

P-Channel 8-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 8	0.040 at V _{GS} = - 4.5 V	- 4.1	7.8 nC
	0.060 at V _{GS} = - 2.5 V	- 3.4	
	0.088 at V _{GS} = - 1.8 V	- 2.0	

FEATURES

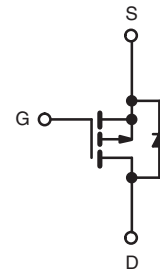
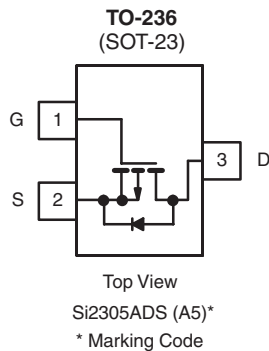
- Halogen-free Option Available
- TrenchFET® Power MOSFET
- 100 % R_g Tested



RoHS
COMPLIANT

APPLICATIONS

- Load Switch
- DC/DC Converter



P-Channel MOSFET

Ordering Information: Si2305ADS-T1-E3 (Lead (Pb)-free)
Si2305ADS-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	- 8	V
Gate-Source Voltage		V _{GS}	± 8	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	- 5.4	A
	T _C = 70 °C		- 4.3	
	T _A = 25 °C		- 4.1 ^{a, b}	
	T _A = 70 °C		- 3.3 ^{a, b}	
Pulsed Drain Current		I _{DM}	- 10	
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	- 1.4	
	T _A = 25 °C		- 0.8 ^{a, b}	
Maximum Power Dissipation	T _C = 25 °C	P _D	1.7	W
	T _C = 70 °C		1.1	
	T _A = 25 °C		0.96 ^{a, b}	
	T _A = 70 °C		0.62 ^{a, b}	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 50 to 150	°C
Soldering Recommendations (Peak Temperature)			260	

Notes:

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

b. t = 10 s.

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	100	130	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	60	75	

Notes:

- a. Surface Mounted on 1" x 1" FR4 board.
b. Maximum under Steady State conditions is 175 °C/W.

SPECIFICATIONS $T_J = 25$ °C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0$ V, $I_D = -250$ μ A	- 8			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250$ μ A		- 55		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			2.1		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250$ μ A	- 0.45		- 0.8	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 8$ V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -8$ V, $V_{GS} = 0$ V			- 1	μ A
		$V_{DS} = -8$ V, $V_{GS} = 0$ V, $T_J = 55$ °C			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5$ V, $V_{GS} = -4.5$ V	- 5			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5$ V, $I_D = -4.1$ A		0.032	0.040	Ω
		$V_{GS} = -2.5$ V, $I_D = -3.4$ A		0.048	0.060	
		$V_{GS} = -1.8$ V, $I_D = -2.0$ A		0.070	0.088	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5$ V, $I_D = -4.1$ A		8		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -4$ V, $V_{GS} = 0$ V, $f = 1$ MHz		740		pF
Output Capacitance	C_{oss}			290		
Reverse Transfer Capacitance	C_{rss}			190		
Total Gate Charge	Q_g	$V_{DS} = -4$ V, $V_{GS} = -4.5$ V, $I_D = -4.1$ A		7.8	15	nC
				4.5	9	
Gate-Source Charge	Q_{gs}	$V_{DS} = -4$ V, $V_{GS} = -2.5$ V, $I_D = -4.1$ A		1.2		
Gate-Drain Charge	Q_{gd}			1.6		
Gate Resistance	R_g	$f = 1$ MHz	1.4	7	14	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4$ V, $R_L = 1.2$ Ω $I_D \cong -3.3$ A, $V_{GEN} = -4.5$ V, $R_g = 1$ Ω		13	20	ns
Rise Time	t_r			35	53	
Turn-Off Delay Time	$t_{d(off)}$			32	48	
Fall Time	t_f			10	20	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4$ V, $R_L = 1.2$ Ω $I_D \cong -3.3$ A, $V_{GEN} = -8$ V, $R_g = 1$ Ω		5	10	
Rise Time	t_r			11	17	
Turn-Off Delay Time	$t_{d(off)}$			22	33	
Fall Time	t_f			16	24	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C			- 1.4	A
Pulse Diode Forward Current ^a	I_{SM}				- 10	
Body Diode Voltage	V_{SD}	$I_F = -3.3$ A		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -3.3$ A, $dI/dt = 100$ A/ μ s, $T_J = 25$ °C		33	50	ns
Body Diode Reverse Recovery Charge	Q_{rr}			14	21	nC
Reverse Recovery Fall Time	t_a			14		ns
Reverse Recovery Rise Time	t_b			19		

