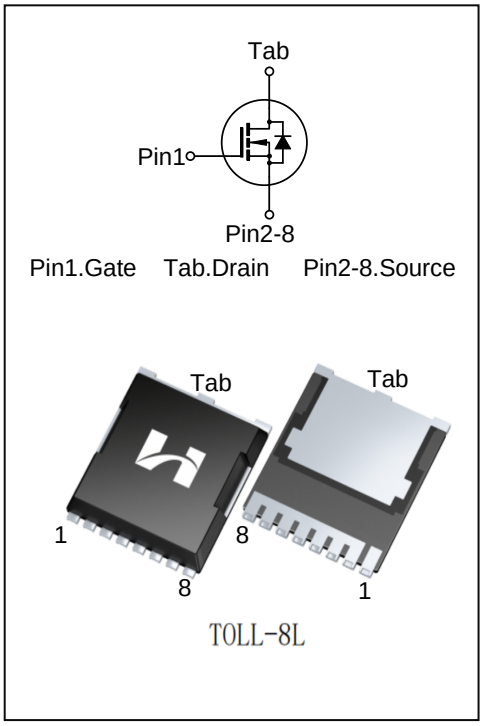
100V,320A N-CHANNEL POWER MOSFET



GENERAL DESCRIPTION

The SGL101R5T uses advanced SGT technology and design to provide excellent $R_{DS(on)}$ with low gate charge.
It can be used in a wide variety applications.

Features

- ◆V_{DS}=100V,I_D=320A
- ◆$R_{DS(on)}$
  TYP: 1.1mΩ@V_{GS}=10V

Applications

- ◆Power faction correction (PFC)
- ◆Switched mode power supplies (SMPS)
- ◆Uninterruptible power supply (UPS)
- ◆LED lighting power

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGL101R5T	TOLL-8L	SGL101R5T	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	T_C = 25°C	I_D	320	A
	T_C = 100°C		210	
Drain Current Pulsed (Note 1)		I_{DM}	1280	A
Power Dissipation(T_C=25°C)		P_D	321	W
-Derate above 25°C			2.14	W/℃
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	3200	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	300	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.39	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	45	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	100	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V	--	--	-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=250μA	2.2	--	3.8	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=150A	--	1.1	1.5	mΩ
		V_{GS}=6.0V, I_D=75A	--	1.3	1.7	mΩ
Dynamic Characteristics						
Gate Resistance	Rg	V_{GS}=0V; f=1.0MHZ	--	2.8	--	Ω
Input Capacitance	C_{iss}	V_{DS}=50V	--	17694	--	pF
Output Capacitance	C_{oss}	V_{GS}=0V	--	2681	--	
Reverse Transfer Capacitance	C_{rss}	f=1.0MHZ	--	66	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V V_{GS}=10V R_G=1.8Ω I_D=100A	--	47	--	ns
Turn-on Rise Time	t_r		--	85	--	
Turn-off Delay Time	$t_{d(off)}$		--	139	--	
Turn-off Fall Time	t_f		--	78	--	ns
Total Gate Charge	Q_g	V_{DD}=50V, I_D=100A V_{GS}=10V	--	239	--	nc
Gate-Source Charge	Q_{gs}		--	85	--	
Gate-Drain Charge	Q_{gd}		--	40	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	320	A
Pulsed Source Current	I_{SM}		--	--	1280	
Diode Forward Voltage	V_{SD}	I_S=100A,V_{GS}=0V	--		1.4	V
Reverse Recovery Time	T_{rr}	I_S=100A,V_R=80V, dIF/dt=100A/μS	--	111	--	ns
Reverse Recovery Charge	Q_{rr}		--	299	--	μC

