



ADVANCED PWM STEP-UP DC-DC CONVERTER

DESCRIPTION

The UTC **UC3551** is a step-up DC/DC converter with high efficiency and low start-up voltage. It is operated in stable waveforms without external compensate. This device incorporates an adaptive current mode PWM control loop in which an error amplifier, ramp generator, comparator, switch pass element and driver are included. Besides, this circuit provides a stable and high efficient operation over a wide range of load currents.

The UTC **UC3551** features high switching rate which is up to 450 KHz, making the external component counts less required. Moreover, it features 17µA low quiescent current, which makes the battery life longer. The low start-up input voltage below 1V makes UTC **UC3551** suitable for 1 to 4 battery cells applications of providing up to 300mA output current.

Two external resistors determine the value of the output voltage. The external power devices (NMOS or NPN) are derived by both internal 2A switch and driver.

The UTC **UC3551** is intended to be used in PDA, DSC, LCD Panel, RF-Tags, MP3, portable instrument and wireless equipment.

FEATURES

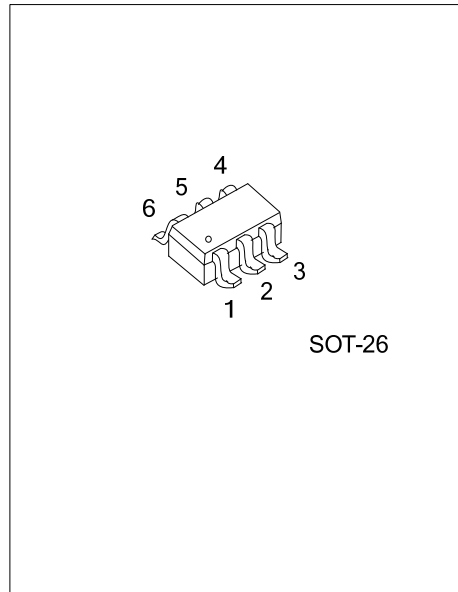
- * Low Start-up Input Voltage is as Low as 1.0V
- * Efficiency up to 90%
- * High Supply Capability to Deliver 3.3V 100mA with 1 Alkaline Cell
- * Quiescent (Switch-off) Supply Current: 17µA
- * Zero Shutdown Mode Supply Current
- * Fixed Switching Frequency: 450KHz
- * Both Internal and External Power Switches for Maximum Flexibility

ORDERING INFORMATION

| Ordering Number | | Package | Packing |
|------------------|------------------|---------|-----------|
| Lead Free | Halogen Free | | |
| UC3551L-xx-AG6-R | UC3551G-xx-AG6-R | SOT-26 | Tape Reel |

Note: xx: Output Voltage, refer to Marking Information.

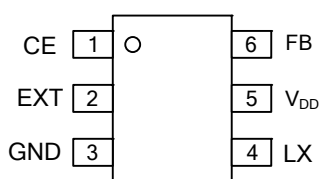
| | | |
|-------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <p>UC3551G-xx-AG6-R</p> | <p>(1)Packing Type (2)Package Type (3)Output Voltage Code (4)Green Package</p> | <p>(1) R: Tape Reel (2) AG6: SOT-26 (3) xx: refer to Marking Information (4) G: Halogen Free and Lead Free, L: Lead Free</p> |
|-------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|



