LR013N10SM10

N-MOSFET TOLL 100V, 330A, 1.1mΩ

Features

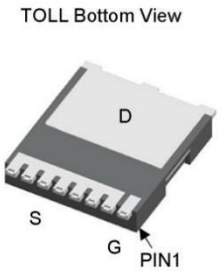
- Uses advanced SGT technology
- Extremely low on-resistance R_{DS}(on)
- Excellent gate charge x R_{DS}(on) product(FOM)

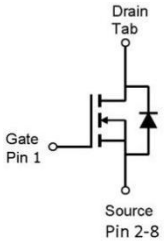
Application

- Motor control and drives
- Battery management
- DC/DC converter
- General purpose applications

Product Summary

V_{DS}	100V
$R_{DS(on)@VGS=10V}$	1.1mΩ
I_D	330A





Package Marking and Ordering Information

Type	Package	Marking	Reel Size	Tape Width	Qty
LR013N10SM10	TOLL	LR013N10SM10	330*28.5mm	24mm	2000

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 100°C (Silicon limit)	I_D	 330 248	A
Pulsed drain current T_C = 25°C, t_p limited by T_{jmax}	$I_{D\ pulse}$	1320	
Avalanche energy, single pulse (L=0.3mH,Rg=25Ω)(1)	E_{AS}	1750	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation T_C = 25°C	P_D	431	W
Operating junction and storage temperature	T_j , T_{stg}	-55~150	℃

Notes:

(1) V_{DS}=75V,V_{GS}=10V,L=0.3mH.

Thermal Resistance

	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.29	℃/W

Electrical Characteristic, at Tj = 25 °C, unless otherwise specified

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA T_j=25°C	2.2	2.6	3.8	
Zero gate voltage drain current	I_{DSS}	V_{DS}=100V,V_{GS}=0 V T_j=25°C	-	-	1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=100A, T_j=25°C	-	1.05	1.3	mΩ
Transconductance	g_{fs}	V_{DS}=5V,I_D=100A	-	280	-	S
Dynamic Characteristic						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=50V, f=1MHz	-	15650	-	pF
Output Capacitance	C_{oss}		-	2100	-	
Reverse Transfer Capacitance	C_{rss}		-	80	-	
Gate Total Charge	Q_G	V_{GS}=10V, V_{DS}=50V, I_D=100A	-	258	-	nC
Gate-Source charge	Q_{gs}		-	68	-	
Gate-Drain charge	Q_{gd}		-	74	-	
Turn-on delay time	$t_{d(on)}$	I_D=100A, V_{GS}=10V, V_{DS}=50V, R_G=3Ω	-	28	-	ns
Rise time	t_r		-	73	-	
Turn-off delay time	$t_{d(off)}$		-	86	-	
Fall time	t_f		-	33	-	
Gate resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1MHz	-	1	-	Ω
Body Diode Characteristic						
Body Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=100A	-	0.8	1.1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=100A, dI/dt=100A/μs	-	115	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=100A, dI/dt=100A/μs	-	320	-	nC

