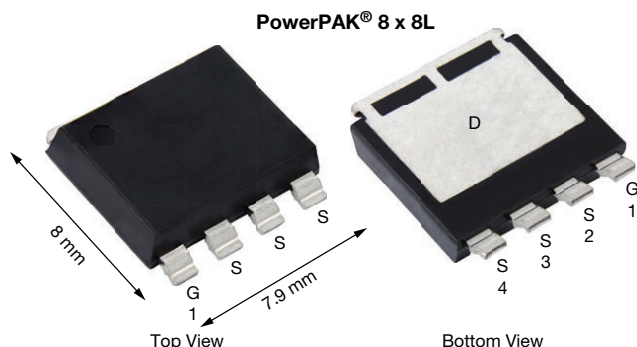


Automotive N-Channel 100 V (D-S) 175 °C MOSFET

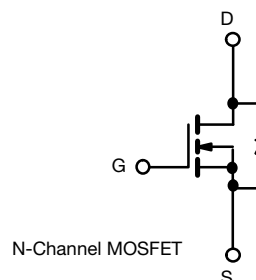


FEATURES

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



RoHS
COMPLIANT
HALOGEN
FREE



PRODUCT SUMMARY	
V_{DS} (V)	100
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.00186
I_D (A) ^e	286
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SQJQ510E (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	286	A
	T _C = 125 °C		165	
Continuous source current (diode conduction)		I _S	317	
Pulsed drain current ^a , ^e		I _{DM}	793	
Single pulse avalanche current	L = 0.1 mH	I _{AS}	71	
Single pulse avalanche energy		E _{AS}	252	mJ
Maximum power dissipation ^e	T _C = 25 °C	P _D	348	W
	T _C = 125 °C		116	
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}	0.43	

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		2.2	3.0	3.5	
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} = 100 V	-	-	10	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	-	0.00155	0.00186	Ω
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.0035	
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.0043	
Forward transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 35 A		-	155	-	S
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 MHz	-	7492	10 489	pF
Output capacitance	C _{oss}			-	3594	5032	
Reverse transfer capacitance	C _{rss}			-	39	55	
Total gate charge ^c	Q _g	V _{GS} = 10 V	V _{DS} = 50 V, I _D = 50 A	-	86	130	nC
Gate-source charge ^c	Q _{gs}			-	39	-	
Gate-drain charge ^c	Q _{gd}			-	3.6	-	
Gate resistance	R _g	f = 1 MHz		0.8	2.0	3.3	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = 50 V, R _L = 1 Ω, I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 1 Ω		-	20	30	ns
Rise time ^c	t _r			-	13	20	
Turn-off delay time ^c	t _{d(off)}			-	38	57	
Fall time ^c	t _f			-	11	17	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed current ^a	I _{SM}			-	-	793	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 = 40 A, di/dt = 100 A/μs		-	98	196	ns
Body diode reverse recovery charge	Q _{rr}			-	203	406	nC
Reverse recovery fall time	t _a			-	46	-	ns
Reverse recovery rise time	t _b			-	52	-	
Body diode peak reverse recovery current	I _{RM(REC)}			-	-3.6	-	A

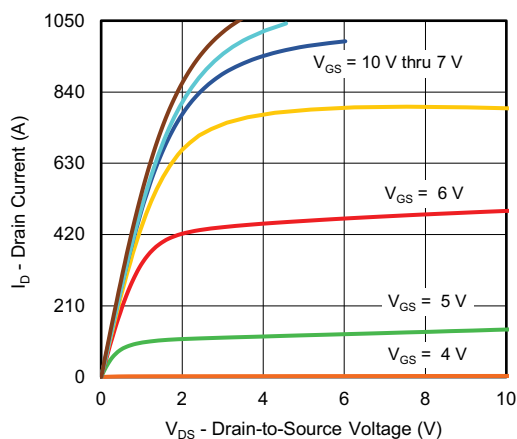
Notes

- 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

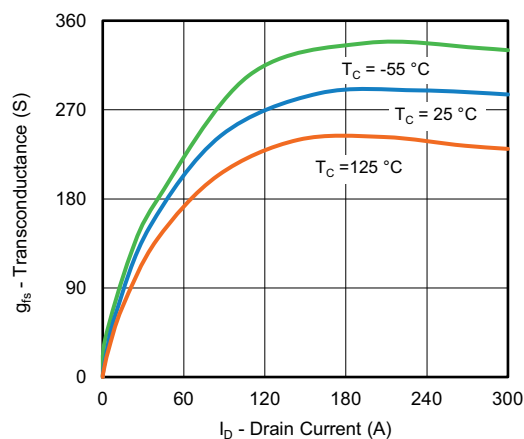
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



