TECH PUBLIC
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# TP402LA Series

**Current 250mA High Voltage 40V Low Power LDO**

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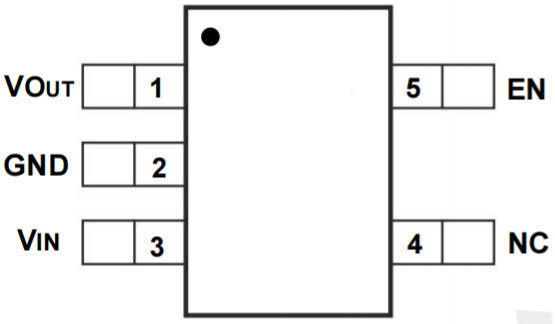
## Features

- 1.5μA Current at no Load(TYP.)
- ±2% Output Accuracy
- 250mA Output Current
- Current Limit Protection

## Applications

- Industrial Controls
- Home Automation
- Wireless power tools
- Motor driver and control board

## PIN CONFIGURATION (TOP VIEW)




SOT23-5

| Pin Number | Pin Name | Pin Function |
|---|---|---|
| 1 | VOUT | Output of the Regulator |
| 2 | GND | Ground |
| 3 | VIN | Input of Supply Voltage |
| 4 | NC | No Internal Connection |
| 5 | EN | Enable ControlInput |

## Ordering Information

**TP402LA XX XX**

PACKAGE TYPE
S5 :SOT23-5

OUTPUT VOLTAGE
30: 3.0V
33: 3.3V
50: 5.0V

**Example: TP402LA33S5**

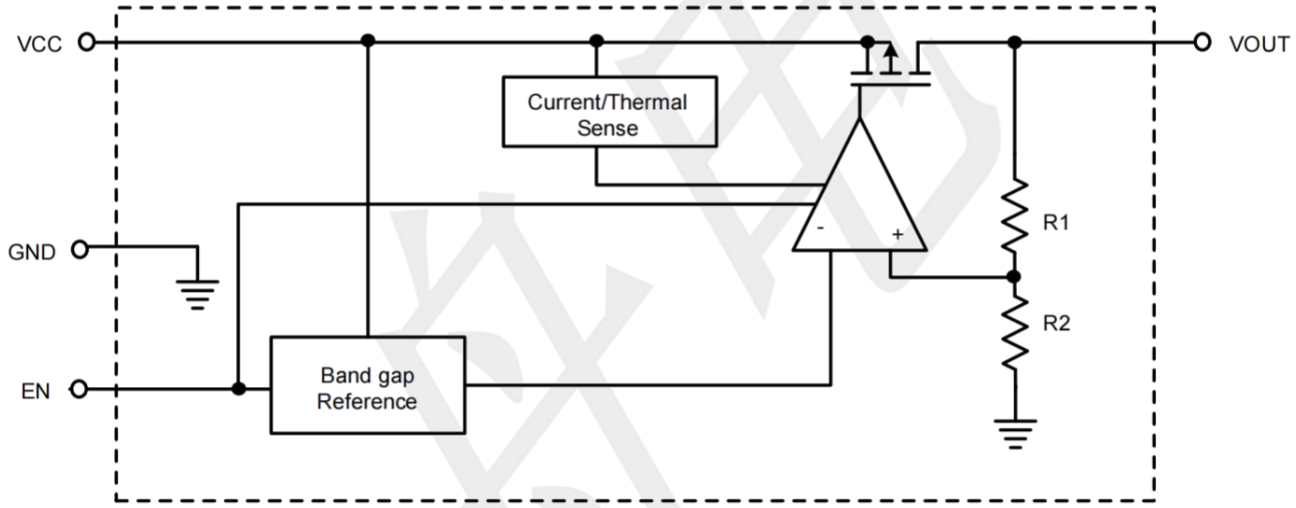
→ 3.3V Version, in SOT23-5 Package & Tape & Reel Packing Type

