AP1118

AnaChip

1A Positive Low Dropout Fixed-Mode Regulator With EN Function

■ Features

- 1.4V maximum dropout at full load current
- Fast transient response
- Output current limiting
- Built-in thermal shutdown
- Packages: TO220-5, TO252-5, TO263-5, SOP8
- Good noise rejection
- Fixed Output 1.5V, 1.8V, 2.5V, 3.3V, 5.0V, 9.0V, 12V
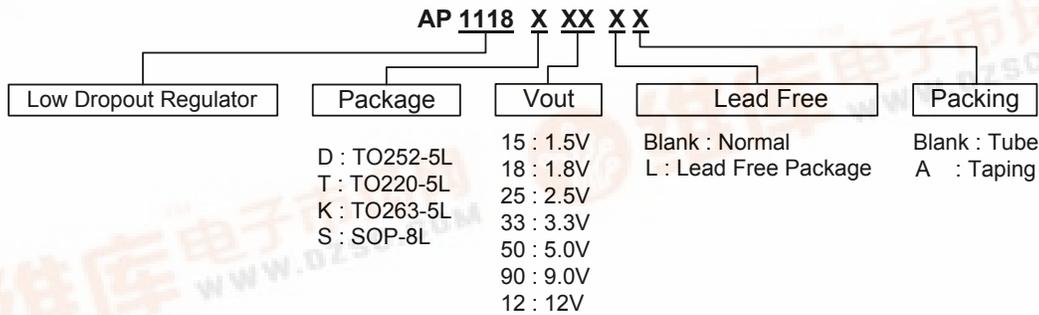- Enable function

■ Applications

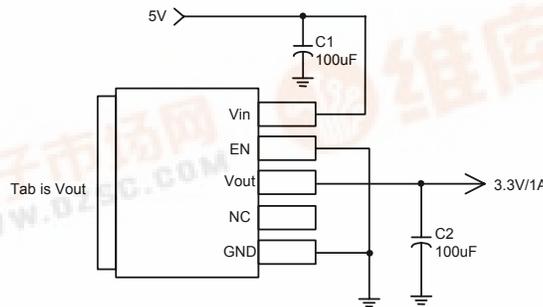- PC peripheral
- Communication
- CDROM..

■ General Description

AP1118 is a low dropout positive fixed-mode regulator with minimum of 1A output current capability. The product is specifically designed to provide well-regulated supply for low voltage IC applications such as high-speed bus termination and low current 3.3V logic supply. AP1118 is also well suited for other applications such as VGA cards. AP1118 is guaranteed to have <1.4V dropout at full load current making it ideal to provide well regulated outputs of 1.25 to 12V with up to 18V input supply. The AP1118 offers a TTL – Logic compatible enable pin.
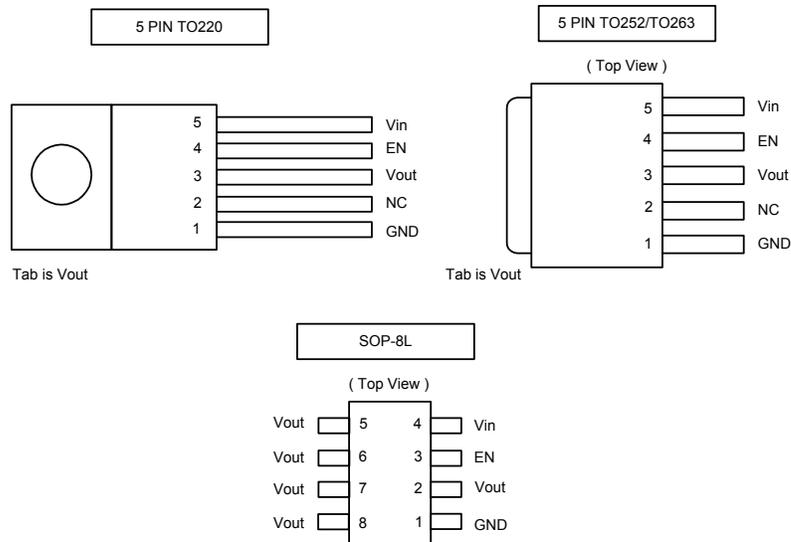
■ Ordering Information

