

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

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 30	0.0075 at $V_{GS} = - 10$ V	- 15
	0.011 at $V_{GS} = - 4.5$ V	- 12.3

FEATURES

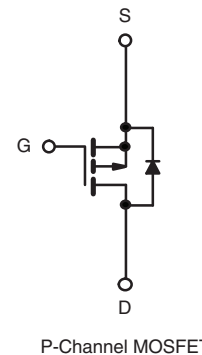
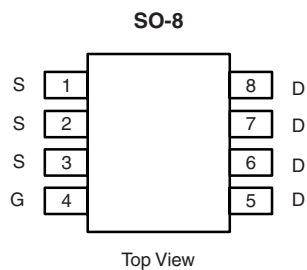
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET[®] Power MOSFET



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Notebook
 - Load Switch
 - Battery Switch



Ordering Information: Si4413ADY-T1-E3 (Lead (Pb)-free)
Si4413ADY-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted					
Parameter	Symbol	10 s	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	- 15	- 10.5	A
		$T_A = 70$ °C	- 11.8	- 8.3	
Pulsed Drain Current	I_{DM}	- 50			
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		1.5
		$T_A = 70$ °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	$t \leq 10$ s	R_{thJA}	33	42	°C/W
	Steady State		70	84	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	16	21	

Notes:

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

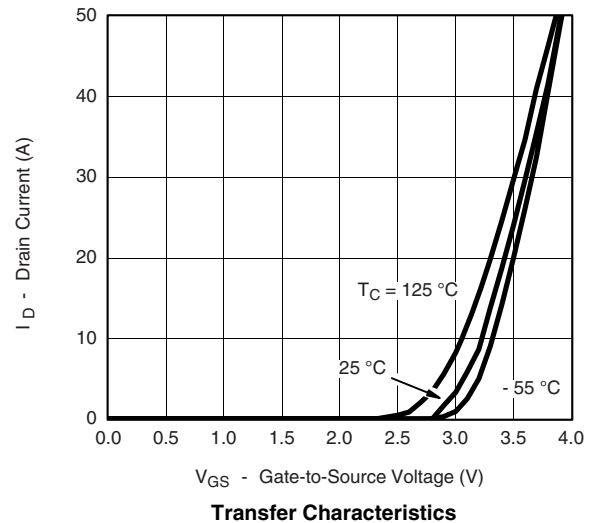
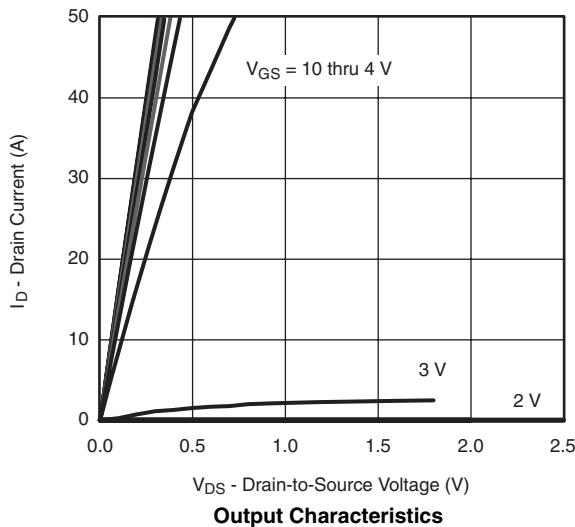
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.0		-3.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 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	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -13\text{ A}$		0.0063	0.0075	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -10\text{ A}$		0.0083	0.011	
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		
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	
Gate Resistance	R_g				3.4	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -2.1\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		70	110	ns

Notes:

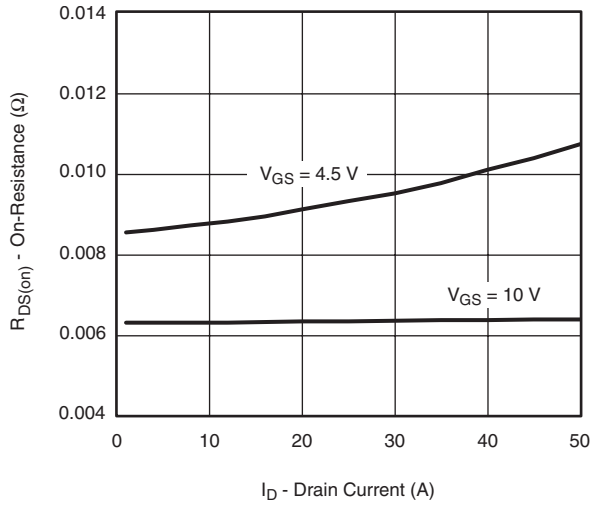
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

