

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

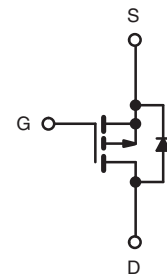
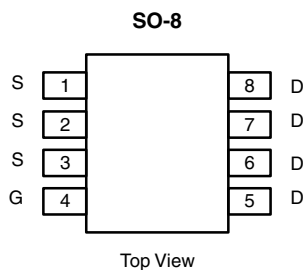
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



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.

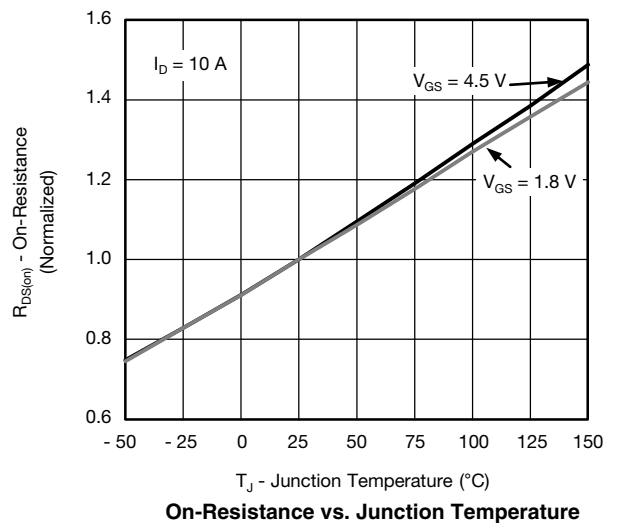
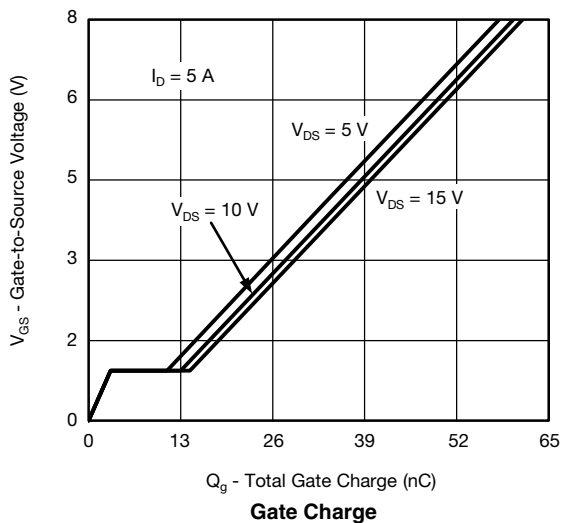
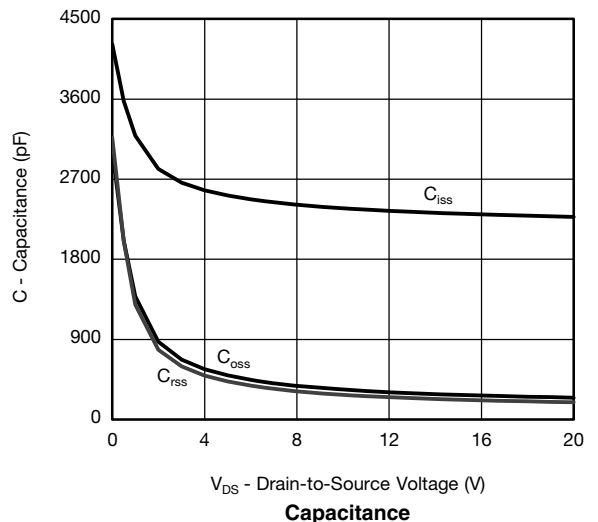
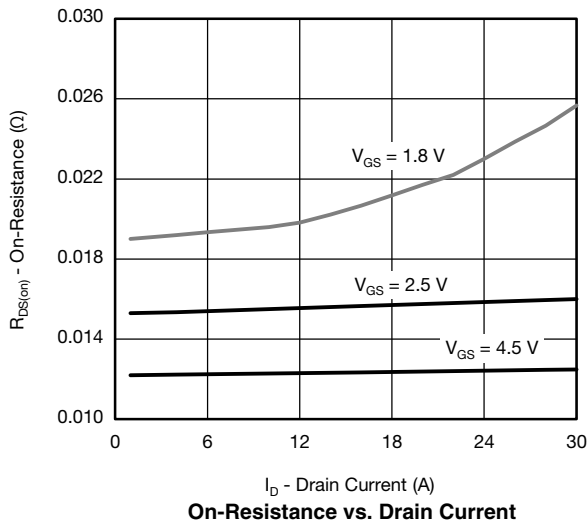
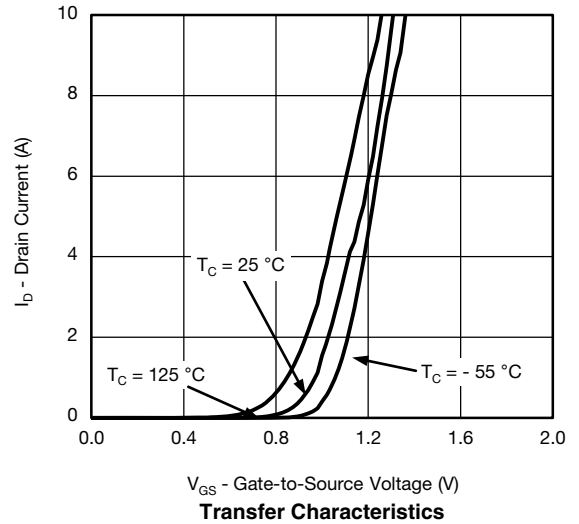
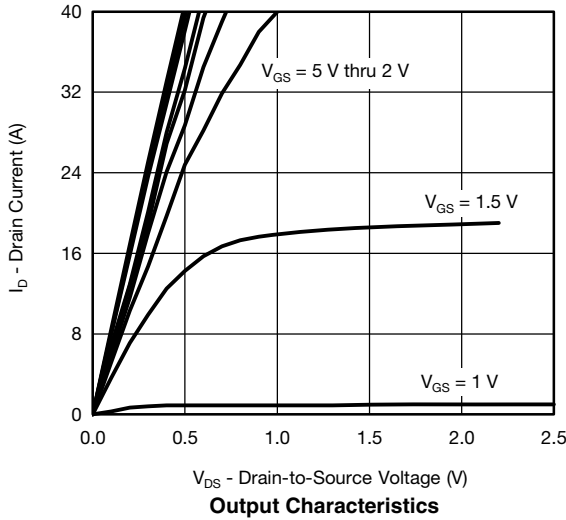
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-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:

