



New Product

Si7909DN
Vishay Siliconix

Dual P-Channel 12-V (D-S) MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
-12	0.037 @ V _{GS} = -4.5 V	-7.7
	0.048 @ V _{GS} = -2.5 V	-6.8
	0.068 @ V _{GS} = -1.8 V	-5.7

FEATURES

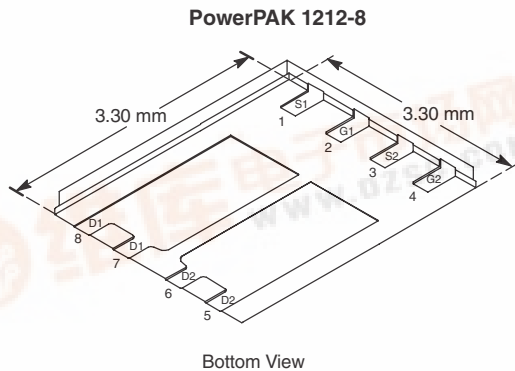
- TrenchFET® Power MOSFETS: 1.8-V Rated
- New Low Thermal Resistance PowerPAK® Package
- Advanced High Cell Density Process
- Ultra-Low r_{DS(on)} and High P_D Capability



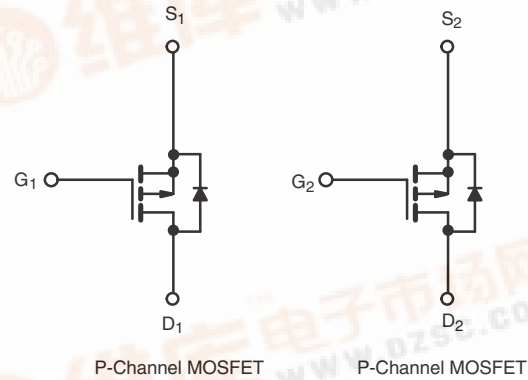
RoHS*
COMPLIANT

APPLICATIONS

- Load Switch
- PA Switch
- Battery Switch
- Bi-Directional Switch



Ordering Information: Si7909DN-T1
Si7909DN-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS T _A = 25°C, unless otherwise noted					
Parameter	Symbol	10 secs	Steady State	Unit	
Drain-Source Voltage	V _{DS}	-12		V	
Gate-Source Voltage	V _{GS}	±8			
Continuous Drain Current (T _J = 150°C) ^a	I _D	T _A = 25°C	-7.7	-5.3	
		T _A = 85°C	-5.5	-3.8	
Pulsed Drain Current	I _{DM}	-20		A	
Continuous Source Current (Diode Conduction) ^a	I _S	-2.3	-1.1	W	
Maximum Power Dissipation ^a	P _D	T _A = 25°C	2.8		1.3
		T _A = 85°C	1.5		0.85
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to 150		°C	
Soldering Recommendations (Peak Temperature) ^{b,c}		260			

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R _{thJA}	t ≤ 10 sec	35	44
		Steady State	75	94
Maximum Junction-to-Case	R _{thJC}	4	5	°C/W

Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
- b. See Solder Profile (<http://www.vishay.com/ppg?73257>). The PowerPAK 1212-8 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.
- c. Re-work Conditions: manual soldering with a soldering iron is not recommended for leadless components.

