

N-Channel 20-V (D-S) Fast Switching MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
20	0.005 at V _{GS} = 4.5 V	19.5	17.5 nC
	0.007 at V _{GS} = 2.5 V	15.5	

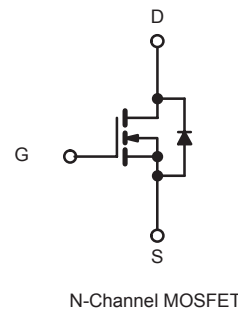
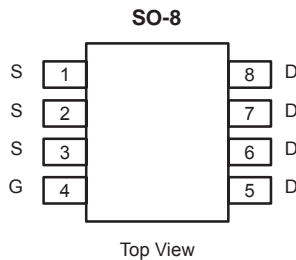
FEATURES

- Halogen-free Option Available
TrenchFET® Power MOSFET
- PWM Optimized
- 100 % R_g Tested



APPLICATIONS

- Synchronous Rectification



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter	Symbol	10 s	Steady State	Unit	
Drain-Source Voltage	V _{DS}	20		V	
Gate-Source Voltage	V _{GS}	± 12			
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	19.5	12.5	A
		T _A = 70 °C	15.6	10.0	
Pulsed Drain Current	I _{DM}	60			
Continuous Source Current (Diode Conduction) ^a	I _S	3.2	1.3		
Single Avalanche Current	L = 0.1 mH	I _{AS}	30		mJ
Single Avalanche Energy		E _{AS}	45		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	3.8	1.5	W
		T _A = 70 °C	2.0	0.8	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	
Soldering Recommendations (Peak Temperature) ^{b, c}		260			

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	R _{thJA}	t ≤ 10 s	24	33	°C/W
		Steady State	65	81	
Maximum Junction-to-Case (Drain)	R _{thJC}	1.9	2.4		

Notes:

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

b. copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

c. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

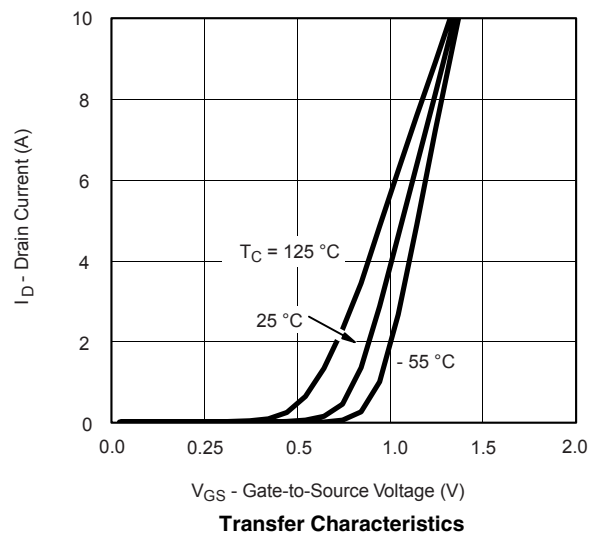
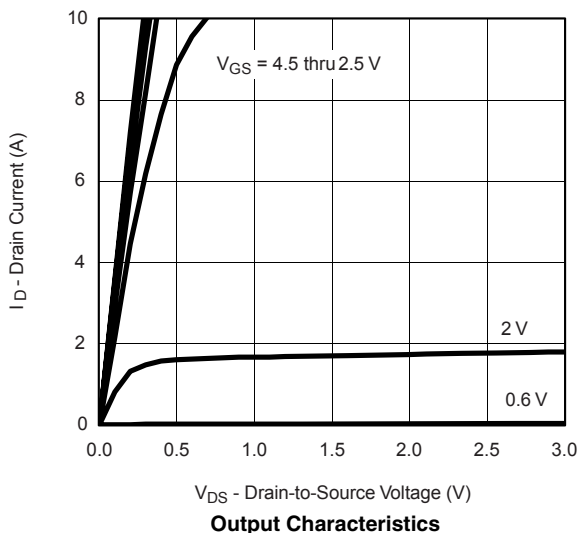
MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.5		1.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 12\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\ \text{V}, V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 20\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55\text{ }^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 4.5\ \text{V}$	40			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 4.5\ \text{V}, I_D = 6.5\ \text{A}$		0.005	0.007	Ω
		$V_{GS} = 2.5\ \text{V}, I_D = 5.5\ \text{A}$		0.007	0.009	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 19.5\ \text{A}$		105		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 3.2\ \text{A}, V_{GS} = 0\ \text{V}$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10\ \text{V}, V_{GS} = 4.5\ \text{V}, I_D = 19.5\ \text{A}$		17.5	27	nC
Gate-Source Charge	Q_{gs}			6.6		
Gate-Drain Charge	Q_{gd}			2.8		
Gate Resistance	R_g	$f = 1\ \text{MHz}$	0.7	1.4	2.1	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10\ \text{V}, R_L = 10\ \Omega$ $I_D = 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$		25	40	ns
Rise Time	t_r			15	25	
Turn-Off Delay Time	$t_{d(off)}$			50	75	
Fall Time	t_f			12	20	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 3.2\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		30	60	

