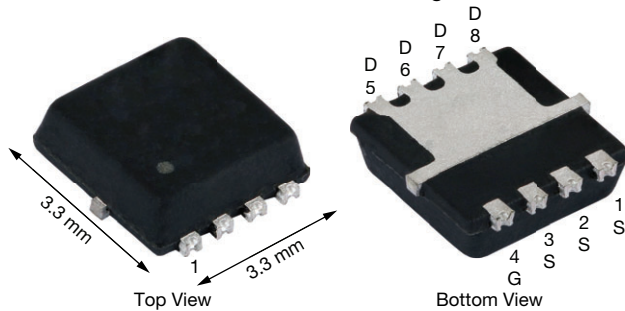


Automotive N-Channel 40 V (D-S) 175 °C MOSFET

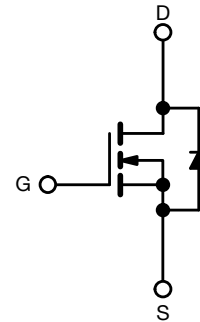
PowerPAK® 1212-8W Single

Marking code: Q080

PRODUCT SUMMARY	
V_{DS} (V)	40
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.0079
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.0105
I_D (A)	16
Configuration	Single

FEATURES

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

AUTOMOTIVE GRADE


RoHS COMPLIANT
 HALOGEN FREE


N-Channel MOSFET

ORDERING INFORMATION	
Package	PowerPAK® 1212-8W
Lead (Pb)-free and halogen-free	SQS488CENW (for detailed order number please see www.vishay.com/doc?79771)

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 ^a	I_D	$T_C = 25$ °C	16
		$T_C = 125$ °C	16
Continuous source current (diode conduction) ^a	I_S	16	A
Pulsed drain current ^b	I_{DM}	64	mJ
Single pulse avalanche current	I_{AS}	19	
Single pulse avalanche energy	E_{AS}	18	
Maximum power dissipation	P_D	$T_C = 25$ °C	39.47
		$T_C = 125$ °C	13.16
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}	81	°C/W
Junction-to-case (drain)			

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 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 ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$		40	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		1.5	2.0	2.5	
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 40\text{ V}$	-	-	1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = 40\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 40\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	150	
On-state drain current ^a	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	15	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 10\text{ A}$	-	0.0064	0.0079	Ω
		$V_{GS} = 10\text{ V}$	$I_D = 10\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.0118	
		$V_{GS} = 10\text{ V}$	$I_D = 10\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.0140	
		$V_{GS} = 4.5\text{ V}$	$I_D = 10\text{ A}$	-	0.0087	0.0105	
Forward transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 10\text{ A}$		-	50	-	S
Dynamic ^b							
Input capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	1318	1850	pF
Output capacitance	C_{oss}			-	321	450	
Reverse transfer capacitance	C_{rss}			-	31	43	
Total gate charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 20\text{ V}, I_D = 4\text{ A}$	-	22	35	nC
Gate-source charge ^c	Q_{gs}			-	4	-	
Gate-drain charge ^c	Q_{gd}			-	3.7	-	
Gate resistance	R_g	$f = 1\text{ MHz}$		0.5	1.0	1.5	Ω
Turn-on delay time ^c	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 5\text{ }\Omega$ $I_D \cong 4\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	11	18	ns
Rise time ^c	t_r			-	3	5	
Turn-off delay time ^c	$t_{d(off)}$			-	20	30	
Fall time ^c	t_f			-	4	7	
Source-Drain Diode Ratings and Characteristic ^b							
Pulsed current ^a	I_{SM}			-	-	64	A
Forward voltage	V_{SD}	$I_F = 10\text{ A}, V_{GS} = 0\text{ V}$		-	0.82	1.1	V
Body diode reverse recovery time	t_{rr}	$I_F = 5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		-	24	48	ns
Body diode reverse recovery charge	Q_{rr}			-	12	24	nC
Reverse recovery fall time	t_a			-	11	-	ns
Reverse recovery rise time	t_b			-	13	-	
Body diode peak reverse recovery current	$I_{RM(REC)}$					-	-0.9

