Simple 1 Amp Step-Down Fixed Voltage Regulators

PRELIMINARY

FEATURES

- 5V, 12V and 15V Output, ±3% Max Over Line and Load Conditions
- Guaranteed 1A Output Current
- Wide Input Voltage Range From V_{OUT}+2V to 40V (60V for HV)
- Requires Only 4 External Components
- 52 kHz Fixed Frequency Internal Oscillator
- Low Power Standby Mode, I_Q Typically < 200 µA
- Efficiency Typically Over 80%
- Uses Readily Available Standard Inductors
- Thermal Shutdown and Current Limit Protection
- 100% Electrical Thermal Limit Burn-in
- Replacement for LM2575 Series

APPLICATIONS

- Simple High-Efficiency Step-Down (buck) Regulator
- Efficient Pre-Regulator for Linear Regulators
- On-Card Switching Regulators
- Positive to Negative Converter (Inverting, Buck-Boost)
- Isolated Flyback Converter using Minimum Number of External Components
- Negative Boost Converter

DESCRIPTION

The UC1575/UC2575 family of devices provides all the active functions necessary to implement a simple step-down (buck) switching regulator. Utilizing a minimum number of external components, these regulators offer a simple, high efficiency replacement for popular three-terminal adjustable linear regulators, greatly reducing, and in many cases eliminating, the need for a heat sink.

The UC1575/UC2575 series features an output voltage of 5V, 12V or 15V (see Table 1) and is capable of driving a 1A load while maintaining excellent line and load regulation. Other features include internal frequency compensation, an on-chip fixed frequency oscillator with a ±3% tolerance, and output voltage with ±2% tolerance within specified input voltages and output load conditions. External shutdown with a standby current of 200µA is provided. The output switch includes cycle-by-cycle current limiting and thermal shutdown for full protection under fault conditions.

A standard series of inductors and capacitors are available from several manufacturers optimized for use with the UC1575/UC2575 series. This feature greatly simplifies the design of switched mode power supplies.

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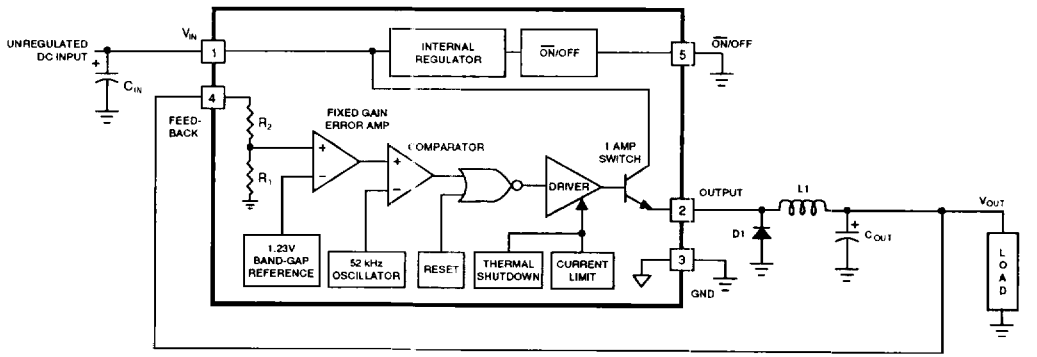
CONNECTION DIAGRAM

5-PIN TO-220 (TOP VIEW)
T-PACKAGE

BLOCK DIAGRAM



Note: Pin numbers are for the TO-220 package

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ABSOLUTE MAXIMUM RATINGS (Note 1)

If Military/Aerospace specified devices are required, please contact the UICC Sales Office/Distributors for availability and specifications.

