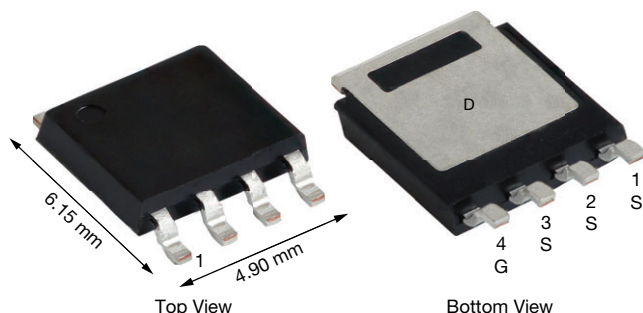


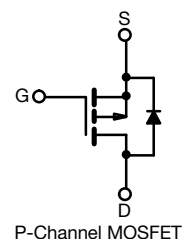
Automotive P-Channel 30 V (D-S) 175 °C MOSFET

PowerPAK® SO-8L


FEATURES

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

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE


P-Channel MOSFET

PRODUCT SUMMARY

V _{DS} (V)	-30
R _{DS(on)} (Ω) at V _{GS} = -10 V	0.0030
R _{DS(on)} (Ω) at V _{GS} = -4.5 V	0.0047
I _D (A)	-300
Configuration	Single
Package	PowerPAK SO-8L

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V _{DS}	-30	V
Gate-source voltage ^a	V _{GS}	± 20	V
Continuous drain current	I _D	-300	A
		-173	
Continuous source current (diode conduction) ^b	I _S	-455	
Pulsed drain current ^c	I _{DM}	-560	
Single pulse avalanche current	I _{AS}	-55	mJ
Single pulse avalanche energy	E _{AS}	151	
Maximum power dissipation ^c	P _D	500	W
		166	
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}	46	°C/W
Junction-to-case (drain)	R _{thJC}	0.3	

Notes

- Not intended for continuous use with positive gate voltage > 5.0 V
- Package limited
- When mounted on 1" square PCB (FR4 material)
- See solder profile (www.vishay.com/doc?73257). For PowerPAK SO-8L, 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	-	-	-50	
		V _{GS} = 0 V	V _{DS} = -30 V, T _J = 175 °C	-	-	-150	
On-state drain current ^a	I _{D(on)}	V _{GS} = -10 V	V _{DS} ≥ -5 V	-30	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = -10 V	I _D = -10 A	-	0.0023	0.0030	Ω
		V _{GS} = -10 V	I _D = -10 A, T _J = 125 °C	-	-	0.0047	
		V _{GS} = -10 V	I _D = -10 A, T _J = 175 °C	-	-	0.0056	
		V _{GS} = -4.5 V	I _D = -8 A	-	0.0038	0.0052	
Forward transconductance ^b	g _{fs}	V _{DS} = -15 V, I _D = -10 A		-	80	-	S
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = -15 V, f = 1 MHz	-	10 856	15 200	pF
Output capacitance	C _{oss}			-	1231	1724	
Reverse transfer capacitance	C _{rss}			-	1143	1600	
Total gate charge ^c	Q _g	V _{GS} = -10 V	V _{DS} = -15 V, I _D = -10 A	-	207	311	nC
Gate-source charge ^c	Q _{gs}			-	36	-	
Gate-drain charge ^c	Q _{gd}			-	33	-	
Gate resistance	R _g	f = 1 MHz		1.1	2.3	3.5	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = -15 V, R _L = 1.5 Ω, I _D ≅ -10 A, V _{GEN} = -10 V, R _g = 1 Ω		-	16	24	ns
Rise time ^c	t _r			-	10	15	
Turn-off delay time ^c	t _{d(off)}			-	104	156	
Fall time ^c	t _f			-	29	44	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed current ^a	I _{SM}			-	-	-600	A
Forward voltage	V _{SD}	I _F = -10 A, V _{GS} = 0 V		-	-0.76	-1.2	V
Body diode reverse recovery time	t _{rr}	I _F = -10 A, di/dt = 100 A/μs		-	32	64	ns
Body diode reverse recovery charge	Q _{rr}			-	27	54	nC
Reverse recovery fall time	t _a			-	17	-	ns
Reverse recovery rise time	t _b			-	16	-	
Body diode peak reverse recovery current	I _{RM(REC)}			-	-1.347	-	A

