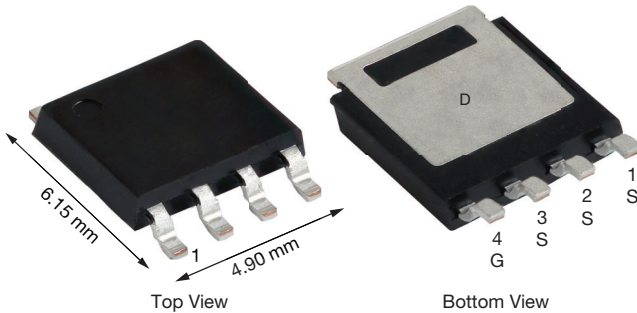


Automotive N-Channel 30 V (D-S) 175 °C MOSFET

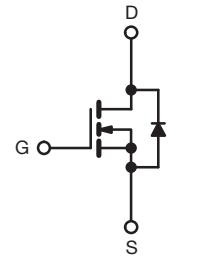
PowerPAK® SO-8L



FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Q_{gd}/Q_{gs} ratio < 1 optimizes switching characteristics
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE


RoHS
 COMPLIANT
 HALOGEN
FREE


N-Channel MOSFET

PRODUCT SUMMARY

V _{DS} (V)	30
R _{DS(on)} (Ω) at V _{GS} = 10 V	0.00180
I _D (A) ^d	202
Configuration	Single

ORDERING INFORMATION

Package	PowerPAK® SO-8L
Lead (Pb)-free and halogen-free	SQJ120EP (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}	30	V
Gate-source voltage	V _{GS}	± 20	
Continuous drain current ^d	I _D	T _C = 25 °C	202
		T _C = 125 °C	116
Continuous source current (diode conduction) ^d	I _S	118	A
Pulsed drain current ^b	I _{DM}	630	mJ
Single pulse avalanche current	I _{AS}	37.5	
Single pulse avalanche energy	E _{AS}	70	
Maximum power dissipation ^a	P _D	T _C = 25 °C	130
		T _C = 125 °C	43
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 ^c	R _{thJA}	42	°C/W
Junction-to-case (drain)	R _{thJC}	1.15	

Notes

- 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
- Using thermal characterization methods based on 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



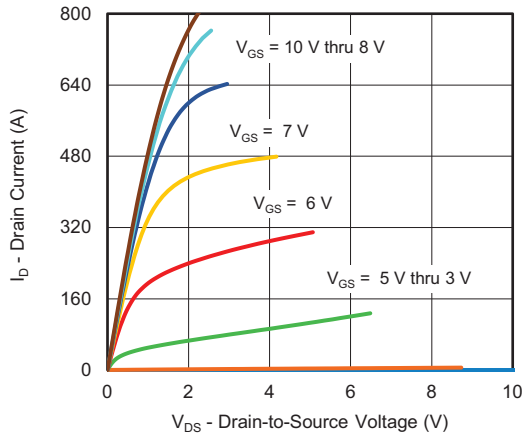
SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$		30	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		2.0	3.0	3.5	
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
		$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 30\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	250	
On-state drain current ^a	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	30	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 15\text{ A}$	-	0.0015	0.0018	Ω
		$V_{GS} = 10\text{ V}$	$I_D = 15\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.0027	
		$V_{GS} = 10\text{ V}$	$I_D = 15\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.0032	
Forward transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 40\text{ A}$		-	120	-	S
Dynamic ^b							
Input capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	4013	5619	pF
Output capacitance	C_{oss}			-	1174	2484	
Reverse transfer capacitance	C_{rss}			-	196	275	
Total gate charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$	-	58	88	nC
Gate-source charge ^c	Q_{gs}			-	17	-	
Gate-drain charge ^c	Q_{gd}			-	13	-	
Gate resistance	R_g	$f = 1\text{ MHz}$		0.8	2	3.2	Ω
Turn-on delay time ^c	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 1\text{ }\Omega$ $I_D \cong 15\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	15	23	ns
Rise time ^c	t_r			-	13	20	
Turn-off delay time ^c	$t_{d(off)}$			-	31	47	
Fall time ^c	t_f			-	11	17	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed current ^a	I_{SM}			-	-	472	A
Forward voltage	V_{SD}	$I_F = 15\text{ A}, V_{GS} = 0\text{ V}$		-	-	1.1	V
Body diode reverse recovery time	t_{rr}	$I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		-	46	92	ns
Body diode reverse recovery charge	Q_{rr}			-	36	72	nC
Reverse recovery fall time	t_a			-	22	-	ns
Reverse recovery rise time	t_b			-	24	-	
Body diode peak reverse recovery current	$I_{RM(REC)}$					-	-1.33

