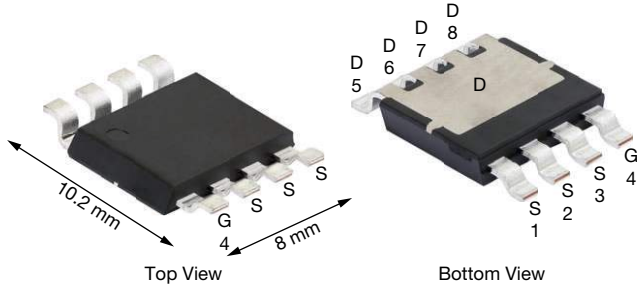
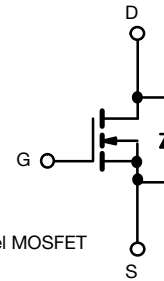


# Automotive N-Channel 100 V (D-S) 175 °C MOSFET

**PowerPAK® 8 x 8LR**

**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)

AUTOMOTIVE GRADE


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


N-Channel MOSFET

PRODUCT SUMMARY	
V <sub>DS</sub> (V)	100
R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = 10 V	0.00253
I <sub>D</sub> (A)	296
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK 8 x 8LR
Lead (Pb)-free and halogen-free	SQJQ112ER (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	T <sub>C</sub> = 25 °C	I <sub>D</sub>	296	A
	T <sub>C</sub> = 125 °C		171	
Continuous source current (diode conduction)		I <sub>S</sub>	545	
Pulsed drain current <sup>a</sup>		I <sub>DM</sub>	655	
Single pulse avalanche current	L = 0.1 mH	I <sub>AS</sub>	69	
Single pulse avalanche energy		E <sub>AS</sub>	242	mJ
Maximum power dissipation	T <sub>C</sub> = 25 °C	P <sub>D</sub>	600	W
	T <sub>C</sub> = 125 °C		200	
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>	40	°C/W
Junction-to-case (drain)		R <sub>thJC</sub>	0.25	

**Notes**

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)
- See solder profile ([www.vishay.com/doc?73257](http://www.vishay.com/doc?73257))



SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
<b>Static</b>							
Drain-source breakdown voltage	$V_{DS}$	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$		100	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		2	3	3.5	
Gate-source leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$		-	-	$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 100\text{ V}$	-	-	1	$\mu\text{A}$
		$V_{GS} = 0\text{ V}$	$V_{DS} = 100\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 100\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	500	
On-state drain current <sup>a</sup>	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	50	-	-	A
Drain-source on-state resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$	-	0.0021	0.00253	$\Omega$
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.0054	
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.0068	
Forward transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$		-	45	-	S
<b>Dynamic <sup>b</sup></b>							
Input capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	11388	15 945	$\text{pF}$
Output capacitance	$C_{oss}$			-	1326	1857	
Reverse transfer capacitance	$C_{rss}$			-	80	112	
Total gate charge <sup>c</sup>	$Q_g$	$V_{GS} = 10\text{ V}$	$V_{DS} = 50\text{ V}, I_D = 20\text{ A}$	-	181	272	$\text{nC}$
Gate-source charge <sup>c</sup>	$Q_{gs}$			-	48	-	
Gate-drain charge <sup>c</sup>	$Q_{gd}$			-	37	-	
Gate resistance	$R_g$	$f = 1\text{ MHz}$		0.7	1.5	2.3	$\Omega$
Turn-on delay time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 2.5\text{ }\Omega,$ $I_D \cong 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	21	30	$\text{ns}$
Rise time <sup>c</sup>	$t_r$			-	16	24	
Turn-off delay time <sup>c</sup>	$t_{d(off)}$			-	67	95	
Fall time <sup>c</sup>	$t_f$			-	16	24	
<b>Source-Drain Diode Ratings and Characteristics <sup>b</sup></b>							
Pulsed current <sup>a</sup>	$I_{SM}$			-	-	655	A
Forward voltage	$V_{SD}$	$I_F = 40\text{ A}, V_{GS} = 0\text{ V}$		-	0.7	1.2	V
Body diode reverse recovery time	$t_{rr}$	$I_F = 15\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		-	70	140	ns
Body diode reverse recovery charge	$Q_{rr}$			-	172	344	nC
Reverse recovery fall time	$t_a$			-	44	-	ns
Reverse recovery rise time	$t_b$			-	26	-	
Body diode peak reverse recovery current	$I_{RM(REC)}$					-	4.3

