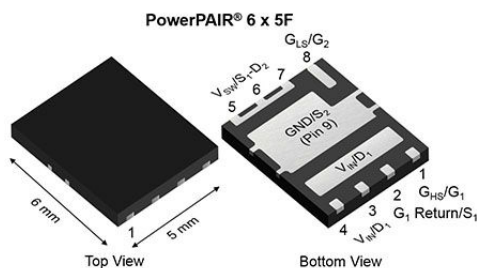


Dual N-Channel 30 V (D-S) MOSFET With Schottky Diode



PRODUCT SUMMARY		
	CHANNEL-1	CHANNEL-2
V_{DS} (V)	30	30
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.0033	0.0014
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.0053	0.0023
Q_g typ. (nC)	9	24
I_D (A) ^a	73	158
Configuration	Dual	

FEATURES

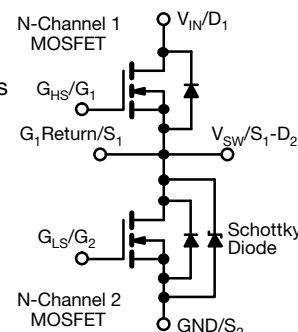
- TrenchFET[®] Gen IV power MOSFET
- SkyFET[®] low side MOSFET with integrated Schottky
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- CPU core power
- Computer / server peripherals
- POL
- Synchronous buck converter
- Telecom DC/DC



ORDERING INFORMATION	
Package	PowerPAIR [®] 6 x 5F
Lead (Pb)-free and halogen-free	SiZF918BDT-T1-GE3

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)					
PARAMETER		SYMBOL	CHANNEL-1	CHANNEL-2	UNIT
Drain-source voltage		V _{DS}	30	30	V
Gate-source voltage		V _{GS}	+20, -16	+16, -12	
Continuous drain current (T _J = 150 °C)	T _C = 25 °C	I _D	73	158	A
	T _C = 70 °C		59	127	
	T _A = 25 °C		25 ^{b, c}	41 ^{b, c}	
	T _A = 70 °C		20 ^{b, c}	33 ^{b, c}	
Pulsed drain current (t = 100 μs)		I _{DM}	210	280	
Continuous source-drain diode current	T _C = 25 °C	I _S	24	54	
	T _A = 25 °C		3.1 ^{b, c}	3.7 ^{b, c}	
Single pulse avalanche current	L = 0.1 mH	I _{AS}	20	26	
Single pulse avalanche energy		E _{AS}	20	34	
Maximum power dissipation	T _C = 25 °C	P _D	26.6	60	W
	T _C = 70 °C		17	38	
	T _A = 25 °C		3.4 ^{b, c}	4 ^{b, c}	
	T _A = 70 °C		2.2 ^{b, c}	2.6 ^{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	CHANNEL-1		CHANNEL-2		UNIT
			TYP.	MAX.	TYP.	MAX.	
Maximum junction-to-ambient ^{b, f}	$t \leq 10$ s	R_{thJA}	30	37	25	31	°C/W
Maximum junction-to-case (source)	Steady state	R_{thJC}	3.8	4.7	1.7	2.1	

Notes

- $T_C = 25$ °C
- Surface mounted on 1" x 1" FR4 board
- $t = 10$ s
- See solder profile (www.vishay.com/doc?73257). The PowerPAIR 6 x 5F 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
- Maximum under steady state conditions is 77 °C/W for channel-1 and 68 °C/W for channel-2



