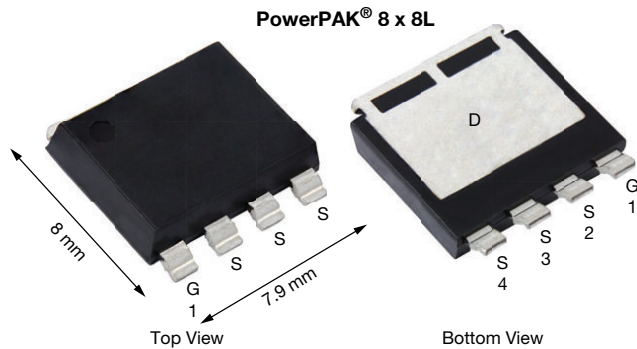


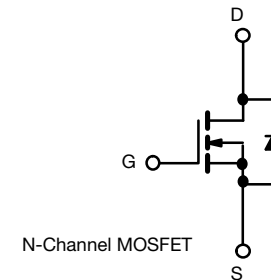
Automotive N-Channel 60 V (D-S) 175 °C MOSFET



FEATURES

- TrenchFET® Gen IV 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

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE


PRODUCT SUMMARY	
V_{DS} (V)	60
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.00085
I_D (A)	602
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SQJQ160E (for detailed order number please see www.vishay.com/doc?79771)

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)					
PARAMETER	SYMBOL	LIMIT	UNIT		
Drain-source voltage	V_{DS}	60	V		
Gate-source voltage	V_{GS}	± 20			
Continuous drain current	I_D	$T_C = 25$ °C	602	A	
		$T_C = 125$ °C	347		
Continuous source current (diode conduction)	I_S	545	mJ		
Pulsed drain current ^a	I_{DM}	655			
Single pulse avalanche current	I_{AS}	76			
Single pulse avalanche energy	E_{AS}	288	W		
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) ^c		260			

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	LIMIT	UNIT	
Junction-to-ambient	R_{thJA}	40	°C/W	
Junction-to-case (drain)	R_{thJC}	0.25		

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)



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		60	-	-	V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		2	3	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} = 60 V	-	-	1	μA
		V _{GS} = 0 V	V _{DS} = 60 V, T _J = 125 °C	-	-	50	
		V _{GS} = 0 V	V _{DS} = 60 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	-	0.00055	0.00085	Ω
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.0014	
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.0018	
Forward transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 40 A		-	205	-	S
Dynamic^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 MHz	-	11 431	16 070	pF
Output capacitance	C _{oss}			-	4772	6681	
Reverse transfer capacitance	C _{rss}			-	327	458	
Total gate charge ^c	Q _g	V _{GS} = 10 V	V _{DS} = 30 V, I _D = 50 A	-	183	275	nC
Gate-source charge ^c	Q _{gs}			-	53	-	
Gate-drain charge ^c	Q _{gd}			-	42	-	
Gate resistance	R _g	f = 1 MHz		0.7	1.4	2.1	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.6 Ω, I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 1 Ω		-	20	30	ns
Rise time ^c	t _r			-	18	27	
Turn-off delay time ^c	t _{d(off)}			-	60	90	
Fall time ^c	t _f			-	19	29	
Source-Drain Diode Ratings and Characteristics^b							
Pulsed current ^a	I _{SM}			-	-	655	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		-	88	176	ns
Body diode reverse recovery charge	Q _{rr}			-	138	276	nC
Reverse recovery fall time	t _a			-	35	-	ns
Reverse recovery rise time	t _b			-	55	-	
Body diode peak reverse recovery current	I _{RM(REC)}					-	2.7

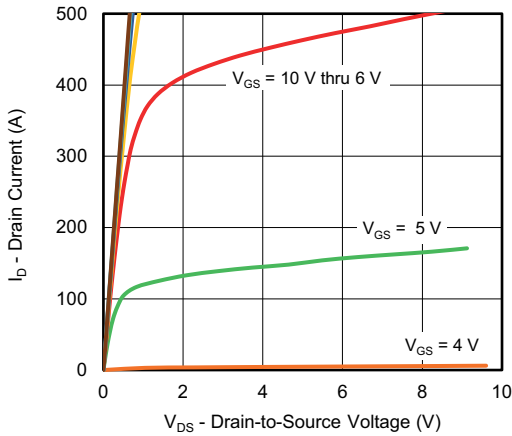
Notes

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- b. Guaranteed by design, not subject to production testing
- c. Independent of operating temperature

