N-Channel 30-V (D-S) MOSFET with Schottky Diode

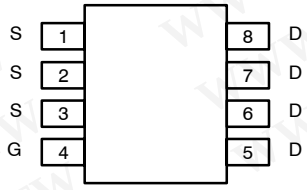
MOSFET PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.018 @ V_{GS} = 10 V	9
	0.028 @ V_{GS} = 4.5 V	7.3

SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.50 V @ 1.0 A	1.4

FEATURES

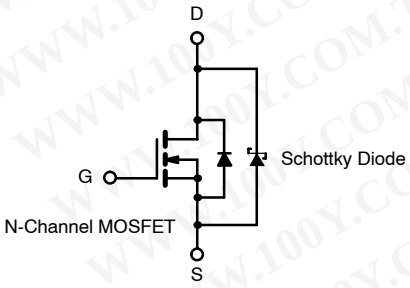
- LITTLE FOOT® *Plus* Power MOSFET
- 100% R_g Tested

SO-8



Top View

Ordering Information:
Si4812DY
Si4812DY-T1 (with Tape and Reel)
Si4812DY—E3 (Lead (Pb)-Free)
Si4812DY-T1—E3 (Lead (Pb)-Free with Tape and Reel)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	Limit 10 sec	Limit Steady State	Unit
Drain-Source Voltage (MOSFET)		V_{DS}	30		V
Reverse Voltage (Schottky)			30		
Gate-Source Voltage (MOSFET)		V_{GS}	±20		
Continuous Drain Current (T_J = 150°C) (MOSFET)[a, b]	T_A = 25°C	I_D	9	6.9	A
	T_A = 70°C		7.5	5.6	
Pulsed Drain Current (MOSFET)		I_{DM}	50		
Continuous Source Current (MOSFET Diode Conduction)[a, b]		I_S	2.1	1.2	
Average Foward Current (Schottky)		I_F	1.4	0.8	
Pulsed Foward Current (Schottky)		I_{FM}	30		
Maximum Power Dissipation (MOSFET)[a, b]	T_A = 25°C	P_D	2.5	1.4	W
	T_A = 70°C		1.6	0.9	
Maximum Power Dissipation (Schottky)[a, b]	T_A = 25°C		2.0	1.2	
	T_A = 70°C		1.3	0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter	Device	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient (t ≤ 10 sec)[a]	MOSFET	R_{thJA}	40	50	°C/W
	Schottky		50	60	
Maximum Junction-to-Ambient (t = steady state)[a]	MOSFET		72	90	
	Schottky		85	100	

Notes
a. Surface Mounted on FR4 Board.
b. t ≤ 10 sec.

For SPICE model information via the Worldwide Web: http://www.vishay.com/www/product/spice.htm

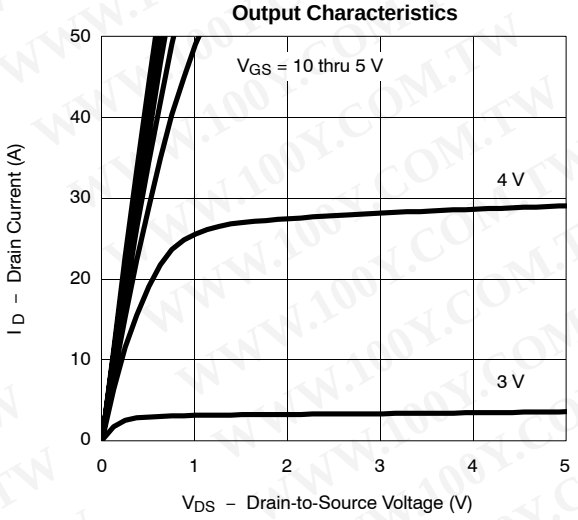
MOSFET + SCHOTTKY SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1		3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current (MOSFET + Schottky)	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V		0.004	0.100	mA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 100°C		0.7	10	
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 125°C		3.0	20	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	20			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 9 A		0.012	0.018	Ω
		V_{GS} = 4.5 V, I_D = 7.3 A		0.019	0.028	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 9 A		23		S
Schottky Diode Forward Voltage[a]	V_{SD}	I_S = 1.0 A, V_{GS} = 0 V		0.45	0.50	V
		I_S = 1.0 A, V_{GS} = 0 V, T_J = 125°C		0.33	0.42	
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 5 V, I_D = 9 A		13	24	nC
Gate-Source Charge	Q_{gs}			4		
Gate-Drain Charge	Q_{gd}			5.7		
Gate Resistance	R_g		0.2		2.4	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		16	25	ns
Rise Time	t_r			10	20	
Turn-Off Delay Time	$t_{d(off)}$			35	50	
Fall Time	t_f			13	20	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.0 A, di/dt = 100 A/μs		35	70	

