



N-Channel 30-V (D-S), Reduced Qg Fast Switching MOSFET with Schottky Diode

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.0185 @ $V_{GS} = 10$ V	9
	0.033 @ $V_{GS} = 4.5$ V	7

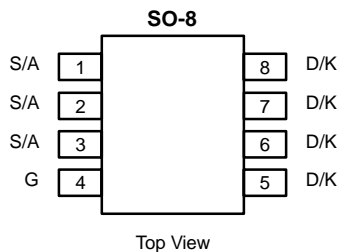
SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.5 V @ 1 A	2.0

FEATURES

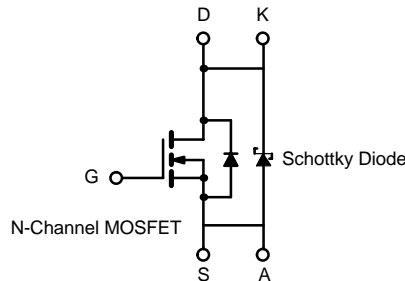
- TrenchFET® Power MOSFET
- LITTLE FOOT Plus™ Integrated Schottky
- PWM Optimized

APPLICATIONS

- Low Power Synchronous Rectification



Ordering Information: Si4300DY
Si4300DY-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 (MOSFET)		V_{DS}	30		V
Reverse Voltage (Schottky)		V_{DA}	30		
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current ($T_J = 150^\circ\text{C}$) (MOSFET) ^a	$T_A = 25^\circ\text{C}$	I_D	9	6.4	A
	$T_A = 70^\circ\text{C}$		7	5.1	
Pulsed Drain Current (MOSFET)		I_{DM}	40		
Continuous Source Current (MOSFET Diode Conduction) ^a		I_S	2.3	1.25	
Average Forward Current (Schottky)		I_F	2.3	1.25	
Pulsed Forward Current (Schottky)		I_{FM}	20		
Maximum Power Dissipation (MOSFET) ^a	$T_A = 25^\circ\text{C}$	P_D	2.5	1.38	W
	$T_A = 70^\circ\text{C}$		1.6	0.88	
Maximum Power Dissipation (Schottky) ^a	$T_A = 25^\circ\text{C}$		2.2	1.25	
	$T_A = 70^\circ\text{C}$		1.4	0.80	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	MOSFET		Schottky		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	R_{thJA}	40	50	45	55	$^\circ\text{C/W}$
	Steady-State		70	90	78	100	
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJF}	18	23	25	30	

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

MOSFET SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED).						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.8			V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V			100	μA
		V _{DS} = 24 V, V _{GS} = 0 V, T _J = 85 °C			2000	
On-State Drain Current ^b	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	30			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 9 A		0.0155	0.0185	Ω
		V _{GS} = 4.5 V, I _D = 7 A		0.0275	0.033	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 9 A		16		S
Schottky Diode Forward Voltage ^b	V _{SD}	I _S = 1.0 A, V _{GS} = 0 V		0.47	0.5	V
Dynamic^a						
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 5 V, I _D = 9 A		8.7	13	nC
Gate-Source Charge	Q _{gs}			2.25		
Gate-Drain Charge	Q _{gd}			4.2		
Gate Resistance	R _g		0.5		2.7	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 15 Ω I _D = 1 A, V _{GEN} = 10 V, R _G = 6 Ω		11	16	ns
Rise Time	t _r			8	15	
Turn-Off Delay Time	t _{d(off)}			22	30	
Fall Time	t _f			9	15	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 2.3 A, di/dt = 100 A/μs		32	60	

