

## Features

- Output current greater than 1.5A
- Range Output voltage range adjustable from 1.25V to 37V

## Applications

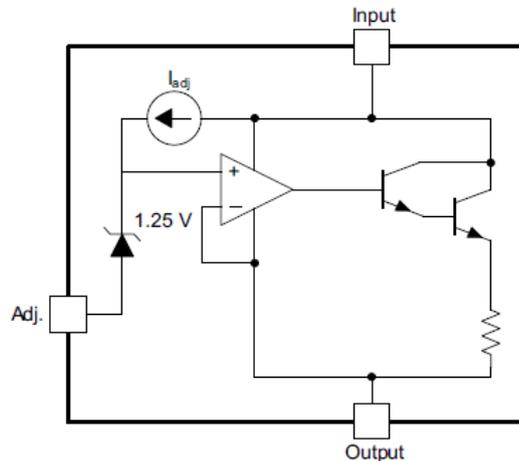
- Power Management for Computer Mother Board, Graphic Card
- LCD Monitor and LCD TV
- DVD Decode Board
- ADSL Modem
- Post Regulators for Switching Supplies

## General Description

The LM317 device is an adjustable three-terminal positive-voltage regulator capable of supplying more than 1.5A over an output-voltage range of 1.25V to 37V. LM317 features a very low standby current 1.5mA .

LM317 is available in SOT89-3, TO-252, TO-220 and SOT-223 package.

## Block Diagram





**Pin Configuration**

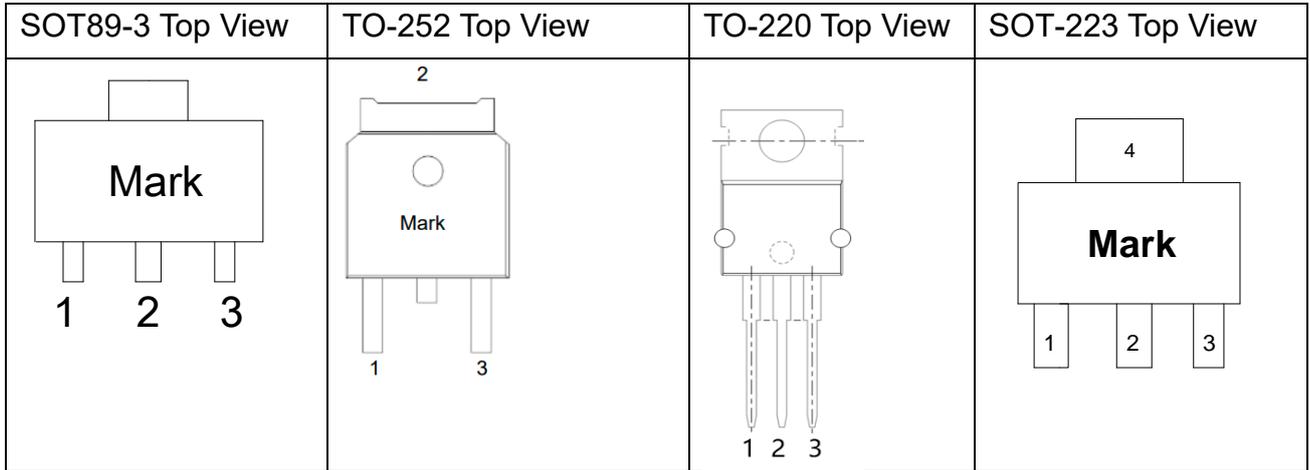


Table1: LM317 series (SOT89-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Table2: LM317 series (TO-252 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Table3: LM317 series (TO-220 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

Table4: LM317 series (SOT-223 PKG)

PIN NO.	PIN NAME	FUNCTION
1	ADJ	ADJ pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin
4	VOUT	Output voltage pin

## Absolute Maximum Ratings

Max Input Voltage .....	..40V
Max Operating Junction Temperature( $T_j$ ) .....	..150°C
Ambient Temperature( $T_a$ ) .....	..-20°C~ 85°C
Storage Temperature( $T_s$ ) .....	..-40°C~150°C

Caution: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

## Thermal Information

Symbol	Parameter	TO-220	UNIT
$R_{\theta(JA)}$	Junction-to-ambient thermal resistance	37.9	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	51.1	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	23.2	°C/W
$\Psi_{JT}$	Junction-to-top characterization parameter	13.0	°C/W
$\Psi_{JB}$	Junction-to-board characterization parameter	22.8	°C/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	4.2	°C/W

## Electrical Characteristics

$T_A=25^\circ\text{C}$ , unless otherwise noted.

