YINPENGWEI EIECTRONIC

40V N-Channel SGT MOSFET(Preliminary)

PW4022L

General Description

- Trench Power SGT technology
- Very low on-resistance $R_{DS(ON)}$
- Low Gate Charge
- Excellent Gate Charge x $R_{DS(ON)}$ Product

Applications

- High Frequency Switching and Synchronous Rectification

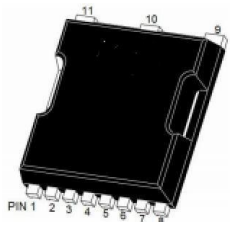
Product Summary

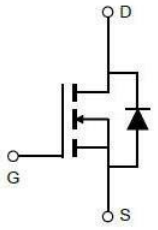
V_{DS}	40V
I_D (at V_{GS} =10V)	220A
$R_{DS(ON)}$ (at V_{GS} =10V)	0.78 mΩ

100% DVDS Tested
100% UIS Tested

RoHS

Toll





Part Number	Package Type	Form	Marking
PW4022L	TOLL	Reel	PW4022L

Absolute Maximum Ratings (T_A =25°C unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C =25°C	I_D	220	A
	T_C =100°C		120	
Pulsed Drain Current A		I_{DM}	520	A
Avalanche Current A		I_{AS}	50	A
Single Pulse Avalanche Energy	L =0.5mH B	E_{AS}	720	mJ
Power Dissipation T_C =25°C		P_D	240	W
-Derating factor			2	W/°C
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	1.0	°C/W
Maximum Junction-to-Ambient	Steady-State	$R_{\theta JA}$	50	

Electrical Characteristics(T_J =25ºC unless otherwise noted)							
Symbol	**Parameter**	**Conditions**		**Value**			**Units**
				Min	**Typ**	**Max**	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D =250μA,V_{GS} =0V		40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =40V, V_{GS} =0V	T_J =25ºC			1	μA
			T_J =125ºC			100	
I_{GSS}	Gate-Body Leakage Current	V_{DS} =0V, V_{GS} =±20V				±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250μA		1.0	1.7	2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =20A			0.78	0.9	mΩ
g_{FS}	Forward Transconductance	V_{DS} =10V, I_D =10A			60		S
V_{SD}	Diode Forward Voltage	I_S =20A, V_{GS} =0V				1.2	V
I_S	Maximum Body-Diode Continuous Current					120	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =20V, f =1MHz			5332		pF
C_{oss}	Output Capacitance				2120		
C_{rss}	Reverse Transfer Capacitance				92		
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS} =10V,V_{DS} =20V, I_D =65A			84		nC
Q_{gs}	Gate Source Charge				30		
Q_{gd}	Gate Drain Charge				17		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =15V, I_D =90A, R_G =1.6Ω			12		ns
t_r	Turn-On Rise Time				48		
$T_{D(off)}$	Turn-Off Delay Time				24		
t_f	Turn-Off Fall Time				9.2		
t_{rr}	Body Diode Reverse Recovery Time	I_F =60A, di/dt =100A/μs			24		ns
Q_{rr}	Body Diode Reverse Recovery Charge				44		nC

