

Dual N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY				
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
Channel 1	30	0.0153 at V _{GS} = 10 V	8 ^e	8.4
		0.0184 at V _{GS} = 4.5 V	8 ^e	
Channel 2	30	0.0280 at V _{GS} = 10 V	8	3.6
		0.0340 at V _{GS} = 4.5 V	7.1	

FEATURES

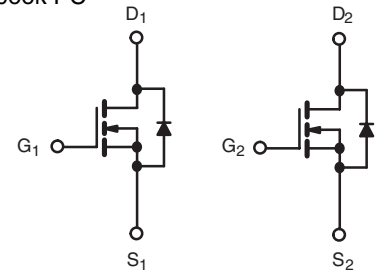
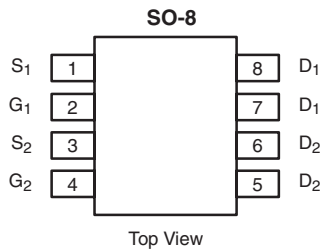
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- DC/DC for Notebook PC



Ordering Information: Si4276DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

N-Channel MOSFET N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter	Symbol	Channel 1	Channel 2	Unit	
Drain-Source Voltage	V _{DS}	30		V	
Gate-Source Voltage	V _{GS}	± 20			
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	8 ^e	8	
		T _C = 70 °C	8 ^e	6.4	
		T _A = 25 °C	8 ^{b, c, e}	6.8 ^{b, c}	
		T _A = 70 °C	7.6 ^{b, c}	5.5 ^{b, c}	
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	50	30	A	
Source-Drain Current Diode Current	I _S	T _C = 25 °C	3.0		2.3
		T _A = 25 °C	1.7 ^{b, c}		1.7 ^{b, c}
Single Pulse Avalanche Current	I _{AS}	20	10		mJ
Avalanche Energy	E _{AS}	20	5		
Maximum Power Dissipation	P _D	T _C = 25 °C	3.6	2.8	
		T _C = 70 °C	2.3	1.8	
		T _A = 25 °C	2.1 ^{b, c}	2.0 ^{b, c}	
		T _A = 70 °C	1.3 ^{b, c}	1.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Channel 1		Channel 2		Unit	
		Typical	Maximum	Typical	Maximum		
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	47	60	58	62.5	°C/W
Maximum Junction-to-Foot (Drain)	Steady	R _{thJF}	30	35	38	45	

Notes:

- Based on T_C = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 107 °C/W (Ch 1) and 110 °C/W (Ch 2).
- Package limited.

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	Ch 1	30		V	
		$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	Ch 2	30			
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	Ch 1	29		mV/ $^\circ\text{C}$	
		$I_D = 250\text{ }\mu\text{A}$	Ch 2	30			
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250\text{ }\mu\text{A}$	Ch 1	- 5.2			
		$I_D = 250\text{ }\mu\text{A}$	Ch 2	- 4.4			
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch 1	1.2	2.5	V	
		$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch 2	1.2	2.5		
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	Ch 1		100	nA	
			Ch 2		100		
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	Ch 1		1	μA	
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	Ch 2		1		
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	Ch 1		10		
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	Ch 2		10		
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	Ch 1	10		A	
		$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	Ch 2	10			
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 9.5\text{ A}$	Ch 1	0.0127	0.0153	Ω	
		$V_{GS} = 10\text{ V}, I_D = 6.8\text{ A}$	Ch 2	0.0230	0.0280		
		$V_{GS} = 4.5\text{ V}, I_D = 8.7\text{ A}$	Ch 1	0.0146	0.0184		
		$V_{GS} = 4.5\text{ V}, I_D = 6.1\text{ A}$	Ch 2	0.0280	0.0340		
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 9.5\text{ A}$	Ch 1	43		S	
		$V_{DS} = 15\text{ V}, I_D = 6.8\text{ A}$	Ch 2	17			
Dynamic^a							
Input Capacitance	C_{iss}	Channel 1 $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$ Channel 2 $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	Ch 1		1000	μF	
			Ch 2		366		
Output Capacitance	C_{oss}		Ch 1		215		
			Ch 2		82		
Reverse Transfer Capacitance	C_{rss}		Ch 1		85		
			Ch 2		45		
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 9.5\text{ A}$	Ch 1	17.2	26	nC	
		$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 6.8\text{ A}$	Ch 2	7.3	15		
		Channel 1 $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 9.5\text{ A}$	Ch 1	8.4	17		
			Ch 2	3.6	8		
Gate-Source Charge	Q_{gs}	Channel 2 $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 6.8\text{ A}$	Ch 1	3			
			Ch 2	1.1			
Gate-Drain Charge	Q_{gd}	Ch 1	2.6				
		Ch 2	1.3				
Gate Resistance	R_g	$f = 1\text{ MHz}$	Ch 1	0.6	3.1	6.2	Ω
			Ch 2	0.5	2.6	5.2	



