

TENTATIVE TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

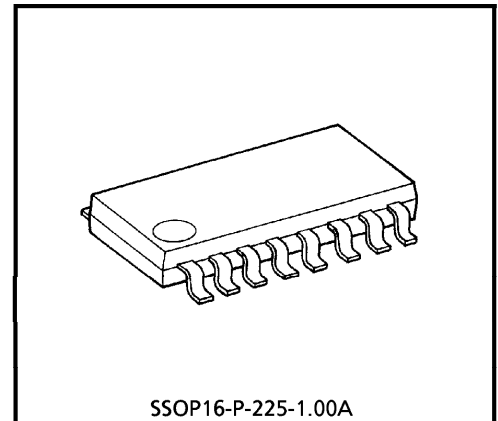
# TA2061AF

## INFRARED LINEAR AUDIO SIGNAL TRANSMIT IC

TA2061AF is an IC developed for use in the transmitter of infrared audio signal transmit/receive systems. The device incorporates a 2.3/2.8 MHz voltage controlled oscillator ( $V_{CO}$ ) for the linear audio signal transmission band. The device is ideal for the transmitters of wireless stereo headphones and wireless microphones that use infrared transmission.

### FEATURES

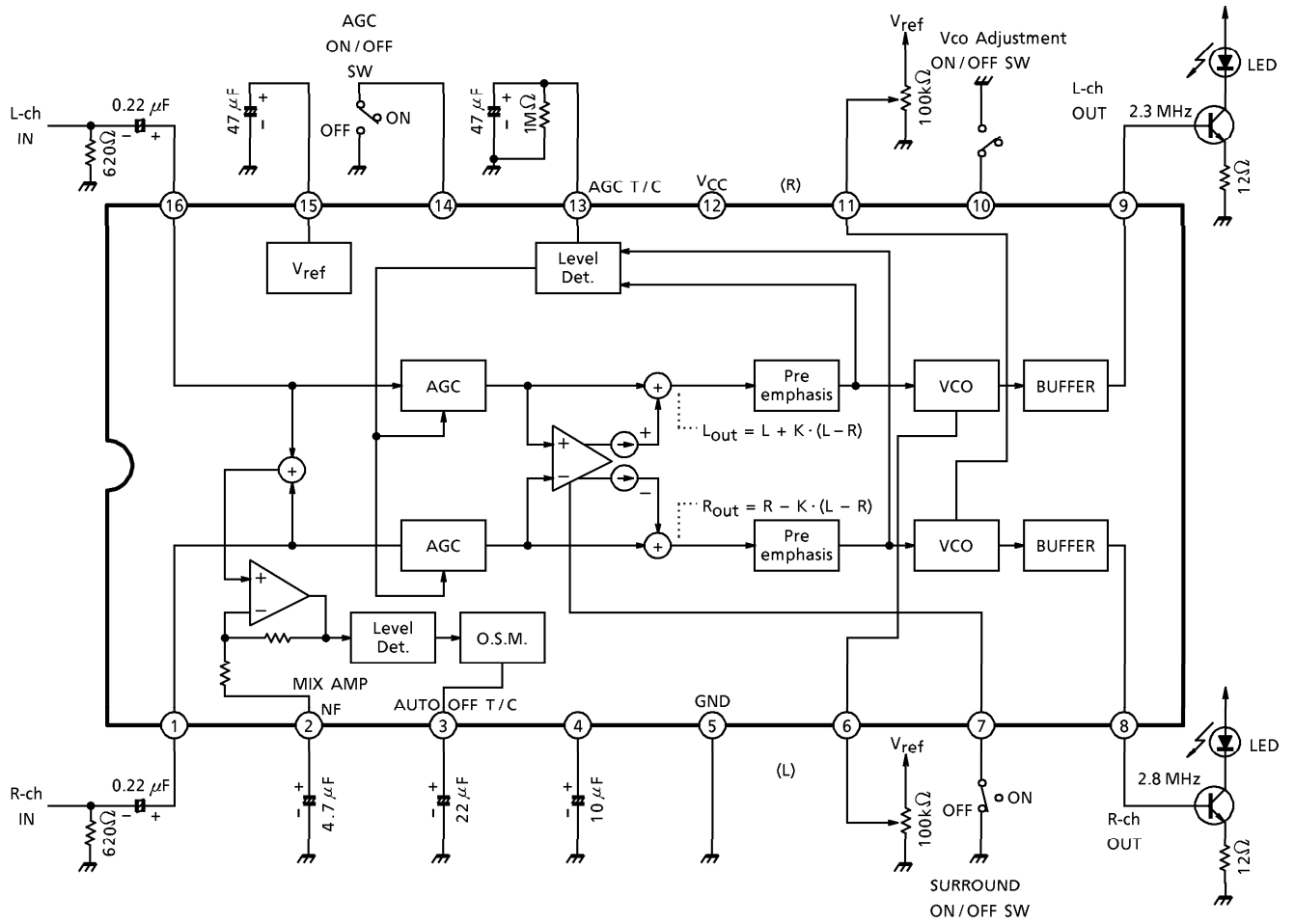
- Built-in two crystal  $V_{CO}$  channels for audio signal transmission. :  $f_c = 2.3/2.8$  MHz (Typ.)
- Built-in pre-emphasis :  $\tau = 75$   $\mu$ s (Typ.)
- $V_{CO}$  fo adjustment on/off function.
- Built-in audio signal AGC (on/off)
- Built-in auto on/off function (on/off)
- Built-in simple surround function (on/off)
  - :  $L_{out} = 1.5L_{in} - 0.5R_{in}$
  - :  $R_{out} = 1.5R_{in} - 0.5L_{in}$
- Few external parts
- Compact package : 16-pin 1mm pitch flat package
- Operating supply voltage range
  - :  $V_{CC}(\text{opr.}) = 4.0$  to  $16.0$  V ( $T_a = 25^\circ\text{C}$ )

