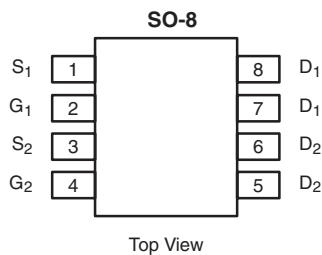


Dual N-Channel 20 V MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
20	0.0046 at $V_{GS} = 10$ V	19.8 ^a	14.5
	0.006 at $V_{GS} = 4.5$ V	17.3 ^a	



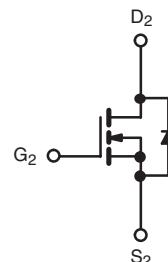
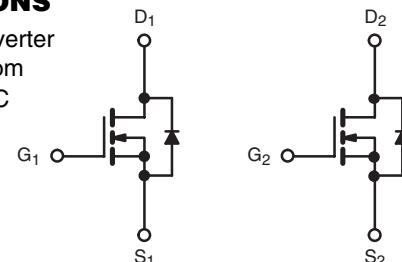
FEATURES

- Halogen-free According to IEC 61249-2-21
Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



APPLICATIONS

- DC/DC Converter
- Fixed Telecom
- Notebook PC



Ordering Information: Si4204DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

N-Channel MOSFET

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	19.8 15.9 15.5 ^{b, c} 12.2 ^{b, c}	A
		$T_C = 25$ °C $T_C = 70$ °C $T_A = 25$ °C $T_A = 70$ °C	
Pulsed Drain Current (10 μ s Pulse Width)	I_{DM}	50	
Source-Drain Current Diode Current	I_S	2.7 1.6 ^{b, c}	
Pulsed Source-Drain Current	I_{SM}	50	
Single Pulse Avalanche Current	I_{AS}	20	
Single Pulse Avalanche Energy	E_{AS}	20	
Maximum Power Dissipation	P_D	3.25 2.10 2.0 ^{b, c} 1.25 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	
		°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typ.	Max.	Unit	
Maximum Junction-to-Ambient ^{b, d}	R_{thJA}	45	62.5	°C/W	
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	29		38

