



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

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 30	0.030 at $V_{GS} = - 10$ V	- 7.5
	0.050 at $V_{GS} = - 4.5$ V	- 5.8

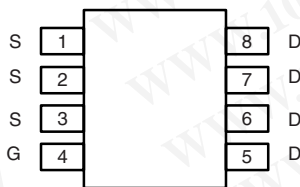
FEATURES

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



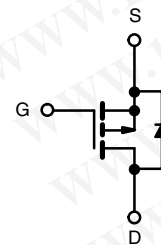
RoHS
COMPLIANT
HALOGEN
FREE
Available

SO-8



Top View

Ordering Information: Si4431BDY-T1-E3 (Lead (Pb)-free)
Si4431BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)



P-Channel MOSFET

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	$T_A = 25$ °C	- 7.5	- 5.7	A
	$T_A = 70$ °C	- 6.0	- 4.6	
Pulsed Drain Current	I_{DM}	- 30		
Continuous Source Current (Diode Conduction) ^a	I_S	- 2.1	- 1.2	
Maximum Power Dissipation ^a	$T_A = 25$ °C	2.5	1.5	W
	$T_A = 70$ °C	1.6	0.9	
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}	38	50	°C/W	
		Steady State	70		
Maximum Junction-to-Foot	R_{thJF}	22	28		

Notes:

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

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted

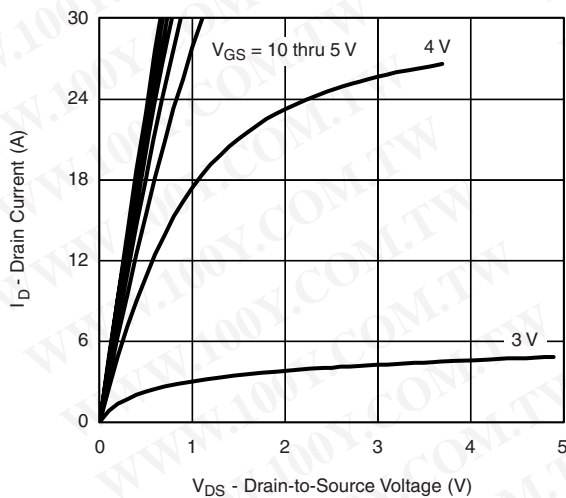
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.0		-3.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			-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
		$V_{DS} = -5\text{ V}, V_{GS} = -4.5\text{ V}$	-7			
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -7.5\text{ A}$		0.023	0.030	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -5.8\text{ A}$		0.036	0.050	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -7.5\text{ A}$		18		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -2.1\text{ A}, V_{GS} = 0\text{ V}$		-0.78	-1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -5\text{ V}, I_D = -7.5\text{ A}$		13	20	nC
Gate-Source Charge	Q_{gs}		3.6			
Gate-Drain Charge	Q_{gd}		6			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 15\text{ }\Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}, R_G = 6\text{ }\Omega$		10	20	ns
Rise Time	t_r		10	20		
Turn-Off Delay Time	$t_{d(off)}$		70	110		
Fall Time	t_f		47	70		
Source-Drain Reverse Recovery Time	t_{rr}		$I_F = -2.1\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		45	

Notes:

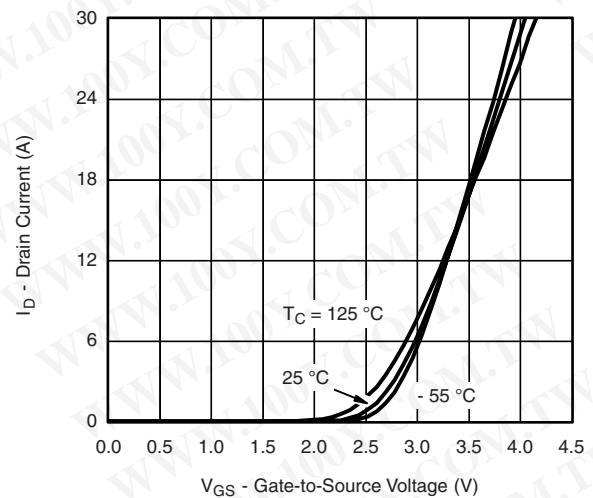
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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



