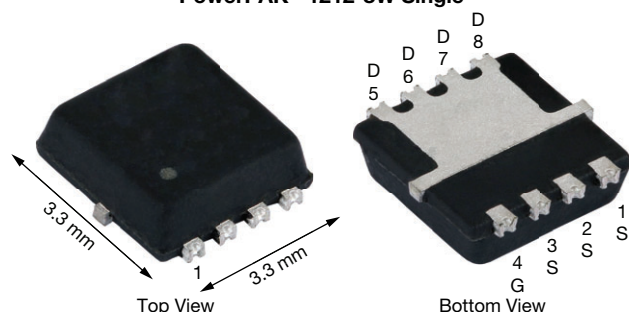


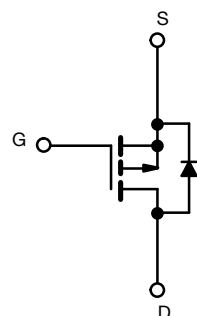
Automotive P-Channel 30 V (D-S) 175 °C MOSFET

PowerPAK® 1212-8W Single

Marking code: Q030

PRODUCT SUMMARY	
V_{DS} (V)	-30
$R_{DS(on)}$ (Ω) at $V_{GS} = -10$ V	0.021
$R_{DS(on)}$ (Ω) at $V_{GS} = -4.5$ V	0.060
I_D (A)	-16
Configuration	Single
Package	PowerPAK 1212-8W

FEATURES

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


RoHS
COMPLIANT
HALOGEN
FREE


P-Channel MOSFET

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	$T_C = 25$ °C	I_D	-16	A
	$T_C = 125$ °C		-16	
Continuous source current (diode conduction) ^a		I_S	-16	
Pulsed drain current ^b		I_{DM}	-64	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	-22	mJ
Single pulse avalanche energy		E_{AS}	24	
Maximum power dissipation ^b	$T_C = 25$ °C	P_D	62.5	W
	$T_C = 125$ °C		20	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) ^{e, f}			260	

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-ambient	PCB mount ^c	R_{thJA}	81	°C/W
Junction-to-case (drain)		R_{thJC}	2.4	

Notes

- Package limited
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)
- Parametric verification ongoing
- See solder profile (www.vishay.com/doc?73257). The PowerPAK 1212-8W is a leadless package. 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
- 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} = ± 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	-20	-	-	A
Drain-source on-state resistance ^b	R _{DS(on)}	V _{GS} = -10 V	I _D = -12 A	-	0.018	0.021	Ω
		V _{GS} = -10 V	I _D = -12 A, T _J = 125 °C	-	-	0.031	
		V _{GS} = -10 V	I _D = -12 A, T _J = 175 °C	-	-	0.035	
		V _{GS} = -4.5 V	I _D = -9 A	-	0.040	0.060	
Forward transconductance ^b	g _{fs}	V _{DS} = -15 V, I _D = -7 A		-	18	-	S
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = -15 V, f = 1 MHz	-	1575	1975	pF
Output capacitance	C _{oss}			-	335	418	
Reverse transfer capacitance	C _{rss}			-	240	300	
Total gate charge ^c	Q _g	V _{GS} = -4.5 V	V _{DS} = -15 V, I _D = -10.5 A	-	17	26	nC
Gate-source charge ^c	Q _{gs}			-	5.9	9	
Gate-drain charge ^c	Q _{gd}			-	9.2	14	
Gate resistance	R _g	f = 1 MHz		1.6	3.43	6	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = -15 V, R _L = 1.78 Ω I _D ≅ -8.4 A, V _{GEN} = -4.5 V, R _g = 1 Ω		-	65	100	ns
Rise time ^c	t _r			-	43	65	
Turn-off delay time ^c	t _{d(off)}			-	23	34	
Fall time ^c	t _f			-	15	22	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed current ^a	I _{SM}			-	-	-64	A
Forward voltage	V _{SD}	I _F = -8.8 A, V _{GS} = 0 V		-	-0.8	-1.2	V

