

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

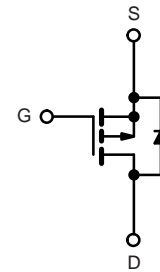
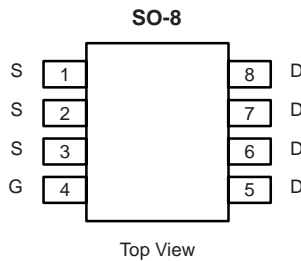
PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)
- 30	0.0039 at V <sub>GS</sub> = 10 V	- 21	80 nC
	0.006 at V <sub>GS</sub> = 4.5 V	-18	

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> Tested

### APPLICATIONS

- Load Switches
  - Notebook PCs
  - Desktop PCs



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>	± 20		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	- 21	A
		T <sub>C</sub> = 70 °C	- 19.2	
		T <sub>A</sub> = 25 °C	- 18 <sup>b, c</sup>	
		T <sub>A</sub> = 70 °C	- 14.7 <sup>b, c</sup>	
Pulsed Drain Current	I <sub>DM</sub>	- 80		
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C	- 22.5	
		T <sub>A</sub> = 25 °C	- 17 <sup>b, c</sup>	
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	6.1	W
		T <sub>C</sub> = 70 °C	4	
		T <sub>A</sub> = 25 °C	3.6 <sup>b, c</sup>	
		T <sub>A</sub> = 70 °C	2.2 <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>	28	35	°C/W	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	15	20		

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 85 °C/W.

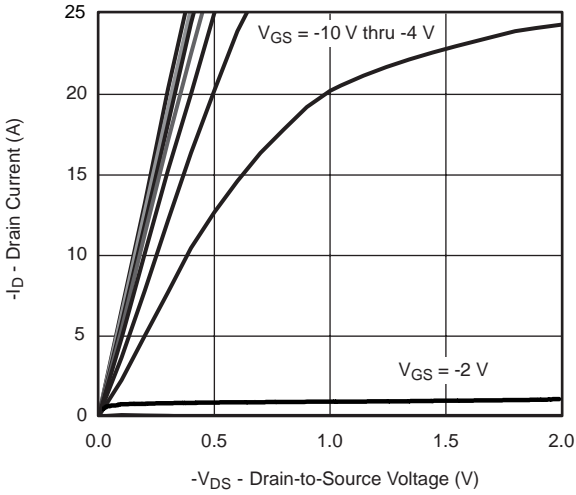
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 30			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1.2		- 2.5	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	- 21			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -15\text{ A}$		0.0039	0.0049	$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -10\text{ A}$		0.006	0.0072	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -5\text{ V}, I_D = -15\text{ A}$		70		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		6129		$\text{pF}$
Output Capacitance	$C_{oss}$			1080		
Reverse Transfer Capacitance	$C_{rss}$			701		
Total Gate Charge	$Q_g$	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -15\text{ A}$		80	120	$\text{nC}$
				37		
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -15\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -10\text{ A}$		13		$\text{nC}$
Gate-Drain Charge	$Q_{gd}$			19		
Gate Resistance	$R_g$		$f = 1\text{ MHz}$		90	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		105		$\text{ns}$
Rise Time	$t_r$			152		
Turn-Off Delay Time	$t_{d(off)}$			96		
Fall Time	$t_f$			55		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -15\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		88		$\text{ns}$
Rise Time	$t_r$			106		
Turn-Off Delay Time	$t_{d(off)}$			72		
Fall Time	$t_f$			40		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			- 21	A
Pulse Diode Forward Current	$I_{SM}$				- 80	
Body Diode Voltage	$V_{SD}$	$I_S = -10\text{ A}, V_{GS} = 0\text{ V}$		- 0.7	- 1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -15\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		19		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			11		nC
Reverse Recovery Fall Time	$t_a$			10		ns
Reverse Recovery Rise Time	$t_b$			9		