Notes

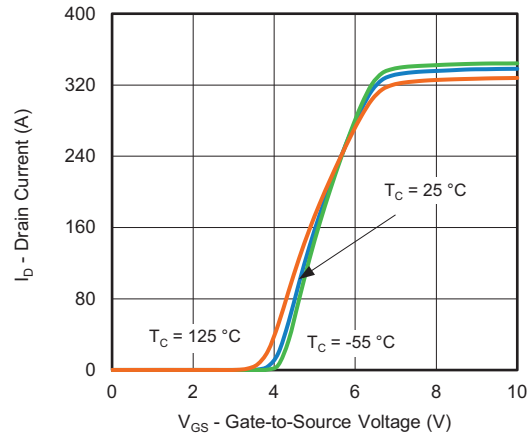
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- b. Guaranteed by design, not subject to production testing
- c. Independent of operating temperature

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.

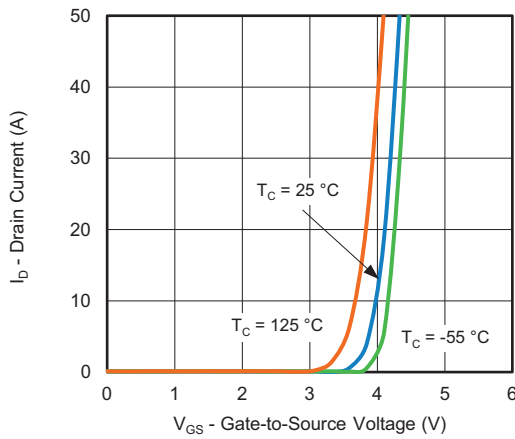
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



