

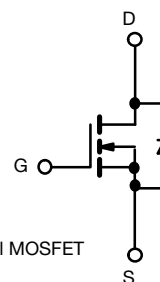
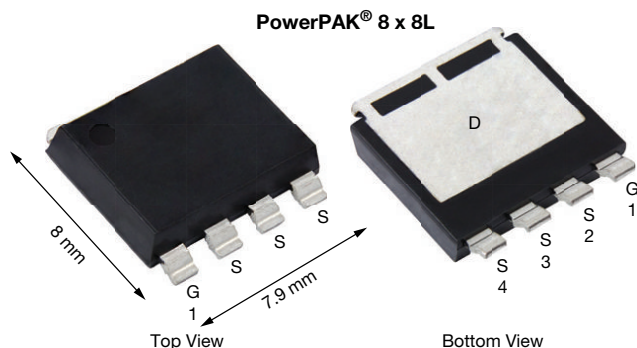
# Automotive N-Channel 100 V (D-S) 175 °C MOSFET



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

## FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 %  $R_g$  and UIS tested
- Thin 1.9 mm height
- Material categorization:  
for definitions of compliance please see  
[www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



N-Channel MOSFET

PRODUCT SUMMARY	
$V_{DS}$ (V)	100
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	0.0036
$I_D$ (A) <sup>e</sup>	155
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SQJQ118E (for detailed order number please see <a href="http://www.vishay.com/doc?79776">www.vishay.com/doc?79776</a> )

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25$ °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		$V_{DS}$	100	V
Gate-source voltage		$V_{GS}$	$\pm 20$	
Continuous drain current <sup>e</sup>	$T_C = 25$ °C	$I_D$	155	A
	$T_C = 125$ °C		89	
Continuous source current (diode conduction) <sup>e</sup>		$I_S$	209	
Pulsed drain current <sup>a, e</sup>		$I_{DM}$	571	
Single pulse avalanche current		$I_{AS}$	55	
Single pulse avalanche energy		$E_{AS}$	151	mJ
Maximum power dissipation <sup>c, e</sup>	$T_C = 25$ °C	$P_D$	230	W
	$T_C = 125$ °C		76	
Operating junction and storage temperature range		$T_J, T_{stg}$	-55 to +175	°C
Soldering recommendations (peak temperature) <sup>c</sup>			260	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-ambient	PCB mount <sup>b</sup>	$R_{thJA}$	40	°C/W
Junction-to-case (drain) <sup>d</sup>		$R_{thJC}$	0.65	

## Notes

- Pulse test; pulse width  $\leq 300$   $\mu$ s, duty cycle  $\leq 2$  %
- When mounted on 1" square PCB (FR4 material)
- See solder profile ([www.vishay.com/doc?73257](http://www.vishay.com/doc?73257)). 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
- As per JESD51-14
- Values based on  $R_{thJC}$  and  $T_C$  of 25 °C. Actual values achievable will be dependent on the thermal characteristics of the complete system

