N-Channel 12-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
12	0.0057 @ V_{GS} = 4.5 V	20
	0.0067 @ V_{GS} = 2.5 V	18.8
	0.0085 @ V_{GS} = 1.8 V	16.5

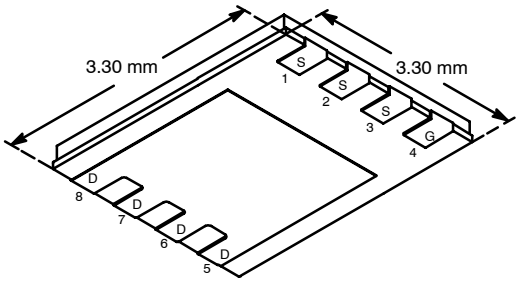
FEATURES

- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile

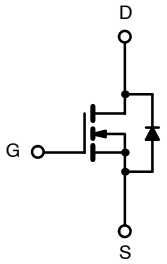
APPLICATIONS

- PA Switch, Load Switch and Battery Switch for Portable Devices
- Point-of-Load for 5-V or 3.3-V BUS Stepdown

PowerPAK 1212-8



Bottom View



N-Channel MOSFET

Ordering Information: Si7402DN-T1

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]	T_A = 25°C	I_D	20	13	A
	T_A = 70°C		16	10	
Pulsed Drain Current		I_{DM}	50		
Continuous Source Current (Diode Conduction)[a]		I_S	3.2	1.3	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	3.8	1.5	W
	T_A = 70°C		2.4	1.0	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	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.

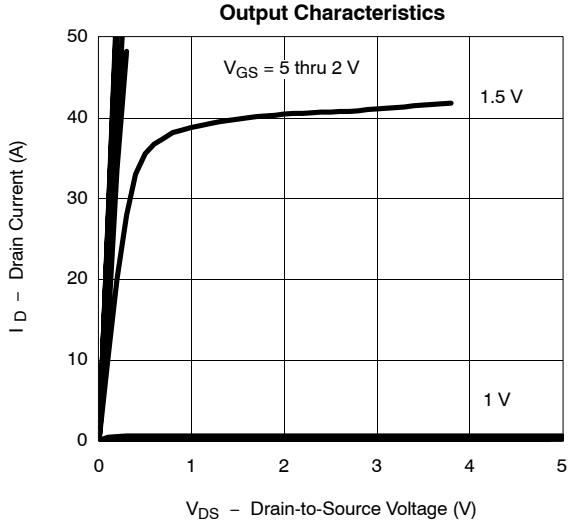
MOSFET SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	0.45		0.85	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 12 V, V_{GS} = 0 V			1	μA
		V_{DS} = 12 V, V_{GS} = 0 V, T_J = 55°C			5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 4.5 V	50			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 20 A		0.0045	0.0057	Ω
		V_{GS} = 2.5 V, I_D = 18 A		0.0053	0.0067	
		V_{GS} = 1.8 V, I_D = 1 A		0.0065	0.0085	
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 20 A		100		S
Diode Forward Voltage[a]	V_{SD}	I_S = 3.2 A, V_{GS} = 0 V		0.70	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 6 V, V_{GS} = 4.5 V, I_D = 20 A		36	55	nC
Gate-Source Charge	Q_{gs}			4		
Gate-Drain Charge	Q_{gd}			9.5		
Gate Resistance	R_g			1.8		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 6 V, R_L = 6 Ω I_D ≅ 1 A, V_{GEN} = 4.5 V, R_g = 6 Ω		35	55	ns
Rise Time	t_r			65	100	
Turn-Off Delay Time	$t_{d(off)}$			110	165	
Fall Time	t_f			60	90	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 2.3 A, di/dt = 100 A/μs		40	80	

