RST025N12SM10

N-MOSFET TOLL 120V,220A,2.1mΩ

Features

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

Application

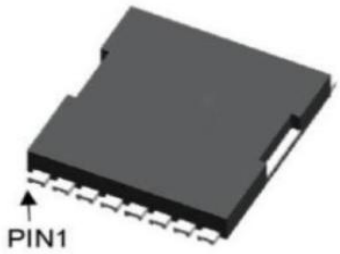
- Motor control and drive
- Battery management
- DC/DC

Product Summary

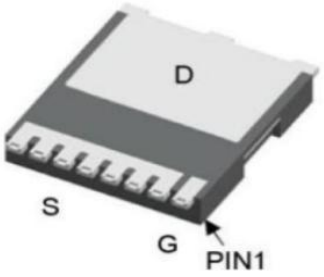
Package	TOLL
V_{DS}	120V
$R_{DS(on)@VGS=10V}$	2.1mΩ
I_D	220A

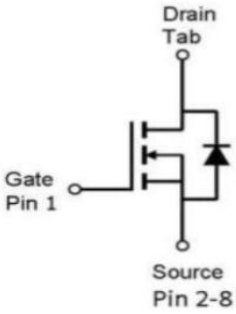
Package Marking

TOLL Top View



TOLL Bottom View





Type	Package	Marking	Reel Size	Tape Width	Packing	Qty
RST025N12SM10	TOLL	LR025N12SM10	330*28.5mm	24mm	Reel&Tape	2000

Maximum Ratings (TC=25℃unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous drain current T_c=25℃（Silicon limit） T_c=100℃（Silicon limit）	I_D	 220 129	A
Pulsed Drain Current	I_{DM}	880	A
Maximum Power Dissipation	P_d	250	W
Single pulse avalanche energy	E_{AS}	1849	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	R_{thJC}	0.5	℃/W
Thermal resistance, junction-to-ambient	R_{thJA}	40	

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	min	typ	max	Unit
Static Characteristic						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	120	132	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=VGS, I_D=250uA	2	3.4	4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=120V,V_{GS}=0V	-	-	1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Drain-source on-state resistance	$R_{DS(on)}$	I_D=50A,V_{GS}=10V	-	2.1	2.5	mΩ
Forward transconductance	g_{fs}	I_D=50A,V_{DS}=5V	-	159	-	S
Dynamic Characteristic						
Input Capacitance	C_{iss}	V_{DS}=40V,V_{GS}=0V, f=1MHz	-	9318	-	pF
Output Capacitance	C_{oss}		-	2859	-	
Reverse Transfer Capacitance	C_{rss}		-	156	-	
Gate resistance	Rg	f=1MHz	-	2.2	-	Ω
Gate Total Charge	Q_G	V_{DS}=60V,I_D=50A, V_{GS}=10V	-	144	-	nC
Gate-Source charge	Q_{gs}		-	48	-	
Gate-Drain charge	Q_{gd}		-	35	-	
Turn-on delay time	$t_{d(on)}$	V_{GS}=10V, V_{DS}=60V, R_G=3Ω	-	58	-	ns
Rise time	t_r		-	90	-	
Turn-off delay time	$t_{d(off)}$		-	102	-	
Fall time	t_f		-	91	-	

Body Diode Characteristic

Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=100A	-	-	1.1	v
Reverse Recovery Time	t_{rr}	I_F =50A di/dt = 100A/μs	-	85	-	ns
Reverse Recovery Charge	Q_{rr}		-	182	-	nC

