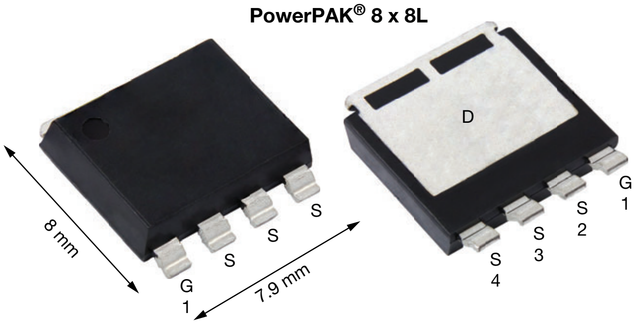
Automotive N-Channel 80 V (D-S) 175 °C MOSFET

PowerPAK® 8 x 8L

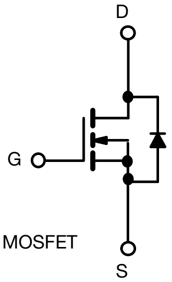


Top View

Bottom View

FEATURES

- TrenchFET® Gen V 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



N-Channel MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	80
$R_{DS(on)}$ (Ω) at V_{GS} = 10 V	0.00144
I_D (A) [e]	352
Configuration	Single

ORDERING INFORMATION	
Package	PowerPAK 8 x 8L
Lead (Pb)-free and halogen-free	SQJQ580E (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}	80	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current [e]	T_C = 25 °C	I_D	352	A
	T_C = 125 °C		203	
Continuous source current (diode conduction)		I_S	340	
Pulsed drain current [a, e]		I_{DM}	700	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	75	
Single pulse avalanche energy		E_{AS}	285	mJ
Maximum power dissipation [e]	T_C = 25 °C	P_D	375	W
	T_C = 125 °C		125	
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	PCB mount [b]	R_{thJA}	40	°C/W
Junction-to-case (drain) [d]		R_{thJC}	0.4	

Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %

b. When mounted on 1" square PCB (FR4 material)

c. See solder profile (www.vishay.com/doc?73257)

d. As per JESD51-14

e. 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

For technical questions, contact: automostechsupport@vishay.com

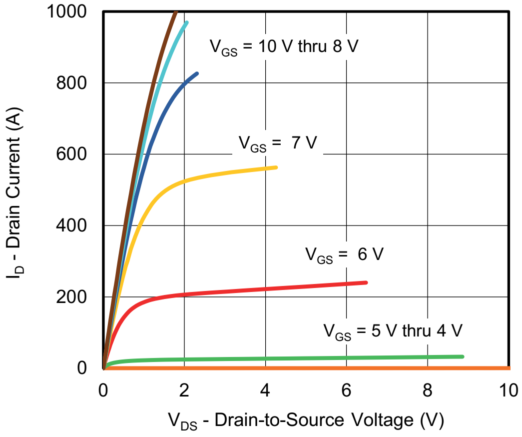
SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0, I_D = 250 μA		80	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA		2.2	2.8	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} = 80 V	-	-	1	μA
		V_{GS} = 0 V	V_{DS} = 80 V, T_J = 125 °C	-	-	50	
		V_{GS} = 0 V	V_{DS} = 80 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	-	0.0012	0.00144	Ω
		V_{GS} = 10 V	I_D = 20 A, T_J = 125 °C	-	-	0.0025	
		V_{GS} = 10 V	I_D = 20 A, T_J = 175 °C	-	-	0.0031	
Forward transconductance [b]	g_{fs}	V_{DS} = 15 V, I_D = 25 A		-	100	-	S
Dynamic [b]							
Input capacitance	C_{iss}	V_{GS} = 0 V	V_{DS} = 25 V, f = 1 MHz	-	8037	11 252	pF
Output capacitance	C_{oss}			-	4450	6250	
Reverse transfer capacitance	C_{rss}			-	52	73	
Total gate charge [c]	Q_g	V_{GS} = 10 V	V_{DS} = 40 V, I_D = 50 A	-	93	140	nC
Gate-source charge [c]	Q_{gs}			-	46	-	
Gate-drain charge [c]	Q_{gd}			-	8	-	
Gate resistance	R_g	f = 1 MHz		0.9	1.8	2.7	Ω
Turn-on delay time [c]	$t_{d(on)}$	V_{DD} = 40 V, R_L = 0.8 Ω, I_D ≅ 50 A, V_{GEN} = 10 V, R_g = 1 Ω		-	21	32	ns
Rise time [c]	t_r			-	16	24	
Turn-off delay time [c]	$t_{d(off)}$			-	37	56	
Fall time [c]	t_f			-	11	17	
Source-Drain Diode Ratings and Characteristics [b]							
Pulsed current [a]	I_{SM}			-	-	700	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 = 40 A, di/dt = 100 A/μs		-	97	194	ns
Body diode reverse recovery charge	Q_{rr}			-	254	508	nC
Reverse recovery fall time	t_a			-	60	-	ns
Reverse recovery rise time	t_b			-	37	-	
Body diode peak reverse recovery current	$I_{RM(REC)}$			-	-4.6	-	A