A. Single pulse width limited by maximum junction temperature.

B. Tj=25℃,VDD=25V,VG=10V,L=0.5mH,Rg=25Ω

C. The power dissipation P_D is based on $T_{J(MAX)}$ =150ºC, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

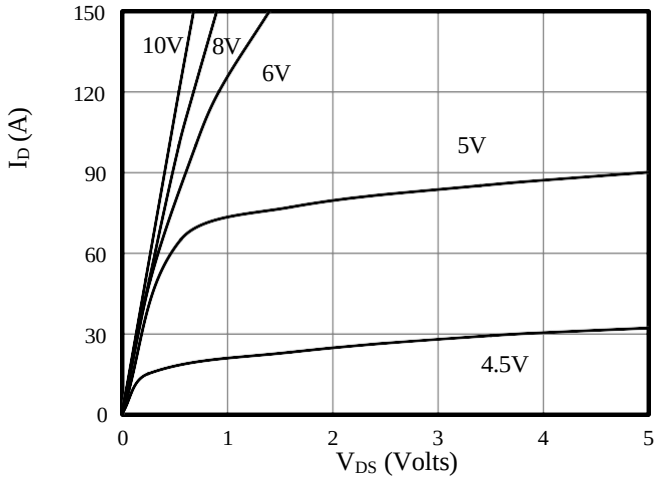


Figure 1: On-Region Characteristics

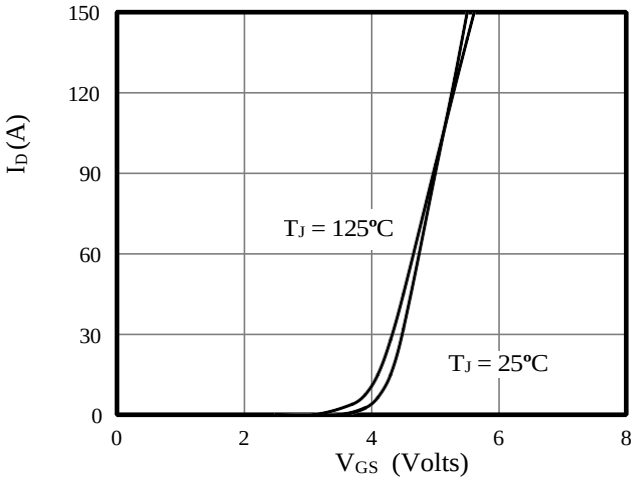


Figure 2: Transfer Characteristics