1.Pluse width limited by maximum junction temperature

2.L=1.0mH, V_{DD}=80V, V_G=10V, R_G=25Ω, starting T_J=25°C

3.Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

4.Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. Output Characteristics

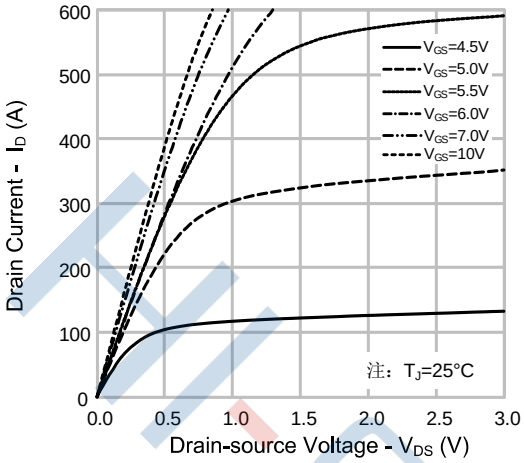


Figure 2. Transfer Characteristics

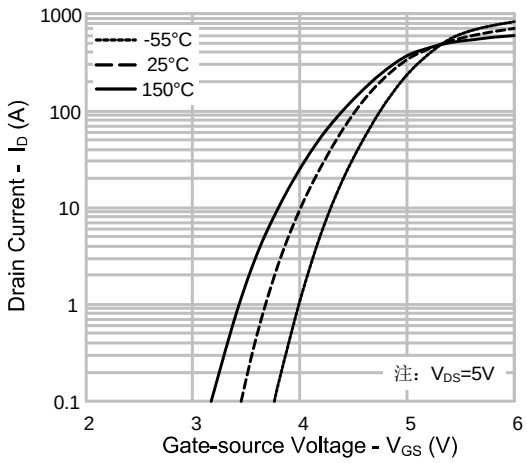


Figure 3. On-resistance vs. Drain Current

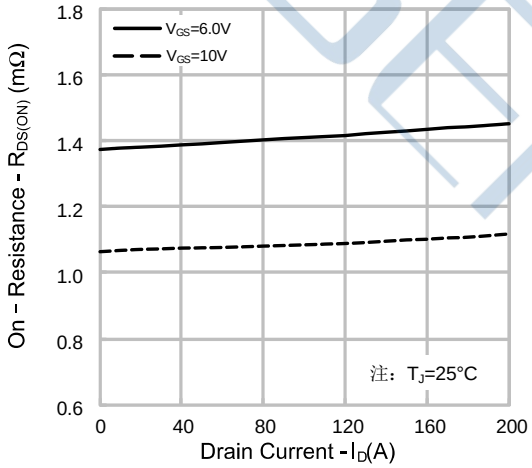


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

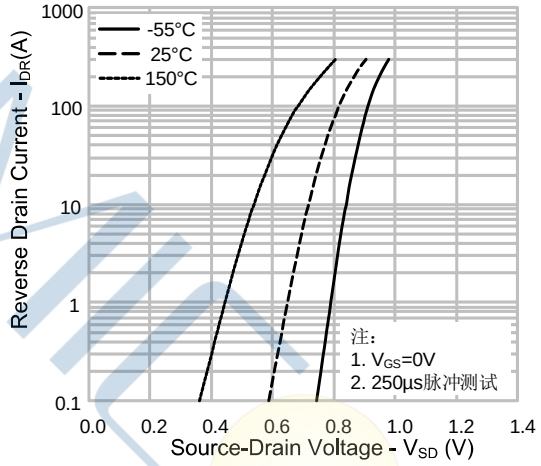


Figure 5. Capacitance Characteristics

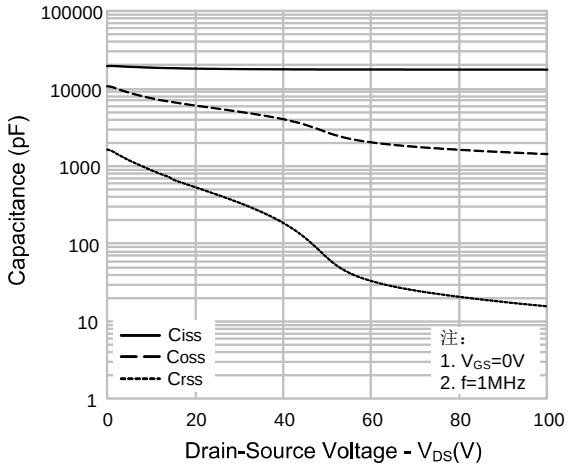
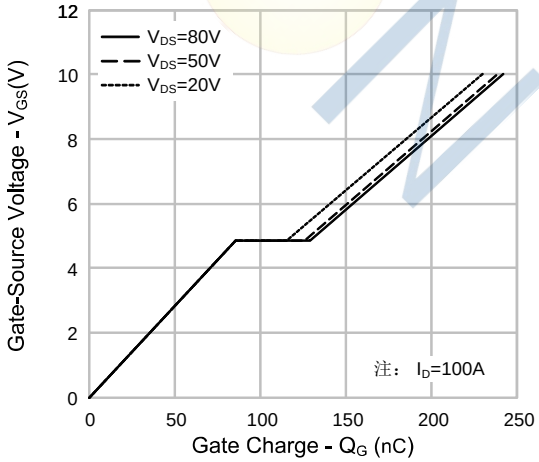


