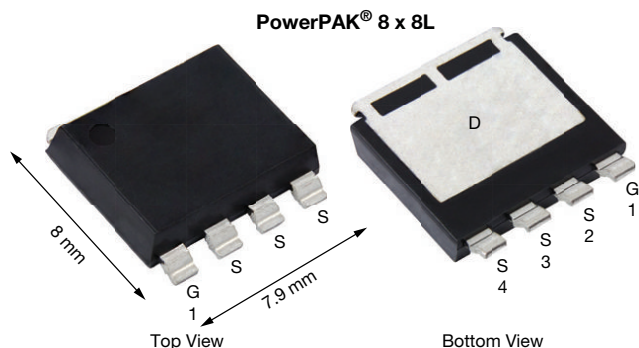


# Automotive N-Channel 100 V (D-S) 175 °C MOSFET

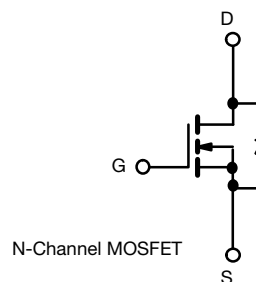


## FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 % R<sub>g</sub> 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)



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



## PRODUCT SUMMARY

$V_{DS}$ (V)	100
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 10$ V	0.0055
$R_{DS(on)}$ ( $\Omega$ ) at $V_{GS} = 4.5$ V	0.0062
$I_D$ (A) <sup>e</sup>	136
Configuration	Single

## ORDERING INFORMATION

Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SQJQ114EL (for detailed order number please see <a href="http://www.vishay.com/doc?79776">www.vishay.com/doc?79776</a> )

**ABSOLUTE MAXIMUM RATINGS** (T<sub>C</sub> = 25 °C, unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V <sub>DS</sub>	100	V
Gate-source voltage		V <sub>GS</sub>	± 20	
Continuous drain current <sup>e</sup>	T <sub>C</sub> = 25 °C	I <sub>D</sub>	136	A
	T <sub>C</sub> = 125 °C		78	
Continuous source current (diode conduction) <sup>e</sup>		I <sub>S</sub>	252	
Pulsed drain current <sup>a, e</sup>		I <sub>DM</sub>	311	
Single pulse avalanche current	L = 0.1 mH	I <sub>AS</sub>	46	
Single pulse avalanche energy		E <sub>AS</sub>	105	
Maximum power dissipation <sup>e</sup>	T <sub>C</sub> = 25 °C	P <sub>D</sub>	277	W
	T <sub>C</sub> = 125 °C		92	
Operating junction and storage temperature range		T <sub>J</sub> , T <sub>stg</sub>	-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 <sub>thJA</sub>	44	°C/W
Junction-to-case (drain) <sup>d</sup>		R <sub>thJC</sub>	0.54	

## Notes

- a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2 \%$
- b. When mounted on 1" square PCB (FR4 material)
- c. See solder profile ([www.vishay.com/doc?73257](http://www.vishay.com/doc?73257))
- d. As per JESD51-14
- e. Values based on  $R_{\text{thJC}}$  and  $T_C$  of  $25^\circ\text{C}$ . 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		1.4	1.9	2.4	
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	-	0.0035	0.0055	Ω
		V <sub>GS</sub> = 10 V	I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C	-	-	0.0120	
		V <sub>GS</sub> = 10 V	I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C	-	-	0.0150	
		V <sub>GS</sub> = 4.5 V	I <sub>D</sub> = 20 A	-	0.0048	0.0062	
Forward transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A		-	165	-	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	-	6428	9000	pF
Output capacitance	C <sub>oss</sub>			-	618	866	
Reverse transfer capacitance	C <sub>rss</sub>			-	39	55	
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	-	102	158	nC
Gate-source charge <sup>c</sup>	Q <sub>gs</sub>			-	20	-	
Gate-drain charge <sup>c</sup>	Q <sub>gd</sub>			-	14	-	
Gate resistance	R <sub>g</sub>	f = 1 MHz		0.5	1.1	1.8	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		-	14	22	ns
Rise time <sup>c</sup>	t <sub>r</sub>			-	4	8	
Turn-off delay time <sup>c</sup>	t <sub>d(off)</sub>			-	47	71	
Fall time <sup>c</sup>	t <sub>f</sub>			-	6	9	
Source-Drain Diode Ratings and Characteristics <sup>b</sup>							
Pulsed current <sup>a</sup>	I <sub>SM</sub>			-	-	311	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		-	49	98	ns
Body diode reverse recovery charge	Q <sub>rr</sub>			-	91	182	nC
Reverse recovery fall time	t <sub>a</sub>			-	40	-	ns
Reverse recovery rise time	t <sub>b</sub>			-	10	-	
Body diode peak reverse recovery current	I <sub>RM(REC)</sub>			-	3.4	-	A