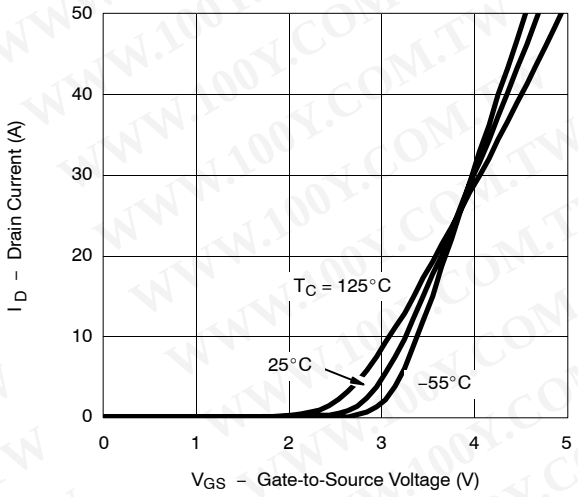
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

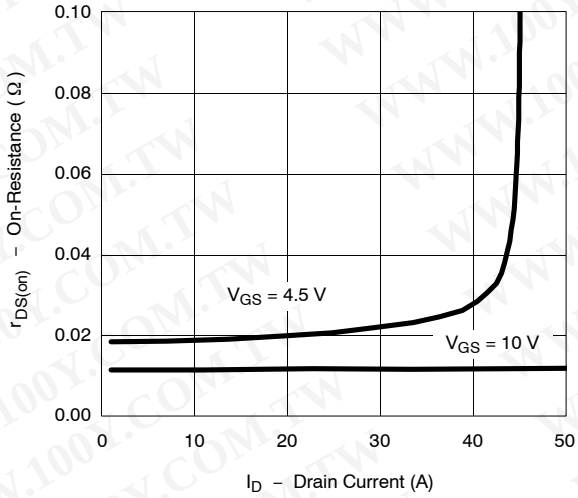
Output Characteristics



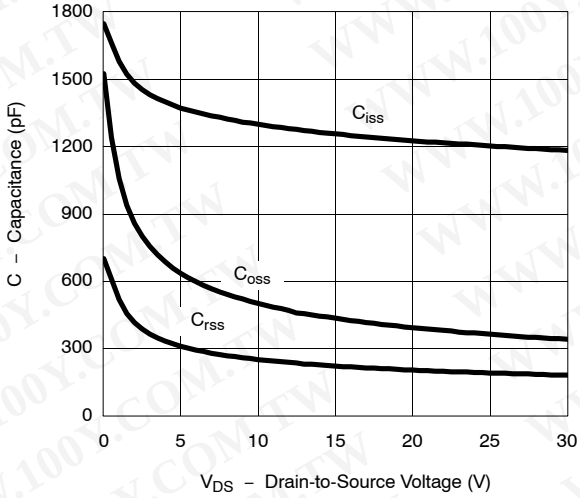
Transfer Characteristics



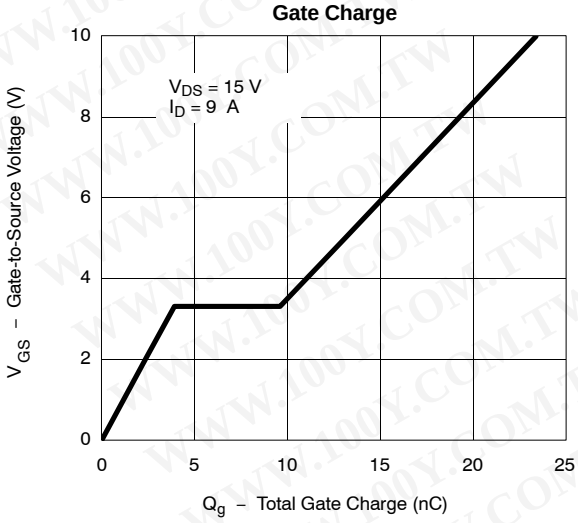
On-Resistance vs. Drain Current



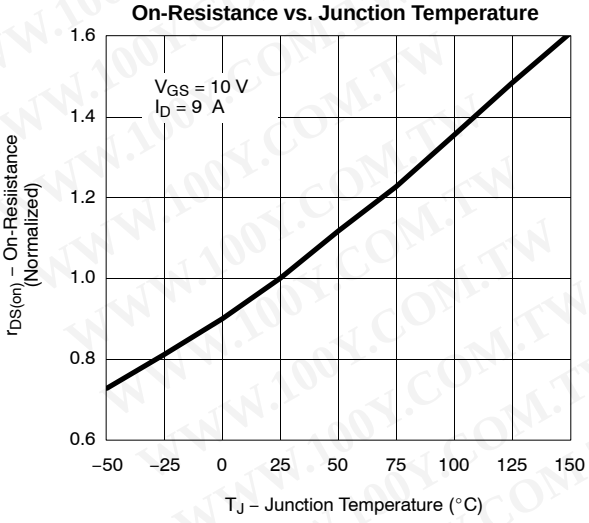
Capacitance



