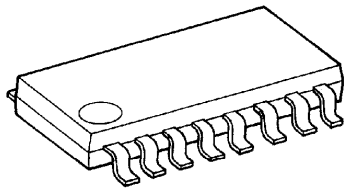
TENTATIVE TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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.



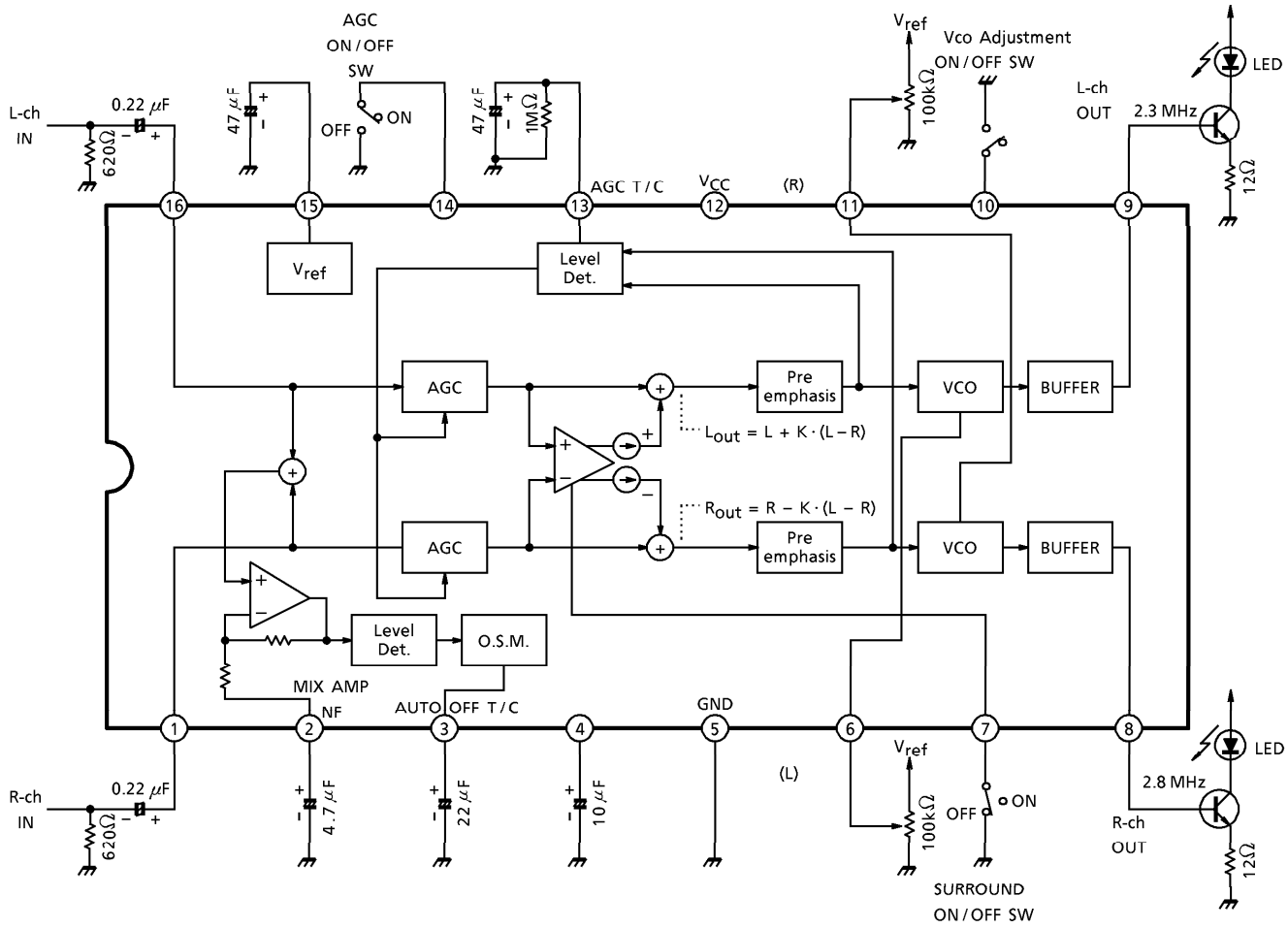
SSOP16-P-225-1.00A

Weight : 0.14 g (Typ.)