**Notes:**

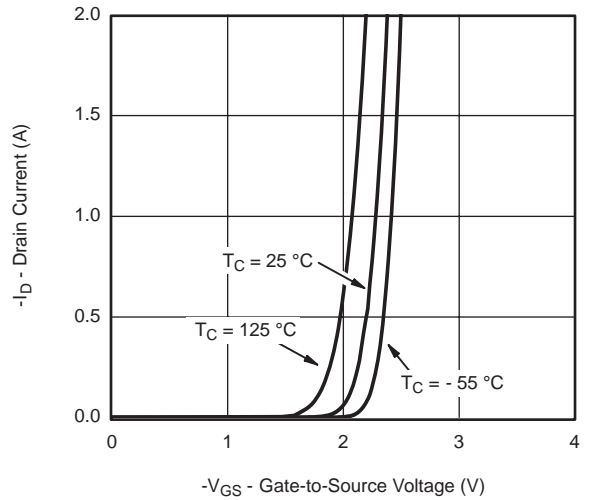
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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.

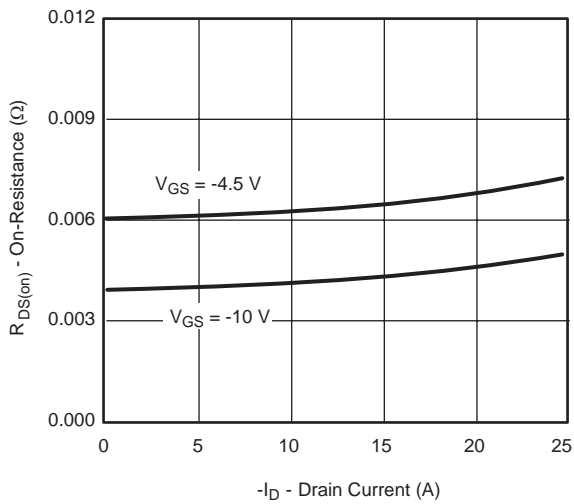
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



