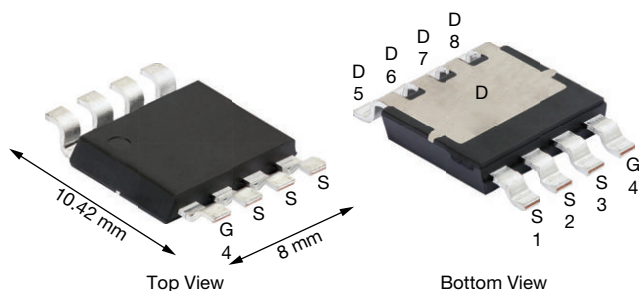


Automotive P-Channel 40 V (D-S) 175 °C MOSFET

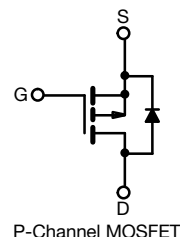
PowerPAK® 8 x 8LR


FEATURES

- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Thin 1.6 mm package
- Very low thermal resistance
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE



PRODUCT SUMMARY

V_{DS} (V)	-40
$R_{DS(on)}$ (Ω) at $V_{GS} = -10$ V	0.0020
$R_{DS(on)}$ (Ω) at $V_{GS} = -4.5$ V	0.0029
I_D (A) ^e	-230
Configuration	Single

ORDERING INFORMATION

Package	PowerPAK® 8 x 8LR
Lead (Pb)-free and halogen-free	SQJQ141ELR (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}	-40	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current ^e	I_D	$T_C = 25$ °C	A
		$T_C = 125$ °C	
Continuous source current (diode conduction) ^e	I_S	-194	
Pulsed drain current ^{a, e}	I_{DM}	-910	
Single pulse avalanche current	I_{AS}	-66	
Single pulse avalanche energy	E_{AS}	218	
Maximum power dissipation ^e	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) ^c		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-ambient	R_{thJA}	44	°C/W
Junction-to-case (drain) ^d	R_{thJC}	0.7	

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). 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
- 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

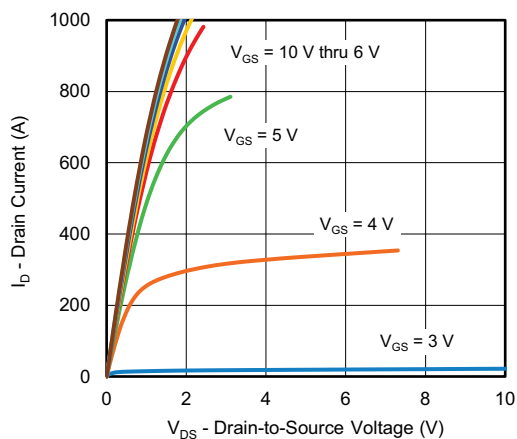
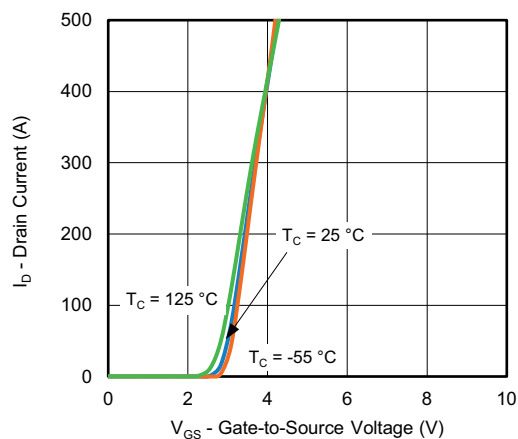
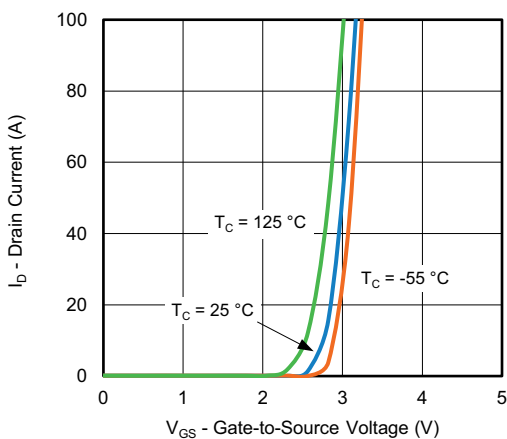
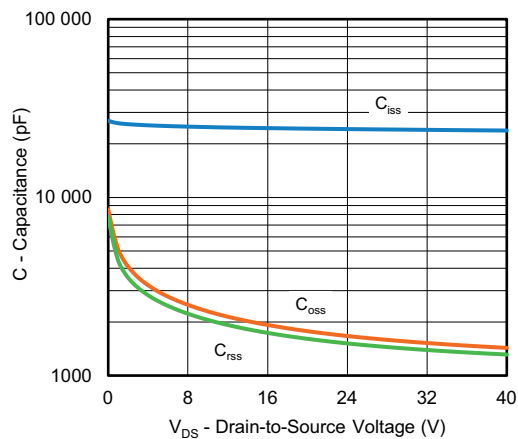
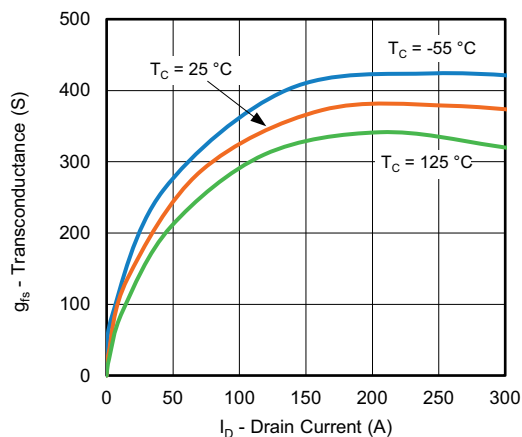
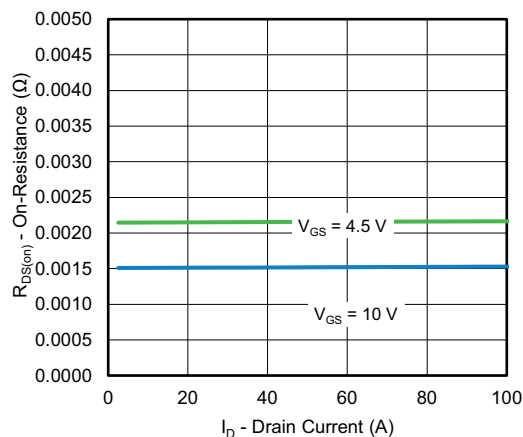


SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0, I _D = -250 μA		-40	-	-	V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA		-1.5	-2	-2.5	
Gate-source 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} = -40 V	-	-	-1	μA
		V _{GS} = 0 V	V _{DS} = -40 V, T _J = 125 °C	-	-	-200	
		V _{GS} = 0 V	V _{DS} = -40 V, T _J = 175 °C	-	-	-500	
On-state drain current ^a	I _{D(on)}	V _{GS} = -10 V	V _{DS} ≥ -5 V	-100	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = -4.5 V	I _D = -8 A	-	0.0020	0.0029	Ω
		V _{GS} = -10 V	I _D = -10 A	-	0.0014	0.0020	
		V _{GS} = -10 V	I _D = -10 A, T _J = 125 °C	-	-	0.0035	
		V _{GS} = -10 V	I _D = -10 A, T _J = 175 °C	-	-	0.0040	
Forward transconductance ^b	g _{fs}	V _{DS} = -15 V, I _D = -50 A		-	180	-	S
Dynamic ^b							
Input capacitance	C _{iSS}	V _{GS} = 0 V	V _{DS} = -25 V, f = 1 MHz	-	23 979	33 571	pF
Output capacitance	C _{oSS}			-	1640	2296	
Reverse transfer capacitance	C _{rSS}			-	1478	2082	
Total gate charge ^c	Q _g	V _{GS} = 10 V	V _{DS} = -20 V, I _D = -30 A	-	497	746	nC
Gate-source charge ^c	Q _{gs}			-	95	-	
Gate-drain charge ^c	Q _{gd}			-	84	-	
Gate resistance	R _g	f = 1 MHz		0.8	2.2	3.3	Ω
Turn-on delay time ^c	t _{d(on)}	R _L = 0.67 Ω I _D ≅ -30 A, V _{GEN} = -10 V, R _g = 1 Ω		-	19	29	ns
Rise time ^c	t _r			-	21	45	
Turn-off delay time ^c	t _{d(off)}			-	234	351	
Fall time ^c	t _f			-	85	128	
Source-Drain Diode Ratings and Characteristics ^b							
Reverse recovery time	t _a	I _{FM} = -20 A, di/dt = 100 A/μs		-	24	-	ns
	t _b			-	24	-	
	t _{rr}			-	48	96	
Reverse recovery charge	Q _{rr}			-	54	108	nC
Reverse recovery current	I _{RM}			-	-	-2.0	A
Pulsed current ^a	I _{SM}			-	-	-776	A
Forward voltage	V _{SD}	I _F = -50 A, V _{GS} = 0		-	-0.8	-1.1	V

