

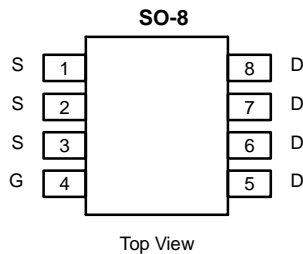


## N-Channel 30-V (D-S) MOSFET

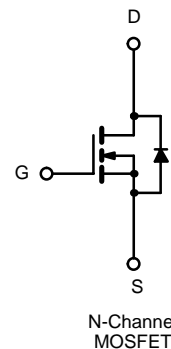
PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.018 @ $V_{GS} = 10$ V	9.0
	0.028 @ $V_{GS} = 4.5$ V	7.3

### FEATURES

- TrenchFET® Power MOSFET



Ordering Information: Si4416DY  
Si4416DY-T1 (with Tape and Reel)



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	10 secs	Steady State	Unit	
Drain-Source Voltage	$V_{DS}$	30		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>a</sup>	$I_D$	$T_A = 25^\circ\text{C}$	9.0	6.9	A
		$T_A = 70^\circ\text{C}$	7.5	5.6	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse Width)	$I_{DM}$	50			
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	2.1	1.2		
Maximum Power Dissipation <sup>a</sup>	$P_D$	$T_A = 25^\circ\text{C}$	2.5	1.4	W
		$T_A = 70^\circ\text{C}$	1.6	0.9	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typ	Max	Unit	
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	$t \leq 10$ sec	40	50	$^\circ\text{C/W}$
		Steady-State	72	90	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	16	20		

**Notes**

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

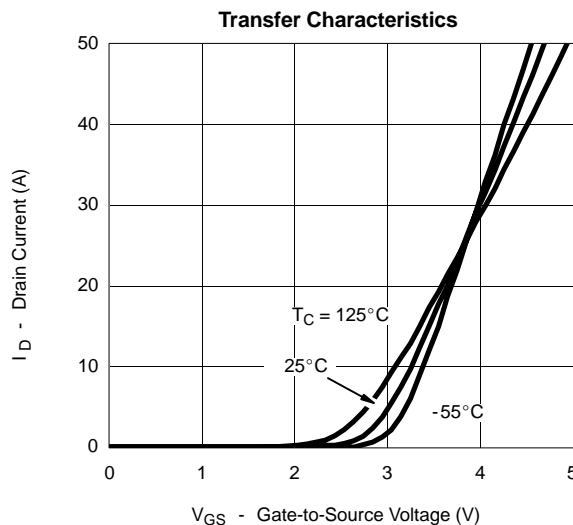
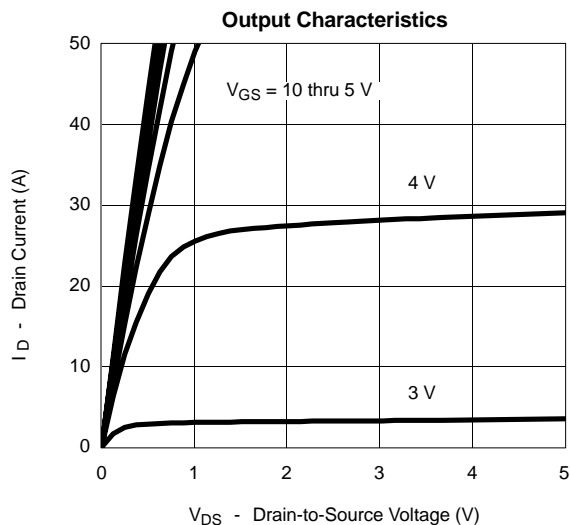
### MOSFET SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$			25	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} \geq 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			A
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10 \text{ V}, I_D = 9.0 \text{ A}$		0.012	0.018	$\Omega$
		$V_{GS} = 4.5 \text{ V}, I_D = 7.3 \text{ A}$		0.019	0.028	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}, I_D = 9.0 \text{ A}$		23		S
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_S = 2.1 \text{ A}, V_{GS} = 0 \text{ V}$			1.2	V
<b>Dynamic<sup>a</sup></b>						
Gate Charge	$Q_g$	$V_{DS} = 15 \text{ V}, V_{GS} = 5 \text{ V}, I_D = 9.0 \text{ A}$		14	20	nC
Total Gate Charge	$Q_{gt}$	$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 9.0 \text{ A}$		24	35	
Gate-Source Charge	$Q_{gs}$			4.5		
Gate-Drain Charge	$Q_{gd}$			5.9		
Gate Resistance	$R_g$		0.2	1.0	2.4	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15 \text{ V}, R_L = 15 \Omega$ $I_D \cong 1 \text{ A}, V_{GEN} = 10 \text{ V}, R_G = 6 \Omega$		16	20	ns
Rise Time	$t_r$			10	20	
Turn-Off Delay Time	$t_{d(off)}$			34	50	
Fall Time	$t_f$			13	20	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 2.1 \text{ A}, di/dt = 100 \text{ A}/\mu\text{s}$		50	90	

