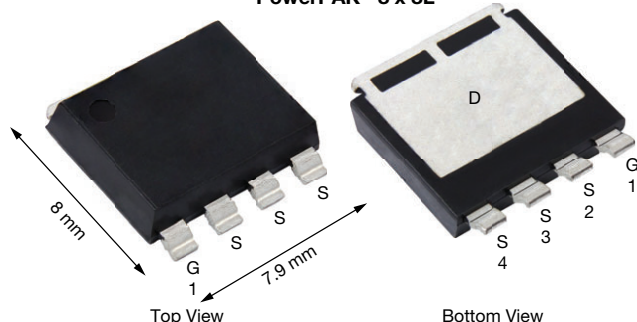


Automotive N-Channel 40 V (D-S) 175 °C MOSFET

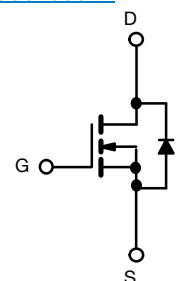
PowerPAK® 8 x 8L


FEATURES

- TrenchFET® Gen IV power MOSFET
- 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



N-Channel MOSFET

PRODUCT SUMMARY

V_{DS} (V)	40
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.00124
I_D (A)	460
Configuration	Single
Package	PowerPAK 8 x 8L

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	I_D	$T_C = 25$ °C	A
		$T_C = 125$ °C	
Continuous source current (diode conduction)	I_S	450	
Pulsed drain current ^b	I_{DM}	900	
Single pulse avalanche current	I_{AS}	48	
Single pulse avalanche energy	E_{AS}	115.2	mJ
Maximum power dissipation	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		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-ambient	R_{thJA}	44	°C/W
Junction-to-case (drain)	R_{thJC}	0.3	

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 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		40	-	-	V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		2	3	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} = 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	-	-	330	
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} = 10 V	I _D = 20 A	-	0.00100	0.00124	Ω
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.00200	
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.00240	
Forward transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 60 A		-	150	-	S
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 MHz	-	5360	6975	pF
Output capacitance	C _{oss}			-	2070	2700	
Reverse transfer capacitance	C _{rss}			-	167	215	
Total gate charge ^c	Q _g	V _{GS} = 10 V	V _{DS} = 20 V, I _D = 20 A	-	92	130	nC
Gate-source charge ^c	Q _{gs}			-	26	-	
Gate-drain charge ^c	Q _{gd}			-	20.1	-	
Gate resistance	R _g	f = 1 MHz		0.65	1.59	2.56	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = 20 V, R _L = 1 Ω I _D ≅ 20 A, V _{GEN} = 10 V, R _g = 1 Ω		-	18.5	26	ns
Rise time ^c	t _r			-	18	25	
Turn-off delay time ^c	t _{d(off)}			-	37	52	
Fall time ^c	t _f			-	14	20	
Source-Drain Diode Ratings and Characteristics ^b							
Reverse recovery time	t _{rr}	V _{DD} = 32 V, I _{FM} = 15 A, di/dt = 100 A/μs		-	59	-	ns
Reverse recovery charge	Q _{rr}			-	69	-	nC
Reverse recovery current	I _{RM}			-	2	3.2	A
Pulsed current ^a	I _{SM}			-	-	900	A
Forward voltage	V _{SD}	I _F = 50 A, V _{GS} = 0		-	0.8	1.1	V

