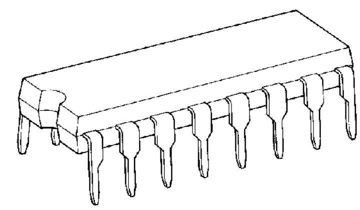
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8637BP

VHF MODULATOR FOR VCR OR VDP



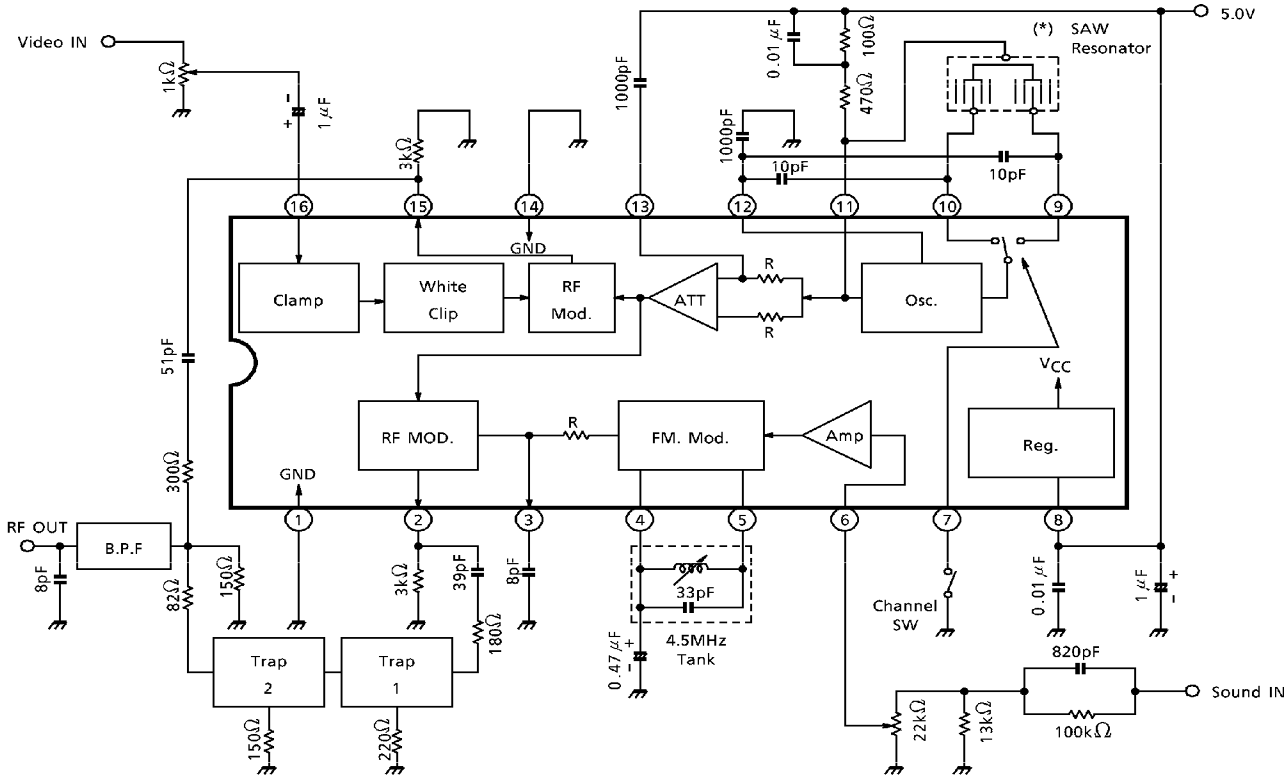
DIP16-P-300-2.54A

Weight : 1.11g (Typ.)

