

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

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 20	0.015 at $V_{GS} = - 4.5$ V	- 9.4
	0.019 at $V_{GS} = - 2.5$ V	- 8.4
	0.024 at $V_{GS} = - 1.8$ V	- 7.5

### FEATURES

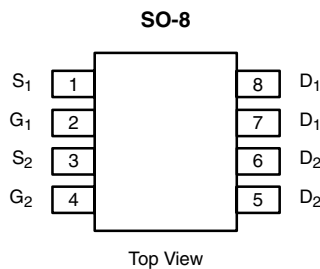
- TrenchFET<sup>®</sup> Power MOSFET
- Advanced High Cell Density Process

### APPLICATIONS

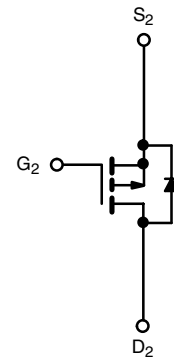
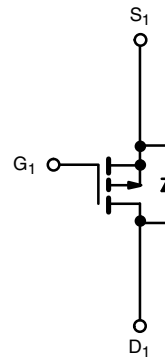
- Load Switching



**RoHS\***  
COMPLIANT



Ordering Information: Si4913DY-T1  
Si4913DY-T1-E3 (Lead (Pb)-free)



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	- 9.4	- 7.1	A
		$T_A = 70$ °C	- 7.5	- 5.7	
Pulsed Drain Current	$I_{DM}$	- 30			
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	- 1.7	- 0.9		
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25$ °C	2.0	1.1	W
		$T_A = 70$ °C	1.3	0.7	
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>	$R_{thJA}$	$t \leq 10$ sec	45	62.5	°C/W
		Steady State	85	110	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	26	35		

Notes:

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

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

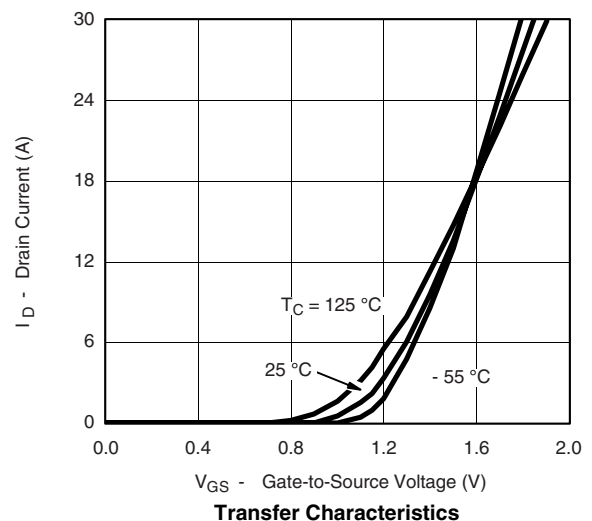
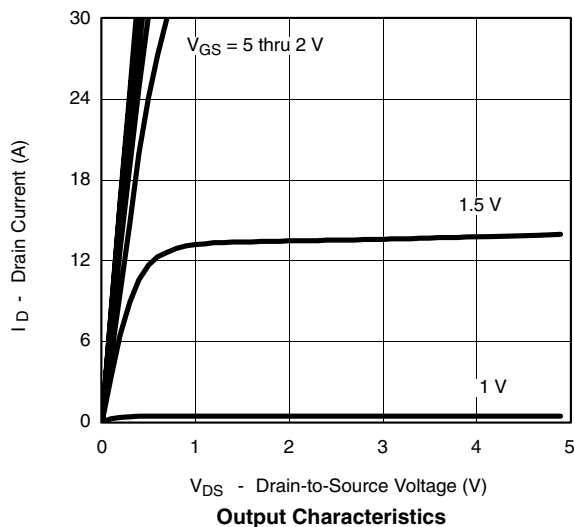
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -500\text{ }\mu\text{A}$	-0.40		-1.0	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-5	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -4.5\text{ V}$	-30			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -9.4\text{ A}$		0.0125	0.015	$\Omega$
		$V_{GS} = -2.5\text{ V}, I_D = -8.4\text{ A}$		0.0155	0.019	
		$V_{GS} = -1.8\text{ V}, I_D = -3.0\text{ A}$		0.020	0.024	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}, I_D = -9.4\text{ A}$		40		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -1.7\text{ A}, V_{GS} = 0\text{ V}$		-0.7	-1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -9.4\text{ A}$		43	65	nC
Gate-Source Charge	$Q_{gs}$		7.1			
Gate-Drain Charge	$Q_{gd}$		10.9			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_G = 6\text{ }\Omega$		32	50	ns
Rise Time	$t_r$		42	65		
Turn-Off Delay Time	$t_{d(off)}$		350	525		
Fall Time	$t_f$		160	240		
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -1.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		127	200	

