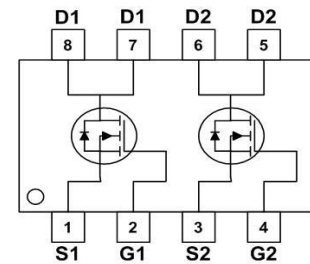




### MX30D10 Dual N-Channel Enhancement Mode Power MOSFET

#### MX30D10 Description

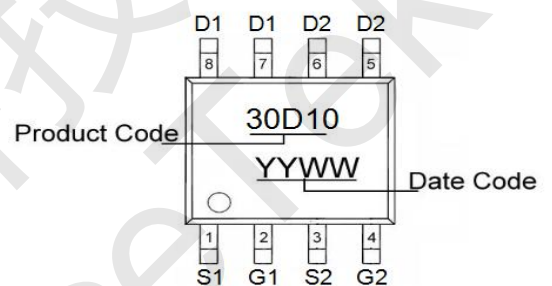
The MX30D10 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.



#### MX30D10 General Features

- ◆  $V_{DS} = 30V$ ,  $I_D = 10A$
- ◆  $R_{DS(ON)}(Typ.) 11.5m\Omega @ V_{GS}=10V$
- ◆  $R_{DS(ON)}(Typ.) 14.5m\Omega @ V_{GS}=4.5V$
- ◆ High density cell design for ultra low Rds on
- ◆ Fully characterized Avalanche voltage and current

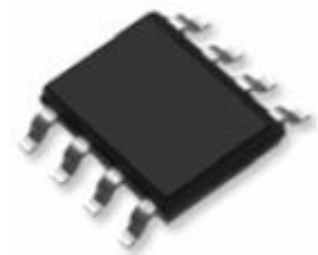
Schematic diagram



Marking and pin assignment

#### MX30D10 Application

Power switching application  
 Hard Switched and High Frequency Circuits  
 Uninterruptible Power Supply



SOP-8 top view

#### MX30D10 Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	10	A
Drain Current-Continuous(Tc=70°C)	$I_D (70^\circ C)$	8	A
Pulsed Drain Current	$I_{DM}$	36	A
Maximum Power Dissipation	$P_D$	1.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

#### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient(Note 2)	$R_{\theta JA}$	85	°C/W
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### MX30D10 Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	1.8	2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =8A	-	11.5	13	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A	-	14.5	18	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =8A	-	24	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1.0MHz	-	940	-	PF
Output Capacitance	C <sub>oss</sub>		-	131	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	109	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =8A V <sub>GEN</sub> =4.5V, R <sub>G</sub> =1.5 Ω	-	4.2	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	8.2	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	31	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	4	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =8A, V <sub>GS</sub> =4.5V	-	9.63	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	3.88	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	3.44	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	-	-	1	V
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	9	A

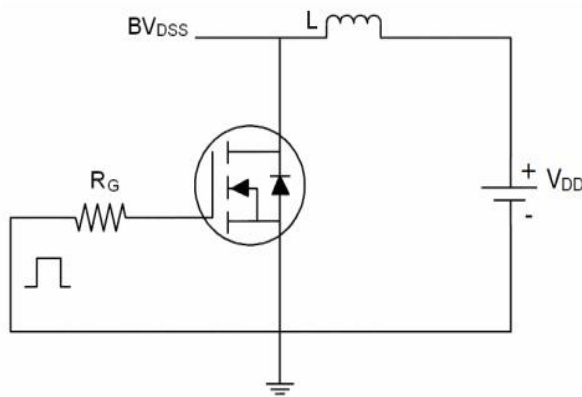
#### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

