



## UM601/A

Preliminary

LINEAR INTEGRATED CIRCUIT

### VOLTAGE AND CURRENT CONTROLLER

#### DESCRIPTION

The UTC **UM601/A** integrated circuit incorporates a high stability series band gap voltage reference, two ORed operational amplifiers and a current source.

This IC compares the DC voltage and the current level at the output of a switching power supply to an internal reference. It provides a feedback through an optocoupler to the PWM controller IC in the primary side.

The controlled current generator can be used to modify the level of current limitation by offsetting the information coming from the current sensing resistor.

It can be used in voltage supervisors, every types of application requiring a precision voltage regulation and current limitation, over voltage protection, battery charger with a constant voltage and a limited output current.

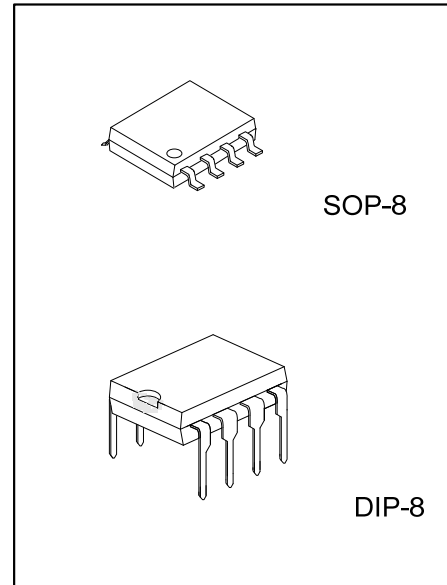
#### FEATURES

- \* 1.24V Series Voltage Reference with 10mA Output Current and 1% Precision (UM601A)
- \* Two Operational Amplifiers with ORed Output and 1MHz Gain Bandwidth Product
- \* Built-In Current Generator with Enable / Disable Function
- \* 4.5 ~ 32V Supply Voltage Range

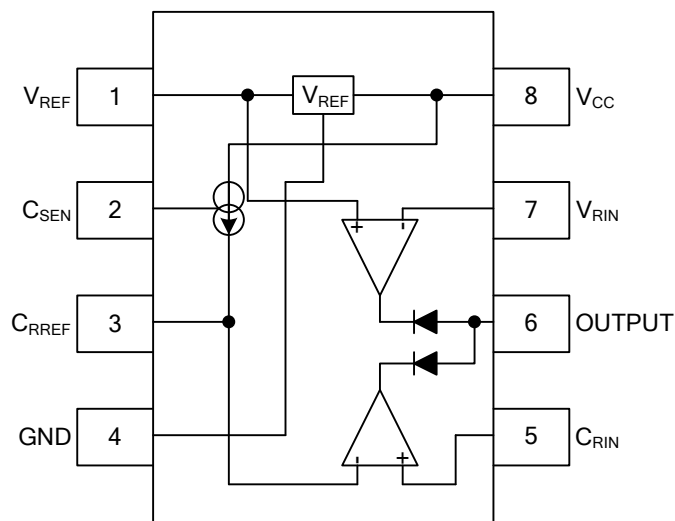
#### ORDERING INFORMATION

Ordering Number			Package	Packing
Normal	Lead Free	Halogen Free		
UM601-S08-R	UM601L-S08-R	UM601G-S08-R	SOP-8	Tape Reel
UM601-D08-T	UM601L-D08-T	UM601G-D08-T	DIP-8	Tube
UM601A-S08-R	UM601AL-S08-R	UM601AG-S08-R	SOP-8	Tape Reel
UM601A-D08-T	UM601AL-D08-T	UM601AG-D08-T	DIP-8	Tube

<p>UM601XG-S08-R</p>	<p>(1) R: Tape Reel, T: Tube  (2) S08: SOP-8, D08: DIP-8  (3) Blank: Pb/Sn, L: Lead Free, G: Halogen Free  (4) Refer to Electrical Characteristics</p>
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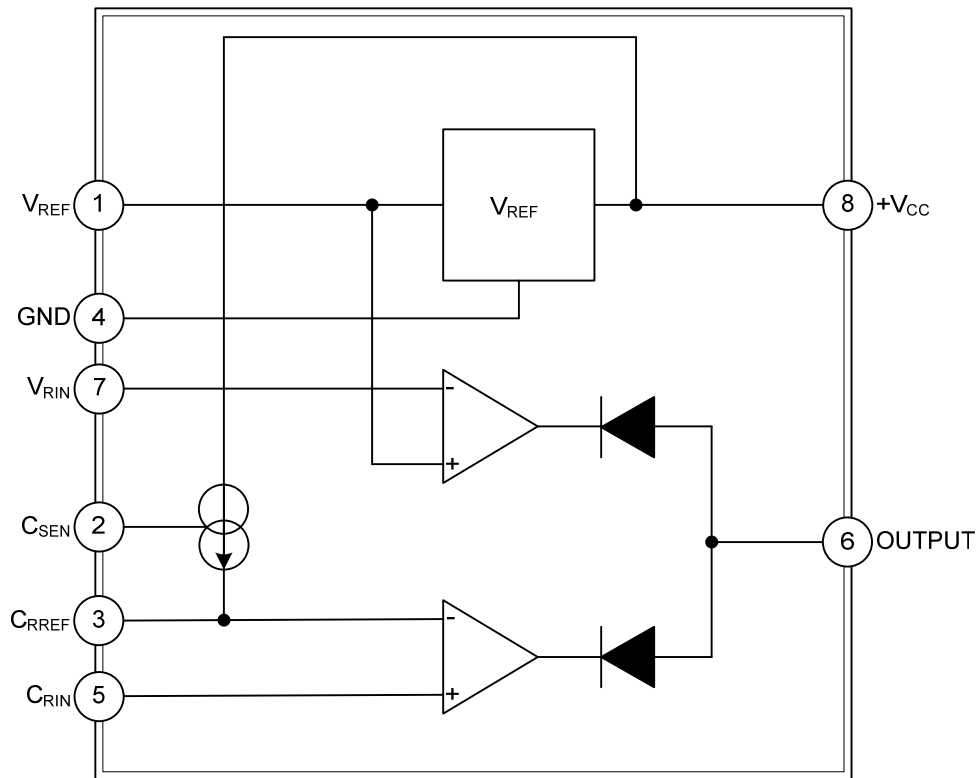
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN	NAME	TYPE	FUNCTION
1.	V <sub>REF</sub>	OUTPUT	Voltage Reference Output 1.24V, 10mA max. Do not short circuit
2.	C <sub>SEN</sub>	INPUT	Current source enable input. This current source can be used to offset the voltage measurement on the sense resistor and therefore to modify the charge current. The current source is enabled when the input voltage on pin 2 is lower than 0.8V
3.	C <sub>RREF</sub>	INPUT	Current Limitation Reference Input
4.	GND	INPUT	Ground
5.	C <sub>RIN</sub>	INPUT	Current Limitation Loop Input, connected to the sense resistor
6.	OUTPUT	OUTPUT	Output pin common to the voltage regulation and current limitation loops. This output can drive the primary side (LED) of an optocoupler
7.	V <sub>RIN</sub>	INPUT	Voltage Regulation Loop Input
8.	V <sub>CC</sub>	INPUT	Power Supply Input (4.5 ~ 32VDC)

