

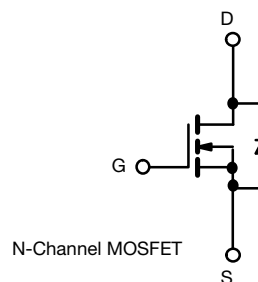
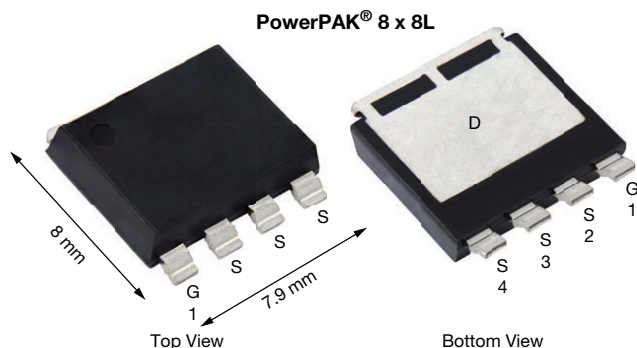
Automotive N-Channel 100 V (D-S) 175 °C MOSFET



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



PRODUCT SUMMARY	
V_{DS} (V)	100
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.0055
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.0062
I_D (A) ^e	136
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SQJQ114EL (for detailed order number please see www.vishay.com/doc?79776)

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}	± 20	
Continuous drain current ^e	$T_C = 25$ °C	I_D	136	A
	$T_C = 125$ °C		78	
Continuous source current (diode conduction) ^e		I_S	252	
Pulsed drain current ^{a, e}		I_{DM}	311	
Single pulse avalanche current		I_{AS}	46	
Single pulse avalanche energy		E_{AS}	105	mJ
Maximum power dissipation ^e	$T_C = 25$ °C	P_D	277	W
	$T_C = 125$ °C		92	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) ^c			260	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-ambient	PCB mount ^b	R_{thJA}	44	°C/W
Junction-to-case (drain) ^d		R_{thJC}	0.54	

Notes

- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)
- See solder profile (www.vishay.com/doc?73257)
- 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 _C = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA		100	-	-	V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		1.4	1.9	2.4	
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V		-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{GS} = 0 V	V _{DS} = 100 V	-	-	1	μA
		V _{GS} = 0 V	V _{DS} = 100 V, T _J = 125 °C	-	-	50	
		V _{GS} = 0 V	V _{DS} = 100 V, T _J = 175 °C	-	-	500	
On-state drain current ^a	I _{D(on)}	V _{GS} = 10 V	V _{DS} ≥ 5 V	50	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 20 A	-	0.0035	0.0055	Ω
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.0120	
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.0150	
		V _{GS} = 4.5 V	I _D = 20 A	-	0.0048	0.0062	
Forward transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 15 A		-	165	-	S
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 MHz	-	6428	9000	pF
Output capacitance	C _{oss}			-	618	866	
Reverse transfer capacitance	C _{rss}			-	39	55	
Total gate charge ^c	Q _g	V _{GS} = 10 V	V _{DS} = 50 V, I _D = 20 A	-	102	158	nC
Gate-source charge ^c	Q _{gs}			-	20	-	
Gate-drain charge ^c	Q _{gd}			-	14	-	
Gate resistance	R _g	f = 1 MHz		0.5	1.1	1.8	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = 50 V, R _L = 2.5 Ω, I _D ≅ 20 A, V _{GEN} = 10 V, R _g = 1 Ω		-	14	22	ns
Rise time ^c	t _r			-	4	8	
Turn-off delay time ^c	t _{d(off)}			-	47	71	
Fall time ^c	t _f			-	6	9	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed current ^a	I _{SM}			-	-	311	A
Forward voltage	V _{SD}	I _F = 40 A, V _{GS} = 0 V		-	0.7	1.1	V
Body diode reverse recovery time	t _{rr}	I _F = 15 A, di/dt = 100 A/μs		-	49	98	ns
Body diode reverse recovery charge	Q _{rr}			-	91	182	nC
Reverse recovery fall time	t _a			-	40	-	ns
Reverse recovery rise time	t _b			-	10	-	
Body diode peak reverse recovery current	I _{RM(REC)}			-	3.4	-	A