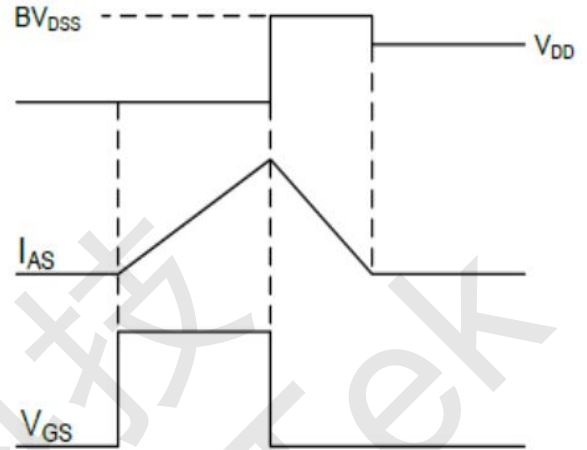


## MX30D10 Test Circuit

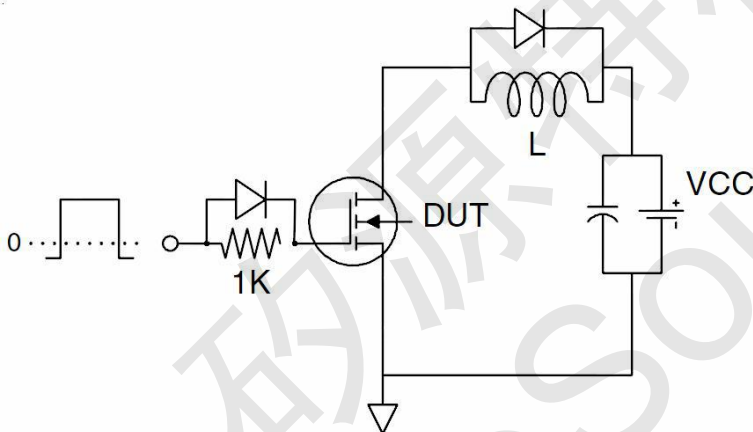
### 1) $E_{AS}$ test Circuits and waveform:



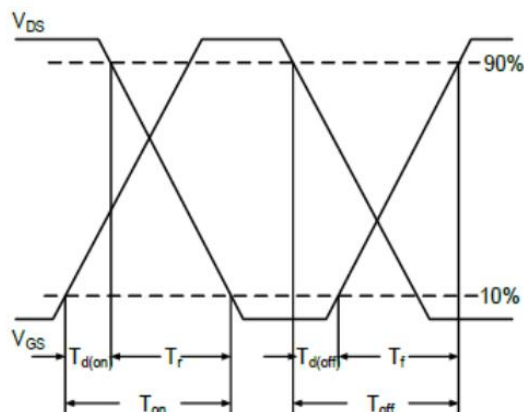
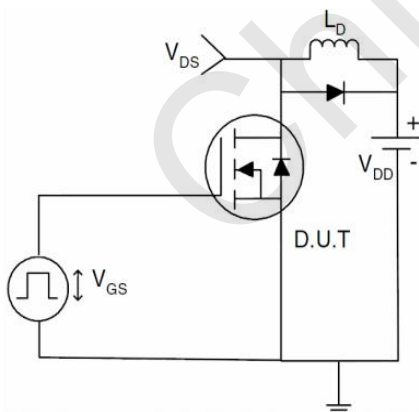
$$E_{AS} = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