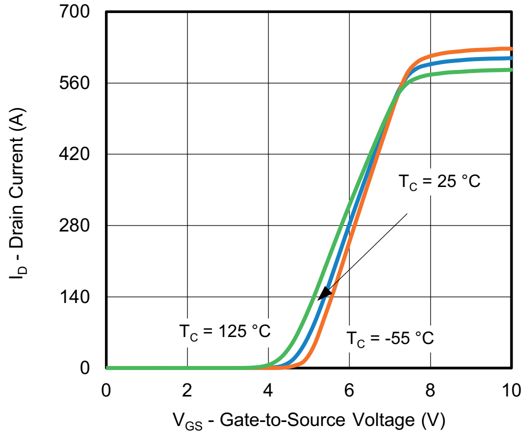
Notes

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

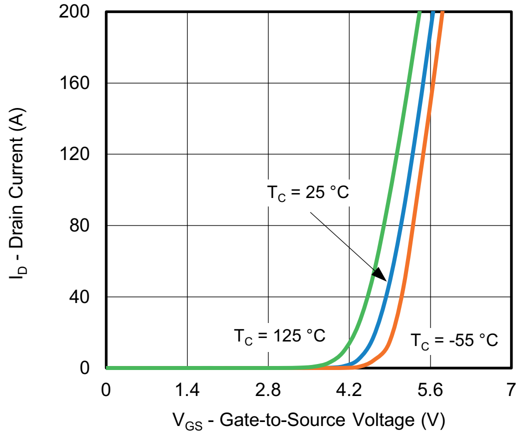
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



