# AP450

**2 Channel Linear Controller with Enable Function**

## ■ Features

- 2 Channel Linear Control Circuitries
- Operating voltage can be up to 20V
- Under voltage Lockout (UVLO) Protection
- Current Limit
- Over Voltage Protection
- Power Good Function
- 1.25V/0.8V internal voltage reference
- 8-pin PDIP and SOP **Pb-Free** packages

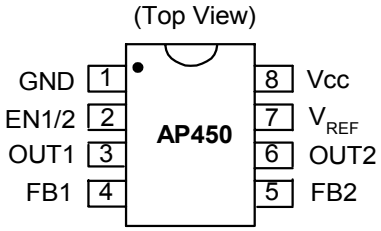
## ■ General Description

The AP450 series integrates two channel linear controllers into a single chip, mainly designs for power-supply regulator. All the functions included an on-chip 1.25V/0.8V reference output, error amplifier, UVLO, current limit. During low VCC situation, the UVLO makes sure that the outputs are off until the internal circuit is operational normally.

## ■ Applications

- Backlight inverter
- LCD Monitor
- XDROM, XDSL Product

## ■ Pin Assignment

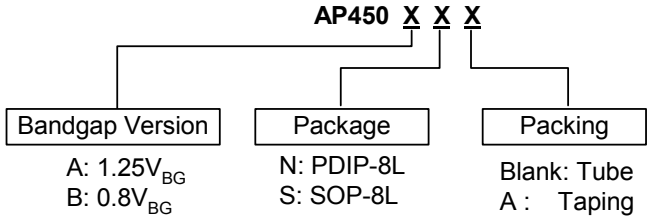



**SOP-8L/PDIP-8L**

## ■ Pin Descriptions

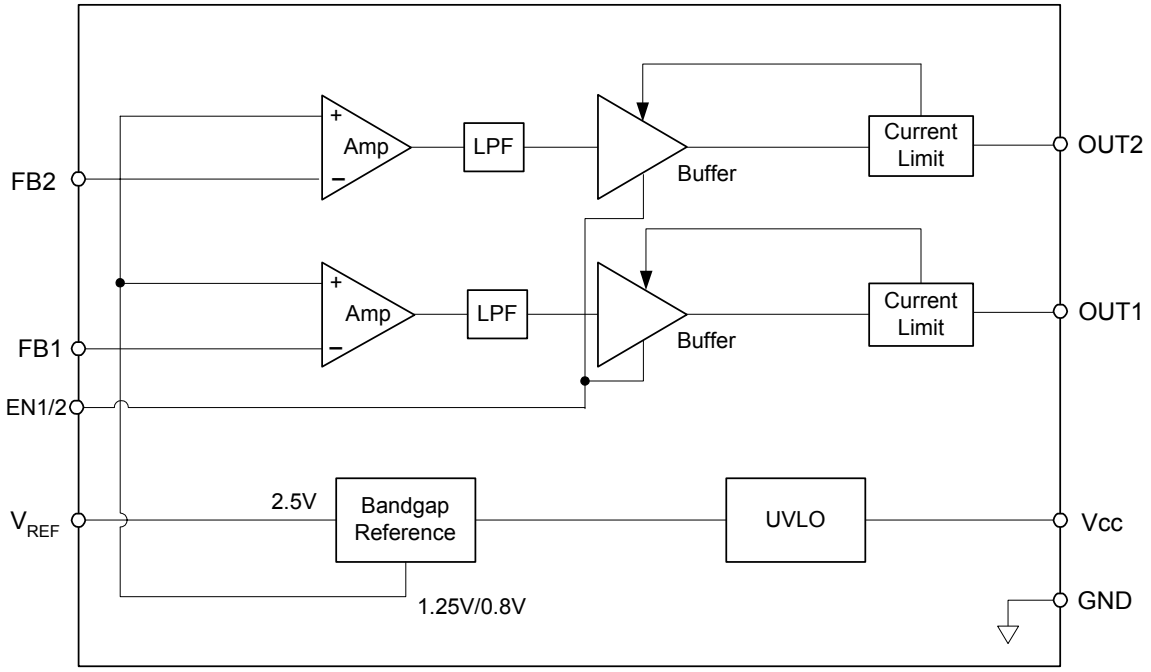
| Pin Name | Pin No. | Description |
|---|---|---|
| GND | 1 | Signal Ground |
| EN1/2 | 2 | Channel 1/2 Enable Pin |
| OUT1 | 3 | Linear Controller CH1output |
| FB1, 2 | 4, 5 | Voltage Feedback |
| OUT2 | 6 | Linear Controller CH2 output |
| $V_{REF}$ | 7 | 1.25V/0.8V Output |
| Vcc | 8 | Supply Voltage |

