

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

PRODUCT SUMMARY

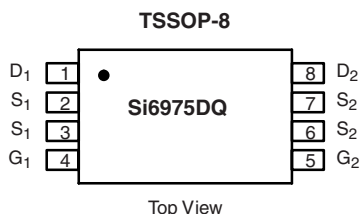
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 12	0.027 at $V_{GS} = - 4.5$ V	- 5.1
	0.036 at $V_{GS} = - 2.5$ V	- 4.5
	0.046 at $V_{GS} = - 1.8$ V	- 3.9

FEATURES

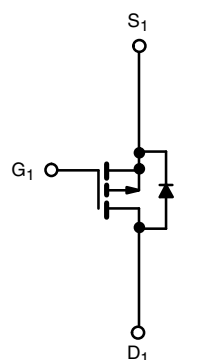
- Halogen-free
- TrenchFET® Power MOSFETs: 1.8 V Rated



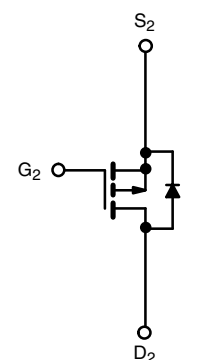
RoHS
COMPLIANT



Ordering Information: Si6975DQ-T1-GE3 (Lead (Pb)-free and Halogen-free)



P-Channel MOSFET



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ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

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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	T _A = 25 °C	I _D	- 5.1	- 4.3	A
	T _A = 70 °C		- 4.1	- 3.5	
Pulsed Drain Current (10 μs Pulse Width)		I _{DM}	- 30		
Continuous Source Current (Diode Conduction) ^a		I _S	- 1.0	- 0.7	
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	1.14	0.83	W
	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}	86	110	$^\circ\text{C/W}$
		124	150	
Maximum Junction-to-Foot (Drain)	R_{thJF}	52	65	

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	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -5\text{ mA}$	-0.45			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}	$V_{DS} = -9.6\text{ V}$, $V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -9.6\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 70\text{ }^\circ\text{C}$			-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	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$, $I_D = -5.1\text{ A}$		0.022	0.027	Ω
		$V_{GS} = -2.5\text{ V}$, $I_D = -4.5\text{ A}$		0.028	0.035	
		$V_{GS} = -1.8\text{ V}$, $I_D = -3.9\text{ A}$		0.037	0.046	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}$, $I_D = -5.1\text{ A}$		20		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.0\text{ A}$, $V_{GS} = 0\text{ V}$		-0.65	-1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -5.1\text{ A}$		23	30	nC
Gate-Source Charge	Q_{gs}			3.0		
Gate-Drain Charge	Q_{gd}			4.3		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\text{ V}$, $R_L = 6\text{ }\Omega$ $I_D \equiv -1\text{ A}$, $V_{GEN} = -4.5\text{ V}$, $R_G = 6\text{ }\Omega$		25	40	ns
Rise Time	t_r			32	50	
Turn-Off Delay Time	$t_{d(off)}$			96	140	
Fall Time	t_f			62	95	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -1.0\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$		60	100	

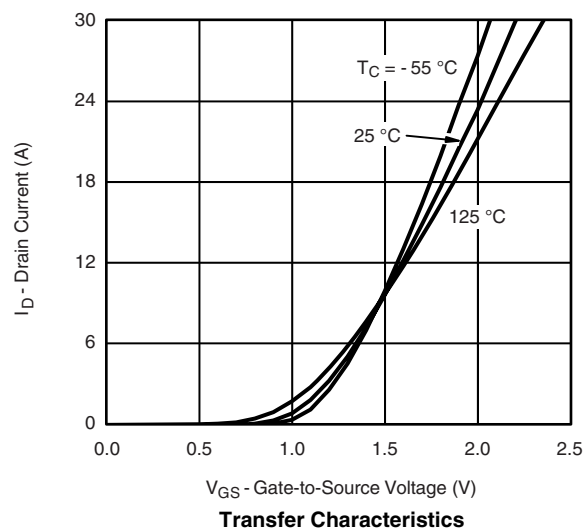
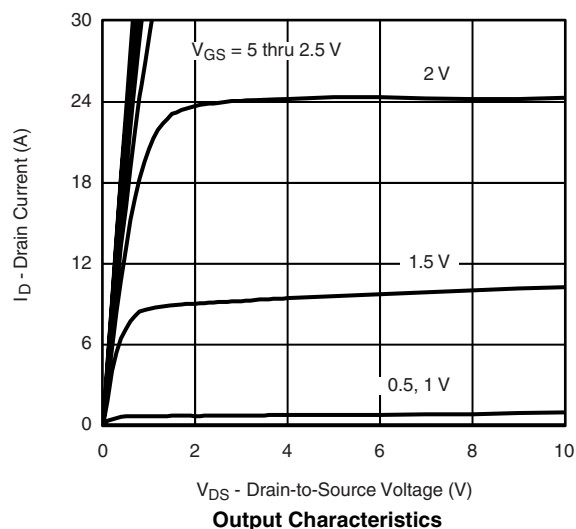
Notes:

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

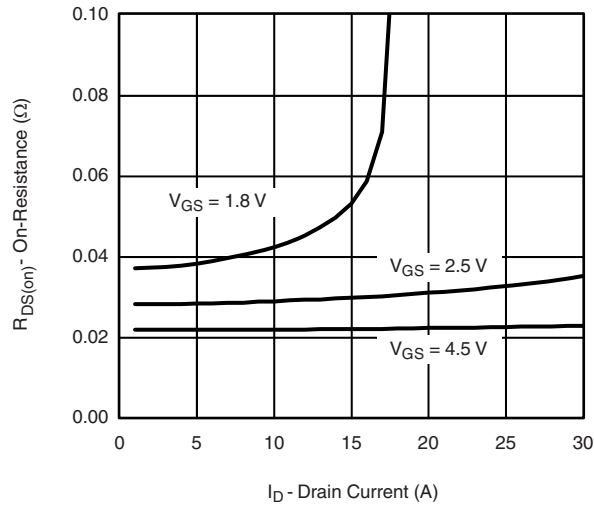
b. Guaranteed by design, not subject to production testing.

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.

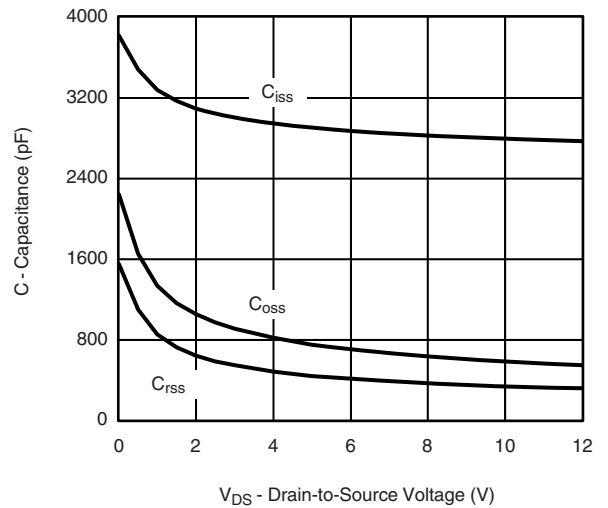
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



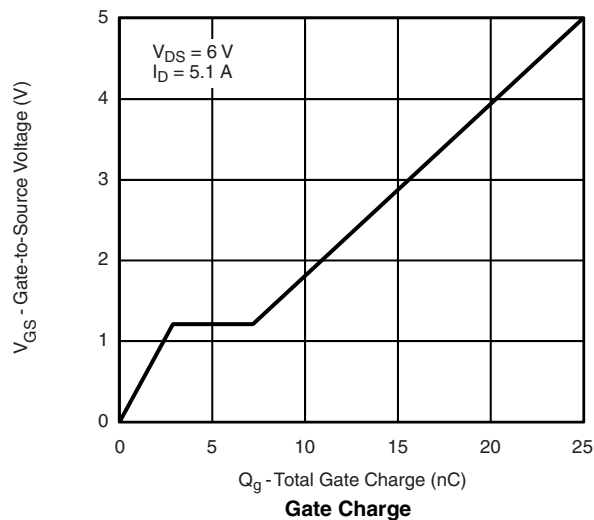
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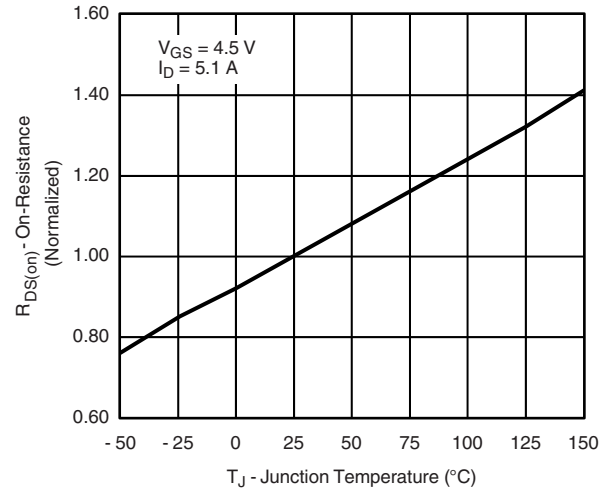
On-Resistance vs. Drain Current



