



New Product

Si4413DY
Vishay Siliconix

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

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
- 30	0.0095 at $V_{GS} = - 10$ V	- 13
	0.0145 at $V_{GS} = - 4.5$ V	- 10

FEATURES

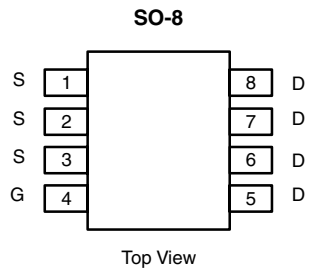
- TrenchFET[®] Power MOSFET

APPLICATIONS

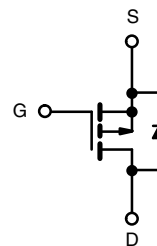
- Notebook
 - Load switch
 - Battery switch



RoHS*
COMPLIANT



Ordering Information: Si4413DY-T1
Si4413DY-T1-E3 (Lead (Pb)-free)



P-Channel MOSFET

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}	± 20		
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_A = 25$ °C	- 13	- 9
		$T_A = 70$ °C	- 10.5	- 7.5
Pulsed Drain Current	I_{DM}	- 50		A
Continuous Source Current (Diode Conduction) ^a	I_S	- 2.7	- 1.36	W
Maximum Power Dissipation ^a	P_D	$T_A = 25$ °C	3.0	
		$T_A = 70$ °C	1.9	0.95
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	R_{thJA}	$t \leq 10$ sec	33	42	°C/W
		Steady State	70	84	
Maximum Junction-to-Foot (Drain)	R_{thJF}	16	21		

Notes:

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

* Pb containing terminations are not RoHS compliant, exemptions may apply.

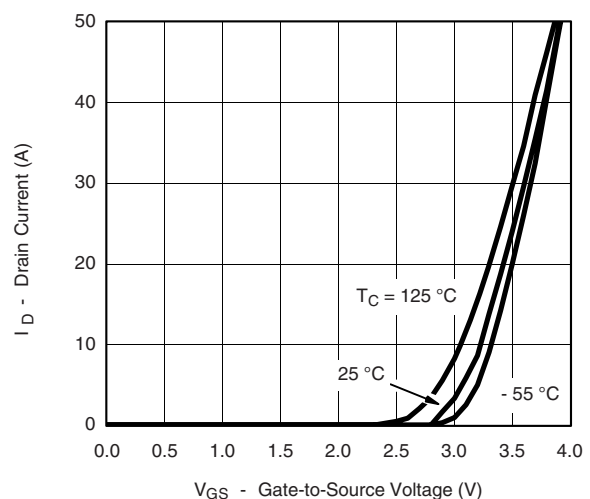
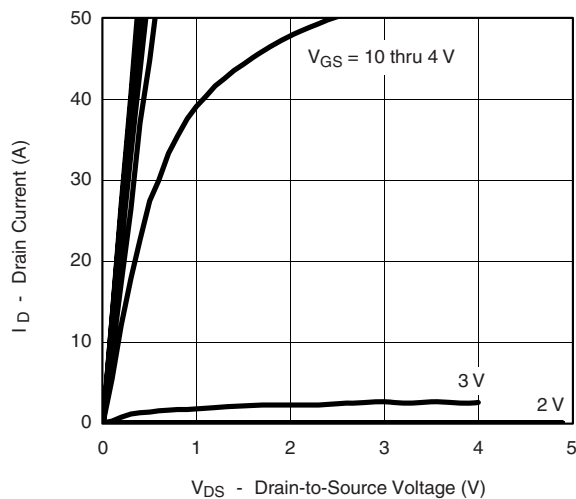
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.0		3.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-30			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -13\text{ A}$		0.0075	0.0095	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -10\text{ A}$		0.0115	0.0145	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -13\text{ A}$		50		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -2.7\text{ A}, V_{GS} = 0\text{ V}$		-0.74	-1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -5\text{ V}, I_D = -13\text{ A}$		61	95	nC
Gate-Source Charge	Q_{gs}		15.5			
Gate-Drain Charge	Q_{gd}		32			
Gate Resistance	R_g			3.4		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_G = 6\text{ }\Omega$		21	35	ns
Rise Time	t_r		18	30		
Turn-Off Delay Time	$t_{d(off)}$		170	260		
Fall Time	t_f		97	150		
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -2.1\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		70	110	

Notes:

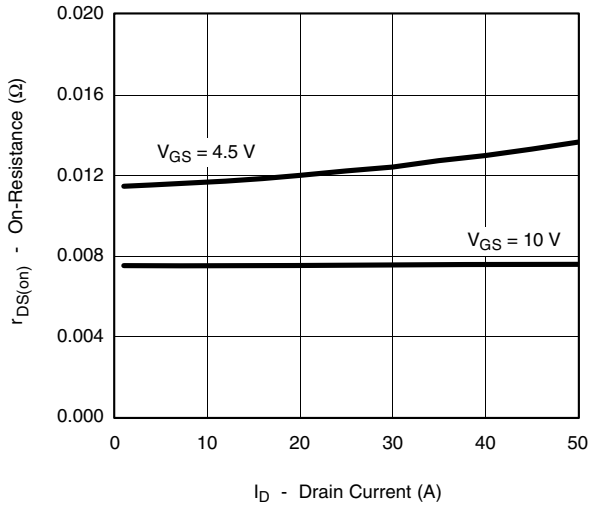
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

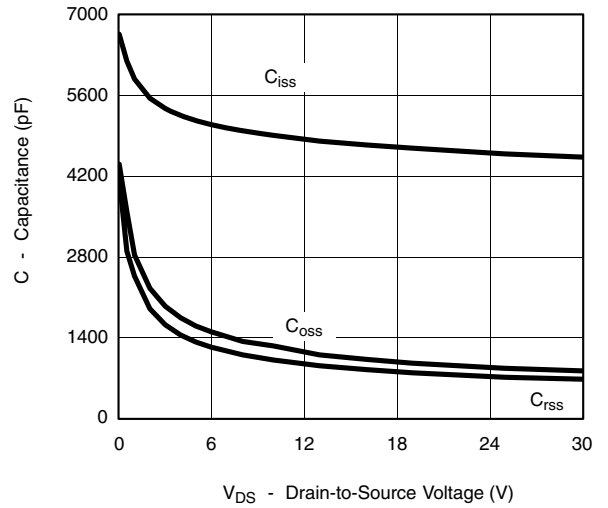
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



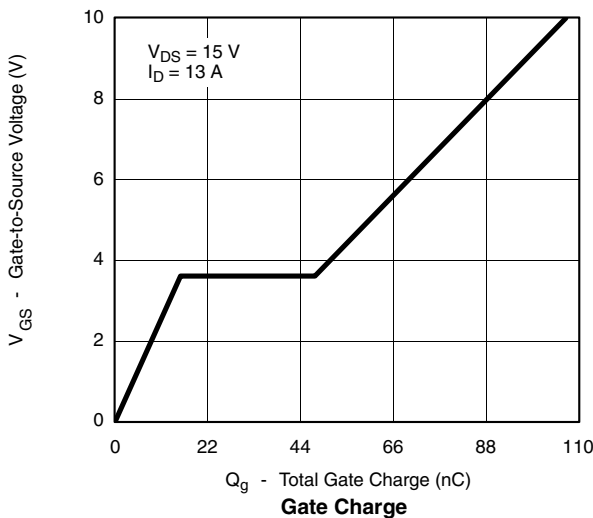
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