## ■ Ordering Information




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## ■ Block Diagram




## ■ Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $V_{CC}$ | Supply voltage | 22 | V |
| $V_I$ | Amplifier input voltage | 20 | V |
| $V_{O1}$ / $V_{O2}$ | CH1 / CH1Linear driver voltage to ground | -0.3≦V≦20 | V |
| $T_{OP}$ | Operating temperature range | -20 to +85 | °C |
| $T_{ST}$ | Storage temperature range | -65 to +150 | °C |
| $T_{LEAD}$ | Lead temperature 1.6 mm(1/16 inch) from case for 10 seconds | 260 | °C |

## ■ Recommended Operating Conditions

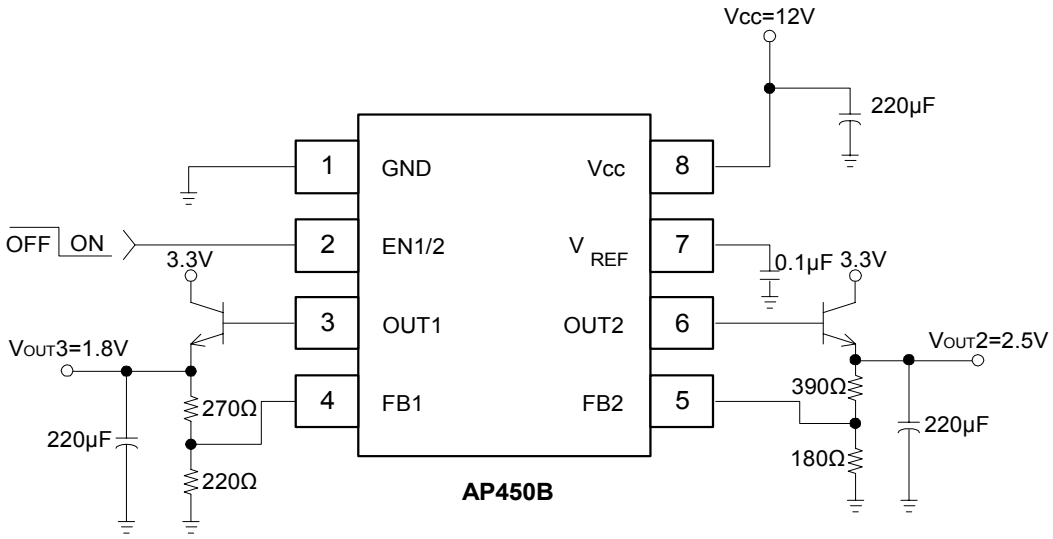
| Symbol | Parameter | Min. | Max. | Unit |
|---|---|---|---|---|
| $V_{CC}$ | Supply voltage | 3.6 | 20 | V |
| $V_I$ | Amplifier input voltage | 1.05 | 1.45 | V |
| $V_{O1}$ / $V_{O2}$ | CH1 / CH2 Linear driver voltage to ground | - | Vcc-1.5 | V |
| $I_{FB}$ | Current into feedback terminal | - | 45 | μA |
| $R_F$ | Feedback resistor | 100 | - | kΩ |
| $T_{OP}$ | Operating free-air temperature | -20 | 85 | ºC |