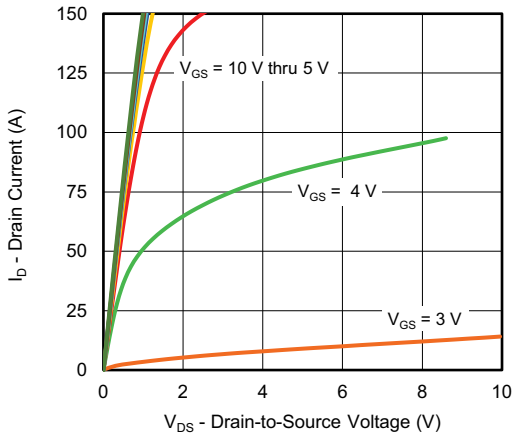
Notes

- 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

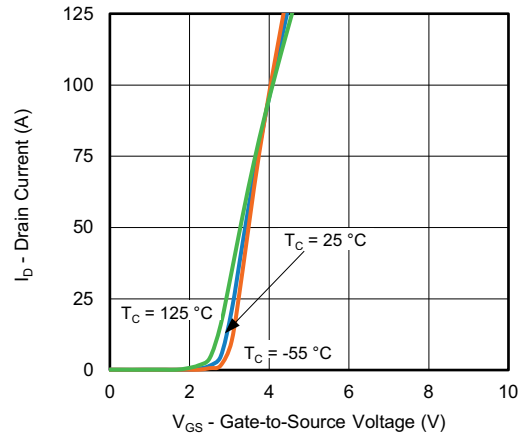
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



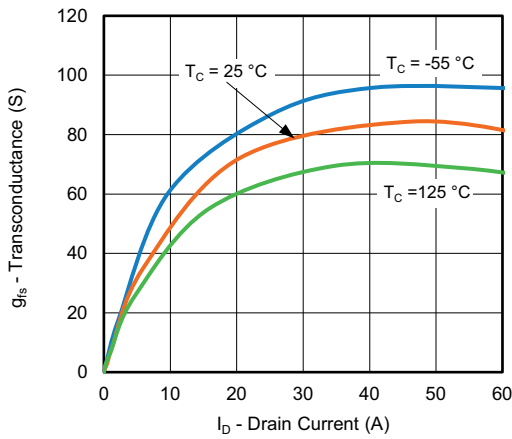
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



