



N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ)
100	0.034 at V _{GS} = 10 V	20	24 nC
	0.040 at V _{GS} = 6.0 V	20	

FEATURES

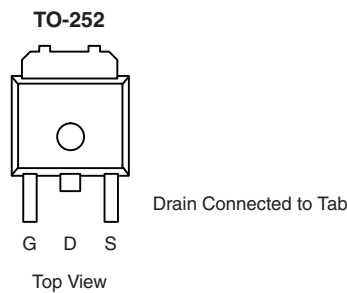
- TrenchFET[®] Power MOSFET
- 100 % UIS Tested



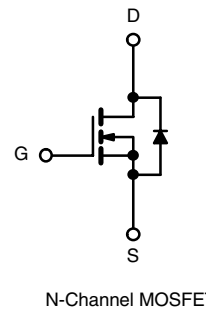
RoHS COMPLIANT

APPLICATIONS

- LCD TV Inverter
- LCD Backlight



Ordering Information:
SUD50N10-34P-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	100	V	
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	20 ^a	A
		T _C = 70 °C	20 ^a	
		T _A = 25 °C	5.9 ^b	
		T _A = 70 °C	4.7 ^b	
Pulsed Drain Current	I _{DM}	50		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	20 ^a	
		T _A = 25 °C	2.0 ^b	
Single Pulse Avalanche Current	I _{AS}	25		
Avalanche Energy	E _{AS}	31	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	56	W
		T _C = 70 °C	36	
		T _A = 25 °C	2.5 ^b	
		T _A = 70 °C	1.6 ^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 ^b	R _{thJA}	38	50	°C/W	
Maximum Junction-to-Case	R _{thJC}	1.6	2.2		

Notes:
a. Package limited.
b. Surface mounted on 1" x 1" FR4 board.

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}	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	100			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		115		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 8.7		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2		4	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			20	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 7\text{ A}$		0.028	0.034	Ω
		$V_{GS} = 6\text{ V}, I_D = 6\text{ A}$		0.031	0.040	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 7\text{ A}$		25		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1800		pF
Output Capacitance	C_{oss}			200		
Reverse Transfer Capacitance	C_{rss}			70		
Total Gate Charge	Q_g	$V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 7\text{ A}$		24	30	nC
Gate-Source Charge	Q_{gs}			7.6		
Gate-Drain Charge	Q_{gd}			5.4		
Gate Resistance	R_g	$f = 1\text{ MHz}$		1.2		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong 5\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$		13	25	ns
Rise Time	t_r			12	24	
Turn-Off Delay Time	$t_{d(off)}$			30	55	
Fall Time	t_f		10	20		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong 5\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		10	20	
Rise Time	t_r			11	20	
Turn-Off Delay Time	$t_{d(off)}$			20	40	
Fall Time	t_f		9	18		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			20	A
Pulse Diode Forward Current ^a	I_{SM}				50	
Body Diode Voltage	V_{SD}	$I_S = 5\text{ A}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		50	80	ns
Body Diode Reverse Recovery Charge	Q_{rr}			100	150	nC
Reverse Recovery Fall Time	t_a			38		ns
Reverse Recovery Rise Time	t_b			12		

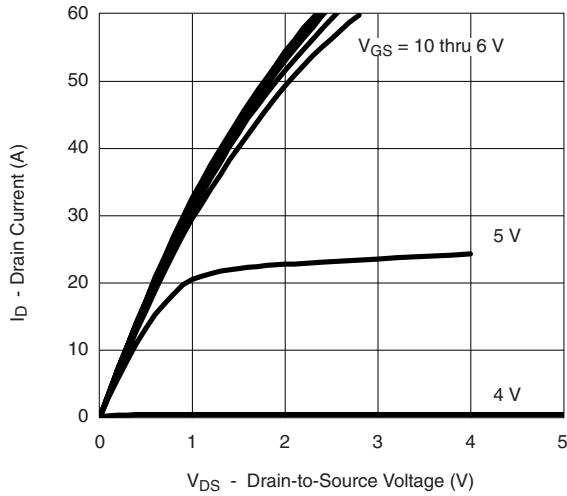
Notes:

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

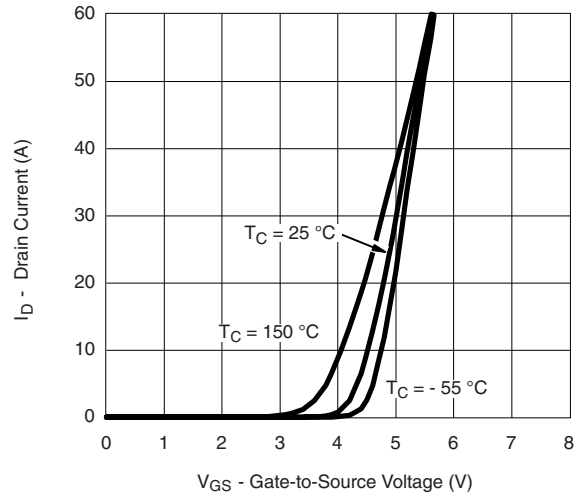
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



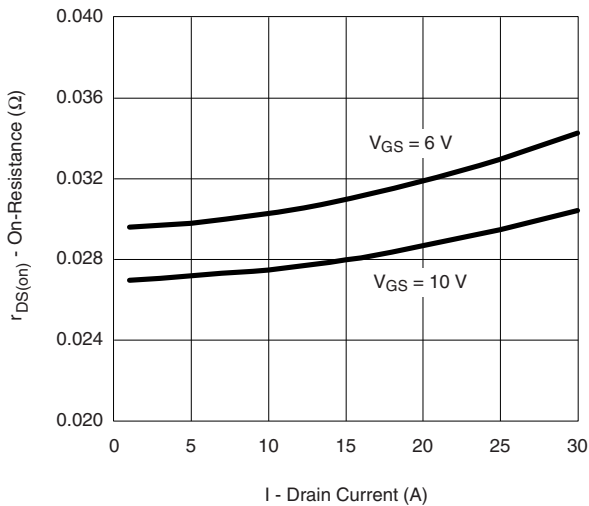
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