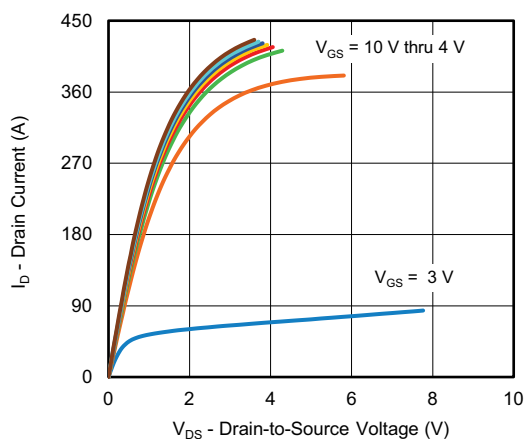
**Notes**

- 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

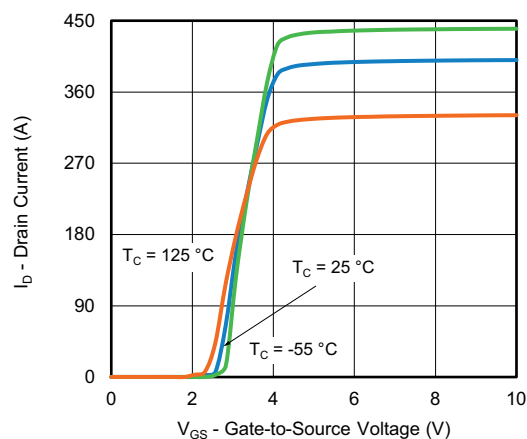
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



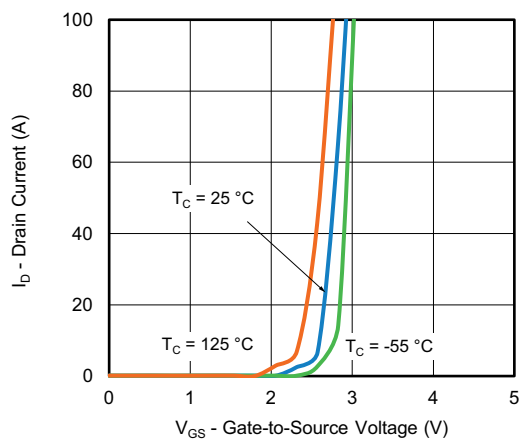
**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)