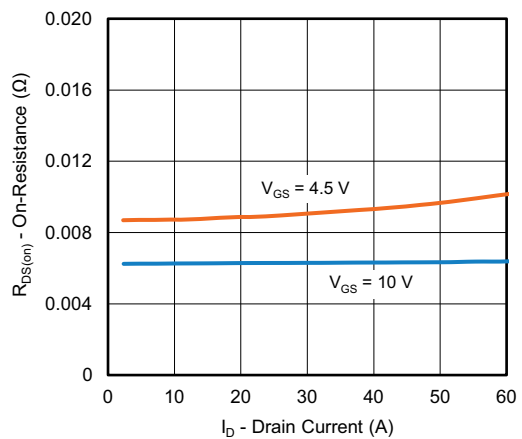
Output Characteristics



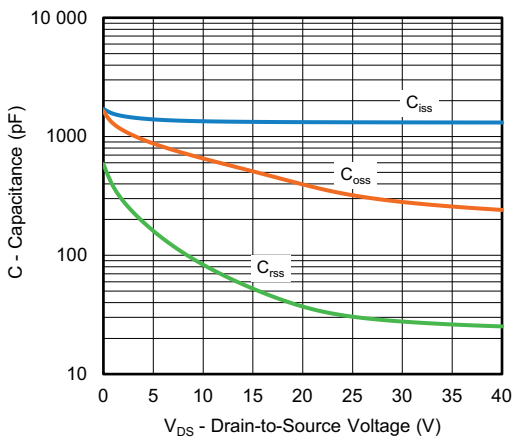
Transfer Characteristics



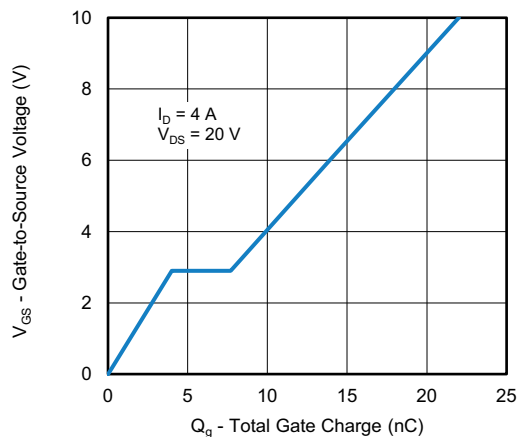
Transconductance



On-Resistance vs. Drain Current



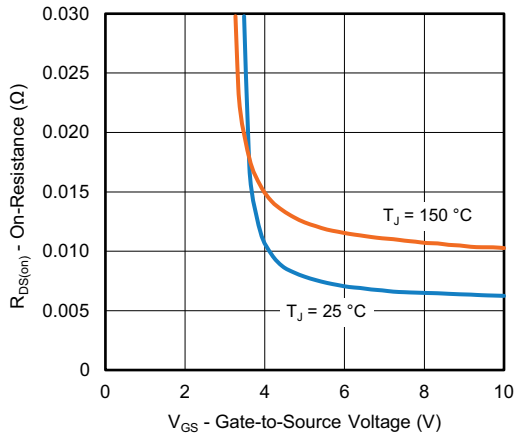
Capacitance



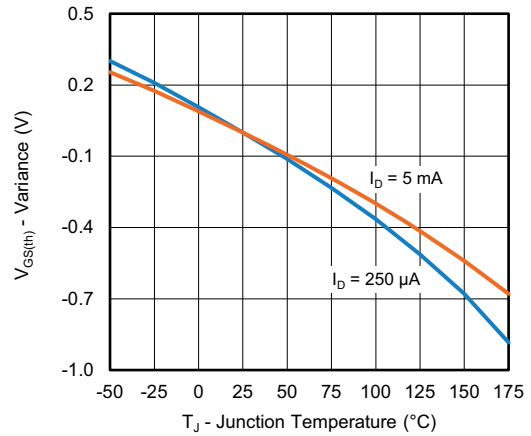
Gate Charge



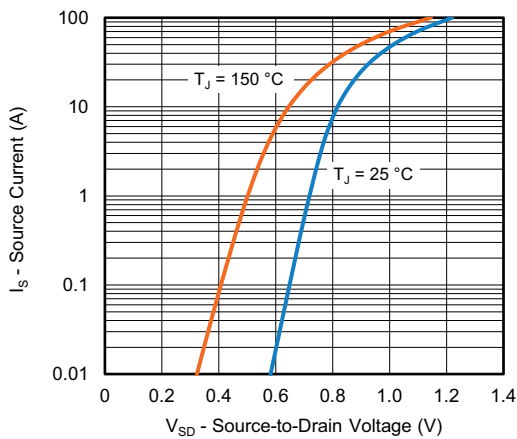
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



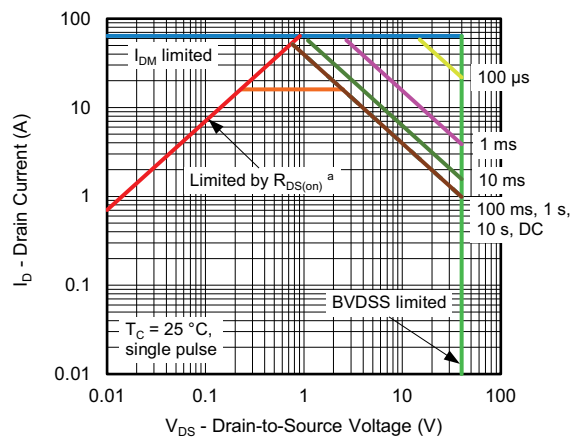
On-Resistance vs. Gate-to-Source Voltage



