



P-Channel 20-V (D-S) MOSFET

TrenchFET®
MOSFETs
1.5-V Rated



**ESD Protected
2000 V**

PRODUCT SUMMARY		
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (mA)
-20	8 @ V _{GS} = -4.5 V	-150
	12 @ V _{GS} = -2.5 V	-125
	15 @ V _{GS} = -1.8 V	-100
	20 @ V _{GS} = -1.5 V	-30

FEATURES

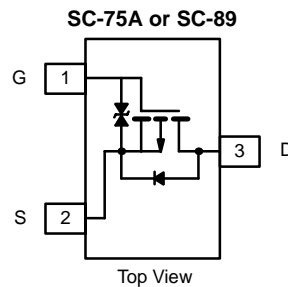
- High-Side Switching
- Low On-Resistance: 8 Ω
- Low Threshold: 0.9 V (typ)
- Fast Switching Speed: 45 ns
- 1.8-V Operation
- Gate-Source ESD Protection

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers



SC-75A (SOT- 416): Si1031R
SC-89 (SOT- 490): Si1031X

Marking Code: H

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C UNLESS OTHERWISE NOTED)							
Parameter	Symbol	Si1031R		Si1031X		Unit	
		5 secs	Steady State	5 secs	Steady State		
Drain-Source Voltage	V _{DS}	-20				V	
Gate-Source Voltage	V _{GS}	±6					
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	-150	-140	-165	-155	mA
		T _A = 85 °C	-110	-100	-150	-125	
Pulsed Drain Current ^a	I _{DM}	-500		-600		mW	
Continuous Source Current (diode conduction) ^a	I _S	-250	-200	-340	-240		
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	280	250	340	300	mW
		T _A = 85 °C	145	130	170	150	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to 150				°C	
Gate-Source ESD Rating (HBM, Method 3015)	ESD	2000				V	

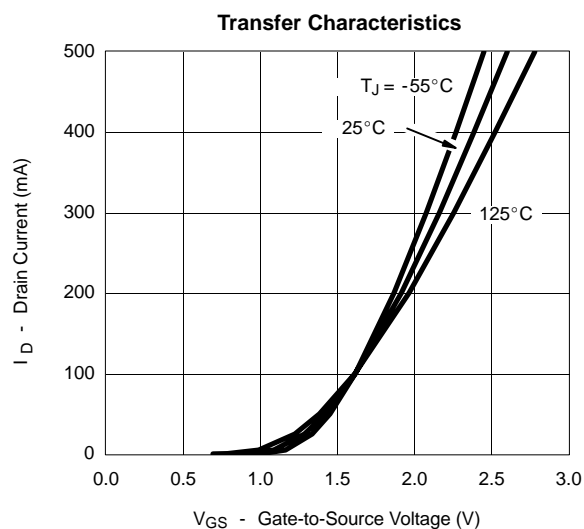
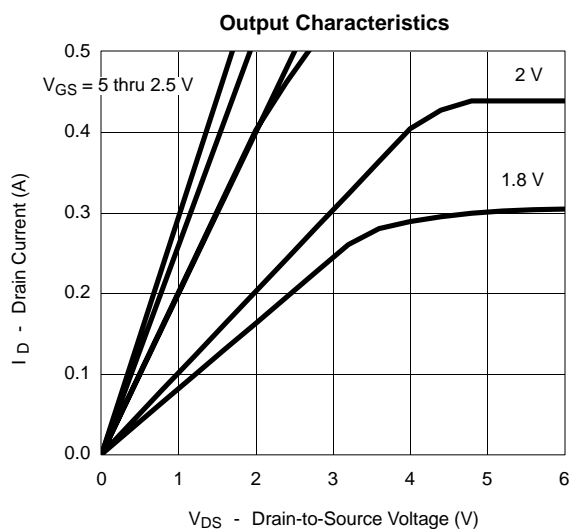
Notes
a. Surface Mounted on FR4 Board.

