

P-Channel 1.8 V (G-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^d	Q _g (Typ.)
- 20	0.0155 at V _{GS} = - 4.5 V	- 13.4	36.5 nC
	0.0195 at V _{GS} = - 2.5 V	- 12	
	0.0250 at V _{GS} = - 1.8 V	- 10.5	

FEATURES

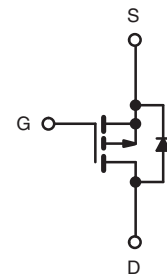
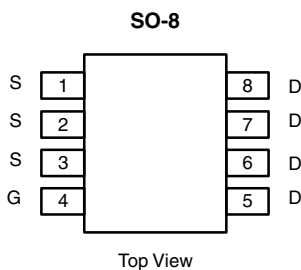
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Adaptor Switch
- High Current Load Switch
- Notebook



Ordering Information: Si4403CDY-T1-GE3 (Lead (Pb)-free and Halogen-free)

P-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}	± 8		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	- 13.4	A
		T _C = 70 °C	- 10.7	
		T _A = 25 °C	- 9.4 ^{a, b}	
		T _A = 70 °C	- 7.5 ^{a, b}	
Pulsed Drain Current	I _{DM}	- 40		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	- 4.1	
		T _A = 25 °C	- 2.1 ^{a, b}	
Avalanche Current	I _{AS}	- 15		
Single-Pulse Avalanche Energy	E _{AS}	11.25	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	5	W
		T _C = 70 °C	3.2	
		T _A = 25 °C	2.5 ^{a, b}	
		T _A = 70 °C	1.6 ^{a, b}	
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 ^{a, c}	R _{thJA}	38	50	°C/W	
Maximum Junction-to-Foot	R _{thJF}	20	25		

Notes:

- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 85 °C/W.
- Based on T_C = 25 °C.

