

Description

The AP131 is a 300mA, fixed output voltage, low dropout linear regulator. The Device included pass element, error amplifier, band-gap, current limit and thermal shutdown circuitry. The device is ON when the EN pin is set to logic high level.

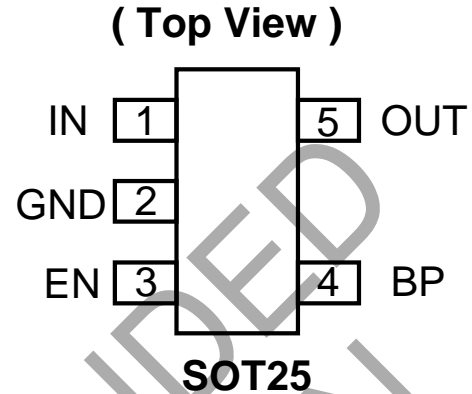
The characteristics of low dropout voltage and less quiescent current make it good for some critical current applications, for example, some battery powered devices. The typical quiescent current is approximately 50µA from zero to maximum load. Due to the internal flexible design, it results in extensively fixed output voltage versions and makes it convenient to use for applications. Built-in current-limit and thermal-shutdown functions prevent any fault condition from IC damage. An external capacitor can be connected to the BP pin and reduce the output noise.

Features

- Input Voltage Range is from 2.7V to 5.5V
- Dropout Voltage 400mV at 300mA Output Current
- Guaranteed 300mA Output Current
- Internal Ron = 1.5Ω PMOS Draws no Base Current
- Low Quiescent Current 50µA
- Output Voltage: 1.5V/1.8V/2.0V/2.5V/2.8V/2.9V/3.0V/3.3V/ 3.5V; Accuracy 2%
- Active Low Shutdown Function (EN pin)
- Fast Transient Response
- Good Load Regulation
- Current Limit and Thermal Shutdown Protection
- Short-Circuit Current Fold-Back
- Lead Free package: SOT25
- SOT25: Available in "Green" Molding Compound (No Br, Sb)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

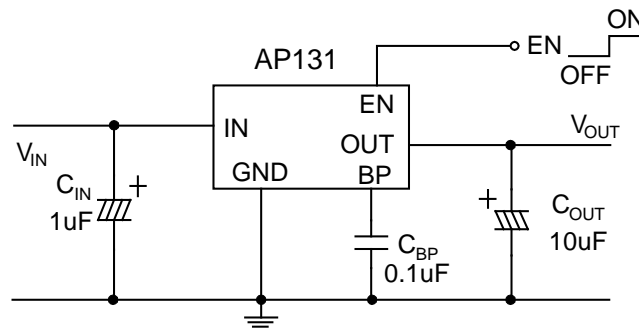
Pin Assignments



Applications

- Battery Powered Device
- Wireless Communication
- CD-ROM, DVD, and LAN Card
- PC Peripheral

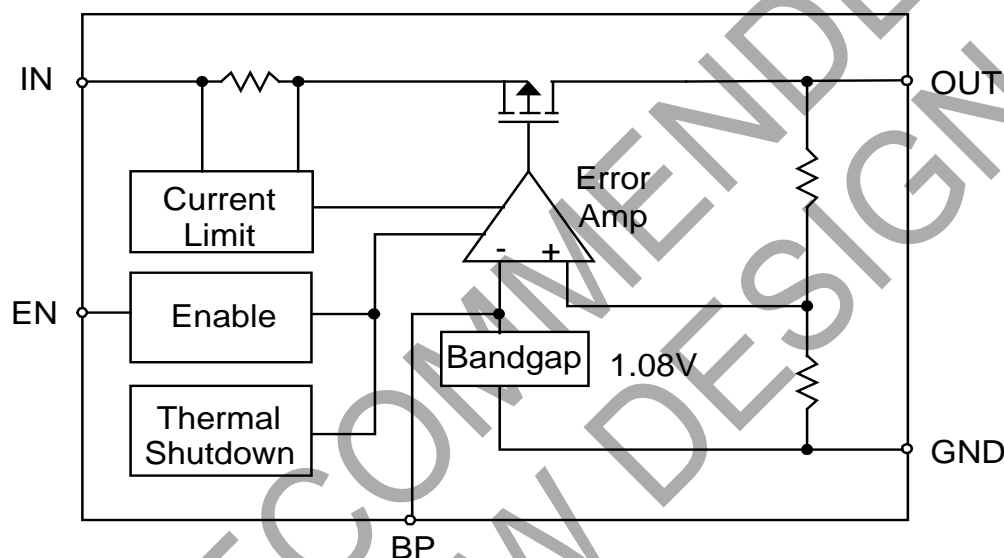
Typical Applications Circuit



Pin Descriptions

| Pin Name | Description |
|----------|----------------|
| IN | Input Voltage |
| GND | Ground |
| EN | Enable Pin |
| BP | Band-Gap |
| OUT | Output Voltage |

