

Dual P-Channel 12-V (D-S) MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
- 12	0.021 at V _{GS} = - 4.5 V	- 5.8
	0.028 at V _{GS} = - 2.5 V	- 5.0
	0.037 at V _{GS} = - 1.8 V	- 4.4

FEATURES

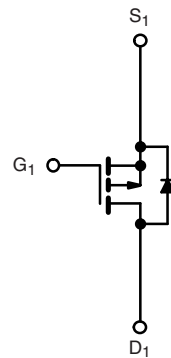
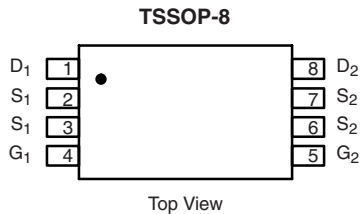
- Halogen-free
- TrenchFET[®] Power MOSFETs



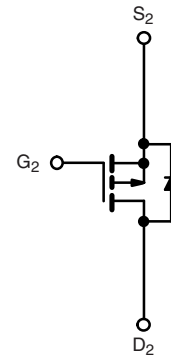
RoHS
COMPLIANT

APPLICATIONS

- Load Switch
- Battery Switch



P-Channel MOSFET



P-Channel MOSFET

Ordering Information: Si6913DQ-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	10 s	Steady State	Unit
Drain-Source Voltage	V _{DS}	- 12		V
Gate-Source Voltage	V _{GS}	± 8		
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	- 5.8	- 4.9
		T _A = 70 °C	- 4.6	- 3.9
Pulsed Drain Current (10 μs Pulse Width)	I _{DM}	- 30		A
Continuous Source Current (Diode Conduction) ^a	I _S	- 1.0	- 0.7	
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	1.14	0.83
		T _A = 70 °C	0.73	0.53
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	R _{thJA}	t ≤ 10 s	86	110
		Steady State	124	150
Maximum Junction-to-Foot (Drain)	R _{thJF}	52	65	°C/W

Notes:

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

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted

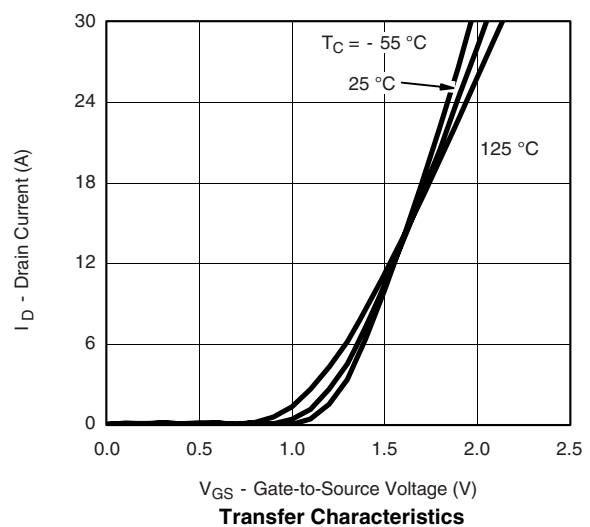
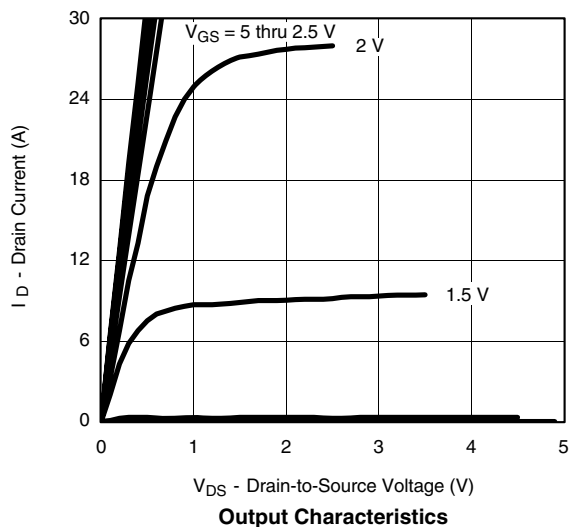
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -400\text{ }\mu\text{A}$	-0.40		-0.9	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -12\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			-25	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -4.5\text{ V}$	-20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -5.8\text{ A}$		0.016	0.021	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -5.0\text{ A}$		0.021	0.028	
		$V_{GS} = -1.8\text{ V}, I_D = -4.4\text{ A}$		0.029	0.037	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -5.8\text{ A}$		25		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.0\text{ A}, V_{GS} = 0\text{ V}$		-0.61	-1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -5.8\text{ A}$		18.5	28	nC
Gate-Source Charge	Q_{gs}			2.7		
Gate-Drain Charge	Q_{gd}			5.0		
Gate Resistance	R_g	$f = 1.0\text{ MHz}$		4.6		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\text{ V}, R_L = 6\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_G = 6\text{ }\Omega$		45	70	ns
Rise Time	t_r			80	120	
Turn-Off Delay Time	$t_{d(off)}$			130	200	
Fall Time	t_f			80	120	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -1.0\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		65	100	

