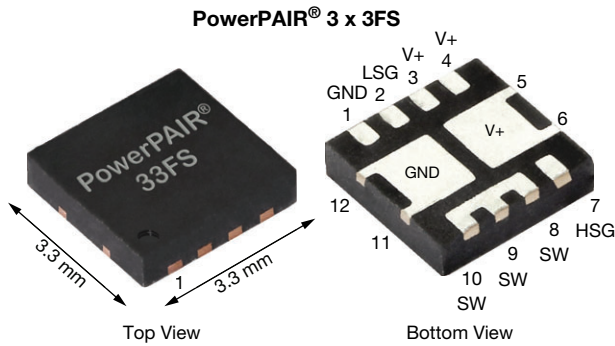


## Dual N-Channel 30 V (D-S) MOSFET



### FEATURES

- TrenchFET® Gen V power MOSFET
- Symmetric dual N-channel
- Flip chip technology optimal thermal design
- High side and low side MOSFETs form optimized combination for 50 % duty cycle
- Optimized  $R_{DS} - Q_g$  and  $R_{DS} - Q_{gd}$  FOM elevates efficiency for high frequency switching
- 100 %  $R_g$  and UIS tested
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

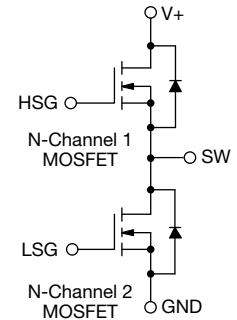


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

PRODUCT SUMMARY	
$V_{DS}$ (V)	30
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = 10$ V	0.00243
$R_{DS(on)}$ max. ( $\Omega$ ) at $V_{GS} = 4.5$ V	0.00351
$Q_g$ typ. (nC)	9.5
$I_D$ (A)	125 <sup>a</sup>
Configuration	Dual

### APPLICATIONS

- Synchronous buck
- Computer / server peripherals
- Half bridge
- POL
- Telecom DC/DC



ORDERING INFORMATION	
Package	PowerPAIR 3 x 3FS
Lead (Pb)-free and halogen-free	SiZF5300DT-T1-GE3

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	$V_{DS}$	30	V
Gate-source voltage	$V_{GS}$	+16 / -12	
Continuous drain current ( $T_J = 150$ °C)	$I_D$	$T_C = 25$ °C	125
		$T_C = 70$ °C	100
		$T_A = 25$ °C	35 <sup>b, c</sup>
		$T_A = 70$ °C	28 <sup>b, c</sup>
Pulsed drain current ( $t = 100$ $\mu$ s)	$I_{DM}$	150	A
Continuous source current (MOSFET diode conduction)	$I_S$	$T_C = 25$ °C	
		$T_A = 25$ °C	3.7 <sup>b, c</sup>
Single pulse avalanche current	$I_{AS}$	20	mJ
Single pulse avalanche energy	$E_{AS}$	20	
Maximum power dissipation	$P_D$	$T_C = 25$ °C	56.8
		$T_C = 70$ °C	36.4
		$T_A = 25$ °C	4.5 <sup>b, c</sup>
		$T_A = 70$ °C	2.9 <sup>b, c</sup>
Operating junction and storage temperature range	$T_J, T_{stg}$	-55 to +150	°C
Soldering recommendations (peak temperature)		260	

### Notes

- $T_C = 25$  °C
- Surface mounted on 1" x 1" FR4 board
- $t = 10$  s



THERMAL RESISTANCE RATINGS						
PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT	
Maximum junction-to-ambient <sup>a, b</sup>	$t \leq 10$ s	$R_{thJA}$	22	28	°C/W	
Maximum junction-to-case (drain)	Steady state	$R_{thJC}$	1.7	2.2		

**Notes**

- a. Surface mounted on 1" x 1" FR4 board
- b. Maximum under steady state conditions is 64 °C/W

