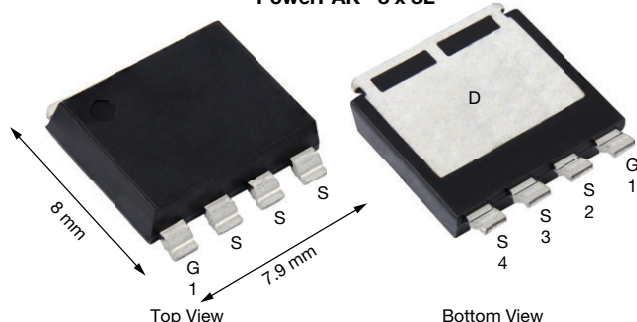


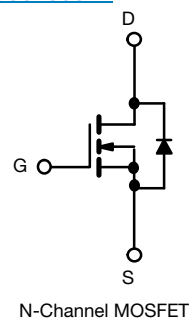
Automotive N-Channel 30 V (D-S) 175 °C MOSFET

PowerPAK® 8 x 8L


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

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE


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	A
		$T_C = 125$ °C	
Continuous source current (diode conduction)	I_S	545	
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	W
		$T_C = 125$ °C	
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

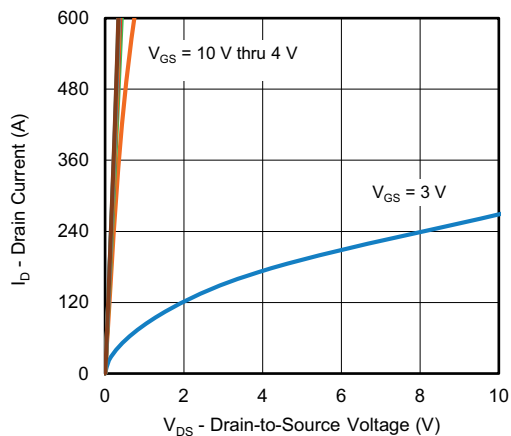
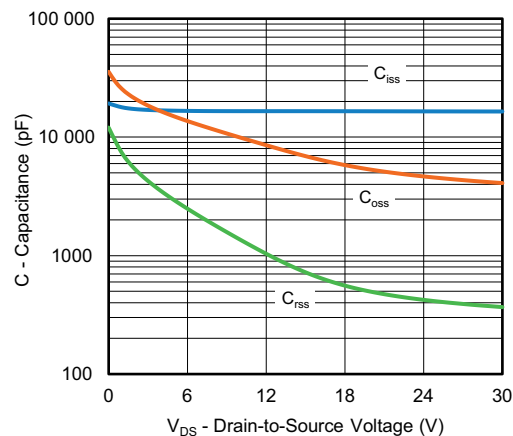
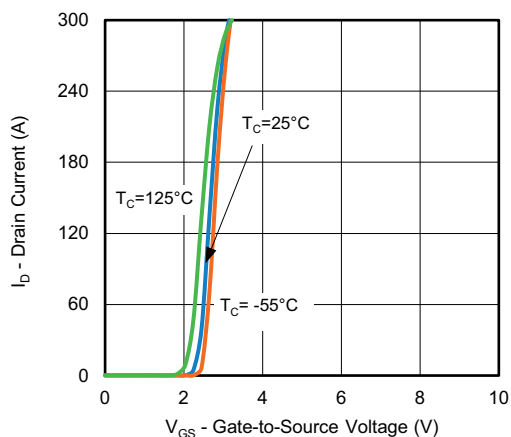
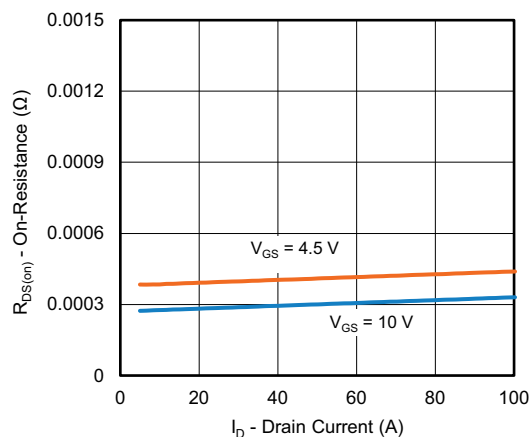
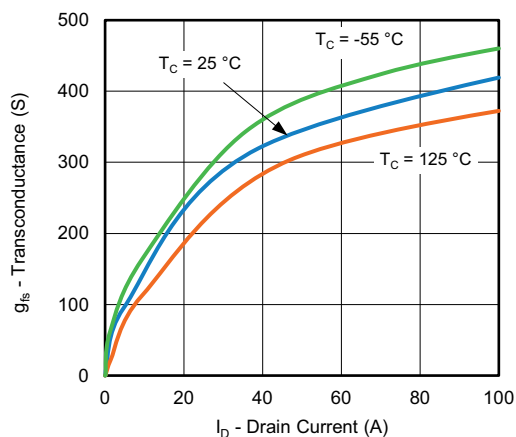
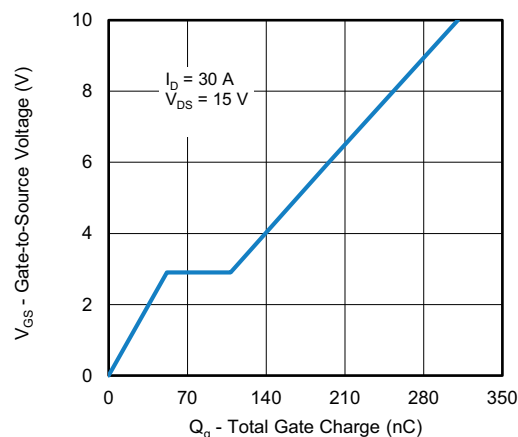


