

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

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
- 20	0.0075 at $V_{GS} = - 4.5$ V	- 14
	0.009 at $V_{GS} = - 2.5$ V	- 13
	0.0115 at $V_{GS} = - 1.8$ V	- 12

### FEATURES

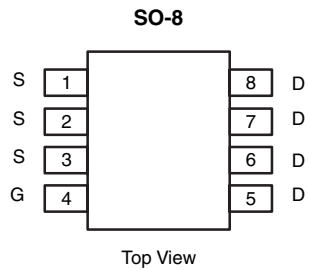
- TrenchFET® Power MOSFET

### APPLICATIONS

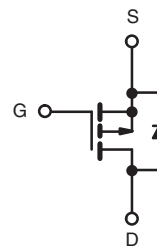
- Game Station
- Load Switch



**RoHS\***  
COMPLIANT



**Ordering Information:** Si4423DY-T1  
Si4423DY-T1-E3 (Lead (Pb)-free)



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	- 14	- 10	A
		$T_A = 70$ °C	- 11.5	- 8	
Pulsed Drain Current	$I_{DM}$	- 50			
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	- 2.7	- 1.36	W	
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25$ °C	3.0		1.5
		$T_A = 70$ °C	1.9		0.95
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	33	42	°C/W
		Steady State	70	84	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	16	21		

Notes:

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

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

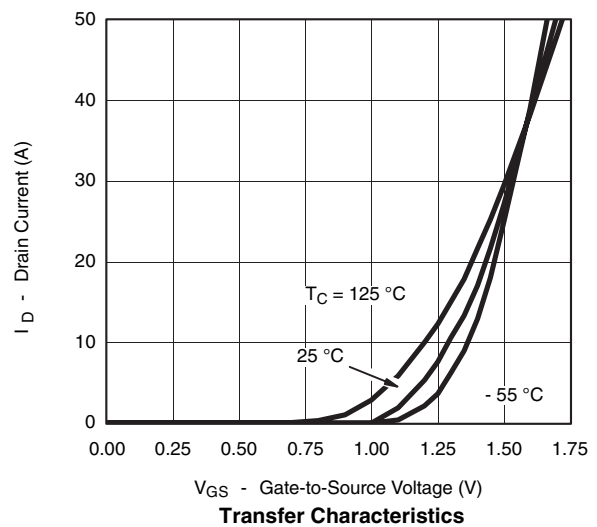
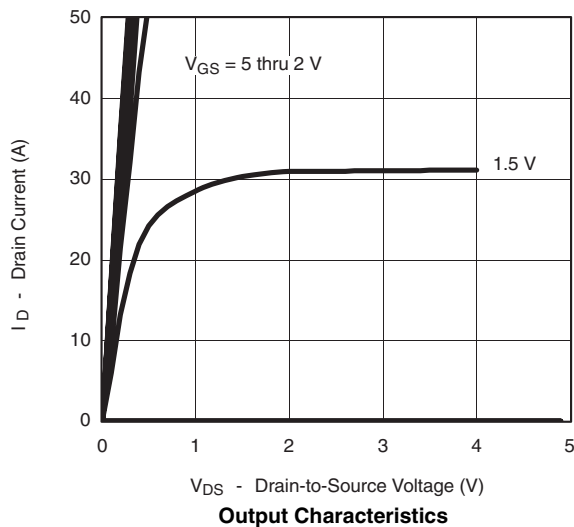
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -600\text{ }\mu\text{A}$	-0.4		-0.9	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			$\pm 100$	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>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -4.5\text{ V}$	-30			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -14\text{ A}$		0.006	0.0075	$\Omega$
		$V_{GS} = -2.5\text{ V}, I_D = -13\text{ A}$		0.0071	0.009	
		$V_{GS} = -1.8\text{ V}, I_D = -12\text{ A}$		0.009	0.0115	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}, I_D = -14\text{ A}$		60		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -2.7\text{ A}, V_{GS} = 0\text{ V}$		-0.6	-1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -10\text{ V}, V_{GS} = -5\text{ V}, I_D = -14\text{ A}$		116	175	nC
Gate-Source Charge	$Q_{gs}$		16			
Gate-Drain Charge	$Q_{gd}$		27			
Gate Resistance	$R_g$			3.2		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -4.5\text{ V}, R_G = 6\text{ }\Omega$		75	115	ns
Rise Time	$t_r$		165	250		
Turn-Off Delay Time	$t_{d(off)}$		460	700		
Fall Time	$t_f$		210	320		
Source-Drain Reverse Recovery Time	$t_{rr}$		$I_F = -2.1\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		105	

Notes:

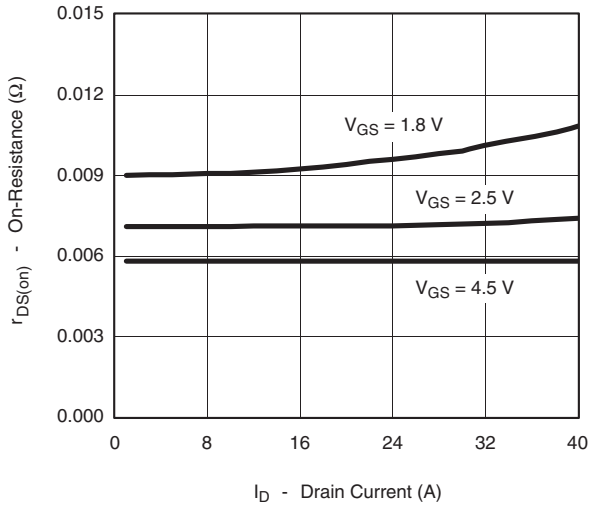
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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.

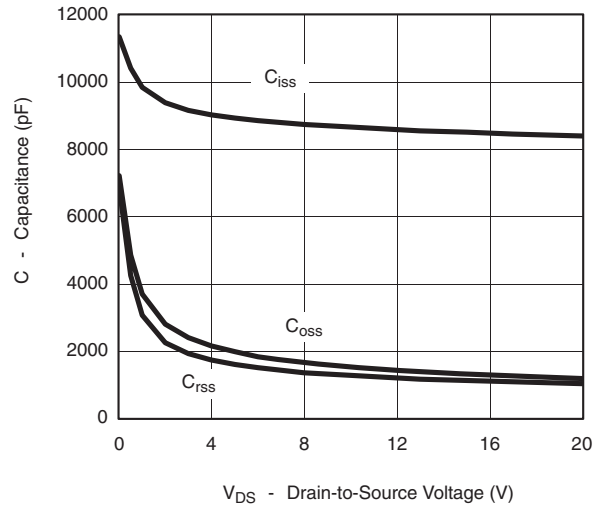
## TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$ , unless otherwise noted



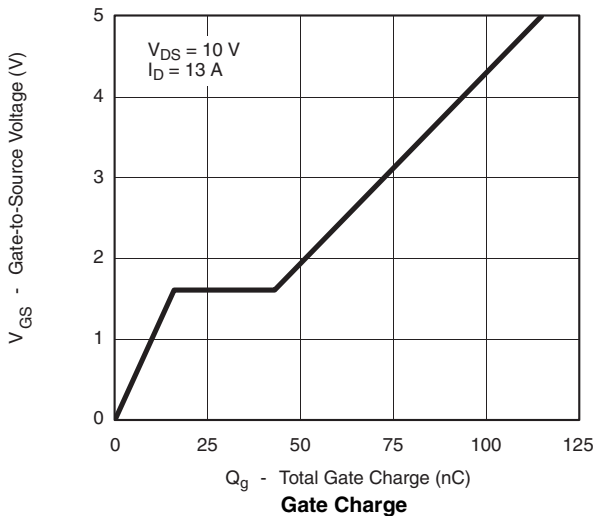
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



