
250mA Ultra Low Dropout Linear Regulator

Features

- Maximum Output Current: 250mA
- Highly Accurate: Output Voltage $\pm 2\%$
- Low Power Consumption: 2 μ A Typ.
- Small input/output differential:
0.4V at 160mA ($V_{OUT}=3.3V$)
0.12V at 100mA ($V_{OUT}=5.0V$)
- SOT-23 Package

Applications

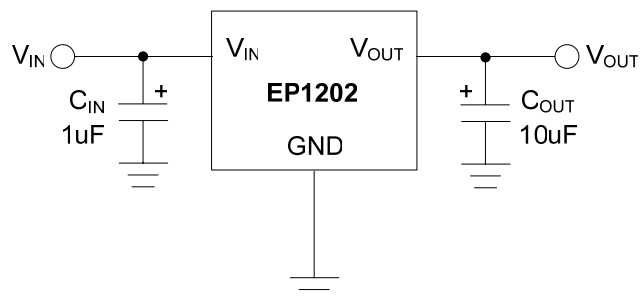
- Battery Powered Equipment
- Palmtops
- Portable Cameras and Video Recorders
- Reference Voltage Sources

Description

The EP1202 series is a group of positive voltage output, three-pin regulators, that provides a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and programmable fuse technologies.

The EP1202 consists of a high-precision voltage reference, an error correction circuit, and a current limited output driver. Transient responses to load variations have improved in comparison to the existing series. SOT-23(150mW) package is available.

Typical Application



Electrical Characteristics

Symbol	Parameter		Conditions	Min.	Typ.	Max.	Units	
$V_{OUT(E)}$ (Note 1)	Output Voltage		EP1202-18	$V_{IN}=2.8V, I_{OUT}=40mA$	1.764	1.800	1.836	V
			EP1202-33	$V_{IN}=4.3V, I_{OUT}=40mA$	3.234	3.300	3.366	
$I_{OUT(max)}$	Maximum Output Current		EP1202-18	$V_{IN}=2.8V, V_{OUT(E)} \geq 1.62V$	80			mA
			EP1202-33	$V_{IN}=4.3V, V_{OUT(E)} \geq 2.97V$	150			
V_D	Dropout Voltage (Note 2)	V_{D1}	EP1202-18	$I_{OUT}=40mA$		200	370	mV
		V_{D2}		$I_{OUT}=80mA$		450	710	
		V_{D1}	EP1202-33	$I_{OUT}=80mA$		200	360	
		V_{D2}		$I_{OUT}=160mA$		450	700	
REG_{LINE}	Line Regulation ($\Delta V_{OUT}/\Delta V_{IN}\Delta V_{OUT}$)		EP1202-18	$I_{OUT}=40mA, 2.8V \leq V_{IN} \leq 10V$		0.2	0.3	%V
			EP1202-33	$I_{OUT}=40mA, 4.3V \leq V_{IN} \leq 10V$		0.2	0.3	
REG_{LOAD}	Load Regulation (ΔV_{OUT})		EP1202-18	$V_{IN}=2.8V, 1mA \leq I_{OUT} \leq 40mA$		10	30	mV
			EP1202-33	$V_{IN}=4.3V, 1mA \leq I_{OUT} \leq 80mA$		20	50	
I_S	Supply Current		EP1202-18	$V_{IN}=2.8V$		3.0	5.0	μA
			EP1202-33	$V_{IN}=4.3V$		2.0	5.0	
V_{IN}	Input Voltage		EP1202-18		1.8		10	V
			EP1202-33		1.8		10	
	Output Voltage Temperature Characteristics ($\Delta V_{OUT}/\Delta T_{OPR}\Delta V_{OUT}$)		EP1202-18	$I_{OUT}=40mA, -40^\circ C \leq T_{OPR} \leq 85^\circ C$		± 100		ppm/ $^\circ C$
			EP1202-33	$I_{OUT}=40mA, -40^\circ C \leq T_{OPR} \leq 85^\circ C$		± 100		