Notes:

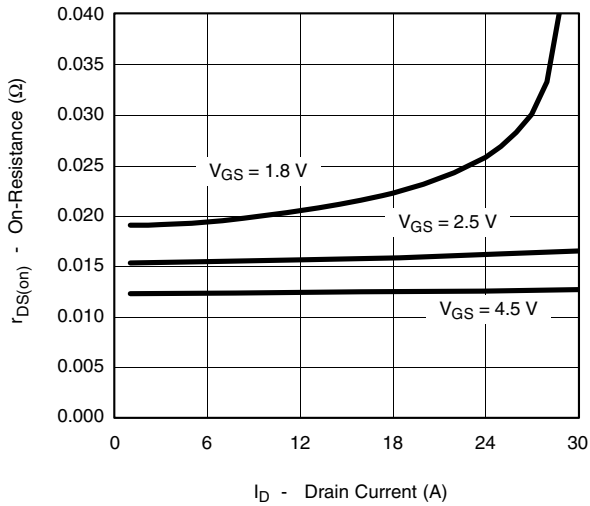
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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.

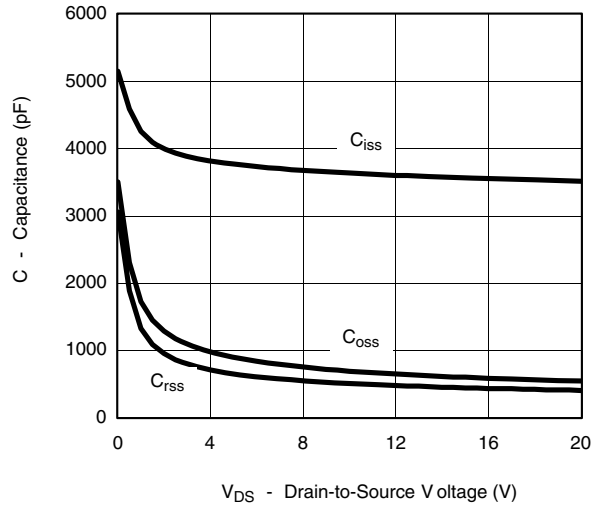
## TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$ unless noted



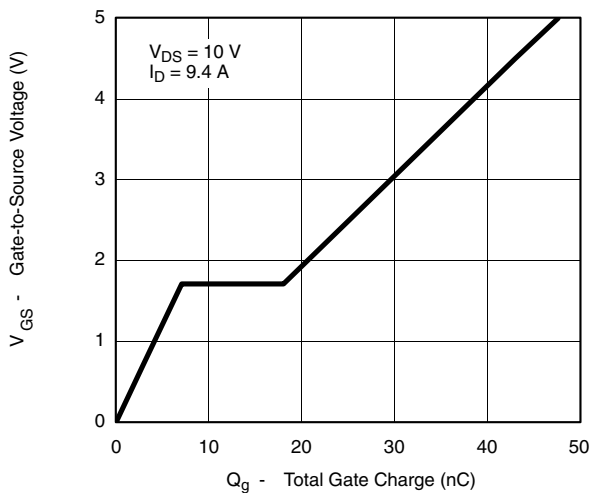
**TYPICAL CHARACTERISTICS** 25 °C unless noted



