

N-Channel 150-V (D-S) MOSFET

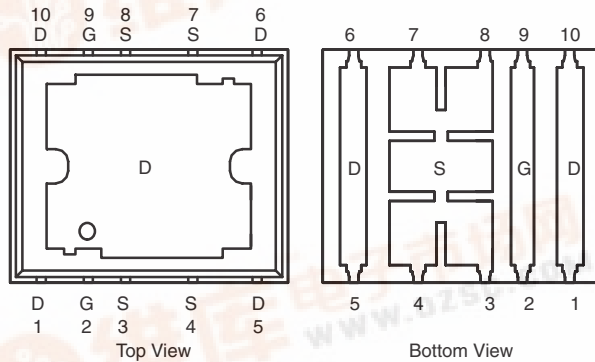
PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a	Q_g (Typ.)
150	0.038 at $V_{GS} = 10$ V	37	46 nC
	0.040 at $V_{GS} = 6$ V	36	

Package Drawing

www.vishay.com/doc?64713

PolarPAK



Top surface is connected to pins 1, 5, 6, and 10

Ordering Information: SiE804DF-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

- Halogen-free According to IEC 61249-2-21
- TrenchFET[®] Power MOSFET
- Ultra Low Thermal Resistance Using Top-Exposed PolarPAK[®] Package for Double-Sided Cooling
- Leadframe-Based New Encapsulated Package
 - Die Not Exposed
 - Same Layout Regardless of Die Size, > 100 V
- 100 % R_g and UIS Tested

RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Primary Side Switch
- Half-Bridge



N-Channel MOSFET

For Related Documents
www.vishay.com/ppg?69091ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	37
		$T_C = 70^\circ\text{C}$	29
		$T_A = 25^\circ\text{C}$	7.5 ^{b, c}
		$T_A = 70^\circ\text{C}$	6 ^{b, c}
Pulsed Drain Current	I_{DM}	50	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$	37
		$T_A = 25^\circ\text{C}$	4.3 ^{b, c}
Single Pulse Avalanche Current	I_{AS}	25	
Single Pulse Avalanche Energy	E_{AS}	62	mJ
Maximum Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	125
		$T_C = 70^\circ\text{C}$	80
		$T_A = 25^\circ\text{C}$	5.2 ^{b, c}
		$T_A = 70^\circ\text{C}$	3.3 ^{b, c}
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

Notes:

- $T_C = 25^\circ\text{C}$.
- Surface Mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- See Solder Profile (www.vishay.com/doc?73257). The PolarPAK 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.
- Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.



THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	20	24	°C/W
Maximum Junction-to-Case (Drain Top)	Steady State	R_{thJC} (Drain)	0.8	1	
Maximum Junction-to-Case (Source) ^{a, c}		R_{thJC} (Source)	2.2	2.7	

Notes:

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

b. Maximum under Steady State conditions is 68 °C/W.

c. Measured at source pin (on the side of the package).

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	150			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250$ μ A		175		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 7		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	1		3	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 150$ V, $V_{GS} = 0$ V			1	μ A
		$V_{DS} = 150$ V, $V_{GS} = 0$ V, $T_J = 55$ °C			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 10$ V	25			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 7.6$ A		0.031	0.038	Ω
		$V_{GS} = 6$ V, $I_D = 7.4$ A		0.032	0.040	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15$ V, $I_D = 7.6$ A		40		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 50$ V, $V_{GS} = 0$ V, $f = 1$ MHz		3000		pF
Output Capacitance	C_{oss}			210		
Reverse Transfer Capacitance	C_{rss}			110		
Total Gate Charge	Q_g	$V_{DS} = 50$ V, $V_{GS} = 10$ V, $I_D = 7.6$ A		70	105	nC
Gate-Source Charge	Q_{gs}	$V_{DS} = 50$ V, $V_{GS} = 6$ V, $I_D = 7.6$ A		46	70	
Gate-Drain Charge	Q_{gd}			11		
Gate Resistance	R_g	$f = 1$ MHz		19		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 75$ V, $R_L = 12.5$ Ω $I_D \cong 6$ A, $V_{GEN} = 6$ V, $R_g = 1$ Ω		2.1	4.2	Ω
Rise Time	t_r			20	30	
Turn-Off Delay Time	$t_{d(off)}$			15	25	
Fall Time	t_f			40	60	
Switching Time	t_f	$V_{DD} = 75$ V, $R_L = 12.5$ Ω $I_D \cong 6$ A, $V_{GEN} = 10$ V, $R_g = 1$ Ω		12	20	ns
	$t_{d(on)}$			15	25	
	t_r			10	15	
	$t_{d(off)}$			42	65	
	t_f			10	15	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C			37	A
Pulse Diode Forward Current ^a	I_{SM}				25	
Body Diode Voltage	V_{SD}	$I_S = 6$ A		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 6$ A, $dI/dt = 100$ A/ μ s, $T_J = 25$ °C		70	110	ns
Body Diode Reverse Recovery Charge	Q_{rr}			220	330	nC
Reverse Recovery Fall Time	t_a			54		ns
Reverse Recovery Rise Time	t_b			16		

