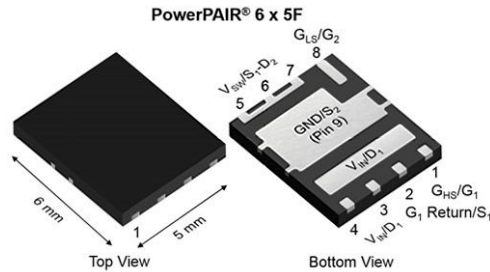


Dual N-Channel 30 V (D-S) MOSFET with Schottky Diode



FEATURES

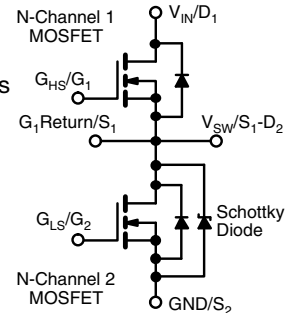
- TrenchFET® Gen IV power MOSFET
- SkyFET® low-side MOSFET with integrated Schottky
- 100 % R_{θ} and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

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



PRODUCT SUMMARY		
	CHANNEL-1	CHANNEL-2
V_{DS} (V)	30	30
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.00380	0.00117
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.00530	0.00158
Q_g typ. (nC)	11	46
I_D (A) ^a	60	60
Configuration	Dual	

ORDERING INFORMATION

Package	PowerPAIR 6 x 5F
Lead (Pb)-free and halogen-free	SiZF906ADT-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		V
Gate-source voltage	V_{GS}	+20, -16		V
Continuous drain current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	60 ^a	A
		$T_C = 70$ °C	60 ^a	
		$T_A = 25$ °C	27 ^{b, c}	
		$T_A = 70$ °C	21.7 ^{b, c}	
Pulsed drain current ($t = 100$ μ s)	I_{DM}	80	100	A
Continuous source-drain diode current	I_S	$T_C = 25$ °C	31.6	A
		$T_A = 25$ °C	3.7 ^{b, c}	
Single pulse avalanche current	I_{AS}	18	19	mJ
Single pulse avalanche energy	E_{AS}	16	18	
Maximum power dissipation	P_D	$T_C = 25$ °C	38	W
		$T_C = 70$ °C	24	
		$T_A = 25$ °C	4.5 ^{b, c}	
		$T_A = 70$ °C	2.9 ^{b, c}	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150		°C
Soldering recommendations (peak temperature) ^{d, e}		260		°C

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}	22	28	20	25	°C/W
Maximum junction-to-case (source)	Steady state	R_{thJC}	2.6	3.3	1.2	1.5	°C/W

Notes

- Package limited
- Surface mounted on 1" x 1" FR4 board
- $t = 10$ s
- See solder profile (www.vishay.com/doc?73257). The PowerPAIR 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 60 °C/W for channel-1 and 60 °C/W for channel-2



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}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	Ch-1	30	-	-	V		
			Ch-2	30	-	-			
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	Ch-1	1.1	-	2.2			
			Ch-2	1.1	-	2.2			
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = +20\text{ V}, -16\text{ V}$	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		
			Ch-2	-	50	250			
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	Ch-1	-	-	5			
			Ch-2	-	300	3000			
On-state drain current ^b	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	Ch-1	20	-	-	A		
			Ch-2	20	-	-			
Drain-source on-state resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$	Ch-1	-	0.00300	0.00380	Ω		
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	Ch-2	-	0.00090	0.00117			
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$	Ch-1	-	0.00400	0.00530			
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$	Ch-2	-	0.00120	0.00158			
Forward transconductance ^b	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 15\text{ A}$	Ch-1	-	130	-	S		
		$V_{DS} = 10\text{ V}, I_D = 20\text{ A}$	Ch-2	-	130	-			
Dynamic ^a									
Input capacitance	C_{iss}	Channel-1 $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	Ch-1	-	2000	-	μF		
			Ch-2	-	8200	-			
Output capacitance	C_{oss}		Ch-1	-	680	-			
			Ch-2	-	3700	-			
Reverse transfer capacitance	C_{rss}		Channel-2 $V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	Ch-1	-	50	-		
				Ch-2	-	260	-		
C_{rss}/C_{iss} ratio				Ch-1	-	0.025	0.050		
				Ch-2	-	0.033	0.070		
Total gate charge	Q_g			$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	Ch-1	-	24.5	49	nC
					Ch-2	-	100	200	
		Channel-1 $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		Ch-1	-	11	22		
				Ch-2	-	46	92		
Gate-source charge	Q_{gs}	Channel-2 $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		Ch-1	-	5.1	-		
				Ch-2	-	17.1	-		
Gate-drain charge	Q_{gd}	Channel-2 $V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$	Ch-1	-	1.3	-			
			Ch-2	-	7.2	-			
Output charge	Q_{oss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$	Ch-1	-	21	-			
			Ch-2	-	96	-			
Gate resistance	R_g	$f = 1\text{ MHz}$	Ch-1	0.2	1	2	Ω		
			Ch-2	0.12	0.6	1.2			



SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT		
Dynamic ^a								
Turn-on delay time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}, R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\ \Omega$	Ch-1	-	20	40	ns	
			Ch-2	-	45	90		
Rise time	t_r		Ch-1	-	80	160		
			Ch-2	-	60	120		
Turn-off delay time	$t_{d(off)}$		Channel-2 $V_{DD} = 15\text{ V}, R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\ \Omega$	Ch-1	-	20		40
			Ch-2	-	65	130		
Fall time	t_f	Channel-1 $V_{DD} = 15\text{ V}, R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\ \Omega$	Ch-1	-	40	80		
			Ch-2	-	30	60		
Turn-on delay time	$t_{d(on)}$		Channel-2 $V_{DD} = 15\text{ V}, R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\ \Omega$	Ch-1	-	10		20
			Ch-2	-	15	30		
Rise time	t_r		Ch-1	-	35	70		
			Ch-2	-	20	40		
Turn-off delay time	$t_{d(off)}$	Channel-1 $V_{DD} = 15\text{ V}, R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\ \Omega$	Ch-1	-	20	40		
			Ch-2	-	40	80		
Fall time	t_f		Channel-2 $V_{DD} = 15\text{ V}, R_L = 1.5\ \Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\ \Omega$	Ch-1	-	10	20	
			Ch-2	-	10	20		
Drain-Source Body Diode Characteristics								
Continuous source-drain diode current	I_S		$T_C = 25\text{ }^\circ\text{C}$	Ch-1	-	-	31.6	A
		Ch-2		-	-	60		
Pulse diode forward current ^a	I_{SM}		Ch-1	-	-	80		
			Ch-2	-	-	100		
Body diode voltage	V_{SD}	$I_S = 10\text{ A}, V_{GS} = 0\text{ V}$	Ch-1	-	0.8	1.2	V	
		$I_S = 3\text{ A}, V_{GS} = 0\text{ V}$	Ch-2	-	0.39	0.59		
Body diode reverse recovery time	t_{rr}	Channel-1 $I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	35	90	ns	
			Ch-2	-	70	140		
Body diode reverse recovery charge	Q_{rr}		Channel-2 $I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	20	40	nC
				Ch-2	-	105	210	
Reverse recovery fall time	t_a	Channel-1 $I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	15	-	ns	
			Ch-2	-	37	-		
Reverse recovery rise time	t_b		Channel-2 $I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	Ch-1	-	20		-
				Ch-2	-	33		-

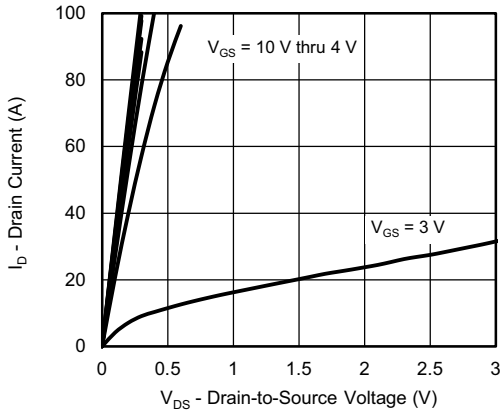
Notes

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

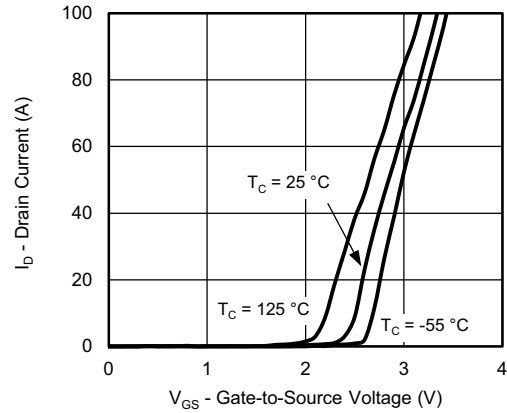
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



