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	21 nC
	0.0076 at V_{GS} = 4.5 V	35	

FEATURES

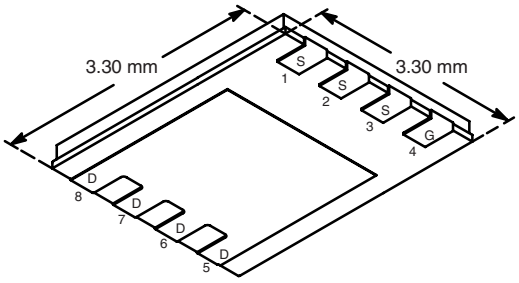
- **Halogen-free Option Available**
- TrenchFET® Power MOSFET
- Low Thermal Resistance PowerPAK® Package with Small Size and Low 1.07 mm Profile
- 100 % R_g Tested

RoHS COMPLIANT

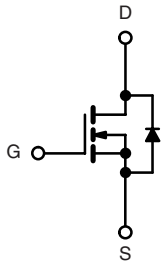
APPLICATIONS

- Synchronous Rectification
- Notebook
- DC/DC Converter

PowerPAK 1212-8



Bottom View



N-Channel MOSFET

Ordering Information: Si7328DN-T1-E3 (Lead (Pb)-free)
Si7328DN-T1-GE3 (Lead (Pb)-free and Halogen-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)	T_C = 25 °C	I_D	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	T_C = 25 °C	I_S	35[e]	
	T_A = 25 °C		3.15[a, b]	
Maximum Power Dissipation	T_C = 25 °C	P_D	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:
a. Surface Mounted on 1" x 1" FR4 board.
b. t = 10 s.
c. 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.
d. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.
e. Package limited.

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a, b]	$t \leq 10$ 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.

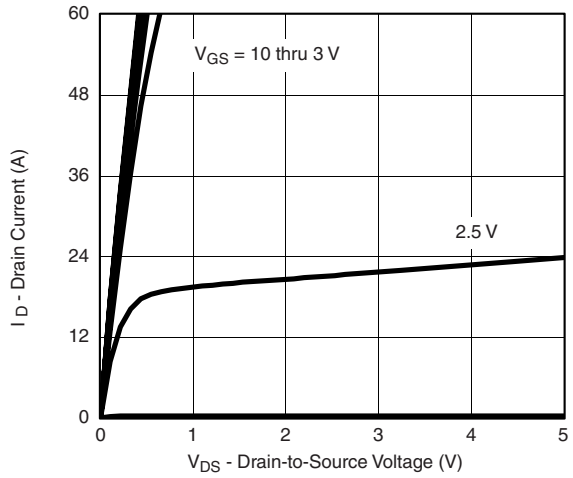
MOSFET SPECIFICATIONS T_J = 25 °C, unless otherwise noted

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, $V_{GS} = \pm 12$ 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]	$I_{D(on)}$	$V_{DS} \geq 5$ 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 $I_D \cong 17.3$ 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	
Body Diode Reverse Recovery Charge	Q_{rr}			18		nC

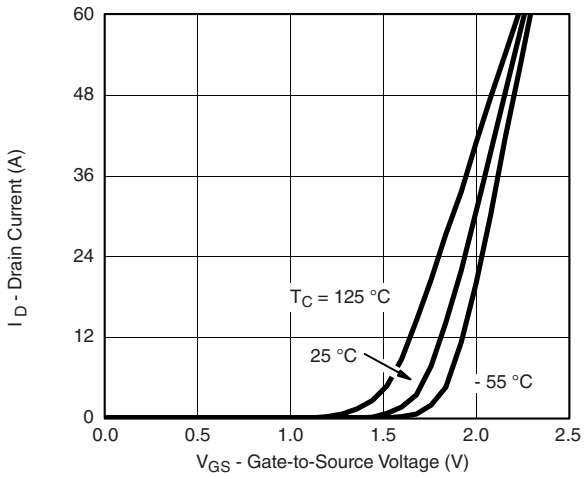
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