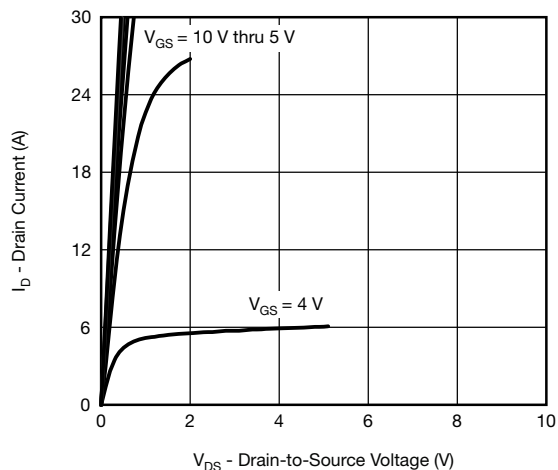
Notes

- 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

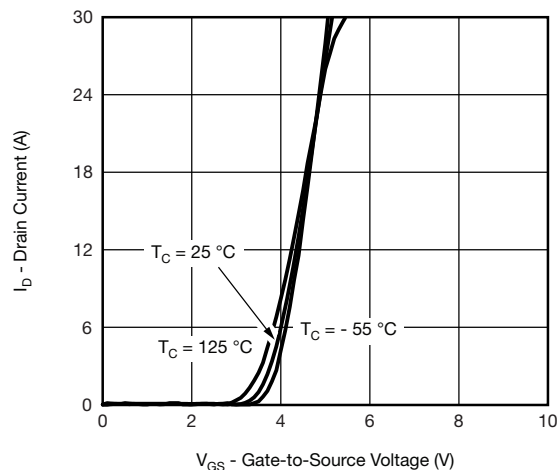
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



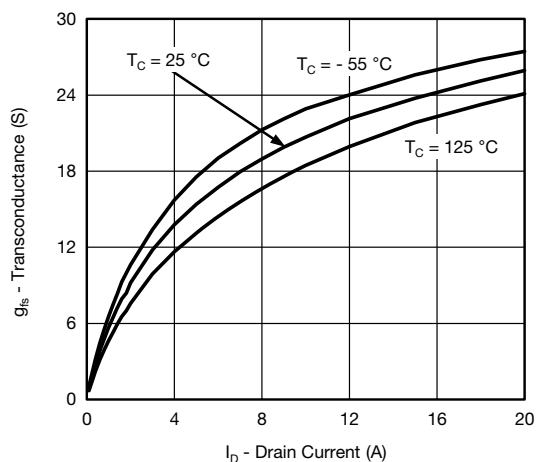
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



