Dual N-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)[a]	Q_g (Typ)
40	0.060 at V_{GS} = 10 V	5.0	5.6
	0.070 at V_{GS} = 4.5 V	4.7	

FEATURES

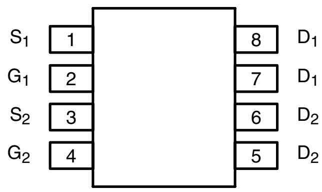
- TrenchFET® Power MOSFET
- 100 % R_g Tested

RoHS COMPLIANT

APPLICATIONS

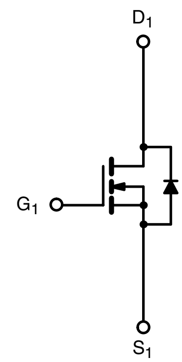
- CCFL Inverter

SO-8

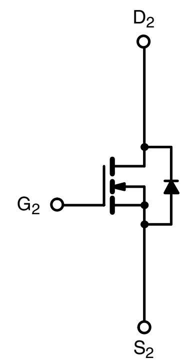


Top View

Ordering Information: Si4908DY-T1–E3 (Lead (Pb)–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}	40	V
Gate-Source Voltage		V_{GS}	± 16	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	5	A
	T_C = 70 °C		4.7	
	T_A = 25 °C		4.1[b, c]	
	T_A = 70 °C		3.3[b, c]	
Pulsed Drain Current (10 µs Pulse Width)		I_{DM}	20	
Source-Drain Current Diode Current	T_C = 25 °C	I_S	2.3	
	T_A = 25 °C		1.5[b, c]	
Pulsed Source-Drain Current		I_{SM}	20	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	7	
Single Pulse Avalanche Energy		E_{AS}	2.5	mJ
Maximum Power Dissipation	T_C= 25 °C	P_D	2.75	W
	T_C= 70 °C		1.75	
	T_A = 25 °C		1.85[b, c]	
	T_A = 70 °C		1.18[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]	t ≤ 10 sec	R_{thJA}	57	67.5	°C/W
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	35	45	

Notes
a. Based on T_C = 25 °C.
b. Surface Mounted on 1” x 1” FR4 Board.
c. t = 10 sec.
d. Maximum under steady state conditions is 120 °C/W.

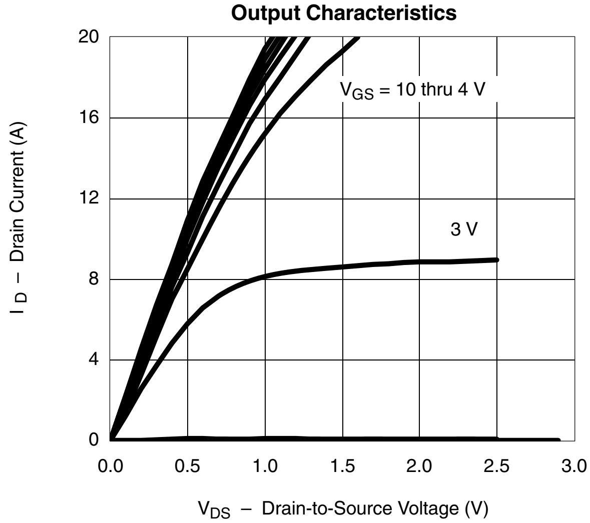
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	**Symbol**	**Test Condition**	**Min**	**Typ[a]**	**Max**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 μA	40			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 μA		40		V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I_D = 250 μA		–4.6		V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	0.8		2.2	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 16 V			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V			1	μA
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 55 °C			10	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	20			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 4.1 A		0.048	0.060	Ω
		V_{GS} = 4.5 V, I_D = 3.8 A		0.056	0.070	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 4.1 A		15		S
Dynamic[a]						
Input Capacitance	C_{iss}	N-Channel V_{DS} = 20 V, V_{GS} = 0 V, f = 1 MHz		355		pF
Output Capacitance	C_{oss}			50		
Reverse Transfer Capacitance	C_{rss}			29		
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 10 V, I_D = 5 A		8	12	nC
		N-Channel V_{DS} = 20 V, V_{GS} = 4.5 V, I_D = 5 A		3.7	6	
Gate-Source Charge	Q_{gs}			1.1		
Gate-Drain Charge	Q_{gd}			1.4		
Gate Resistance	R_g	f = 1 MHz		3.4	5.2	Ω
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 20 V, R_L = 4 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_g = 1 Ω		8	13	ns
Rise Time	t_r			20	30	
Turn-Off Delay Time	$t_{d(off)}$			23	35	
Fall Time	t_f			27	42	
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 20 V, R_L = 4 Ω I_D ≅ 1 A, V_{GEN} = 4.5 V, R_g = 1 Ω		74	110	
Rise Time	t_r			95	145	
Turn-Off Delay Time	$t_{d(off)}$			31	48	
Fall Time	t_f			33	50	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			2.3	A
Pulse Diode Forward Current[a]	I_{SM}				20	
Body Diode Voltage	V_{SD}	I_S = 1.5 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	N-Channel I_F = 2 A, di/dt = 100 A/μs, T_J = 25 °C		26	40	ns
Body Diode Reverse Recovery Charge	Q_{rr}			26	40	nC
Reverse Recovery Fall Time	t_a			13		ns
Reverse Recovery Rise Time	t_b			13		

Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

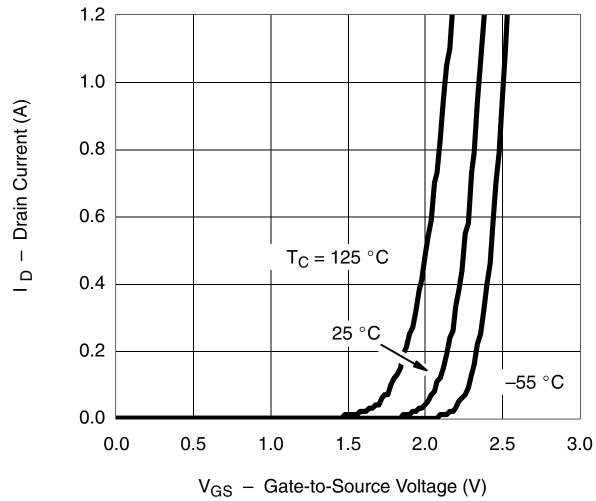
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

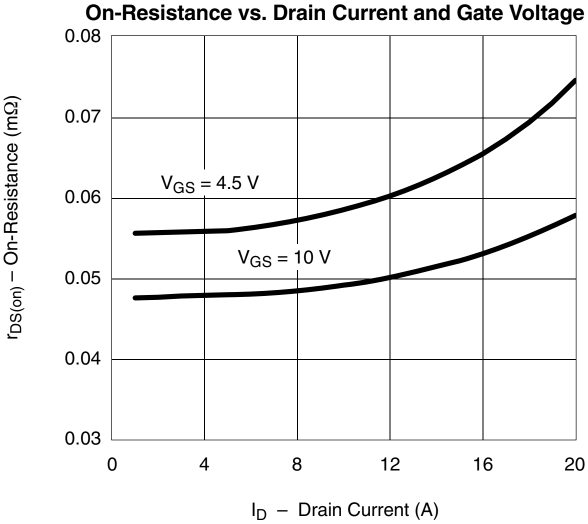
Output Characteristics



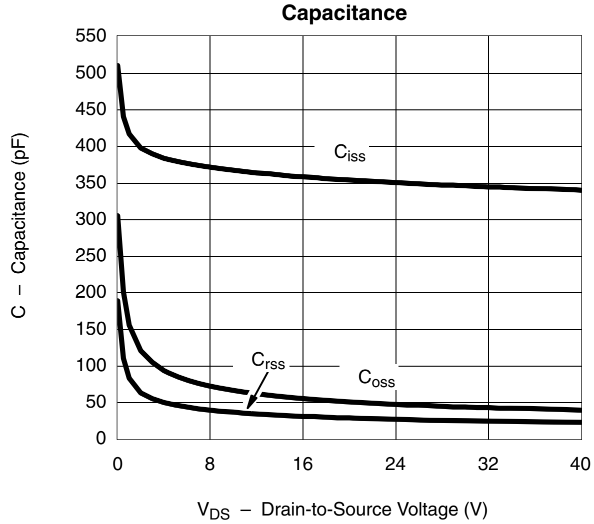
Transfer Characteristics



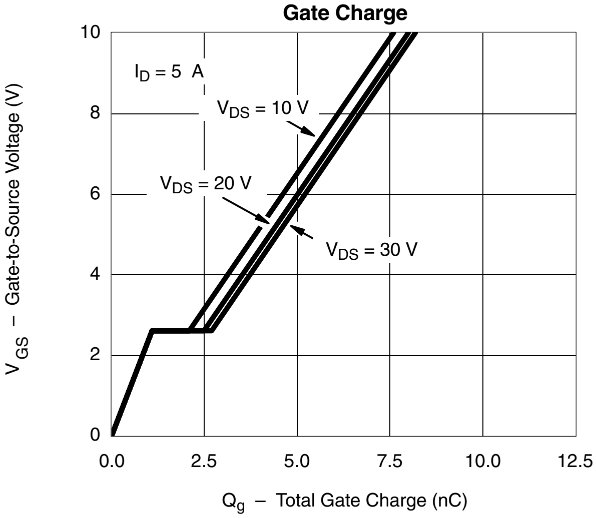
On-Resistance vs. Drain Current and Gate Voltage



