

30V N-Channel Enhancement Mode MOSFET

Description

The PECN3412MR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and high density cell Design for ultra low on-resistance. This device is suitable for use as a load switch or in PWM applications.

General Features

- ◆ $V_{DS} = 30V$, $I_D = 6A$
 $R_{DS(ON)}(Typ.) = 11m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)}(Typ.) = 13m\Omega$ @ $V_{GS} = 4.5V$
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

Application

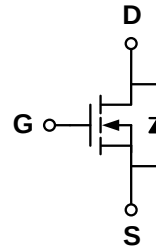
- ◆ PWM applications
- ◆ Load switch

Package

- ◆ SOT-23-3L

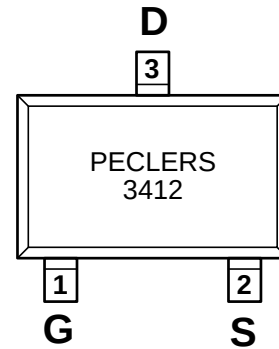


Schematic diagram



Marking and pin assignment

SOT-23-3L
(TOP VIEW)



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN3412MR	-55°C to +150°C	SOT-23-3L	3000

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}	±20	V
Drain current-continuous ^a @ $T_J = 125^\circ C$ -pulse d^b	I_D	6	A
	I_{DM}	24	A
Drain-source Diode forward current	I_S	6	A
Maximum power dissipation	P_D	1.4	W
Operating junction Temperature range	T_J	-55—150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	30	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
Gate-body leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.65	2.2	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =6A	-	11	14	mΩ
		V _{GS} =4.5V, I _D =5A		13	15	
Forward transconductance	g _{fs}	V _{GS} =5V, I _D =6A	-	33	-	S
Dynamic Characteristics						
Input capacitance	C _{ISS}	V _{DS} =15V ,V _{GS} =0V f=1.0MHz	-	760	-	pF
Output capacitance	C _{OSS}		-	125	-	
Reverse transfer capacitance	C _{RSS}		-	70	-	
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DS} =15V V _{GS} =10V R _L =2.6 ohm R _{GEN} =3ohm	-	4.4	-	ns
Rise time	t _r		-	9	-	
Turn-off delay time	t _{D(OFF)}		-	17	-	
Fall time	t _f		-	6	-	
Total gate charge	Q _g	V _{DS} =15V,I _D =6A V _{GS} =10V	-	14	-	nC
Gate-source charge	Q _{gs}		-	2.4	-	
Gate-drain charge	Q _{gd}		-	3	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V _{SD}	V _{GS} =0V,I _S =1A	-	0.76	1.16	V

Notes:

- surface mounted on FR4 board, $t \leq 10\text{sec}$
- pulse test: pulse width $\leq 300\mu s$, duty $\leq 2\%$
- guaranteed by design, not subject to production testing

Thermal Characteristics

Thermal Resistance junction-to ambient	$R_{th JA}$	100	$^{\circ}C/W$
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Typical Performance Characteristics