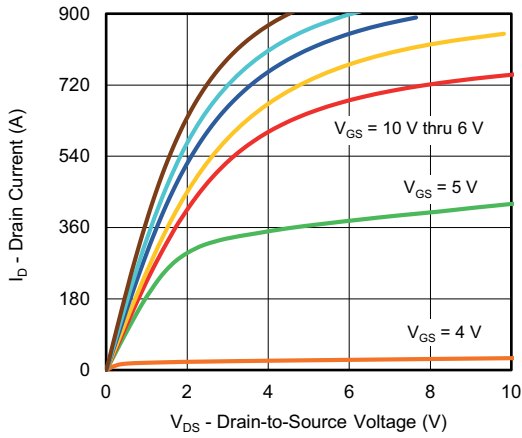
**Notes**

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

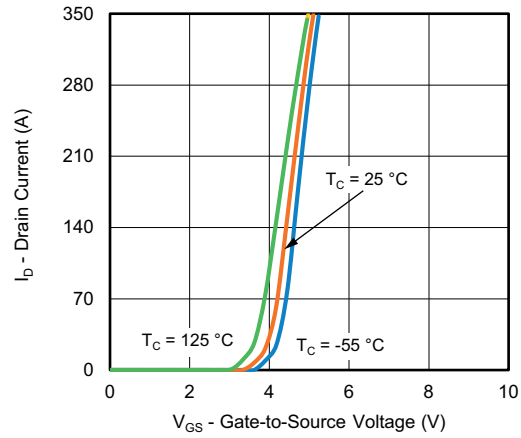
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



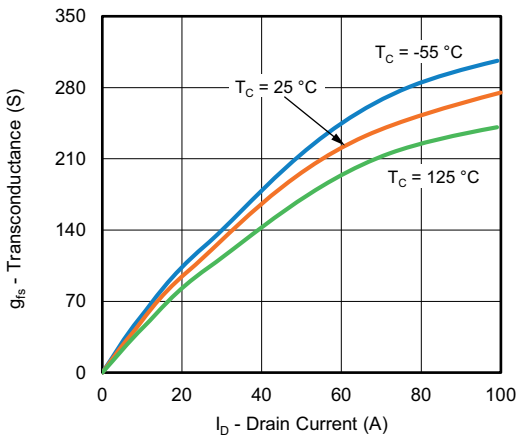
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise noted)