Notes:

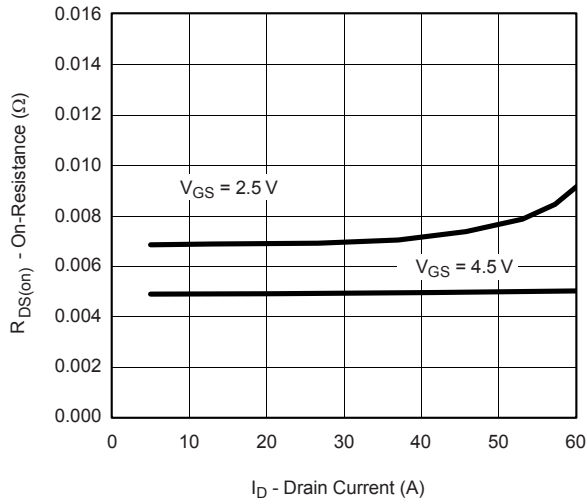
- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

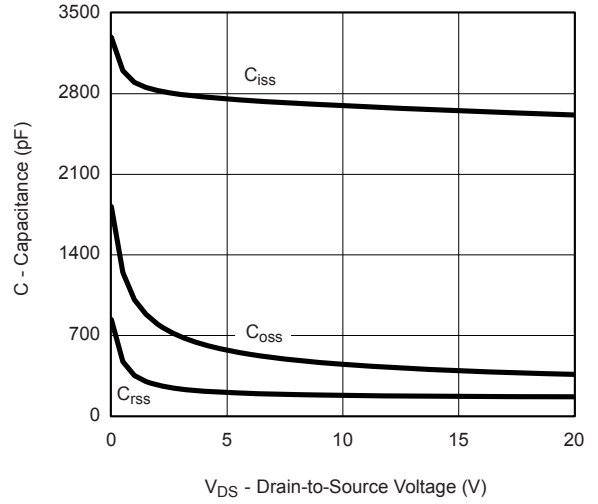
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



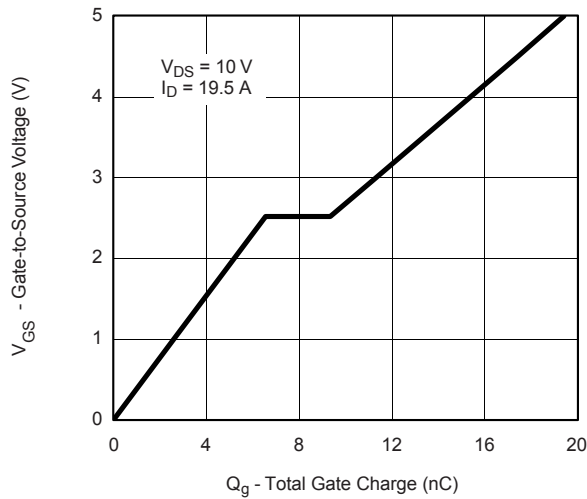
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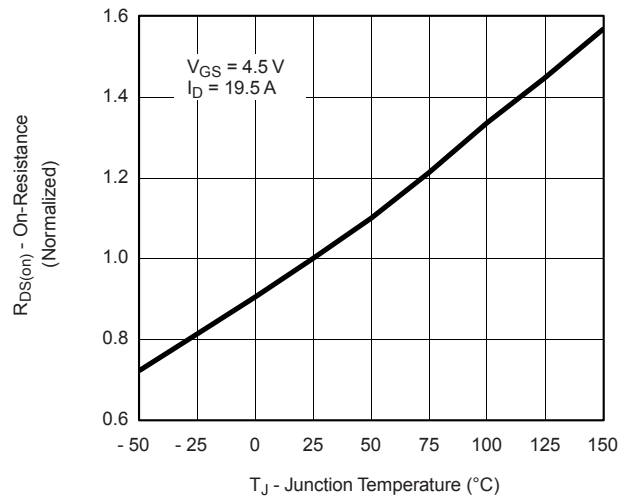
On-Resistance vs. Drain Current