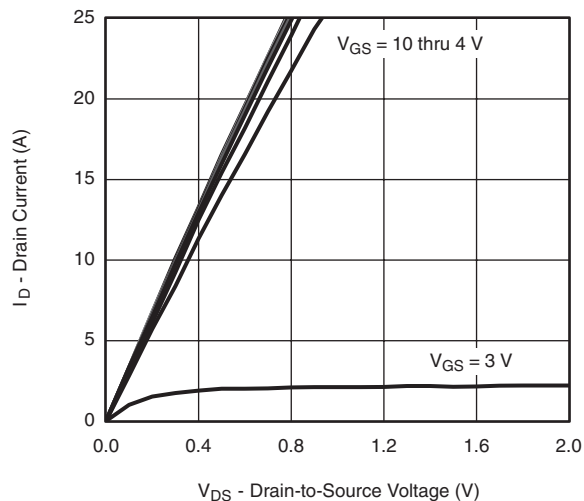
Notes:

a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %

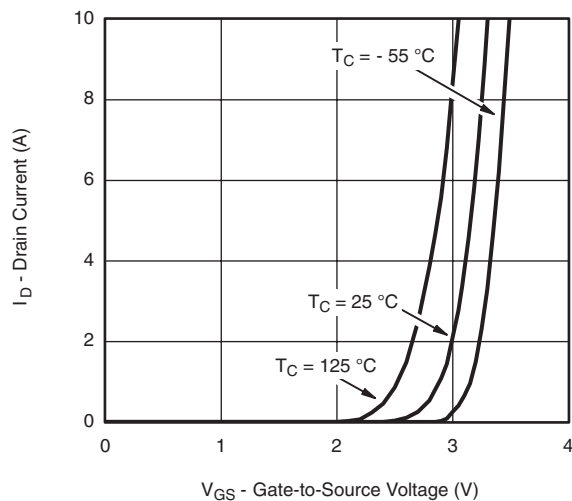
b. Guaranteed by design, not subject to production testing.

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.

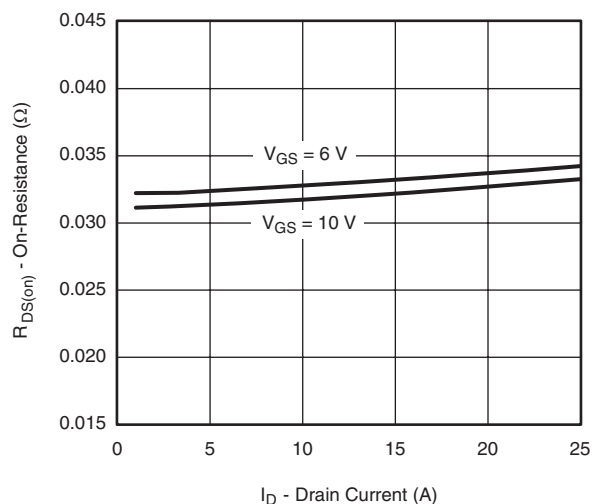
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