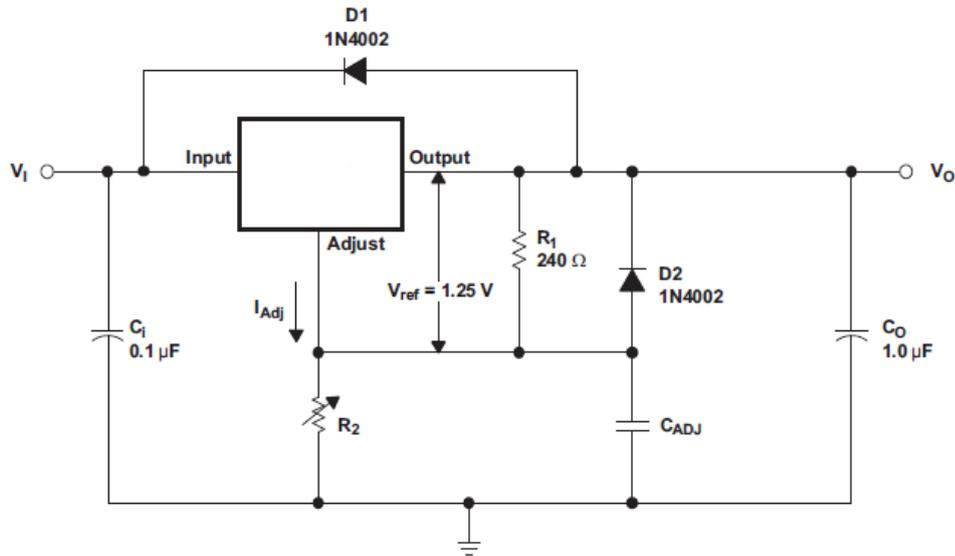
Parameter	Test Conditions	Min	Typ	Max	Unit
Line regulation	$V_I - V_O = 3\text{V to } 40\text{V}$ $T_j = 25^\circ\text{C}$	-5	--	5	mV
Load regulation	$I_o = 10\text{mA to } 1500\text{mA}$	-25	--	25	mV
Reference voltage	$V_I - V_O = 3\text{V to } 40\text{V}$ , $P_D \leq 20\text{W}$ , $I_o = 10\text{mA to } 1.5\text{A}$	1.2	1.25	1.3	V
Output-voltage Temperature stability	$T_j = 0^\circ\text{C to } 125^\circ\text{C}$		0.7		% $V_O$
Maximum output current	$V_I - V_O \leq 15\text{V}$ , $T_j = 25^\circ\text{C}$	--	1.5	--	A

## Detailed Description

LM317 device is an adjustable three-terminal positive-voltage regulator capable of supplying up to 1.5A over an output-voltage range of 1.25V to 37V. It requires only two external resistors to set the output voltage. The device features a typical line regulation of 1mV and typical load regulation of 7 mV.

The LM317 device is versatile in its applications, including uses in programmable output regulation and local oMcard regulation. Or, by connecting a fixed resistor between the ADJUST and OUTPUT terminals, the LM317 device can function as a precision current regulator. An optional output capacitor can be added to improve transient response.