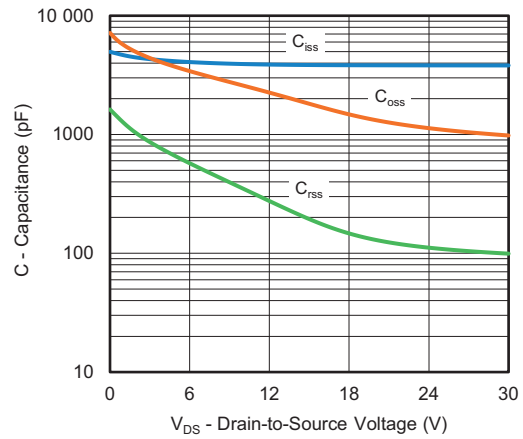
Output Characteristics



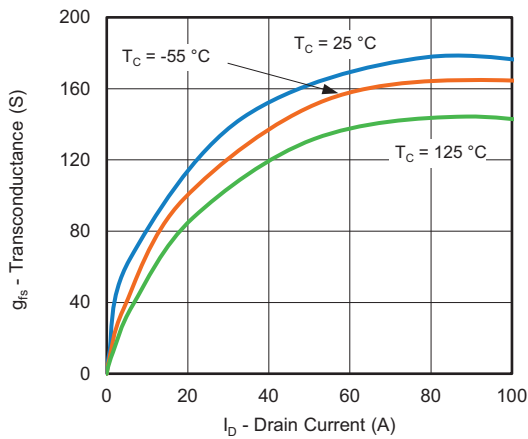
Transfer Characteristics



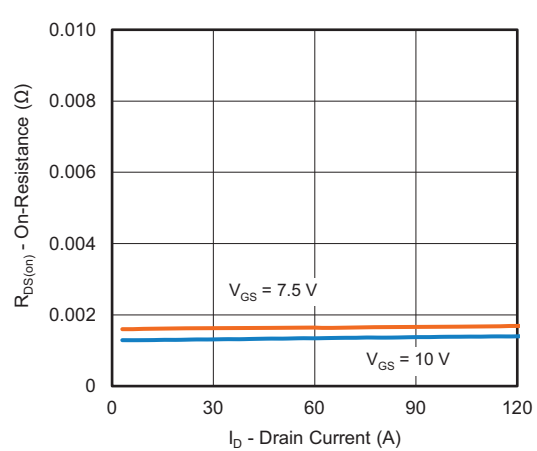
Transfer Characteristics



Capacitance



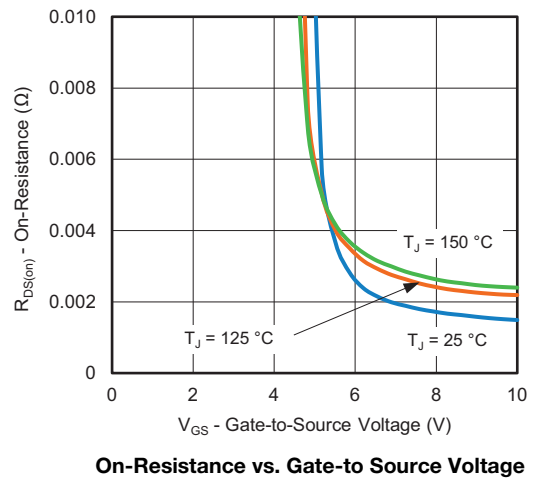
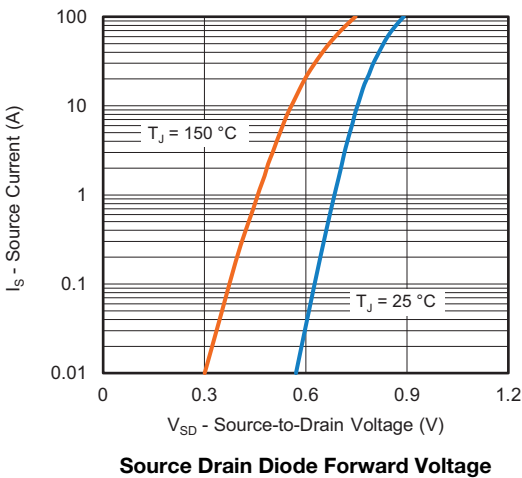
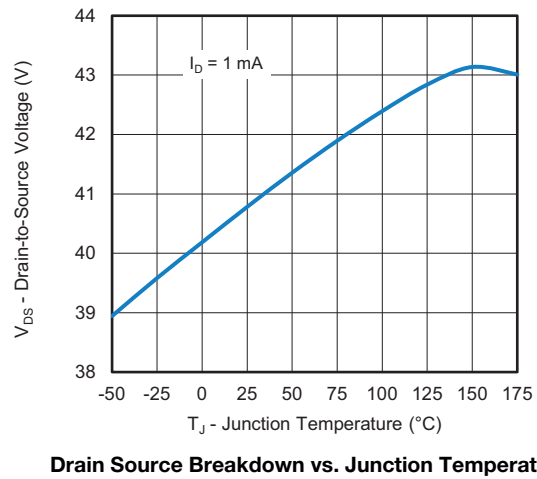
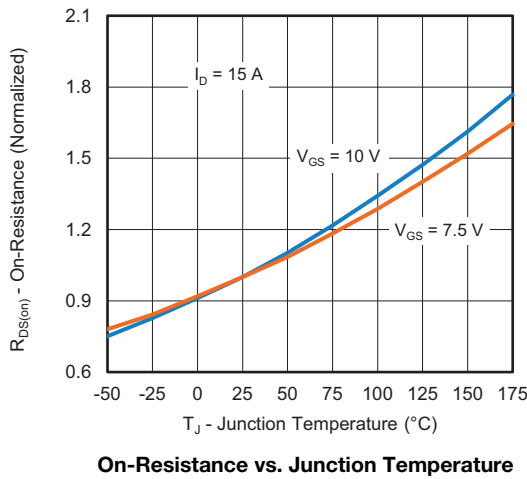
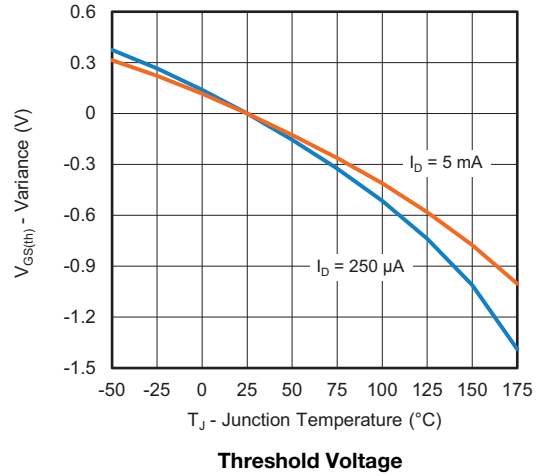
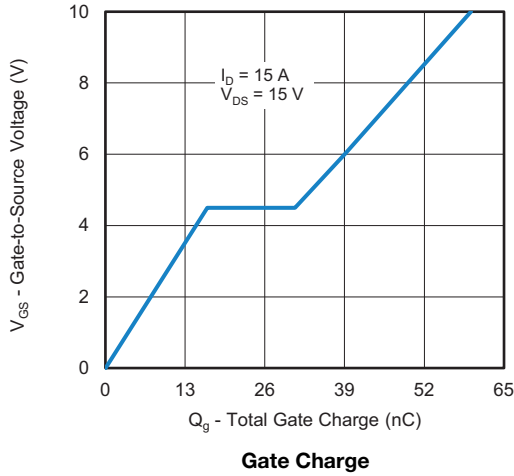
Transconductance