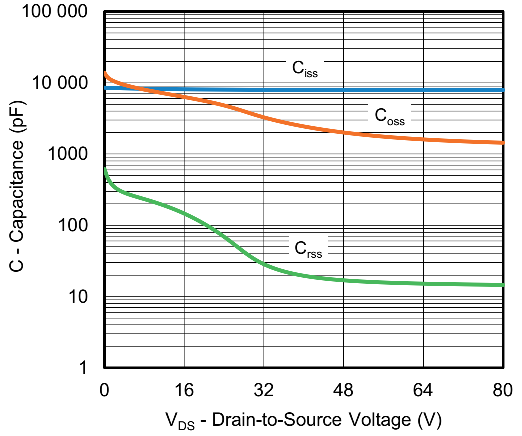
Output Characteristics



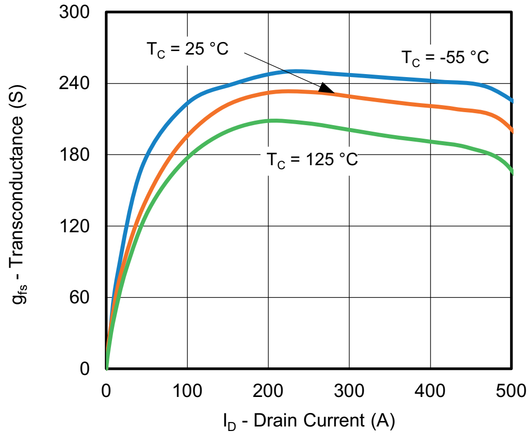
Transfer Characteristics



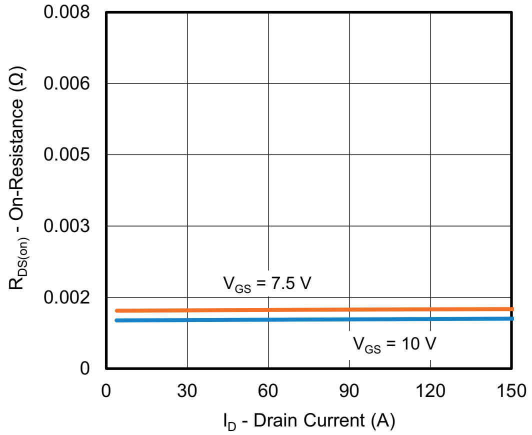
Transfer Characteristics



Capacitance

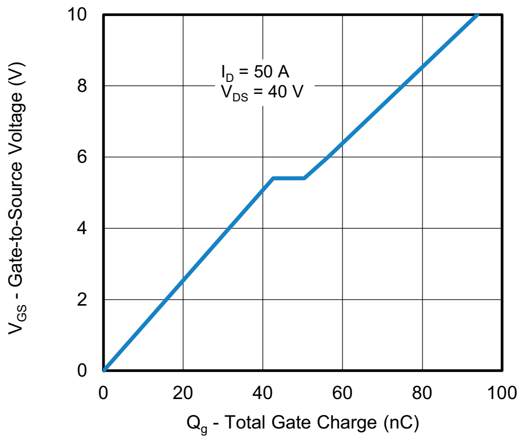


Transconductance

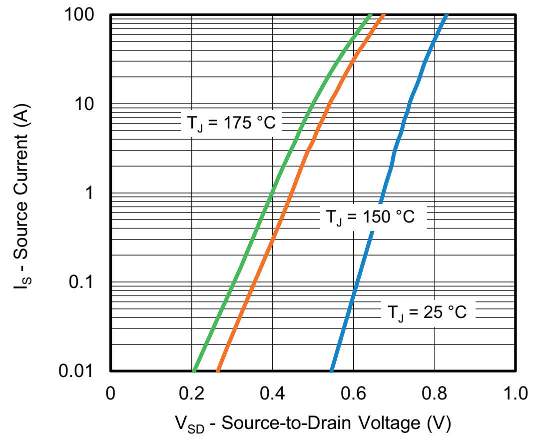


On-Resistance vs. Drain Current

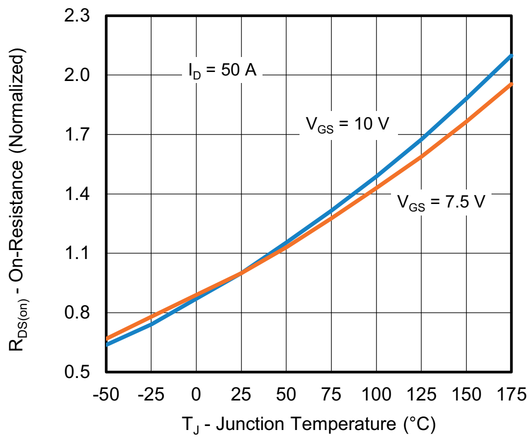
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