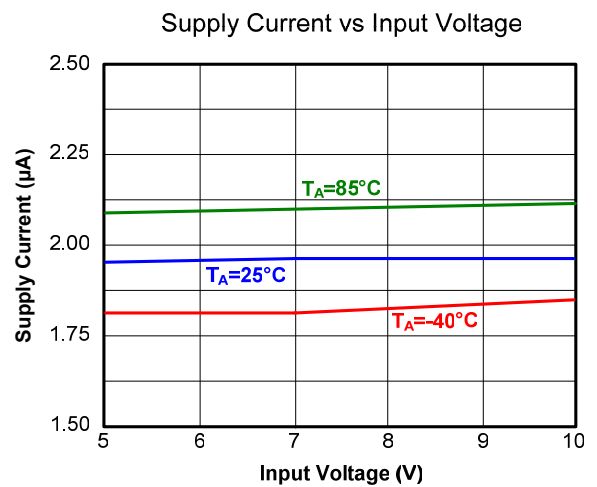
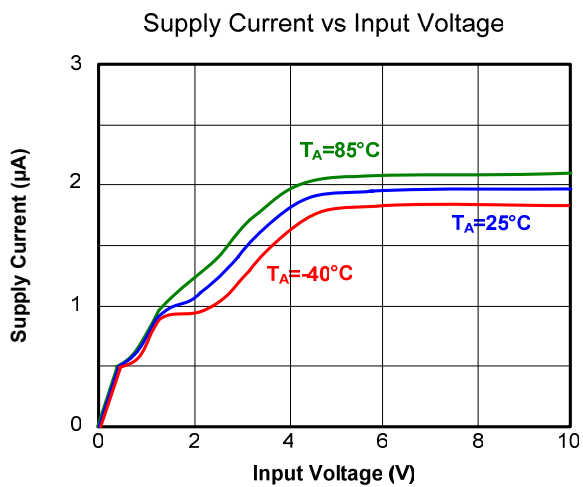
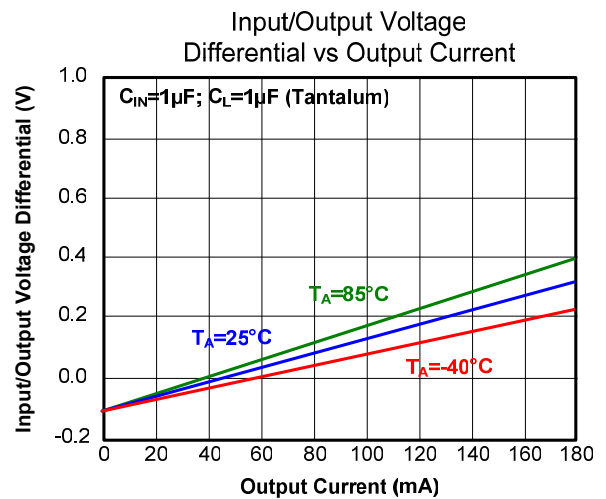
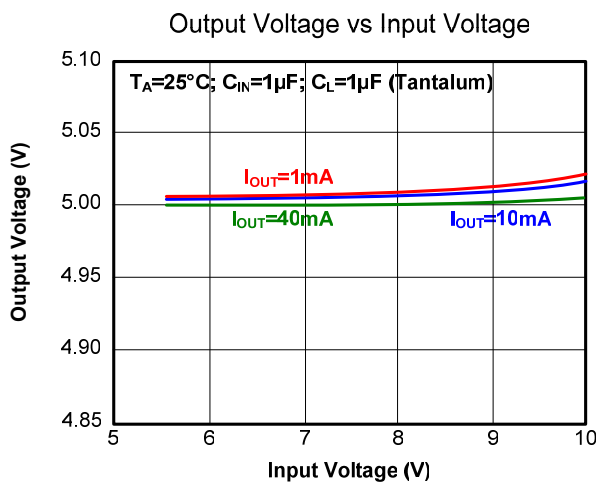
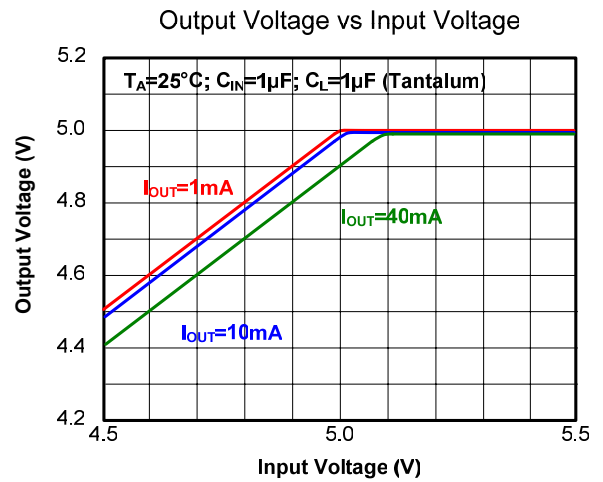
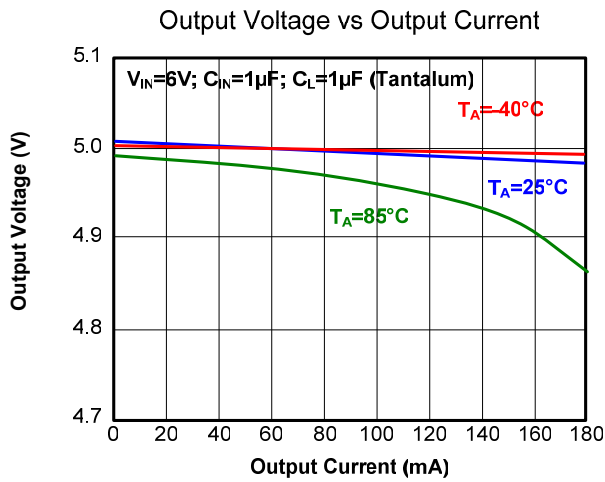
Note 1: $V_{OUT(E)}$ = Effective output voltage (i.e. the output voltage when “ $V_{OUT}+1.0V$ ” is provided while maintaining a certain I_{OUT} value.