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 μA	Ch-1	30	-	-	V	
		V _{GS} = 0 V, I _D = 5 mA	Ch-2	30	-	-		
Drain-source breakdown voltage (transient) ^c	V _{DS(t)}	V _{GS} = 0 V, t _(transient) = ≤ 1 μs	Ch-1	36	-	-		
			Ch-2	36	-	-		
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	Ch-1	1.1	-	2.2		
			Ch-2	1.1	-	2.2		
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = +20 V, -16 V	Ch-1	-	-	± 100	nA	
		V _{DS} = 0 V, V _{GS} = +16 V, -12 V	Ch-2	-	-	± 100		
Zero Gate voltage drain current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	Ch-1	-	-	1	μA	
			Ch-2	-	100	1000		
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C	Ch-1	-	-	5		
			Ch-2	-	500	5000		
Drain-source on-state resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 10 A	Ch-1	-	0.0023	0.0033	Ω	
		V _{GS} = 10 V, I _D = 15 A	Ch-2	-	0.00092	0.0014		
		V _{GS} = 4.5 V, I _D = 10 A	Ch-1	-	0.0036	0.0053		
		V _{GS} = 4.5 V, I _D = 10 A	Ch-2	-	0.0015	0.0023		
Forward transconductance ^b	g _{fs}	V _{DS} = 10 V, I _D = 40 A	Ch-1	-	80	-	S	
		V _{DS} = 10 V, I _D = 40 A	Ch-2		140	-		
Dynamic ^a								
Input capacitance	C _{iss}	Channel-1 V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz Channel-2 V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz	Ch-1	-	1290	-	pF	
Output capacitance	C _{oss}		Ch-2	-	3350	-		
			Ch-1	-	510	-		
Reverse transfer capacitance	C _{rss}		Ch-2	-	1890	-		
			Ch-1	-	41	-		
C _{rss} /C _{iss} ratio			Ch-2	-	71	-		
			Ch-1	-	0.032	0.064		
			Ch-2		0.021	0.042		
Total gate charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 10 A	Ch-1	-	19	29	nC	
		V _{DS} = 15 V, V _{GS} = 10 V, I _D = 10 A	Ch-2	-	51	77		
		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 10 A	Ch-1		9	13.5		
		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 10 A	Ch-2	-	24	36		
Gate-source charge	Q _{gs}	Channel-1 V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 10 A	Ch-1	-	4.2	-		
			Ch-2	-	10.3	-		
Gate-drain charge	Q _{gd}	Channel-2 V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 10 A	Ch-1	-	2.2	-		
			Ch-2	-	6	-		
Output charge	Q _{oss}	V _{DS} = 15 V, V _{GS} = 0 V	Ch-1	-	14	-		
			Ch-2	-	51	-		
Gate resistance	R _g	f = 1 MHz	Ch-1	0.2	1	2	Ω	
			Ch-2	0.1	0.5	1		
Turn-on delay time	t _{d(on)}	Channel-1 V _{DD} = 15 V, R _L = 3 Ω I _D ≅ 5 A, V _{GEN} = 4.5 V, R _g = 1 Ω Channel-2 V _{DD} = 15 V, R _L = 3 Ω I _D ≅ 5 A, V _{GEN} = 4.5 V, R _g = 1 Ω	Ch-1	-	19	40	ns	
Rise time	t _r		Ch-2	-	28	60		
			Ch-1	-	50	100		
			Ch-2	-	61	120		
Turn-off delay time	t _{d(off)}		Ch-1	-	20	40		
			Ch-2	-	37	70		
Fall time	t _f		Ch-1	-	10	20		
			Ch-2	-	15	30		



SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Dynamic ^a								
Turn-on delay time	t _{d(on)}	Channel-1 V _{DD} = 15 V, R _L = 3 Ω I _D ≡ 5 A, V _{GEN} = 10 V, R _g = 1 Ω	Ch-1	-	11	20	ns	
			Ch-2	-	15	30		
Rise time	t _r		Ch-1	-	5	10		
			Ch-2	-	6	15		
Turn-off delay time	t _{d(off)}	Channel-2 V _{DD} = 15 V, R _L = 3 Ω I _D ≡ 5 A, V _{GEN} = 10 V, R _g = 1 Ω	Ch-1	-	22	40		
			Ch-2	-	35	70		
Fall time	t _f		Ch-1	-	5	10		
			Ch-2	-	7	15		
Drain-Source Body Diode Characteristics								
Continuous source-drain diode current	I _S	T _C = 25 °C	Ch-1	-	-	24	A	
			Ch-2	-	-	60		
Pulse diode forward current ^a	I _{SM}		Ch-1	-	-	210		
			Ch-2	-	-	280		
Body diode voltage	V _{SD}	I _S = 5 A, V _{GS} = 0 V	Ch-1	-	0.8	1.1	V	
		I _S = 3 A, V _{GS} = 0 V	Ch-2	-	0.36	0.6		
Body diode reverse recovery time	t _{rr}	Channel-1 I _F = 10 A, di/dt = 100 A/μs, T _J = 25 °C Channel-2 I _F = 5 A, di/dt = 100 A/μs, T _J = 25 °C	Ch-1	-	22	45	ns	
			Ch-2	-	45	90		
Body diode reverse recovery charge	Q _{rr}		Ch-1	-	11	20	nC	
			Ch-2	-	55	110		
Reverse recovery fall time	t _a		Channel-2 I _F = 5 A, di/dt = 100 A/μs, T _J = 25 °C	Ch-1	-	12	-	ns
				Ch-2	-	26	-	
Reverse recovery rise time	t _b			Ch-1	-	10	-	
				Ch-2	-	19	-	

