

## P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY		
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
- 20	0.0075 at V <sub>GS</sub> = - 4.5 V	- 14
	0.009 at V <sub>GS</sub> = - 2.5 V	- 13
	0.0115 at V <sub>GS</sub> = - 1.8 V	- 12

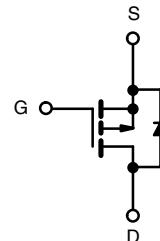
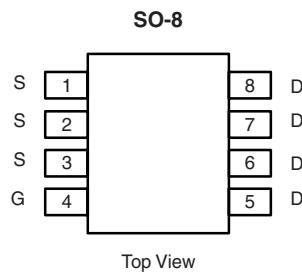
### FEATURES

- Halogen-free According to IEC 61249-2-21  
Definition
- TrenchFET® Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



### APPLICATIONS

- Game Station  
- Load Switch



P-Channel MOSFET

Ordering Information: Si4423DY-T1-E3 (Lead (Pb)-free)  
Si4423DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

### ABSOLUTE MAXIMUM RATINGS T<sub>A</sub> = 25 °C, unless otherwise noted

Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	V <sub>DS</sub>	- 20		V	
Gate-Source Voltage	V <sub>GS</sub>		± 8		
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	T <sub>A</sub> = 25 °C	I <sub>D</sub>	- 14	A	
	T <sub>A</sub> = 70 °C		- 11.5		
Pulsed Drain Current	I <sub>DM</sub>	- 50			
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	- 2.7	- 1.36		
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C	P <sub>D</sub>	3.0	W	
	T <sub>A</sub> = 70 °C		1.9		
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>a</sup>	t ≤ 10 s	R <sub>thJA</sub>	33	°C/W
	Steady State		70	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	16	21	

Notes:

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

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$ , $I_D = -600 \mu\text{A}$	-0.4		-0.9	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}$ , $V_{GS} = \pm 8 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20 \text{ V}$ , $V_{GS} = 0 \text{ V}$		-1		$\mu\text{A}$
		$V_{DS} = -20 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $T_J = 70^\circ\text{C}$		-10		
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{DS} = -5 \text{ V}$ , $V_{GS} = -4.5 \text{ V}$	-30			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = -4.5 \text{ V}$ , $I_D = -14 \text{ A}$		0.006	0.0075	$\Omega$
		$V_{GS} = -2.5 \text{ V}$ , $I_D = -13 \text{ A}$		0.0071	0.009	
		$V_{GS} = -1.8 \text{ V}$ , $I_D = -12 \text{ A}$		0.009	0.0115	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10 \text{ V}$ , $I_D = -14 \text{ A}$		60		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -2.7 \text{ A}$ , $V_{GS} = 0 \text{ V}$		-0.6	-1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -10 \text{ V}$ , $V_{GS} = -5 \text{ V}$ , $I_D = -14 \text{ A}$		116	175	nC
Gate-Source Charge	$Q_{gs}$			16		
Gate-Drain Charge	$Q_{gd}$			27		
Gate Resistance	$R_g$			3.2		$\Omega$
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = -10 \text{ V}$ , $R_L = 10 \Omega$ $I_D \approx -1 \text{ A}$ , $V_{GEN} = -4.5 \text{ V}$ , $R_g = 6 \Omega$		75	115	ns
Rise Time	$t_r$			165	250	
Turn-Off Delay Time	$t_{d(\text{off})}$			460	700	
Fall Time	$t_f$			210	320	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -2.1 \text{ A}$ , $dl/dt = 100 \text{ A}/\mu\text{s}$		105	160	