AP 1118 X XX X X

Low Dropout Regulator	Package	Vout	Lead Free	Packing
	D : TO252-5L T : TO220-5L K : TO263-5L S : SOP-8L	15 : 1.5V 18 : 1.8V 25 : 2.5V 33 : 3.3V 50 : 5.0V 90 : 9.0V 12 : 12V	Blank : Normal L : Lead Free Package	Blank : Tube A : Taping

■ Typical Circuit

(5V/3.3V fixed output)

Rev. 1.1   Feb. 15, 2005

AP1118

1A Positive Low Dropout Fixed-Mode Regulator With EN Function

◼ Connection Diagram

5 PIN TO220

5 | Vin
4 | EN
3 | Vout
2 | NC
1 | GND

Tab is Vout

5 PIN TO252/TO263

(Top View)

5 | Vin
4 | EN
3 | Vout
2 | NC
1 | GND

Tab is Vout

SOP-8L

(Top View)

Vout | 5 | 4 | Vin
Vout | 6 | 3 | EN
Vout | 7 | 2 | Vout
Vout | 8 | 1 | GND

◼ Pin Descriptions

NAME	FUNCTION
GND	Ground.
Vout	The output of the regulator. A minimum of 10uF capacitor must be connected from this pin to ground to insure stability.
Vin	The input pin of regulator. Typically a large storage capacitor is connected from this pin to ground to insure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 1.3V higher than Vout in order for the device to regulate properly.
EN	The input pin of regulator. TTL/CMOS compatible input Logic high = disable output, Logic Low or open = output enable. (internal pull-down resistor~100 K).
NC	No connection.

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■ Absolute Maximum Ratings

Characteristics	Symbol	Values	Unit
DC Supply Voltage	Vin	-0.3 to 18	V
Enable Pin Voltage	V_{EN}	7	V
Power Dissipation	P_D	Internally Limited	
Storage Temperature	T_{ST}	-65 to +150	^oC
Operating Junction Temperature Range	$T_{OP.}$	0 to +150	^oC

■ Electrical Characteristics (Under Operating Conditions)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	AP1118-1.5	I_{OUT} = 10mA, T_J = 25°C, 3V$\leq V_{IN} \leq$15V	1.470	1.500	1.530	V
	AP1118-1.8	I_{OUT} = 10mA, T_J = 25°C, 3.3V$\leq V_{IN} \leq$15V	1.764	1.800	1.836	V
	AP1118-2.5	I_{OUT} = 10mA, T_J = 25°C, 4V$\leq V_{IN} \leq$15V	2.450	2.500	2.550	V
	AP1118-3.3	I_{OUT} = 10mA, T_J = 25°C, 4.8V$\leq V_{IN} \leq$15V	3.235	3.300	3.365	V
	AP1118-5.0	I_{OUT} = 10mA, T_J = 25°C, 6.5V$\leq V_{IN} \leq$15V	4.900	5.000	5.100	V
	AP1118-9.0	I_{OUT} = 10mA, T_J = 25°C, 10.5V$\leq V_{IN} \leq$18V	8.820	9.000	9.180	V
	AP1118-12.0	I_{OUT} = 10mA, T_J = 25°C, 13.5V$\leq V_{IN} \leq$18V	11.760	12.000	12.240	V
Line Regulation	AP1118-XXX	I_O=10mA,V_{OUT}+1.5V<V_{IN}<18V, T_J=25°C			0.2	%
Load Regulation	AP1118-1.5	V_{IN}=3V, 0mA<Io<1A, T_J=25°C (Note 1,2)		12	15	mV
	AP1118-1.8	V_{IN}=3.3V, 0mA<Io<1A, T_J=25°C (Note 1,2)		15	18	mV
	AP1118-2.5	V_{IN}=4V, 0mA<Io<1A, T_J=25°C (Note 1,2)		20	25	mV
	AP1118-3.3	V_{IN} = 5V, 0$\leq I_{OUT} \leq$1A, T_J=25°C (Note 1,2)		26	33	mV
	AP1118-5.0	V_{IN} = 8V, 0$\leq I_{OUT} \leq$1A, T_J=25°C (Note 1,2)		40	50	mV
	AP1118-9.0	V_{IN} =12V, 0$\leq I_{OUT} \leq$1A, T_J=25°C (Note 1,2)		70	90	mV
	AP1118-12.0	V_{IN} =15V, 0$\leq I_{OUT} \leq$1A, T_J=25°C (Note 1,2)		100	120	mV
Dropout Voltage (V_{IN}-V_{OUT})	AP1118- 1.5/1.8 2.5/3.3/5.0/9.0/12	I_{OUT} = 1A , ΔV_{OUT}=0.1V		1.3	1.4	V

