AXElite 亞瑟萊特科技股份有限公司 AXElite Technology Co., Ltd.
Powered By Innovation

# 2A Ultra Low Dropout Linear Regulator

❖ GENERAL DESCRIPTION

The AX1202 is a low-dropout voltage regulator suitable for various electronic equipments. It provides constant voltage power source. The dropout voltage of AX1202 is below 0.27V in full rated current (2A). This regulator has various functions such as a peak current protection, a thermal shut down, a short circuit protect.

The AX1202 is available in SOP-8L, TO252-5L, TO220-5L, TO220-5LR, TO263-5L and PDIP-8L power packages which features small size to reduce the junction-to-case resistance, being applicable in 0.5~3W applications.

❖ FEATURES

- Ultra Low Dropout - 0.27V(typical) at 2A Output Current
- Adjustable mode: 1.22V Reference Voltage
- Fixed mode:5V, 9V, 12V output voltage
- Operating voltage: up to 23V for TO220 and TO263 packages.
                                   up to 16V for TO252, PDIP-8L and SOP-8L packages.
- Current-Limit and Thermal Shutdown Protection
- Short circuit protection, Enable function.
- Built-in internal SW P-channel MOS
- SOP-8L, TO252-5L, TO220-5L, TO220-5LR, TO263-5L, and PDIP-8L Pb-Free Packages.

❖ BLOCK DIAGRAM

AXElite 亞瑟萊特科技股份有限公司 AXElite Technology Co., Ltd.
POWERED By Innovation
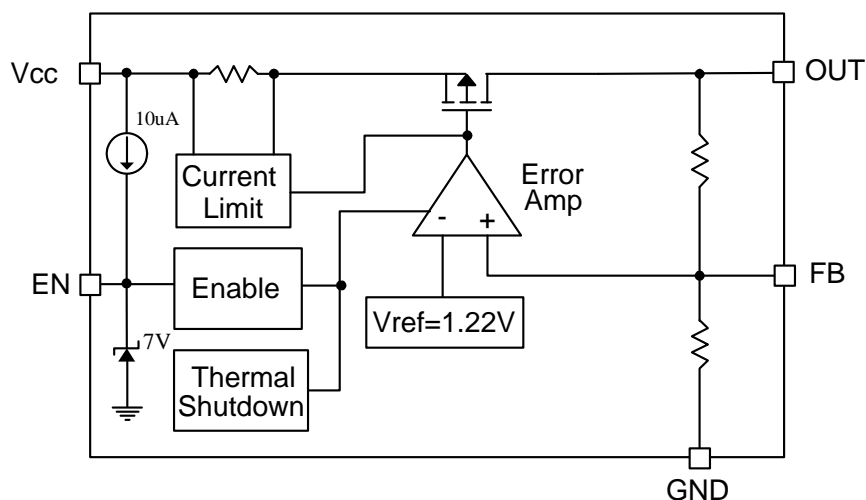
❖ PIN ASSIGNMENT

The packages of AX1202 are SOP-8L, PDIP-8L, TO252-5L, TO220-5L, TO220-5LR and TO263-5L; the pin assignment is given by:
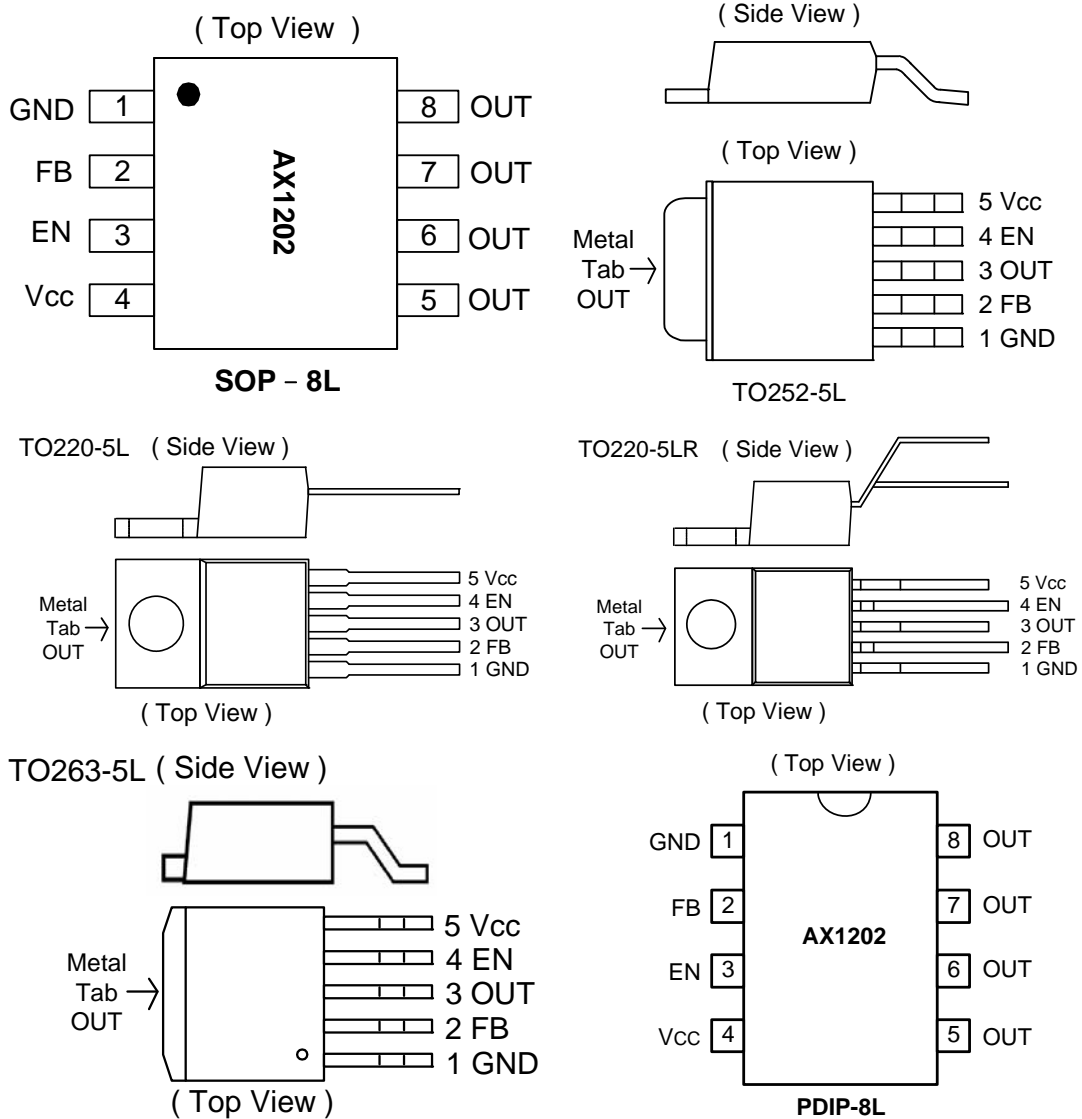
Name	Description
FB	Feedback pin
EN	Enable input, it is pull-high typically. Drive EN high or floating to turn on the regulator, driver it low to turn it off.
V_{CC}	IC power supply pin
OUT	Output Voltage pin
GND	Ground pin

