UTC UM603　　LINEAR INTEGRATED CIRCUIT

## DUAL OPERATIONAL AMPLIFIER AND CURRENT CONTROLLER

DESCRIPTION

The UM603 is a monolithic IC that includes one independent op-amp and another op-amp for witch the non inverting input is wired to a 2.5V fixed voltage reference . This device is offering space and cost saving in many applications like power supply management or data acquisition systems
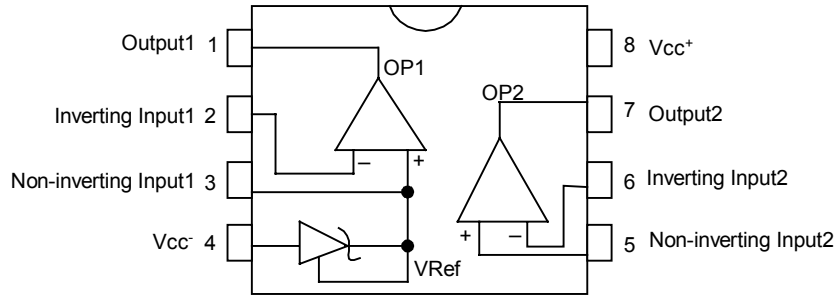
FEATURES

OPERATIONAL AMPLIFIER
*Low input offset voltage: 0.5mV typ.
*Low supply current: 350uA/op.(@ Vcc= 5 V)
*Medium bandwidth(unity gain): 0.9MHz
*Large output voltage swing: 0 V to (Vcc-1.5 V)
*Input common mode voltage range includes ground
*Wide power supply range: 3V to 32V
　± 1.5 TO ± 16V
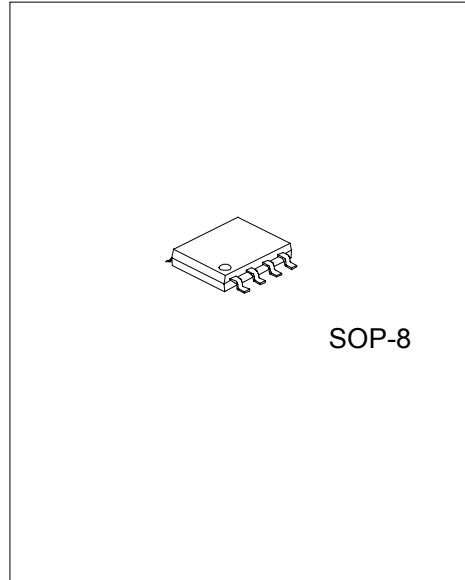
VOLTAGE REFERENCE
*Fixed output voltage reference 2.5V
*Sink current capability : 1 to 100mA
*Typical output impedance : 0.2 Ω

SOP-8

PIN CONFIGURATION

Output1　1 ... OP1 ... 8　Vcc$^+$
Inverting Input1　2 ... 7　Output2
Non-inverting Input1　3 ... OP2 ... 6　Inverting Input2
Vcc$^-$　4 ... VRef ... 5　Non-inverting Input2

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	Vcc	36	V
Differential Input Voltage	Vid	36	V
Input Voltage	Vin	-0.3 to +36	V
Operating Free-air Temperature Range	Vi	-55 to +125	°C
Maximum Junction Temperature	Tj	150	°C
Thermal Resistance Junction to Ambient(SO package)	Rthja	175	°C/W

UTC　UNISONIC TECHNOLOGIES CO., LTD.　1

UTC UM603   LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
Total Supply Current,excluding Current in the Voltage Reference	Icc	VCC^+=5V,no load, Tmin.<Tamb<Tmax.	0.7		1.2	mA
		VCC^+=30V,no load, Tmin,<Tamb<Tmax			2	