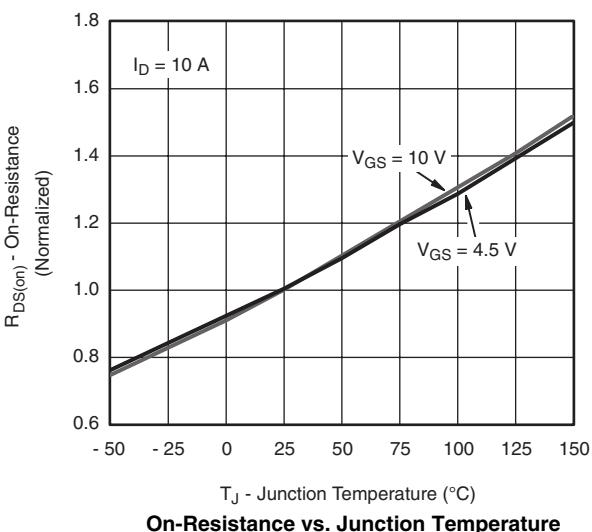
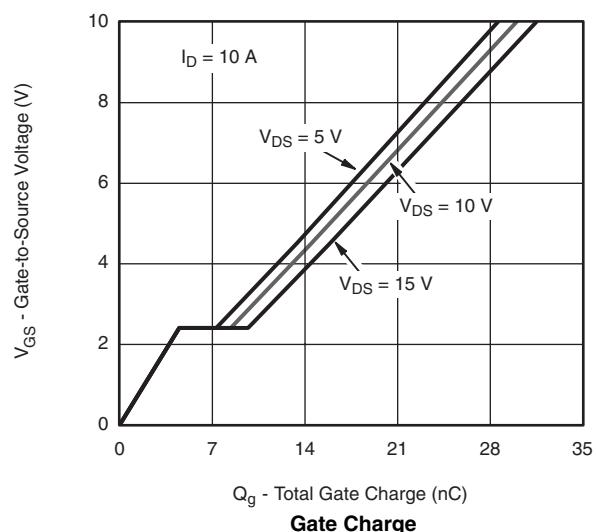
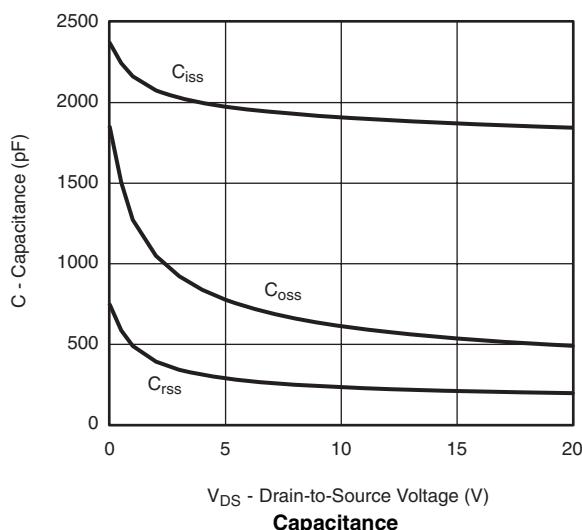
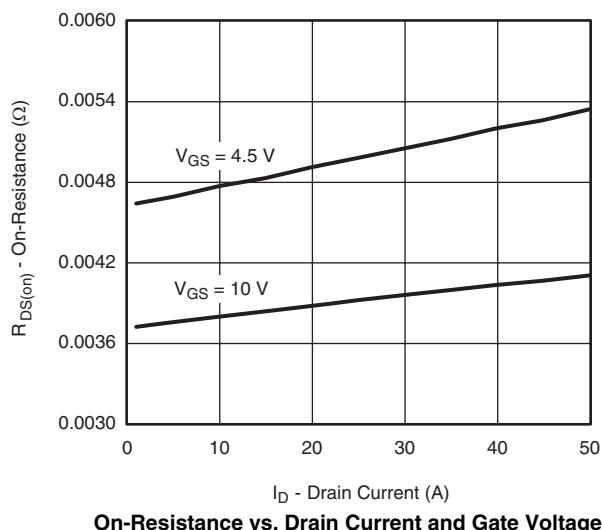
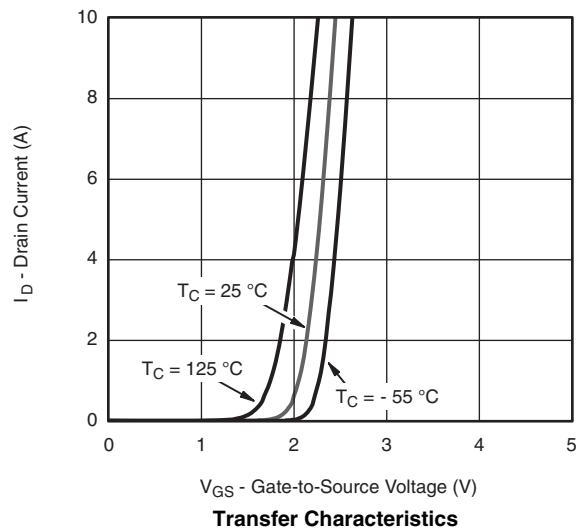
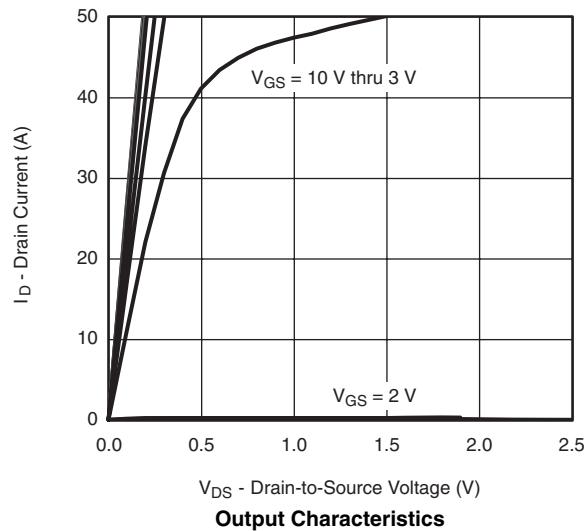
Notes:

- a. Based on $T_C = 25$ °C.
- b. Surface mounted on 1" x 1" FR4 board.
- c. $t = 10$ s.
- d. Maximum under steady state conditions is 120 °C/W.