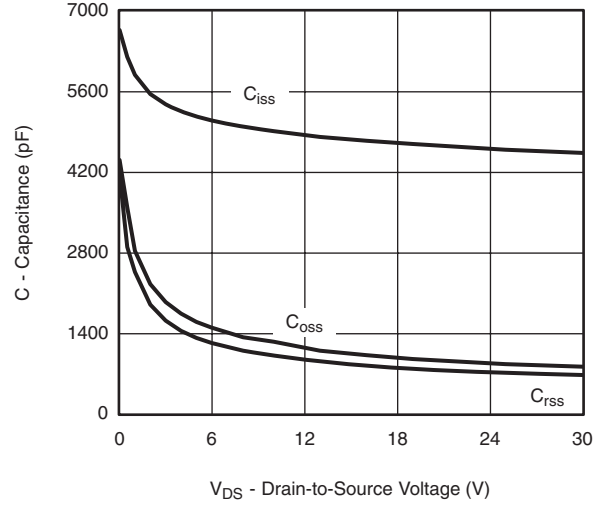
TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$, unless otherwise noted



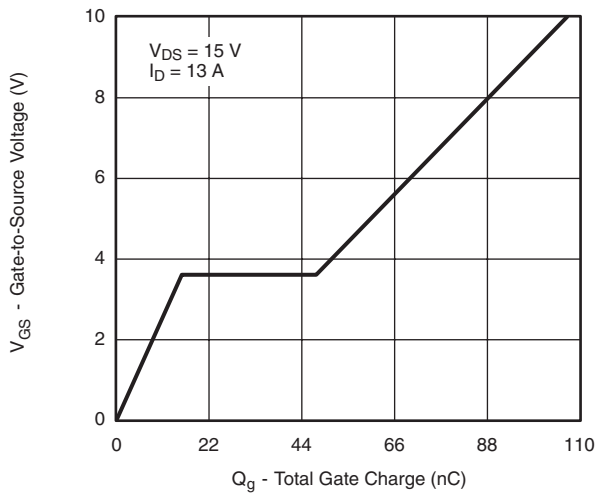
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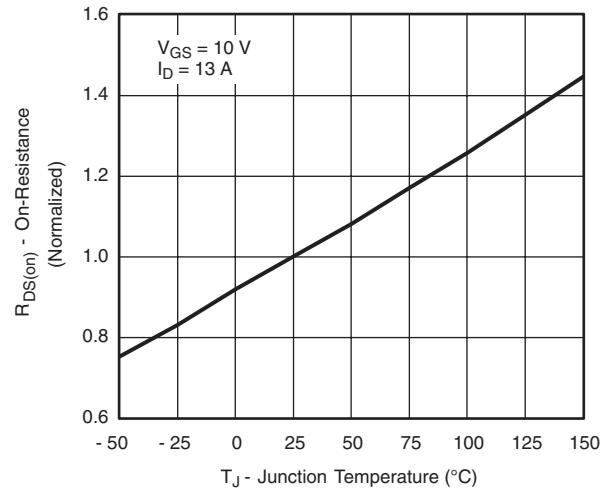
On-Resistance vs. Drain Current