## Absolute Maximum Ratings

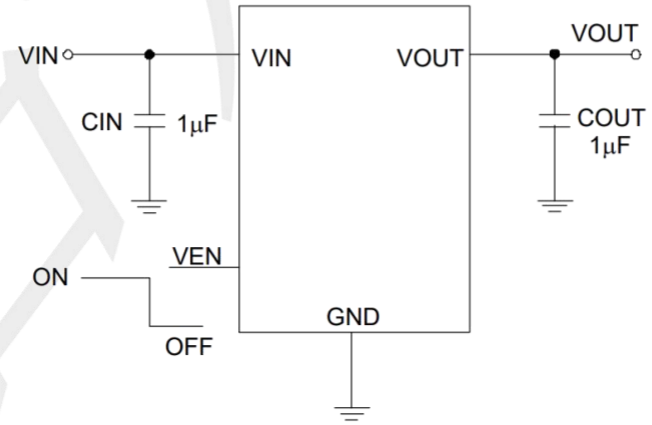
**over operating free-air temperature range (unless otherwise noted)**

| | | MIN | MAX | UNIT |
|---|---|---|---|---|
| VIN，EN | Continuous input voltage range | -0.3 | 45 | V |
| VOUT | Output voltage range | -0.3 | 7 | |
| Current | Maximum output current | Internally limited | | mA |
| Temperature | Operating Temperature, Topr | -40 | +85 | ℃ |
| | Storage, Tstg | -55 | +125 | |
| | Welding temperature and time，Tsolder | +260, 10s | | |
| Power Dissipation | Pd | 250 | | mW |

## BLOCK DIAGRAM




## Typical Application Circuit



## Electrical Characteristics ( TA=25℃, unless otherwise specified)

| PARAMETER | SYMBOL | TEST Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{IN}$ | | -- | -- | 40 | V |
| Output current | $I_{OUT(max)}$ | | 250 | 300 | -- | mA |
| DC Output Voltage Accuracy | | $I_{OUT}$ = 0.1mA | -2 | -- | 2 | % |
| Dropout Voltage（$V_{IN}$-$V_{OUT}$） | $I_{OUT}$= 100mA | $V_{OUT}$ = 3.0V | -- | 350 | -- | mV |
| | | $V_{OUT}$ = 3.3V | -- | 340 | -- | |
| | | $V_{OUT}$ = 5.0V | -- | 280 | -- | |
| Ground Current ($I_{OUT}$ = 0mA) | $I_Q$ | $V_{OUT}$ = 3.3V | -- | 1.5 | 3.0 | uA |
| Shutdown Ground Current | $I_{SD}$ | $V_{EN}$ = 0V, $V_{OUT}$ = 0V | -- | 0.01 | 0.5 | |
| $V_{OUT}$ Shutdown Leakage Current | $I_{LEAK}$ | | -- | 0.01 | 0.5 | |
| Power supply voltage regulation rate | $\frac{\Delta V_{OUT}}{\Delta V_{IN}*V_{OUT}}$ | $I_{OUT}$ =10mA, VIN≤40V | -- | 0.05 | -- | % / V |
| Output Current Limit | $I_{LIM}$ | $V_{OUT}$=0.9× $V_{OUT(NOM)}$ | 300 | -- | -- | mA |
| Enable Threshold Voltage | $V_{IH}$ | EN Rising | 1.2 | -- | -- | V |
| | $V_{IL}$ | EN Falling | -- | -- | 0.5 | |
| Power Supply Rejection Ratio | PSRR | $V_{OUT}$ =5V, $I_{OUT}$ =30mA, $V_{IN}$ = 12V, f = 1kHz | -- | 80 | -- | dB |
| Thermal Shutdown Temperature | $T_{SD}$ | $I_{OUT}$ =10mA | -- | 140 | -- | ℃ |
| Thermal Shutdown Hysteresis | $\Delta T_{SD}$ | | -- | 20 | -- | |
| Package Thermal Resistance (Note 1) | SOT23-5 | Thermal Resistance Junction-toAmbient | -- | 220 | -- | ℃/W |
| short-circuit current | ISHORT | $V_{IN}$=4.0V | -- | 42 | -- | mA |
| Overcurrent protection current | ILIMIT | $V_{IN}$=4.0V | -- | 400 | -- | mA |

Note: 1. Test condition: the device is mounted on FR-4 substrate PC board, with minimum recommended pad layout.