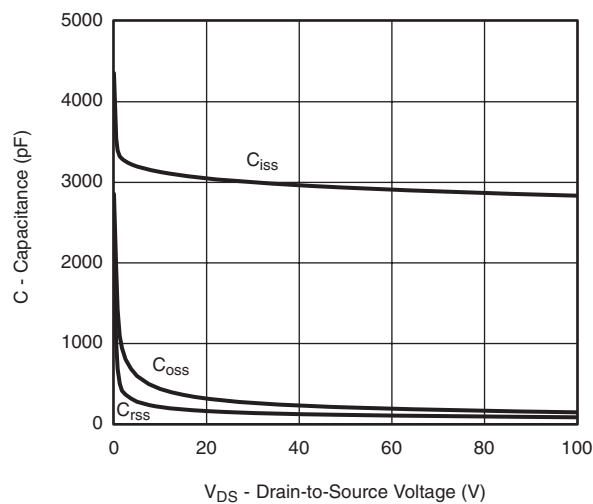
Output Characteristics



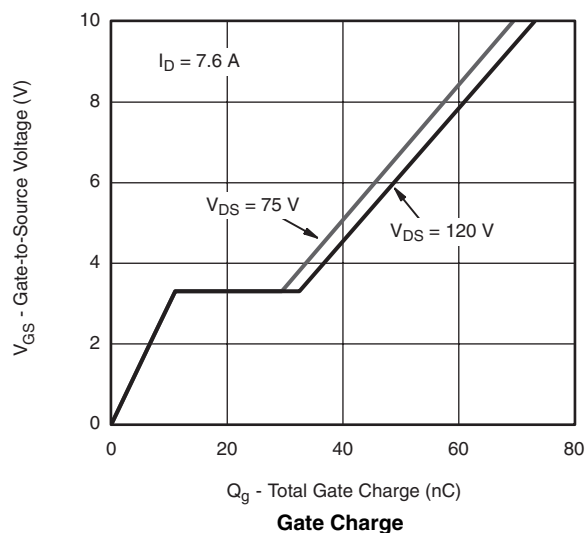
Transfer Characteristics



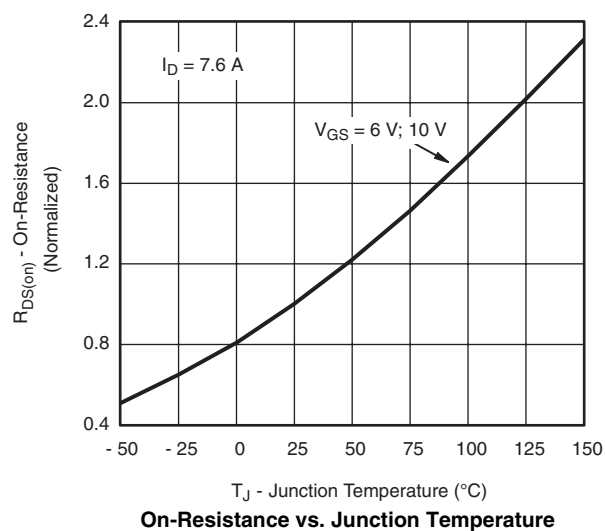
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