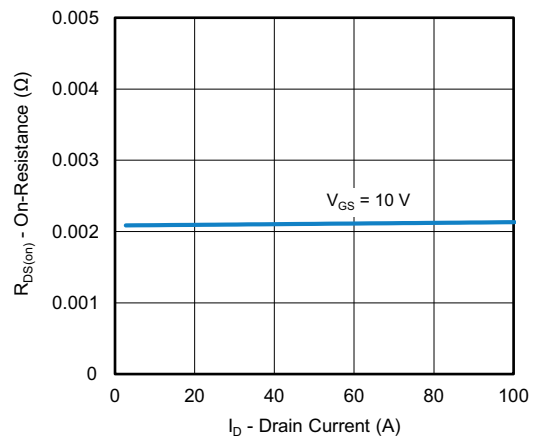
Output Characteristics



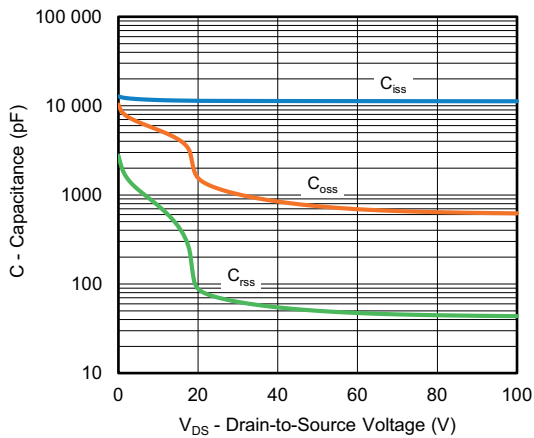
Transfer Characteristics



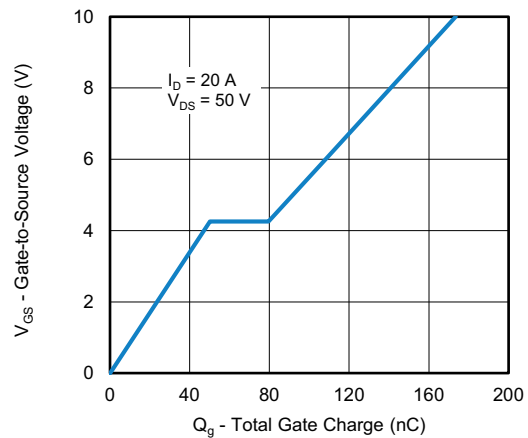
Transconductance



On-Resistance vs. Drain Current



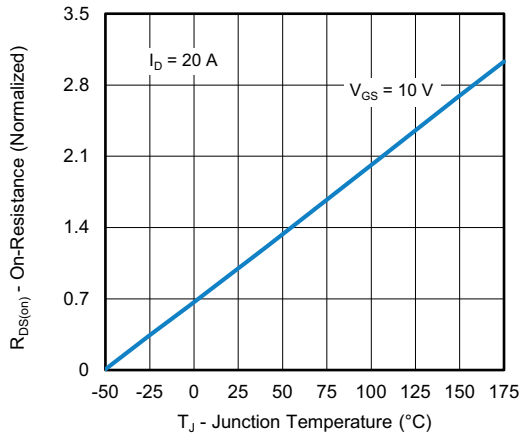
Capacitance



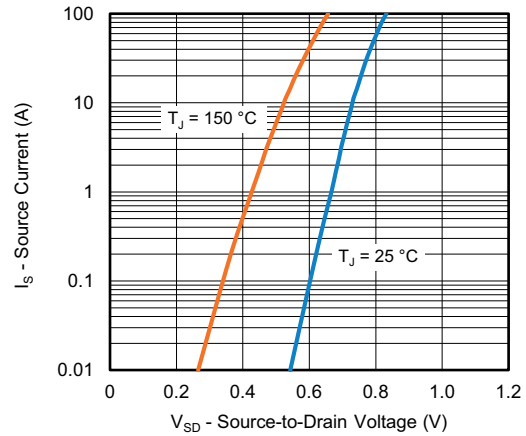
Gate Charge



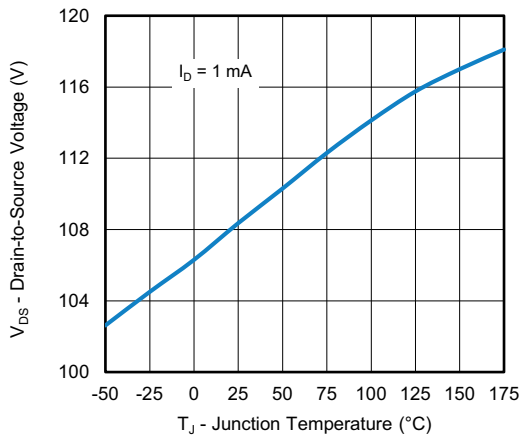
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, unless otherwise noted)



