

## P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 20	0.01125 at $V_{GS} = - 4.5$ V	- 9.5
	0.01425 at $V_{GS} = - 2.5$ V	- 8.5
	0.0185 at $V_{GS} = - 1.8$ V	- 7.3

### FEATURES

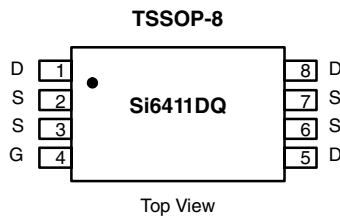
- TrenchFET<sup>®</sup> Power MOSFET

### APPLICATIONS

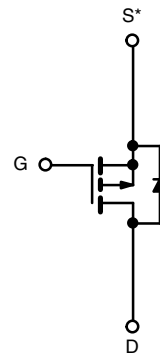
- Load Switch
- PA Switch
- Charger Switch



**RoHS\***  
COMPLIANT



Ordering Information: Si6411DQ-T1  
Si6411DQ-T1-E3 (Lead (Pb)-free)



\* Source Pins 2, 3, 6 and 7 must be tied common.

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	10 sec	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	- 20		V	
Gate-Source Voltage	$V_{GS}$	$\pm 8$			
Continuous Drain Current ( $T_J = 150$ °C) <sup>a</sup>	$I_D$	$T_A = 25$ °C	- 9.5	- 7.5	A
		$T_A = 70$ °C	- 7.5	- 6	
Pulsed Drain Current (10 $\mu$ s Pulse Width)	$I_{DM}$	- 30		A	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	- 1.5	- 0.95		
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25$ °C	1.75	1.08	W
		$T_A = 70$ °C	1.14	0.69	
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 <sup>a</sup>	$t \leq 10$ sec	$R_{thJA}$	55	70	°C/W
	Steady State		95	115	
Maximum Junction-to-Foot	Steady State	$R_{thJF}$	38	50	

Notes:

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

\* Pb containing terminations are not RoHS compliant, exemptions may apply.



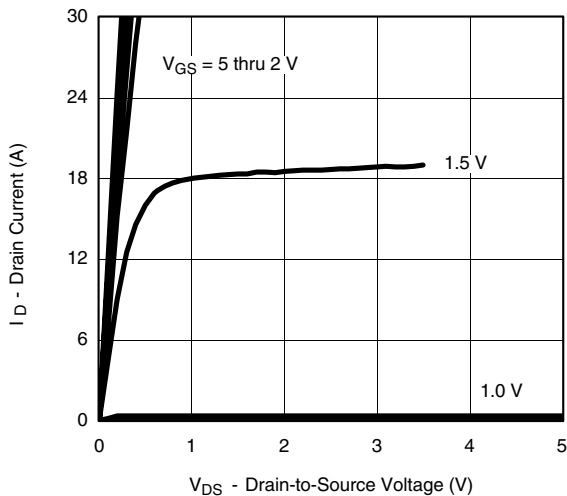
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -500\text{ }\mu\text{A}$	-0.40		-0.8	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			-10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -4.5\text{ V}$	-20			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -9.5\text{ A}$		0.009	0.01125	$\Omega$
		$V_{GS} = -2.5\text{ V}, I_D = -8.5\text{ A}$		0.0115	0.01425	
		$V_{GS} = -1.8\text{ V}, I_D = -7.5\text{ A}$		0.0147	0.0185	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -9.5\text{ A}$		45		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -1.5\text{ A}, V_{GS} = 0\text{ V}$		-0.64	-1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -10\text{ V}, V_{GS} = -5\text{ V}, I_D = -9.5\text{ A}$		55	85	nC
Gate-Source Charge	$Q_{gs}$		7.2			
Gate-Drain Charge	$Q_{gd}$		12			
Gate Resistance	$R_g$			4.5		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_G = 6\text{ }\Omega$		45	70	ns
Rise Time	$t_r$			75	115	
Turn-Off Delay Time	$t_{d(off)}$			240	360	
Fall Time	$t_f$			110	170	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -1.5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		80	120	