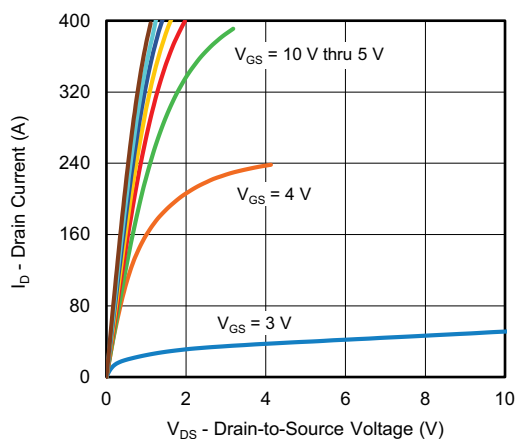
Notes

- 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

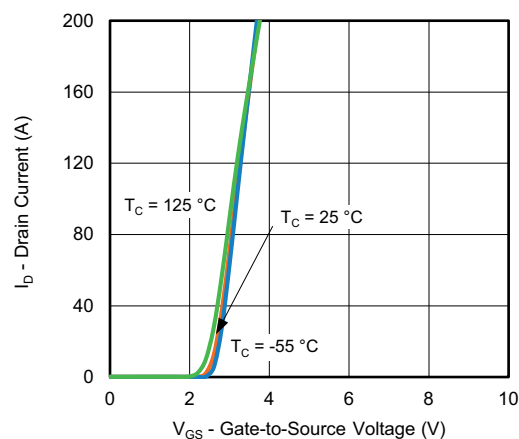
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



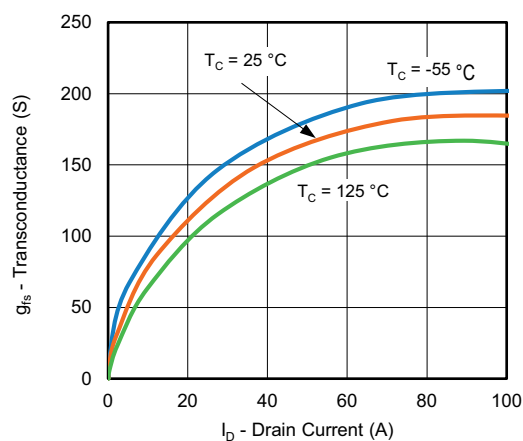
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