Gate Charge

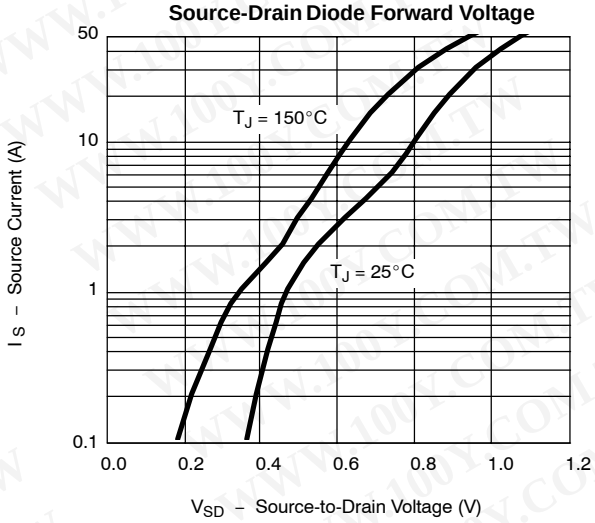


On-Resistance vs. Junction Temperature

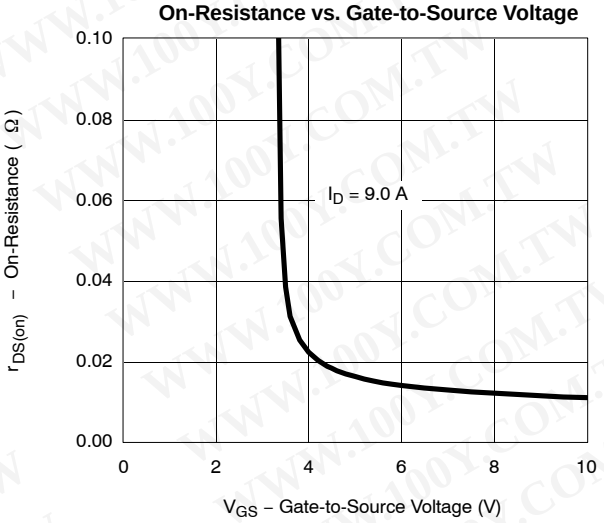


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

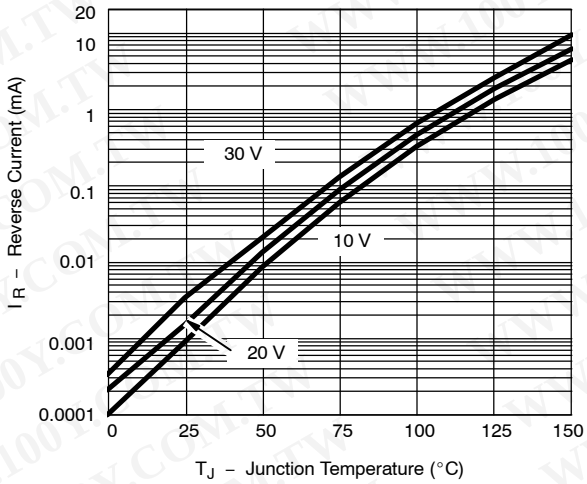
Source-Drain Diode Forward Voltage



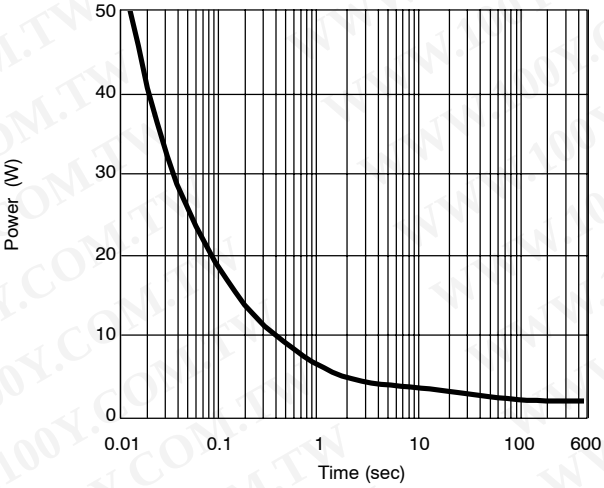
On-Resistance vs. Gate-to-Source Voltage