## ■ Electrical Characteristics ($T_A$=25ºC, $V_{CC}$=6V)

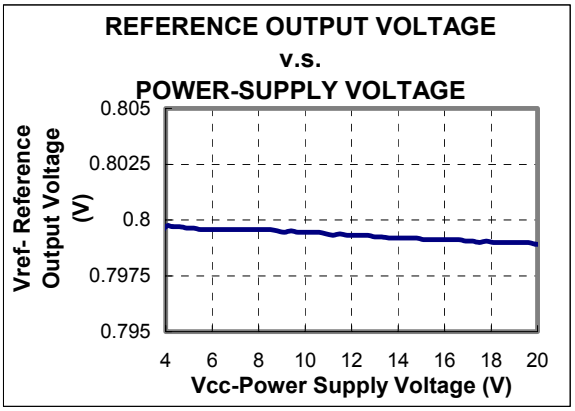
**Reference (REF)**

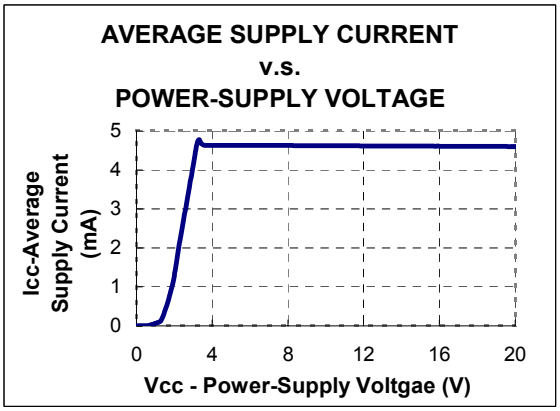
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{OUT1/2}$ | $V_{O1}$ / $V_{O2}$ connect to FB1 / FB2 | AP450A | 1.225 | 1.25 | 1.275 | V |
| | | AP450B | 0.784 | 0.800 | 0.816 | |
| | Output voltage change with temperature | $T_A$ = -20ºC ~ 25ºC | - | -0.1 | ±1 | % |
| | | $T_A$ = 25ºC ~ 85ºC | - | -0.2 | ±1 | % |
| **Under voltage lockout (UVLO)** | | | | | | |
| $V_{UT}$ | Upper threshold voltage ($V_{CC}$) | $I_{O(REF)}$ = 0.1mA, $T_A$ = 25ºC | - | 2.9 | - | V |
| $V_{LWT}$ | Lower threshold voltage ($V_{CC}$) | | - | 2.4 | - | V |
| $V_{HT}$ | Hysteresis ($V_{CC}$) | | - | 500 | - | mV |
| **Output section** | | | | | | |
| $I_{CL1}$ | CH1 Current Limit | $V_{CC}$=5V, $V_{NOUT2}$=$V_{FB2}$=0V | 25 | - | - | mA |
| $I_{CL2}$ | CH2 Current Limit | $V_{CC}$=5V, $V_{NOUT3}$=$V_{FB3}$=0V | 25 | - | - | mA |
| **Enable function** | | | | | | |
| $V_{IL}$ | EN pin logic input threshold voltage for EN1/2 | Low (regulator ON) | - | 1.3 | 0.6 | V |
| $V_{IH}$ | | High (regulator OFF) | 2.0 | | - | V |
| $I_{IL}$ | EN pin logic input current for EN1/2 | Low (regulator ON) | - | -0.03 | - | µA |
| $I_{IH}$ | | High (regulator OFF) | - | 0.3 | - | µA |
| **Total device** | | | | | | |
| $I_{CCA}$ | Average supply current | | - | 5 | 7 | mA |
| **Thermal Resistor** | | | | | | |
| $\theta_{JA}$ | Thermal Resistor Junction to Ambient | SOP8 | - | 90 | - | ºC/W |
| | | PDIP8 | - | 60 | - | ºC/W |

