30V N-Channel Enhancement Mode MOSFET

Description

The PECN3404A 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.)=16mΩ @V_{GS}=10V
  $R_{DS(ON)}$(Typ.)=21mΩ @V_{GS}=4.5V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

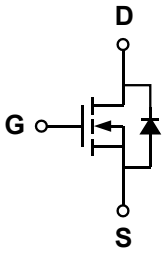
Application

- PWM applications
- Load switch

Package

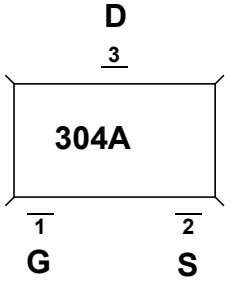
SOT-23-3L

Schematic diagram



Marking and pin assignment

SOT-23-3L
(TOP VIEW)



PECN—Natlinear
Power 304A—

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN3404AM R-G	-55°C to +150°C	SOT-23-3L	3000

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	30	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	6	A
	T_A=75℃		5	A
Pulsed Drain Current		I_{DM}	24	A
Avalanche energy(L=0.1mH)		E_{AS},E_{AR}	32	mJ
Maximum power dissipation		P_D	1.4	W
Operating junction Temperature range		Tj	-55—150	℃

Electrical Characteristics (TA=25℃ 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	0.8	1.35	1.9	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=6A	-	16	20	mΩ
		V_{GS}=4.5V, I_D=5A		21	26	
Forward transconductance	gfs	V_{GS}=5V, I_D=6A	-	22	-	S
Dynamic Characteristics						
IPECNut capacitance	C_{ISS}	V_{DS}=15V ,V_{GS}=0V f=1.0MHz	-	370	-	pF
Output capacitance	C_{OSS}		-	65	-	
Reverse transfer capacitance	C_{RSS}		-	40	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=15V V_{GS}=10V R_L=2.6 ohm R_{GEN}=3ohm	-	4.5	-	ns
Rise time	tr		-	2.5	-	
Turn-off delay time	$t_{D(OFF)}$		-	14.5	-	
Fall time	tf		-	2.5	-	
Total gate charge	Qg	V_{DS}=15V,I_D=6A V_{GS}=10V	-	7.1	-	nC
Gate-source charge	Qgs		-	1.4	-	
Gate-drain charge	Qgd		-	1.7	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=1A	-	0.82	1.16	V

Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient[A]	≤ 10s	$R_{\theta JA}$	65	90	℃/W
Maximum Junction-to-Ambient[A]	Steady-State		85	125	
Maximum Junction-to-Lead[B]	Steady-State	$R_{\theta JC}$	63	80	

A:The value of R qJA is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: The R qJA is the sum of the thermal impedence from junction to lead R qJL and lead to ambient.