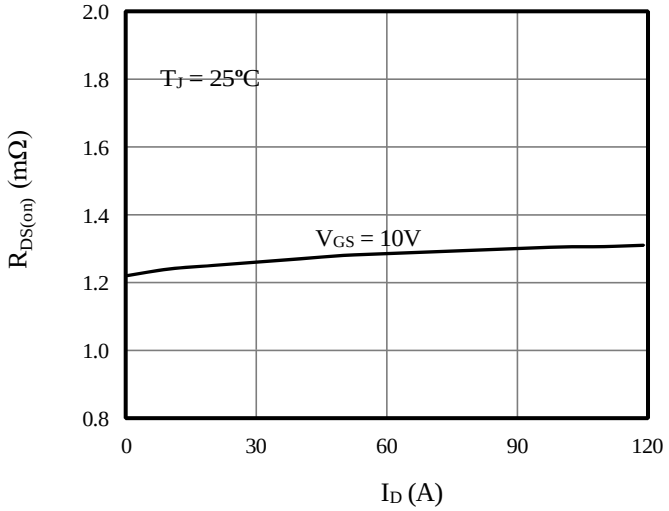


Figure 3: On-Resistance vs. Drain Current

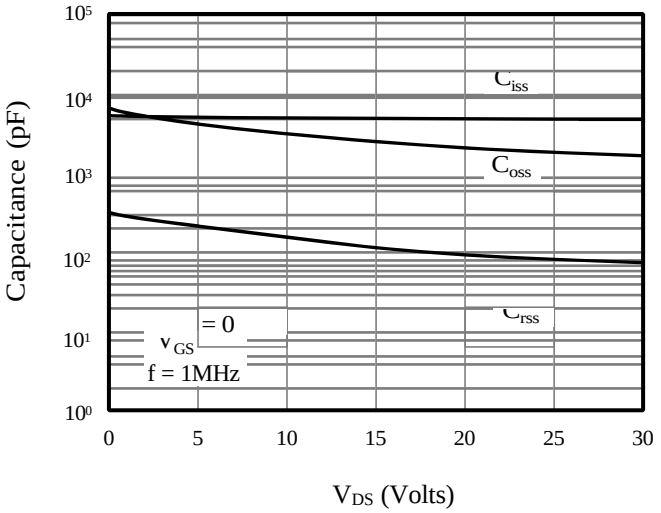


Figure 4: Capacitance Characteristics

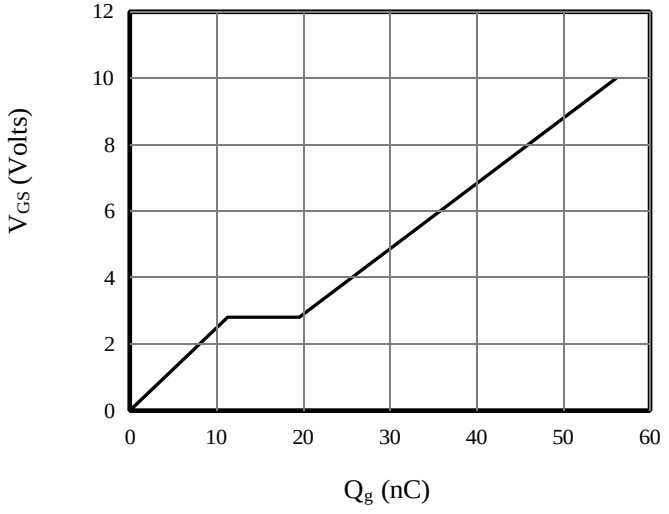


Figure 5: Gate Charge Characteristics

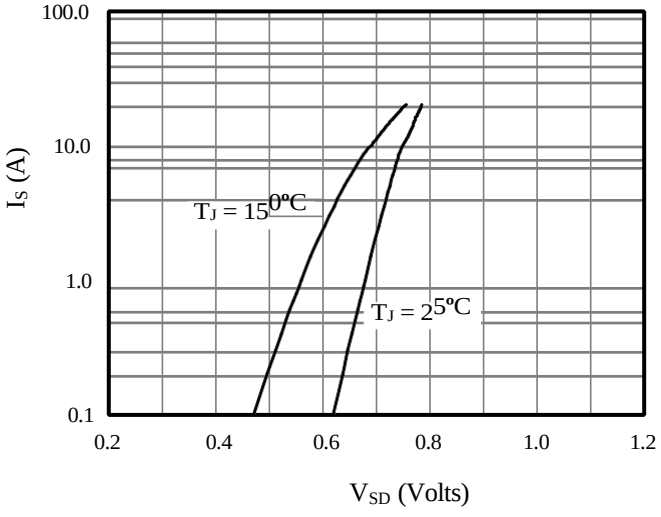


Figure 6: Body Diode Forward Voltage

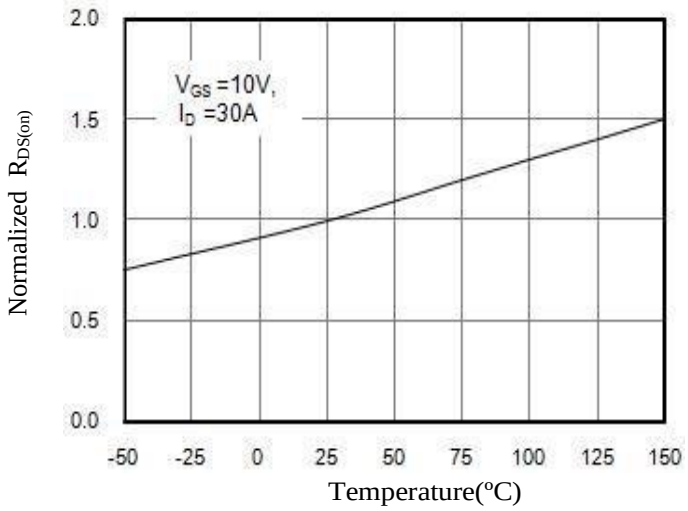