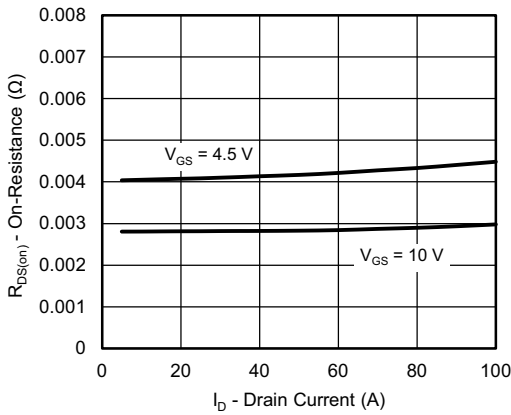
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



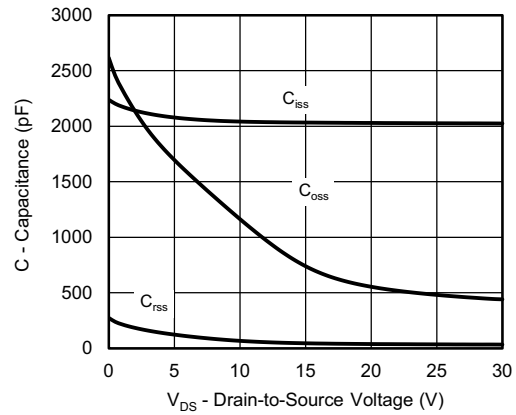
Output Characteristics



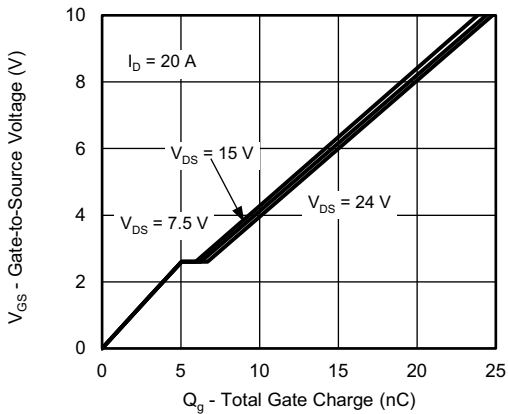
Transfer Characteristics



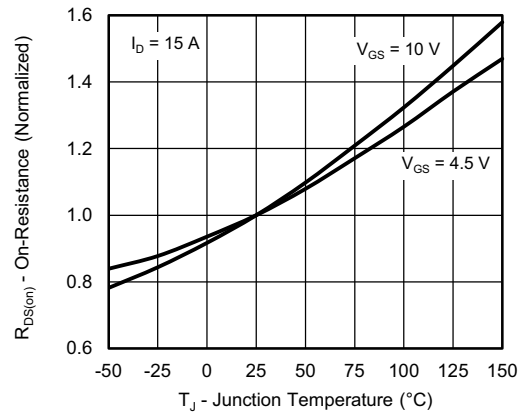
On-Resistance vs. Drain Current



Capacitance



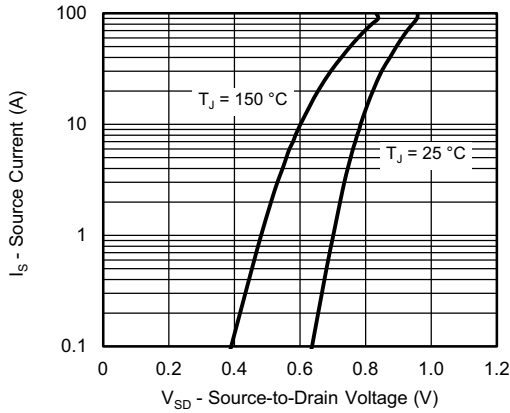
Gate Charge



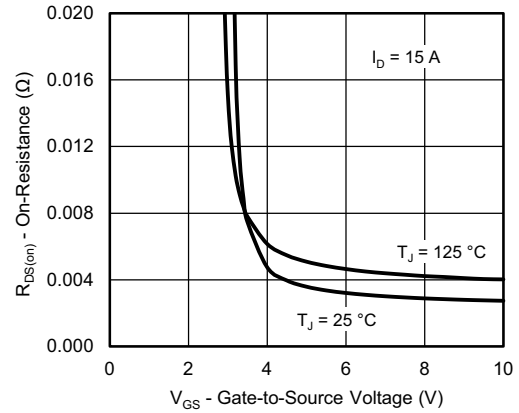
On-Resistance vs. Junction Temperature



