N-Channel 200-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
200	0.240 @ V_{GS} = 10 V	2.6
	0.250 @ V_{GS} = 6 V	2.5

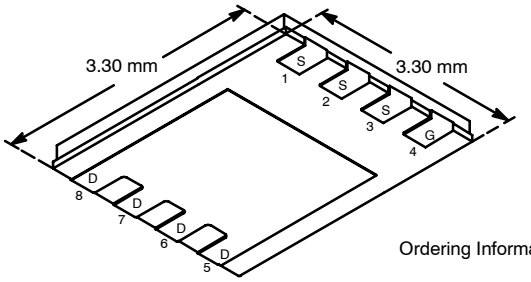
FEATURES

- PWM-Optimized TrenchFET® Power MOSFET
- 100% R_g Tested
- Avalanche Tested

APPLICATIONS

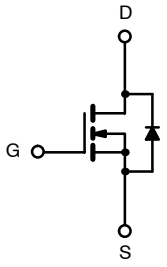
- Primary Side Switch
  - Telecom Power Supplies
  - Distributed Power Architectures
  - Miniature Power Modules

PowerPAK 1212-8



Bottom View

Ordering Information: Si7820DN-T1—E3



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	200		V
Gate-Source Voltage		V_{GS}	±20		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	2.6	1.7	A
	T_A = 70°C		2.1	1.3	
Pulsed Drain Current		I_{DM}	10		
Continuous Source Current (Diode Conduction)[a]		I_S	3.2	1.3	
Single Avalanche Current	L = 0.1 mH	I_{AS}	3.5		
Single Avalanche Energy		E_{AS}	0.6		mJ
Maximum Power Dissipation[a]	T_A = 25°C	P_D	3.8	1.5	W
	T_A = 70°C		2.0	0.8	
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}	26	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.

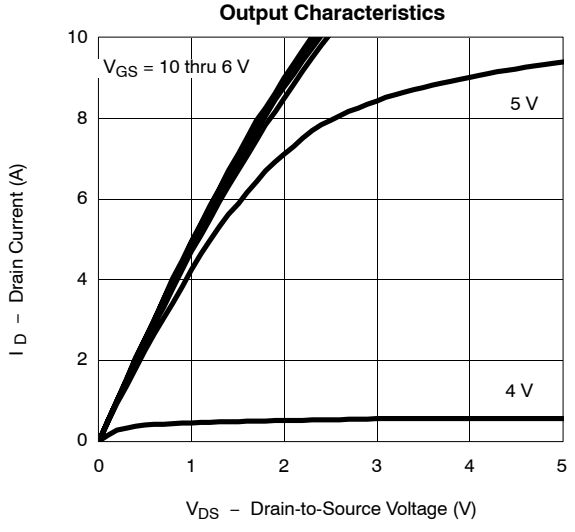
MOSFET SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	2		4	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 200 V, V_{GS} = 0 V			1	μA
		V_{DS} = 200 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	10			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 2.6 A		0.200	0.240	Ω
		V_{GS} = 6 V, I_D = 2.5 A		0.210	0.250	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 2.6 A		8		S
Diode Forward Voltage[a]	V_{SD}	I_S = 3.2 A, V_{GS} = 0 V		0.78	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 100 V, V_{GS} = 10 V, I_D = 2.6 A		12.1	18	nC
Gate-Source Charge	Q_{gs}			2.5		
Gate-Drain Charge	Q_{gd}			4.1		
Gate Resistance	R_g	f = 1 MHz	1	2.3	3.9	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 100 V, R_L = 100 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_G = 6 Ω		11	20	ns
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			30	45	
Fall Time	t_f			17	30	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 3.2 A, di/dt = 100 A/μs		65	100	