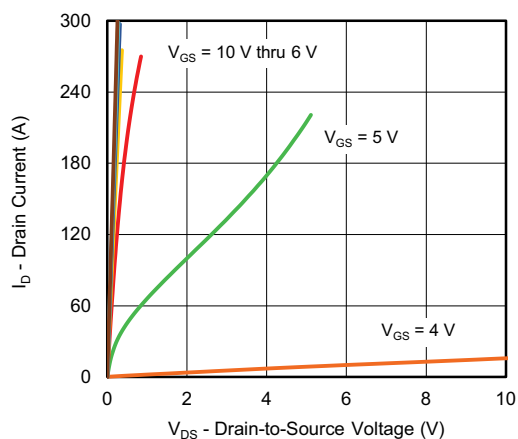
Notes

- 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

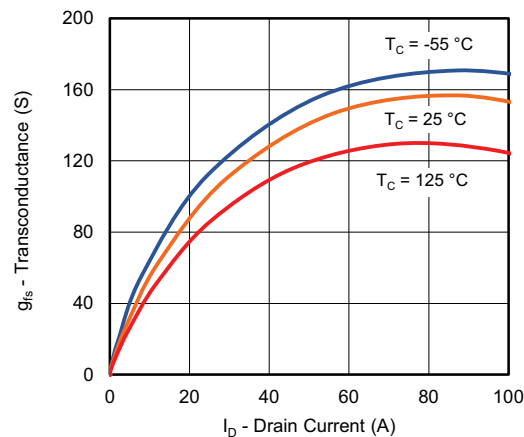
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



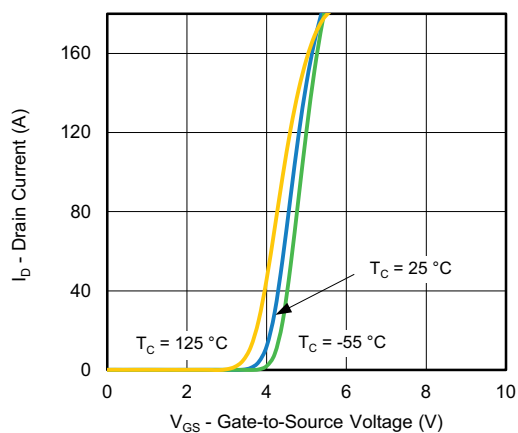
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