Typical Performance Characteristics

Fig.1 Typ. transfer characteristics

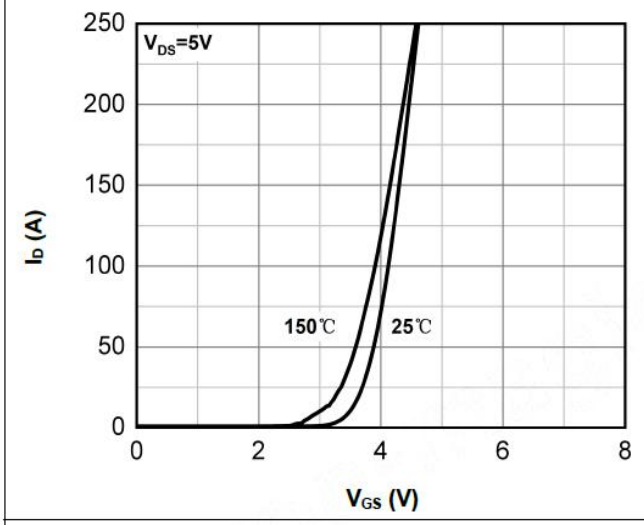


Fig.2 Typ. output characteristics

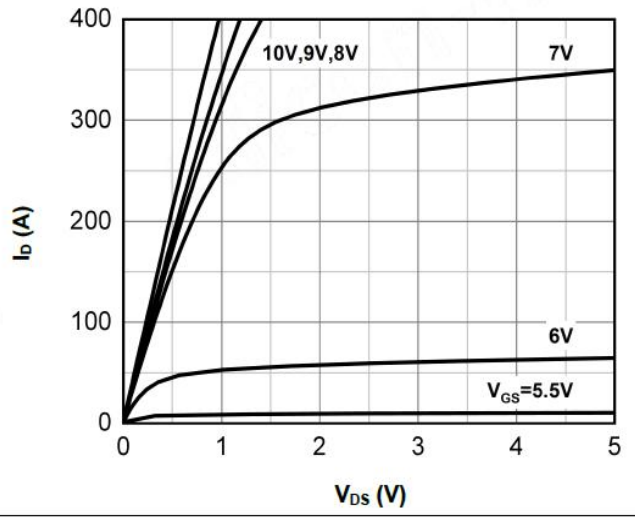


Fig.3 Normalized on-resistance vs drain current

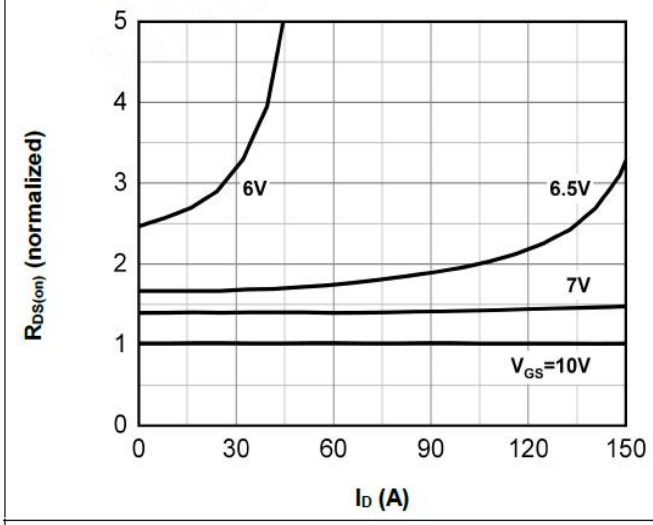