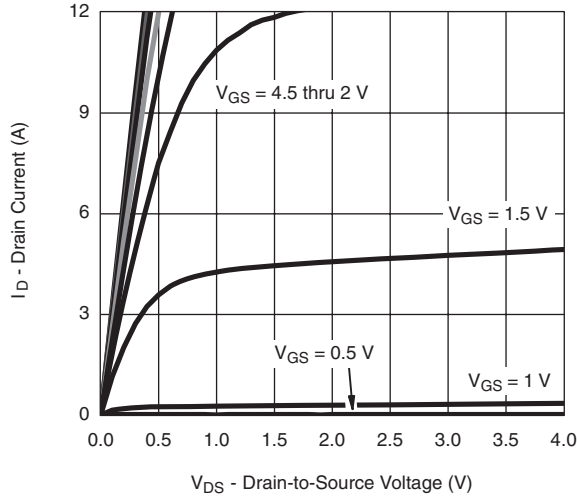
Notes:

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

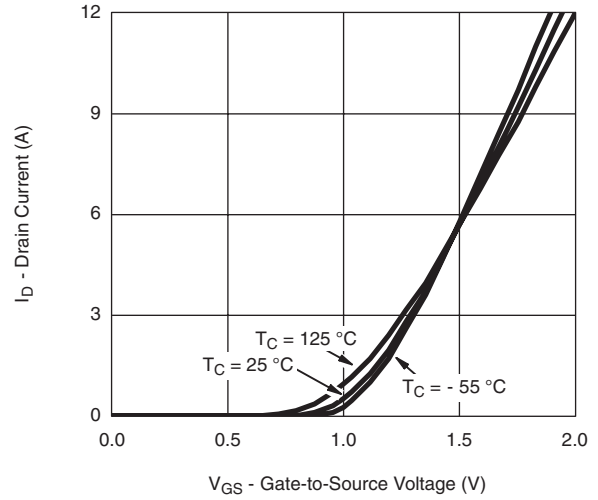
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



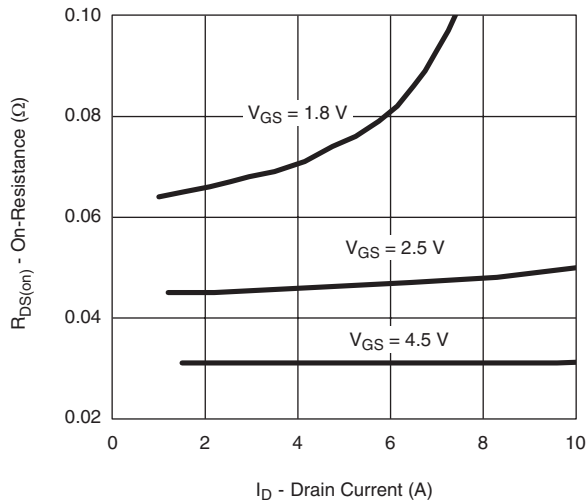
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