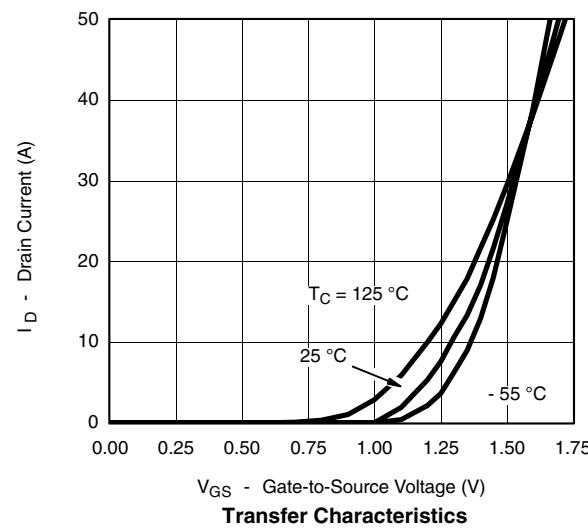
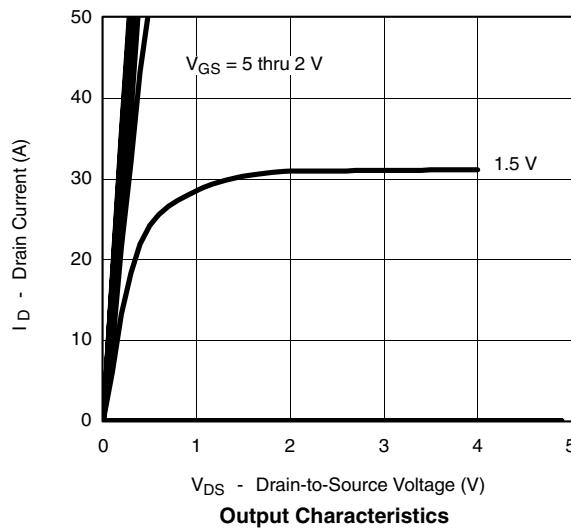
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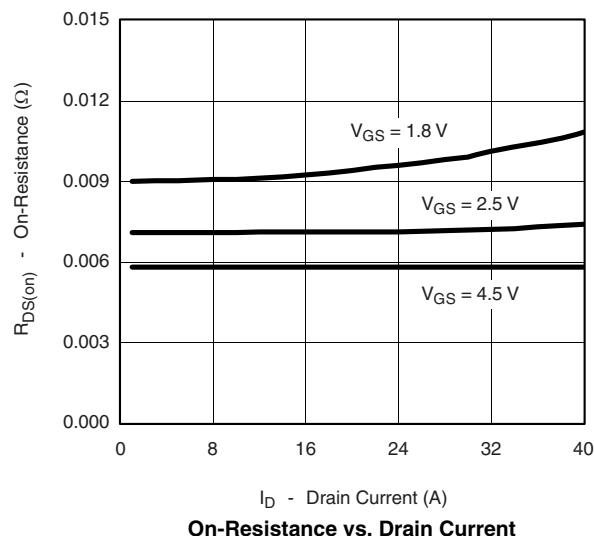
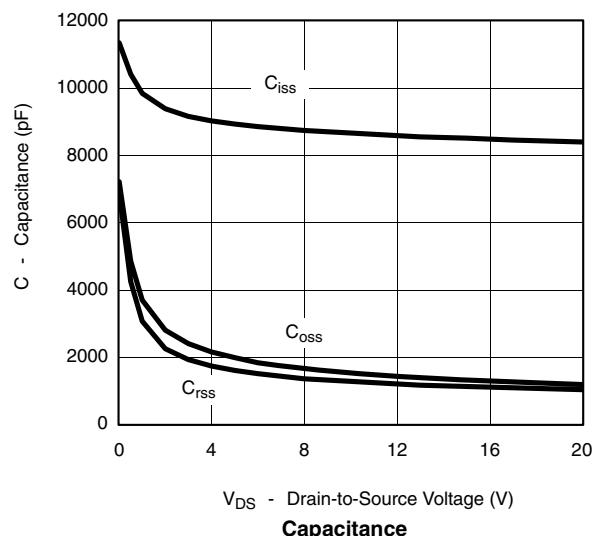