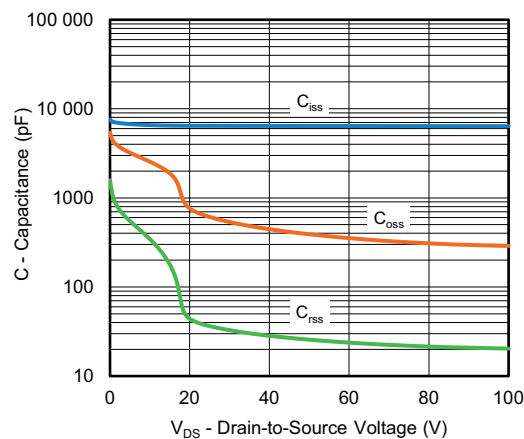
**Output Characteristics**



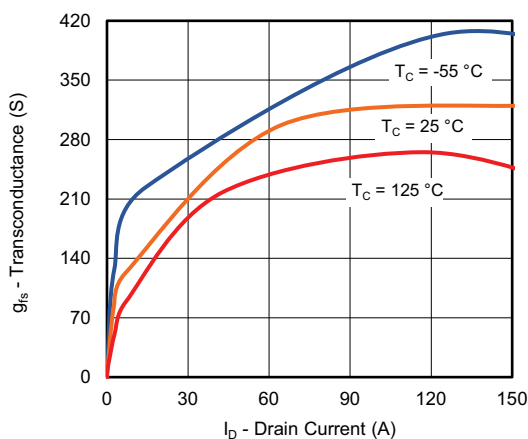
**Transfer Characteristics**



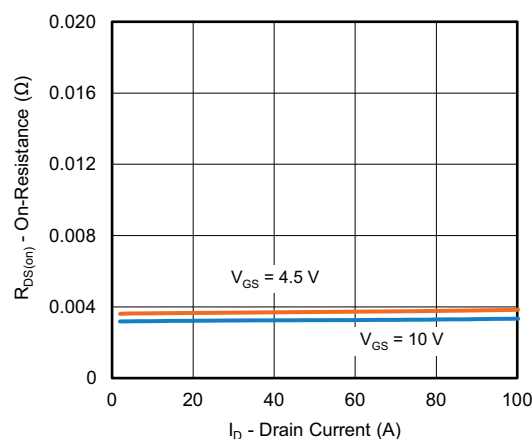
**Transfer Characteristics**



**Capacitance**



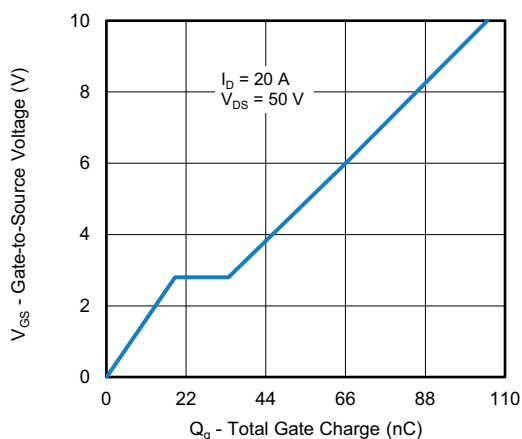
**Transconductance**



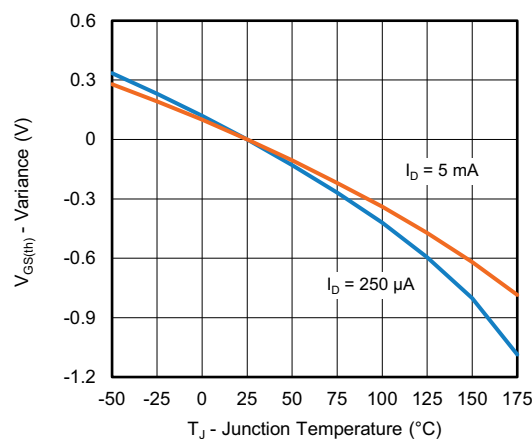
**On-Resistance vs. Drain Current**



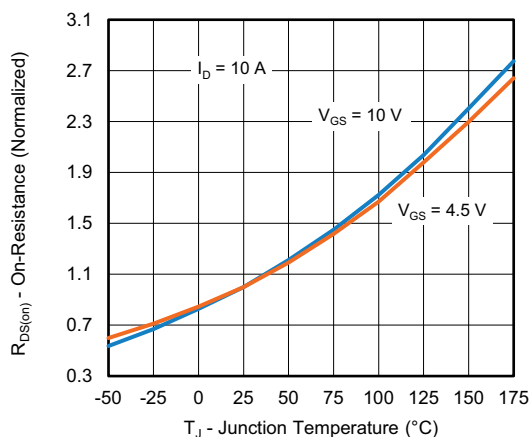
**TYPICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)



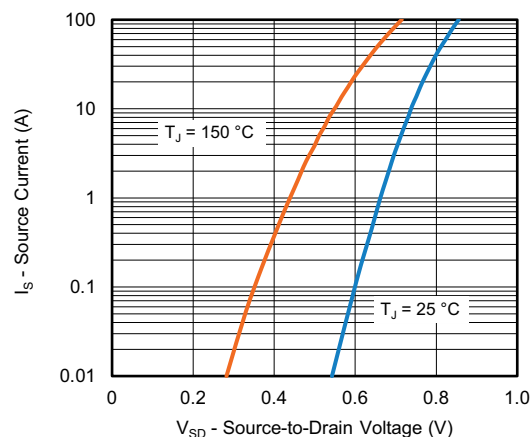
**Gate Charge**



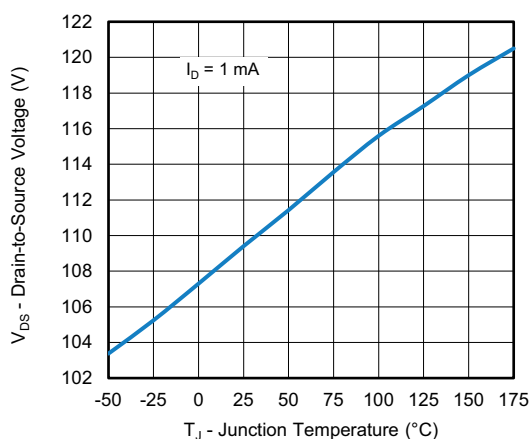
**Threshold Voltage**



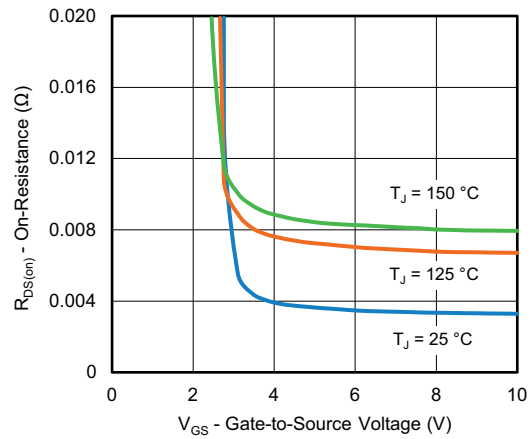
**On-Resistance vs. Junction Temperature**