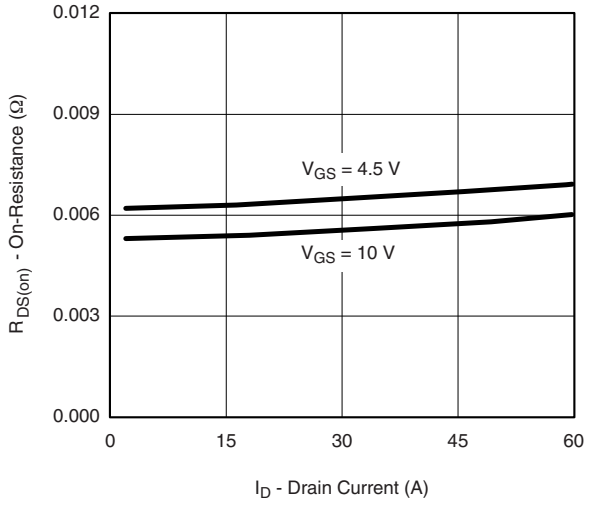
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



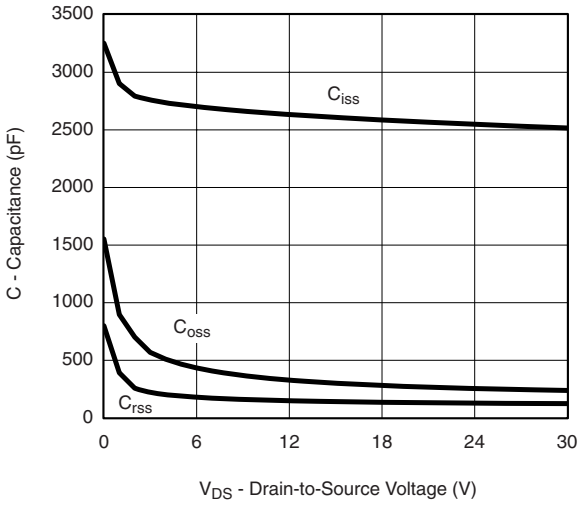
Output Characteristics



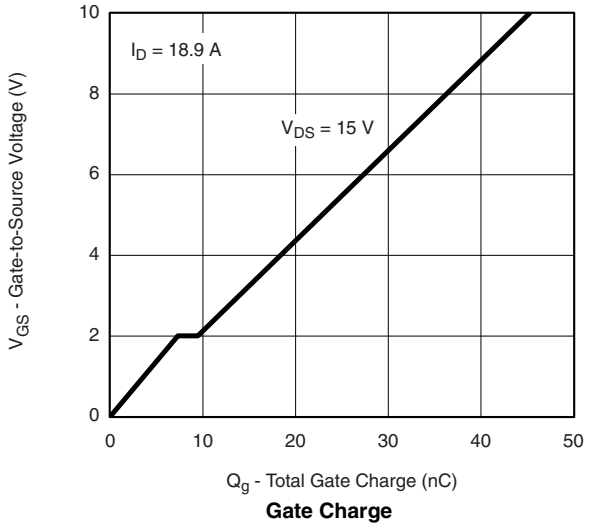
Transfer Characteristics



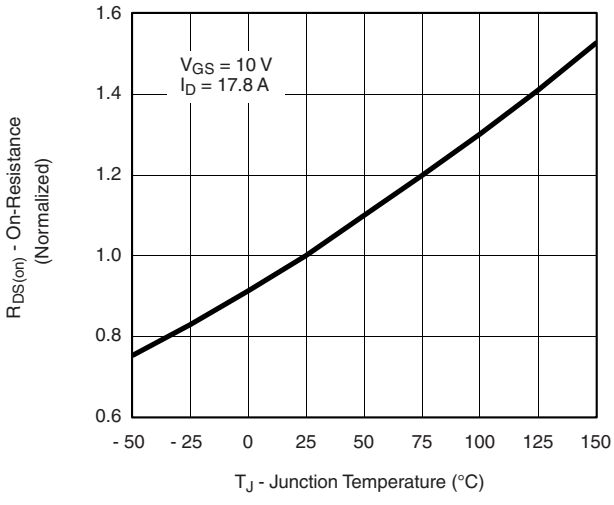
On-Resistance vs. Drain Current



Capacitance

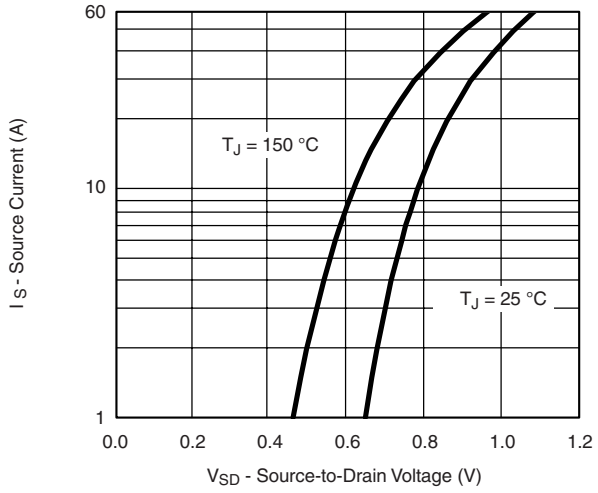


