

## 300mA Low Dropout (LDO) Linear Regulator

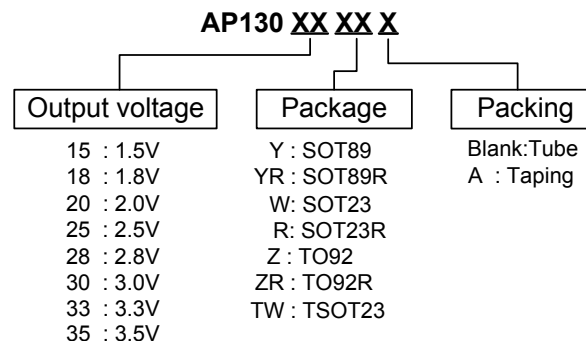
### ■ Features

- Input voltage range is up to 7V
- Dropout voltage 400mV at 300mA output current
- Guaranteed 300mA output current.
- Internal  $R_{ON} = 1.5\Omega$  PMOS draws no base current
- Low quiescent current 50 $\mu$ A
- Output voltage: 1.5V/1.8V/2.0V/2.5V/2.8V/3.0V/3.3V/3.5V; accuracy 2%
- Fast transient response
- Good load regulation
- Current limit and thermal shutdown protection
- Short circuit current fold-back
- 3 leads SOT89, TO92 and SOT23, TSOT23-3L **Pb-Free** Package

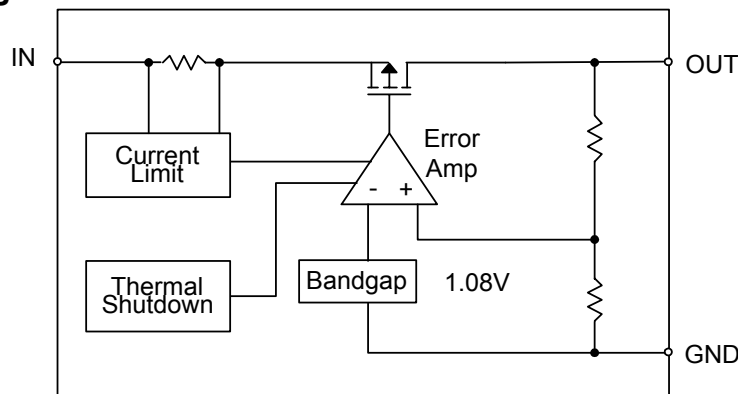
### ■ Applications

- Wireless Communication
- Battery Powered device
- CD-ROM, DVD, and LAN Card
- PC peripheral

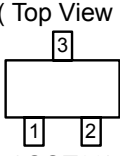
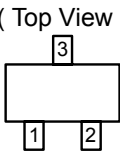
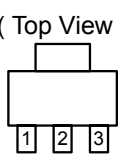
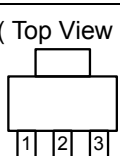
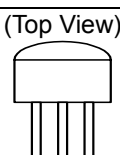
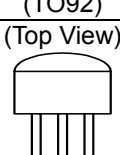
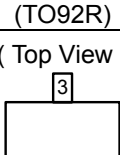
### ■ Ordering Information



### ■ Block Diagram



### ■ Pin Assignments and Pin Descriptions

Package		No.	Name	Description
Type	Code			
( Top View )  ( SOT23)	W	1	IN	IN: Power Input OUT: Output Voltage GND: Ground
		2	OUT	
		3	GND	
( Top View )  (SOT23R)	R	1	GND	
		2	OUT	
		3	IN	
( Top View )  (SOT89)	Y	1	OUT	
		2	GND	
		3	IN	
( Top View )  (SOT89R)	YR	1	GND	
		2	IN	
		3	OUT	
(Top View)  (TO92)	Z	1	IN	
		2	GND	
		3	OUT	
(Top View)  (TO92R)	ZR	1	GND	
		2	IN	
		3	OUT	
( Top View )  ( TSOT23)	TW	1	IN	
		2	OUT	
		3	GND	