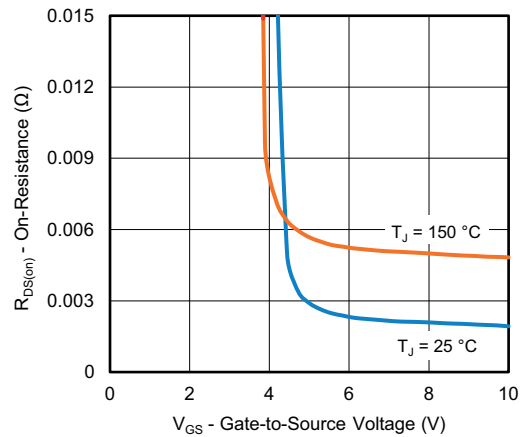
On-Resistance vs. Junction Temperature



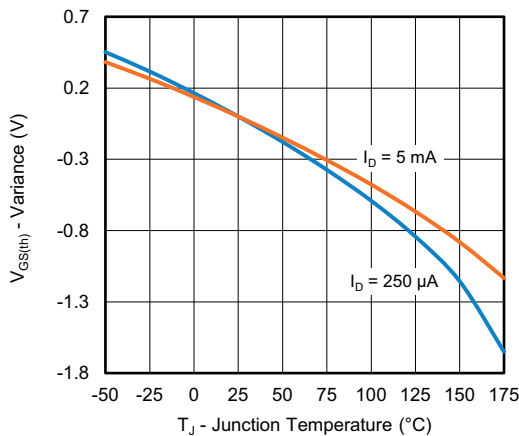
Source Drain Diode Forward Voltage



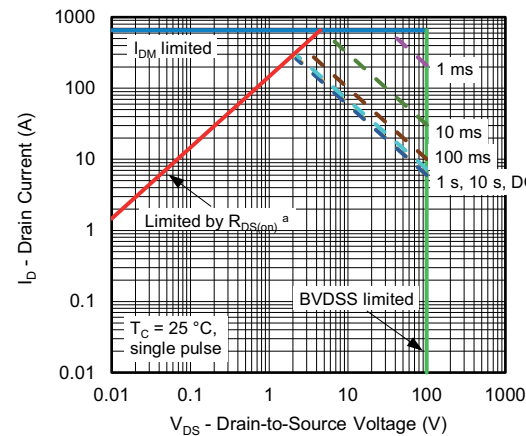
Drain Source Breakdown vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



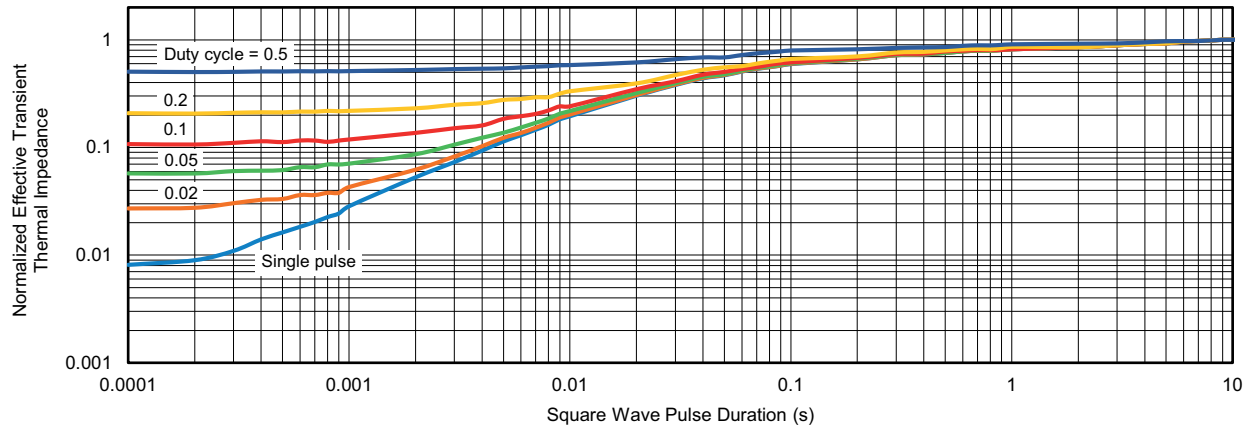
Safe Operating Area

Note

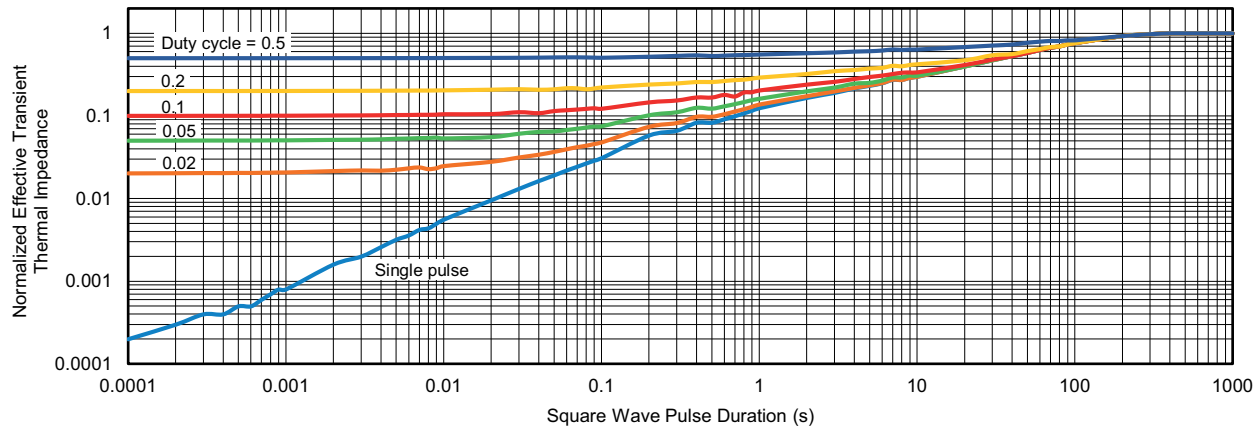
a. V<sub>GS</sub> > minimum V<sub>GS</sub> at which R<sub>DS(on)</sub> is specified



**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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