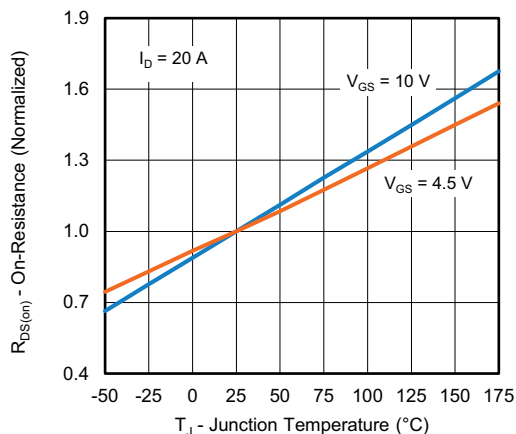
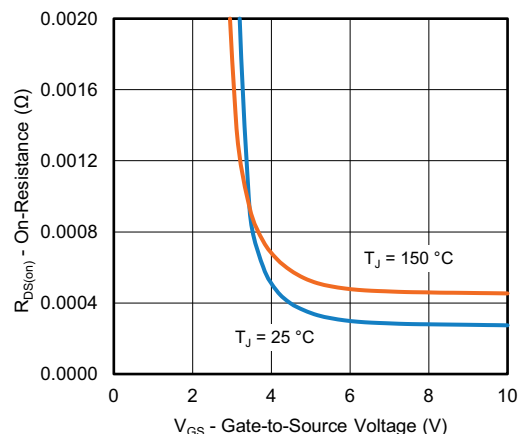
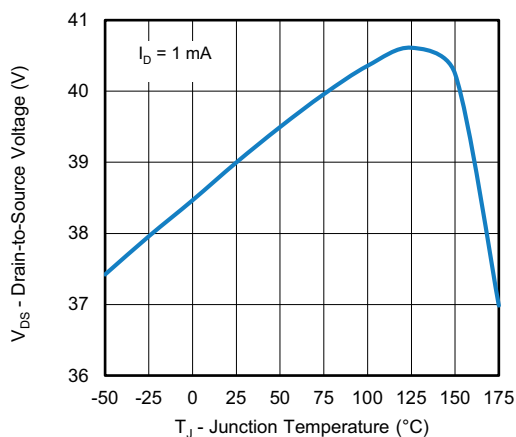
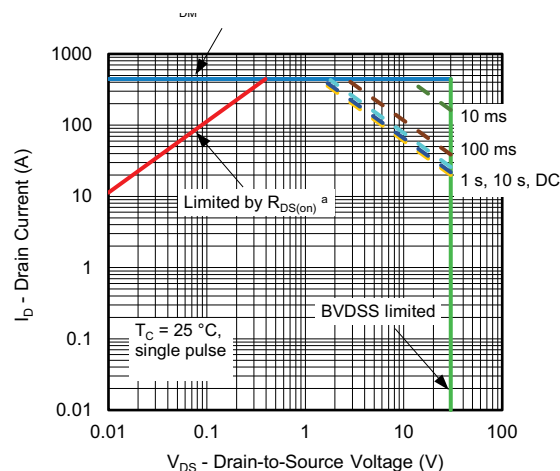
SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)								
PARAMETER		SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static								
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA		30	-	-	V	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		1.5	2.0	2.5		
Gate-source 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} = 30 V	-	-	1	μA	
		V _{GS} = 0 V	V _{DS} = 30 V, T _J = 125 °C	-	-	200		
		V _{GS} = 0 V	V _{DS} = 30 V, T _J = 175 °C	-	-	330		
On-state drain current ^a	I _{D(on)}	V _{GS} = 10 V	V _{DS} ≥ 5 V	100	-	-	A	
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 20 A	-	0.00045	0.00052	Ω	
		V _{GS} = 4.5 V	I _D = 20 A	-	0.0006	0.0007		
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.0008		
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.0009		
Forward transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 60 A		-	360	-	S	
Dynamic ^b								
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 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 V	V _{DS} = 15 V, I _D = 30 A	-	310	455	nC	
Gate-source charge ^c	Q _{gs}			-	53	-		
Gate-drain charge ^c	Q _{gd}			-	56	-		
Gate resistance	R _g	f = 1 MHz		0.9	1.9	2.9	Ω	
Turn-on delay time ^c	t _{d(on)}	V _{DD} = 15 V, R _L = 0.5 Ω I _D ≅ 30 A, V _{GEN} = 10 V, R _g = 1 Ω		-	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 V, I _{FM} = 20 A, di/dt = 100 A/μs		-	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 A, V _{GS} = 0		-	0.8	1.1	V	