AXElite 亞瑟萊特科技股份有限公司 AXElite Technology Co., Ltd.
Powered By Innovation

❖ ORDER/MARKING INFORMATION

Order Information
AX1202 XXX XX X

Package	Vout	Packing
N : PDIP-8L S : SOP-8L D5: TO252-5L M5:TO263-5L T5 : TO220-5L T5R:TO220-5LR	Blank : Adj 50 = 5.0V 90 = 9.0V 12 = 12V	Blank : Tube A : Taping

Top Marking

ADJ Version

Logo ← **AX** 1 2 0 2 → Part number
YYWWX → ID code:internal
→ WW:01~52
→ Year: 10=2010
11=2011

FIXED Version (V$_{OUT}$=5.0V)

Logo ← **AX** 1 2 0 2 → Part number
- 5 0 → Output voltage
YYWWX → ID code:internal
→ WW:01~52
→ Year: 10=2010
11=2011

❖ ABSOLUTE MAXIMUM RATINGS (T$_A$=25°C)

Characteristics		Symbol	Rating	Unit
V$_{CC}$ Supply Voltage		V$_{CC}$	-0.3 to 25	V
EN Pin Voltage		V$_{EN}$	-0.3 to 7	V
FB Pin Voltage		V$_{FB}$	-0.3 to Vcc+0.3	V
Output current		I$_{OUT}$	2.5	A
Power Dissipation		PD	TO220=4, TO252=2.3, SOP8=1.6, TO263=4	W
Storage Temperature Range		T$_{ST}$	-65 to +150	°C
Junction Temperature Range		T$_J$	-40 to 125	°C
Operating Temperature Range		T$_{OP}$	-40 to +85	°C
Thermal Resistance from Junction to case	TO220	θ$_{JC}$	3.5	°C/W
	TO263		3.5	
	TO252		10	
	PDIP8		15	
	SOP8		20	
Thermal Resistance from Junction to ambient	TO220	θ$_{JA}$	25	°C/W
	TO263		25	
	TO252		45	
	PDIP8		50	
	SOP8		60	

Note: θ$_{JA}$ is measured with the PCB copper area(need connect to OUT pin) of approximately 1.5 in^2 (Multi-layer).

Rev.2.0 Jun.22, 2010

**AXElite Technology Co., Ltd.**

❖ ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, T_A=25°C, V_{CC}=12V)

Characteristics	Symbol	Conditions		Min	Typ	Max	Units
V_{CC} Supply Voltage	V_{CC}	I_{OUT} =2A	TO220, TO263 packages	5.1	-	23	V
			TO252,SOP-8L,PDIP-8L packages	5.1	-	16	V
Feedback Voltage	V_{FB}	I_{OUT}=10mA, V_{CC} =10V		1.196	1.22	1.244	V
Output Voltage	V_{OUT}	I_{OUT}=10mA, V_{CC} =6V		4.90	5.0	5.10	V
		I_{OUT}=10mA, V_{CC} =10V		8.82	9.0	9.18	
		I_{OUT}=10mA, V_{CC} =13V		11.76	12	12.24	
GND Current	I_{GND}	I_{OUT}= 0~2A		-	1.2	3	mA
Shutdown Current	I_{SD}	V_{EN}=0V		-	0.15	0.4	mA
Load regulation	V_{Load}	5mA < I_{OUT} < 2A		-	0.5	1.5	%
Line regulation	V_{Line}	I_{OUT}=10mA, V_{OUT}+1.0V<V_{CC}< V_{OUT}+10V		-	0.1	0.5	%
Ripple rejection ratio	PSRR	Note1		-	65	-	dB
Dropout Voltage	V_{DROP}	I_{OUT}= 2A, V_{OUT}=5V		-	0.27	0.4	V
		I_{OUT}= 2A, V_{OUT}=9V		-	0.26	0.39	
		I_{OUT}= 2A, V_{OUT}=12V		-	0.18	0.31	
Short circuit protect	Iscp	V_{OUT}<20%		-	0.6	-	A
Current Limit	CL	SOP-8L, PDIP-8L		2.2	-	-	A
		TO220, TO263, TO252L		2.5	-	-	A
EN Pin Logic input threshold voltage	V_{ENH}	High (regulator ON)		2.0	-	-	V
	V_{ENL}	Low (regulator OFF)		-	-	0.8	V
EN Pin Input Current	I_{ENH}	V_{EN}=2.5V (ON)		-	20	-	uA
	I_{ENL}	V_{EN}=0.3V (OFF)		-	-10	-	uA
Internal MOSFET RDSON	R_{DSON}	V_{CC}=5.5V		-	120	150	mΩ
		V_{CC}=12V		-	80	100	
Thermal Shutdown	TSD			-	140	-	°C

Note: These parameters, although guaranteed, are not 100% tested in production.

AXElite 亞瑟萊特科技股份有限公司 AXElite Technology Co., Ltd.