## Typical Operating Characteristics

**$V_{IN}$=12V, $I_{OUT}$=1mA, $V_{OUT}$=3.3V, $C_{IN}$=$C_{OUT}$=1uF, $T_J$=25℃, unless otherwise specified**

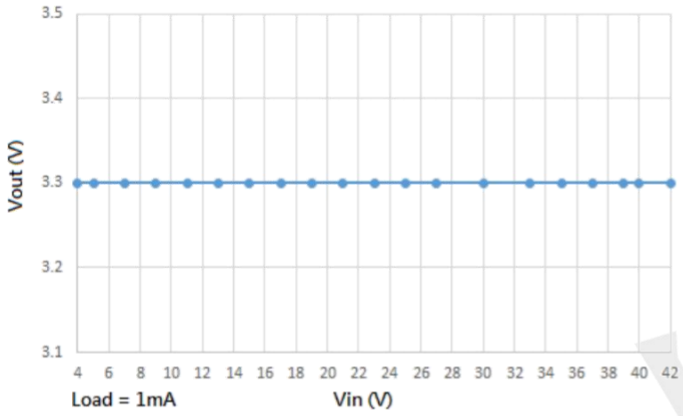



Fig 1. $V_{OUT}$ vs $V_{IN}$

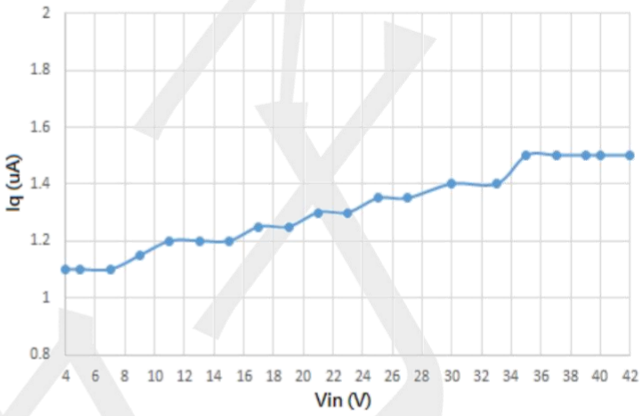



Fig 2. $I_Q$ vs $V_{IN}$

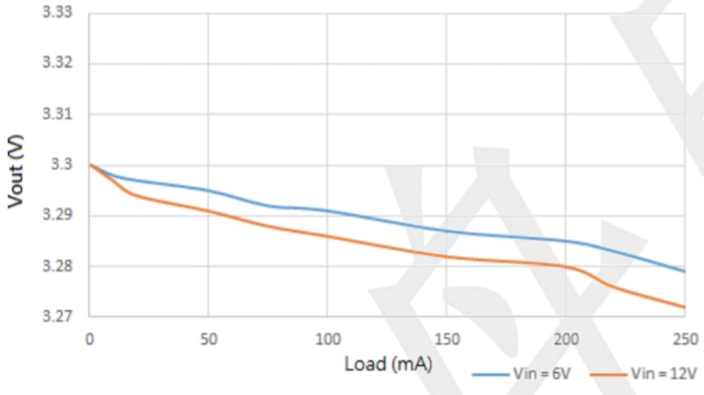



Fig 3. $V_{OUT}$ vs Load