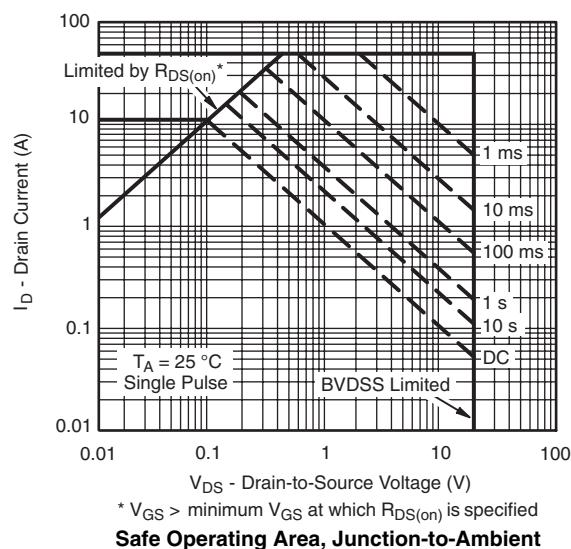
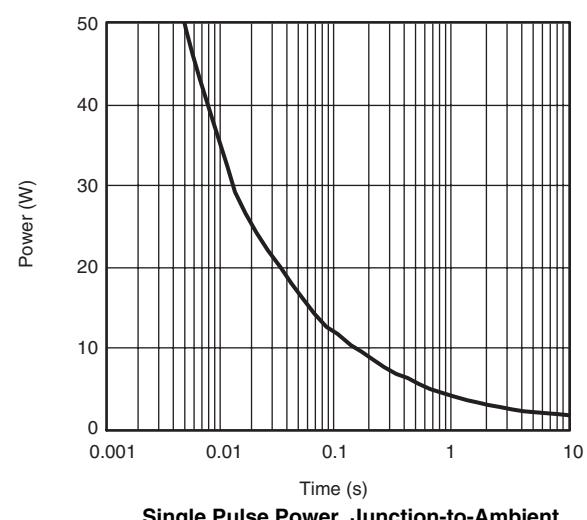
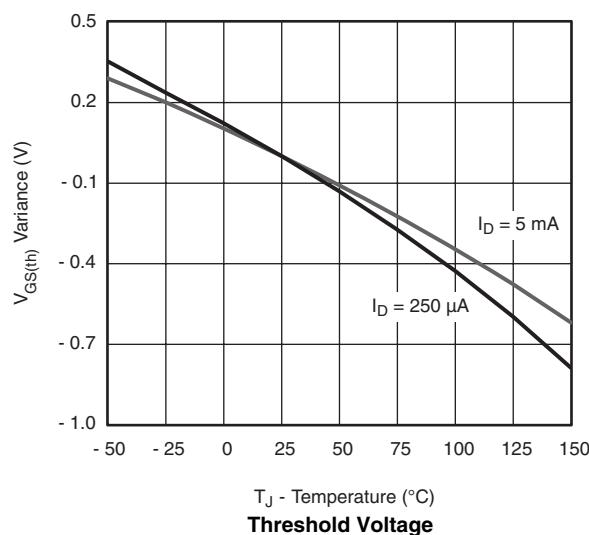
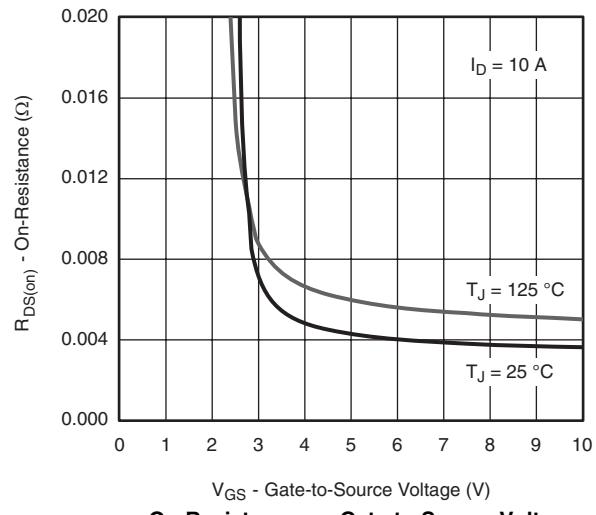
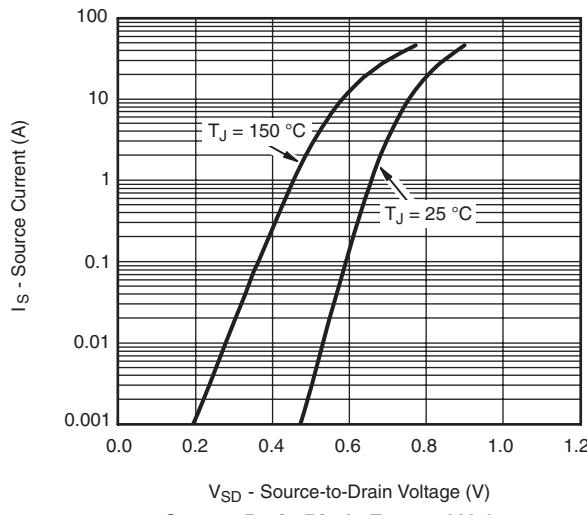
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