SPECIFICATIONS ( $T_J = 25$ °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-source breakdown voltage	$V_{DS}$	$V_{GS} = 0$ V, $I_D = 1$ mA	30	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250$ $\mu$ A	1	-	2	
Gate-source leakage	$I_{GSS}$	$V_{DS} = 0$ V, $V_{GS} = +16$ V / -12 V	-	-	$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 24$ V, $V_{GS} = 0$ V	-	-	1	$\mu$ A
		$V_{DS} = 24$ V, $V_{GS} = 0$ V, $T_J = 55$ °C	-	-	5	
On-state drain current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 10$ V	30	-	-	A
Drain-source on-state resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 10$ A	-	0.00202	0.00243	$\Omega$
		$V_{GS} = 4.5$ V, $I_D = 7$ A	-	0.00293	0.00351	
Forward transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 10$ V, $I_D = 10$ A	-	61	-	S
<b>Dynamic <sup>b</sup></b>						
Input capacitance	$C_{iss}$	$V_{DS} = 15$ V, $V_{GS} = 0$ V, $f = 1$ MHz	-	1480	-	pF
Output capacitance	$C_{oss}$		-	500	-	
Reverse transfer capacitance	$C_{rss}$		-	35	-	
$C_{rss}/C_{iss}$ ratio			-	0.023	0.055	
Total gate charge	$Q_g$	$V_{DS} = 15$ V, $V_{GS} = 10$ V, $I_D = 20$ A	-	21	32	nC
Gate-source charge	$Q_{gs}$	$V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 20$ A	-	9.5	15	
Gate-drain charge	$Q_{gd}$		-	5.5	-	
Gate resistance	$R_g$		$f = 1$ MHz	0.18	0.9	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15$ V, $R_L = 1$ $\Omega$ , $I_D \cong 15$ A, $V_{GEN} = 10$ V, $R_g = 1$ $\Omega$	-	12	24	ns
Rise time	$t_r$		-	8	16	
Turn-off delay time	$t_{d(off)}$		-	25	50	
Fall time	$t_f$		-	6	12	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15$ V, $R_L = 1$ $\Omega$ , $I_D \cong 15$ A, $V_{GEN} = 4.5$ V, $R_g = 1$ $\Omega$	-	22	44	
Rise time	$t_r$		-	48	96	
Turn-off delay time	$t_{d(off)}$		-	22	44	
Fall time	$t_f$		-	12	24	
<b>Drain-source Body Diode Characteristics</b>						
Continuous source-drain diode current	$I_S$	$T_C = 25$ °C	-	-	47.3	A
Pulse diode forward current	$I_{SM}$		-	-	150	
Body diode voltage	$V_{SD}$	$I_S = 15$ A, $V_{GS} = 0$ V	-	0.85	1.2	V
Body diode reverse recovery time	$t_{rr}$	$I_F = 15$ A, $di/dt = 100$ A/ $\mu$ s, $T_J = 25$ °C	-	17	34	ns
Body diode reverse recovery charge	$Q_{rr}$		-	6	12	nC
Reverse recovery fall time	$t_a$		-	9	-	ns
Reverse recovery rise time	$t_b$		-	8	-	

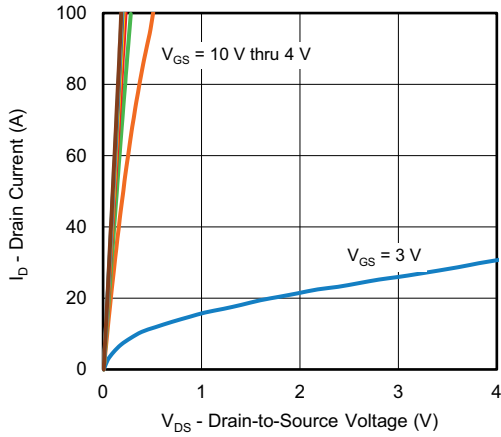
**Notes**

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

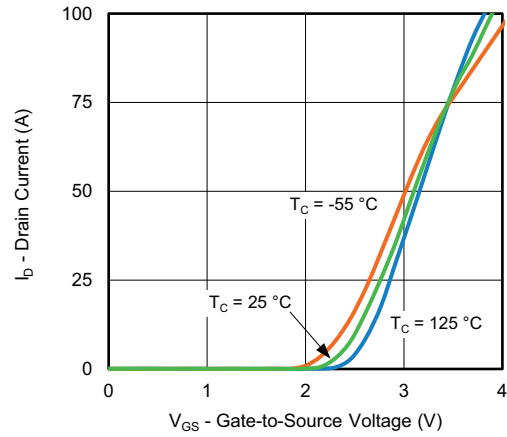
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