**Source Drain Diode Forward Voltage**



**Drain Source Breakdown vs. Junction Temperature**



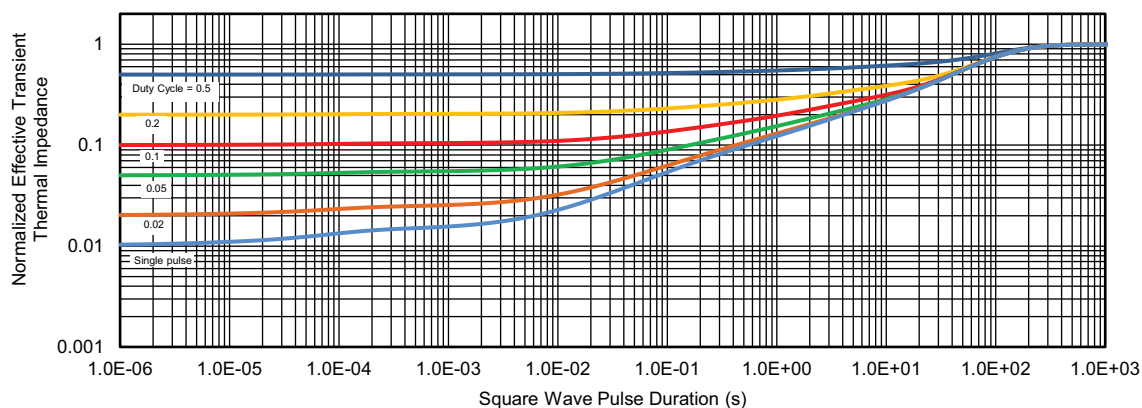
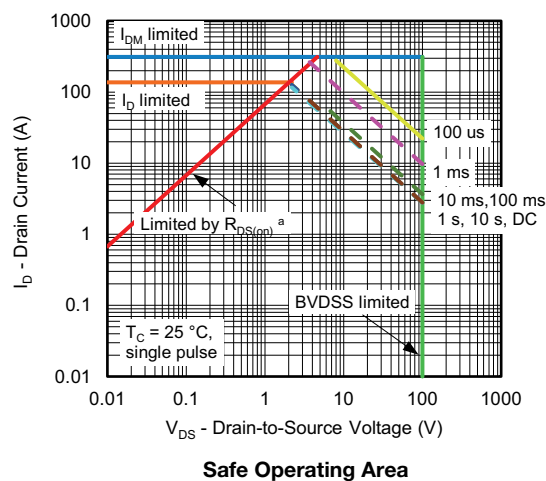
**On-Resistance vs. Gate-to-Source Voltage**

**Note**

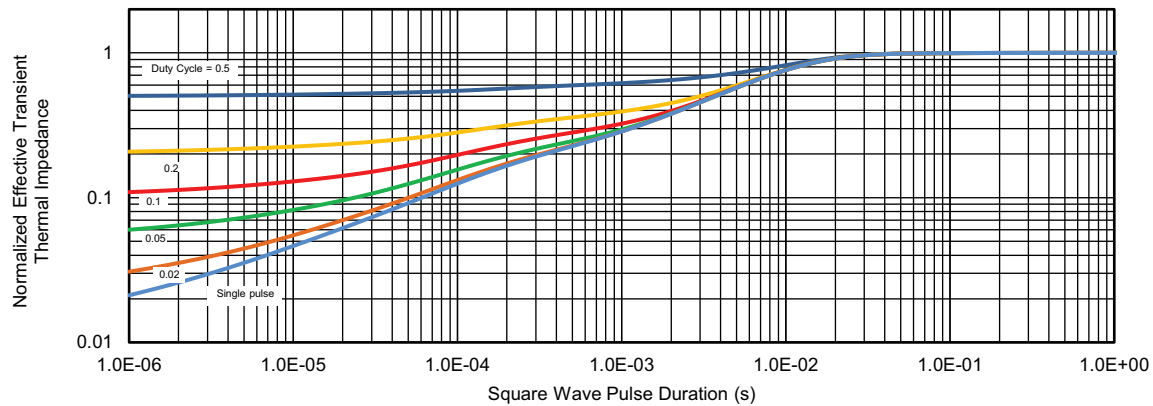
- a.  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified



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



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



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

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