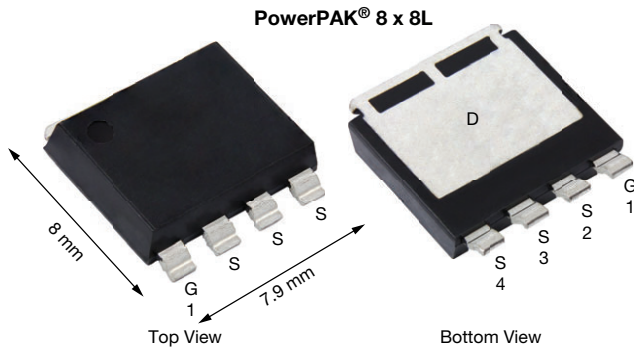


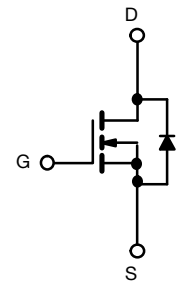
Automotive N-Channel 30 V (D-S) 175 °C MOSFET

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE


FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Thin 1.6 mm package
- Very low thermal resistance
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



N-Channel MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	30
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.00052
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.0007
I_D (A)	445
Configuration	Single
Package	PowerPAK 8 x 8L

ORDERING INFORMATION	
Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SQJQ130EL (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}	30	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current	I_D	$T_C = 25$ °C	445
		$T_C = 125$ °C	445
Continuous source current (diode conduction)	I_S	545	A
Pulsed drain current ^b	I_{DM}	445	
Single pulse avalanche current	I_{AS}	86	
Single pulse avalanche energy	E_{AS}	374	mJ
Maximum power dissipation	P_D	$T_C = 25$ °C	600
		$T_C = 125$ °C	200
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) ^d		260	

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-ambient	R_{thJA}	44	°C/W
Junction-to-case (drain)	R_{thJC}	0.25	

Notes

- Package limited
- 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). 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



SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$		30	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		1.5	2.0	2.5	
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}$	-	-	1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	200	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	330	
On-state drain current ^a	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	100	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$	-	0.00045	0.00052	Ω
		$V_{GS} = 4.5\text{ V}$	$I_D = 20\text{ A}$	-	0.0006	0.0007	
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.0008	
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.0009	
Forward transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 60\text{ A}$		-	360	-	S
Dynamic ^b							
Input capacitance	C_{ISS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	16 675	23 345	pF
Output capacitance	C_{OSS}			-	6850	9560	
Reverse transfer capacitance	C_{RSS}			-	715	1000	
Total gate charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$	-	310	455	nC
Gate-source charge ^c	Q_{gs}			-	53	-	
Gate-drain charge ^c	Q_{gd}			-	56	-	
Gate resistance	R_g	$f = 1\text{ MHz}$		0.9	1.9	2.9	Ω
Turn-on delay time ^c	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 0.5\text{ }\Omega$ $I_D \cong 30\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	22	33	ns
Rise time ^c	t_r			-	30	45	
Turn-off delay time ^c	$t_{d(off)}$			-	109	164	
Fall time ^c	t_f			-	57	86	
Source-Drain Diode Ratings and Characteristics ^b							
Reverse recovery time	t_{rr}	$V_{DD} = 24\text{ V}, I_{FM} = 20\text{ A},$ $di/dt = 100\text{ A}/\mu\text{s}$		-	40	-	ns
	t_a			-	44	-	
	t_b			-	83	166	
Reverse recovery charge	Q_{rr}			-	156	312	nC
Reverse recovery current	I_{RM}			-	-	3.4	A
Pulsed current ^a	I_{SM}			-	-	1600	A
Forward voltage	V_{SD}	$I_F = 50\text{ A}, V_{GS} = 0$		-	0.8	1.1	V