Fig.4 Typ. on-resistance vs gate-source voltage

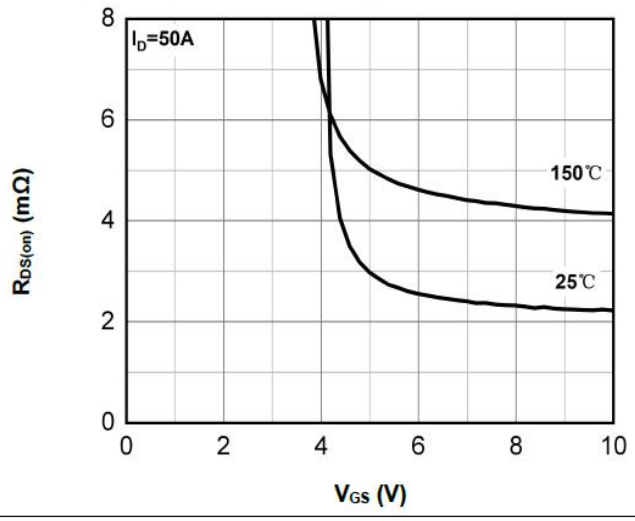


Fig.5 Normalized on-resistance vs junction temperature

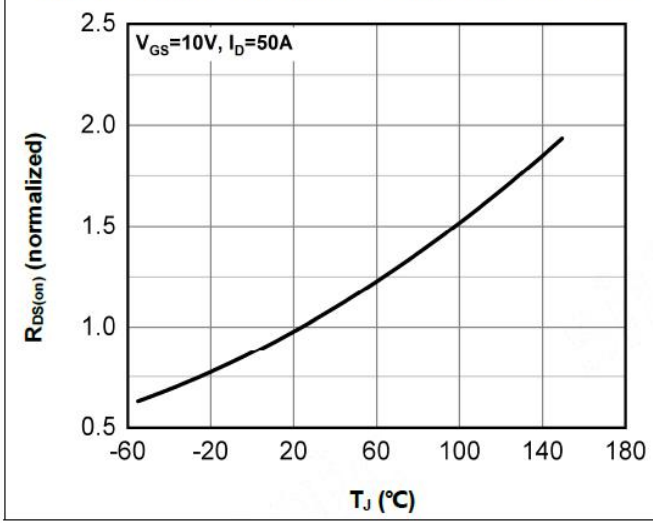


Fig.6 Typ. gate charge

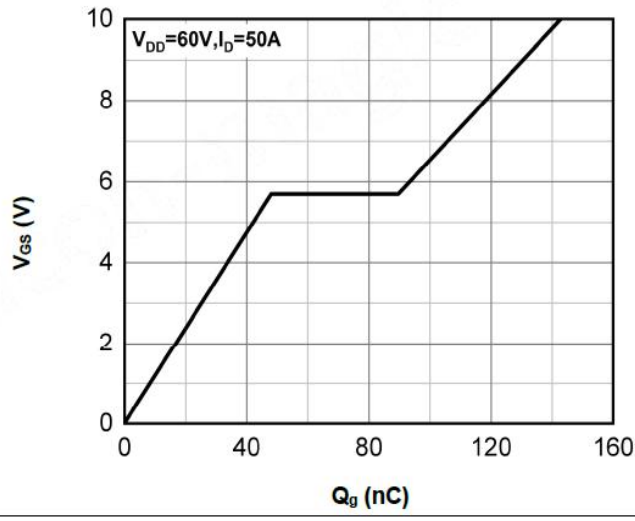