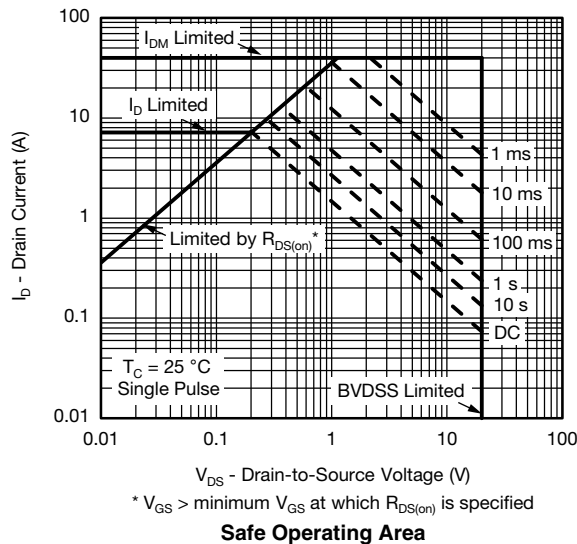
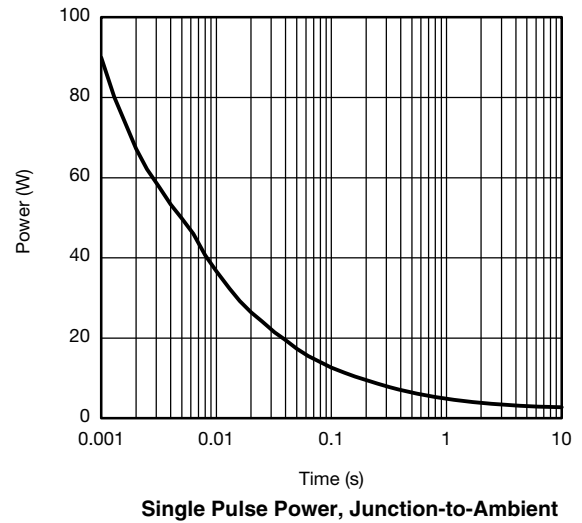
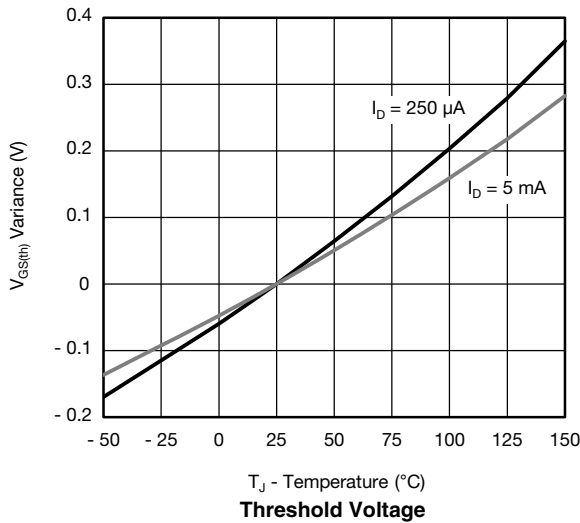
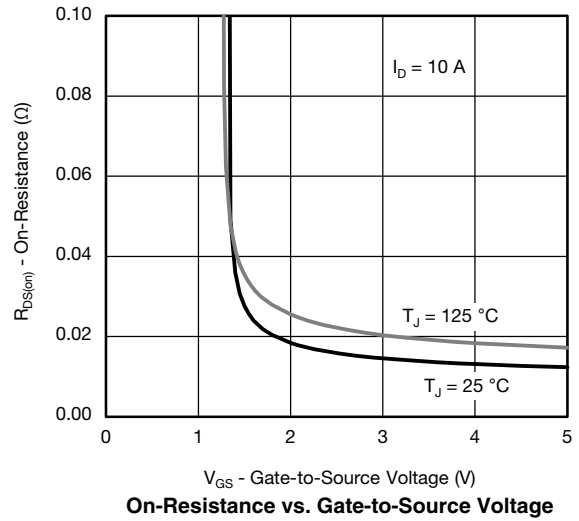
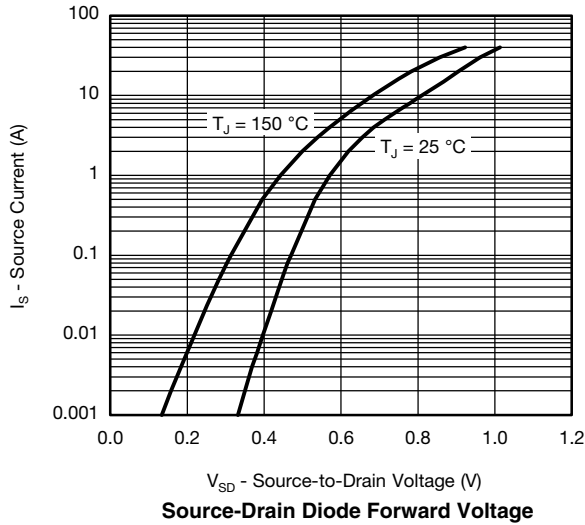
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