**Notes**

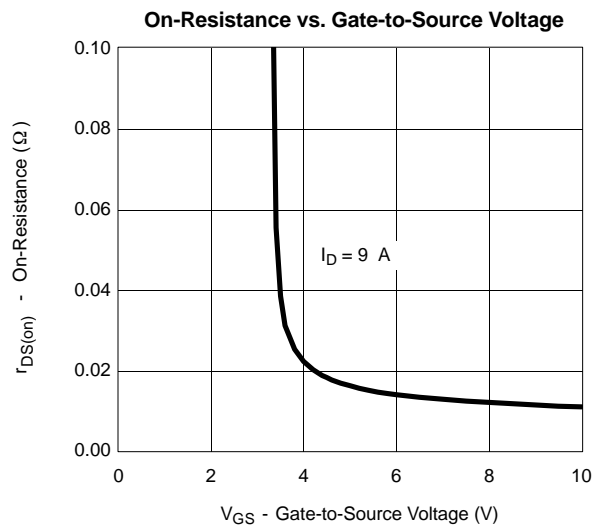
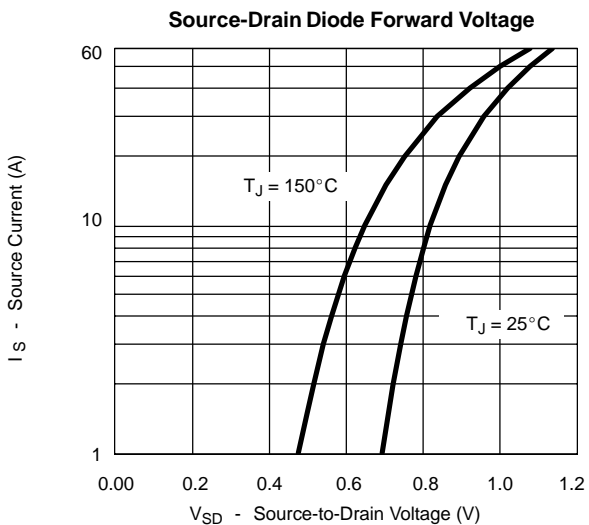
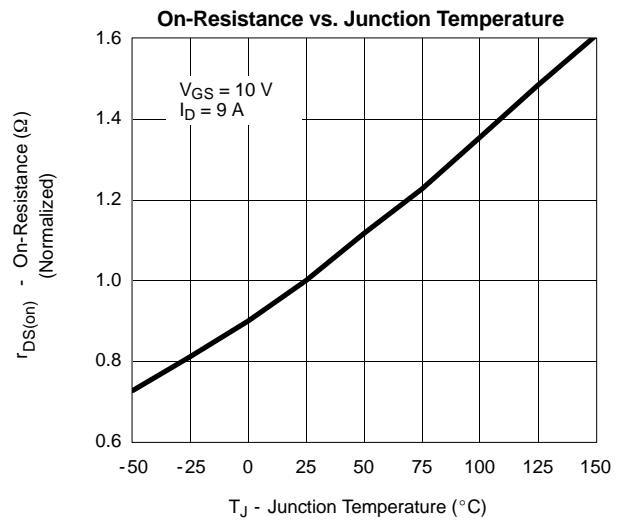
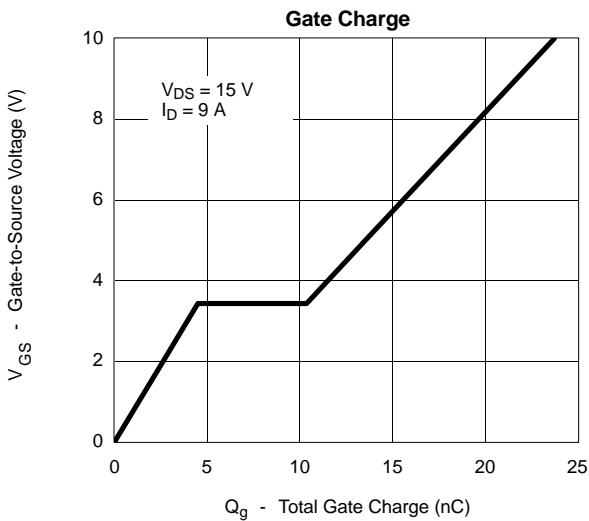
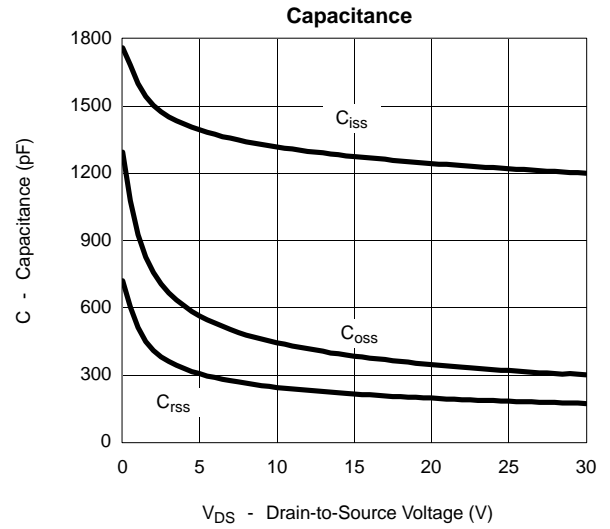
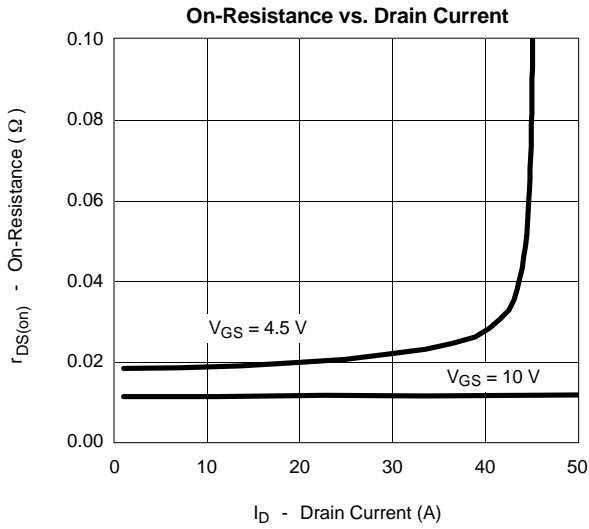
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

### TYPICAL CHARACTERISTICS ( $25^\circ\text{C}$ UNLESS NOTED)





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



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