

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

PRODUCT SUMMARY			
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a, c</sup>	$Q_g$ (Typ.)
30	0.0055at $V_{GS} = 10$ V	15	60 nC
	0.0070at $V_{GS} = 4.5$ V	12	

### FEATURES

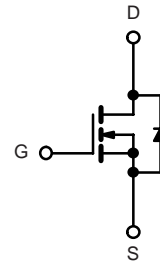
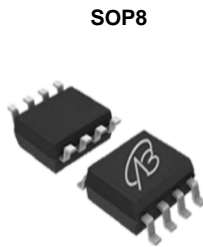
- TrenchFET<sup>®</sup> Power MOSFET
- 100 %  $R_g$  and UIS Tested



**RoHS**  
COMPLIANT

### APPLICATIONS

- Synchronous Rectification
- Power Supplies



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	30	V
Gate-Source Voltage		$V_{GS}$	$\pm 25$	
Continuous Drain Current ( $T_J = 175$ °C)	$T_C = 25$ °C	$I_D$	15 <sup>a, c</sup>	A
	$T_C = 70$ °C		12 <sup>c</sup>	
	$T_A = 25$ °C		10 <sup>b</sup>	
	$T_A = 70$ °C		8 <sup>b</sup>	
Pulsed Drain Current		$I_{DM}$	45	
Avalanche Current Pulse		$I_{AS}$	80	
Single Pulse Avalanche Energy		$E_{AS}$	320	mJ
Continuous Source-Drain Diode Current	$T_C = 25$ °C	$I_S$	110 <sup>a, c</sup>	A
	$T_A = 25$ °C		2.6 <sup>b</sup>	
Maximum Power Dissipation	$T_C = 25$ °C	$P_D$	312 <sup>a</sup>	W
	$T_C = 70$ °C		200	
	$T_A = 25$ °C		3.13 <sup>b</sup>	
	$T_A = 70$ °C		2.0 <sup>b</sup>	
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 <sup>b</sup>		$R_{thJA}$	32	40	°C/W
Maximum Junction-to-Case					

Notes:

a. Based on  $T_C = 25$  °C.

b. Surface Mounted on 1" x 1" FR4 board.

c. Calculated based on maximum junction temperature. Package limitation current is 110 A.

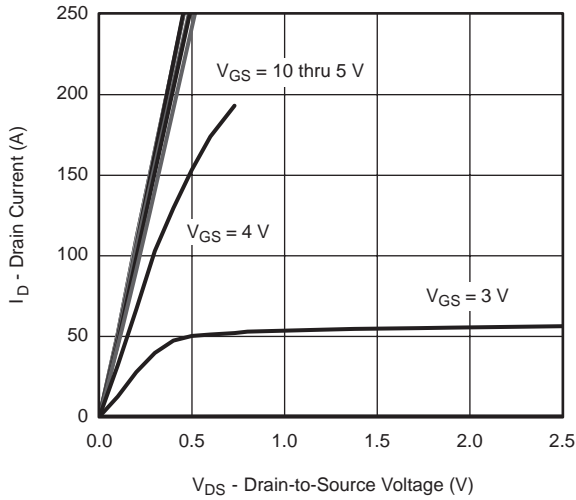
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
<b>Static</b>							
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V	
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		41		mV/°C	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 8			
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	$\mu\text{A}$	
		$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10		
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	120			A	
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		0.0055		$\Omega$	
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		0.0070			
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$		180		S	
<b>Dynamic<sup>b</sup></b>							
Input Capacitance	$C_{iss}$	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		2900		pF	
Output Capacitance	$C_{oss}$			550			
Reverse Transfer Capacitance	$C_{rss}$			250			
Total Gate Charge	$Q_g$	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		60	120	nC	
Gate-Source Charge	$Q_{gs}$			20			
Gate-Drain Charge	$Q_{gd}$			12			
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		0.85	1.3	$\Omega$	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 1.0\text{ }\Omega$ $I_D \cong 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		20	30	ns	
Rise Time	$t_r$			11	17		
Turn-Off Delay Time	$t_{d(off)}$			77	110		
Fall Time	$t_f$			10	15		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 1.0\text{ }\Omega$ $I_D \cong 20\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		102	155		
Rise Time	$t_r$			62	95		
Turn-Off Delay Time	$t_{d(off)}$			180	270		
Fall Time	$t_f$			60	90		
<b>Drain-Source Body Diode Characteristics</b>							
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			15	A	
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				45		
Body Diode Voltage	$V_{SD}$	$I_S = 20\text{ A}$		0.8	1.2	V	
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		20	60	ns	
Body Diode Reverse Recovery Charge	$Q_{rr}$				70	105	nC
Reverse Recovery Fall Time	$t_a$				30		ns
Reverse Recovery Rise Time	$t_b$				20		

