

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

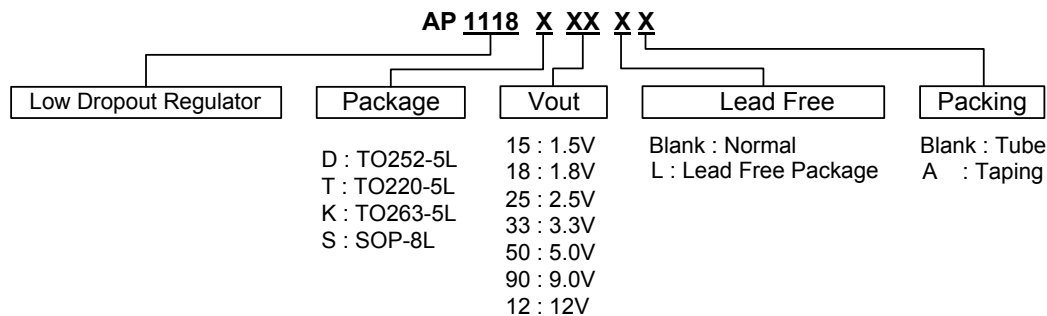
■ Applications

- PC peripheral
- Communication
- CDROM..

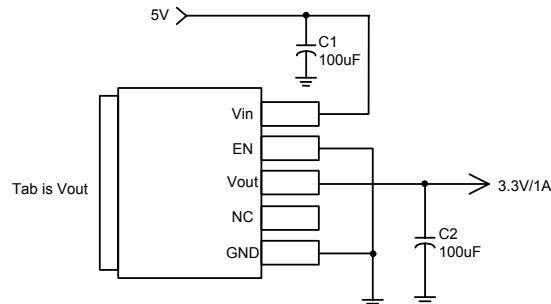
■ General Description

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



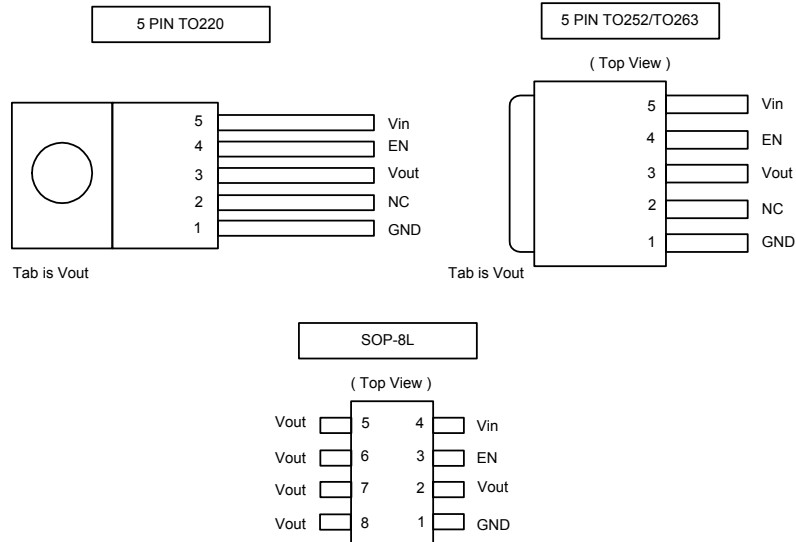
■ Typical Circuit



(5V/3.3V fixed output)

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■ 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 = 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 | V _{in} | -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 | °C |
| Operating Junction Temperature Range | T _{OP.} | 0 to +150 | °C |

■ Electrical Characteristics (Under Operating Conditions)