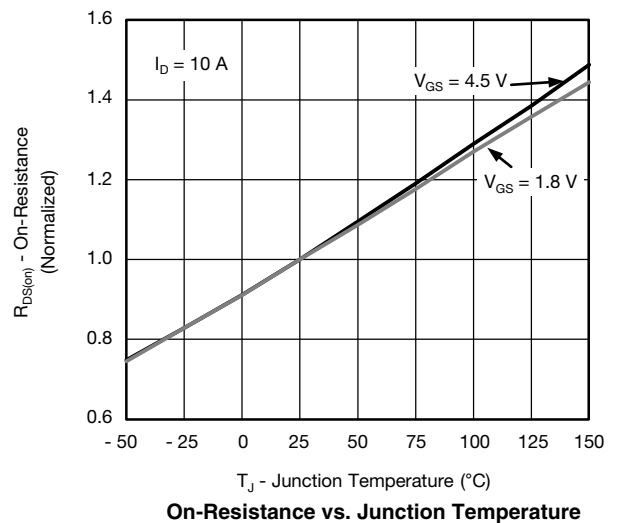
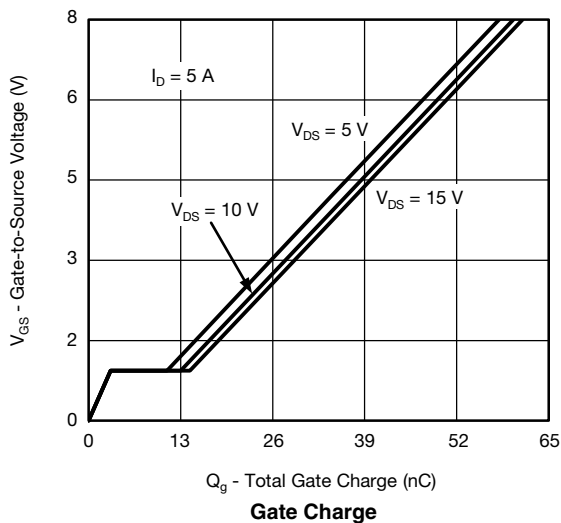
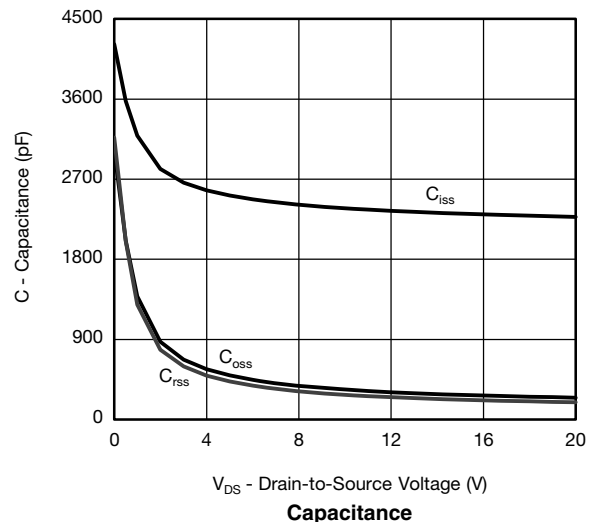
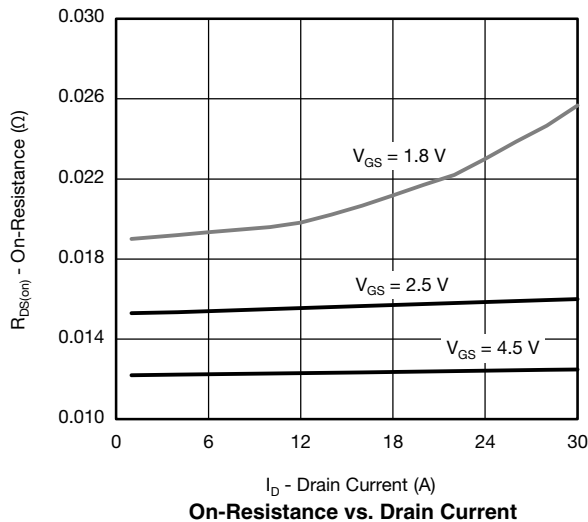
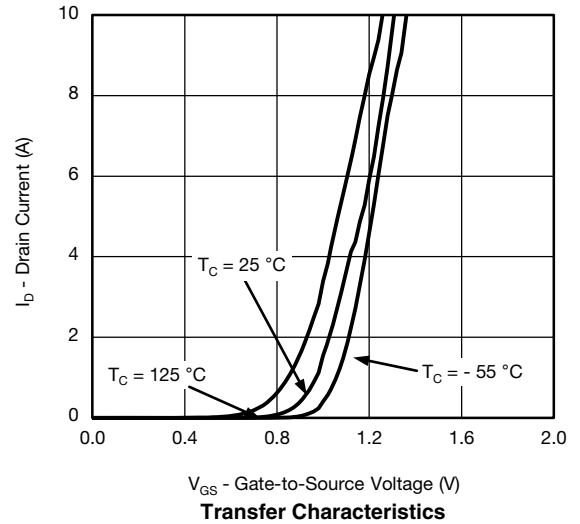
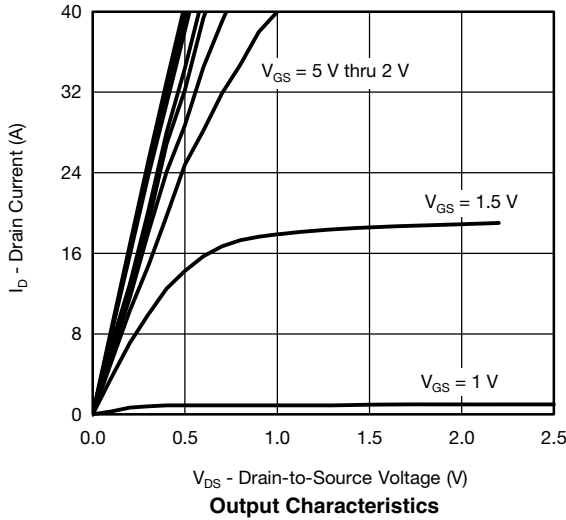
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-14.5		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		2.8			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-0.4		-1.0	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq -10\text{ V}, V_{GS} = -5\text{ V}$	-20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -9\text{ A}$		0.0125	0.0155	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -6\text{ A}$		0.0155	0.0195	
		$V_{GS} = -1.8\text{ V}, I_D = -3\text{ A}$		0.0195	0.0250	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -9\text{ A}$		40		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		2380		pF
Output Capacitance	C_{oss}		340			
Reverse Transfer Capacitance	C_{rss}		280			
Total Gate Charge	Q_g	$V_{DS} = -10\text{ V}, V_{GS} = -8\text{ V}, I_D = -5\text{ A}$		60	90	nC
				36.5	55	
Gate-Source Charge	Q_{gs}	$V_{DS} = -10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$		3.1		nC
Gate-Drain Charge	Q_{gd}		9.9			
Gate Resistance	R_g		$f = 1\text{ MHz}$	1.0	4.8	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 2\text{ }\Omega$ $I_D \cong -5\text{ A}, V_{GEN} = -8\text{ V}, R_g = 1\text{ }\Omega$		7	14	ns
Rise Time	t_r		9	18		
Turn-Off Delay Time	$t_{d(off)}$		108	200		
Fall Time	t_f		41	80		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 2\text{ }\Omega$ $I_D \cong -5\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		14	28	ns
Rise Time	t_r		16	32		
Turn-Off Delay Time	$t_{d(off)}$		101	200		
Fall Time	t_f		40	80		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			-4.1	A
Pulse Diode Forward Current	I_{SM}				-40	
Body Diode Voltage	V_{SD}	$I_S = -3\text{ A}, V_{GS} = 0\text{ V}$		-0.66	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -2.3\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		81	150	ns
Body Diode Reverse Recovery Charge	Q_{rr}		150	300	nC	
Reverse Recovery Fall Time	t_a		43		ns	
Reverse Recovery Rise Time	t_b		38			