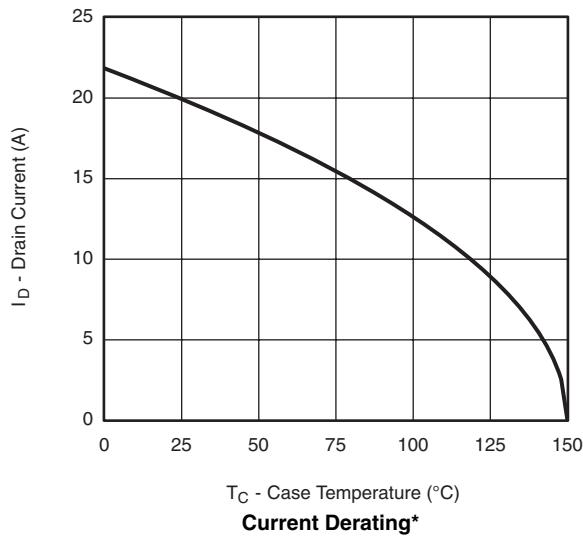
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	20			V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		20		mV/ $^\circ\text{C}$	
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$	$I_D = 250 \mu\text{A}$		- 5.8			
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1.0		2.4	V	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20 \text{ V}$, $V_{GS} = 0 \text{ V}$			1	μA	
		$V_{DS} = 20 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			10		
On-State Drain Current ^b	$I_{D(\text{on})}$	$V_{DS} = 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	20			A	
Drain-Source On-State Resistance ^b	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 10 \text{ A}$		0.0038	0.0046	Ω	
		$V_{GS} = 4.5 \text{ V}$, $I_D = 8 \text{ A}$		0.0047	0.0060		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 10 \text{ A}$		50		S	
Dynamic^a							
Input Capacitance	C_{iss}	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $I_D = 1 \text{ MHz}$		2110		pF	
Output Capacitance	C_{oss}			926			
Reverse Transfer Capacitance	C_{rss}			235			
Total Gate Charge	Q_g	$V_{DS} = 10 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 10 \text{ A}$		30	45	nC	
Gate-Source Charge	Q_{gs}	$V_{DS} = 10 \text{ V}$, $V_{GS} = 4.5 \text{ V}$, $I_D = 10 \text{ A}$		14.5	22		
Gate-Drain Charge	Q_{gd}			4.5			
Gate Resistance	R_g			3.9			
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 10 \text{ V}$, $R_L = 1 \Omega$ $I_D \geq 10 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$		0.4	1.4	2.8	Ω
Rise Time	t_r				8	16	ns
Turn-Off Delay Time	$t_{d(\text{off})}$				15	30	
Fall Time	t_f				24	45	
Turn-On Delay Time	$t_{d(\text{on})}$				9	18	
Rise Time	t_r				18	35	
Turn-Off Delay Time	$t_{d(\text{off})}$				24	45	
Fall Time	t_f				26	50	
					13	26	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			2.7	A	
Pulse Diode Forward Current ^a	I_{SM}				50		
Body Diode Voltage	V_{SD}	$I_S = 3 \text{ A}$		0.70	1.2	V	
Body Diode Reverse Recovery Time	t_{rr}	N-Channel $I_F = 10 \text{ A}$, $dl/dt = 100 \text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$		20	40	ns	
Body Diode Reverse Recovery Charge	Q_{rr}			10	20	nC	
Reverse Recovery Fall Time	t_a			11		nS	
Reverse Recovery Rise Time	t_b			9			