*Pb-containing terminations are not RoHS compliant, exemptions may apply

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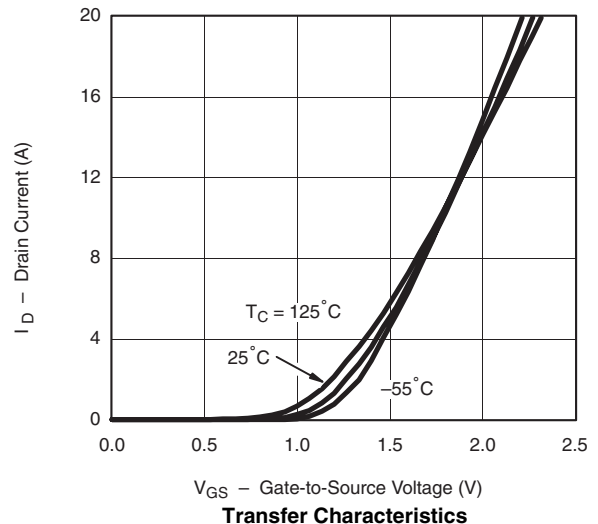
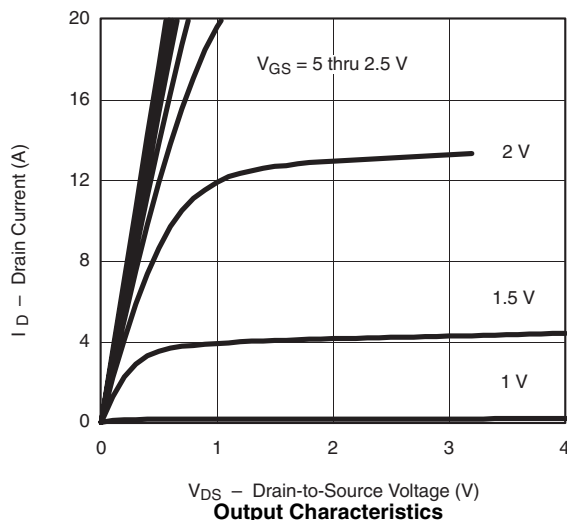
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -700 \mu\text{A}$	-0.40		-1.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 8 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12 \text{ V}, V_{GS} = 0 \text{ V}$			-1	μA
		$V_{DS} = -12 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 85^\circ\text{C}$			-5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5 \text{ V}, V_{GS} = -4.5 \text{ V}$	-20			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -4.5 \text{ V}, I_D = -7.7 \text{ A}$		0.031	0.037	Ω
		$V_{GS} = -2.5 \text{ V}, I_D = -6.8 \text{ A}$		0.040	0.048	
		$V_{GS} = -1.8 \text{ V}, I_D = -3.0 \text{ A}$		0.057	0.068	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -6 \text{ V}, I_D = -7.7 \text{ A}$		17		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -2.3 \text{ A}, V_{GS} = 0 \text{ V}$		-0.7	-1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6 \text{ V}, V_{GS} = -4.5 \text{ V}, I_D = -7.7 \text{ A}$		15.5	24	nC
Gate-Source Charge	Q_{gs}		2.5			
Gate-Drain Charge	Q_{gd}		4.3			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6 \text{ V}, R_L = 6 \Omega$ $I_D \cong -1 \text{ A}, V_{GEN} = -4.5 \text{ V}, R_G = 6 \Omega$		25	40	ns
Rise Time	t_r		45	70		
Turn-Off Delay Time	$t_{d(off)}$		90	135		
Fall Time	t_f		85	130		
Source-Drain Reverse Recovery Time	t_{rr}		$I_F = -2.3 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$		70	

Notes

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

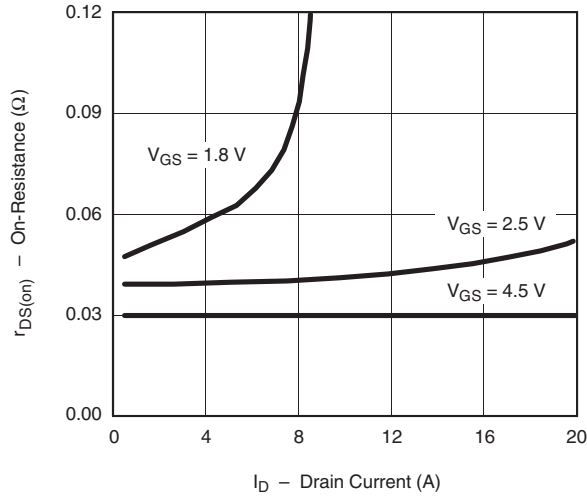
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

