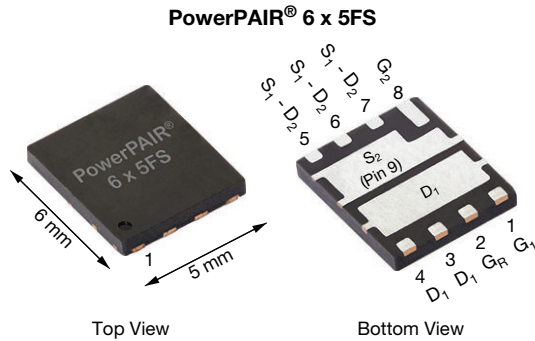


Symmetric Dual N-Channel 40 V (D-S) MOSFET



FEATURES

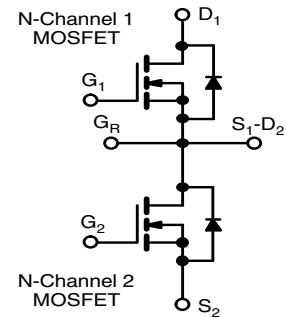
- TrenchFET® Gen IV power MOSFET
- 100 % R_g and UIS tested
- Symmetric dual N-channel
- Flip chip technology optimal thermal design
- High side and low side MOSFETs form optimized combination for 50 % duty cycle
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Buck-boost
- Half-bridge synchronous rectification
- Telecom DC/DC
- Motor drive control



PRODUCT SUMMARY	
V _{DS} (V)	40
R _{DS(on)} max. (Ω) at V _{GS} = 10 V	0.00137
R _{DS(on)} max. (Ω) at V _{GS} = 4.5 V	0.00240
Q _g typ. (nC)	30
I _D (A) ^a	159
Configuration	Dual

ORDERING INFORMATION	
Package	PowerPAIR 6 x 5FS
Lead (Pb)-free and halogen-free	SiZF640DT-T1-GE3

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-source voltage	V _{DS}	40	V	
Gate-source voltage	V _{GS}	+20, -16		
Continuous drain current (T _J = 150 °C)	I _D	T _C = 25 °C	159	
		T _C = 70 °C	127	
		T _A = 25 °C	41 ^{b, c}	
		T _A = 70 °C	33 ^{b, c}	
Pulsed drain current (t = 100 μs)	I _{DM}	300	A	
Continuous source-drain diode current	I _S	T _C = 25 °C		57
		T _A = 25 °C		3.8 ^{b, c}
Single pulse avalanche current	I _{AS}	40		mJ
Single pulse avalanche energy	E _{AS}	80		
Maximum power dissipation	P _D	T _C = 25 °C	62.5	
		T _C = 70 °C	40	
		T _A = 25 °C	4.2 ^{b, c}	
		T _A = 70 °C	2.7 ^{b, c}	
Operating junction and storage temperature range	T _J , T _{stg}	-55 to +150	°C	
Soldering recommendations (peak temperature) ^{d, e}		260		

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 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	TYP.	MAX.	UNIT	
Maximum junction-to-ambient ^{a, b}	$t \leq 10$ s	R_{thJA}	24	30	°C/W	
Maximum junction-to-case (source)	Steady state	R_{thJC}	1.6	2.0		