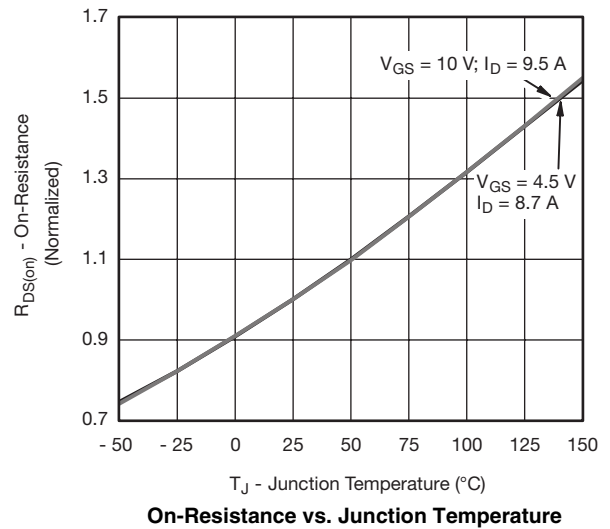
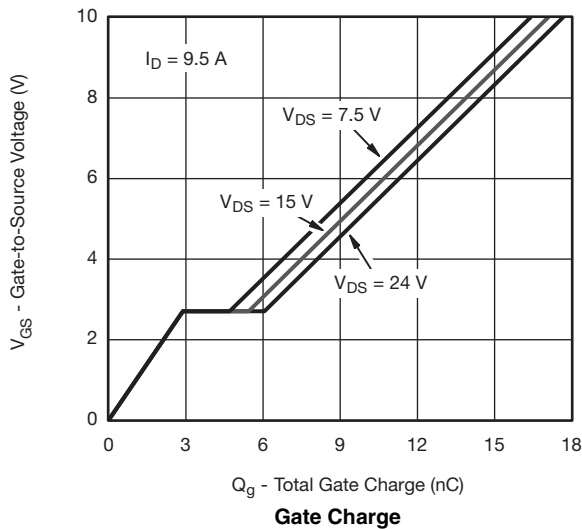
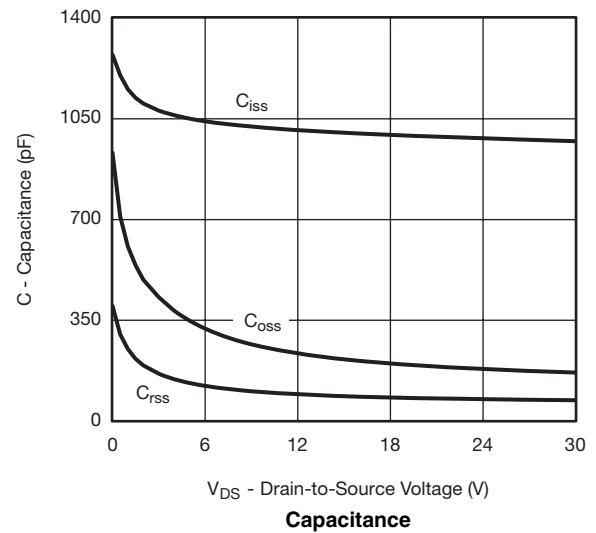
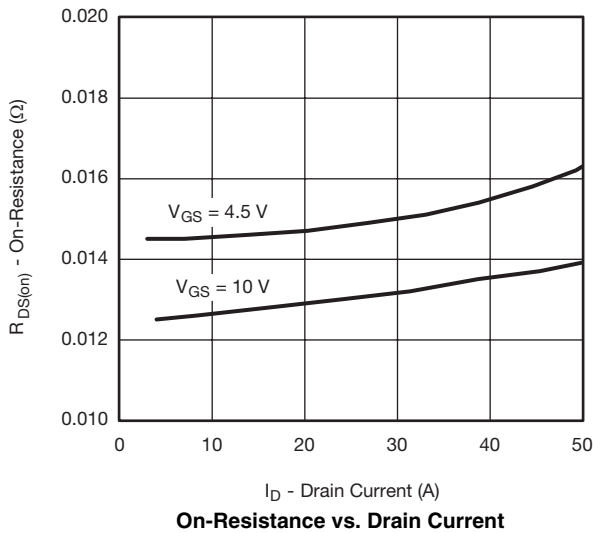
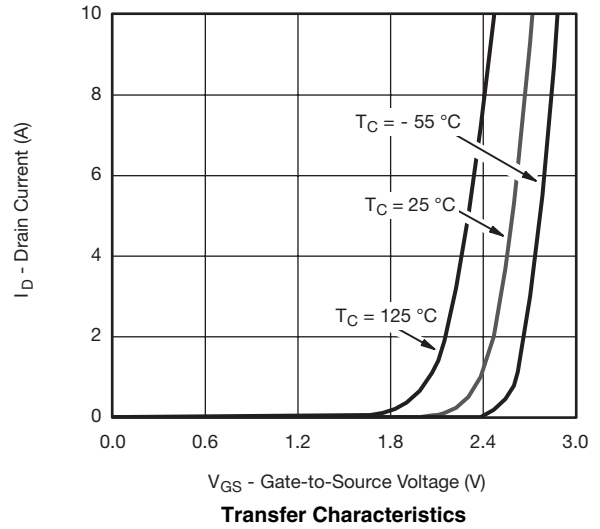
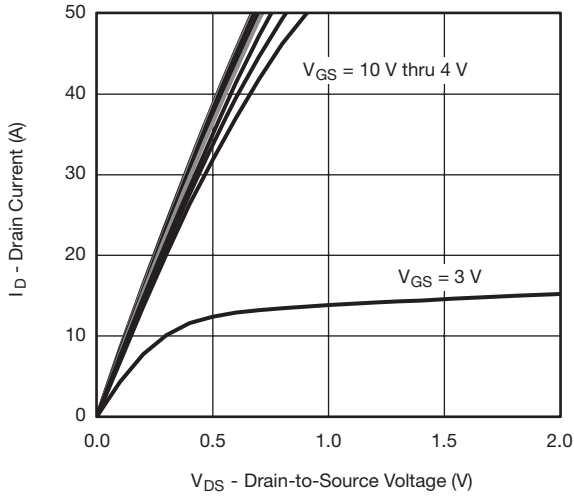
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Dynamic^a							
Turn-On Delay Time	$t_{d(on)}$	Channel 1 $V_{DD} = 15\text{ V}, R_L = 2\ \Omega$ $I_D \cong 7.6\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\ \Omega$	Ch 1		8	16	ns
			Ch 2		4	8	
Rise Time	t_r		Ch 1		10	20	
			Ch 2		8	16	
Turn-Off Delay Time	$t_{d(off)}$	Channel 2 $V_{DD} = 15\text{ V}, R_L = 2.7\ \Omega$ $I_D \cong 5.5\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\ \Omega$	Ch 1		20	30	
			Ch 2		11	20	
Fall Time	t_f		Ch 1		7	14	
			Ch 2		7	14	
Turn-On Delay Time	$t_{d(on)}$	Channel 1 $V_{DD} = 15\text{ V}, R_L = 2\ \Omega$ $I_D \cong 7.6\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\ \Omega$	Ch 1		14	21	
			Ch 2		8	16	
Rise Time	t_r		Ch 1		11	20	
			Ch 2		10	20	
Turn-Off Delay Time	$t_{d(off)}$	Channel 2 $V_{DD} = 15\text{ V}, R_L = 2.7\ \Omega$ $I_D \cong 5.5\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\ \Omega$	Ch 1		18	27	
			Ch 2		10	20	
Fall Time	t_f		Ch 1		7	14	
			Ch 2		7	14	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$	Ch 1			3	A
			Ch 2			2.3	
Pulse Diode Forward Current ^a	I_{SM}		Ch 1			50	
			Ch 2			30	
Body Diode Voltage	V_{SD}	$I_S = 7.6\text{ A}$	Ch 1		0.82	1.2	V
		$I_S = 5.5\text{ A}$	Ch 2		0.85	1.2	
Body Diode Reverse Recovery Time	t_{rr}	Channel 1 $I_F = 7.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	Ch 1		20	30	ns
			Ch 2		13	20	
Body Diode Reverse Recovery Charge	Q_{rr}		Ch 1		12	20	nC
			Ch 2		6	12	
Reverse Recovery Fall Time	t_a	Channel 2 $I_F = 5.5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	Ch 1		11		ns
			Ch 2		7		
Reverse Recovery Rise Time	t_b		Ch 1		9		
			Ch 2		6		

