



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.

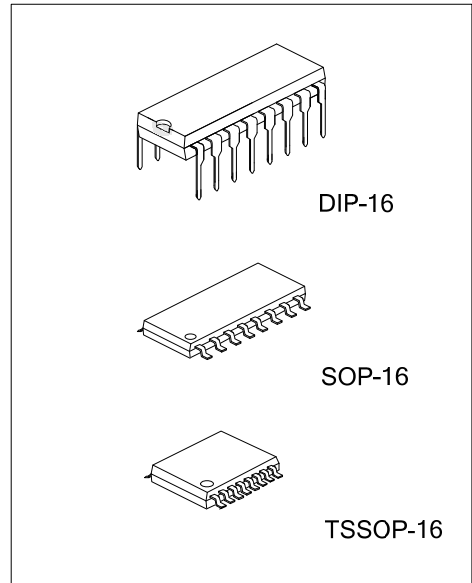
FEATURES

- * 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

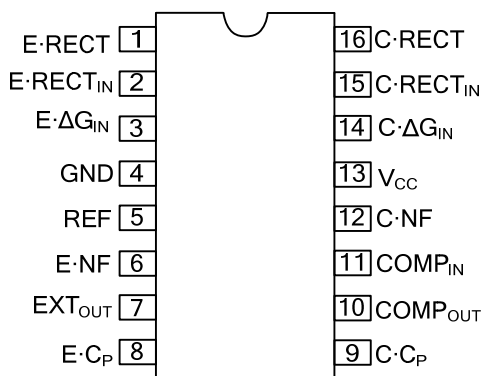
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UTA31101L-D16-T	UTA31101G-D16-T	DIP-16	Tube
-	UTA31101G-S16-R	SOP-16	Tape Reel
-	UTA31101G-P16-R	TSSOP-16	Tape Reel

<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>
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MARKING

DIP-16	SOP-16 / TSSOP-16
<p>16 15 14 13 12 11 10 9 Date Code UTC □□□□ UTA31101 □ L: Lead Free G: Halogen Free Lot Code 1 2 3 4 5 6 7 8</p>	<p>16 15 14 13 12 11 10 9 Date Code UTC □□□□ UTA31101G Lot Code 1 2 3 4 5 6 7 8</p>

■ PIN CONFIGURATION

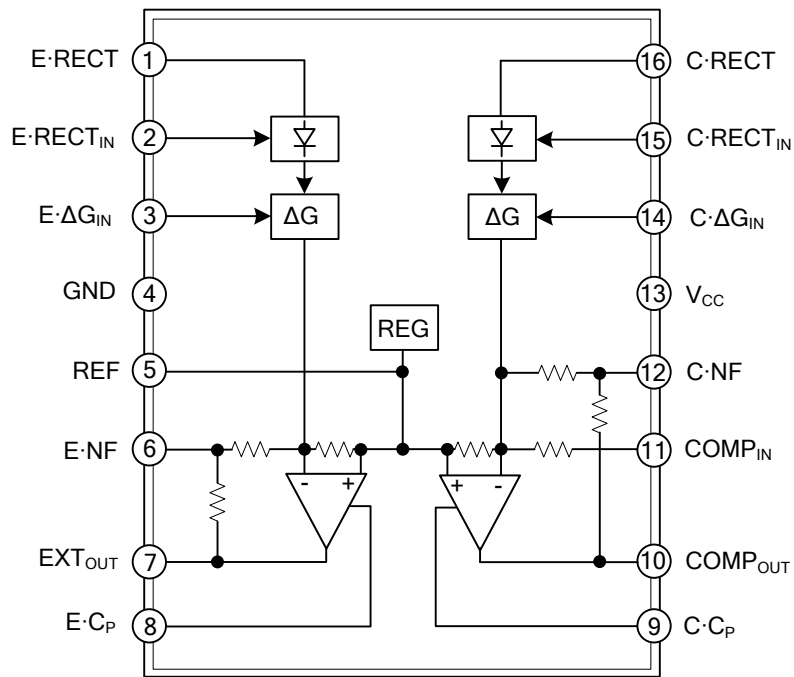


■ PIN DESCRIPTION

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

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■ BLOCK DIAGRAM



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■ 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

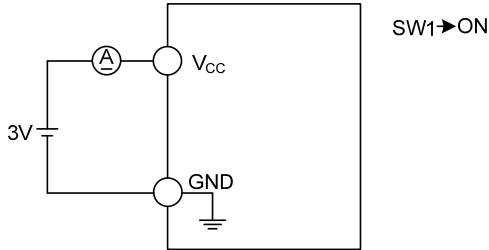
(V_{CC}=3V, f=1kHz, T_A=25°C, 0dB=-20dBV, Unless otherwise specified)