OPERATOR2(independent op-amp)
Vcc^+=+5V,Vcc=Ground,Vo=1.4V,Tamb=25°C(unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
Input Offset Voltage	Vio	V_{icm}=0V Tamb=25°C Tmin.≤Tamb≤Tmax.		1	4 5	mV
Input Offset Voltage Drift	DVio			7		μV/°C
Input Offset Current	Iio	Tmin.≤Tamb≤Tmax.		2	75 150	nA
Input Bias Current	Iib	Tmin.≤Tamb≤Tmax.		20	150 200	nA
Large Signal Voltage Gain	Avd	Vcc=15V,RL=2k,Vo=1.4V~11.4V Tmin,≤Tamb≤Tmax.	50 25	100		V/mV
Supply Voltage Rejection Ratio	SVR	Vicm=0V, Vcc=5V ~30V	65	100		dB
Input Common Mode Voltage Range	Vicm	Vcc=+30V-see note1)	0		(Vcc+)-1.5	V
		Tmin.≤Tamb≤Tmax.	0		(Vcc+)-2	
Common Mode Rejction Ratio	CMR	Tmin.≤Tamb≤Tmax.	70 60	85		dB
Output Current Source	Isource	Vcc=+15V,Vo=2V,Vjd=+1V	20	40		mA
Short Circuit to Ground	Io	Vcc=+15V		40	60	mA
Output Current Sink	Isink	Vid=-1V, Vcc=+15V,Vo=2V Vcc=+15V,Vo=0.2V	10 12	20 50		V
High Level Output Voltage	VOH	Vcc^+=30V Tamb=25℃,RL=10k Tmin.≤Tamb≤Tmax. Tamb=25℃,RL=10k Tmin.≤Tamb≤Tmax.	26 26 27 27	27 28		V
Low Level Output Voltage	VOL	RL=10k Tmin.≤Tamb≤Tmax.		5	20 20	mV
Slew Rate at Unity Gain	SR	Vi=0.5 ~ 3V,Vcc=15V RL=2k,CL=100pF,unity gain	0.2	0.4		V/μs
Gain Bandwidth Product	GBP	Vcc=30V,RL=2K,CL=100pF F=100kHz,Vin=10mV	0.5	0.9		MHz
Total Harmonic Distortion	THD	f=1kHz Av=20dB,RL=2k,Vcc=30V CL=100pF,Vo=2Vpp		0.02		%
Equivalent Input Noise Voltage	en	f=1kHz,Rs=100Ω,Vcc=30V		50		nV/√Hz

1.The input common-mode votage of either input signal voltage should not be allowed to go negative by more than 0.3V. The upper end of the common-mode voltage range is Vcc^+ -1.5V. Both can go to Vcc+ 0.3V without damage.

OPERATOR1(op-amp with ono-inverting input connected to the internal Vref)

UTC UM603 LINEAR INTEGRATED CIRCUIT

Vcc$^+$=+5V,Vcc=Ground,Tamb=1.4V,Tamb=25°C(unless otherwise specified)

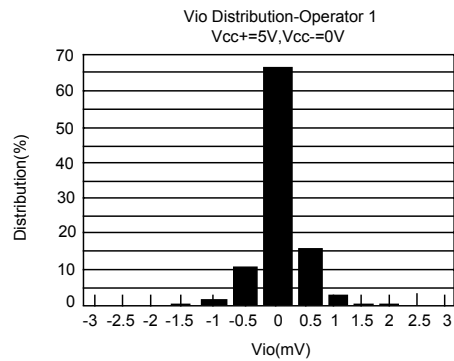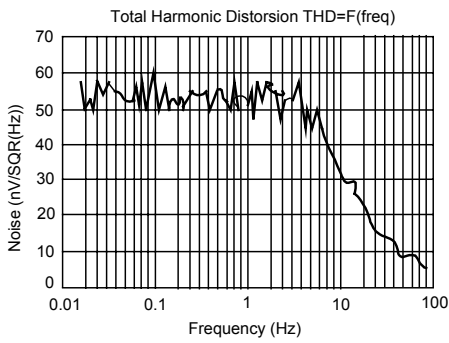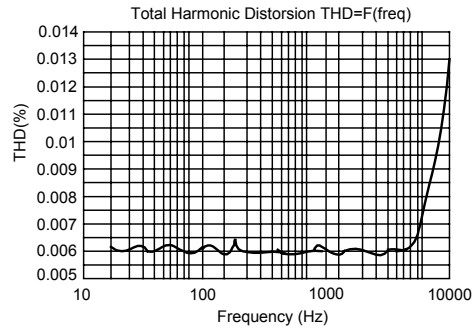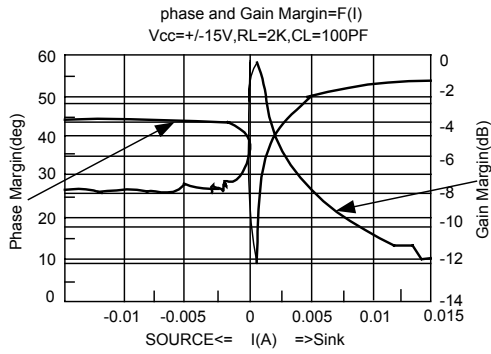| PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
Input Offset Voltage	Vio	V$_{icm}$=0V Tamb=25°C Tmin.≤Tamb≤Tmax.		1	4 5	mV
Input Offset Voltage Drift	DVio			7		μV/°C
Input Bias Current	Iib	negative input		20		nA
Large Signal Voltage Gain	Avd	Vicm=0V Vcc=15V,RL=2k		100		V/mV
Supply Voltage Rejection Ratio	SVR	Vicm=0V, Vcc=5V ~30V	65	100		dB
Output Current Source	Isource	Vcc=+15V,Vo=2V,Vjd=+1V	20	40		mA
Short Circuit to Ground	Io	Vcc=+15V		40	60	mA
Output Current Sink	Isink	Vid=-1V, Vcc=+15V,Vo=2V Vcc=+15V,Vo=0.2V	10 12	20 50		V
High Level Output Voltage	VOH	Vcc$^+$=30V Tamb=25℃,RL=10k Tmin.≤Tamb≤Tmax. Tamb=25℃,RL=10k Tmin.≤Tamb≤Tmax.	26 26 27 27	27 28		V
Low Level Output Voltage	VOL	RL=10k Tmin.≤Tamb≤Tmax.		5	20 20	mV
Slew Rate at Unity Gain	SR	Vi=0.5 ~ 3V,Vcc=15V RL=2k,CL=100pF,unity gain	0.2	0.4		V/μs
Gain Bandwidth Product	GBP	Vcc=30V,RL=2K,CL=100pF F=100kHz,Vin=10mV	0.5	0.9		MHz
Total Harmonic Distortion	THD	f=1kHz Av=20dB,RL=2k,Vcc=30V CL=100pF,Vo=2Vpp		0.02		%

