



# AP1119

## 0.5A Positive Low Dropout Fixed-Mode Regulator With EN Function

### ■ Features

- 1.3V maximum dropout at full load current
- Fast transient response
- Output current limiting
- Built-in thermal shutdown
- Packages: SOT89-5L
- Good noise rejection
- 5-Terminal device with fixed 1.5V, 1.8V, 2.5V, 3.3V, 5.0V, 9.0V, 12V output.

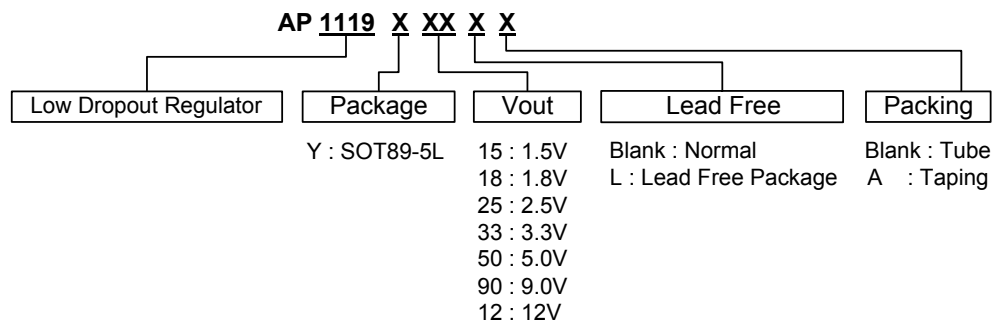
### ■ Applications

- PC peripheral
- Communication
- CDROM..

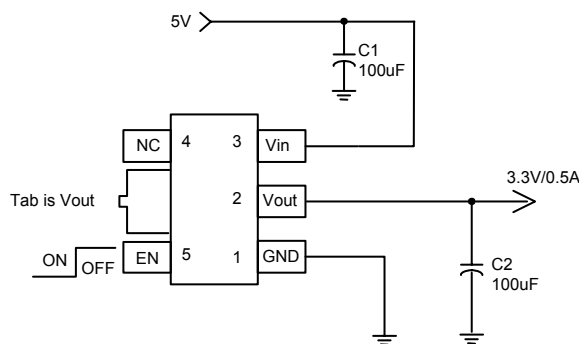
### ■ General Description

AP1119 is a low dropout positive adjustable or fixed-mode regulator with minimum of 0.5A 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. AP1119 is also well suited for other applications such as VGA cards. AP1119 is guaranteed to have <1.3V dropout at full load current making it ideal to provide well regulated fixed outputs of 1.5 to 12V with up to 18V input supply. The AP1119 offers a TTL – Logic compatible enable pin.

### ■ Ordering Information



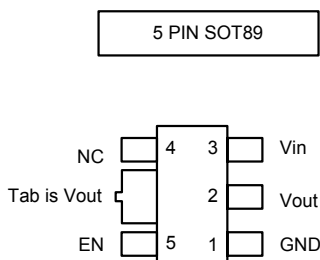
### ■ Typical Circuit



( 5V/3.3V fixed output )

## 0.5A Positive Low Dropout Fixed-Mode Regulator With EN Function

### ■ Connection Diagram



### ■ 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 =Enable output. (internal Pull-down resistor ~ 100K).                                                                                                                                                           |

### ■ Absolute Maximum Ratings

| Characteristics                      | Symbol           | Values             | Unit |
|--------------------------------------|------------------|--------------------|------|
| DC Supply Voltage                    | Vin              | -0.3 to 18         | V    |
| Power Dissipation                    | P <sub>D</sub>   | Internally Limited |      |
| Storage Temperature                  | T <sub>ST</sub>  | -65 to +150        | °C   |
| Operating Junction Temperature Range | T <sub>OP.</sub> | 0 to +150          | °C   |