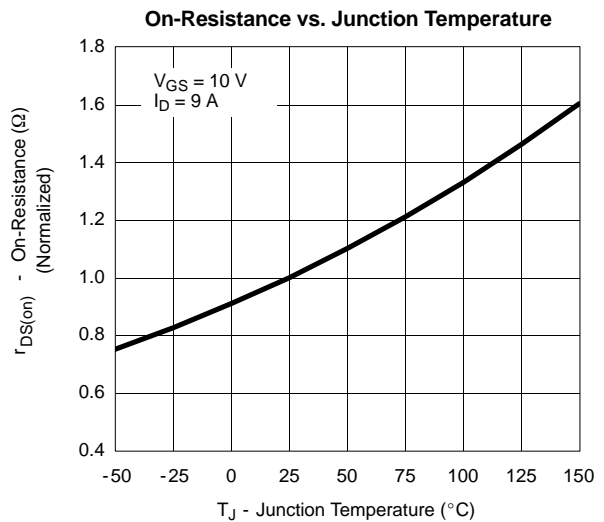
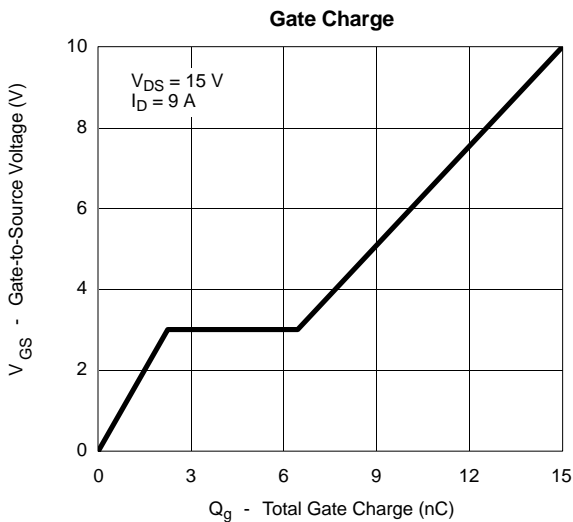
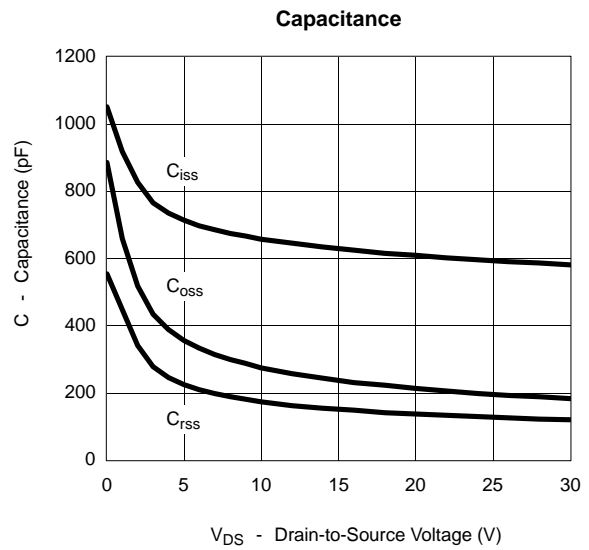
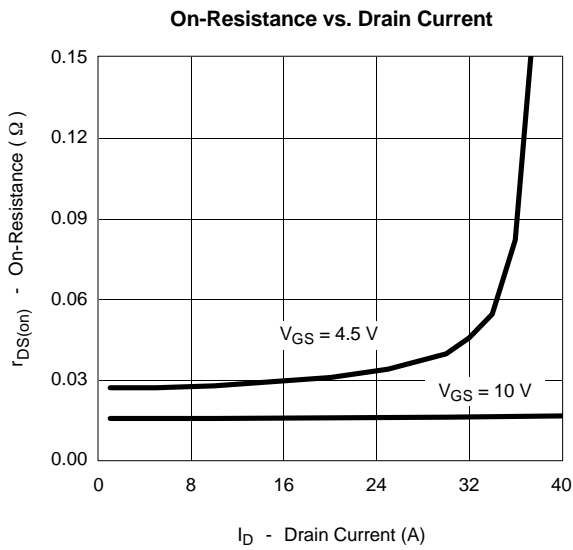
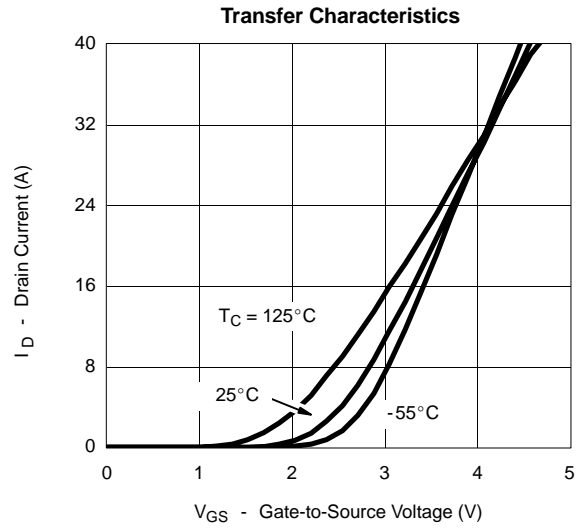
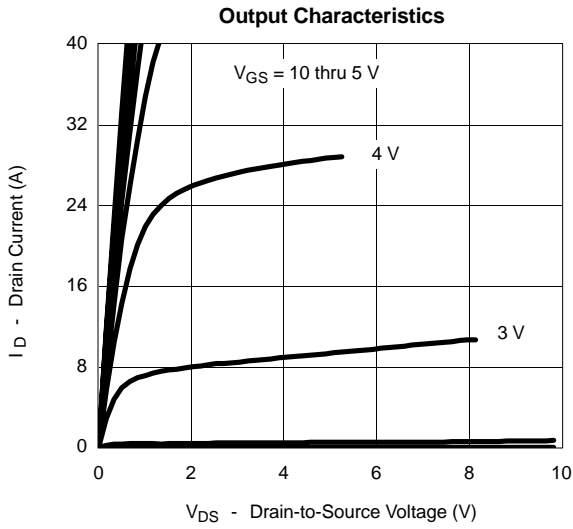
Notes