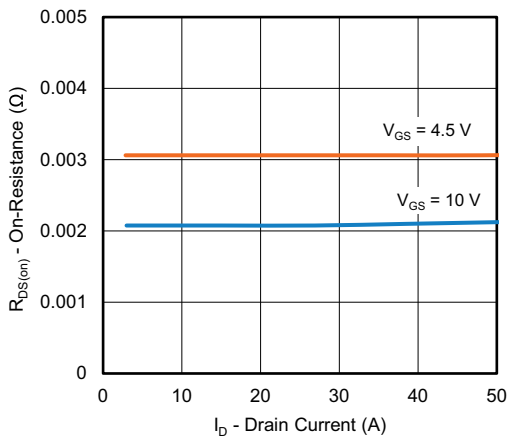
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



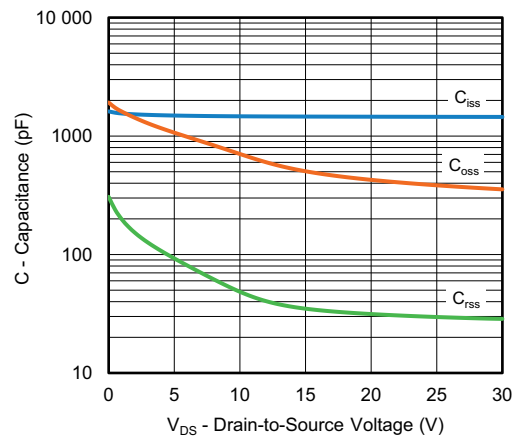
Output Characteristics



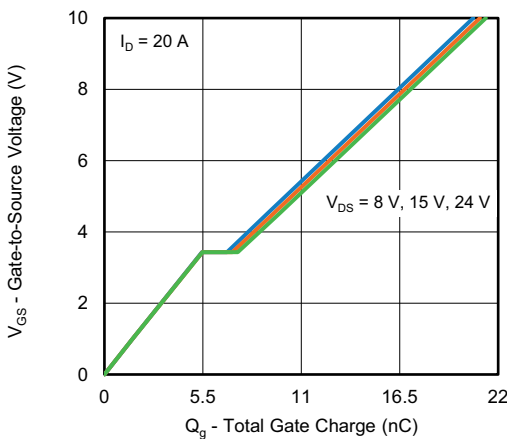
Transfer Characteristics



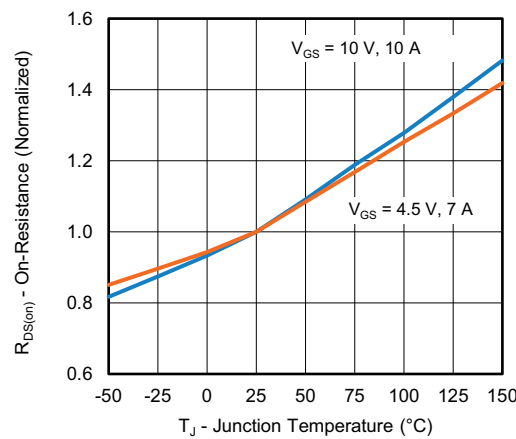
On-Resistance vs. Drain Current and Gate



