

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

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	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

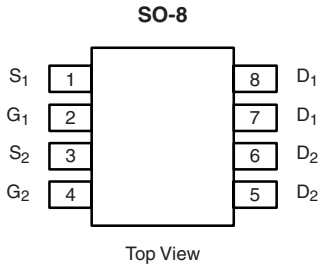
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



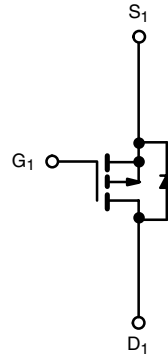
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

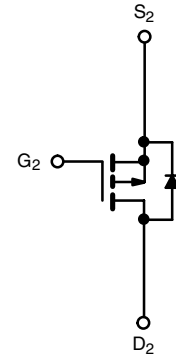
- Load Switching



Ordering Information: Si4913DY-T1-E3 (Lead (Pb)-free)
Si4913DY-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}	- 20		V
Gate-Source Voltage		V_{GS}	± 8		
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	- 9.4	- 7.1	A
	$T_A = 70\text{ }^{\circ}\text{C}$		- 7.5	- 5.7	
Pulsed Drain Current		I_{DM}	- 30		
Continuous Source Current (Diode Conduction) ^a		I_S	- 1.7	- 0.9	
Maximum Power Dissipation ^a	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	2.0	1.1	W
	$T_A = 70\text{ }^{\circ}\text{C}$		1.3	0.7	
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 ^a	R_{thJA}	45	62.5	$^\circ\text{C/W}$
		85	110	
Maximum Junction-to-Foot (Drain)	R_{thJF}	26	35	

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	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -500\text{ }\mu\text{A}$	-0.40		-1.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\text{ V}$, $V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -20\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$			-5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}$, $V_{GS} = -4.5\text{ V}$	-30			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$, $I_D = -9.4\text{ A}$		0.0125	0.015	Ω
		$V_{GS} = -2.5\text{ V}$, $I_D = -8.4\text{ A}$		0.0155	0.019	
		$V_{GS} = -1.8\text{ V}$, $I_D = -3.0\text{ A}$		0.020	0.024	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10\text{ V}$, $I_D = -9.4\text{ A}$		40		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.7\text{ A}$, $V_{GS} = 0\text{ V}$		-0.7	-1.2	V
Dynamic^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	

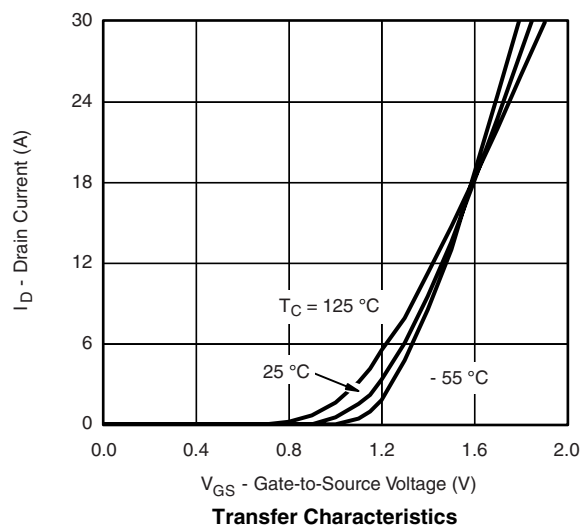
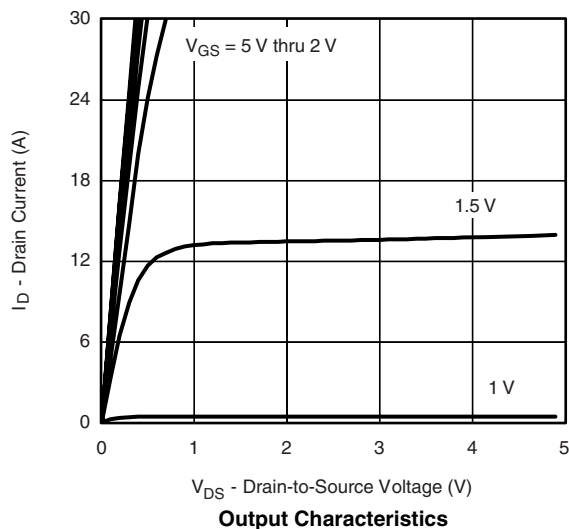
Notes:

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

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

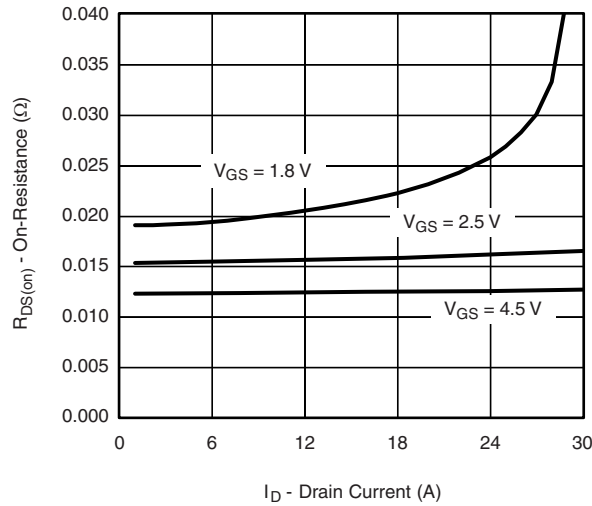
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

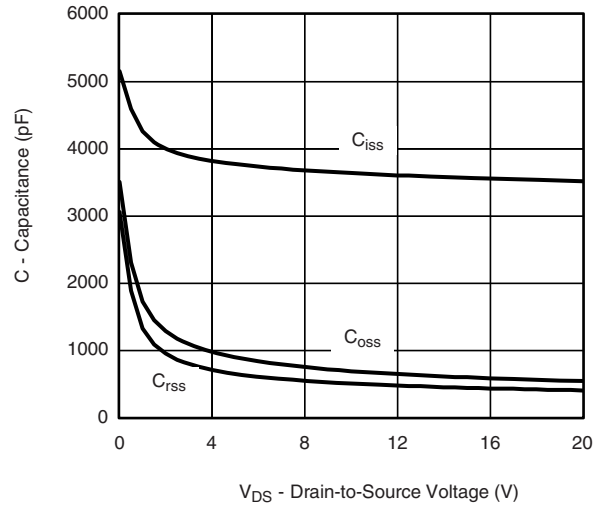




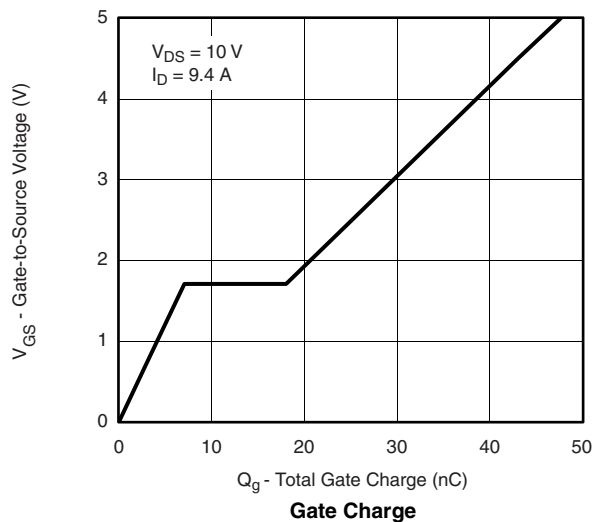
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