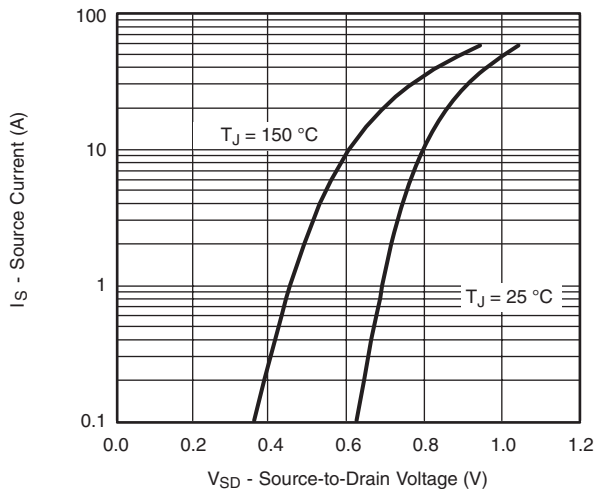
Gate Charge



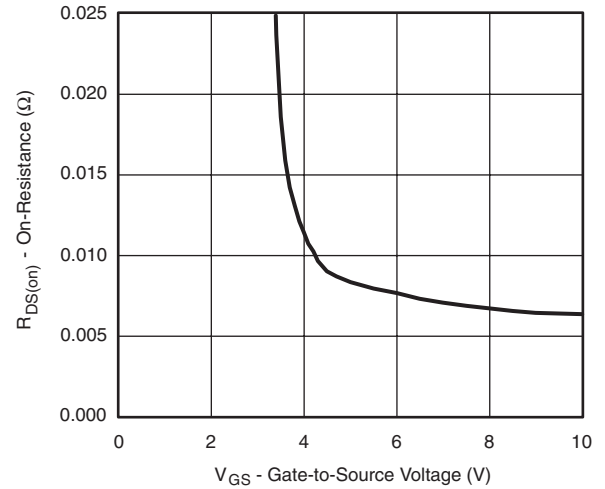
Source-Drain Diode Forward Voltage



Capacitance

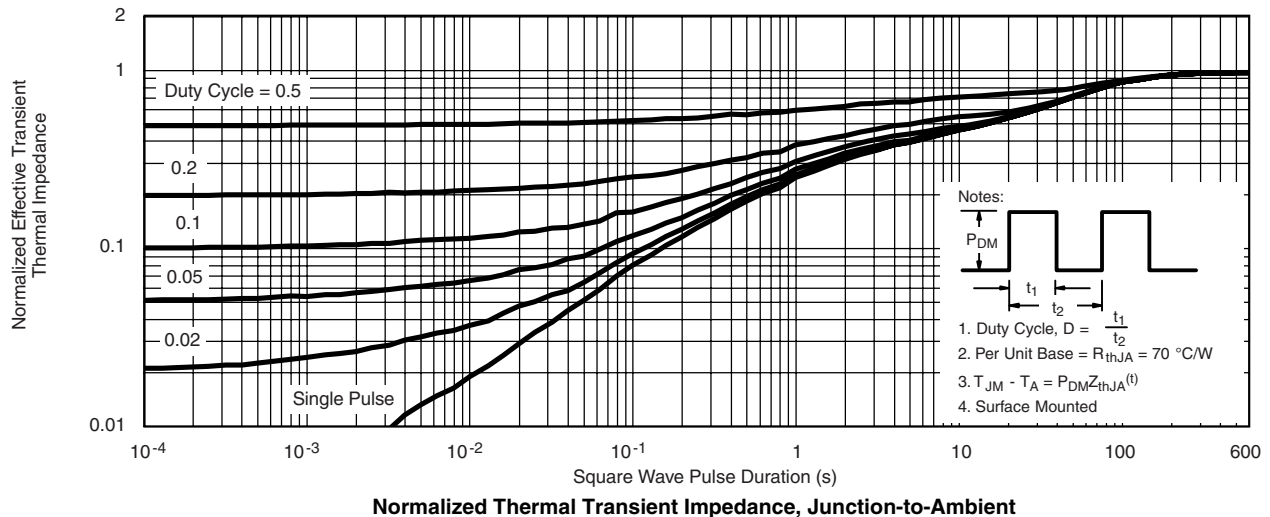
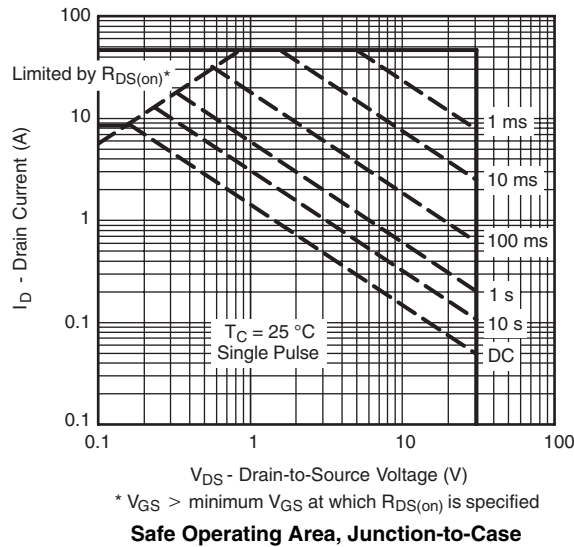
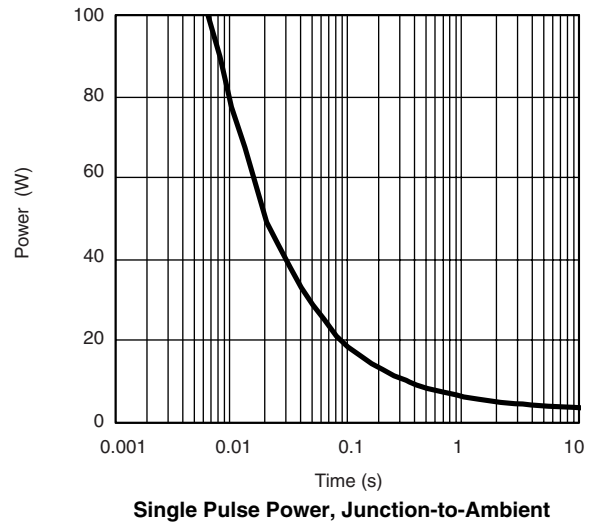
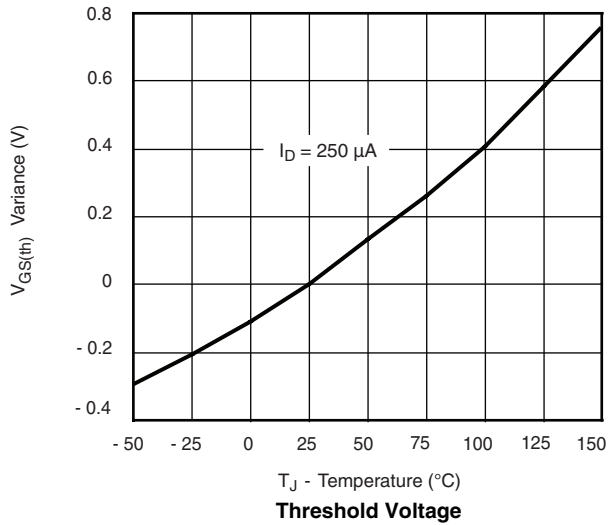