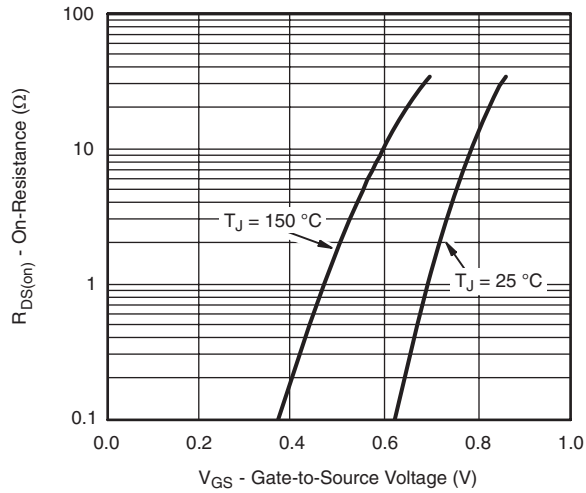
Gate Charge



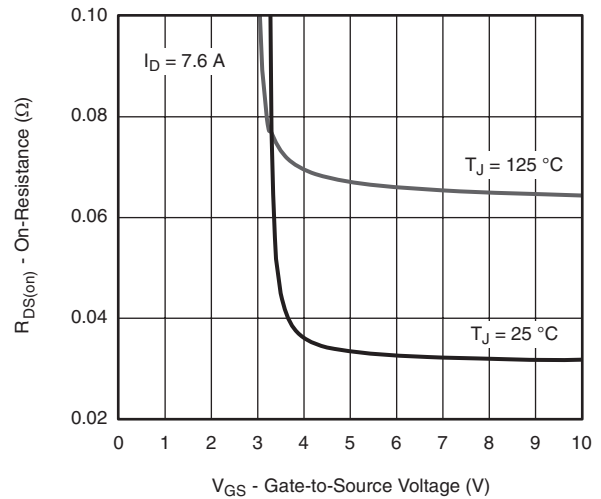
On-Resistance vs. Junction Temperature

SiE804DF

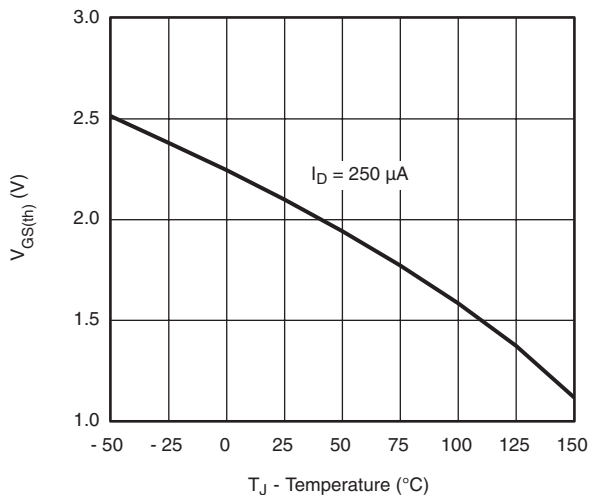
Vishay Siliconix 供应商

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

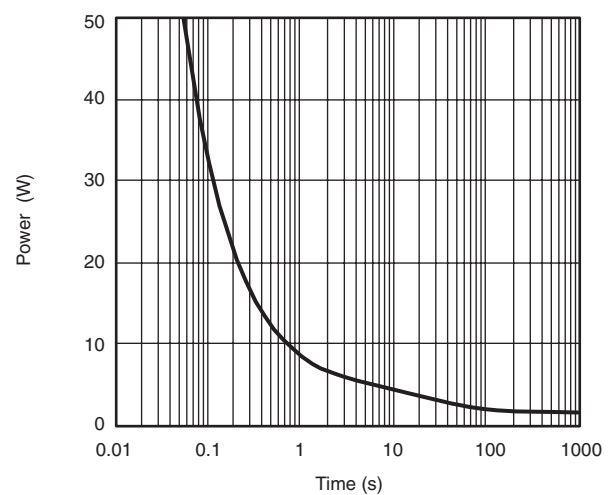
Source-Drain Diode Forward Voltage



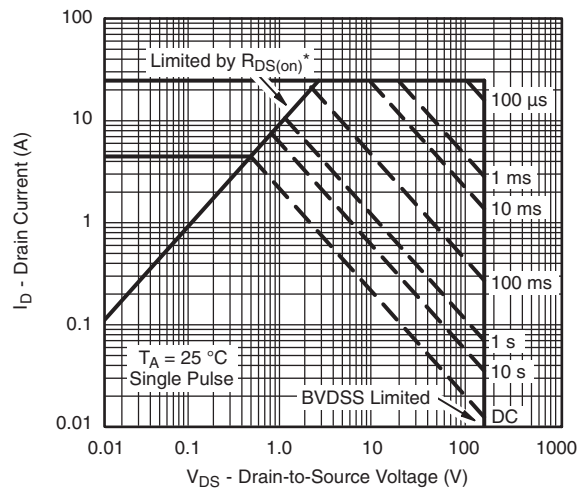
On-Resistance vs. Gate-to-Source Voltage