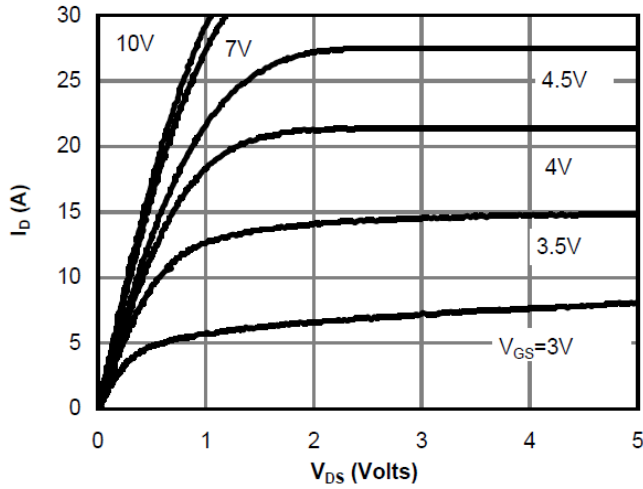


Fig 1: On-Region Characteristics

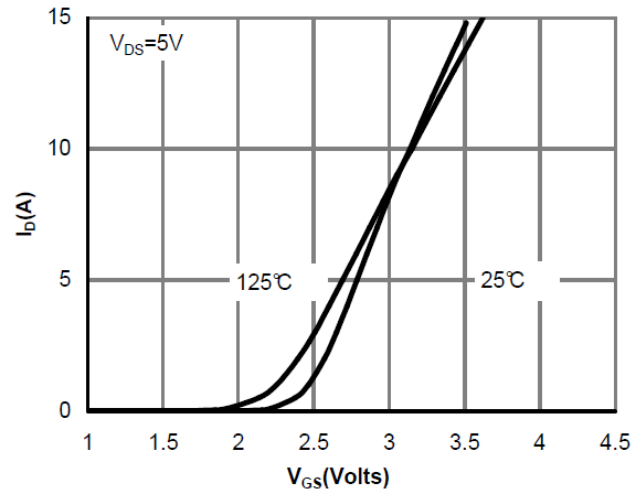


Figure 2: Transfer Characteristics

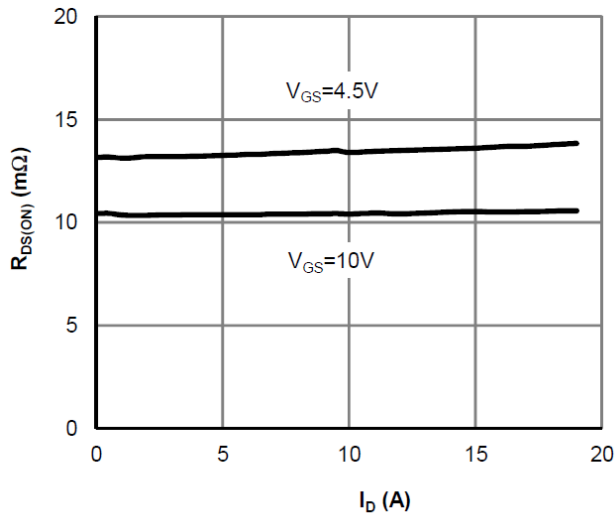


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

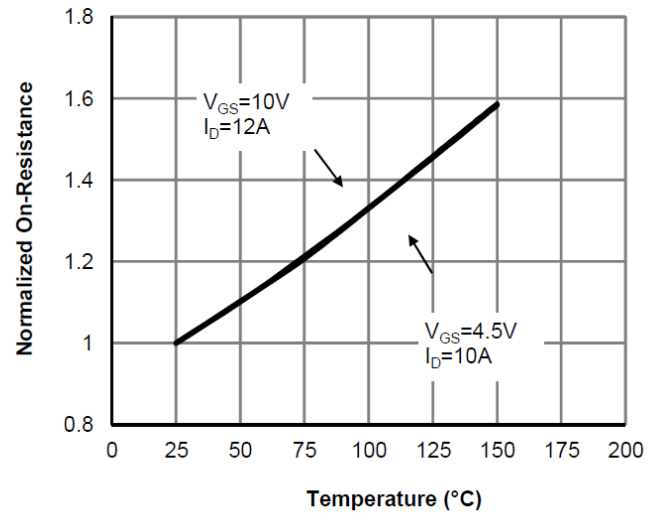