Typical Performance Characteristics

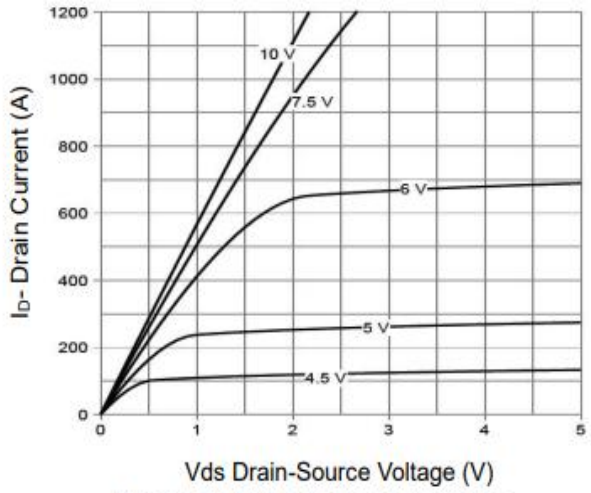


Figure 1 Output Characteristics

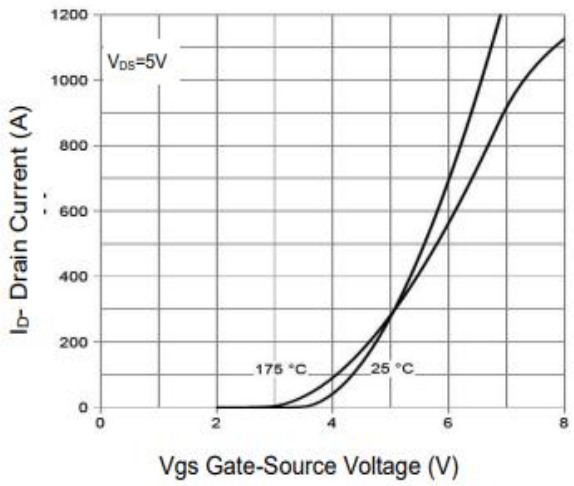


Figure 2 Transfer Characteristics

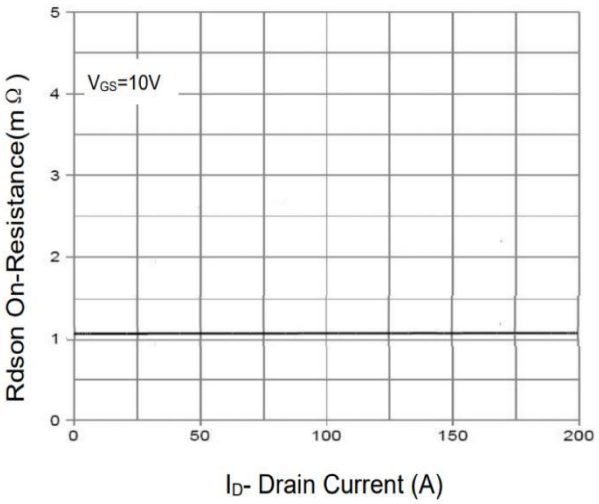


Figure 3 Rdson- Drain Current

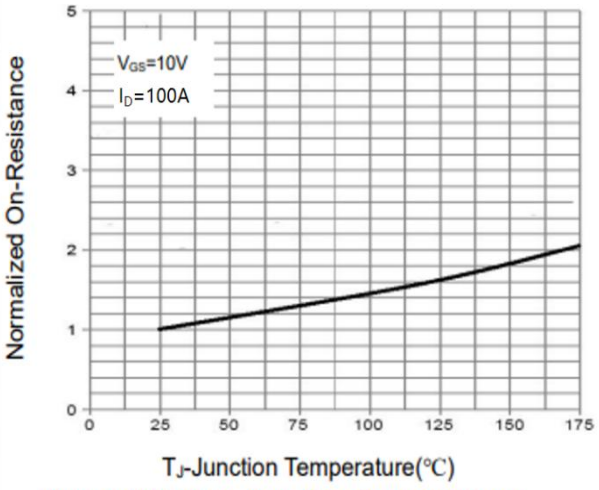