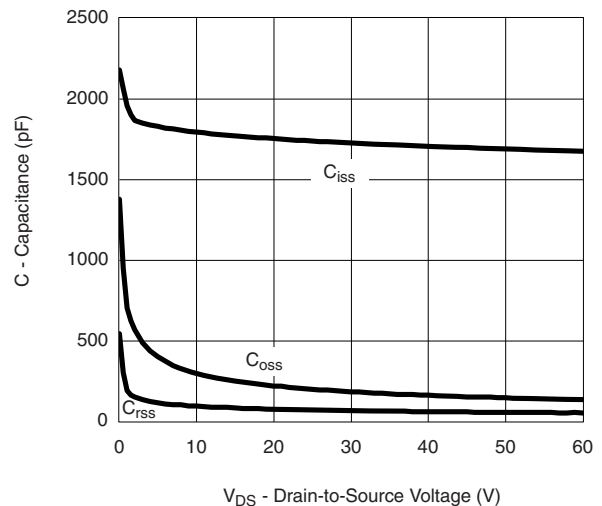
Output Characteristics



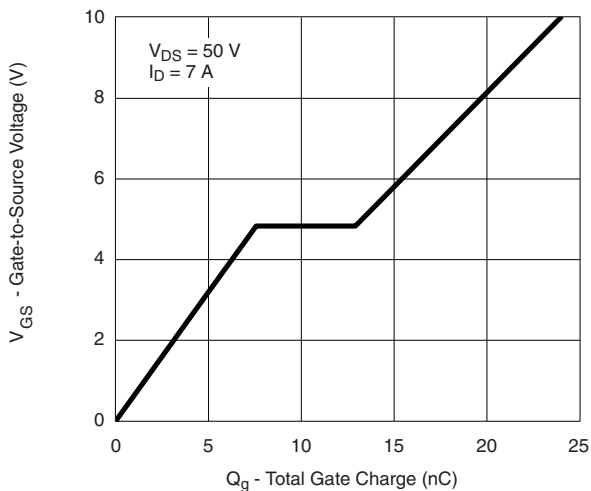
Transfer Characteristics



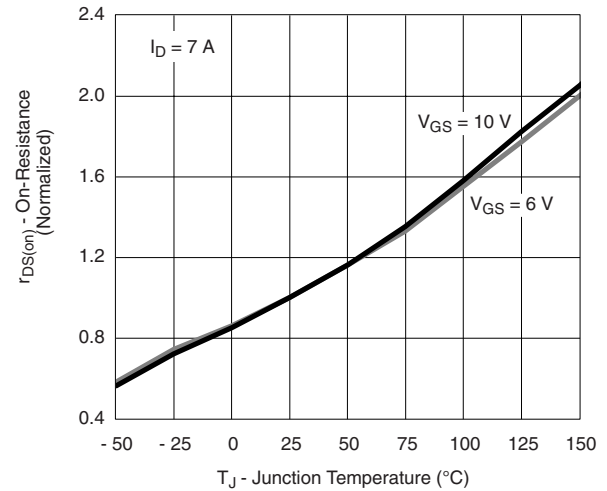
On-Resistance vs. Drain Current



Capacitance



Gate Charge



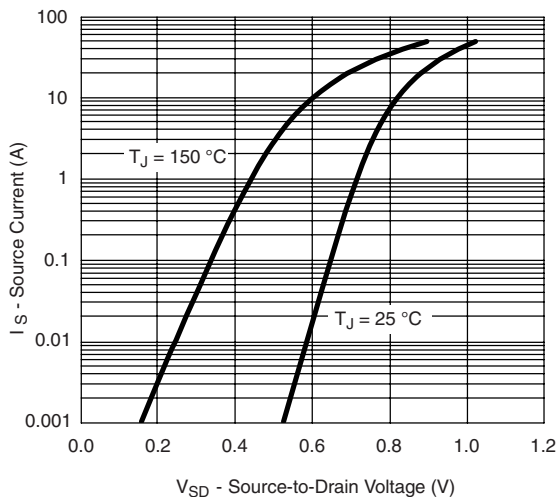
On-Resistance vs. Junction Temperature

SUD50N10-34P

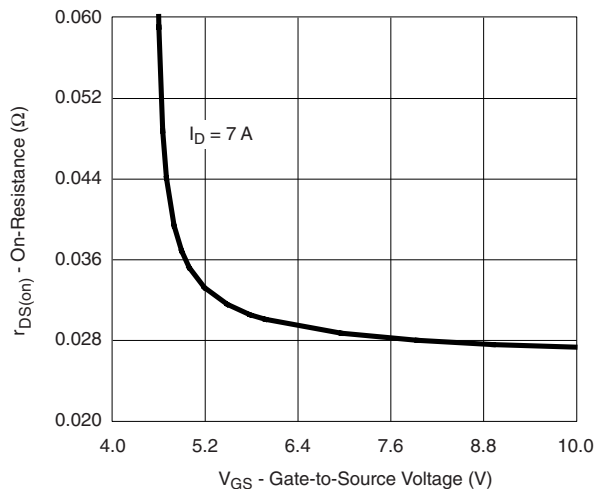


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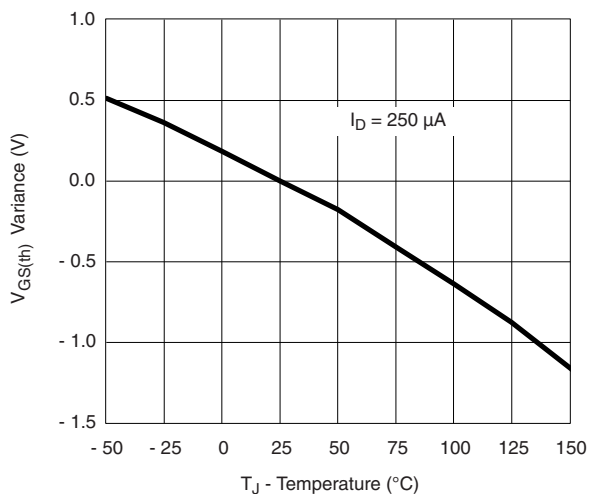
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