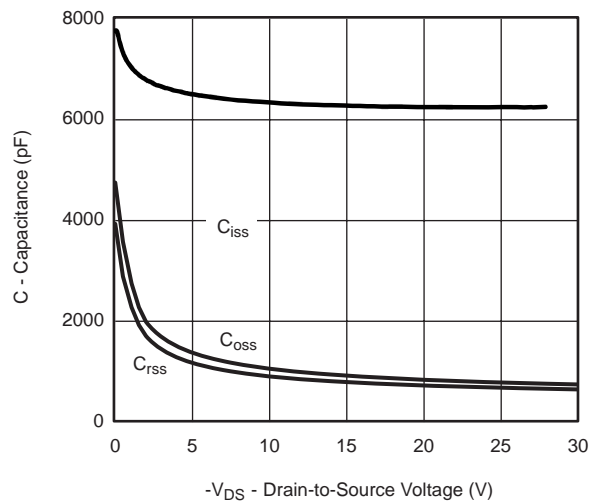
**Output Characteristics**



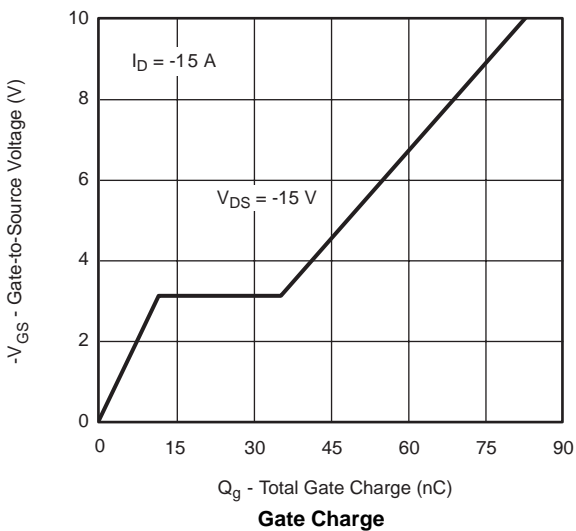
**Transfer Characteristics**



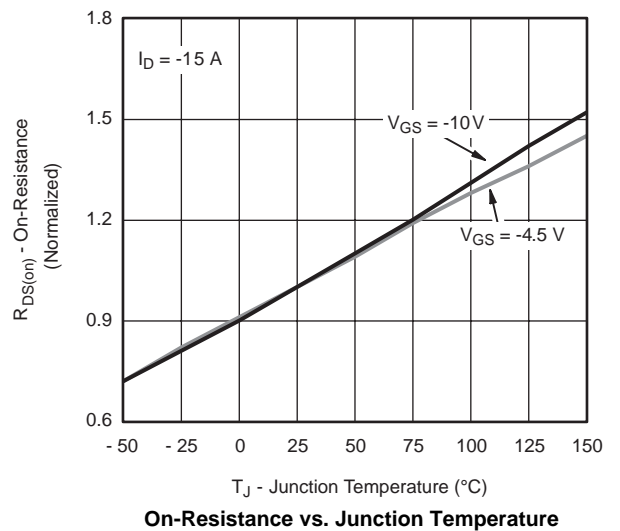
**On-Resistance vs. Drain Current**