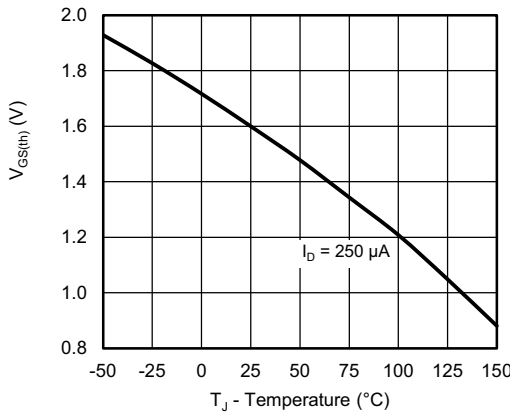
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



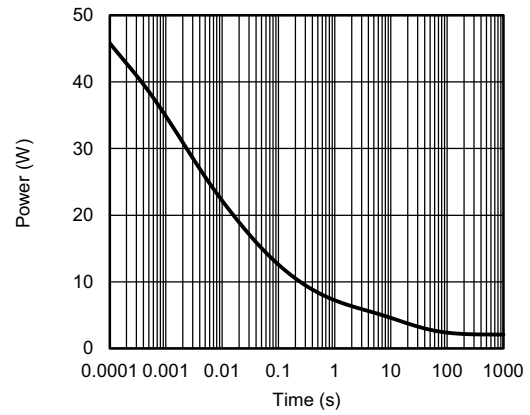
Source-Drain Diode Forward Voltage



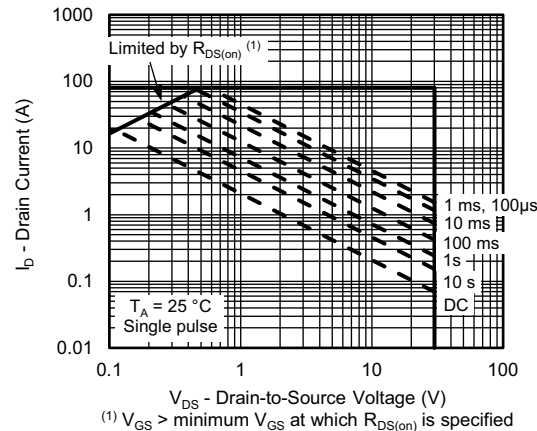
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



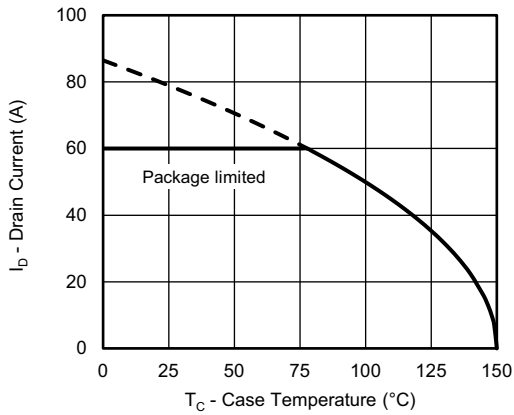
Single Pulse Power, Junction-to-Ambient



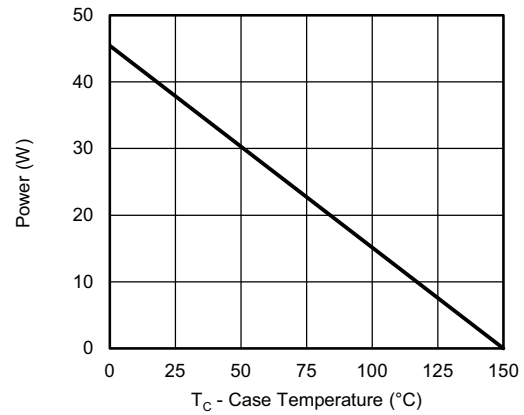
Safe Operating Area, Junction-to-Ambient