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)	V _{IN} =-12dBV		-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

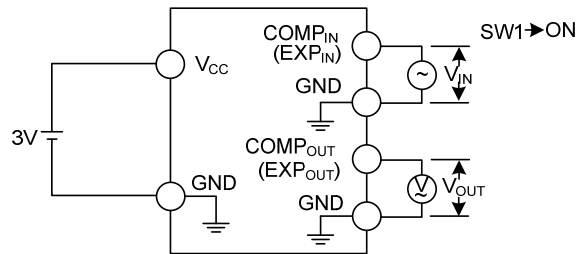
Note: Output deviation=(V_{OUT} - V_{REF}) - V_{IN} × αβ
 αβ: (COMP=0.5, EXP=2)

■ TEST CIRCUIT

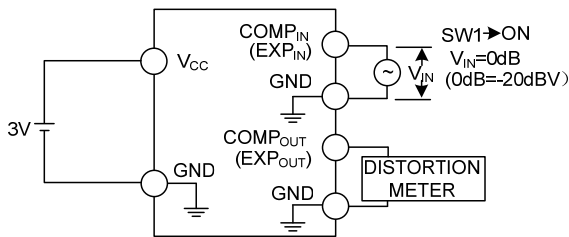
(1) I_{CCQ}



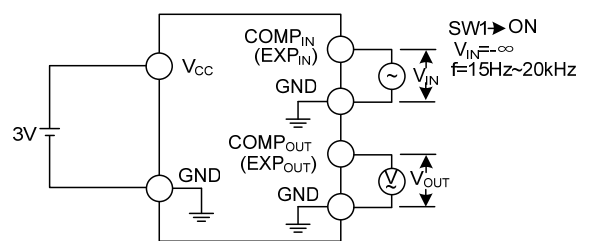
(2) V_{REF}



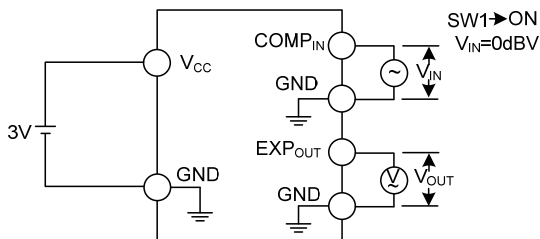
(3) THD_C, THD_E



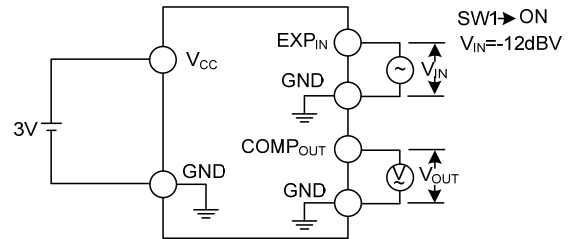
(4) V_{NOC}, V_{NOE}



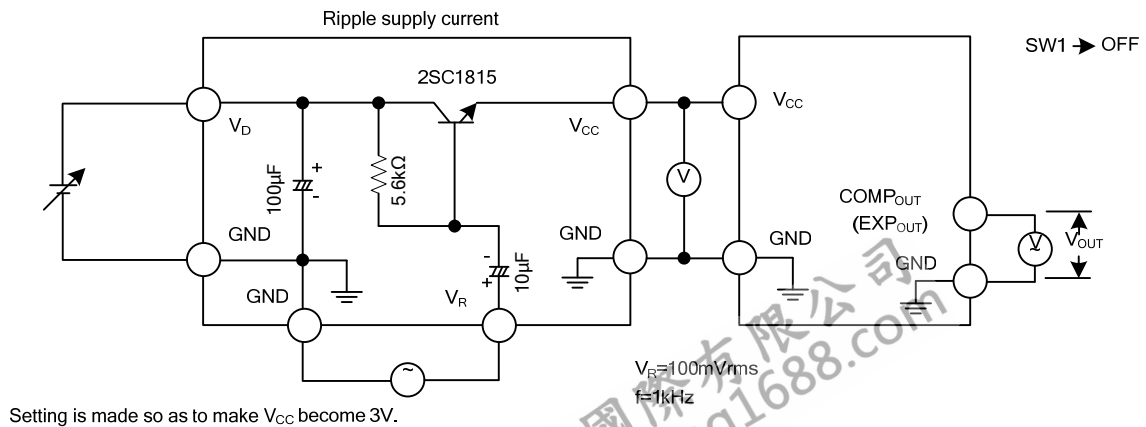
(5) CT (C → E)



(6) CT (E → C)