Notes:

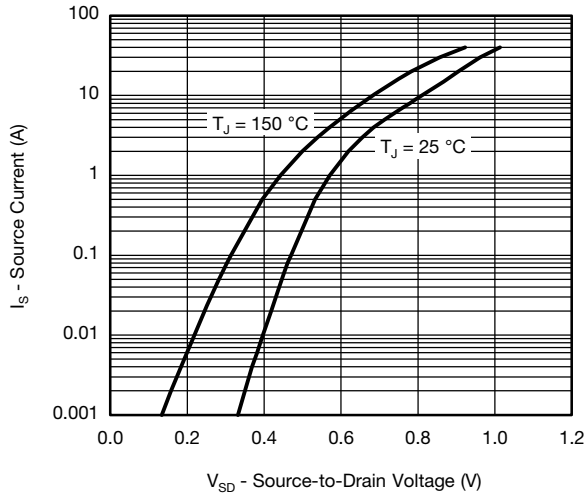
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

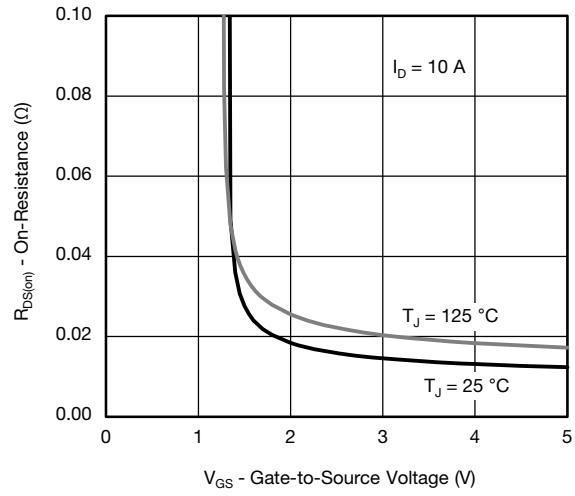
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



