



## Dual P-Channel 12-V (D-S) MOSFET

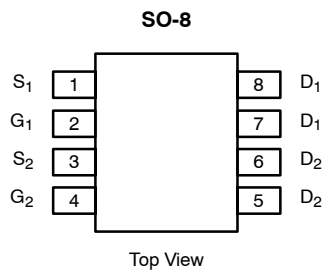
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A)
-12	0.018 @ V <sub>GS</sub> = -4.5 V	-8.9
	0.022 @ V <sub>GS</sub> = -2.5 V	-8.1
	0.028 @ V <sub>GS</sub> = -1.8 V	-3.6

### FEATURES

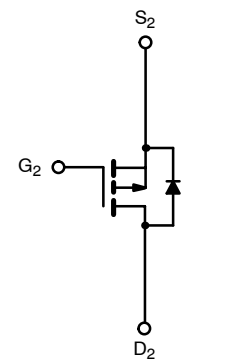
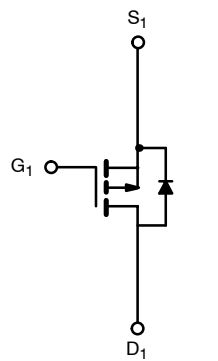
- TrenchFET® Power MOSFET
- Advanced High Cell Density Process

### APPLICATIONS

- Load Switching



Ordering Information: Si4931DY—E3  
Si4931DY-T1—E3 (with Tape and Reel)



ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)					
Parameter	Symbol	10 secs	Steady State	Unit	
Drain-Source Voltage	V <sub>DS</sub>	-12		V	
Gate-Source Voltage	V <sub>GS</sub>	± 8			
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	-8.9	-6.7	A
		T <sub>A</sub> = 70 °C	-7.1	-5.4	
Pulsed Drain Current	I <sub>DM</sub>	-30			
continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	-1.7	-0.9		
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	2.0	1.1	W
		T <sub>A</sub> = 70 °C	1.3	0.7	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150		°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 sec	46	62.5	°C/W
		Steady State	80	110	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	24	32		

Notes

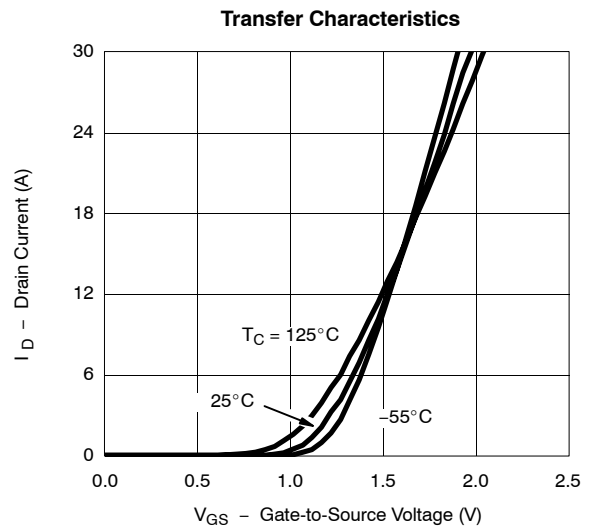
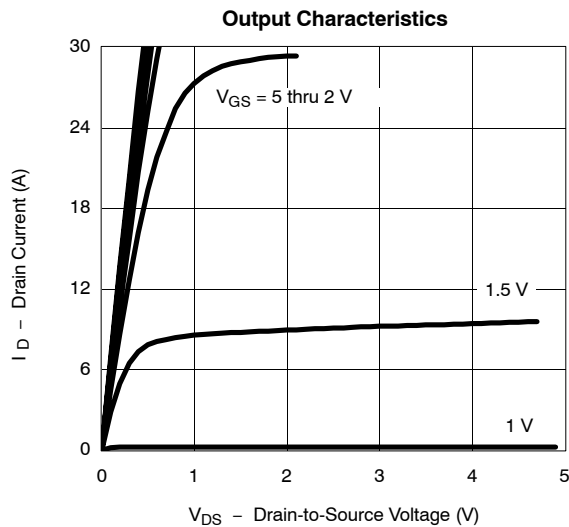
a. Surface Mounted on 1" x 1" FR4 Board.

SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -350 μA	-0.4		-1.0	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -12 V, V <sub>GS</sub> = 0 V			-1	μA
		V <sub>DS</sub> = -12 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			-5	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -4.5 V	-30			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -8.9 A		0.0145	0.018	Ω
		V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -8.1 A		0.018	0.022	
		V <sub>GS</sub> = -1.8 V, I <sub>D</sub> = -3.6 A		0.023	0.028	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = -6 V, I <sub>D</sub> = -8.9 A		26		S
Diode Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>S</sub> = -1.7 A, V <sub>GS</sub> = 0 V		-0.7	-1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -6 V, V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -8.9 A		34.5	52	nC
Gate-Source Charge	Q <sub>gs</sub>			5.1		
Gate-Drain Charge	Q <sub>gd</sub>			9.6		
Gate Resistance	R <sub>g</sub>			9		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -6 V, R <sub>L</sub> = 6 Ω I <sub>D</sub> ≅ -1 A, V <sub>GEN</sub> = -4.5 V, R <sub>G</sub> = 6 Ω		25	40	ns
Rise Time	t <sub>r</sub>			46	70	
Turn-Off Delay Time	t <sub>d(off)</sub>			230	345	
Fall Time	t <sub>f</sub>			155	235	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>		I <sub>F</sub> = -1.7 A, di/dt = 100 A/μs		128	

Notes

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

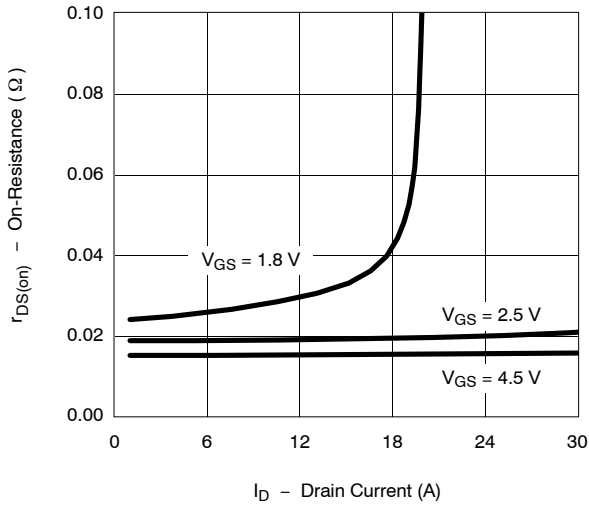
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