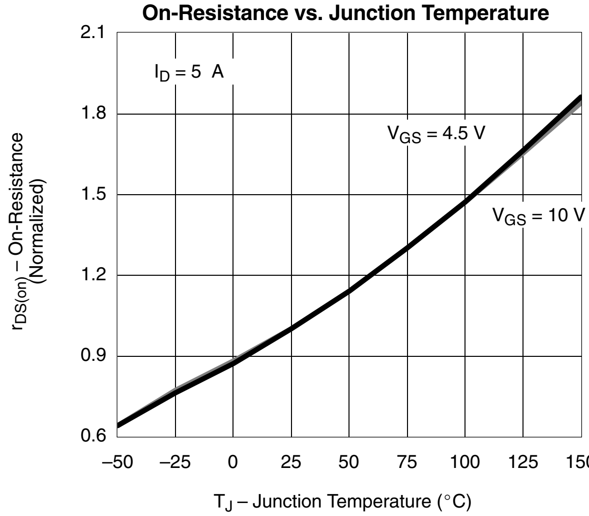
Capacitance



Gate Charge

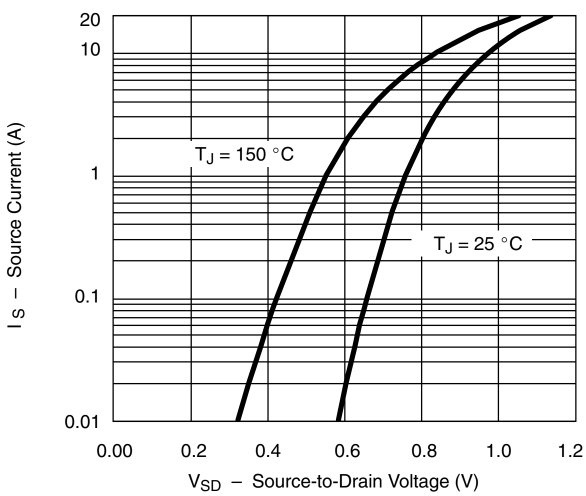


On-Resistance vs. Junction Temperature

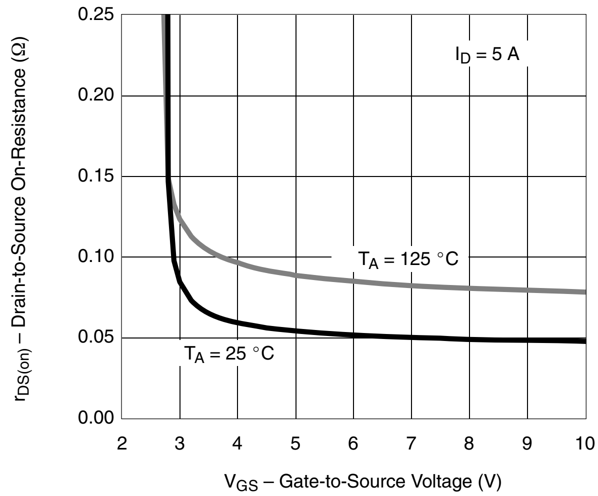


TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