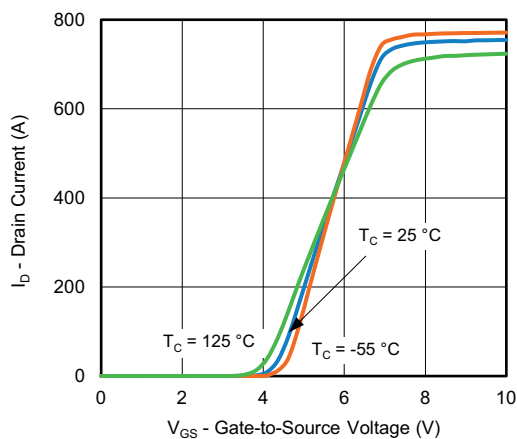
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



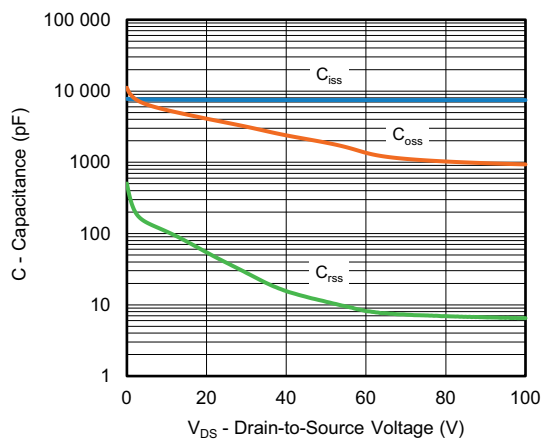
Output Characteristics



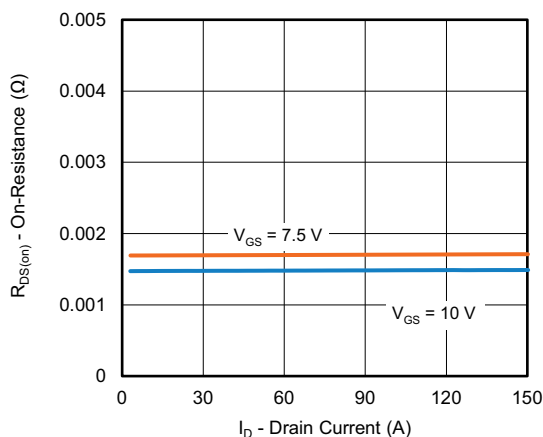
Transconductance



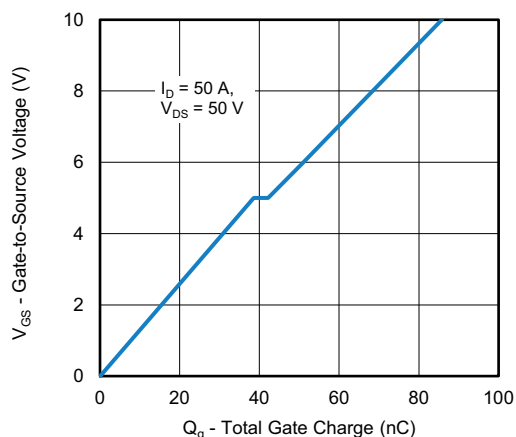