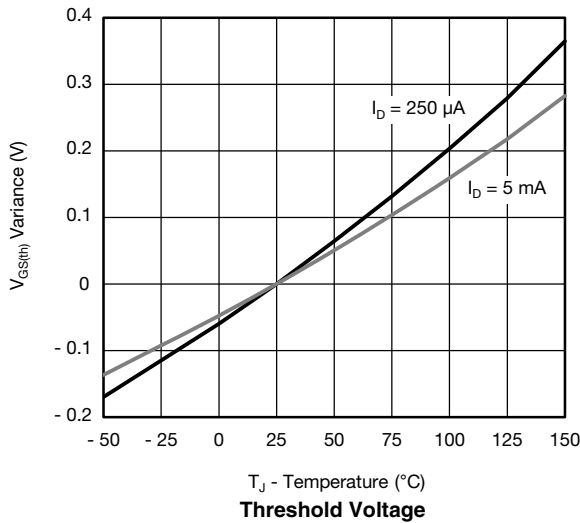
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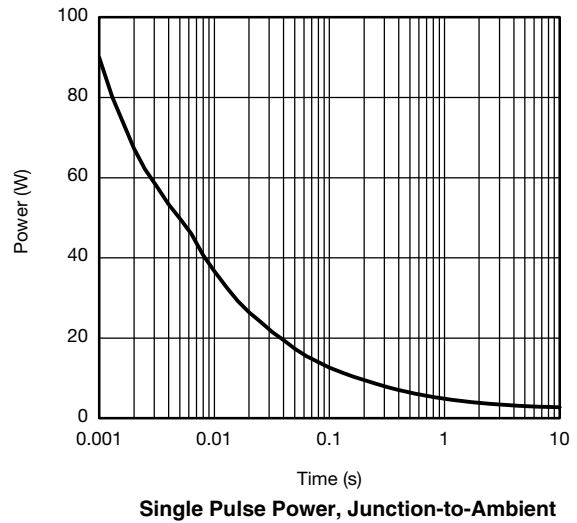
Source-Drain Diode Forward Voltage



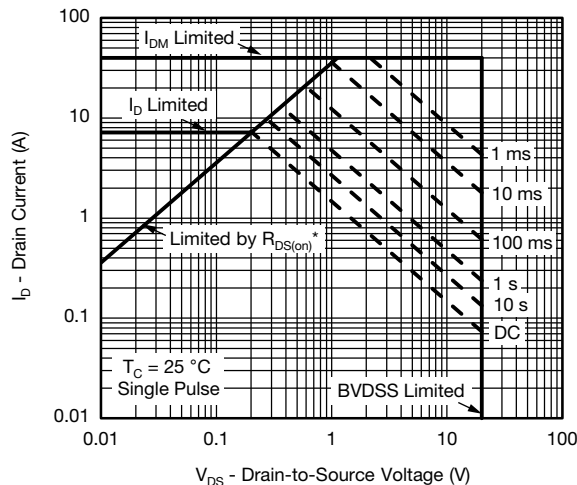
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



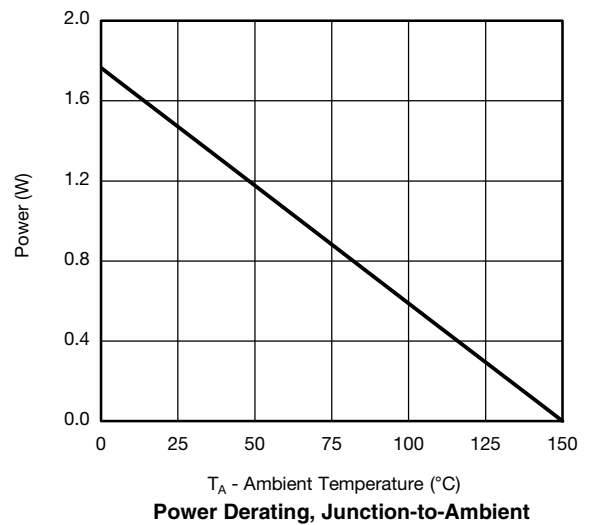
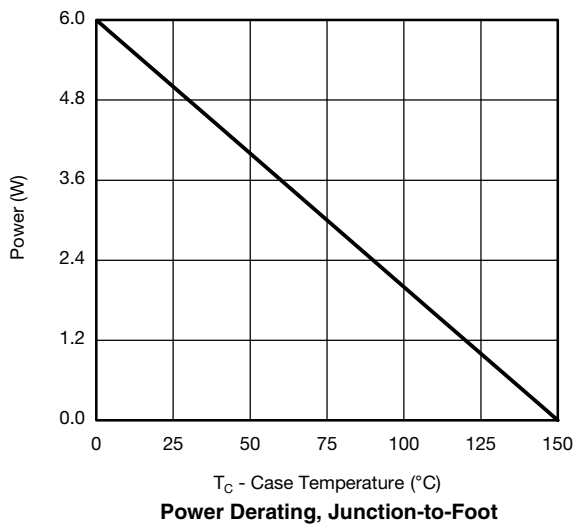
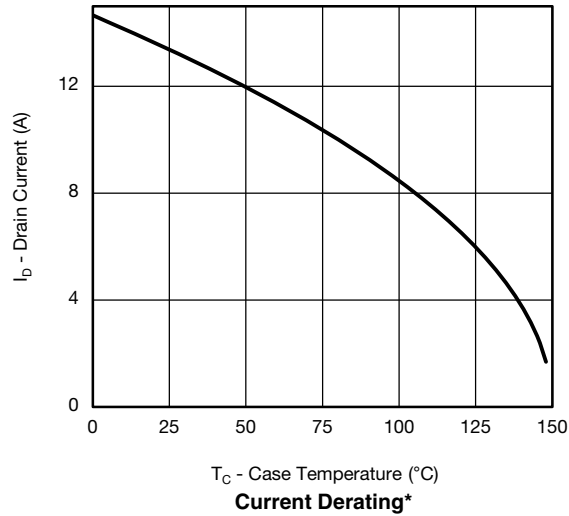
Single Pulse Power, Junction-to-Ambient