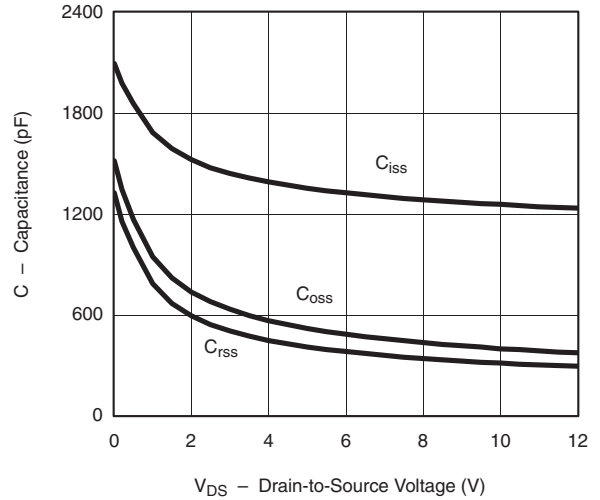




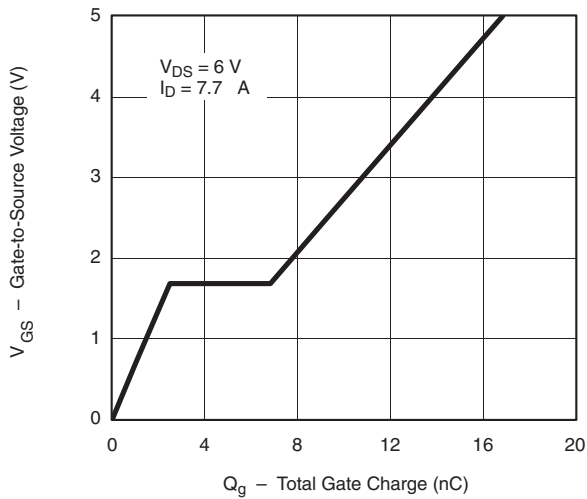
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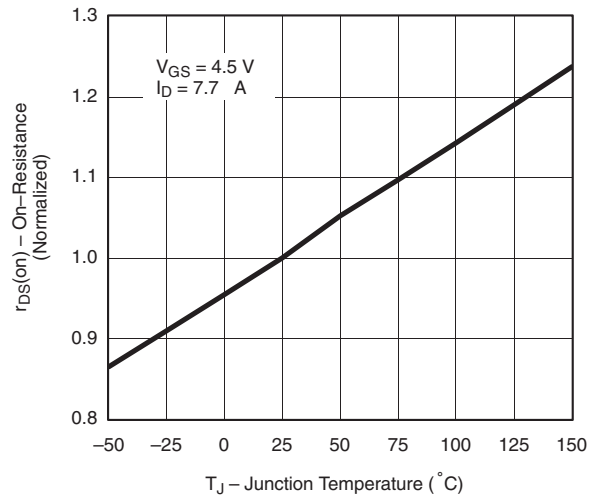
On-Resistance vs. Drain Current