MARKING INFORMATION

| PACKAGE | VOLTAGE CODE | MARKING |
|---------|--------------|---------|
| SOT-26 | AD:ADJ | |

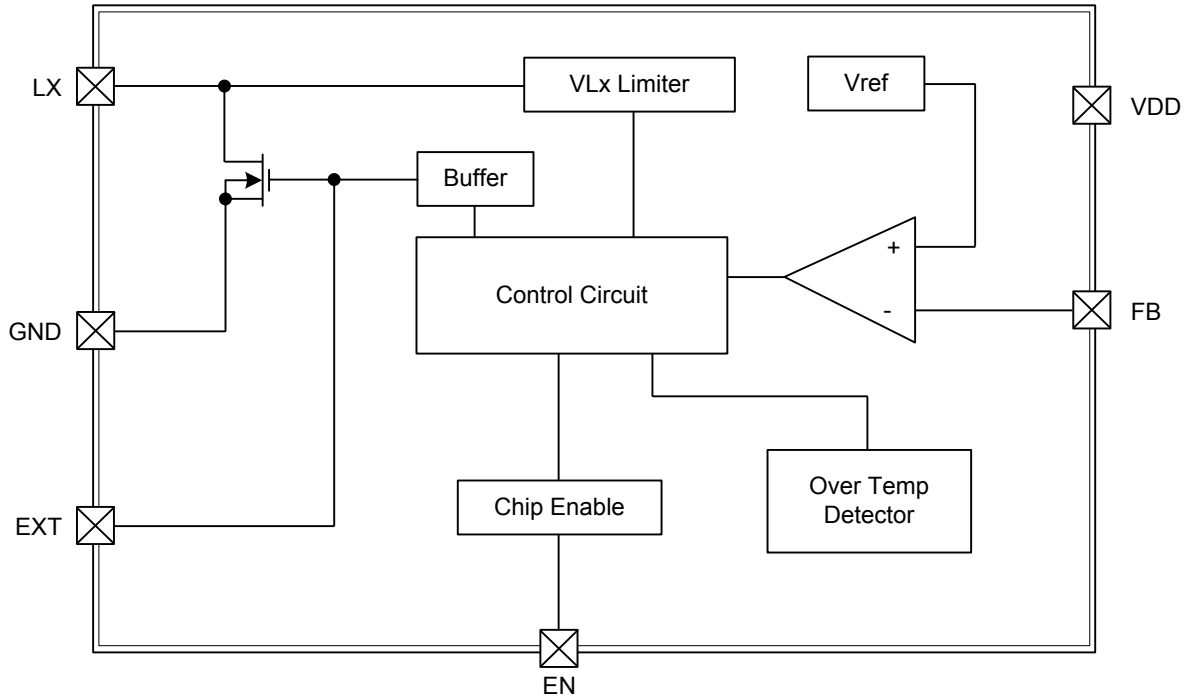
PIN CONFIGURATION



PIN DESCRIPTION

| PIN NO. | PIN NAME | DESCRIPTION |
|---------|-----------------|---------------------------------------------------------------------------------|
| 1 | CE | Chip enable UC3551 gets into shutdown mode when CE pin set to low. |
| 2 | EXT | Output pin for driving external NMOS |
| 3 | GND | Ground |
| 4 | LX | Pin for switching |
| 5 | V _{DD} | Input positive power pin of UC3551 |
| 6 | FB | Feedback input pin Internal reference voltage for the error amplifier is 1.25V. |

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | RATINGS | UNIT |
|--------------------------------|-----------|----------------------------|------|
| Supply Voltage | V_{IN} | - 0.3 ~ 7 | V |
| LX Pin Switch Voltage | V_{LX} | - 0.3 ~ ($V_{DD} + 0.8$) | V |
| Other I/O Pin Voltages | | - 0.3 ~ ($V_{DD} + 0.3$) | V |
| LX Pin Switch Current | I_{LX} | 2.5 | A |
| EXT Pin Driver Current | I_{EXT} | 200 | mA |
| Operating Junction Temperature | T_{OPR} | 125 | °C |
| Storage Temperature | T_{STG} | -65~+150 | °C |

Notes: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|------------------|---------------|---------|------|
| Junction to Case | θ_{JC} | 145 | °C/W |