Output Characteristics



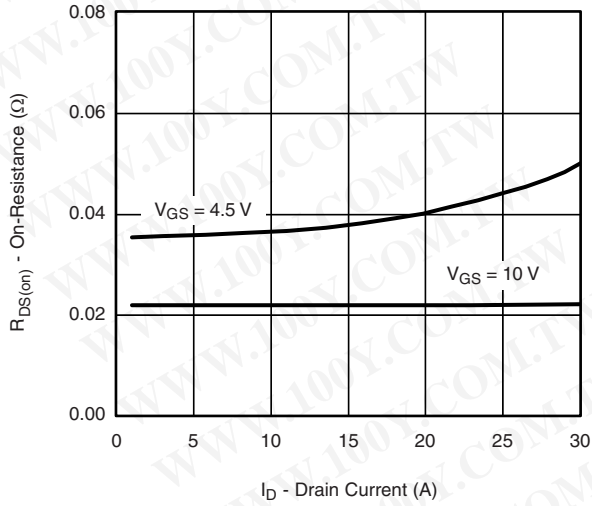
Transfer Characteristics



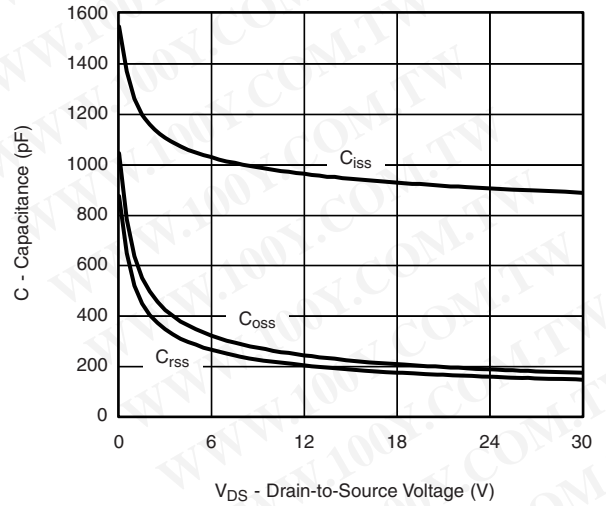
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Si4431BDY
Vishay Siliconix

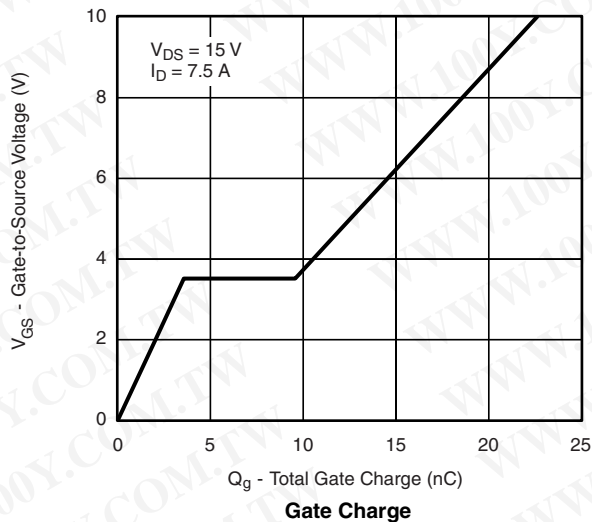
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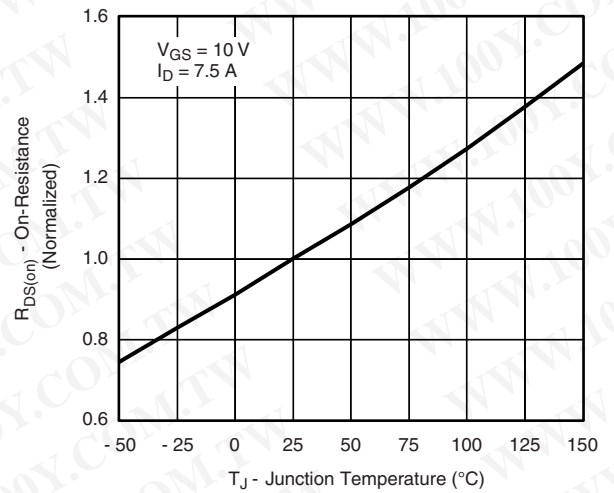
On-Resistance vs. Drain Current



