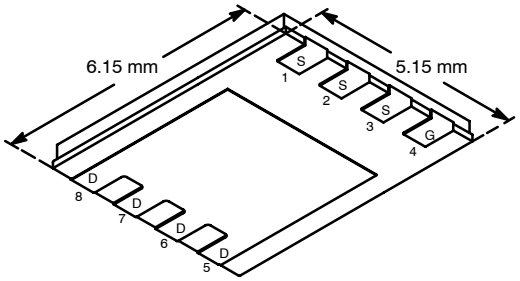
N-Channel 60-V (D-S) Fast Switching MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
60	0.0083 @ V_{GS} = 10 V	19.3	105

FEATURES

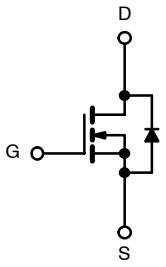
- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile
- 100% R_g Tested
- High Threshold Voltage At High Temperature

PowerPAK SO-8



Bottom View

Ordering Information: Si7452DP-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}	60		V
Gate-Source Voltage		V_{GS}	±20		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	19.3	11.5	A
	T_A = 70°C		15.5	9.2	
Pulsed Drain Current		I_{DM}	60		
Continuous Source Current (Diode Conduction)[a]		I_S	4.5	1.6	
Avalanche Current		I_{AS}	40		
Avalanche Energy		E_{AS}	80		mJ
Maximum Power Dissipation[a]	T_A = 25°C	P_D	5.4	1.9	W
	T_A = 70°C		3.4	1.2	
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}	18	23	°C/W
	Steady State		52	65	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.0	1.3	

Notes
a. Surface Mounted on 1" x 1" FR4 Board.

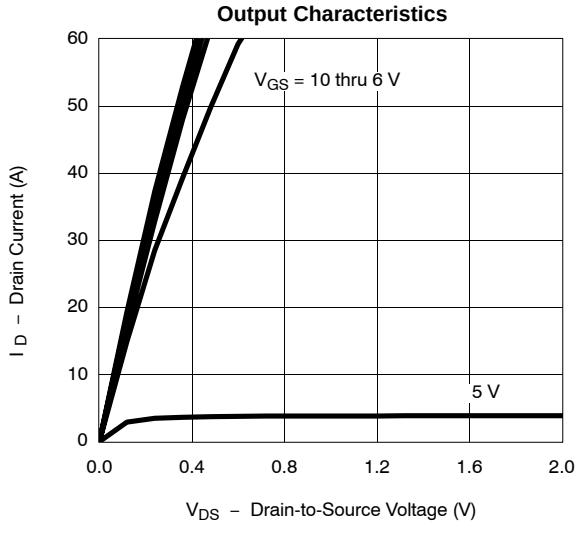
MOSFET SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

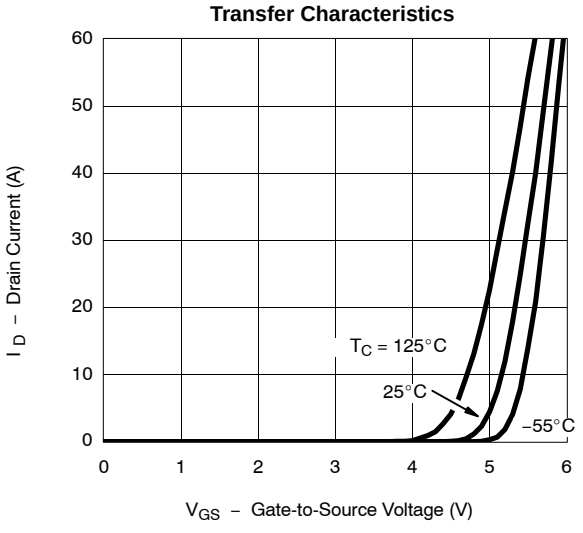
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	3.4		4.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	μA
		V_{DS} = 60 V, V_{GS} = 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 = 19.3 A		0.007	0.0083	Ω
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 19.3 A		51		S
Diode Forward Voltage[a]	V_{SD}	I_S = 4.5 A, V_{GS} = 0 V		0.8	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 19.3 A		105	160	nC
Gate-Source Charge	Q_{gs}			40		
Gate-Drain Charge	Q_{gd}			21		
Gate Resistance	R_g	f = 1 MHz	0.5	1.0	1.5	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 30 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_g = 6 Ω		45	70	ns
Rise Time	t_r			15	25	
Turn-Off Delay Time	$t_{d(off)}$			90	135	
Fall Time	t_f			40	60	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 4.5 A, di/dt = 100 A/μs		46	70	

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.