Typical Performance Characteristics

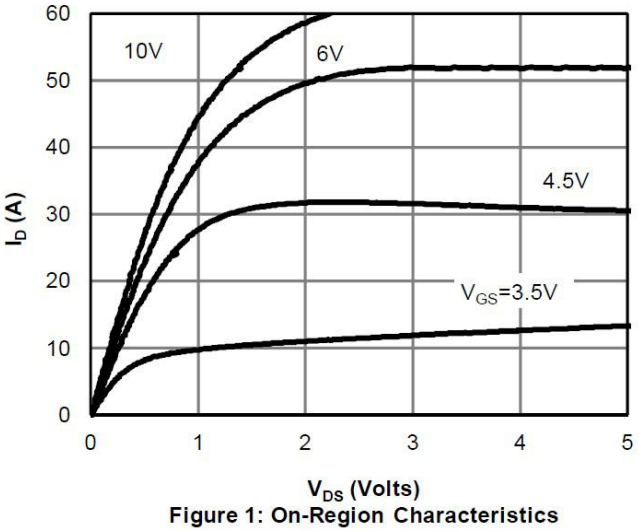


Figure 1: On-Region Characteristics

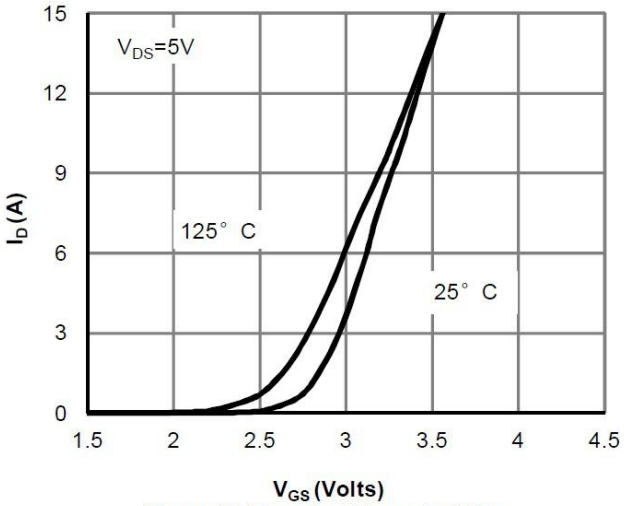


Figure 2: Transfer Characteristics

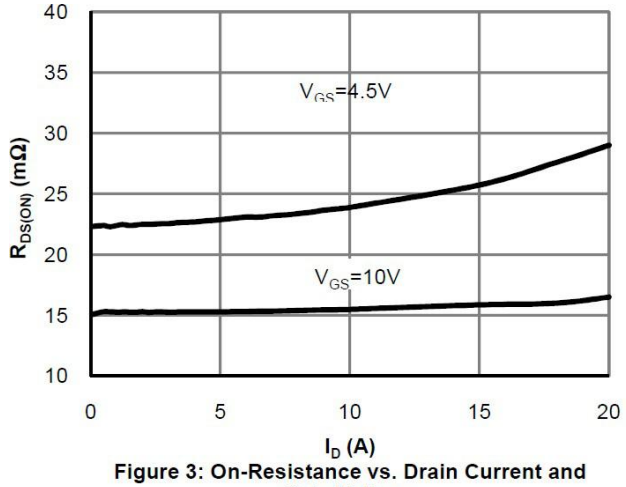


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

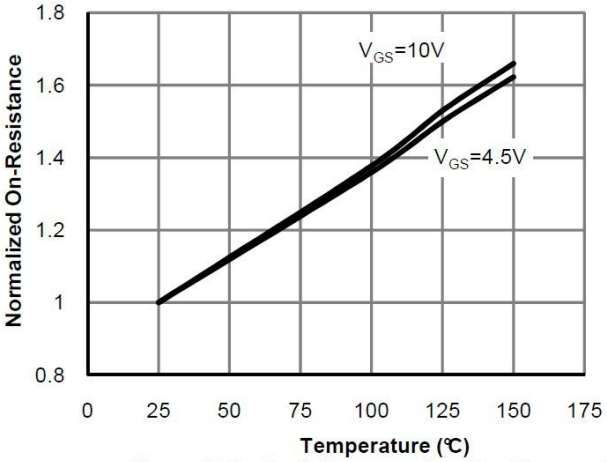


Figure 4: On-Resistance vs. Junction Temperature