SSOP16-P-225-1.00A  
Weight : 0.14 g (Typ.)

980910EBA1

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BLOCK DIAGRAM



## FUNCTIONS AND PINS

## 1. Matrix surround function

Simple surround processing by surround function on/off switch (pin 7)

surround off :  $0.0\text{ V} \leq V_7 \leq 2.0\text{ V}$

surround on :  $4.0\text{ V} \leq V_7 \leq V_{CC}$  or open

When surround is on, L and R channel signals are matrix-processed at audio signal level.

(\*) Where L and R channels input/output signals are  $L_{in}$ ,  $R_{in}$ ,  $L_{out}$ , and  $R_{out}$

$$L_{out} = 1.5 \times L_{in} - 0.5 \times R_{in}$$

$$R_{out} = 1.5 \times R_{in} - 0.5 \times L_{in}$$

(\*) When  $L_{in} = R_{in}$  (same phase)

$$L_{out} = R_{out} = 1.0 \times R_{in} = 1.0 \times L_{in}$$

(\*) When  $R_{in} = -R_{in}$  (opposite phase)

$$L_{out} = 2.0 \times L_{in} = -2.0 \times R_{in}$$

$$R_{out} = 2.0 \times R_{in} = -2.0 \times L_{in}$$

The above method implements simple surround sound which emphasizes stereo characteristics.

2.  $V_{CO}$  - fo adjustment on/off function

If the  $V_{CO}$  fo adjustments on/off switch (pin 10) can be externally controlled,  $V_{CO}$  frequency of the L-channel (2.3 MHz) can be adjusted using pin 6.

$V_{CO}$  frequency of the R-channel (2.8 MHz) can be adjusted using pin 11.

Adjust based on  $V_{ref}$  (pin 15) using the potentiometer. The adjustment range is about  $\pm 25\text{ kHz}$  at  $GND-V_{ref}$  with  $V_{ref}/2$  as the center.

Note that even when the voltage applied to the adjustment pin is  $1/2 V_{ref}$ , the fo frequency fluctuates due to switching from off to on.

fo adjusted externally : Open Pin 10

fo fixed internally : Connect pin 10 to GND

## 3. Audio AGC on/off function

The AGC function of the audio signal processing portion can be switched on/off using pin 14.

