

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

PRODUCT SUMMARY

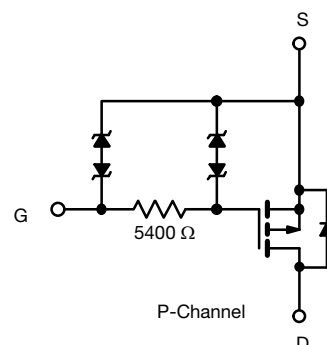
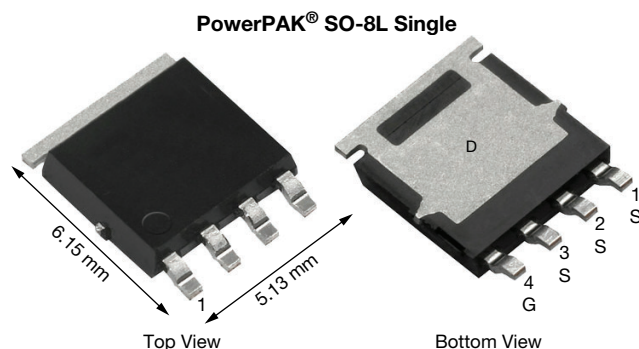
V_{DS} (V)	-30
$R_{DS(on)}$ (Ω) at $V_{GS} = -10$ V	0.0085
$R_{DS(on)}$ (Ω) at $V_{GS} = -4.5$ V	0.0200
I_D (A)	-30 ^a
Configuration	Single
Package	PowerPAK SO-8L

FEATURES

- TrenchFET® power MOSFET
- ESD protection: 3000 V
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE



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 ^a	I_D	$T_C = 25$ °C	A
		$T_C = 125$ °C	
Continuous Source Current (Diode conduction) ^a	I_S	-30	
Pulsed Drain Current ^b	I_{DM}	-84	
Single Pulse Avalanche Current	I_{AS}	-6.5	mJ
Single Pulse Avalanche Energy	E_{AS}	211	
Maximum Power Dissipation ^b	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, e}		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient	R_{thJA}	68	°C/W
Junction-to-Case (Drain)	R_{thJC}	2.2	

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 of PowerPAK SO-8L 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.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.



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 V, 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} = ± 12 V		-	-	± 2	μA
		V _{DS} = 0 V, V _{GS} = ± 20 V		-	-	± 1	mA
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	-	-	-250	
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	-	0.0070	0.0085	Ω
		V _{GS} = -10 V	I _D = -10 A, T _J = 125 °C	-	-	0.0130	
		V _{GS} = -10 V	I _D = -10 A, T _J = 175 °C	-	-	0.0150	
		V _{GS} = -4.5 V	I _D = -7 A	-	0.0120	0.0200	
Forward Transconductance ^b	g _{fs}	V _{DS} = -10 V, I _D = -10 A		-	32	-	S
Dynamic ^b							
Output Capacitance	C _{oss}	V _{GS} = 0 V	V _{DS} = -15 V, f = 1 MHz	-	712	890	pF
Total Gate Charge ^c	Q _g	V _{GS} = -10 V	V _{DS} = -15 V, I _D = -10 A	-	75	164	nC
Gate-Source Charge ^c	Q _{gs}			-	9.5	-	
Gate-Drain Charge ^c	Q _{gd}			-	19	-	
Gate Resistance	R _g	f = 1 MHz		2	4.3	7.5	kΩ
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		-	38	57	ns
Rise Time ^c	t _r			-	82	123	
Turn-Off Delay Time ^c	t _{d(off)}			-	134	201	
Fall Time ^c	t _f			-	178	214	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed Current ^a	I _{SM}			-	-	-84	A
Forward Voltage	V _{SD}	I _F = -3 A, V _{GS} = 0 V		-	-0.75	-1.2	V