Maximum Supply Voltage
- UC1575/UC2575 ..... 45V
- UC2575HV 63V

ON/OFF Pin Input Voltage ..... -0.3 ≤ V ≤ +40V

Output Voltage to Ground (Steady State) ..... -1V

Power Dissipation ..... Internally Limited

Storage Temperature Range ..... -65°C to +150°C

Minimum ESD Rating
- (C = 100 pF, R = 1.5 kΩ) ..... 2 kV
- FB Pin (Pin 4) ..... 1 kV

Lead Temperature
- (Soldering, 10 sec.) ..... 260°C

TEST CIRCUIT AND LAYOUT GUIDELINES *(Figure 1)*

C_{IN} ..... 100 µF, 75V Aluminum Electrolytic
C_{OUT} ..... 330 µF, 15V Aluminum Electrolytic
220 µF, 15V Aluminum Electrolytic for UC2575-5
D1 ..... Schottky, MBR360
L1 ..... 330 µH (PE-52627) for UC2575-5
470µH (AIE-430-0634) for UC2575-12
680µH (AIE-415-0935) for UC2575-15
5-Pin TO-220 Socket ..... 2936 (Loranger Mfg. Co.)
4-Pin TO-3 Socket ..... 8112-AG7 (Augat Inc.)

OPERATING RATINGS

Maximum Junction Temperature ..... 150°C

Temperature Range
- UC1575 ..... -55°C ≤ T_J ≤ +150°C
- UC2575/UC2575HV ..... -40°C ≤ T_J ≤ +125°C

Supply Voltage
- UC1575/UC2575 ..... 40V
- UC2575HV 60V

Order Number For:		Output Voltage	Temperature Range
Standard Voltage Rating (40V)	High Voltage Rating (60V)		
UC2575T-5.0	UC2575HVT-5.0	5.0	-40°C≤T_J≤+125°C
UC2575T-12	UC2575HVT-12	12.0	
UC2575T-15	UC2575HVT-15	15.0	
UC1575K-5.0		5.0	-55°C≤T_J≤+150°C
UC1575K-12		12.0	
UC1575K-15		15.0	

TABLE 1

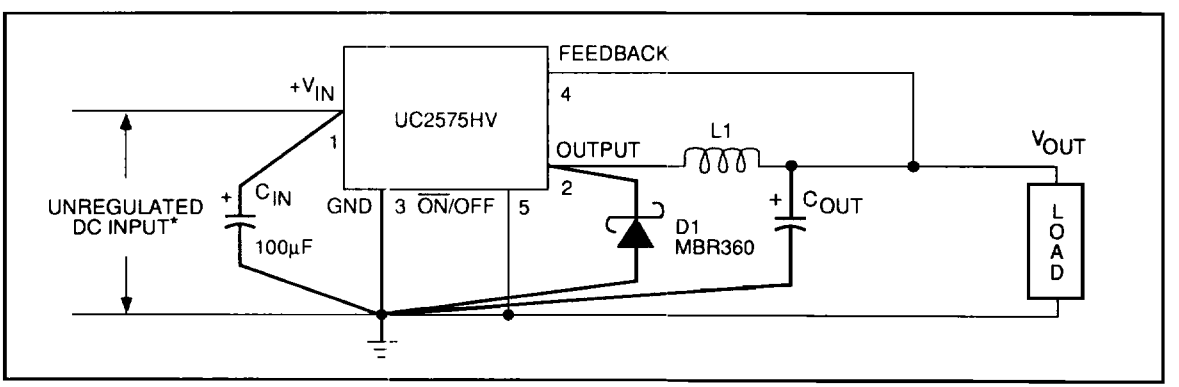

FIGURE 1

Note: *Pin numbers are for the TO-220 package*

** 7-40V (60HV) for-5, 15-35V (60HV) for-12, 17-40V (60HV) for-15*

As in any switching regulator, layout is very important. Rapidly switching currents associated with wiring inductance generate voltage transients which can cause problems. For minimal stray inductance and ground loops, the length of the leads indicated by heavy lines should be kept as **short** as possible. Single-point grounding (as indicated) or ground plane construction should be used for best results.