



UTA31101

Preliminary

LINEAR INTEGRATED CIRCUIT

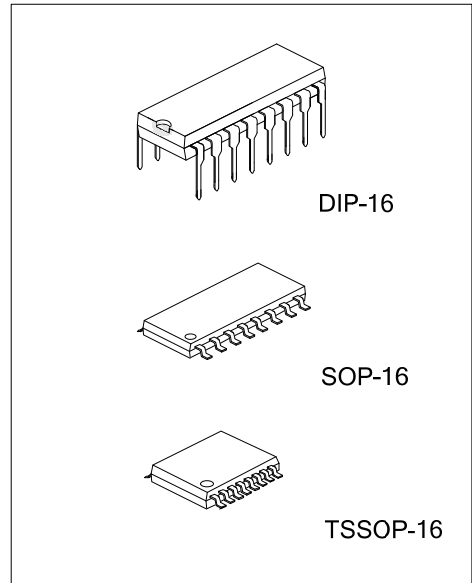
**COMPANDER IC FOR
CORDLESS TELEPHONE**

■ **DESCRIPTION**

The UTC **UTA31101** is a precision dual gain control circuit designed for low voltage applications. The UTC **UTA31101** channel 1 is an expander, while channel 2 can be configured either for expander or compressor.

■ **FEATURES**

- * Wide operating supply voltage range: $V_{CC}=1.8\sim 9V$
 - * For noise reduction, compressor and expander are incorporated into a package.
 - * Low operating supply voltage and small consumption current make this IC suitable for its application to the sets using the battery such as the codeless telephone set. etc.
- $V_{CC(MIN)}=1.8V$ ($T_A=25^\circ C$)
 $I_{CCQ}=2.7mA$ (Typ.) ($V_{CC}=3V$, $T_A=25^\circ C$)
- * Recommendable operating supply voltage: $V_{CC}=3V$



■ **ORDERING INFORMATION**

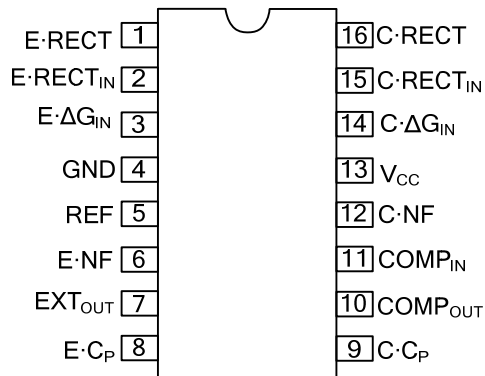
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UTA31101L-D16-T	UTA31101G-D16-T	DIP-16	Tube
-	UTA31101G-S16-R	SOP-16	Tape Reel
-	UTA31101G-P16-R	TSSOP-16	Tape Reel

<p>UTA31101L-D16-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) D16: DIP-16, S16: SOP-16, P16: TSSOP-16 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
---	--

■ **MARKING**

DIP-16	SOP-16 / TSSOP-16

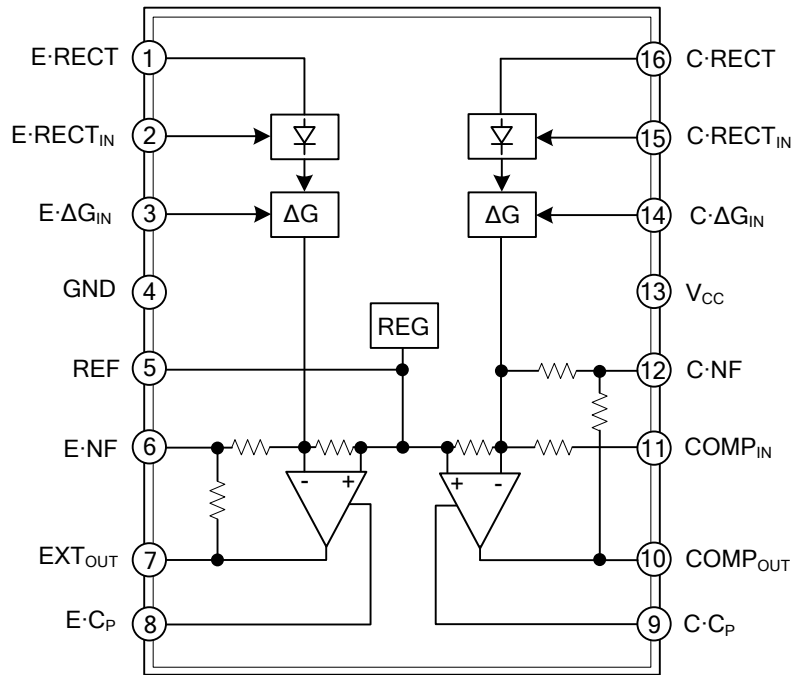
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	E·RECT	Expander rectifier capacitance
2	E·RECT _{IN}	Input of expander rectifier
3	E·ΔG _{IN}	Input of expander gain cell
4	GND	Ground
5	REF	Reference voltage
6	E·NF	Feedback of compandor
7	EXT _{OUT}	Output of compressor
8	E·C _P	Compensate pad for expander
9	C·C _P	Compensate pad for compressor
10	COMP _{OUT}	Output of compressor
11	COMP _{IN}	Input of compressor
12	C·NF	Compressor gain cell capacitance
13	V _{CC}	Power supply
14	C·ΔG _{IN}	Input of compressor gain cell
15	C·RECT _{IN}	Input of compressor rectifier
16	C·RECT	Compressor rectifier capacitance