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



Current Derating ^a



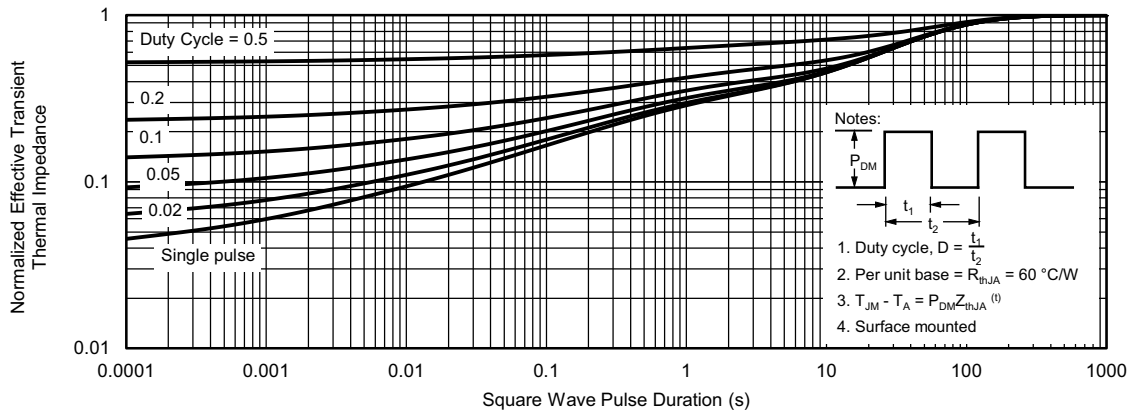
Power, Junction-to-Case

Note

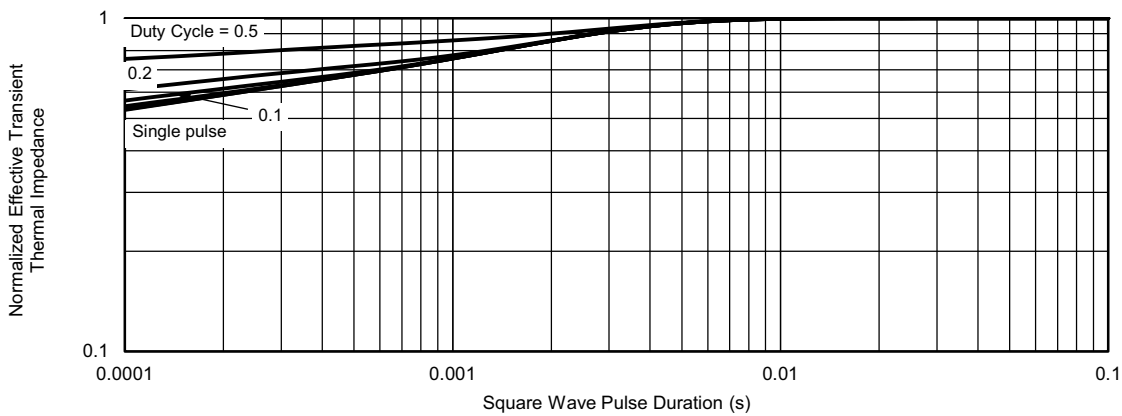
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



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

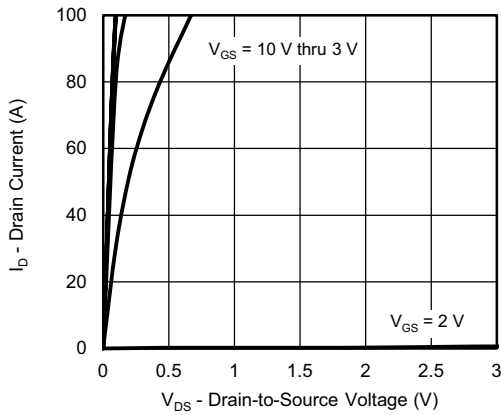


Normalized Thermal Transient Impedance, Junction-to-Ambient

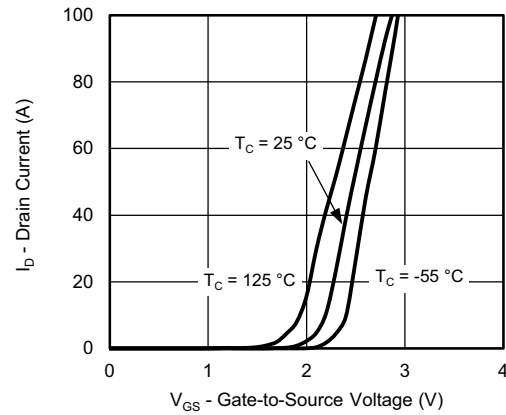


Normalized Thermal Transient Impedance, Junction-to-Case

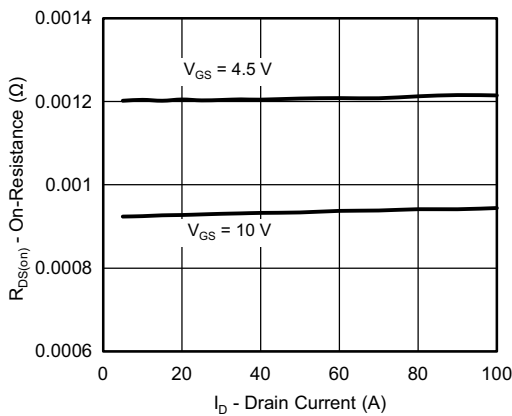
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