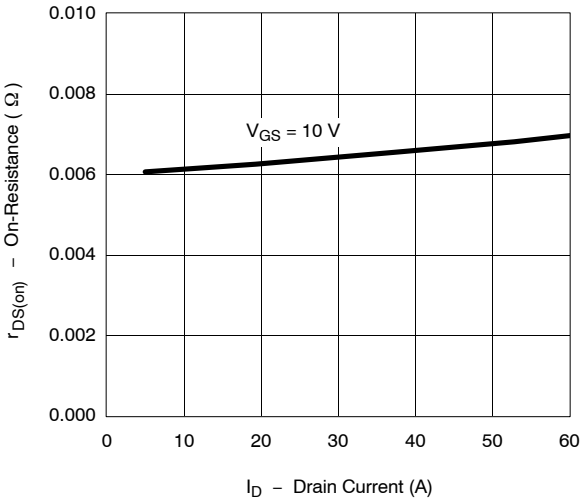
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



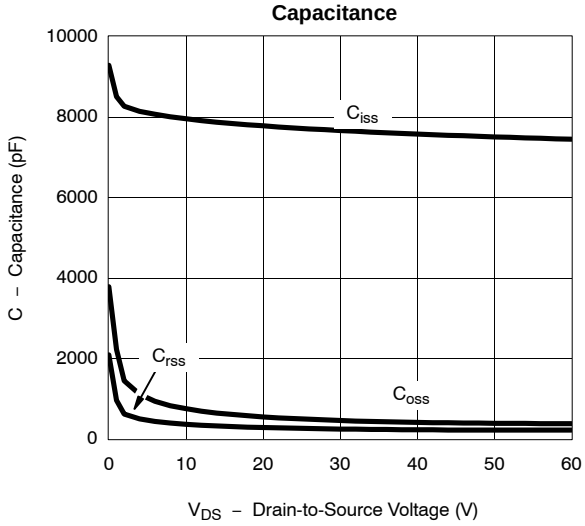


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

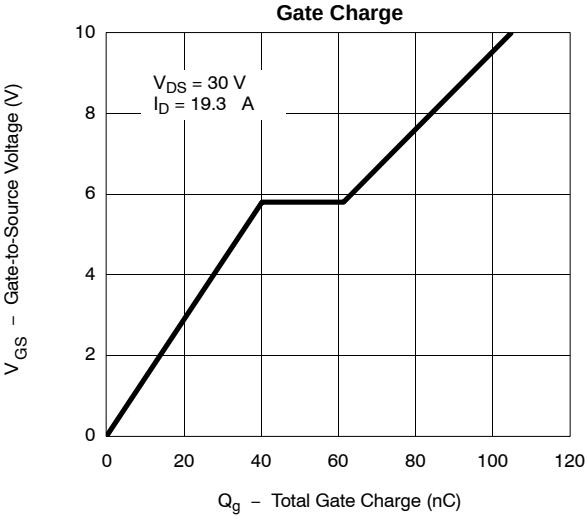
On-Resistance vs. Drain Current



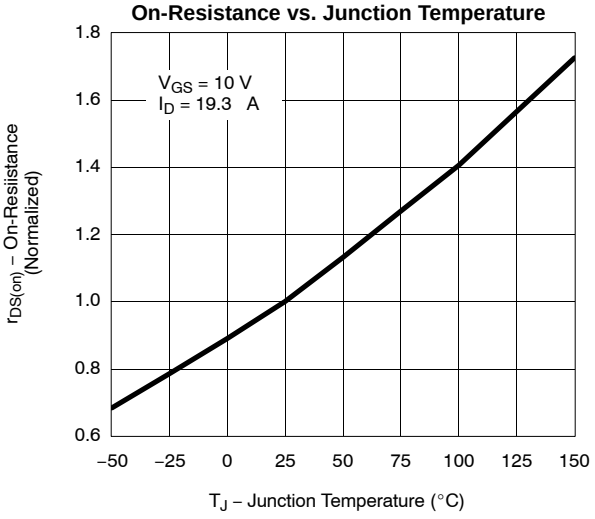
Capacitance



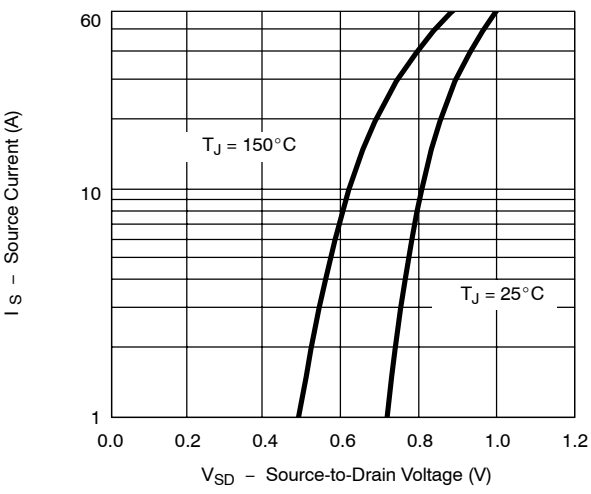
Gate Charge



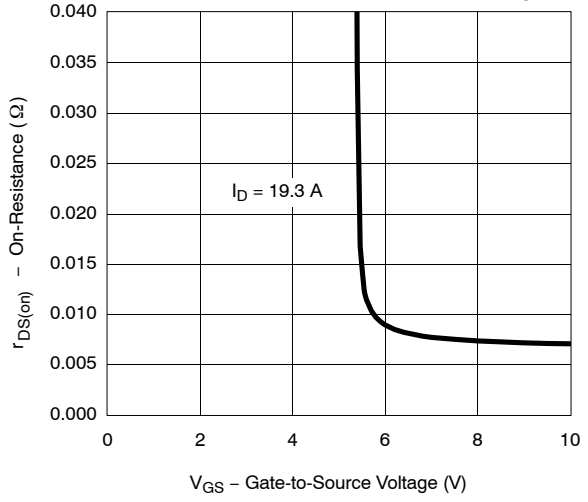
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