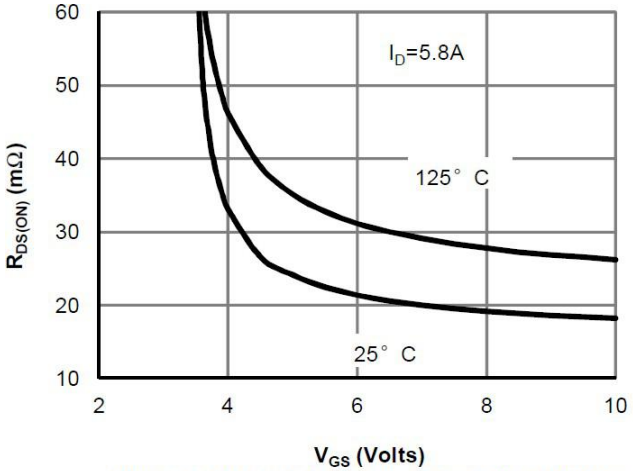


Figure 5: On-Resistance vs. Gate-Source Voltage

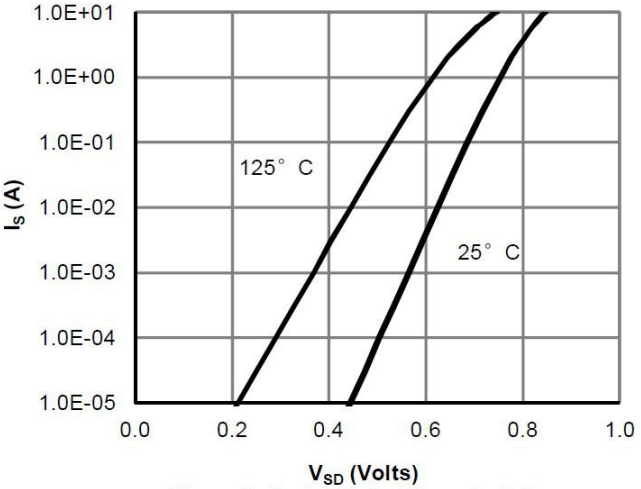


Figure 6: Body-Diode Characteristics

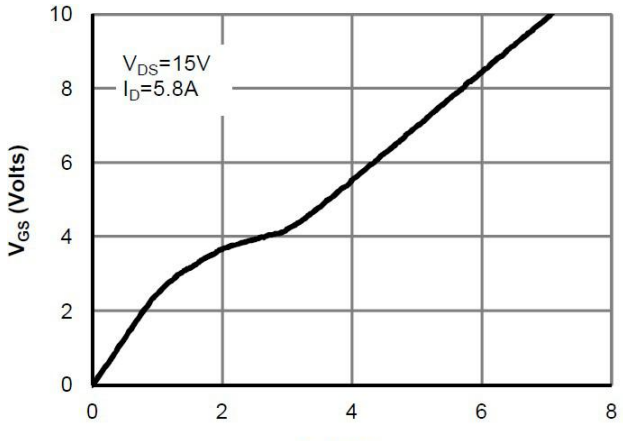


Figure 7: Gate-Charge Characteristics

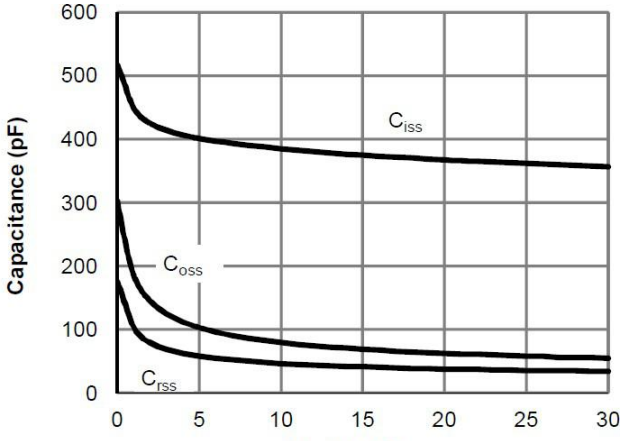


Figure 8: Capacitance Characteristics