Functional Block Diagram



Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Symbol | Parameter | Rating | Unit |
|----------|---|-------------|------------------|
| V_{CC} | Input Voltage | +6 | V |
| T_{OP} | Operating Junction Temperature Range | -40 to +125 | $^\circ\text{C}$ |
| T_{ST} | Storage Temperature Range | -65 to +150 | $^\circ\text{C}$ |
| P_D | Power Dissipation, P_D @ $T_A = 25^\circ\text{C}$ | 250 | mW |

Recommended Operating Conditions (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Symbol | Parameter | Min | Max | Unit |
|-----------|-------------------------------|-----|-----|------------------|
| V_{IN} | Input Voltage | 2.7 | 5.5 | V |
| I_{OUT} | Output Current | 0 | 300 | mA |
| T_A | Operating Ambient Temperature | -40 | 85 | $^\circ\text{C}$ |

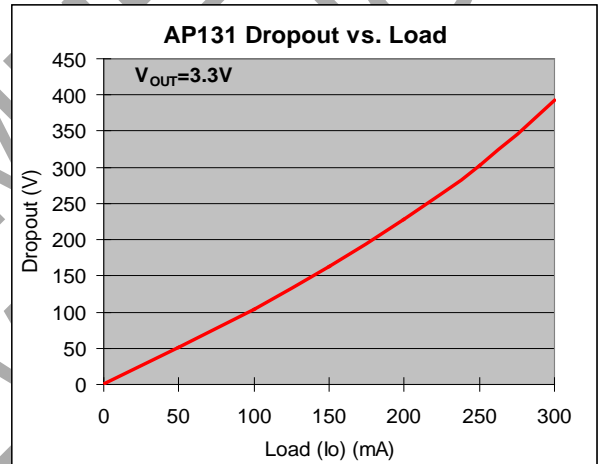
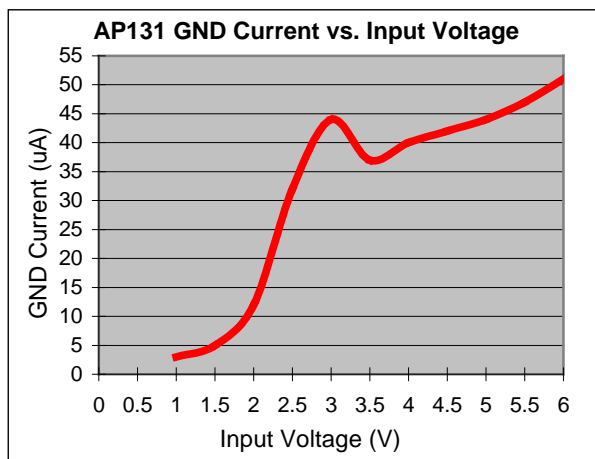
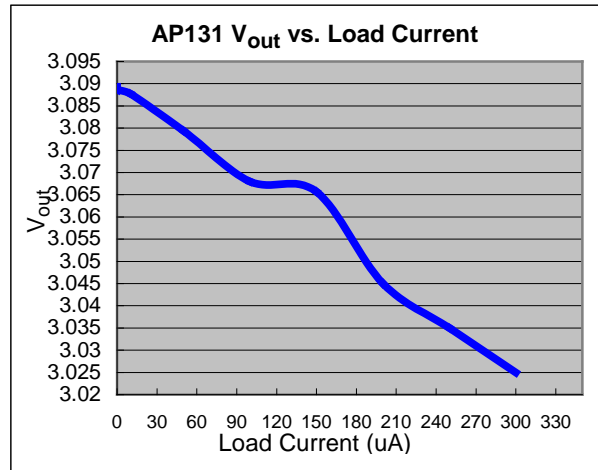
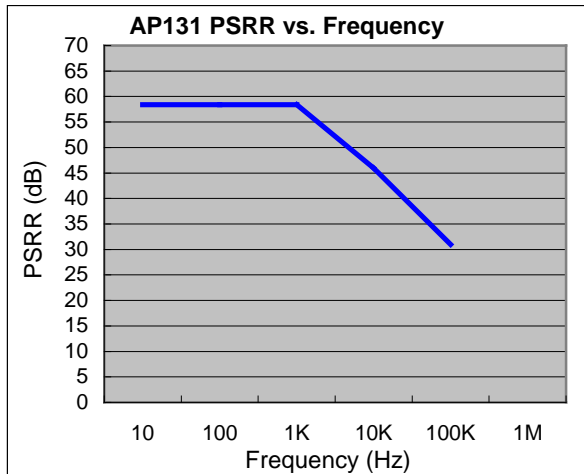
Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