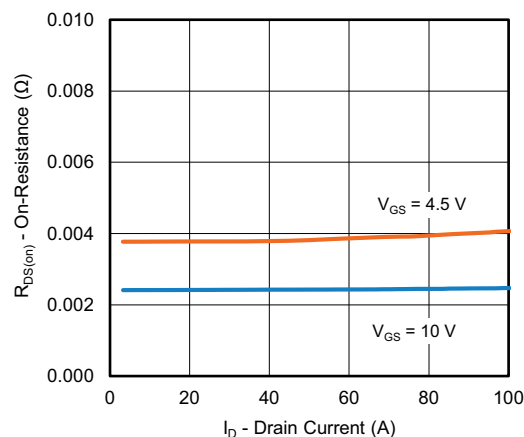
Output Characteristics



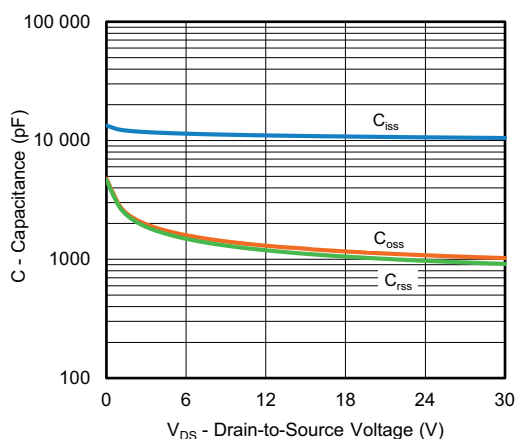
Transfer Characteristics



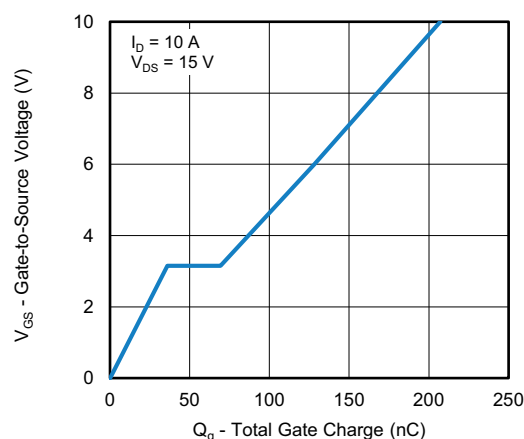
Transconductance



On-Resistance vs. Drain Current



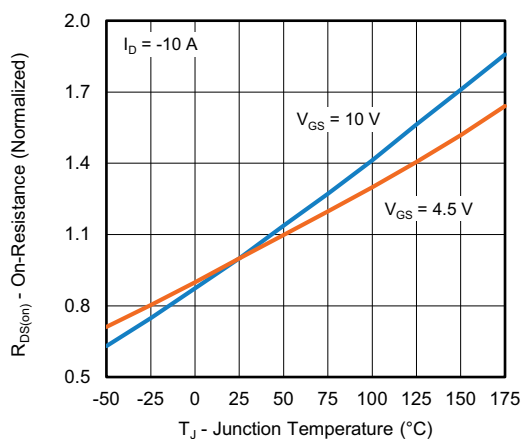
Capacitance



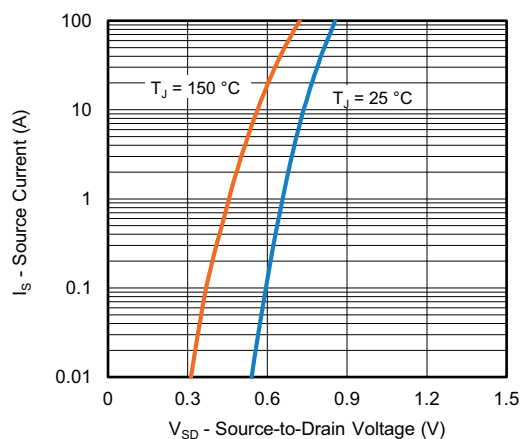
Gate Charge



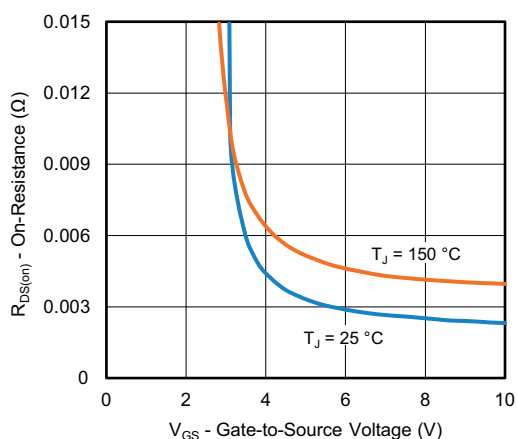
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