**300mA Low Dropout (LDO) Linear Regulator****■ Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit
$V_{CC}$	Input Voltage	-0.1 to +7	V
$T_{OP}$	Operating Junction Temperature Range	-40 to +125	°C
$T_{ST}$	Storage Temperature Range	-65 to +150	°C
$P_D$	Power Dissipation, $P_D$ @ $T_A=25^\circ\text{C}$		
	TO-92	+0.6	W
	SOT-89	+0.5	W
	SOT-23 / TSOT23-3L	+0.25	W
$\theta_{JA}$	Package Thermal Resistance		
	TO-92	+100	°C/W
	SOT-89	+100	°C/W
	SOT-23 / TSOT23-3L	+250	°C/W

**■ Electrical Characteristics**

$T_A=25^\circ\text{C}$ ,  $C_{IN}=1\mu\text{F}$ ,  $C_{OUT}=10\mu\text{F}$ , unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{DROP}$	Dropout Voltage (Note 1)	$I_L=300\text{mA}$	-	400	500	mV
$I_{LIMIT}$	Current Limit (Note 2)	$V_{IN}=5\text{V}$ , $V_{OUT}=0\text{V}$	350	450	-	mA
$I_{short}$	Short Circuit Current	$V_{OUT}<1.05\text{V}$	-	150	300	mA
$\Delta V_{LINE}$	Line Regulation	$I_L=1\text{mA}$ , $V_{IN}=5\sim 7\text{V}$	-	0.1	0.3	%/V
PSRR	Ripple Rejection	$F=100\text{Hz}$ , $C_{IN}=1\mu\text{F}$ , $C_O=10\mu\text{F}$ , $I_L=100\text{mA}$	-	58	-	dB
$\Delta V_{LOAD}$	Load Regulation (Note 3)	$I_L=1\sim 300\text{mA}$ , $V_{IN}=5\text{V}$	-	30	40	mV
$\Delta V_{OUT}$	Output Voltage Accuracy	$I_L=1\text{mA}$ , $V_{IN}=5\text{V}$	-2	-	+2	%
	Output Voltage Temperature Coefficient (Note 4)		-	50	150	PPM/°C
$I_Q$	Quiescent Current	$I_L=0\text{mA}$ , $V_{IN}=5\text{V}$	-	50	100	$\mu\text{A}$

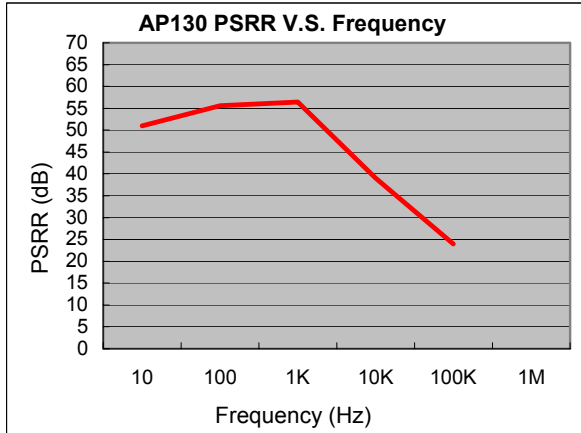
**Note 1.** Dropout voltage is defined as the input to output differential voltage. Dropout is measured at constant junction temperature by using pulsed ON time, and the criterion is  $V_{OUT}$  inside target value  $\pm 2\%$ . This test is skipped at the condition of  $V_{IN}<3\text{V}$ .

**Note 2.** Current limit is measured at constant junction temperature by using pulsed testing with a low ON time.

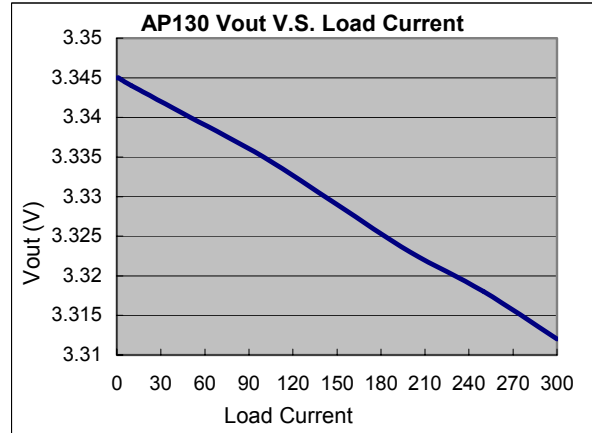
**Note 3.** Regulation is measured at constant junction temperature by using pulsed testing with a low ON time.