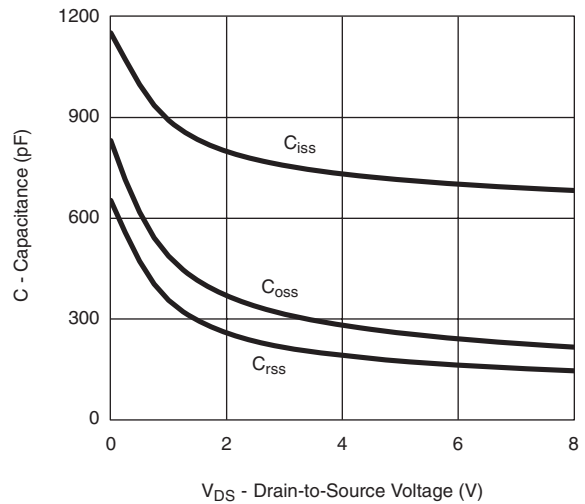
Output Characteristics



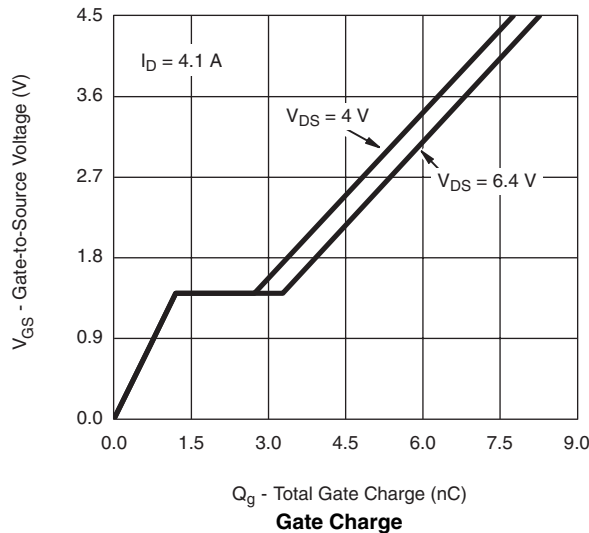
Transfer Characteristics



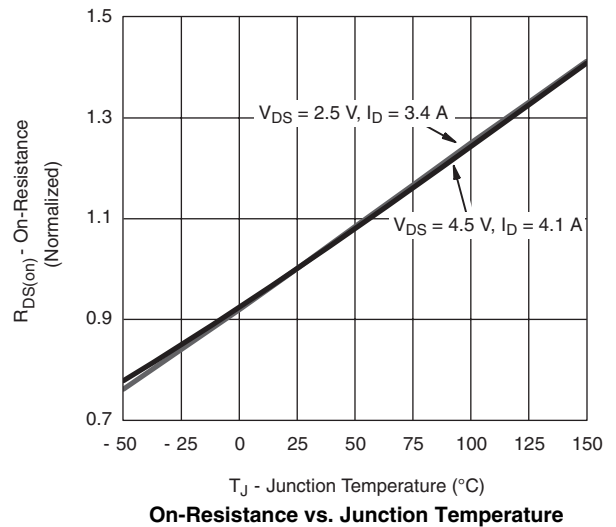
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



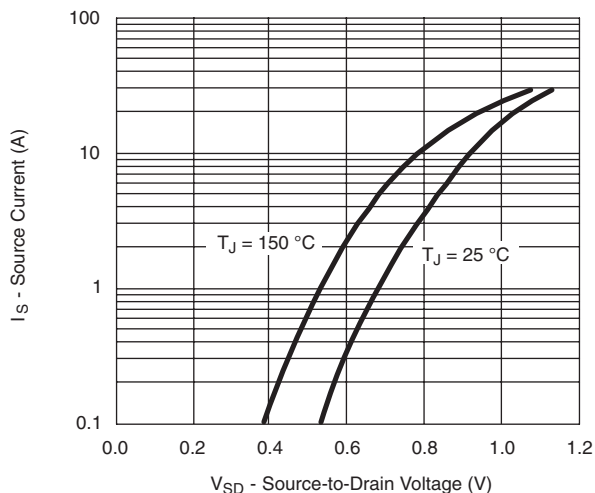
Gate Charge



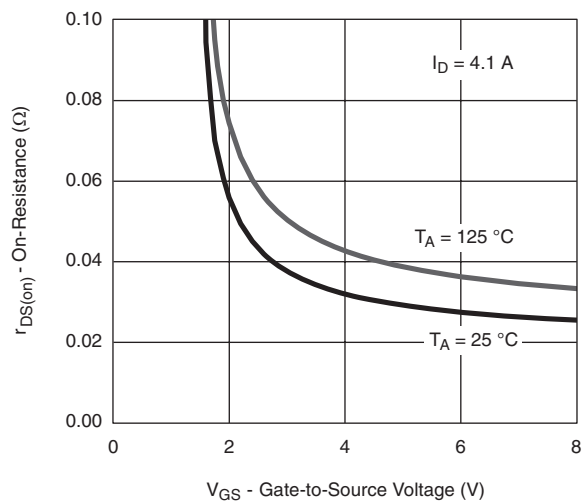
On-Resistance vs. Junction Temperature



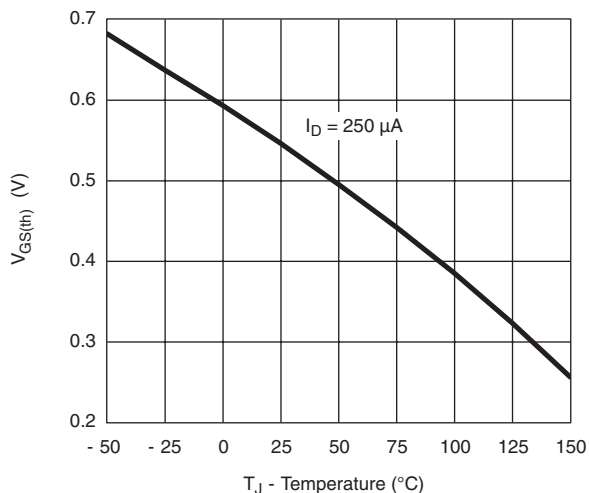
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



