



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

PRODUCT SUMMARY

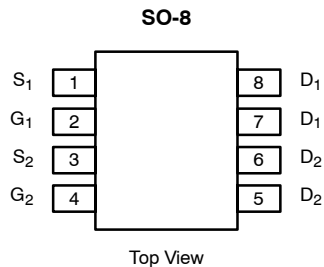
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
-12	0.018 @ $V_{GS} = -4.5$ V	-8.9
	0.022 @ $V_{GS} = -2.5$ V	-8.1
	0.028 @ $V_{GS} = -1.8$ V	-3.6

FEATURES

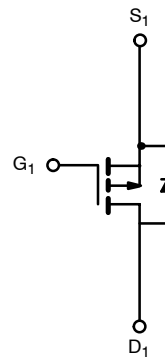
- TrenchFET® Power MOSFET
- Advanced High Cell Density Process

APPLICATIONS

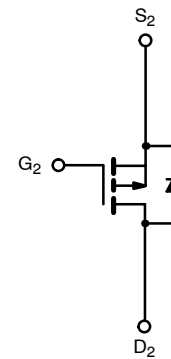
- Load Switching



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



P-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V _{DS}	−12		V
Gate-Source Voltage		V _{GS}	±8		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	−8.9	−6.7	A
	T _A = 70°C		−7.1	−5.4	
Pulsed Drain Current		I _{DM}	−30		
continuous Source Current (Diode Conduction) ^a		I _S	−1.7	−0.9	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	2.0	1.1	W
	T _A = 70°C		1.3	0.7	
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	$t \leq 10$ sec	R_{thJA}	46	62.5	$^\circ\text{C/W}$
	Steady State		80	110	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	24	32	

Notes

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

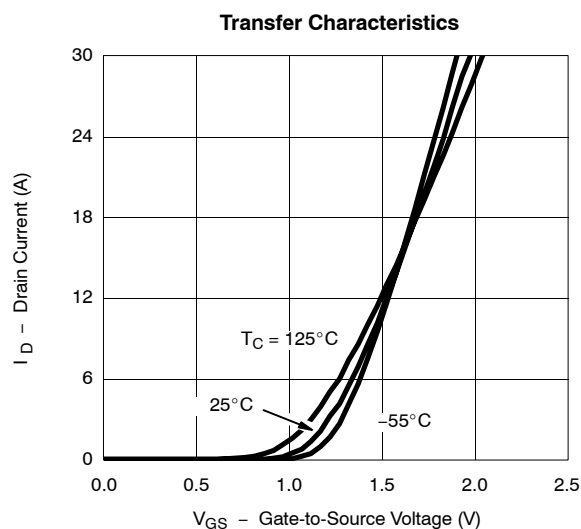
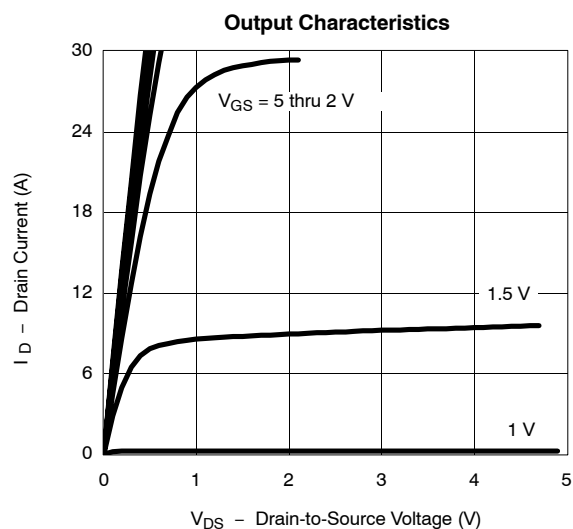
SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