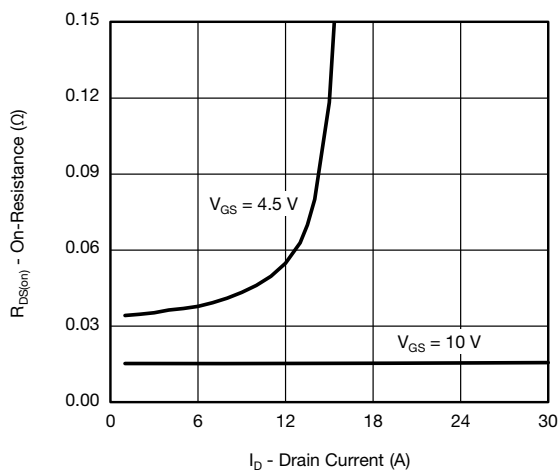
Output Characteristics



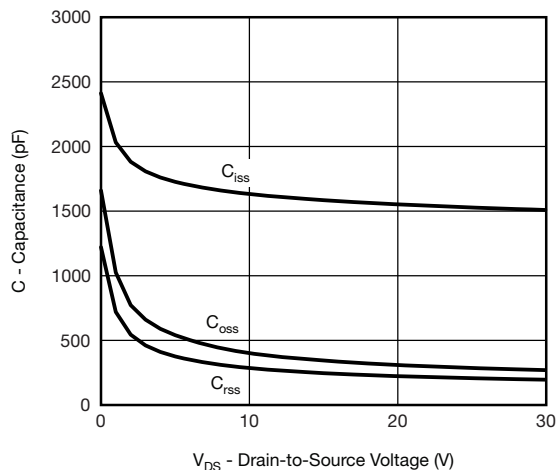
Transfer Characteristics



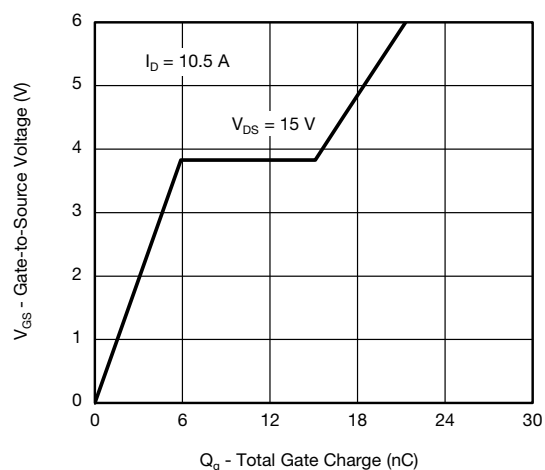
Transconductance



On-Resistance vs. Drain Current



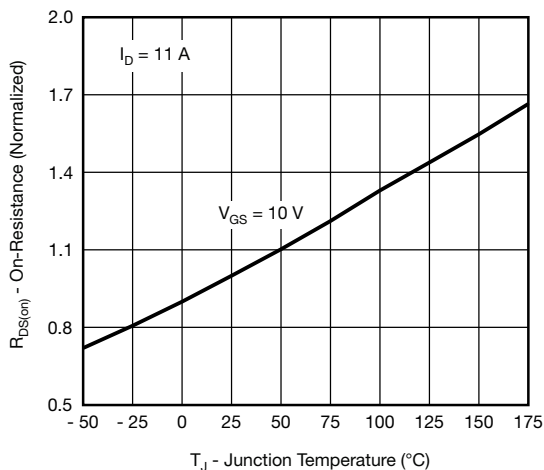
Capacitance



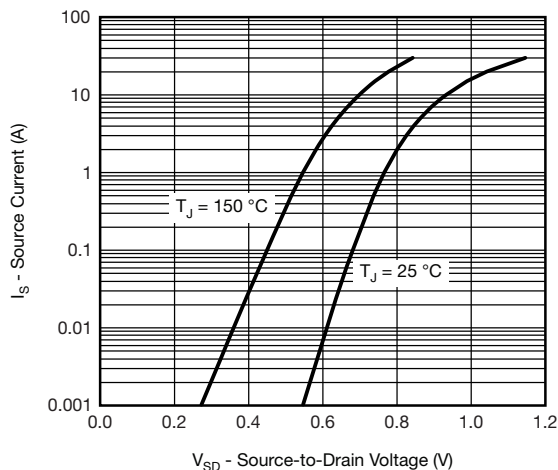
Gate Charge



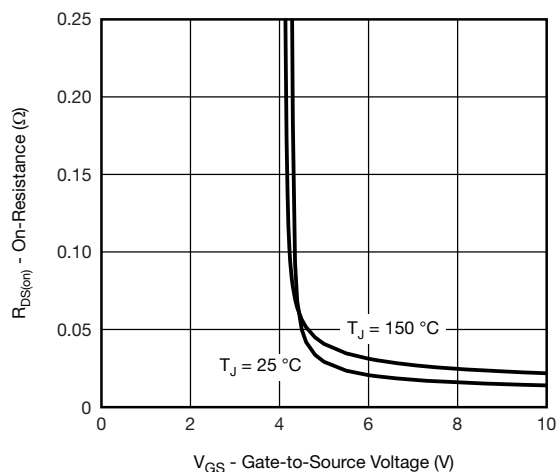
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