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

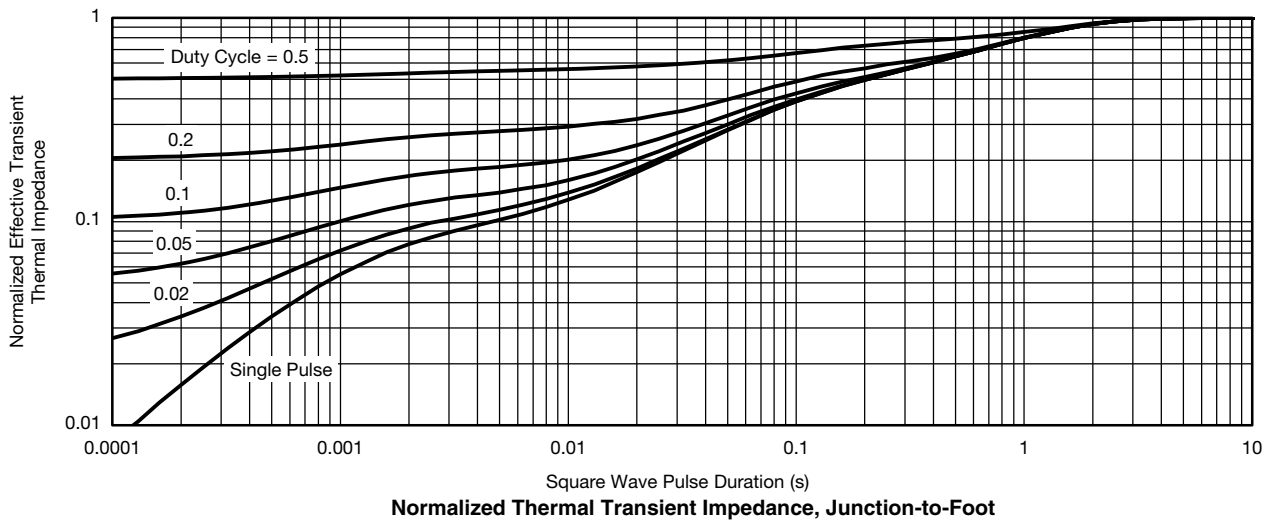
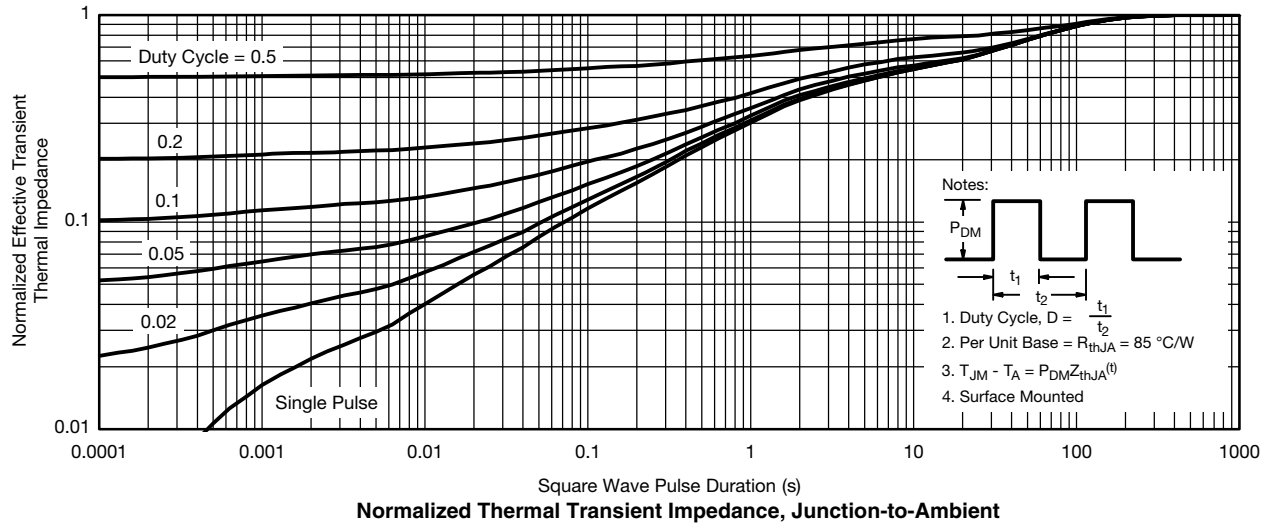
Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