### Typical Application

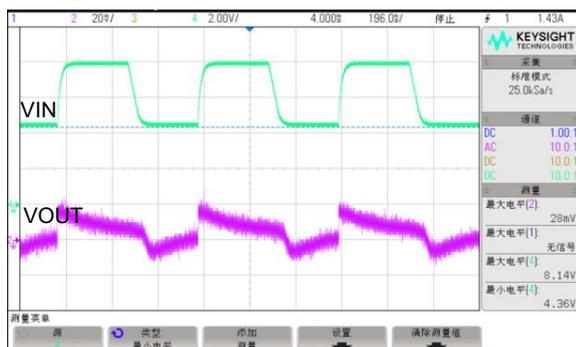


Adjustable Voltage Regulator

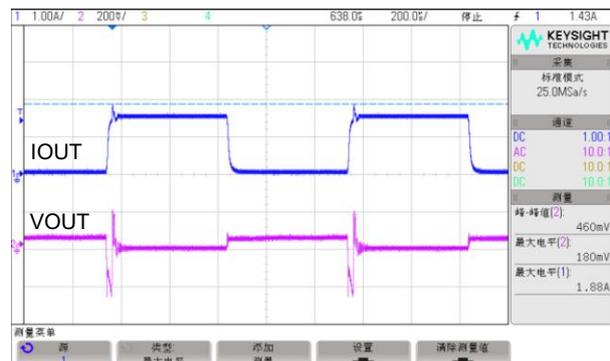
1. R1 and R2 are required to set the output voltage.
2. CADJ is recommended to improve ripple rejection. It prevents amplification of the ripple as the output voltage is adjusted higher.
3. C1 is recommended, particularly if the regulator is not in close proximity to the power-supply filter capacitors. A 0.1uF or 1uF ceramic or tantalum capacitor provides sufficient bypassing for most applications, especially when adjustment and output capacitors are used.
4. Co improves transient response, but is not needed for stability.
5. Protection diode D2 is recommended if CADJ is used. The diode provides a low-impedance discharge path to prevent the capacitor from discharging into the output of the regulator.
6. Protection diode D1 is recommended if Co is used. The diode provides a low-impedance discharge path to prevent the capacitor from discharging into the output of the regulator.
7. Vo is calculated as shown:  $V_O = V_{REF}(1+R_2/R_1) + (I_{ADJ} \times R_2)$ , IADJ is typically 50uA and negligible in most applications.