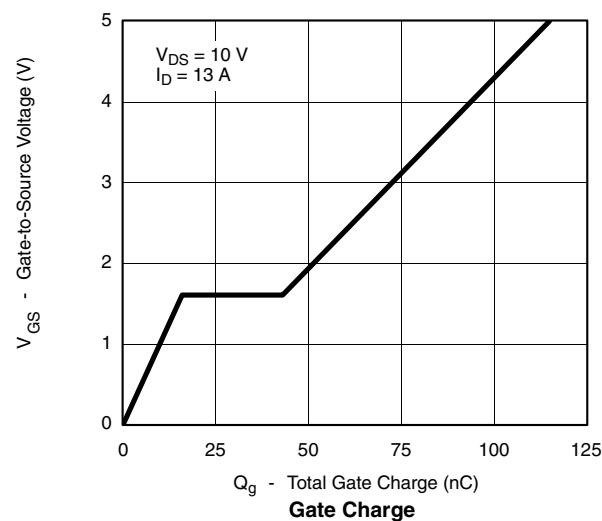
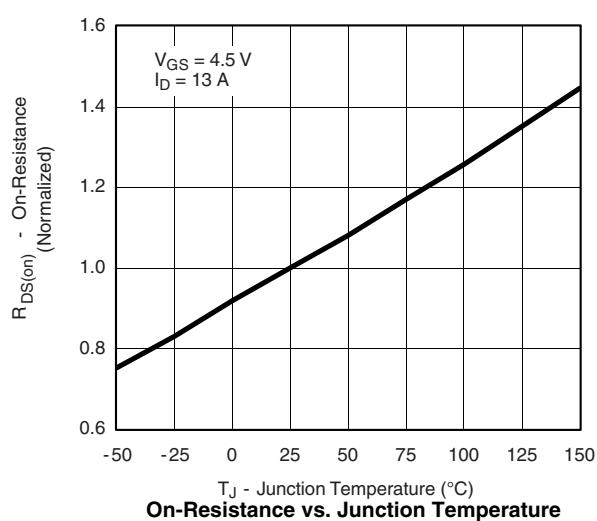
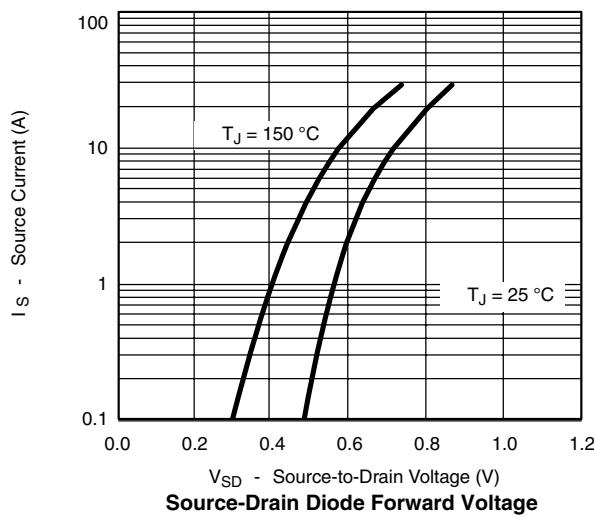
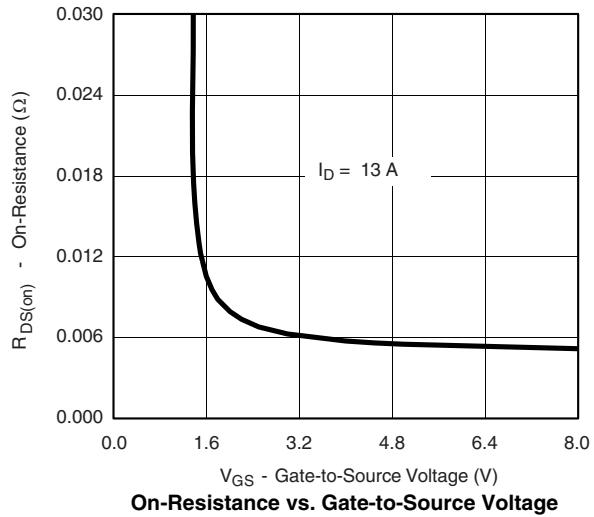
a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