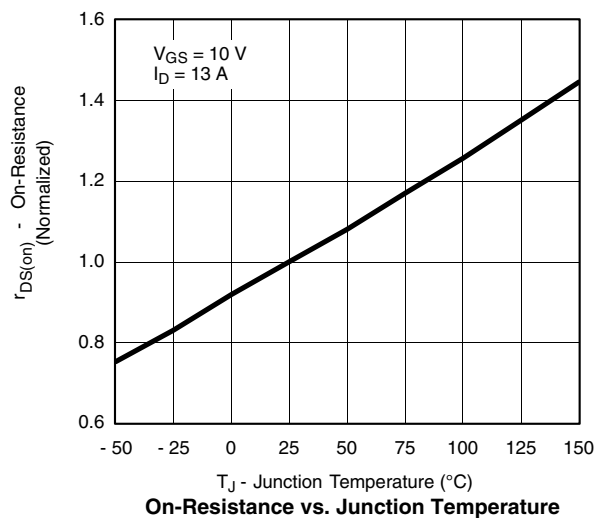
On-Resistance vs. Drain Current



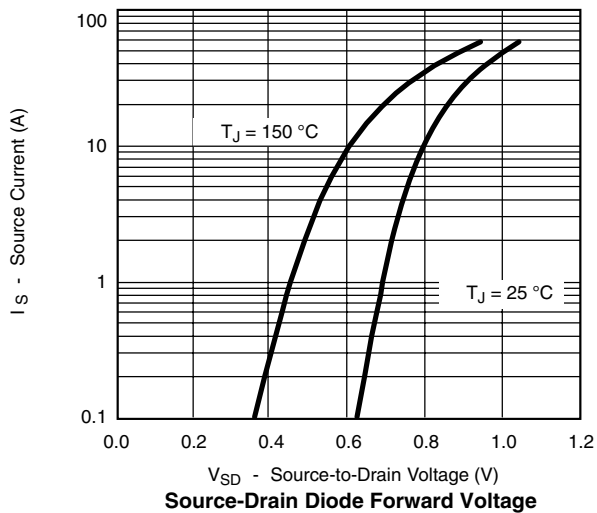
Capacitance



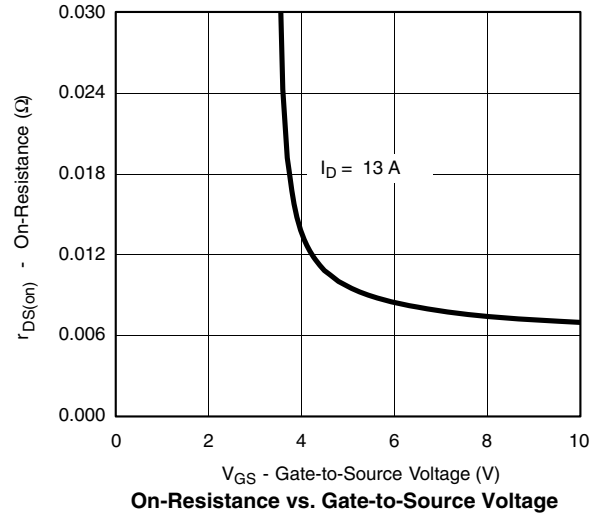
Gate Charge



On-Resistance vs. Junction Temperature

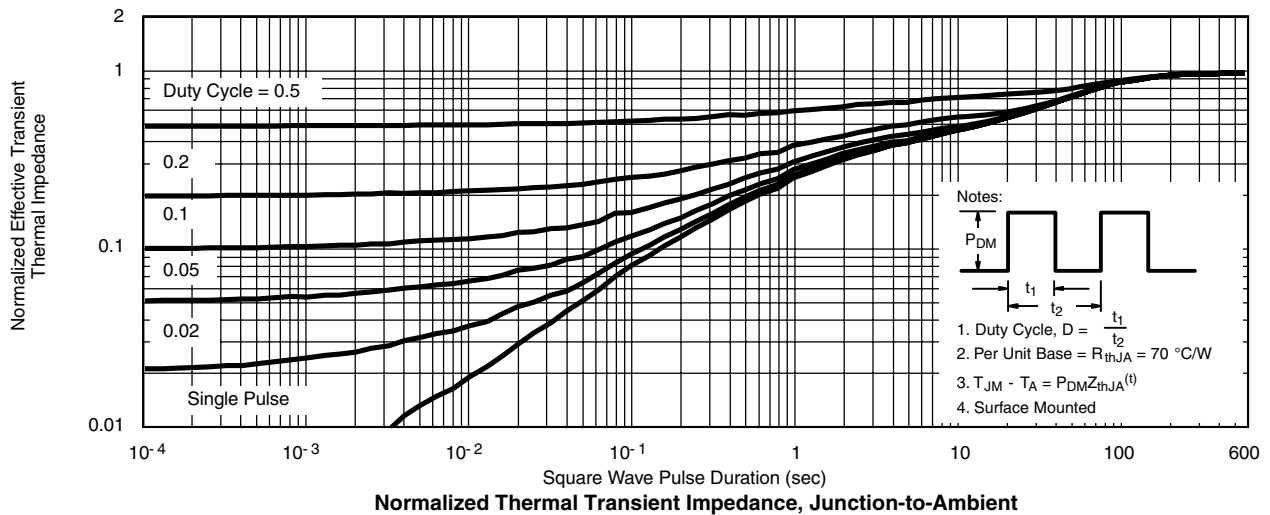
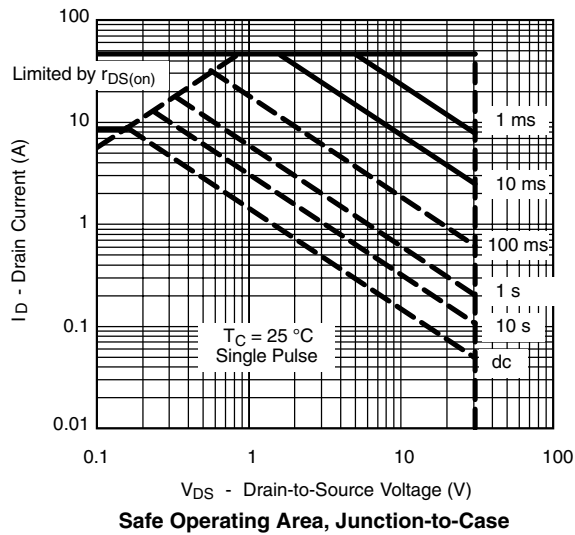
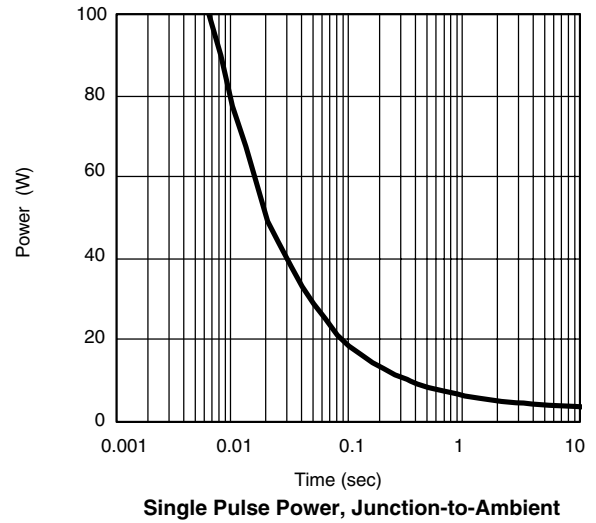
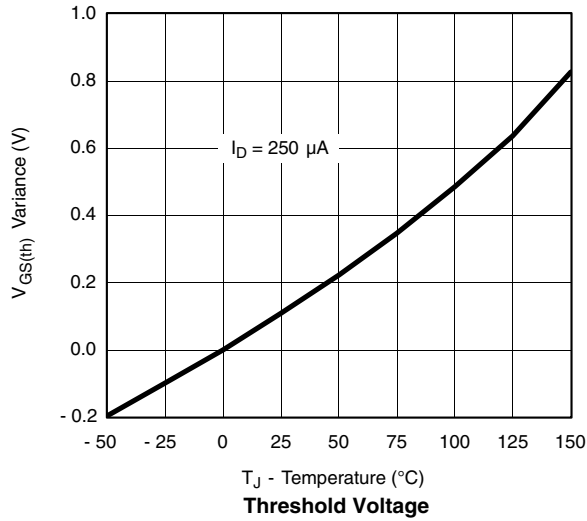


