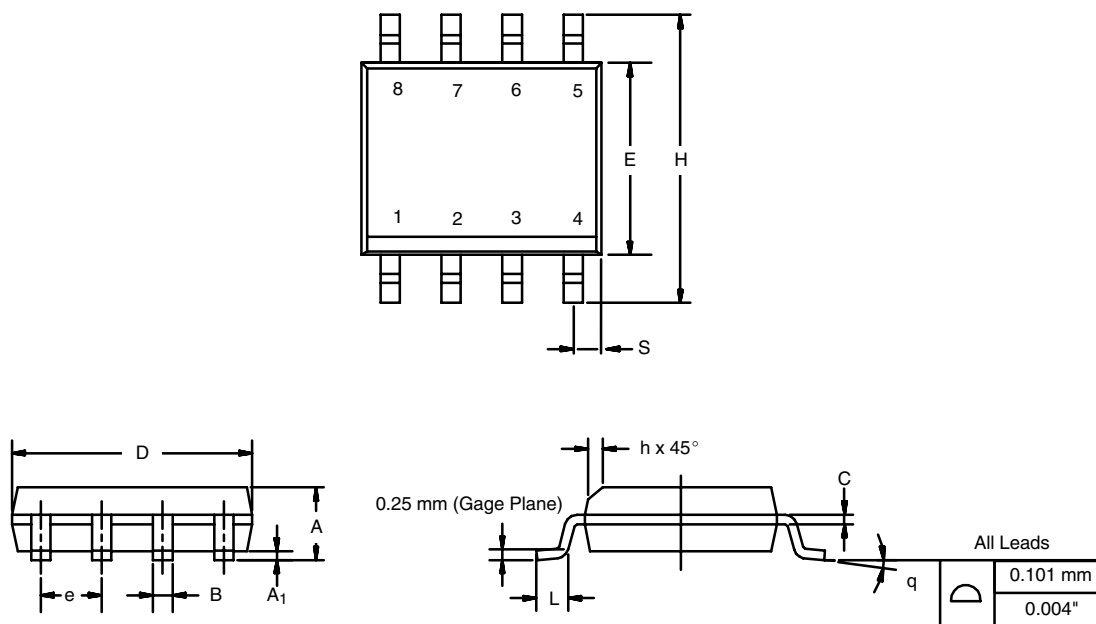
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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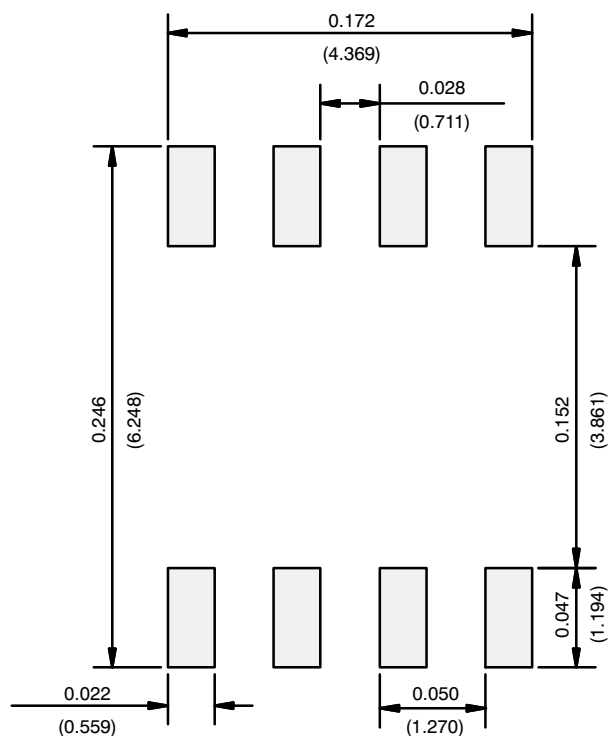
SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A 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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