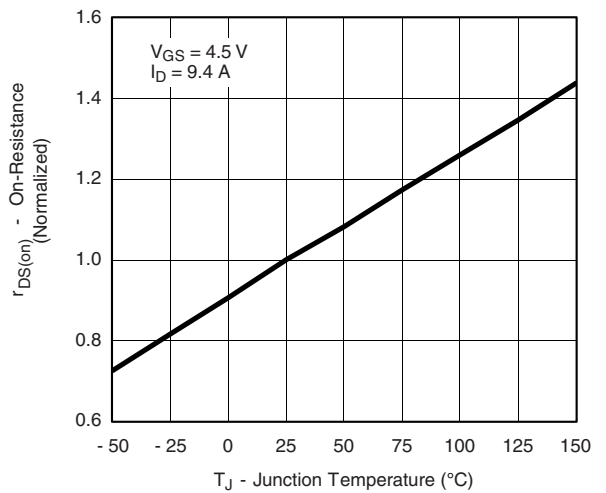
**On-Resistance vs. Drain Current**



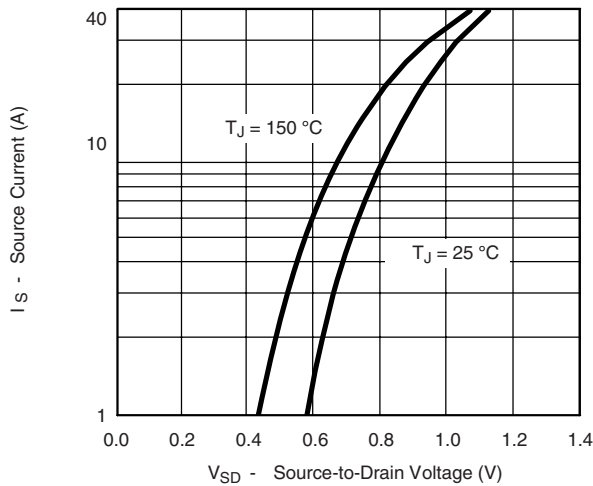
**Capacitance**



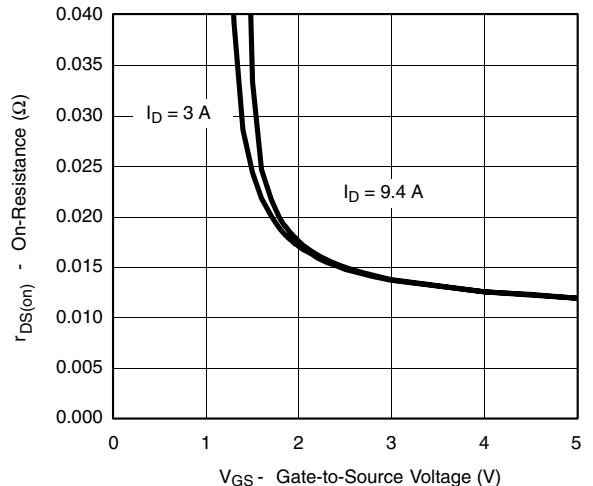
**Gate Charge**



**On-Resistance vs. Junction Temperature**

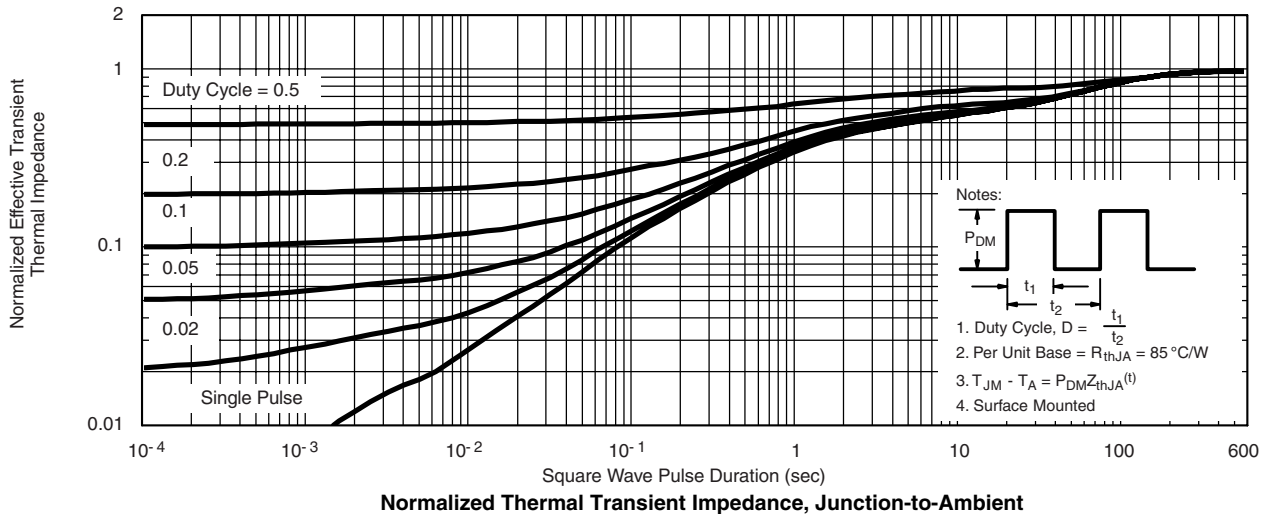
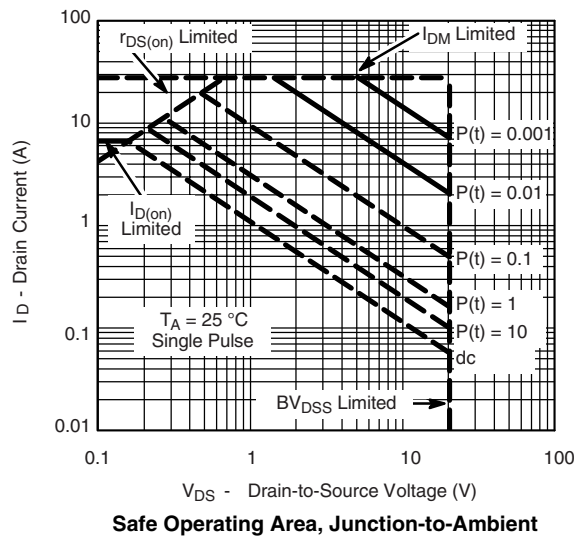
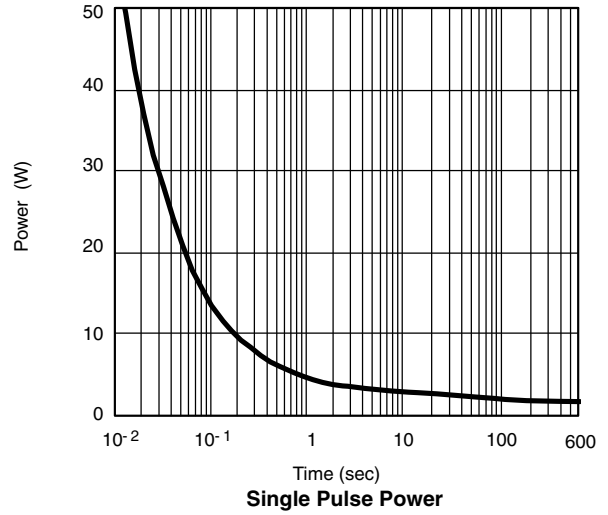
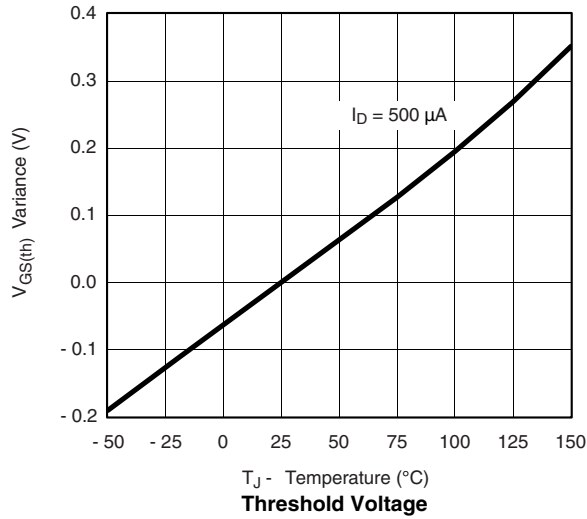