Fig.7 Typ. forward characteristics of body diode

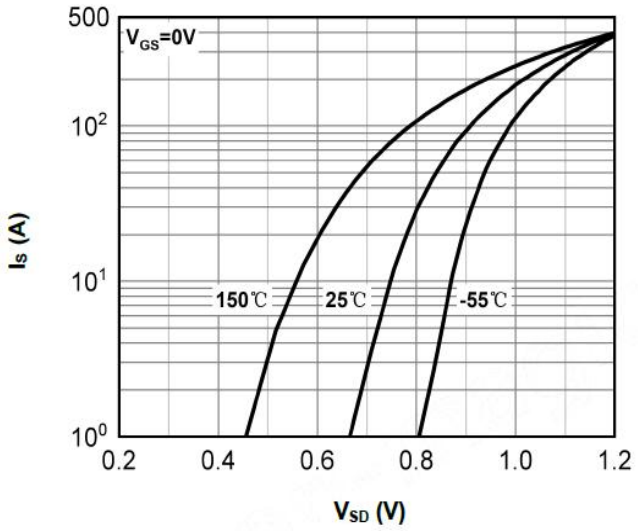


Fig.8 Safe operating area

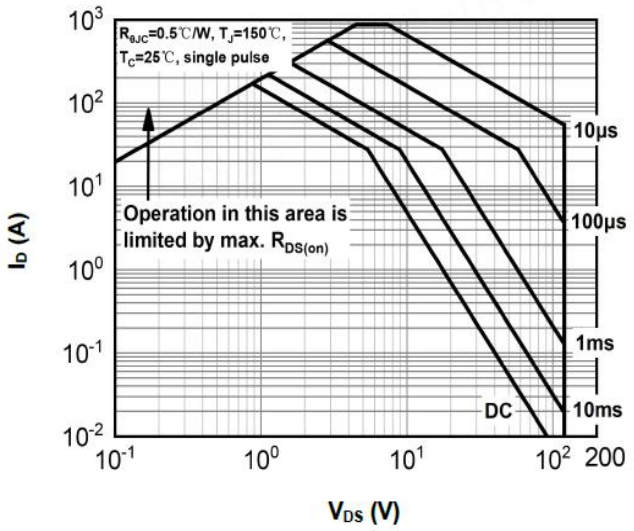


Fig.9 Typ. Capacitance

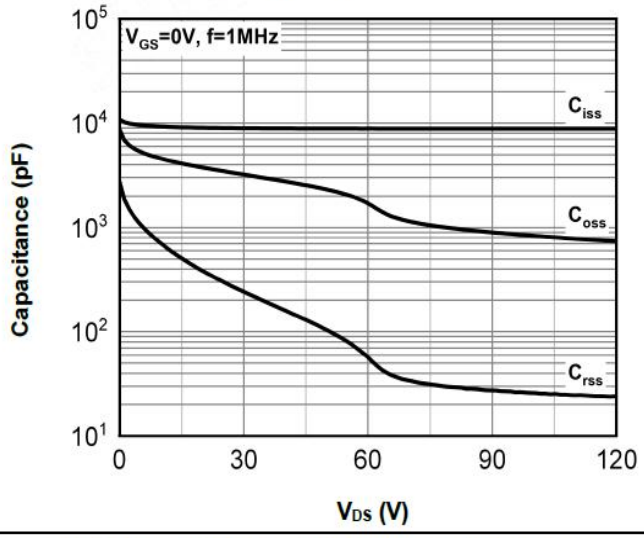


Fig.10 Single pulse maximum power dissipation