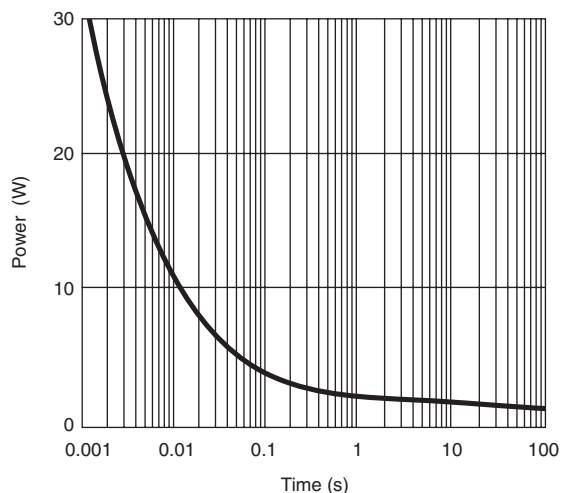
Source-Drain Diode Forward Voltage



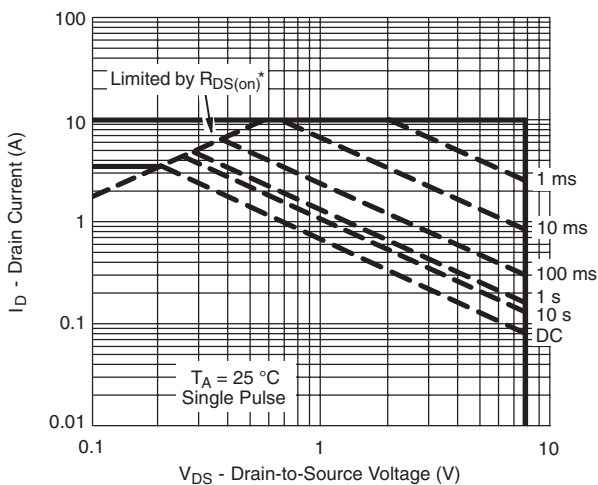
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient

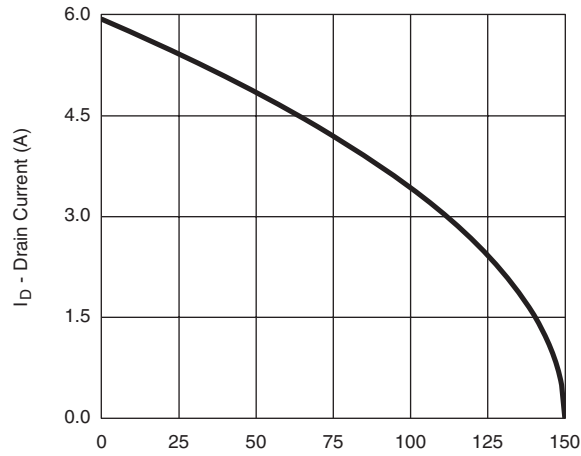


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

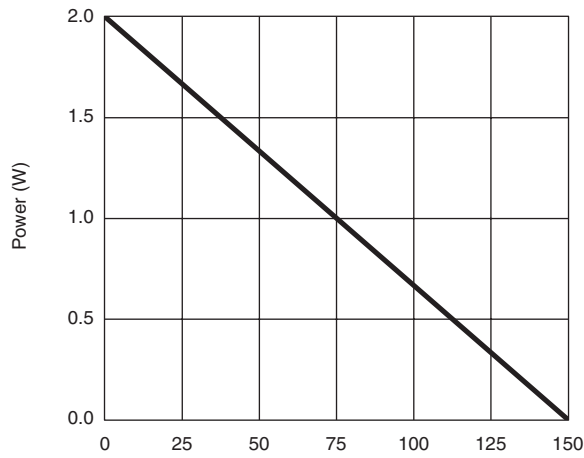
Safe Operating Area, Junction-to-Ambient



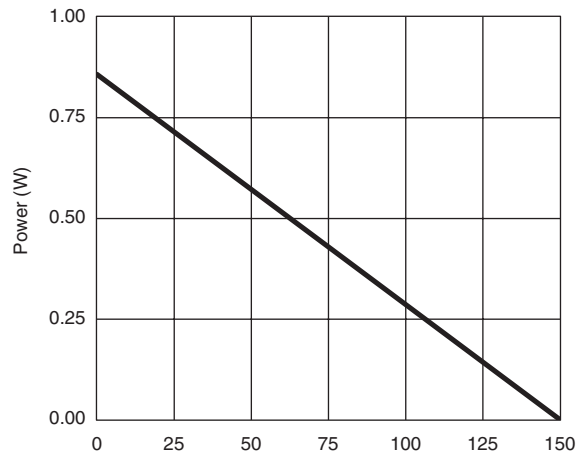
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