- a. Guaranteed by design, not subject to production testing.
 b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

SCHOTTKY SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V _F	I _F = 1.0 A		0.47	0.5	V
		I _F = 1.0 A, T _J = 125 °C		0.36	0.42	
Maximum Reverse Leakage Current	I _{rm}	V _r = 24 V		0.004	0.100	mA
		V _r = 24 V, T _J = 100 °C		0.7	10	
		V _r = -24 V, T _J = 125 °C		3.0	20	
Junction Capacitance	C _T	V _r = 10 V		50		pF



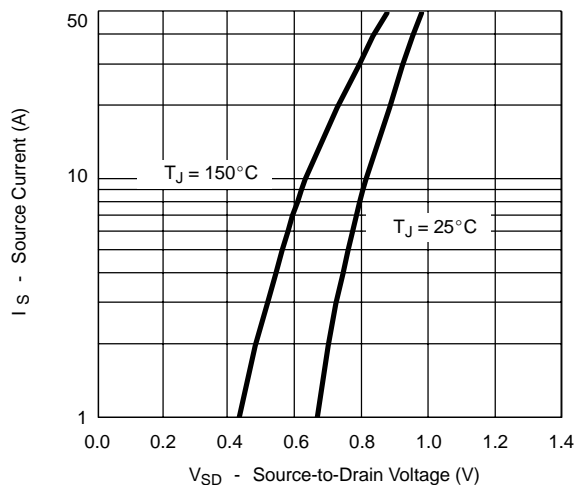
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET



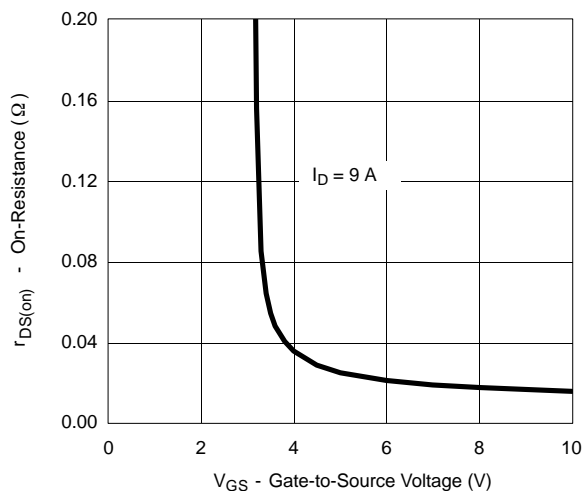
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

MOSFET

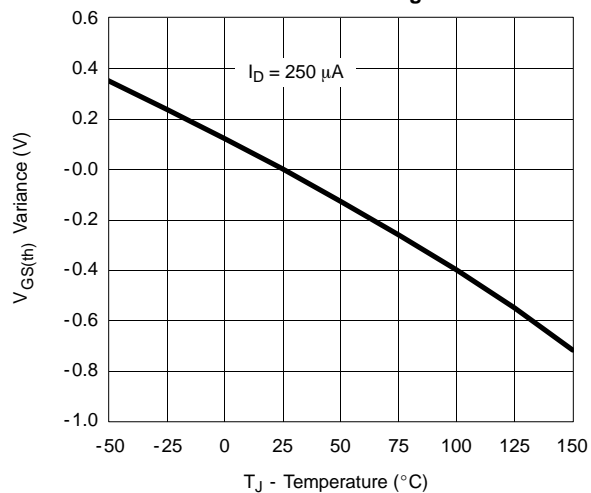
Source-Drain Diode Forward Voltage



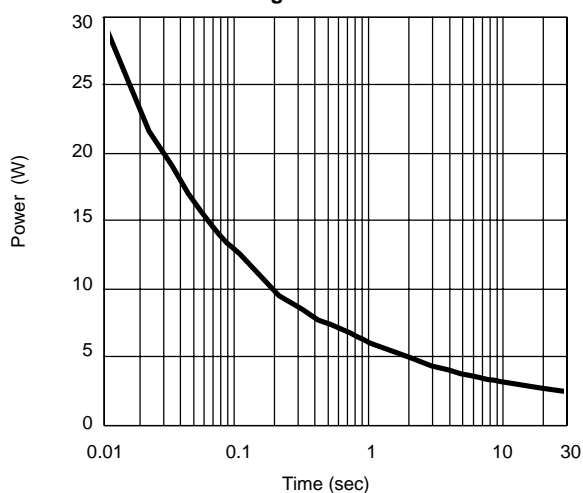
On-Resistance vs. Gate-to-Source Voltage