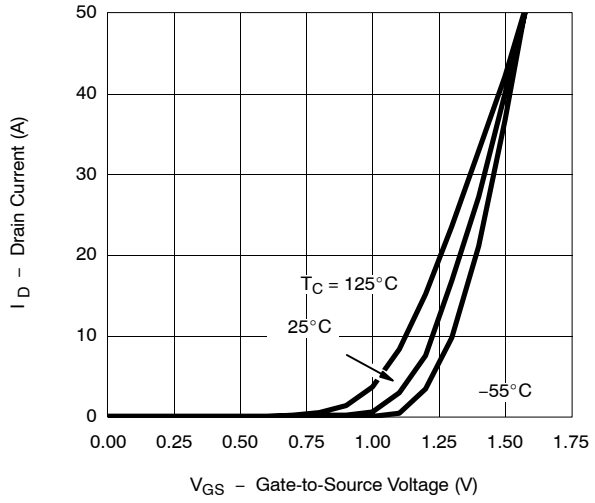
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

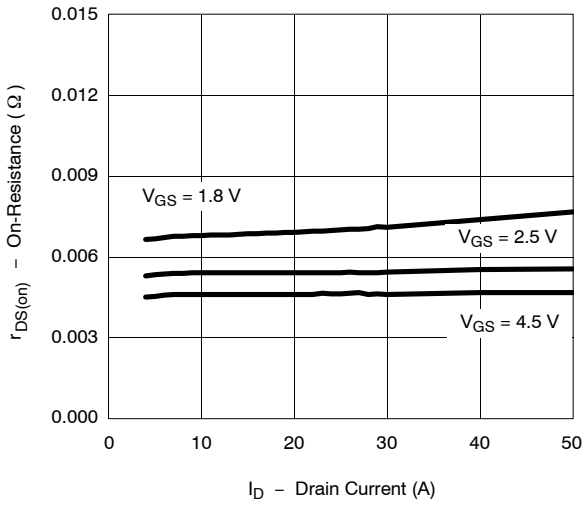


Transfer Characteristics

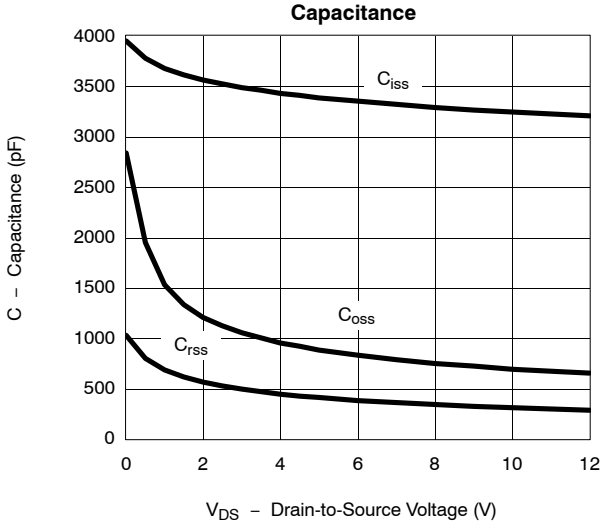


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