Figure 4 Rdson-Junction Temperature

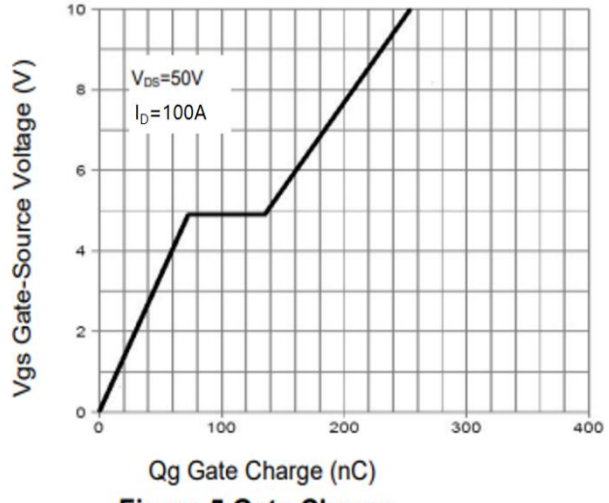


Figure 5 Gate Charge

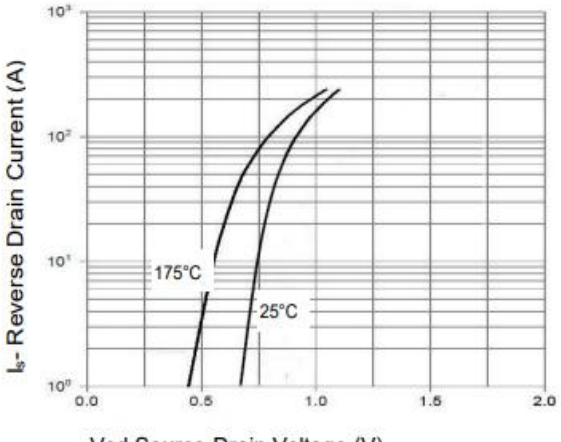


Figure 6 Source- Drain Diode Forward

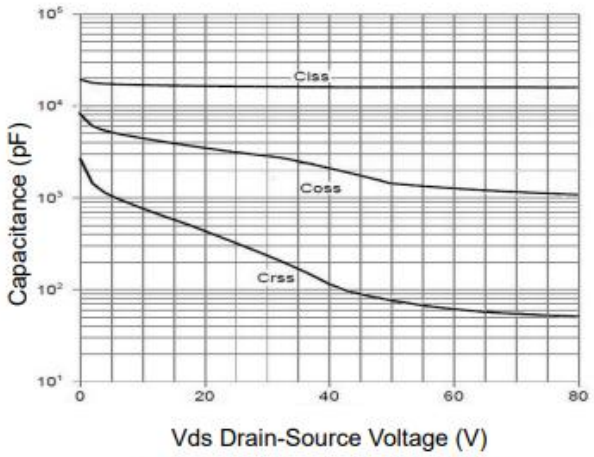


Figure 7 Capacitance vs Vds

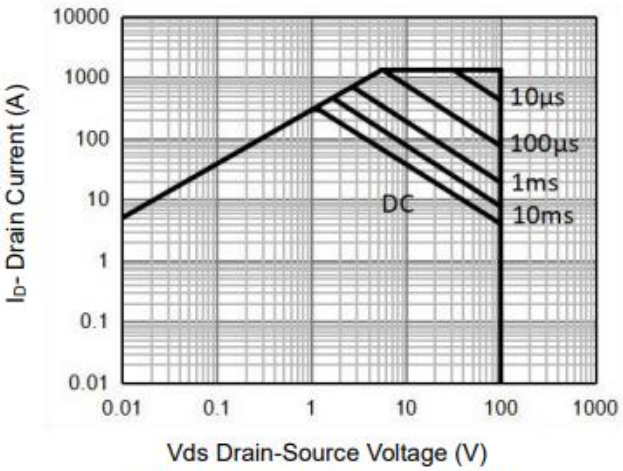


Figure 8 Safe Operation Area(Note 3)