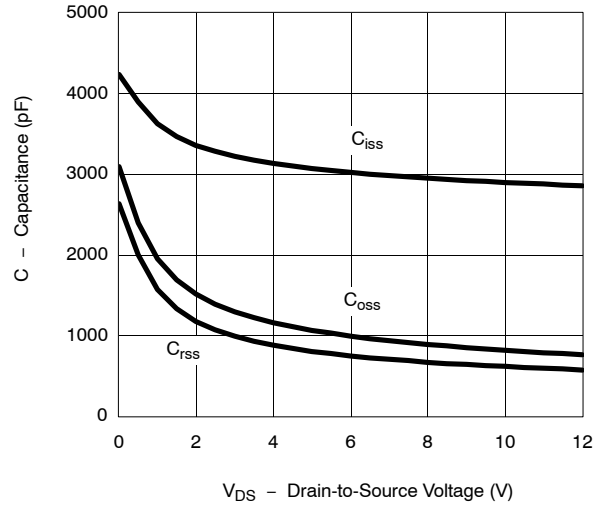


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

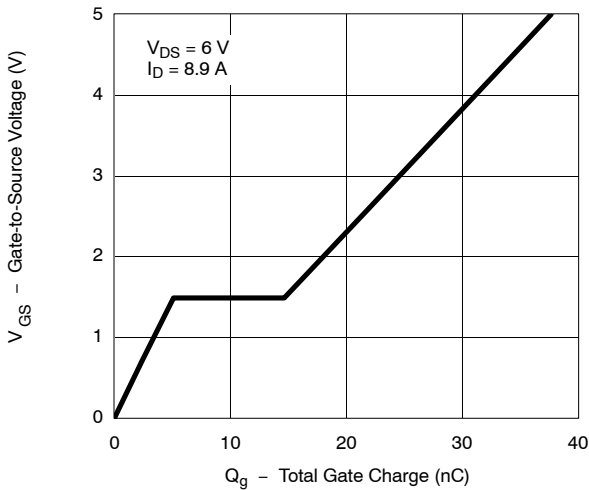
**On-Resistance vs. Drain Current**



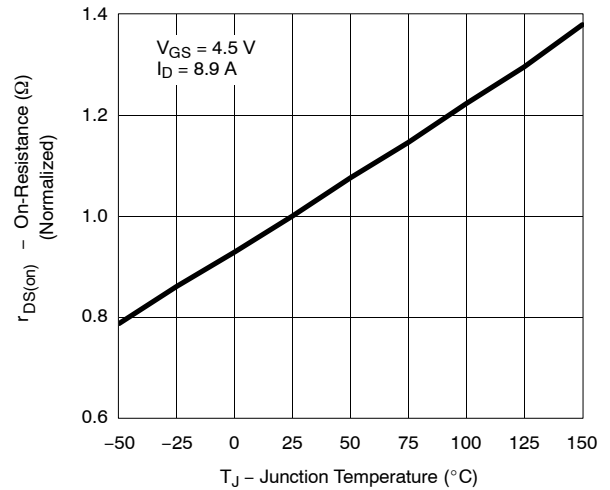
**Capacitance**



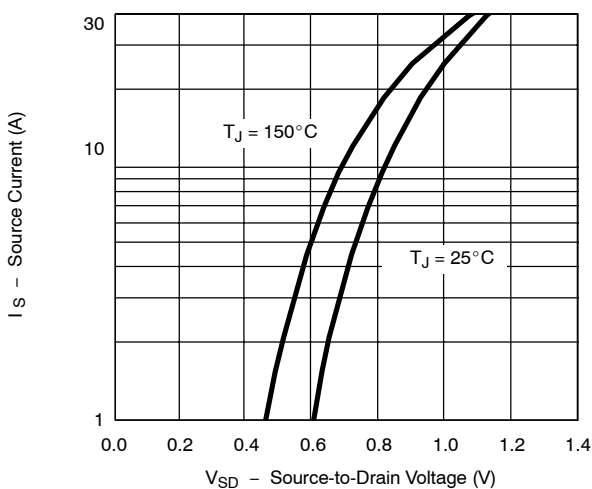
**Gate Charge**



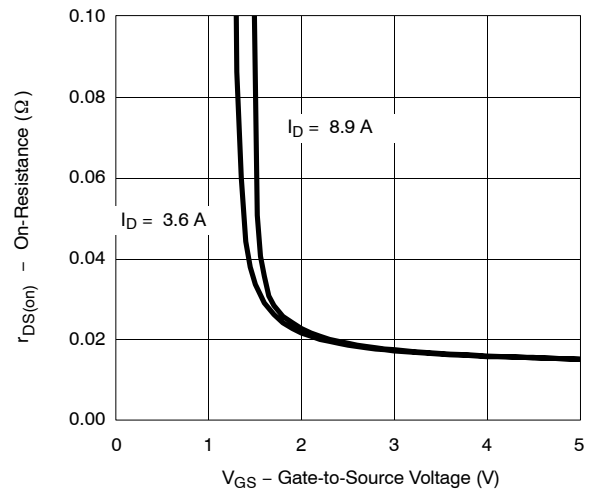
**On-Resistance vs. Junction Temperature**