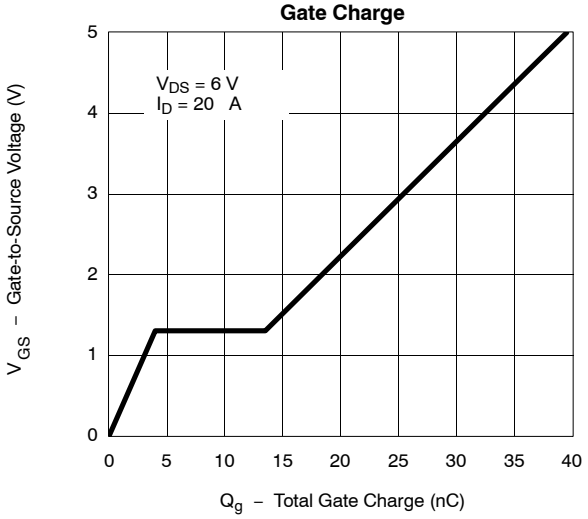
On-Resistance vs. Drain Current



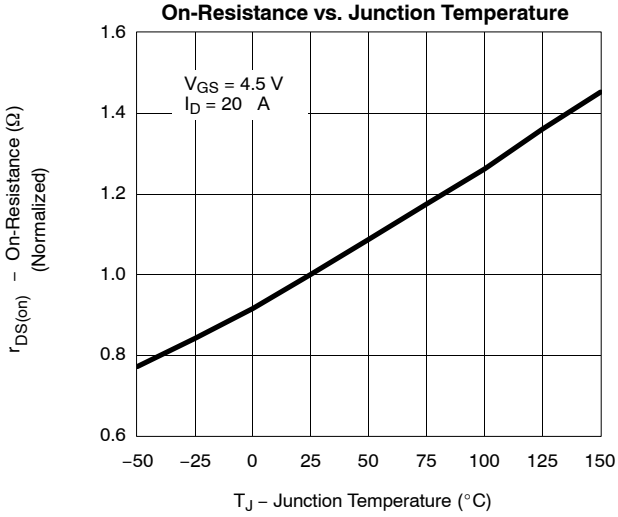
Capacitance



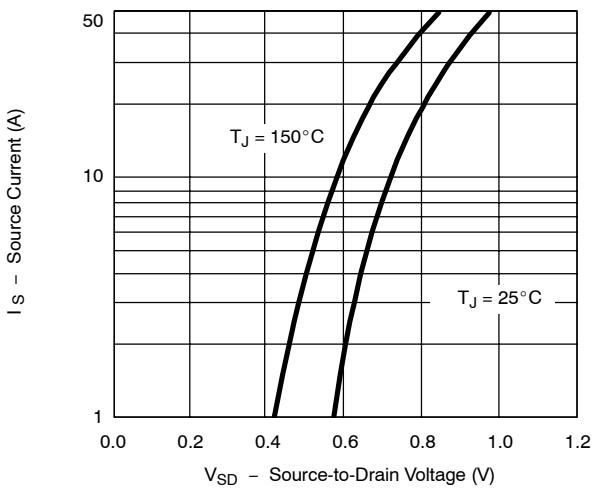
Gate Charge



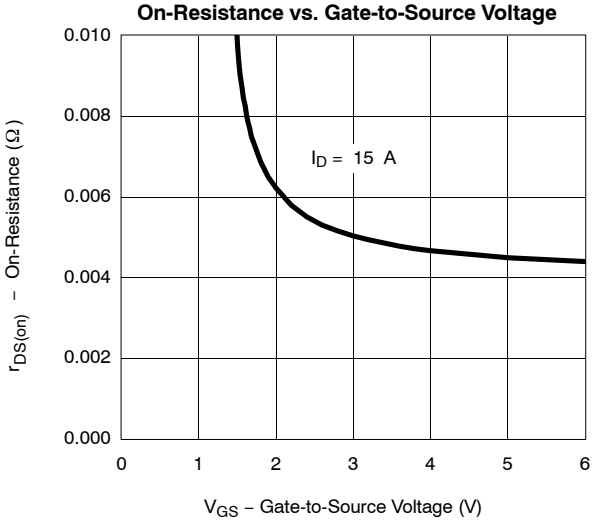
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