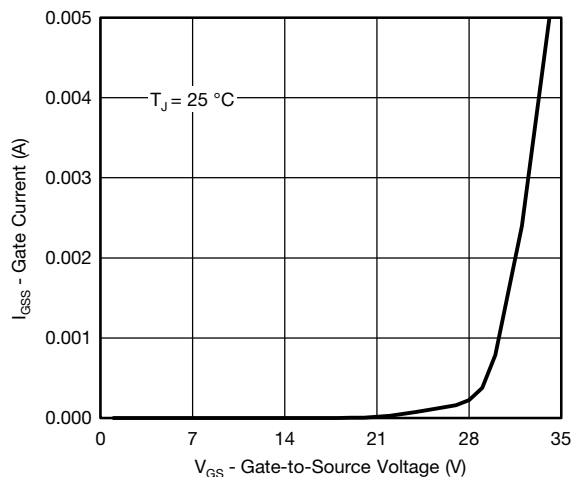
Notes

- 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.

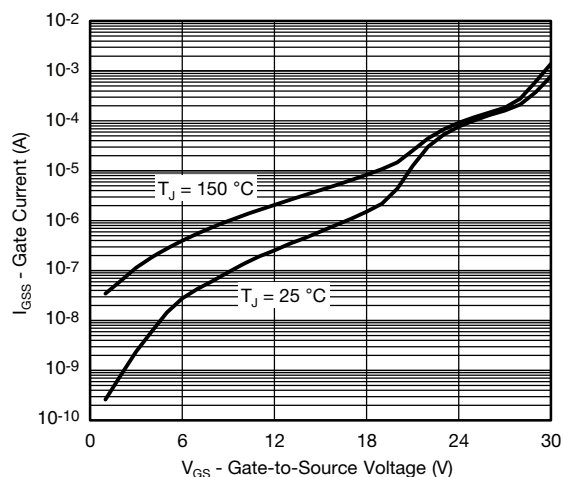
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



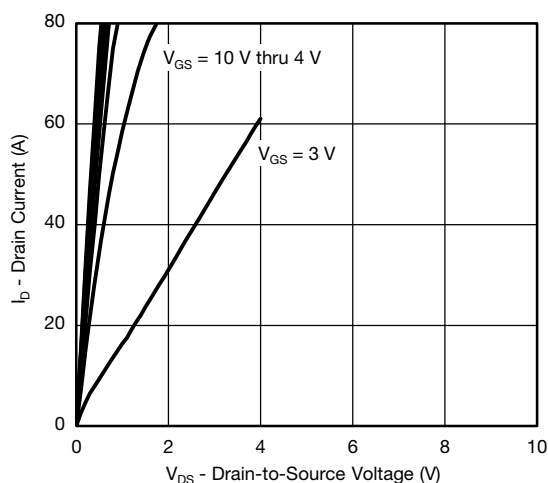
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



