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

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (mA)
20	5 @ V_{GS} = 4.5 V	200
	7 @ V_{GS} = 2.5 V	175
	9 @ V_{GS} = 1.8 V	150
	10 @ V_{GS} = 1.5 V	50

TrenchFET®
MOSFETs
1.5-V Rated

ESD Protected
2000 V

FEATURES

- Low-Side Switching
- Low On-Resistance: 5 Ω
- Low Threshold: 0.9 V (typ)
- Fast Switching Speed: 35 ns (typ)
- 1.5-V Operation
- Gate-Source ESD Protection

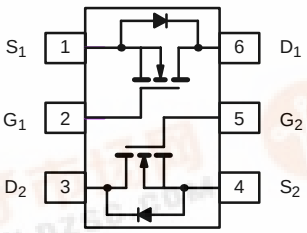
BENEFITS

- 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-89



Top View

Marking Code: L

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	5 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	±5		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	190	180	mA
	T_A = 85°C		140	130	
Pulsed Drain Current[b]		I_{DM}	650		
Continuous Source Current (diode conduction)		I_S	450	380	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	280	250	mW
	T_A = 85°C		145	130	
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.
b. Pulse width limited by maximum junction temperature.

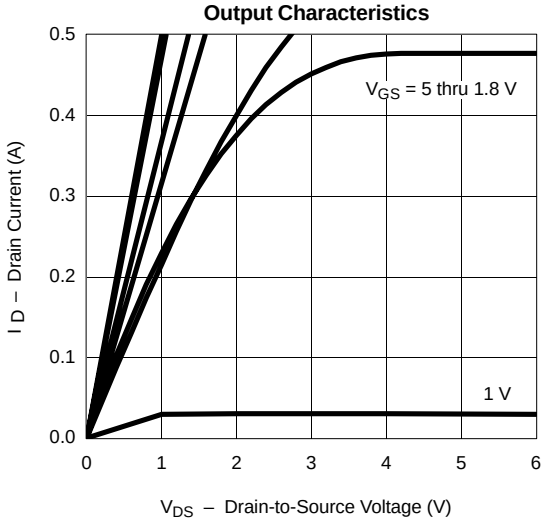
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	0.40		1.2	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±2.8 V		±0.5	±1.0	μA
		V_{DS} = 0 V, V_{GS} = ±4.5 V		±1.0	±3.0	
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	250			mA
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 200 mA			5	Ω
		V_{GS} = 2.5 V, I_D = 175 m A			7	
		V_{GS} = 1.8 V, I_D = 150 m A			9	
		V_{DS} = 1.5 V, I_D = 40 mA			10	
Forward Transconductance[a]	g_{fs}	V_{DS} = 10 V, I_D = 200 mA		0.5		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		750		pC
Gate-Source Charge	Q_{gs}			75		
Gate-Drain Charge	Q_{gd}			225		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 47 Ω I_D ≅ 200 mA, V_{GEN} = 4.5 V, R_G = 10 Ω			50	ns
Rise Time	t_r				25	
Turn-Off Delay Time	$t_{d(off)}$				50	
Fall Time	t_f				25	

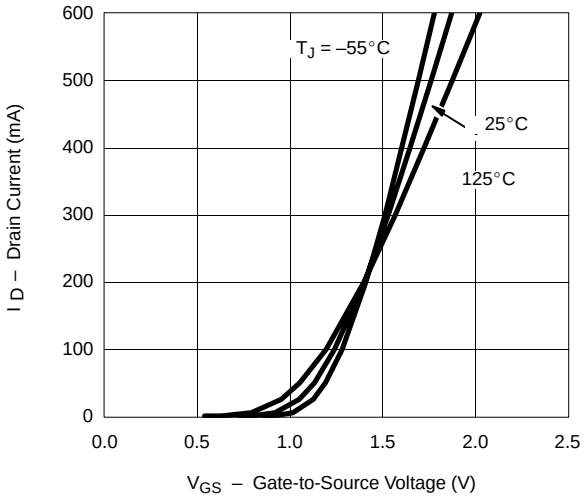
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