Notes:

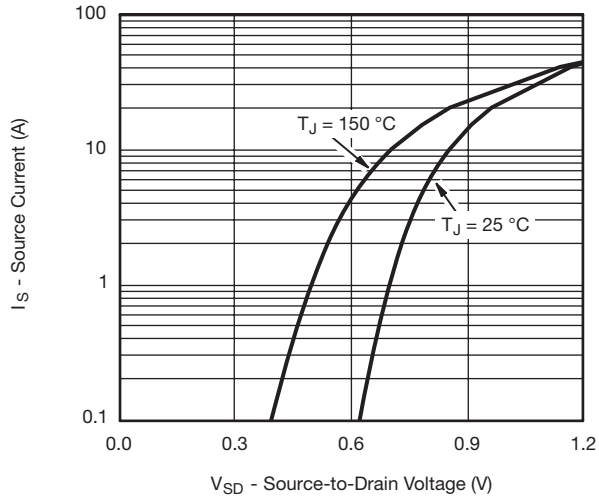
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

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.

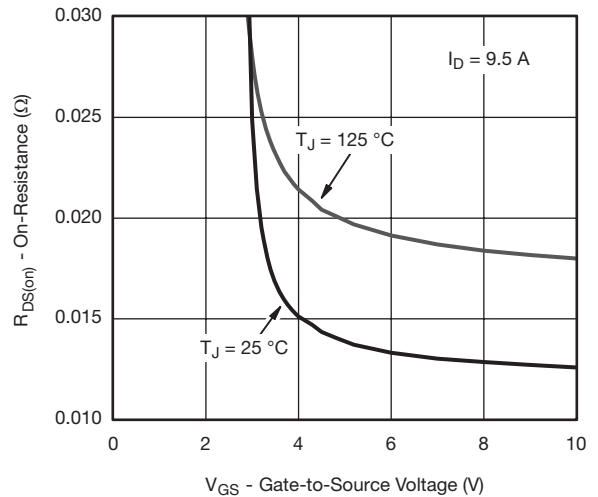
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



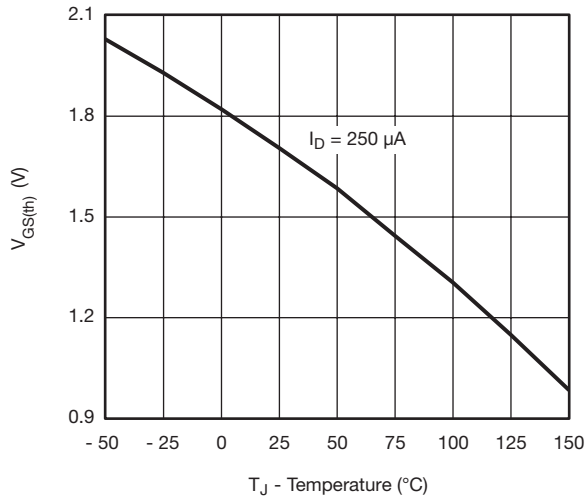
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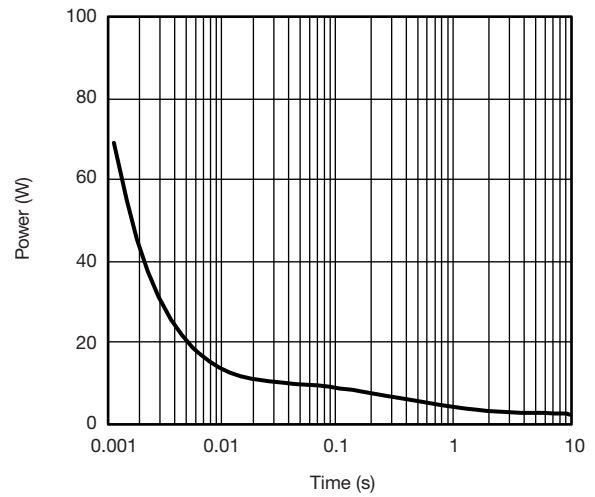
Source-Drain Diode Forward Voltage