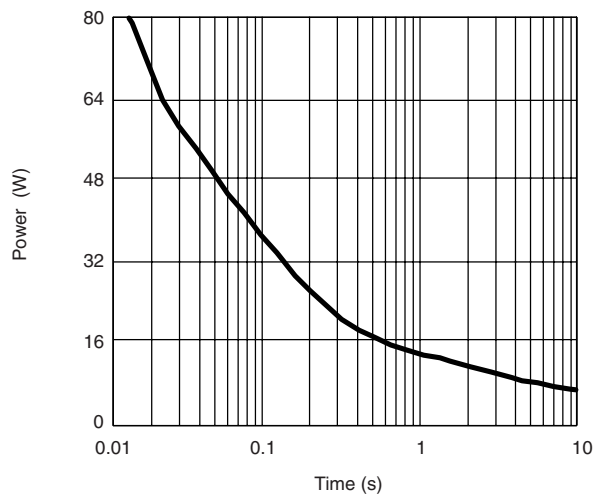
Source-Drain Diode Forward Voltage



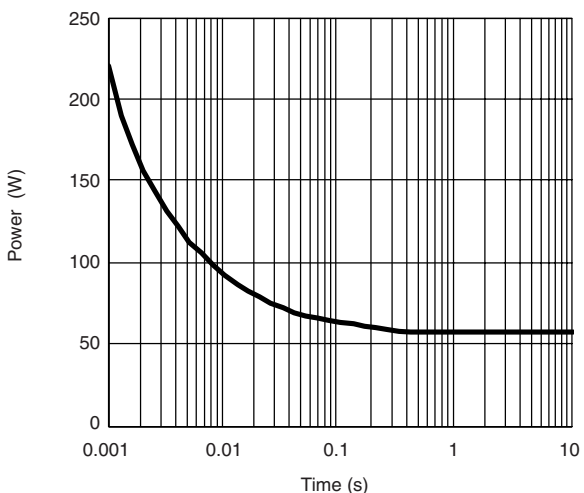
On-Resistance vs. Gate-to-Source Voltage



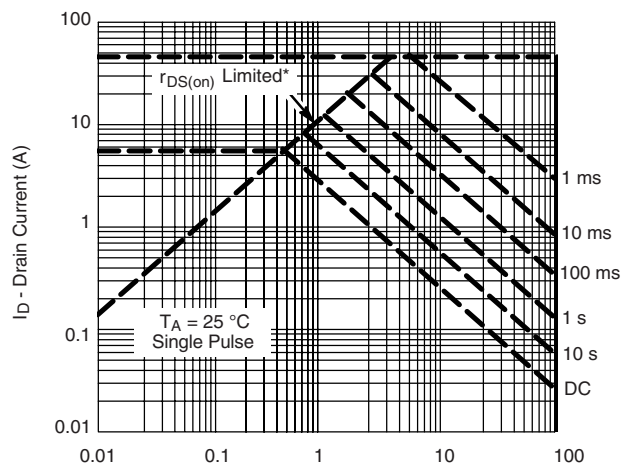
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