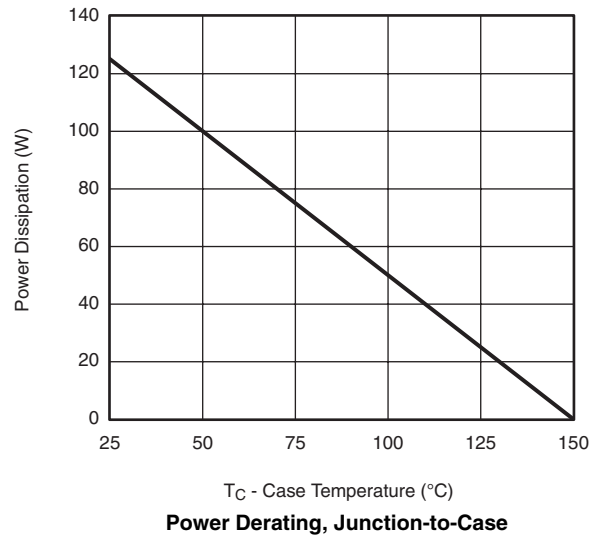
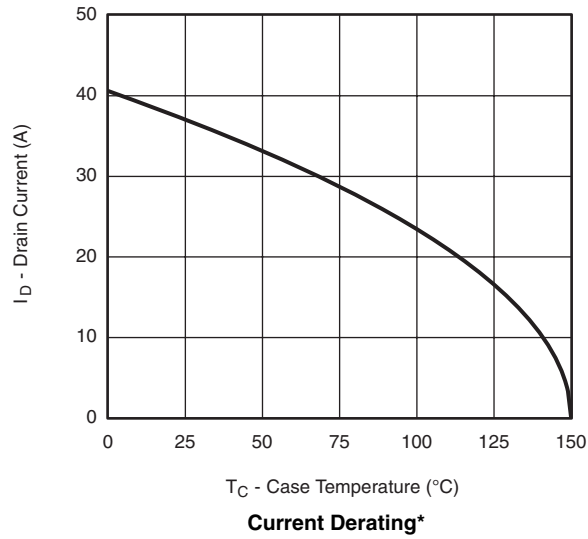
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