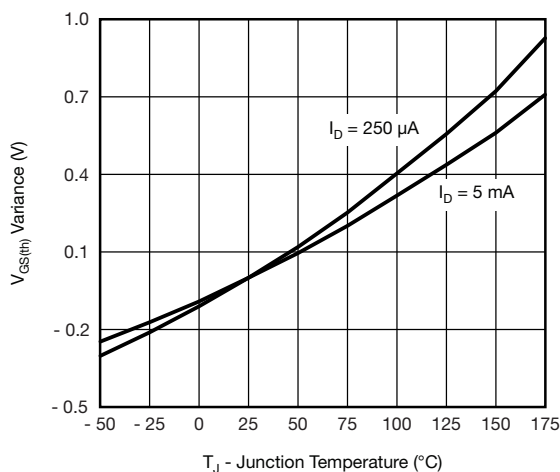
On-Resistance vs. Junction Temperature



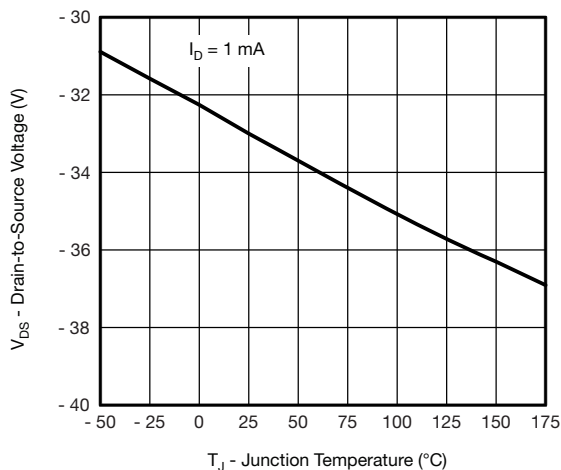
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



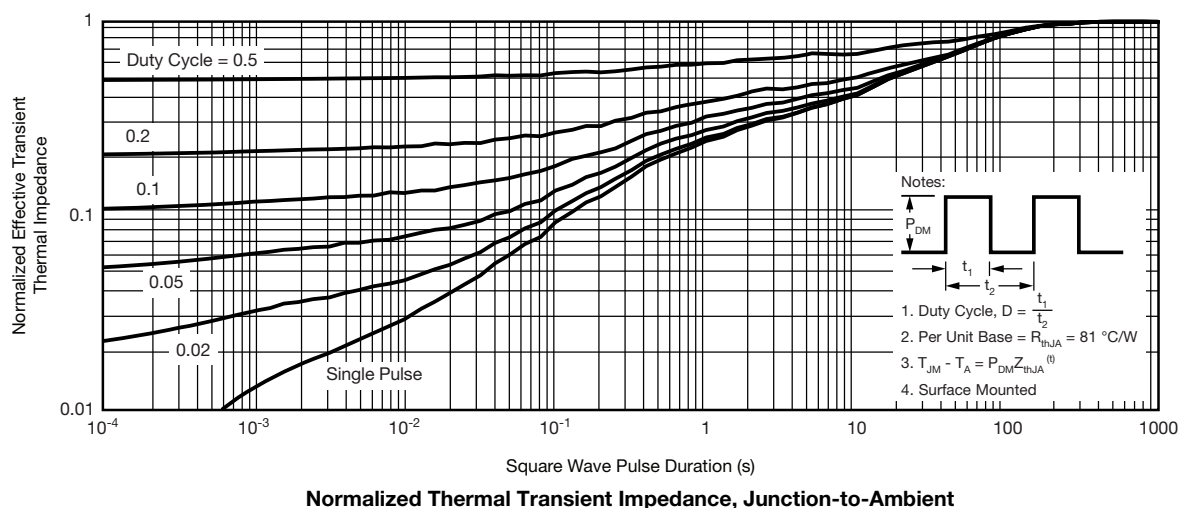
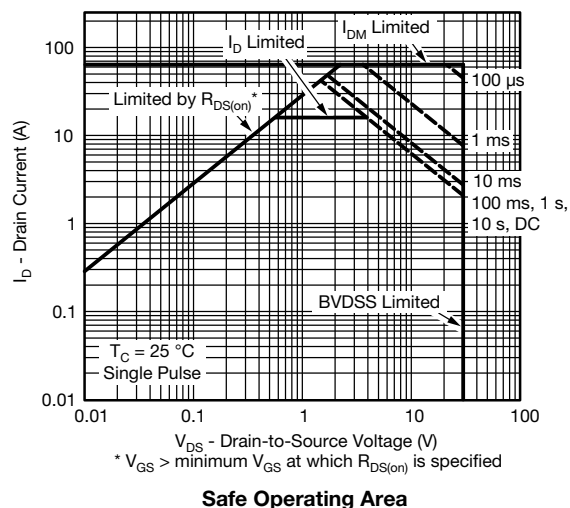
Threshold Voltage