Figure 6. Gate Charge



Typical Performance Characteristics

Figure 7. Breakdown Voltage vs. Temperature Characteristics

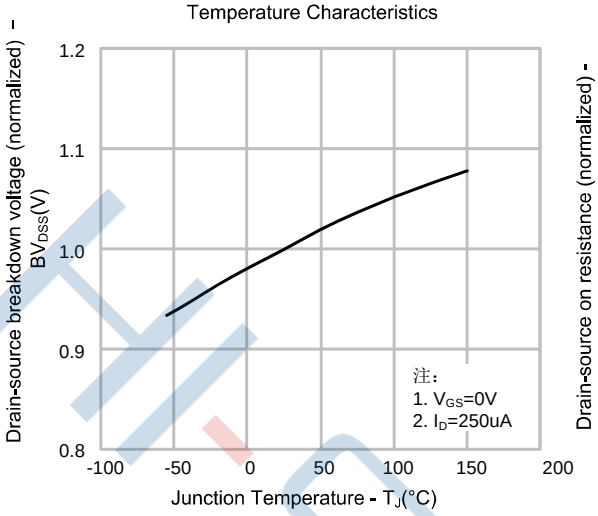


Figure 8. On-resistance vs. Temperature Characteristics

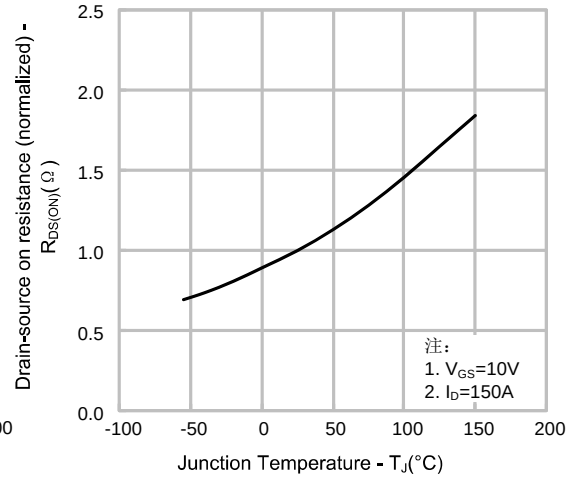
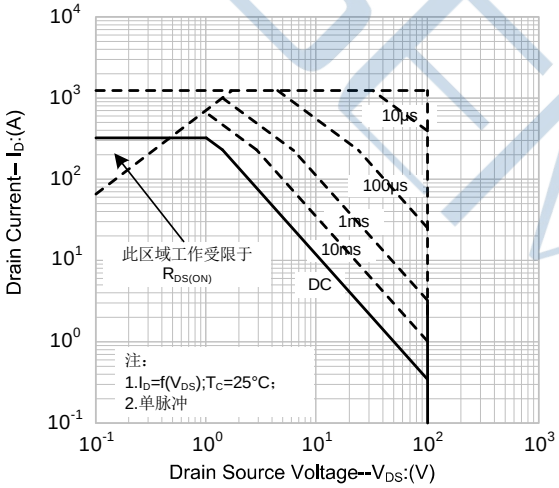
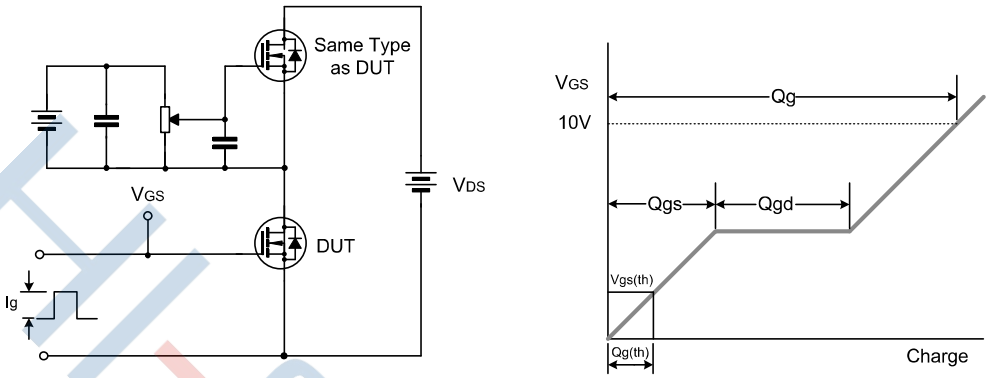