On-Resistance vs. Drain Current

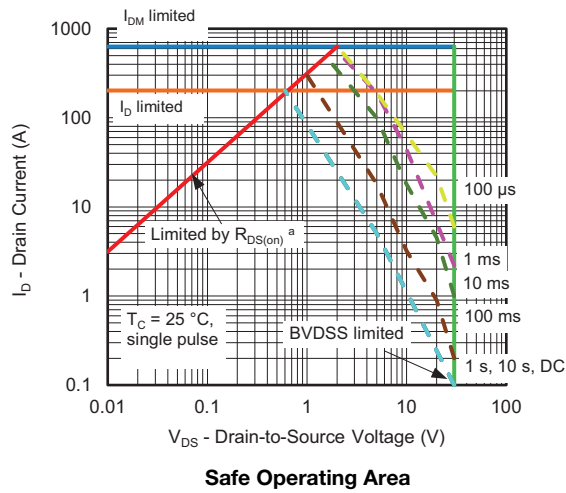


TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)





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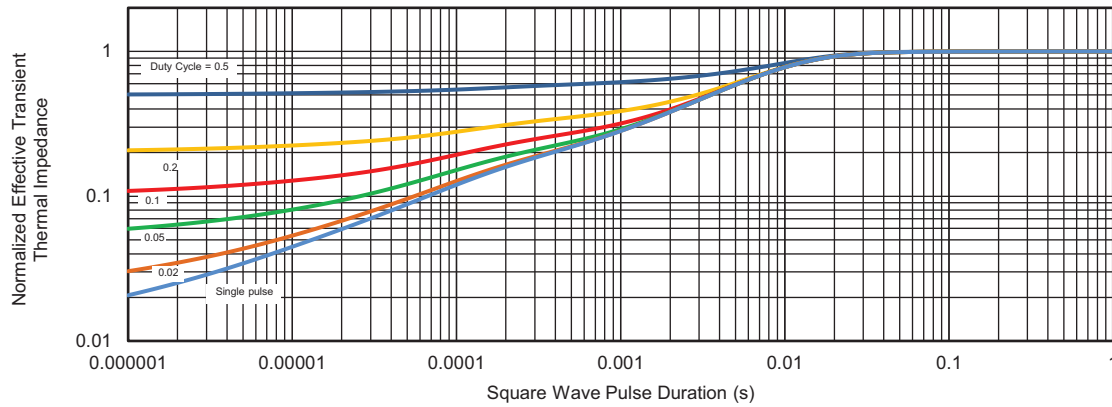


Note

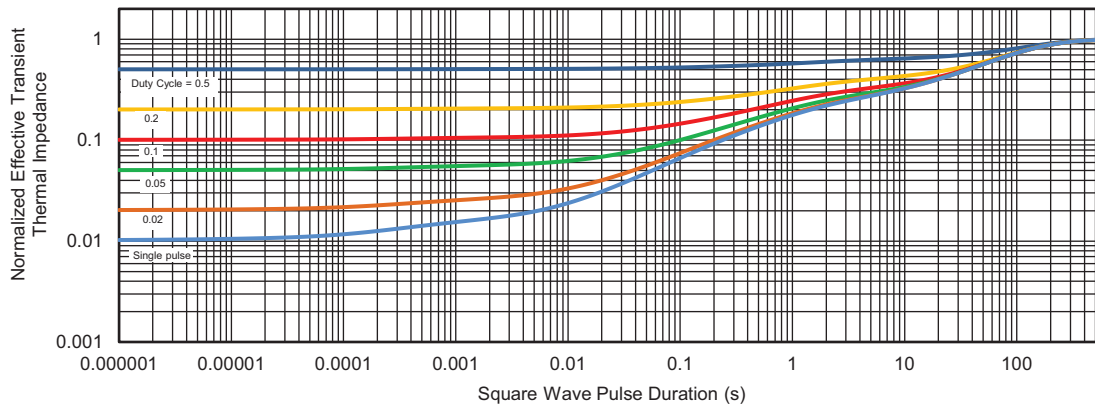
a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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



Normalized Thermal Transient Impedance, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient ($25\text{ }^\circ\text{C}$)
 - Normalized Transient Thermal Impedance Junction-to-Case ($25\text{ }^\circ\text{C}$)
 are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions

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