Gate Charge

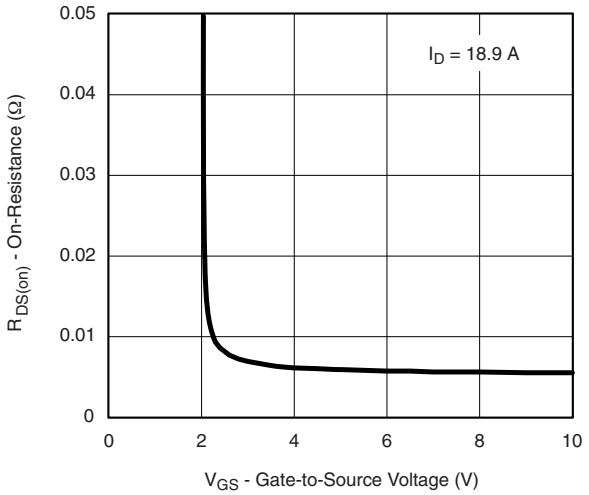


On-Resistance vs. Junction Temperature

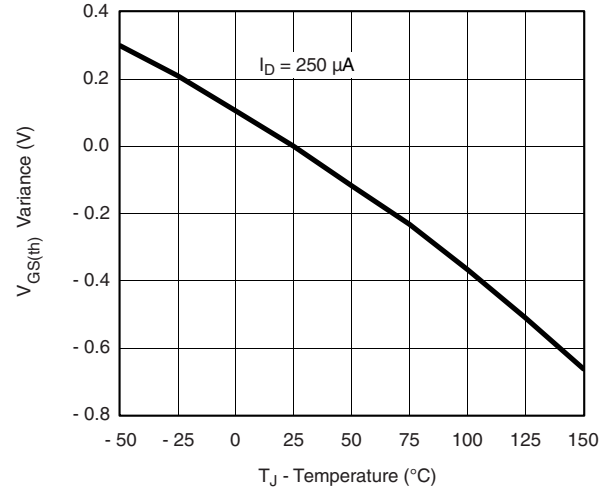
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



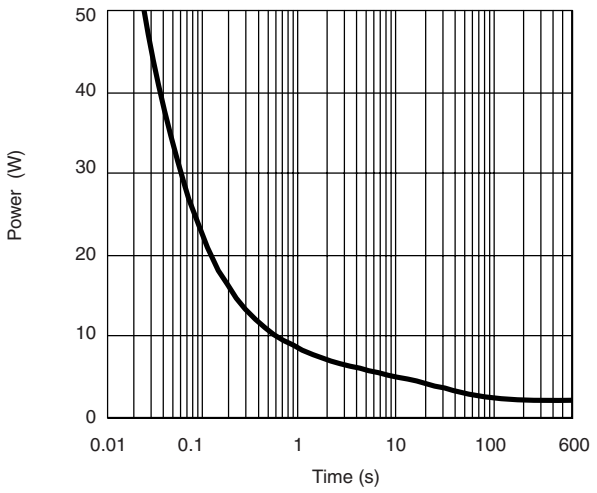
Source-Drain Diode Forward Voltage



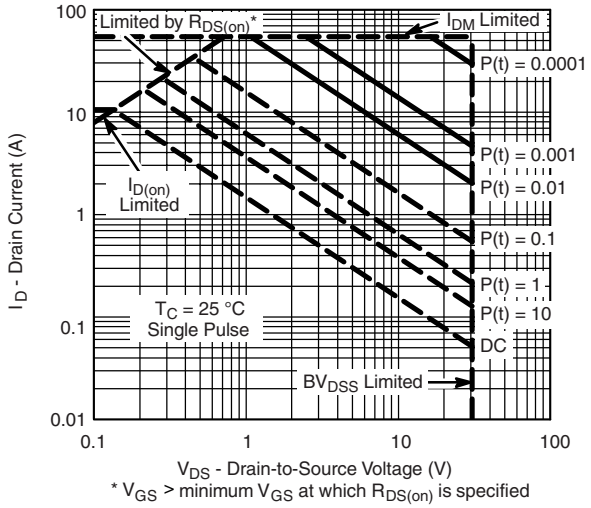
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



