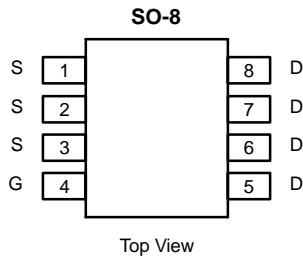


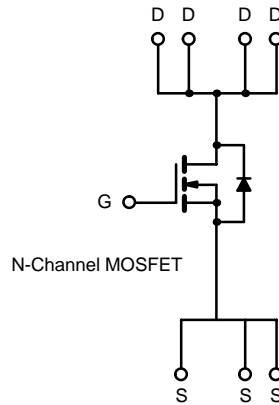
## N-Channel Reduced $Q_g$ , Fast Switching MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.0135 @ $V_{GS} = 10$ V	10
	0.020 @ $V_{GS} = 4.5$ V	8

**TrenchFET<sup>®</sup>**  
Power MOSFETs  
**High-Efficiency**  
PWM Optimized



Ordering Information: Si4820DY  
Si4820DY-T1 (with Tape and Reel)



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	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, b</sup>	$T_A = 25^\circ\text{C}$	10	A
	$T_A = 70^\circ\text{C}$	8	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse Width)	$I_{DM}$	50	
Continuous Source Current (Diode Conduction) <sup>a, b</sup>	$I_S$	2.3	W
Maximum Power Dissipation	$T_A = 25^\circ\text{C}$	2.5	
	$T_A = 70^\circ\text{C}$	1.6	
Operating Junction and Storage Temperature Range (MOSFET and Schottky)	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient (MOSFET) <sup>a</sup>	$t \leq 10$ sec		50	$^\circ\text{C/W}$
	Steady State	70		

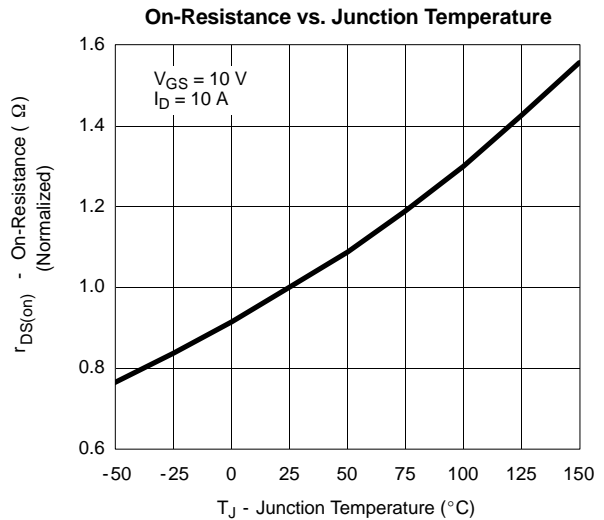
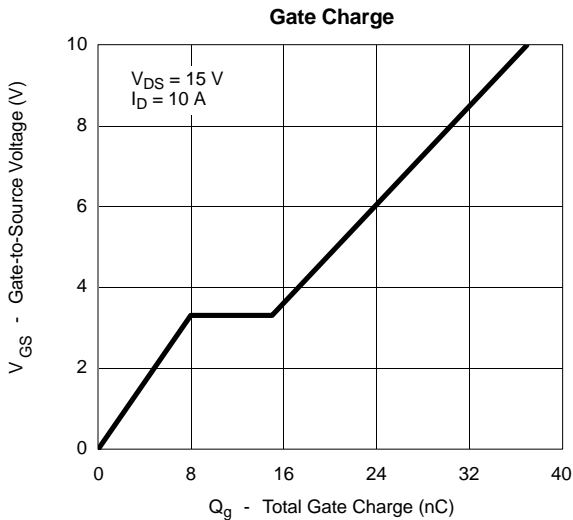
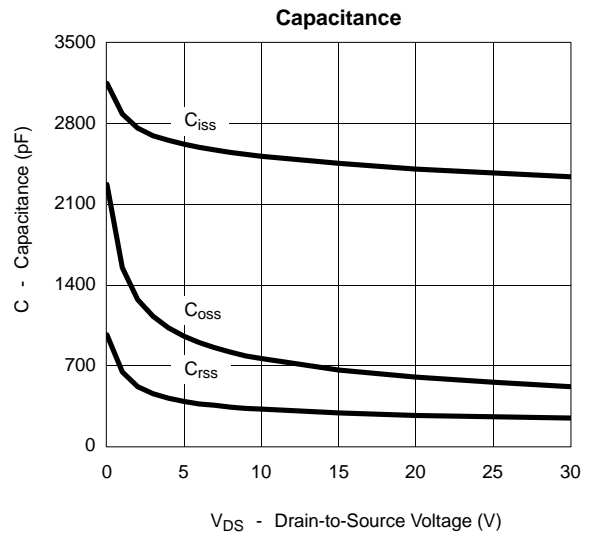
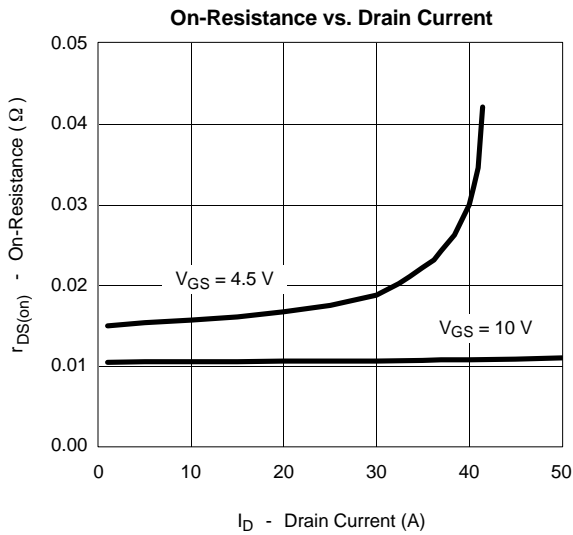
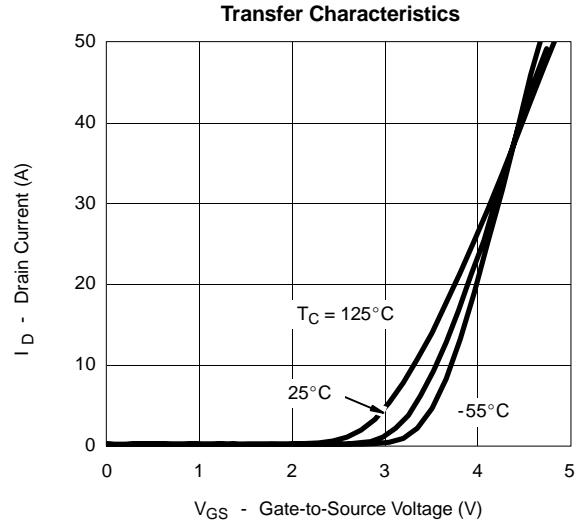
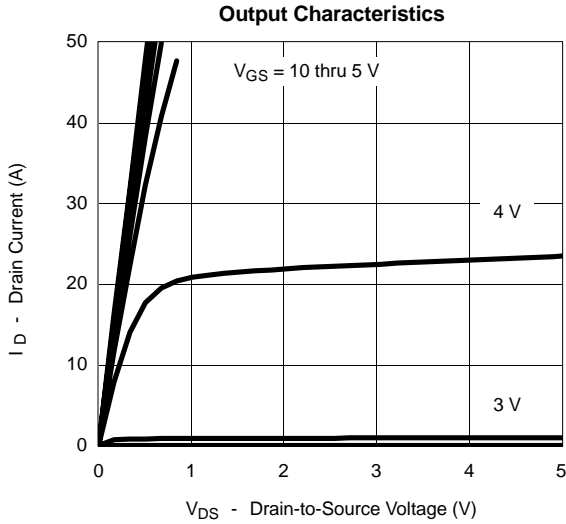
Notes  
a. Surface Mounted on FR4 Board.  
b.  $t \leq 10$  sec.