FEATURES

- Built-in two crystal V_{CO} channels for audio signal transmission. : fc = 2.3 / 2.8 MHz (Typ.)
- Built-in pre-emphasis : τ = 75 μs (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
  : $V_{CC\,(opr.)}$ = 4.0 to 16.0 V (Ta = 25°C)

BLOCK DIAGRAM



FUNCTIONS AND PINS

1. Matrix surround function

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

surround off : $0.0\,V \leqq V_7 \leqq 2.0\,V$

surround on : $4.0\,V \leqq V_7 \leqq V_{CC}$ 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)

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

(*) 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 ±25 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 A_{GC} 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 (Ta = 25°C)

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

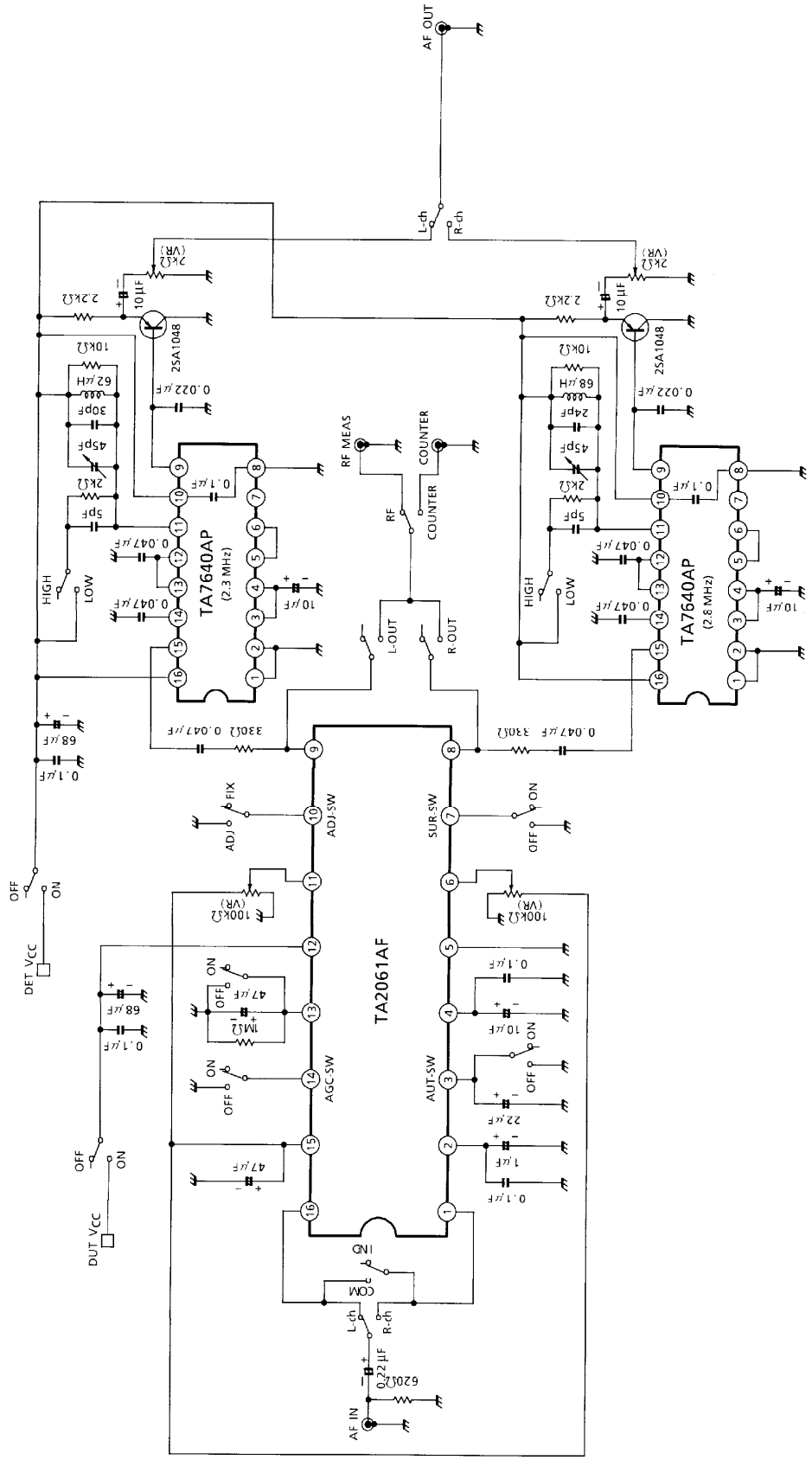
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V_{CC} = 9 V, V_{in} = 245 mV (−1 dBm), f = 1 kHz, Ta = 25°C, Surround off, fo adjustment off, AGC on)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Stand-by Current	I_{STB}	—	Auto off (V_{in} = 0, V_3 = 0 V)	—	2.6	3.3	mA
Operating Current	I_{CC}	—	ON	—	19.0	26.0	mA
Input Signal Level	V_{inMAX}	—	THD ≦ 10%	—	2.0	—	V_{rms}
Channel Separation	Sep.	—	(Note 1)	—	45	—	dB
Total Harmonic Distortion	THD	—	—	—	0.3	—	%
Frequency Response	f_{res}	—	f = 1 k~10 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	—	kΩ
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	Vi_{ON}	—	On-signal Level (V_{in}-L = V_{in}-R)	—	3	—	s
	T_{OFF}	—	Time until input signal	—	130	—	
Pre-emphasis	P-Emf	—	—	—	75	—	μs

