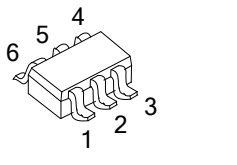
# NANOPOWER, 1.8V, COMPARATOR WITH VOLTAGE REFERENCE




SOT-26

## ■ DESCRIPTION

The UTC **LMV3012** is a push-pull output comparator and can provide an independent on-chip voltage reference. The UTC **LMV3012** has 5μA (max) quiescent current, input common-mode range 200mV beyond the supply rails. Single-supply operation can range from 1.8V to 5.5V. The integrated 1.242V series voltage reference with low 100ppm/°C (max) drift, is stable with up to 10nF capacitive load, and the output current can be up to 0.5mA (Typ).

The UTC **LMV3012** is also available in the tiny SC59-6 package for space-conservative designs. The device is specified for the temperature range of -40°C~+125°C.

## ■ FEATURES

* Low quiescent current: 5μA (max)
* Stable on-chip voltage reference: 1.242V
* Voltage reference initial accuracy: ±1%
* Reference output current: 0.5mA (Typ)
* Input common-mode range: 200mV beyond rails
* Push-pull output
* The lower supply voltage: 1.8V ~ 5.5V
* Fast response time:6μs propagation delay with 100mV overdrive

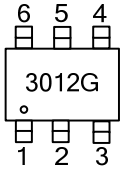
## ■ ORDERING INFORMATION

| Ordering Number | Package | Packing |
|---|---|---|
| LMV3012G-AG6-R | SOT-26 | Tape Reel |

Note: Pin Assignment: G: Gate D: Drain S: Source

| | |
|---|---|
| LMV3012G-AG6-R<br>(1)Packing Type | (1) R: Tape Reel |
| (2)Package Type | (2) AG6: SOT-26 |
| (3)Green Package | (3) G: Halogen Free and Lead Free |

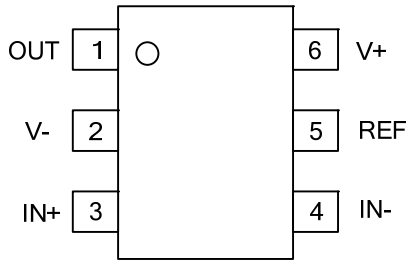
## ■ MARKING





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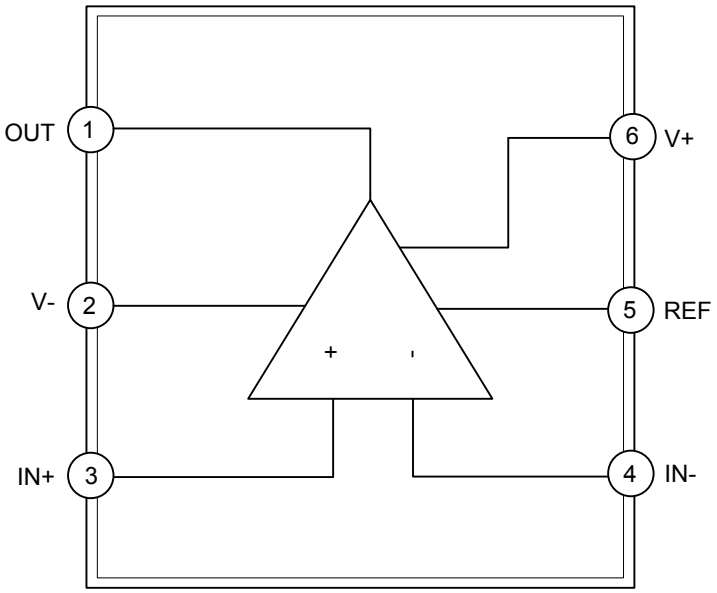
## ■ PIN CONFIGURATION




## ■ PIN DESCRIPTION

| PIN NO. | PIN NAME | DESCRIPTION |
|---|---|---|
| 1 | OUT | Comparator output. |
| 2 | V- | Negative supply. |
| 3 | IN+ | Noninverting comparator input. |
| 4 | IN- | Inverting comparator input. |
| 5 | REF | Voltage reference output. |
| 6 | V+ | Positive supply. |

## ■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | +7 | V |
| Signal Input Terminals, Voltage (Note 1) | | –0.5~(V+)+0.5 | V |
| Signal Input Terminals, Current (Note 1) | | ±10 | mA |
| Output Short-Circuit (Note 2) | | Continuous | |
| Junction Temperature | $T_J$ | +150 | °C |
| Operating Temperature | $T_{OPR}$ | -40~+125 | °C |
| Storage Temperature | $T_{STG}$ | -55~+150 | °C |
| Lead Temperature (Soldering, 10s) | $T_L$ | +300 | °C |

Notes: 1. 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.
2. Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.5V beyond the supply rails should be current limited to 10mA or less.
3. Short-circuit to ground

## ■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Junction to Ambient | $\theta_{JA}$ | 230 | °C/W |

## ■ ELECTRICAL CHARACTERISTICS ($V_S$=+1.8V~+5.5V)

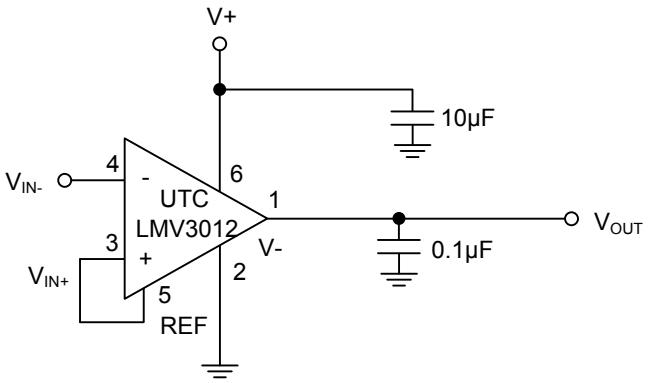
Boldface limits apply over the specified temperature range, $T_A$=-40°C~+125°C. At $T_A$=+25°C, $V_{OUT}$=$V_S$, unless otherwise noted