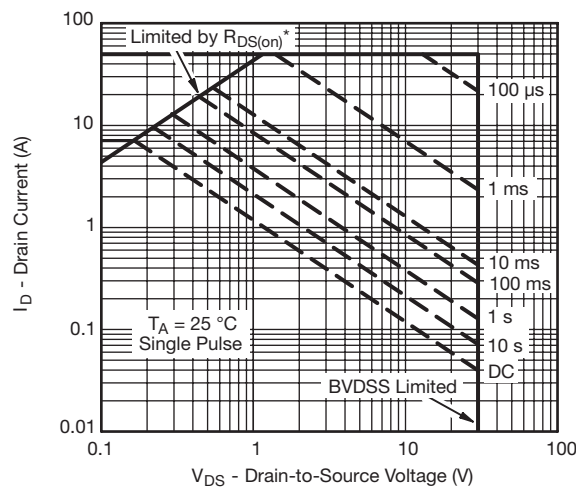
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

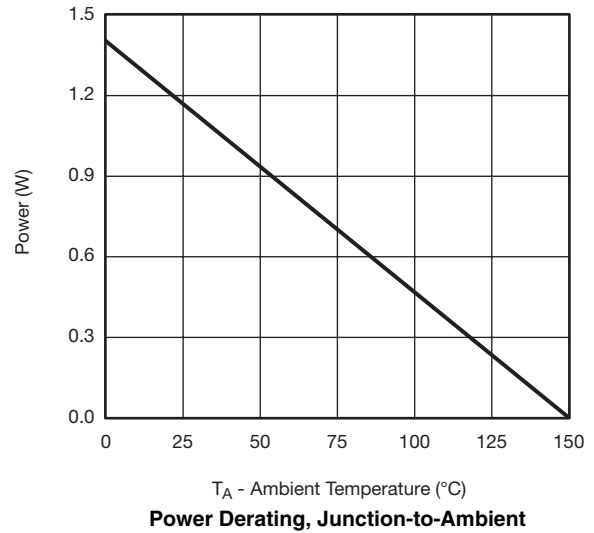
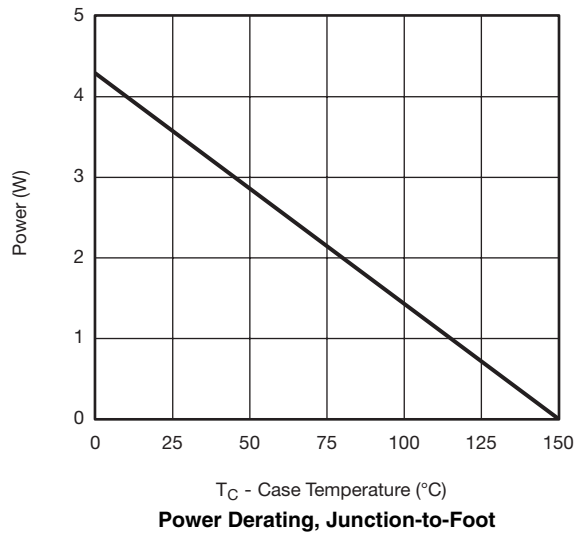
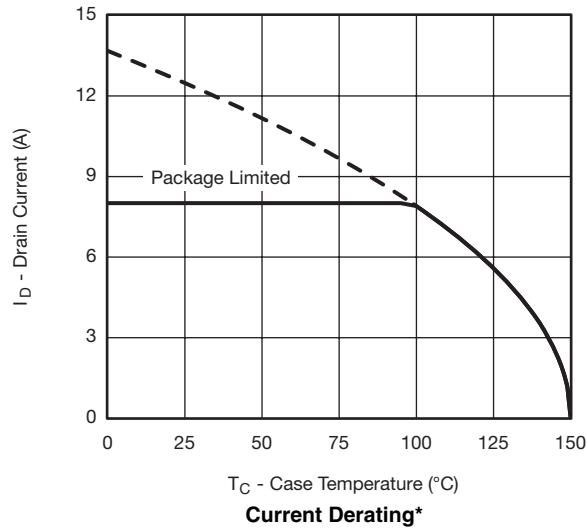