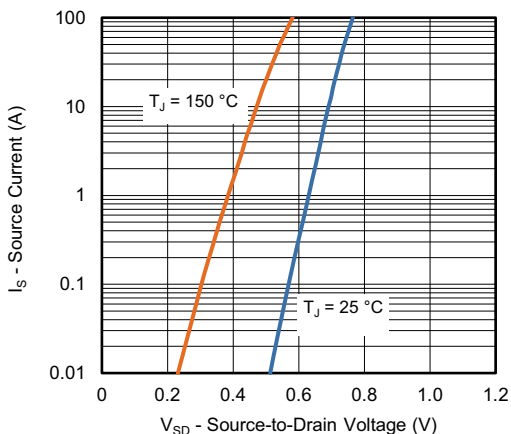
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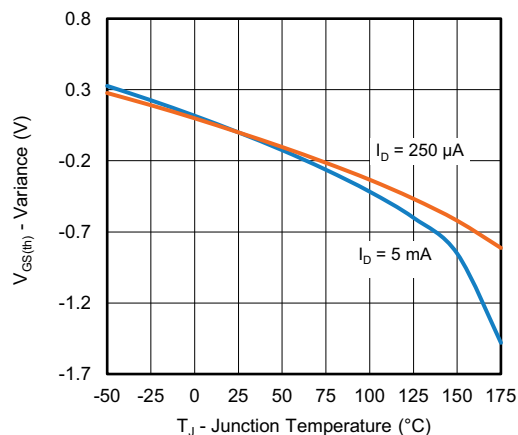
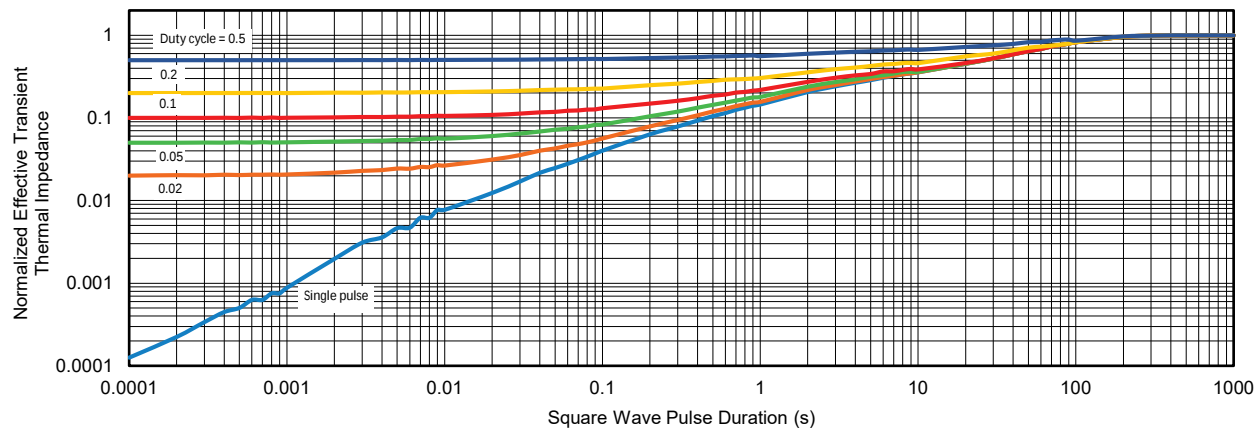
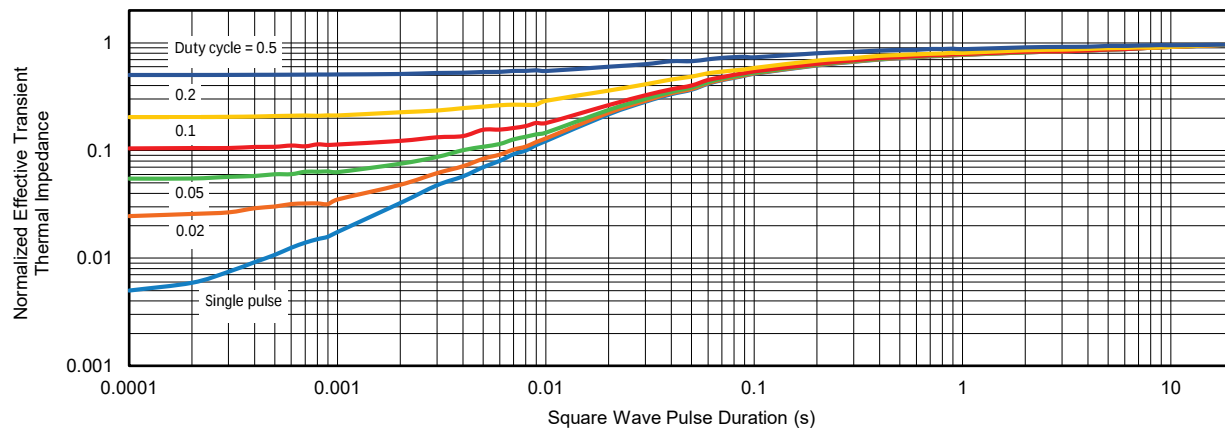
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing
c. Independent of operating temperature

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)

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
Note

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

Fig. 9 - Source Drain Diode Forward Voltage

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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