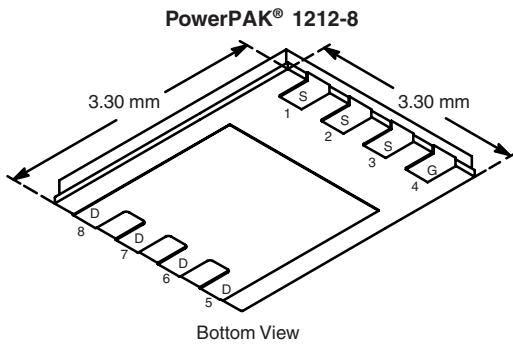


N-Channel 125-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ.)
125	0.108 at $V_{GS} = 10$ V	14.5	9.1 nC
	0.115 at $V_{GS} = 4.5$ V	14	



Ordering Information: Si7606DN-T1-E3 (Lead (Pb)-free)
Si7606DN-T1-GE3 (Lead (Pb)-free and Halogen-free)

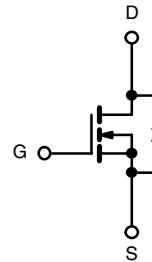
FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET
- Optimized for Fast Switching Applications
- Low Thermal Resistance PowerPAK® Package with Small Size and Low 1.07 mm Profile
- 100 % R_g Tested



APPLICATIONS

- Primary Side Switch



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	125	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	14.5	A
		11.6	
		3.9 ^{b, c}	
		3.1 ^{b, c}	
Pulsed Drain Current	I_{DM}	20	
Continuous Source-Drain Diode Current	I_S	18	
		3.2 ^{b, c}	
Avalanche Current	I_{AS}	15	
Single-Pulse Avalanche Energy	E_{AS}	11	mJ
Maximum Power Dissipation	P_D	52	W
		33	
		3.8 ^{b, c}	
		2.4 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R_{thJA}	26	33	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	1.9	2.4	

Notes:

- a. Based on $T_C = 25$ °C.
- b. Surface Mounted on 1" x 1" FR4 board.
- c. $t = 10$ s.
- d. See Solder Profile (www.vishay.com/ppg?73257). The PowerPAK 1212-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- e. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.
- f. Maximum under Steady State conditions is 81 °C/W.