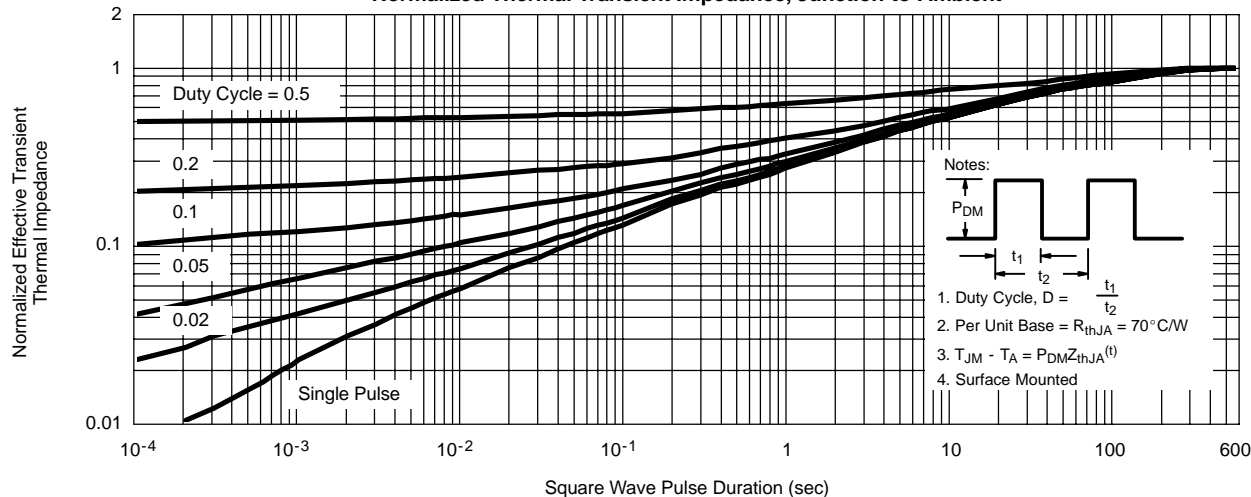
Threshold Voltage



Single Pulse Power

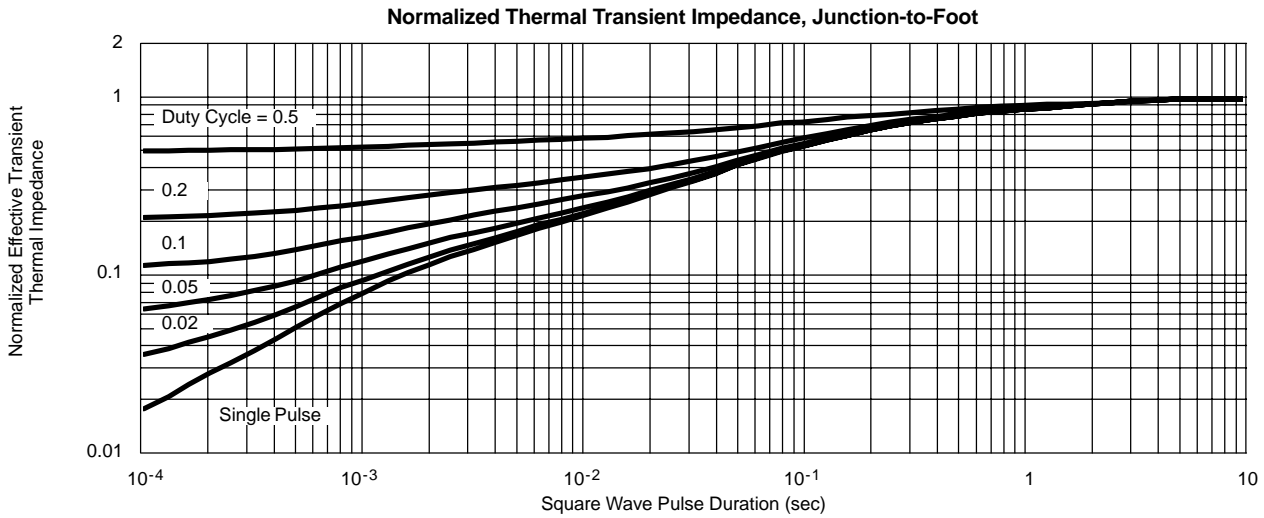


Normalized Thermal Transient Impedance, Junction-to-Ambient





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) SCHOTTKY