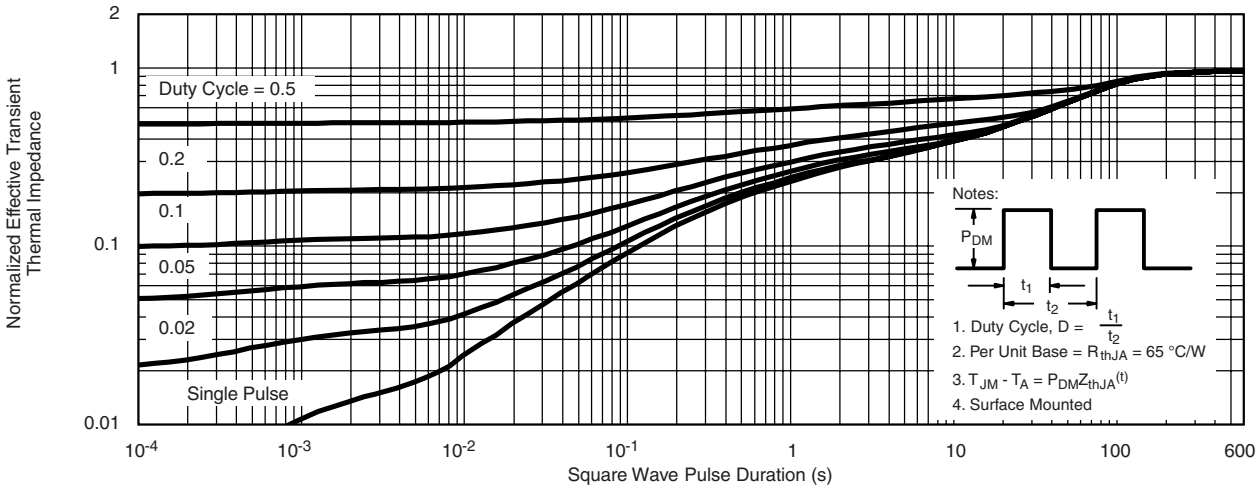
Single Pulse Power, Junction-to-Ambient



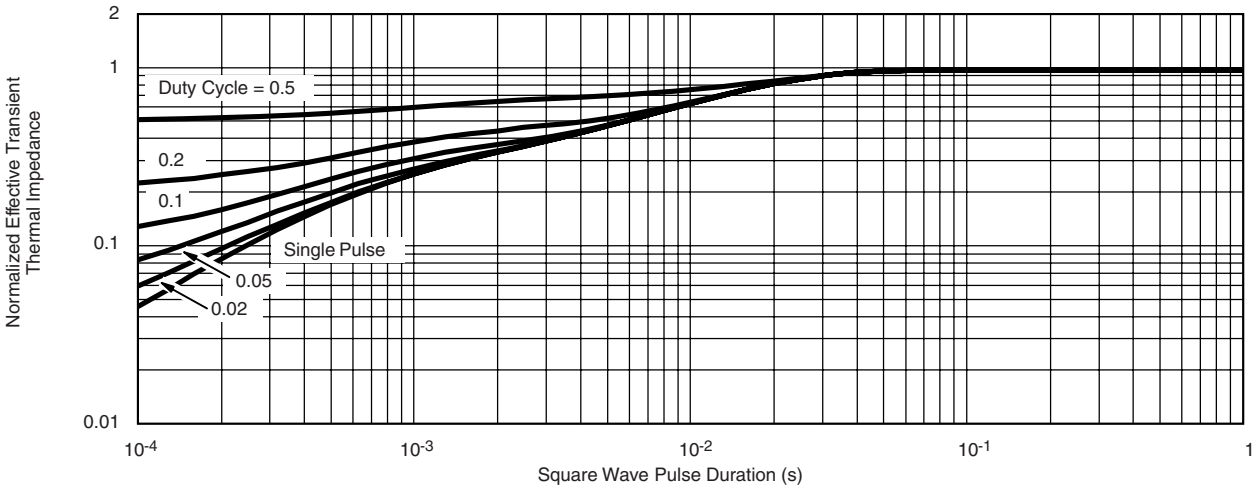
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

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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