Notes:

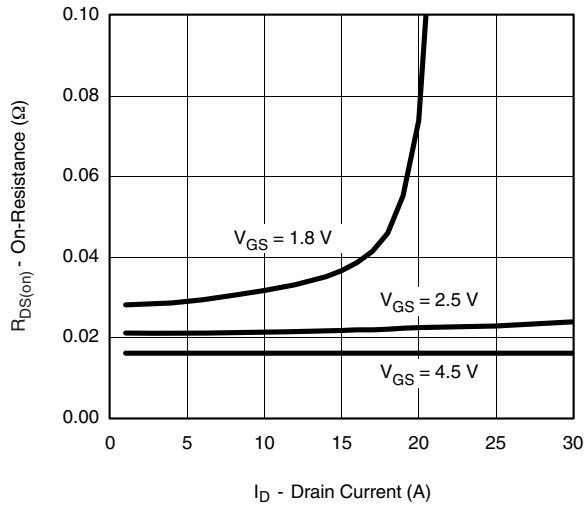
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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

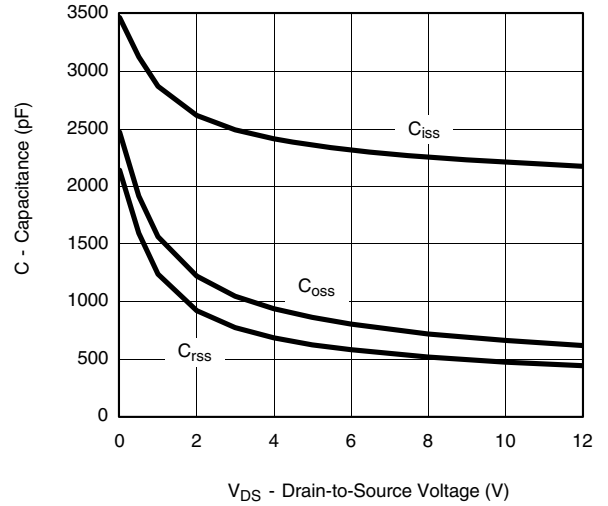
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted

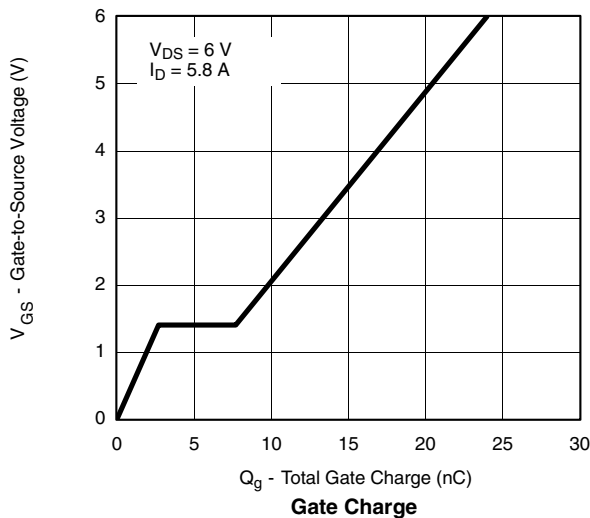
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