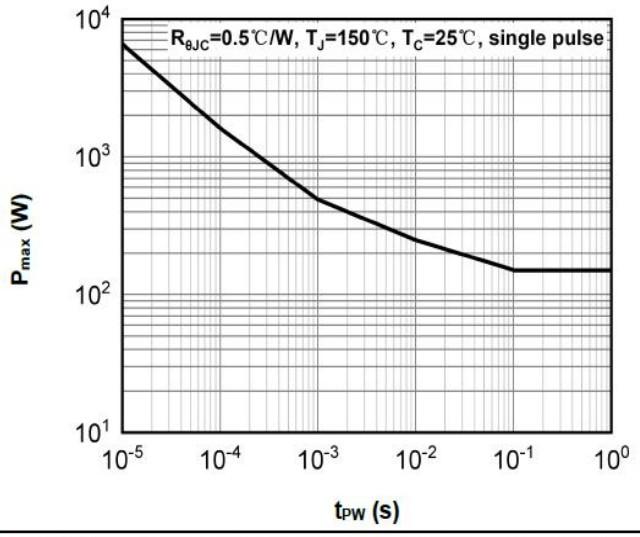


Fig.11 Max. power dissipation vs case temperature

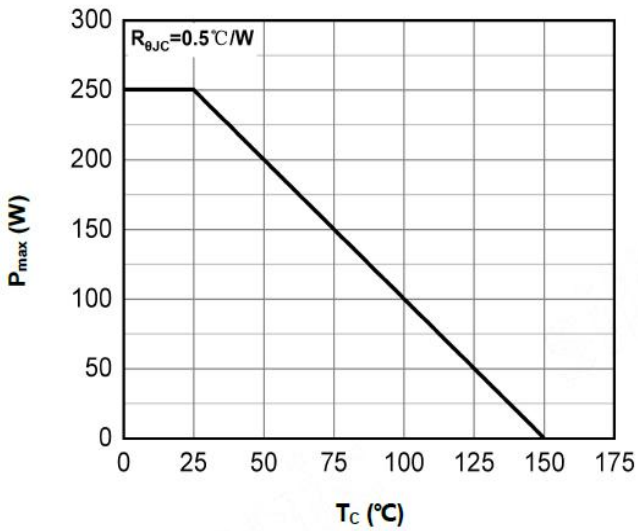


Fig.12 Max. continuous drain current vs case temperature

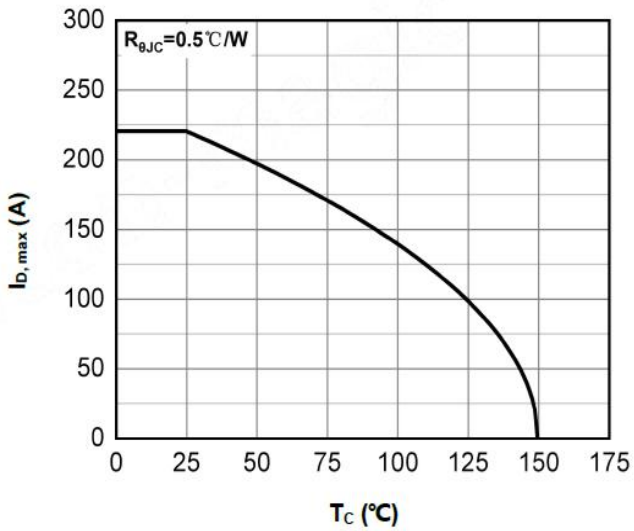