Source-Drain Diode Forward Voltage



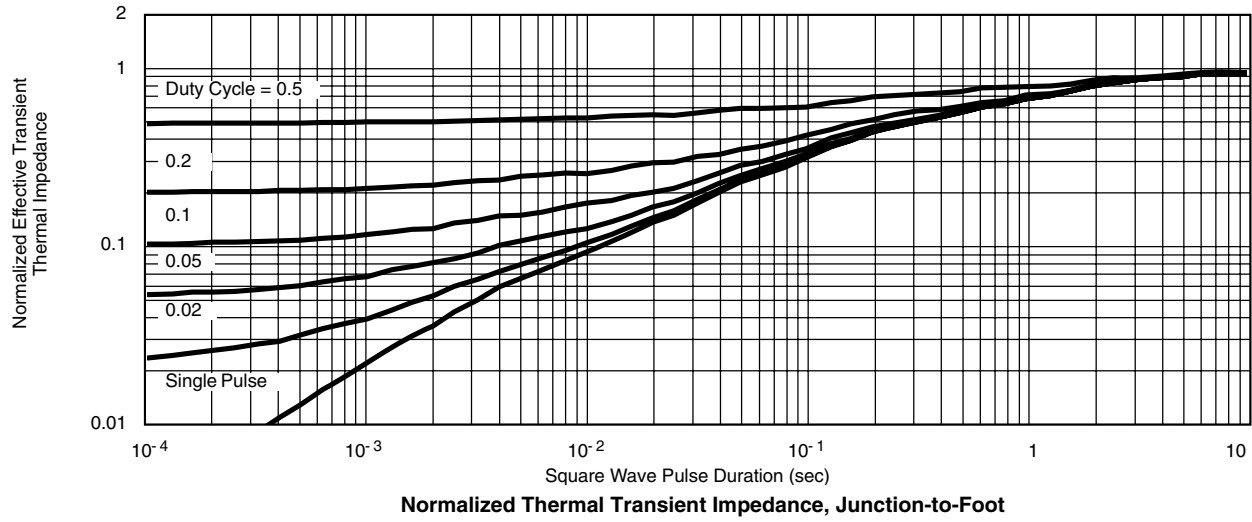
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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