**0.5A Positive Low Dropout Fixed-Mode Regulator With EN Function****■ Electrical Characteristics (Under Operating Conditions)**

| PARAMETER                              | CONDITIONS                                                                       |                                                                                                 | MIN    | TYP    | MAX    | UNIT               |
|----------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------|--------|--------|--------------------|
| Output Voltage                         | AP1119-1.5                                                                       | $I_{OUT} = 10\text{mA}$ , $T_J = 25^\circ\text{C}$ , $3\text{V} \leq V_{IN} \leq 12\text{V}$    | 1.470  | 1.500  | 1.530  | V                  |
|                                        | AP1119-1.8                                                                       | $I_{OUT} = 10\text{mA}$ , $T_J = 25^\circ\text{C}$ , $3.3\text{V} \leq V_{IN} \leq 12\text{V}$  | 1.764  | 1.800  | 1.836  | V                  |
|                                        | AP1119-2.5                                                                       | $I_{OUT} = 10\text{mA}$ , $T_J = 25^\circ\text{C}$ , $4\text{V} \leq V_{IN} \leq 12\text{V}$    | 2.450  | 2.500  | 2.550  | V                  |
|                                        | AP1119-3.3                                                                       | $I_{OUT} = 10\text{mA}$ , $T_J = 25^\circ\text{C}$ , $4.8\text{V} \leq V_{IN} \leq 12\text{V}$  | 3.235  | 3.300  | 3.365  | V                  |
|                                        | AP1119-5.0                                                                       | $I_{OUT} = 10\text{mA}$ , $T_J = 25^\circ\text{C}$ , $6.5\text{V} \leq V_{IN} \leq 12\text{V}$  | 4.900  | 5.000  | 5.100  | V                  |
|                                        | AP1119-9.0                                                                       | $I_{OUT} = 10\text{mA}$ , $T_J = 25^\circ\text{C}$ , $10.5\text{V} \leq V_{IN} \leq 18\text{V}$ | 8.820  | 9.000  | 9.180  | V                  |
|                                        | AP1119-12.0                                                                      | $I_{OUT} = 10\text{mA}$ , $T_J = 25^\circ\text{C}$ , $13.5\text{V} \leq V_{IN} \leq 18\text{V}$ | 11.760 | 12.000 | 12.240 | V                  |
| Line Regulation                        | AP1119-XXX                                                                       | $I_O = 10\text{mA}$ , $V_{OUT} + 1.5\text{V} < V_{IN} < 15\text{V}$ , $T_J = 25^\circ\text{C}$  |        |        | 0.2    | %                  |
| Load Regulation                        | AP1119-1.5                                                                       | $V_{IN} = 3\text{V}$ , $0\text{mA} < I_O < 0.5\text{A}$ , $T_J = 25^\circ\text{C}$ (Note 1,2)   |        | 12     | 15     | mV                 |
|                                        | AP1119-1.8                                                                       | $V_{IN} = 3.3\text{V}$ , $0\text{mA} < I_O < 0.5\text{A}$ , $T_J = 25^\circ\text{C}$ (Note 1,2) |        | 15     | 18     | mV                 |
|                                        | AP1119-2.5                                                                       | $V_{IN} = 4\text{V}$ , $0\text{mA} < I_O < 0.5\text{A}$ , $T_J = 25^\circ\text{C}$ (Note 1,2)   |        | 20     | 25     | mV                 |
|                                        | AP1119-3.3                                                                       | $V_{IN} = 5\text{V}$ , $0 \leq I_{OUT} \leq 0.5\text{A}$ , $T_J = 25^\circ\text{C}$ (Note 1,2)  |        | 26     | 33     | mV                 |
|                                        | AP1119-5.0                                                                       | $V_{IN} = 8\text{V}$ , $0 \leq I_{OUT} \leq 0.5\text{A}$ , $T_J = 25^\circ\text{C}$ (Note 1,2)  |        | 40     | 50     | mV                 |
|                                        | AP1119-9.0                                                                       | $V_{IN} = 12\text{V}$ , $0 \leq I_{OUT} \leq 0.5\text{A}$ , $T_J = 25^\circ\text{C}$ (Note 1,2) |        | 70     | 90     | mV                 |
|                                        | AP1119-12.0                                                                      | $V_{IN} = 15\text{V}$ , $0 \leq I_{OUT} \leq 0.5\text{A}$ , $T_J = 25^\circ\text{C}$ (Note 1,2) |        | 100    | 120    | mV                 |
| Dropout Voltage ( $V_{IN} - V_{OUT}$ ) | AP1119 series                                                                    | $I_{OUT} = 0.5\text{A}$ , $\Delta V_{OUT} = 0.1V_{OUT}$                                         |        | 1.1    | 1.3    | V                  |
| Current Limit                          | AP1119 series                                                                    | $(V_{IN} - V_{OUT}) = 5\text{V}$                                                                | 0.6    |        |        | A                  |
| Minimum Load Current                   | AP1119-XXX                                                                       | $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$                                               |        | 5      | 10     | mA                 |
| $V_{EN}$                               | Enable Input Voltage                                                             | Logic Low (ON)                                                                                  |        |        | 0.8    | V                  |
|                                        |                                                                                  | Logic High (OFF)                                                                                | 2.0    |        |        |                    |
| $I_{EN}$                               | Enable Input Current                                                             | $V_{EN} = 0.8\text{V}$                                                                          |        |        | 10     | $\mu\text{A}$      |
|                                        |                                                                                  | $V_{EN} = 2.0\text{V}$                                                                          |        |        | 30     |                    |
| Thermal Regulation                     | $T_A = 25^\circ\text{C}$ , 30ms pulse                                            |                                                                                                 |        | 0.008  | 0.04   | %/W                |
| Ripple Rejection                       | $F = 120\text{Hz}$ , $C_{OUT} = 25\mu\text{F}$ Tantalum, $I_{OUT} = 0.5\text{A}$ |                                                                                                 |        | 60     | 70     | dB                 |
|                                        | AP1119-XXX                                                                       | $V_{IN} = V_{OUT} + 3\text{V}$                                                                  |        |        |        |                    |
| Temperature Stability                  | $I_O = 10\text{mA}$                                                              |                                                                                                 |        | 0.5    |        | %                  |
| $\theta_{JA}$                          | SOT89-5L Thermal Resistance Junction-to-Ambient (No heat sink ; No air flow)     |                                                                                                 |        | 300    |        | $^\circ\text{C/W}$ |
| $\theta_{JC}$                          | SOT89-5L                                                                         | : Control Circuitry/Power Transistor Thermal Resistance Junction-to-Case                        |        | 100    |        | $^\circ\text{C/W}$ |