(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 mV_{rms} (−20 dBm) to 1.95 V_{rms} (+8 dBm). Measure time until the output signal level convergence value reaches −1 dB.
(Note 4) : Change V_{in} from 1.95 V_{rms} (+8 dBm) to 77.5 mV_{rms} (−20 dBm). Measure time until the output signal level convergence value reaches −1 dB.

TEST CIRCUIT



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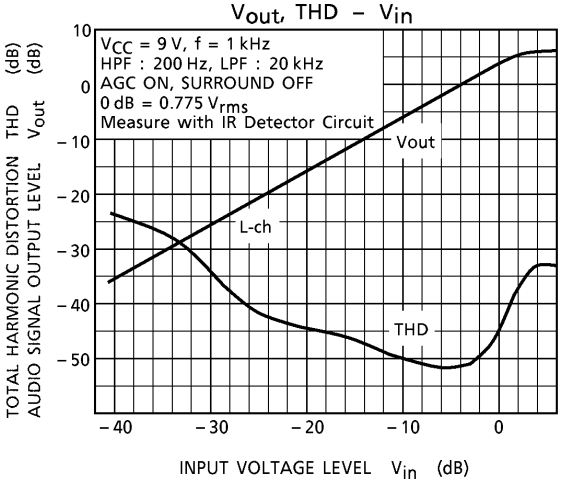
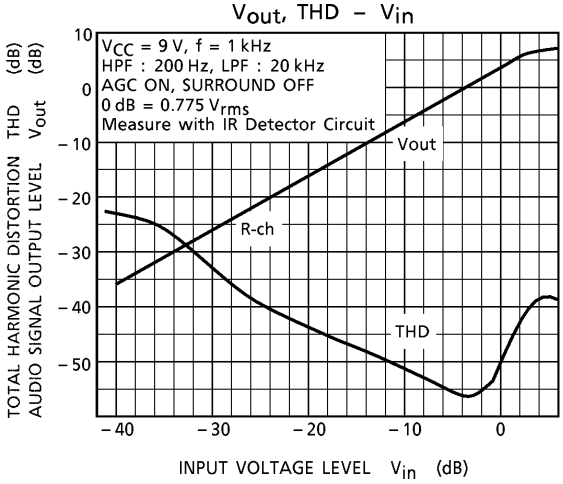
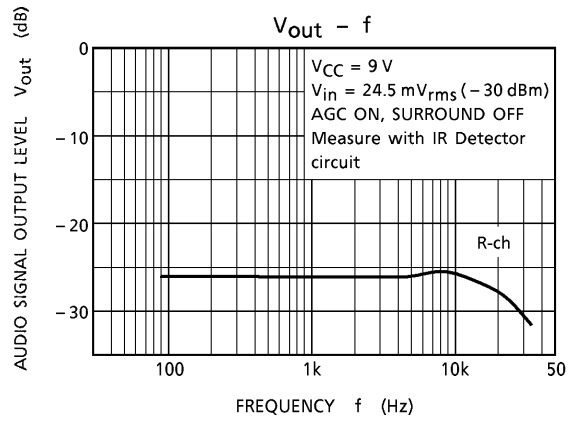
V_{out}, THD – V_{in}