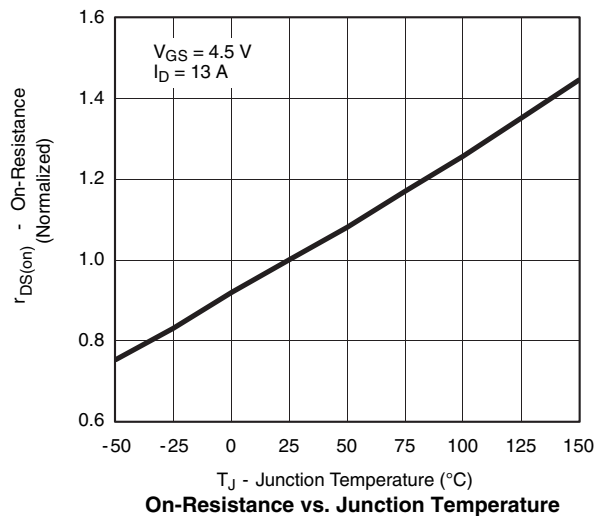
**On-Resistance vs. Drain Current**



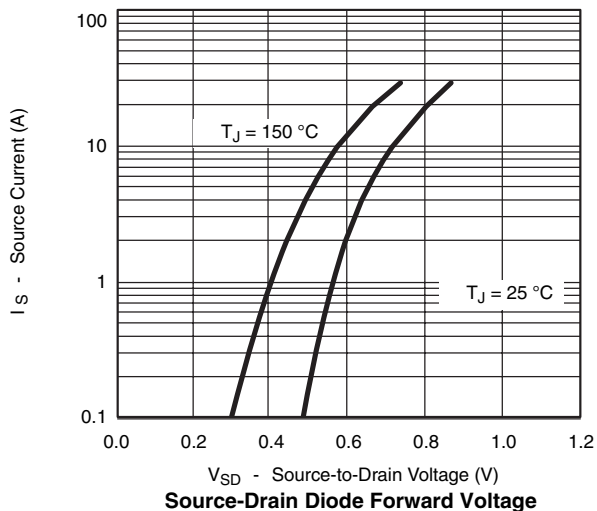
**Capacitance**



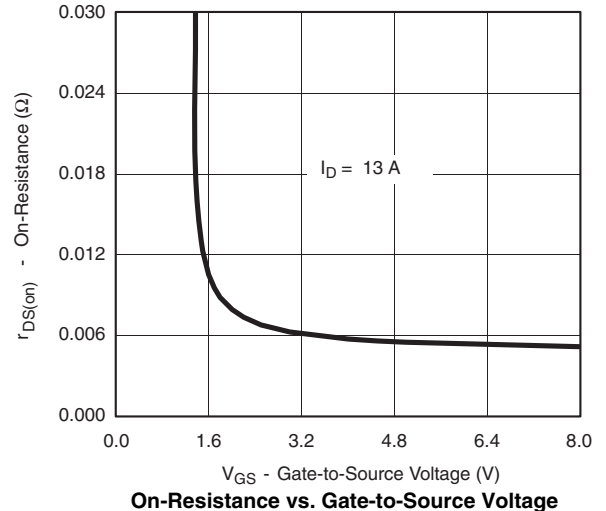
**Gate Charge**



**On-Resistance vs. Junction Temperature**

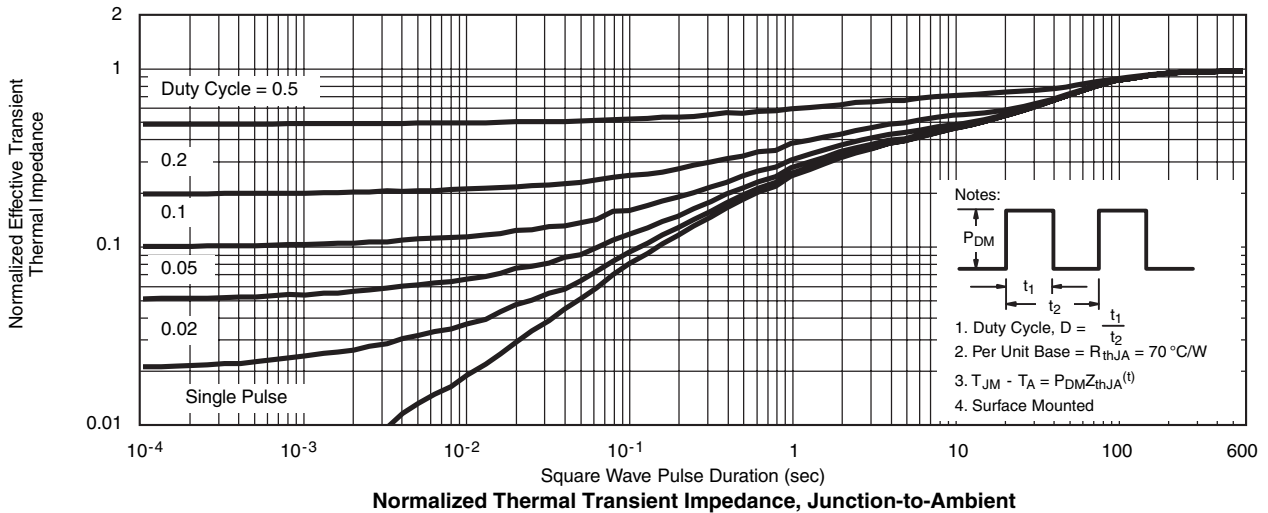
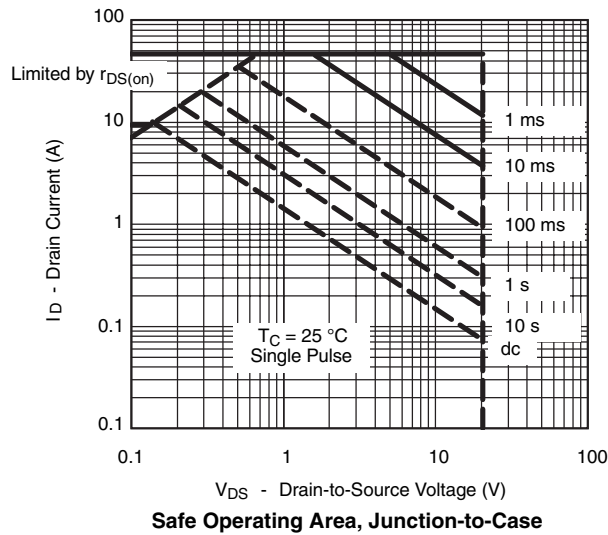
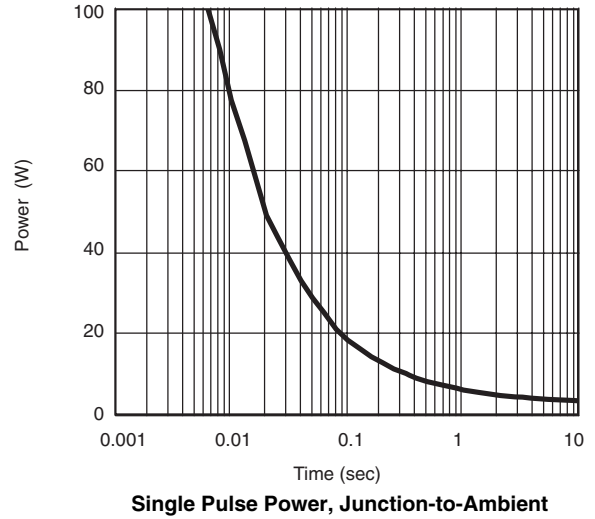
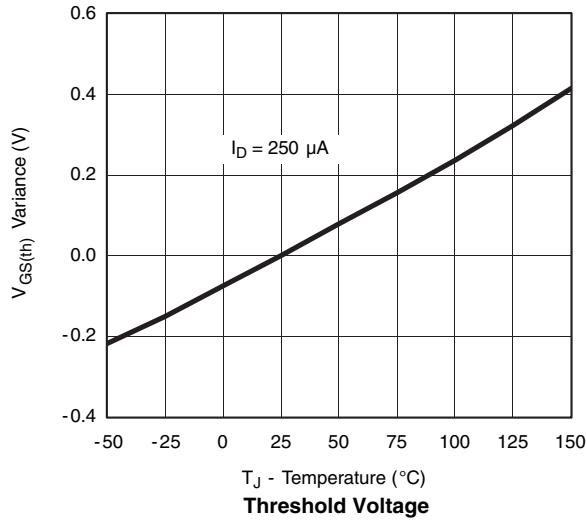


