HUASHUO SEMICONDUCTOR

HSY012N10

N-Ch 100V Fast Switching MOSFETs

General Description

- 100% EAS Guaranteed
- Green Device Available
- Super Low $R_{DS(ON)}$
- Advanced high cell density Trench technology

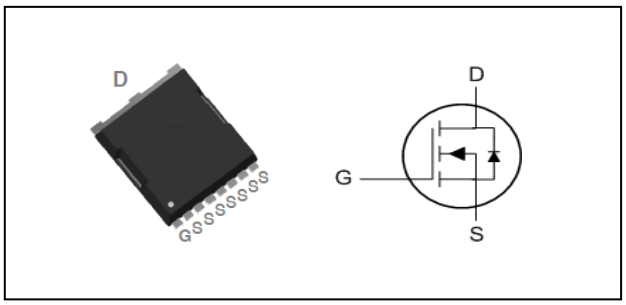
Product Summary

V_{DS}	100	V
$R_{DS(ON),max}$	1.25	mΩ
I_D	300	A

Applications

- MOTOR Driver.
- UPS.
- Power Tools.
- Synchronous Rectiffcation in SMPS.

TOLL Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	300	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	265	A
I_{DM}	Pulsed Drain Current[2]	1200	A
EAS	Single Pulse Avalanche Energy[3]	2800	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	500	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	40	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	0.25	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=50A	---	1.25	1.7	mΩ
		V_{GS}=6V , I_D=50A	---	2.2	4	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.0	---	4.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V , V_{GS}=0V , T_J=125℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Qg	Total Gate Charge (10V)	V_{DS}=50V , V_{GS}=10V , I_D=50A	---	160	---	nC
Qgs	Gate-Source Charge		---	70	---	
Qgd	Gate-Drain Charge		---	60	---	
Td(on)	Turn-On Delay Time	V_{DD}=50V , V_{GS}=10V , R_G=4.5Ω, R_L=1Ω,I_D=50A	---	40	---	ns
Tr	Rise Time		---	128	---	
Td(off)	Turn-Off Delay Time		---	150	---	
Tf	Fall Time		---	118	---	
Ciss	Input Capacitance	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	11370	---	pF
Coss	Output Capacitance		---	1720	---	
Crss	Reverse Transfer Capacitance		---	188	---	

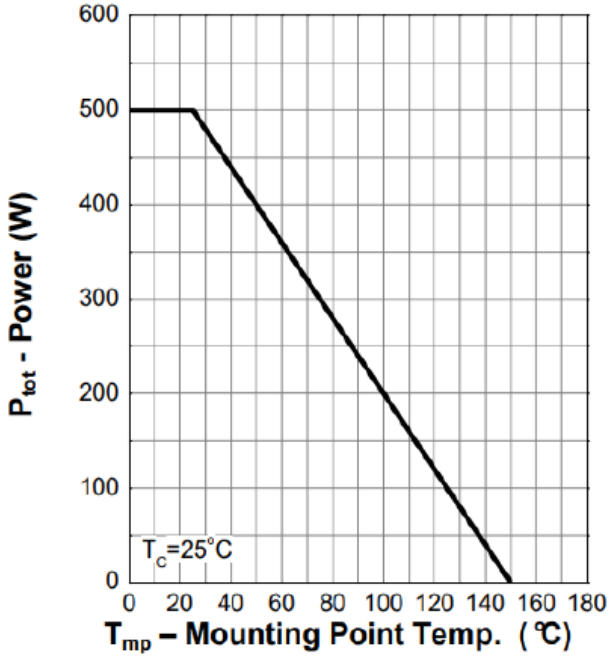
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=50A , T_J=25℃	---	---	1.1	V

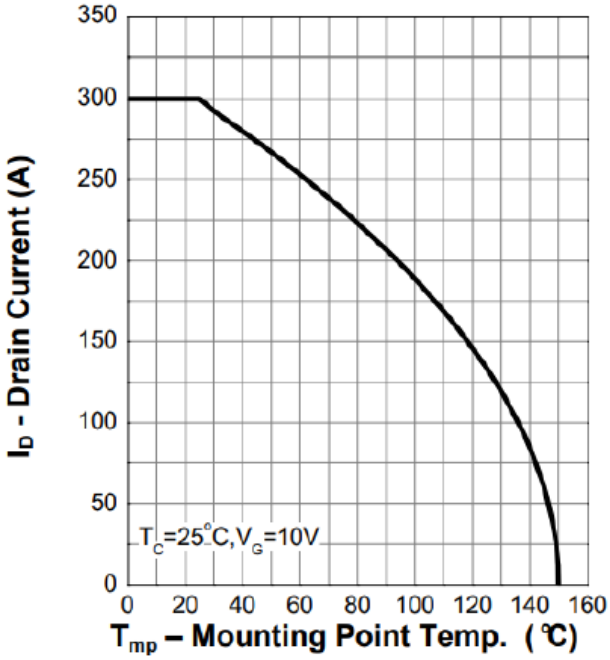
Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
5.Package limitation current.