Note 2: $V_D = \{ V_{IN1}^{(Note 3)} - V_{OUT1}^{(Note 4)} \}$

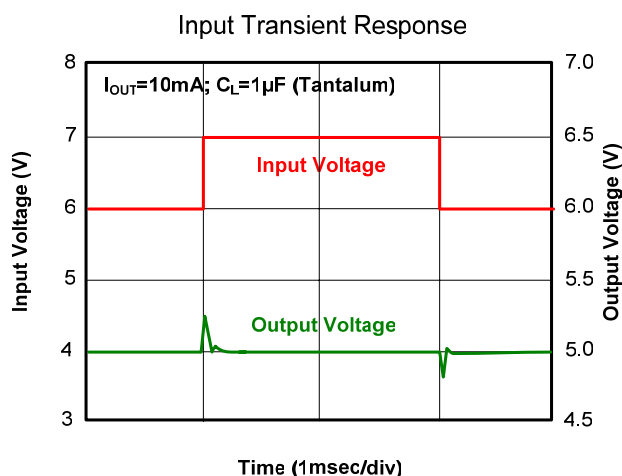
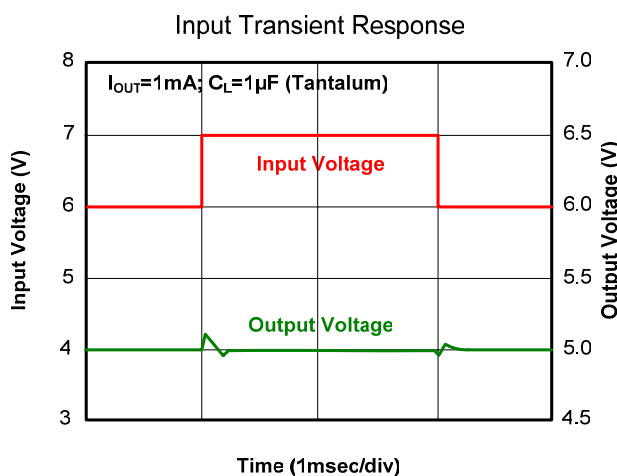
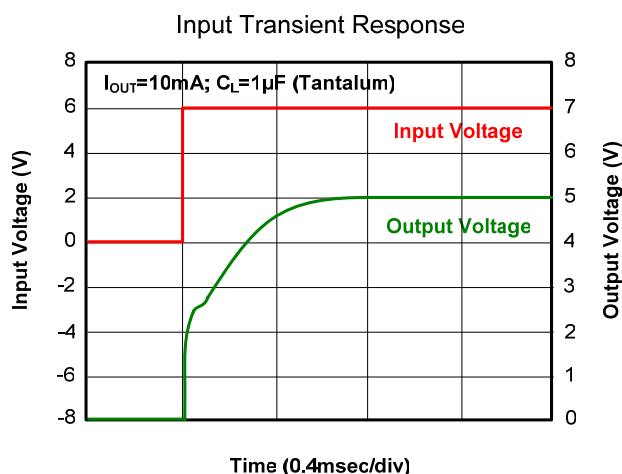
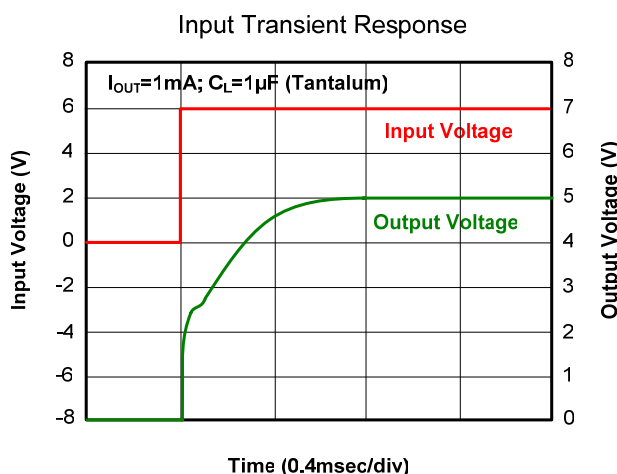
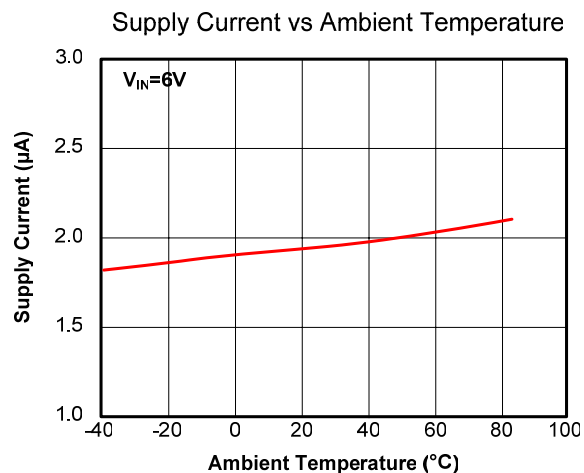
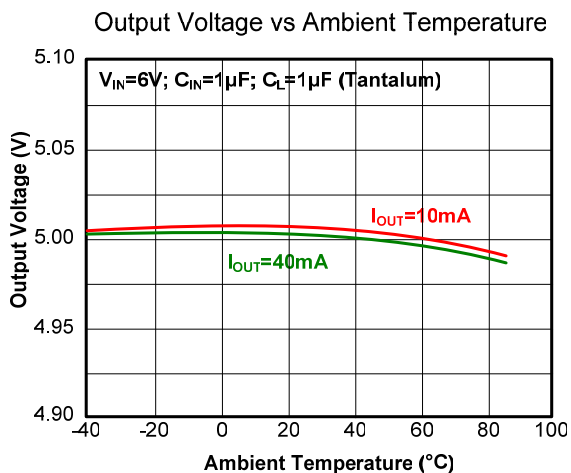
Note 3: The input voltage at the time V_{OUT1} is output input voltage has been gradually reduced.

Note 4: A voltage equal to 98% of the output voltage when a stabilized ($V_{OUT}+ 1.0V$) is input.