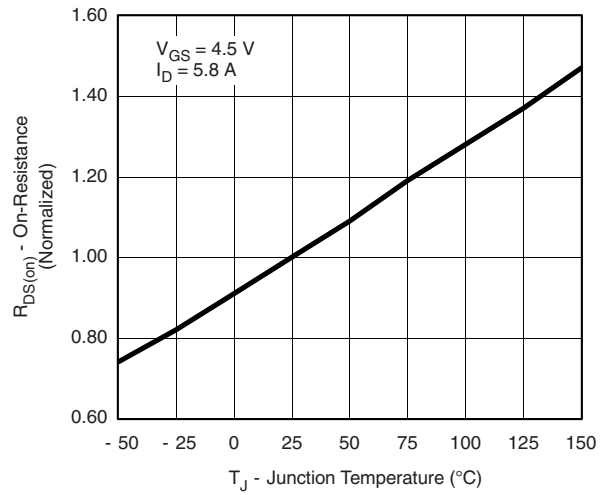
On-Resistance vs. Drain Current



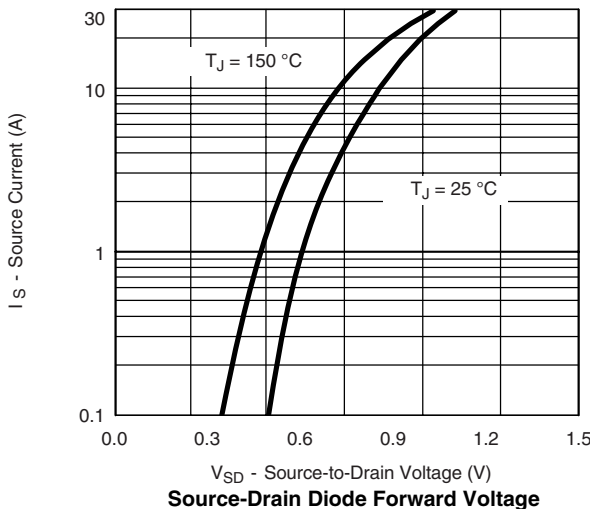
Capacitance



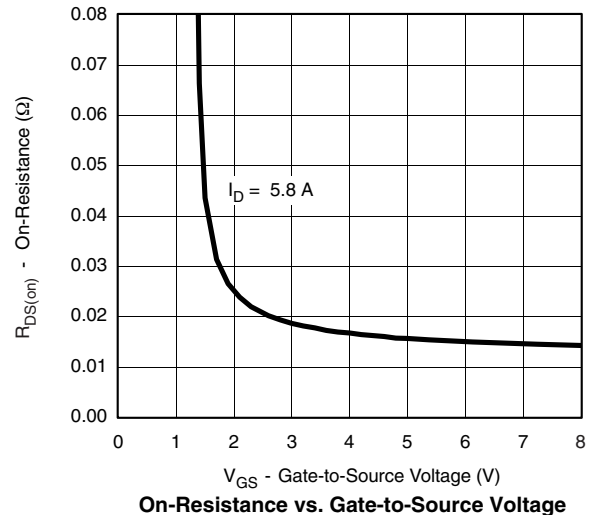
Gate Charge



On-Resistance vs. Junction Temperature

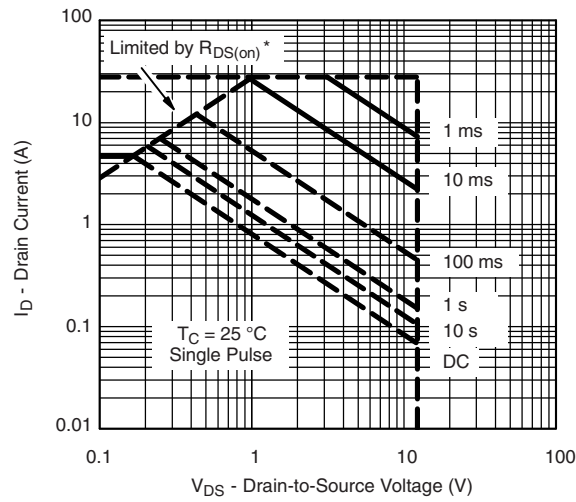
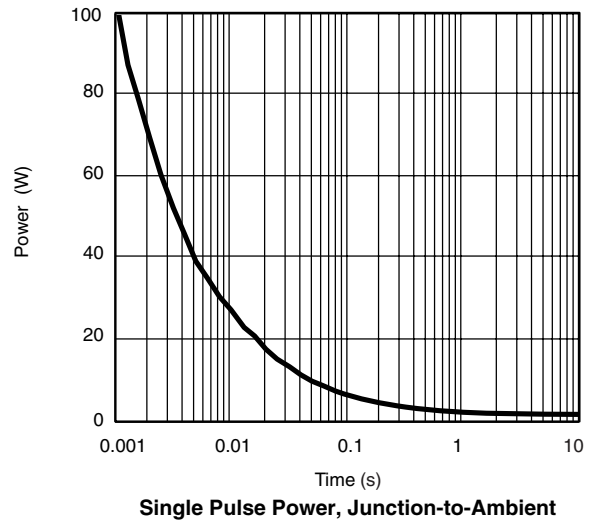
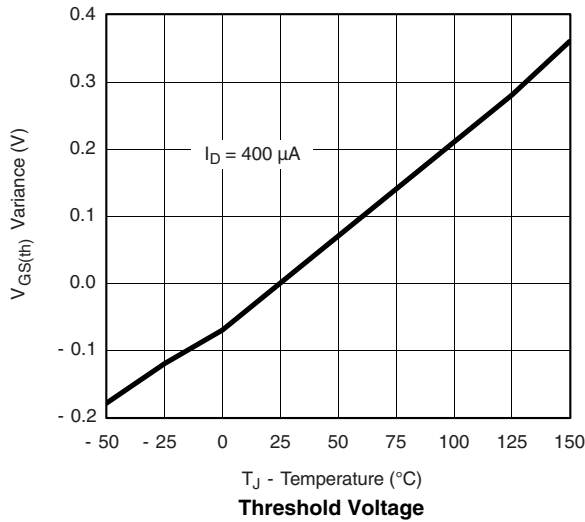