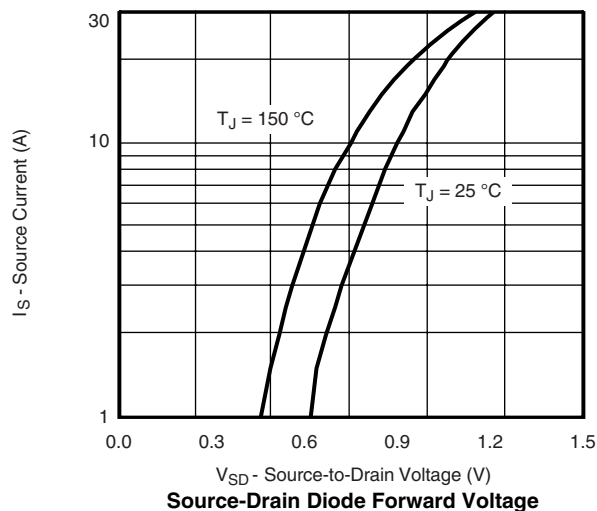
Capacitance



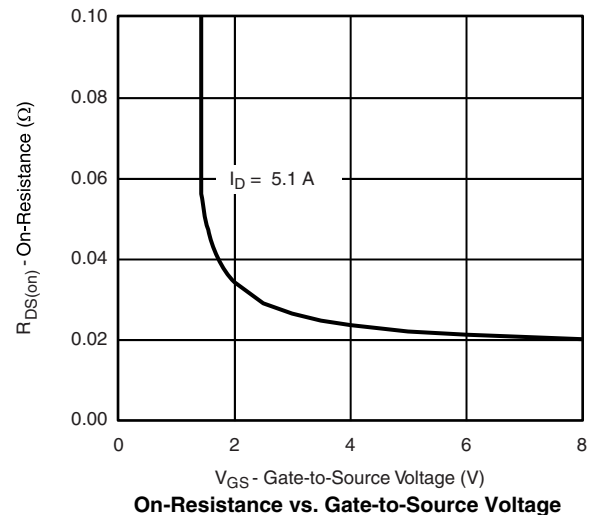
Gate Charge



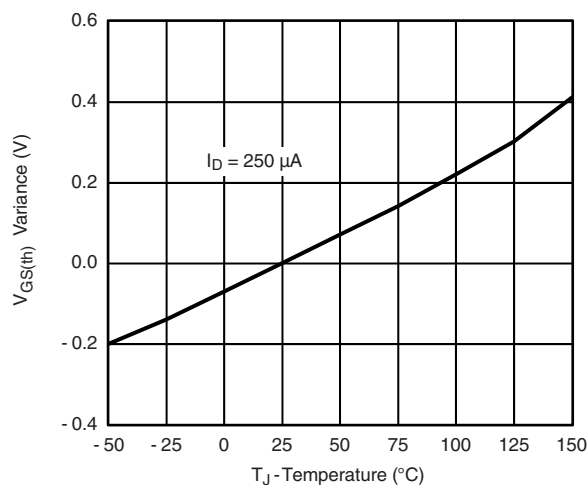
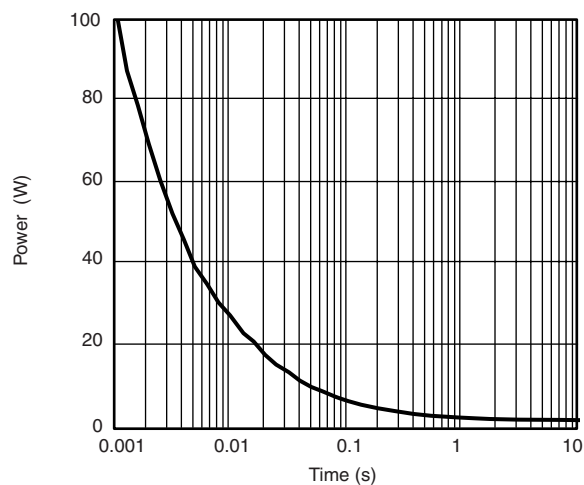
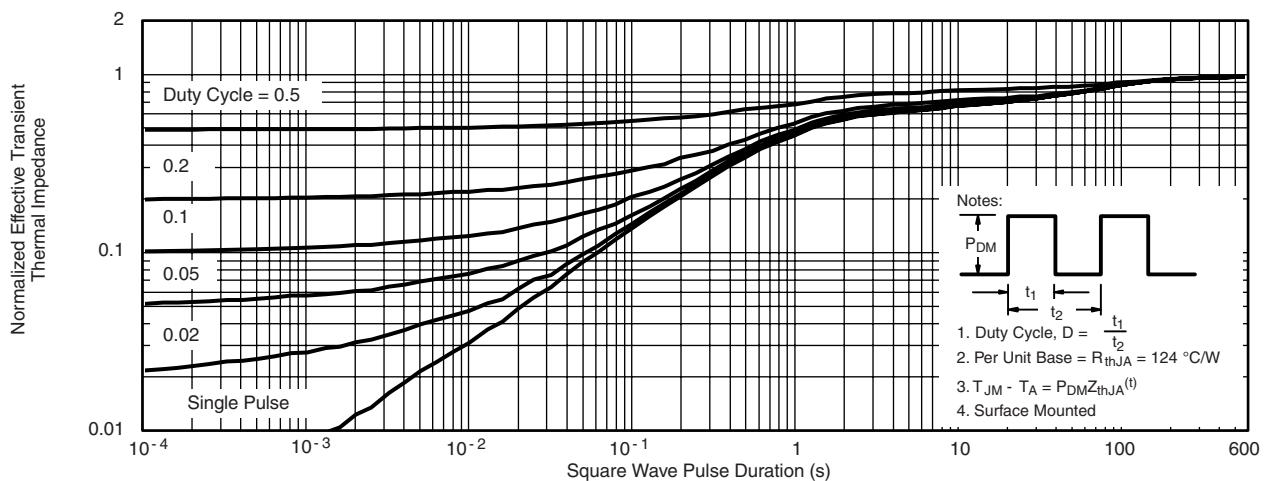
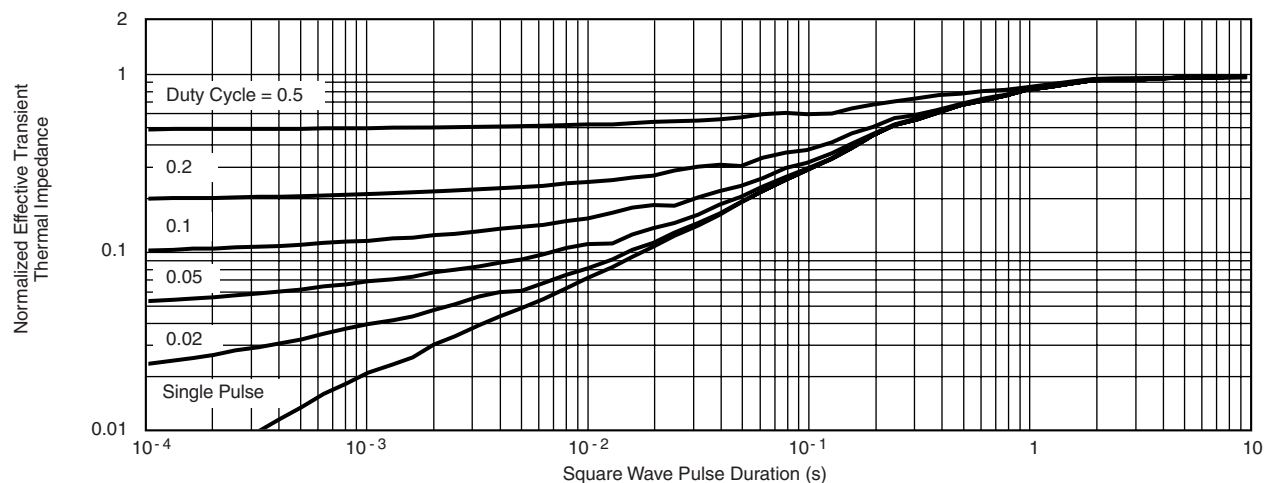
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Threshold Voltage****Single Pulse Power, Junction-to-Ambient****Normalized Thermal Transient Impedance, Junction-to-Ambient****Normalized Thermal Transient Impedance, Junction-to-Foot**

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