

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

### PRODUCT SUMMARY

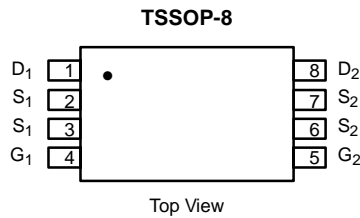
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-20	0.031 @ $V_{GS} = -4.5$ V	-4.8
	0.041 @ $V_{GS} = -2.5$ V	-4.2
	0.058 @ $V_{GS} = -1.8$ V	-3.5

### FEATURES

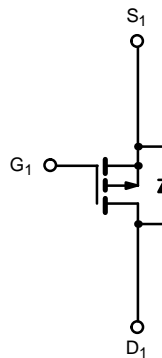
- TrenchFET® Power MOSFETS

### APPLICATIONS

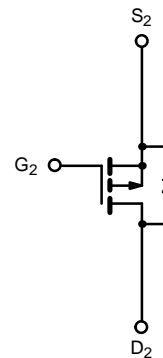
- Load Switch
- Battery Switch



Ordering Information: Si6981DQ T-1



P-Channel MOSFET



P-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		$V_{DS}$	-20		V
Gate-Source Voltage		$V_{GS}$	$\pm 8$		
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	-4.8	-4.1	A
	$T_A = 70^\circ\text{C}$		-3.9	-3.2	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse Width)		$I_{DM}$	-30		
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	-1.0	-0.7	W
Maximum Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	$P_D$	1.14	0.83	
	$T_A = 70^\circ\text{C}$		0.73	0.53	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$

### THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 10$ sec	$R_{thJA}$	86	110	$^\circ\text{C/W}$
	Steady State		124	150	
Maximum Junction-to-Foot (Drain)	Steady State	$R_{thJF}$	59	75	

Notes

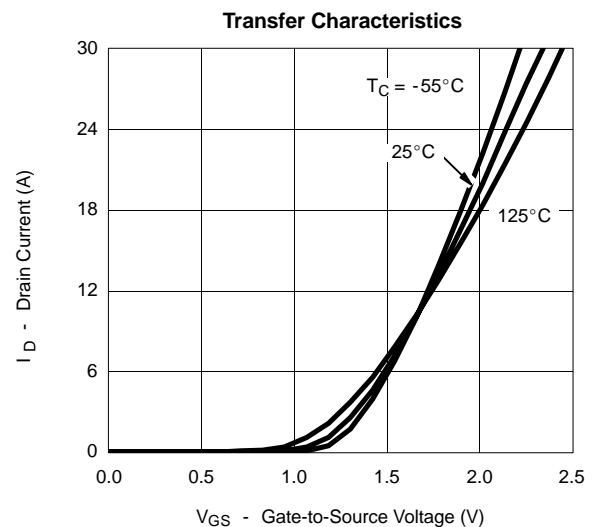
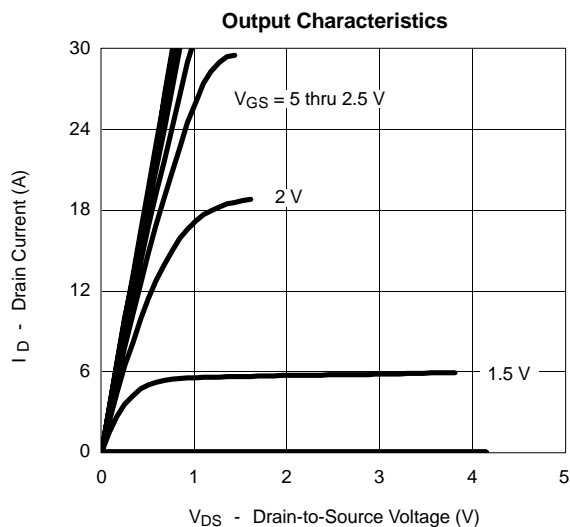
a. Surface Mounted on 1" x 1" FR4 Board.


**SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -300 μA	-0.40		-0.9	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V			-1	μA
		V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 70 °C			-25	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -4.5 V	-20			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -4.8 A		0.026	0.031	Ω
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -4.2 A		0.034	0.041	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -3.5 A		0.046	0.058	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -5 V, I <sub>D</sub> = -4.8 A		17		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = -1.0 A, V <sub>GS</sub> = 0 V		-0.65	-1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -4.8 A		15	25	nC
Gate-Source Charge	Q <sub>gs</sub>		2.4			
Gate-Drain Charge	Q <sub>gd</sub>		3.8			
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -10 V, R <sub>L</sub> = 10 Ω I <sub>D</sub> ≅ -1 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω		35	55	ns
Rise Time	t <sub>r</sub>		55	85		
Turn-Off Delay Time	t <sub>d(off)</sub>		120	180		
Fall Time	t <sub>f</sub>		52	80		
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = -1.0 A, di/dt = 100 A/μs		30	50	

## Notes

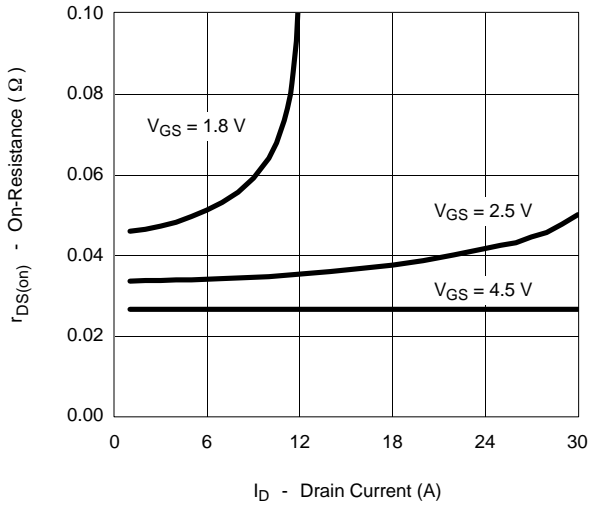
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.