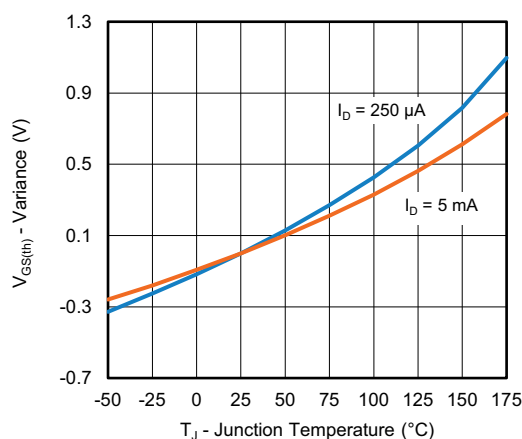
On-Resistance vs. Junction Temperature



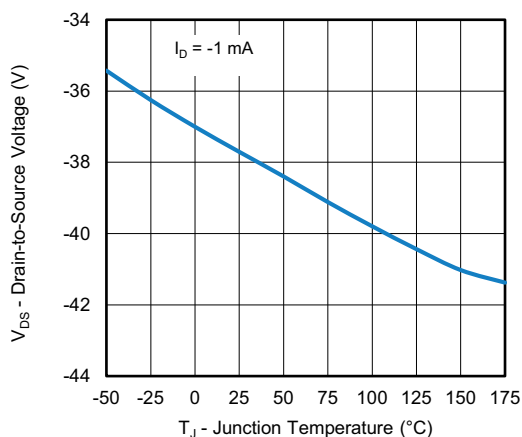
Source Drain Diode Forward Voltage



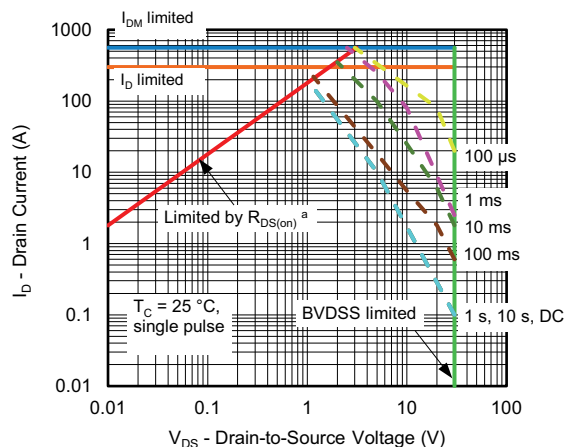
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Drain-Source Breakdown vs. Junction Temperature



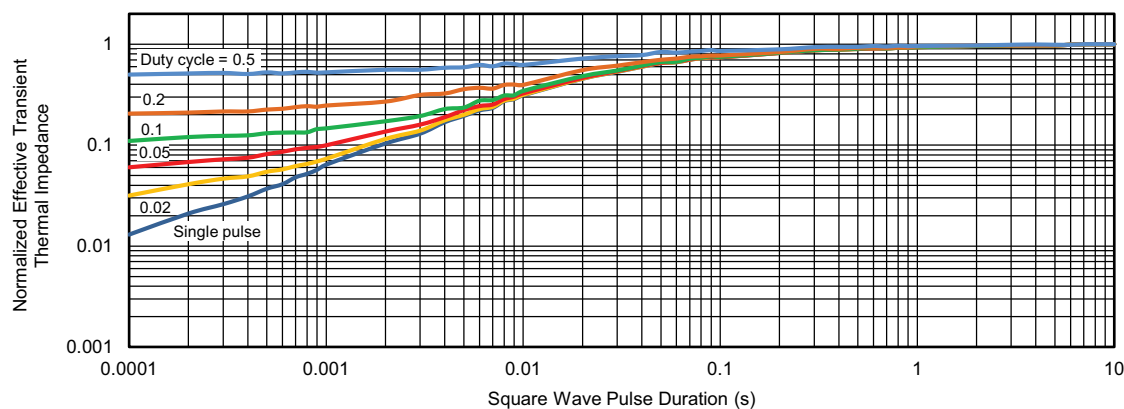
Safe Operating Area

Note

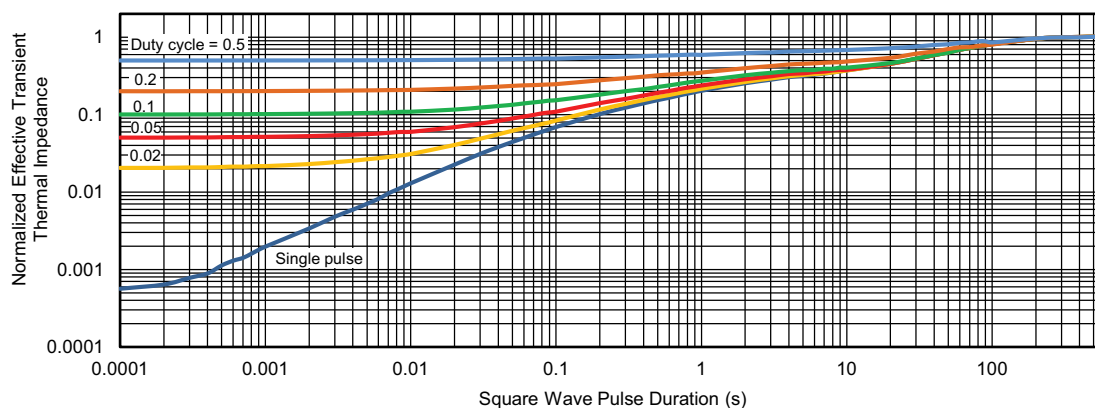
a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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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