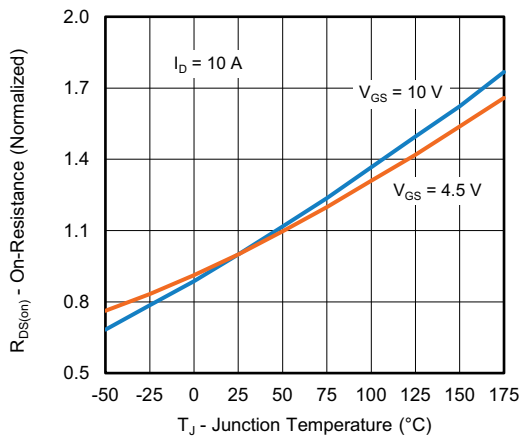
Threshold Voltage



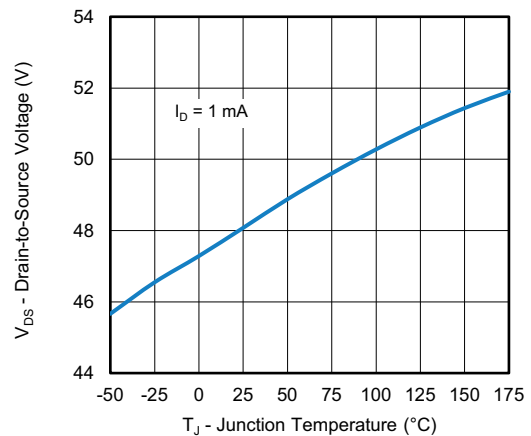
Source Drain Diode Forward Voltage



Safe Operating Area



On-Resistance vs Junction Temperature



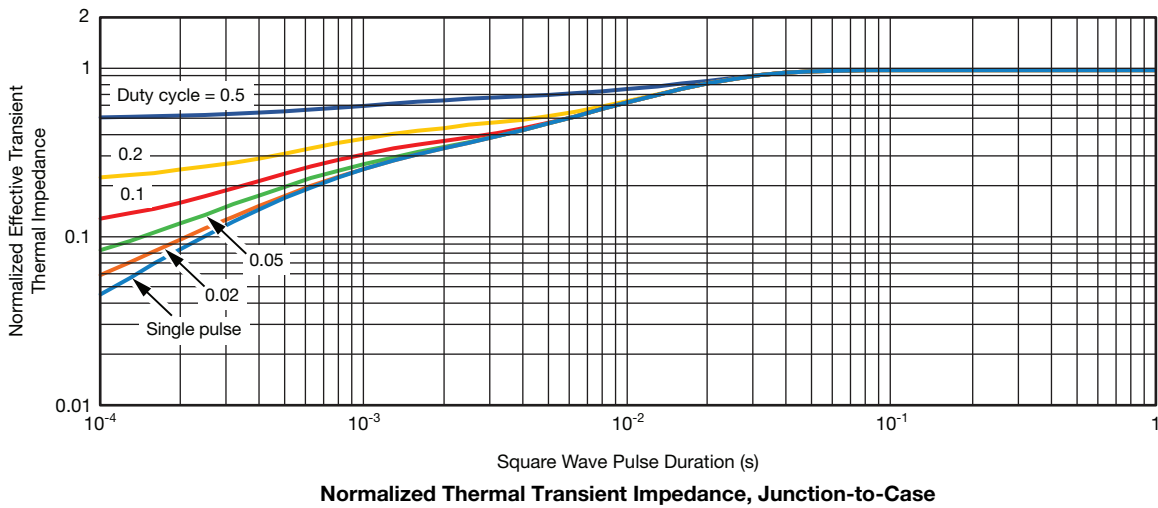
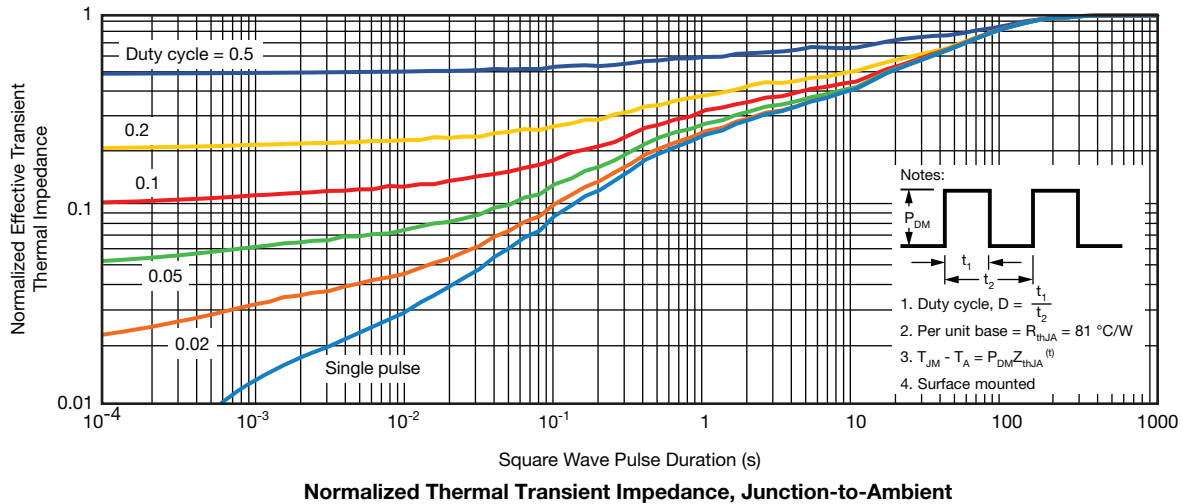
Drain Source Breakdown vs. Junction Temperature

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)



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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