**Note 4.** Guaranteed by design.

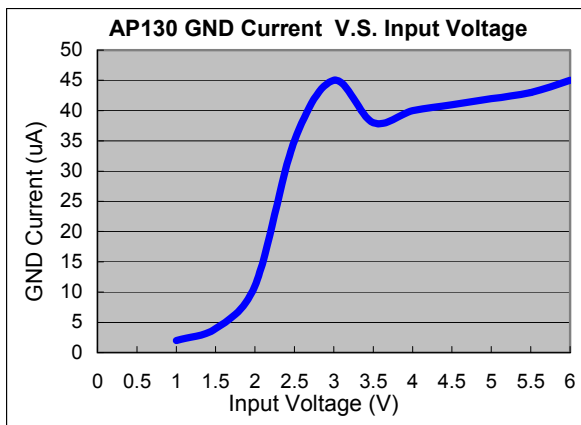
### ■ Typical Characteristics



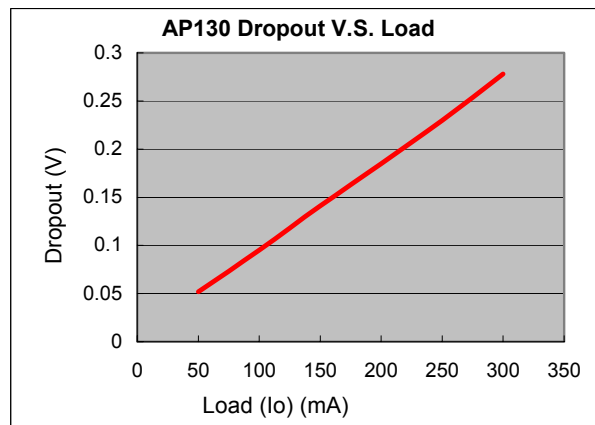
PSRR V.S. Frequency



Vout V.S. Load Current

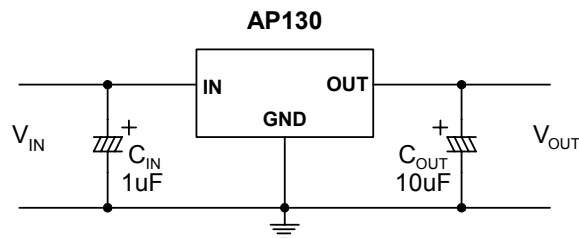


GND Current V.S. Input Voltage



Dropout V.S. Load

### ■ Typical Application Circuit

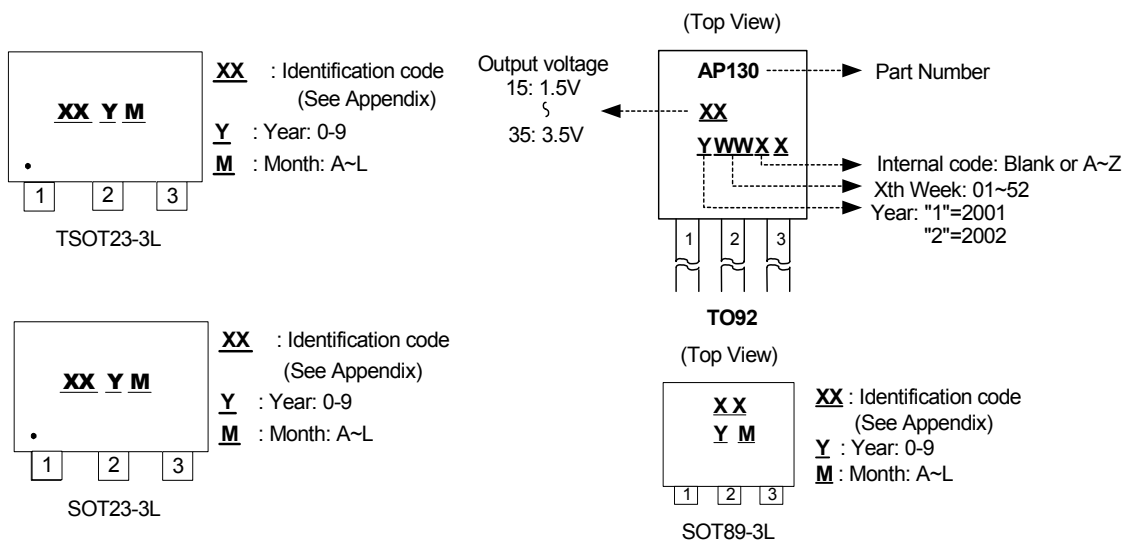


## 300mA Low Dropout (LDO) Linear Regulator

### ■ Function Description

A minimum of 10 $\mu$ F capacitor must be connected from OUT to ground to insure stability. Typically