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

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
–30	0.040 @ V_{GS} = –10 V	±5.8
	0.070 @ V_{GS} = –4.5 V	±4.5

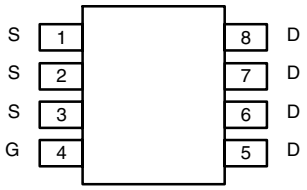
FEATURES

- TrenchFET® Power MOSFET
- 100% UIS Tested

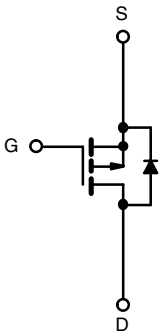
Pb-free Available

RoHS COMPLIANT

SO-8



Top View



P-Channel MOSFET

Ordering Information: Si4431DY-T1
Si4431DY-T1—E3 (Lead (Pb)-Free)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	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	I_D	±5.8	A
	T_A = 70°C		±4.6	
Pulsed Drain Current		I_{DM}	±30	
Continuous Source Current (Diode Conduction)[a]		I_S	–2.3	
Avalanche Current	L = 0.1 mH	I_{AS}	20	
Single-Pulse Avalanche Energy		E_{AS}	20	mJ
Maximum Power Dissipation[a]	T_A = 25°C	P_D	2.5	W
	T_A = 70°C		1.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Maximum Junction-to-Ambient[a]	R_{thJA}	50	°C/W

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

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

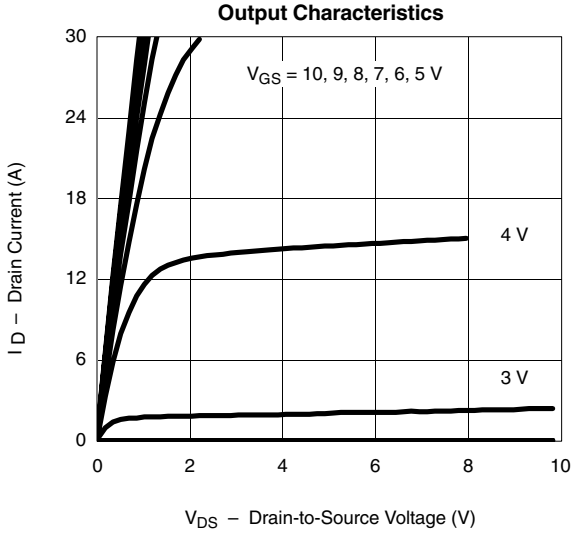
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ[A]	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250 µA	–1.0			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –30 V, V_{GS} = 0 V			–1	µA
		V_{DS} = –30 V, V_{GS} = 0 V, T_J = 70°C			–25	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} ≤ –5 V, V_{GS} = –10 V	–30			A
		V_{DS} ≤ –5 V, V_{GS} = –4.5 V	–7			
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = –10 V, I_D = –5.3 A		0.029	0.040	Ω
		V_{GS} = –4.5 V, I_D = –2.0 A		0.047	0.070	
Forward Transconductance[b]	g_{fs}	V_{DS} = –15 V, I_D = –5.3 A		9.3		S
Diode Forward Voltage[b]	V_{SD}	I_S = –2.3 A, V_{GS} = 0 V		–0.78	–1.2	V
Dynamic[a]						
Total Gate Charge	Q_g	V_{DS} = –15 V, V_{GS} = –10 V, I_D = –5.3 A		22	35	nC
Gate-Source Charge	Q_{gs}			3.95		
Gate-Drain Charge	Q_{gd}			3.5		
Gate Resistance	R_g			4.5	6.1	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		11.5	20	ns
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			38	55	
Fall Time	t_f			15	25	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = –2.3 A, di/dt = 100 A/µs		50	80	

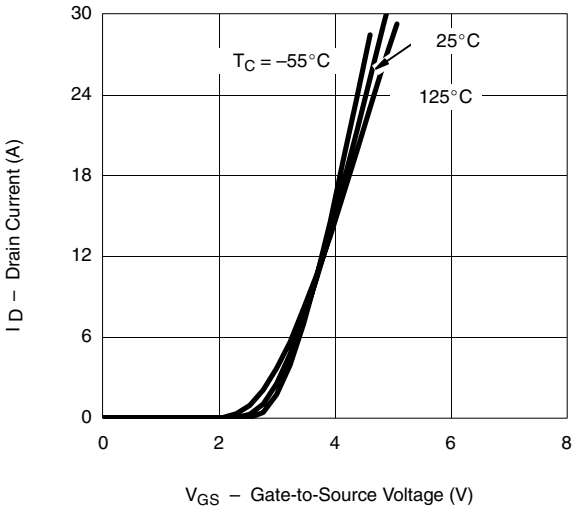
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.