Notes

- a. Surface mounted on 1" x 1" FR4 board
b. Maximum under steady state conditions is 60 °C/W for channel-1 and 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, $I_D = 250$ μ A	40	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 10$ mA	-	25.3	-	mV/°C
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250$ μ A	-	-5.5	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μ A	1	-	2.4	V
Gate-source leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = +20$ V, -16 V	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40$ V, $V_{GS} = 0$ V	-	-	1	μ A
		$V_{DS} = 40$ V, $V_{GS} = 0$ V, $T_J = 70$ °C	-	-	10	
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 15$ A	-	0.0010	0.00137	Ω
		$V_{GS} = 4.5$ V, $I_D = 15$ A	-	0.0016	0.00240	
Forward transconductance ^a	g_{fs}	$V_{DS} = 15$ V, $I_D = 45$ A	-	175	-	S
Dynamic ^b						
Input capacitance	C_{ISS}	$V_{DS} = 20$ V, $V_{GS} = 0$ V, $f = 1$ MHz	-	5750	-	pF
Output capacitance	C_{OSS}		-	960	-	
Reverse transfer capacitance	C_{RSS}		-	55	-	
Total gate charge	Q_g	$V_{DS} = 20$ V, $V_{GS} = 10$ V, $I_D = 15$ A	-	69	106	nC
Gate-source charge	Q_{gs}	$V_{DS} = 20$ V, $V_{GS} = 4.5$ V, $I_D = 15$ A	-	21	-	
Gate-drain charge	Q_{gd}		-	1.5	-	
Output charge	Q_{oss}	$V_{DS} = 20$ V, $V_{GS} = 0$ V	-	46	-	
Gate resistance	R_g	$f = 1$ MHz	0.4	1.7	3.4	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 20$ V, $R_L = 2$ Ω , $I_D \cong 10$ A, $V_{GEN} = 10$ V, $R_g = 1$ Ω	-	18	40	ns
Rise time	t_r		-	45	90	
Turn-off delay time	$t_{d(off)}$		-	45	90	
Fall time	t_f		-	6	12	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 20$ V, $R_L = 2$ Ω , $I_D \cong 10$ A, $V_{GEN} = 4.5$ V, $R_g = 1$ Ω	-	50	100	
Rise time	t_r		-	115	230	
Turn-off delay time	$t_{d(off)}$		-	40	80	
Fall time	t_f		-	10	20	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25$ °C	-	-	57	A
Pulse diode forward current	I_{SM}		-	-	300	
Body diode voltage	V_{SD}	$I_S = 10$ A, $V_{GS} = 0$ V	-	0.75	1.1	V
Body diode reverse recovery time	t_{rr}	$I_F = 10$ A, $di/dt = 100$ A/ μ s, $T_J = 25$ °C	-	40	80	ns
Body diode reverse recovery charge	Q_{rr}		-	36	75	nC
Reverse recovery fall time	t_a		-	25	-	ns
Reverse recovery rise time	t_b		-	15	-	

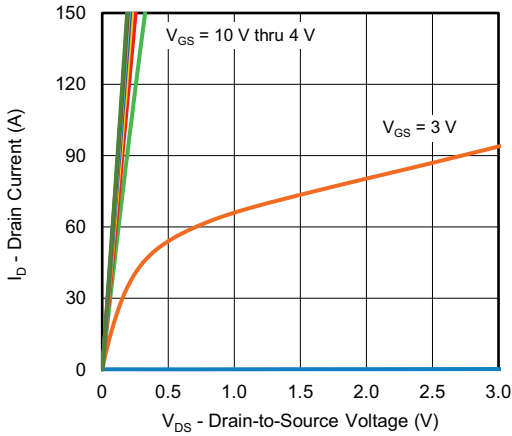
Notes

- a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing

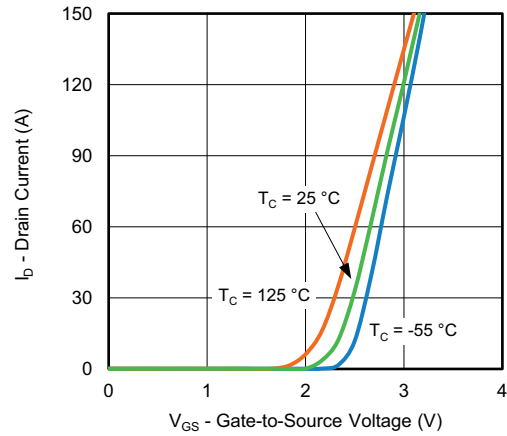
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



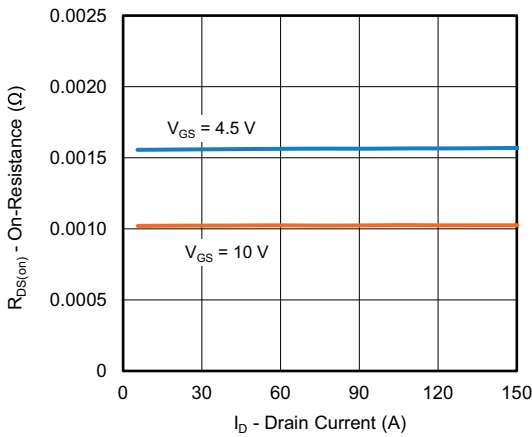
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