**Capacitance**

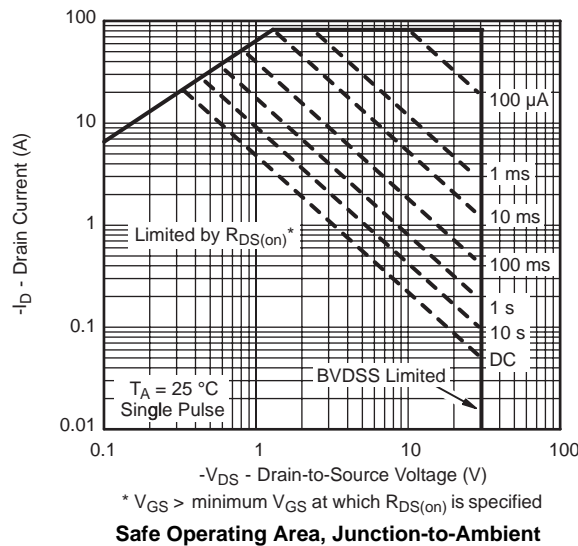
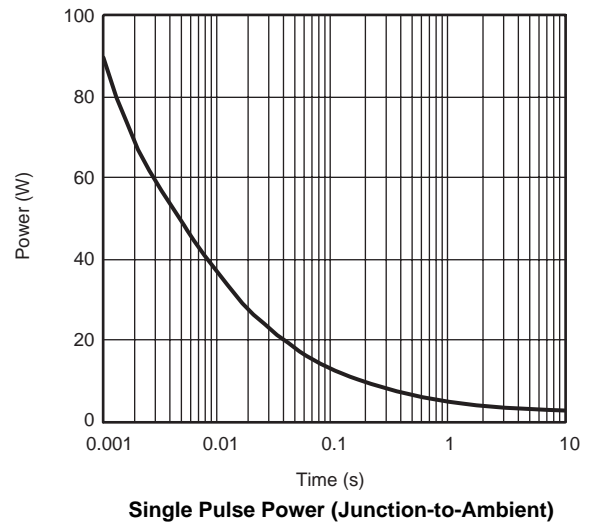
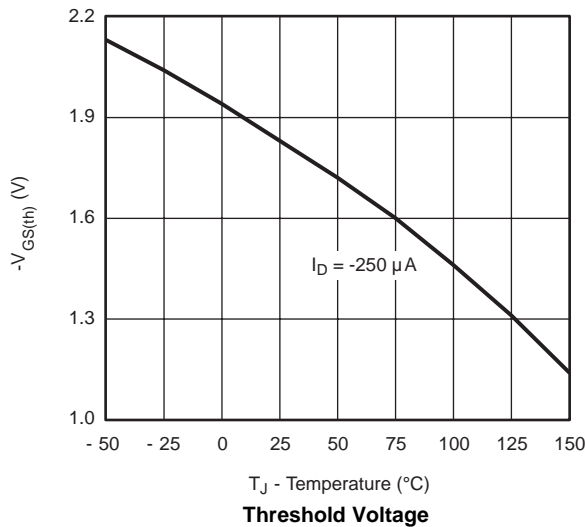
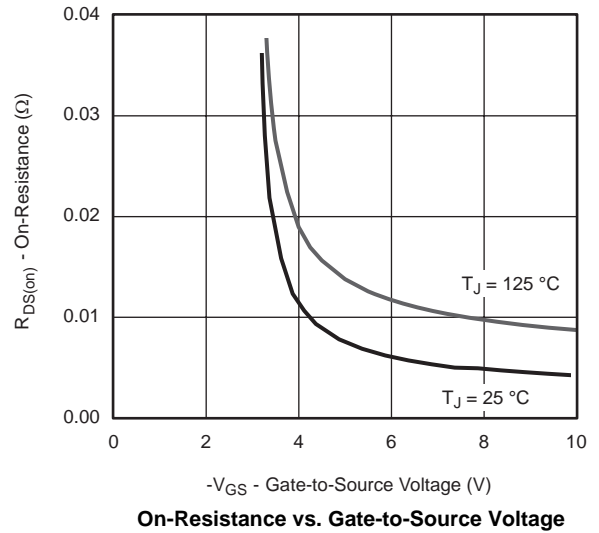
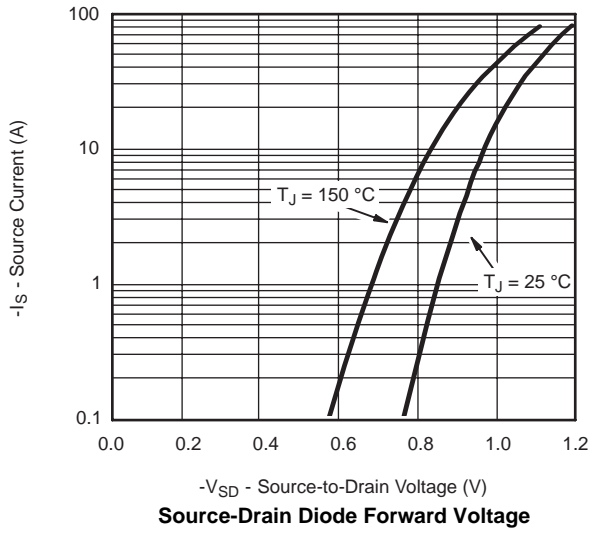