❖ **APPLICATION CIRCUIT**

1. FIXED (SOP-8L, PDIP-8L)
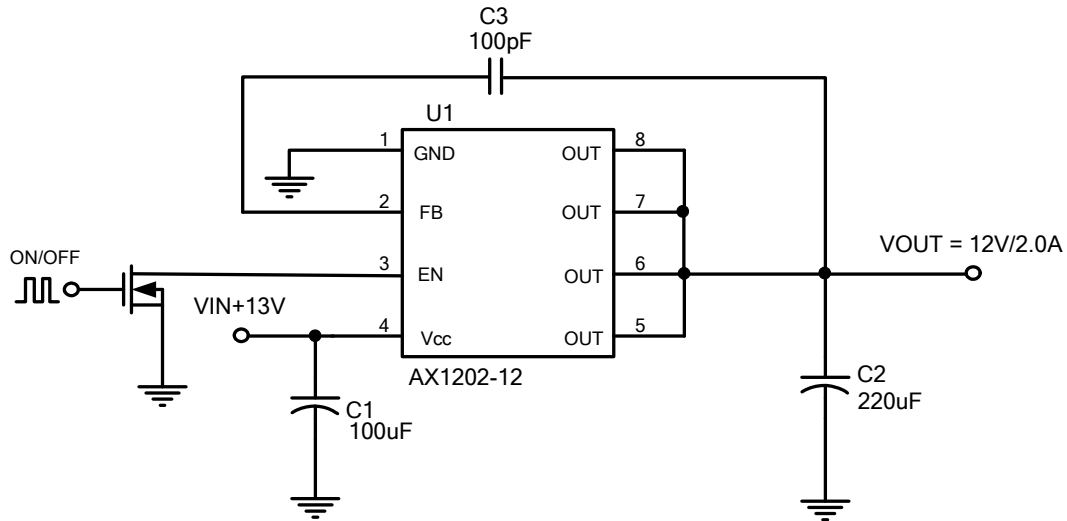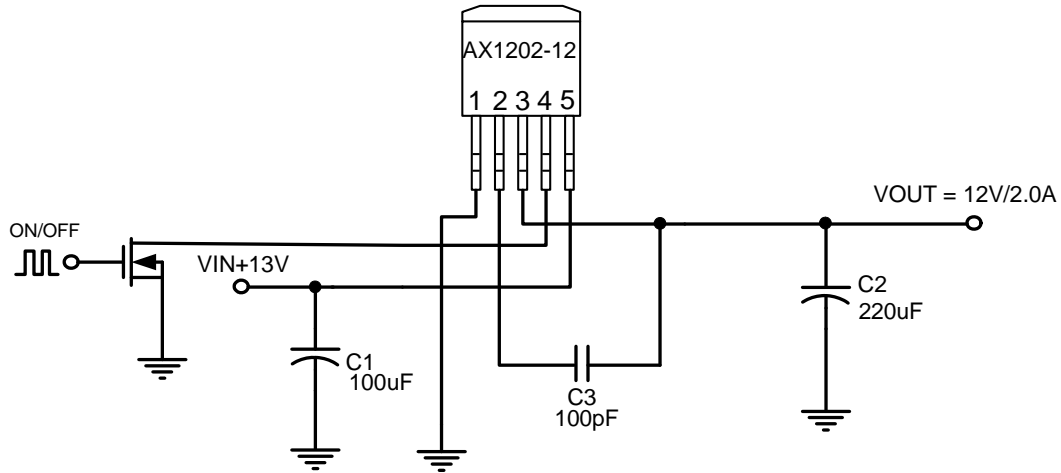

2. ADJ (SOP-8L, PDIP-8L)
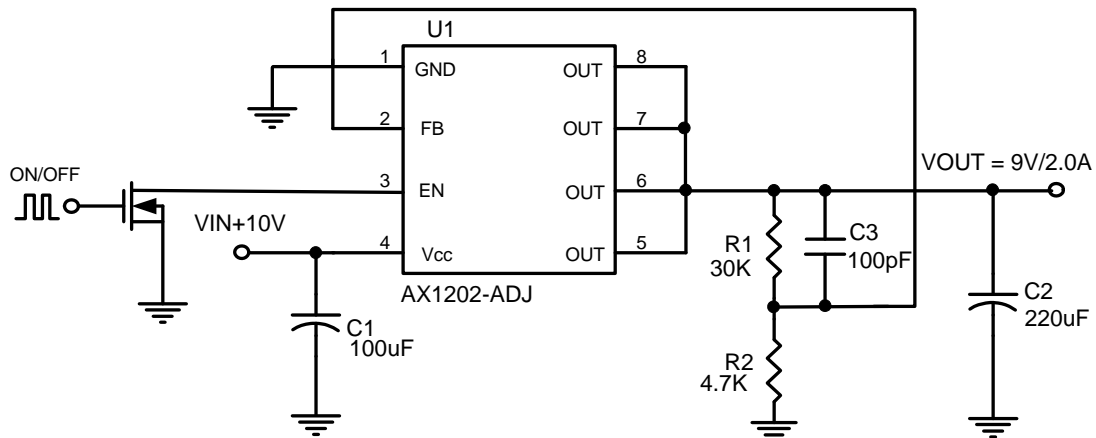
$VOUT = VFB*(1+R1/R2)$

$VFB = 1.22V$

R2 suggest 1K~5.6KΩ

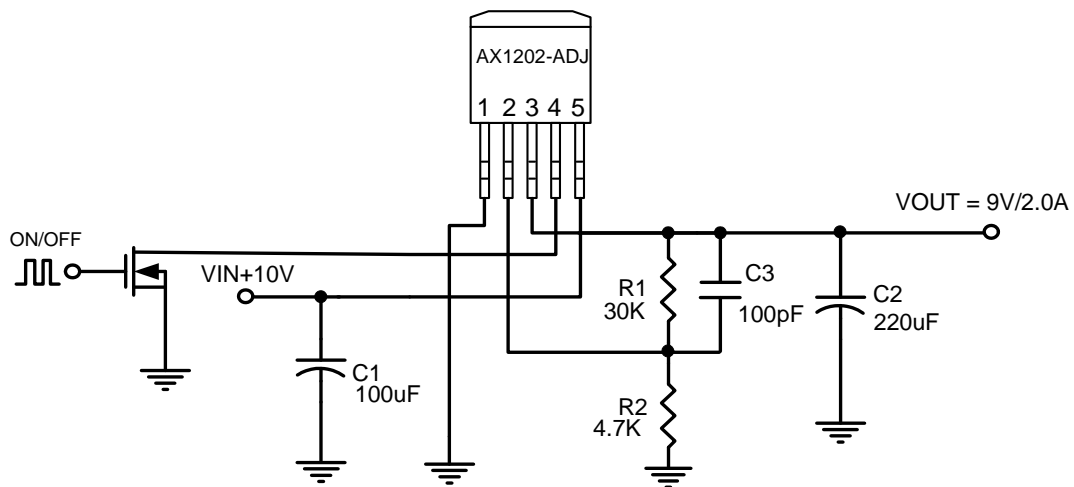C2 choose Low ESR capacitor

C3=47pF~100pF for stability issue

5/14

3. FIXED (TO252-5L, TO220-5L, TO263-5L)

AX1202-12

1 2 3 4 5

VOUT = 12V/2.0A

ON/OFF

VIN+13V

C1 100uF

C3 100pF

C2 220uF

4. ADJ (TO252-5L, TO220-5L, TO263-5L)

AX1202-ADJ

1 2 3 4 5

VOUT = 9V/2.0A

ON/OFF

VIN+10V

C1 100uF

R1 30K

R2 4.7K

C3 100pF

C2 220uF

$VOUT = VFB * (1 + R1/R2)$

