

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^e	Q _g (Typ)
30	0.0066 at V _{GS} = 10 V	35	40 nC
	0.0076 at V _{GS} = 4.5 V	35	

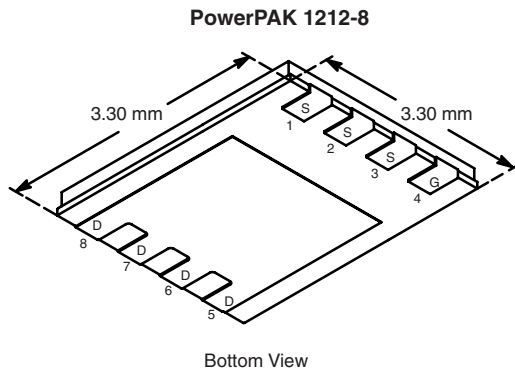
FEATURES

- TrenchFET[®] Power MOSFET
- Low Thermal Resistance PowerPAK[®] Package with Small Size and Low 1.07 mm Profile
- 100 % R_g Tested

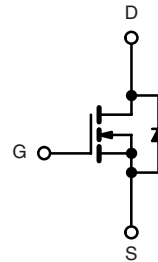


APPLICATIONS

- Synchronous Rectification
- Notebook
- DC/DC Converter



Bottom View



N-Channel MOSFET

Ordering Information: Si7328DN-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	30	V	
Gate-Source Voltage	V _{GS}	± 12		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	35 ^e	A
		T _C = 70 °C	35 ^e	
		T _A = 25 °C	18.9 ^{a, b}	
		T _A = 70 °C	17.35 ^{a, b}	
Pulsed Drain Current	I _{DM}	60		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	35 ^e	
		T _A = 25 °C	3.15 ^{a, b}	
Maximum Power Dissipation	P _D	T _C = 25 °C	52	W
		T _C = 70 °C	43	
		T _A = 25 °C	3.78 ^{a, b}	
		T _A = 70 °C	3.18 ^{a, b}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 50 to 150	°C	
Soldering Recommendations (Peak Temperature) ^{c, d}		260		

Notes:

- Surface Mounted on 1" x 1" FR4 board.
- t = 10 s.
- 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.
- Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Package limited.

**THERMAL RESISTANCE RATINGS**

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	t ≤ 10 s	R _{thJA}	24	33	°C/W
	Steady State		65	81	
Maximum Junction-to-Case (Drain)	Steady State	R _{thJC}	1.9	2.4	

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

b. Maximum under Steady State conditions is 81 °C/W.

MOSFET SPECIFICATIONS T_J = 25 °C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.6		1.5	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 12 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	40			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 18.9 A		0.0055	0.0066	Ω
		V _{GS} = 4.5 V, I _D = 17.65 A		0.0063	0.0076	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 18.9 A		97		S
Diode Forward Voltage	V _{SD}	I _S = 3.2 A, V _{GS} = 0 V		0.7	1.2	V
Dynamic^b						
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		2610		pF
Output Capacitance	C _{oss}			300		
Reverse Transfer Capacitance	C _{rss}			140		
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 18.9 A		21	31.5	nC
Gate-Source Charge	Q _{gs}			7.5		
Gate-Drain Charge	Q _{gd}			2.5		
Gate Resistance	R _g	f = 1 MHz	0.5	1.2	1.8	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 0.86 Ω I _D = 17.3 A, V _{GEN} = 10 V, R _g = 1 Ω		10	15	ns
Rise Time	t _r			10	15	
Turn-Off Delay Time	t _{d(off)}			35	52.5	
Fall Time	t _f			8	12	
Body Diode Reverse Recovery Time	t _{rr}	I _F = 3.2 A, di/dt = 100 A/μs		30	60	nC
Body Diode Reverse Recovery Charge	Q _{rr}			18		

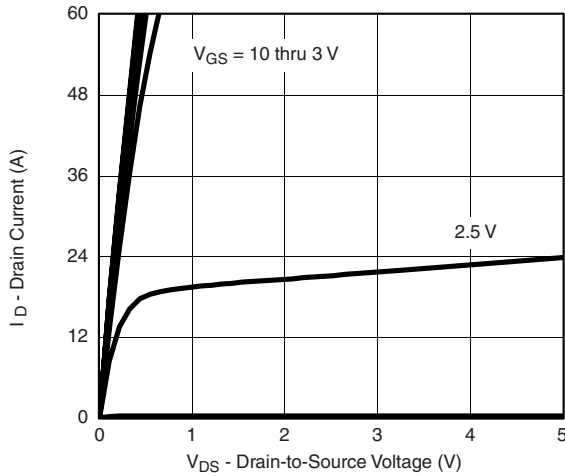
Notes:

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

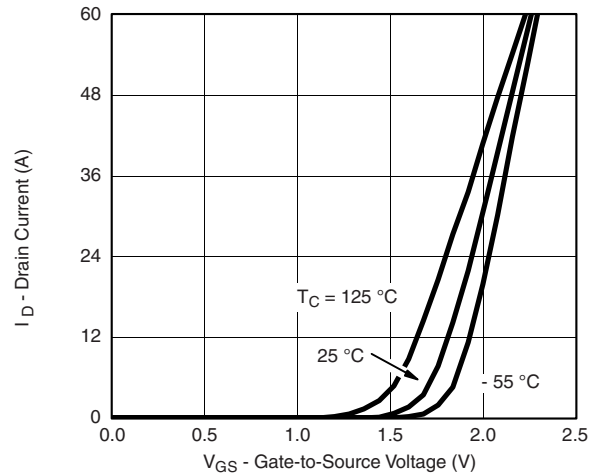
b. Guaranteed by design, not subject to production testing.

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.

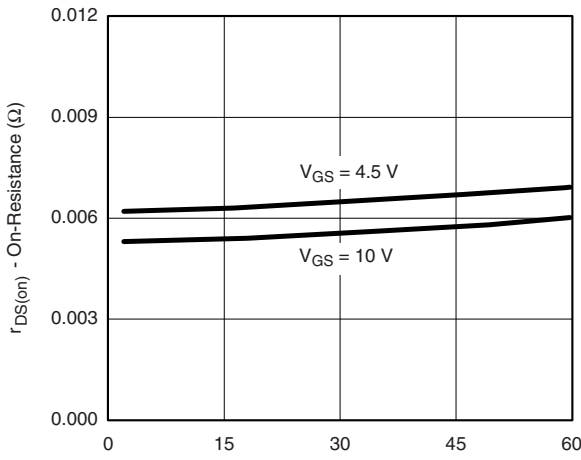
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