**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**


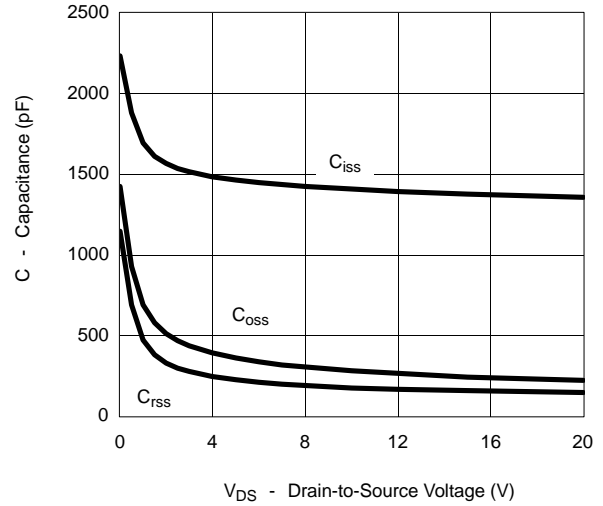


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

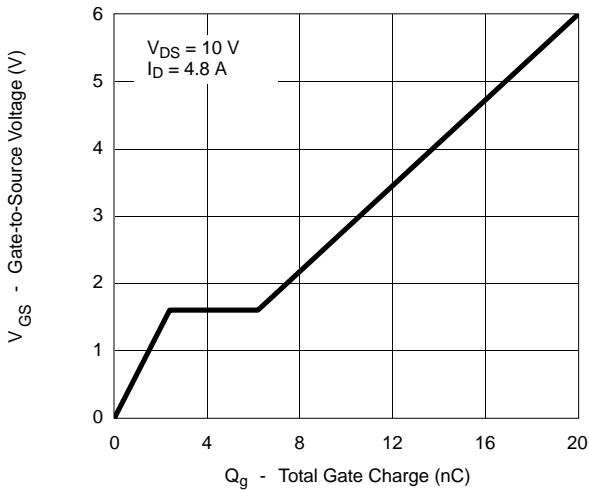
**On-Resistance vs. Drain Current**



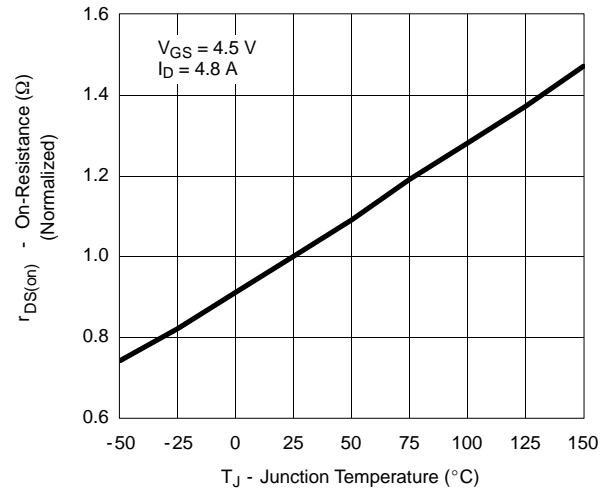
**Capacitance**



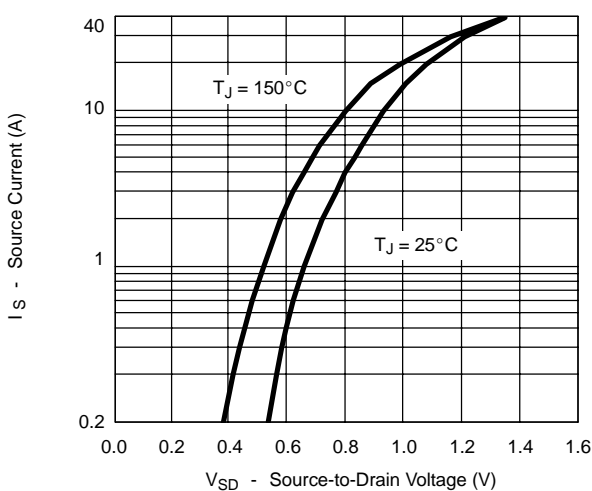
**Gate Charge**



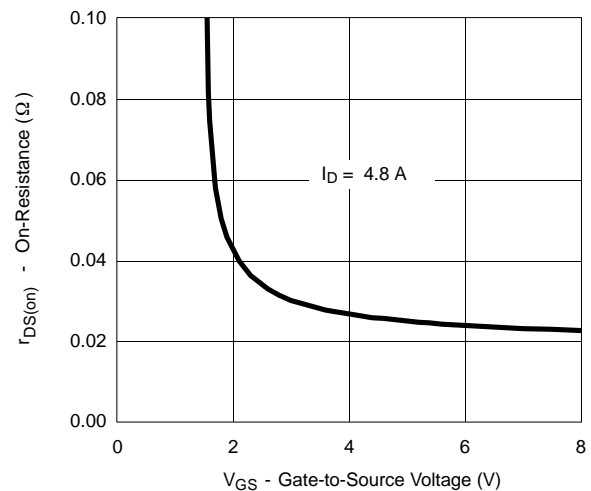
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**