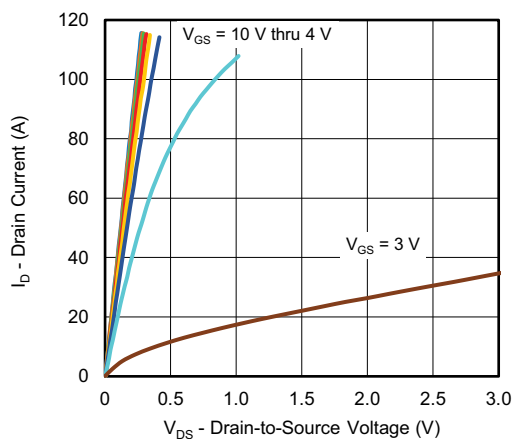
Notes

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

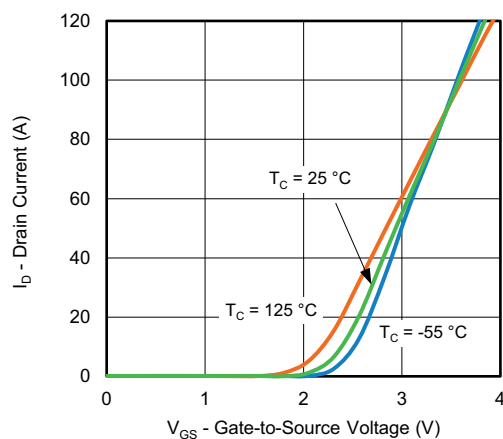
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



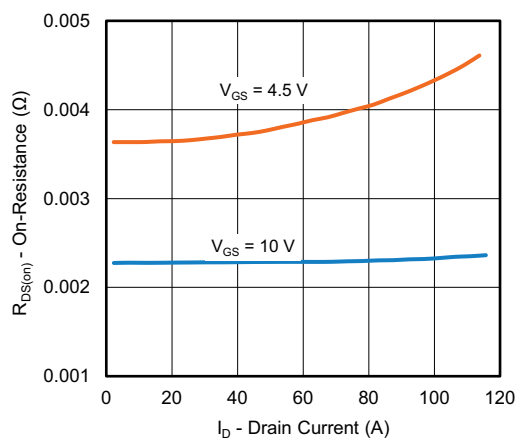
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