AGC off : Connect pin 14 to GND

AGC on : Open pin 14

MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CC}$	14	V
Power Dissipation	$P_D$ (Note)	400	mW
Operating Temperature	$T_{opr}$	-25~75	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55~150	$^\circ\text{C}$

## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified,  $V_{CC} = 9\text{ V}$ ,  $V_{in} = 245\text{ mV}$  ( $-1\text{ dBm}$ ),  $f = 1\text{ kHz}$ ,  $T_a = 25^\circ\text{C}$ , Surround off, fo adjustment off, AGC on)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Stand-by Current	$I_{STB}$	—	Auto off ( $V_{in} = 0$ , $V_3 = 0\text{ V}$ )	—	2.6	3.3	mA
Operating Current	$I_{CC}$	—	ON	—	19.0	26.0	mA
Input Signal Level	$V_{inMAX}$	—	THD $\leq 10\%$	—	2.0	—	$V_{rms}$
Channel Separation	Sep.	—	(Note 1)	—	45	—	dB
Total Harmonic Distortion	THD	—	—	—	0.3	—	%
Frequency Response	$f_{res}$	—	$f = 1\text{ k}\sim 10\text{ kHz}$ , after de-emphasis	-3	0	3	dB
Signal To Noise Ratio	S/N-L	—	L-channel (Note 2)	52	55	—	dB
	S/N-R	—	R-channel (Note 2)	51	54	—	
$V_{CO}$ Frequency	fo-L	—	L-channel	2275	2300	2325	kHz
	fo-R	—	R-channel	2775	2800	2825	
Maximum Frequency Deviation	—	—	L-channel	70	100	120	kHz
	—	—	R-channel	60	80	100	
Input Resistance	$R_{IN}$	—	—	—	47	—	$k\Omega$
Modulation Sensitivity	MS-L	—	L-channel	18	22.5	28	kHz
	MS-R	—	R-channel	18	22.5	28	
3rd Spurious	3rd-Spr	—	—	—	40	—	dB
RF Output Level	$V_{O-L}$	—	L-channel	270	300	340	mV
	$V_{O-R}$	—	R-channel	270	300	340	
Channel Balance	C.B.	—	—	-3	—	3	dB
ALC Attack Time	$T_{ATK}$	—	(Note 3)	—	0.3	—	s
ALC Recovery Time	$T_{RCV}$	—	(Note 4)	—	20	—	s
Auto ON/OFF	$V_{iON}$	—	On-signal Level ( $V_{in-L} = V_{in-R}$ )	—	3	—	s
	$T_{OFF}$	—	Time until input signal	—	130	—	
Pre-emphasis	P-Emf	—	—	—	75	—	$\mu\text{s}$