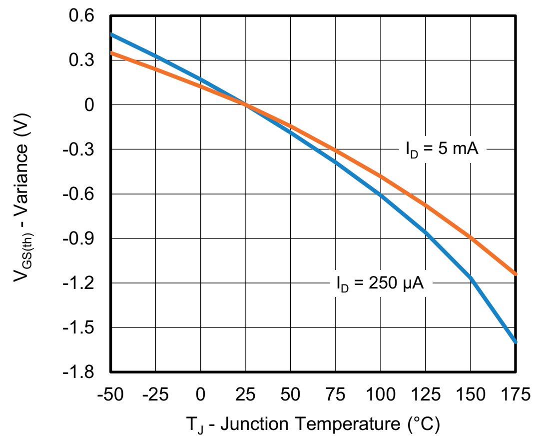
Gate Charge



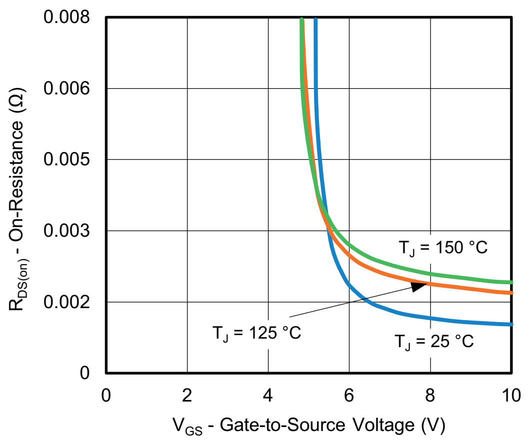
Source Drain Diode Forward Voltage



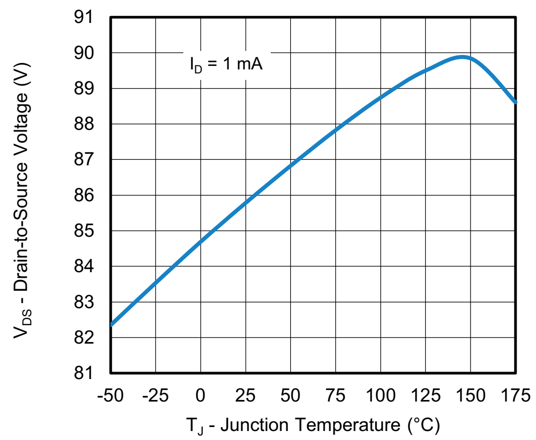
On-Resistance vs. Junction Temperature



Threshold Voltage

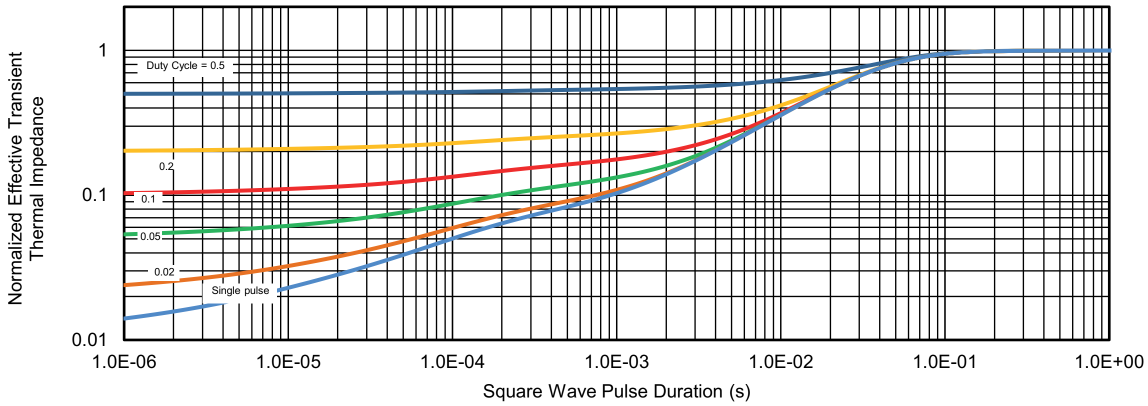


On-Resistance vs. Gate-to-Source Voltage

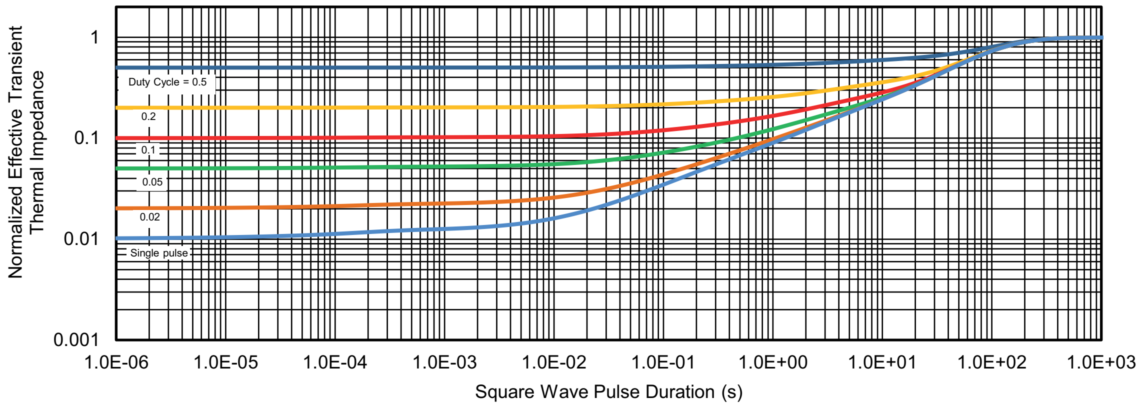


Drain Source Breakdown vs. Junction Temperature

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient

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