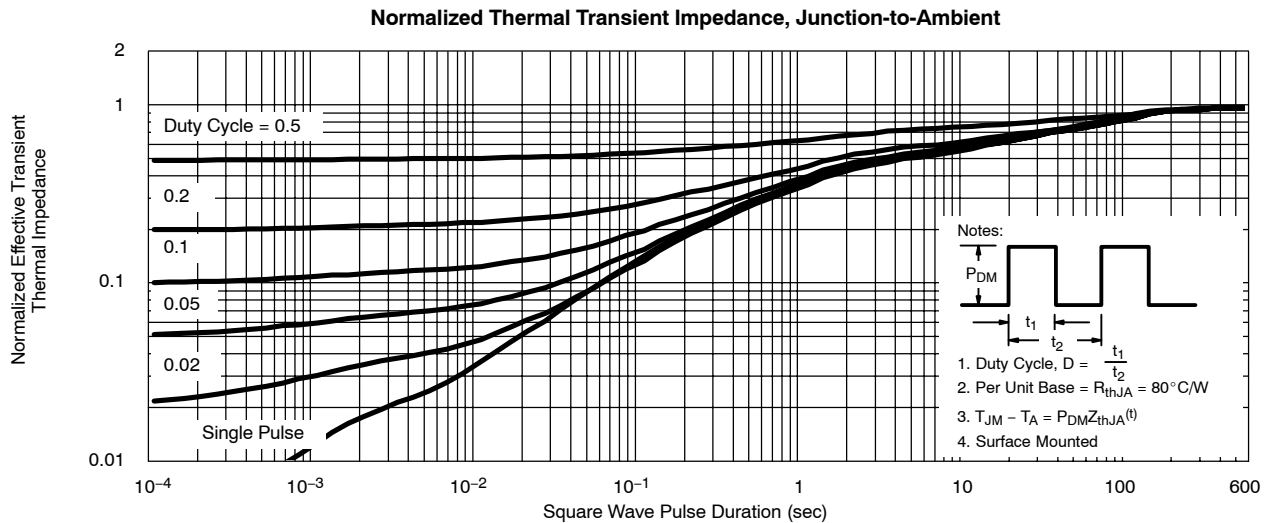
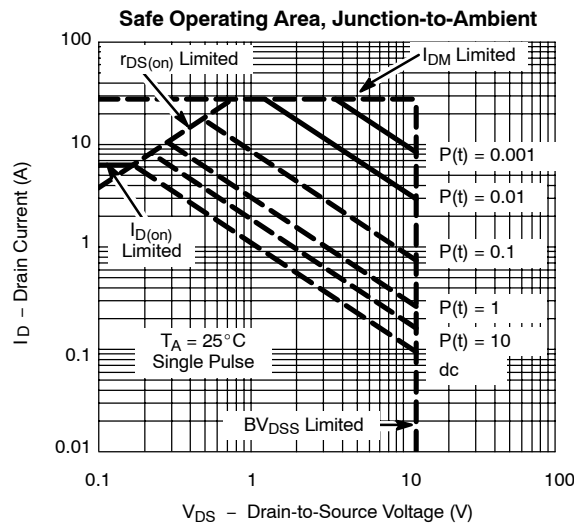
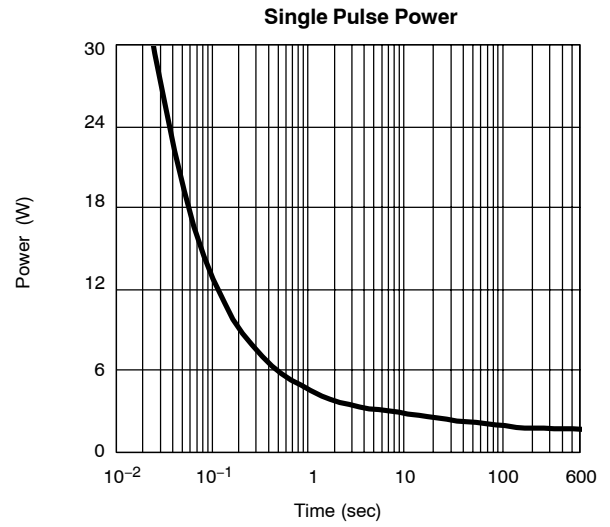
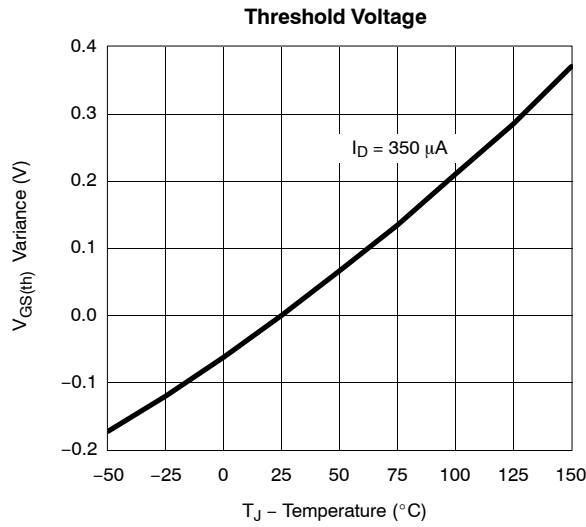
**Source-Drain Diode Forward Voltage**



**On-Resistance vs. Gate-to-Source Voltage**



**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**





**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