**Gate Charge**

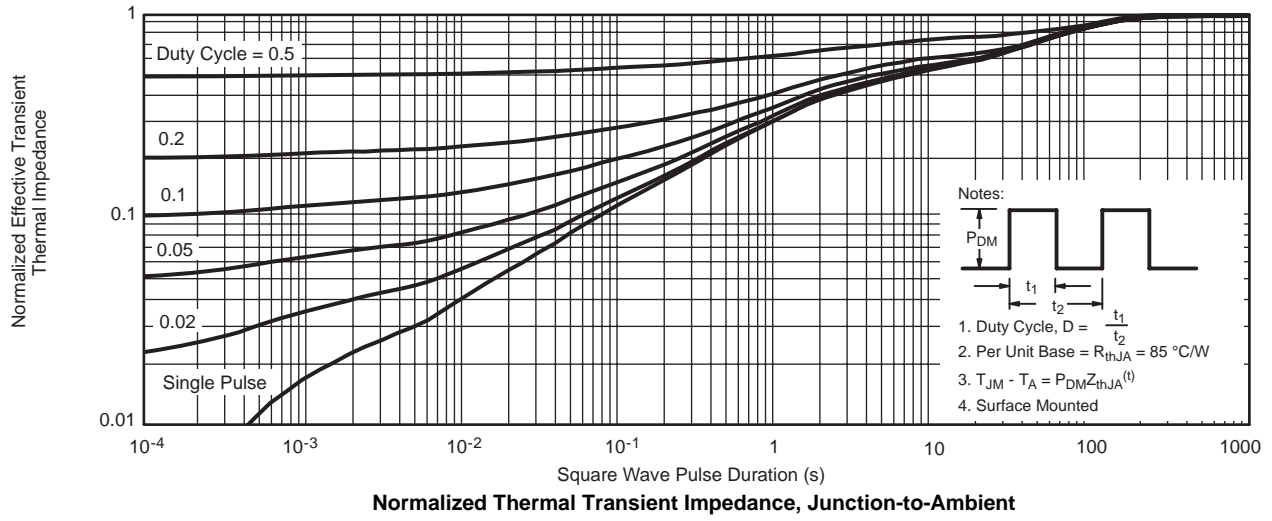


**On-Resistance vs. Junction Temperature**

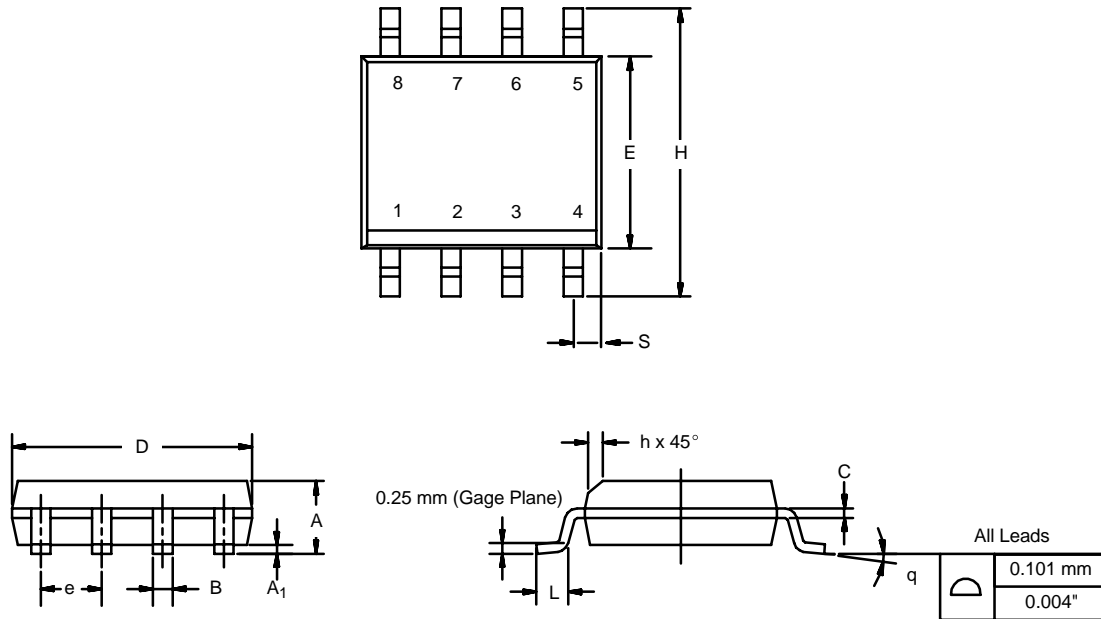
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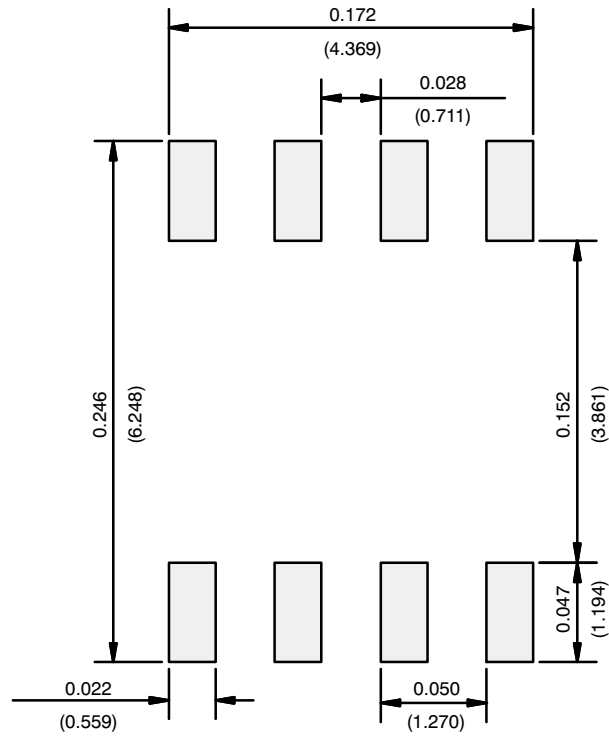


**SOIC (NARROW): 8-LEAD**  
JEDEC Part Number: MS-012



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

**RECOMMENDED MINIMUM PADS FOR SO-8**



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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