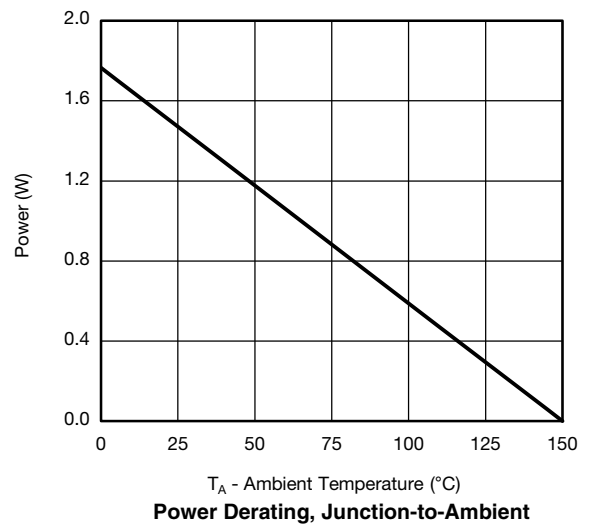
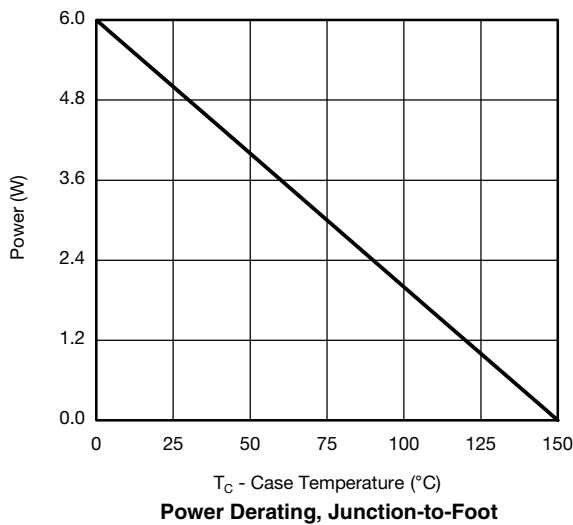
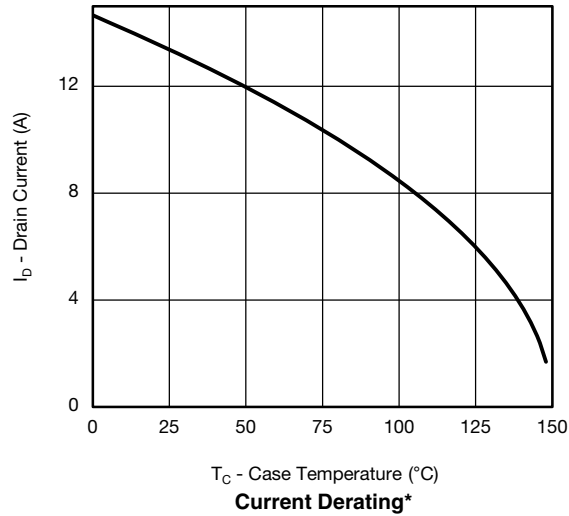
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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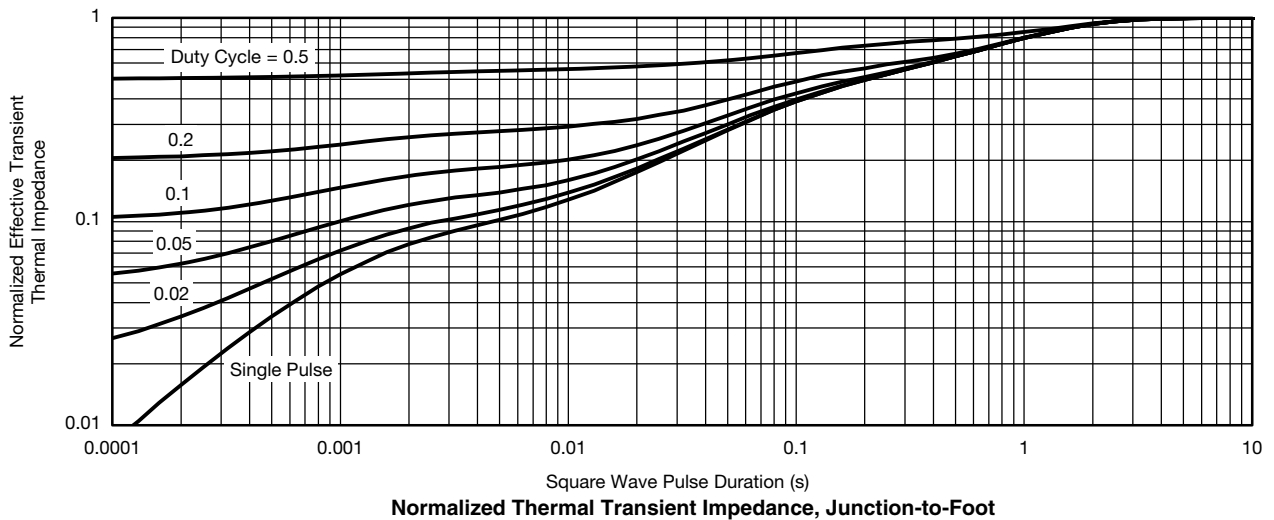