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

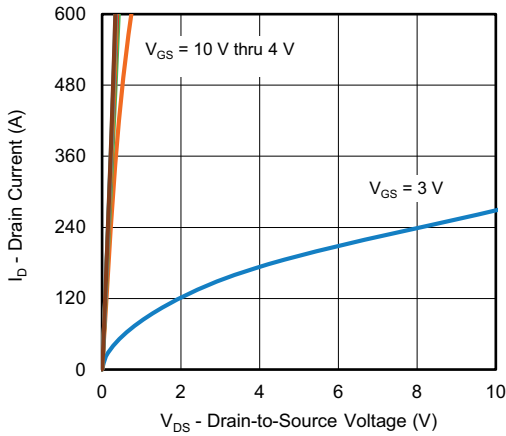


Fig. 1 - Output Characteristics

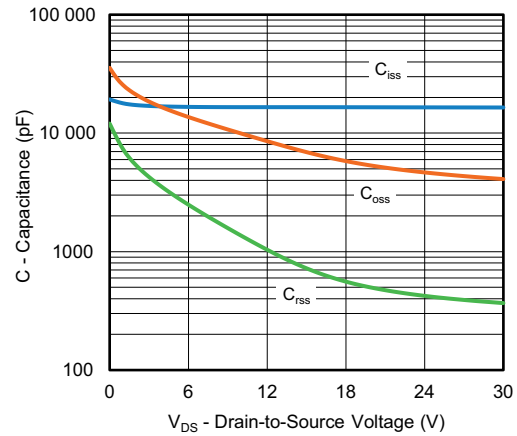


Fig. 4 - Capacitance

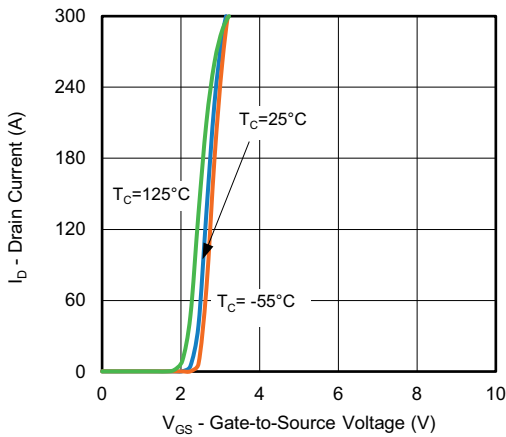


Fig. 2 - Transfer Characteristics

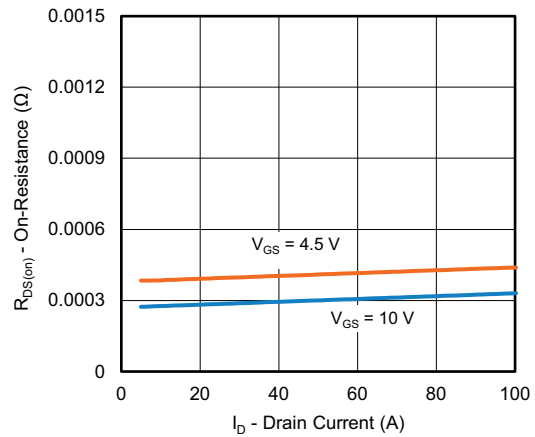


Fig. 5 - On-Resistance vs. Drain Current

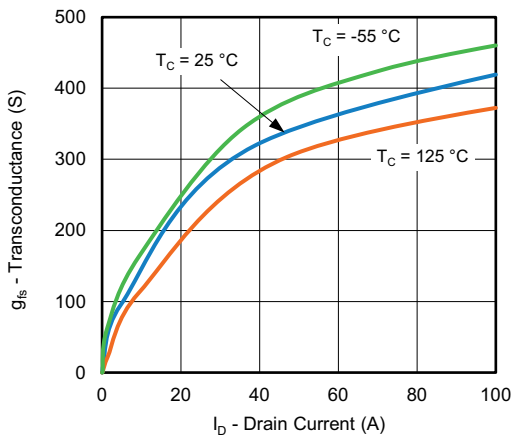


Fig. 3 - Transconductance

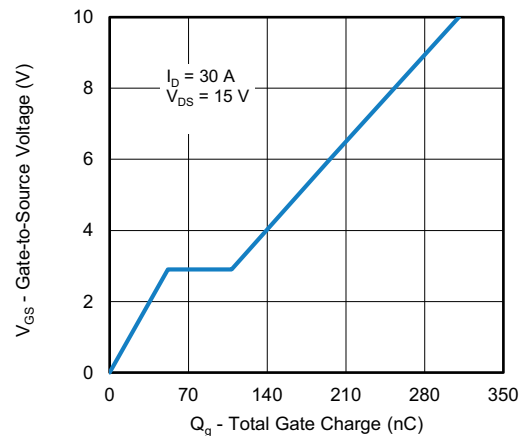


Fig. 6 - Gate Charge

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