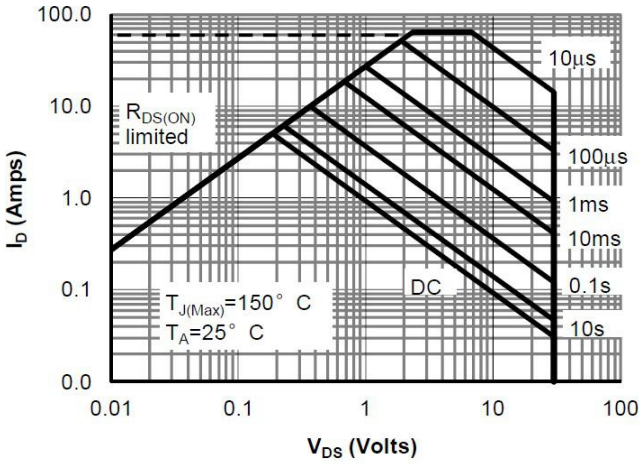


Figure 9: Maximum Forward Biased Safe Operating Area

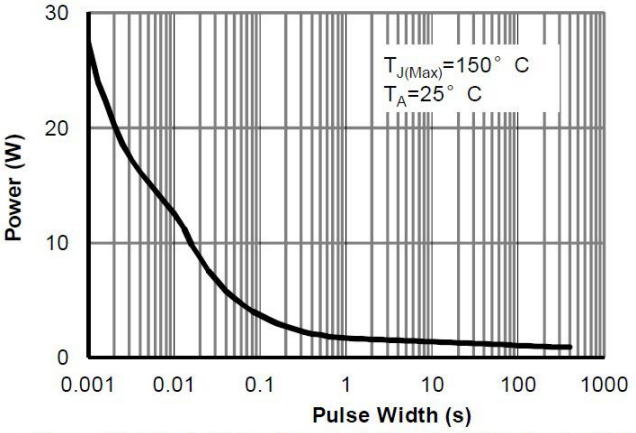


Figure 10: Single Pulse Power Rating Junction-to- Ambient

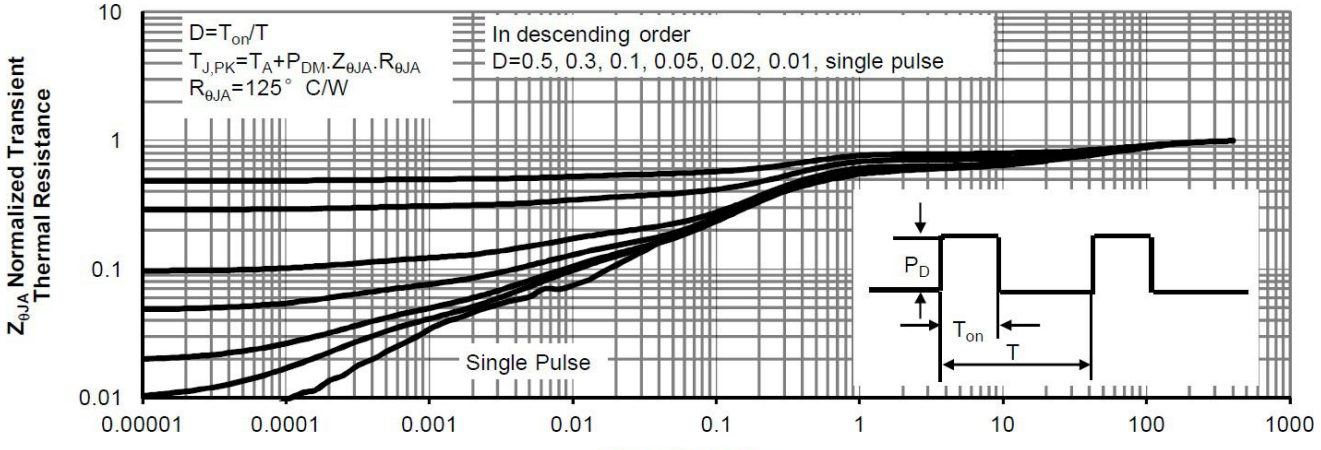
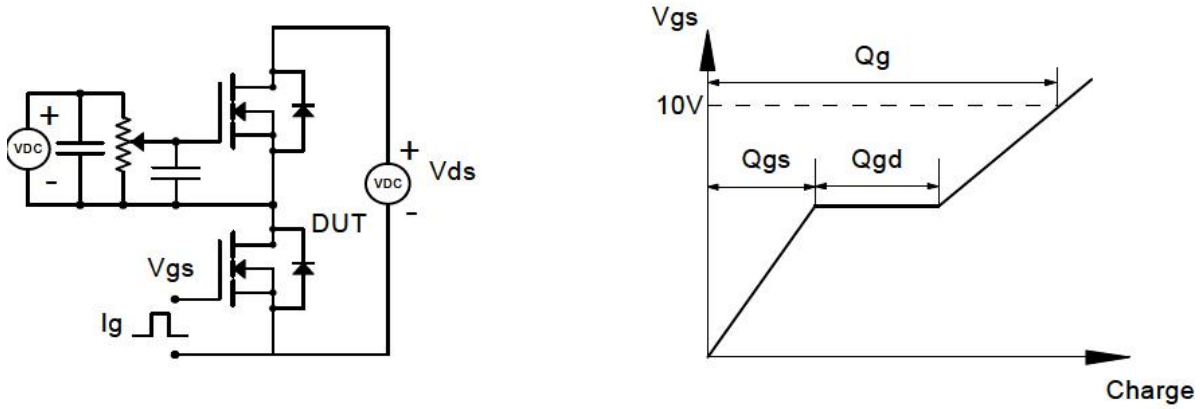


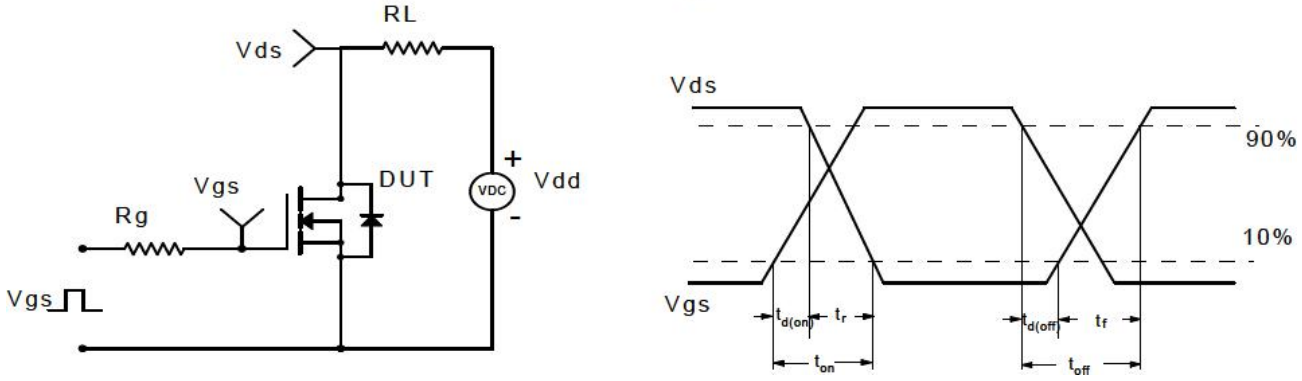
Figure 11: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform

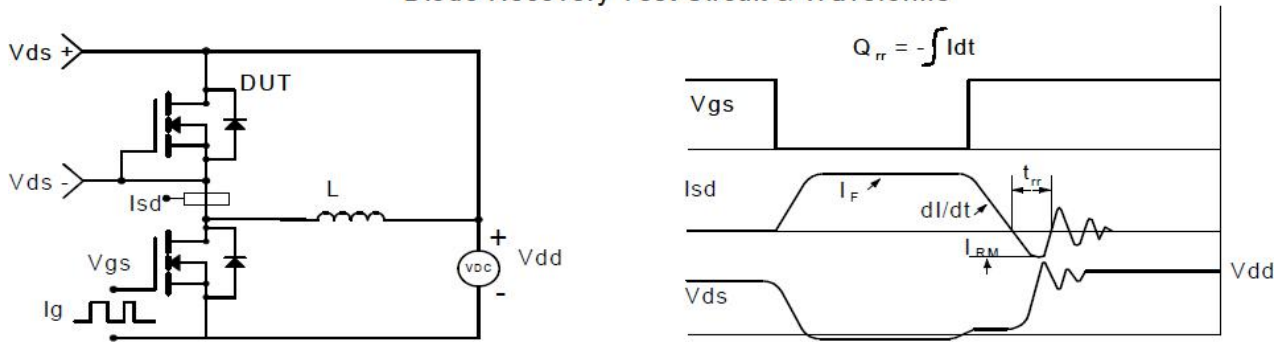


Resistive Switching Test Circuit & Waveforms

Resistive Switching Test Circuit & Waveforms

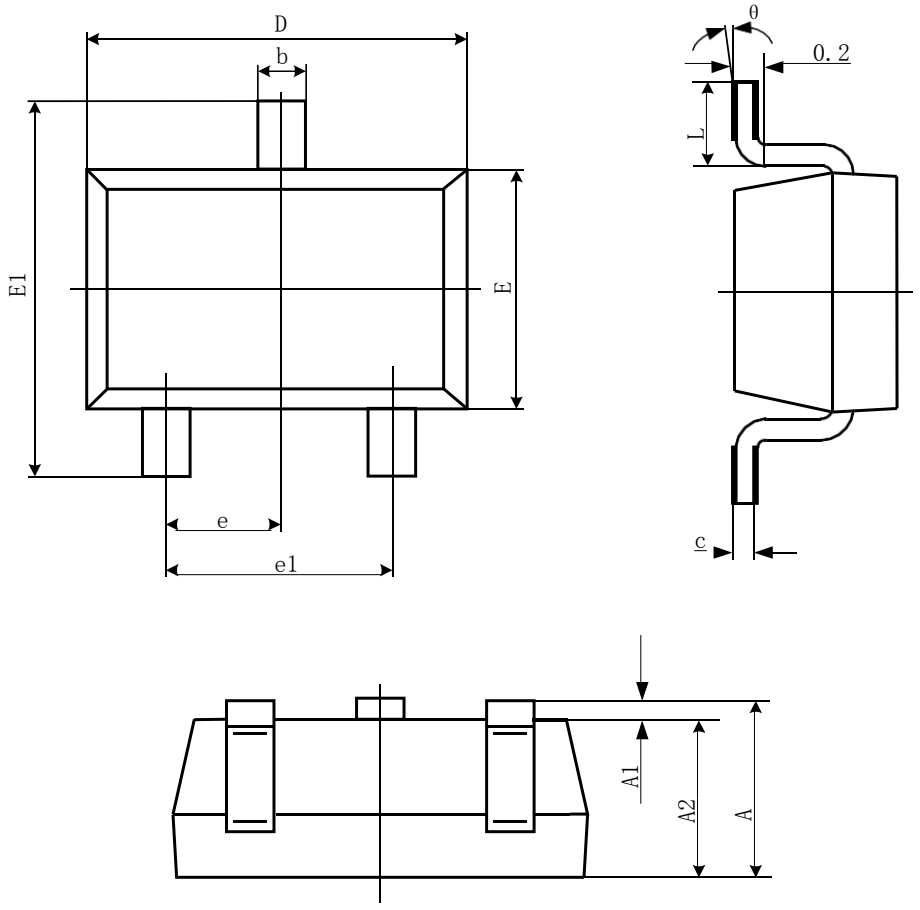


Diode Recovery Test Circuit & Waveforms



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°