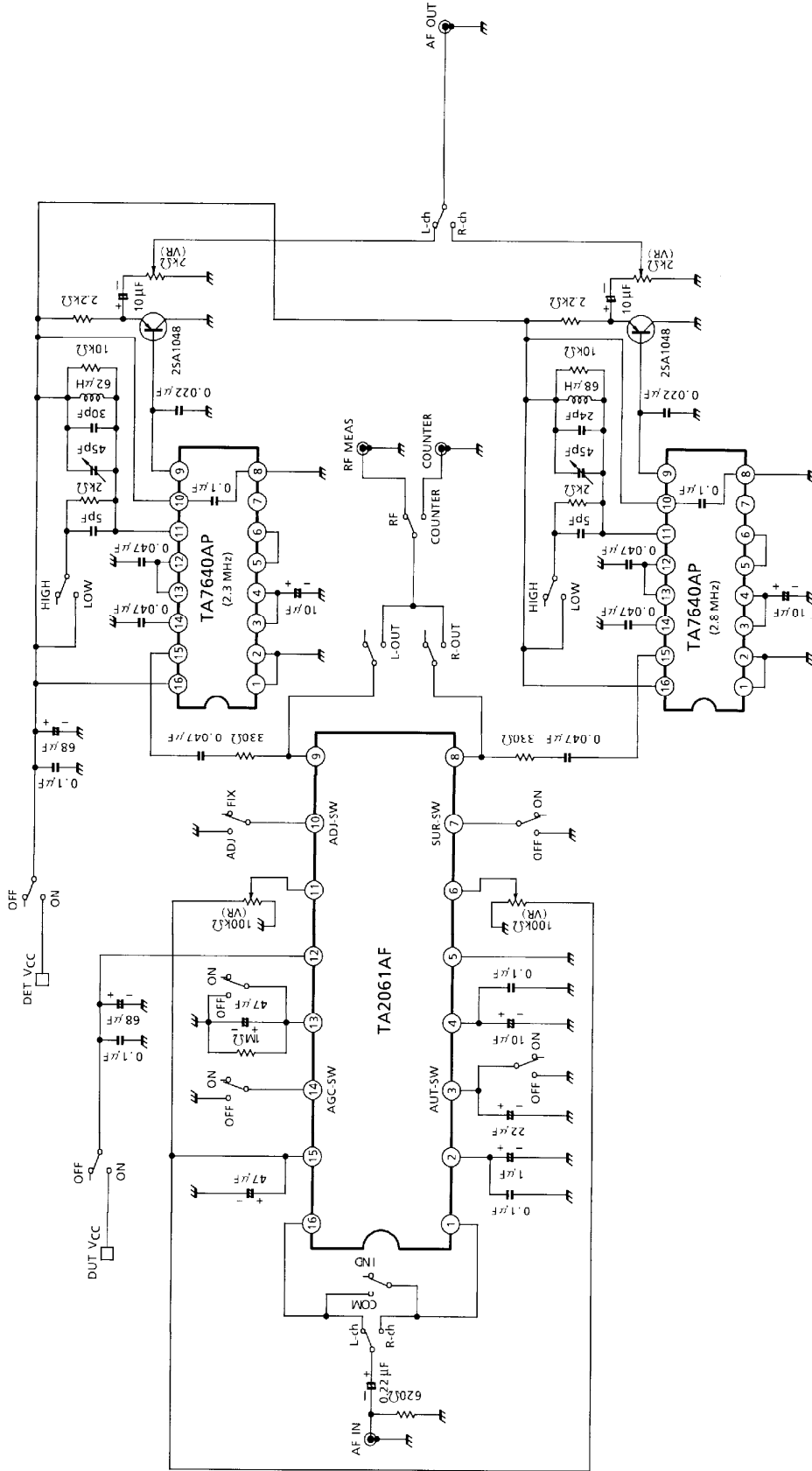
(Note 1) : Set the output level of the channel to which signals are input to 0dB.

(Note 2) : Set the output level to 0dB with 22.5 kHz deviation.