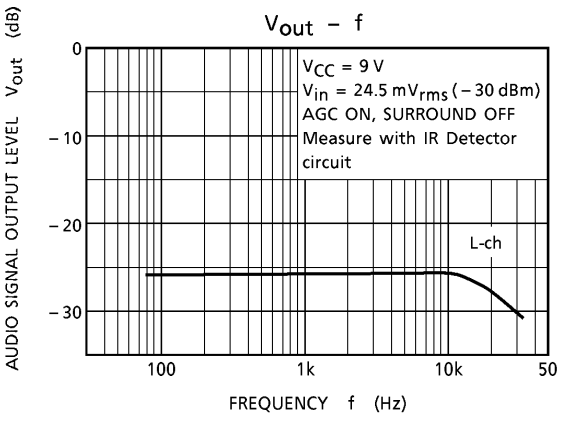
V_{out}, THD – V_{in}



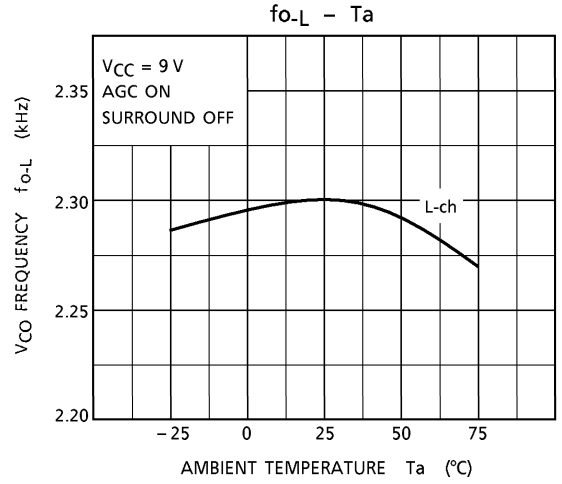
V_{out} – f



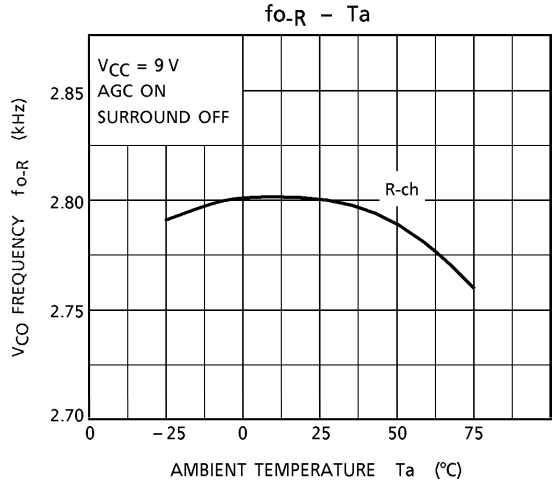
V_{out} – f