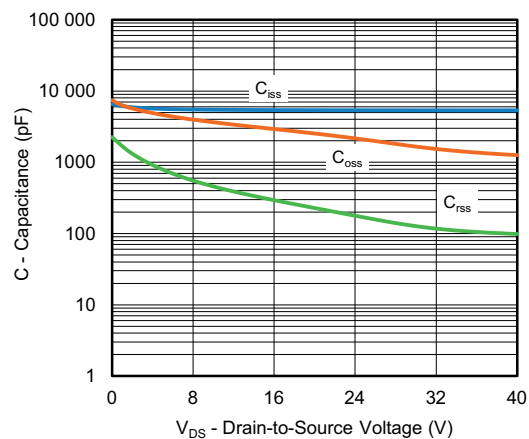
Output Characteristics



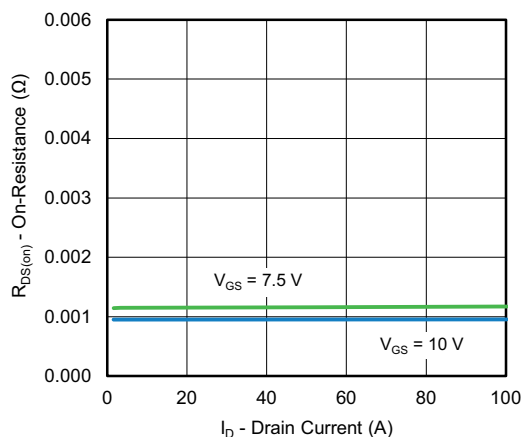
Transconductance



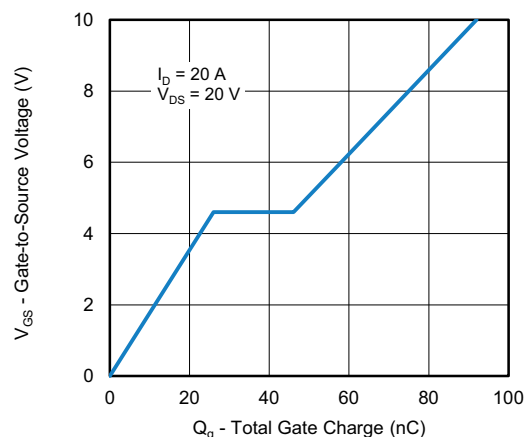
Transfer Characteristics



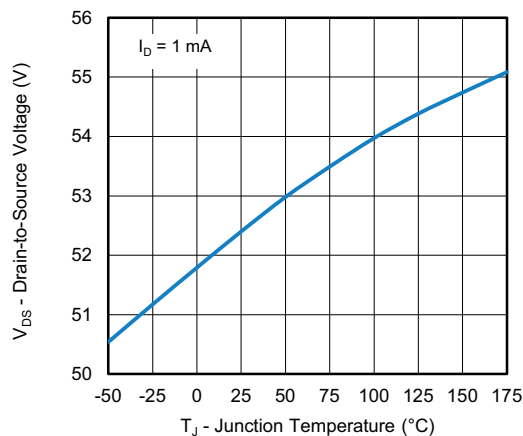
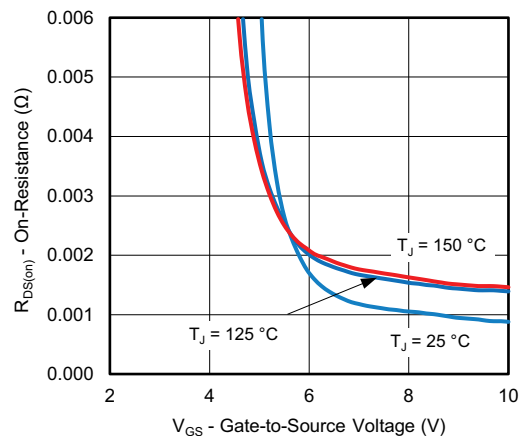
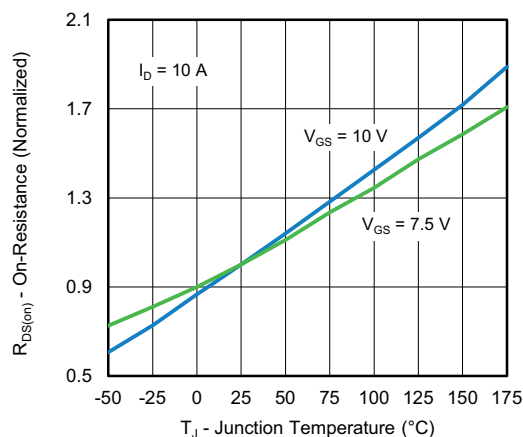
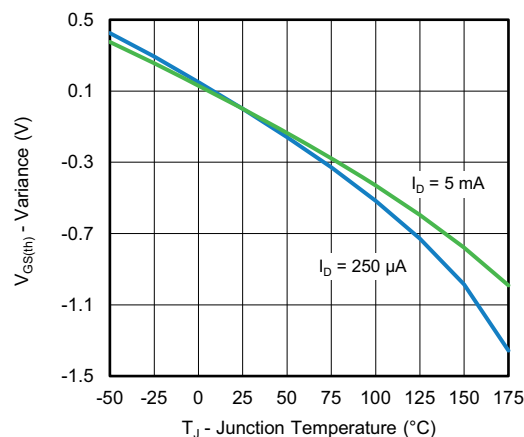
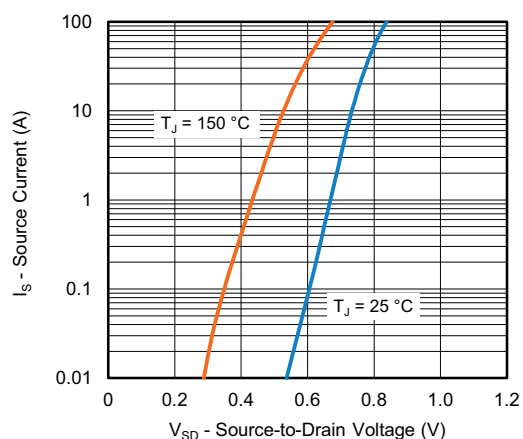
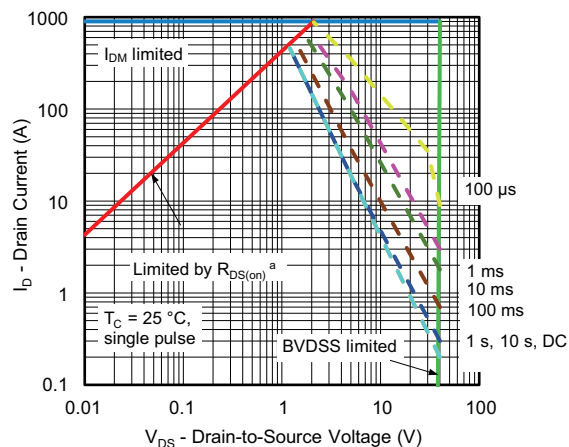
Capacitance