Single Pulse Power, Junction-to-Ambient



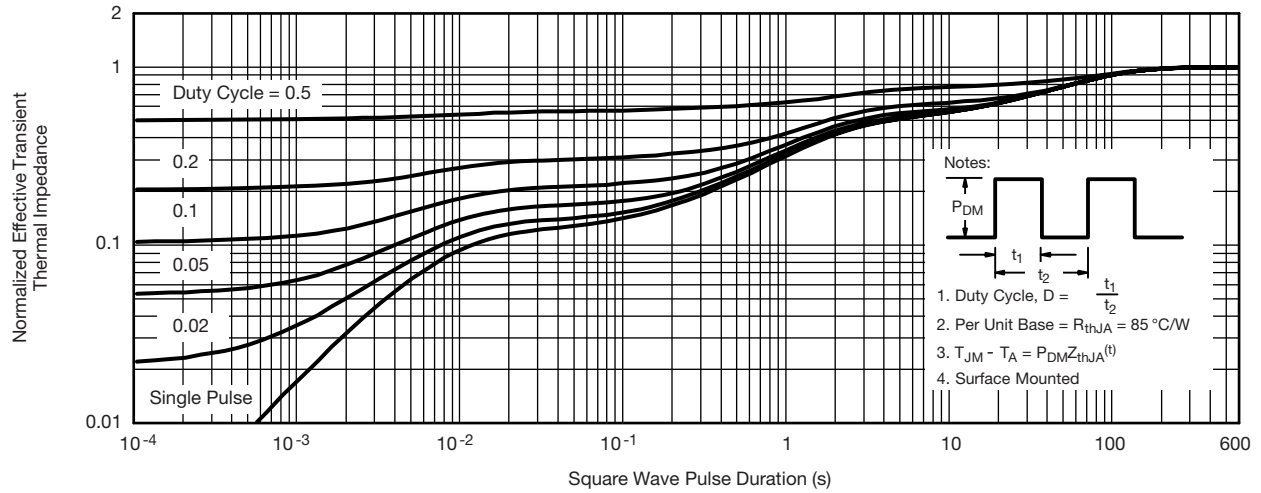
Safe Operating Area, Junction-to-Ambient

CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

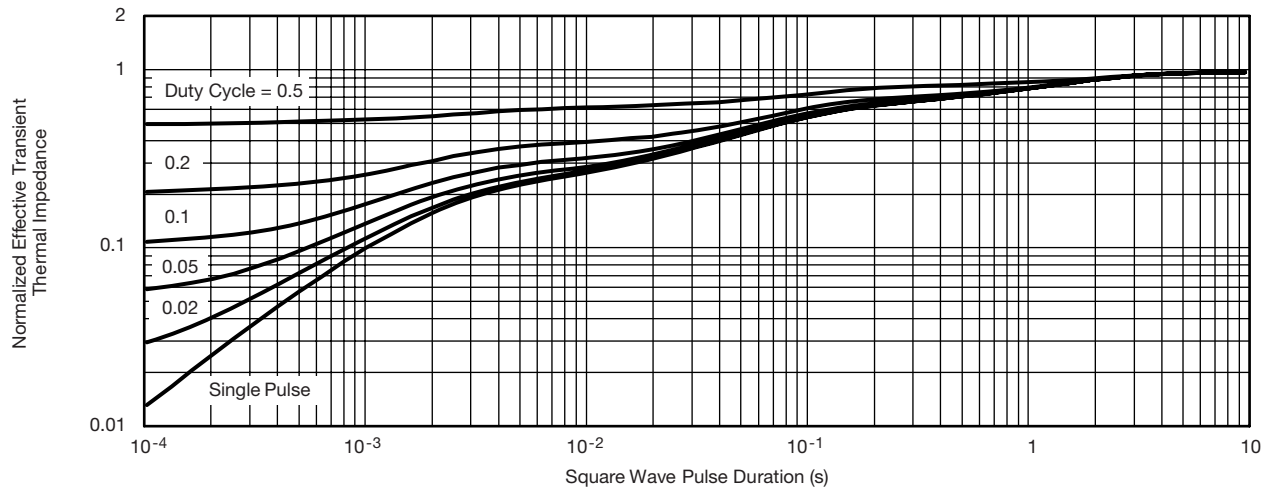


* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

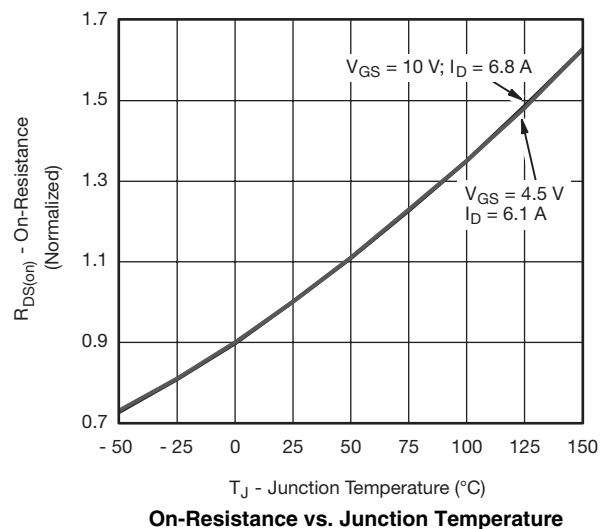
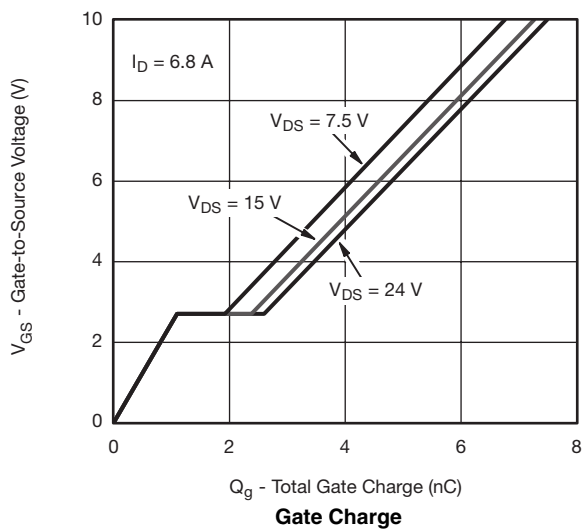
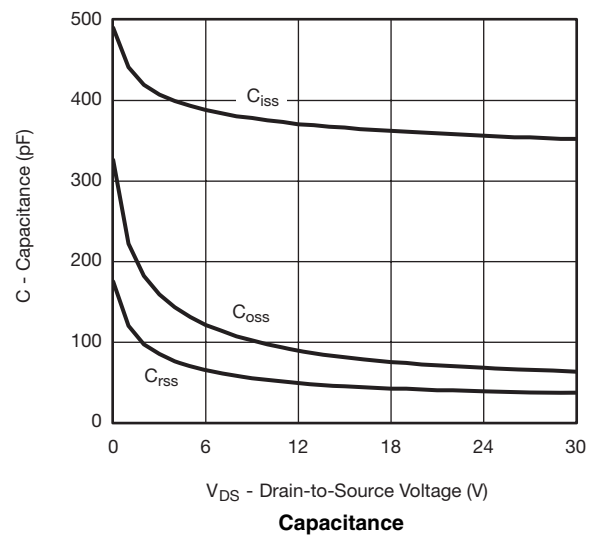
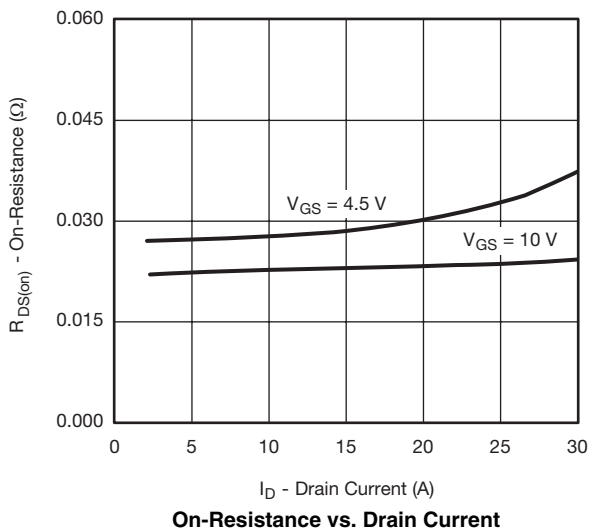
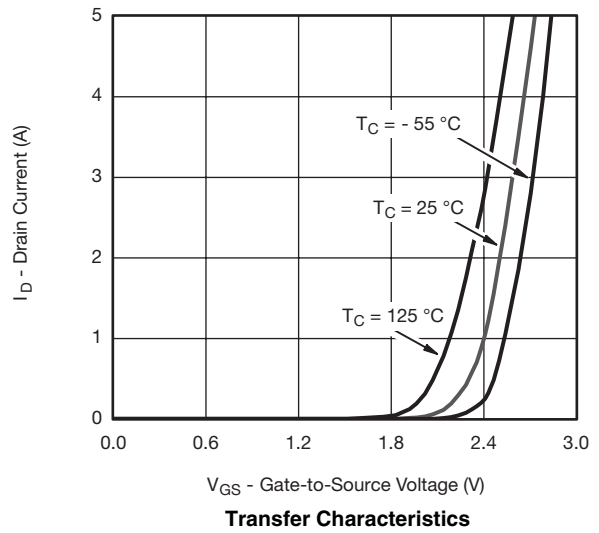
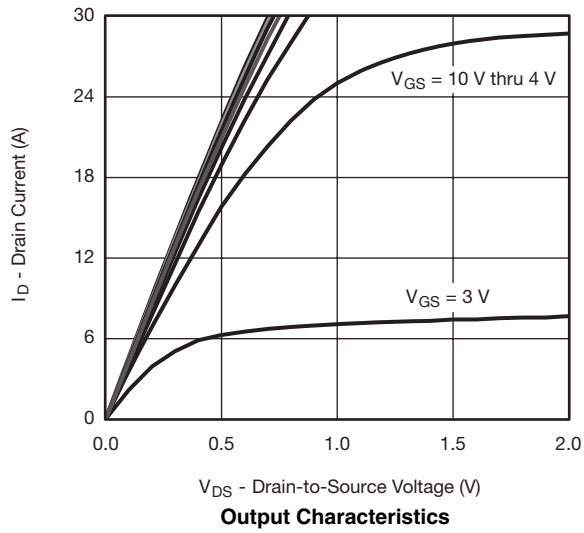