| PARAMETER | CONDITIONS | | MIN | TYP | MAX | UNIT |
|-------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------|--------|--------|--------|------|
| Output Voltage | AP1118-1.5 | I _{OUT} = 10mA, T _J = 25°C, 3V ≤ V _{IN} ≤ 15V | 1.470 | 1.500 | 1.530 | V |
| | AP1118-1.8 | I _{OUT} = 10mA, T _J = 25°C, 3.3V ≤ V _{IN} ≤ 15V | 1.764 | 1.800 | 1.836 | V |
| | AP1118-2.5 | I _{OUT} = 10mA, T _J = 25°C, 4V ≤ V _{IN} ≤ 15V | 2.450 | 2.500 | 2.550 | V |
| | AP1118-3.3 | I _{OUT} = 10mA, T _J = 25°C, 4.8V ≤ V _{IN} ≤ 15V | 3.235 | 3.300 | 3.365 | V |
| | AP1118-5.0 | I _{OUT} = 10mA, T _J = 25°C, 6.5V ≤ V _{IN} ≤ 15V | 4.900 | 5.000 | 5.100 | V |
| | AP1118-9.0 | I _{OUT} = 10mA, T _J = 25°C, 10.5V ≤ V _{IN} ≤ 18V | 8.820 | 9.000 | 9.180 | V |
| | AP1118-12.0 | I _{OUT} = 10mA, T _J = 25°C, 13.5V ≤ V _{IN} ≤ 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 < I _O < 1A, T _J = 25°C (Note 1,2) | | 12 | 15 | mV |
| | AP1118-1.8 | V _{IN} = 3.3V, 0mA < I _O < 1A, T _J = 25°C (Note 1,2) | | 15 | 18 | mV |
| | AP1118-2.5 | V _{IN} = 4V, 0mA < I _O < 1A, T _J = 25°C (Note 1,2) | | 20 | 25 | mV |
| | AP1118-3.3 | V _{IN} = 5V, 0 ≤ I _{OUT} ≤ 1A, T _J = 25°C (Note 1,2) | | 26 | 33 | mV |
| | AP1118-5.0 | V _{IN} = 8V, 0 ≤ I _{OUT} ≤ 1A, T _J = 25°C (Note 1,2) | | 40 | 50 | mV |
| | AP1118-9.0 | V _{IN} = 12V, 0 ≤ I _{OUT} ≤ 1A, T _J = 25°C (Note 1,2) | | 70 | 90 | mV |
| | AP1118-12.0 | V _{IN} = 15V, 0 ≤ I _{OUT} ≤ 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 |



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■ 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 | $0^{\circ}C \leq T_j \leq 125^{\circ}C$ | | 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 | $T_A=25^{\circ}C$, 30ms pulse | | | 0.008 | 0.04 | %/W |
| Ripple Rejection | $F=120Hz, C_{OUT}=25\mu F$ 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 | | | 150 | | $^{\circ}C/W$ |
| | TO-252-5L | | | 102 | | |
| | TO-220-5L | | | 85 | | |
| | TO263-5L | | | 90 | | |
| θ_{JC} Thermal Resistance Junction-to-Case | SOP-8L | : Control Circuitry/Power Transistor | | 25 | | $^{\circ}C/W$ |
| | TO-252-5L | | | 15 | | |
| | TO-220-5L | | | 0.65/2.7 | | |
| | TO263-5L | | | 3.5 | | |