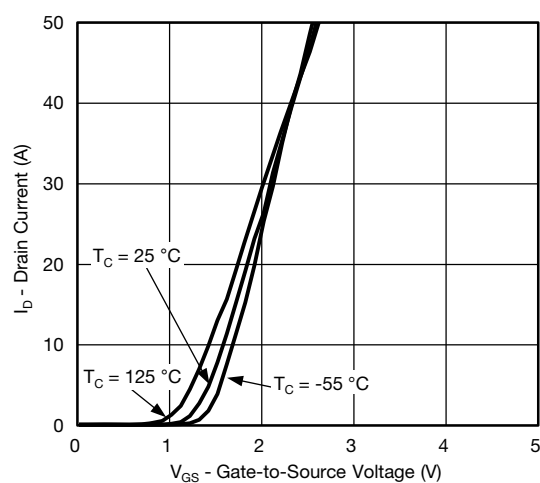
Gate Current vs. Gate-Source Voltage



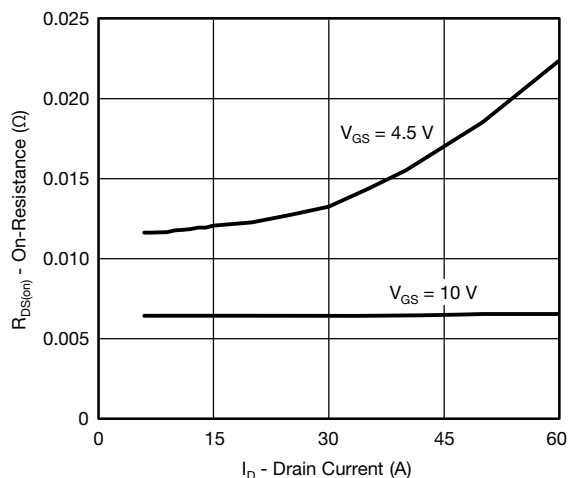
Gate Current vs. Gate-Source Voltage



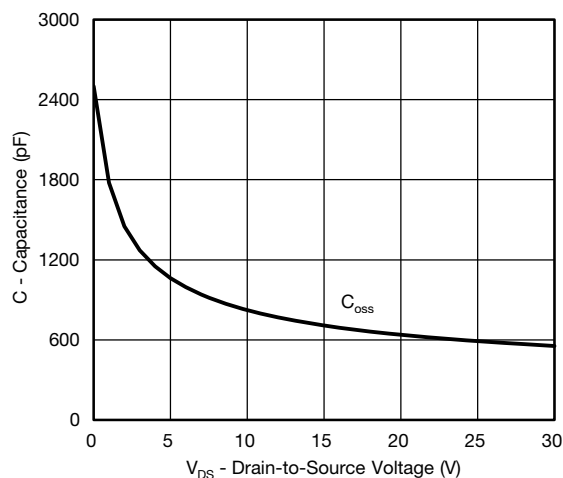
Output Characteristics



Transfer Characteristics



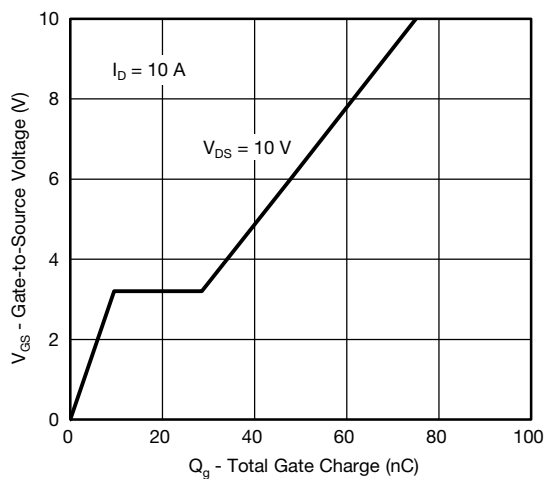
On-Resistance vs. Drain Current



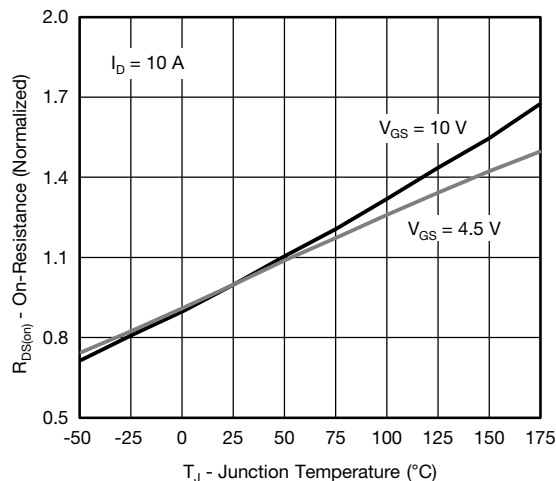
