

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

PRODUCT SUMMARY			
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)	Q _g (Typ)
30	0.023 at V _{GS} = 10 V	8	6.5
	0.025 at V _{GS} = 4.5 V	7.5	
	0.030 at V _{GS} = 3.0 V	6.8	
	0.036 at V _{GS} = 2.5 V	6.0	

FEATURES

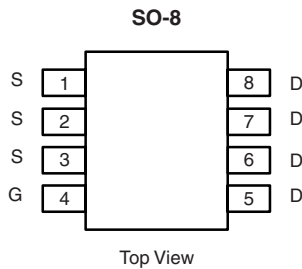
- TrenchFET[®] Gen II Power MOSFET
- 100 % R_g Tested



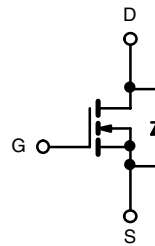
RoHS
COMPLIANT

APPLICATIONS

- High-Side DC/DC Conversion
 - Notebook
 - Desktop
 - Server
- Notebook Logic DC/DC, Low-Side



Ordering Information: Si4346DY-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted					
Parameter	Symbol	10 sec	Steady State	Unit	
Drain-Source Voltage	V _{DS}	30		V	
Gate-Source Voltage	V _{GS}	± 12			
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	8	5.9	A
		T _A = 70 °C	6.5	4.7	
Pulsed Drain Current	I _{DM}	30			
Continuous Source Current (Diode Conduction) ^a	I _S	2.2	1.20		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	2.5	1.31	W
		T _A = 70 °C	1.6	0.84	
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 ^a	t ≤ 10 sec	R _{thJA}	43	50	°C/W
	Steady State		74	95	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	22	27	

Notes:

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

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.7		2.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 12\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}$			1	μA
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55\text{ }^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}, V_{GS} = 10\ \text{V}$	20			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 8\ \text{A}$		0.019	0.023	Ω
		$V_{GS} = 4.5\ \text{V}, I_D = 7.5\ \text{A}$		0.021	0.025	
		$V_{GS} = 3.0\ \text{V}, I_D = 6.8\ \text{A}$		0.023	0.030	
		$V_{GS} = 2.5\ \text{V}, I_D = 6.0\ \text{A}$		0.027	0.036	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\ \text{V}, I_D = 8\ \text{A}$		32		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.2\ \text{A}, V_{GS} = 0\ \text{V}$		0.75	1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 15\ \text{V}, V_{GS} = 4.5\ \text{V}, I_D = 8\ \text{A}$		6.5	10	nC
Gate-Source Charge	Q_{gs}			2.3		
Gate-Drain Charge	Q_{gd}			1.1		
Gate Resistance	R_g		0.25	0.5	0.75	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$		9	15	ns
Rise Time	t_r			11	17	
Turn-Off Delay Time	$t_{d(off)}$			40	60	
Fall Time	t_f			7	11	
Source-Drain Reverse Recovery Time	t_{rr}		$I_F = 2.2\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		20	

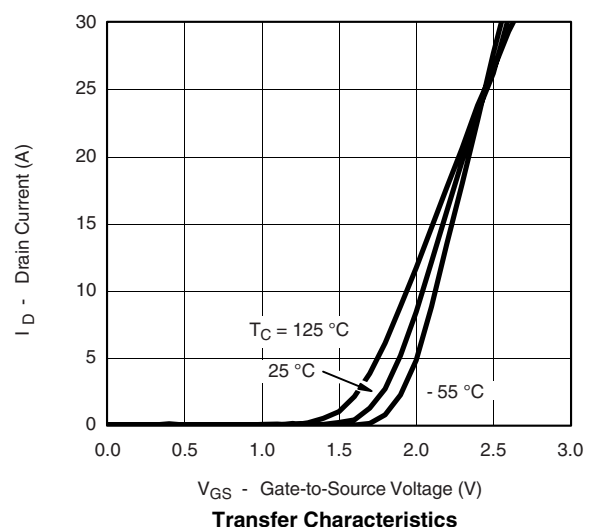
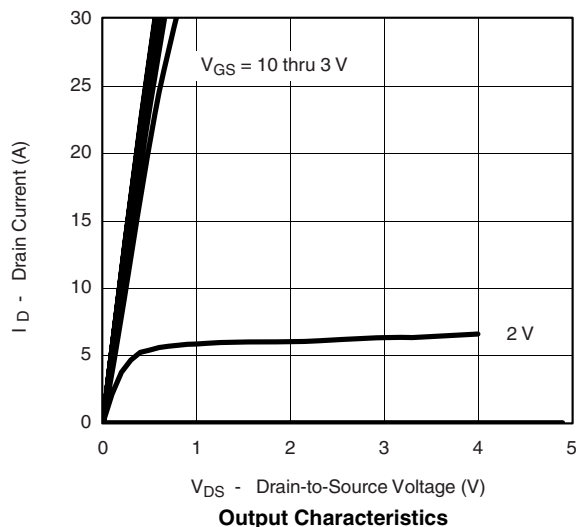
Notes:

a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

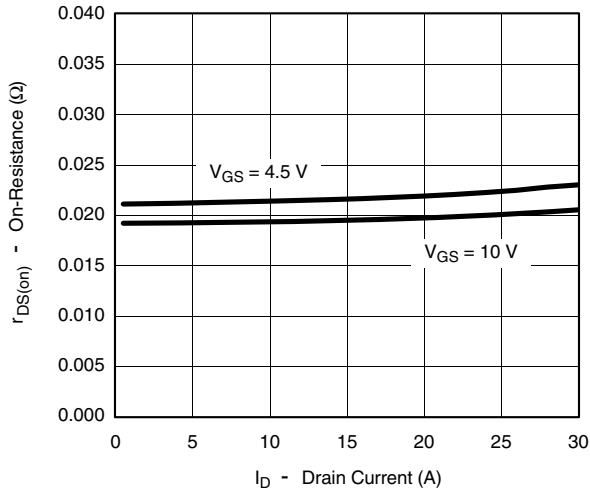
b. Guaranteed by design, not subject to production testing.

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.

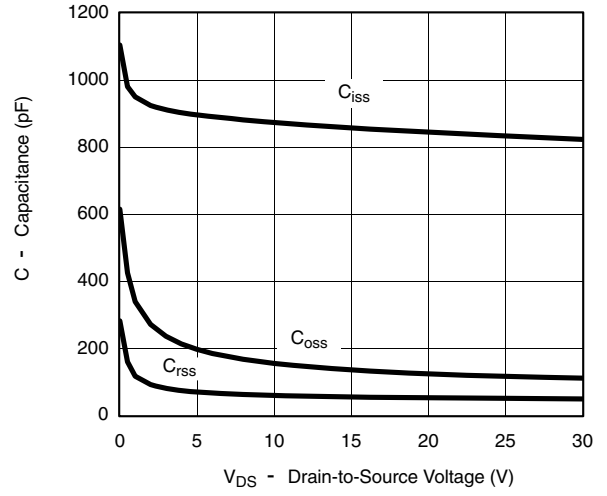
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



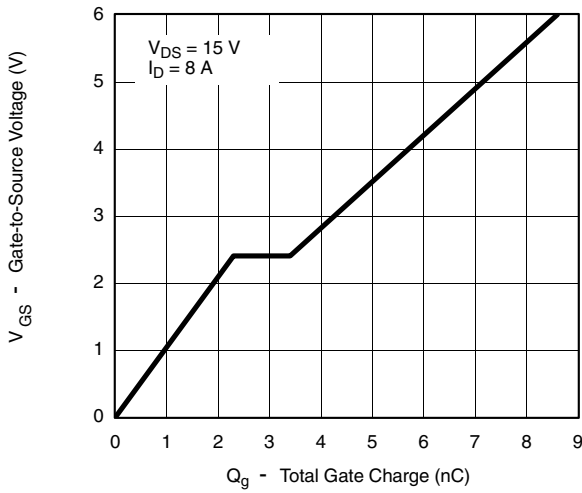
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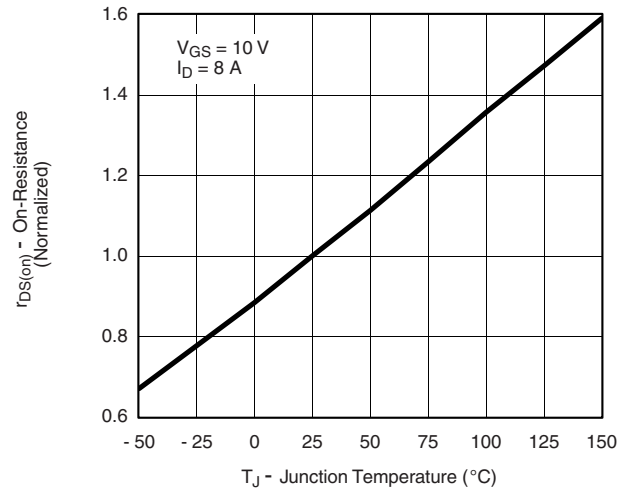
On-Resistance vs. Drain Current