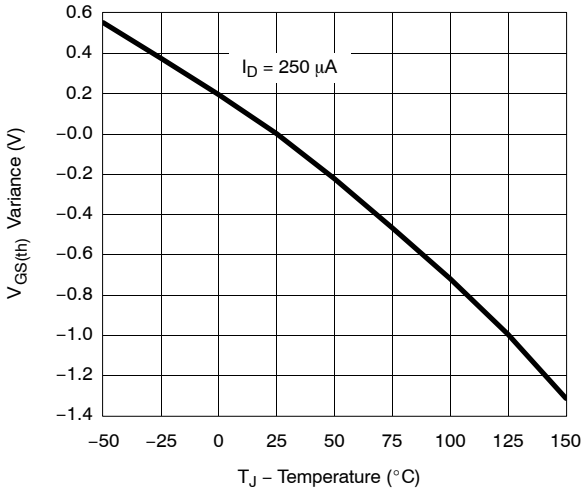


On-Resistance vs. Gate-to-Source Voltage

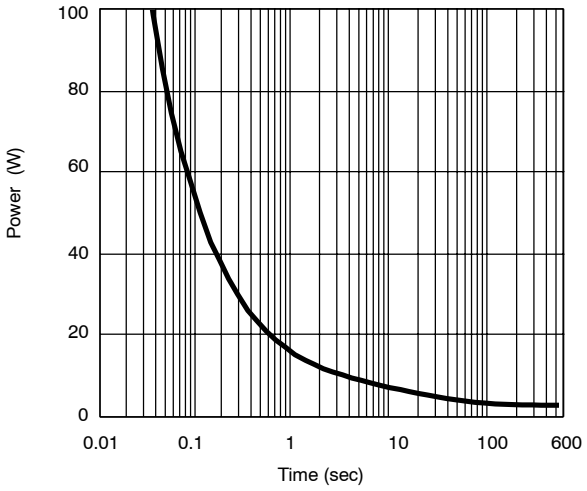


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

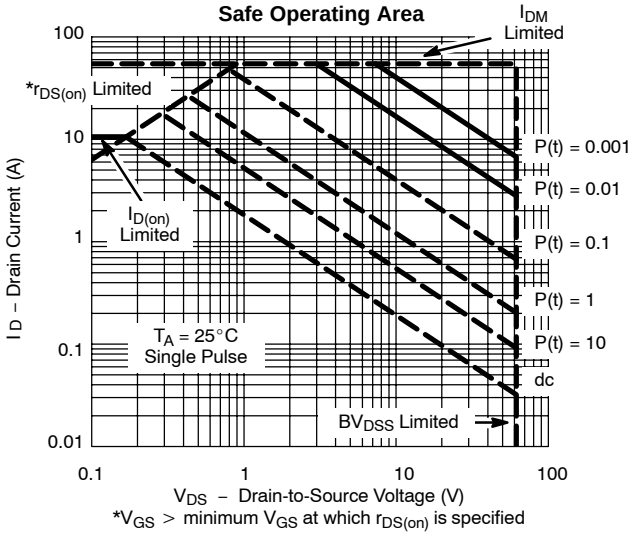
Threshold Voltage