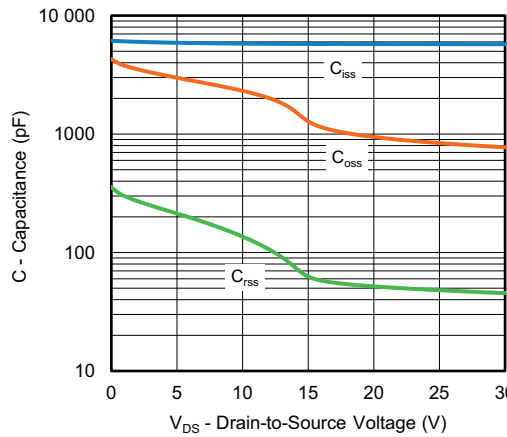
Output Characteristics



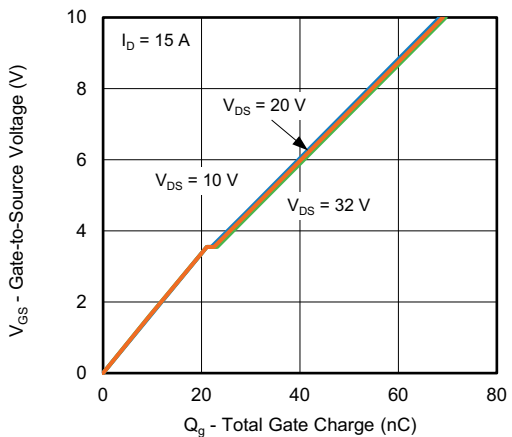
Transfer Characteristics



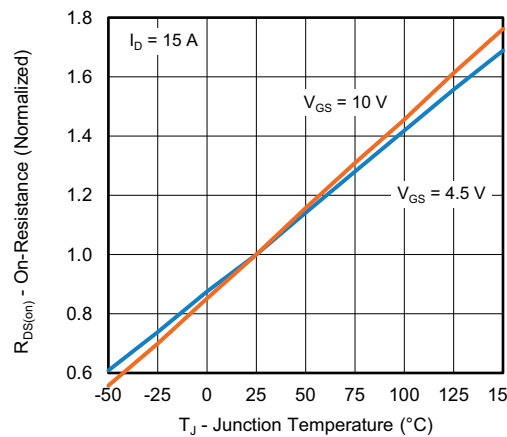
On-Resistance vs. Drain Current



Capacitance



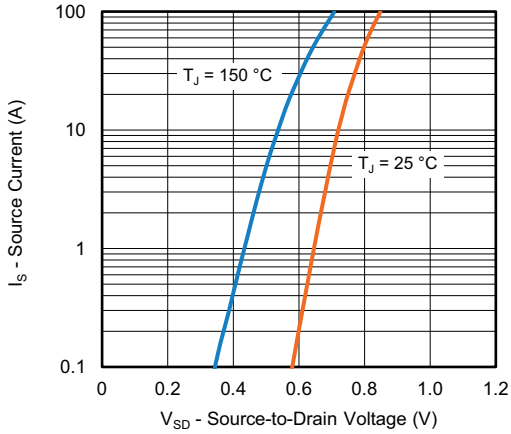
Gate Charge



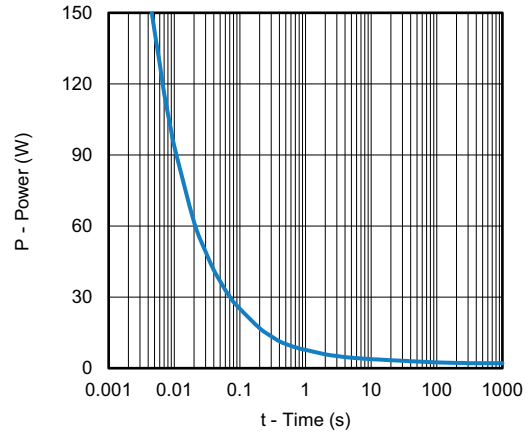
On-Resistance vs. Junction Temperature



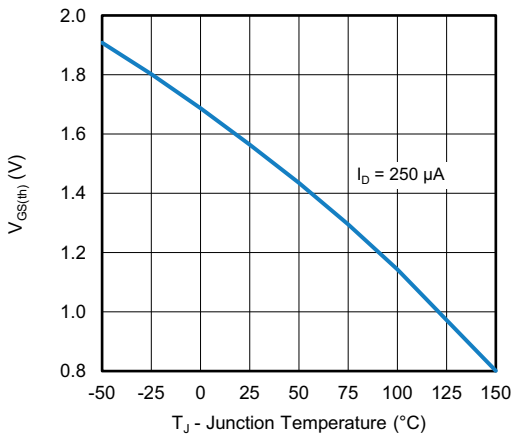