$VFB = 1.22V$

R2 suggest $1K \sim 5.6K\Omega$

C2 choose Low ESR capacitor

C3=47pF~100pF for stability issue

AX1202

❖ TYPICAL CHARACTERISTICS

Vcc vs. GND Current

Vcc vs. Shutdown Current

Iout vs. FB Voltage
(Vcc=12.5V Vout=12V)

Iout vs. Vout
(Vcc=12.5V)

Iout vs. Dropout Voltage

Temperature vs. Current Limit
(Vcc=12.5V Vout=12V)

Rev.2.0 Jun.22, 2010
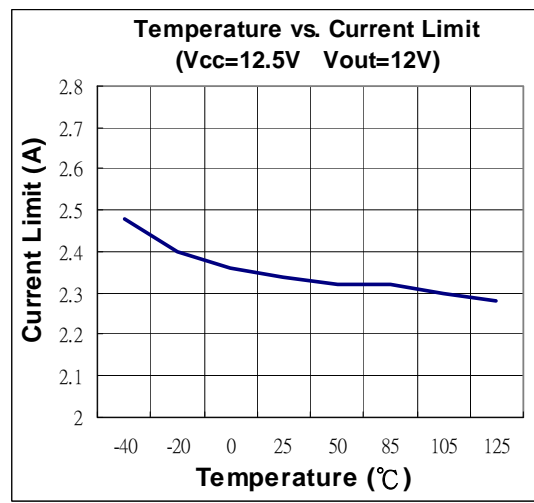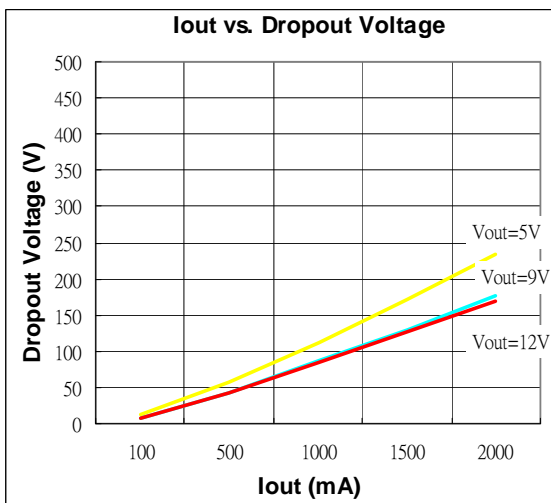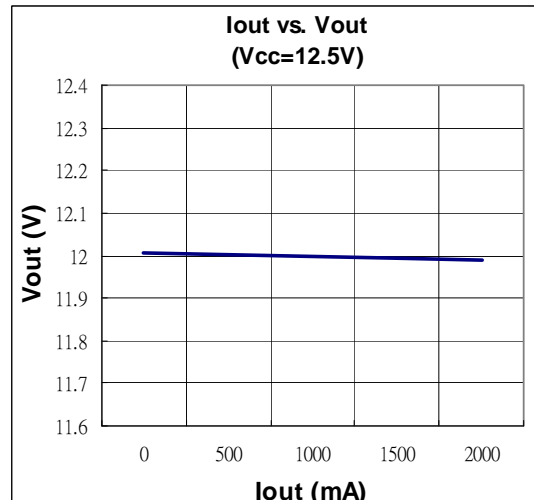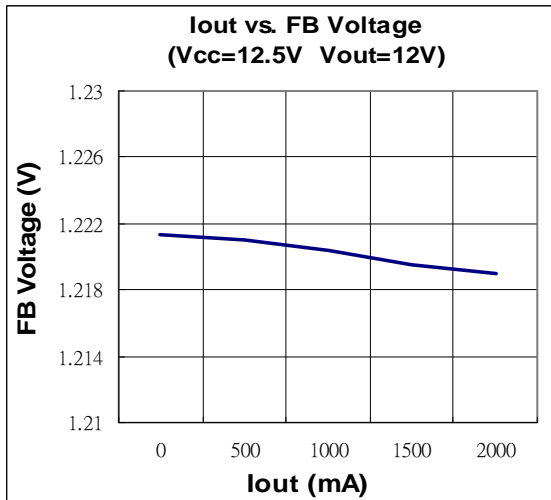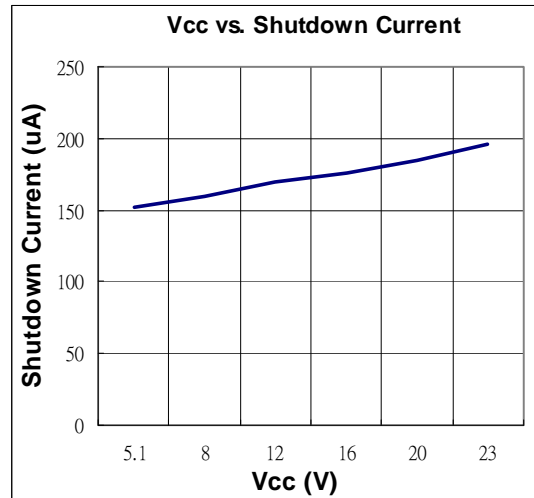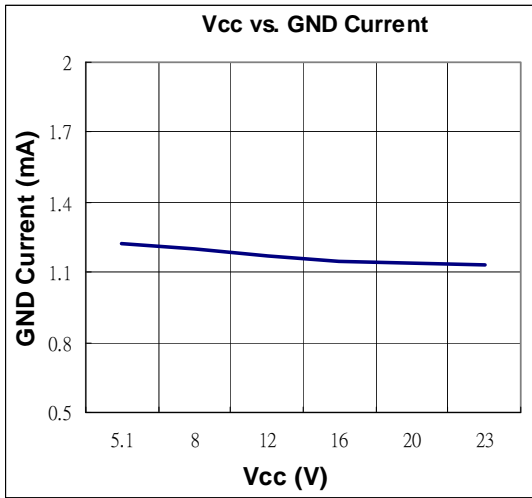
❖ TYPICAL CHARACTERISTICS (CONTINUED)