 $T_A = 25^\circ\text{C}$, $C_{IN} = 1\mu\text{F}$, $C_{OUT} = 10\mu\text{F}$, unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ. | Max | Unit |
|-------------------|---|---|-----|------|----------|-----------------------|
| V_{DROP} | Dropout Voltage (Note 4) | $I_L = 300\text{mA}$ | — | 400 | 500 | mV |
| I_{LIMIT} | Current Limit (Note 5) | $V_{IN} = 5\text{V}$, $V_{OUT} = 0\text{V}$ | 350 | 450 | — | mA |
| I_{short} | Short Circuit Current | $V_{OUT} < 1.05\text{V}$ | — | 150 | 300 | mA |
| ΔV_{LINE} | Line Regulation | $I_{OUT} = 1\text{mA}$, $V_{IN} = (V_{OUT} + 1\text{V})$ to 5.5V | — | 0.1 | 0.3 | %/V |
| ΔV_{LOAD} | Load Regulation (Note 6) | $I_L = 1\sim 300\text{mA}$, $V_{IN} = 5\text{V}$ | — | 30 | 35 | mV |
| ΔV_{OUT} | Output Voltage Accuracy | $I_L = 1\text{mA}$, $V_{IN} = 5\text{V}$ | -2 | — | +2 | % |
| | Output Voltage Temperature Coefficient (Note 7) | — | — | 50 | 150 | PPM/ $^\circ\text{C}$ |
| PSRR | Ripple Rejection | $F = 100\text{Hz}$, $C_{IN} = 1\mu\text{F}$, $C_O = 10\mu\text{F}$, $I_L = 100\text{mA}$ | — | 60 | — | dB |
| I_{SB} | Standby Current | $I_L = 0\text{mA}$, $V_{IN} = 5\text{V}$, $EN = 0\text{V}$ | — | — | 5 | μA |
| I_Q | Quiescent Current | $I_L = 0\text{mA}$, $V_{IN} = 5\text{V}$, $EN = 5\text{V}$ | — | 50 | 100 | μA |
| I_{EN} | Enable Pin Current | — | — | — | < 0.1 | μA |
| V_{ENON} | Enable Pin Voltage | Output ON | 1.5 | — | V_{IN} | V |
| V_{ENOFF} | | Output OFF | 0 | — | 0.8 | V |
| T_{DELAY} | Enable Delay Time | $C_{BP} = 0.1\mu\text{F}$, $C_{OUT} = 1\mu\text{F}$, $I_{OUT} = 30\text{mA}$ | — | 8 | — | μs |
| θ_{JA} | Thermal Resistance Junction-to-Ambient | SOT25 (Note 8) | — | 163 | — | $^\circ\text{C/W}$ |
| θ_{JC} | Thermal Resistance Junction-to-Case | SOT25 (Note 8) | — | 53 | — | $^\circ\text{C/W}$ |

- Notes:
- Dropout voltage is defined as the input to output differential voltage. Dropout is measured at constant junction temperature by using pulsed ON time, and the criterion is V_{OUT} inside target value $\pm 2\%$. This test is skipped at the condition of $V_{IN} < 3\text{V}$.
 - Current limit is measured at constant junction temperature by using pulsed testing with a low ON time.
 - Regulation is measured at constant junction temperature by using pulsed testing with a low ON time.
 - Guaranteed by design.
 - Test conditions for SOT25: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