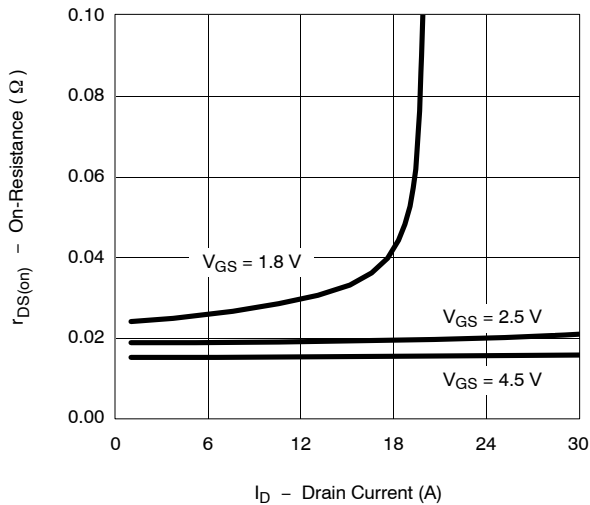
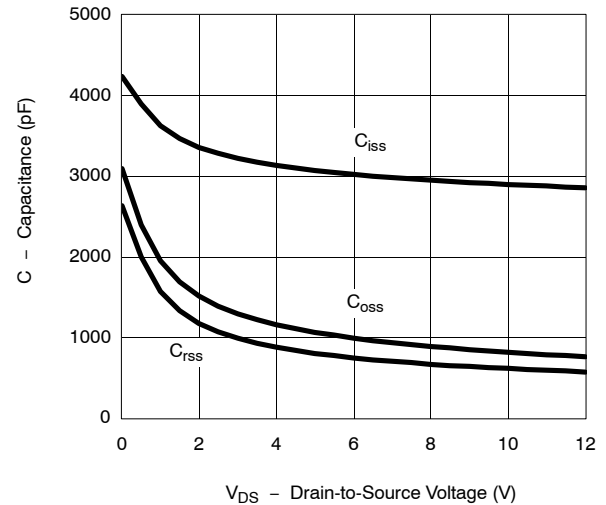
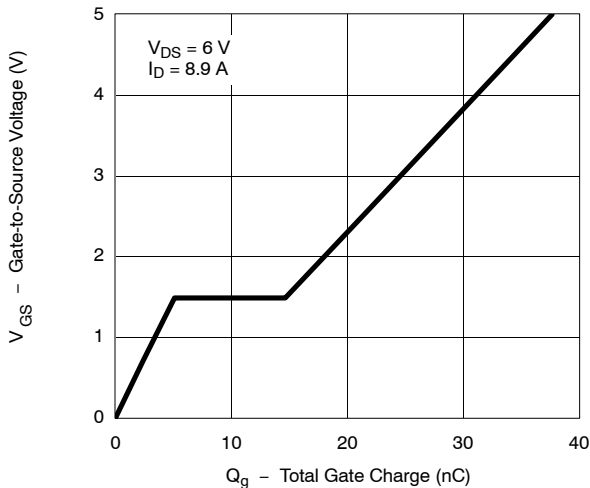
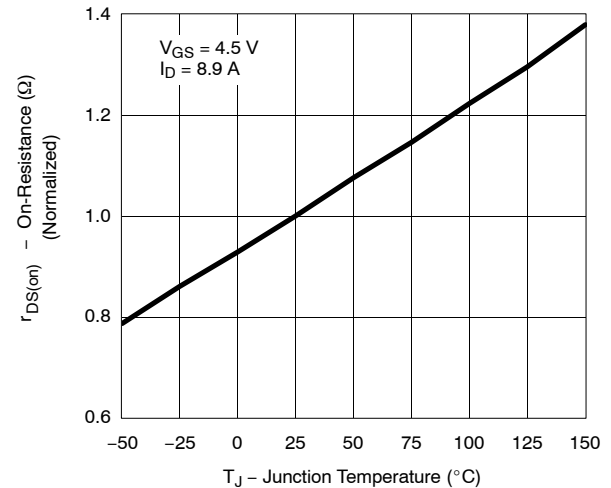
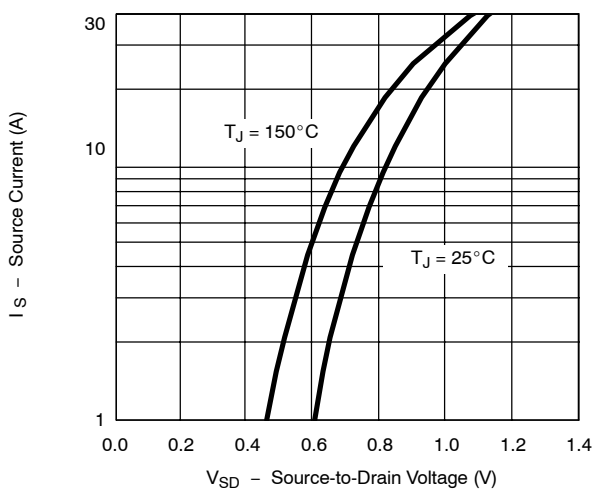
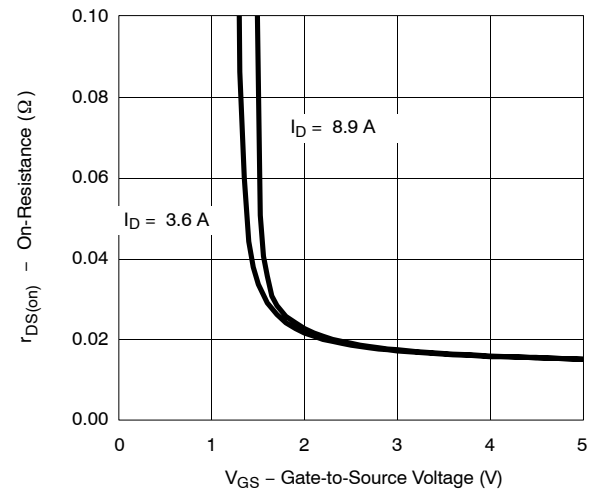
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -350\ \mu\text{A}$	-0.4		-1.0	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 8\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12\ \text{V}, V_{GS} = 0\ \text{V}$			-1	μA
		$V_{DS} = -12\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			-5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\ \text{V}, V_{GS} = -4.5\ \text{V}$	-30			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -4.5\ \text{V}, I_D = -8.9\ \text{A}$		0.0145	0.018	Ω
		$V_{GS} = -2.5\ \text{V}, I_D = -8.1\ \text{A}$		0.018	0.022	
		$V_{GS} = -1.8\ \text{V}, I_D = -3.6\ \text{A}$		0.023	0.028	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -6\ \text{V}, I_D = -8.9\ \text{A}$		26		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1.7\ \text{A}, V_{GS} = 0\ \text{V}$		-0.7	-1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6\ \text{V}, V_{GS} = -4.5\ \text{V}, I_D = -8.9\ \text{A}$		34.5	52	nC
Gate-Source Charge	Q_{gs}			5.1		
Gate-Drain Charge	Q_{gd}			9.6		
Gate Resistance	R_g			9		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6\ \text{V}, R_L = 6\ \Omega$ $I_D \approx -1\ \text{A}, V_{GEN} = -4.5\ \text{V}, R_G = 6\ \Omega$		25	40	ns
Rise Time	t_r			46	70	
Turn-Off Delay Time	$t_{d(off)}$			230	345	
Fall Time	t_f			155	235	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -1.7\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		128	200	