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
DC Supply Voltage	$V_{CC}$	36	V
Output Current	$I_{OUT}$	20	mA
Power Dissipation	$P_D$	200	mW
Input Voltage	$V_{IN}$	-0.3 ~ $V_{CC}-1.5$	V
Input Current	$I_{IN}$	±1	mA
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-40 ~ +125	°C

Note: 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.

### ■ OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	4.5 ~ 32	V
Ambient Operating Temperature	$T_{OPR}$	$T_{MIN}$ ~ $T_{MAX}$	°C

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	130 ~ 200	°C/W

### ■ ELECTRICAL CHARACTERISTICS ( $V_{CC}=15V$ , $T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Total Supply Current	$I_{CC}$	$V_{CC}=15V$			2	mA	
Input Voltage	$V_I$		0		$V_{CC}-1.5$	V	
Input Offset Voltage	$V_{IO}$	$T_A=25^\circ C$	-5	1	5	mV	
		$T_{MIN}<T_{AMB}<T_{MAX}$	-7		7	mV	
Input Bias Current	$I_{IB}$	$V_{IN}=1.2V$ on pin 7 and $V_{IN}=0V$ on pin5	$25^\circ C$	-700	-300	0	nA
		$T_{MIN}<T_{AMB}<T_{MAX}$		-1000		0	nA
Output Sink Current	$I_{SINK}$	$V_{OL}=2.5V$	$25^\circ C$		15		mA
			$T_{MIN}<T_{AMB}<T_{MAX}$		8		mA
Large Signal Voltage Gain	$A_{VO}$	$R_L=2k\Omega$ , $T_{MIN}<T_{AMB}<T_{MAX}$	15			V/mV	
Supply Voltage Rejection Ratio	SVR	$T_{MIN}<T_{AMB}<T_{MAX}$	65	90		dB	
Common Mode Rejection Ratio	CMR	$T_{MIN}<T_{AMB}<T_{MAX}$		80		dB	
Gain Bandwidth Product	GBP	$V_{CC}=15V$ , $F=100kHz$ , $V_{IN}=10mV$ , $R_L=2k\Omega$ , $C_L=100pF$		1		MHz	
Output Leakage Current	$I_{OH}$	$T_A=25^\circ C$			2	$\mu A$	
		$T_{MIN}<T_{AMB}<T_{MAX}$			7	$\mu A$	

### VOLTAGE REFERENCE

PARAMETER	SYMBOL	TEST CONDITIONS	UM601	UM601A	UNIT
Reference Voltage	$V_{REF}$	$I_{OUT}=1mA$ , $T_{AMB}=25^\circ C$	1.21	1.227	V
Temperature Stability	$K_{VT}$	$T_{MIN}<T_{AMB}<T_{MAX}$	1.24	1.240	ppm/°C
Load Regulation	Reglo	$1mA < I_{OUT} < 10mA$		5	mV
Line Regulation	Regli	$5V < V_{IN} < 32V$		3.5	mV

### CURRENT GENERATOR

PARAMETER	SYMBOL	TEST CONDITIONS	UM601	UM601A	UNIT
Current Source	$I_O$			1.4	mA
Temperature Stability	$K_{CGT}$	$T_{MIN}<T_{AMB}<T_{MAX}$		500	ppm/°C
Line Regulation	$C_{gliR}$	$4.5V < V_{CC} < 32V$		0.003	mV
Voltage at the enable pin to have $I_O=1.4mA$	$V_{CSEN}$	$T_{MIN}<T_{AMB}<T_{MAX}$			0.6 V
Voltage at the enable pin to have $I_O=0mA$	$V_{CSDIS}$	$T_{MIN}<T_{AMB}<T_{MAX}$	2		V
Input Current on the Csen pin	$I_{CSEN}$	$T_{MIN}<T_{AMB}<T_{MAX}$			30 $\mu A$
Leakage Current	$I_{CSLEAK}$	$V_{CS}=2V$ , $T_{MIN}<T_{AMB}<T_{MAX}$		0.5	2 $\mu A$

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