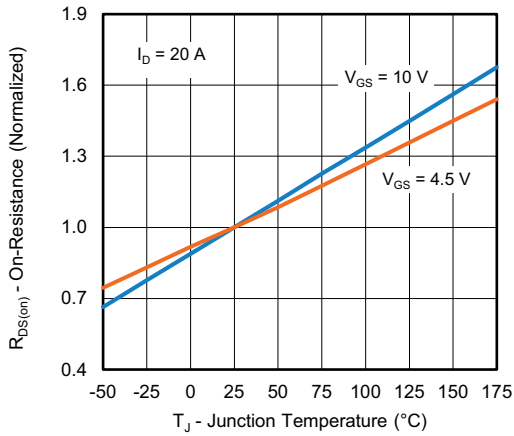


Fig. 7 - On-Resistance vs. Junction Temperature

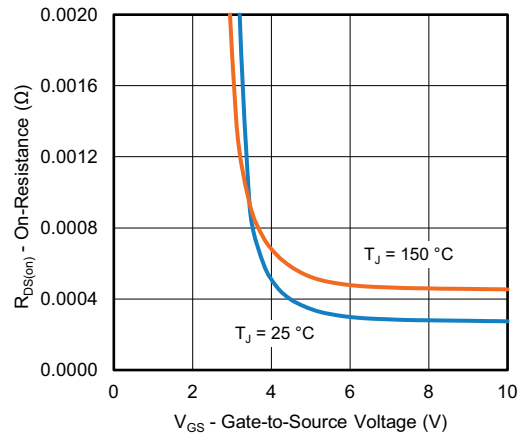


Fig. 10 - On-Resistance vs. Gate-to-Source Voltage

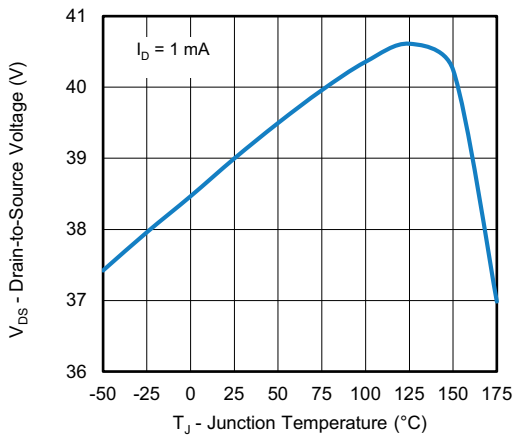


Fig. 8 - Drain Source Breakdown vs. Junction Temperature

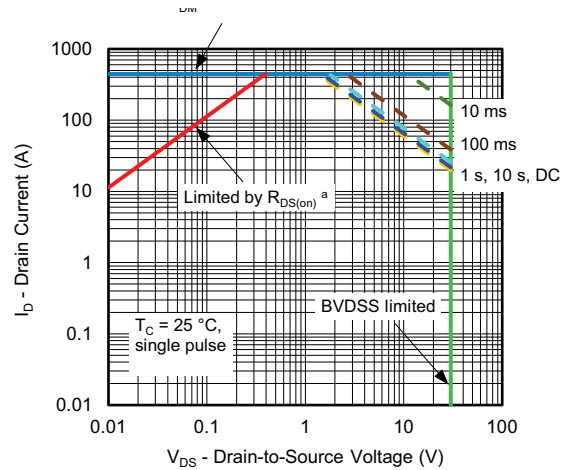


Fig. 11 - Safe Operating Area

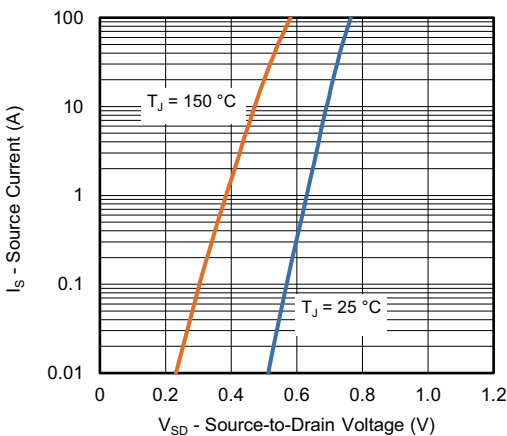


Fig. 9 - Source Drain Diode Forward Voltage

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)