Notes

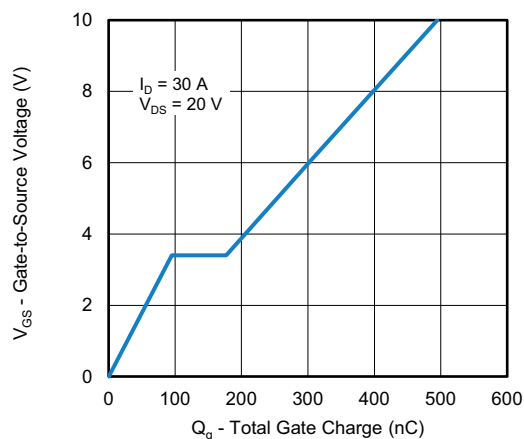
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing
c. Independent of operating temperature

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.

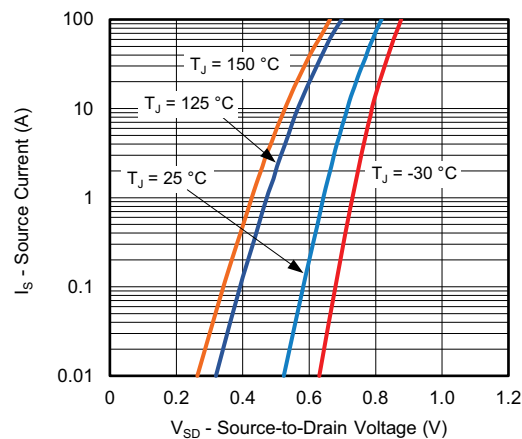
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Output Characteristics

Transfer Characteristics

Transfer Characteristics

Capacitance

Transconductance

On-Resistance vs. Drain Current



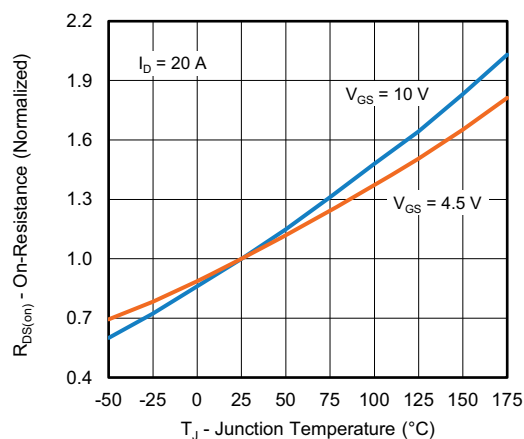
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