On-Resistance vs. Junction Temperature



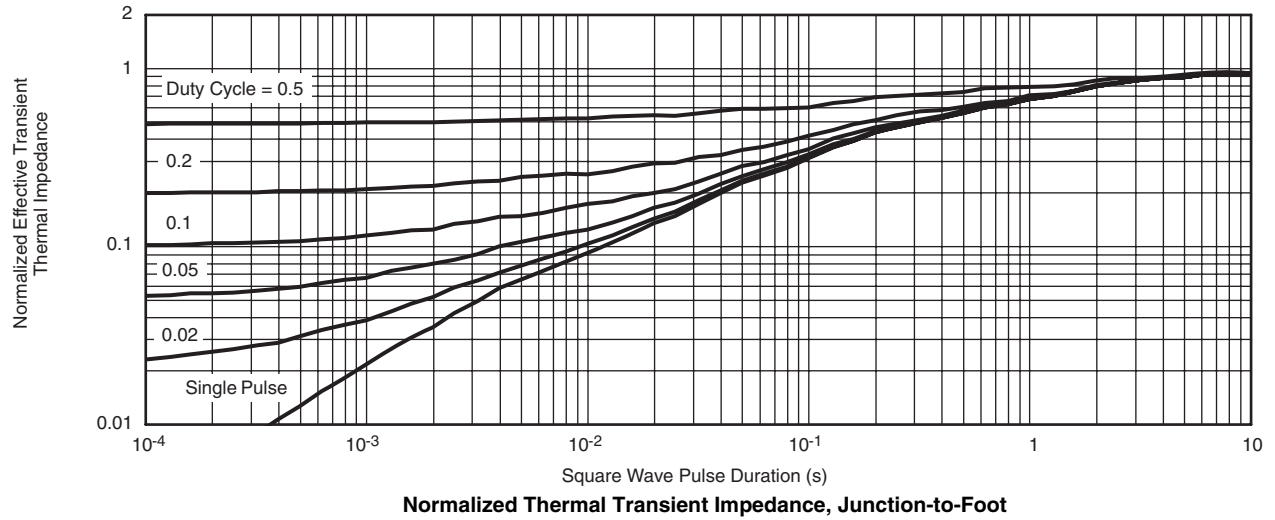
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026
ECN: C-06527-Rev. I, 11-Sep-06				
DWG: 5498				

RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)



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