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



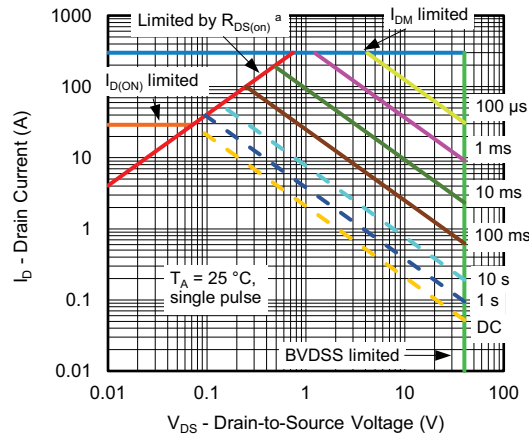
Source-Drain Diode Forward Voltage



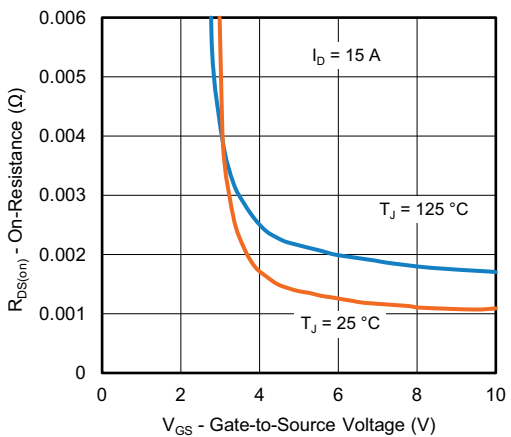
Single Pulse Power, Junction-to-Ambient



Threshold Voltage



Safe Operating Area, Junction-to-Ambient



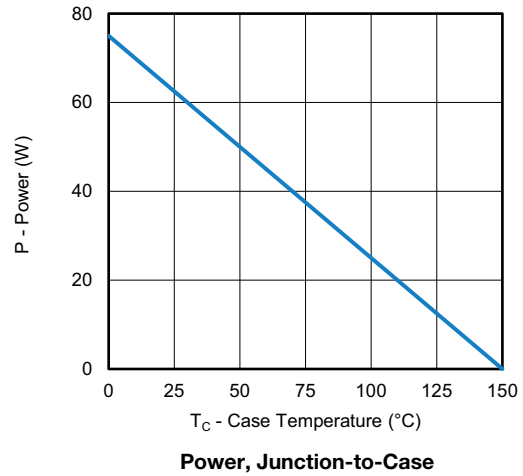
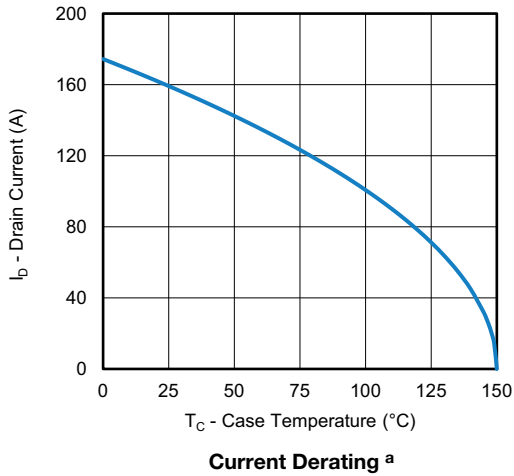
On-Resistance vs. Gate-to-Source Voltage