FEATURES

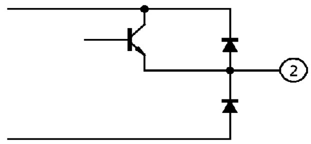
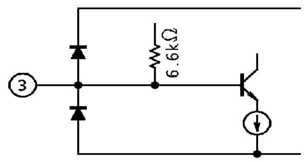
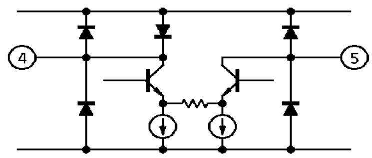
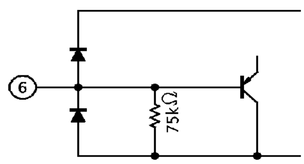
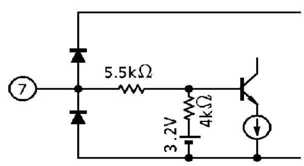
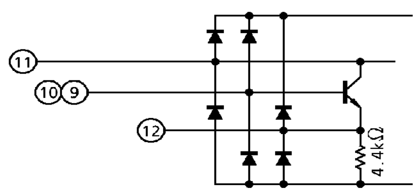
- Video clamp
- White clip
- Main carrier oscillator
- Main carrier attenuator
- Video Modulator
- Sound Modulator
- Sound FM Modulator
- Channel Switch
- Low power operation
- Adjustable output level and V/A ratio with external resistance.
- Minimum number of external parts required.
- Regulator circuit is included.
- Operating voltage range : 4.5V~5.5V, Typ. 5V
- Suggested operating voltage : 4.75V~5.25V, Typ. 5V

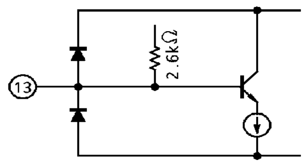
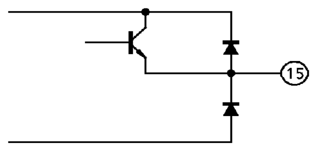
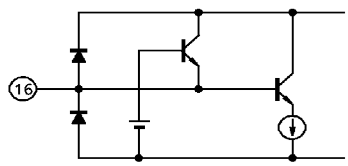
BLOCK DIAGRAM & APPLICATION CIRCUIT



(*) See SAW Resonator Technical Data.

TERMINAL CHARACTERISTICS

NO.	FUNCTION	TYP. DC VOLTAGE	INTERFACE CIRCUIT	COMMENT
1	GND1	(0V)		SOUND GND
2	SOUND RF OUTPUT	3.1V		OPEN EMITTER
3	SOUND RF MODULATOR CAPACITOR	2.8V		L.P.F. OF SOUND HARMONICS SPURIOUS
4 5	4.5MHz TANK COIL	4.2V		—
6	SOUND INPUT	0V		—
7	CHANNEL SW	3.2V		HIGH (OPEN) : PIN9 LOW : PIN10
8	V_{CC}	(5.0V)		—
9	SAW LOW CHANNEL	3.5V (2.8V)		—
10	SAW HIGH CHANNEL	3.5V (2.8V)		
11	SAW COMMON	4.6V		
12	RF OSCILLATOR CAPACITOR	2.8V		

NO.	FUNCTION	TYP. DC VOLTAGE	INTERFACE CIRCUIT	COMMON
13	VIDEO RF MODULATOR CAPACITOR	3.9V		
14	GND2	(0V)		Video & RF GND
15	VIDEO RF OUTPUT	3.0V		OPEN EMITTER
16	VIDEO INPUT	3.6V (Sync DC)		

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	7	V
Power Dissipation	P_D (Note)	750	mA
Input Signal Voltage	e_{in}	2.5	V_{p-p}
Input Voltage at Pin 7	V_{in}	GND − 0.3～V_{CC} + 0.3	V
Operating Temperature	T_{opr}	−10～70	°C
Storage Temperature	T_{stg}	−55～150	°C

(Note) Derated above Ta = 25°C in the proportion of 6mW / °C.