1A Positive Low Dropout Fixed-Mode Regulator With EN Function

■ Electrical Characteristics(Continued)   (Under Operating Conditions)

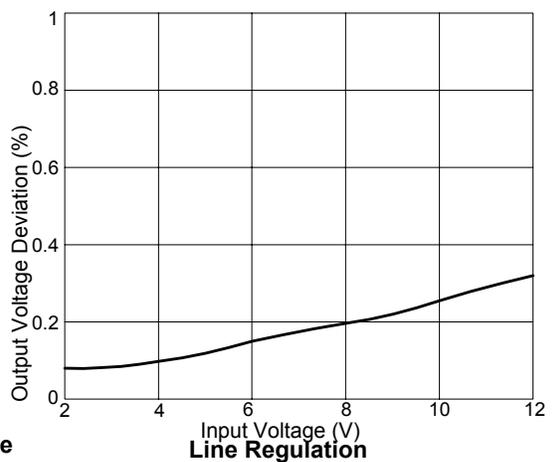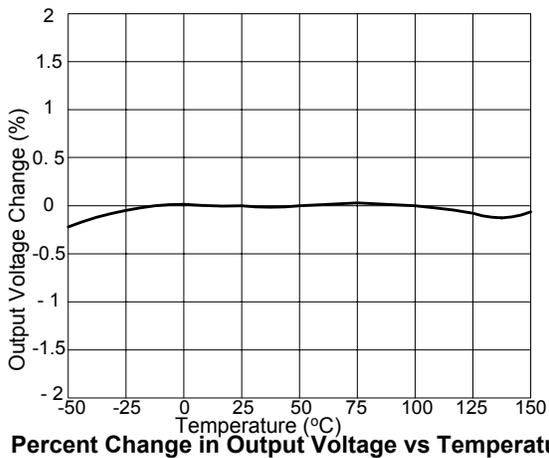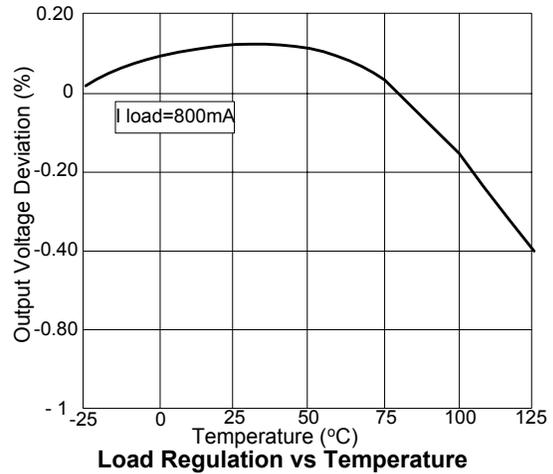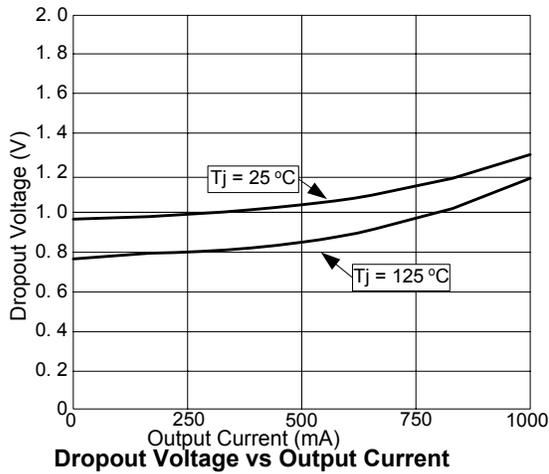| PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Current Limit	AP1118- 1.5/1.8 2.5/3.3/5.0/9.1/12	$(V_{IN}-V_{OUT}) = 5V$	1. 1			A
Minimum Load Current	AP1118-XXX	$0^{o}C \leq Tj \leq 125^{o}C$		5	10	mA
V_{EN}	Enable Input Voltage	Logic Low (ON)			0.8	V
		Logic High (OFF)	1.6			
I_{EN}	Enable Input Current	$V_{EN} = 0.8V$			10	μA
		$V_{EN} = 2.0V$			80	
Thermal Regulation	$T_{A}=25^{O}C$, 30ms pulse			0.008	0.04	%/W
Ripple Rejection	F=120Hz,C_{OUT}=25uF Tantalum, I_{OUT}=1A					
	AP1118-XXX	$V_{IN}=V_{OUT}+3V$		60	70	dB
Temperature Stability	I_{O}=10mA			0.5		%
θ_{JA} Thermal Resistance Junction-to-Ambient(No heat sink ;No air flow)	SOP-8L TO-252-5L TO-220-5L TO263-5L			150 102 85 90		^{O}C/W
θ_{JC} Thermal Resistance Junction-to-Case	SOP-8L TO-252-5L TO-220-5L TO263-5L	: Control Circuitry/Power Transistor		25 15 0.65/2.7 3.5		^{O}C/W