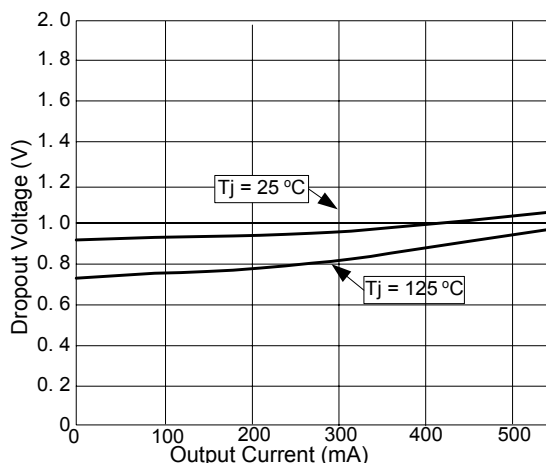
Note1: See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

Note2: Line and load regulation are guaranteed up to the maximum power dissipation of 5W. 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.

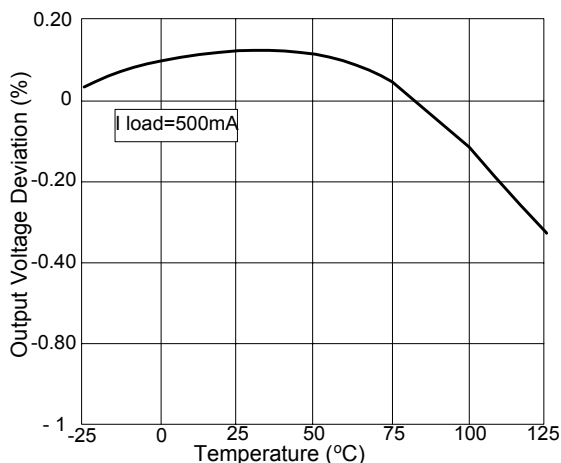
Note3: Quiescent current is defined as the minimum output current required maintain regulation. At 12V input/output differential the device is guaranteed to regulate if the output current is greater than 10mA.