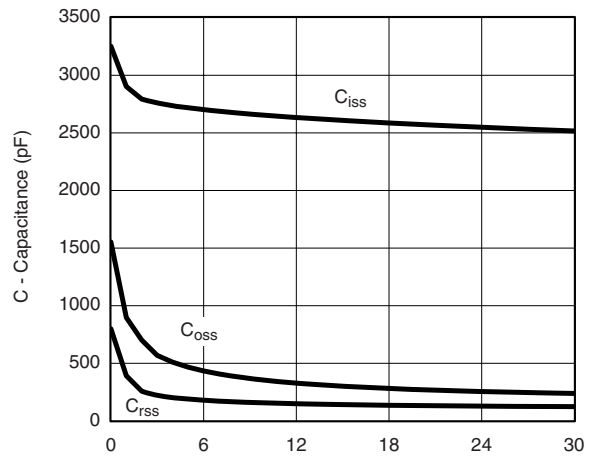
Output Characteristics



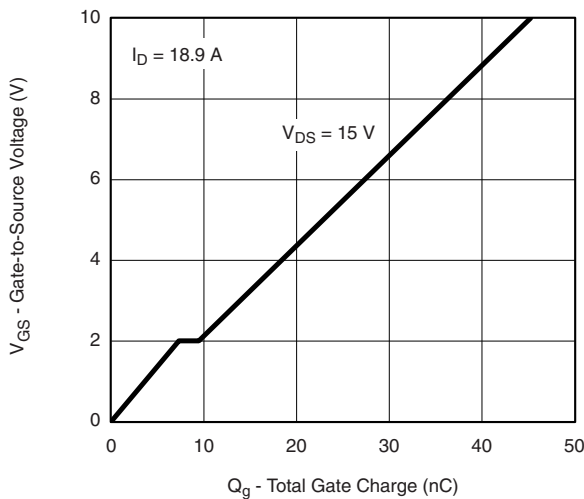
Transfer Characteristics



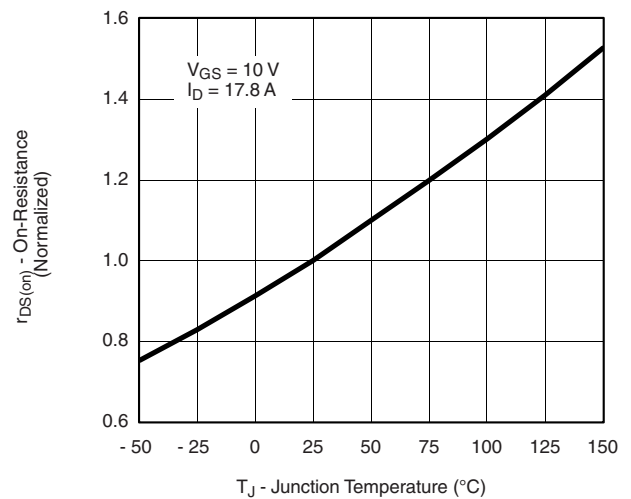
On-Resistance vs. Drain Current



Capacitance



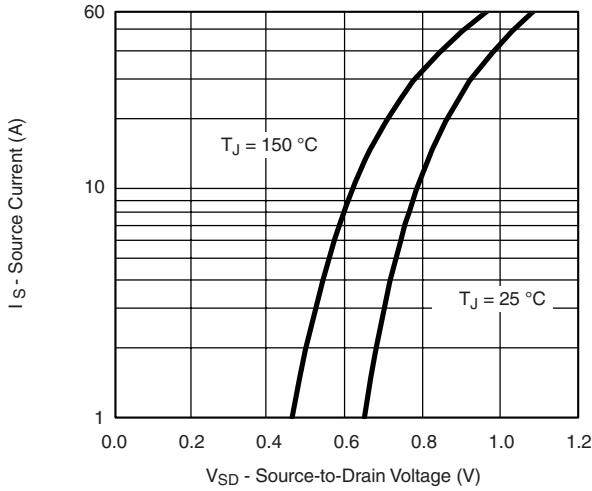
Gate Charge



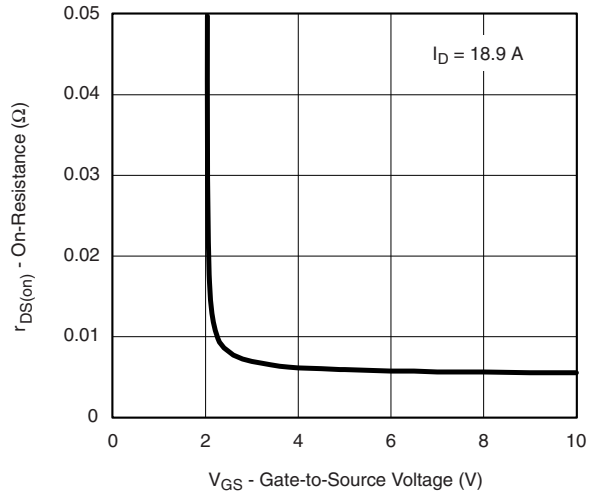
On-Resistance vs. Junction Temperature



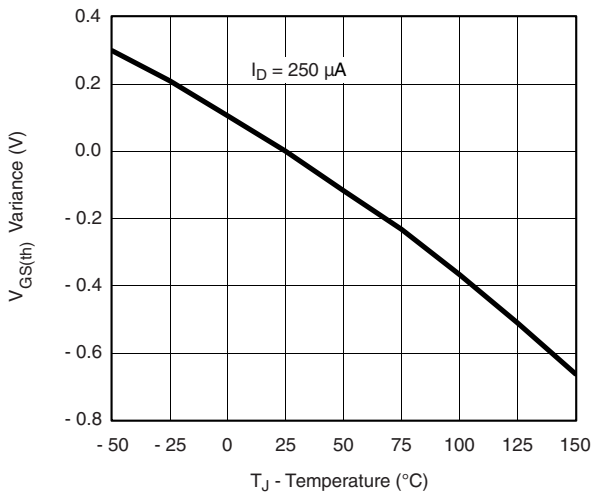
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



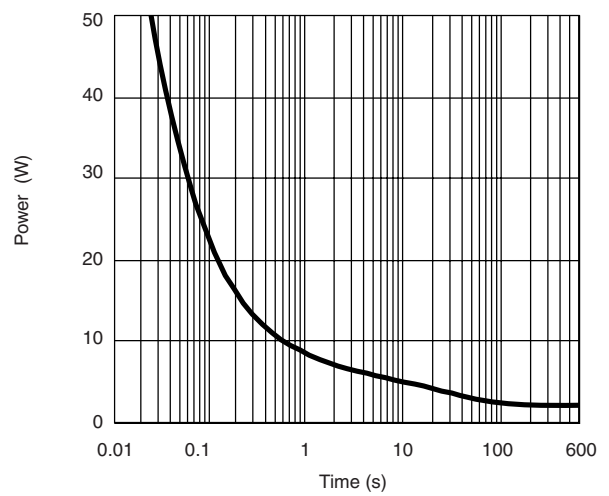
Source-Drain Diode Forward Voltage



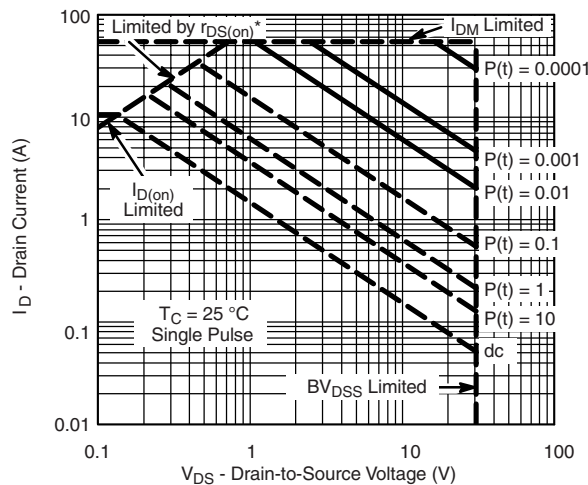
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient

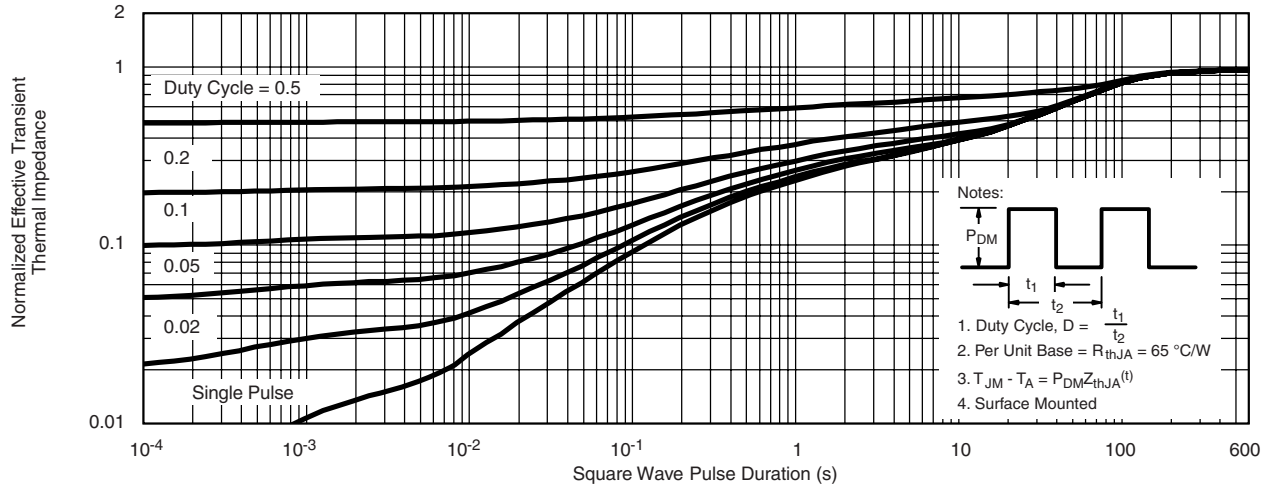


* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

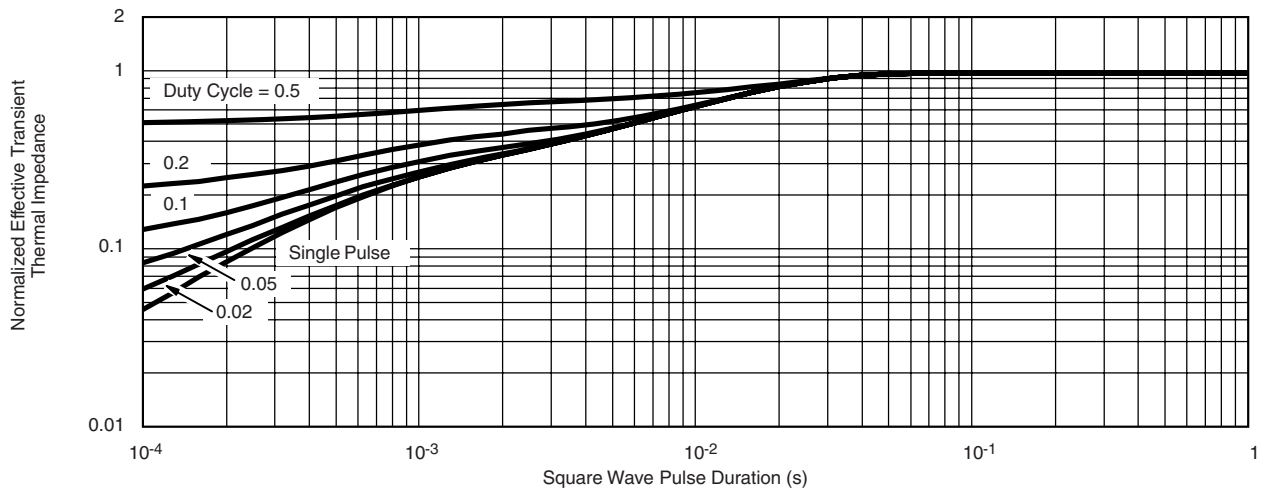
Safe Operating Area, Junction-to-Ambient



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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