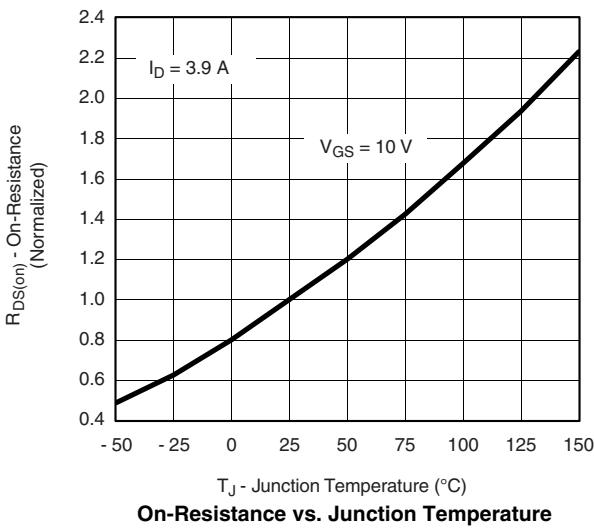
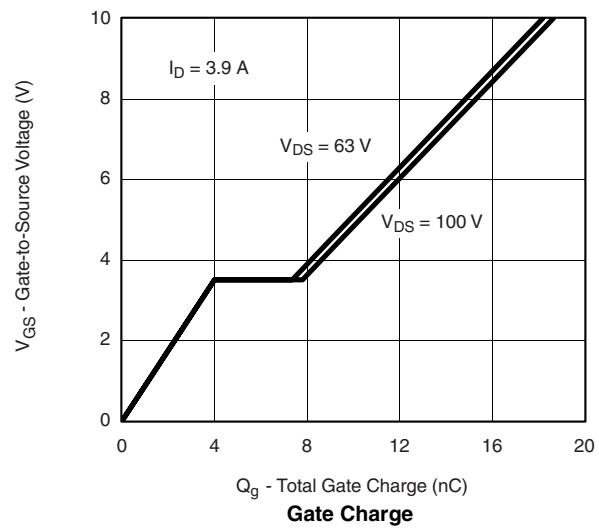
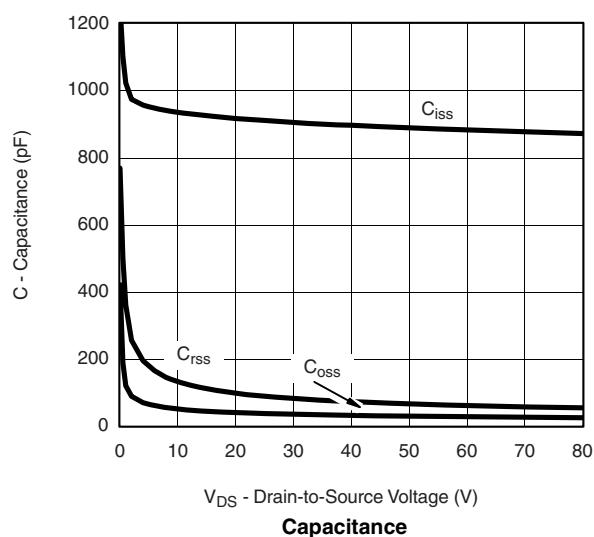
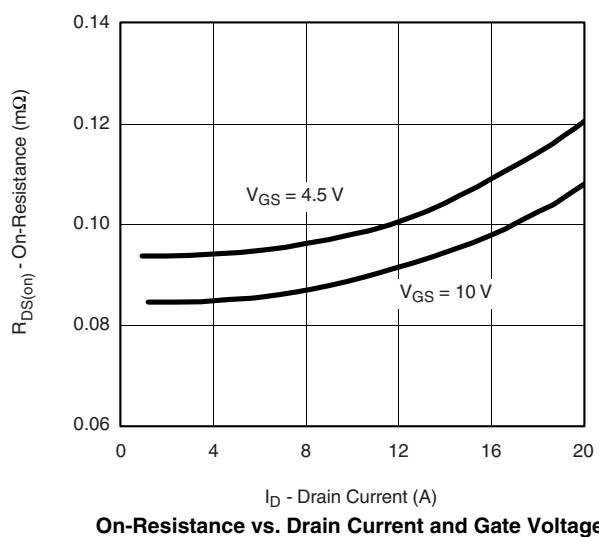
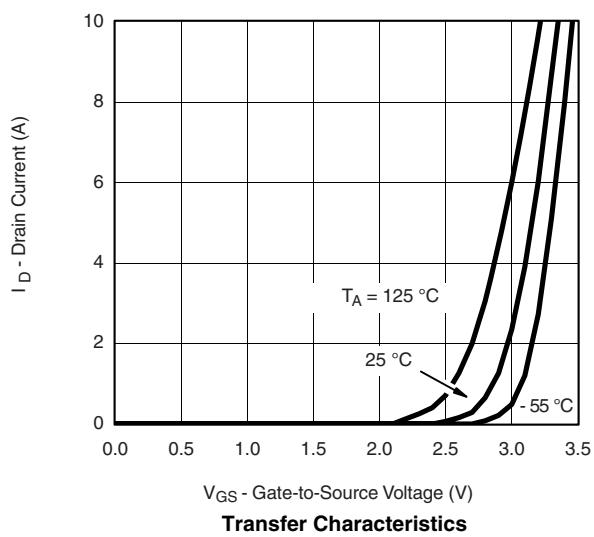
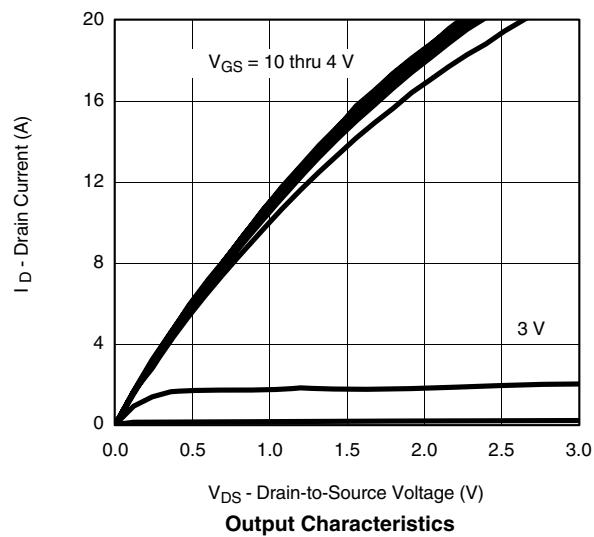
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