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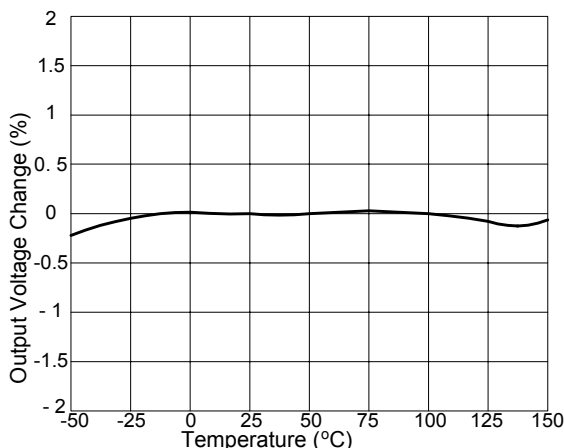
### ■ Typical Performance Characteristics



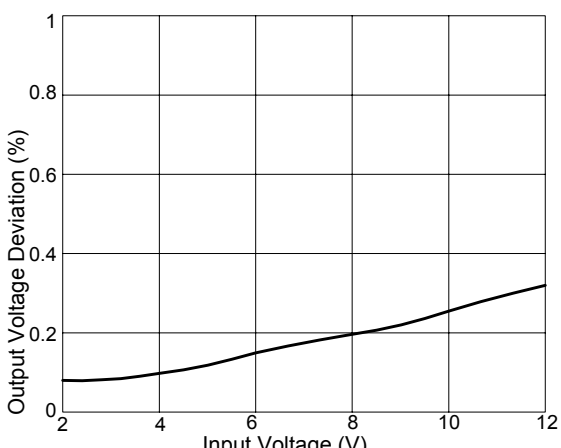
Dropout Voltage vs Output Current



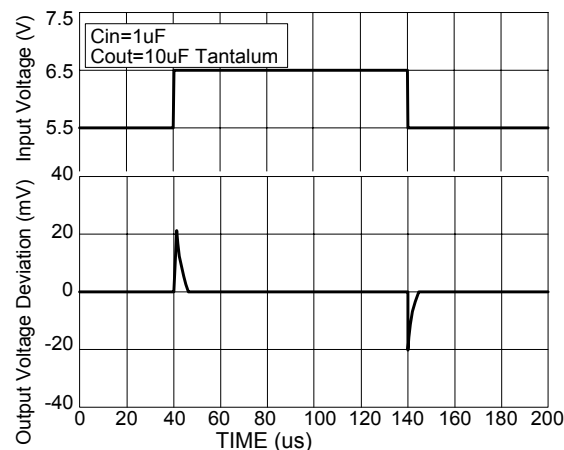
Load Regulation vs Temperature



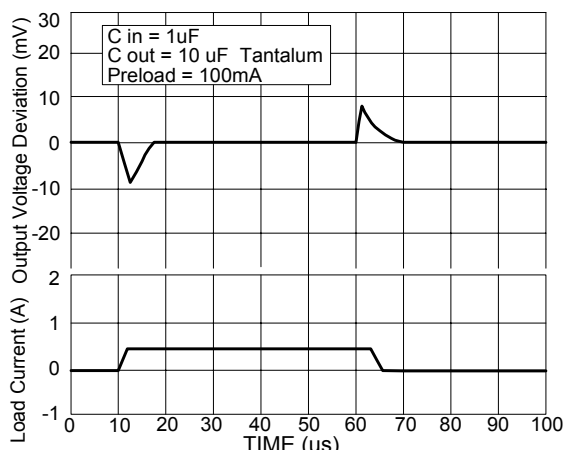
Percent Change in Output Voltage vs Temperature