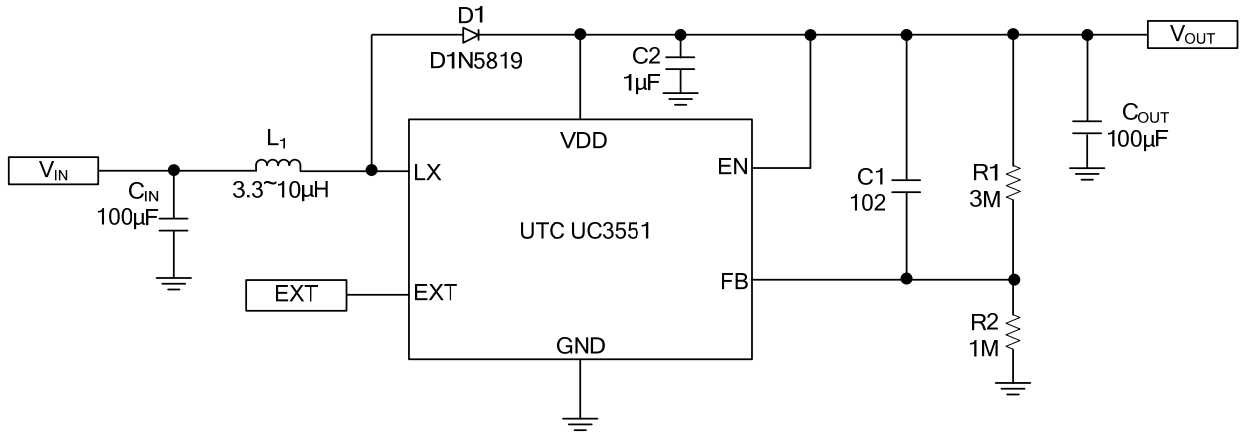
■ ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$, $V_{IN} = 1.5\text{V}$, $V_{DD} = 3.3\text{V}$, Load Current = 0, unless otherwise specified)