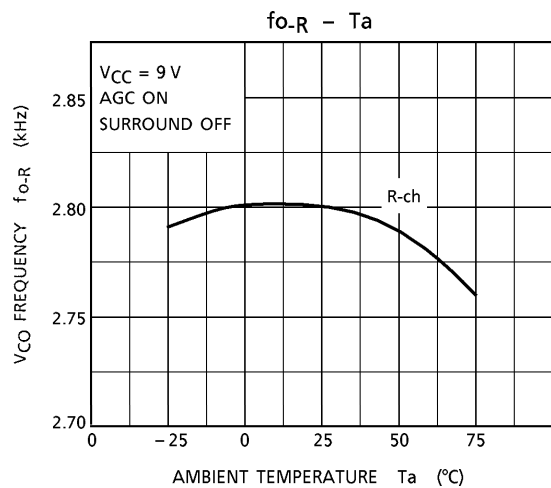
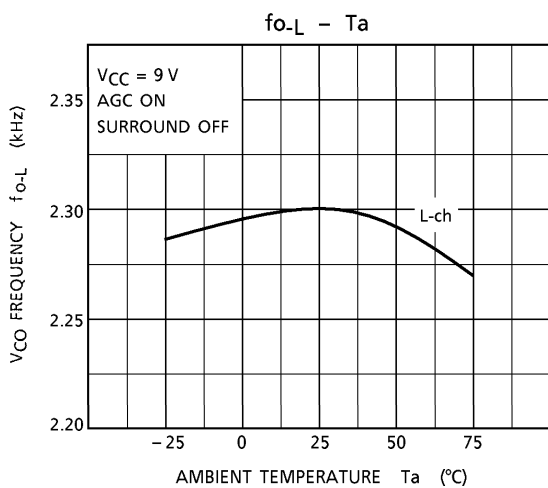
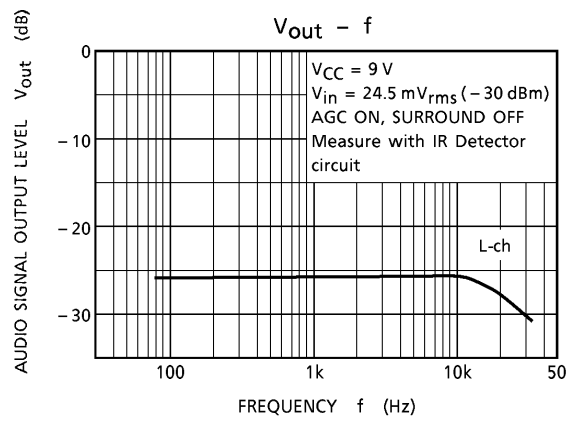
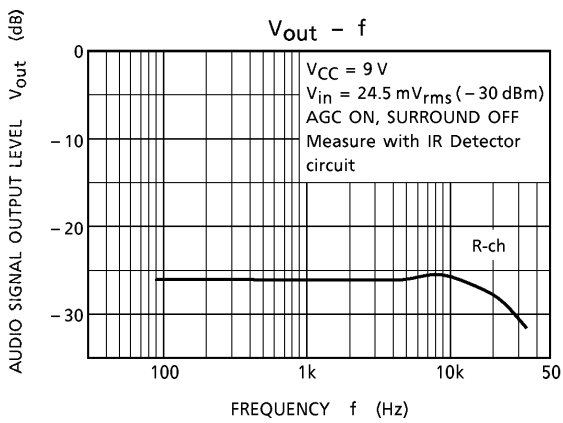
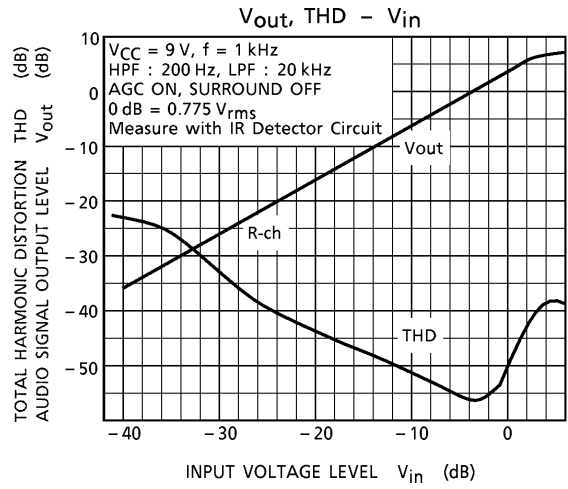
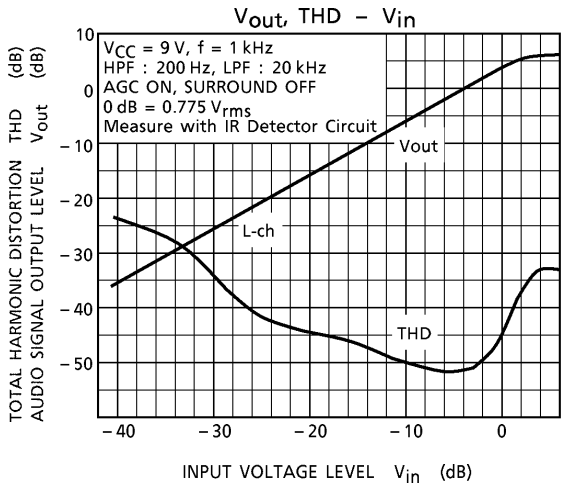
(Note 3) : Change  $V_{in}$  from  $77.5\text{ mV}_{rms}$  ( $-20\text{ dBm}$ ) to  $1.95\text{ V}_{rms}$  ( $+8\text{ dBm}$ ). Measure time until the output signal level convergence value reaches  $-1\text{ dB}$ .