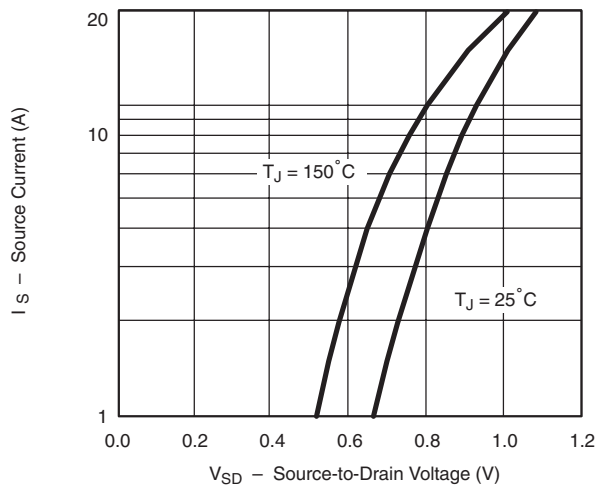
Capacitance



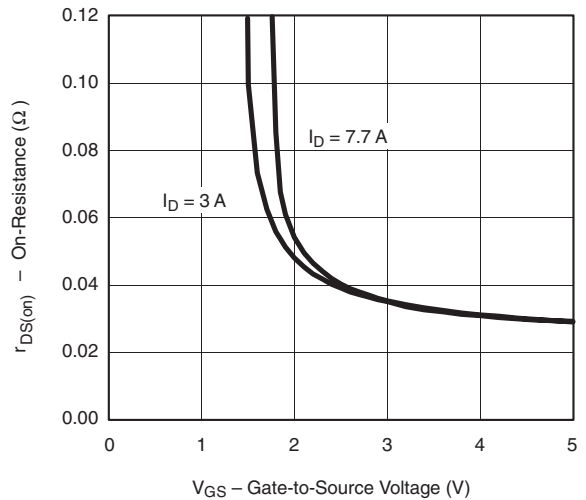
Gate Charge



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

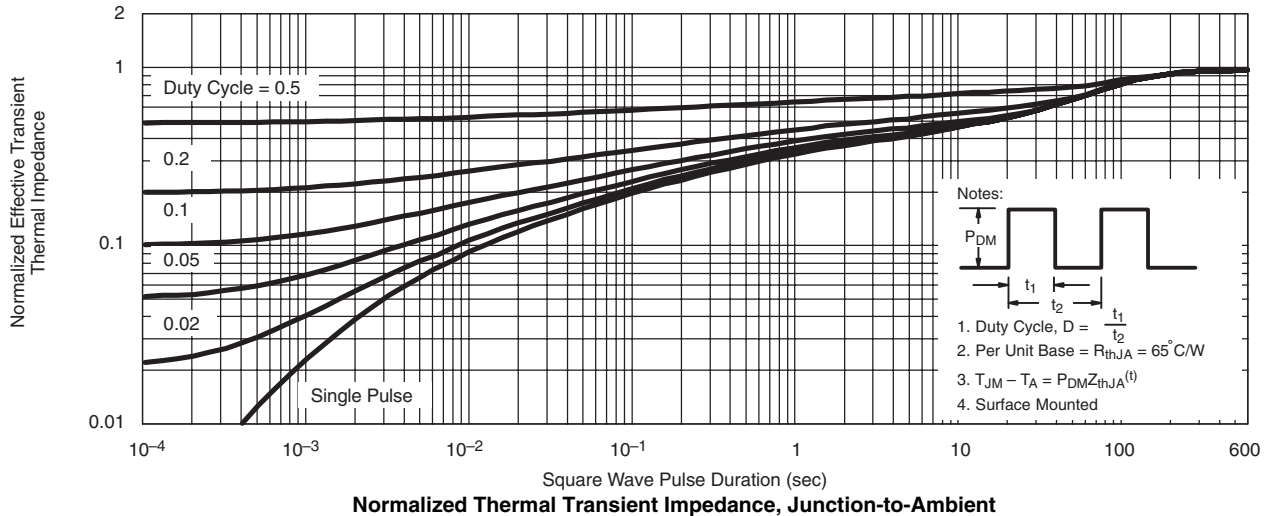
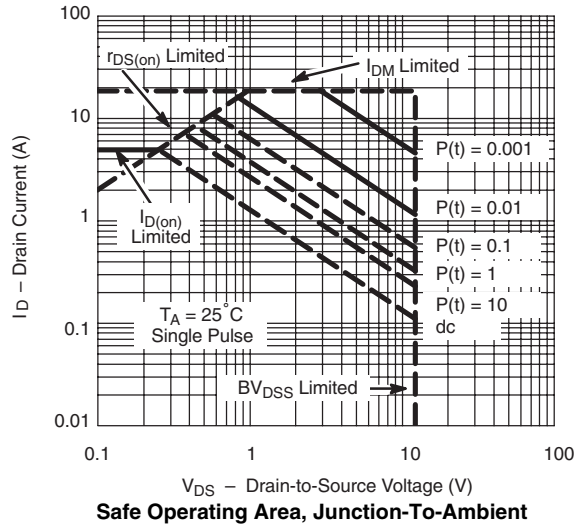
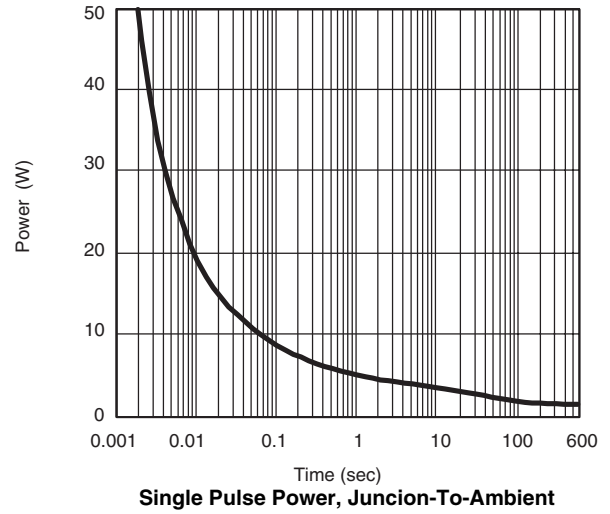