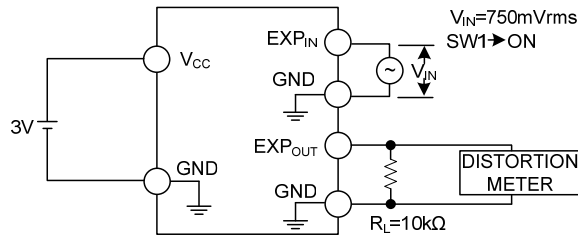


(7) RR_{CI}, RR_E

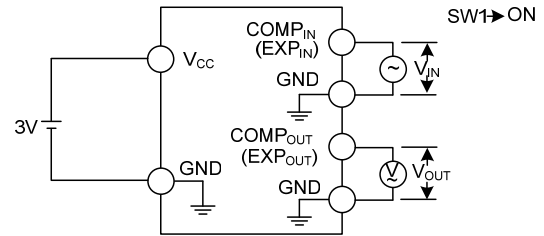


■ TEST CIRCUIT(Cont.)

(8) V_{OM}



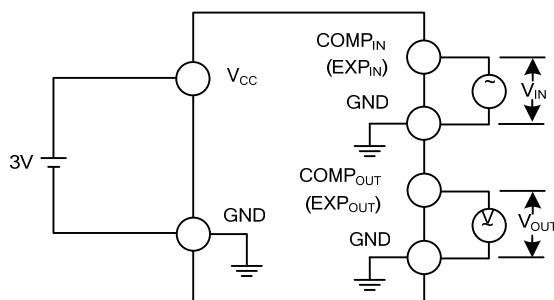
(9) $V_{OC1,2,3}, V_{OE1,2,3}$



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

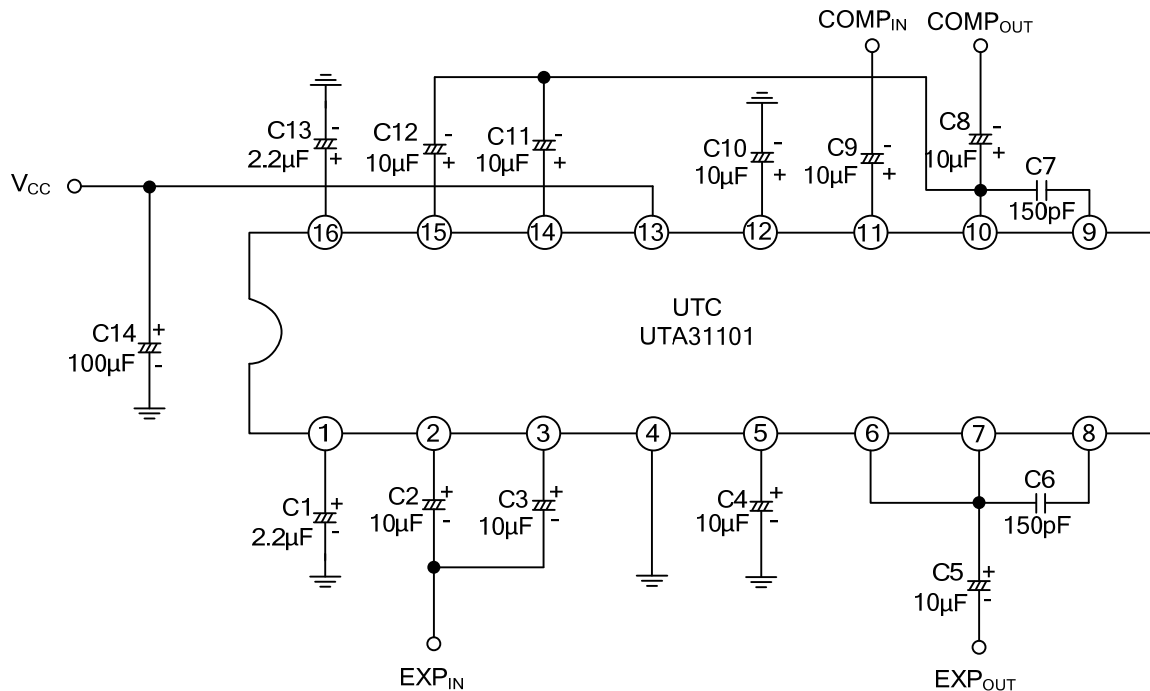
$V_{OC1} \rightarrow V_{IN} = +20\text{dB}$	$V_{OE1} \rightarrow V_{IN} = +6.5\text{dB}$
$V_{OC2} \rightarrow V_{IN} = -20\text{dB}$	$V_{OE2} \rightarrow V_{IN} = -10\text{dB}$
$V_{OC3} \rightarrow V_{IN} = -40\text{dB}$	$V_{OE3} \rightarrow V_{IN} = -25\text{dB}$

(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



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