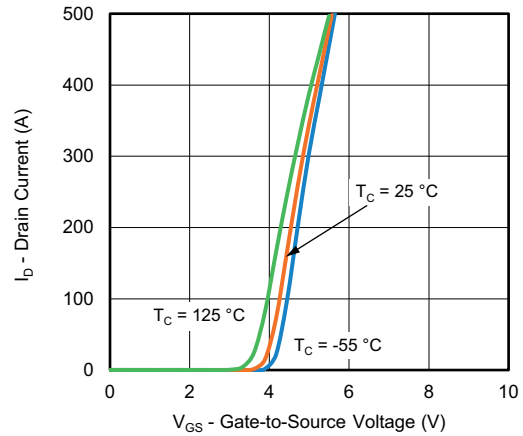
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



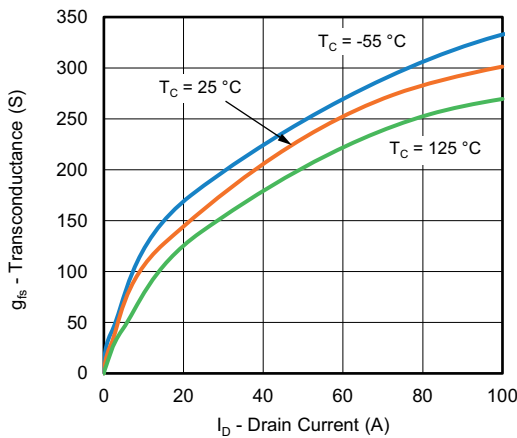
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