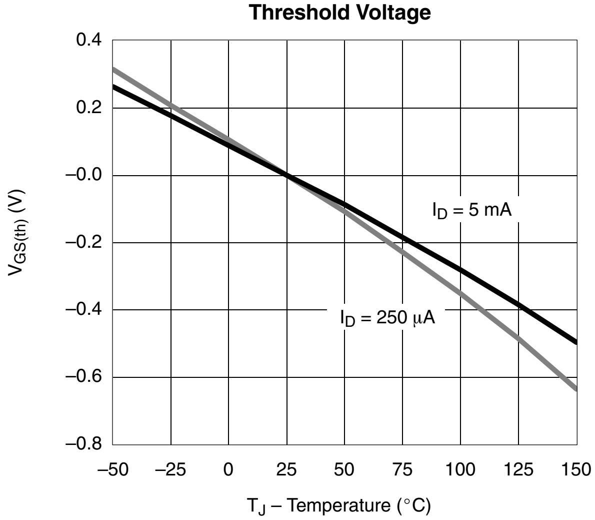
Source-Drain Diode Forward Voltage



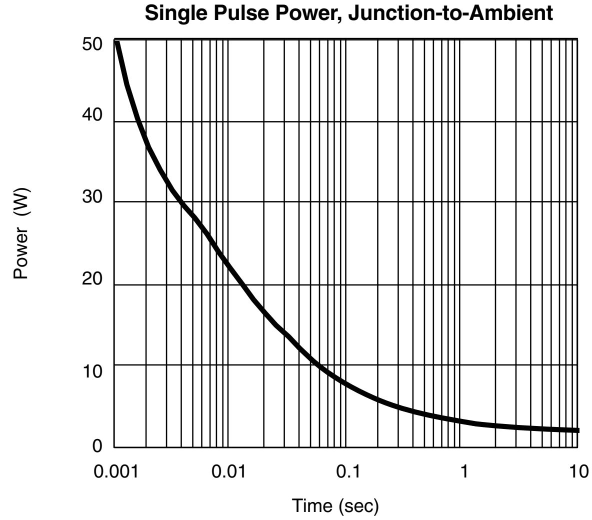
On-Resistance vs. Gate-to-Source Voltage



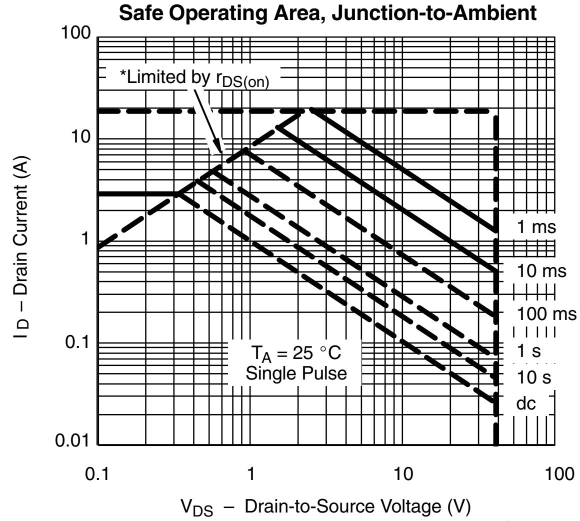
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