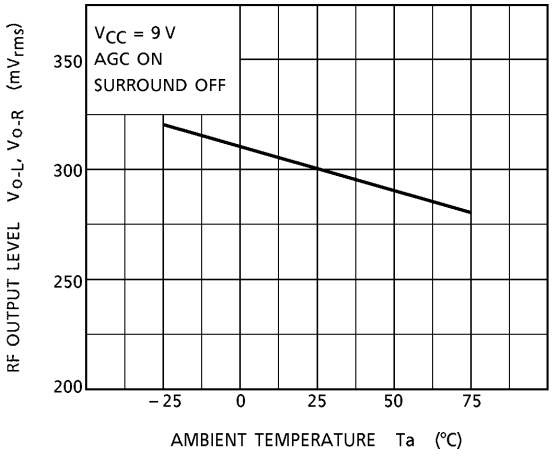
fo_{-L} – Ta



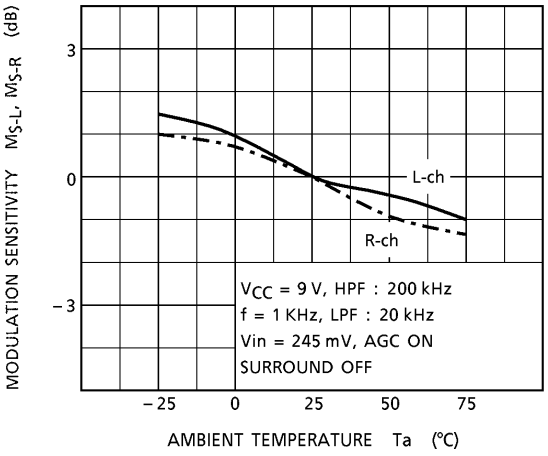
fo_{-R} – Ta



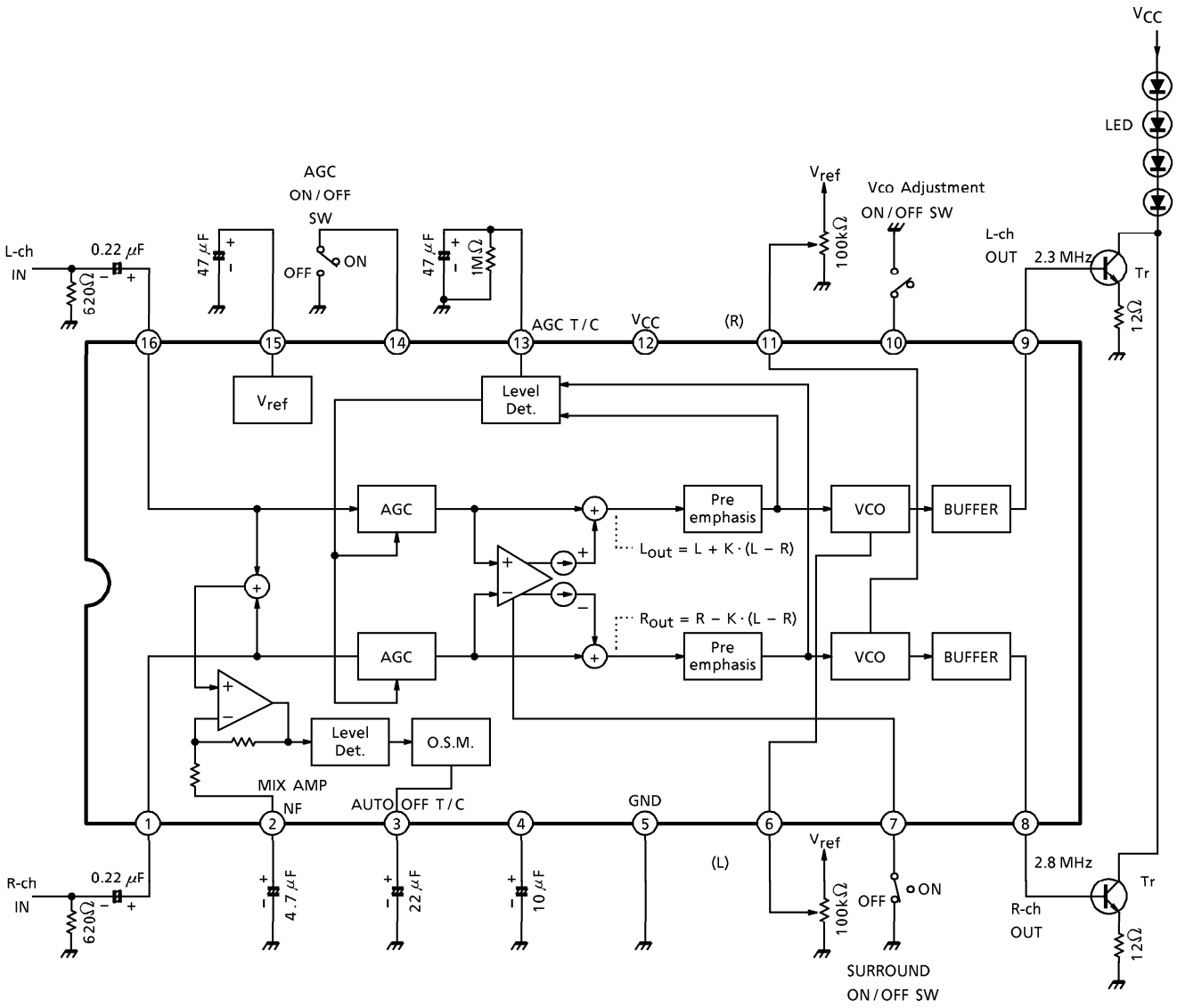
V_{O-L}, V_{O-R} – Ta



M_{S-L}, M_{S-R} – Ta