Normalized Thermal Transient Impedance, Junction-to-Ambient

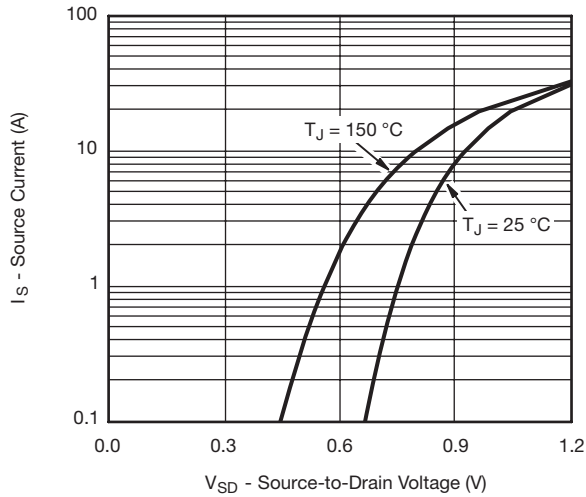


Normalized Thermal Transient Impedance, Junction-to-Foot

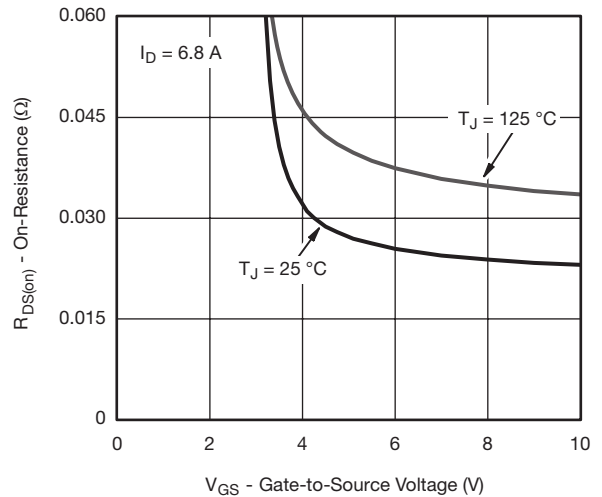
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



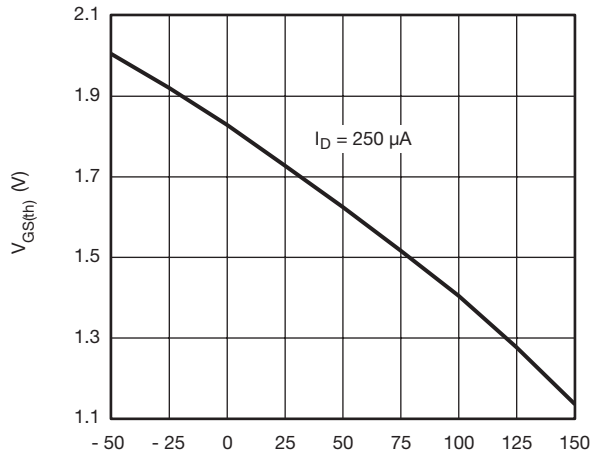
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



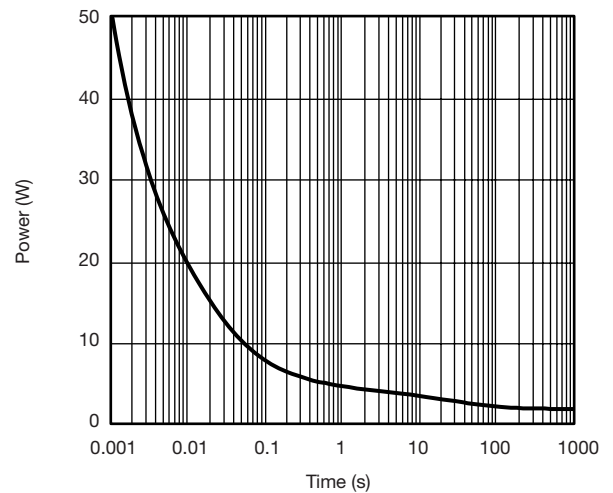
Source-Drain Diode Forward Voltage



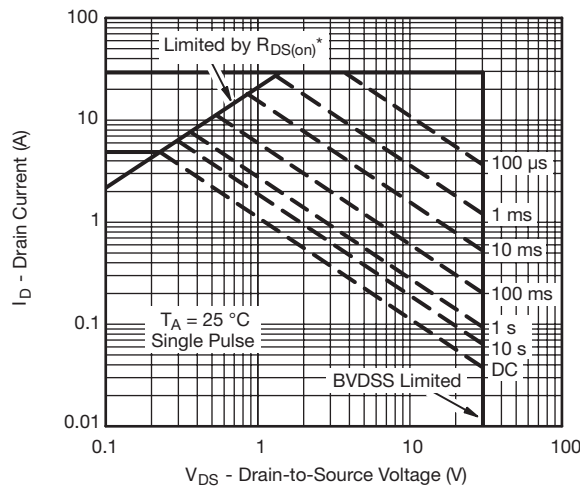
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

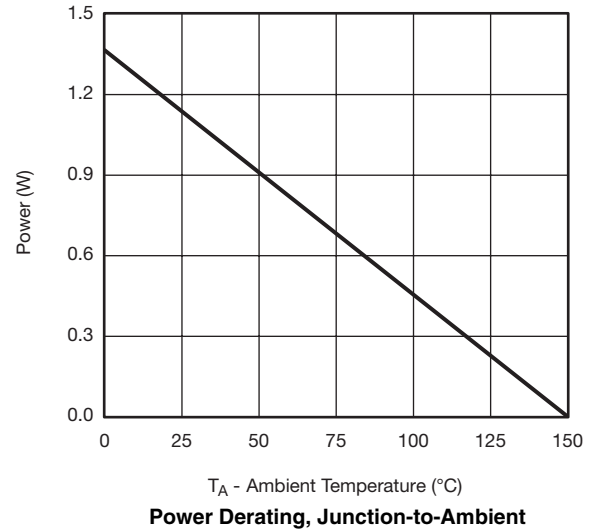
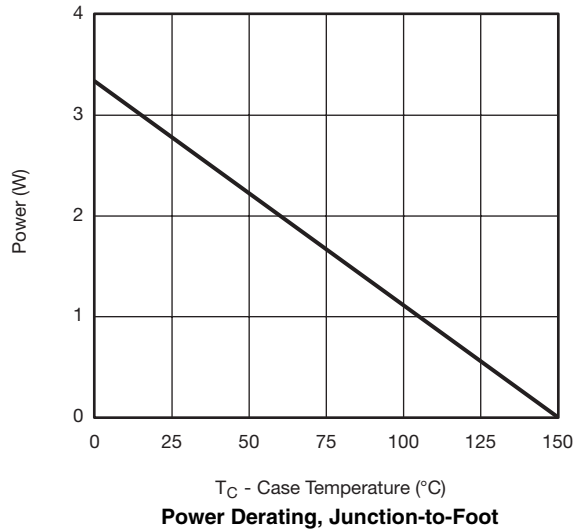
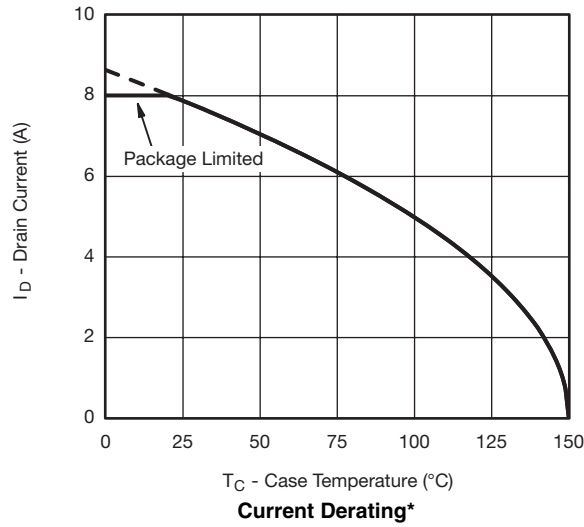