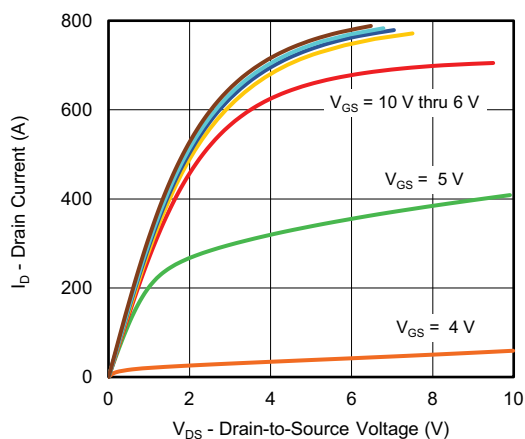
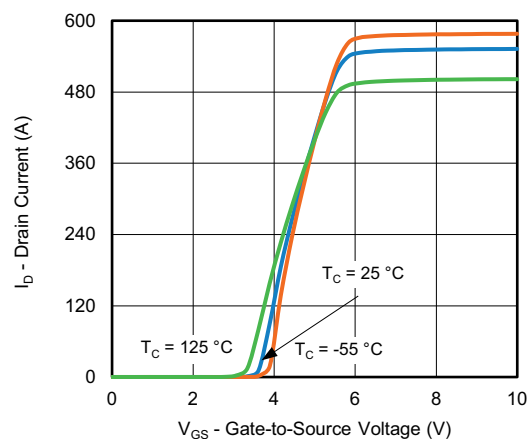
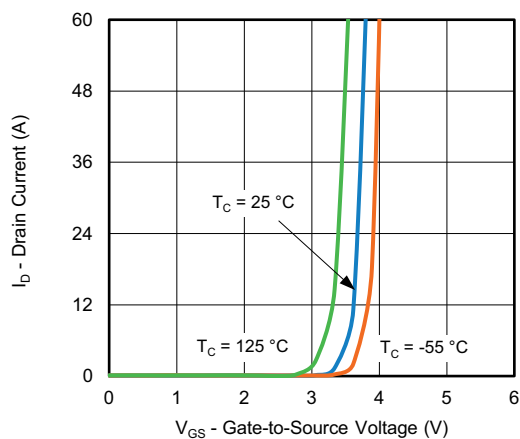
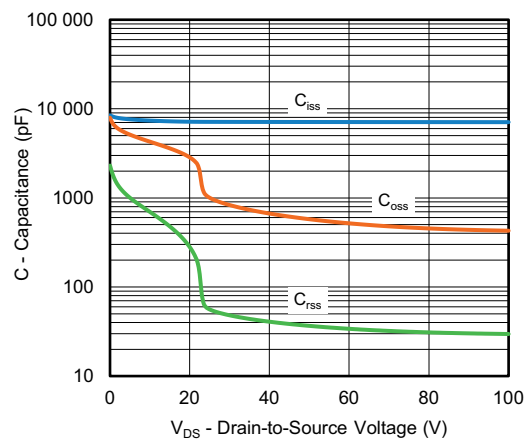
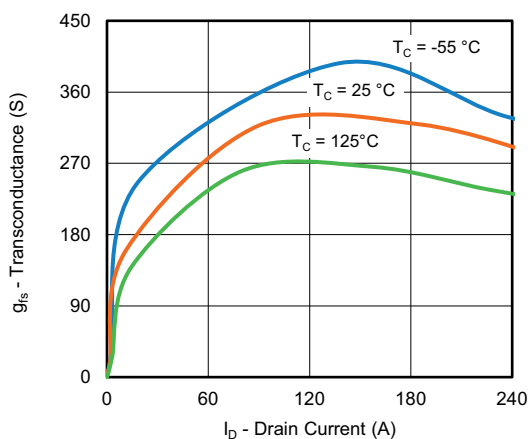
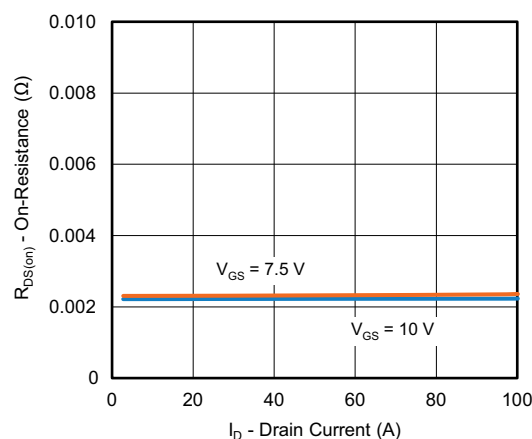