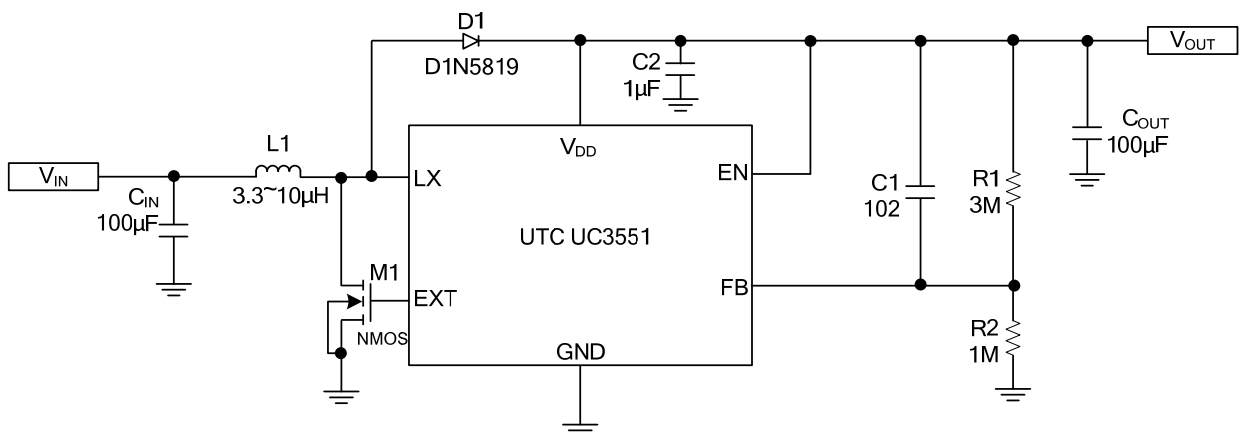
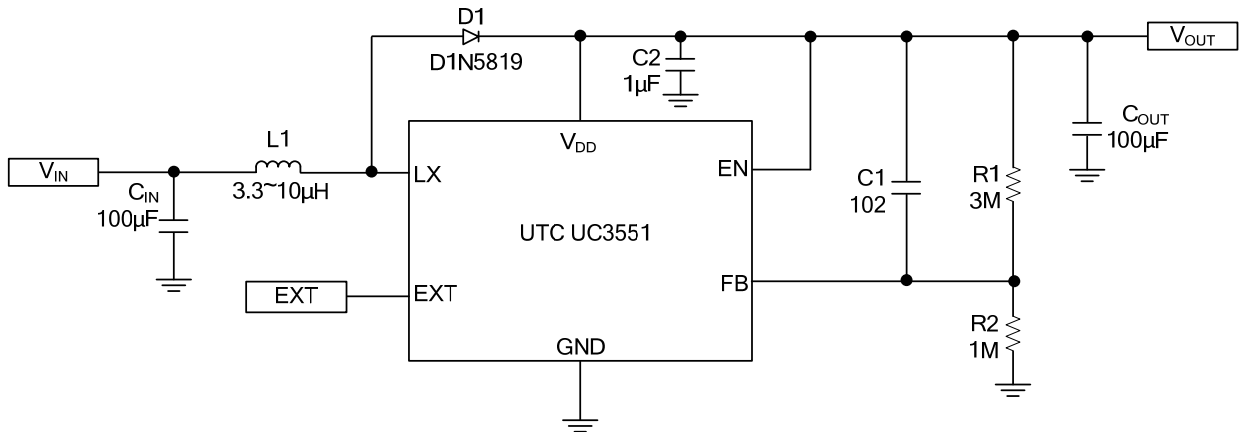
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------------------------|-------------------|------------------------------------------------------|-------|------|---------------|---------------|
| Start-UP Voltage | V_{ST} | $I_L = 1\text{mA}$ | | 0.98 | 1.05 | V |
| Operating VDD Range | V_{DD} | V_{DD} pin voltage | 2 | | 6.5 (Note) | V |
| No Load Current I (V_{IN}) | I_{NO_LOAD} | $V_{IN} = 1.5\text{V}$, $V_{OUT} = 3.3\text{V}$ | | 75 | | μA |
| Switch-off Current I (V_{DD}) | I_{SWITCH_OFF} | $V_{IN} = 6\text{V}$ | | 17 | | μA |
| Shutdown Current I (V_{IN}) | I_{OFF} | CE Pin = 0V, $V_{IN} = 4.5\text{V}$ | | 0.01 | 1 | μA |
| Feedback Reference Voltage | V_{REF} | Close Loop, $V_{DD} = 3.3\text{V}$ | 1.225 | 1.25 | 1.275 | V |
| Switching Frequency | F_S | $V_{DD} = 3.3\text{V}$ | | 450 | | KHz |
| Maximum Duty | D_{MAX} | $V_{DD} = 3.3\text{V}$ | | 95 | | % |
| LX ON Resistance | | $V_{DD} = 3.3\text{V}$ | | 0.3 | | Ω |
| Current Limit Setting | I_{LIMIT} | $V_{DD} = 3.3\text{V}$ | | 2 | | A |
| EXT ON Resistance to V_{DD} | | $V_{DD} = 3.3\text{V}$ | | 5 | | Ω |
| EXT ON Resistance to GND | | $V_{DD} = 3.3\text{V}$ | | 5 | | Ω |
| Line Regulation | ΔV_{LINE} | $V_{IN} = 1.5 \sim 2.5\text{V}$, $I_L = 1\text{mA}$ | | 10 | | mV/V |
| Load Regulation | ΔV_{LOAD} | $V_{IN} = 2.5\text{V}$, $I_L = 1 \sim 100\text{mA}$ | | 0.25 | | mV/mA |
| CE Pin Trip Level | | $V_{DD} = 3.3\text{V}$ | 0.4 | 0.8 | 1.2 | V |
| Temperature Stability for Vout | T_s | | | 50 | | ppm/°C |
| Thermal Shutdown | T_{SD} | | | 165 | | °C |
| Thermal Shutdown Hysterises | ΔT_{SD} | | | 10 | | °C |

Note: The CE pin shall be tied to V_{DD} pin and inhibit to act the ON/OFF state whenever the V_{DD} pin voltage may reach to 5.5V or above.

■ TEST CIRCUIT



■ TYPICAL APPLICATION CIRCUIT



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