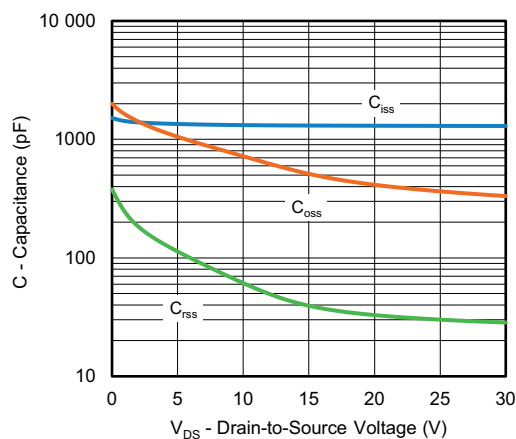
Output Characteristics



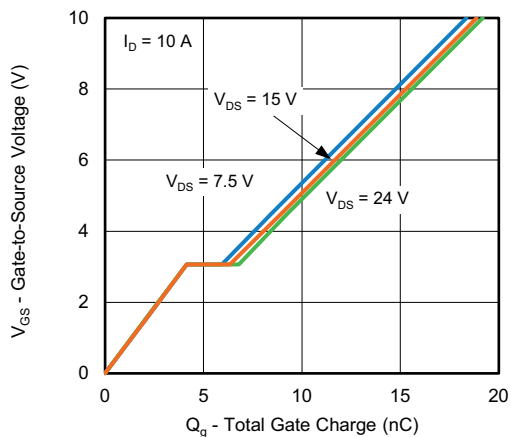
Transfer Characteristics



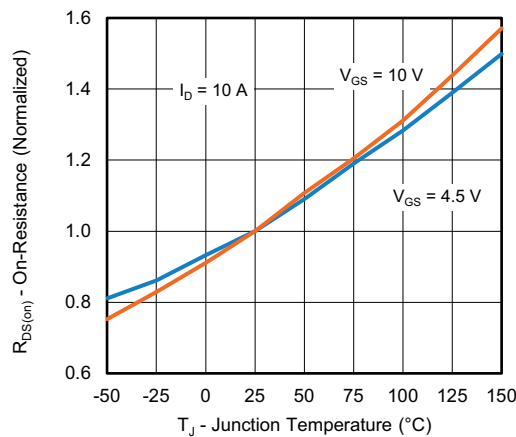
On-Resistance vs. Drain Current



Capacitance



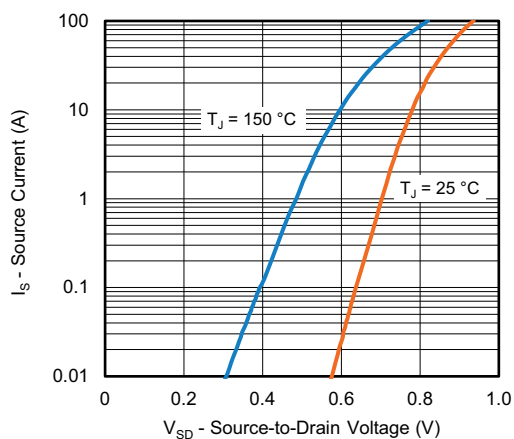
Gate Charge



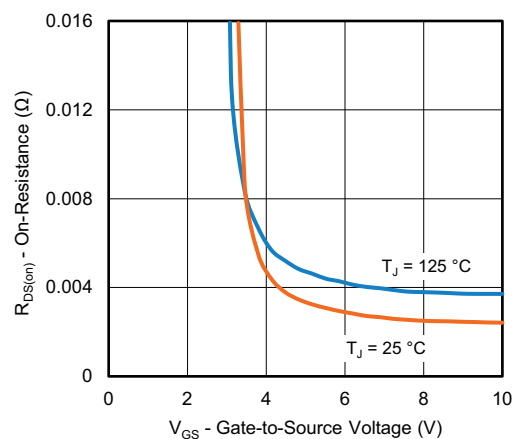
On-Resistance vs. Junction Temperature



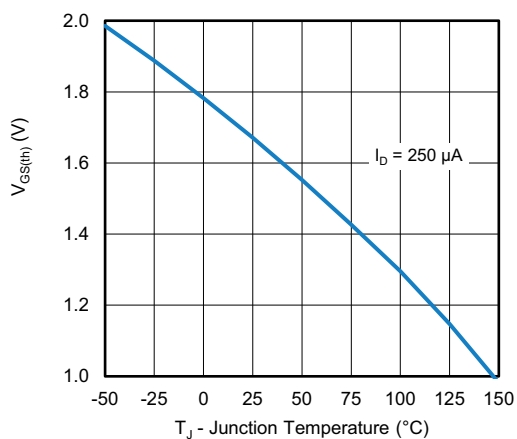
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



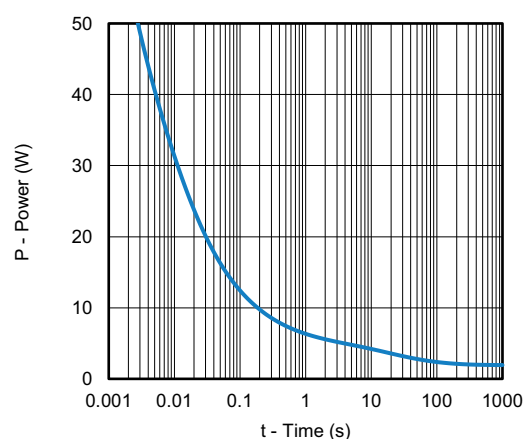
Source-Drain Diode Forward Voltage



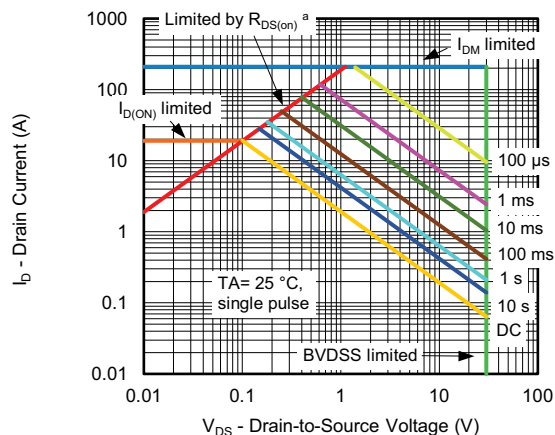
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