Notes:

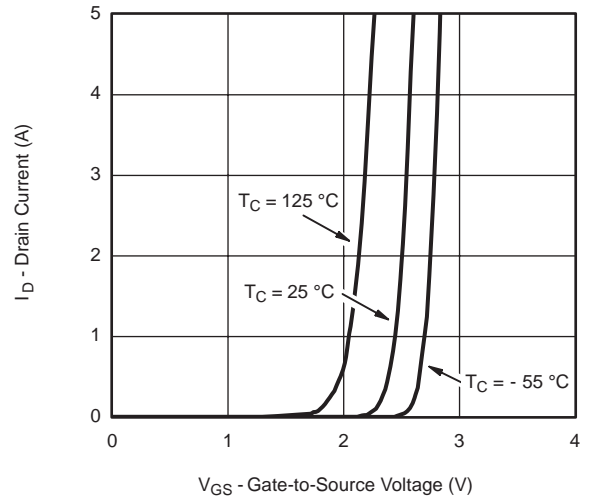
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

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.

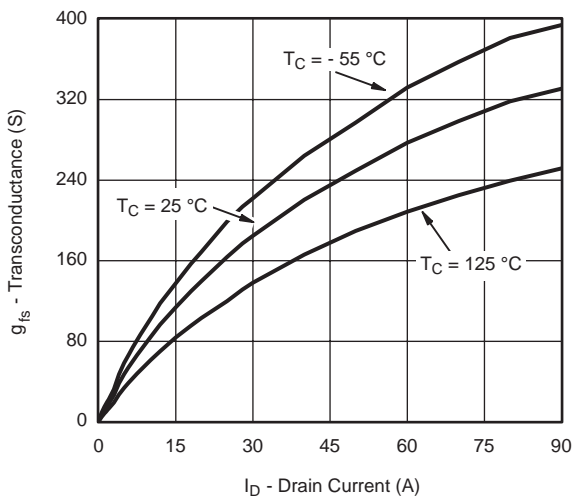
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