Temperature vs. FB Voltage
(Vcc=12.5V　Vout=12V)

Temperature vs. Vout
(Vcc=12.5V　Vout=12V)

Temperature vs. GND Current
(Vcc=12.5V　Vout=12V)

Temperature vs. Shutdown Current
(Vcc=12.5V　Vout=12V)

Load Transient
(V_{CC}=12.5V, V_{OUT}=12V Load=0.1~2A)

Power-ON
(V_{CC}=12V, V_{OUT}=9V Load=1.5A)

8/14

AXElite 亞瑟萊特科技股份有限公司　AXElite Technology Co., Ltd.
Powered By Innovation
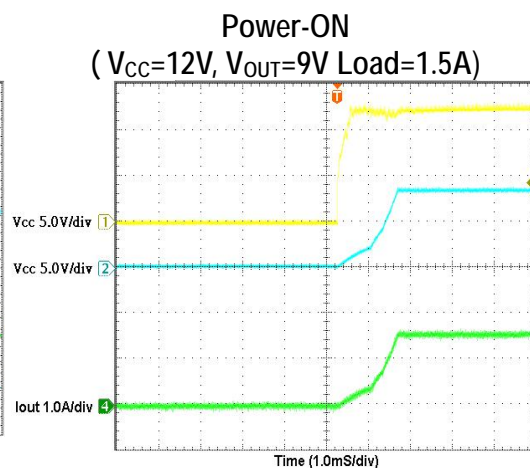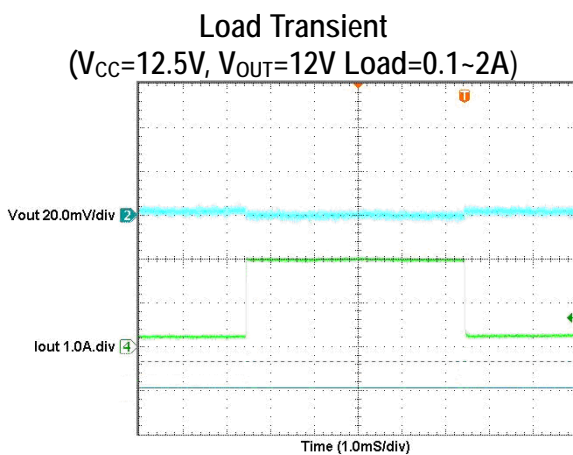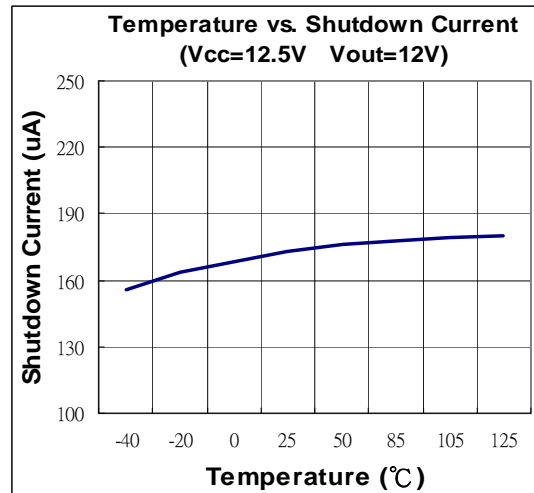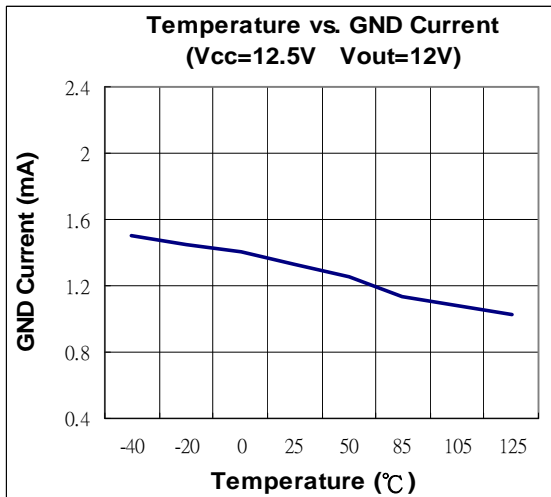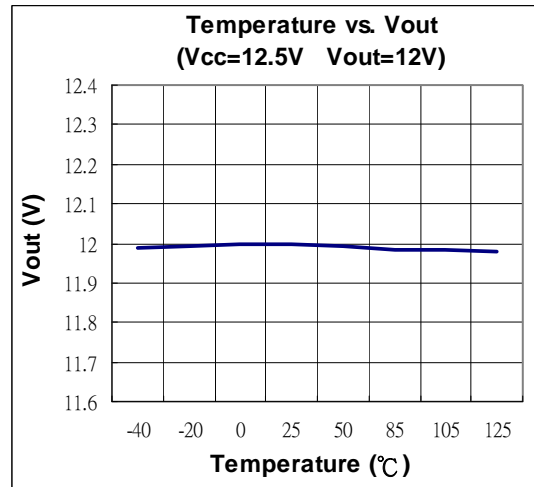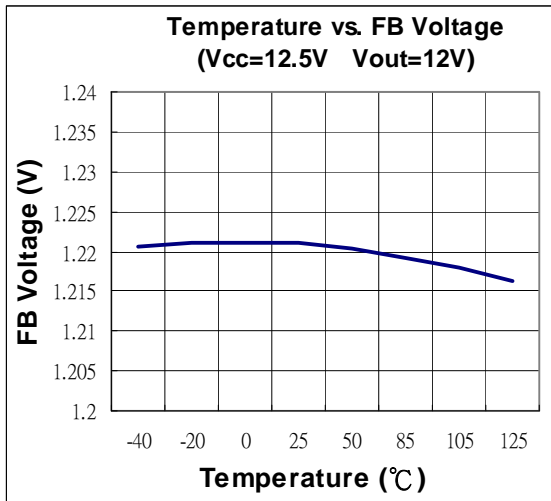
❖ PACKAGE OUTLINES