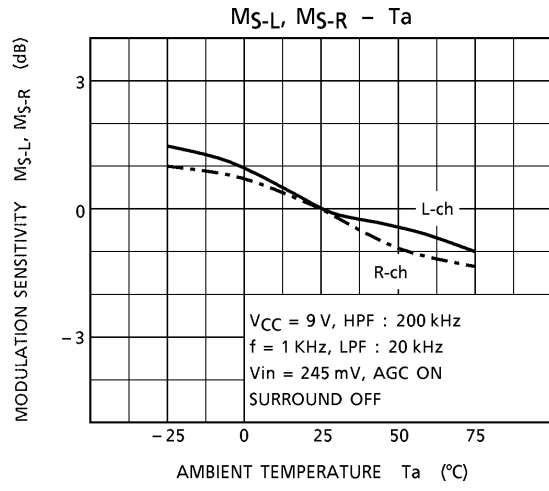
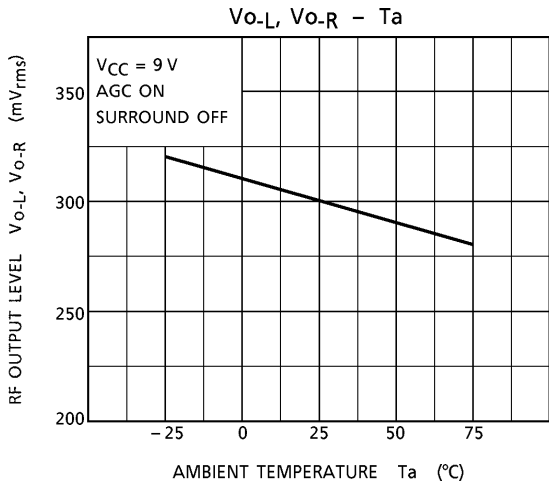
(Note 4) : Change  $V_{in}$  from  $1.95\text{ V}_{rms}$  ( $+8\text{ dBm}$ ) to  $77.5\text{ mV}_{rms}$  ( $-20\text{ dBm}$ ). Measure time until the output signal level convergence value reaches  $-1\text{ dB}$ .