### 2) Gate Charge Test Circuit:

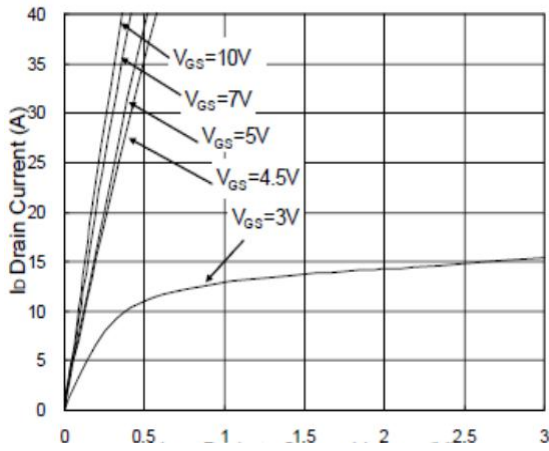


### 3) Switch Time Test Circuit:

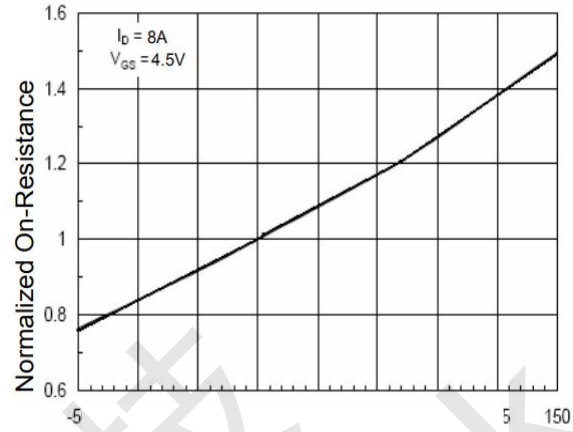




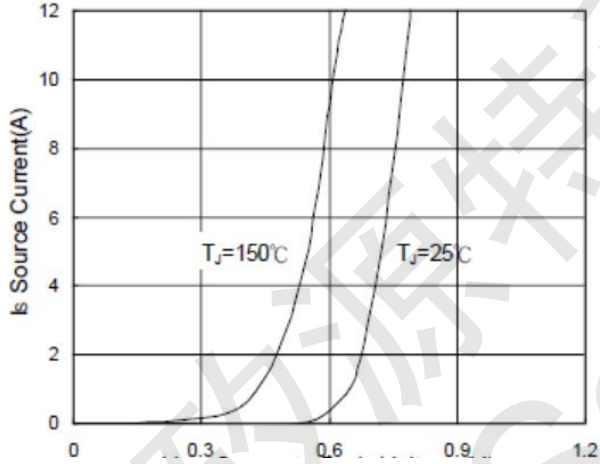
### MX30D10 Typical Electrical and Thermal Characteristics (Curves)



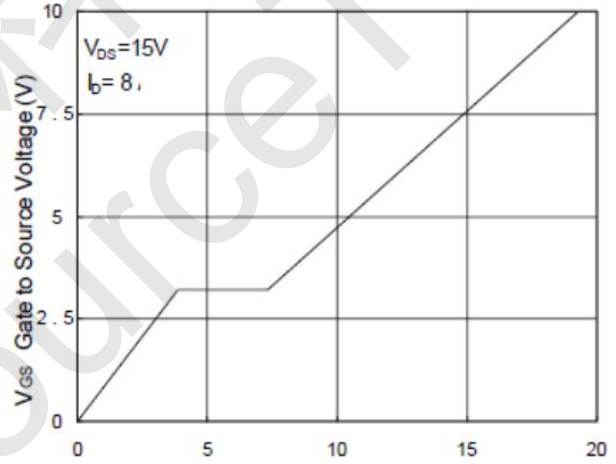
Vds Drain-Source Voltage (V)  
**Figure 1 Output Characteristics**



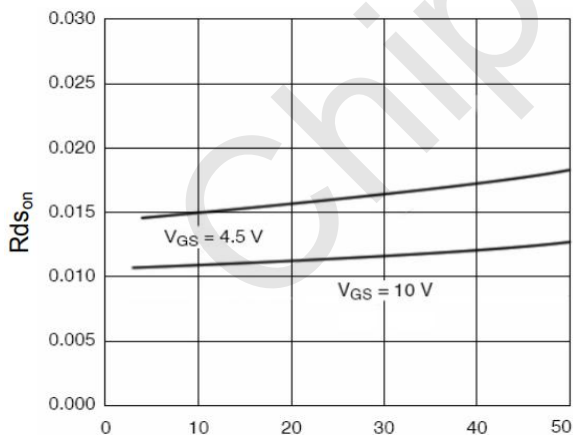
TJ-Junction Temperature(°C)  
**Figure 4 Rdson-Junction Temperature**



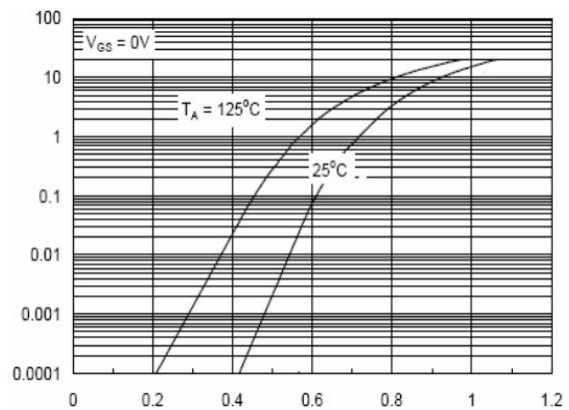
Vgs Gate-Source Voltage (V)  
**Figure 2 Transfer Characteristics**