Single Pulse Power, Junction-to-Ambient



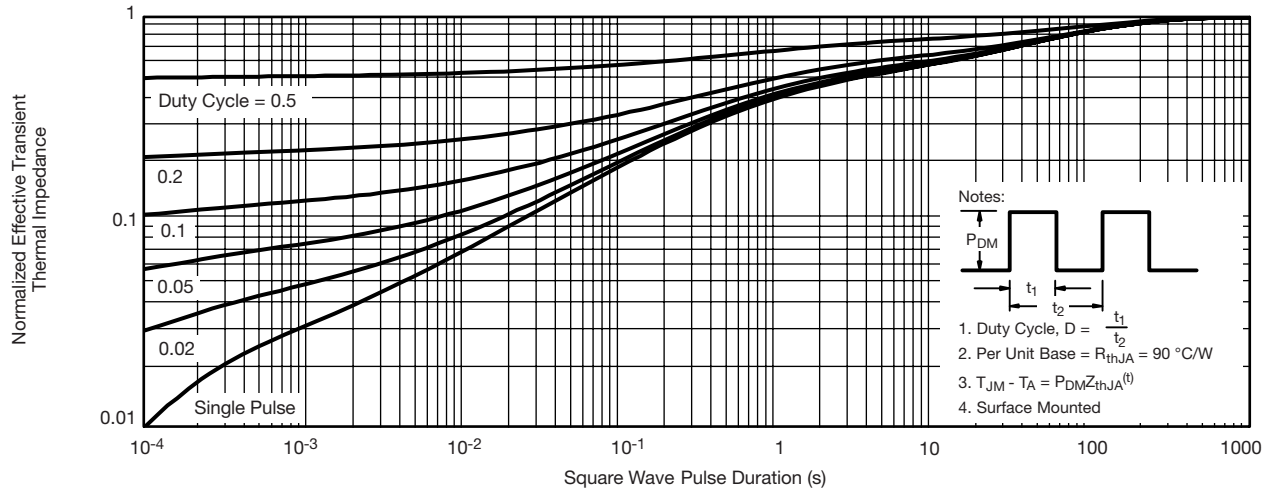
Safe Operating Area, Junction-to-Ambient
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

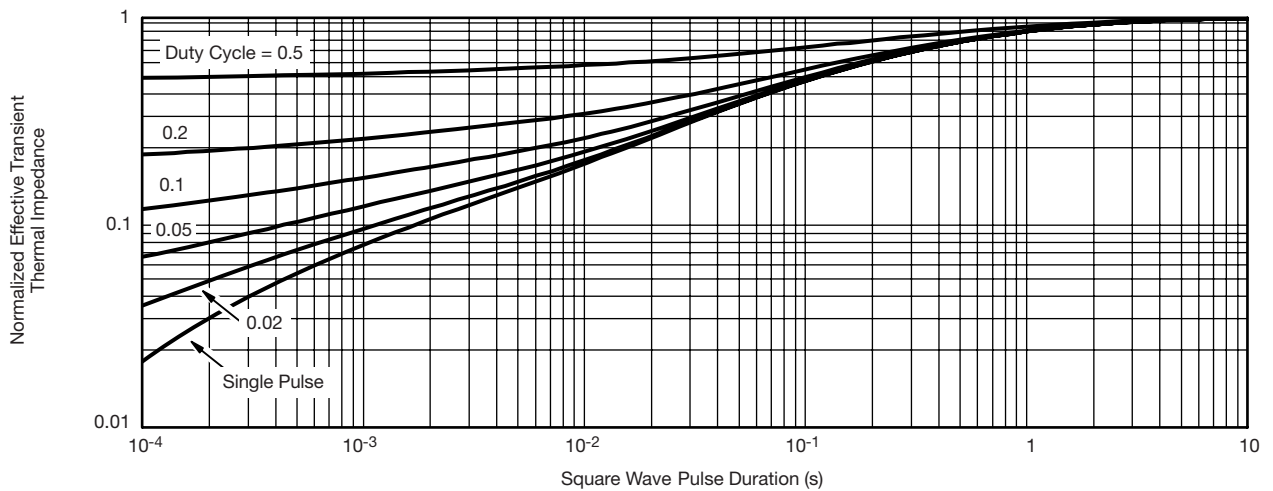


* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

CHANNEL-2 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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