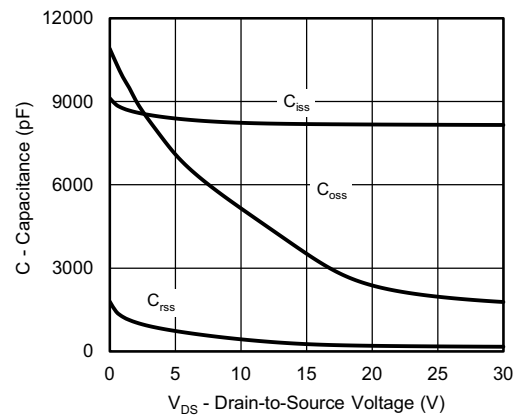
Output Characteristics



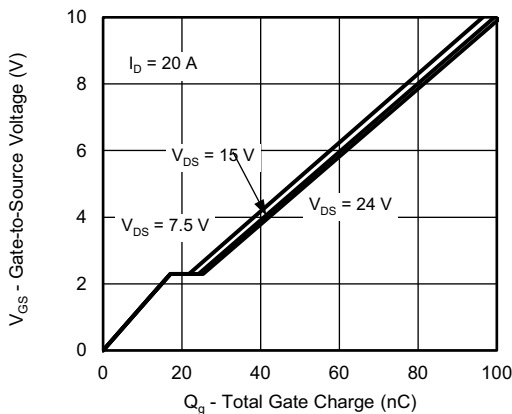
Transfer Characteristics



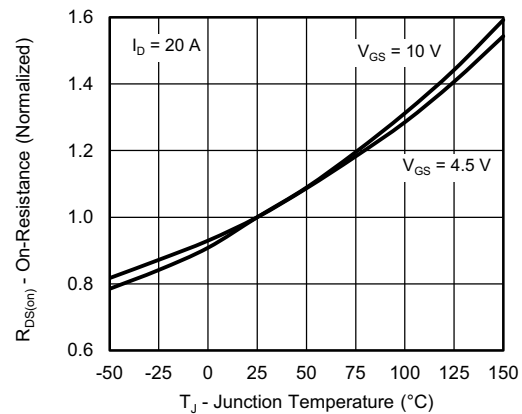
On-Resistance vs. Drain Current



Capacitance



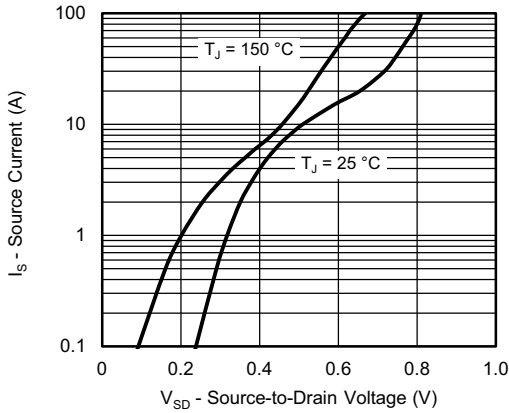
Gate Charge



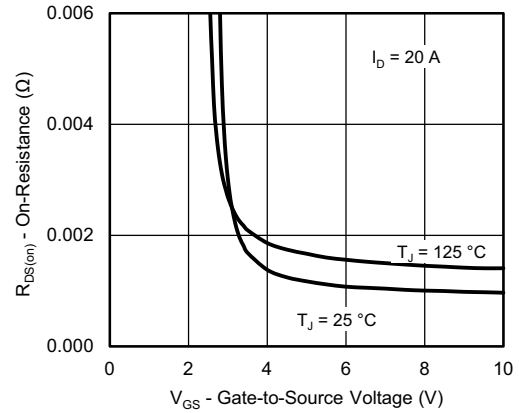
On-Resistance vs. Junction Temperature



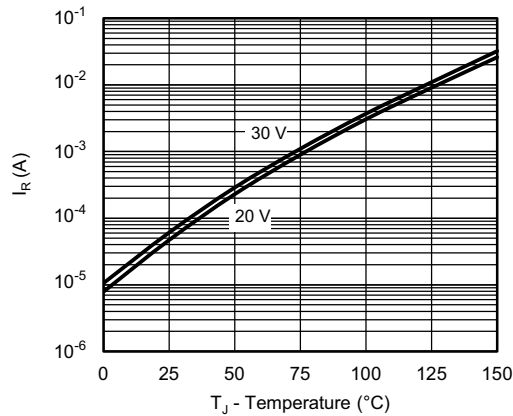
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