Output Characteristics

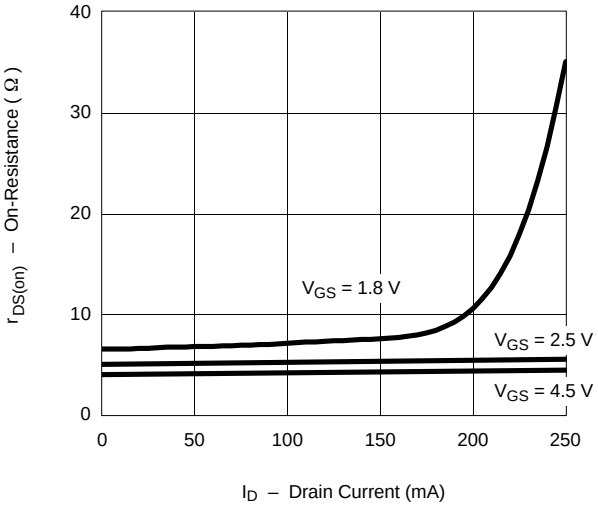


Transfer Characteristics

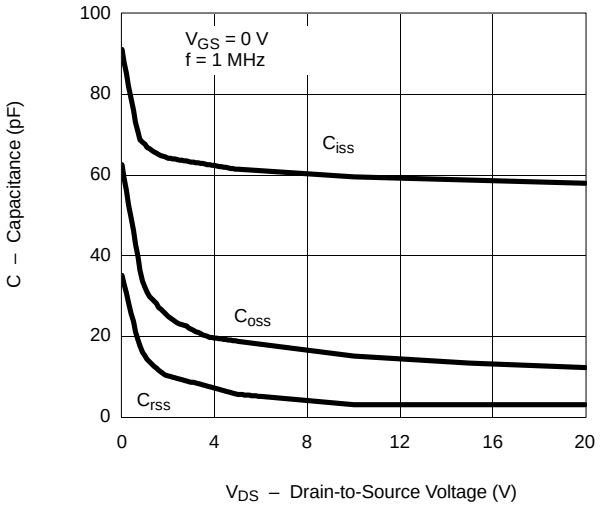


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

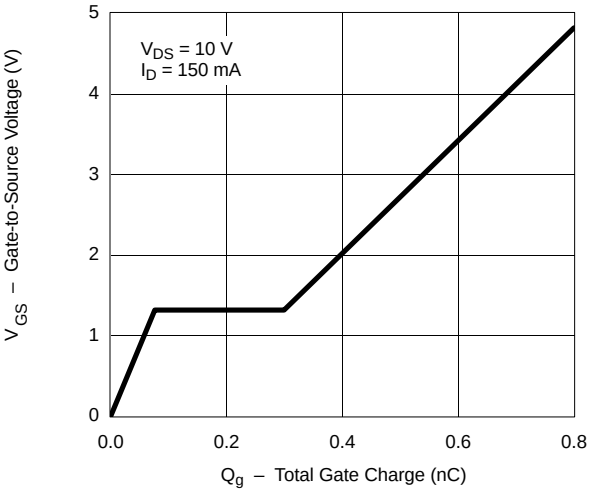
On-Resistance vs. Drain Current



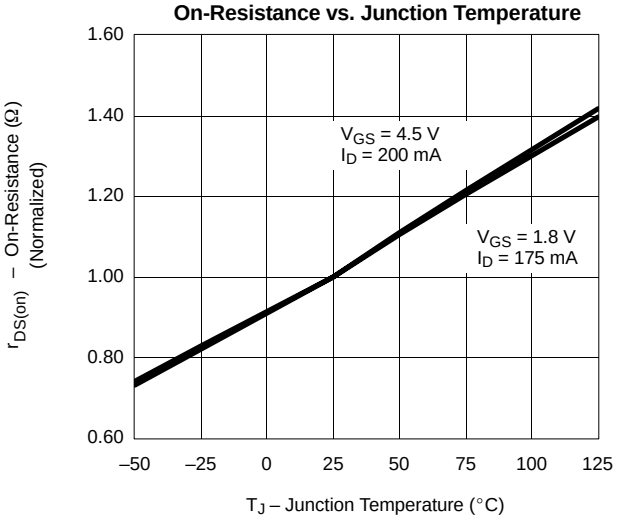
Capacitance



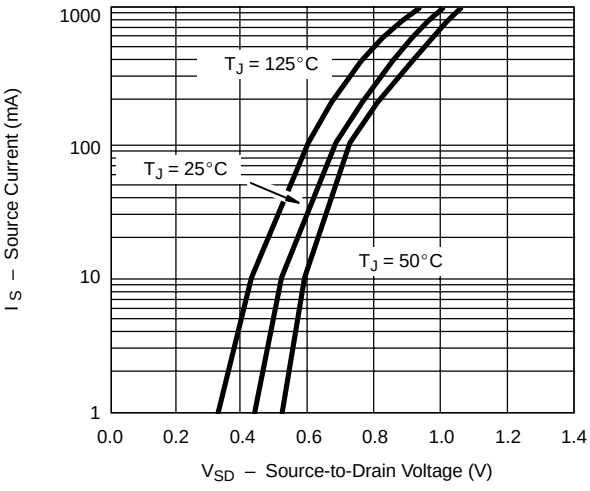
Gate Charge



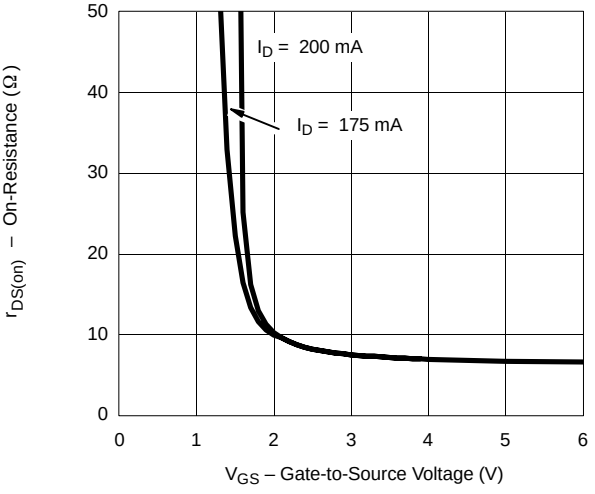