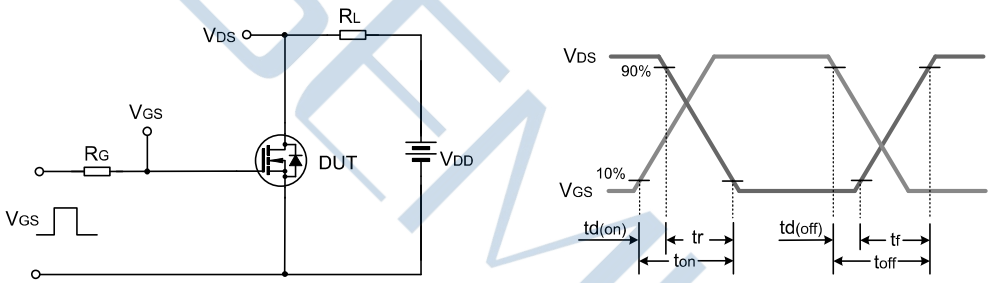
Figure 9. Max. Safe Operating



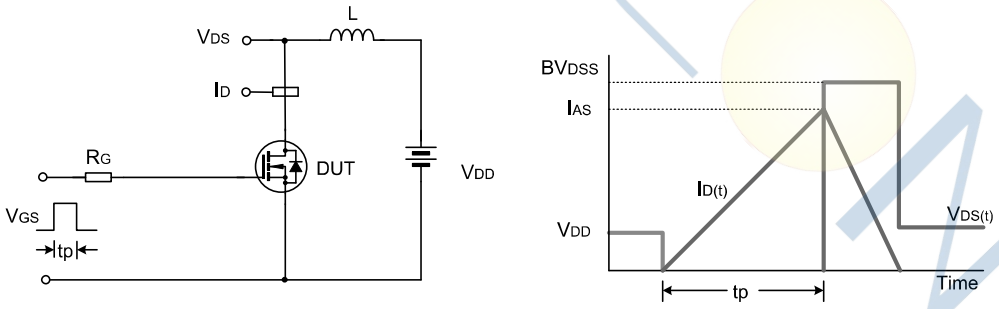
Test Circuit



Gate Charge Test Circuit & Waveform

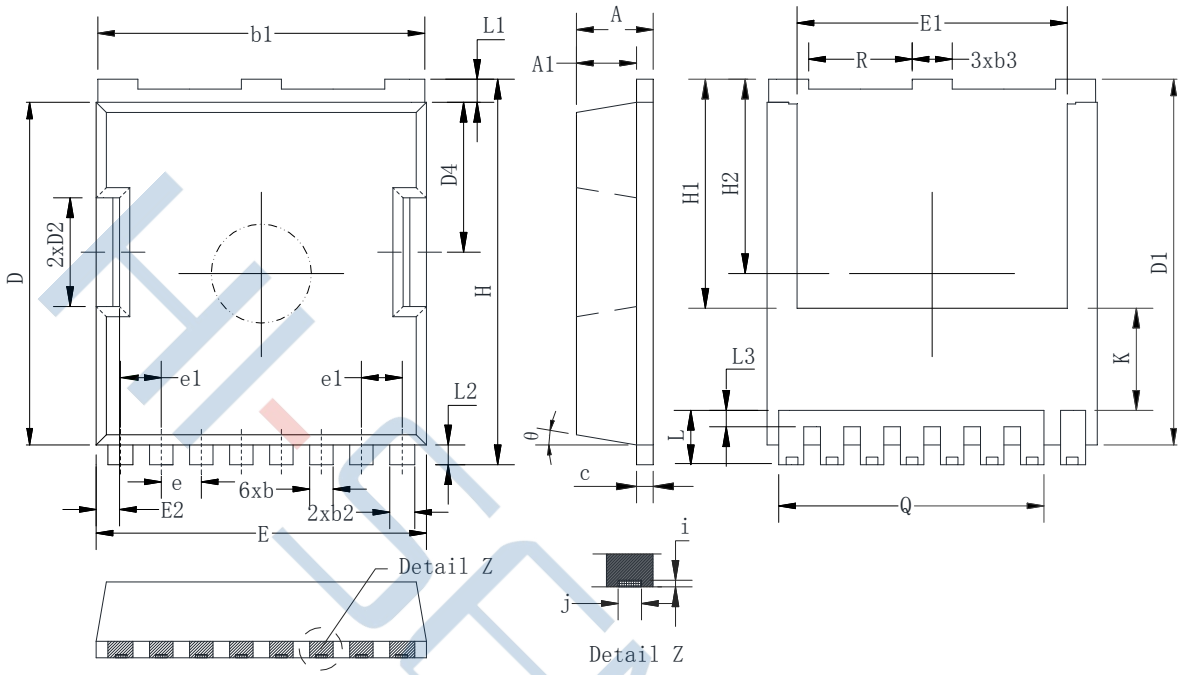


Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

Package Dimensions of TOLL-8L



Symbol	Min	Typ	Max		Symbol	Min	Typ	Max
A	2.25	2.30	2.35		E2	0.65	0.70	0.75
A1	1.75	1.80	1.85		H	11.60	11.70	11.80
b	0.65	0.70	0.75		H1	6.95 BSC		
b1	9.75	9.80	9.85		H2	5.90 BSC		
b2	0.70	0.75	0.80		i	0.10 REF		
b3	1.15	1.20	1.25		j	0.35 REF		
c	0.45	0.50	0.55		K	3.10 REF		
D	10.35	10.40	10.45		L	1.55	1.65	1.75
D1	11.00	11.10	11.20		L1	0.65	0.70	0.75
D2	3.25	3.30	3.35		L2	0.50	0.60	0.70
D4	4.50	4.55	4.60		L3	0.40	0.50	0.60
e	1.20 BSC				Q	7.95 REF		
e1	1.225 BSC				R	3.05	3.10	3.15
E	9.85	9.90	9.95		θ	10°REF		
E1	8.00	8.10	8.20					

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