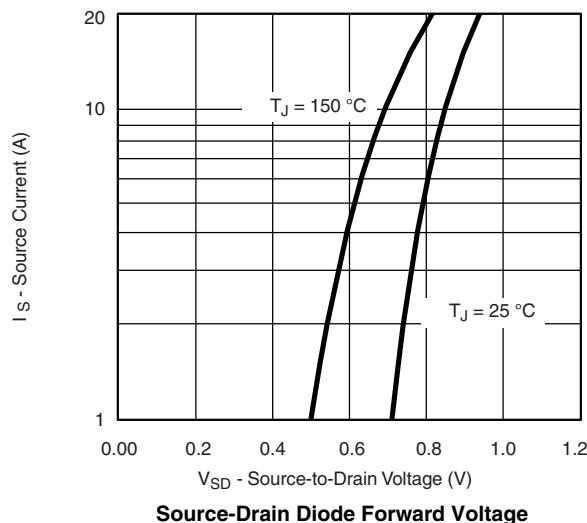
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	125			V	
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		155		mV/°C	
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			- 5.9			
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1.0	2.2	3.0	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}	$V_{DS} = 125 \text{ V}$, $V_{GS} = 0 \text{ V}$			1	μA	
		$V_{DS} = 125 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			10		
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	20			A	
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 3.9 \text{ A}$		0.089	0.108	Ω	
		$V_{GS} = 4.5 \text{ V}$, $I_D = 3.8 \text{ A}$		0.094	0.115		
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 3.9 \text{ A}$		22		S	
Dynamic^b							
Input Capacitance	C_{iss}	$V_{DS} = 60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$		890		pF	
Output Capacitance	C_{oss}			61			
Reverse Transfer Capacitance	C_{rss}			28			
Total Gate Charge	Q_g	$V_{DS} = 63 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 3.9 \text{ A}$		18.5	28	nC	
Gate-Source Charge	Q_{gs}	$V_{DS} = 63 \text{ V}$, $V_{GS} = 4.5 \text{ V}$, $I_D = 3.9 \text{ A}$		9.1	14		
Gate-Drain Charge	Q_{gd}			4			
Gate Resistance	R_g		$f = 1 \text{ MHz}$	0.5	1	1.5	Ω
Turn-On Delay Time	$t_{d(\text{on})}$			15	25	ns	
Rise Time	t_r	$V_{DD} = 63 \text{ V}$, $R_L = 20 \Omega$ $I_D \geq 3.1 \text{ A}$, $V_{GEN} = 4.5 \text{ V}$, $R_g = 1 \Omega$		70	105		
Turn-Off Delay Time	$t_{d(\text{off})}$			17	25		
Fall Time	t_f			25	40		
Turn-On Delay Time	$t_{d(\text{on})}$			10	15		
Rise Time	t_r			12	20		
Turn-Off Delay Time	$t_{d(\text{off})}$			20	30		
Fall Time	t_f			10	15		
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			18	A	
Pulse Diode Forward Current ^a	I_{SM}				20		
Body Diode Voltage	V_{SD}	$I_S = 3.1 \text{ A}$		0.8	1.2	V	
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 3.1 \text{ A}$, $dI/dt = 100 \text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$		50	75	ns	
Body Diode Reverse Recovery Charge	Q_{rr}			150	225	nC	
Reverse Recovery Fall Time	t_a			46		ns	
Reverse Recovery Rise Time	t_b			4			

Notes:

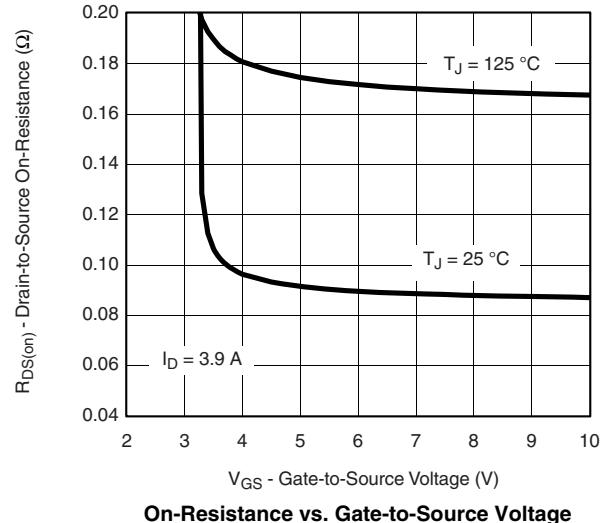
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2 \%$.
b. Guaranteed by design, not subject to production testing.

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.