SPECIFICATIONS (T <sub>C</sub> = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0, I <sub>D</sub> = 250 μA		100	-	-	V
Gate-source threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA		2	3	3.5	
Gate-source leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V		-	-	± 100	nA
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V	V <sub>DS</sub> = 100 V	-	-	1	μA
		V <sub>GS</sub> = 0 V	V <sub>DS</sub> = 100 V, T <sub>J</sub> = 125 °C	-	-	50	
		V <sub>GS</sub> = 0 V	V <sub>DS</sub> = 100 V, T <sub>J</sub> = 175 °C	-	-	500	
On-state drain current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>GS</sub> = 10 V	V <sub>DS</sub> ≥ 5 V	50	-	-	A
Drain-source on-state resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V	I <sub>D</sub> = 20 A	-	0.0028	0.0036	Ω
		V <sub>GS</sub> = 10 V	I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C	-	-	0.0074	
		V <sub>GS</sub> = 10 V	I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C	-	-	0.0098	
Forward transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 25 A		-	100	-	S
Dynamic <sup>b</sup>							
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V	V <sub>DS</sub> = 25 V, f = 1 MHz	-	7213	10 099	pF
Output capacitance	C <sub>oss</sub>			-	973	1445	
Reverse transfer capacitance	C <sub>rss</sub>			-	54	84	
Total gate charge <sup>c</sup>	Q <sub>g</sub>	V <sub>GS</sub> = 10 V	V <sub>DS</sub> = 50 V, I <sub>D</sub> = 20 A	-	122	186	nC
Gate-source charge <sup>c</sup>	Q <sub>gs</sub>			-	30	-	
Gate-drain charge <sup>c</sup>	Q <sub>gd</sub>			-	26	-	
Gate resistance	R <sub>g</sub>	f = 1 MHz		0.4	1.1	2.2	Ω
Turn-on delay time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 50 V, R <sub>L</sub> = 2.5 Ω, I <sub>D</sub> ≅ 20 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 1 Ω		-	17	27	ns
Rise time <sup>c</sup>	t <sub>r</sub>			-	16	26	
Turn-off delay time <sup>c</sup>	t <sub>d(off)</sub>			-	48	74	
Fall time <sup>c</sup>	t <sub>f</sub>			-	13	20	
Source-Drain Diode Ratings and Characteristics <sup>b</sup>							
Pulsed current <sup>a</sup>	I <sub>SM</sub>			-	-	571	A
Forward voltage	V <sub>SD</sub>	I <sub>F</sub> = 40 A, V <sub>GS</sub> = 0 V		-	0.7	1.1	V
Body diode reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 15 A, di/dt = 100 A/μs		-	63	126	ns
Body diode reverse recovery charge	Q <sub>rr</sub>			-	151	302	nC
Reverse recovery fall time	t <sub>a</sub>			-	49	-	ns
Reverse recovery rise time	t <sub>b</sub>			-	14	-	
Body diode peak reverse recovery current	I <sub>RM(REC)</sub>			-	-4.4	-	A

**Notes**

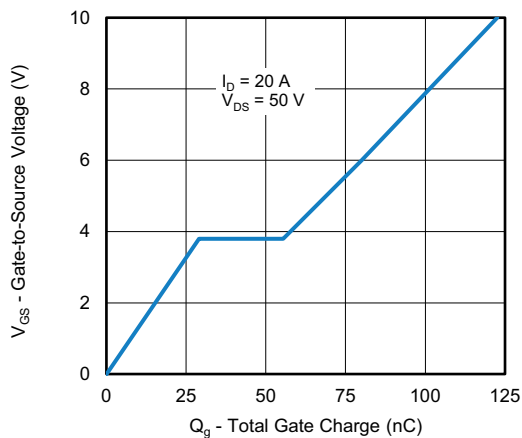
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$   
b. Guaranteed by design, not subject to production testing  
c. Independent of operating temperature

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.