Capacitance



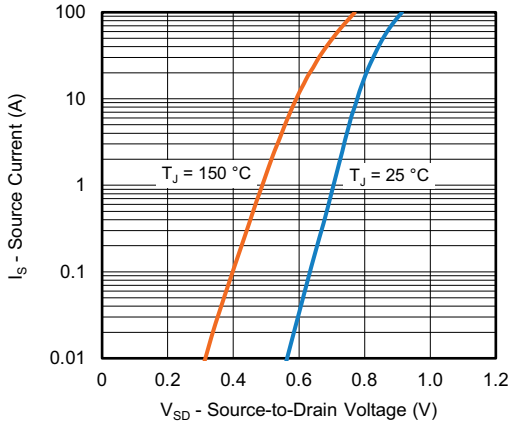
Gate Charge



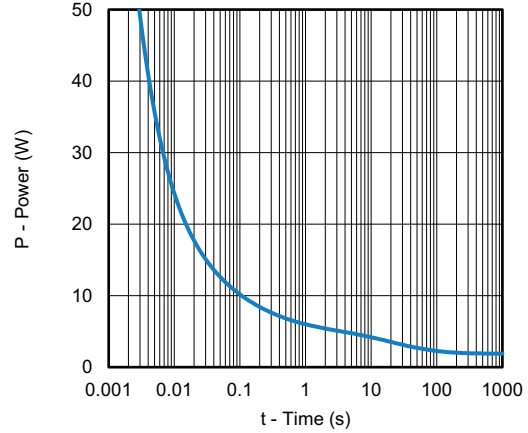
On-Resistance vs. Junction Temperature



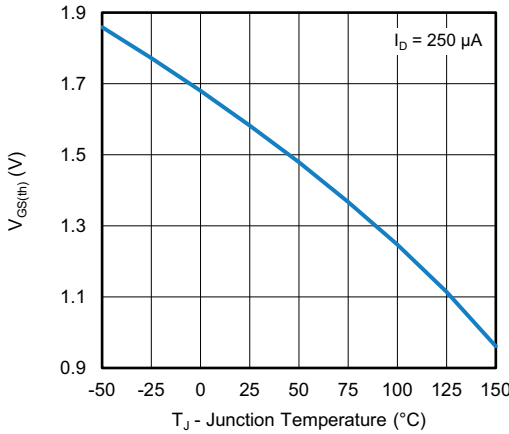
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



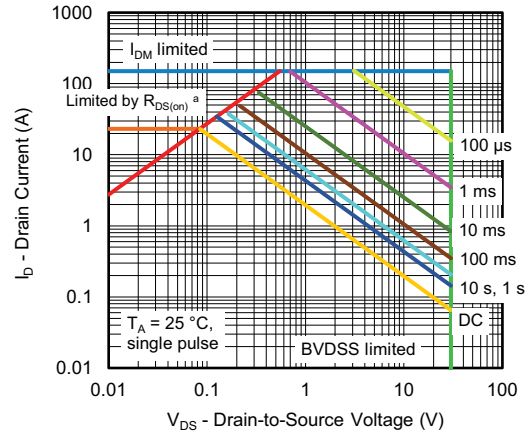
**Source-Drain Diode Forward Voltage**



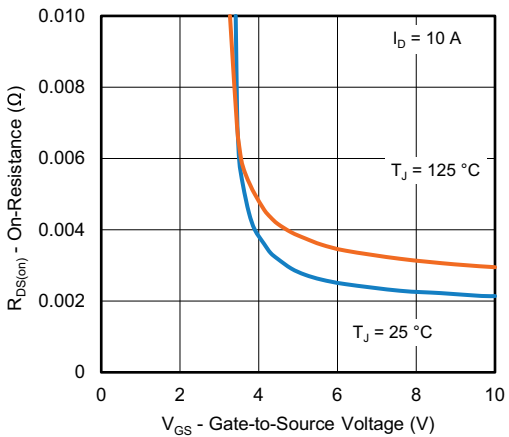
**Single Pulse Power**



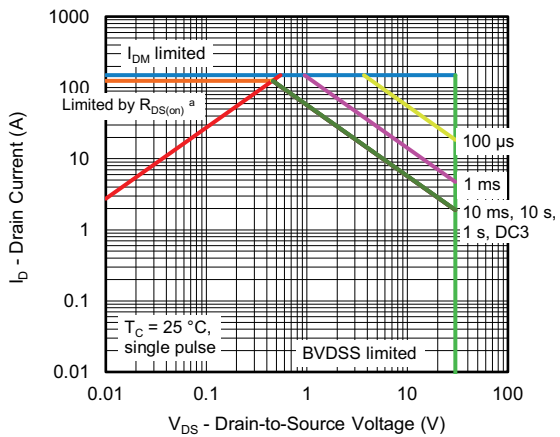
**Threshold Voltage**



**Safe Operating Area, Junction to Ambient**



**On-Resistance vs. Gate-to-Source Voltage**



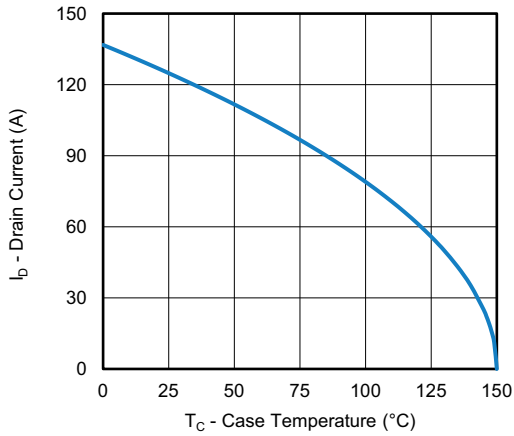
**Safe Operating Area, Junction to Case**