Transfer Characteristics



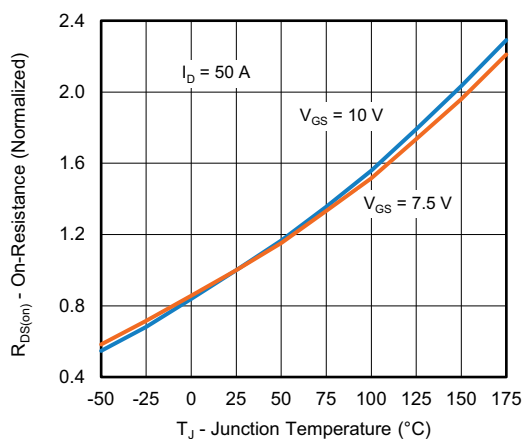
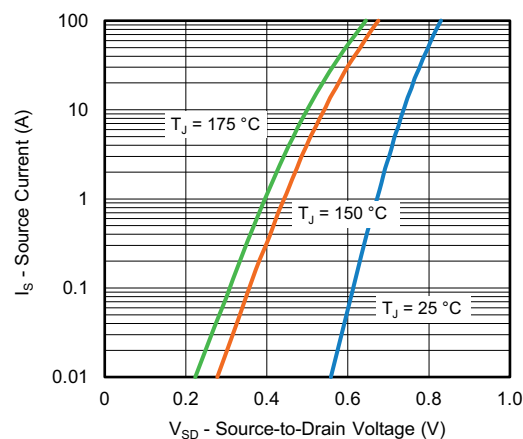
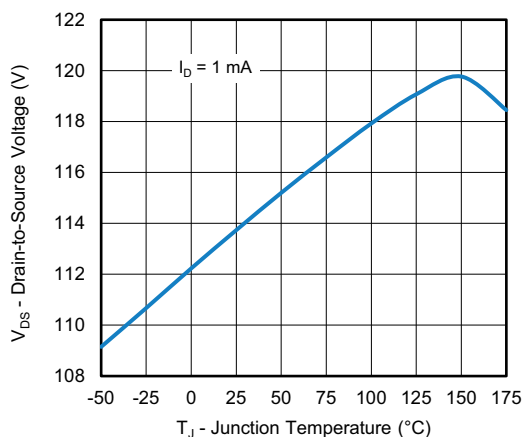
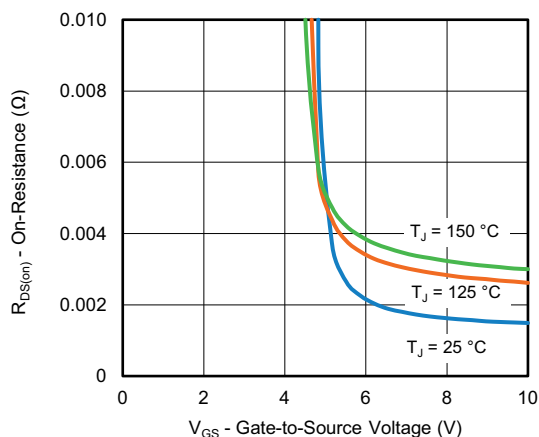
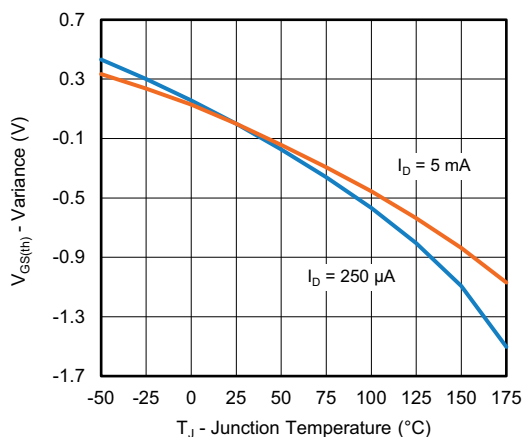
Capacitance