(1)　SOP-8L

DETAIL A

DETAIL A
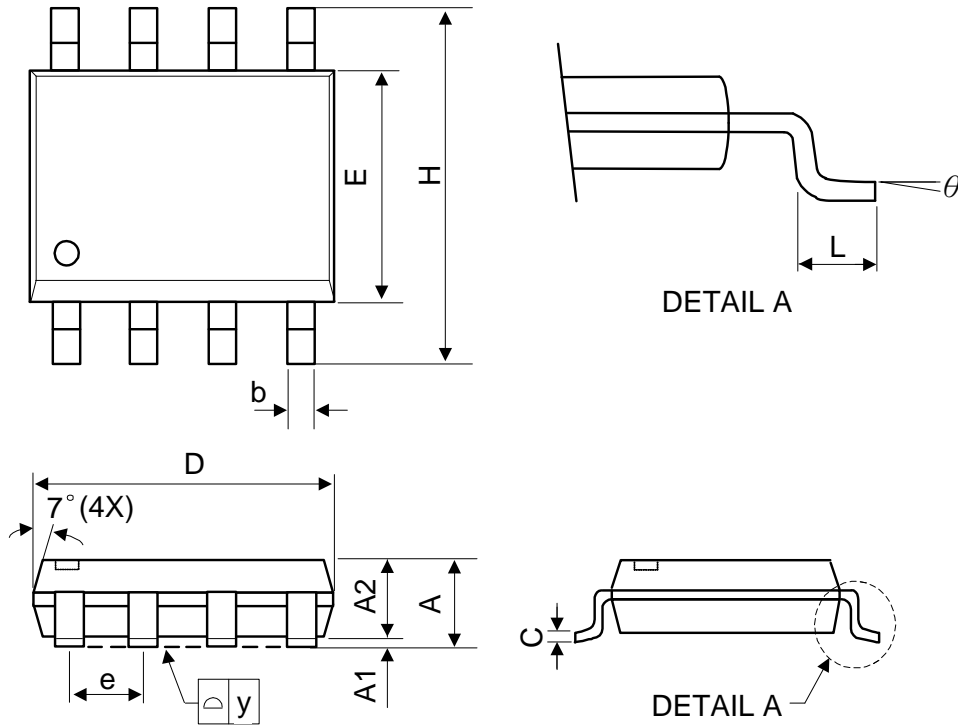
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10	-	0.25	0.040	-	0.100
A2	1.30	1.45	1.50	0.051	0.057	0.059
C	0.19	0.20	0.25	0.0075	0.008	0.010
D	4.70	4.90	5.10	0.185	0.193	0.200
E	3.70	3.90	4.10	0.146	0.154	0.161
H	5.79	5.99	6.20	0.228	0.236	0.244
L	0.38	0.71	1.27	0.015	0.028	0.050
b	0.33	0.41	0.51	0.013	0.016	0.020
e	1.27 TYP.			0.050 TYP.		
y	-	-	0.10	-	-	0.004
θ	0º	-	8º	0º	-	8º

(2)　TO220-5L
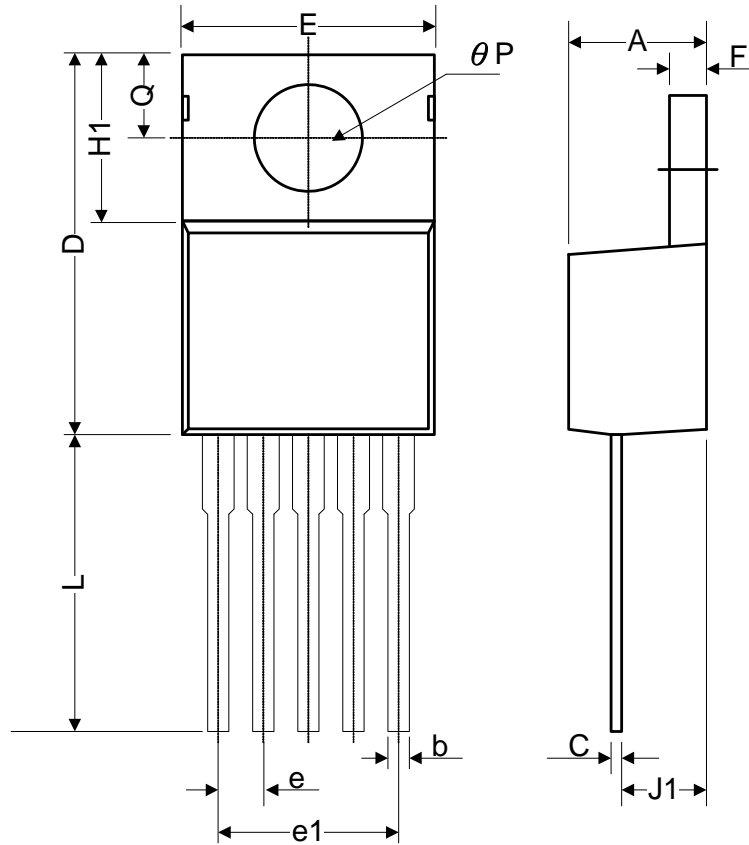
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.07	4.45	4.82	0.160	0.175	0.190
b	0.76	0.89	1.02	0.030	0.035	0.040
C	0.36	0.50	0.64	0.014	0.020	0.025
D	14.22	14.86	15.50	0.560	0.585	0.610
E	9.78	10.16	10.54	0.385	0.400	0.415
e	1.57	1.71	1.85	0.062	0.067	0.073
e1	6.68	6.81	6.93	0.263	0.268	0.273
F	1.14	1.30	1.45	0.045	0.051	0.057
H1	5.46	6.16	6.86	0.215	0.243	0.270
J1	2.29	2.74	3.18	0.090	0.108	0.125
L	13.21	13.97	14.73	0.520	0.550	0.580
θ P	3.68	3.81	3.94	0.145	0.150	0.155
Q	2.54	2.73	2.92	0.100	0.107	0.115

Rev.2.0　Jun.22，2010

AXElite 亞瑟萊特科技股份有限公司 AXElite Technology Co., Ltd.