Capacitance



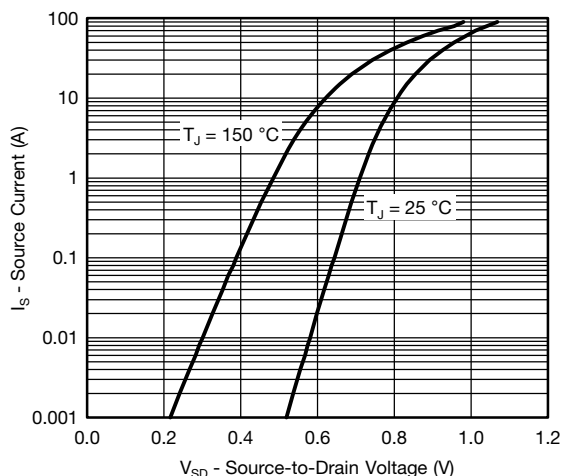
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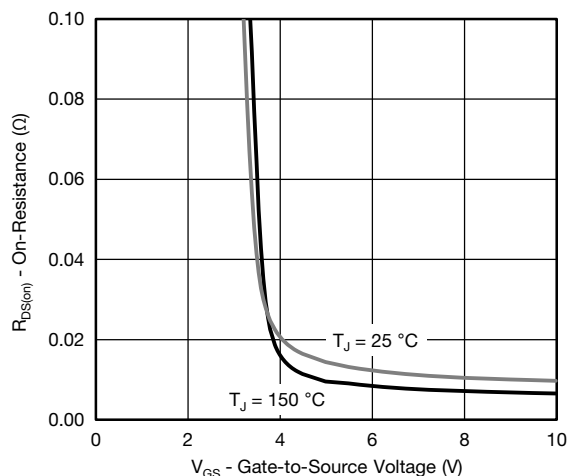
Gate Charge



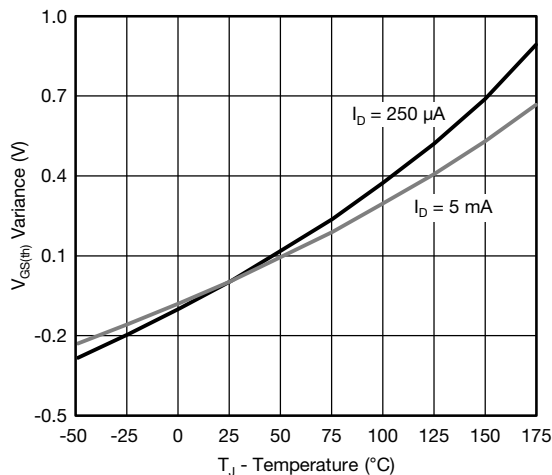
On-Resistance vs. Junction Temperature



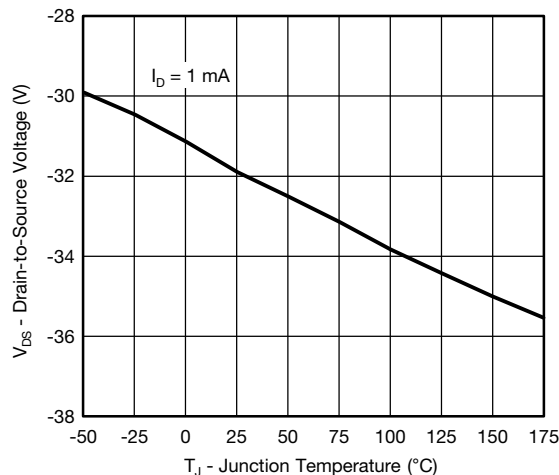
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