Figure 7: On-Resistance vs. Junction Temperature

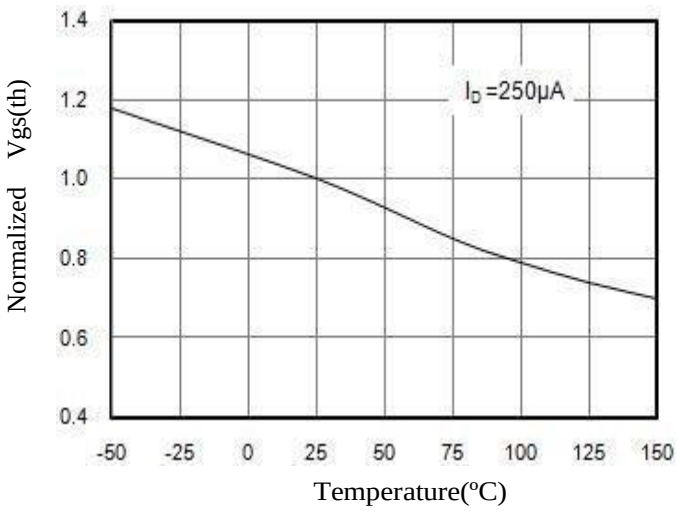


Figure 8: Vgs(th) vs. Junction Temperature

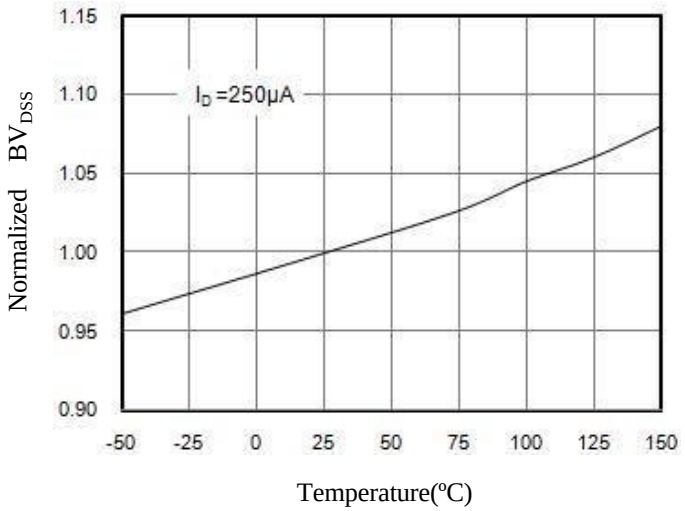


Figure 9: BV_{DSS} vs. Junction Temperature

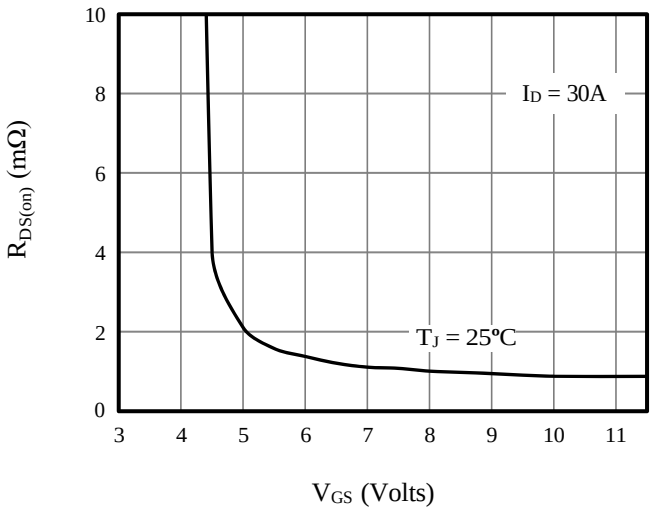


Figure 10: On-Resistance vs. Gate-Source Voltage

Figure A：Gate Charge Test Circuit and Waveforms

