

Precision Reference with Low Offset Error Amplifier PRELIMINARY

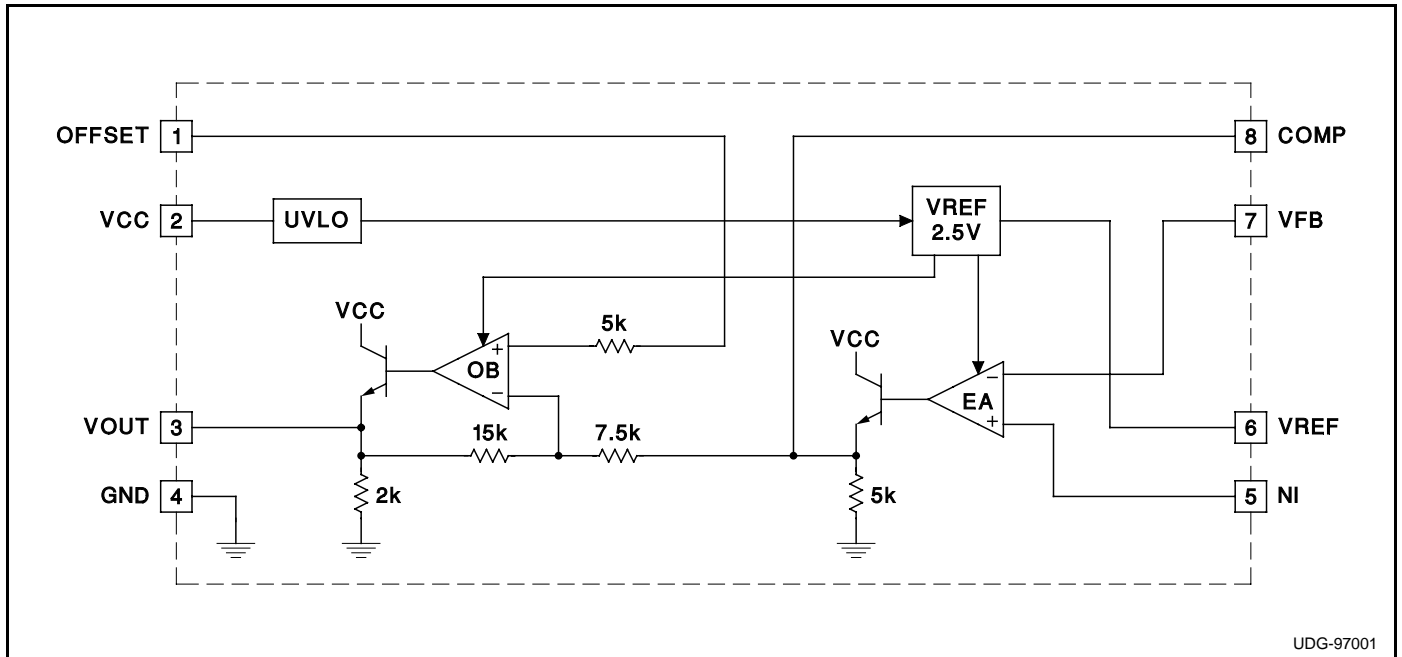
FEATURES

- Accessible 2.5V Precision Reference
- 0.4% Initial Reference Accuracy
- Low 1mV Offset Error Amplifier
- 2X Inverting Amplifier / Buffer Output
- 4.1V Undervoltage Lockout
- ICC 2mA at 5V
- 8-Pin SOIC or DIL Package

DESCRIPTION

The UC3965 includes an accessible 2.5V precision reference, a low offset error amplifier, a 2X inverting amplifier/buffer and an undervoltage lockout circuit. The IC is ideally suited for applications where high precision PWM power supply regulation is required. Typically, the error amplifier is connected to compare a fraction of the "to be regulated" power supply voltage to the on-chip 2.5V reference. The 2X amplifier/buffer output is then used to drive a PWM controller or regulator. The UC3965 is also capable of driving an optocoupler diode for isolated applications.

BLOCK DIAGRAM

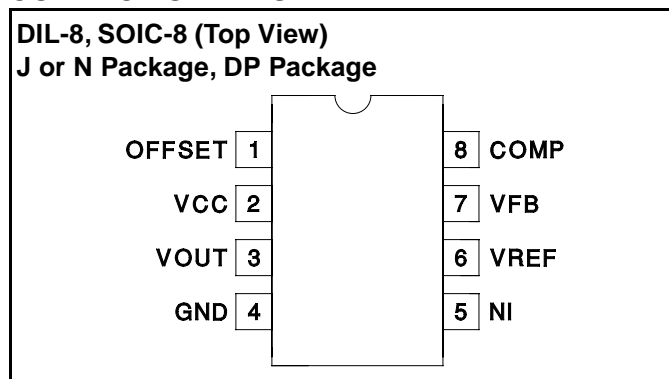


ABSOLUTE MAXIMUM RATINGS

VCC	-0.3V to 20V
VREF	-0.3V to 6V
VFB, COMP, NI, VOUT	-0.3V TO 6V
Storage Temperature	-65°C to +150°C
Junction Temperature	-55°C to +150°C
Lead Temperature (Soldering, 10 sec.)	+300°C

Currents are positive into, negative out of the specified terminal. All voltages are with respect to ground. Consult Packaging Section of Databook for thermal limitations and considerations of packages.