Notes:

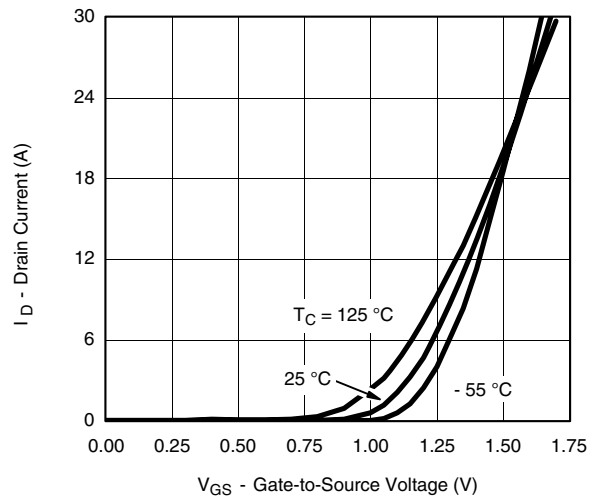
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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 °C unless noted

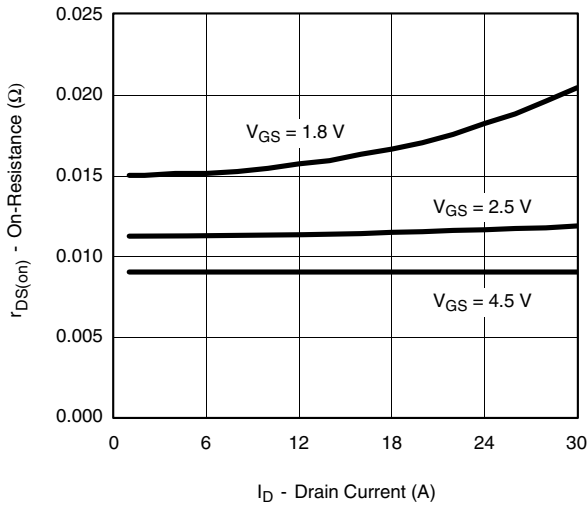


Output Characteristics

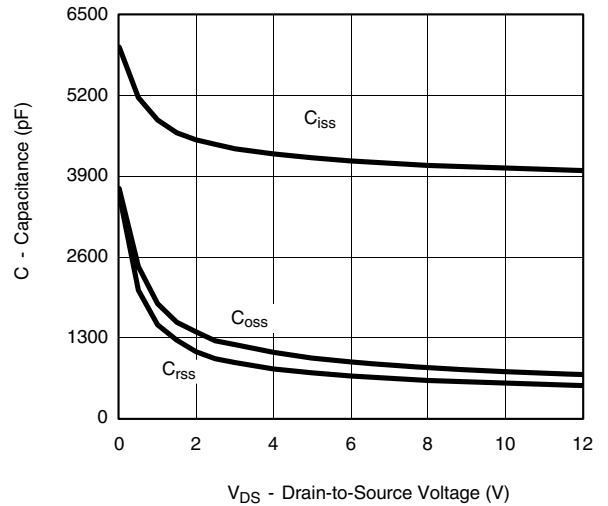


Transfer Characteristics

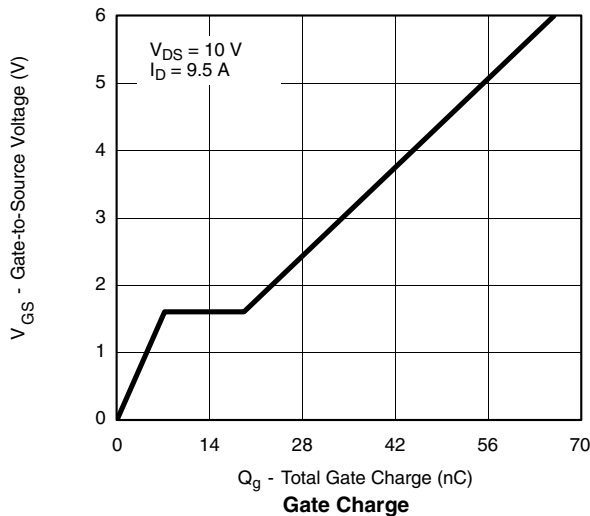
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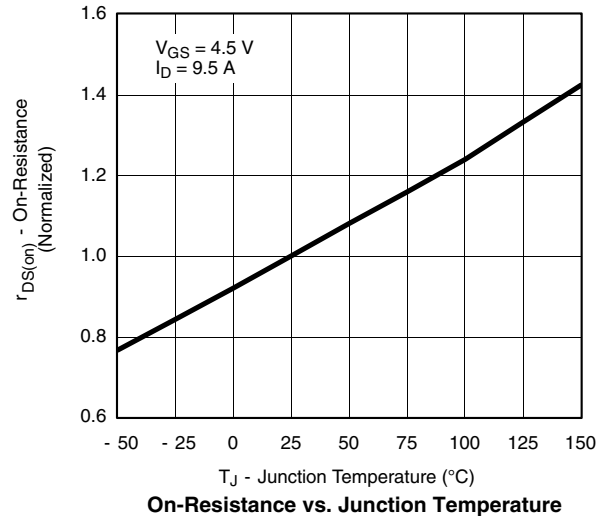
**On-Resistance vs. Drain Current**