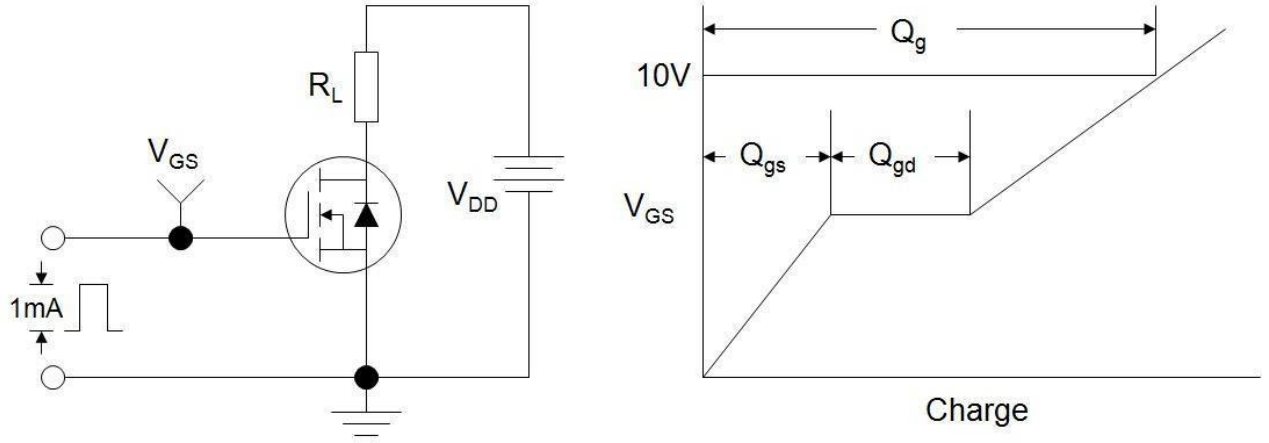


Figure B：Resistive Switching Test Circuit and Waveforms

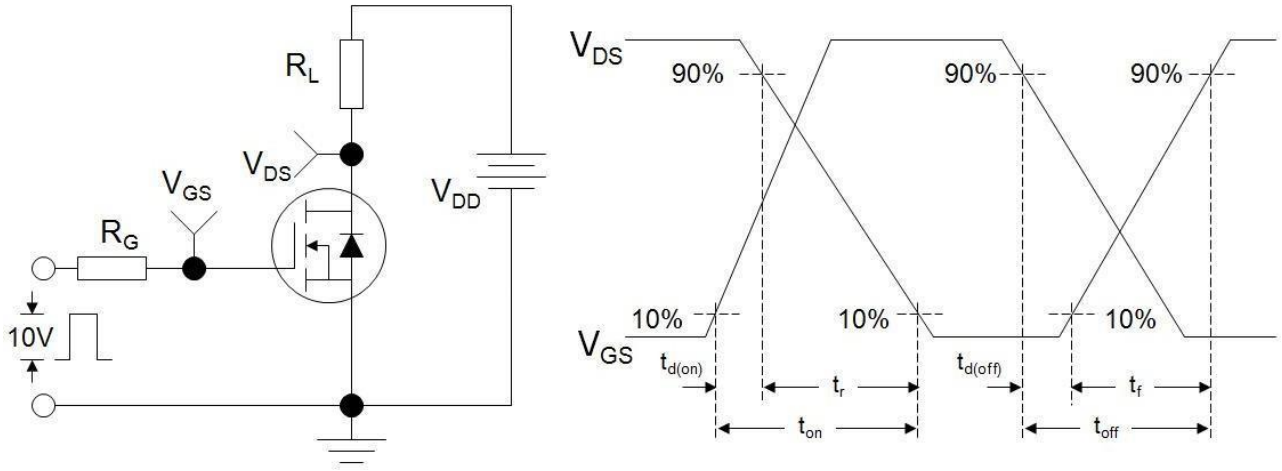
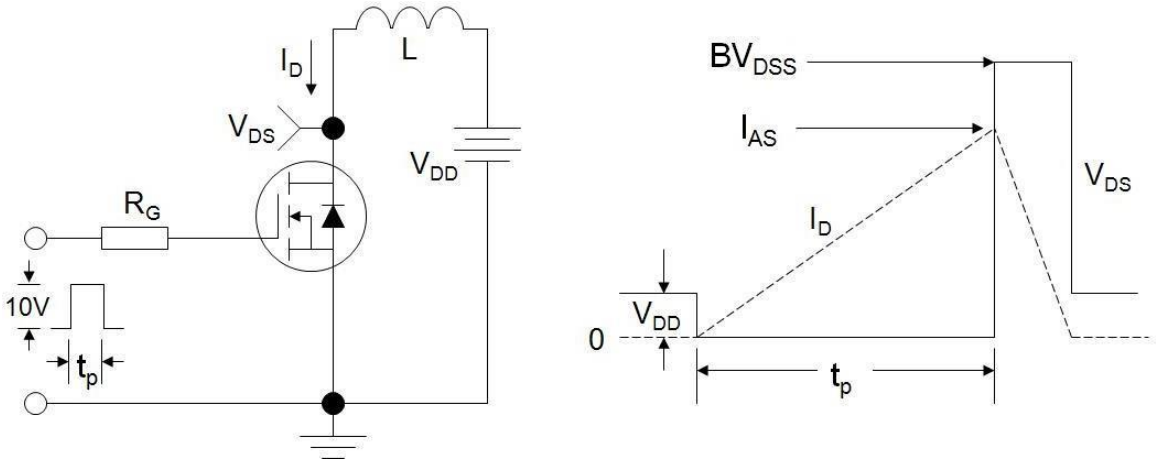
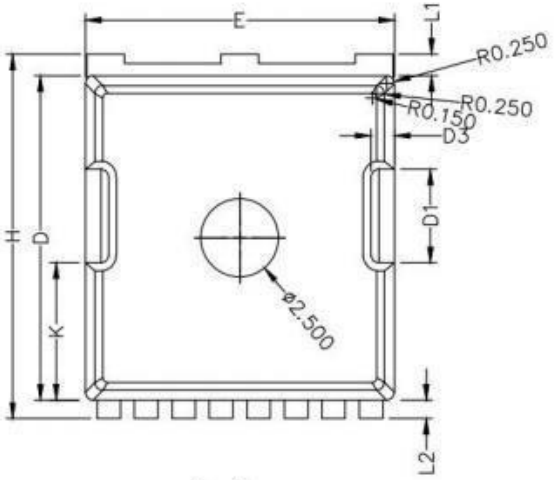


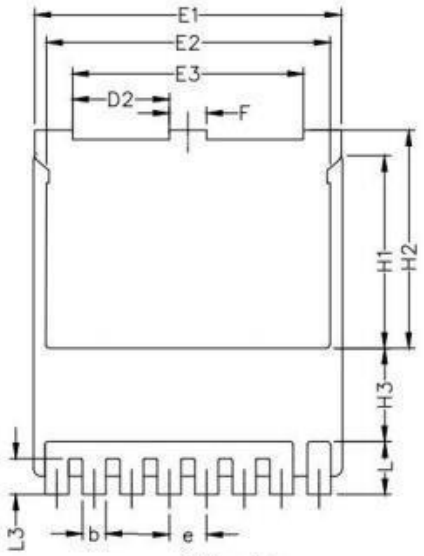
Figure C：Unclamped Inductive Switching (UIS) Test Circuit and Waveforms



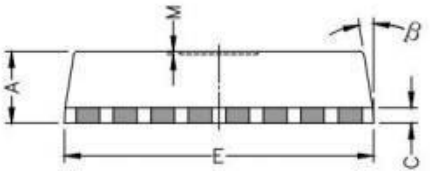
TOLL



Top View



Bottom View



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C	0.508 REF		
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3	0.75 REF		
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e	1.20 BSC		
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3	3.00 BSC		
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M	0.08 REF		
β	8°	10°	12°
K	4.25	4.40	4.55