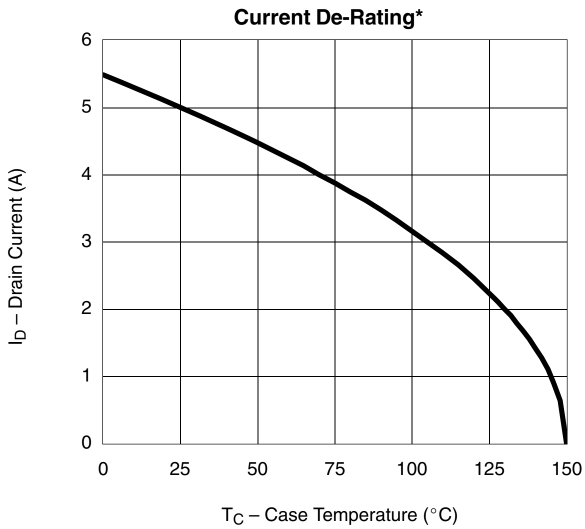


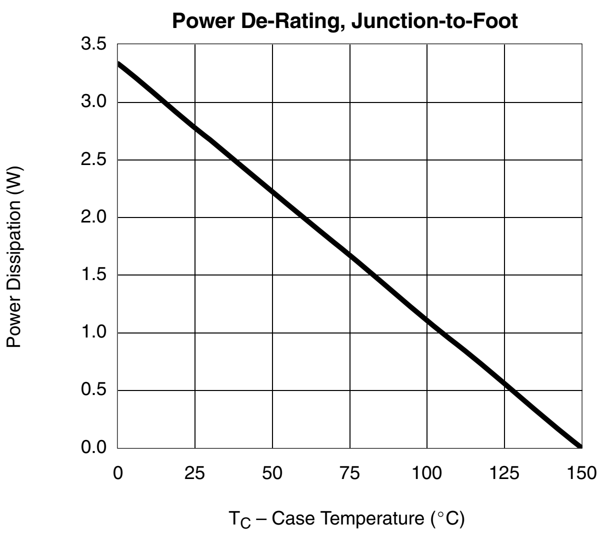
Safe Operating Area, Junction-to-Ambient