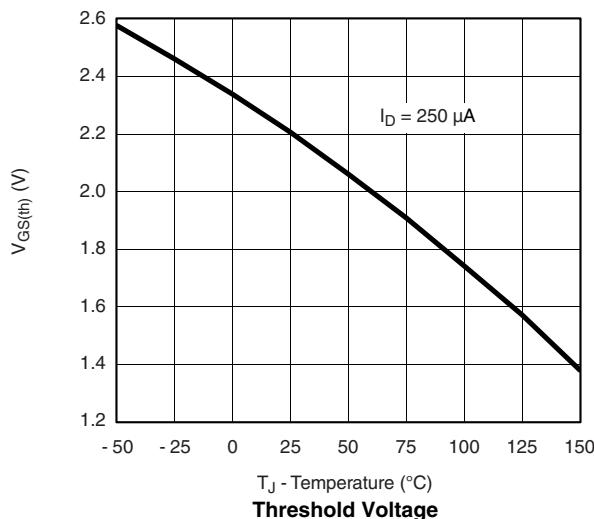
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

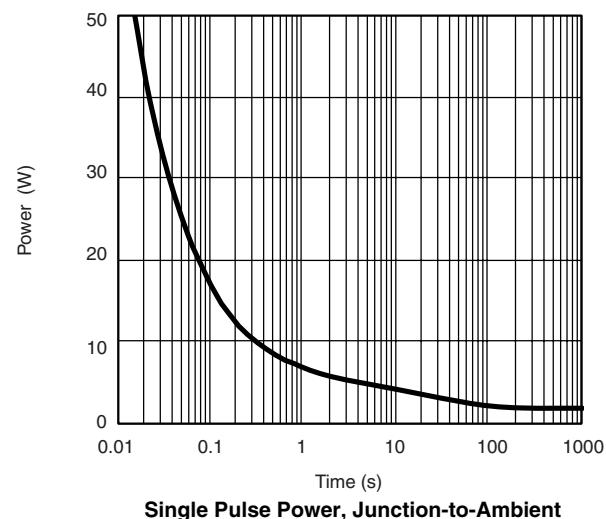
Source-Drain Diode Forward Voltage



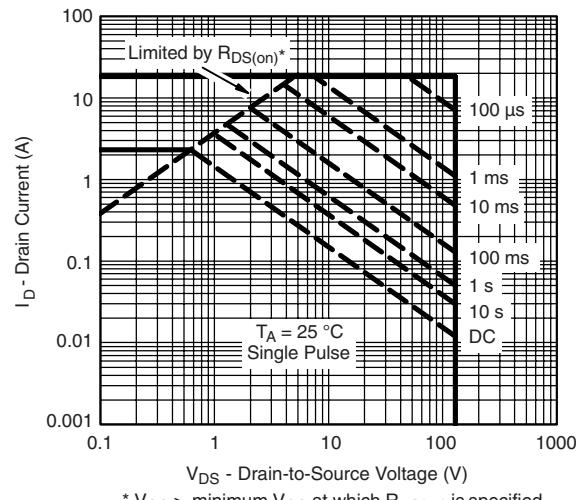
On-Resistance vs. Gate-to-Source Voltage



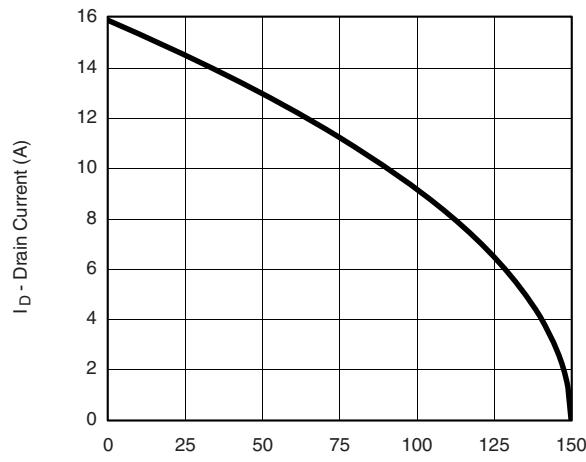
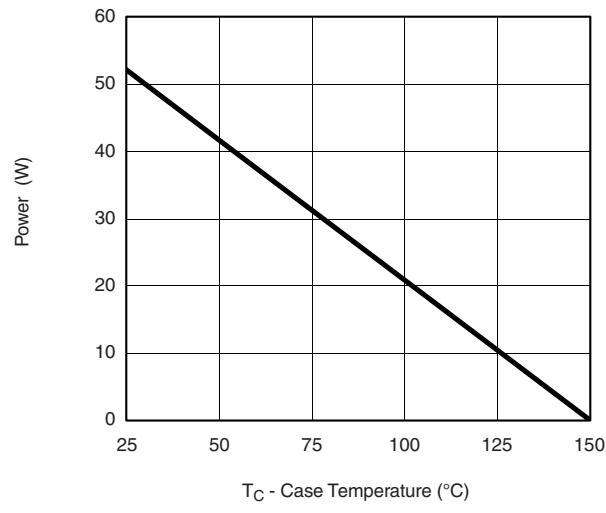
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