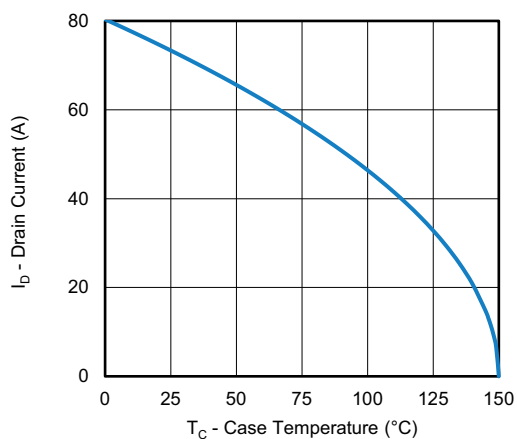
Single Pulse Power, Junction-to-Case



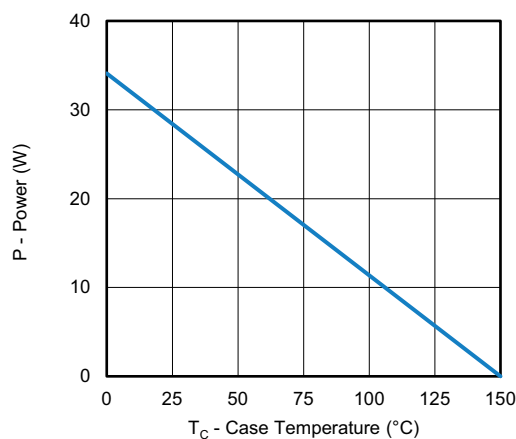
Safe Operating Area, Junction-to-Ambient



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



Current Derating ^a



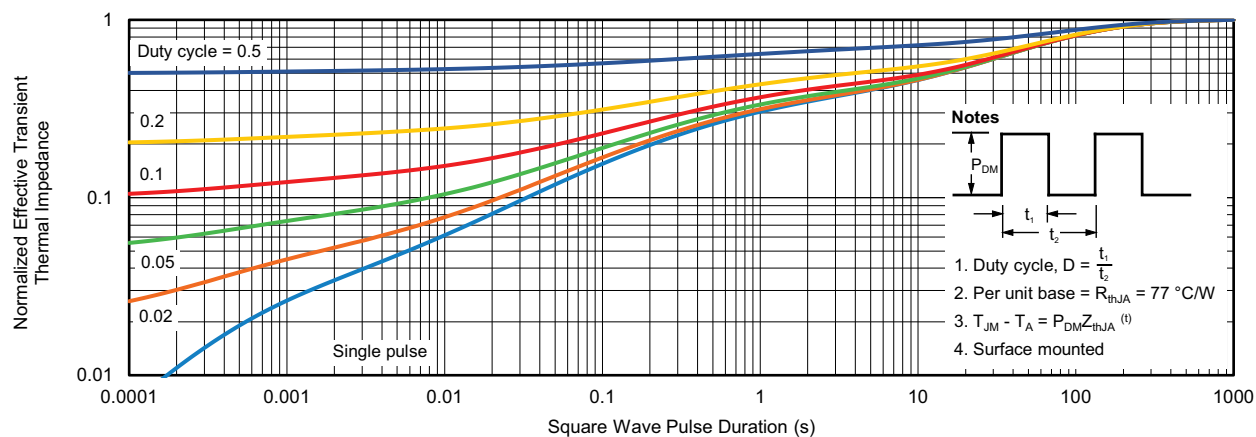
Power, Junction-to-Case

Note

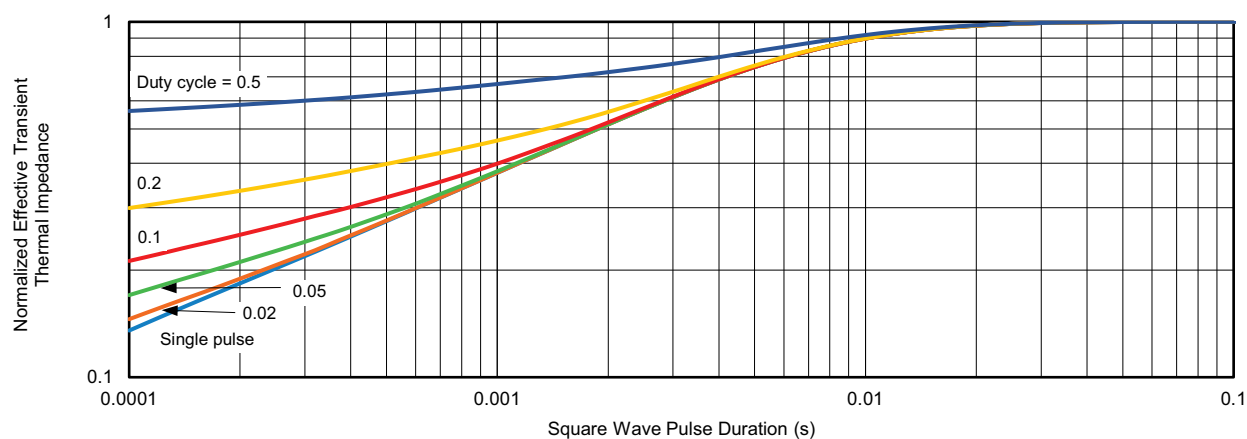
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