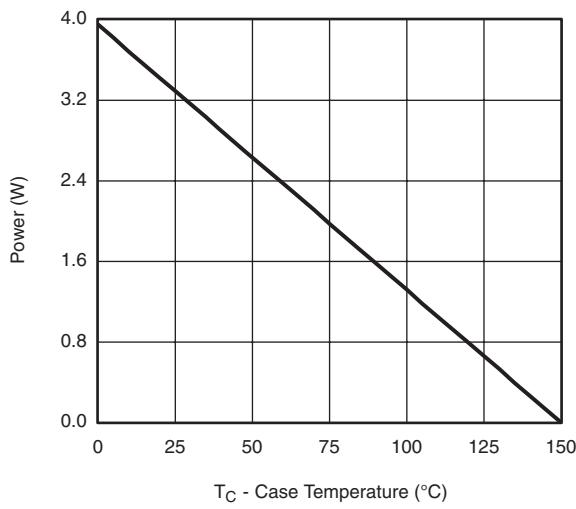
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

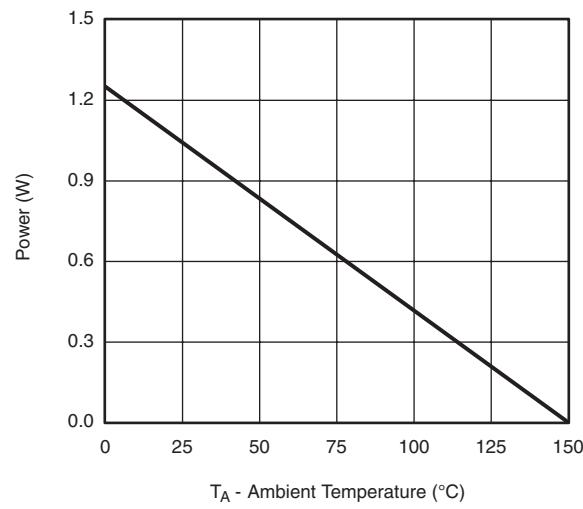
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

 T_C - Case Temperature (°C)