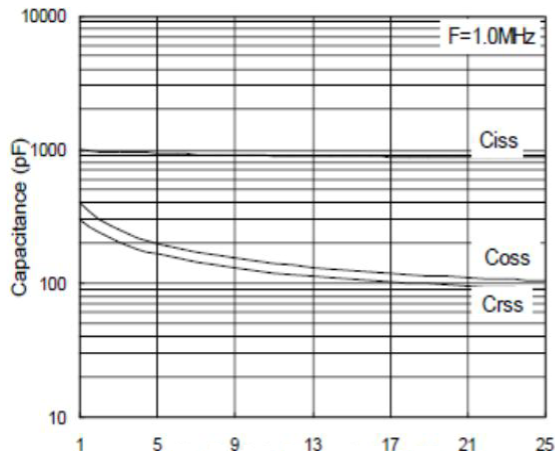
Qg Gate Charge (nC)  
**Figure 5 Gate Charge**



Id- Drain Current(A)  
**Figure 3 Rdson- Drain Current**

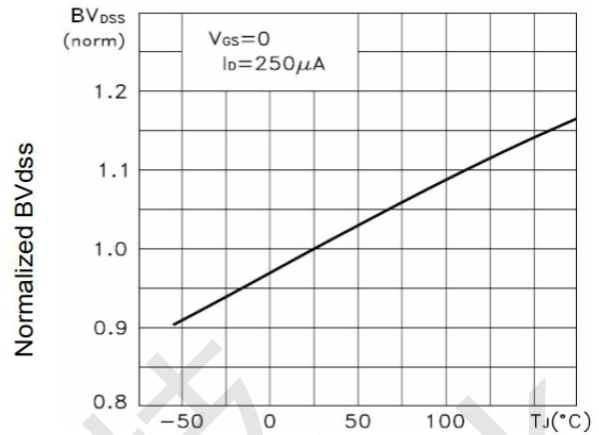


Vsd Source-Drain Voltage (v)  
**Figure 6 Source- Drain Diode Forward**



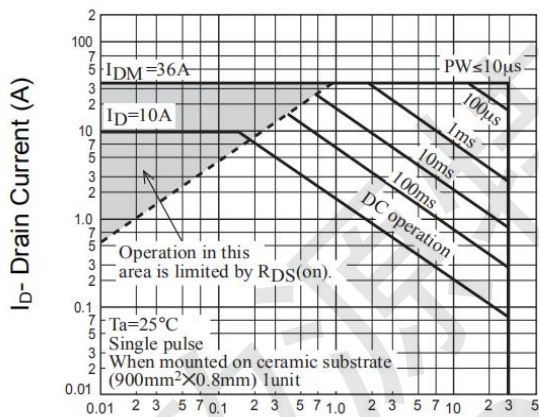
Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds



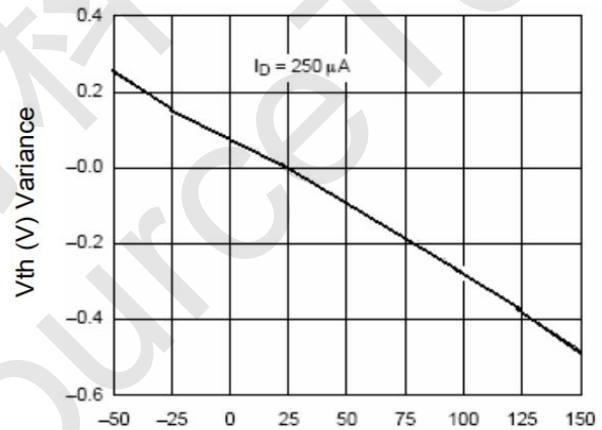
TJ-Junction Temperature(°C)