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	10	V
Power Dissipation	DIP-16	800	mW
	SOP-16	630	mW
	TSSOP-16	520	mW
Operating Temperature	T _{OPR}	-25~75	°C
Storage Temperature	T _{STG}	-55~150	°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.

■ ELECTRICAL CHARACTERISTICS

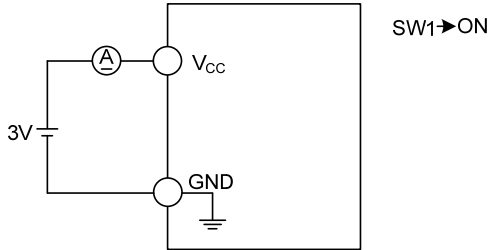
(V_{CC}=3V, f=1kHz, T_A=25°C, 0dB=-20dBV, Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Supply Voltage	V _{CC}		1.8	3.0	9.0	V	
Quiescent Current	I _{CCQ}	V _{CC} =3.0V		2.7	5.0	mA	
Input Reference Level	V _{REF}	V _{IN} =V _{OUT}	-21.5	-20.0	-18.5	dBV	
Total Harmonic Distortion	COMP	THD _C	V _{IN} =0dB	-55	-46	dB	
	EXP	THC _E		-55	-46	dB	
Output Noise Voltage	COMP	V _{NOC}	V _{IN} =-∞, f=15Hz~20kHz	0.5		mVrms	
	EXP	V _{NOE}		15		μVrms	
Cross Talk	C→E	CT (C→E)	V _{IN} =0dBV	-95		dBV	
	E→C	CT (E→C)		-55		dBV	
Ripple Rejection Ratio	COMP	RR _C	V _R =100mVrms, f=1kHz	-30		dB	
	EXP	RR _E		-60		dB	
Maximum Output Voltage (EXP)	V _{OM}	R _L =10Ω		800		mVrms	
Output Deviation (Note 1)	COMP	V _{OC1}	V _{IN} =20dB	-0.4	0.1	0.6	dB
		V _{OC2}	V _{IN} =-20dB	-0.5	0	0.5	dB
		V _{OC3}	V _{IN} =-40dB	-0.6	-0.1	0.4	dB
	EXP	V _{OE1}	V _{IN} =6.5dB	-1.1	-0.1	0.9	dB
		V _{OE2}	V _{IN} =-10dB	-0.9	0.1	1.1	dB
		V _{OE3}	V _{IN} =-25dB	-1.0	0	1.0	dB
Frequency Characteristic	COMP	FR _C	V _{IN} =0dB, f=200~3500Hz and f=1kHz are references.	±0.1		dB	
	EXP	FR _E		±0.1		dB	

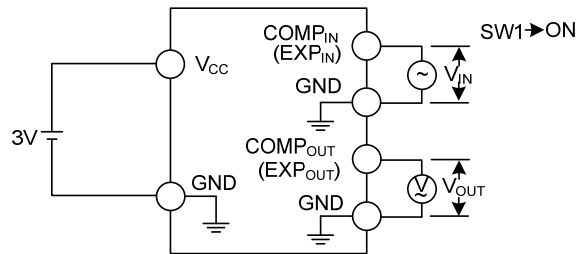
Note: Output deviation=(V_{OUT} - V_{REF}) - V_{IN} × αβ
 αβ: (COMP=0.5, EXP=2)