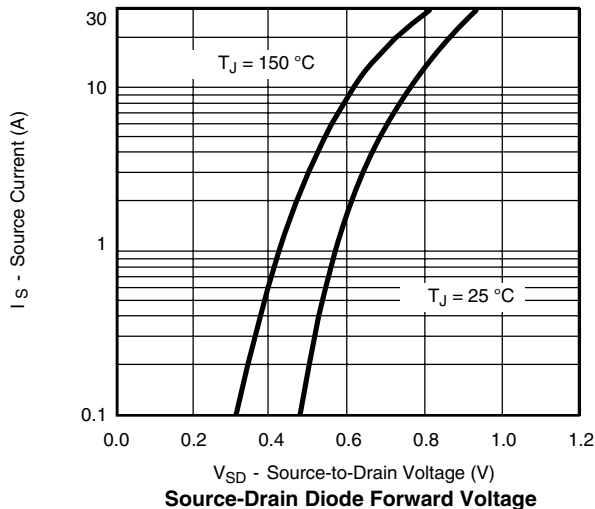
**Capacitance**



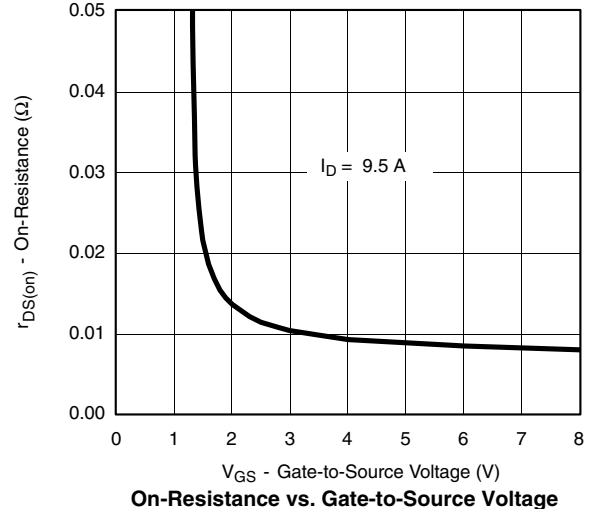
**Gate Charge**



**On-Resistance vs. Junction Temperature**