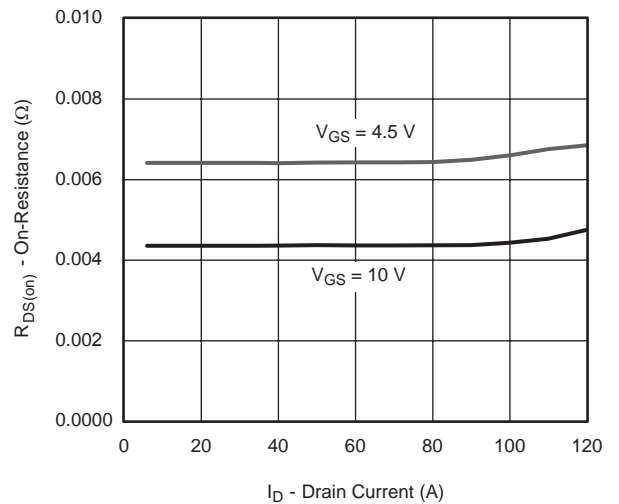
**Output Characteristics**



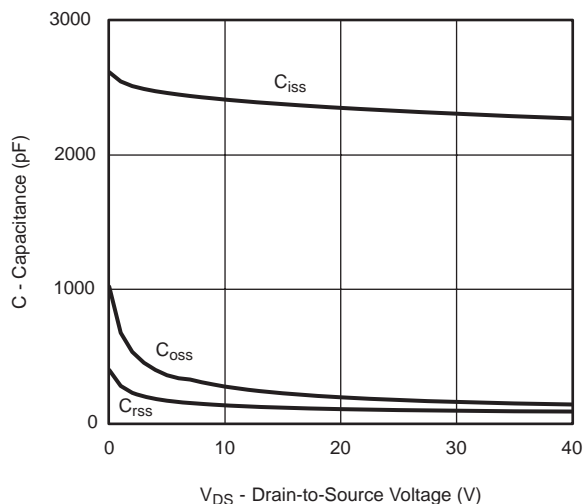
**Transfer Characteristics**



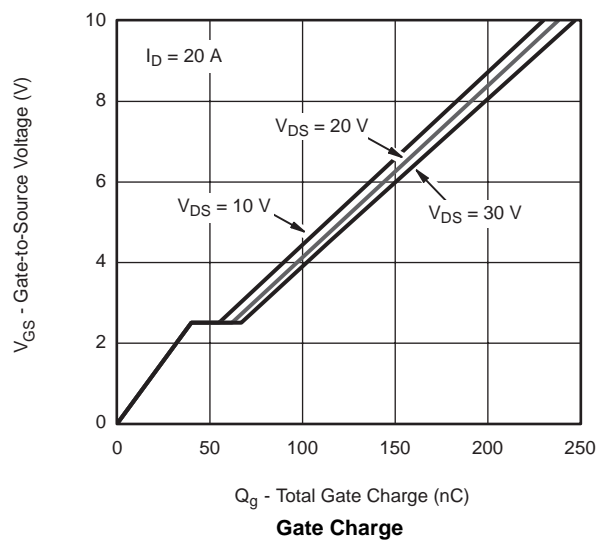
**Transconductance**



**On-Resistance vs. Drain Current**

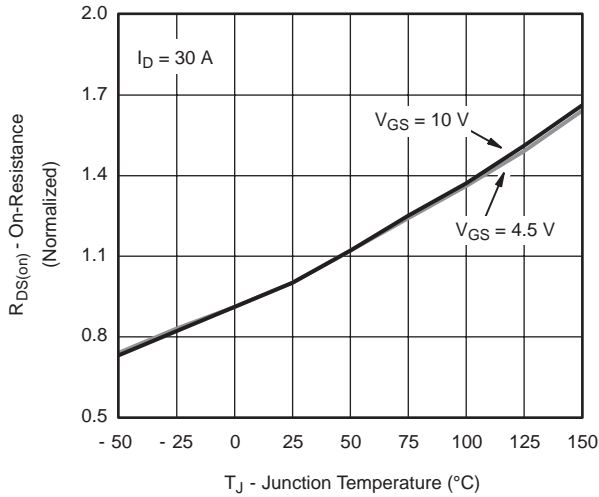


**Capacitance**

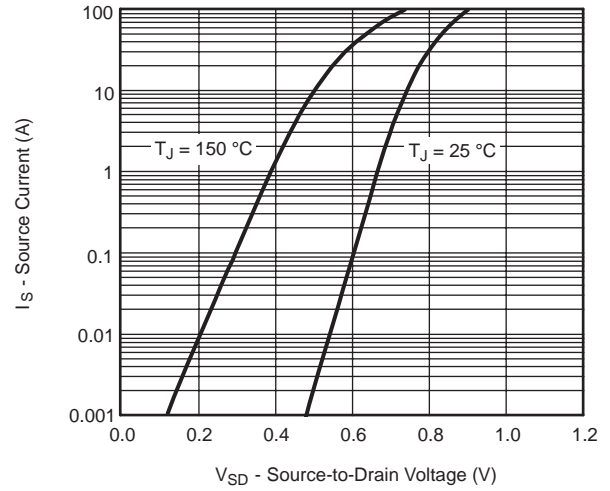


**Gate Charge**

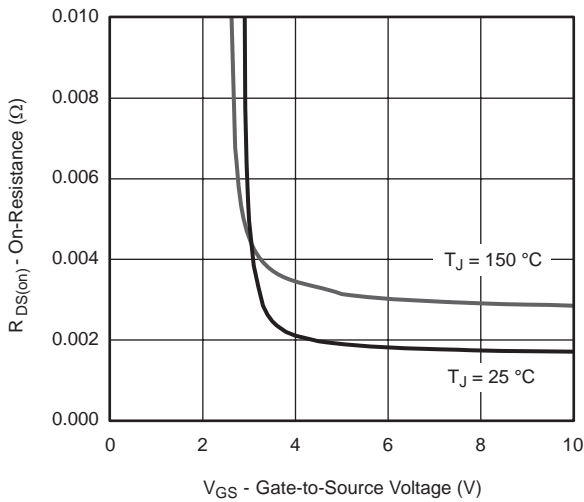
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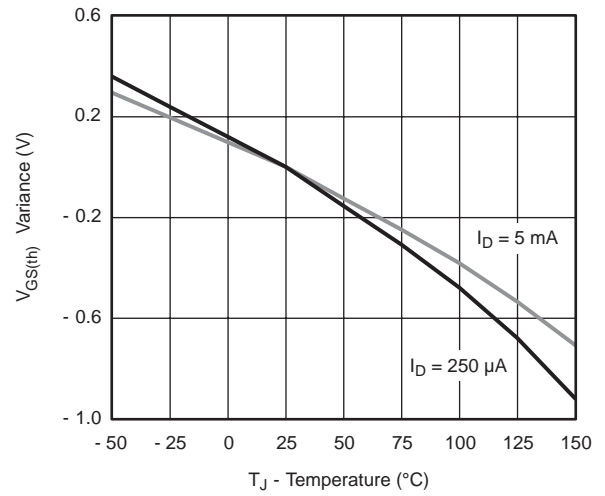
**On-Resistance vs. Junction Temperature**