■ TEST CIRCUIT

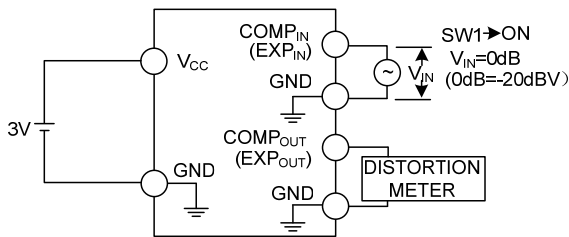
(1) I_{CCQ}



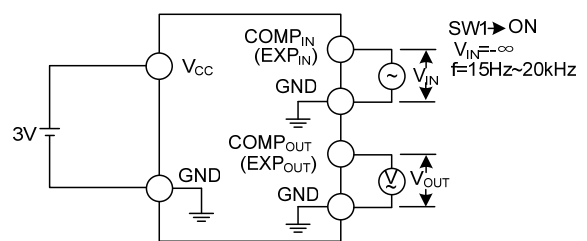
(2) V_{REF}



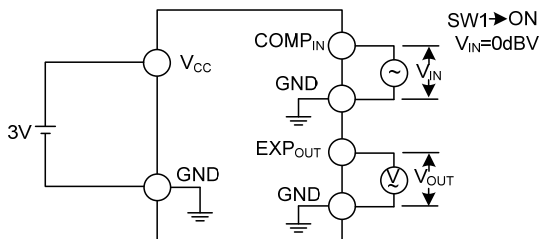
(3) THD_C, THD_E



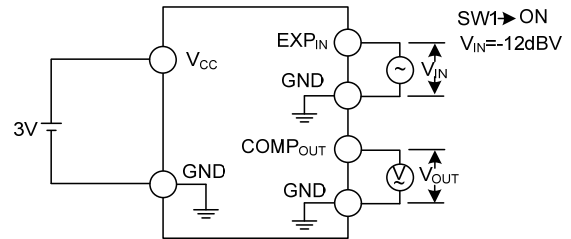
(4) V_{NOC}, V_{NOE}



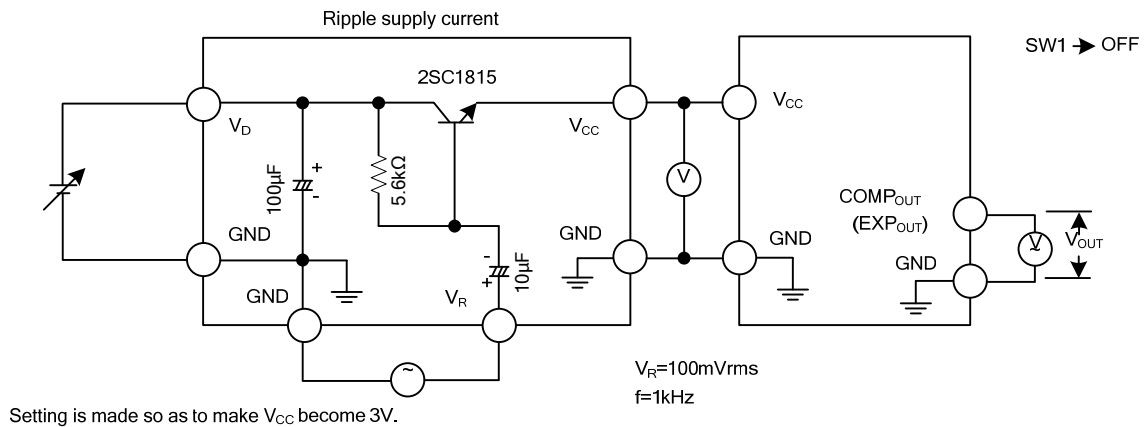
(5) CT (C → E)



(6) CT (E → C)

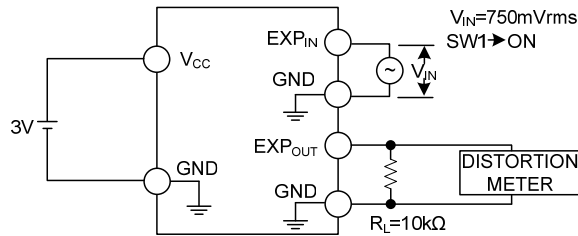


(7) RR_{CI}, RR_E

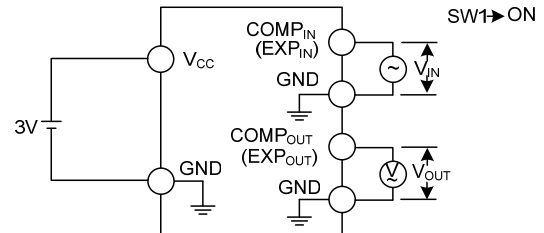


■ TEST CIRCUIT(Cont.)