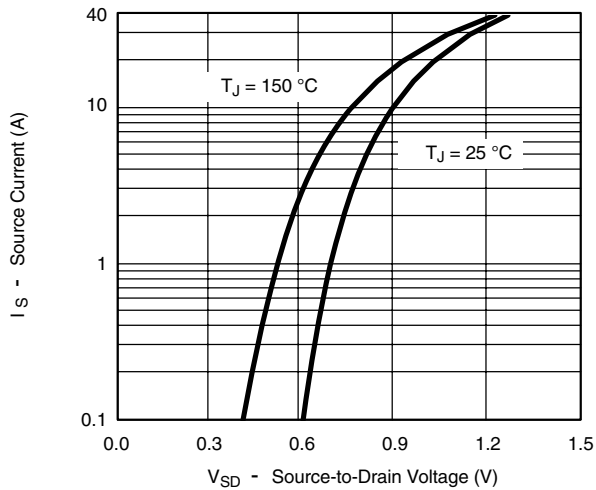
Capacitance



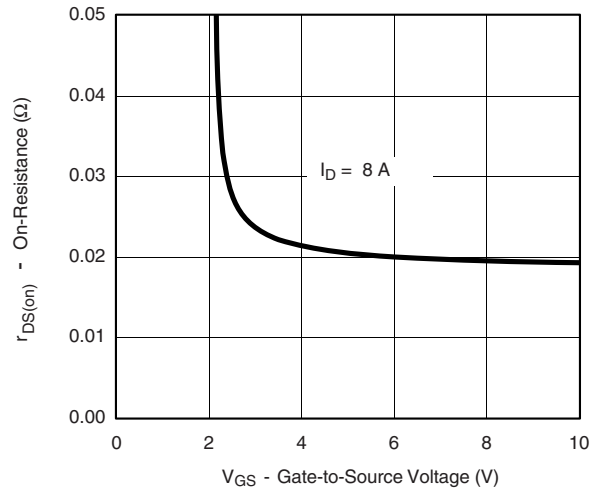
Gate Charge



On-Resistance vs. Junction Temperature

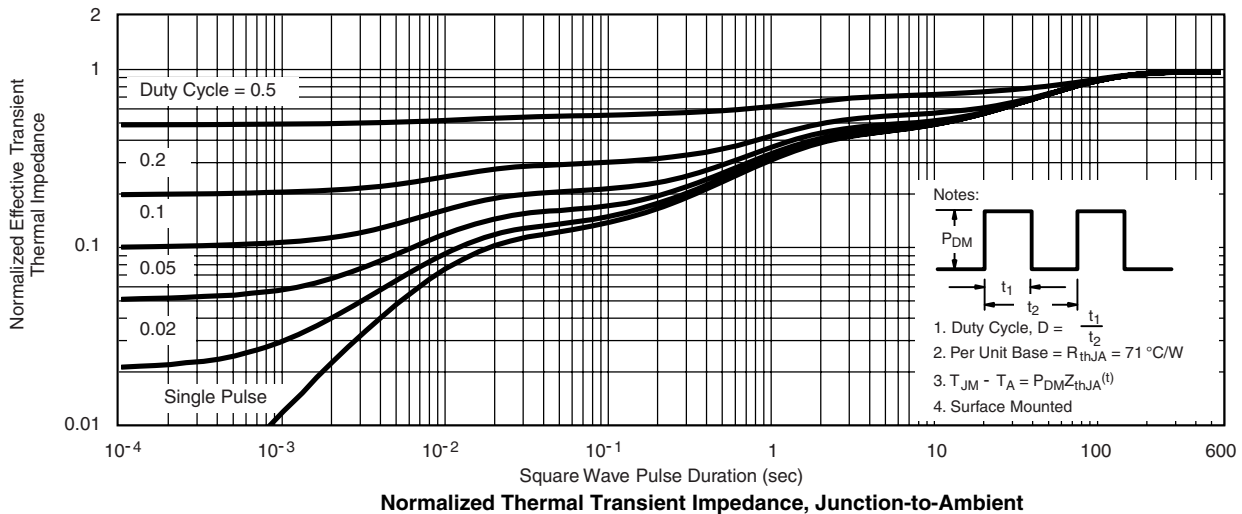
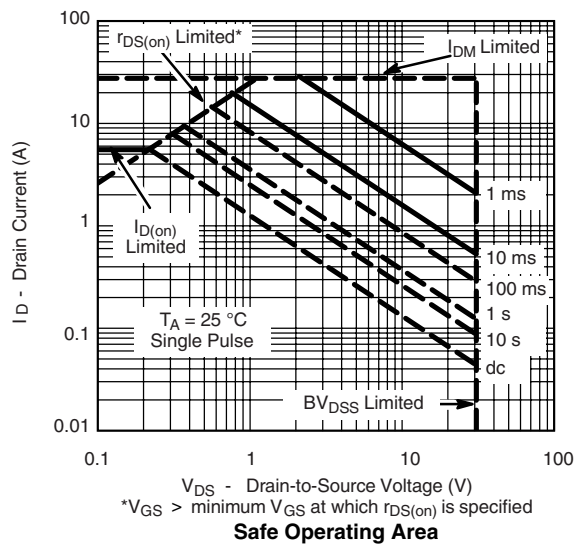
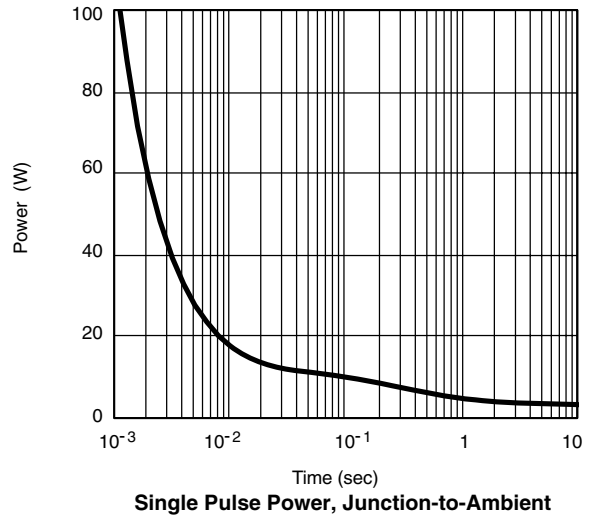
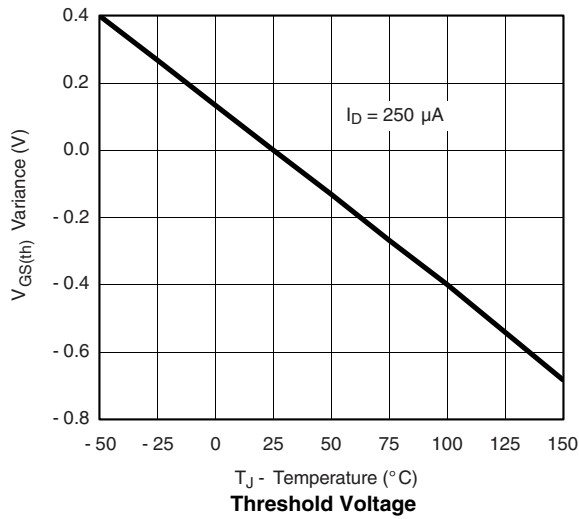