**Source-Drain Diode Forward Voltage**



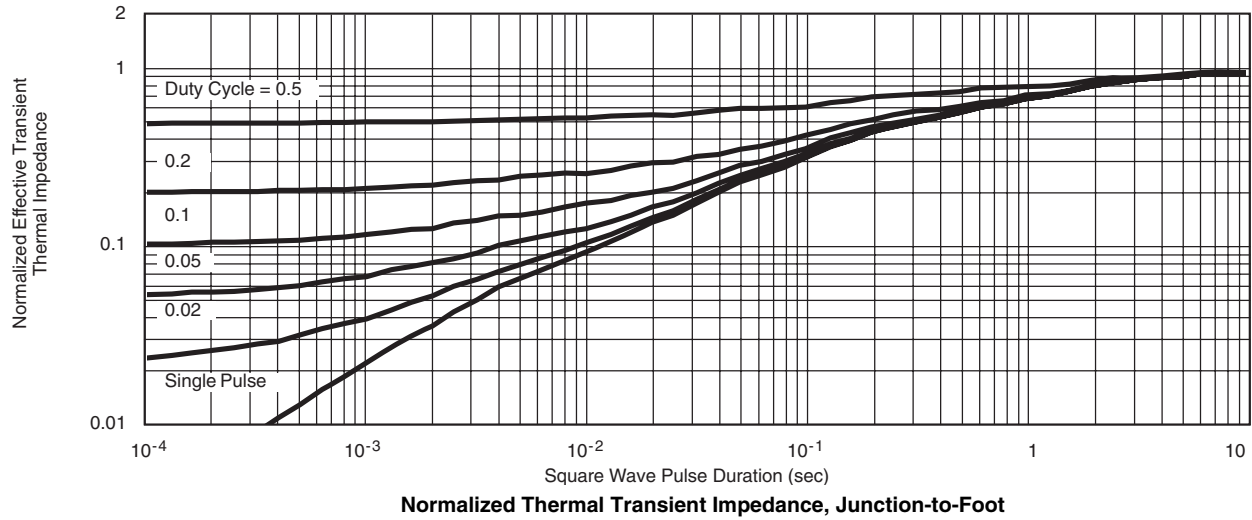
**On-Resistance vs. Gate-to-Source Voltage**

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted





**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



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