TYPICAL CHARACTERISTICS (25°C UNLESS OTHERWISE NOTED)

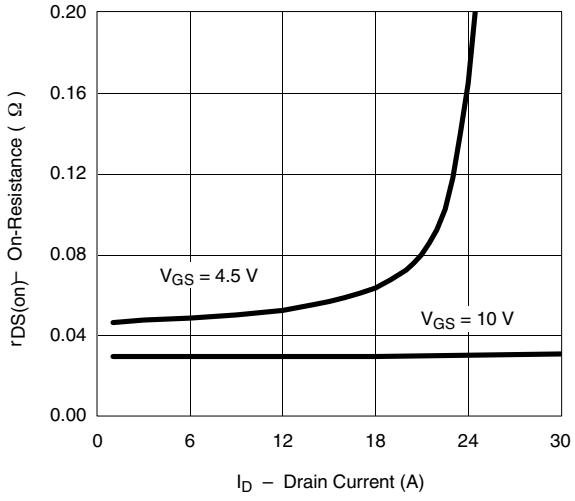
Output Characteristics



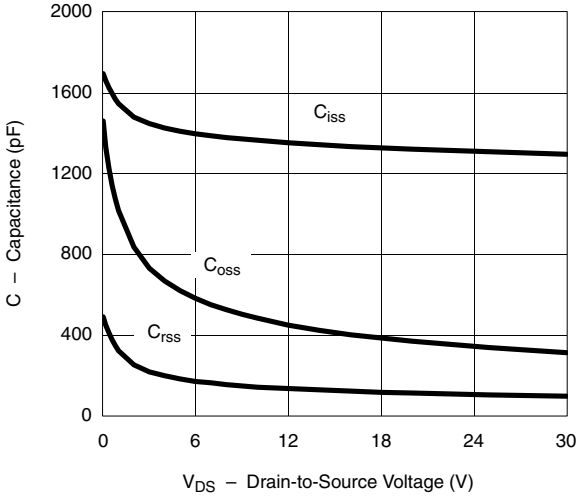
Transfer Characteristics



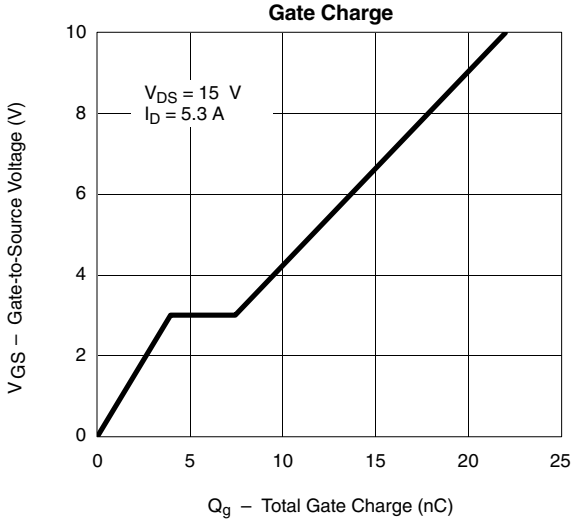
On-Resistance vs. Drain Current



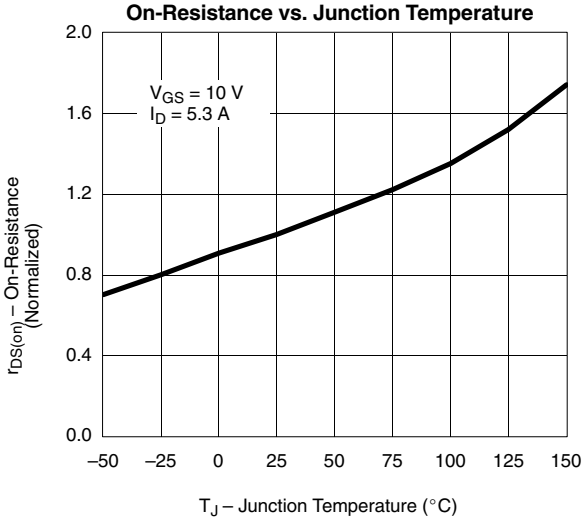
Capacitance



Gate Charge

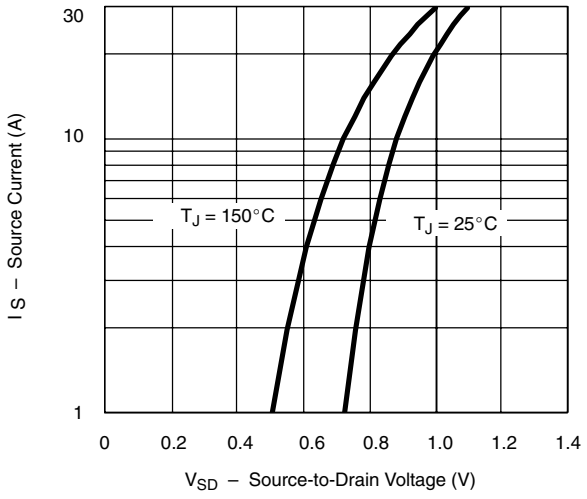


On-Resistance vs. Junction Temperature

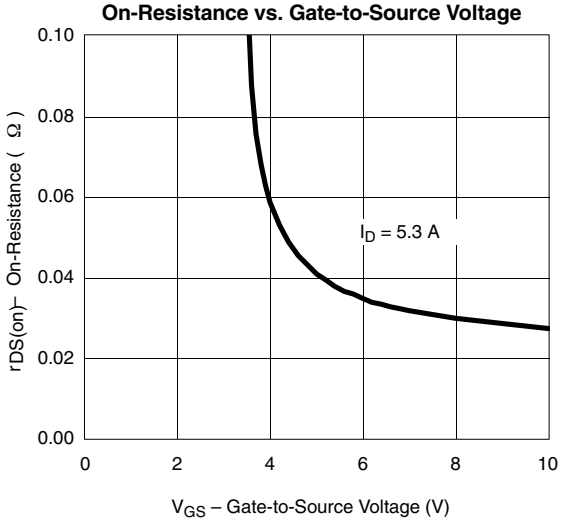


TYPICAL CHARACTERISTICS (25°C UNLESS OTHERWISE NOTED)