* 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.

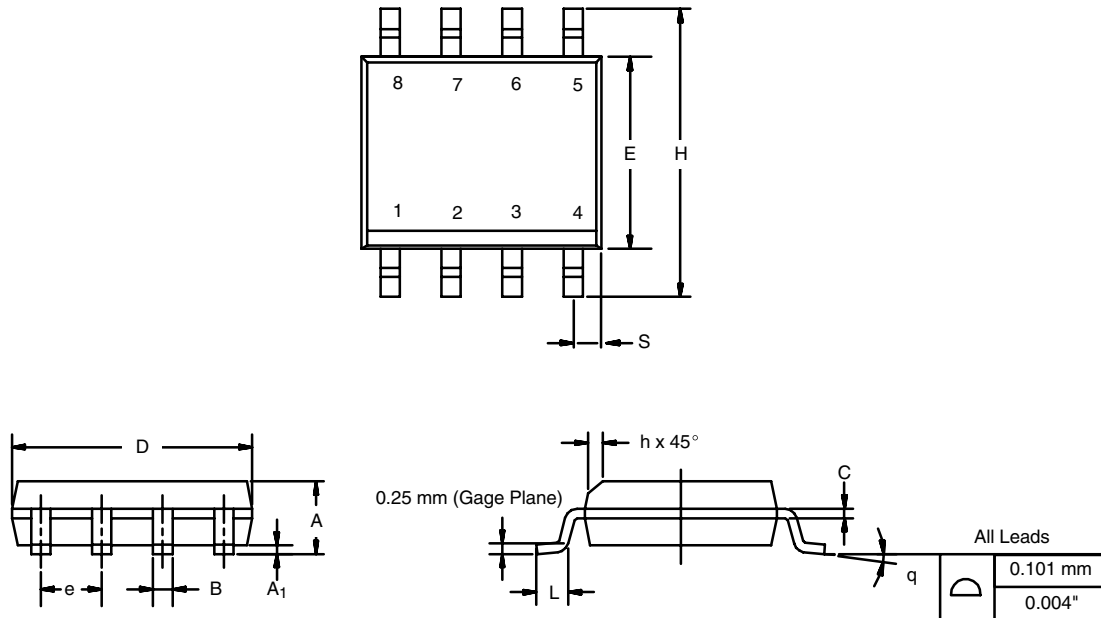
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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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



Recommended Minimum Pads
Dimensions in Inches/(mm)

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