Line Regulation



Line Transient Response

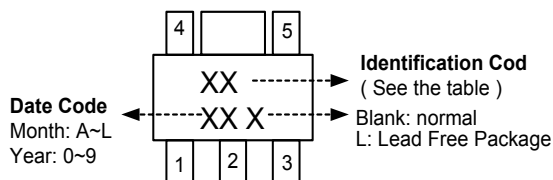


Load Transient Response

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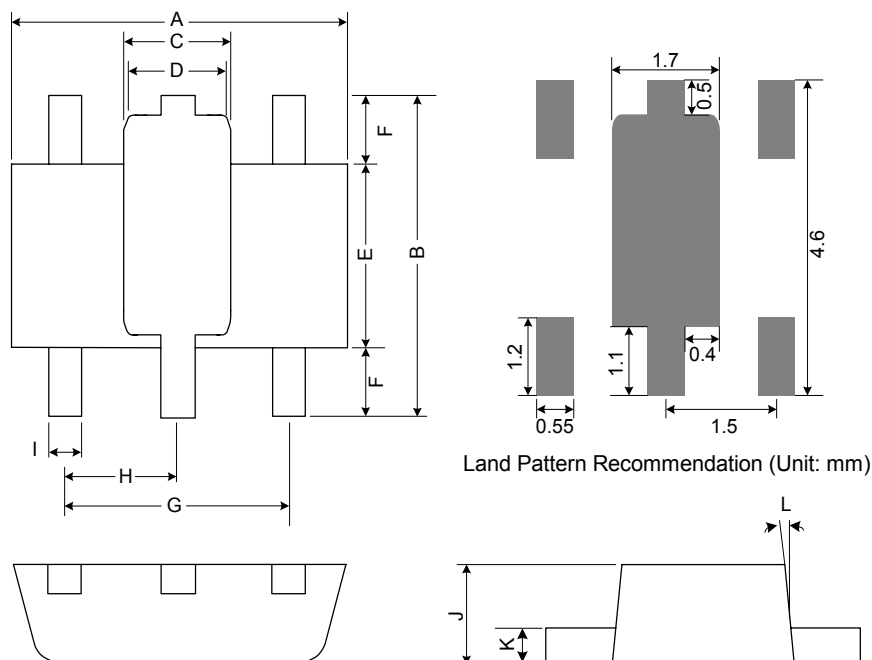
### ■ Marking Information

SOT89-5L



| Identification code | Output version |
|---------------------|----------------|
| JF                  | AP1119-1.5V    |
| JG                  | AP1119-1.8V    |
| JH                  | AP1119-2.5V    |
| JI                  | AP1119-3.3V    |
| JJ                  | AP1119-5.0V    |
| JK                  | AP1119-9.0V    |
| JL                  | AP1119-12V     |

### ■ Package Information



| Symbol | Dimensions In Millimeters |      |      | Dimensions In Inches |       |       |
|--------|---------------------------|------|------|----------------------|-------|-------|
|        | Min.                      | Nom. | Max. | Min.                 | Nom.  | Max.  |
| A      | 4.40                      | 4.50 | 4.60 | 0.173                | 0.177 | 0.181 |
| B      | 4.05                      | 4.15 | 4.25 | 0.159                | 0.163 | 0.167 |
| C      | 1.50                      | 1.60 | 1.70 | 0.059                | 0.063 | 0.067 |
| D      | 1.30                      | 1.40 | 1.50 | 0.051                | 0.055 | 0.059 |
| E      | 2.40                      | 2.50 | 2.60 | 0.094                | 0.098 | 0.102 |
| F      | 0.80                      | -    | -    | 0.031                | -     | -     |
| G      | 3.00 Ref.                 |      |      | 0.118 Ref.           |       |       |
| H      | 1.50 Ref.                 |      |      | 0.059 Ref.           |       |       |
| I      | 0.40                      | 0.46 | 0.52 | 0.016                | 0.018 | 0.020 |
| J      | 1.40                      | 1.50 | 1.60 | 0.055                | 0.059 | 0.063 |
| K      | 0.35                      | 0.39 | 0.43 | 0.014                | 0.015 | 0.017 |
| L      | 5° Typ.                   |      |      | 5° Typ.              |       |       |