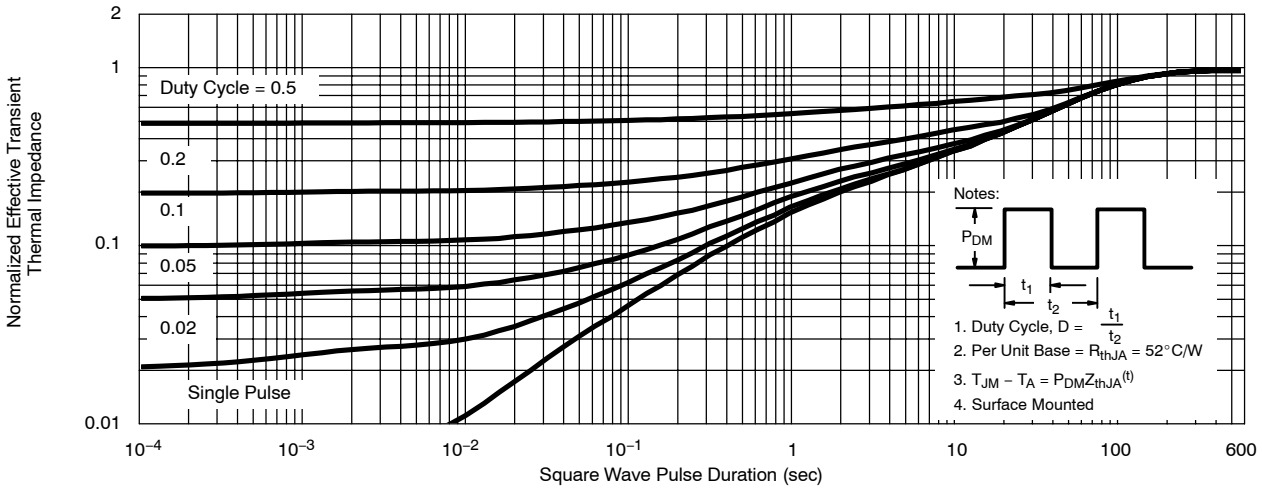
Single Pulse Power, Juncion-To-Ambient



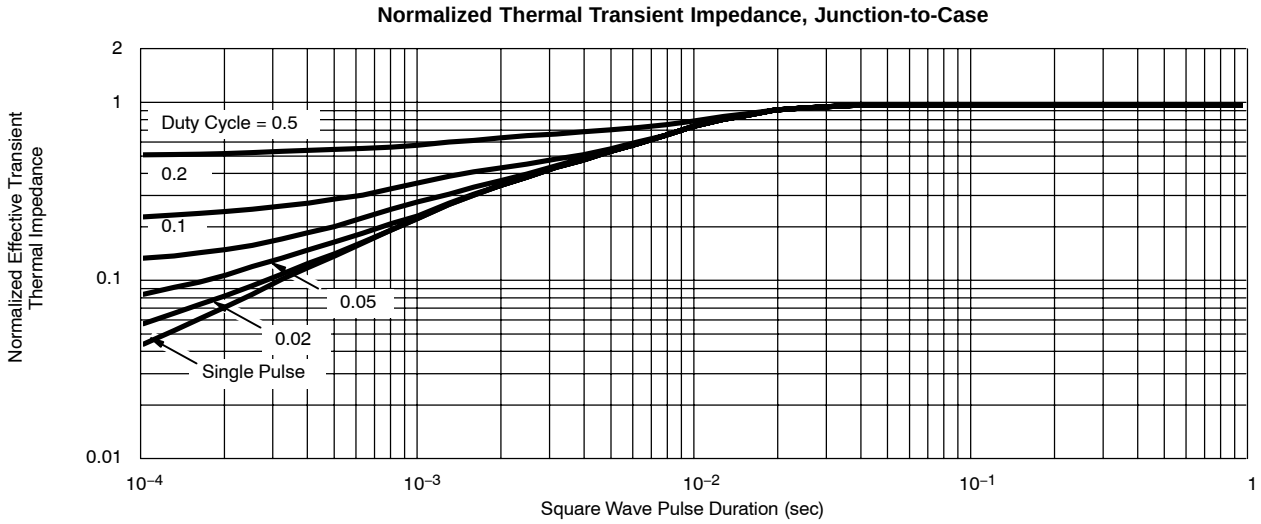
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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