Figure 4: On-Resistance vs. Junction Temperature

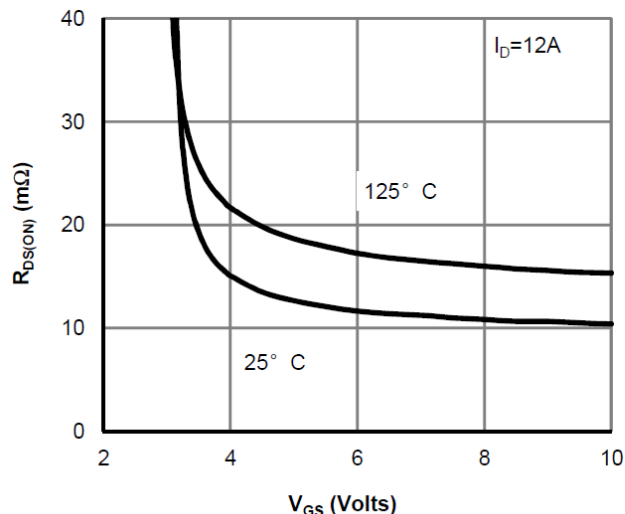


Figure 5: On-Resistance vs. Gate-Source Voltage

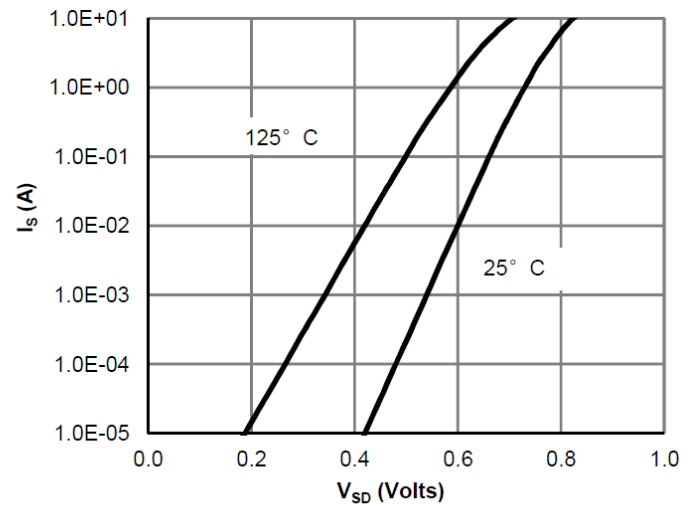


Figure 6: Body-Diode Characteristics

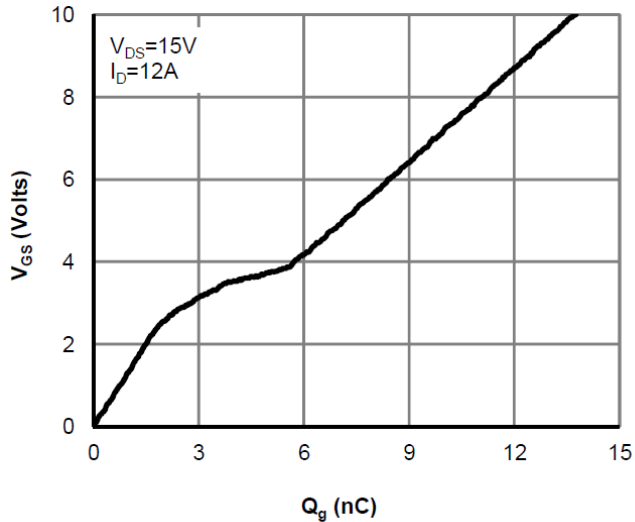