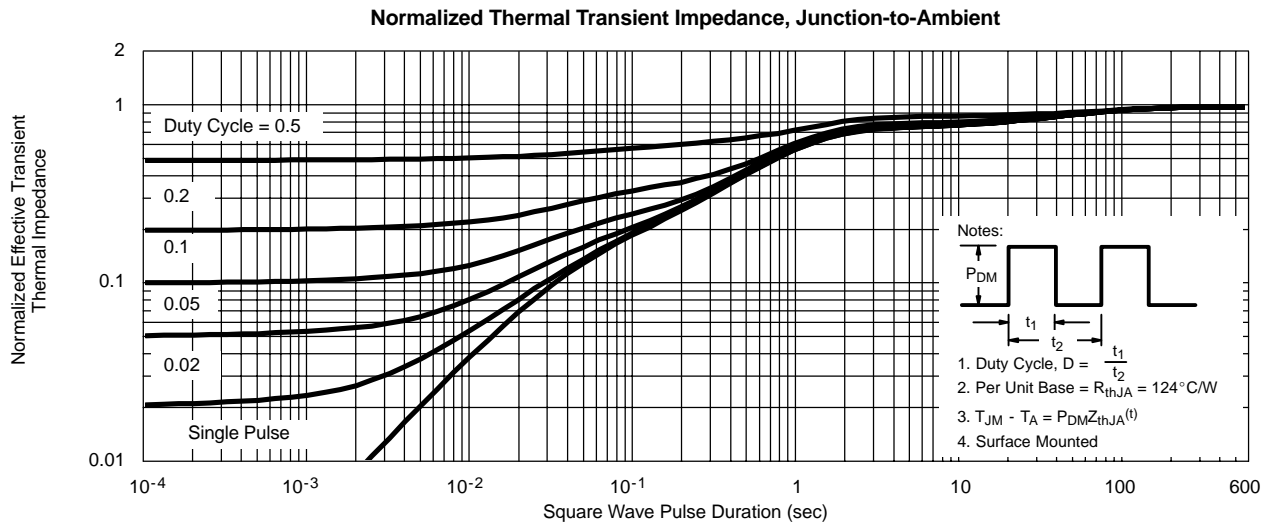
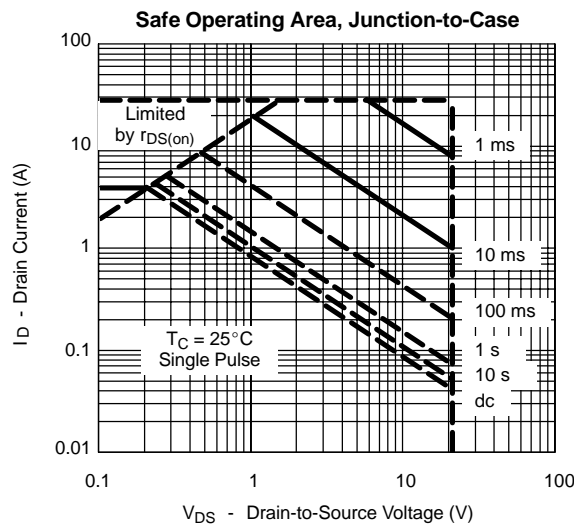
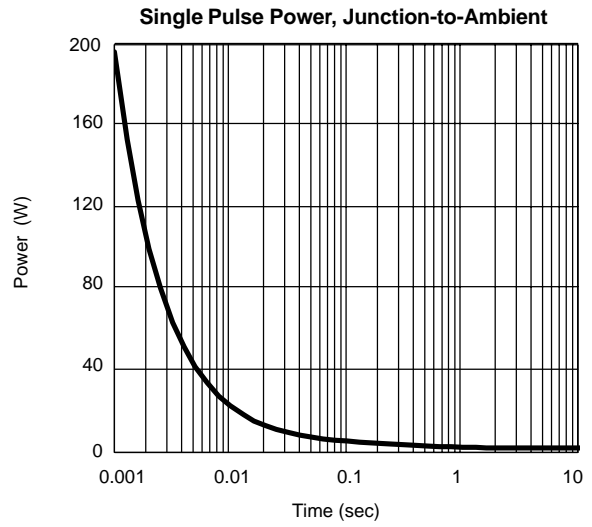
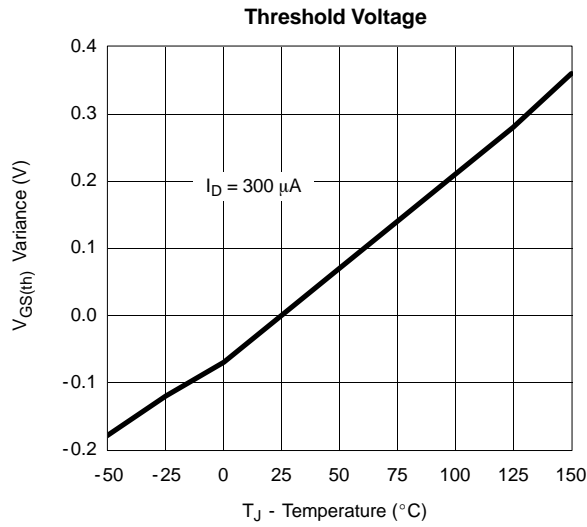


**On-Resistance vs. Gate-to-Source Voltage**





**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**





**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