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



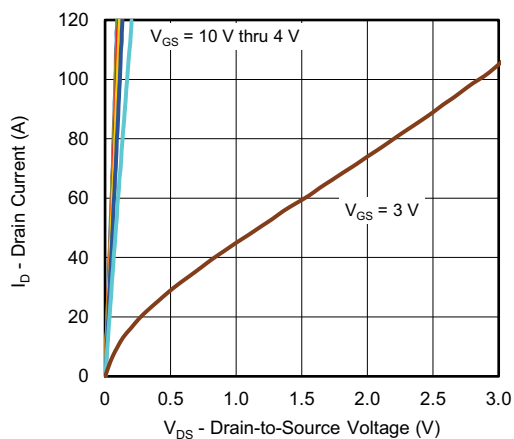
Normalized Thermal Transient Impedance, Junction-to-Ambient



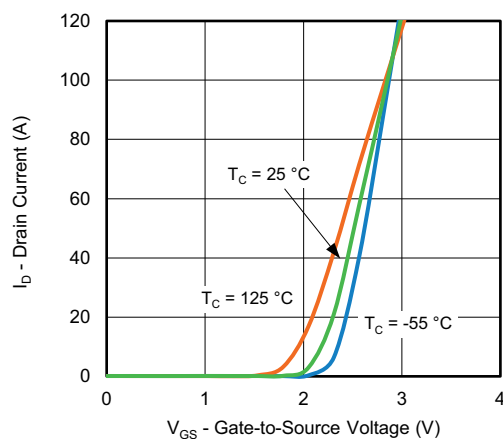
Normalized Thermal Transient Impedance, Junction-to-Case



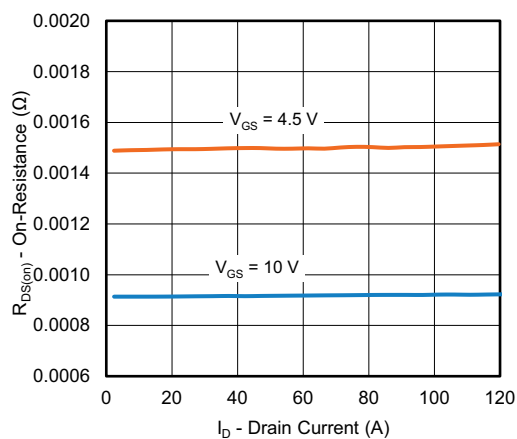
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