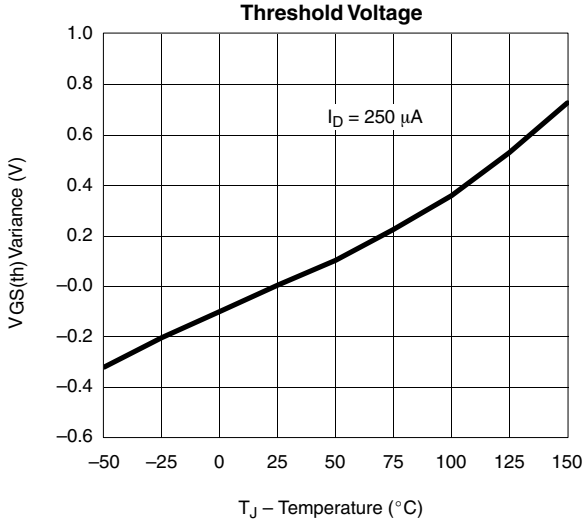
Source-Drain Diode Forward Voltage



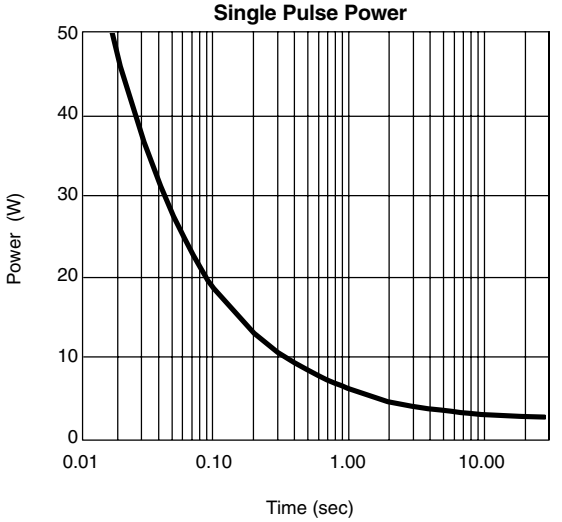
On-Resistance vs. Gate-to-Source Voltage



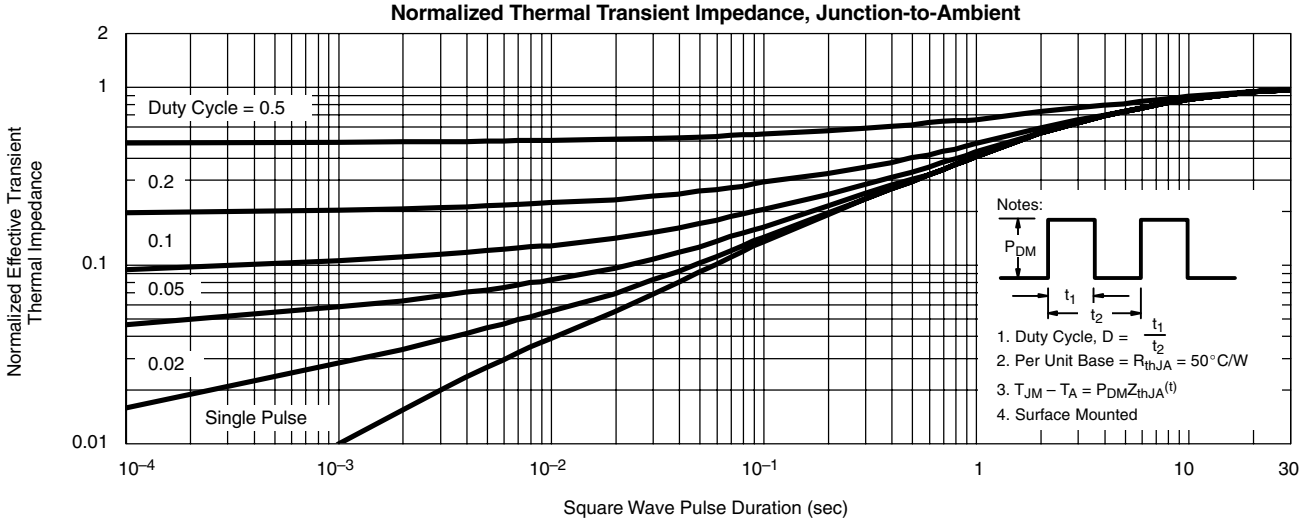
Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient



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