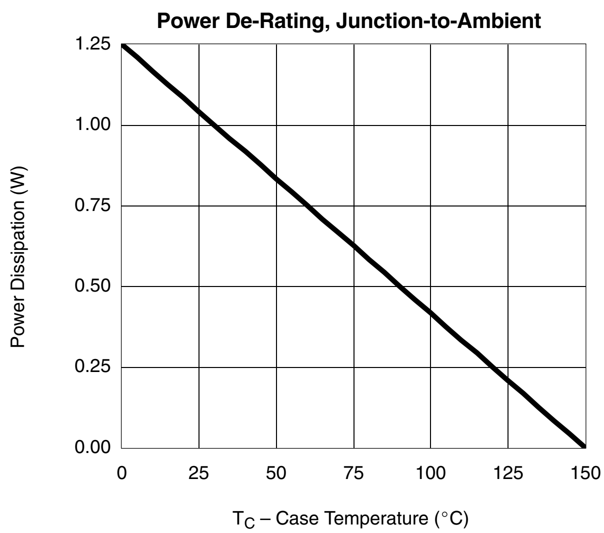


*V_{GS} > minimum V_{GS} at which $r_{DS(on)}$ is specified

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

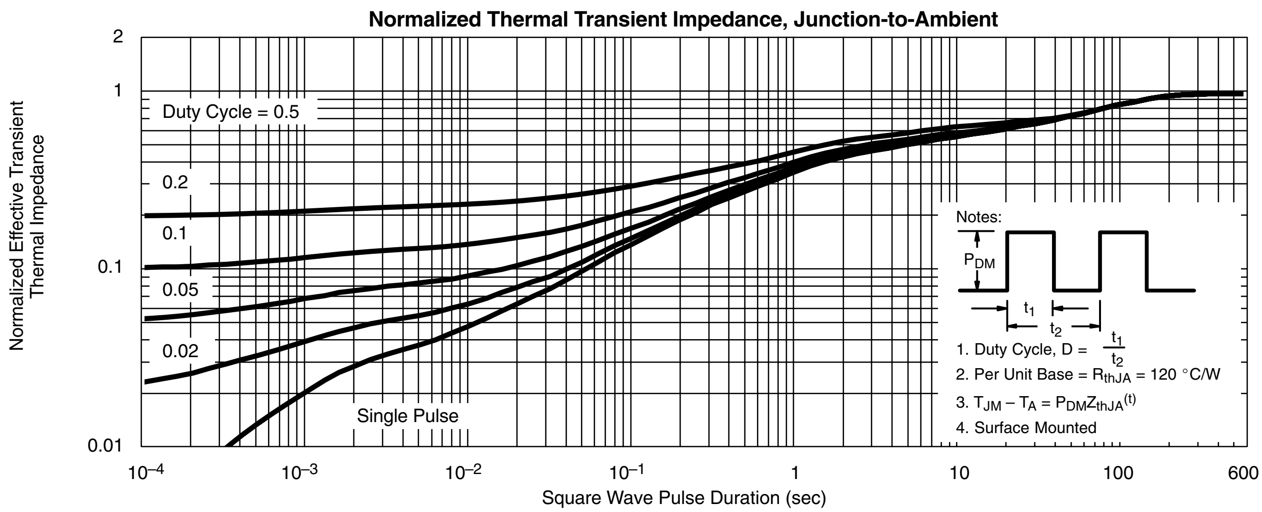


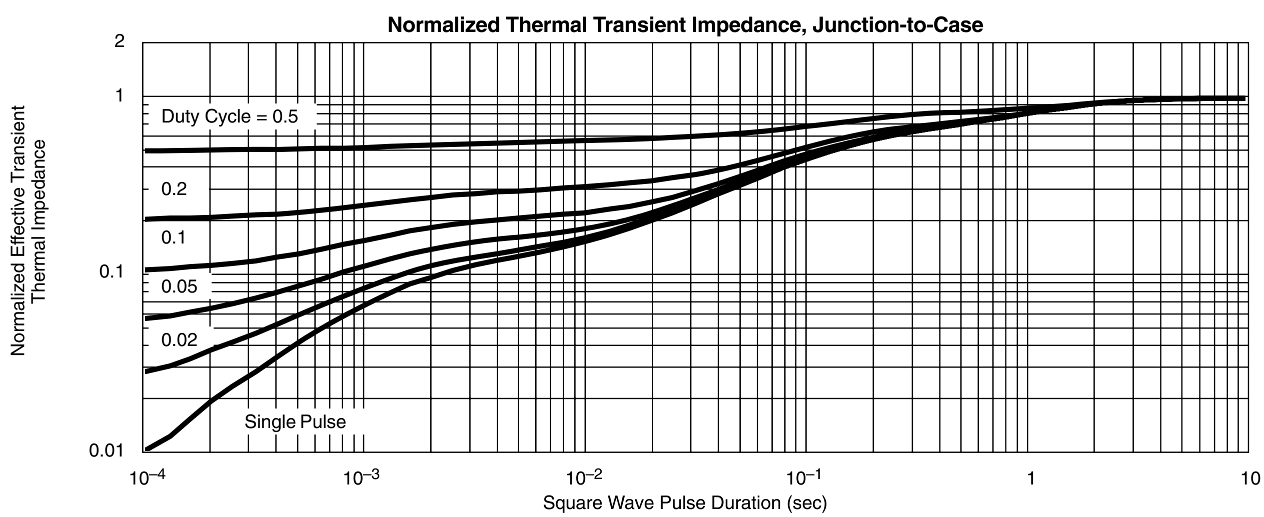




*The power dissipation P_b is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)





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