



LMV3012

Preliminary

LINEAR INTEGRATED CIRCUIT

NANOPOWER, 1.8V, COMPARATOR WITH VOLTAGE REFERENCE

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

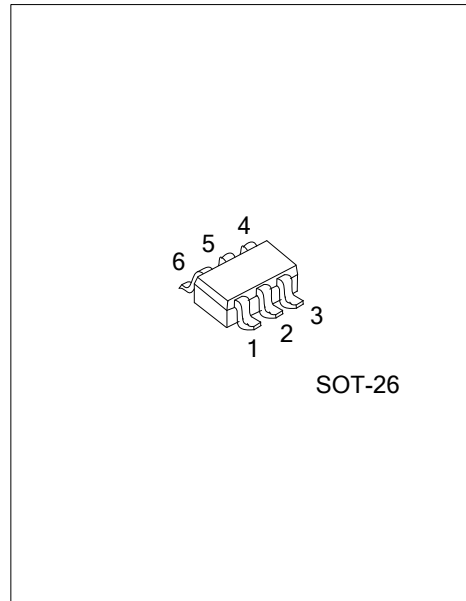
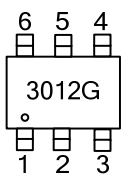
ORDERING INFORMATION

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

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

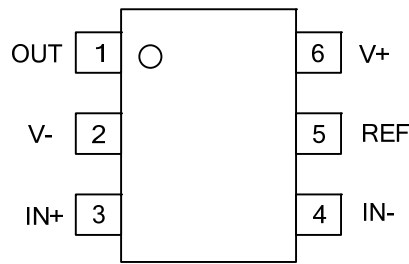
<p>LMV3012G-AG6-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AG6: SOT-26</p> <p>(3) G: Halogen Free and Lead Free</p>
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MARKING



SOT-26

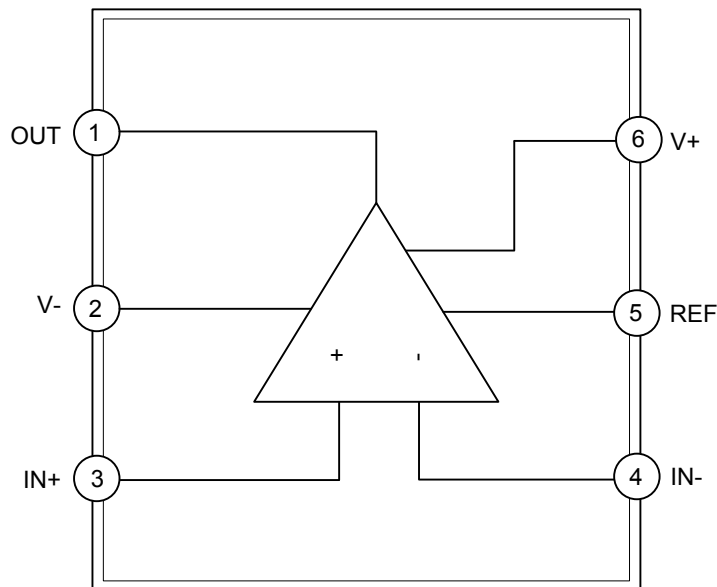
■ PIN CONFIGURATION



■ 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	θ_{JA}	230	°C/W

■ ELECTRICAL CHARACTERISTICS ($V_S=+1.8V\sim+5.5V$)

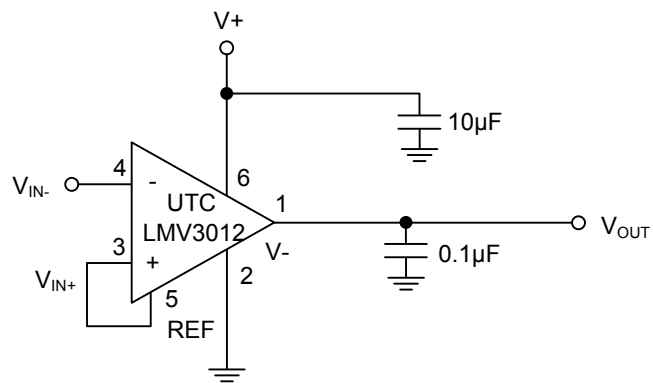
Boldface limits apply over the specified temperature range, $T_A=-40^{\circ}C\sim+125^{\circ}C$. At $T_A=+25^{\circ}C$, $V_{OUT}=V_S$, unless otherwise noted

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	$T_A=-40^{\circ}C\sim+125^{\circ}C$		±12		$\mu V/^{\circ}C$
V_S Power Supply	PSRR	$V_S=1.8V\sim5.5V$		100	1000	$\mu V/V$
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
INPUT VOLTAGE RANGE						
Common-Mode Voltage Range	V_{CM}		(V-) -0.2V		(V+)+0.2V	V
Common-Mode Rejection Ratio	CMRR	$V_{CM}=-0.2V\sim(V+)-1.5V$	60	74		dB
		$V_{CM}=-0.2V\sim(V+)+0.2V$	54	62		dB
INPUT IMPEDANCE						
Common-Mode				$10^{13}\parallel 2$		$\Omega\parallel pF$
Differential				$10^{13}\parallel 4$		$\Omega\parallel pF$
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

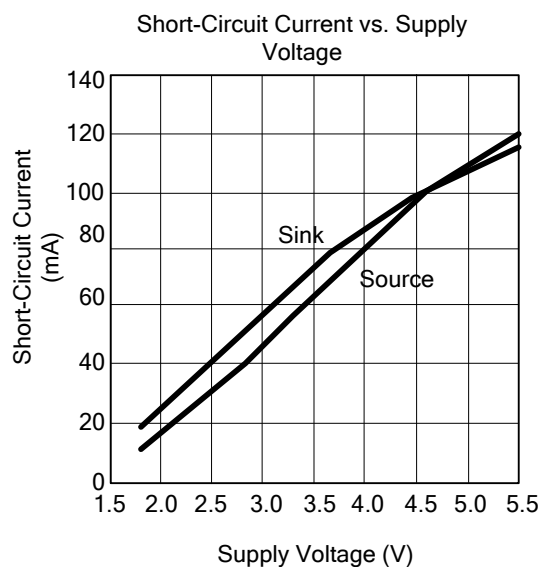
■ ELECTRICAL CHARACTERISTICS(Cont.)

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	$-40^{\circ}C \leq T_A \leq 125^{\circ}C$		40	100	ppm/ $^{\circ}C$
Load Regulation	Sourcing	$0mA < I_{SOURCE} \leq 0.5mA$		0.36	1	mV/mA
	Sinking	$0mA < I_{SINK} \leq 0.5mA$		6.6		mV/mA
Output Current	I_{LOAD}			0.5		mA
Line Regulation	dV_{OUT}/dV_{IN}	$1.8V \leq V_{IN} \leq 5.5V$		10	100	$\mu V/V$
NOISE						
Reference Voltage Noise		$f=0.1Hz \sim 10Hz$		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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