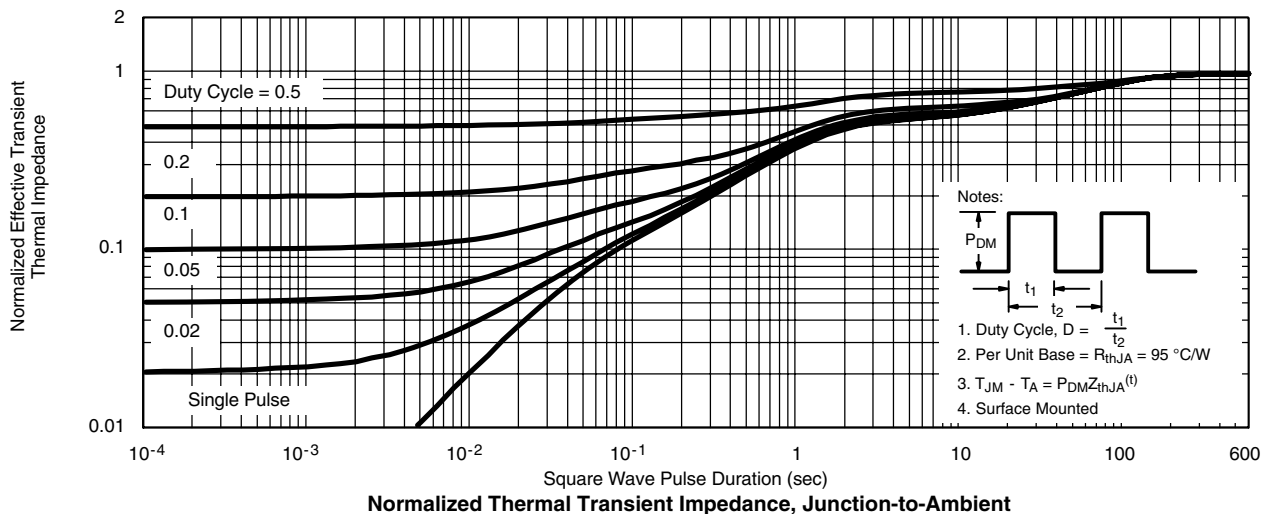
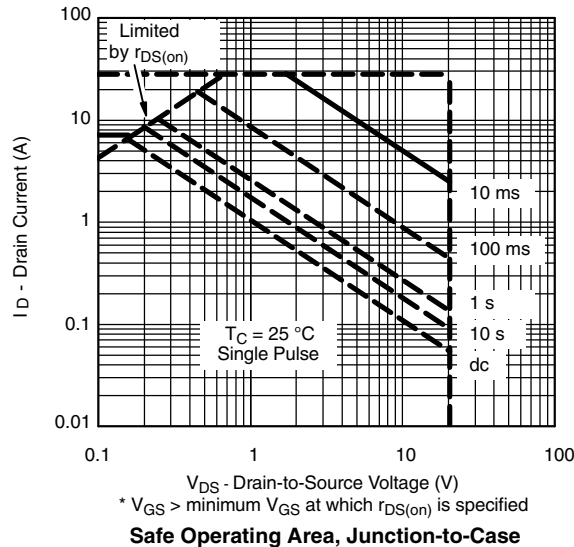
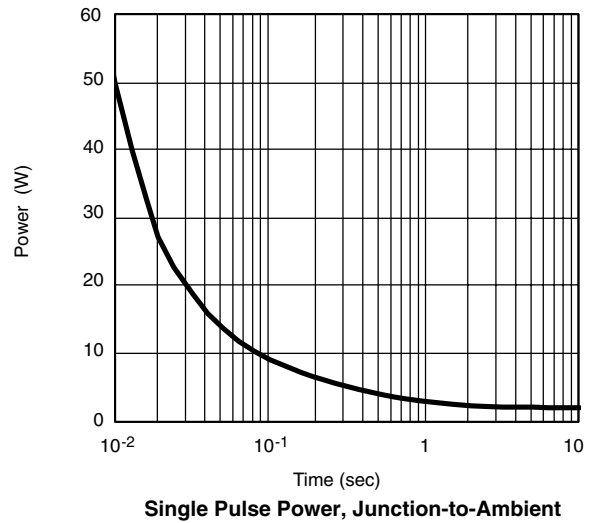
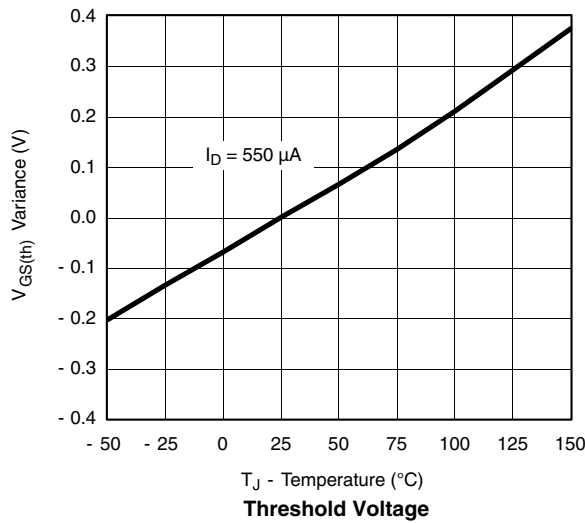