On-Resistance vs. Drain Current



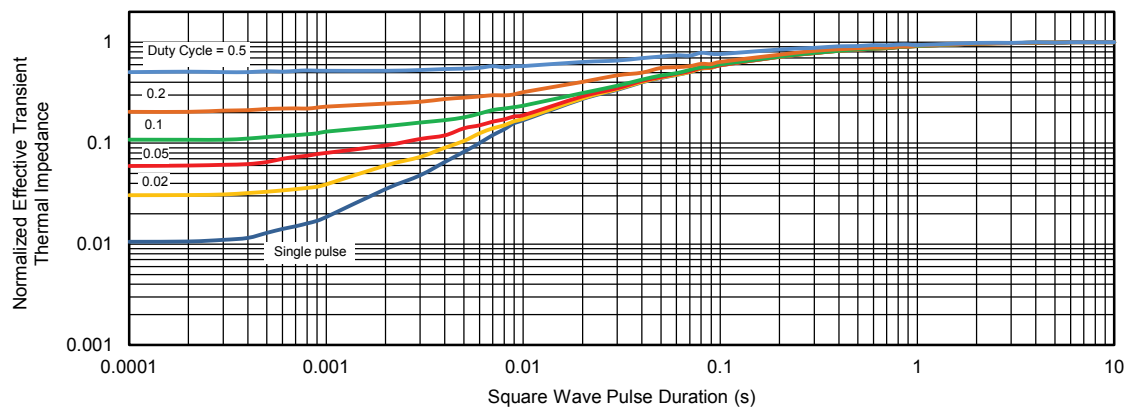
Gate Charge

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

Drain Source Breakdown vs. Junction Temperature

On-Resistance vs. Gate-to-Source Voltage

On-Resistance vs. Junction Temperature

Threshold Voltage

Source Drain Diode Forward Voltage

Safe Operating Area
Note

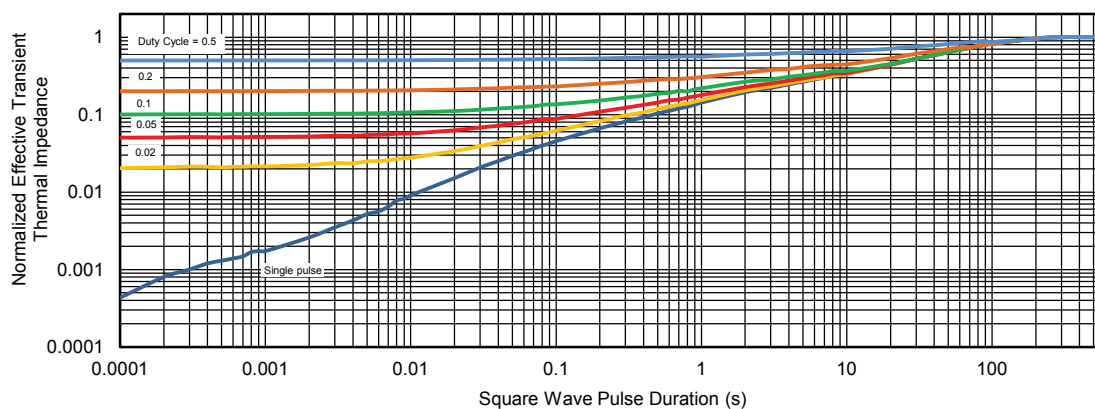
- $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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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