Figure 9 BVdss vs Junction Temperature



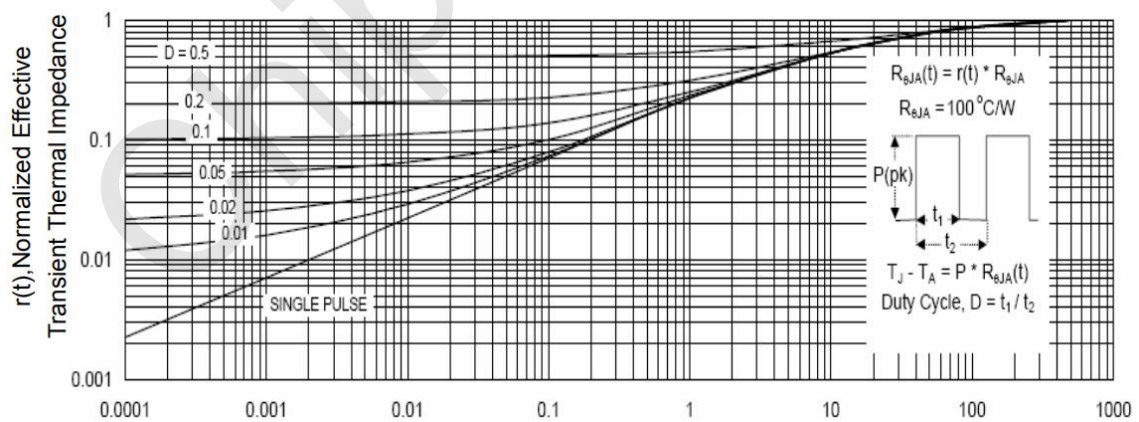
Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area



TJ-Junction Temperature(°C)

Figure 10 Vgs(th) vs Junction Temperature

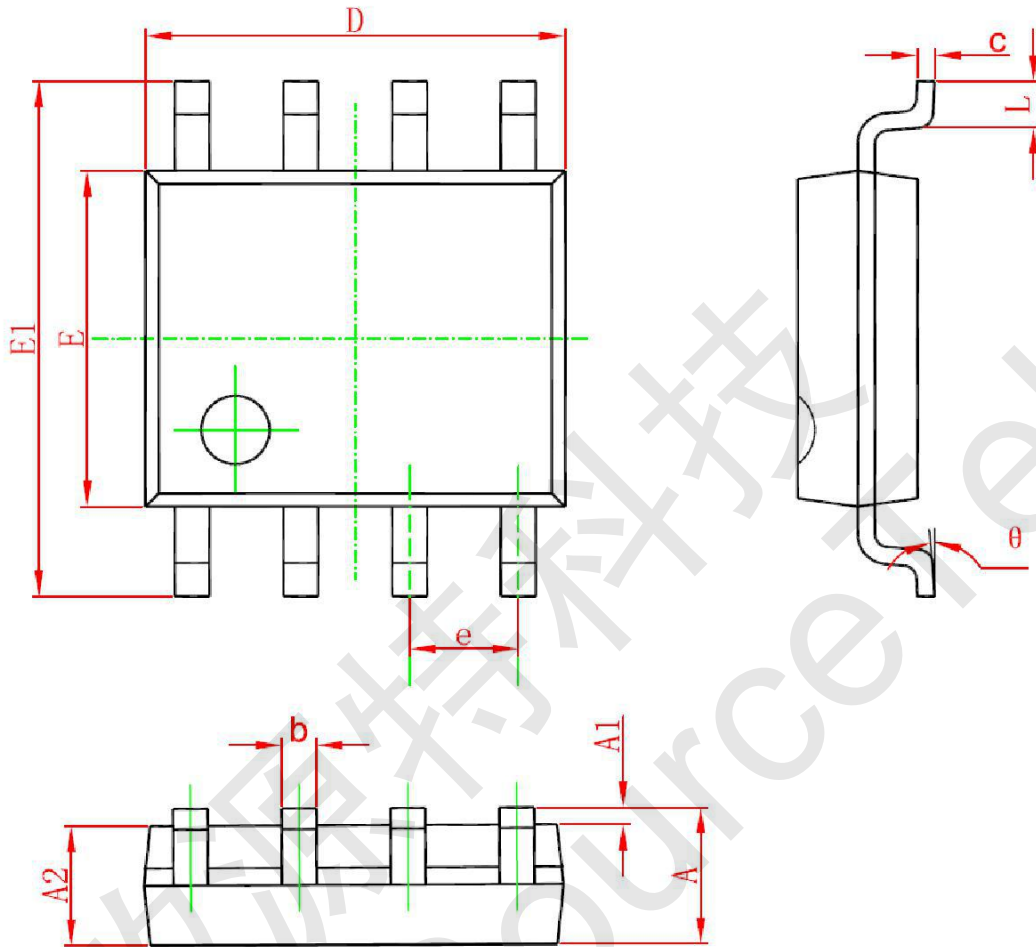


Square Wave Pulse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance



### MX30D10 SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
$\theta$	0°	8°	0°	8°