a large storage capacitor is connected from V<sub>IN</sub> to ground to ensure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 0.7V higher than V<sub>OUT</sub> in order for the device to regulate properly.

### ■ Marking Information



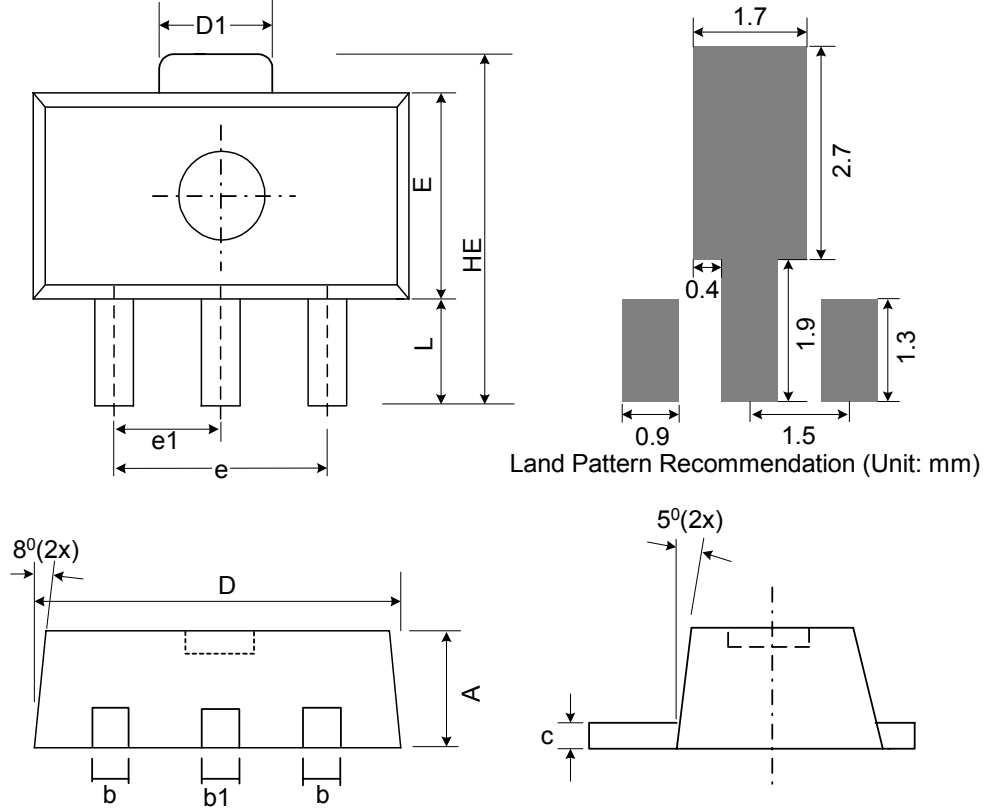
### Appendix

Part Number		Identification code
SOT23/TSOT23	SOT89	
AP130-15W	AP130-15Y	CA
AP130-18W	AP130-18Y	CD
AP130-20W	AP130-20Y	CF
AP130-25W	AP130-25Y	CK
AP130-28W	AP130-28Y	CN
AP130-30W	AP130-30Y	CP
AP130-33W	AP130-33Y	CS
AP130-35W	AP130-35Y	CU