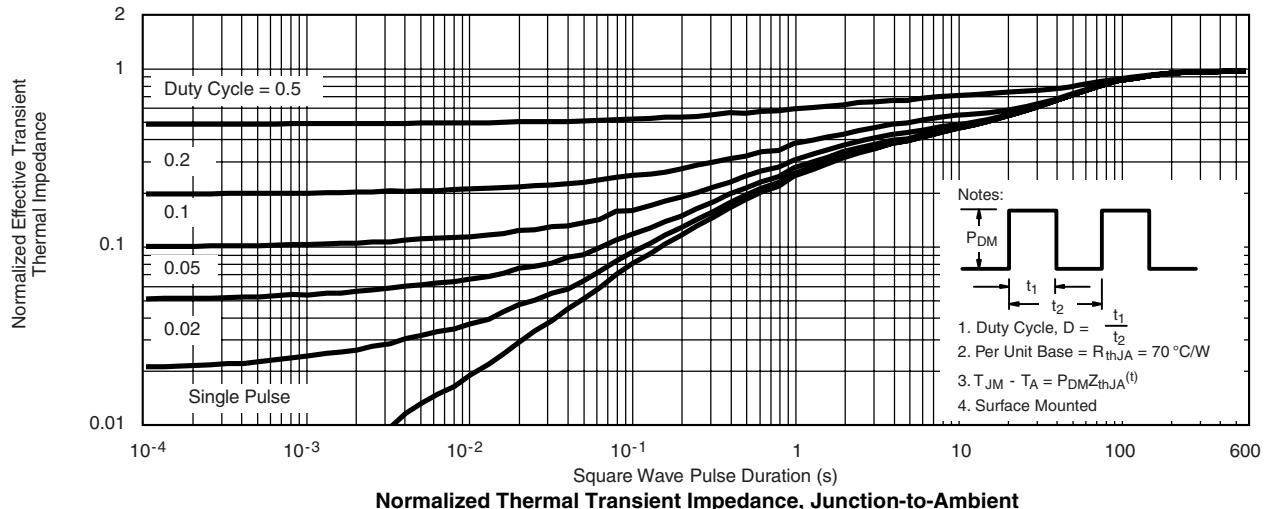
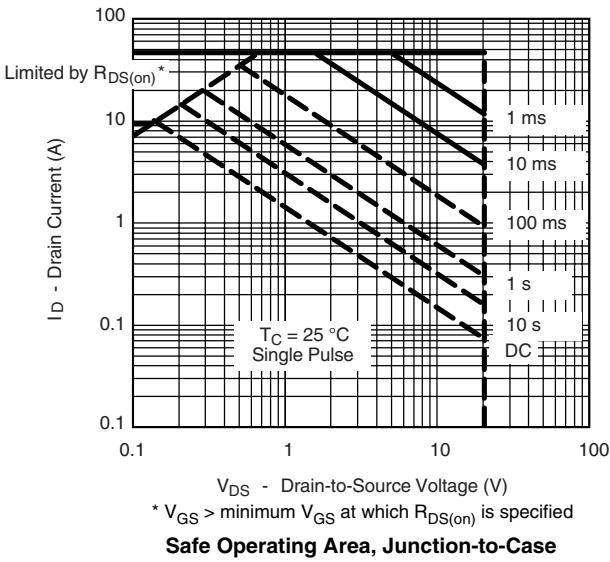
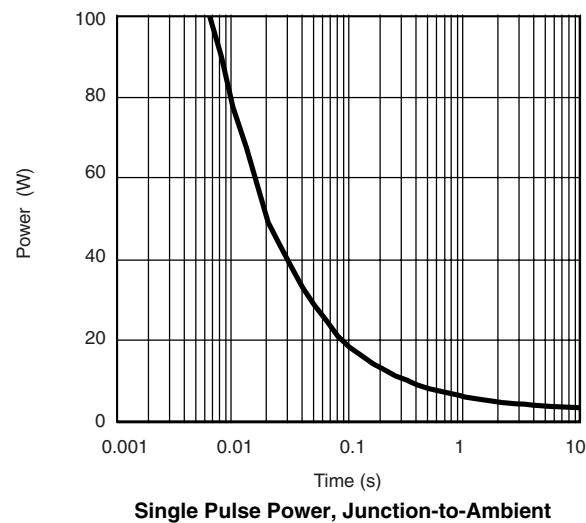
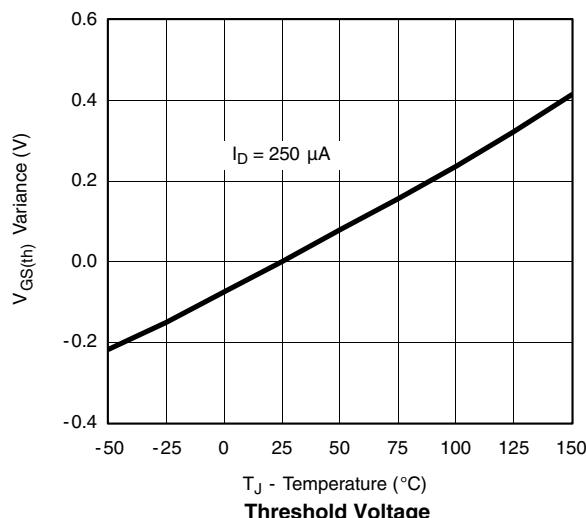
b. Guaranteed by design, not subject to production testing.