Figure 7: Gate-Charge Characteristics

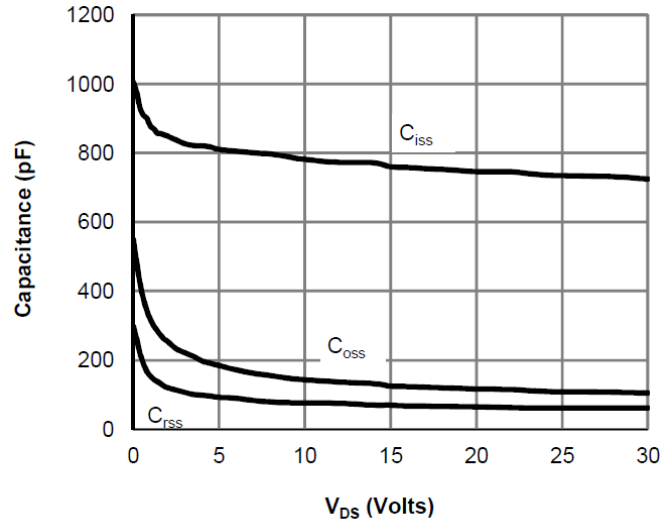


Figure 8: Capacitance Characteristics

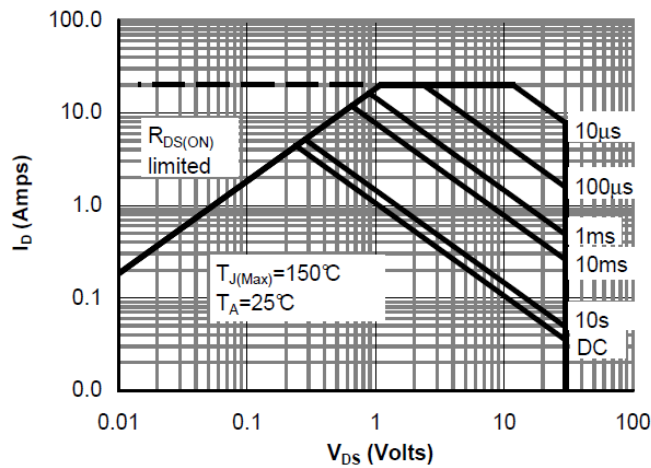


Figure 10: Maximum Forward Biased Safe Operating Area

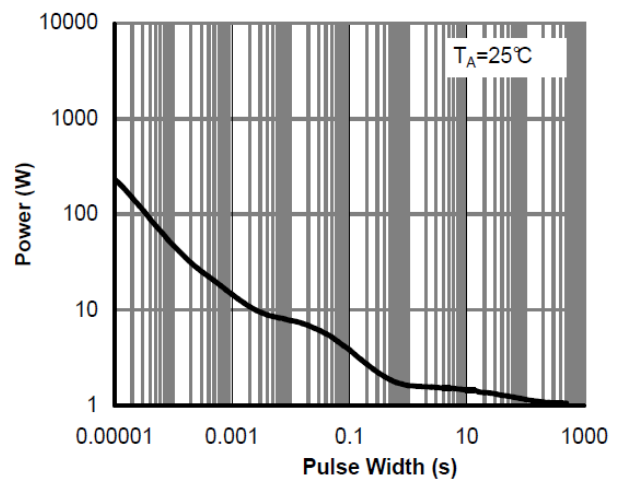


Figure 11: Single Pulse Power Rating Junction-to-Ambient