(8) V_{OM}



(9) $V_{OC1,2,3}, V_{OE1,2,3}$



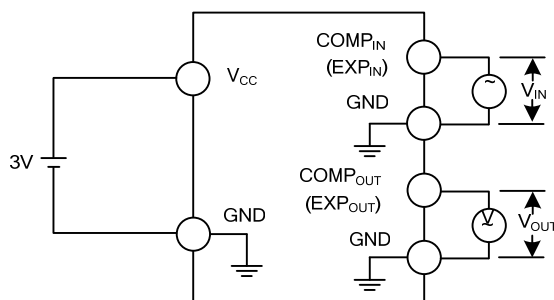
Note: OUTPUT DEVIATION
 $= (V_{OUT} - V_{REF}) - V_{IN} \times \alpha\beta$
 $\alpha\beta$: (COMP=0.5, EXP=2)
 (0dB=-20dBV)

$V_{OC1} \rightarrow V_{IN} = +20\text{dB}$ $V_{OE1} \rightarrow V_{IN} = +6.5\text{dB}$

$V_{OC2} \rightarrow V_{IN} = -20\text{dB}$ $V_{OE2} \rightarrow V_{IN} = -10\text{dB}$

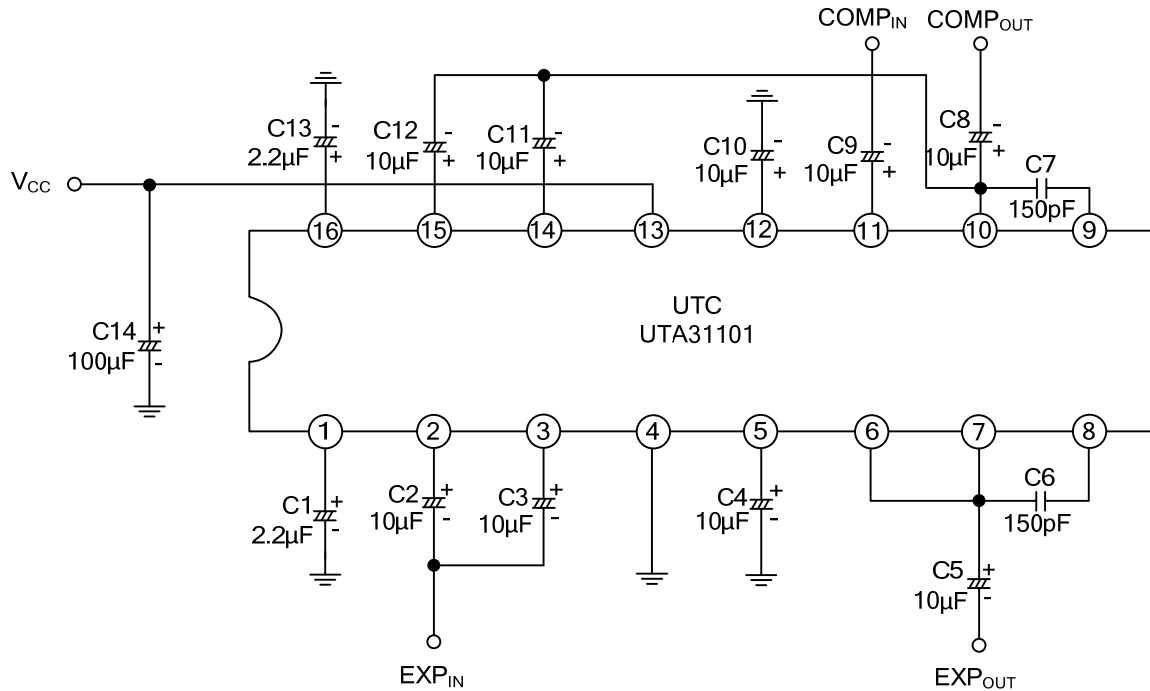
$V_{OC3} \rightarrow V_{IN} = -40\text{dB}$ $V_{OE3} \rightarrow V_{IN} = -25\text{dB}$

(10) FR_C, FR_E



SW1 \rightarrow ON
 $V_{IN} = 0\text{dB}$
 $f = 200\text{Hz} \sim 3.5\text{kHz}$
 and $f = 1\text{kHz}$ are references.

■ TYPICAL APPLICATION CIRCUIT



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.