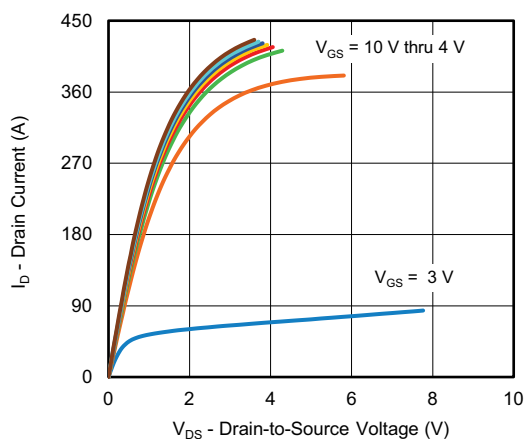
Notes

- 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

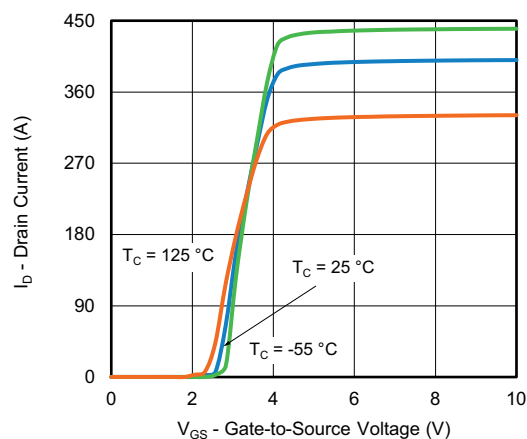
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



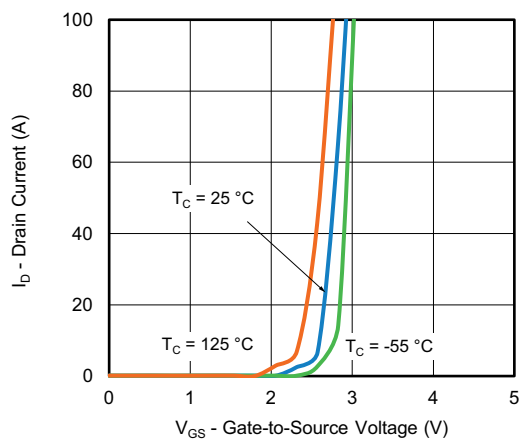
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