T_C - Case Temperature (°C)
Current Derating*



T_C - Case Temperature (°C)
Power, Junction-to-Case

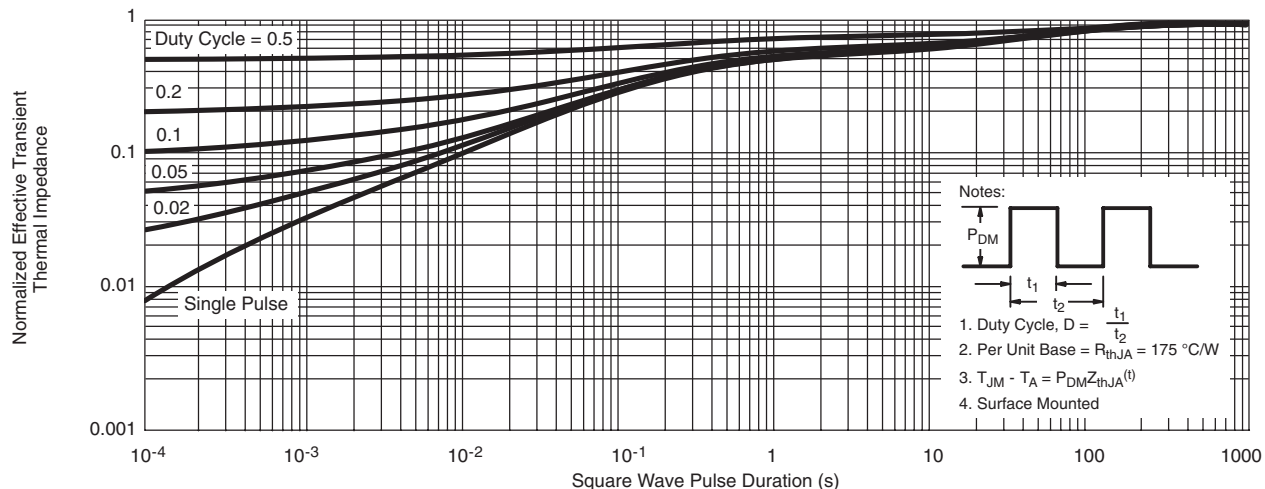


T_A - Ambient Temperature (°C)
Power, Junction-to-Ambient

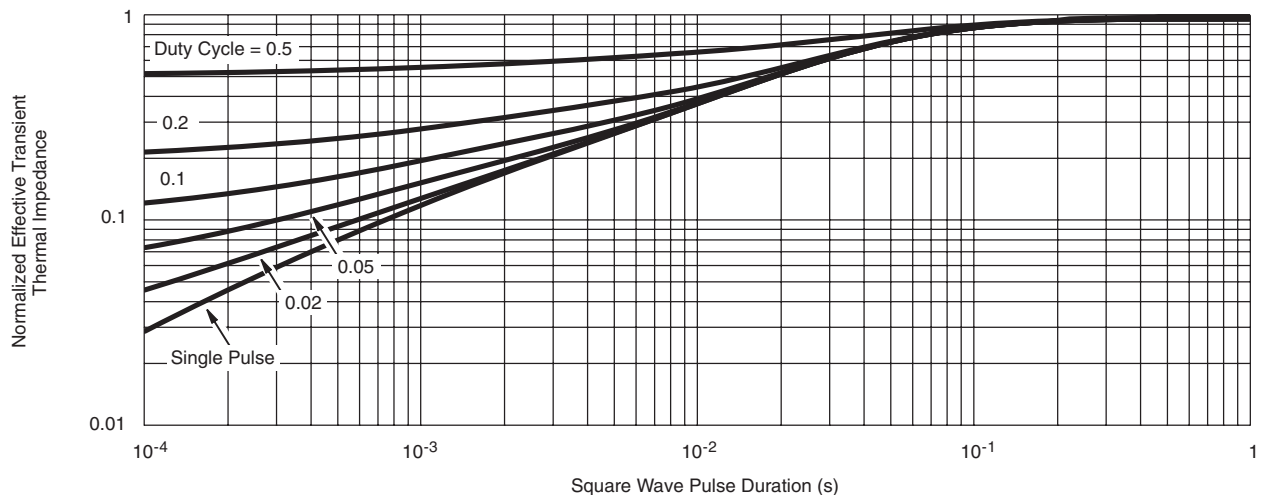
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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