**Note**

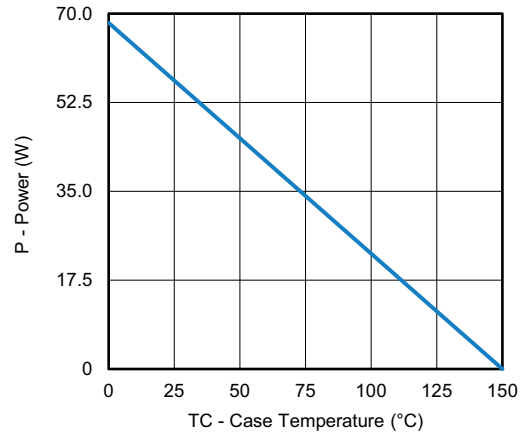
a.  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



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



**Current Derating <sup>a</sup>**



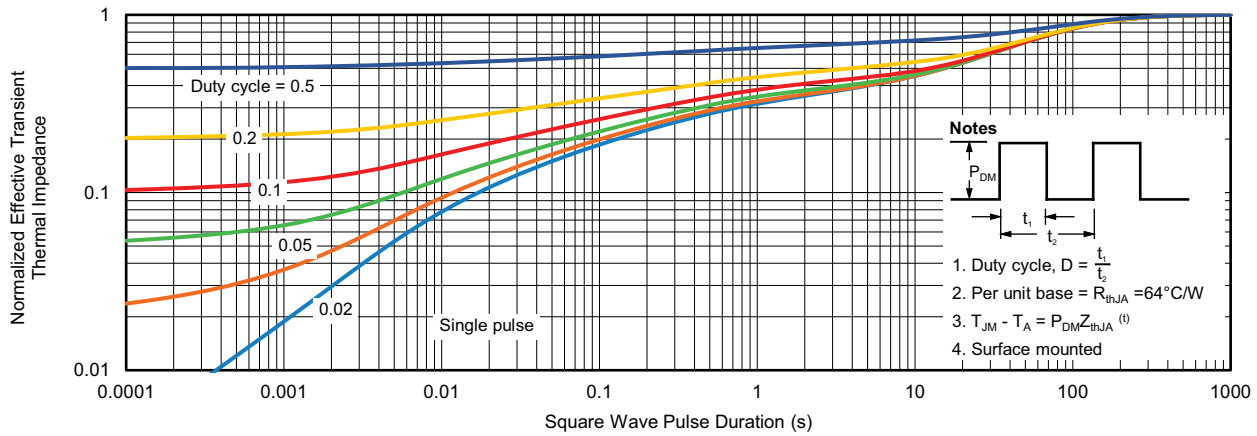
**Power, Junction-to-Case**

**Notes**

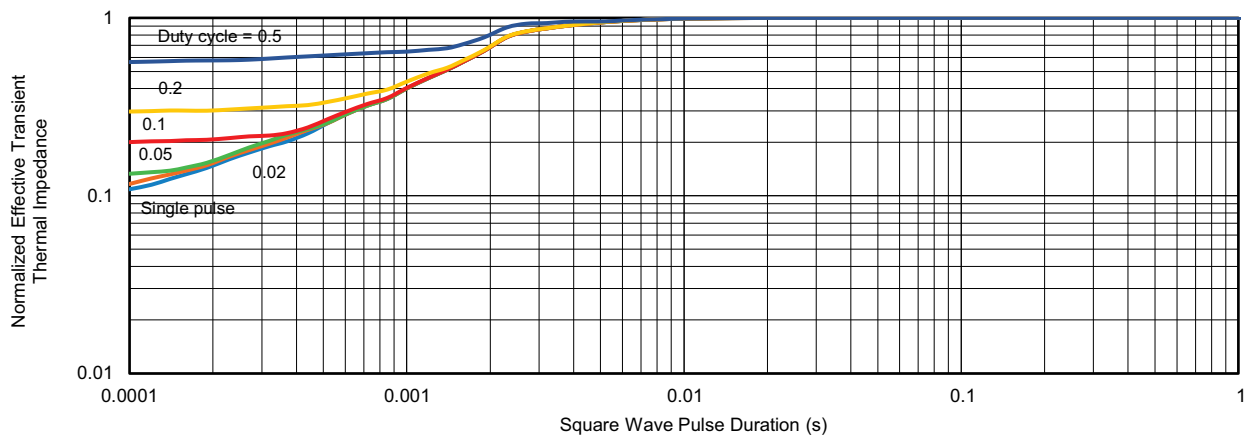
- a. The power dissipation  $P_D$  is based on  $T_J$  max. = 150 °C, using junction-to-ambient thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit
- b.  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



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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