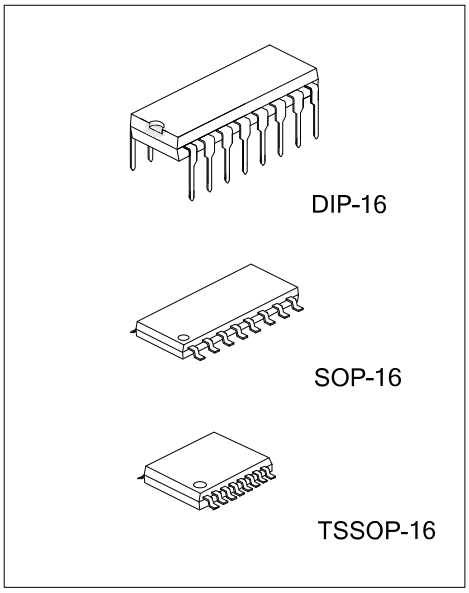
COMPANDER IC FOR CORDLESS TELEPHONE



■ DESCRIPTION

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

■ FEATURES

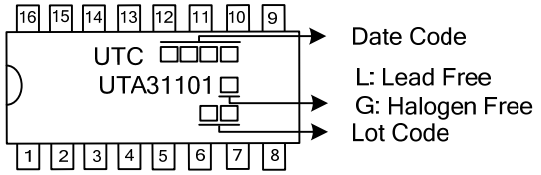
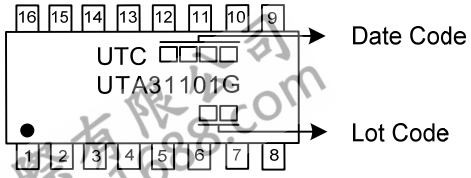
* Wide operating supply voltage range: V_{CC}=1.8~9V
* For noise reduction, compressor and expandor are incorporated into a package.
* Low operating supply voltage and small consumption current make this IC suitable for its application to the sets using the battery such as the codeless telephone set.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

■ ORDERING INFORMATION

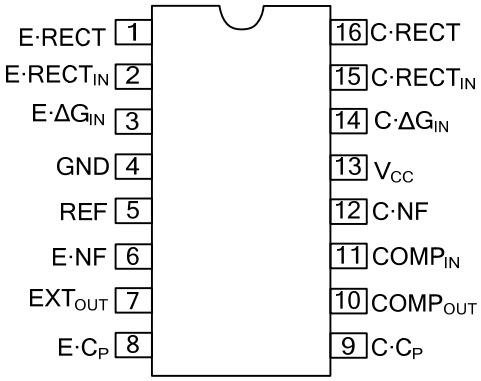
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UTA31101L-D16-T	UTA31101G-D16-T	DIP-16	Tube
-	UTA31101G-S16-R	SOP-16	Tape Reel
-	UTA31101G-P16-R	TSSOP-16	Tape Reel

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

■ MARKING

DIP-16	SOP-16 / TSSOP-16
	

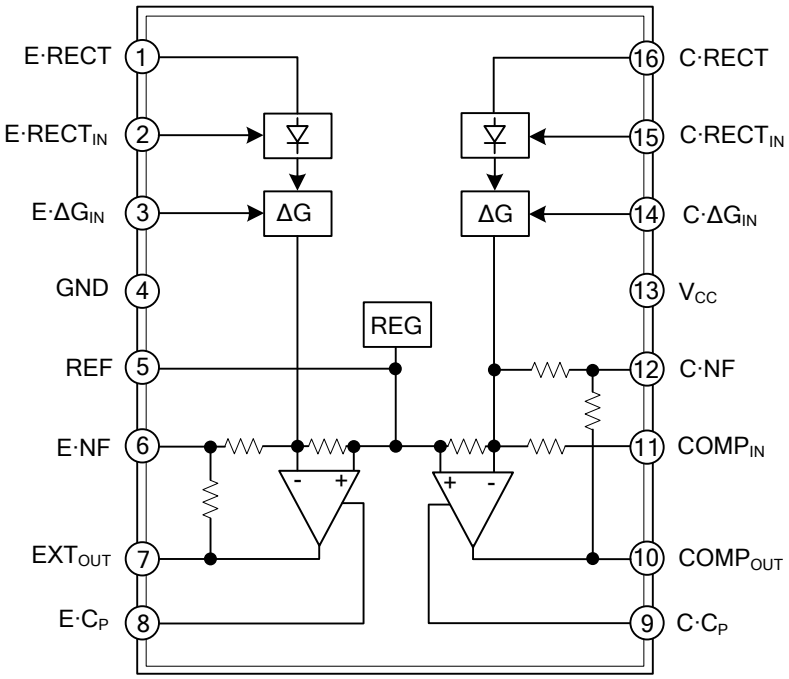
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	E·RECT	Expandor rectifier capacitance
2	E·RECT$_{IN}$	Input of expandor rectifier
3	E·△G$_{IN}$	Input of expandor 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 expandor
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·△G$_{IN}$	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	P_D	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