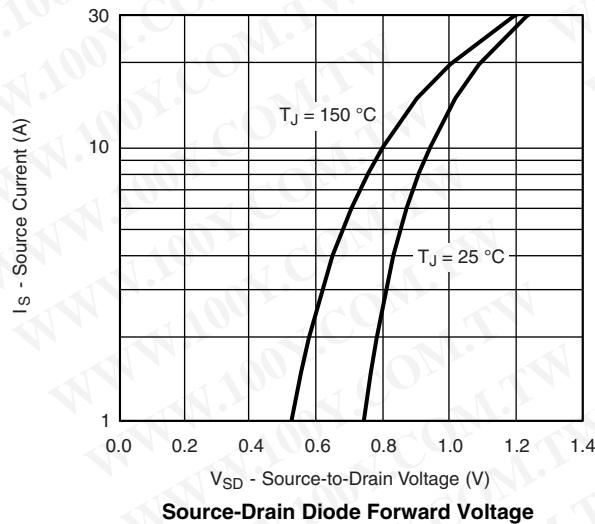
Capacitance



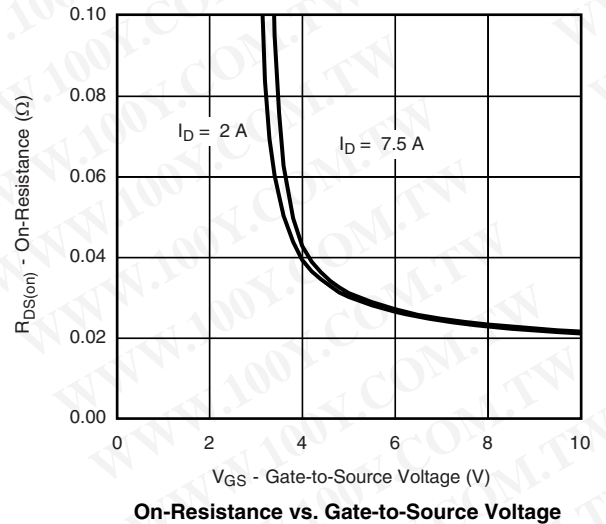
Gate Charge



On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

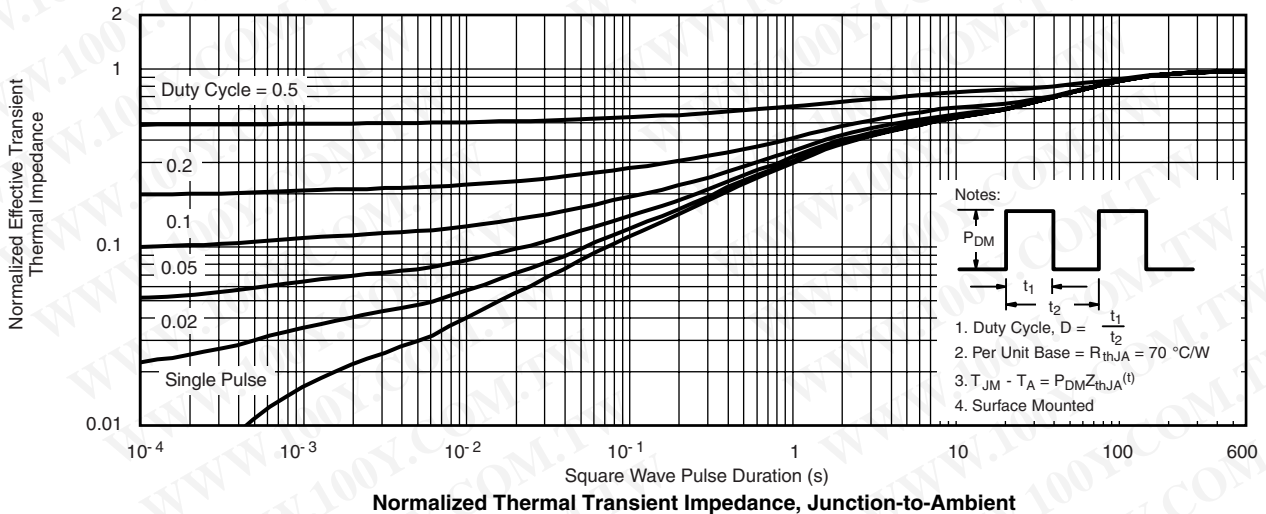
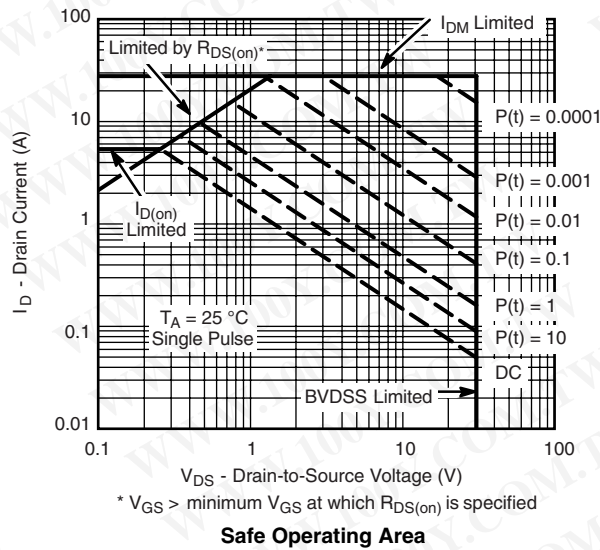