Typical Characteristics

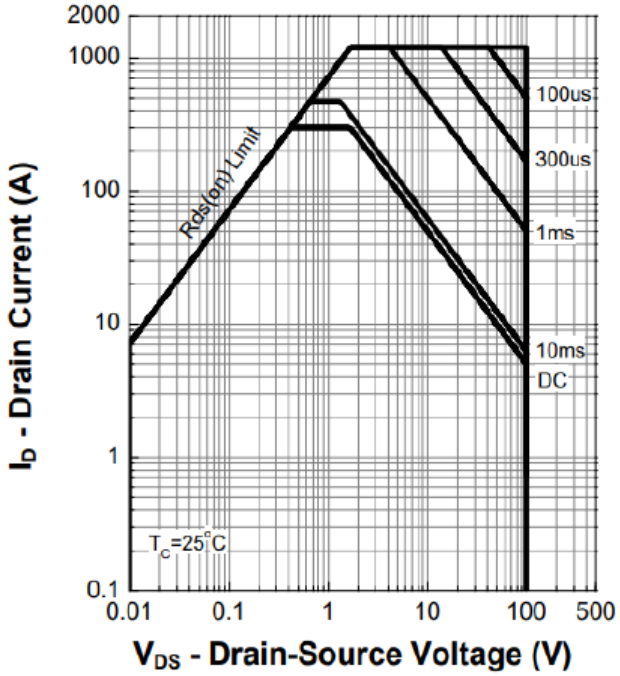
Power Capability



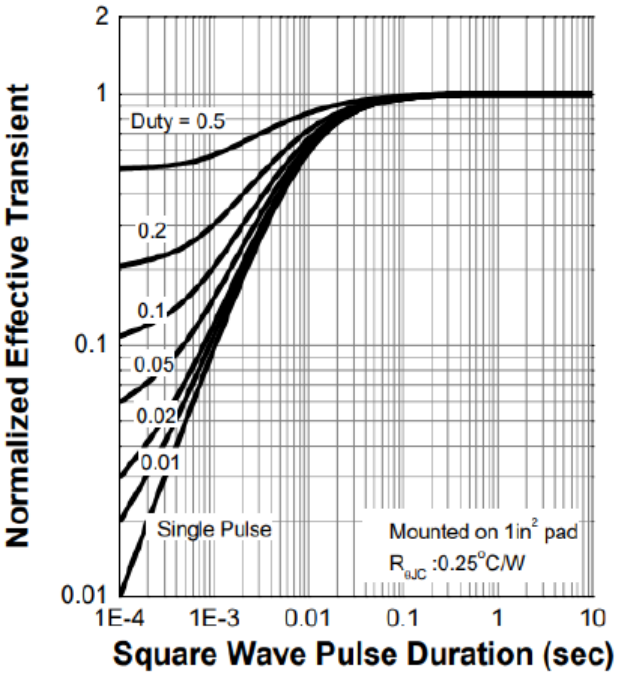
Current Capability

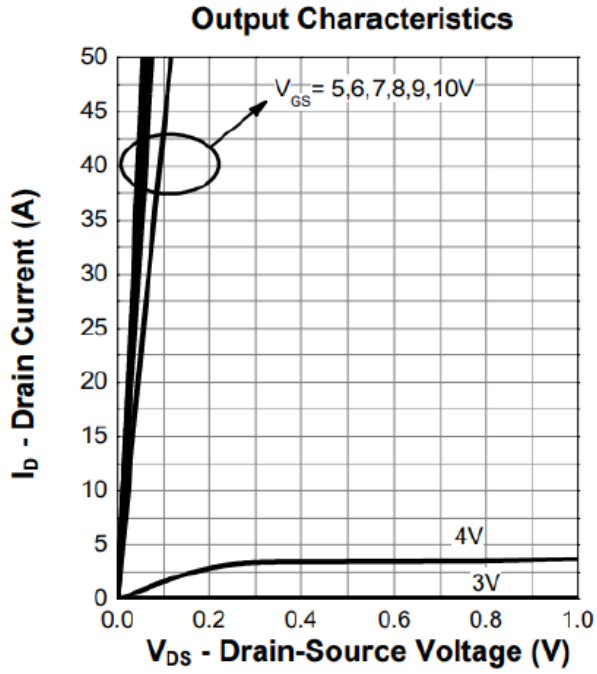


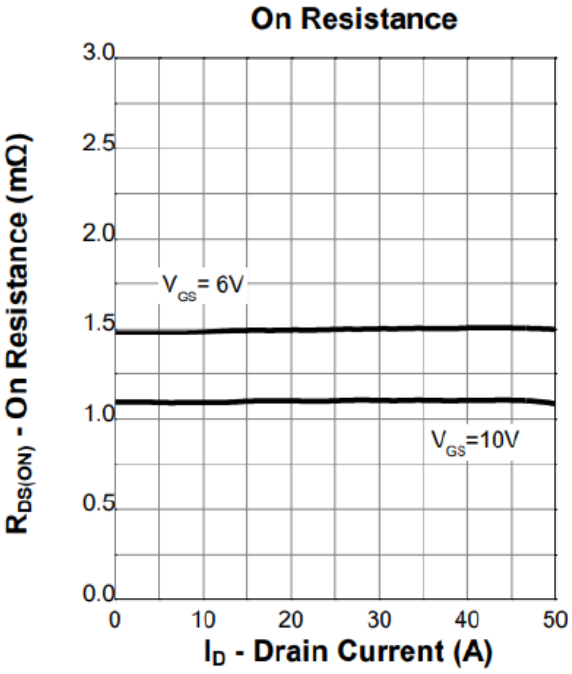
Safe Operating Area