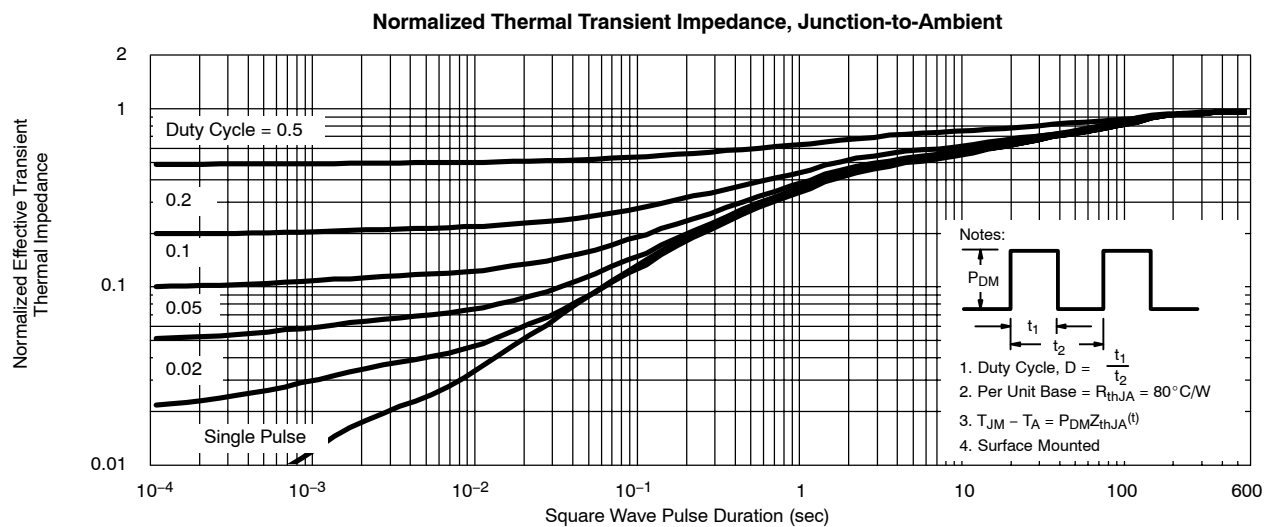
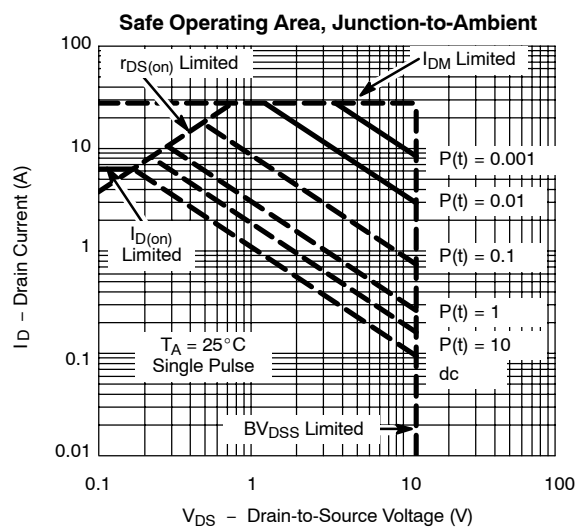
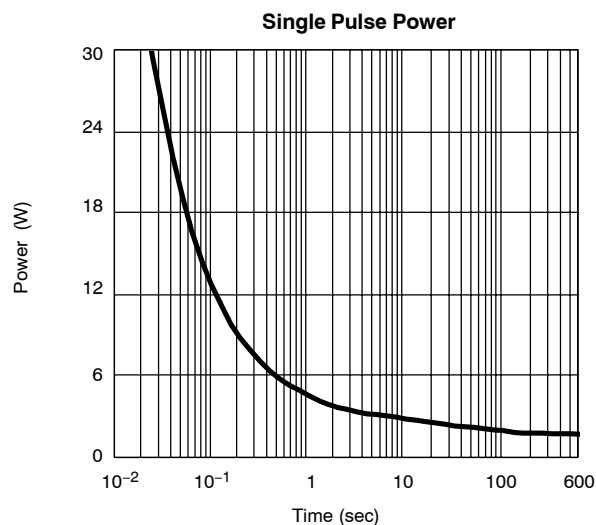
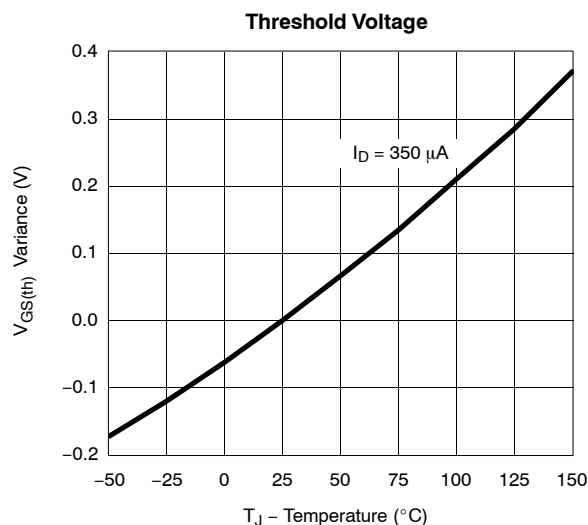
Notes

a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

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)




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