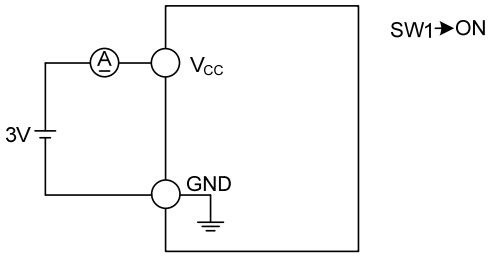
(V_{CC}=3V, f=1kHz, T_A=25°C, 0dB=-20dBV, Unless otherwise specified)

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

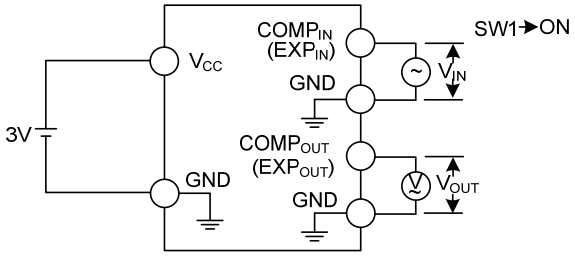
Note: Output deviation=(V_{OUT} - V_{REF}) - V_{IN} × αβ
αβ: (COMP=0.5, EXP=2)

■ TEST CIRCUIT

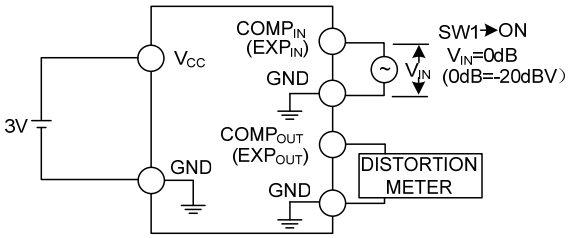
(1) I_{CCQ}



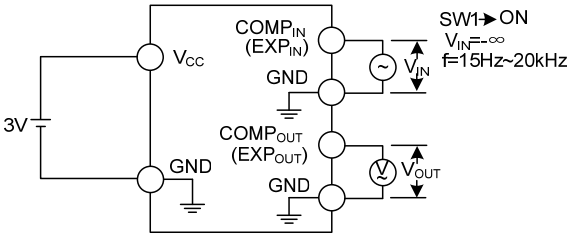
(2) V_{REF}



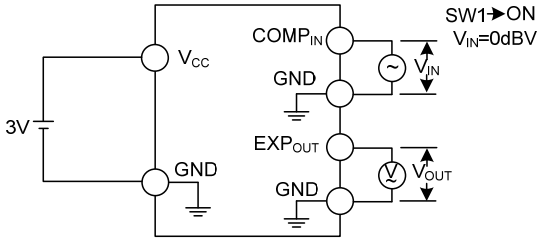
(3) THD_C, THD_E



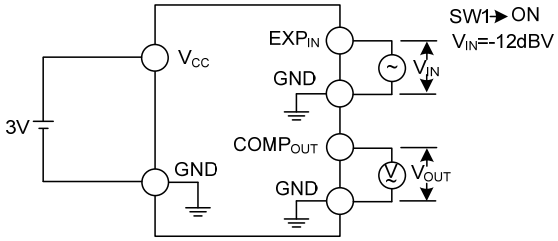
(4) V_{NOC}, V_{NOE}



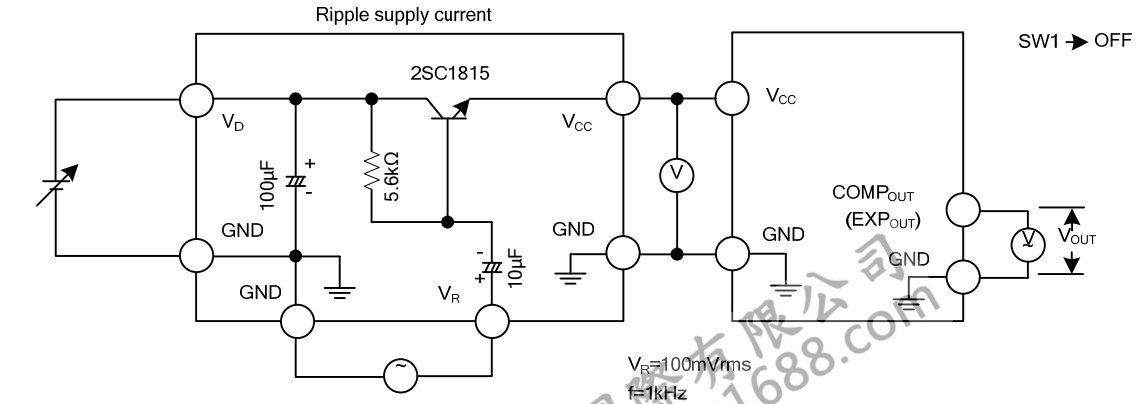
(5) CT (C→E)



(6) CT (E→C)