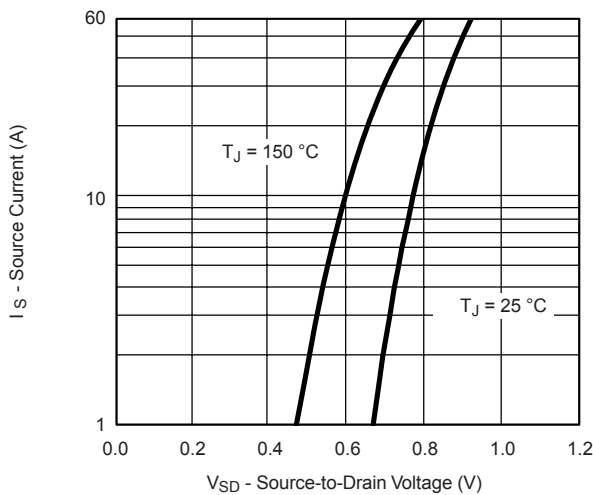
Capacitance



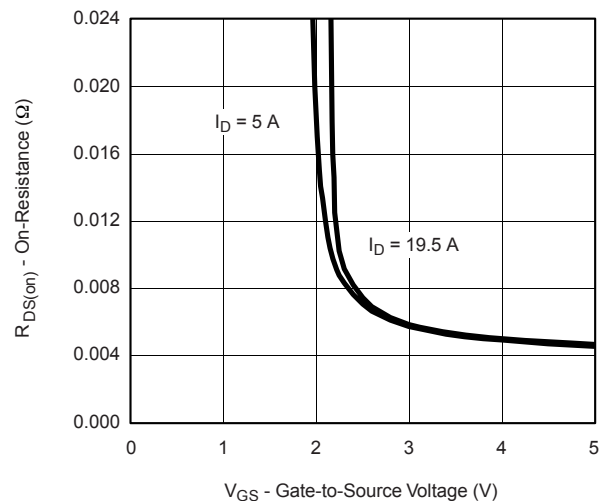
Gate Charge



On-Resistance vs. Junction Temperature