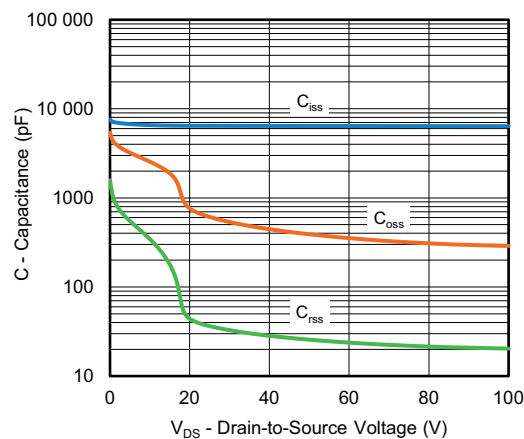
Output Characteristics



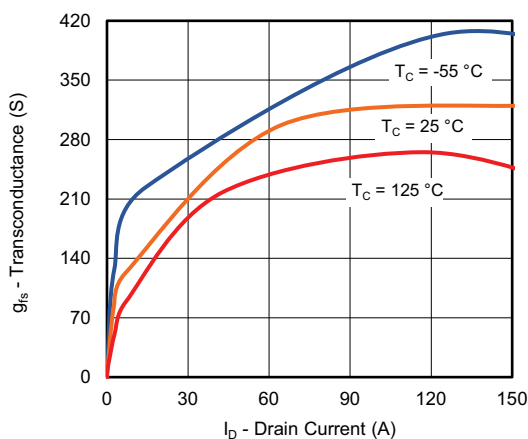
Transfer Characteristics



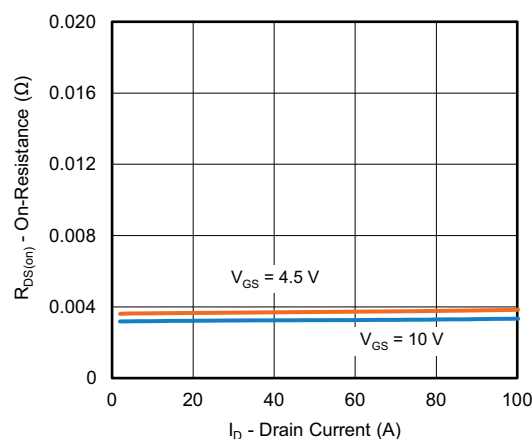
Transfer Characteristics



Capacitance



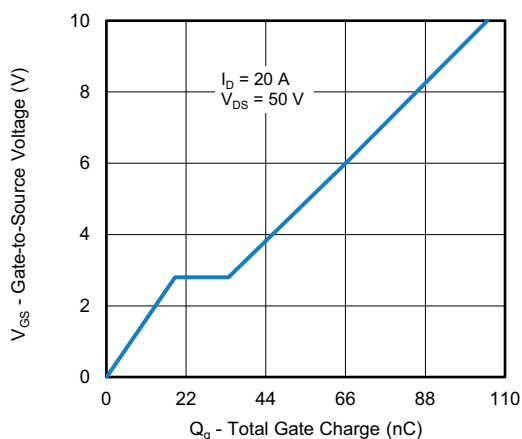
Transconductance



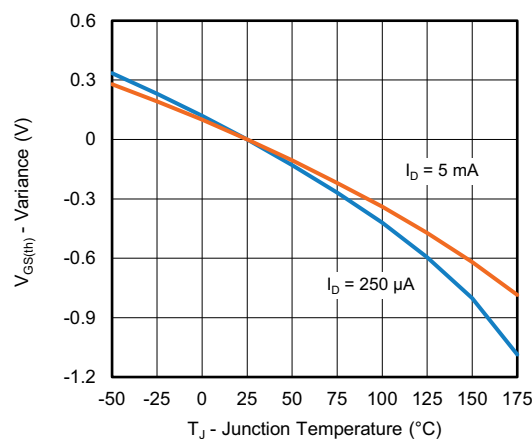
On-Resistance vs. Drain Current



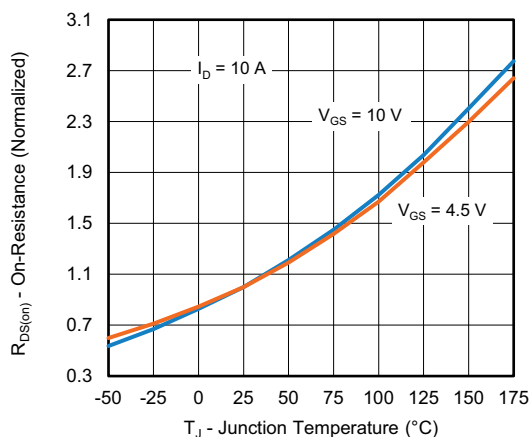
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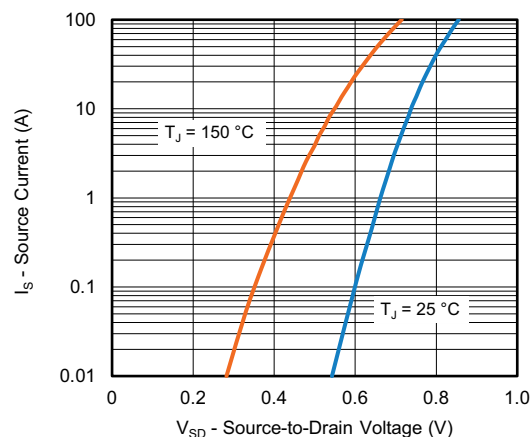
Gate Charge