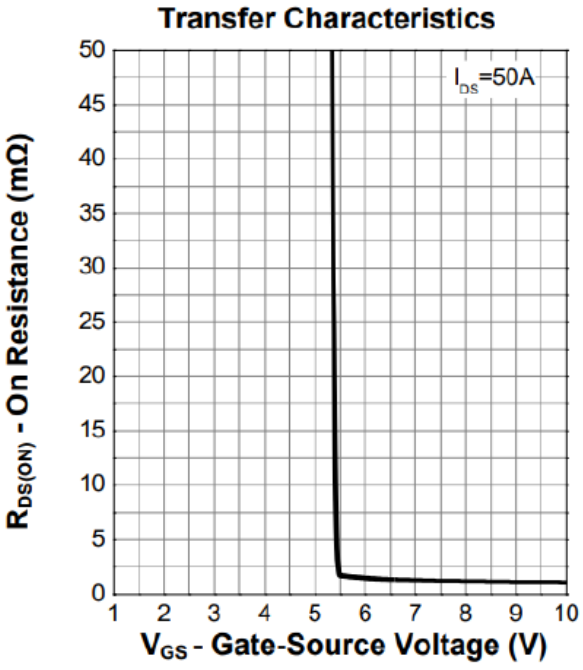


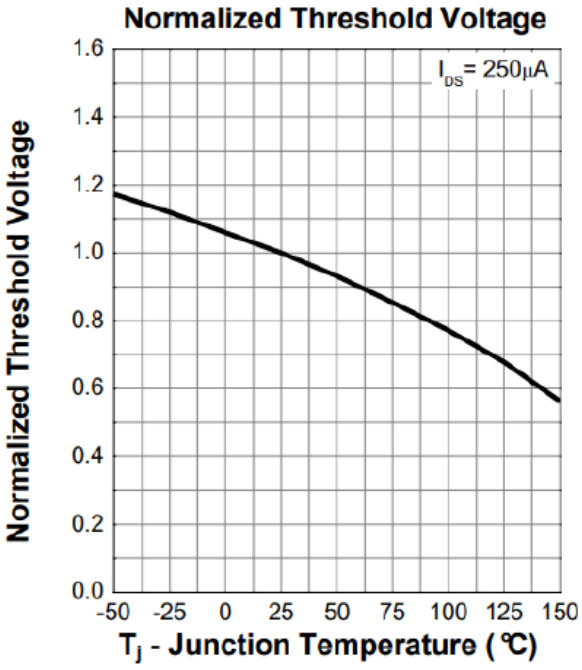
Transient Thermal Impedance

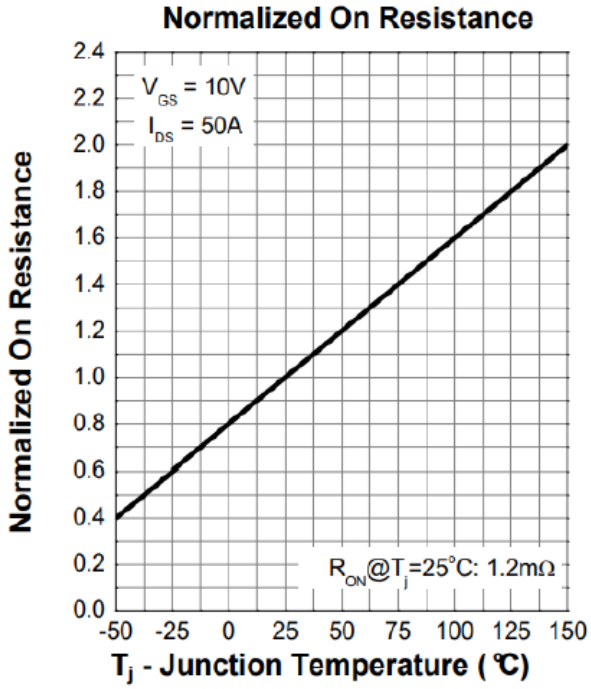


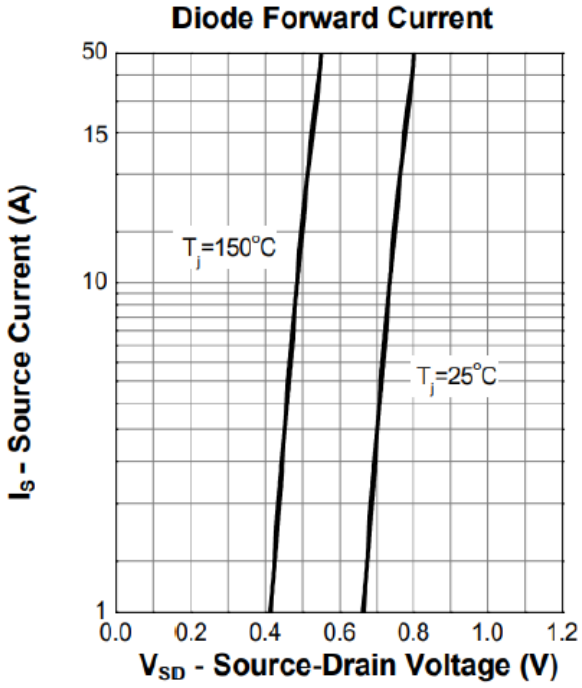

Output Characteristics
V_{GS}= 5,6,7,8,9,10V
4V
3V
I_D - Drain Current (A)
V_{DS} - Drain-Source Voltage (V)