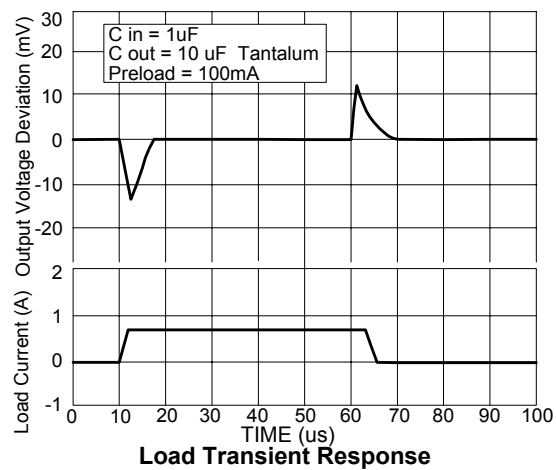
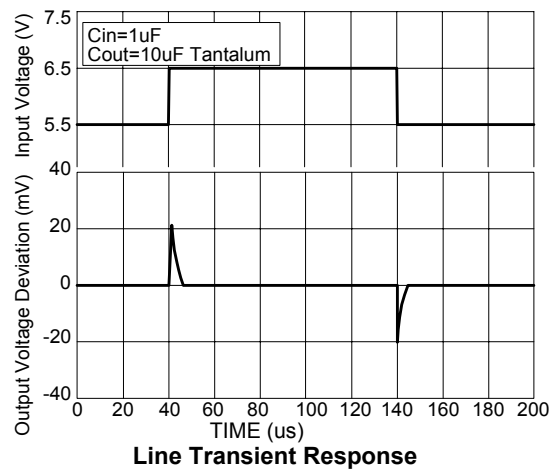
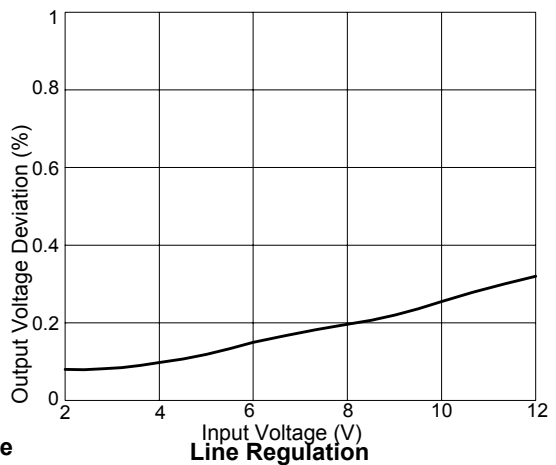
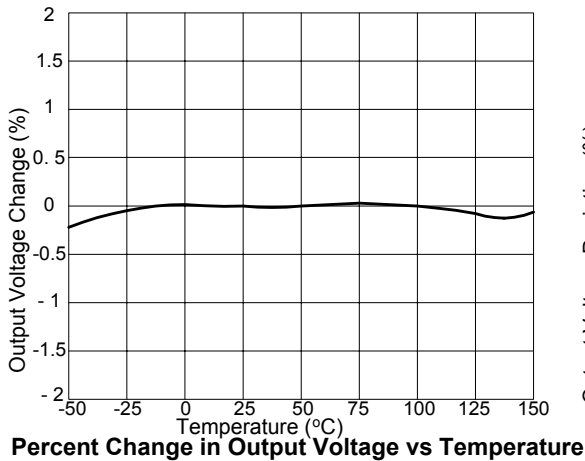
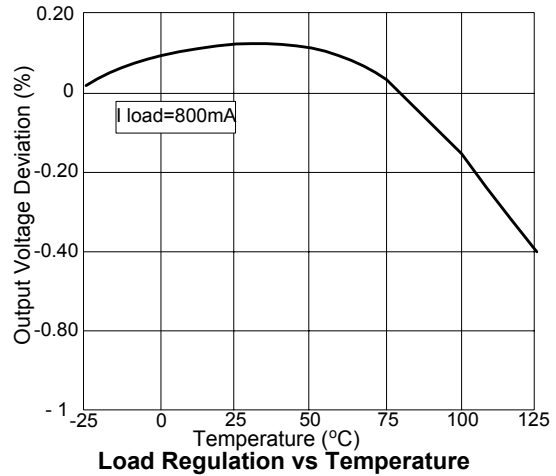
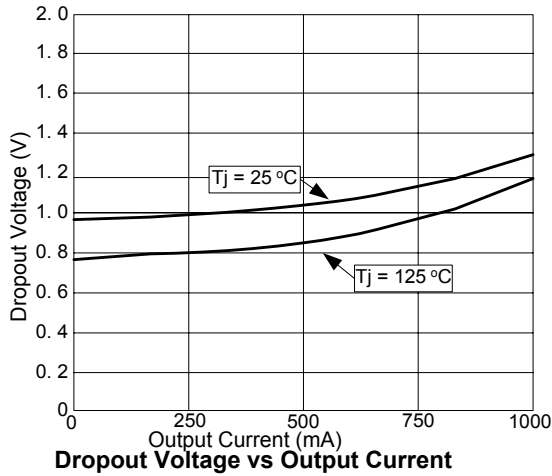
Note1: See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

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.