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **OFFSET VOLTAGE** | | | | | | |
| Input Offset Voltage | $V_{OS}$ | $V_{CM}$=0V, $I_O$=0A | | 0.5 | 12 | mV |
| $V_S$ Temperature | $dV_{OS}/dT$ | $T_A$=-40°C~ +125°C | | ±12 | | μV/°C |
| $V_S$ Power Supply | PSRR | $V_S$=1.8V~5.5V | | 100 | 1000 | μV/V |
| **INPUT BIAS CURRENT** | | | | | | |
| Input Bias Current | $I_B$ | $V_{CM}$=$V_S$/2 | | ±1 | ±10 | pA |
| Input Offset Current | $I_{OS}$ | $V_{CM}$=$V_S$/2 | | ±1 | ±10 | pA |
| **NPUT VOLTAGE RANGE** | | | | | | |
| Common-Mode Voltage Range | $V_{CM}$ | | (V-) -0.2V | | (V+)+0.2V | V |
| Common-Mode Rejection Ratio | CMRR | $V_{CM}$=-0.2V~ (V+)-1.5V | 60 | 74 | | dB |
| | | $V_{CM}$=-0.2V~ (V+)+0.2V | 54 | 62 | | dB |
| **INPUT IMPEDANCE** | | | | | | |
| Common-Mode | | | | $10^{13}$‖2 | | Ω‖pF |
| Differential | | | | $10^{13}$‖4 | | Ω‖pF |
| **SWITCHING CHARACTERISTICS (f=10kHz, $V_{STEP}$=1V)** | | | | | | |
| Propagation Delay Time, Low-to-High | $t_{(PLH)}$ | Input Overdrive=10mV | | 12 | | μs |
| | | Input Overdrive=100mV | | 6 | | μs |
| Propagation Delay Time, High-to-Low | $t_{(PHL)}$ | Input Overdrive=10mV | | 13.5 | | μs |
| | | Input Overdrive=100mV | | 6.5 | | μs |
| Rise Time | $t_R$ | $C_L$=10pF | | 100 | | ns |
| Fall Time | $t_F$ | $C_L$=10pF | | 100 | | ns |
| **OUTPUT ($V_S$=5V)** | | | | | | |
| Voltage Output Low from Rail | $V_{OL}$ | $I_{OUT}$=-5mA | | 150 | 200 | mV |
| Voltage Output High From Rail | $V_{OH}$ | $I_{OUT}$=5mA, $V_S$-$V_{OUT}$ | | 90 | 200 | mV |
| Short-Circuit Current | | $V_{CC}$=5V | | 110 | | mA |

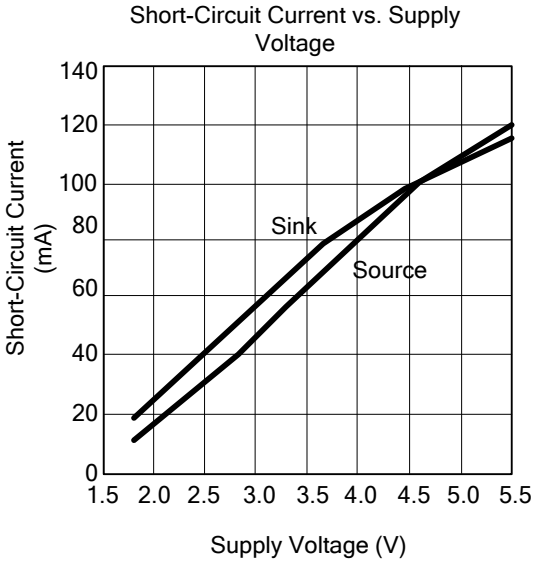
## ■ ELECTRICAL CHARACTERISTICS(Cont.)

| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| **VOLTAGE REFERENCE** | | | | | | | |
| Voltage Reference | | $V_{OUT}$ | $V_{IN}$=5V | 1.230 | 1.242 | 1.254 | V |
| Initial Accuracy | | | | | | ±1 | % |
| Temperature Drift | | $dV_{OUT}/dT$ | -40°C≤$T_A$≤125°C | | 40 | 100 | ppm/°C |
| Load Regulation | Sourcing | $dV_{OUT}/dI_{LOAD}$ | 0mA< $I_{SOURCE}$ ≤0.5mA | | 0.36 | 1 | mV/mA |
| | Sinking | | 0mA< $I_{SINK}$ ≤ 0.5mA | | 6.6 | | mV/mA |
| Output Current | | $I_{LOAD}$ | | | 0.5 | | mA |
| Line Regulation | | $dV_{OUT}/dV_{IN}$ | 1.8V≤$V_{IN}$≤5.5V | | 10 | 100 | μV/V |
| **NOISE** | | | | | | | |
| Reference Voltage Noise | | | f=0.1Hz~10Hz | | 0.2 | | $mV_{PP}$ |
| **POWER SUPPLY** | | | | | | | |
| Specified Voltage | | $V_S$ | | 1.8 | | 5.5 | V |
| Operating Voltage Range | | | | 1.8 | | 5.5 | V |
| Quiescent Current | | $I_Q$ | $V_S$=5V, $V_O$=High | | 2.8 | 5 | μA |

## ■ TYPICAL APPLICATION CIRCUIT



## ■ TYPICAL CHARACTERISTICS




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