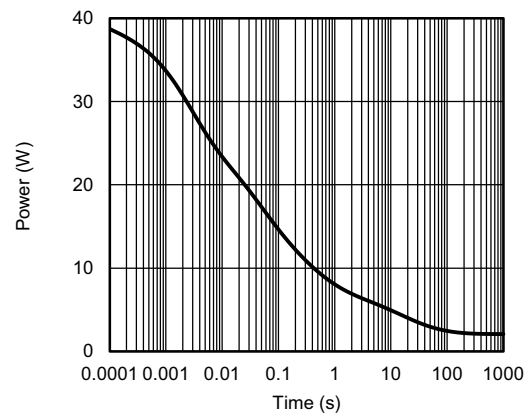
Source-Drain Diode Forward Voltage



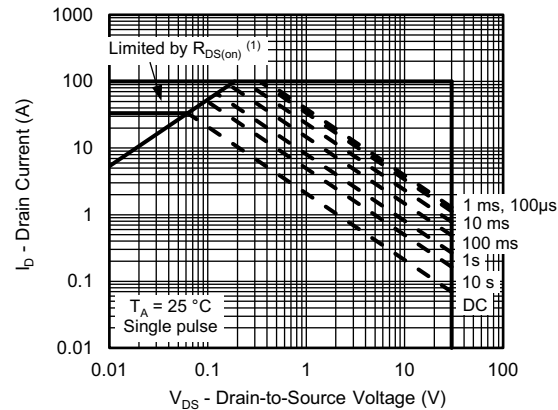
On-Resistance vs. Gate-to-Source Voltage



Reverse Current (Schottky)



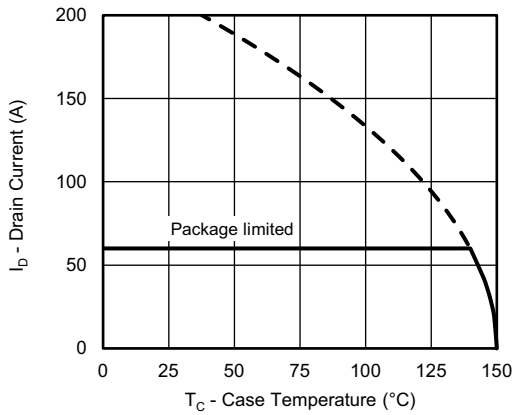
Single Pulse Power, Junction-to-Ambient



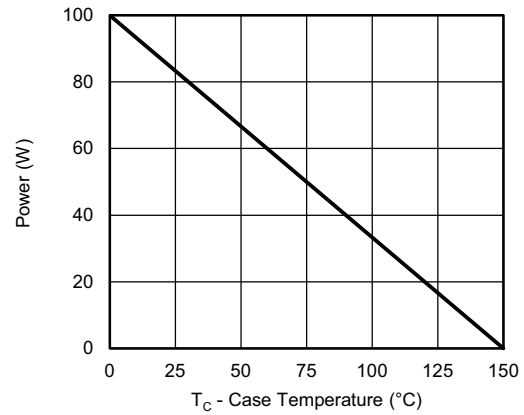
Safe Operating Area, Junction-to-Ambient