SPECIFICATIONS (T_A = 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	-0.40		-1.20	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±2.8 V		±0.5	±1	μA
		V _{DS} = 0 V, V _{GS} = ±4.5 V		±1	±2	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -16 V, V _{GS} = 0 V		-1	-500	nA
		V _{DS} = -16 V, V _{GS} = 0 V, T _J = 85 °C			-10	μA
On-State Drain Current ^a	I _{D(on)}	V _{DS} = -5 V, V _{GS} = -4.5 V	-200			mA
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = -4.5 V, I _D = -150 mA			8	Ω
		V _{GS} = -2.5 V, I _D = -125 mA			12	
		V _{GS} = -1.8 V, I _D = -100 mA			15	
		V _{GS} = -1.5 V, I _D = -30 mA			20	
Forward Transconductance ^a	g _{fs}	V _{DS} = -10 V, I _D = -150 mA		0.4		S
Diode Forward Voltage ^a	V _{SD}	I _S = -150 mA, V _{GS} = 0 V			-1.2	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -150 mA		1500		pC
Gate-Source Charge	Q _{gs}			150		
Gate-Drain Charge	Q _{gd}			450		
Turn-On Delay Time	t _{d(on)}	V _{DD} = -10 V, R _L = 65 Ω I _D ≅ -150 mA, V _{GEN} = -4.5 V, R _G = 10 Ω			55	ns
Rise Time	t _r				30	
Turn-Off Delay Time	t _{d(off)}				60	
Fall Time	t _f				30	

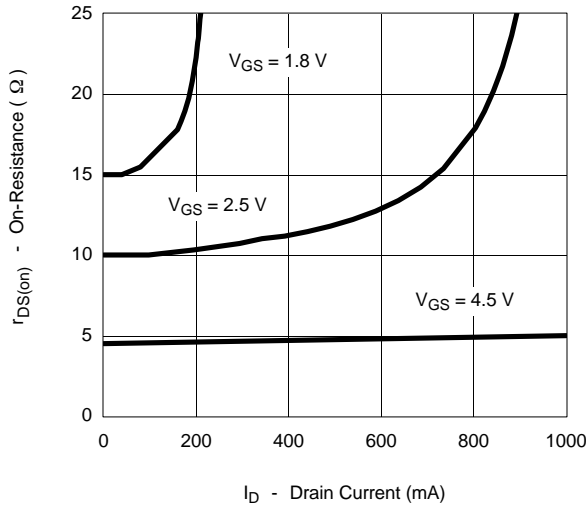
Notes

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

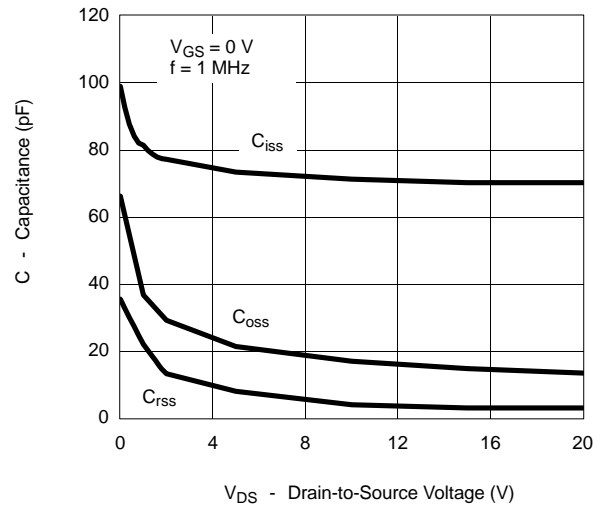
TYPICAL CHARACTERISTICS (T_A = 25 °C UNLESS NOTED)