Source-Drain Diode Forward Voltage

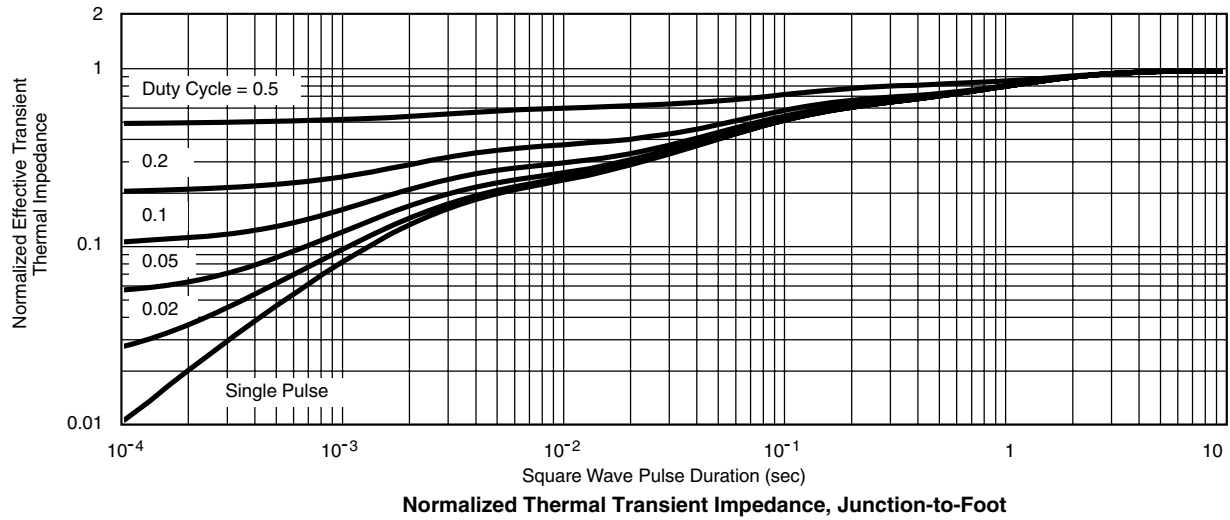


On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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