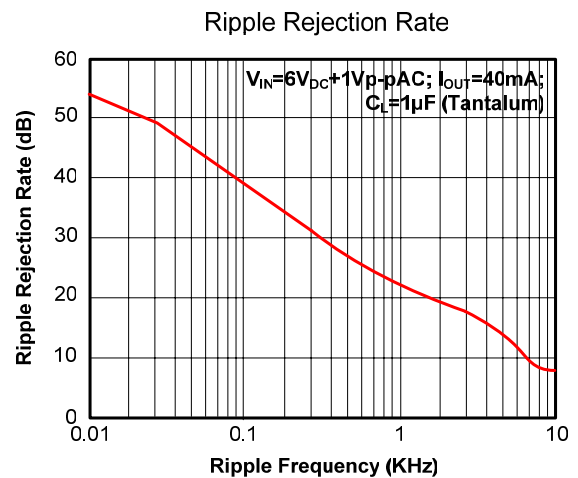
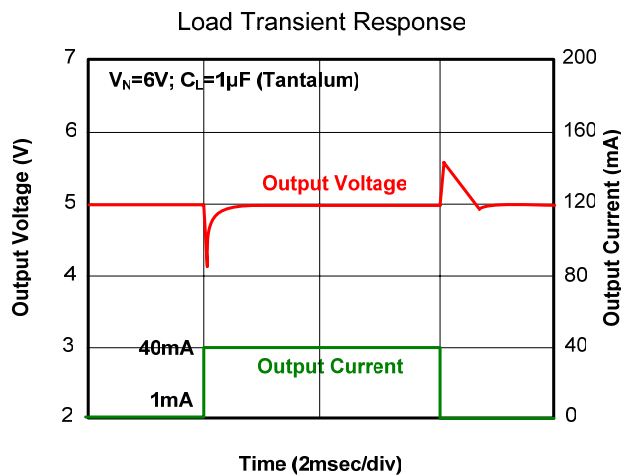
Typical Performance Characteristics



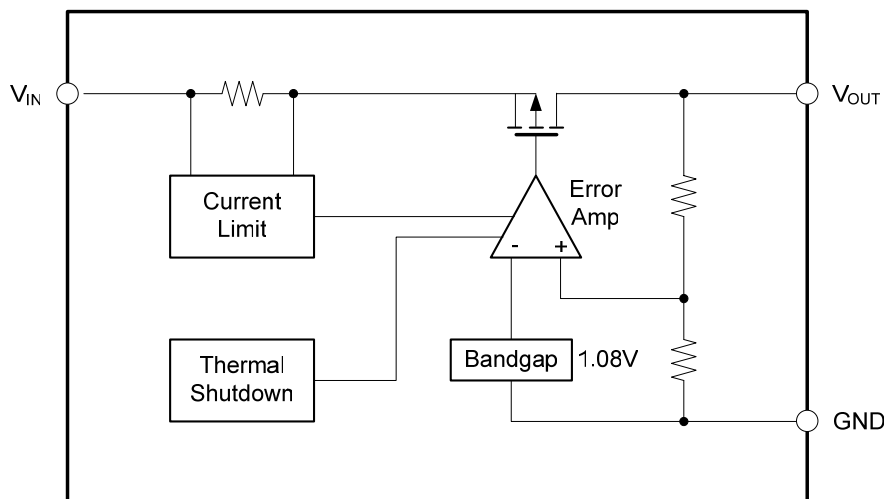
Typical Performance Characteristics (Continued)



Typical Performance Characteristics (Continued)



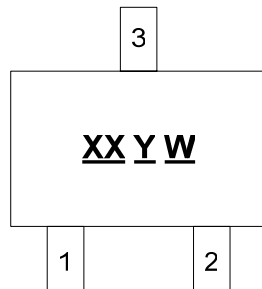
Functional Block Diagram



Functional Description

A minimum of $10\mu F$ capacitor must be connected from V_{OUT} to ground to insure stability. Typically a large storage capacitor is connected from V_{IN} 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_{OUT} in order for the device to regulate properly.