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



Current Derating ^a



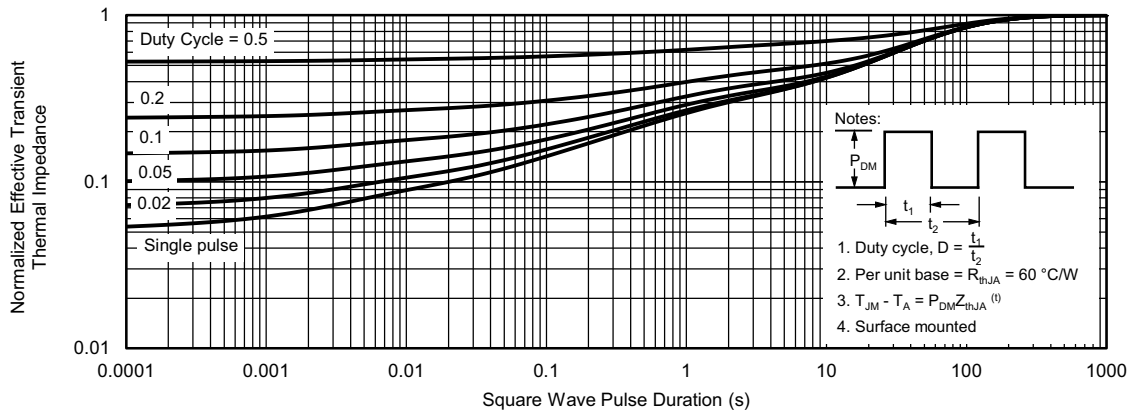
Power, Junction-to-Case

Note

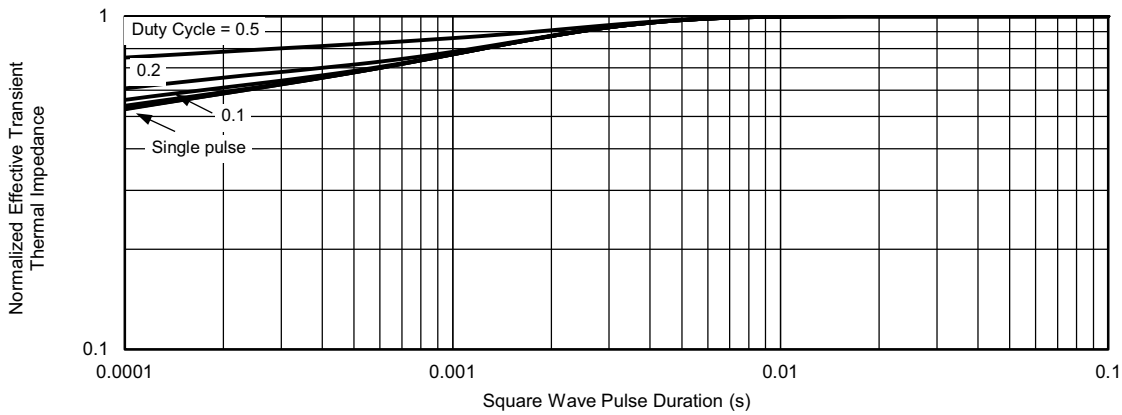
- a. The power dissipation P_D is based on $T_J \text{ max.} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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



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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package / tape drawings, part marking, and reliability data, see www.vishay.com/ppg?75695.

PowerPAIR® 6 x 5 F Case Outline



DIMENSION	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	-	0.10	0.000	-	0.004
b	0.35	0.41	0.46	0.014	0.016	0.018
b1	0.38 ref.			0.015 ref.		
c	0.15	0.20	0.25	0.006	0.008	0.010
D	4.90	5.00	5.10	0.193	0.197	0.201
D1	3.26	3.31	3.36	0.128	0.130	0.132
D2	4.20	4.30	4.40	0.165	0.169	0.173
D3	4.15	4.20	4.25	0.163	0.165	0.167
E	5.90	6.00	6.10	0.232	0.236	0.240
E1	2.50	2.55	2.60	0.098	0.100	0.102
E2	0.87	0.92	0.97	0.034	0.036	0.038
e	1.27 BSC			0.050 BSC		
e1	3.81 BSC			0.150 BSC		
K	0.52	0.57	0.62	0.020	0.022	0.024
K1	0.69	0.74	0.79	0.027	0.029	0.031
K2	0.60	0.65	0.70	0.024	0.026	0.028
K3	0.39 BSC			0.015 BSC		
K4	0.50	0.55	0.60	0.020	0.022	0.024
K5	0.25	0.30	0.35	0.010	0.012	0.014
K6	0.40	0.45	0.50	0.016	0.018	0.020
K7	0.35	0.40	0.45	0.014	0.016	0.018
K8	0.30	0.35	0.40	0.012	0.014	0.016
L	0.33	0.43	0.53	0.013	0.017	0.021
L1	1.31	1.36	1.41	0.052	0.054	0.056
L2	0.20 ref.			0.008 ref.		
ECN: T20-0097-Rev. C, 25-Feb-2020						
DWG: 6043						

Note

- Millimeters will govern



Recommended Minimum PAD for PowerPAIR® 6 x 5



Dimensions in millimeters (inch)

Note

- Linear dimensions are in black, the same information is provided in ordinate dimensions which are in blue.



Disclaimer

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