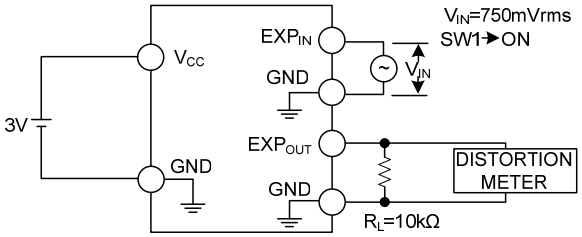
(7) RR_C、RR_E



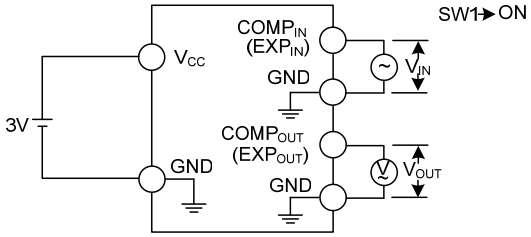
Setting is made so as to make V_{CC} become 3V.

■ TEST CIRCUIT(Cont.)

(8) V_{OM}



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

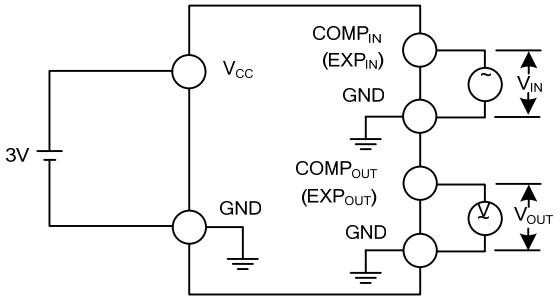


Note: OUTPUT DEVIATION
$=(V_{OUT}-V_{REF})-V_{IN} \times \alpha\beta$
αβ: (COMP=0.5, EXP=2)
(0dB=-20dBV)

V_{OC1}➔ V_{IN}=+20dB
V_{OC2}➔ V_{IN}=-20dB
V_{OC3}➔ V_{IN}=-40dB

V_{OE1}➔ V_{IN}=+6.5dB
V_{OE2}➔ V_{IN}=-10dB
V_{OE3}➔ V_{IN}=-25dB

(10) FR_C, FR_E



SW1➔ ON
V_{IN}=0dB
f=200Hz~3.5kHz
and f=1kHz are references.

■ TYPICAL APPLICATION CIRCUIT