Drain Source Breakdown vs. Junction Temperature

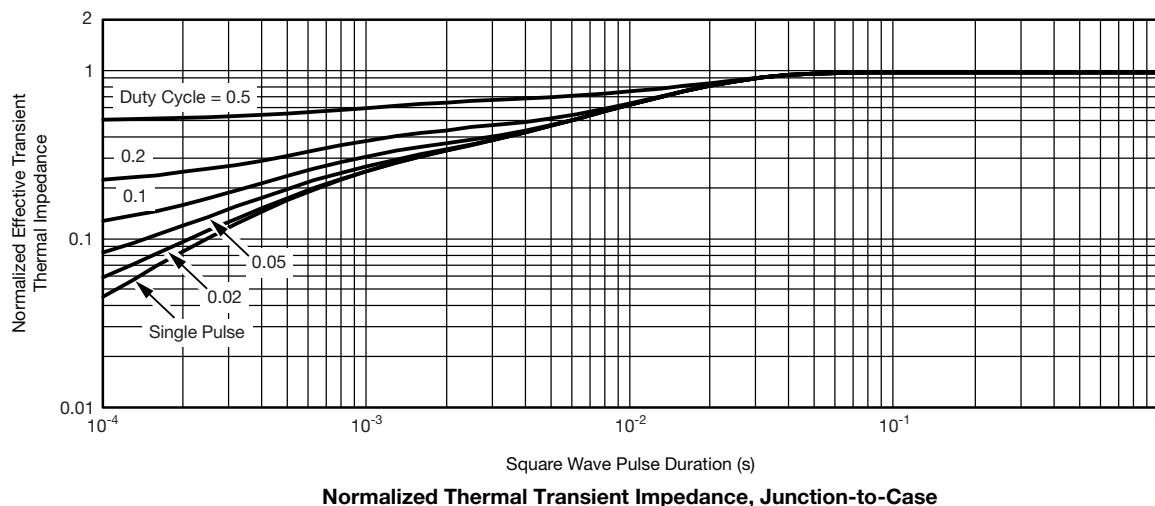


THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)





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

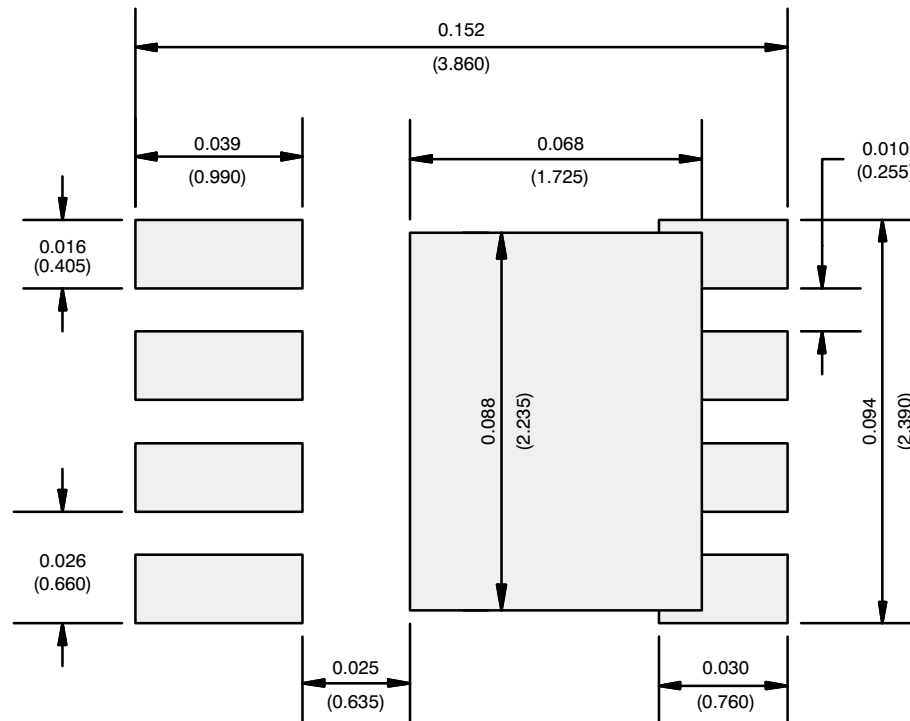


Note

- 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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RECOMMENDED MINIMUM PADS FOR PowerPAK® 1212-8 Single



Recommended Minimum Pads
Dimensions in Inches/(mm)

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