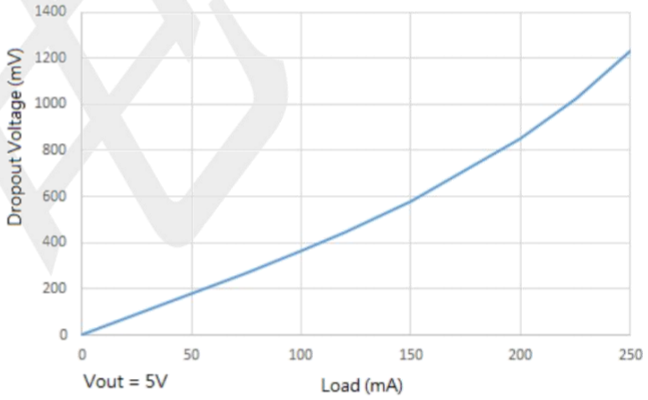



Fig 4. Dropout vs Load

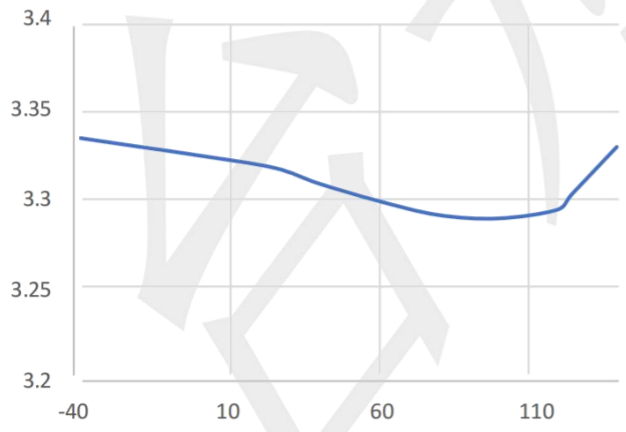


Fig 5. $V_{OUT}$ (3.3V) vs Temperature

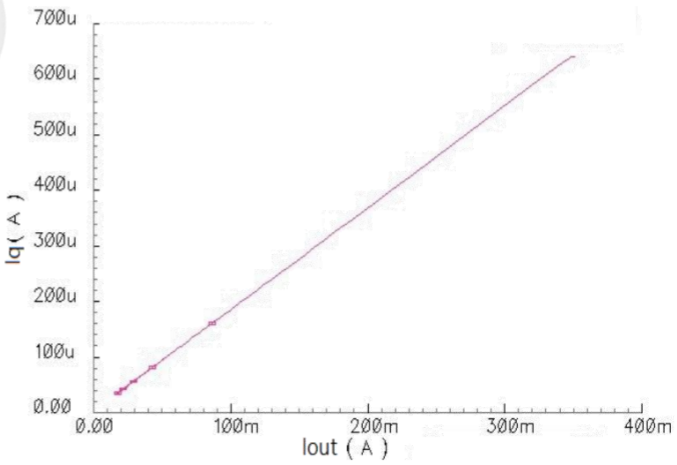
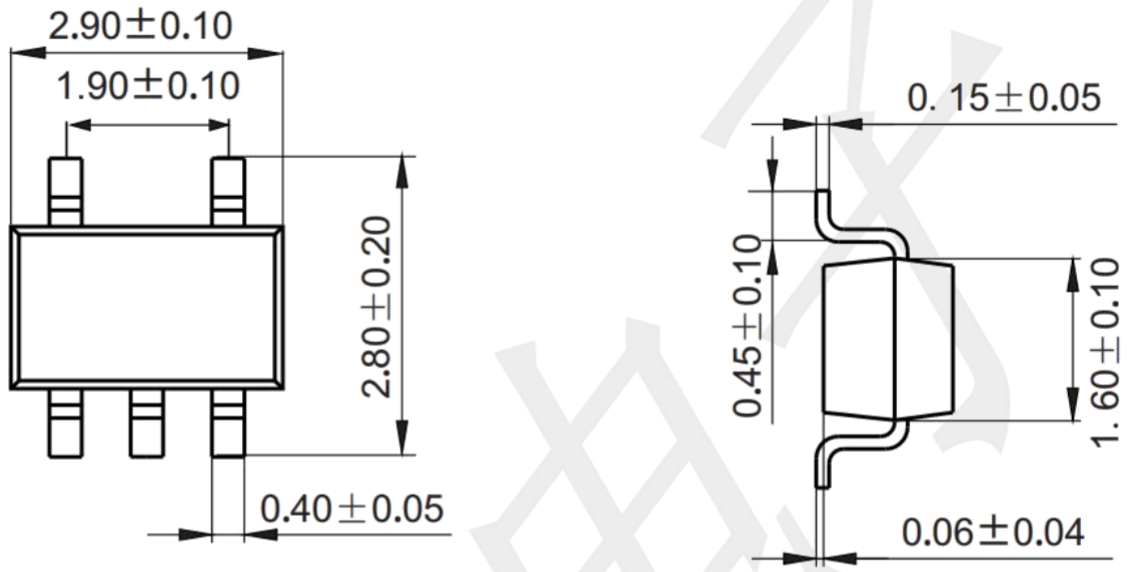
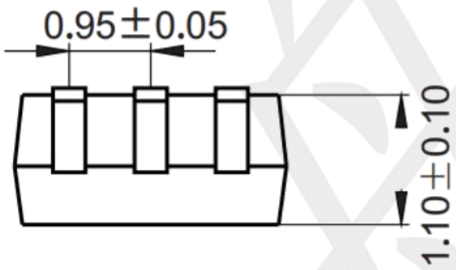



Fig 6. $I_Q$ vs Load

## Package Outline Dimensions (unit: mm)

**SOT23-5 (Unit: mm)**




## Mounting Pad Layout (unit: mm)