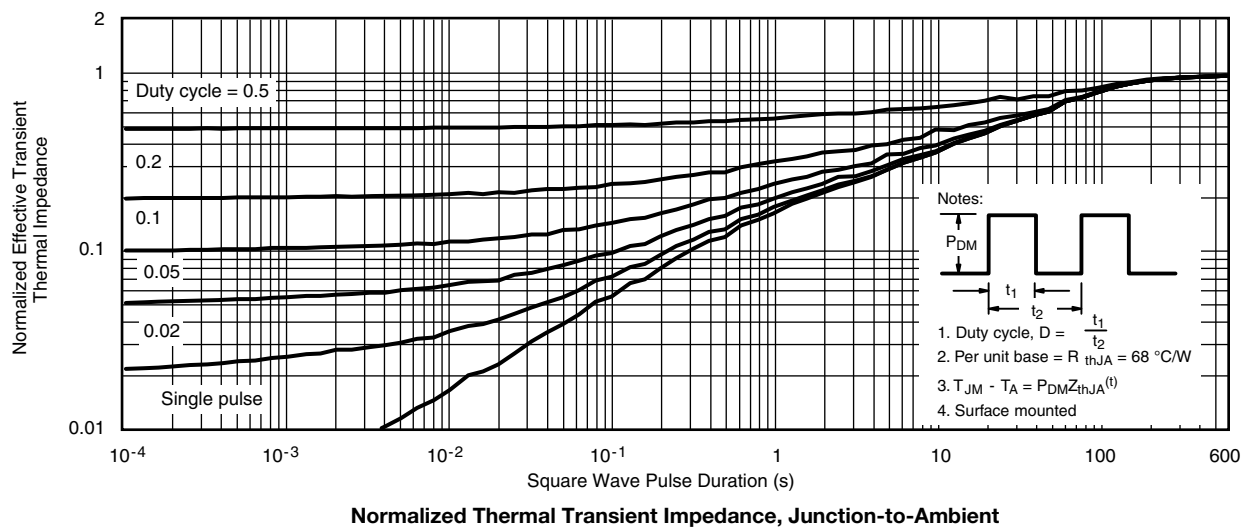
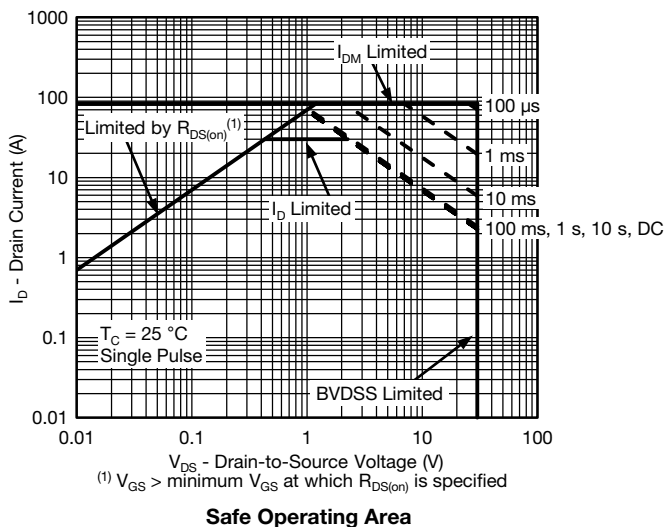
Threshold Voltage



Drain Source Breakdown vs. Junction Temperature

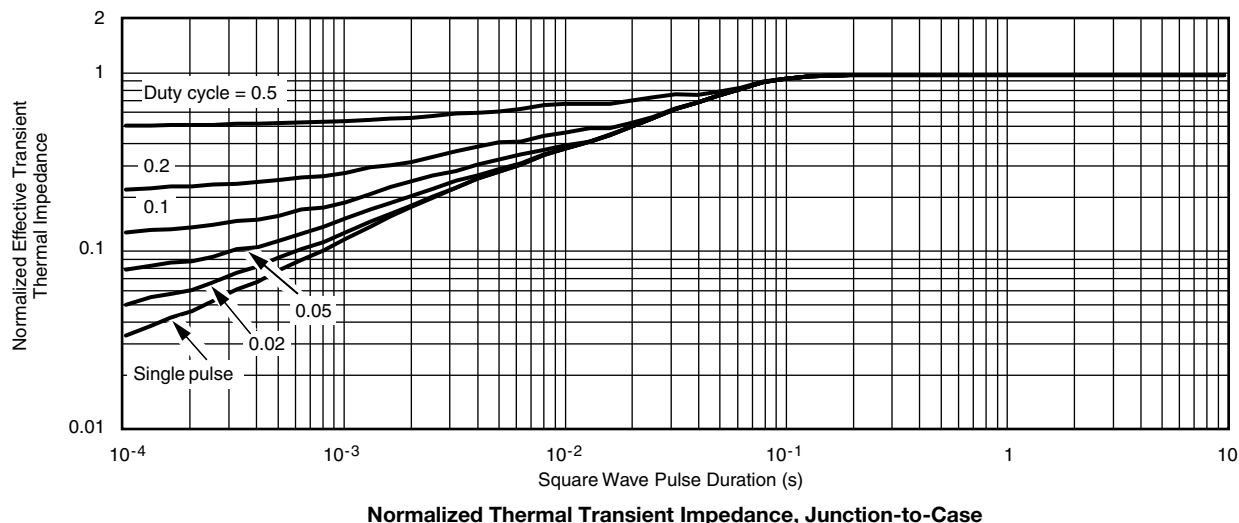


THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)





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



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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