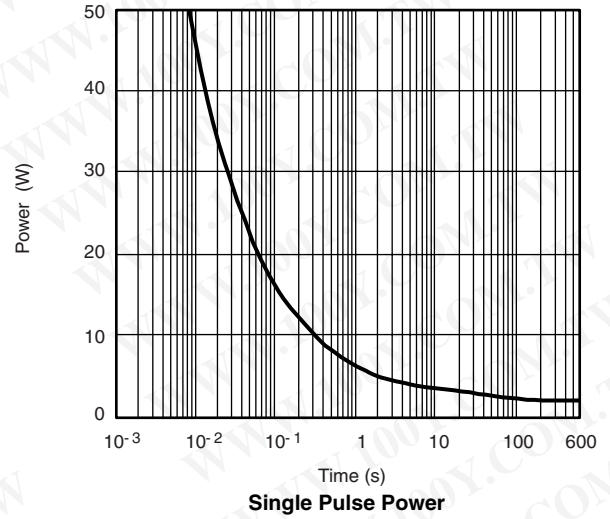
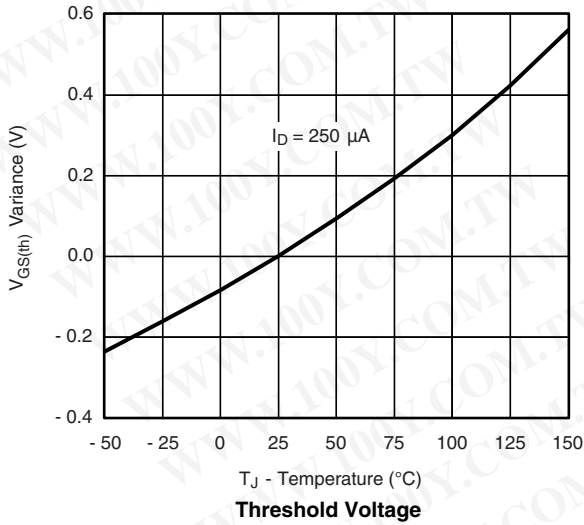
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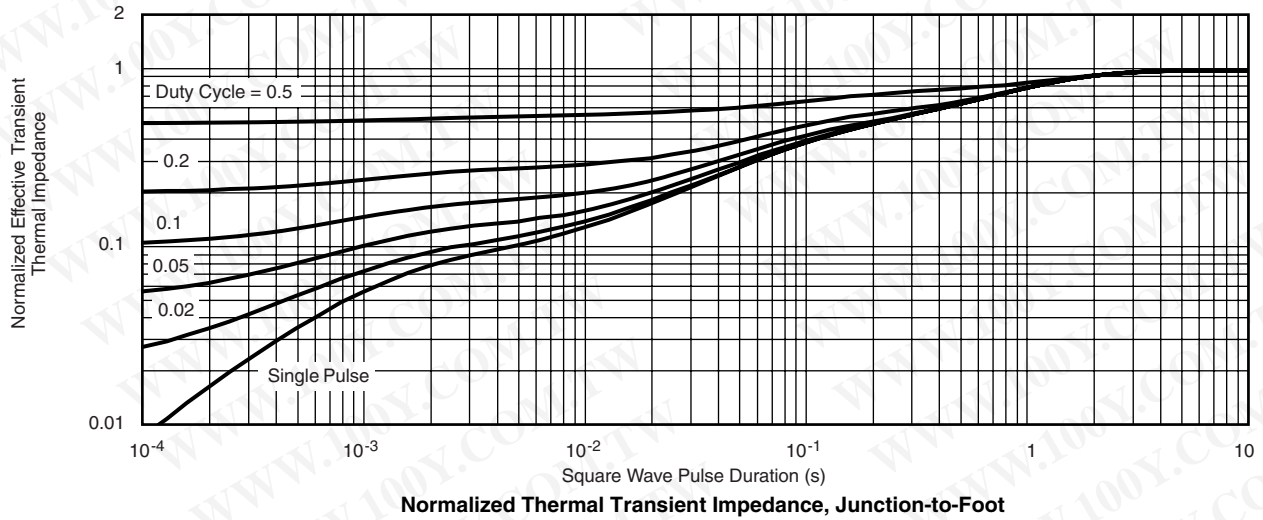


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