VOLTAGE REFERENCE:
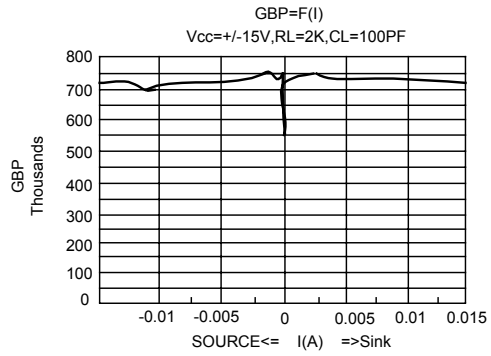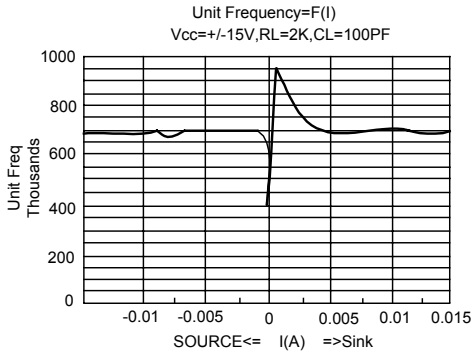
PARAMETER	SYMBOL	Value	UNIT
Cathode Current	Ik	1 ~ 100	mA

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
Input Offset Voltage	Vref	±0.7%, Tamb=25°C Tmin.≤Tamb≤Tmax.	2.482 2.465	2.5	2.518 2.535	V
Reference Input Voltage Deviation Over Temperature Range	△Vref	V$_{KA}$=Vref;Ik=10mA Tmin.≤Tamb≤Tmax.		7	30	mV
Minimum Cathode Current for Regualtion	Imin	V$_{KA}$=Vref		0.5	1	mA
Dynamic Impedance-note[1]	∣Z$_{KA}$∣	VKA=Vref, △Ik=1~100mA,f<1kHz		0.2	0.5	Ω

1.The dynamic impedance is defined as「ZKA」=△kA/△Ik

UTC   UNISONIC TECHNOLOGIES CO., LTD.   3

UTC UM603   LINEAR INTEGRATED CIRCUIT

OPERATIONAL AMPLIFIERS

Unit Frequency=F(I)
Vcc=+/-15V,RL=2K,CL=100PF

GBP=F(I)
Vcc=+/-15V,RL=2K,CL=100PF

phase and Gain Margin=F(I)
Vcc=+/-15V,RL=2K,CL=100PF

Total Harmonic Distorsion THD=F(freq)

Total Harmonic Distorsion THD=F(freq)

Vio Distribution-Operator 1
Vcc+=5V,Vcc-=0V

UTC   UNISONIC TECHNOLOGIES CO., LTD.   4

Vio Distribution-Operator 2
Vcc+=5V,Vcc-=0V

Vref =F(IK)

Vref Stability=f(I,C)