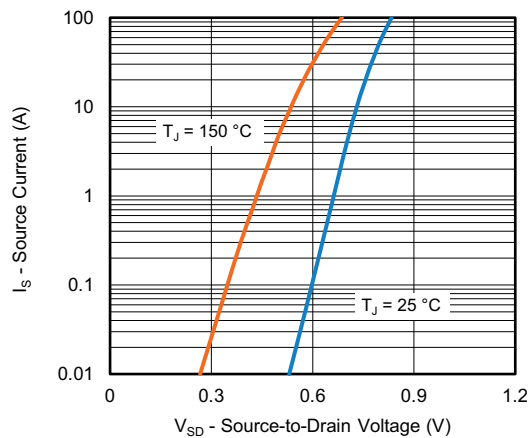
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)

**Output Characteristics**

**Transfer Characteristics**

**Transfer Characteristics**

**Capacitance**

**Transconductance**

**On-Resistance vs. Drain Current**



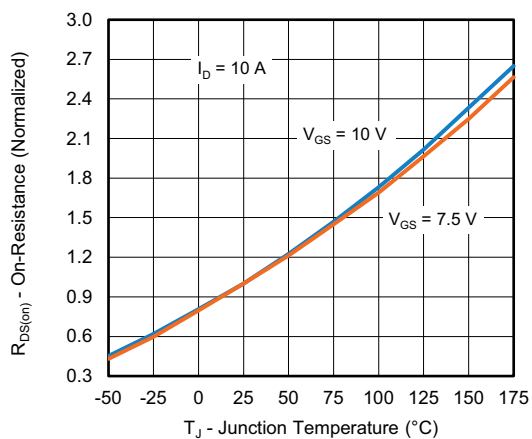
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)



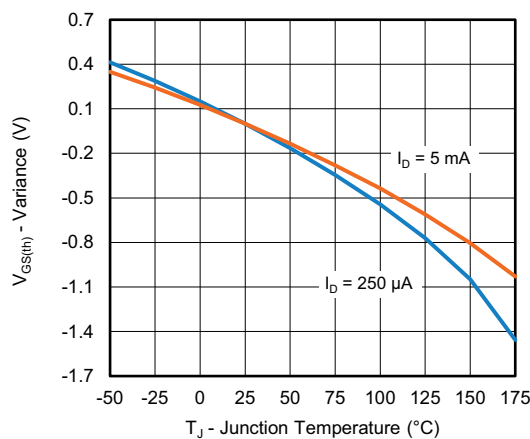
**Gate Charge**



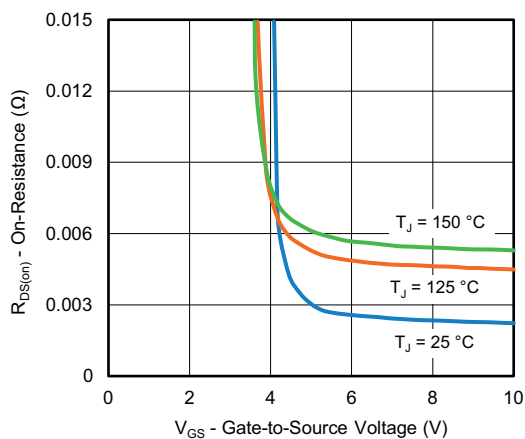
**Source Drain Diode Forward Voltage**



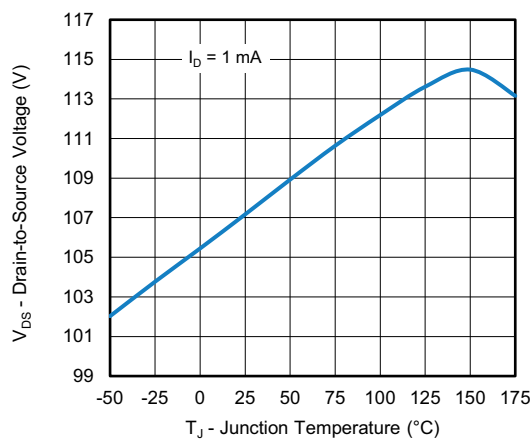
**On-Resistance vs. Junction Temperature**