Source-Drain Diode Forward Voltage

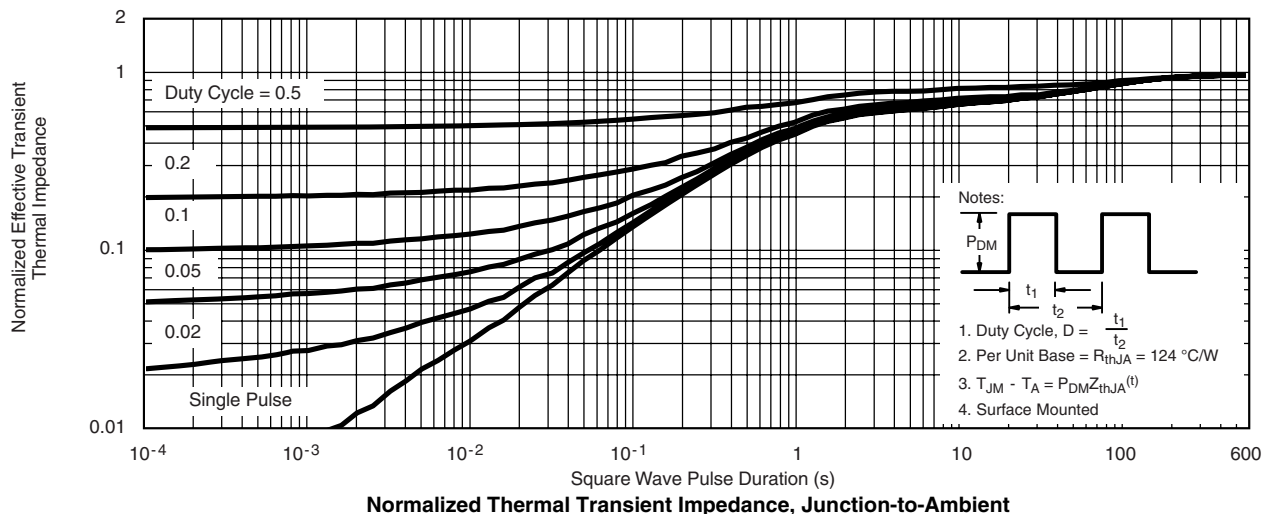


On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

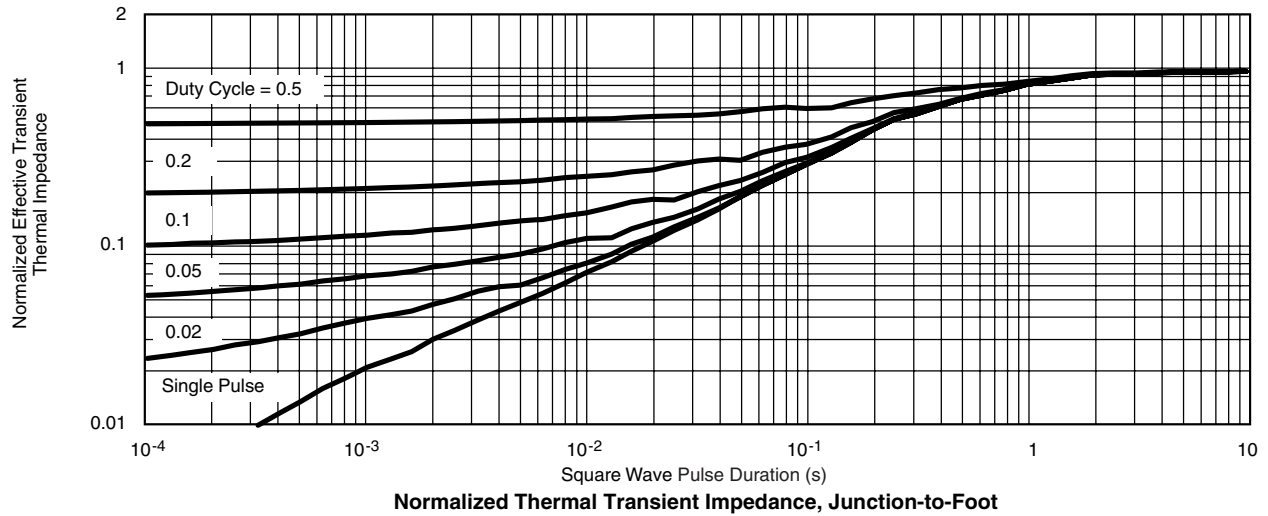


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified





TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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