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

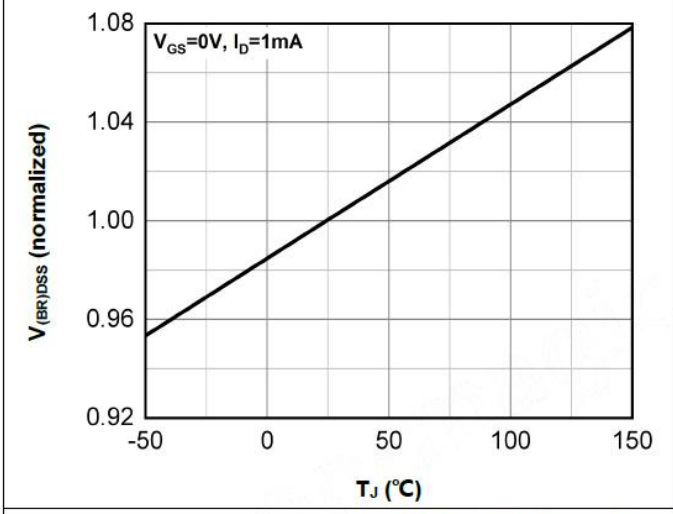


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

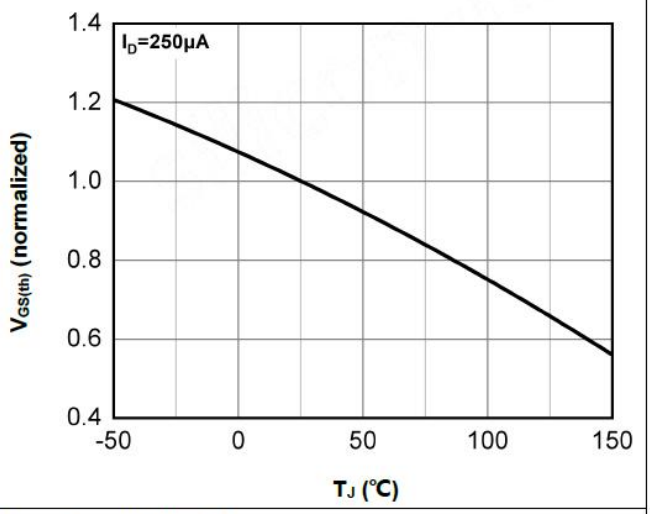
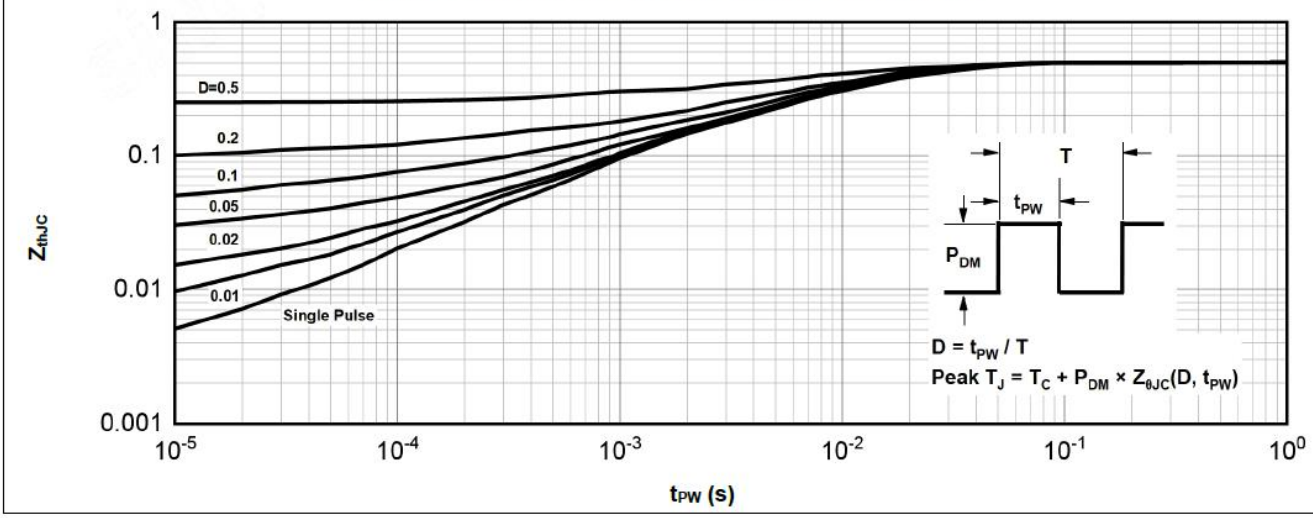
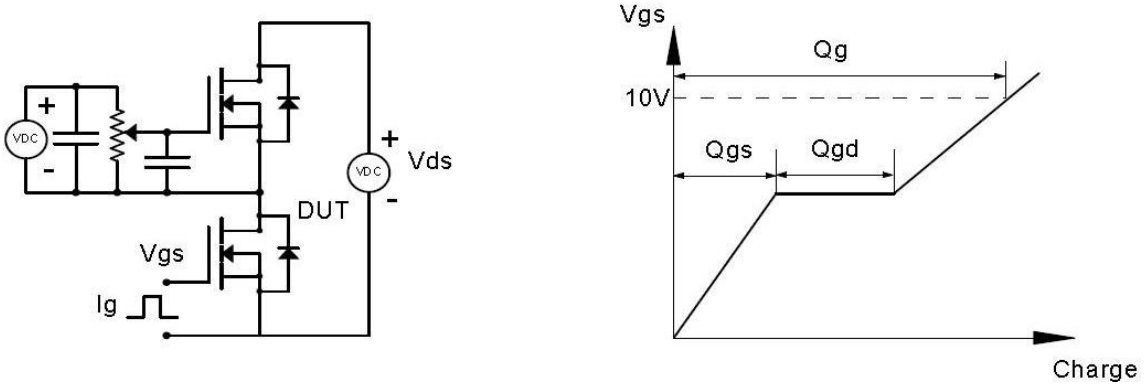