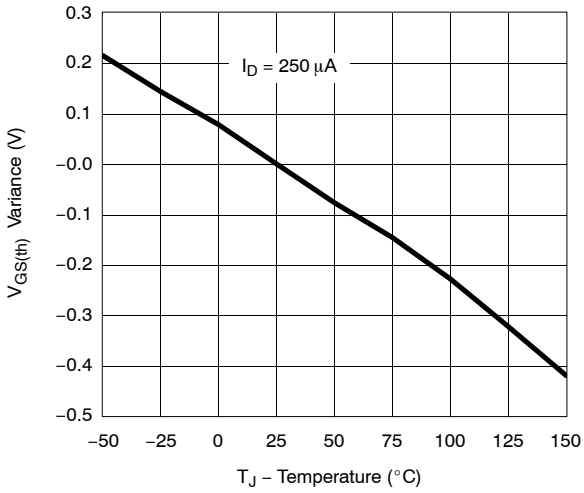


On-Resistance vs. Gate-to-Source Voltage

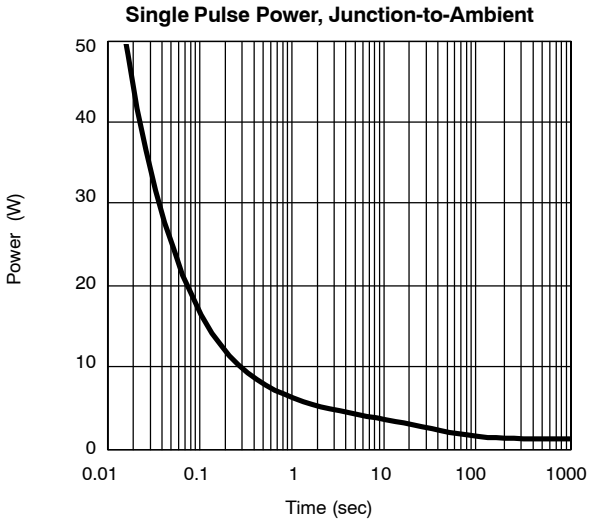


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

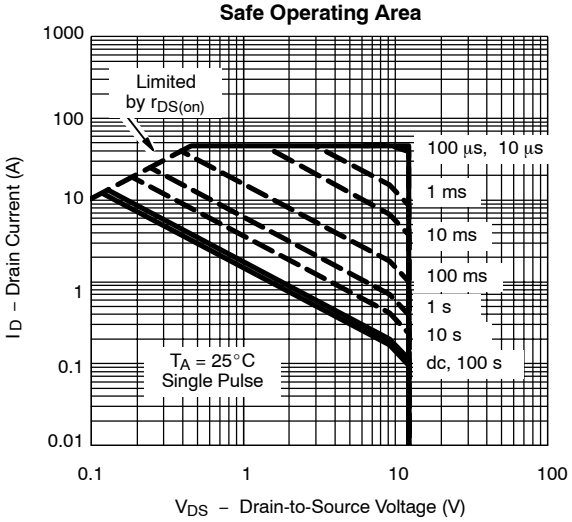
Threshold Voltage



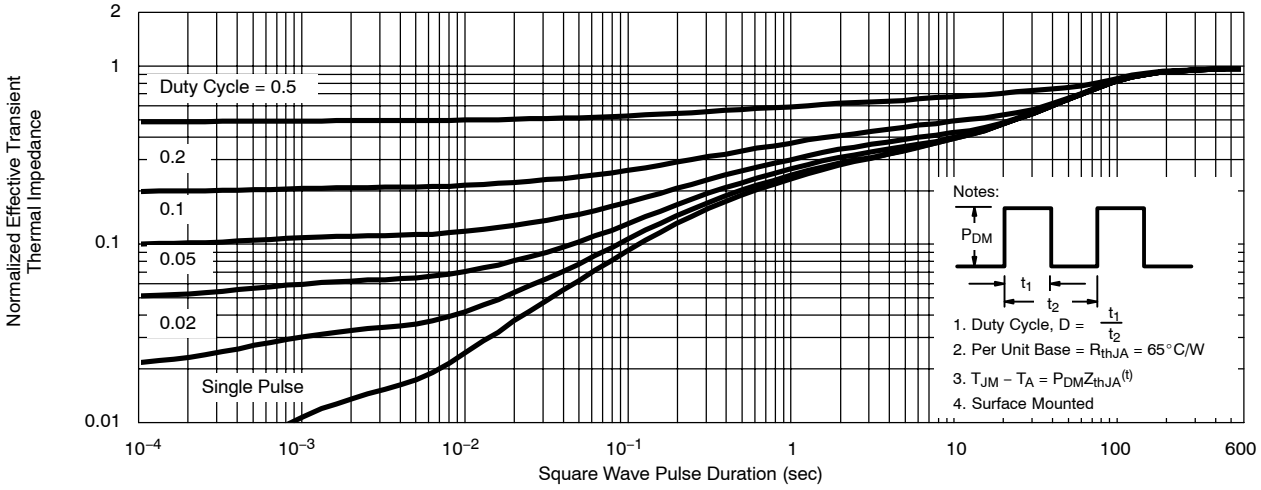
Single Pulse Power, Junction-to-Ambient



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Normalized Thermal Transient Impedance, Junction-to-Case