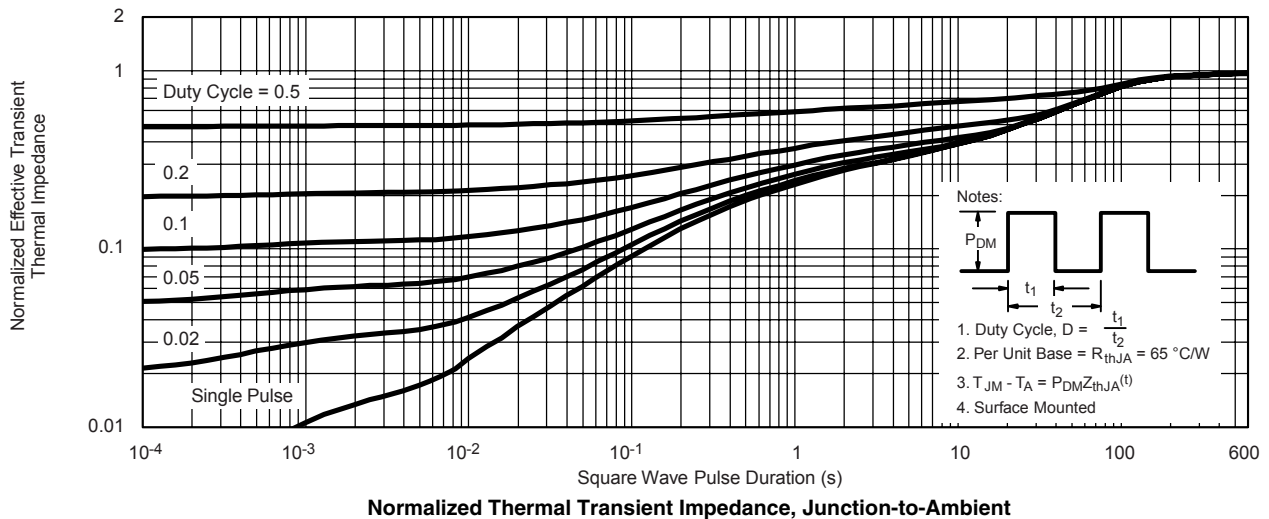
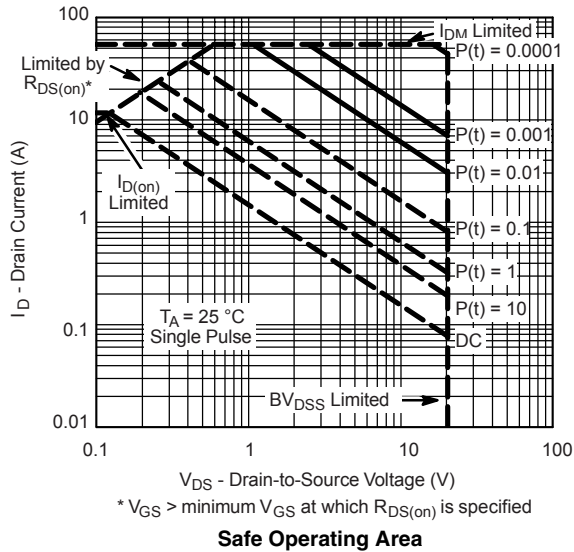
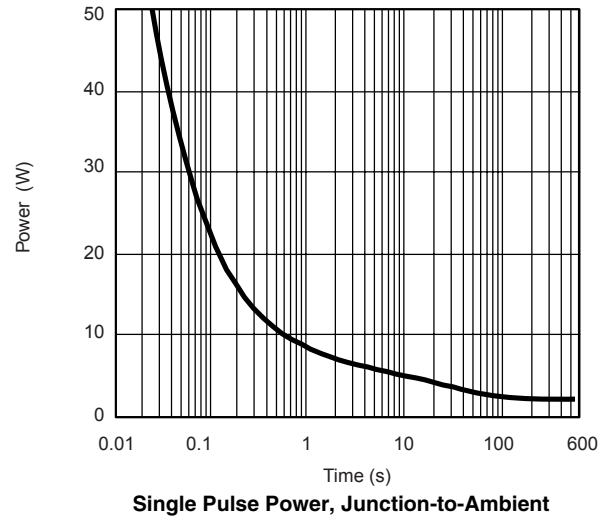
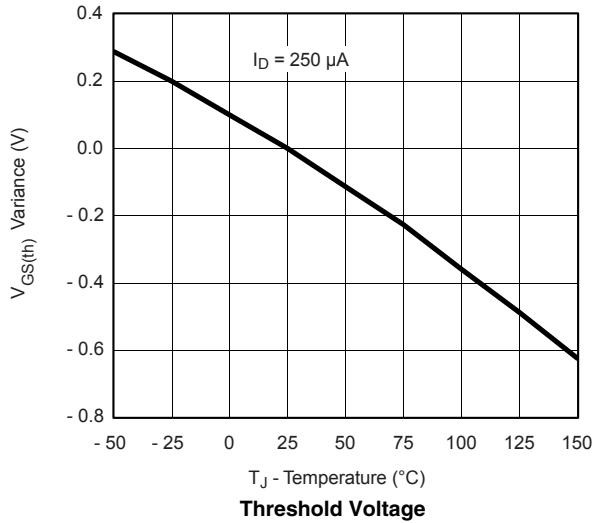