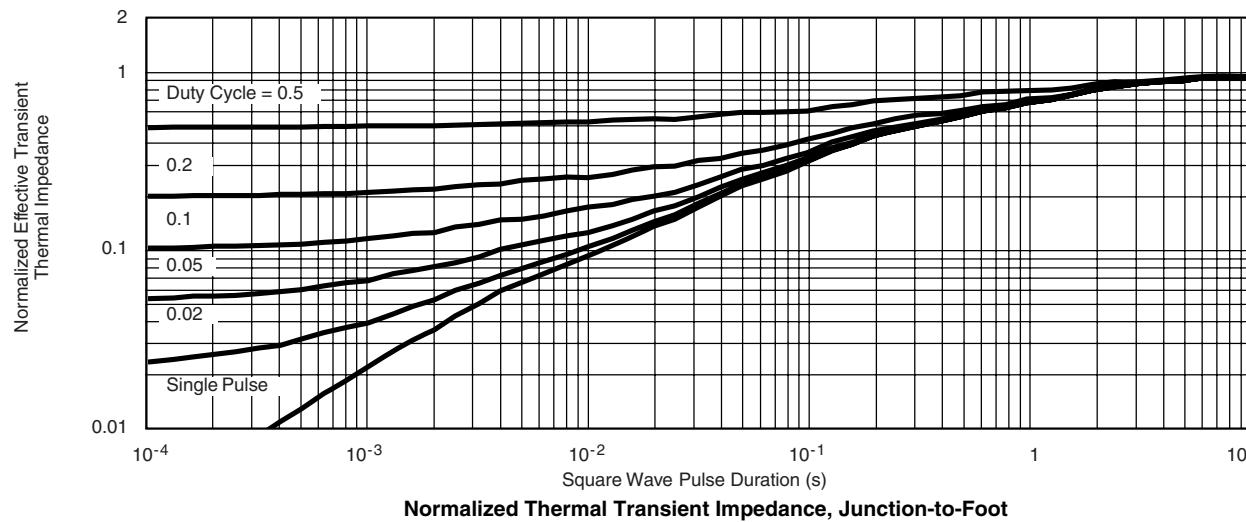
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