TEST CIRCUIT

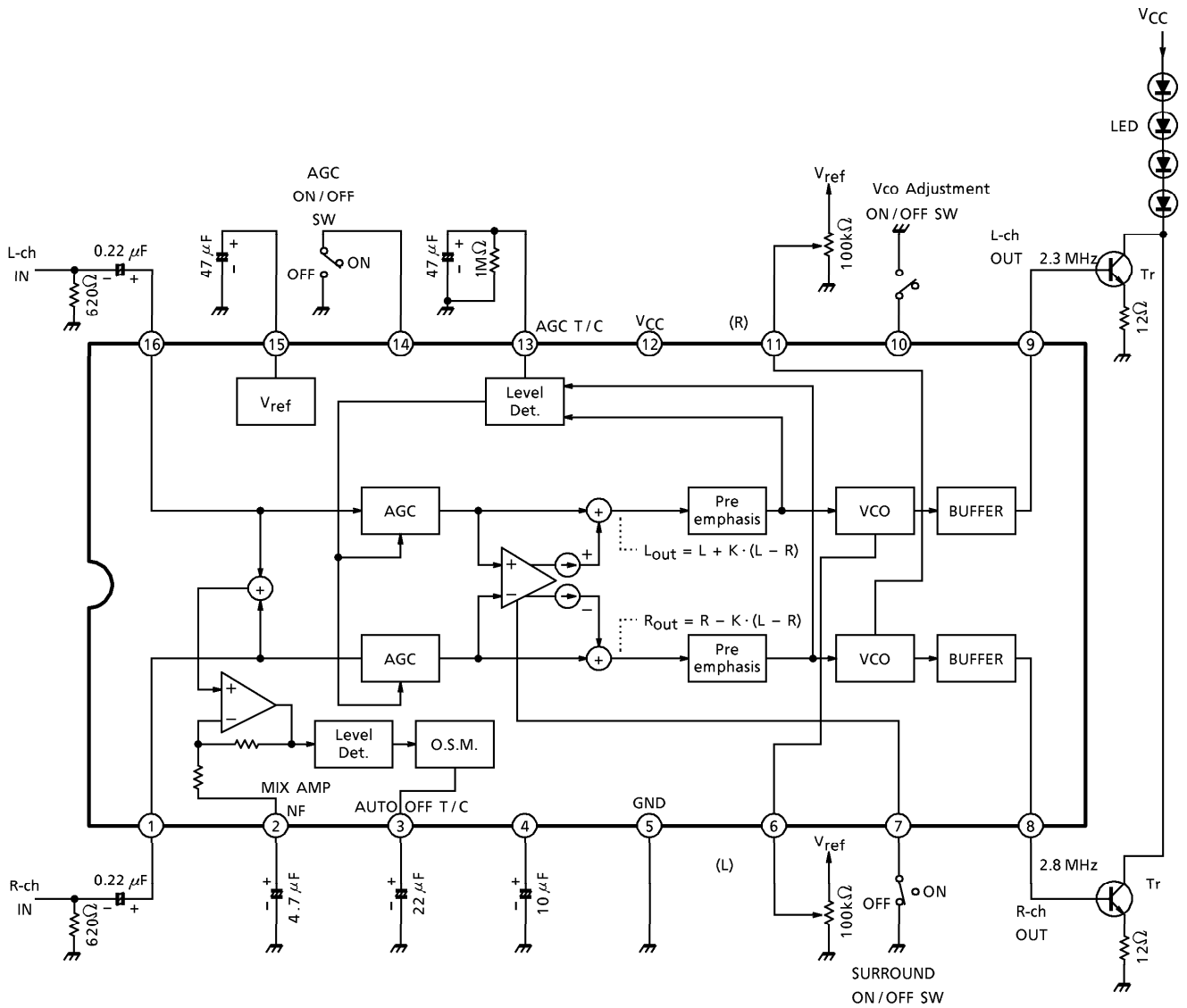


TA2061AF-5





APPLICATION CIRCUIT

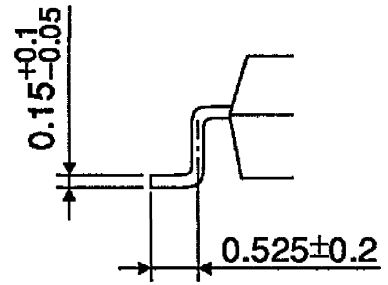
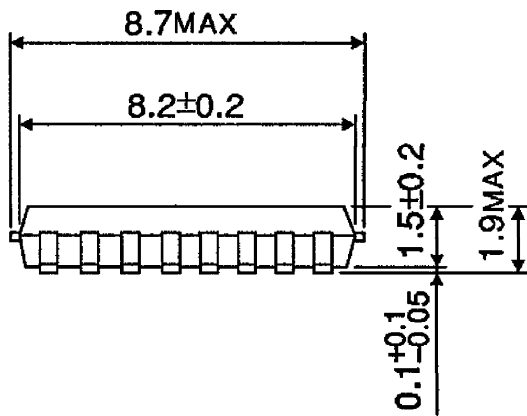
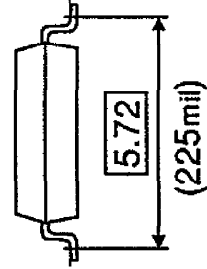
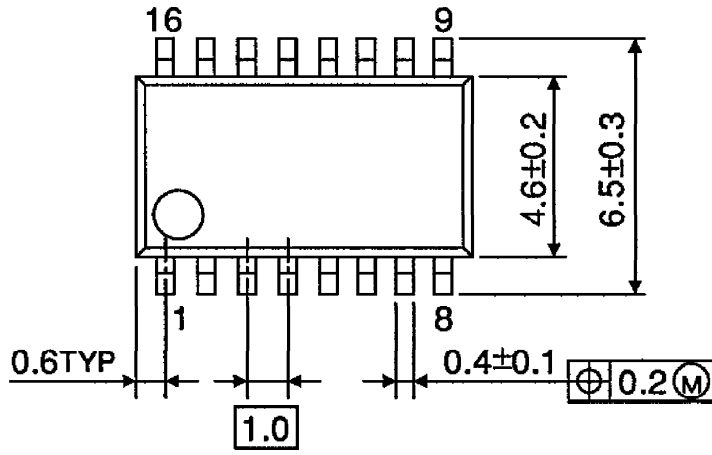


Tr : 2SC2883  
LED : TLN225



**PACKAGE DIMENSIONS**  
SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14 g (Typ.)