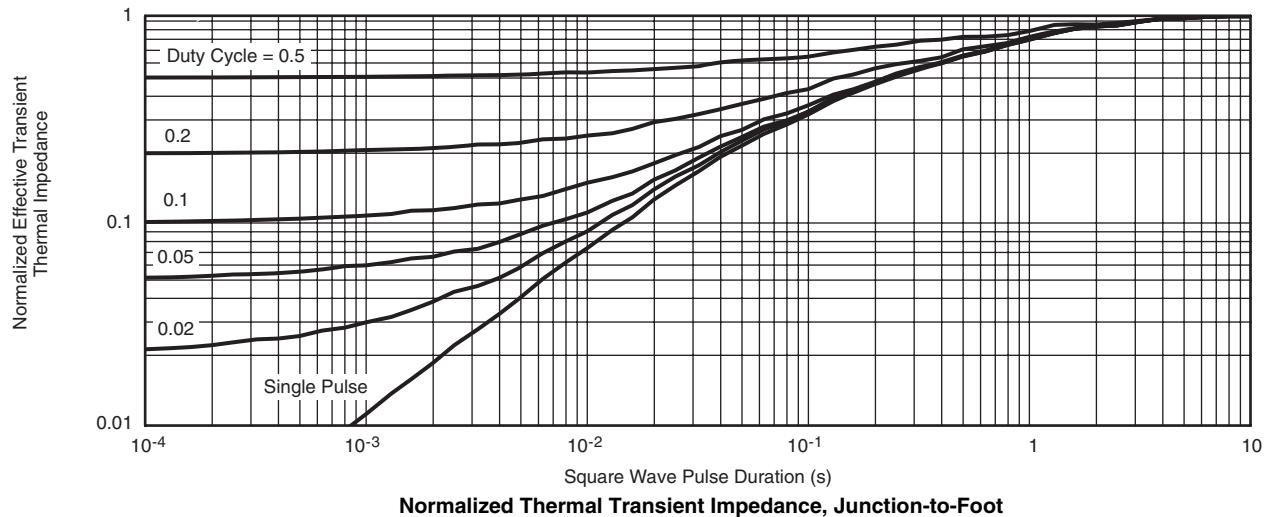
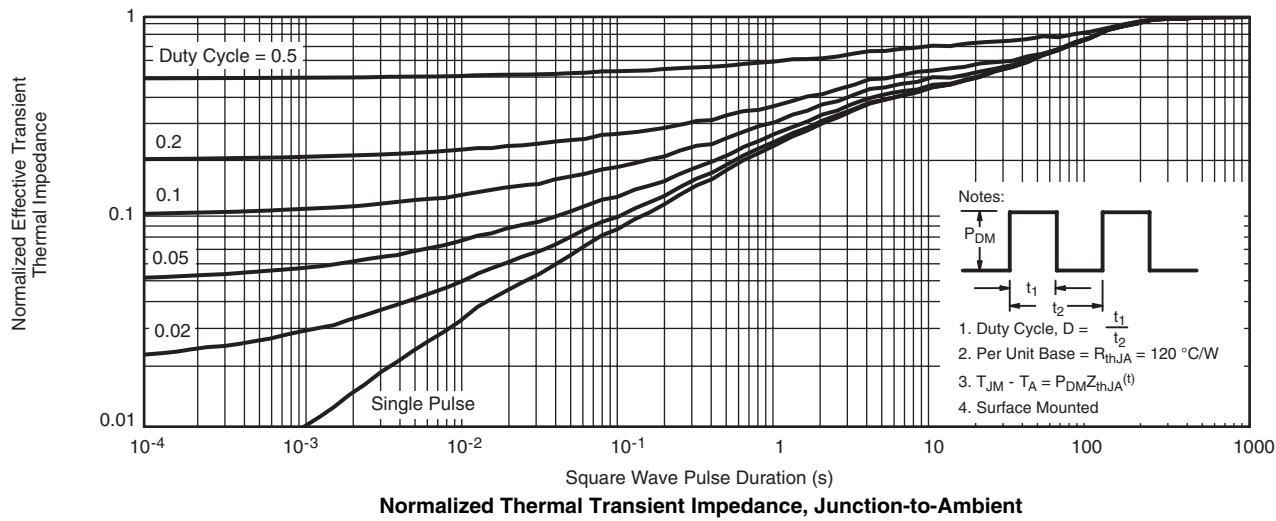
Current Derating*

 T_C - Case Temperature (°C)

Power Derating, Junction-to-Foot

 T_A - Ambient Temperature (°C)

Power Derating, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)} = 150$ °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.