On-Resistance vs. Drain Current

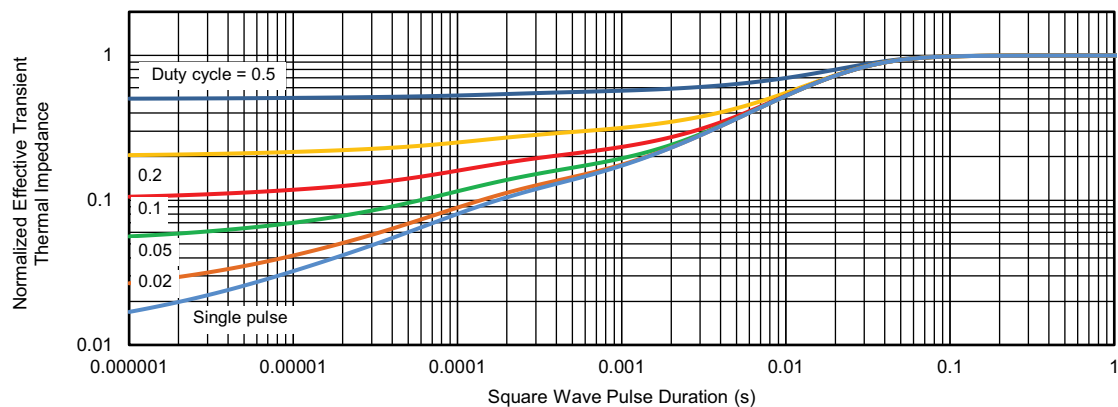


Gate Charge

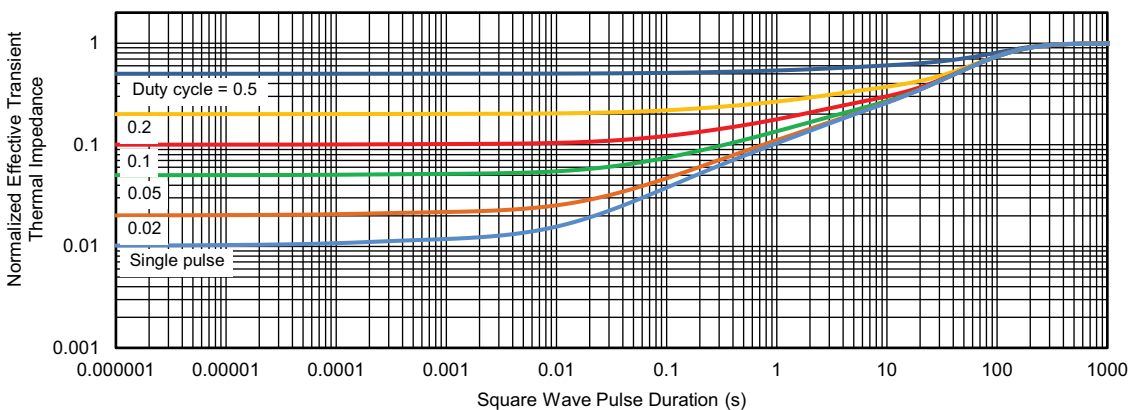
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

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



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



Normalized Thermal Transient Impedance, Junction-to-Case

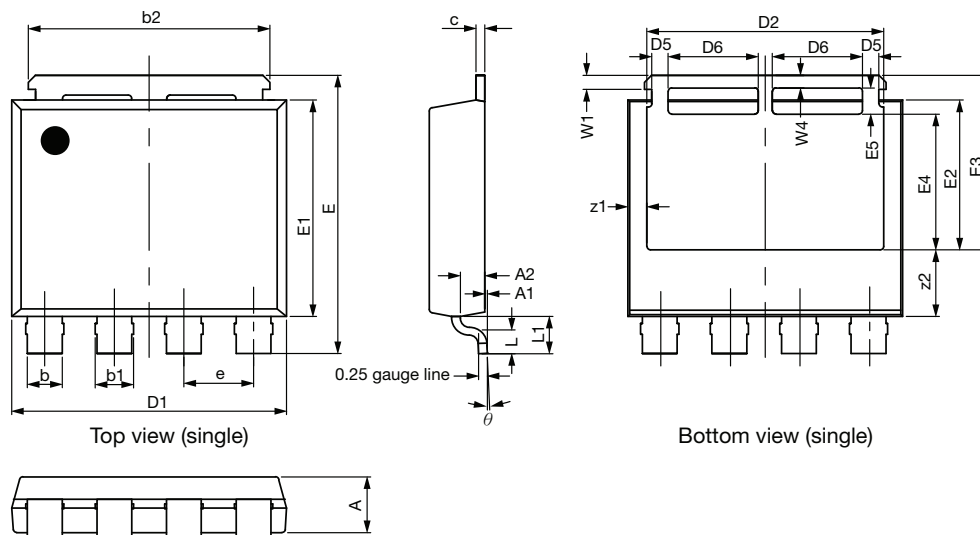


Normalized Thermal Transient Impedance, Junction-to-Ambient

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PowerPAK® 8 x 8L BWL Case Outline 2



DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.50	1.60	1.70	0.059	0.063	0.067
A1	0.00	-	0.127	0.000	-	0.005
A2	0.655	0.705	0.755	0.026	0.028	0.030
b	0.92	1.00	1.08	0.036	0.039	0.043
b1	1.02	1.10	1.18	0.040	0.043	0.046
b2	6.84	6.94	7.04	0.269	0.273	0.277
c	0.20	0.25	0.30	0.008	0.010	0.012
D1	7.80	7.90	8.00	0.307	0.311	0.315
D2	6.70	6.80	6.90	0.264	0.268	0.272
D5	0.37	0.47	0.57	0.015	0.019	0.022
D6	2.49	2.59	2.69	0.098	0.102	0.106
e	1.97	2.00	2.03	0.078	0.079	0.080
E	7.90	8.00	8.10	0.311	0.315	0.319
E1	6.12	6.22	6.32	0.241	0.245	0.249
E2	4.21	4.31	4.41	0.166	0.170	0.174
E3	4.92	5.02	5.12	0.194	0.198	0.202
E4	3.80	3.90	4.00	0.150	0.154	0.157
E5	0.65	0.75	0.85	0.026	0.030	0.033
L	0.61	0.68	0.75	0.024	0.027	0.030
L1	1.00	1.07	1.15	0.039	0.042	0.045
W1	0.30	0.40	0.50	0.012	0.016	0.020
W4	0.32	0.37	0.42	0.013	0.015	0.017
z1	0.45	0.55	0.65	0.018	0.022	0.026
z2	1.81	1.91	2.01	0.071	0.075	0.079
θ	0°	-	5°	0°	-	5°

ECN: S19-0643-Rev. B, 05-Aug-2019
DWG: 6073

Note

- Millimeter will govern



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