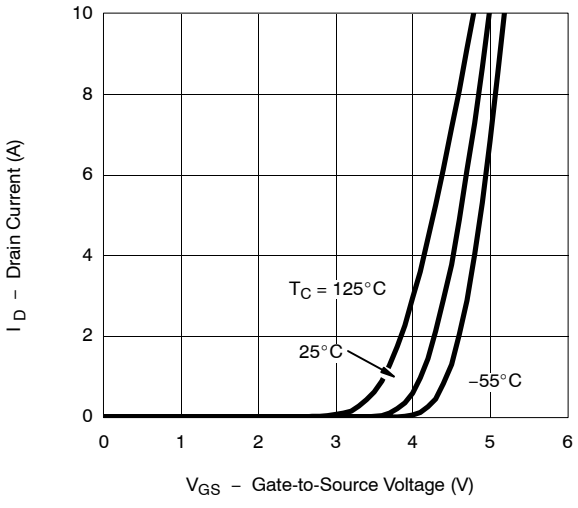
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

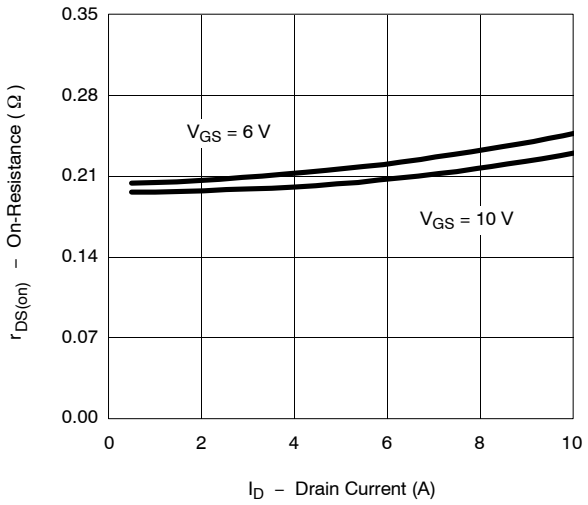


Transfer Characteristics

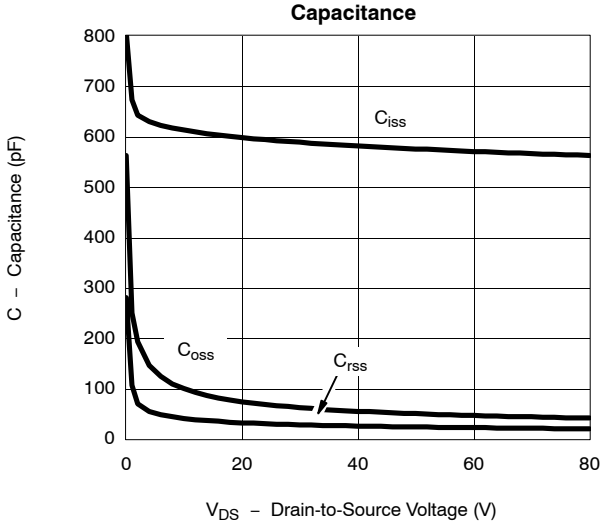


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