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

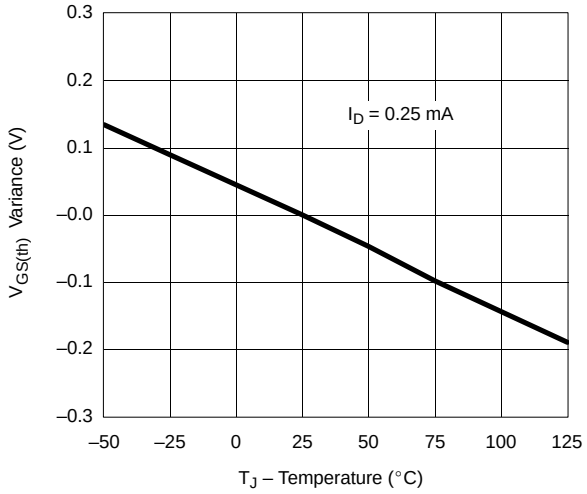


On-Resistance vs. Gate-to-Source Voltage

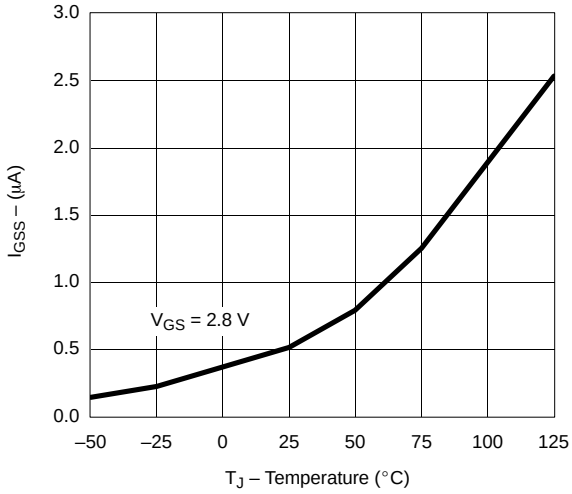


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS NOTED)

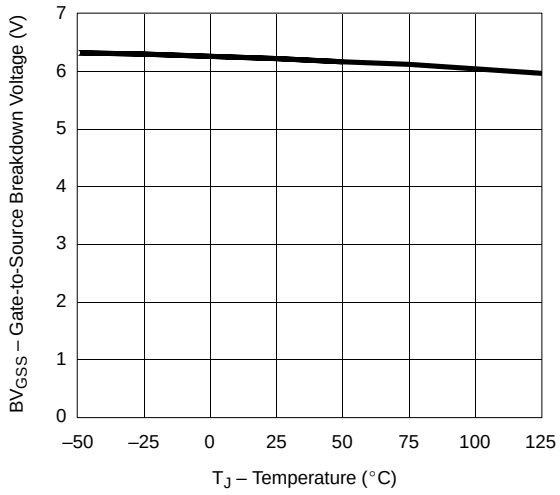
Threshold Voltage Variance vs. Temperature



I_{GSS} vs. Temperature



BV_{GSS} vs. Temperature



Normalized Thermal Transient Impedance, Junction-to-Ambient