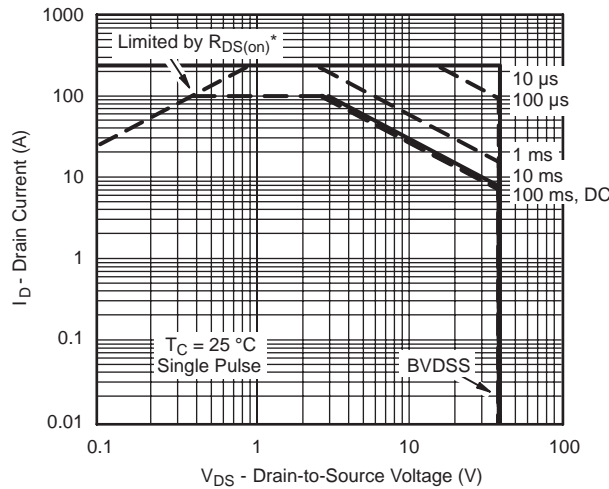
**Forward Diode Voltage vs. Temperature**



**On-Resistance vs. Gate-to-Source Voltage**



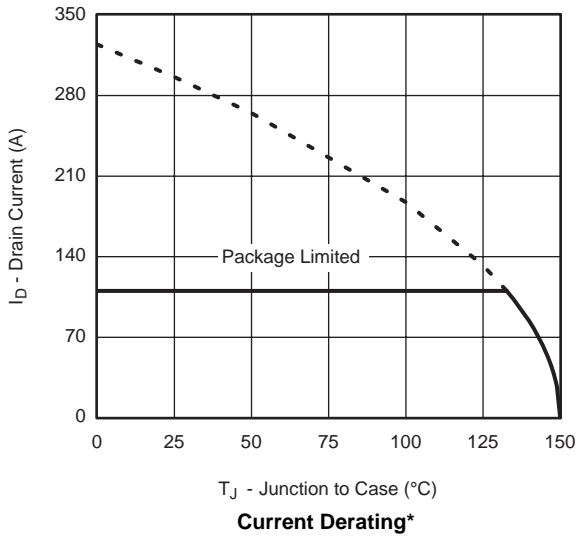
**Threshold Voltage**



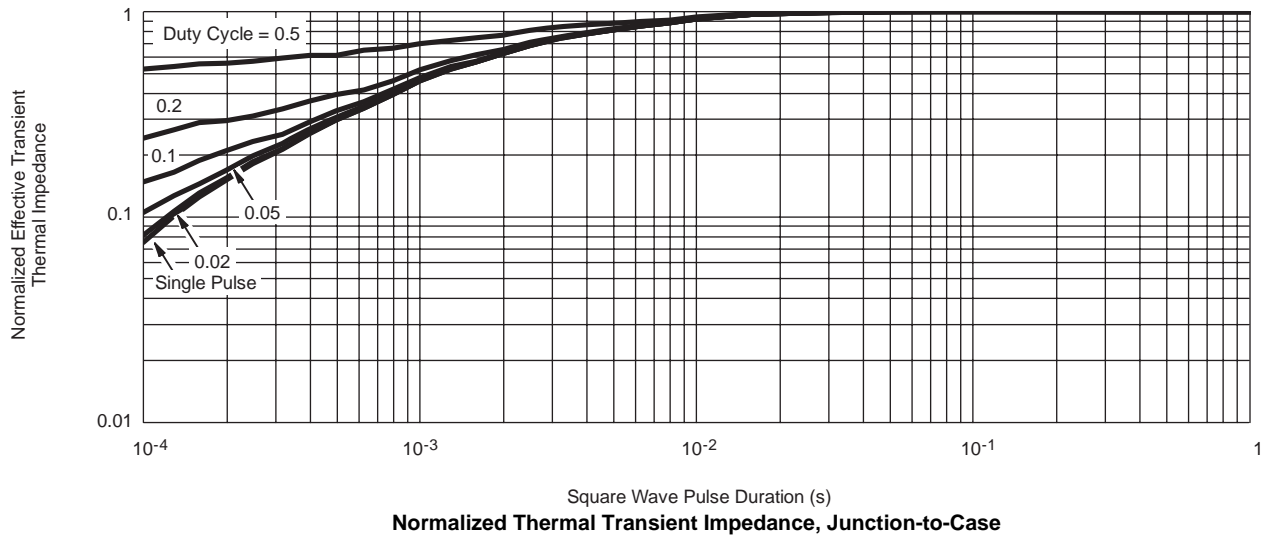
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**Safe Operating Area, Junction-to-Ambient**