Source-Drain Diode Forward Voltage

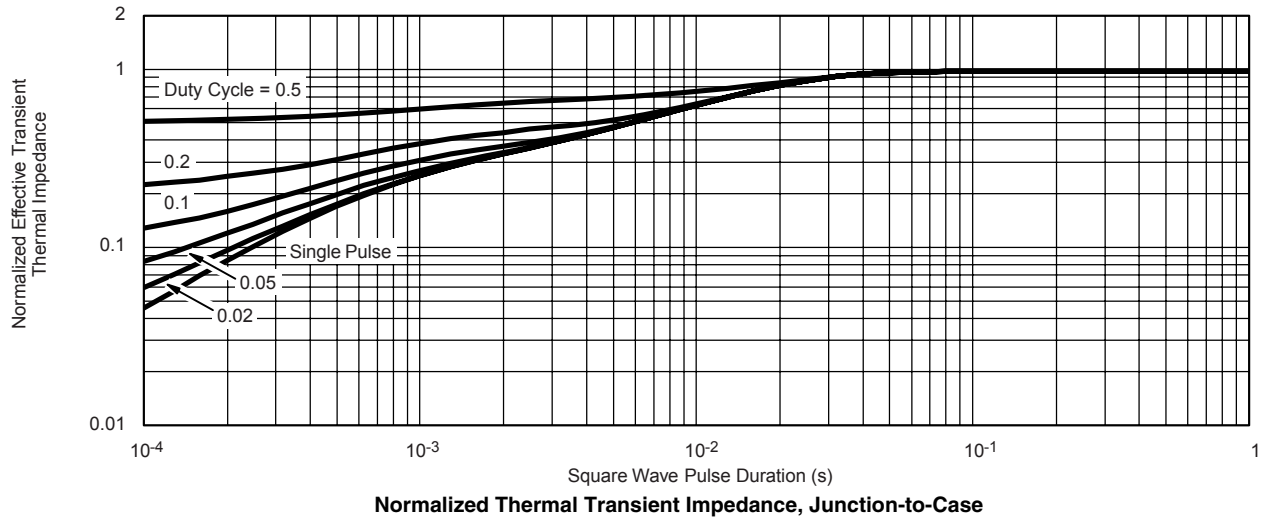


On-Resistance vs. Gate-to-Source Voltage

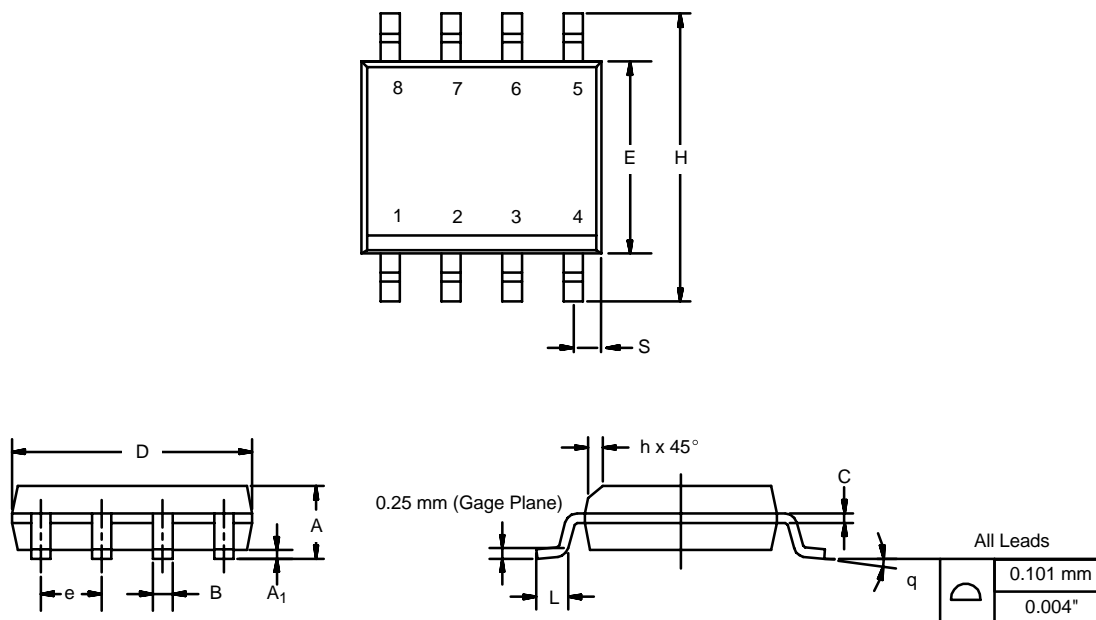
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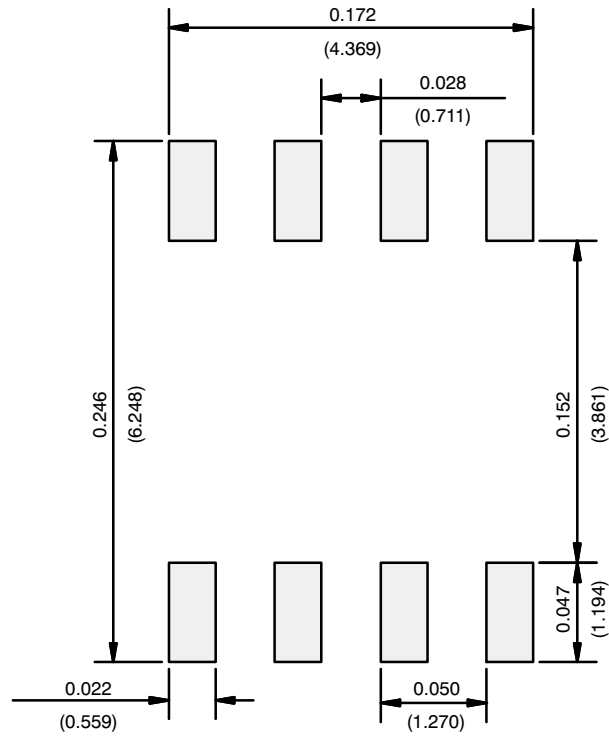


SOIC (NARROW): 8-LEAD
JEDEC Part Number: MS-012



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