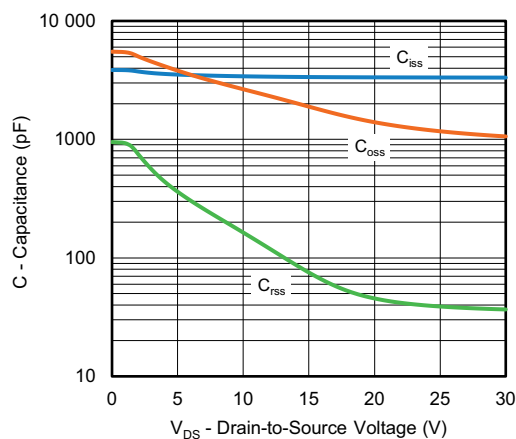
Output Characteristics



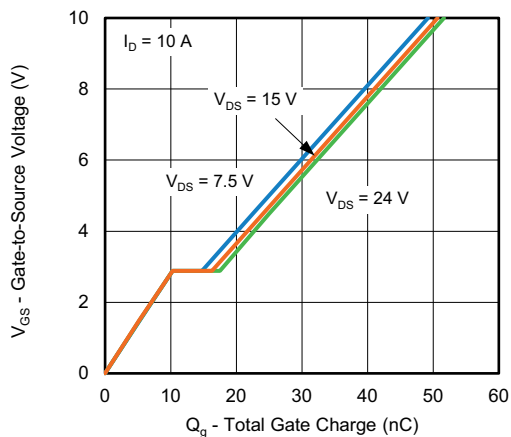
Transfer Characteristics



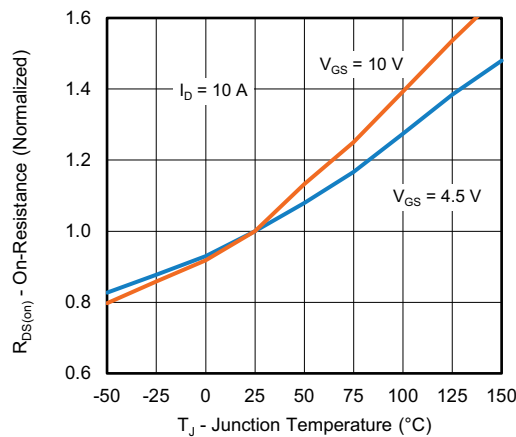
On-Resistance vs. Drain Current



Capacitance



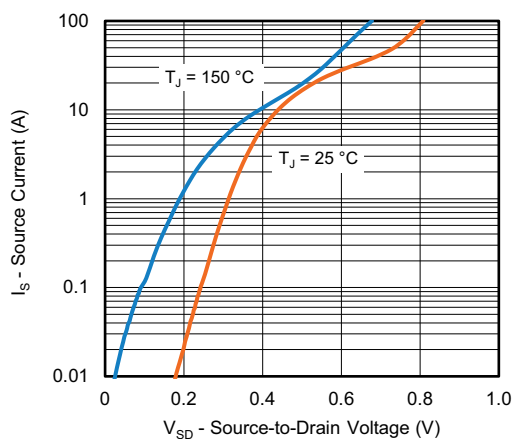
Gate Charge



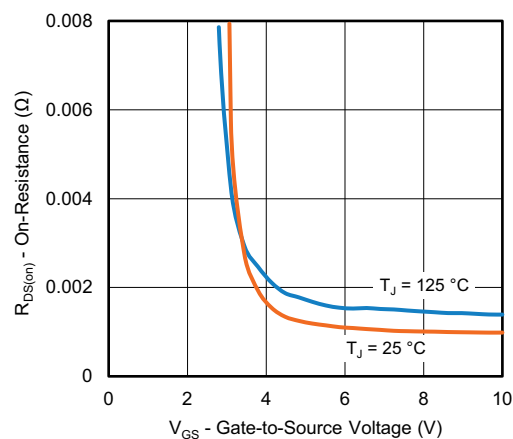
On-Resistance vs. Junction Temperature



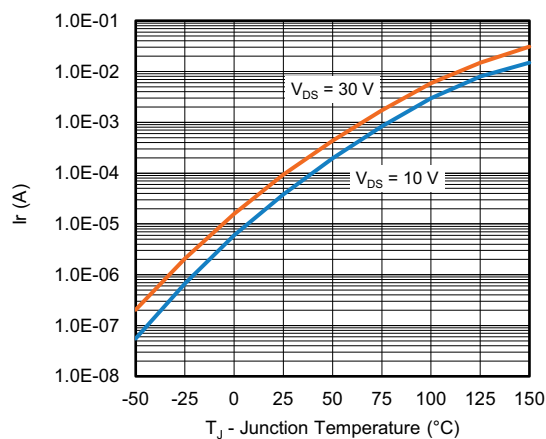
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



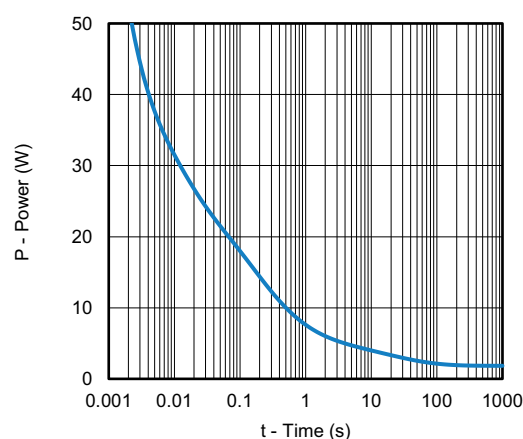
Source-Drain Diode Forward Voltage



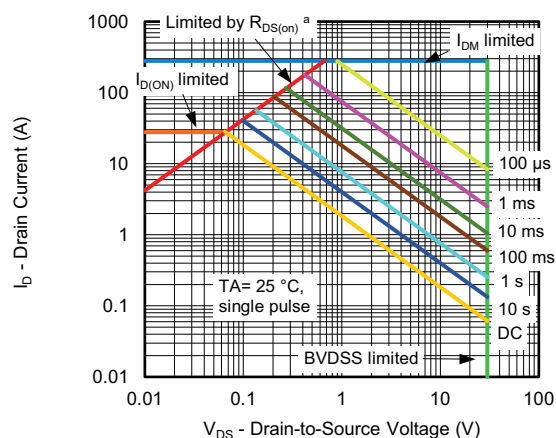
On-Resistance vs. Gate-to-Source Voltage



Reverse Current (Schottky)