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

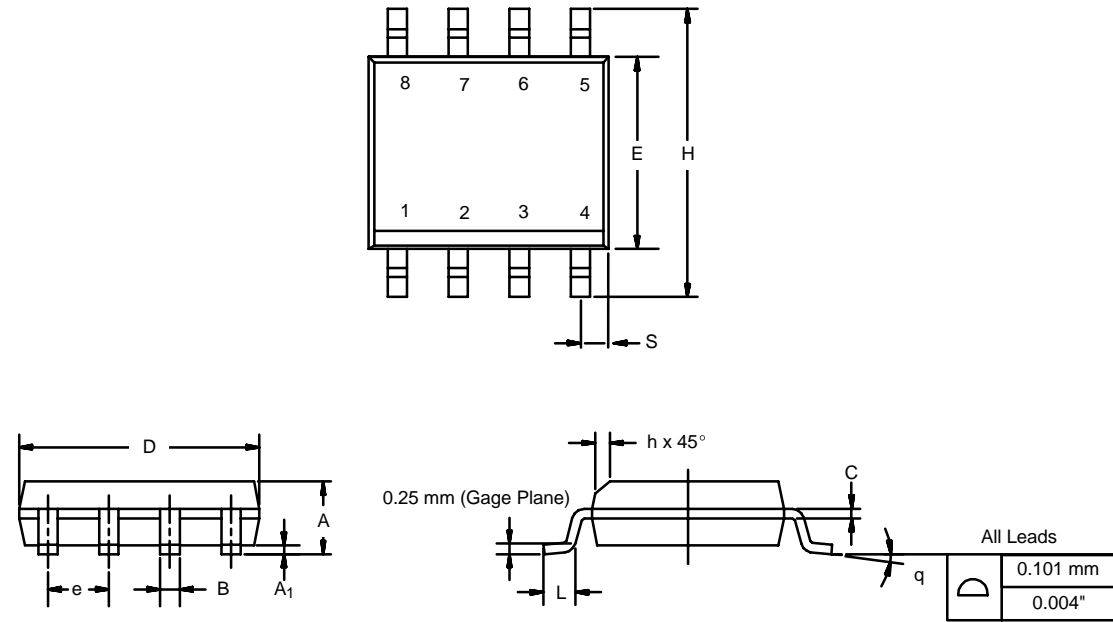


\* The power dissipation  $P_D$  is based on  $T_{J(max)} = 150\text{ °C}$ , using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the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



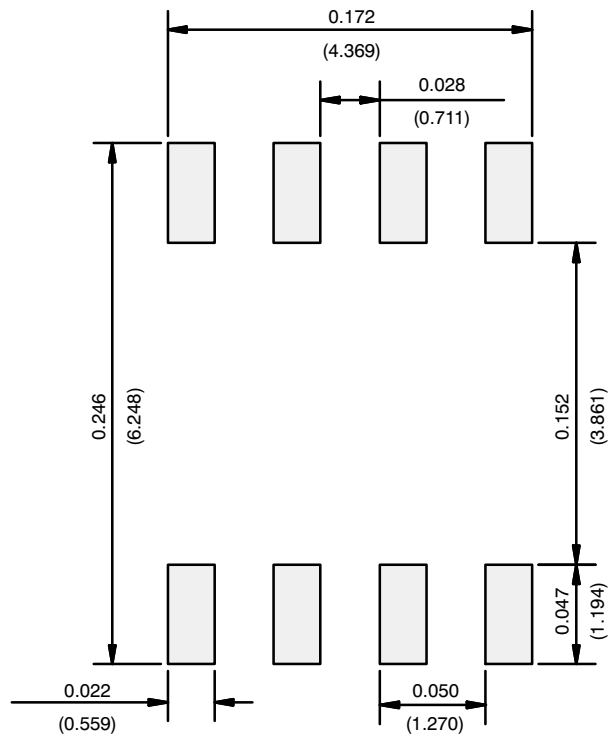
**SOIC (NARROW): 8-LEAD**

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
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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