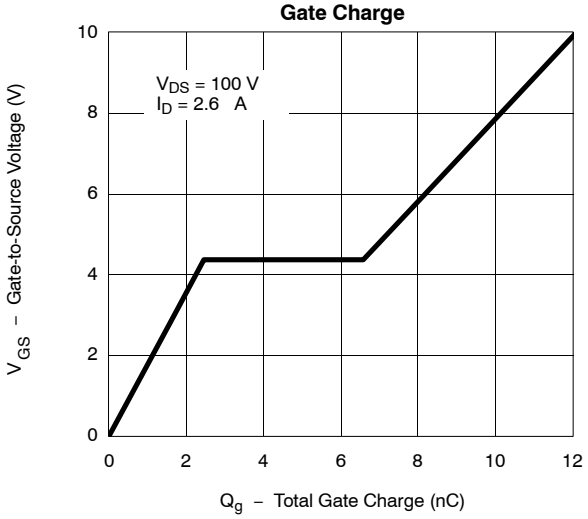
On-Resistance vs. Drain Current



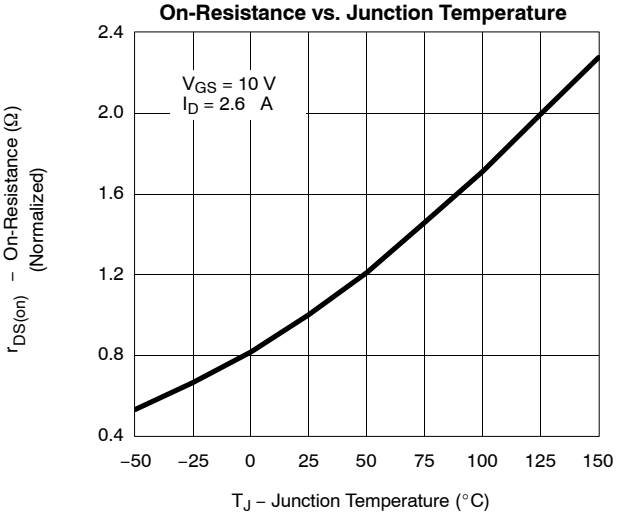
Capacitance



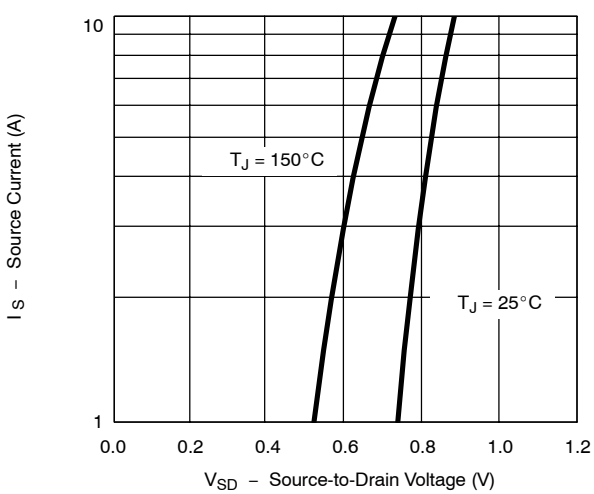
Gate Charge



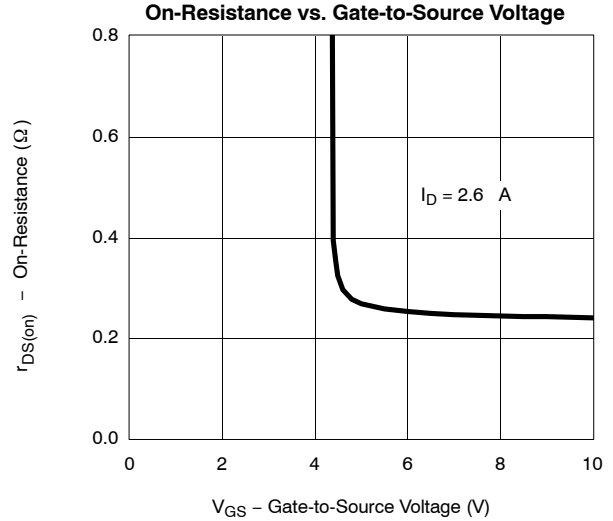
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