MOSFET SPECIFICATIONS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	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>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	20			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 10\ \text{A}$		0.0105	0.0135	$\Omega$
		$V_{GS} = 4.5\ \text{V}, I_D = 5\ \text{A}$		0.0155	0.020	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}, I_D = 10\ \text{A}$		28		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 2.3\ \text{A}, V_{GS} = 0\ \text{V}$		0.74	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 15\ \text{V}, V_{GS} = 5.0\ \text{V}, I_D = 10\ \text{A}$		20	30	nC
Gate-Source Charge	$Q_{gs}$			8		
Gate-Drain Charge	$Q_{gd}$			7		
Gate Resistance	$R_g$		0.5		1.6	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_G = 6\ \Omega$		15	30	ns
Rise Time	$t_r$			8	15	
Turn-Off Delay Time	$t_{d(off)}$			45	90	
Fall Time	$t_f$			18	40	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 2.3\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		50	80	

## Notes

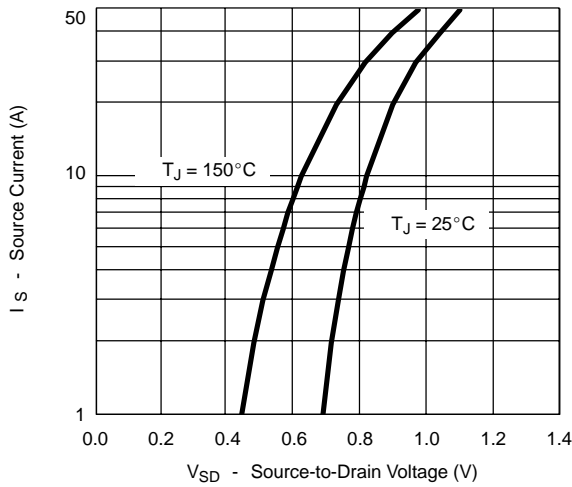
- a. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