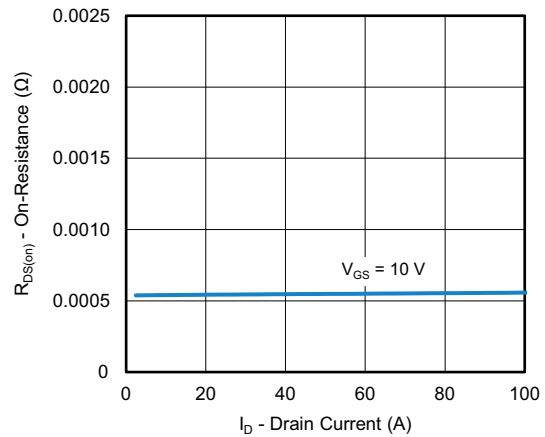
Output Characteristics



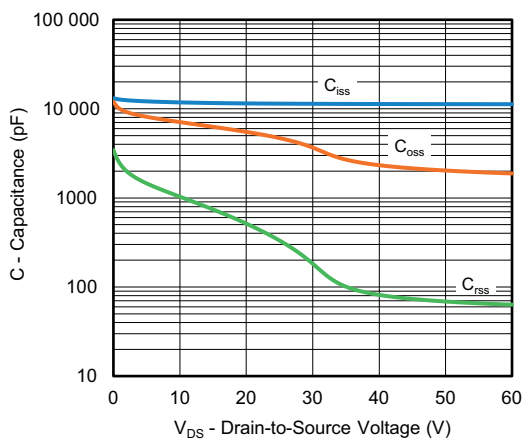
Transfer Characteristics



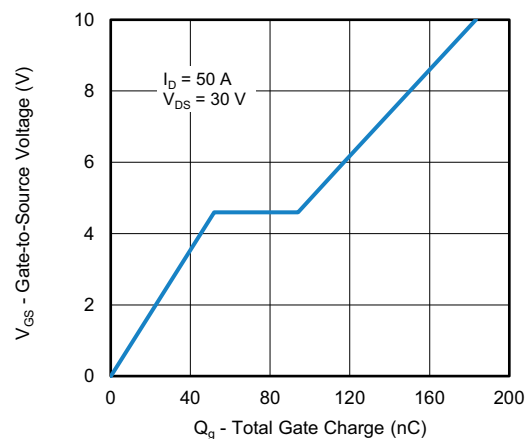
Transconductance



On-Resistance vs. Drain Current

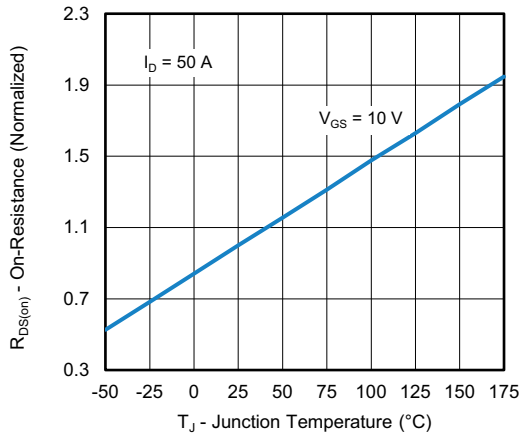


Capacitance

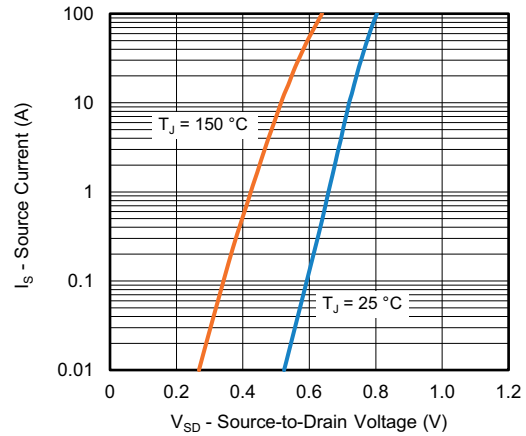


Gate Charge

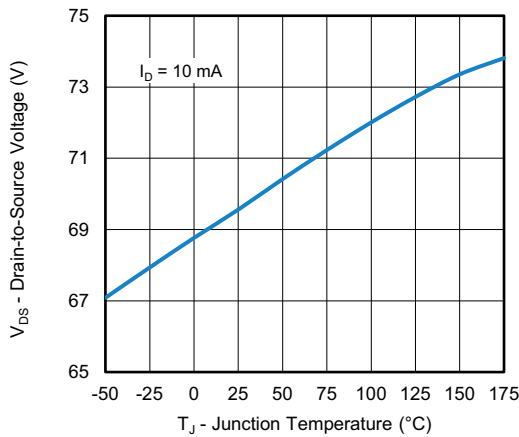
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



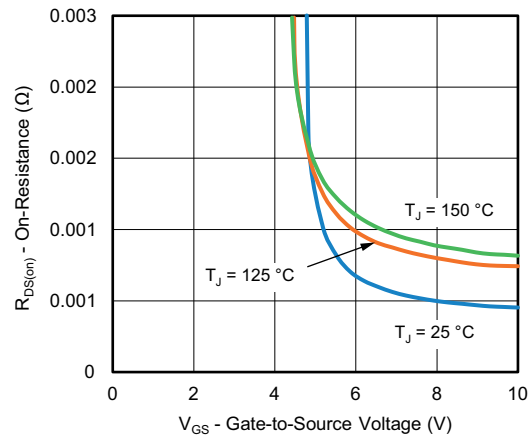
On-Resistance vs. Junction Temperature



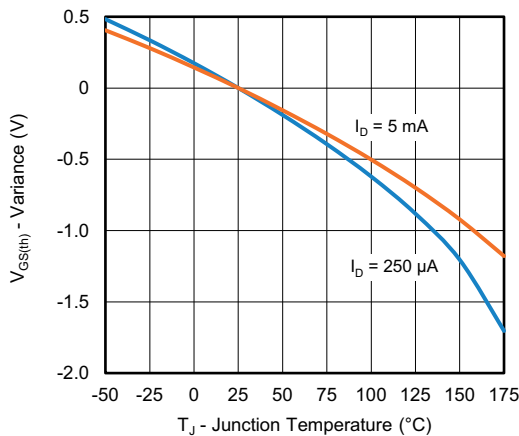
Source Drain Diode Forward Voltage



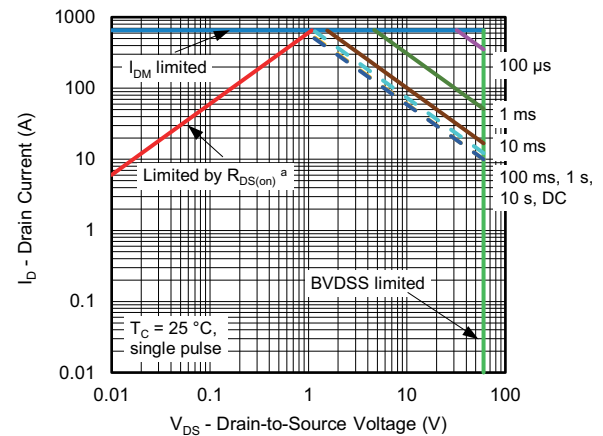
Drain Source Breakdown vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