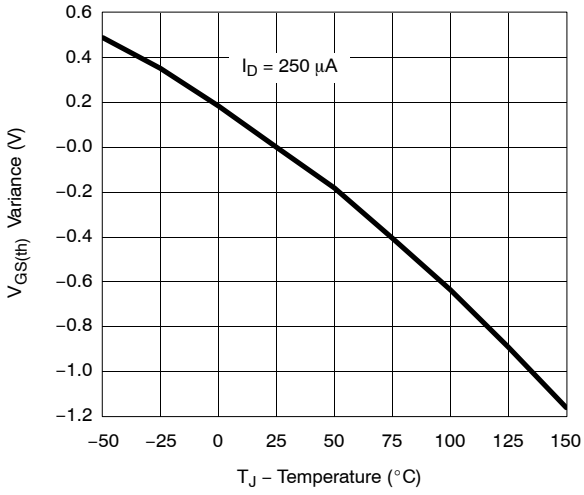


On-Resistance vs. Gate-to-Source Voltage

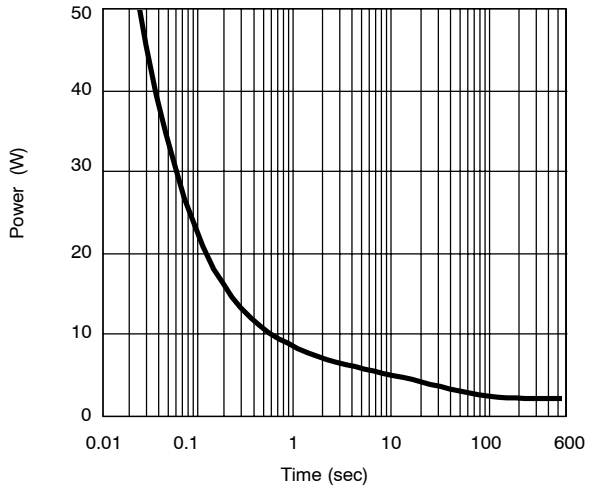


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

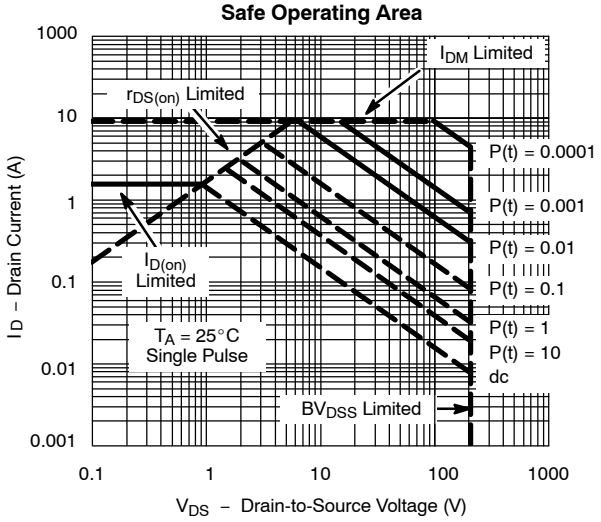
Threshold Voltage



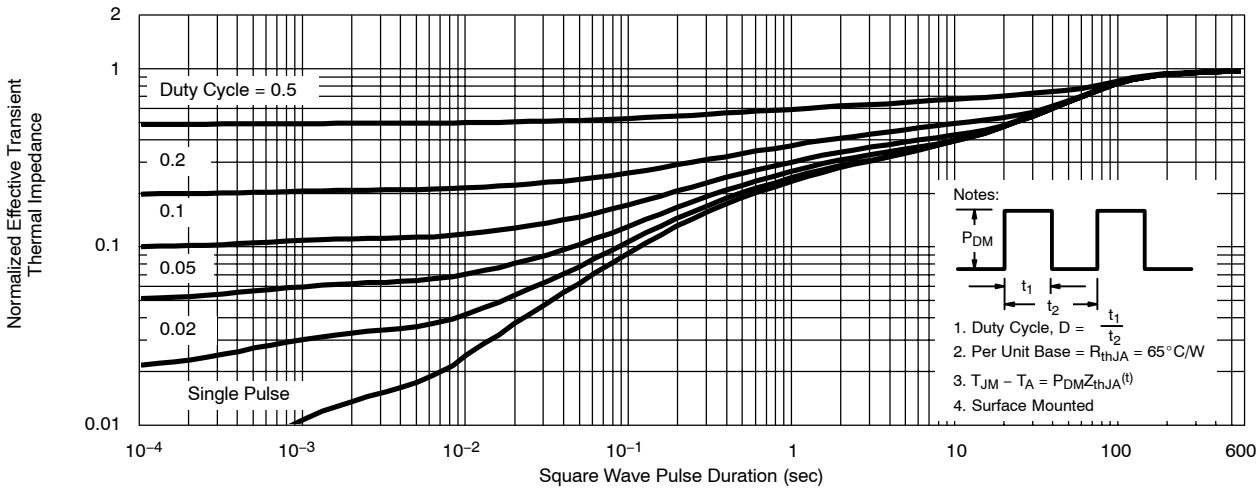
Single Pulse Power, Juncion-to-Ambient



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)