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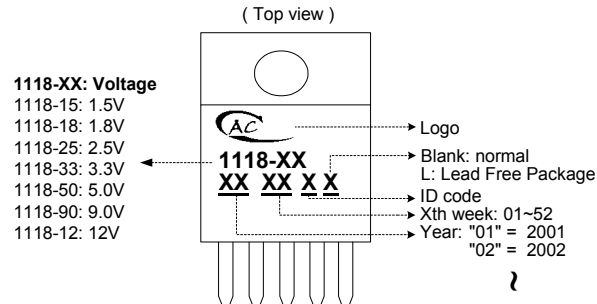
Typical Performance Characteristics



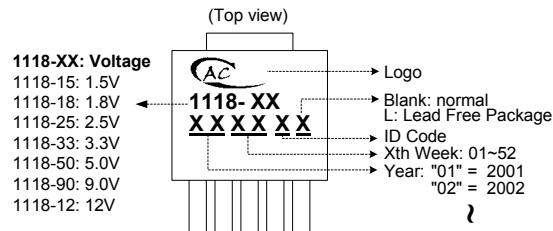
1A Positive Low Dropout Fixed-Mode Regulator With EN Function

■ Marking Information

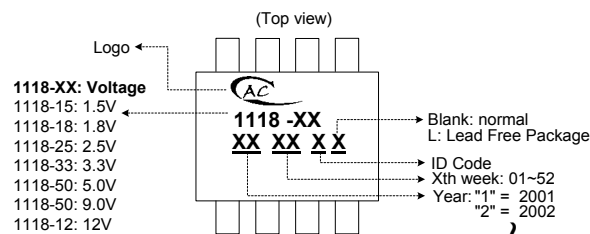
(1) TO220-5L



(2) TO252/TO263-5L



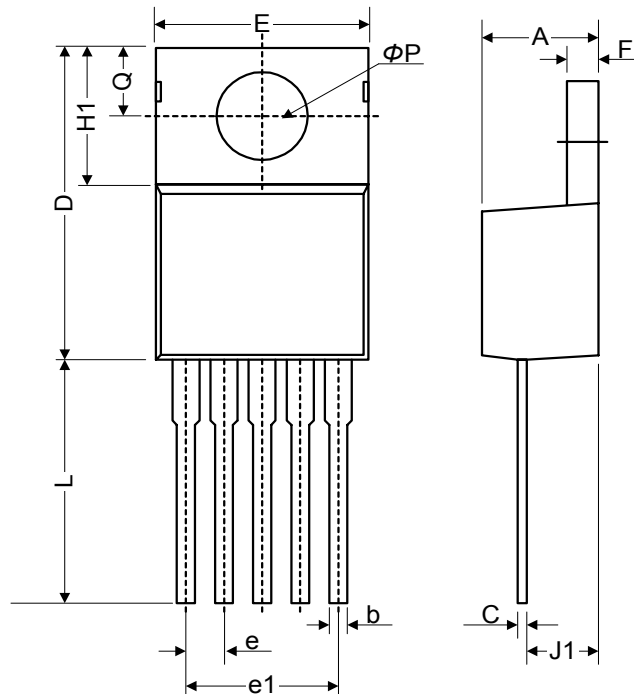
(3) SOP-8L



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■ Package Dimension

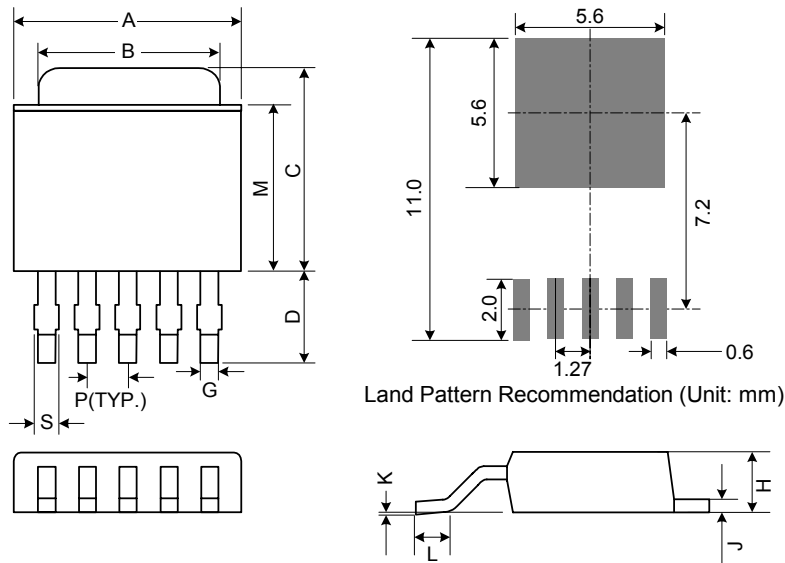
(1) TO220-5



| 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 |
| ϕp | 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 |