Fig.15 Transient thermal impedance from junction to case

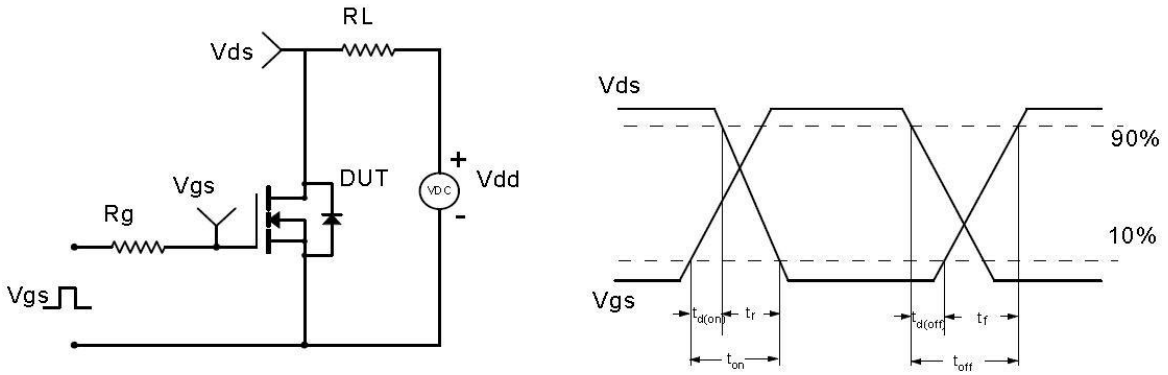


Test Circuit & Waveform

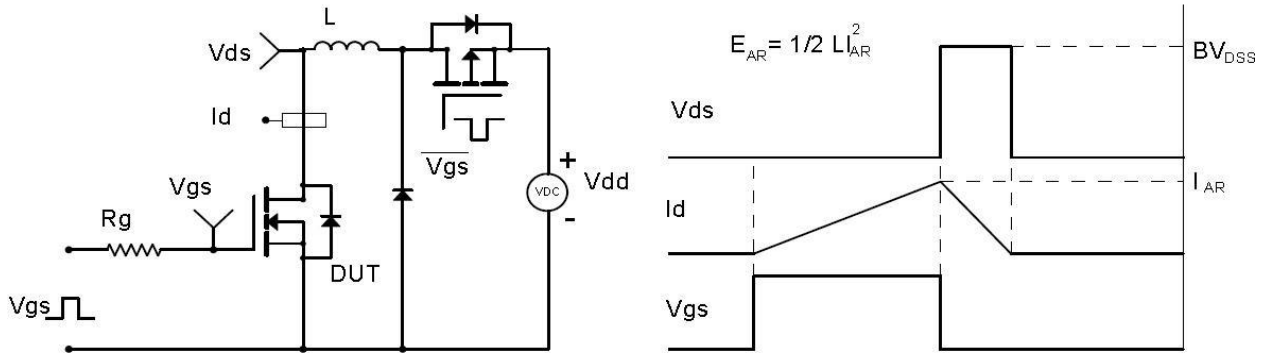
Gate Charge Test Circuit & Waveform



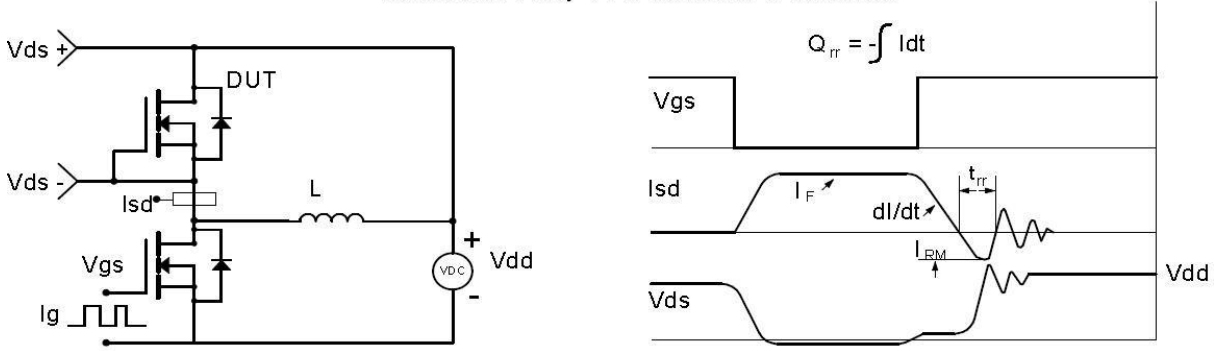
Resistive Switching Test Circuit & Waveforms