Note

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



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

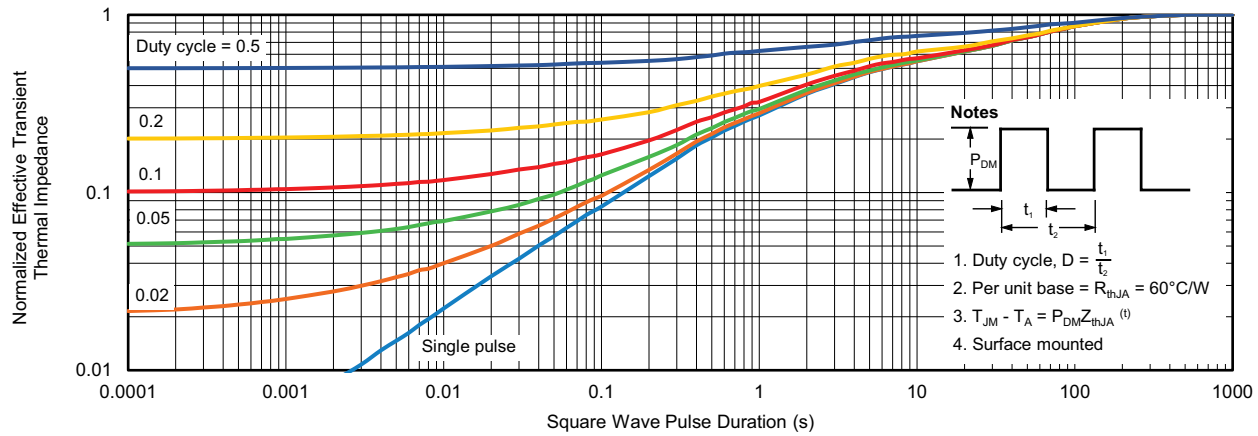


Note

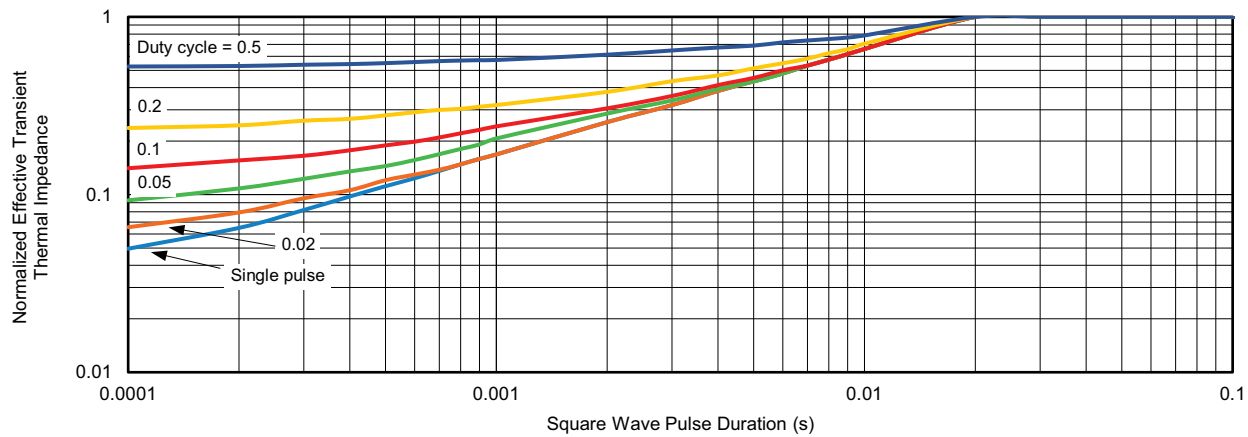
- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit



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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