**Source-Drain Diode Forward Voltage**



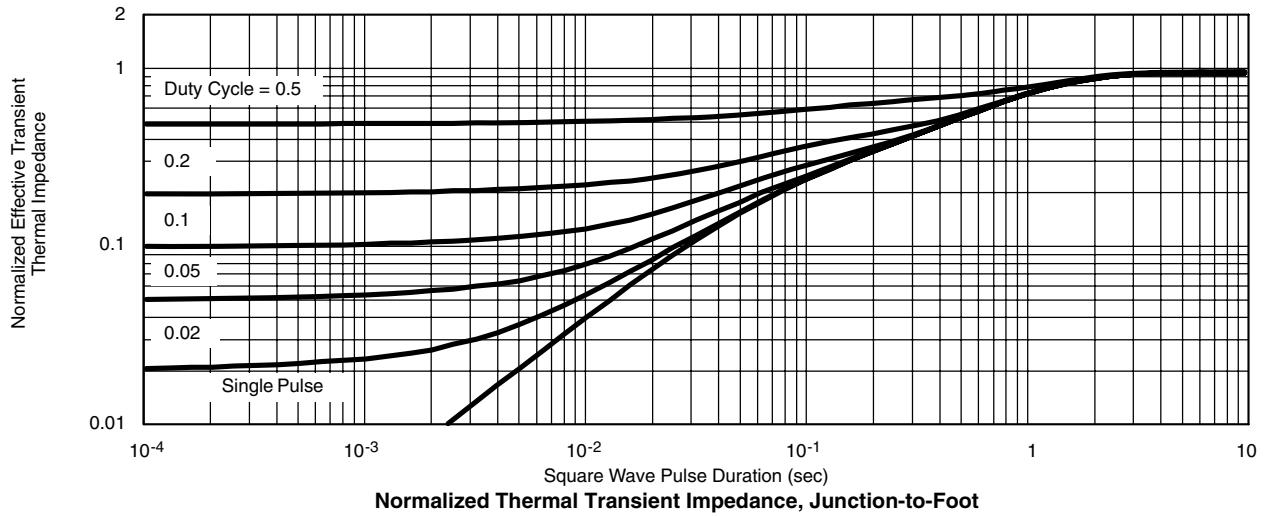
**On-Resistance vs. Gate-to-Source Voltage**

**TYPICAL CHARACTERISTICS** 25 °C unless noted





**TYPICAL CHARACTERISTICS** 25 °C unless noted



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