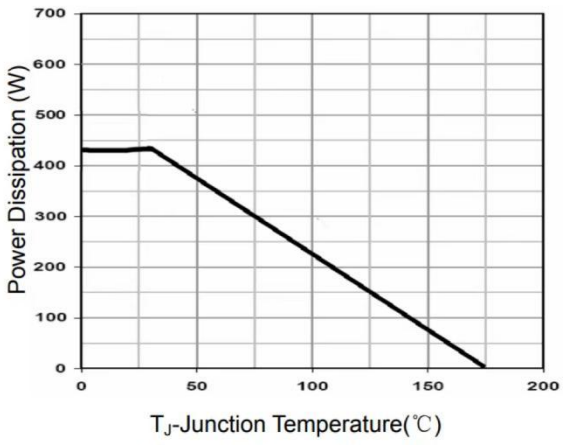


Figure 9 Power De-rating

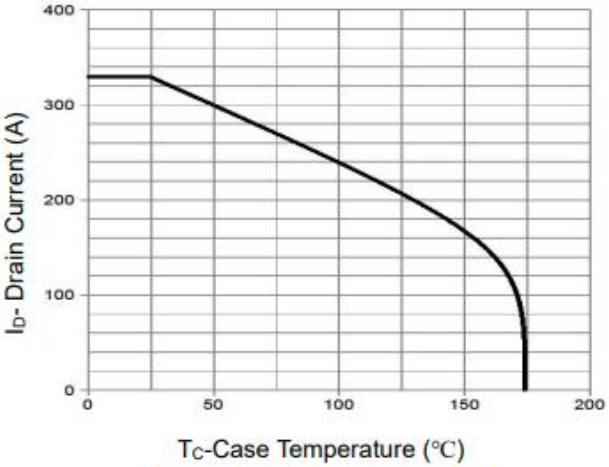


Figure 10 Current De-rating

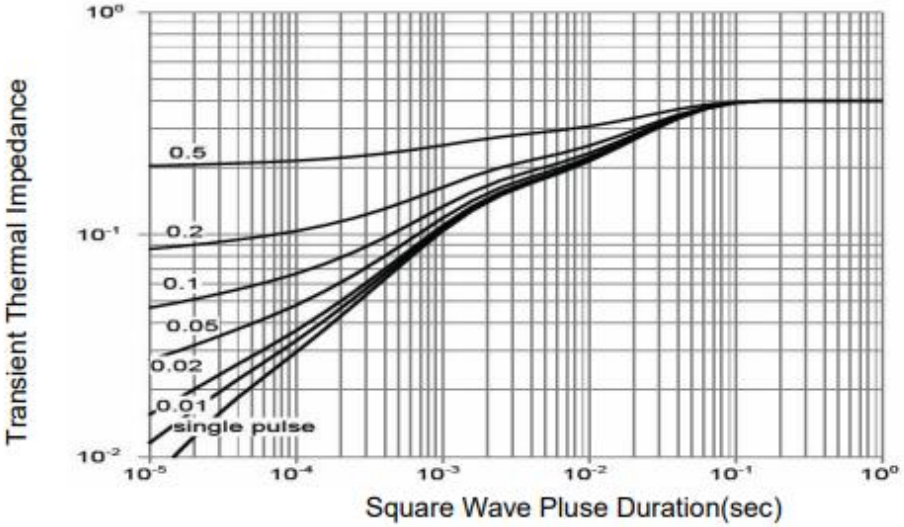
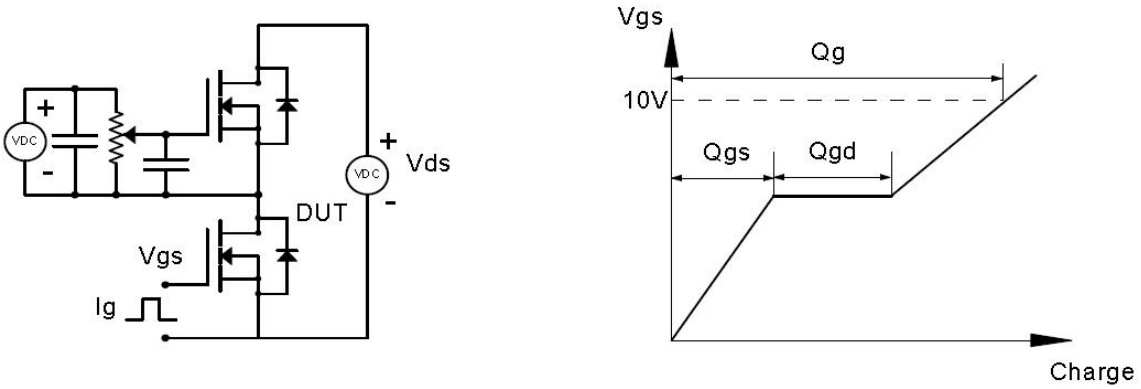