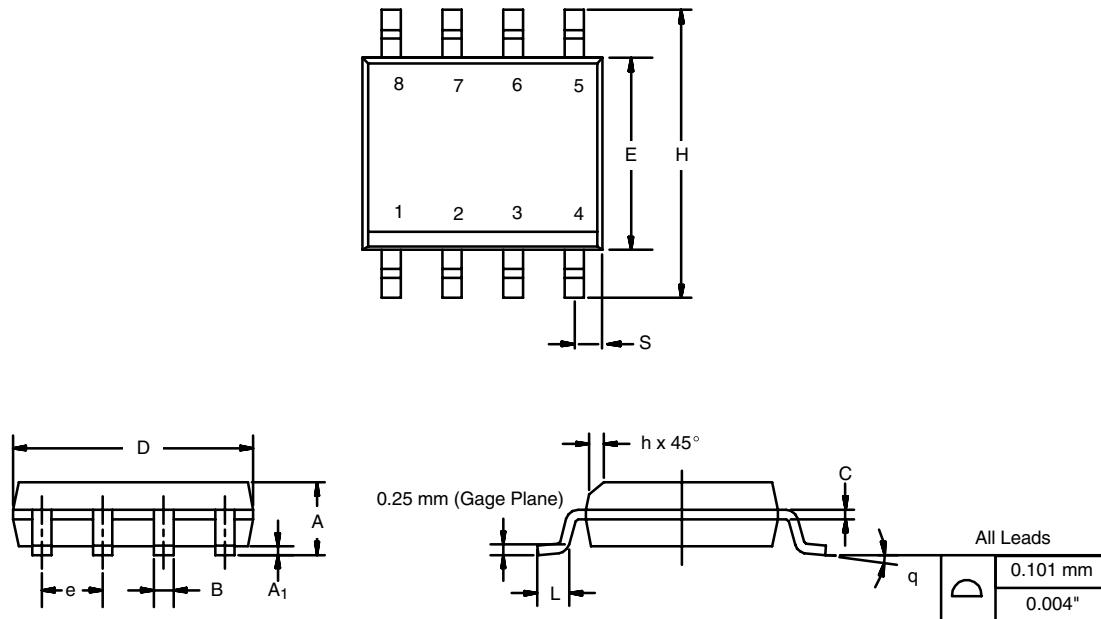
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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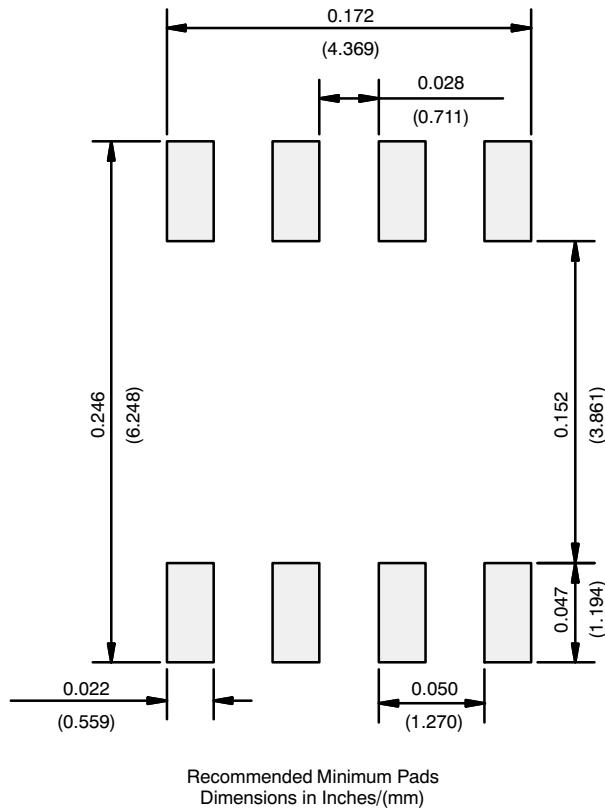
SOIC (NARROW): 8-LEAD

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



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