(3) TO220-5LR
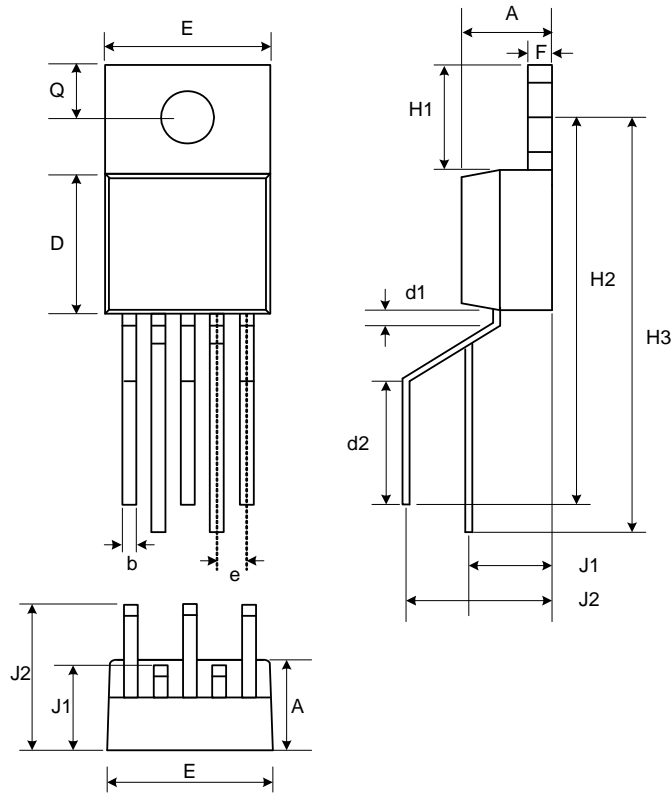
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.4	4.6	4.7	0.175	0.180	0.185
b	0.7	0.8	0.9	0.027	0.032	0.037
D	8.4	8.7	8.9	0.330	0.340	0.350
d1		1.0			0.039	
d2		6.3			0.248	
E	9.91	10.16	10.41	0.390	0.400	0.410
e	1.6	1.7	1.8	0.062	0.067	0.072
F	1.2	1.25	1.3	0.048	0.050	0.052
H1		6.4			0.250	
H2	20.8	21.6	22.4	0.820	0.850	0.880
H3	23.9	24.7	25.5	0.942	0.972	1.002
J1	3.7	4.5	5.3	0.147	0.177	0.207
J2		8.4			0.331	
Q	2.5	2.8	3.0	0.100	0.110	0.120

Rev.2.0 Jun.22, 2010

(4)　TO252-5L

Land Pattern Recommendation (Unit: mm)
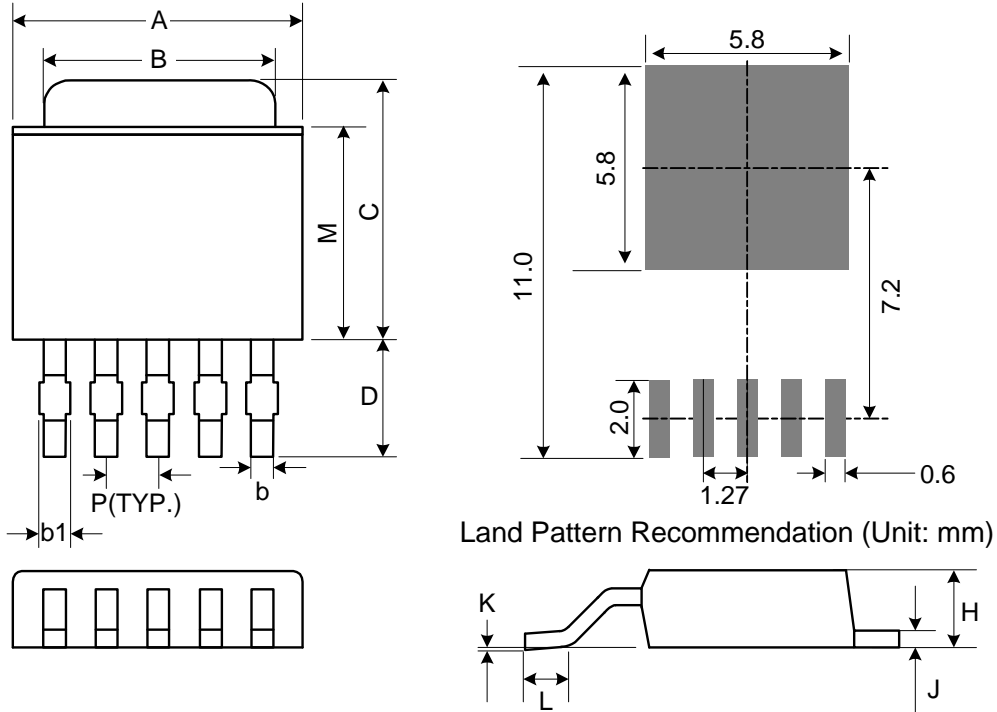
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	6.35	6.60	6.85	0.250	0.260	0.270
B	5.20	5.35	5.50	0.205	0.210	0.216
C	6.80	7.05	7.30	0.268	0.278	0.287
D	2.20	2.60	3.00	0.087	0.102	0.118
P	1.27 REF.			0.050 REF.		
H	2.18	2.30	2.42	0.086	0.090	0.095
J	0.45	0.52	0.58	0.018	0.020	0.023
K	0.00	0.07	0.13	0.000	0.003	0.005
L	0.90	1.27	1.63	0.035	0.050	0.064
M	5.33	5.46	5.59	0.210	0.215	0.220
b	0.45	0.63	0.80	0.018	0.025	0.031
b1	0.40	0.52	0.63	0.016	0.020	0.025