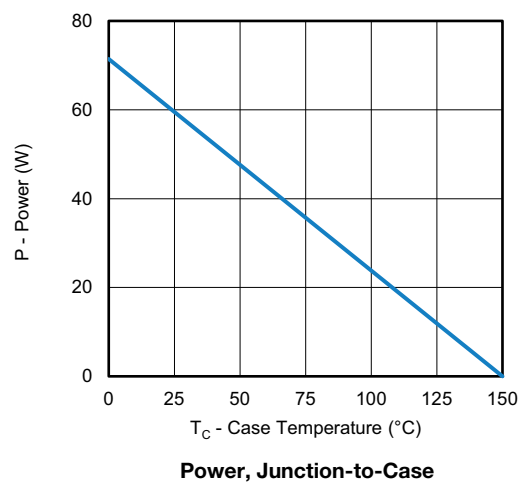
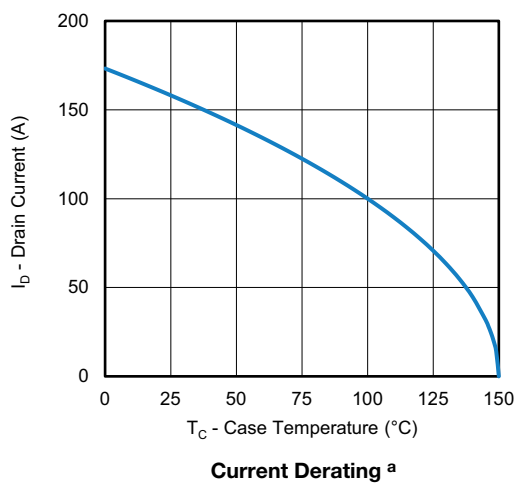
Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Ambient



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

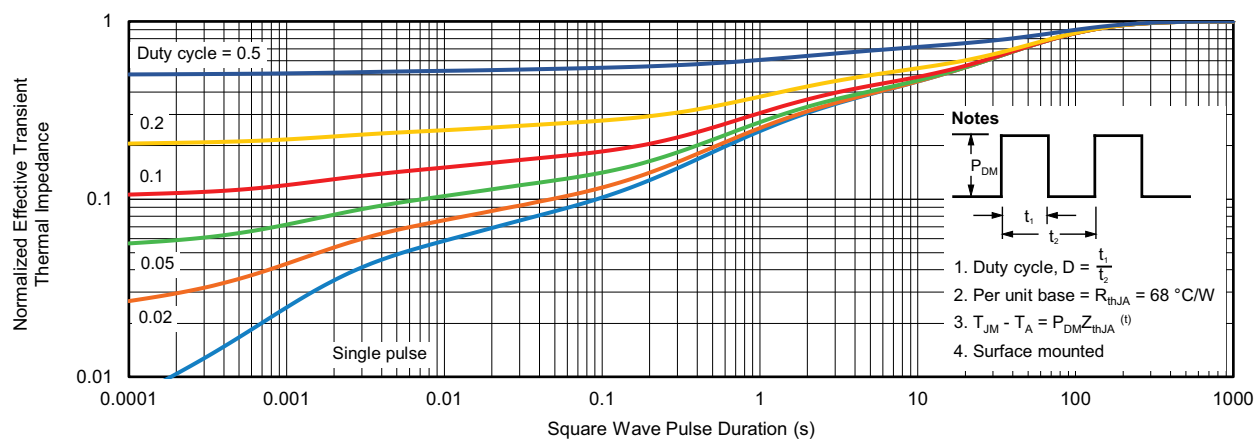


Note

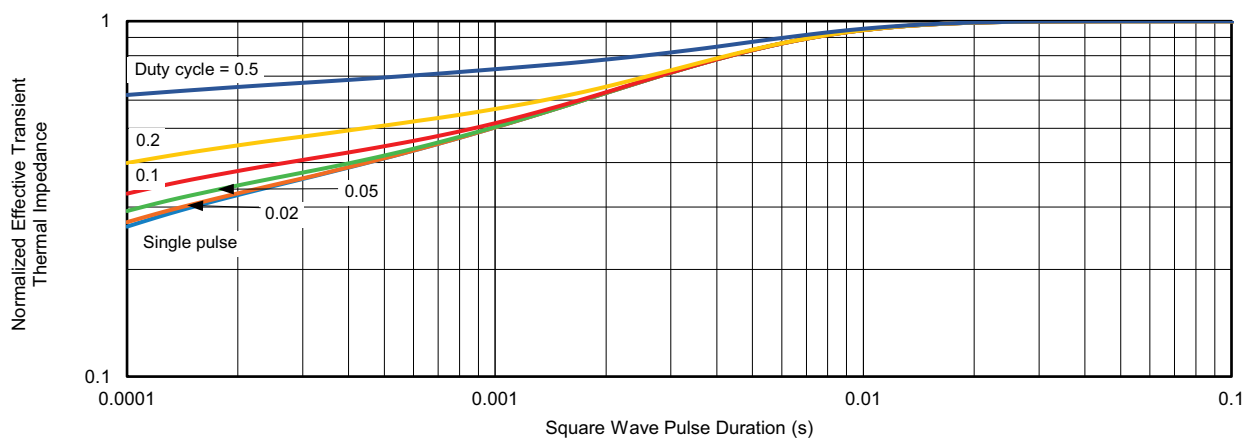
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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