Note1: See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

Note2: Line and load regulation are guaranteed up to the maximum power dissipation of 15W. Power dissipation is determined by the input/output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Note3: Quiescent current is defined as the minimum output current required to maintain regulation. At 12V input/output differential the device is guaranteed to regulate if the output current is greater than 10mA.

■ **Typical Performance Characteristics**

Dropout Voltage vs Output Current

Load Regulation vs Temperature

Percent Change in Output Voltage vs Temperature

Line Regulation

Line Transient Response

Load Transient Response
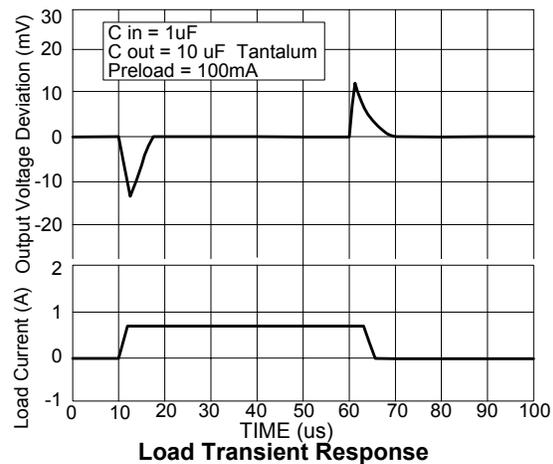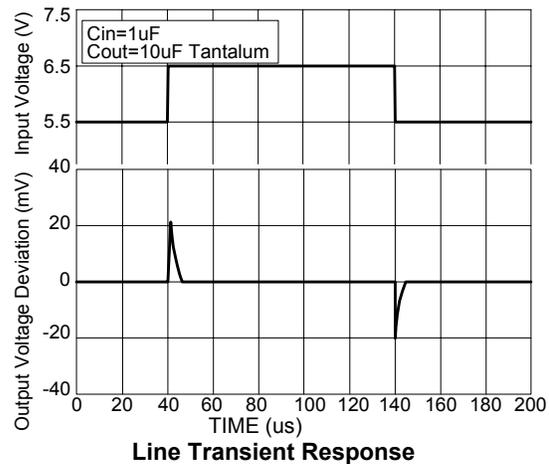
1A Positive Low Dropout Fixed-Mode Regulator With EN Function

■ Marking Information

(1) TO220-5L

(Top view)

1118-XX: Voltage
1118-15: 1.5V
1118-18: 1.8V
1118-25: 2.5V
1118-33: 3.3V
1118-50: 5.0V
1118-90: 9.0V
1118-12: 12V

1118-XX
XX XX X X

→ Logo
→ Blank: normal
   L: Lead Free Package
→ ID code
→ Xth week: 01~52
→ Year: "01" = 2001
        "02" = 2002

(2) TO252/TO263-5L

(Top view)

1118-XX: Voltage
1118-15: 1.5V
1118-18: 1.8V
1118-25: 2.5V
1118-33: 3.3V
1118-50: 5.0V
1118-90: 9.0V
1118-12: 12V

1118- XX
X X X X X X

→ Logo
→ Blank: normal
   L: Lead Free Package
→ ID Code
→ Xth Week: 01~52
→ Year: "01" = 2001
        "02" = 2002

(3) SOP-8L

(Top view)

Logo

1118-XX: Voltage
1118-15: 1.5V
1118-18: 1.8V
1118-25: 2.5V
1118-33: 3.3V
1118-50: 5.0V
1118-50: 9.0V
1118-12: 12V