(5)　TO263-5L

Land Pattern Recommendation
(Unit: mm)
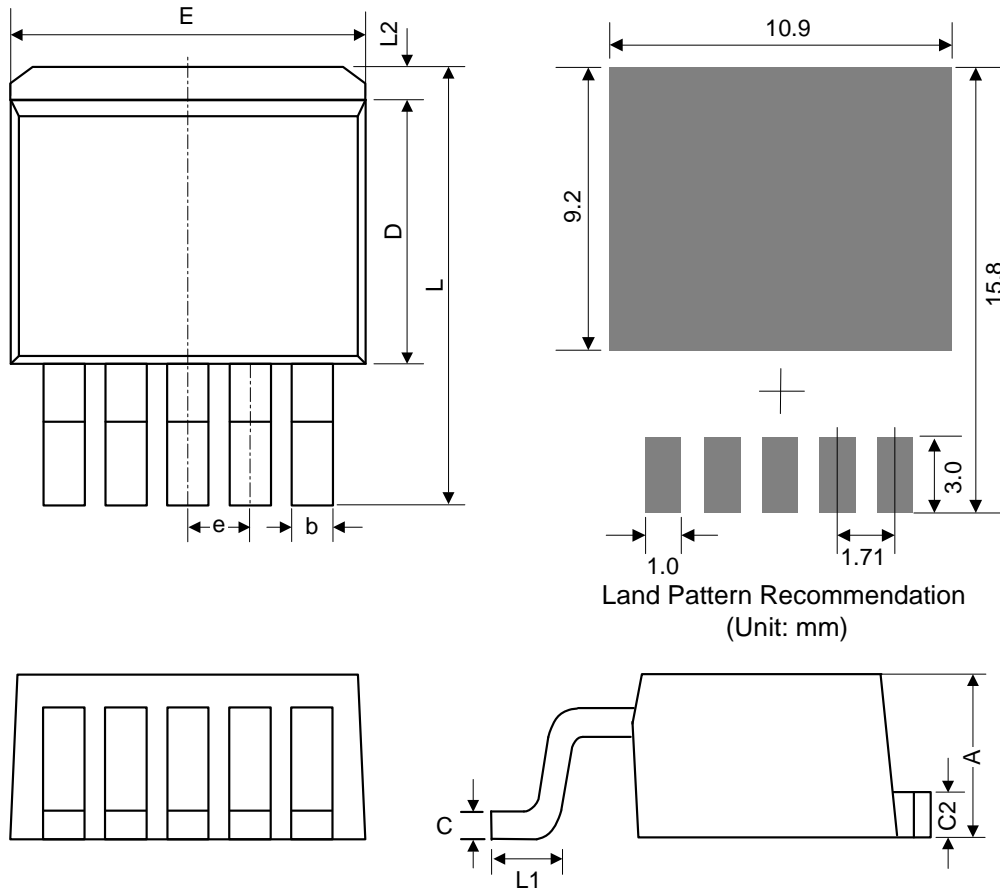
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.07	4.45	4.83	0.160	0.175	0.190
b	0.66	0.81	0.97	0.026	0.032	0.038
C	0.36	0.50	0.64	0.014	0.020	0.025
C2	1.14	1.30	1.45	0.045	0.051	0.057
D	8.60	9.13	9.65	0.339	0.359	0.380
E	9.78	10.16	10.54	0.385	0.400	0.415
e	1.45	1.71	1.96	0.057	0.067	0.077
L	14.60	15.24	15.88	0.575	0.600	0.625
L1	2.29	2.54	2.79	0.090	0.100	0.110
L2	-	-	2.92	-	-	0.115

Rev.2.0 Jun.22, 2010

AXElite Powered By Innovation 亞瑟萊特科技股份有限公司 **AXElite Technology Co., Ltd.**

(6) PDIP-8L

E-PIN Ø0.118 inch

PIN #1 INDENT Ø0.025

15°(4X)

7°(4X)
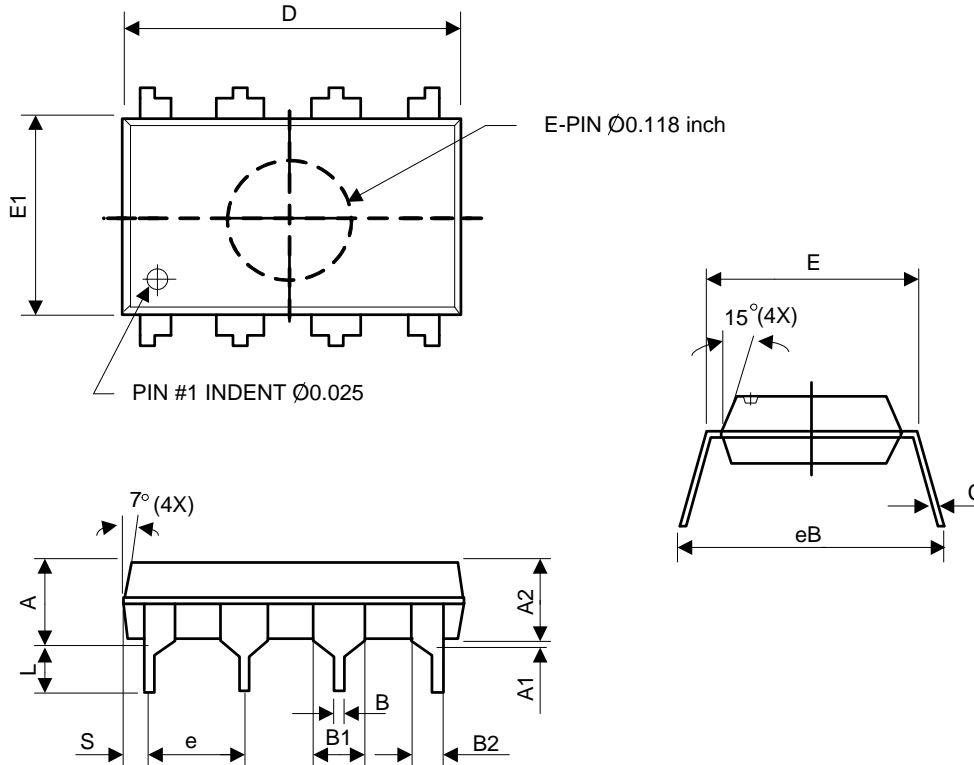
Symbol	Dimensions in millimeters			Dimensions in inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	5.33	-	-	0.210
A1	0.38	-	-	0.015	-	-
A2	2.92	3.94	4.95	0.115	0.155	0.195
B	0.36	0.46	0.56	0.014	0.018	0.022
B1	1.14	1.50	1.80	0.045	0.059	0.071
B2	0.75	0.96	1.14	0.030	0.038	0.045
C	0.20	0.25	0.36	0.008	0.010	0.014
D	9.00	9.60	10.20	0.354	0.378	0.402
E	7.62	7.94	8.26	0.300	0.313	0.325
E1	6.00	6.35	7.20	0.236	0.250	0.283
e	-	2.54	-	-	0.100	-
L	2.92	3.3	3.81	0.115	0.130	0.150
eB	8.38	8.89	9.70	0.330	0.350	0.382
S	0.71	0.84	0.97	0.028	0.033	0.038

Rev.2.0 Jun.22, 2010