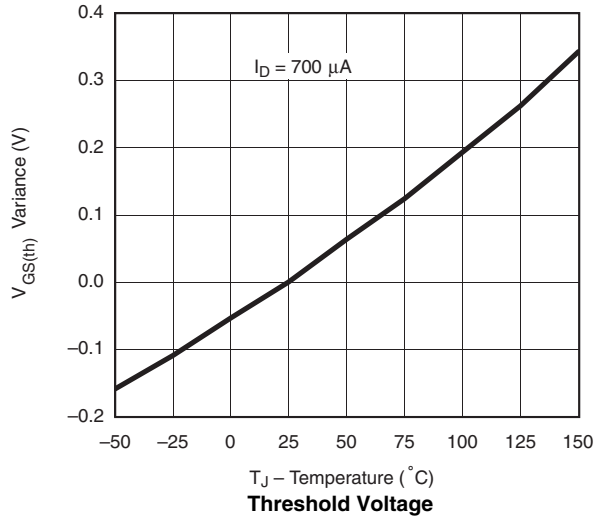
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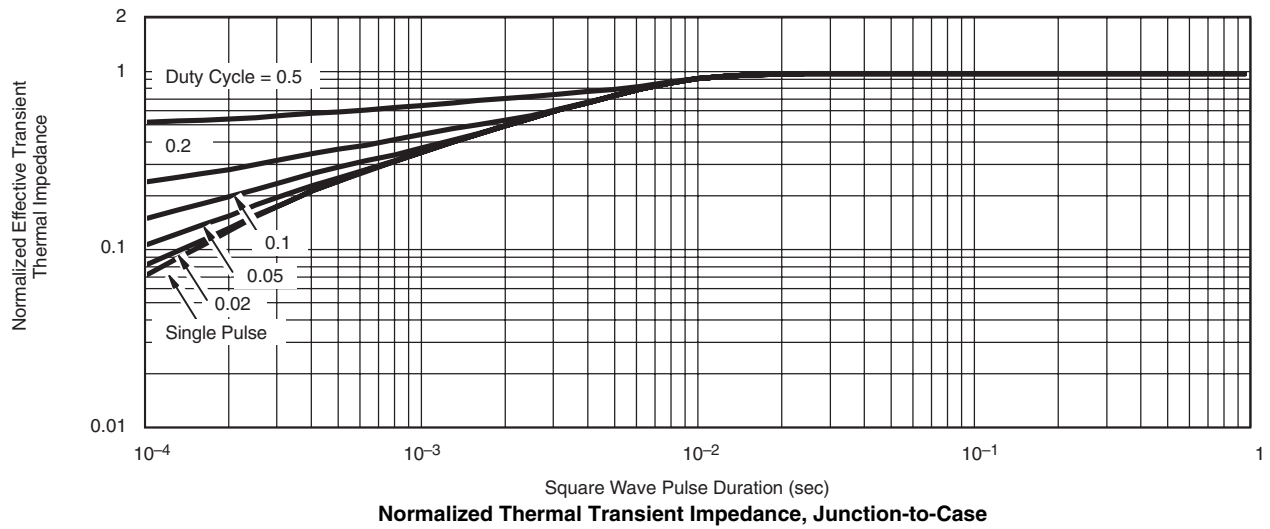




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Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?71996>.