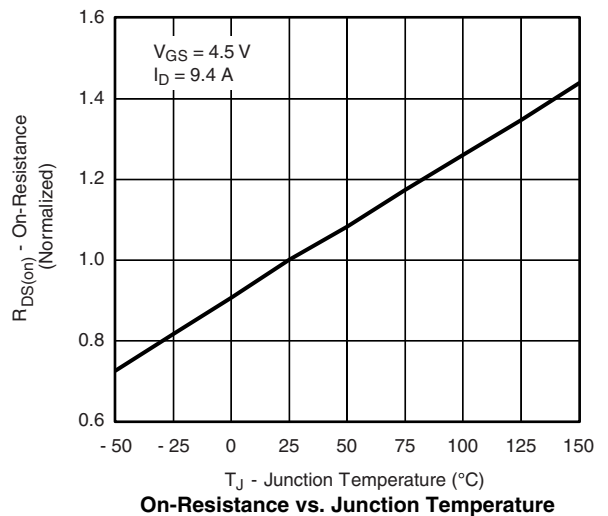
On-Resistance vs. Drain Current



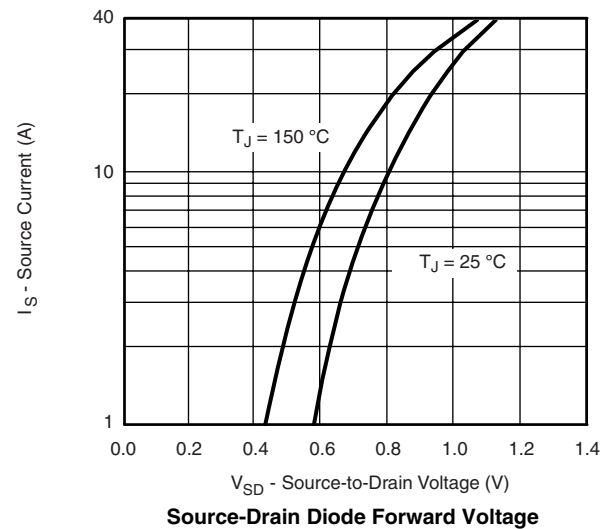
Capacitance



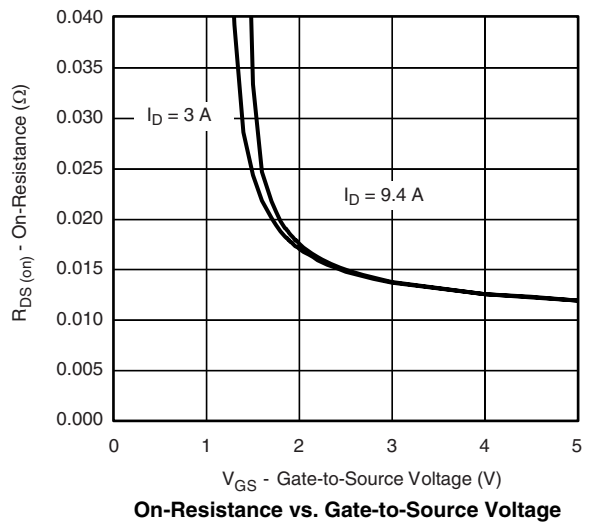
Gate Charge



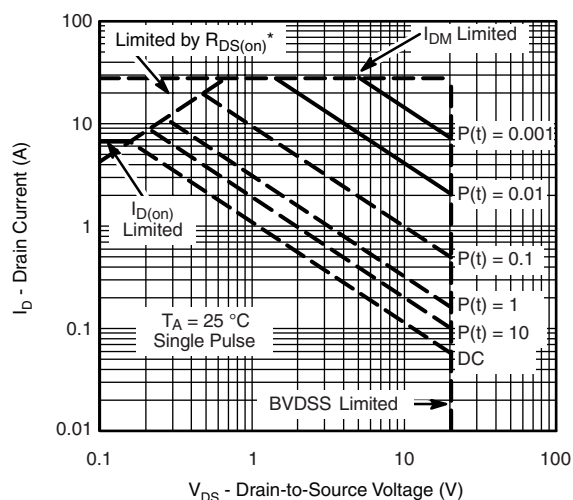
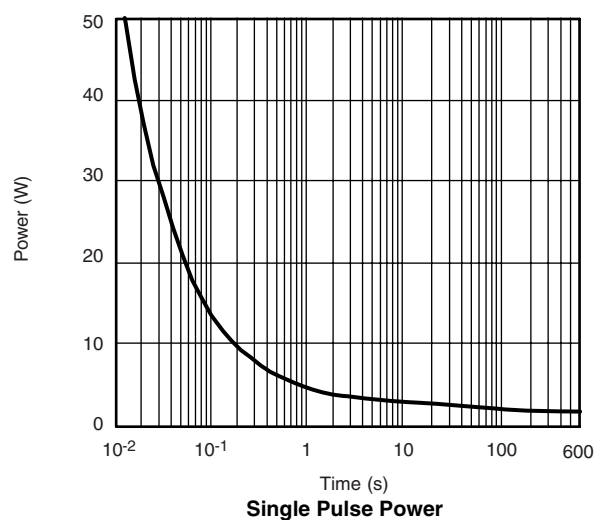
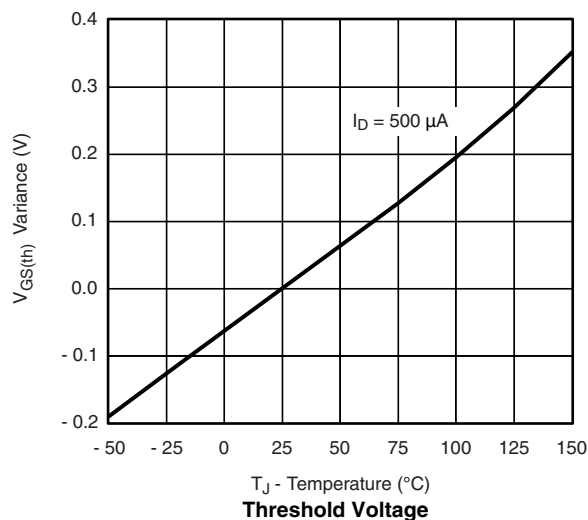
On-Resistance vs. Junction Temperature