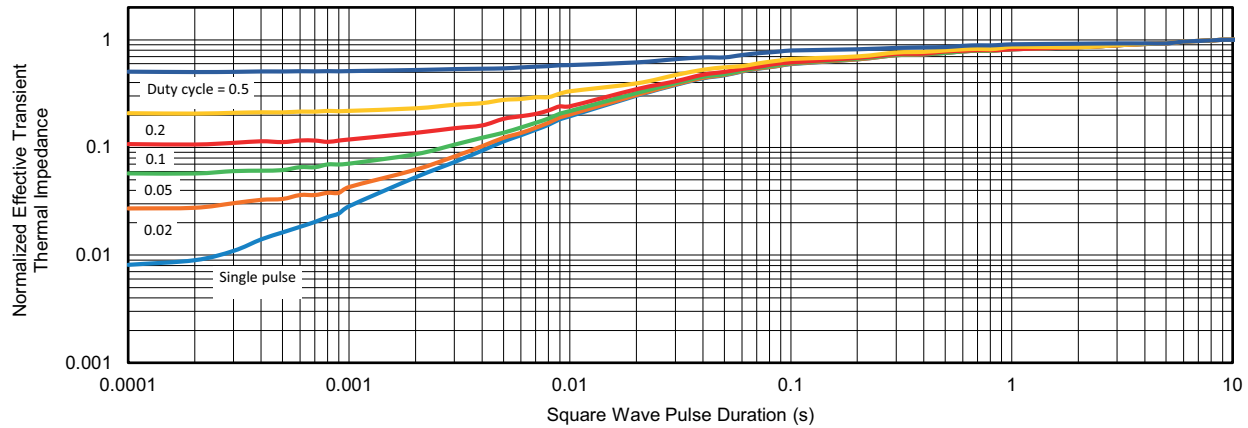
Safe Operating Area

Note

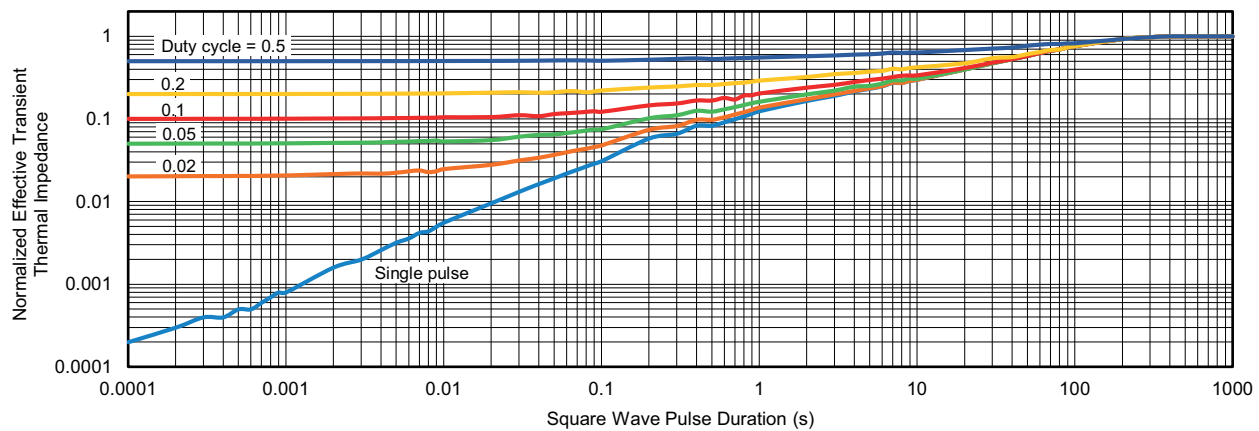
- a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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



Normalized Thermal Transient Impedance, Junction-to-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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