1118 -XX
XX XX X X

→ Blank: normal
   L: Lead Free Package
→ ID Code
→ Xth week: 01~52
→ Year: "1" = 2001
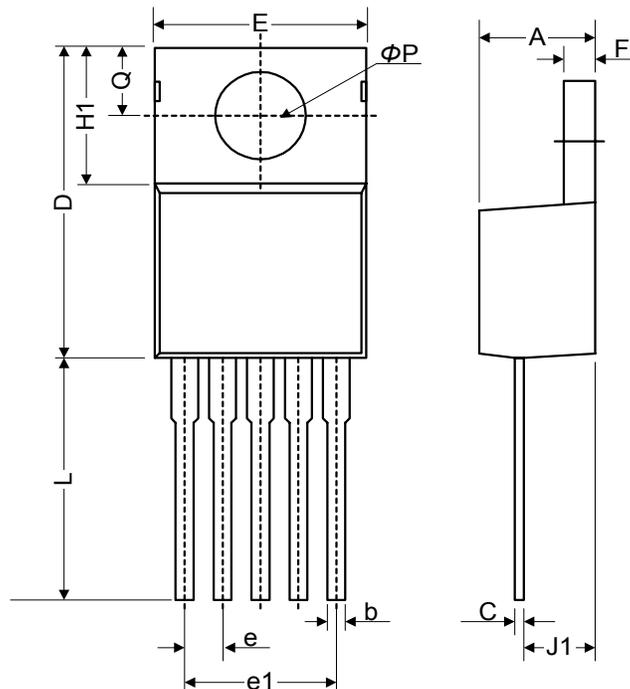   "2" = 2002

1A Positive Low Dropout Fixed-Mode Regulator With EN Function

■ Package Dimension

(1) TO220-5

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	1.27	1.40	0.045	0.050	0.055
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
Øp	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

1A Positive Low Dropout Fixed-Mode Regulator With EN Function

(2) TO252-5

Land Pattern Recommendation (Unit: mm)
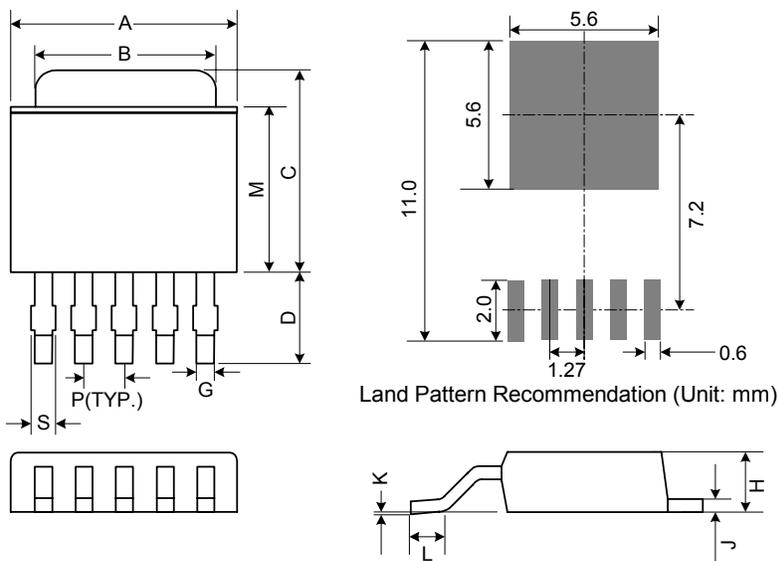
Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	6.35	6.60	6.85	0.250	0.260	0.270
B	5.20	5.35	5.50	0.205	0.211	0.217
C	6.80	7.00	7.30	0.268	0.276	0.287
D	2.20	2.50	2.80	0.087	0.098	0.110
P	1.27 REF.			0.050 REF.		
S	0.50	0.65	0.80	0.020	0.026	0.031
G	0.40	0.50	0.63	0.016	0.020	0.025
H	2.20	2.30	2.40	0.087	0.091	0.094
J	0.45	0.52	0.58	0.018	0.020	0.023
K	0.00	0.08	0.15	0.000	0.003	0.006
L	0.90	1.20	1.63	0.035	0.047	0.064
M	5.40	5.80	6.20	0.213	0.228	0.244