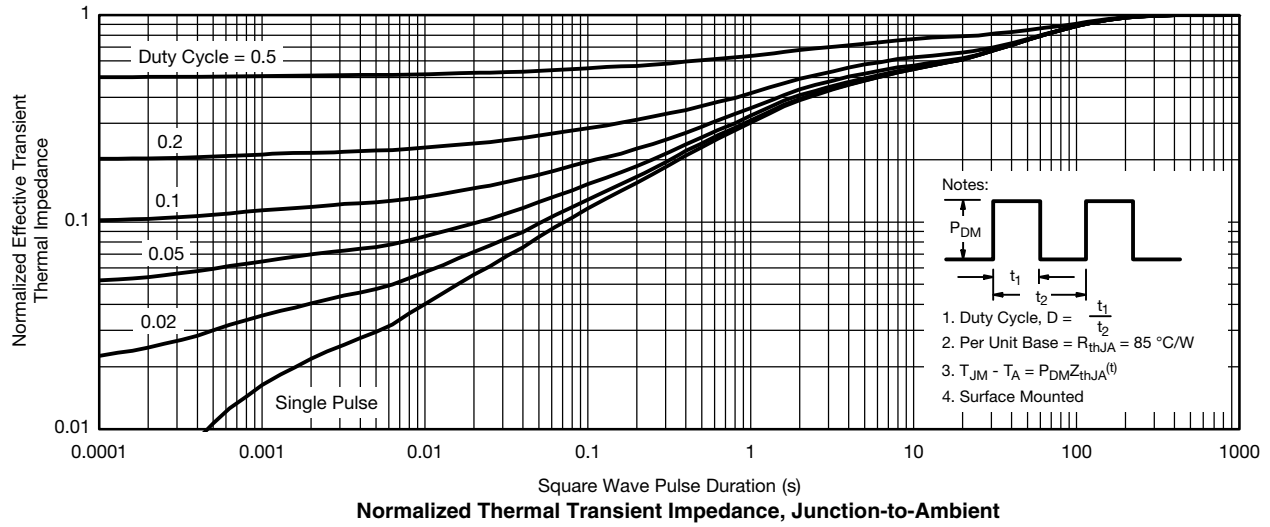


TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



* 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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