**Source-Drain Diode Forward Voltage**



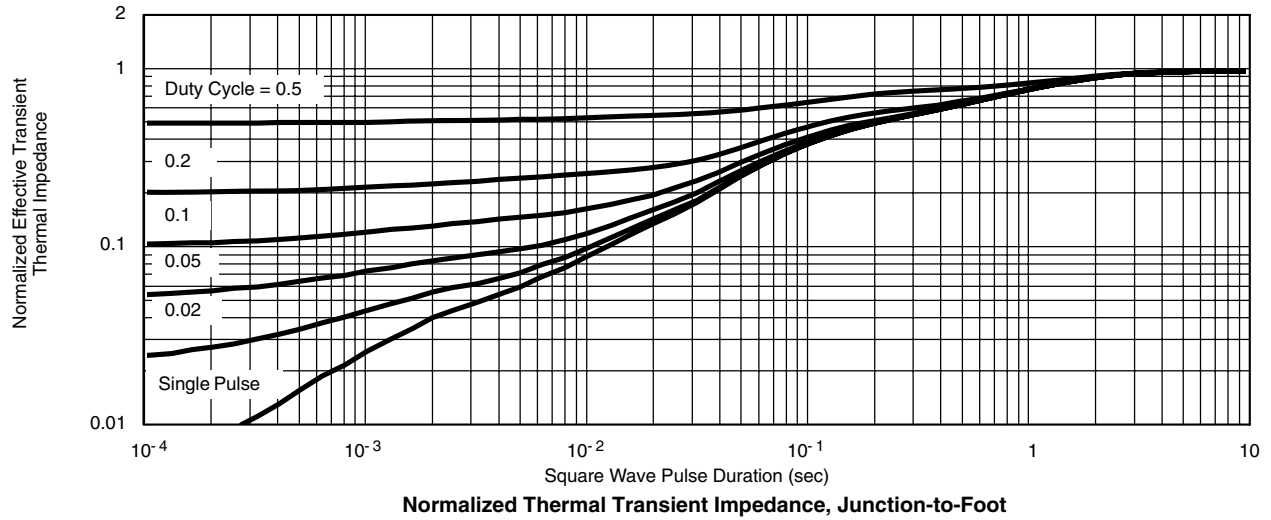
**On-Resistance vs. Gate-to-Source Voltage**

**TYPICAL CHARACTERISTICS** 25 °C unless noted





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