Marking Information



SOT-23

XX : Identification Code
(See Appendix)

YW : Assembly Date

Y : Year

W : Week

(See "Date Code Convention")

Appendix

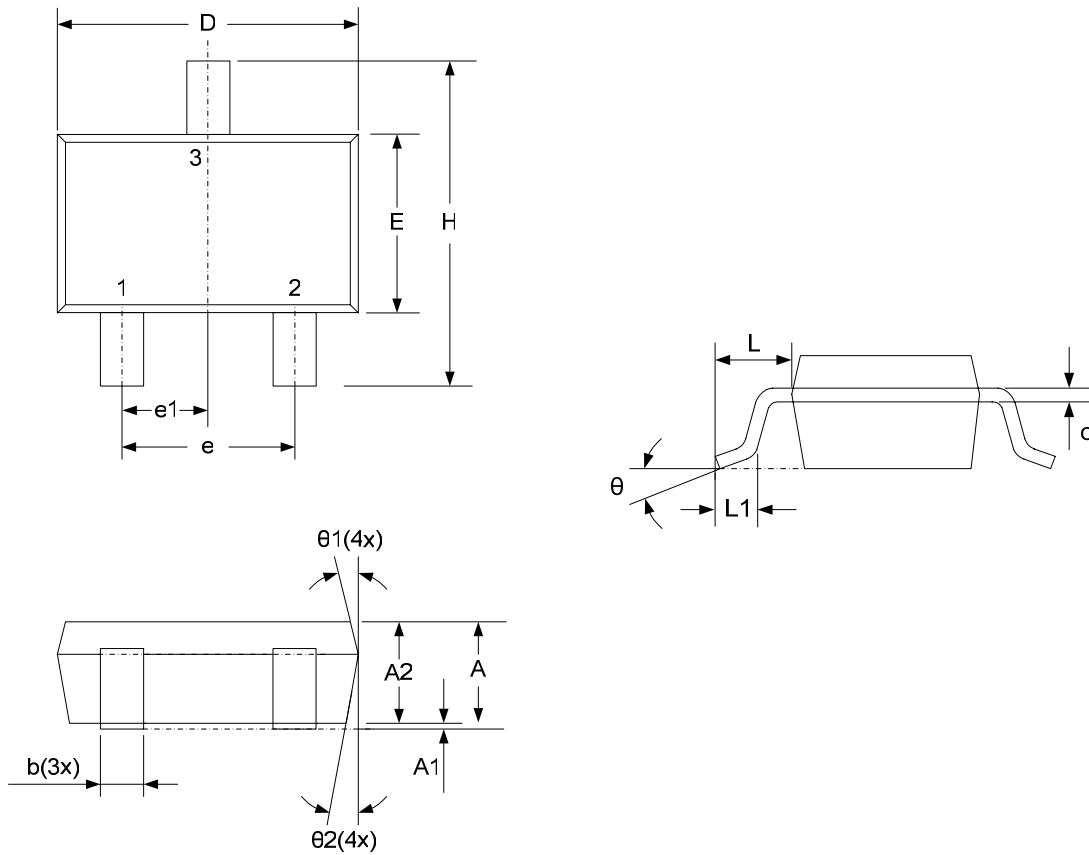
Identification Code	Part Number	V _{OUT}
BH	EP1202	1.5V
BJ	EP1202	1.8V
BK	EP1202	2.5V
BL	EP1202	2.8V
BM	EP1202	3.3V

Date Code Convention

Y	Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Mark	5	6	7	8	9	0	1	2	3	4
	Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Mark	A	B	C	D	E	F	G	H	J	K
W	Week	1	2	3	4	5	6	7	8	9	10
	Mark	1	2	3	4	5	6	7	8	9	a
	Week	11	12	13	14	15	16	17	18	19	20
	Mark	b	c	d	e	f	g	h	i	j	k
	Week	21	22	23	24	25	26	27	28	29	30
	Mark	m	n	p	q	r	s	t	u	v	w
	Week	31	32	33	34	35	36	37	38	39	40
	Mark	x	y	z	A	B	C	D	E	F	G
	Week	41	42	43	44	45	46	47	48	49	50
	Mark	H	J	K	L	M	N	P	Q	R	S
	Week	51	52								
	Mark	T	U								

Package Description

SOT-23



DIM	MILLIMETERS			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
H	2.60	2.80	3.00	0.102	0.110	0.118
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
L	0.50	0.60	0.70	0.020	0.024	0.028
L1	0.30	–	0.60	0.012	–	0.024
θ	0°	5°	10°	0°	5°	10°
$\theta 1$	3°	5°	7°	3°	5°	7°
$\theta 2$	6°	8°	10°	6°	8°	10°