### Typical Performance Characteristics

Line Transient Response



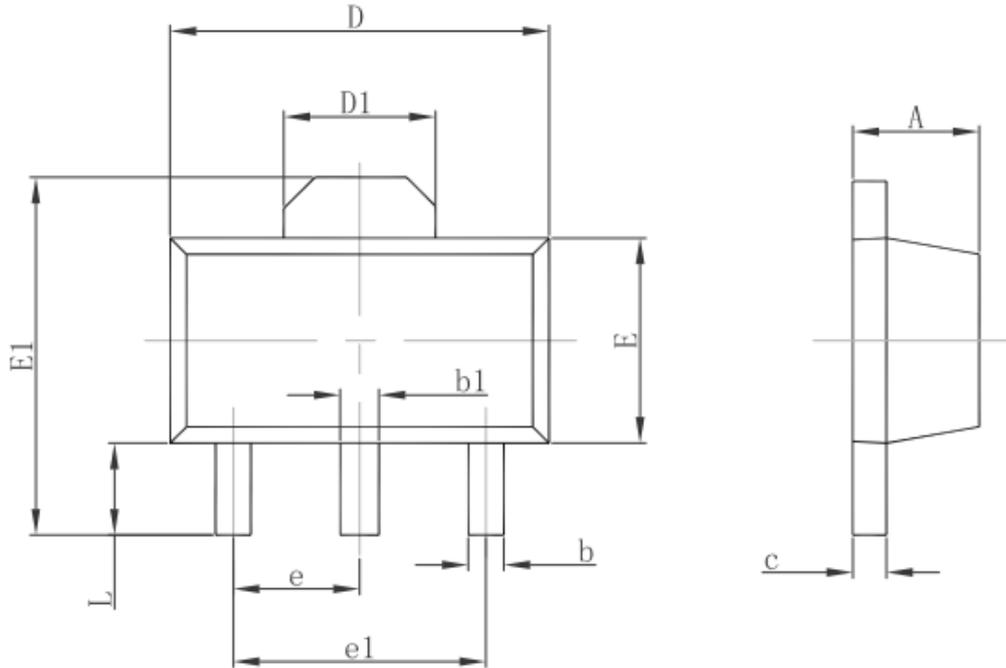
Load Transient Response





### Package Information

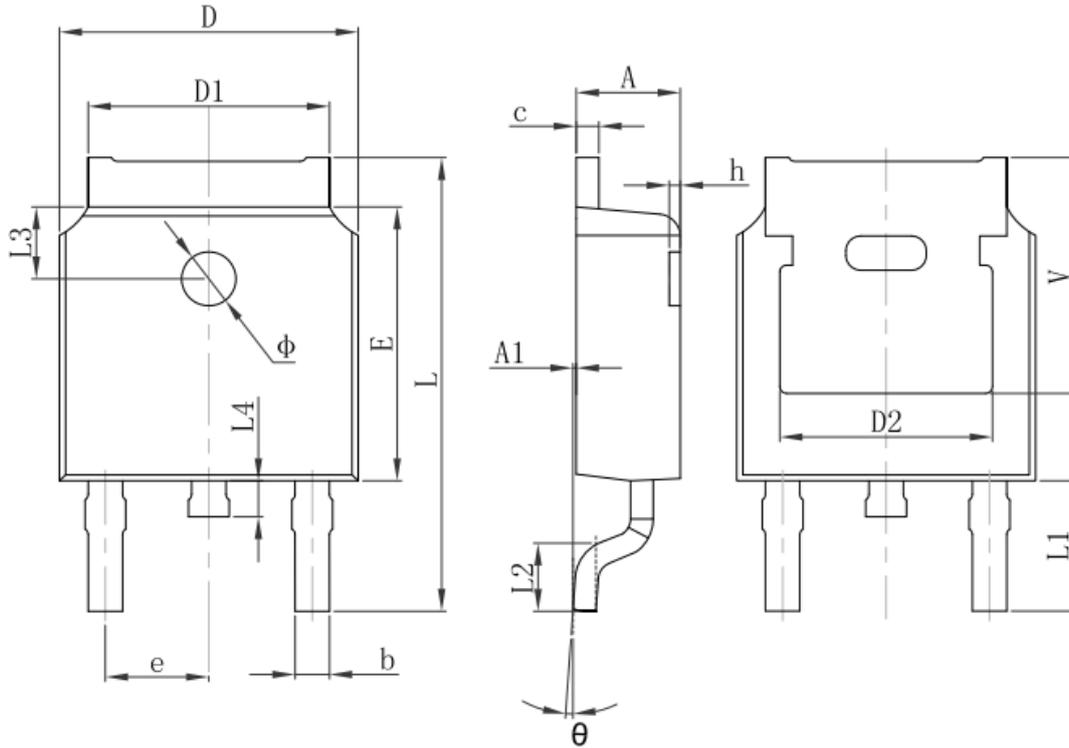
SOT-89 Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047



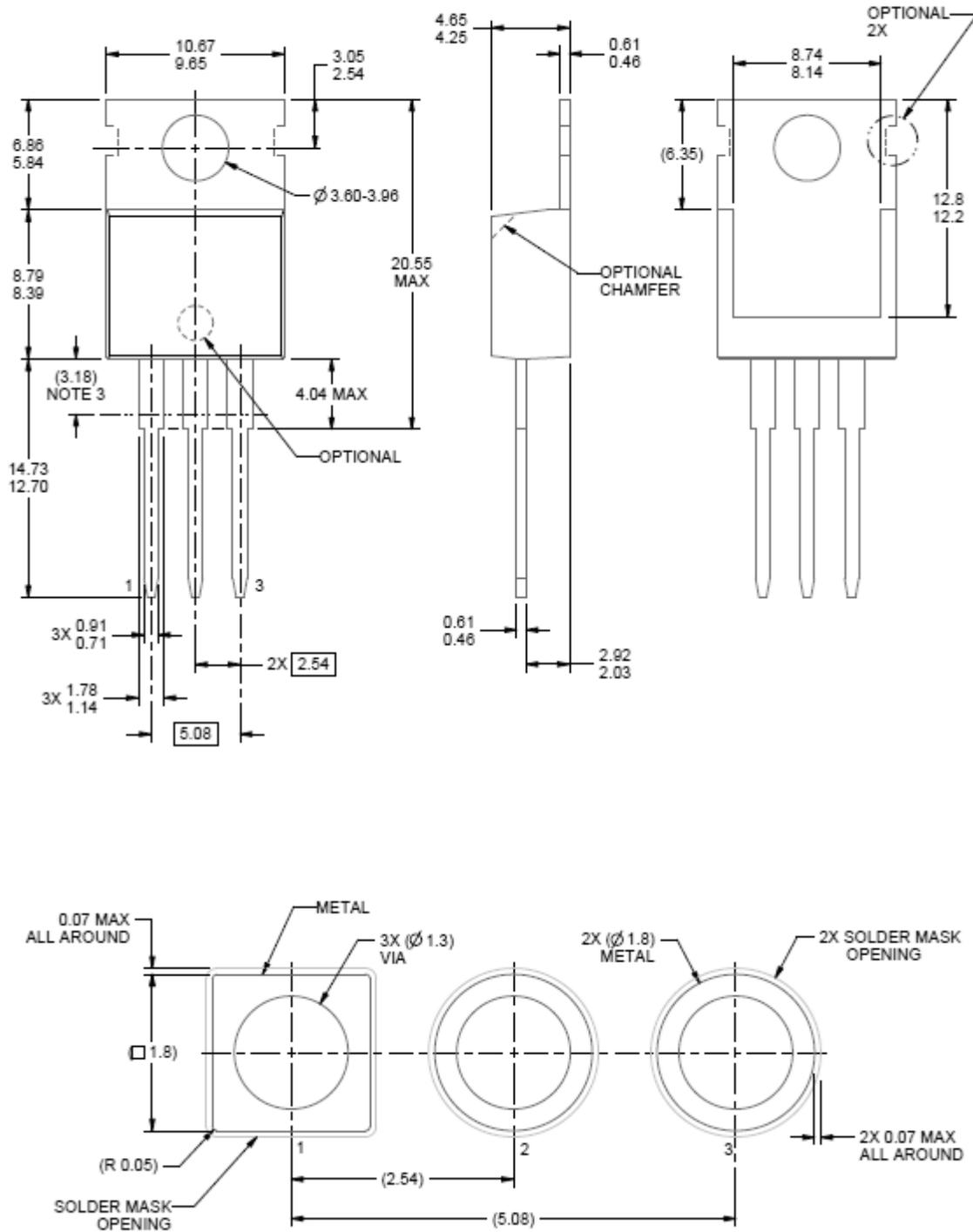
**TO-252-2L PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