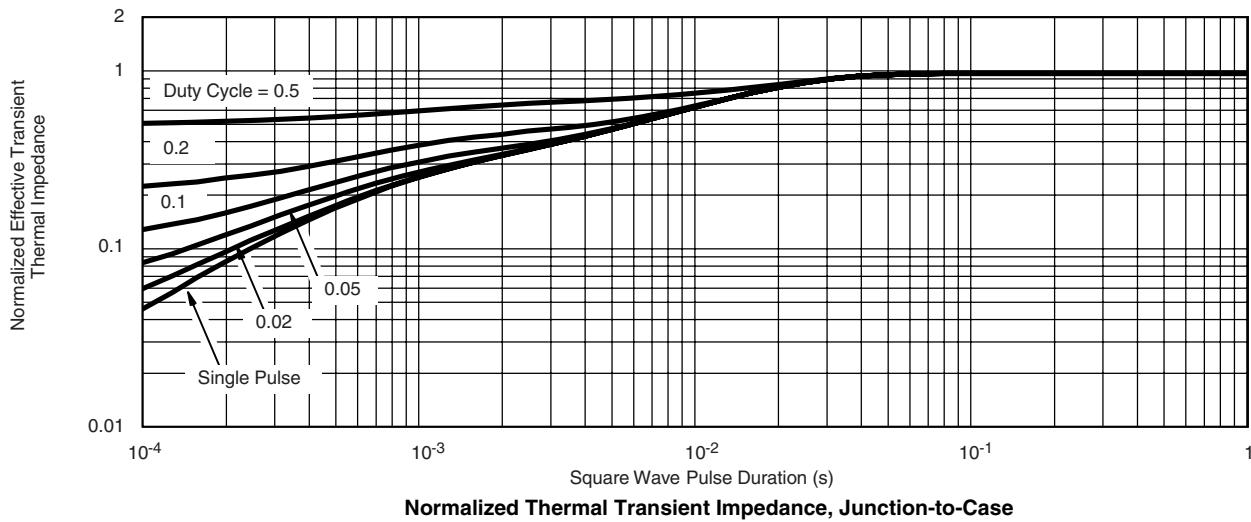
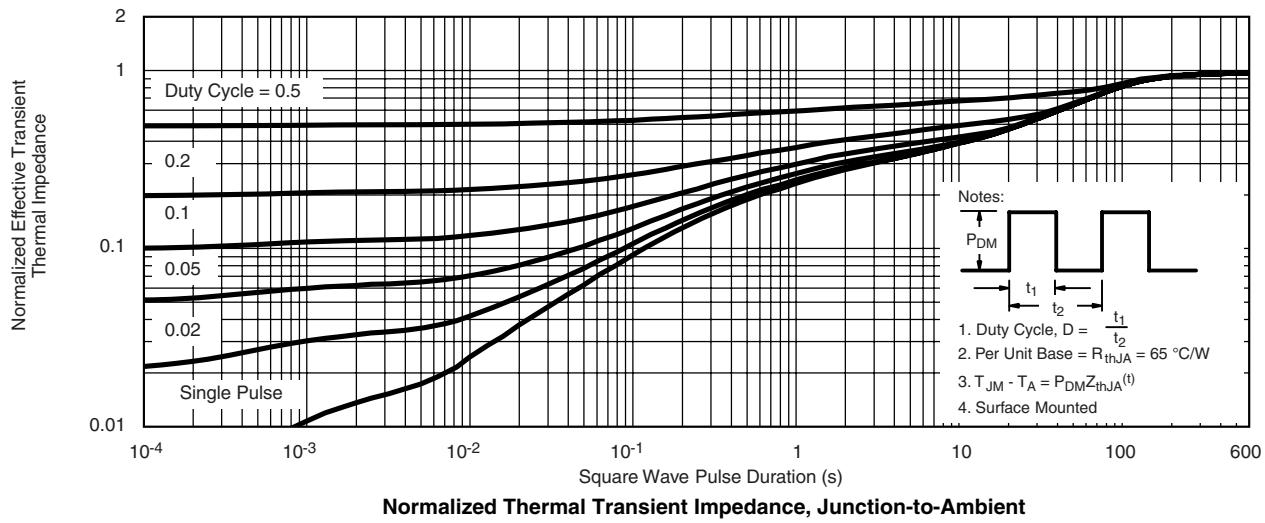


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

T_C - Case Temperature (°C)
Current Derating*

T_C - Case Temperature (°C)
Power Derating

* 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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