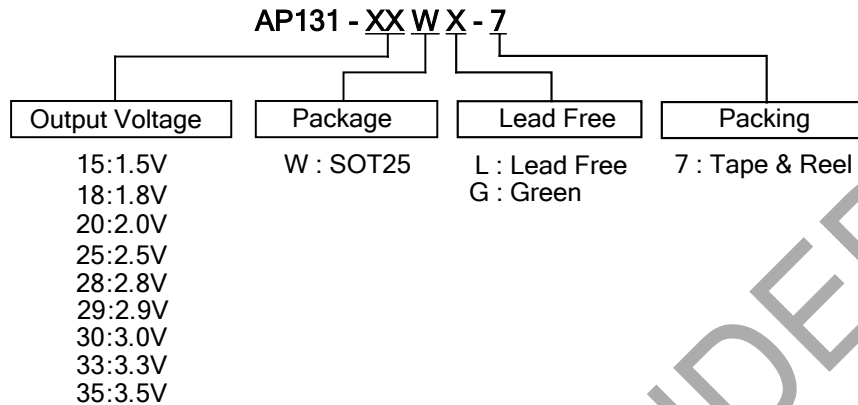
Typical Characteristics



NOT FOR NEW

FOR NEW

Ordering Information

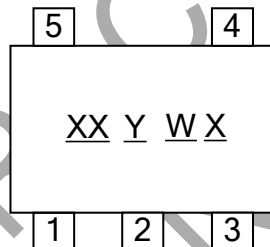


| Device | Package Code | Packaging (Note 2) | 7" Tape and Reel | |
|--------------|--------------|--------------------|------------------|--------------------|
| | | | Quantity | Part Number Suffix |
| AP131-XXWL-7 | W | SOT25 | 3000/Tape & Reel | -7 |
| AP131-XXWG-7 | W | SOT25 | 3000/Tape & Reel | -7 |

Marking Information

(1) SOT25

(Top View)



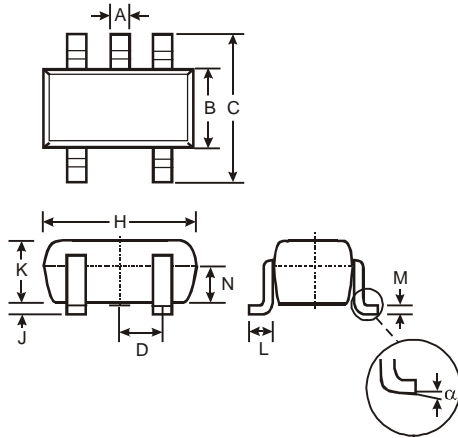
XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
X : a~z : Lead Free
 A~Z : Green

| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AP131-15W | SOT25 | DA |
| AP131-18W | SOT25 | DD |
| AP131-20W | SOT25 | DF |
| AP131-25W | SOT25 | DK |
| AP131-28W | SOT25 | DN |
| AP131-29W | SOT25 | DO |
| AP131-30W | SOT25 | DP |
| AP131-33W | SOT25 | DS |
| AP131-35W | SOT25 | DU |

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT25

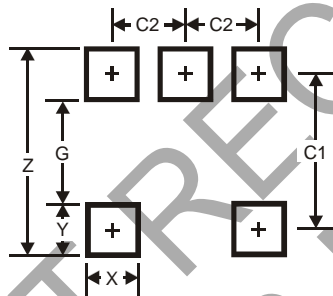


| SOT25 | | | |
|----------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 0.35 | 0.50 | 0.38 |
| B | 1.50 | 1.70 | 1.60 |
| C | 2.70 | 3.00 | 2.80 |
| D | - | - | 0.95 |
| H | 2.90 | 3.10 | 3.00 |
| J | 0.013 | 0.10 | 0.05 |
| K | 1.00 | 1.30 | 1.10 |
| L | 0.35 | 0.55 | 0.40 |
| M | 0.10 | 0.20 | 0.15 |
| N | 0.70 | 0.80 | 0.75 |
| α | 0° | 8° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT25



| Dimensions | Value |
|------------|-------|
| Z | 3.20 |
| G | 1.60 |
| X | 0.55 |
| Y | 0.80 |
| C1 | 2.40 |
| C2 | 0.95 |

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