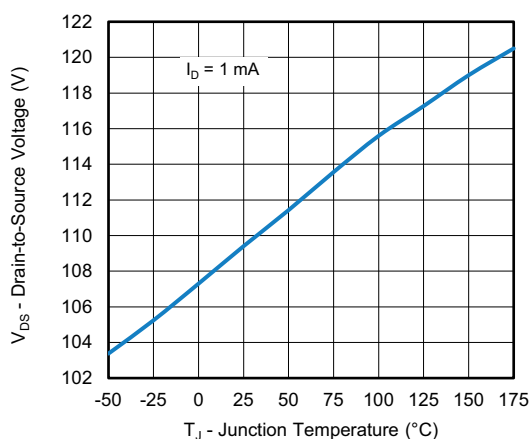
Threshold Voltage



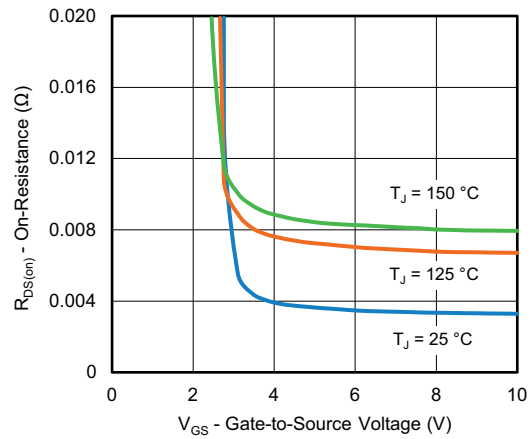
On-Resistance vs. Junction Temperature



Source Drain Diode Forward Voltage



Drain Source Breakdown vs. Junction Temperature



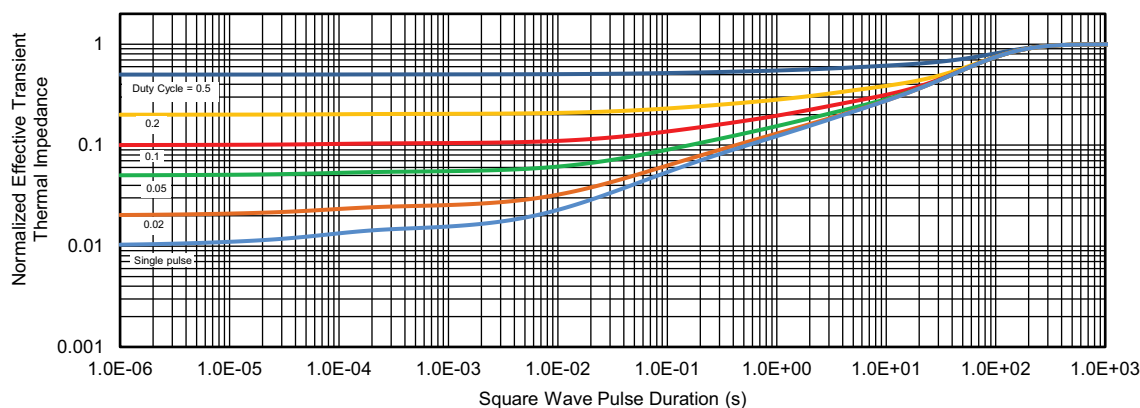
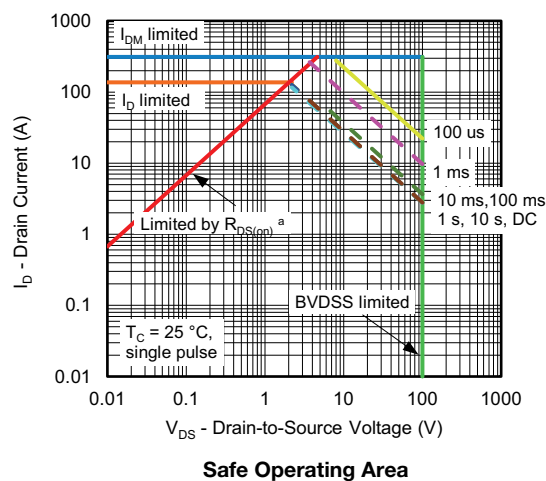
On-Resistance vs. Gate-to-Source Voltage

Note

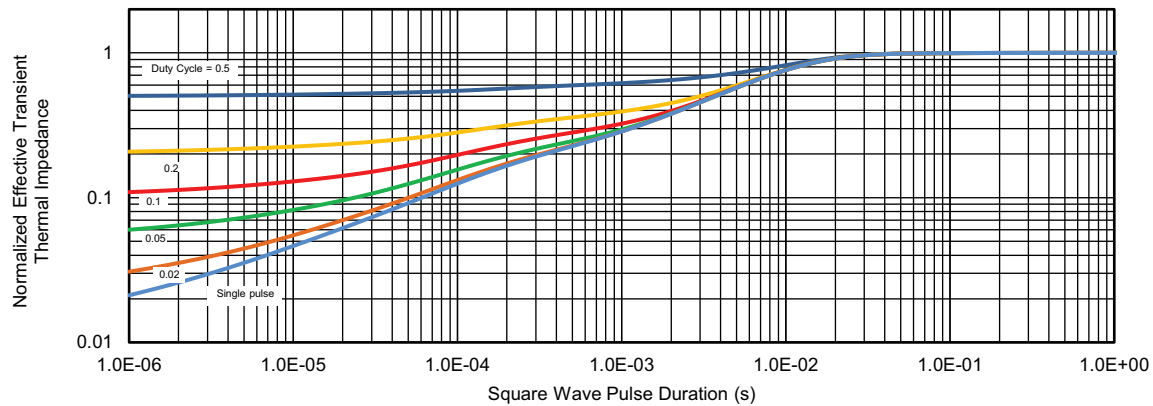
- a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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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