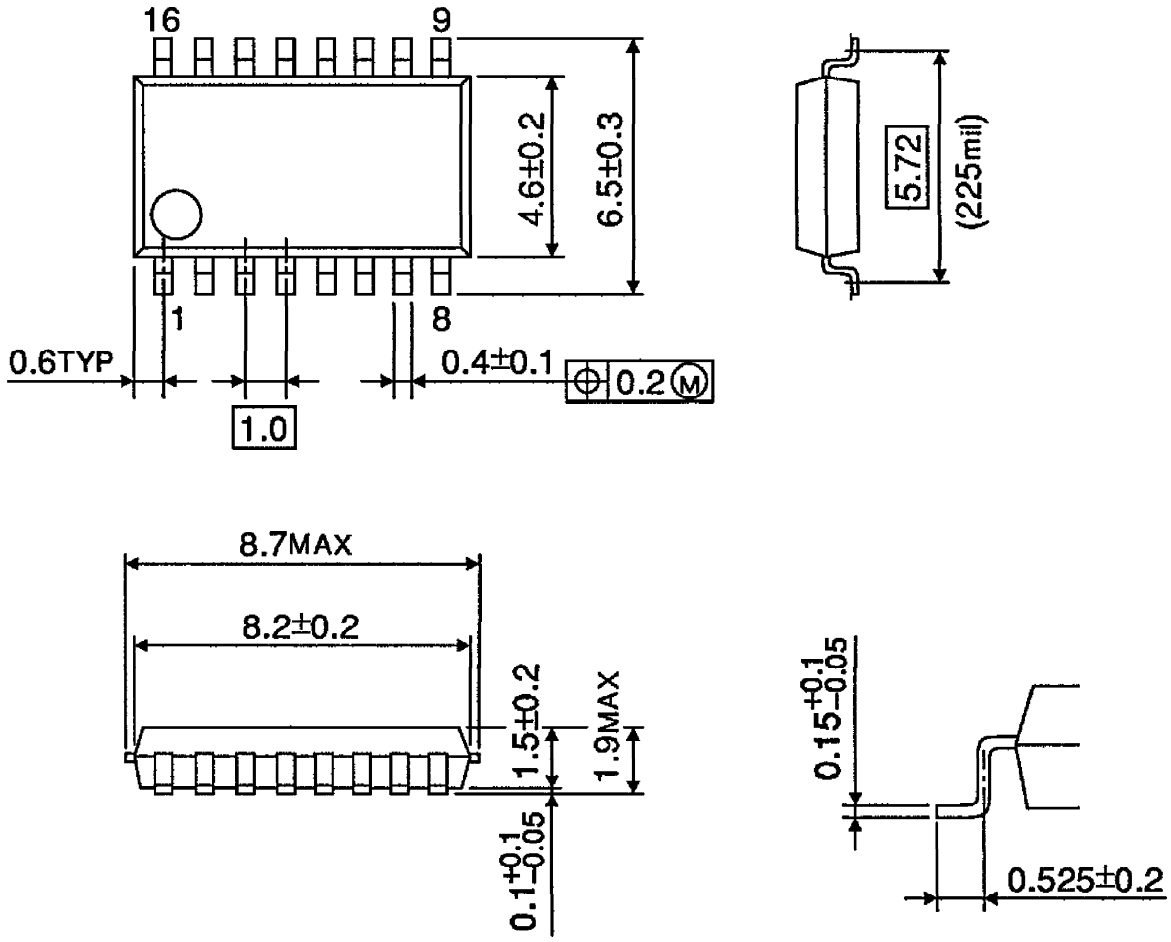
APPLICATION CIRCUIT



Tr : 2SC2883
LED : TLN225

PACKAGE DIMENSIONS

SSOP16-P-225-1.00A Unit : mm



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