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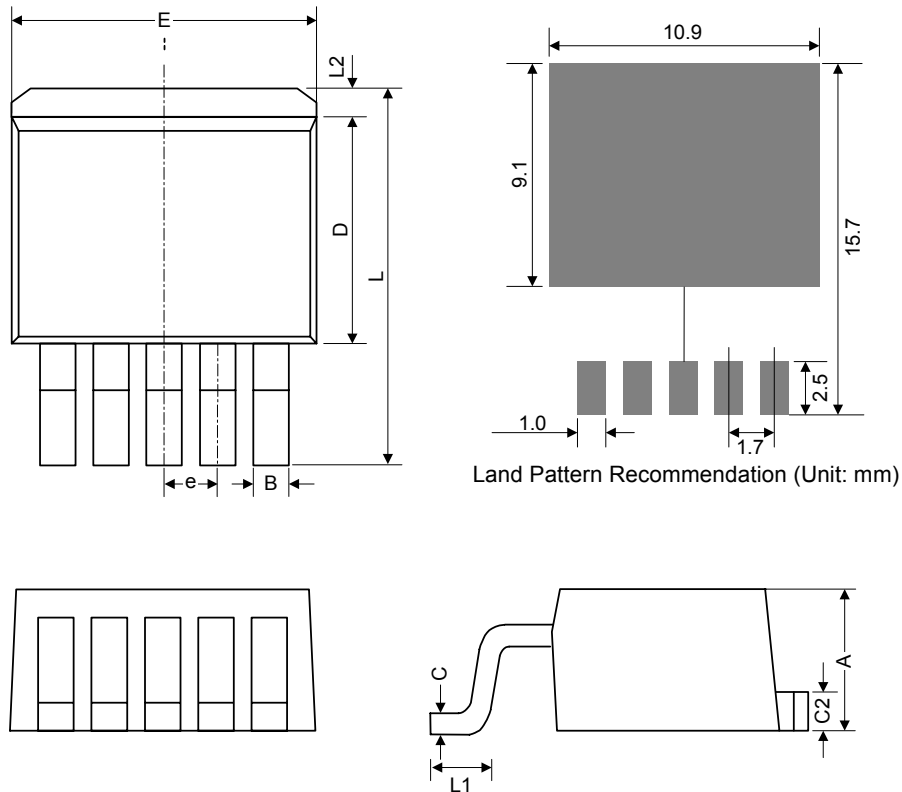
(2) TO252-5



| 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 |

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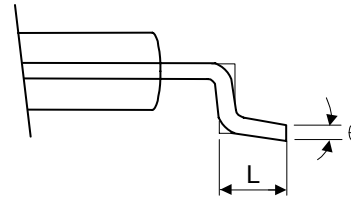
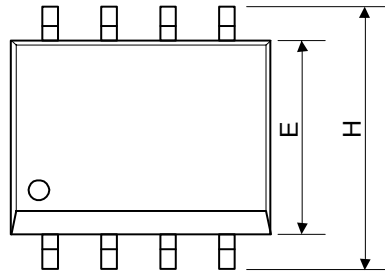
(3) TO263-5



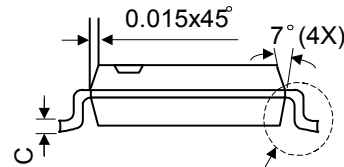
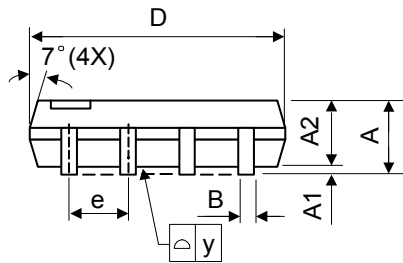
| Symbol | Dimensions In Millimeters | | | Dimensions In Inches | | |
|--------|---------------------------|-------|-------|----------------------|-------|-------|
| | Min. | Nom. | Max. | Min. | Nom. | Max. |
| A | 4.07 | 4.46 | 4.85 | 0.160 | 0.176 | 0.191 |
| B | 0.66 | 0.84 | 1.02 | 0.026 | 0.033 | 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 |

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(4) SOP-8



VIEW "A"



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° |



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