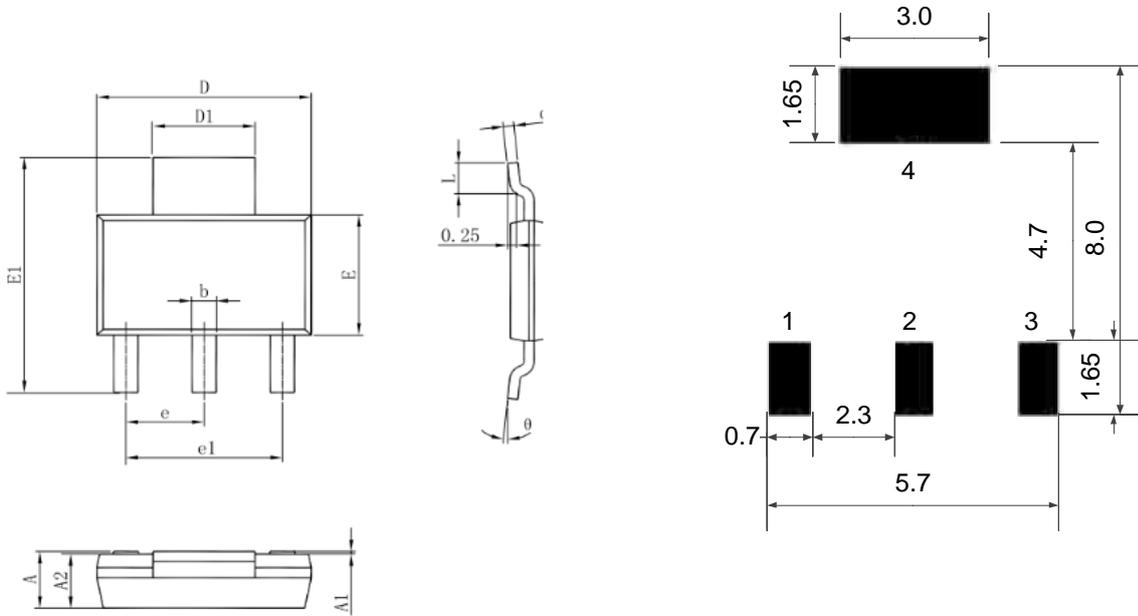


TO-220 Package





SOT-223 Package



PCB Board

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°