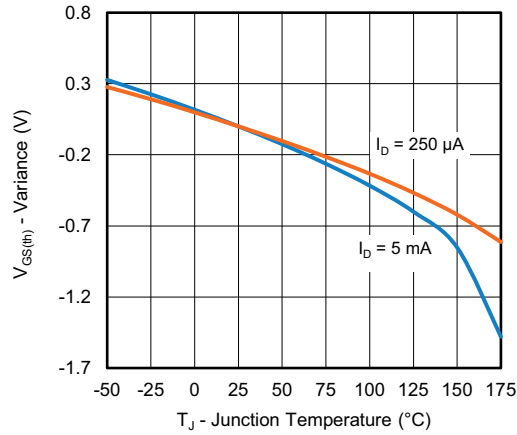


Fig. 12 - Threshold Voltage

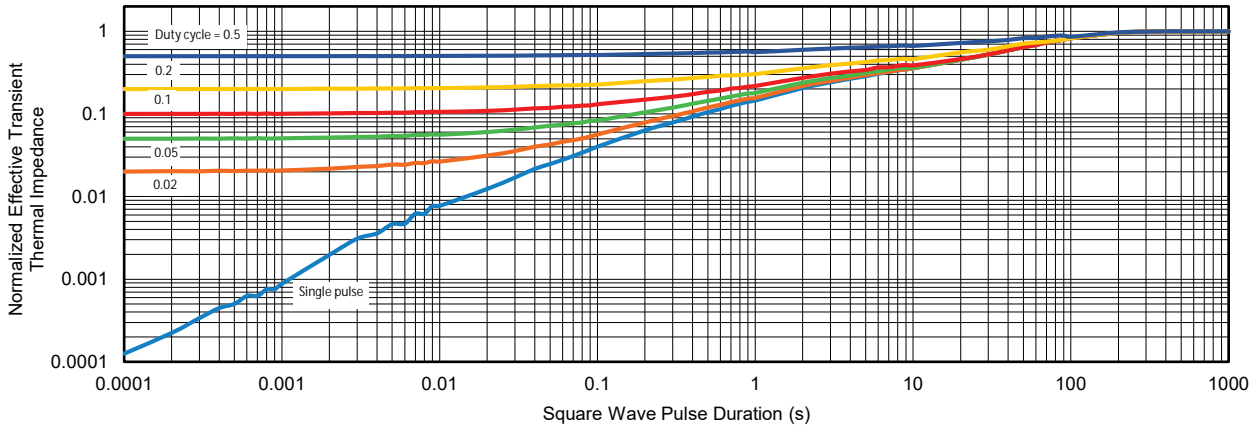


Fig. 13 - Normalized Thermal Transient Impedance, Junction-to-Ambient

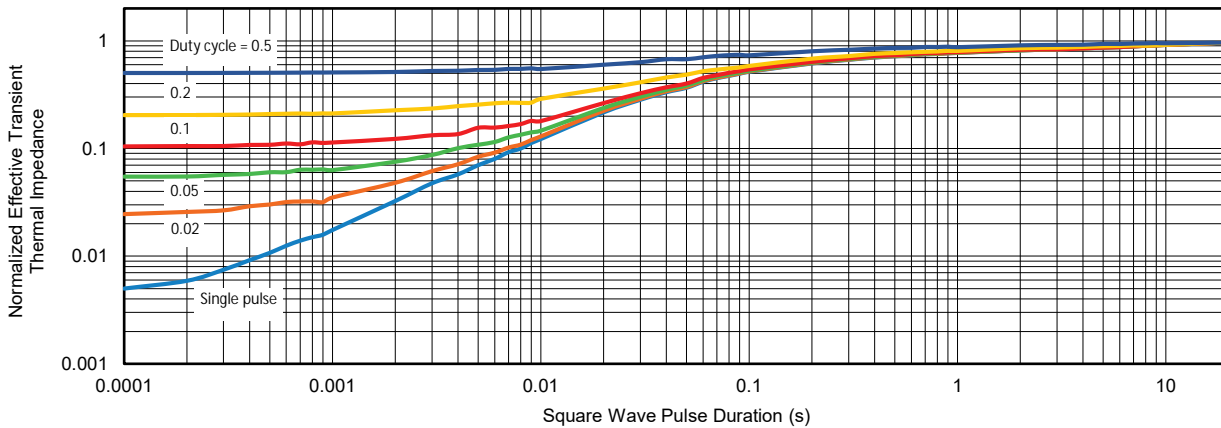


Fig. 14 - Normalized Thermal Transient Impedance, Junction-to-Case

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