Part Number		Identification code
SOT23/TSOT23	SOT89	
AP130-15R	AP130-15YR	GO
AP130-18R	AP130-18YR	GR
AP130-20R	AP130-20YR	GT
AP130-25R	AP130-25YR	GY
AP130-28R	AP130-28YR	H1
AP130-30R	AP130-30YR	H3
AP130-33R	AP130-33YR	H9
AP130-35R	AP130-35YR	HB

### ■ Package Information

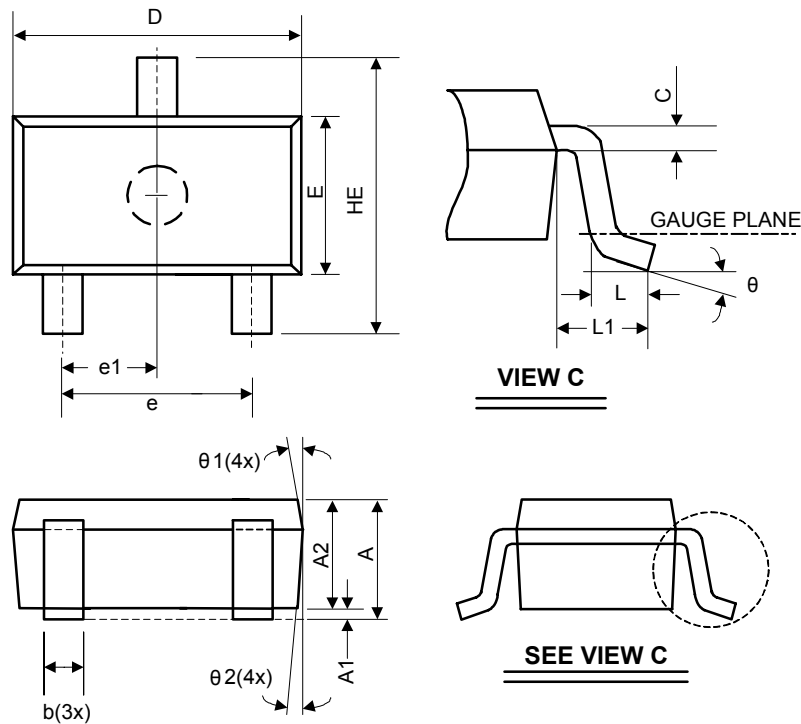
(1) Package Type: SOT89-3L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.50	1.60	0.055	0.059	0.063
b	0.36	0.42	0.48	0.014	0.016	0.018
b1	0.41	0.47	0.53	0.016	0.043	0.051
C	0.35	0.39	0.43	0.014	0.015	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.40	1.60	1.75	0.055	0.062	0.069
e	2.90	3.00	3.10	0.114	0.118	0.122
e1	1.45	1.50	1.55	0.057	0.059	0.061
E	2.35	2.48	2.60	0.093	0.098	0.102
HE	3.94	-	4.25	0.155	-	0.167
L	0.80	-	1.20	0.031	-	0.047

### ■ Package Information (Continued)

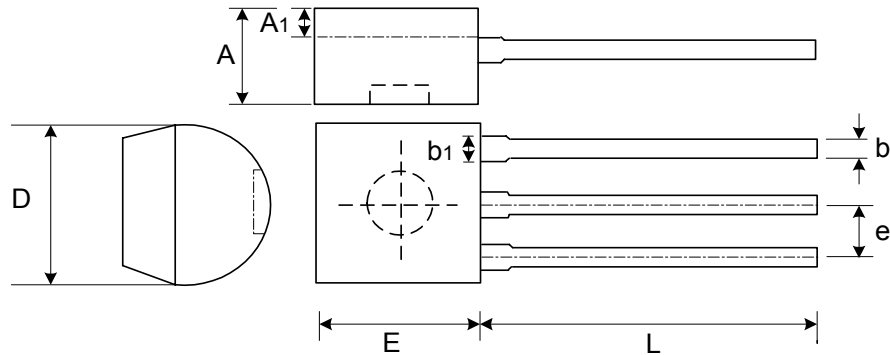
(2) Package Type: SOT23-3L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.05	-	1.35	0.041	-	0.053
A1	0.05	-	0.15	0.002	-	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	-	0.50	0.010	-	0.020
C	0.08	-	0.20	0.003	-	0.008
D	2.70	2.90	3.00	0.106	0.114	0.118
E	1.50	1.60	1.70	0.059	0.063	0.067
HE	2.60	2.80	3.00	0.102	0.110	0.118
L	0.30	-	0.60	0.012	-	0.024
L1	0.50	0.60	0.70	0.020	0.024	0.028
e	1.80	1.90	2.00	0.071	0.075	0.079
e1	0.85	0.95	1.05	0.033	0.037	0.041
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°