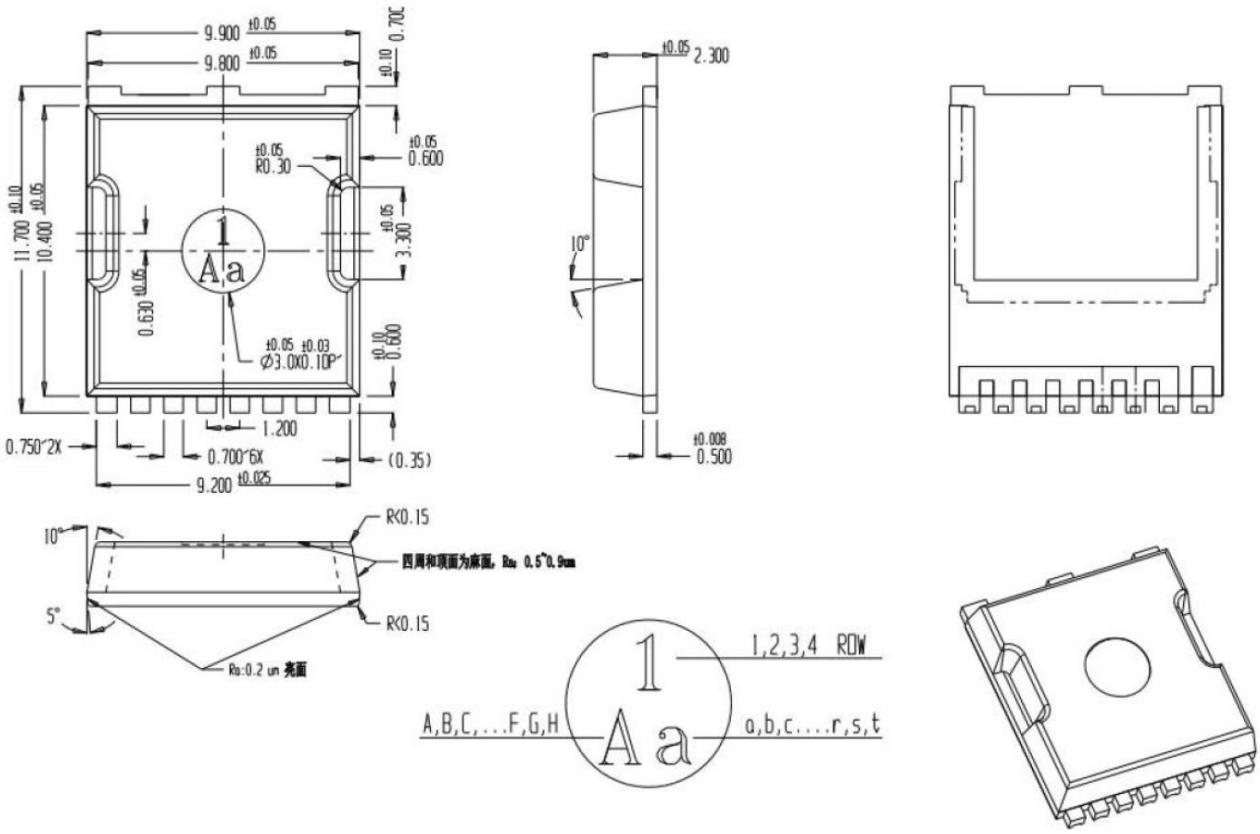
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline:TOLL



Revision History:

Revision	Date	Major changes
1.0	2025/6/6	Release of Preliminary version.
2.0	2025/9/23	Release of official version.