CONNECTION DIAGRAM



ELECTRICAL CHARACTERISTICS Unless otherwise specified, $T_A = 0^\circ\text{C}$ to 70°C for the UC3965, -40°C to 85°C for the UC2965 and -55°C to 125°C for the UC1965; $V_{CC} = 5\text{V}$, $T_A = T_J$.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
General					
VCC		4.3	5	20	V
Operating Current	$V_{CC} = 5\text{V}$	1.5	2	4	mA
Undervoltage Current				200	μA
Minimum Voltage to Start		3.9	4.1	4.3	V
Hysteresis		200	300	400	mV
VREF					
VREF Initial Accuracy	25°C	2.49	2.5	2.51	V
VREF Over Temperature	-55°C to 125°C	2.48	2.5	2.52	V
Total Output Variation	Line, Load, Temperature	2.475	2.5	2.525	V
Line Regulation	$V_{CC} = 4.3\text{V}$ to 20V		2	10	mV
Load Regulation	$0\mu\text{A}$ to $500\mu\text{A}$		2	10	mV
Short Circuit Current	$V_{REF} = 0\text{V}$		2		mA
Error Amplifier					
Input Bias	$V_{CM} = 2.5\text{V}$		200	400	nA
Input Offset Voltage	$V_{CM} = 2.5\text{V}$		1	2	mV
Input Offset Current	$V_{CM} = 2.5\text{V}$	-100	0	100	nA
Gain Bandwidth Product	$V_{IN} = 50\text{mV}$ P-P (Note 1)		6		MHz
Open Loop Gain	$V_{OUT} = 1\text{V}$ to 3.75V	80	100		dB
Output Low Level	$I_{OUT} = 0\mu\text{A}$		0.8		V
	$I_{OUT} = 100\mu\text{A}$		1.2		V
Output High Level	$I_{OUT} = 0\mu\text{A}$		4		V
	$I_{OUT} = -500\mu\text{A}$		4		V
Short Circuit Current	$V_{COMP} = 0\text{V}$		8		mA
CMRR	$V_{CM} = 1.25\text{V}$ to 3.75V	70	100		dB
PSRR	$V_{CC} = 4.3\text{V}$ to 20V	70	100		dB
Rising Slew Rate			2		$\text{V}/\mu\text{s}$
Falling Slew Rate			0.4		$\text{V}/\mu\text{s}$
Inverting Buffer Amplifier					
Input Bias	$V_{CM} = 2.5\text{V}$		1	2	μA
Output Offset Voltage	$V_{CM} = 2.5\text{V}$	-20	0	20	mV
Gain Bandwidth Product	$V_{IN} = 50\text{mV}$ P-P (Note 1)		1.5		MHz
Closed Loop Gain	Inverting Gain	-2.04	-2	-1.96	V/V

ELECTRICAL CHARACTERISTICS (cont.) Unless otherwise specified, $T_A = 0^\circ\text{C}$ to 70°C for the UC3965, -40°C to 85°C for the UC2965 and -55°C to 125°C for the UC1965; $V_{CC} = 5\text{V}$; $T_A = T_J$.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Inverting Buffer Amplifier (cont.)					
Output Low Level	$I_{OUT} = 0\mu\text{A}$		0.3		V
	$I_{OUT} = 100\mu\text{A}$		0.5		V
Output High Level	$I_{OUT} = 0\text{mA}$		4		V
	$I_{OUT} = -4\text{mA}$		4		V
Short Circuit Current	$V_{OUT} = 0\text{V}$		18		mA
CMRR	$V_{CM} = 1.25\text{V}$ to 3.75V	70	100		dB
PSRR	$V_{CC} = 4.3\text{V}$ to 20V	70	100		dB
Rising Slew Rate			0.9		$\text{V}/\mu\text{s}$
Falling Slew Rate			0.9		$\text{V}/\mu\text{s}$

Note 1: Guaranteed by design. Not 100% tested in production.

PIN DESCRIPTIONS

COMP: Error amplifier output.

GND: Ground.

NI: Error amplifier non-inverting input.

OFFSET: Inverting buffer non-inverting input.

VCC: VCC supply and UVLO input.

VFB: Error amplifier inverting input.

VOUT: Inverting buffer output.

VREF: VREF output.