0
5
10
15
20
25
30
35
40
45
50
0.0
0.2
0.4
0.6
0.8
1.0

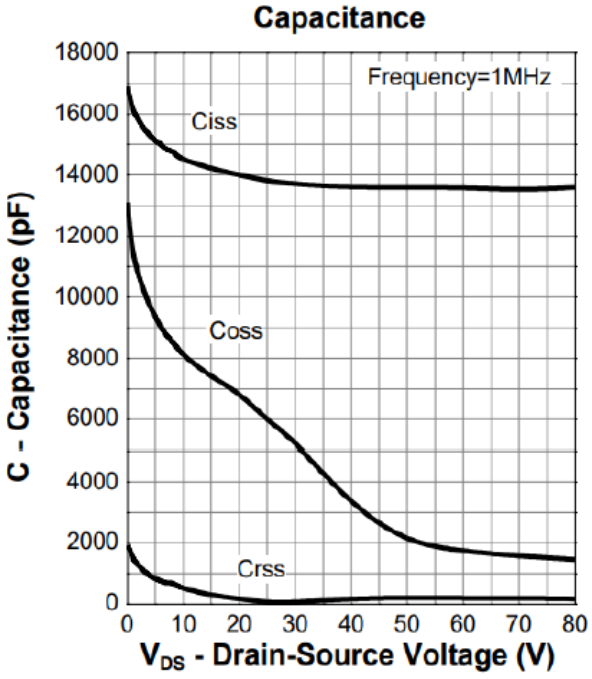

On Resistance
V_{GS}= 6V
V_{GS}=10V
$R_{DS(ON)}$ - On Resistance (mΩ)
I_D - Drain Current (A)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
10
20
30
40
50