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

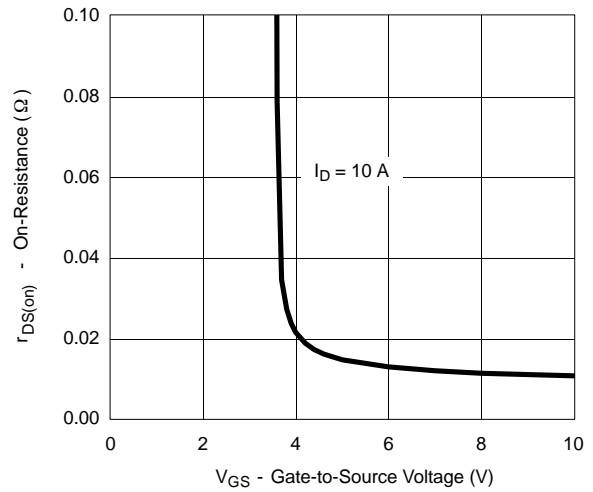


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

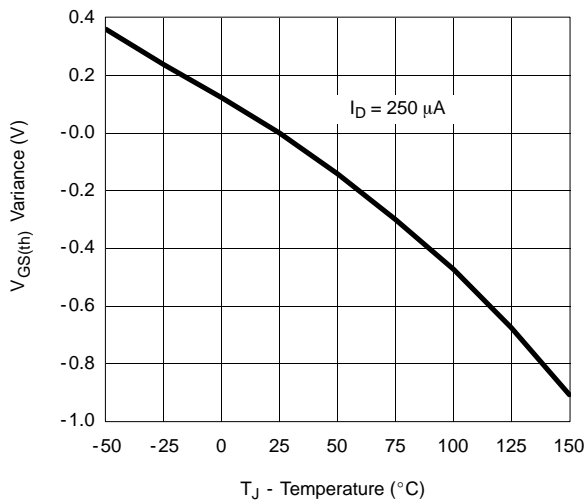
**Source-Drain Diode Forward Voltage**



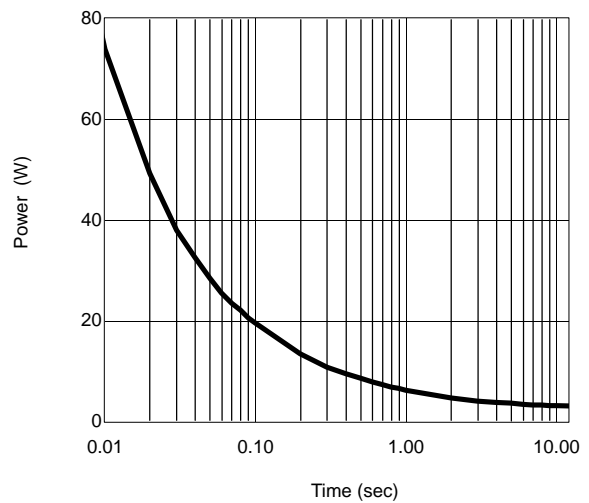
**On-Resistance vs. Gate-to-Source Voltage**



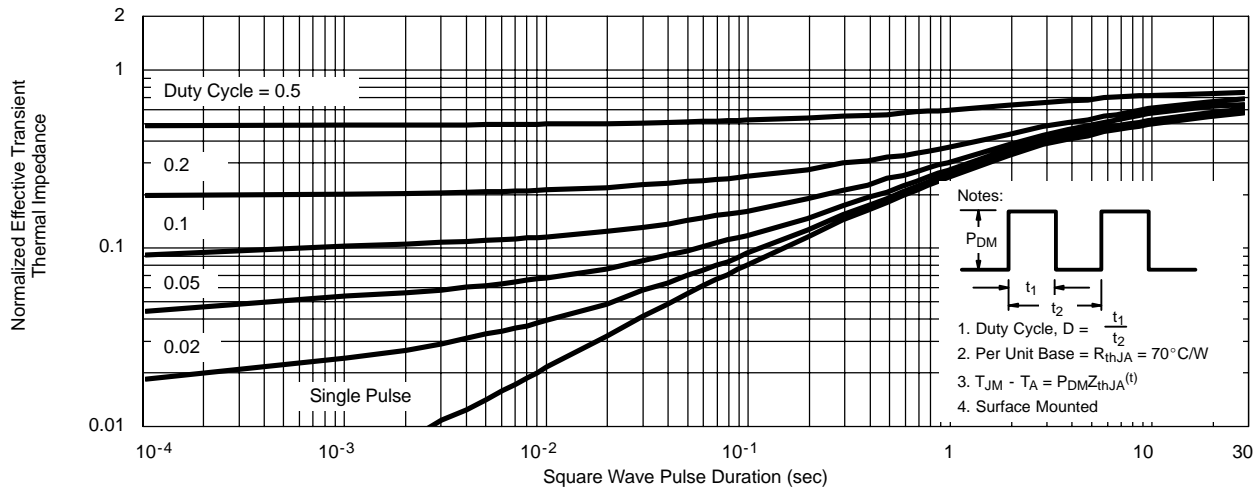
**Threshold Voltage**



**Single Pulse Power**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**





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