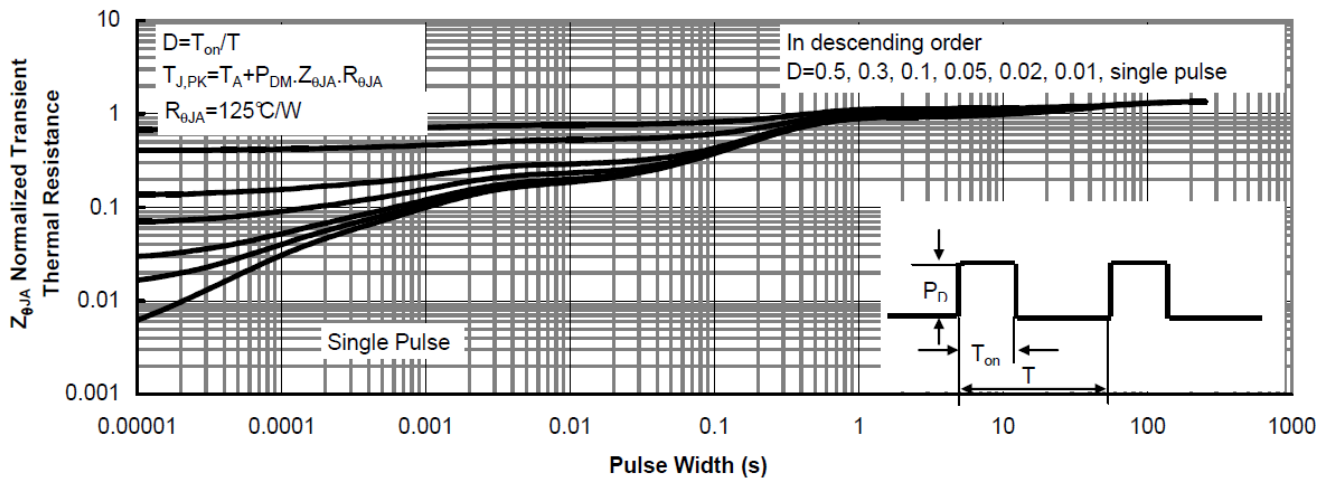
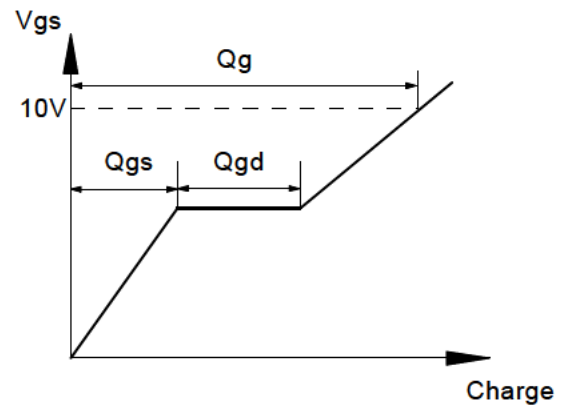
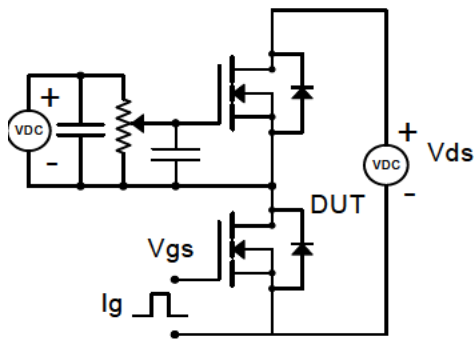


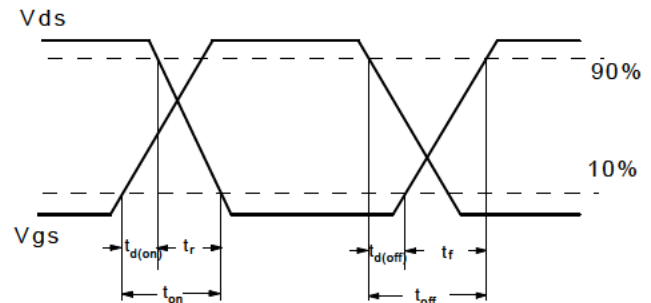
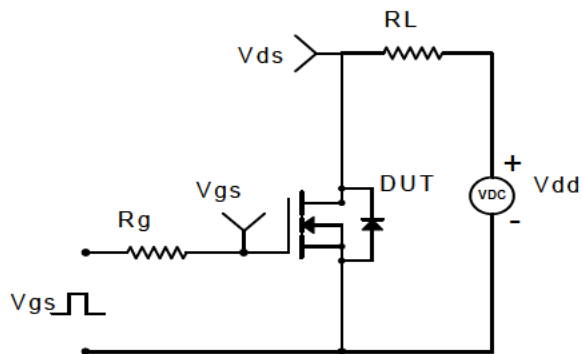
Figure 12: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform

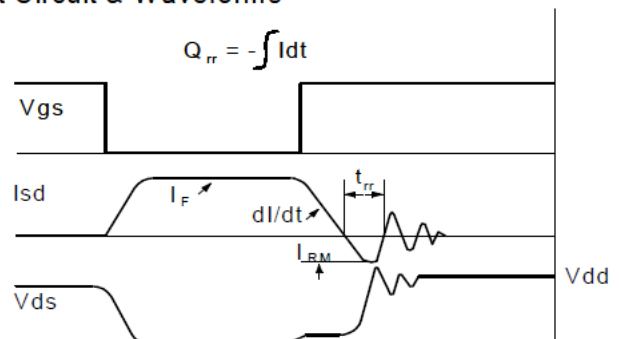
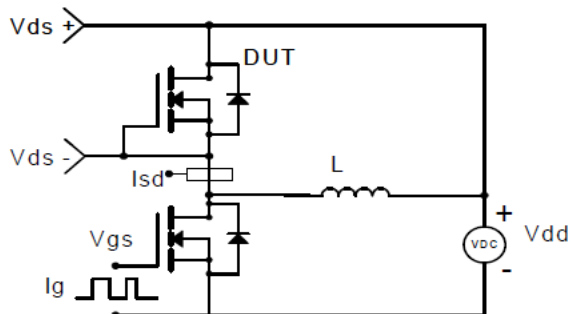


Resistive Switching Test Circuit & Waveforms

Resistive Switching Test Circuit & Waveforms

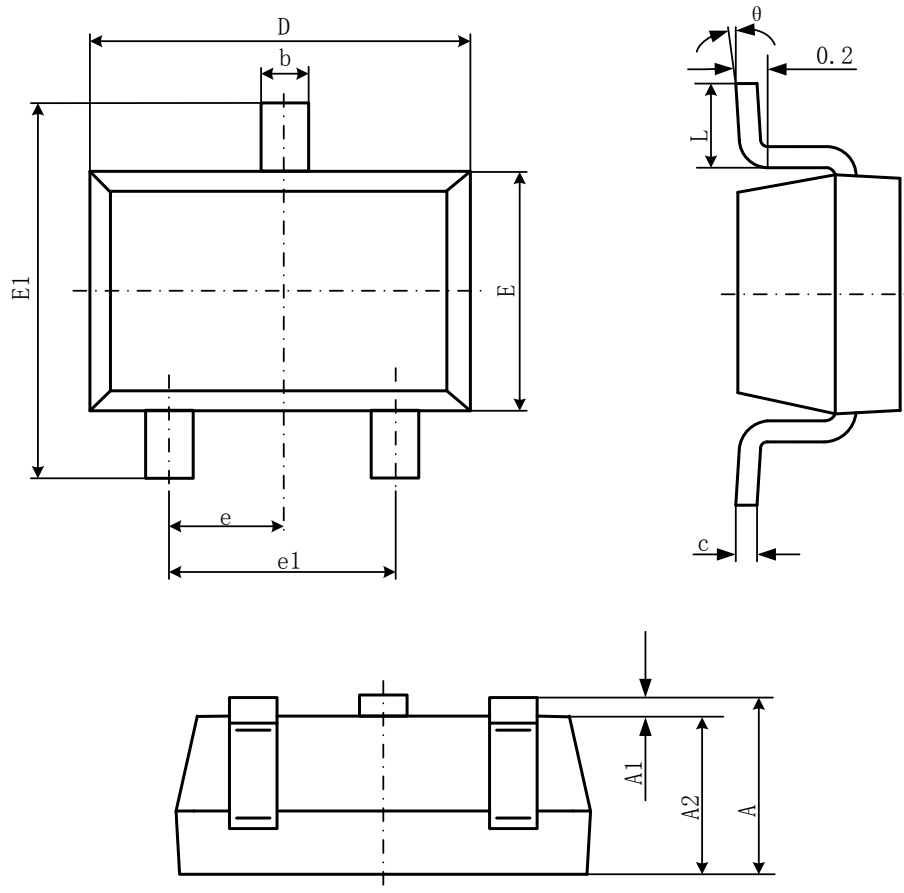


Diode Recovery Test Circuit & Waveforms



Package Information

- SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°