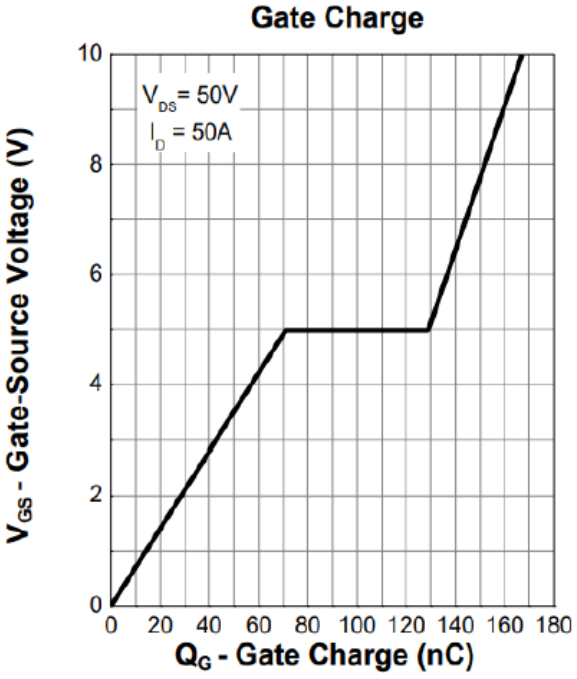

Transfer Characteristics
I_{DS}=50A
$R_{DS(ON)}$ - On Resistance (mΩ)
V_{GS} - Gate-Source Voltage (V)
0
5
10
15
20
25
30
35
40
45
50
1
2
3
4
5
6
7
8
9
10


Normalized Threshold Voltage
I_{DS}= 250μA
Normalized Threshold Voltage
T_J - Junction Temperature (℃)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
-50
-25
0
25
50
75
100
125
150

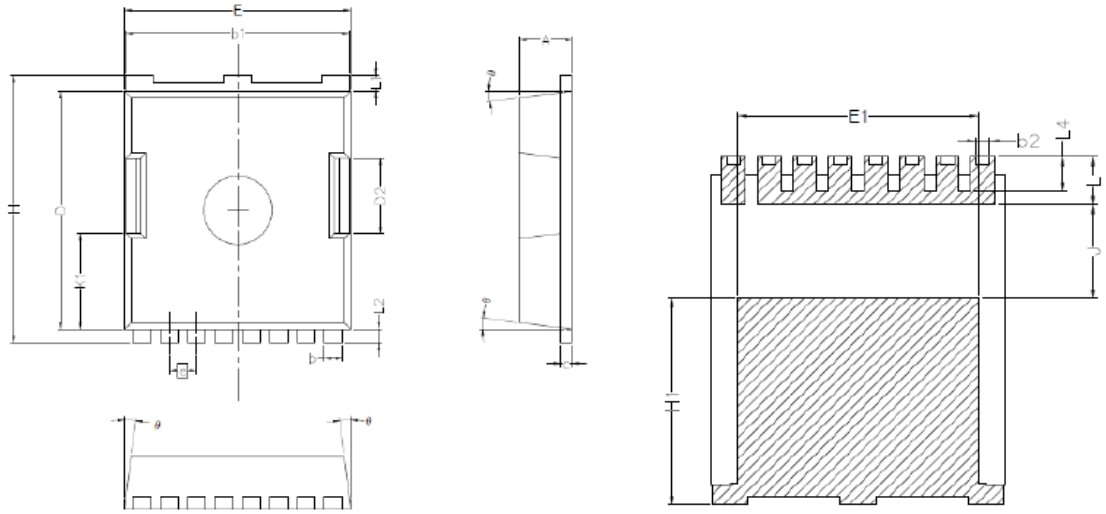

Normalized On Resistance
Normalized On Resistance
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V_{GS} = 10V
I_{DS} = 50A
R_{ON}@T_j=25°C: 1.2mΩ
-50 -25 0 25 50 75 100 125 150
T_j - Junction Temperature (℃)


Diode Forward Current
I_S - Source Current (A)
50
15
10
1
T_j=150°C
T_j=25°C
0.0 0.2 0.4 0.6 0.8 1.0 1.2
V_{SD} - Source-Drain Voltage (V)


Capacitance
C - Capacitance (pF)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Frequency=1MHz
Ciss
Coss
Crss
0 10 20 30 40 50 60 70 80
V_{DS} - Drain-Source Voltage (V)


Gate Charge
V_{GS} - Gate-Source Voltage (V)
10
8
6
4
2
0
V_{DS} = 50V
I_D = 50A
0 20 40 60 80 100 120 140 160 180
Q_G - Gate Charge (nC)

■ TOLL-8L Package information



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.20	2.40
b	0.90	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D2	3.10	3.50
E	9.70	10.10
E1	7.90	8.30
e	1.20BSC	
H	11.48	11.88
H1	6.75	7.15
N	8	
J	3.00	3.30
K1	3.98	4.38
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L4	1.00	1.30
θ	4°	10°