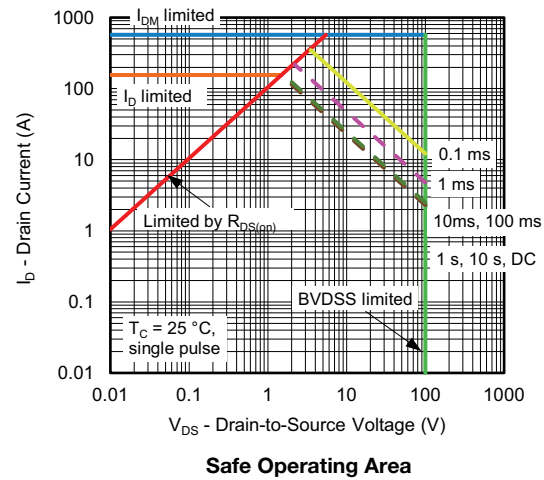
**Threshold Voltage**



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



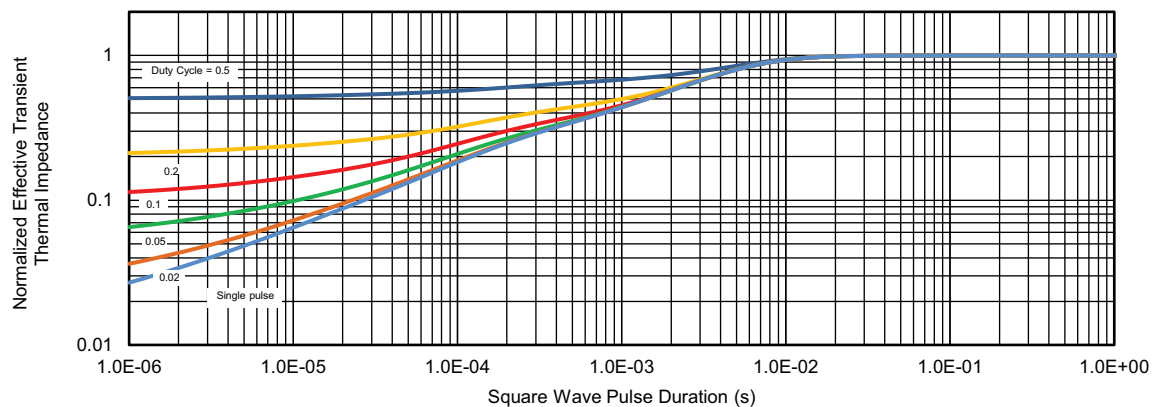
**Drain Source Breakdown vs. Junction Temperature**


**Note**

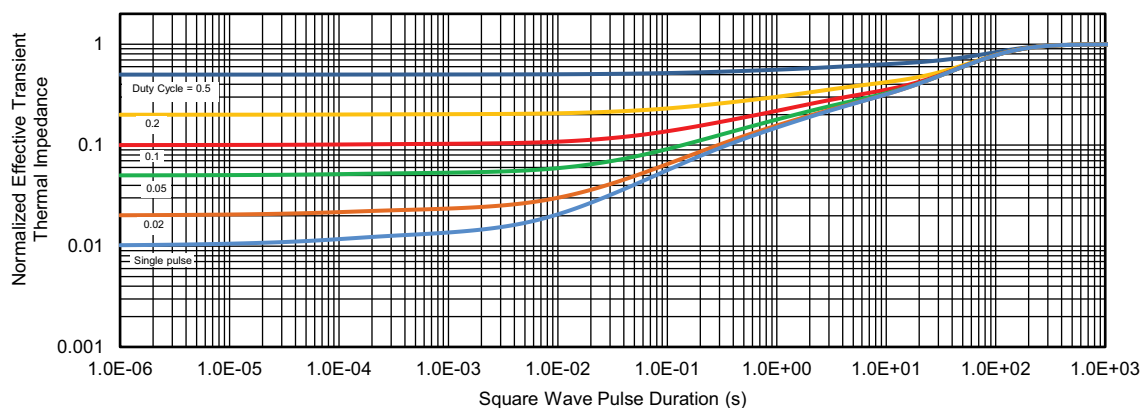
- a.  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



**THERMAL RATINGS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)



**Normalized Thermal Transient Impedance, Junction-to-Case**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

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