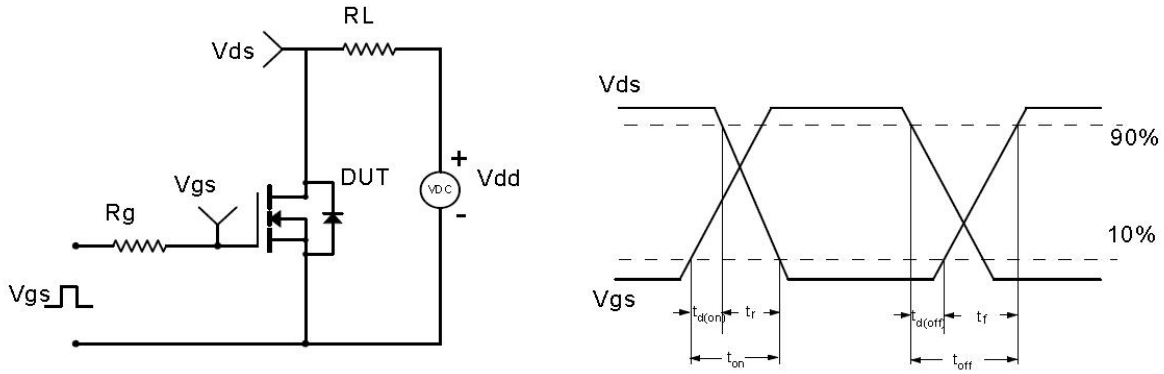
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit & Waveform

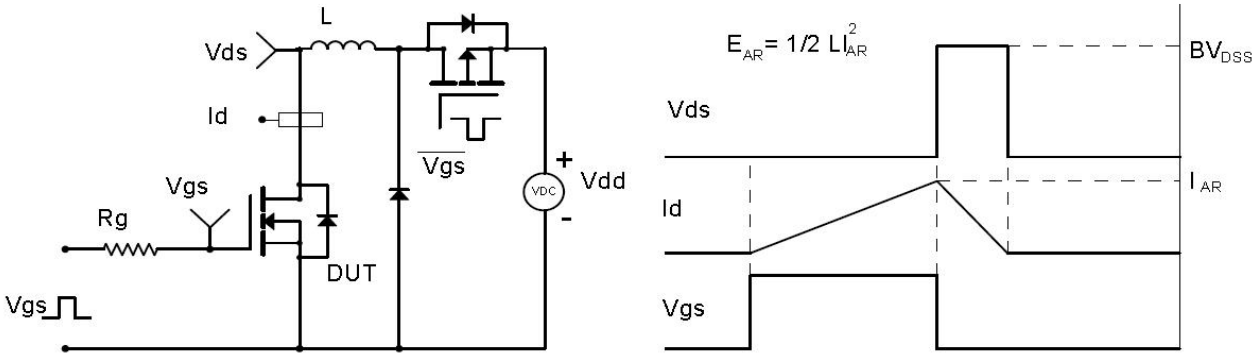
Gate Charge Test Circuit & Waveform



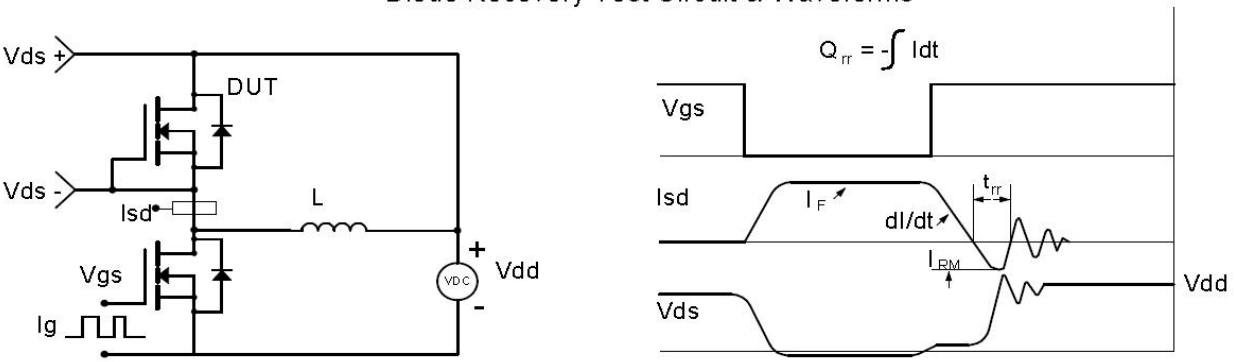
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: DFN5X6