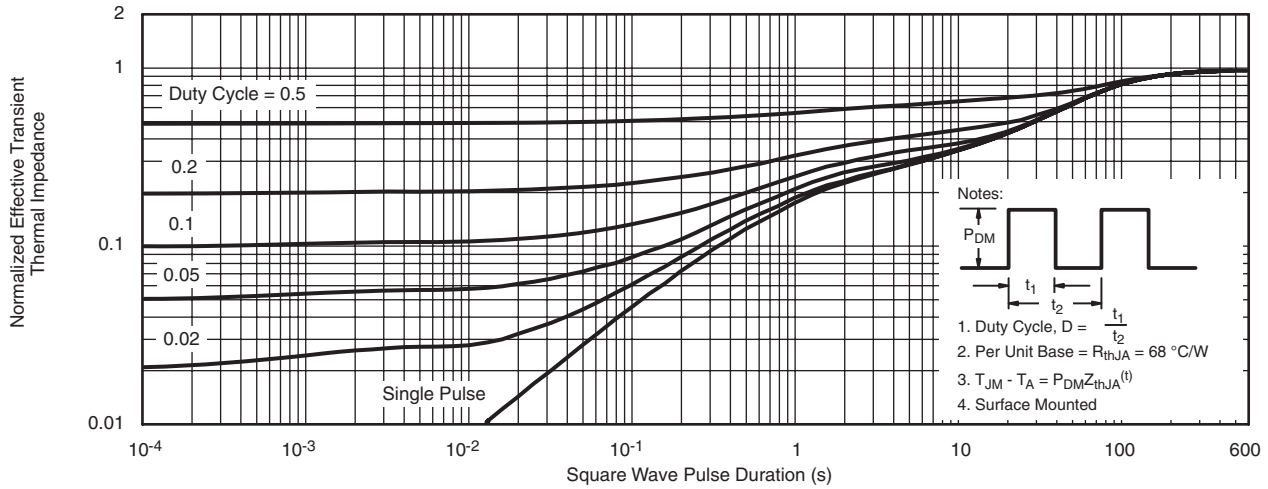
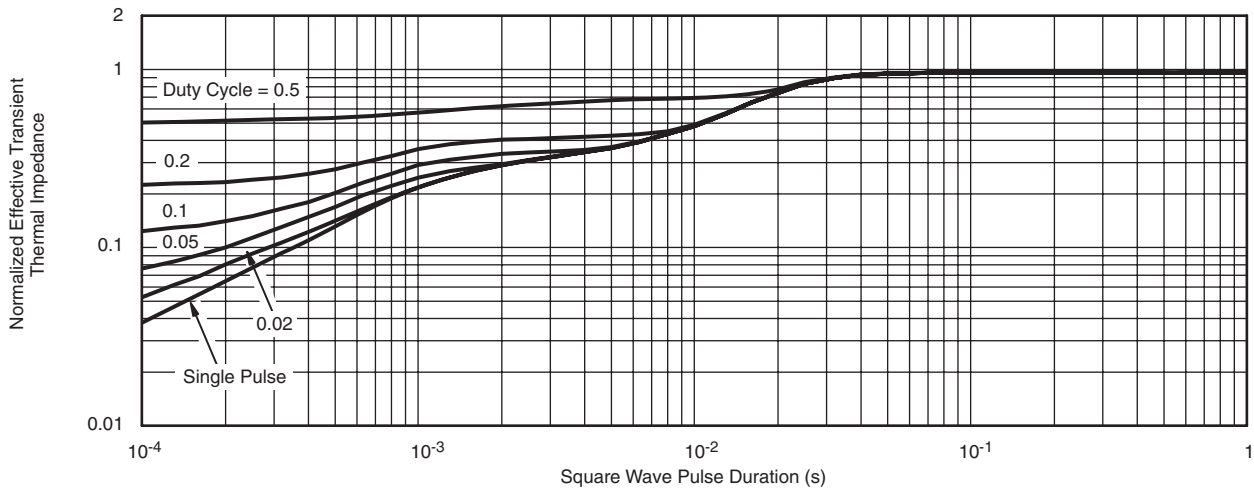
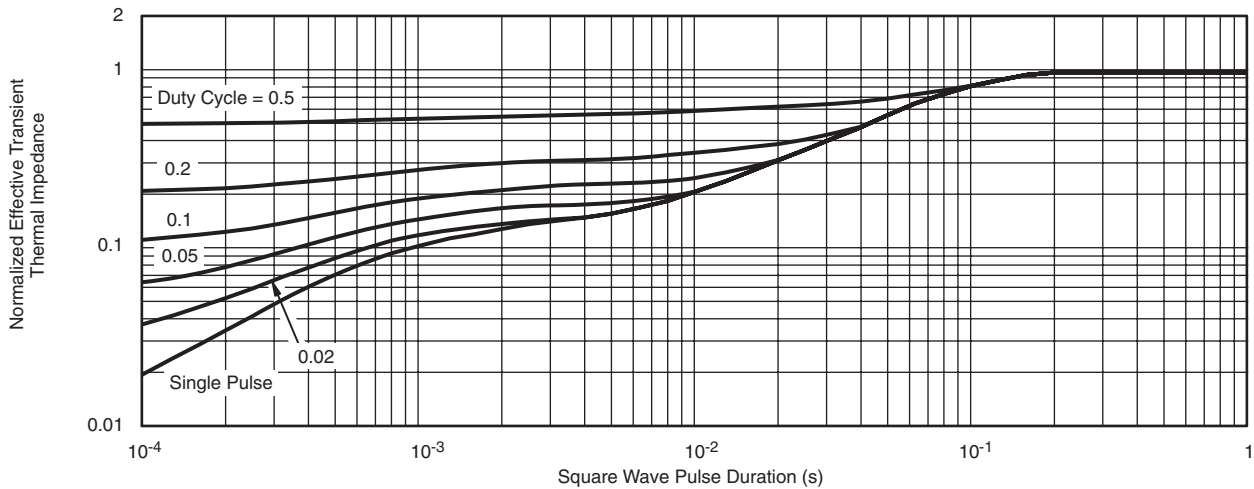
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


* 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.

SiE804DF

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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 (Drain Top)****Normalized Thermal Transient Impedance, Junction-to-Source**

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