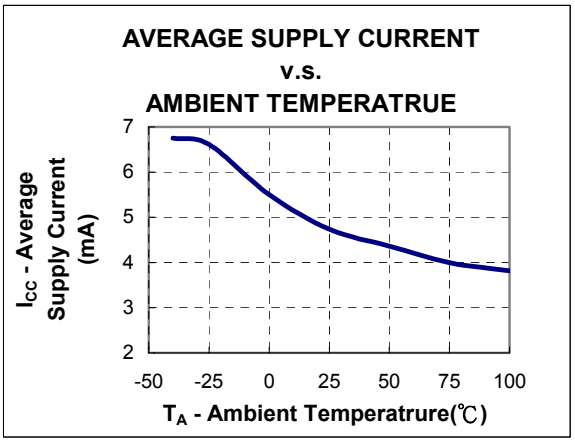
## ■ Typical Application Circuit



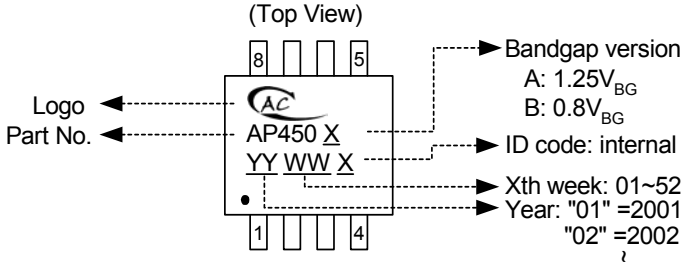
## ■ Typical Characteristics



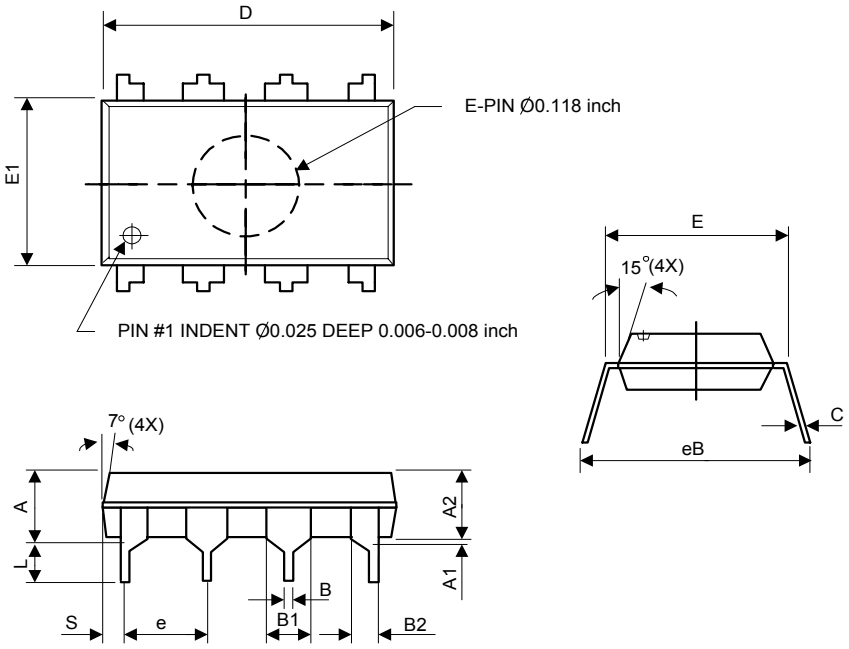

## ■ Marking Information




**SOP-8L/PDIP-8L**

## ■ Package Information

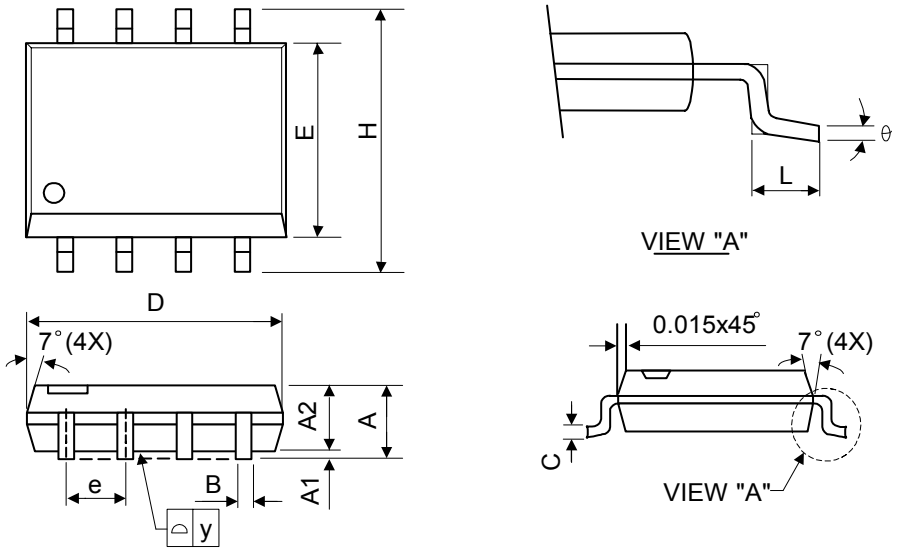
### (1) PDIP-8L (Plastic Dual-in-line Package )




| Symbol | Dimensions in millimeters | | | Dimensions in inches | | |
|---|---|---|---|---|---|---|
| | Min. | Nom. | Max. | Min. | Nom. | Max. |
| A | - | - | 5.33 | - | - | 0.210 |
| A1 | 0.38 | - | - | 0.015 | - | - |
| A2 | 3.1 | 3.30 | 3.5 | 0.122 | 0.130 | 0.138 |
| B | 0.36 | 0.46 | 0.56 | 0.014 | 0.018 | 0.022 |
| B1 | 1.4 | 1.52 | 1.65 | 0.055 | 0.060 | 0.065 |
| B2 | 0.81 | 0.99 | 1.14 | 0.032 | 0.039 | 0.045 |
| C | 0.20 | 0.25 | 0.36 | 0.008 | 0.010 | 0.014 |
| D | 9.02 | 9.27 | 9.53 | 0.355 | 0.365 | 0.375 |
| E | 7.62 | 7.94 | 8.26 | 0.300 | 0.313 | 0.325 |
| E1 | 6.15 | 6.35 | 6.55 | 0.242 | 0.250 | 0.258 |
| e | - | 2.54 | - | - | 0.100 | - |
| L | 2.92 | 3.3 | 3.81 | 0.115 | 0.130 | 0.150 |
| eB | 8.38 | 8.89 | 9.40 | 0.330 | 0.350 | 0.370 |
| S | 0.71 | 0.84 | 0.97 | 0.028 | 0.033 | 0.038 |

## ■ Package Information (Continued)

### (2) SOP- 8L(JEDEC Small Outline Package)




| 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 | $0^{O}$ | - | $8^{O}$ | $0^{O}$ | - | $8^{O}$ |