### ■ Package Information (Continued)

(3) Package Type: TO92-3L

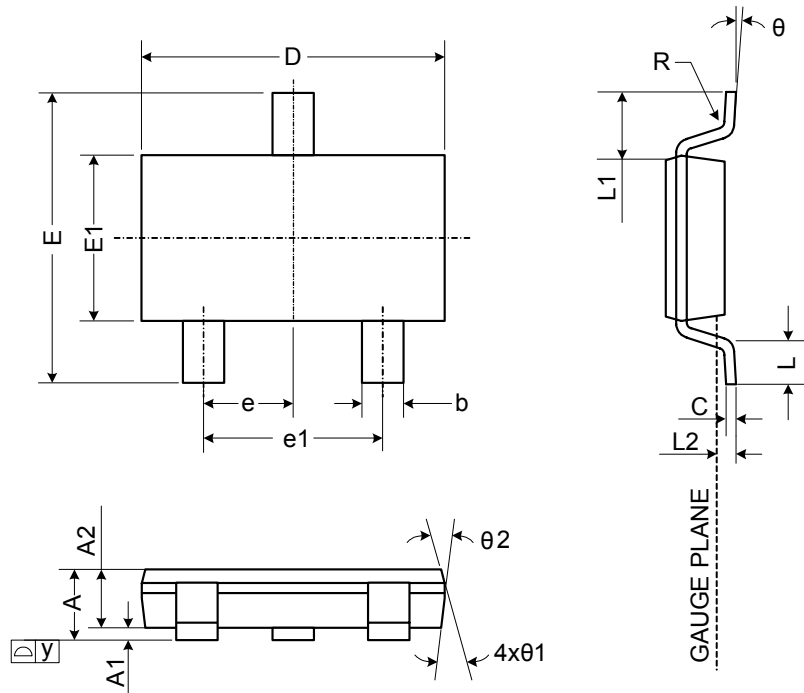


Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	3.302	3.556	3.810	0.130	0.140	0.150
A1	1.016	-	-	0.040	-	-
b	0.330	0.381	0.432	0.013	0.015	0.017
b1	0.406	0.457	0.506	0.016	0.018	0.020
D	4.445	4.572	4.699	0.175	0.180	0.185
E	4.445	4.572	4.699	0.175	0.180	0.185
L	13.00	-	15.500	0.512	-	0.610
e	1.150	1.270	1.390	0.045	0.050	0.055



### ■ Package Information (Continued)

(4) Package Type: TSOT23-3L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.75	-	0.90	0.030	-	0.035
A1	0.00	-	0.10	0.000	-	0.004
A2	0.70	0.75	0.80	0.028	0.030	0.031
b	0.35	-	0.51	0.014	-	0.020
C	0.10	-	0.25	0.004	-	0.010
D	2.80	2.90	3.00	0.110	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
e	0.95 BSC.			0.037		
e1	1.90 BSC.			0.075		
L	0.37	-	-	0.015	-	-
L1	0.60 REF.			0.024		
L2	0.25 BSC.			0.010		
y	-	-	0.10	-	-	0.004
R	0.10	-	-	0.004	-	-
θ	0°	-	8°	0°	-	8°
θ1	7° NOM.			7° NOM.		
θ2	5° NOM.			5° NOM.		