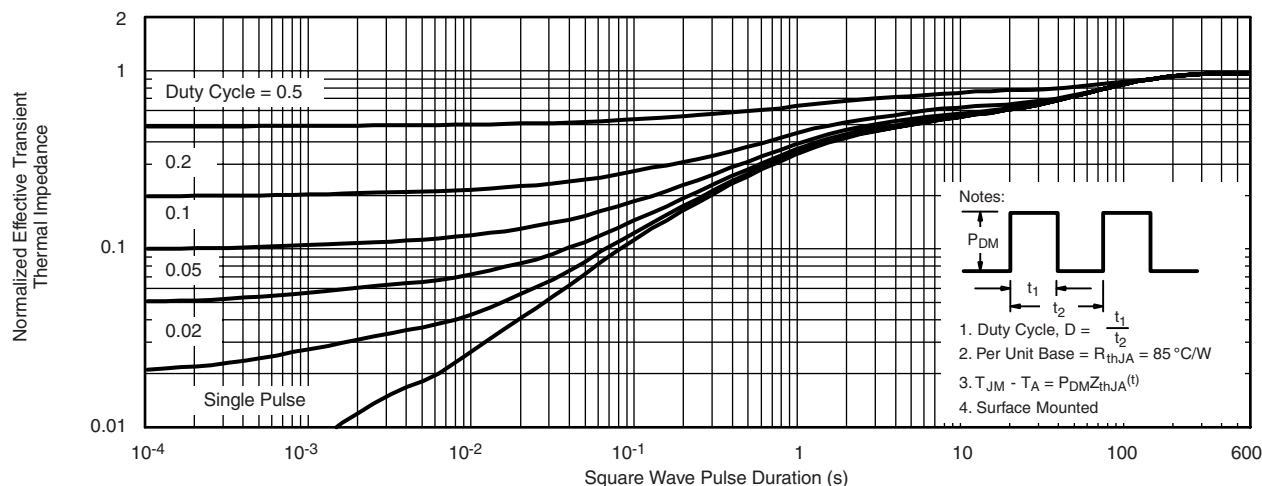
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

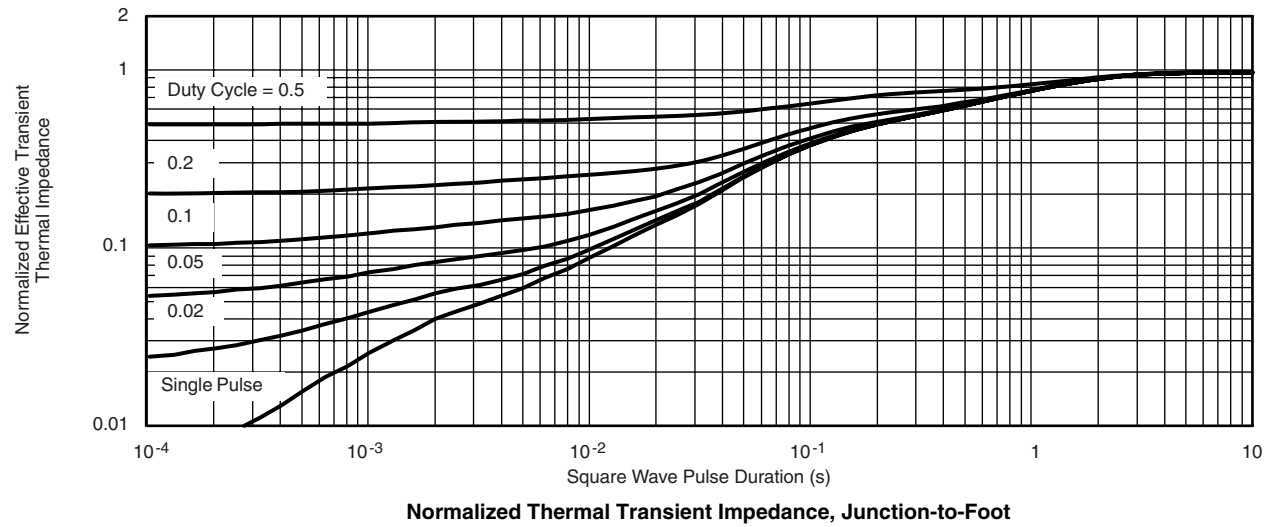
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

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

Safe Operating Area, Junction-to-Ambient**Normalized Thermal Transient Impedance, Junction-to-Ambient**



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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