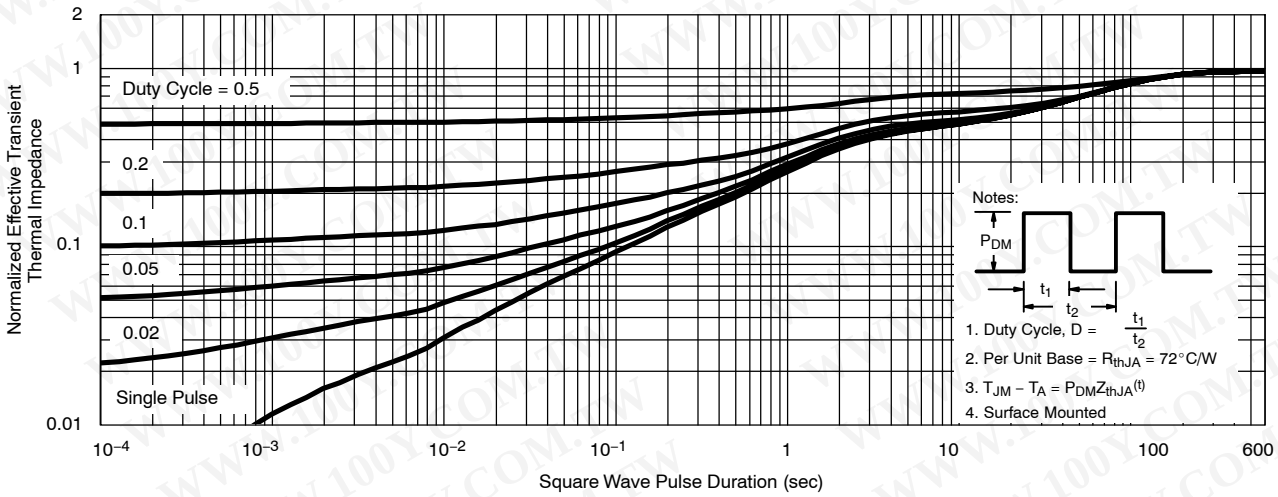
Reverse Current (Schottky)



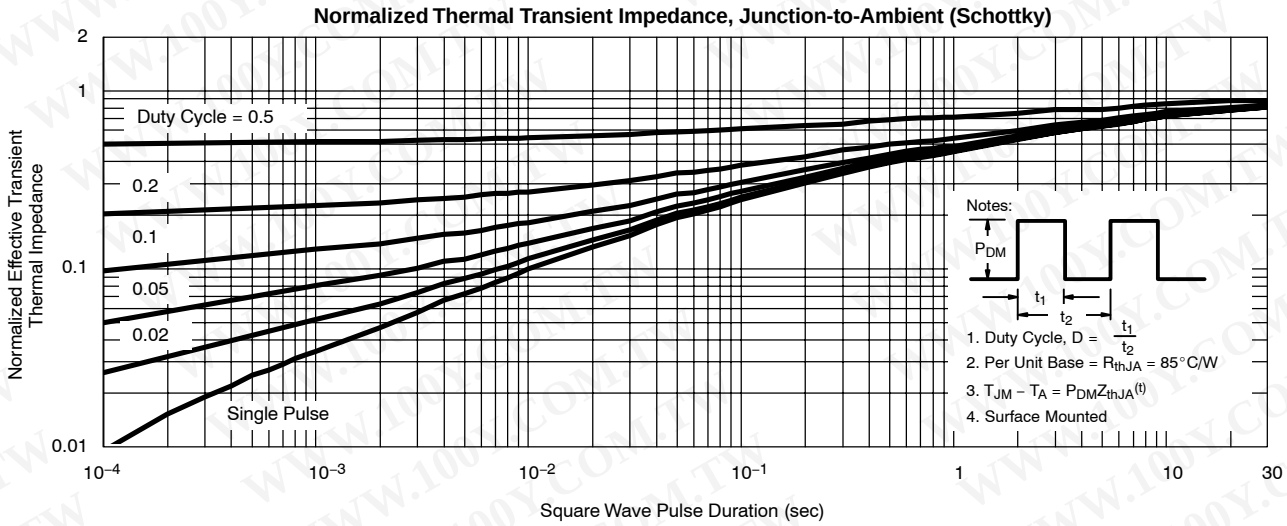
Single Pulse Power (MOSFET)



Normalized Thermal Transient Impedance, Junction-to-Ambient (MOSFET)



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



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