1A Positive Low Dropout Fixed-Mode Regulator With EN Function

(3) TO263-5

Land Pattern Recommendation (Unit: mm)
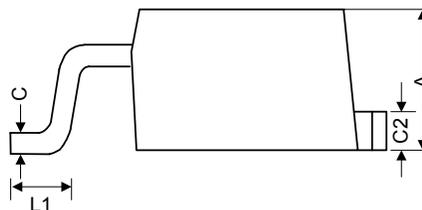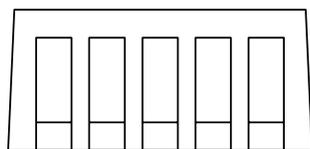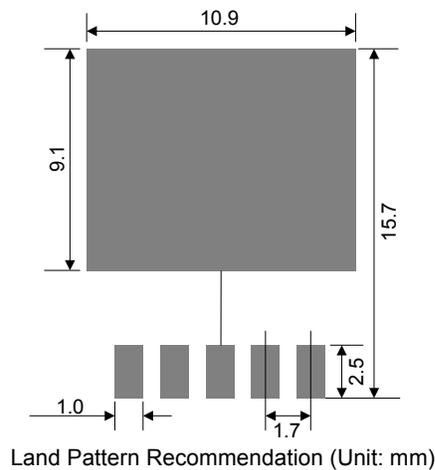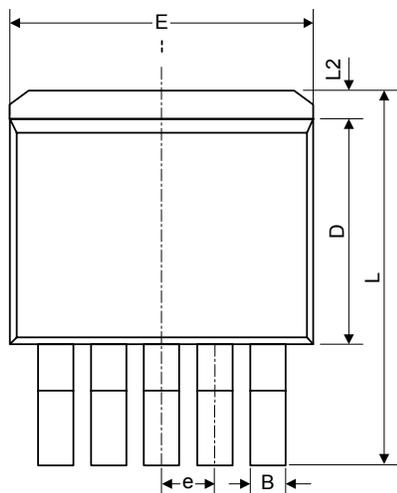
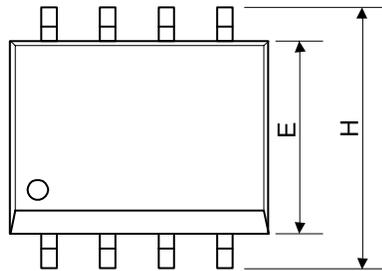| Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.07	4.46	4.85	0.160	0.176	0.191
B	0.66	0.84	1.02	0.026	0.033	0.040
C	0.36	0.50	0.64	0.014	0.020	0.025
C2	1.14	1.27	1.40	0.045	0.050	0.055
D	8.65	9.15	9.65	0.341	0.360	0.380
E	9.78	10.16	10.54	0.385	0.400	0.415
e	1.57	1.71	1.85	0.062	0.068	0.073
L	14.61	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

1A Positive Low Dropout Fixed-Mode Regulator With EN Function

(4) SOP-8

VIEW "A"
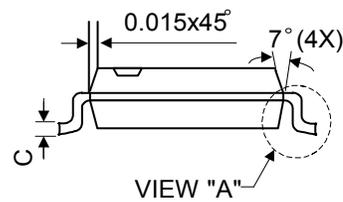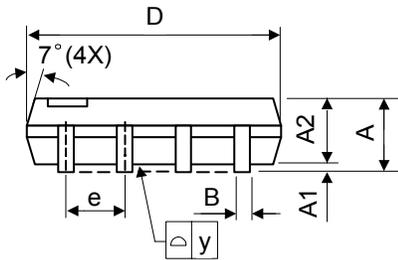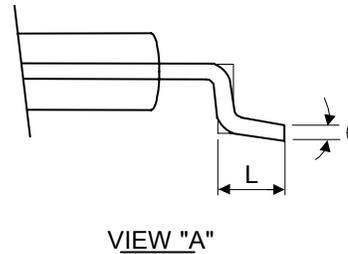
Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.60	1.75	0.055	0.063	0.069
A1	0.10	-	0.25	0.040	-	0.100
A2	1.30	1.45	1.50	0.051	0.057	0.059
B	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.010
D	4.80	5.05	5.30	0.189	0.199	0.209
E	3.70	3.90	4.10	0.146	0.154	0.161
e	-	1.27	-	-	0.050	-
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
y	-	-	0.10	-	-	0.004
θ	0°	-	8°	0°	-	8°