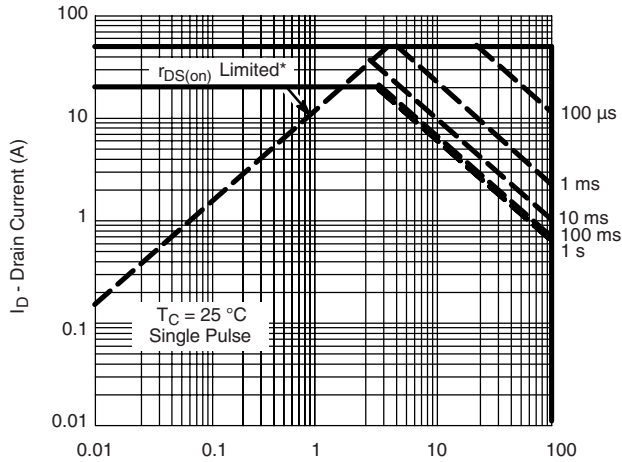
Single Pulse Power, Junction-to-Case



Safe Operating Area, Junction-to-Ambient

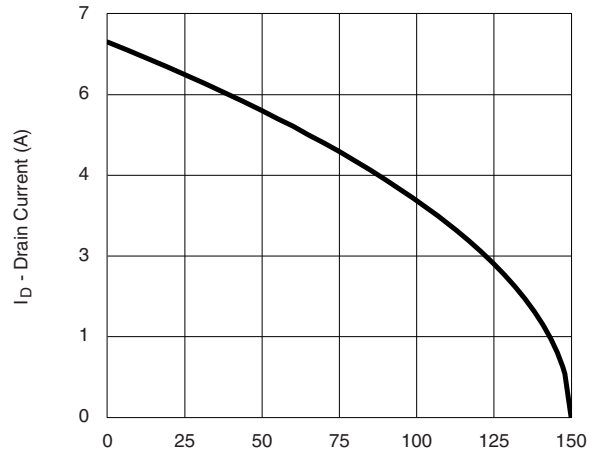


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

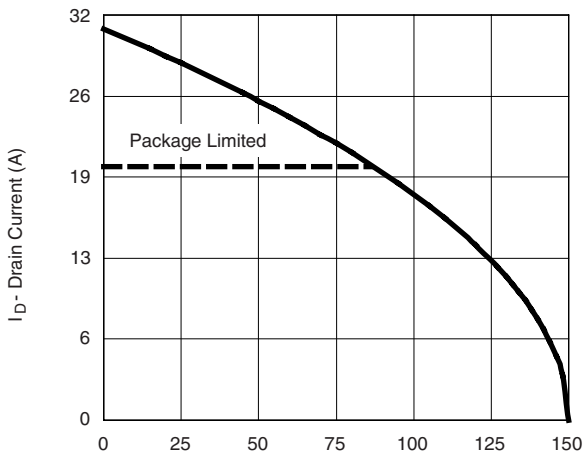


V_{DS} - Drain-to-Source Voltage (V)
 * $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