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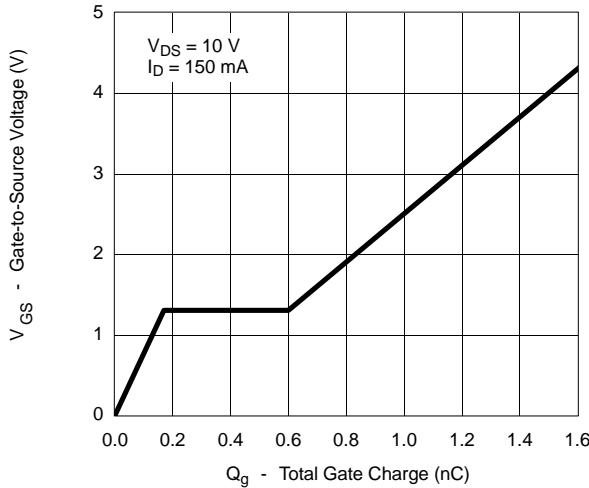
On-Resistance vs. Drain Current



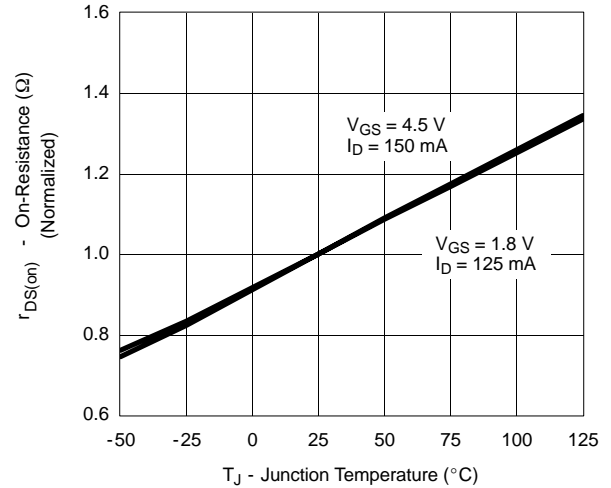
Capacitance



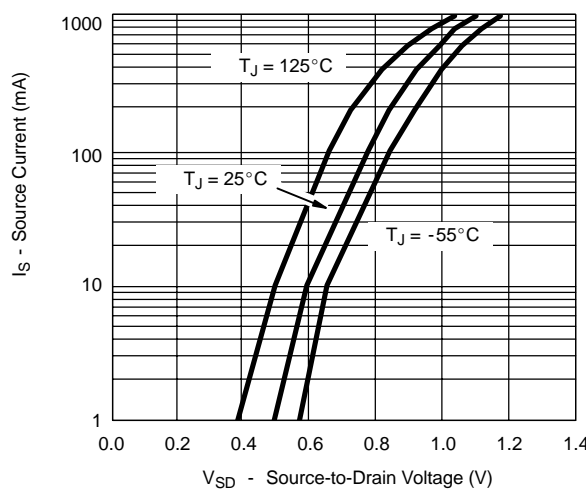
Gate Charge



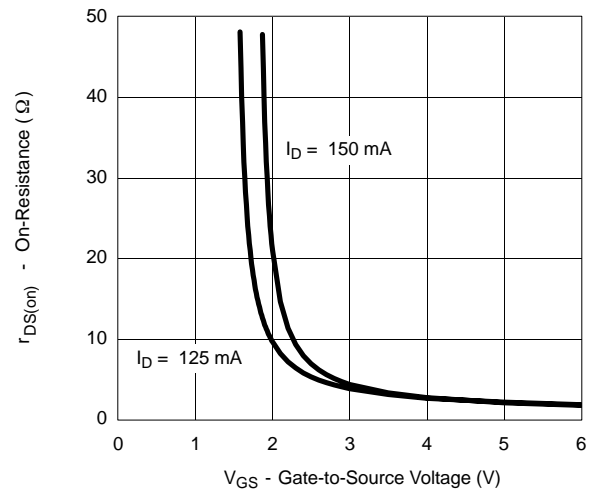
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