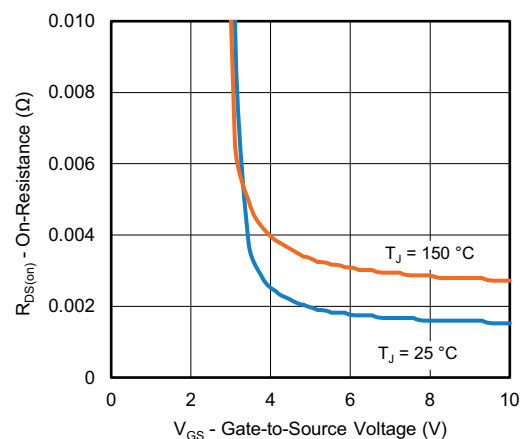
Gate Charge



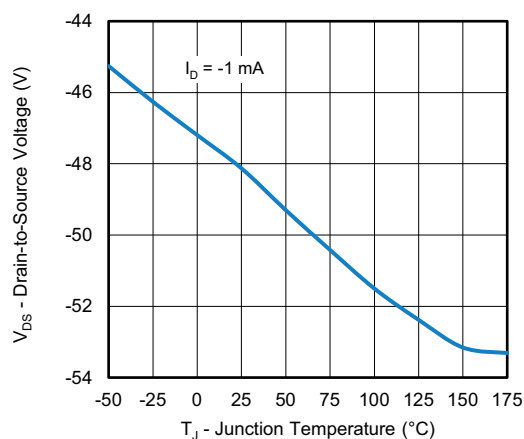
Source Drain Diode Forward Voltage



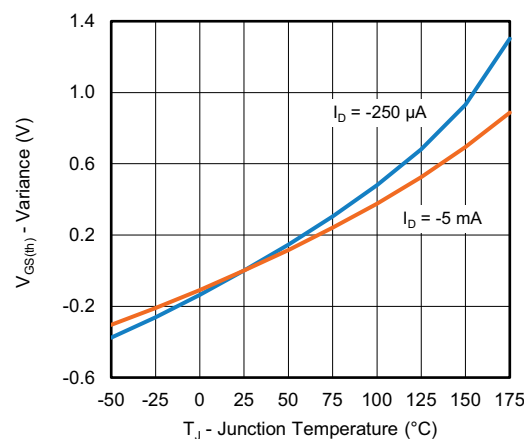
On-Resistance vs. Junction Temperature



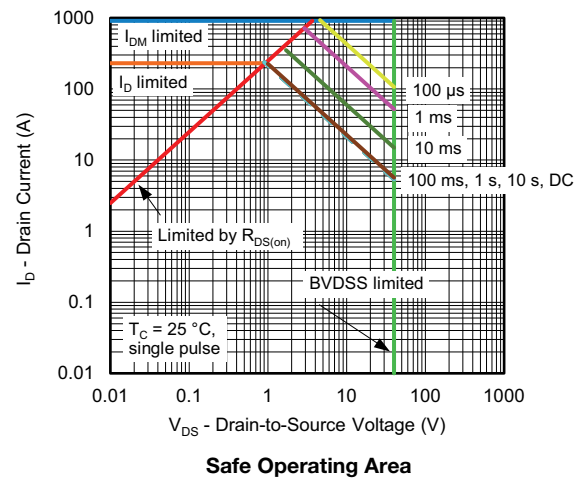
On-Resistance vs. Gate-to-Source Voltage



Drain Source Breakdown vs. Junction Temperature



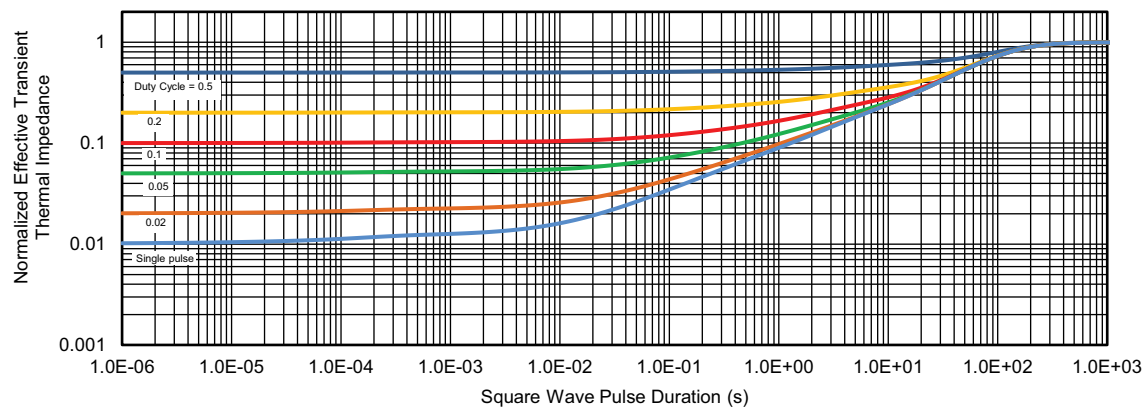
Threshold Voltage


Note

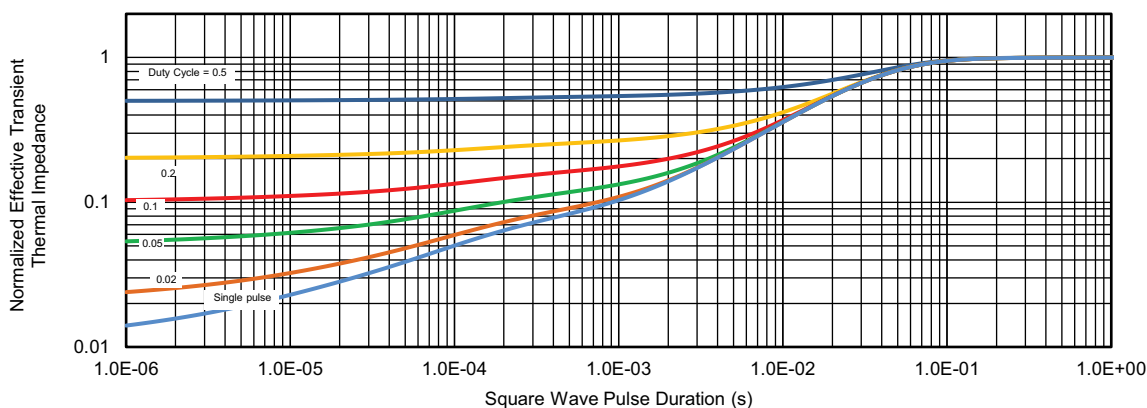
- a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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