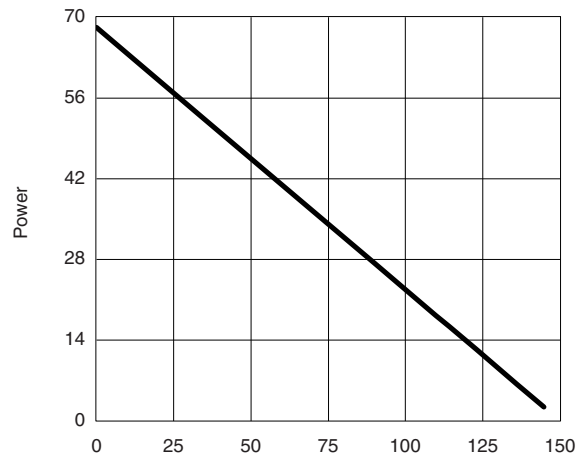
Safe Operating Area, Junction-to-Case



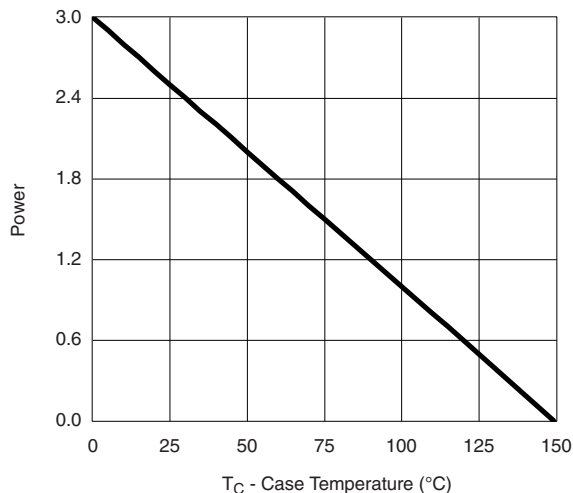
Current Derating, Junction-to-Ambient**



Current Derating, Junction-to-Case**



Power Derating, Junction-to-Case**



Power Derating, Junction-to-Ambient**

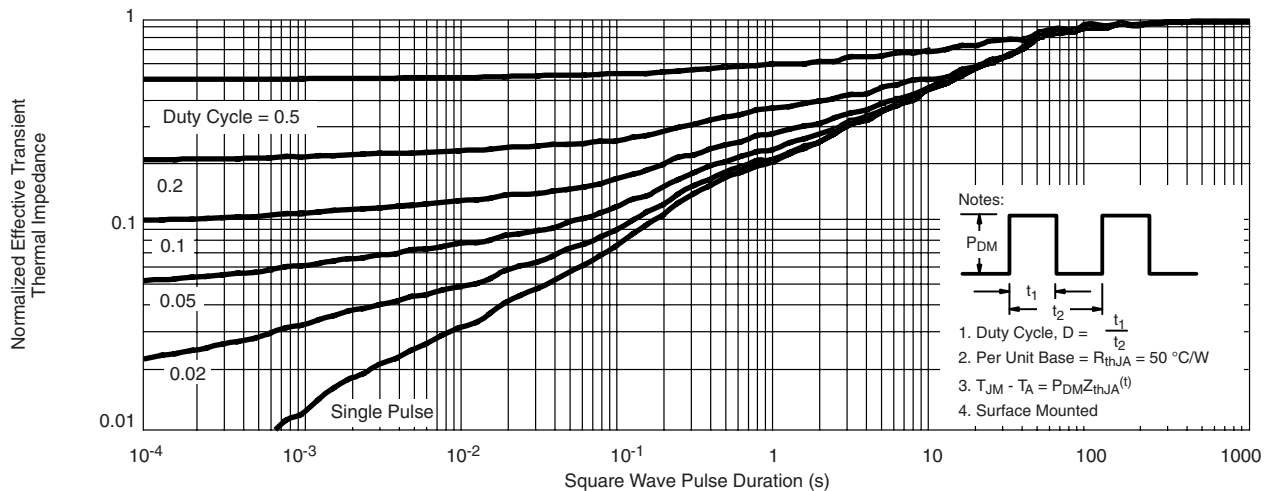
** The power dissipation P_D is based on $T_{J(max)} = 175\text{ °C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

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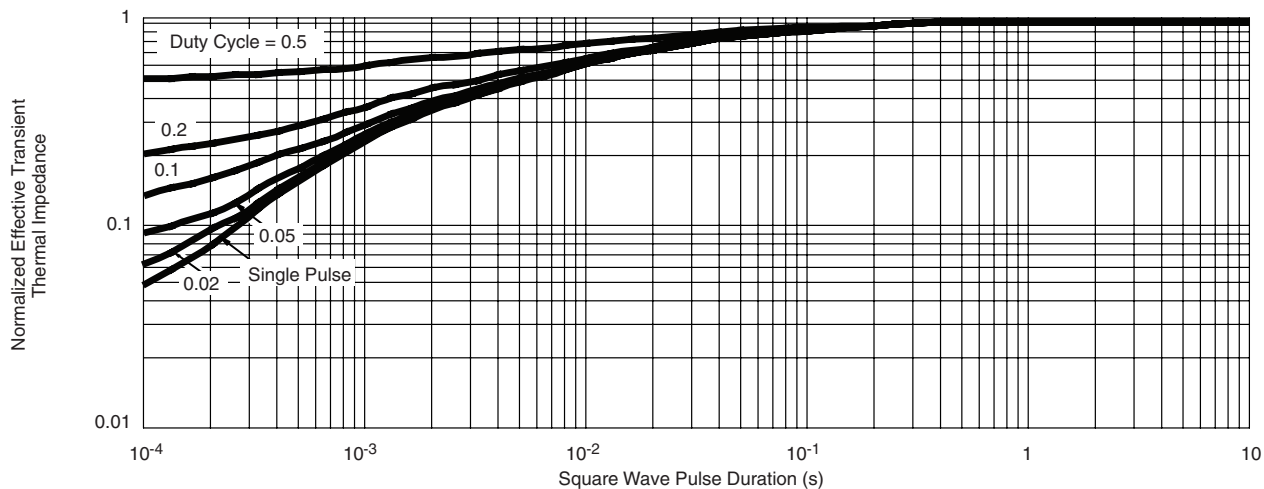
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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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