**TYPICAL CHARACTERISTICS**  $25^\circ\text{C}$ , 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**

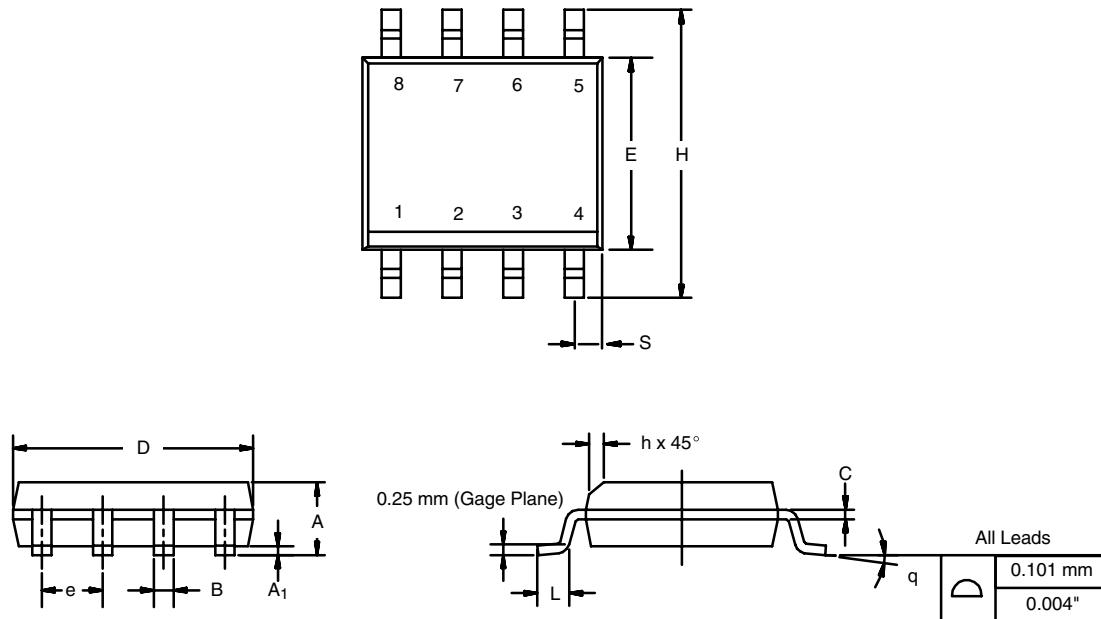
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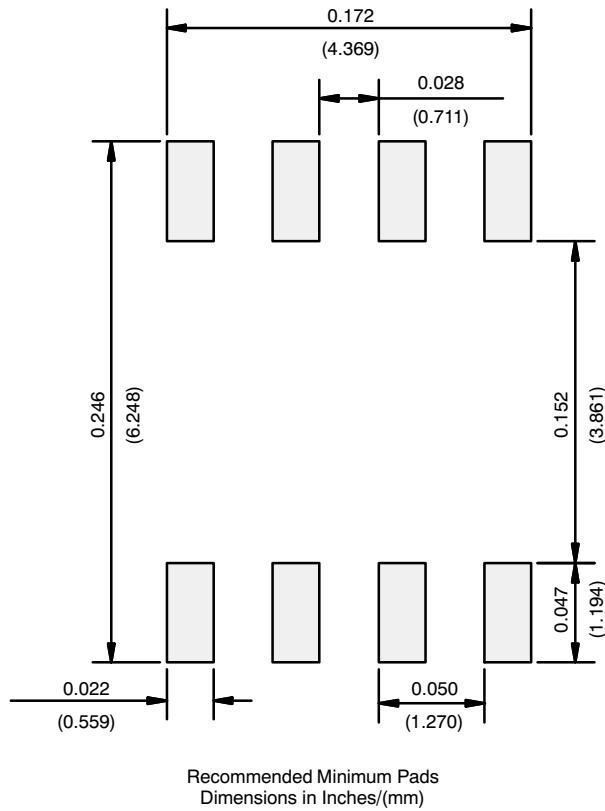
### SOIC (NARROW): 8-LEAD

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
ECN: C-06527-Rev. I, 11-Sep-06				
DWG: 5498				

## RECOMMENDED MINIMUM PADS FOR SO-8



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