ELECTRICAL CHARACTERISTICS ($V_{CC}=5.0V$, $Ta=25°C$)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC}	—	$S_1=2$, $S_2=1$, $S_3=2$		10	14	20	mA
Video RF Output Level	$V_o(f_{p1})$	—	$S_2=1$, $S_3=2$ (Note 1) V_{i1} : No input signal V_{o1} : Output level	$S_1=2$	90	92	94	dBμV
	$V_o(f_{p2})$	—		$S_1=1$				
Video RF Output Level Temperature Drift	$\Delta V_o(f_{p1})$	—	$V_o(f_{p1})$ ($Ta=-10\sim70°C$) $-V_o(f_{p1})$ ($Ta=25°C$)		—	—	±2	dB
	$\Delta V_o(f_{p2})$	—	$V_o(f_{p2})$ ($Ta=-10\sim70°C$) $-V_o(f_{p2})$ ($Ta=25°C$)					
Video Modulation Factor	m_{p1}	1	$S_2=1$, $S_3=2$ $V_{i1}=0.45V_{p\text{-}p}$, white	$S_1=2$	72	77	82	%
	m_{p2}			$S_1=1$				
Video Modulation Factor Temperature Stability	Δm_{p1}	1	m_{p1} ($Ta=-10\sim70°C$) $-m_{p1}$ ($Ta=25°C$)		—	—	±3	%
	Δm_{p2}	1	m_{p2} ($Ta=-10\sim70°C$) $-m_{p2}$ ($Ta=25°C$)					
Video Modulation Factor Difference	Δm_p	1	$m_{p1}-m_{p2}$		—	—	±1	%
Max. Video Modulation Factor	m_{p2} (Max.)	1	$S_1=1$, $S_2=1$, $S_3=2$ $V_{i1}=2.0V_{p\text{-}p}$, white		89	94	98	%
Max. Video Modulation Temperature Drift	Δm_{p2} (Max.)	1	$Ta=-10\sim70°C$ m_{p2} (Max.)		89	94	98	%
Defferential Gain	DG_1	2	$S_2=1$, $S_3=2$, $V_{i1}=0.45V_{p\text{-}p}$, Stair case, (Note 2)	$S_1=2$	—	±2	±5	%
	DG_2			$S_1=1$				
Defferential Phase	DP_1	2	$S_2=1$, $S_3=2$, $V_{i1}=0.45V_{p\text{-}p}$, Stair case, (Note 2)	$S_1=2$	—	±2	±5	°
	DP_2			$S_1=1$				
Sound RF Output Level	$V_o(f_{s1})$	—	$S_2=1$, $S_3=2$ (Note 1) V_{o3} : Sound RF level	$S_1=2$	81	83	86	dBμV
	$V_o(f_{s2})$			$S_1=1$				
Sound FM Temperature Drift	Δf_s	—	$S_1=1$, $S_2=2$, $S_3=2$ (Note 3) f_s ($Ta=0\sim60°C$) $-f_s$ ($Ta=25°C$)		—	—	±10	kHz
Sound FM Modulation Sensitivity	β_s	—	$S_1=1$, $S_2=2$, $S_3=1$ (Note 4)		0.36	0.43	0.52	kHz / mV
Sound Total Harmonic Distortion	THD	—	$S_1=1$, $S_2=2$, $S_3=3$ $V_{i2}=1kHz$ (Note 5)		—	0.2	1.0	%

(Note 1) Measure RF level by spectrum analyzer (Input impedance = 50) and calculate measurement data V_O (dBm) by

Output Level (dBμV) = V_O + 107 + 16 (dBμV)

(Note 2) Measure after that demodulated by the standard demodulator (For example Tektronix 1450).

(Note 3) Adjust a sound FM center frequency to 4.500MHz at Ta = 25°C, then measure a frequency drift at Ta = 0~60°C for at Ta = 25°C.
This spec (Δf_S) does not include TANK temperature coefficiency.

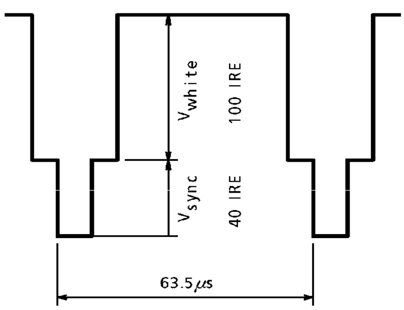
(Note 4) Connect Va + 0.2 (V) and Va − 0.2 (V) to V_1 (Va ; #6 terminals open voltage) then measure each frequency and calculate by

$$\beta_S = \frac{\text{Frequency difference between } V_1 = Va + 0.2 \text{ and } V_2 = Va - 0.2}{0.4}$$

(Note 5) Adjust V_{i2} level so that FM deviation become ±20kHz, then measure THD after that demodulate by standard demodulator (for example tektronix 1450)

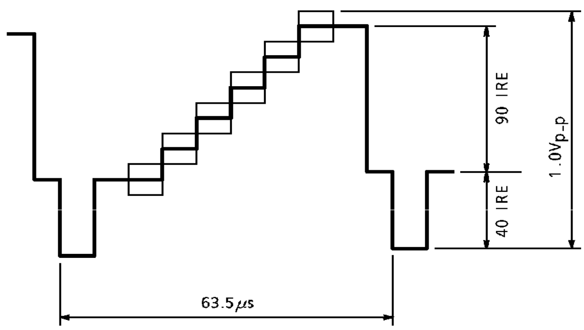
Input wave form

White signal

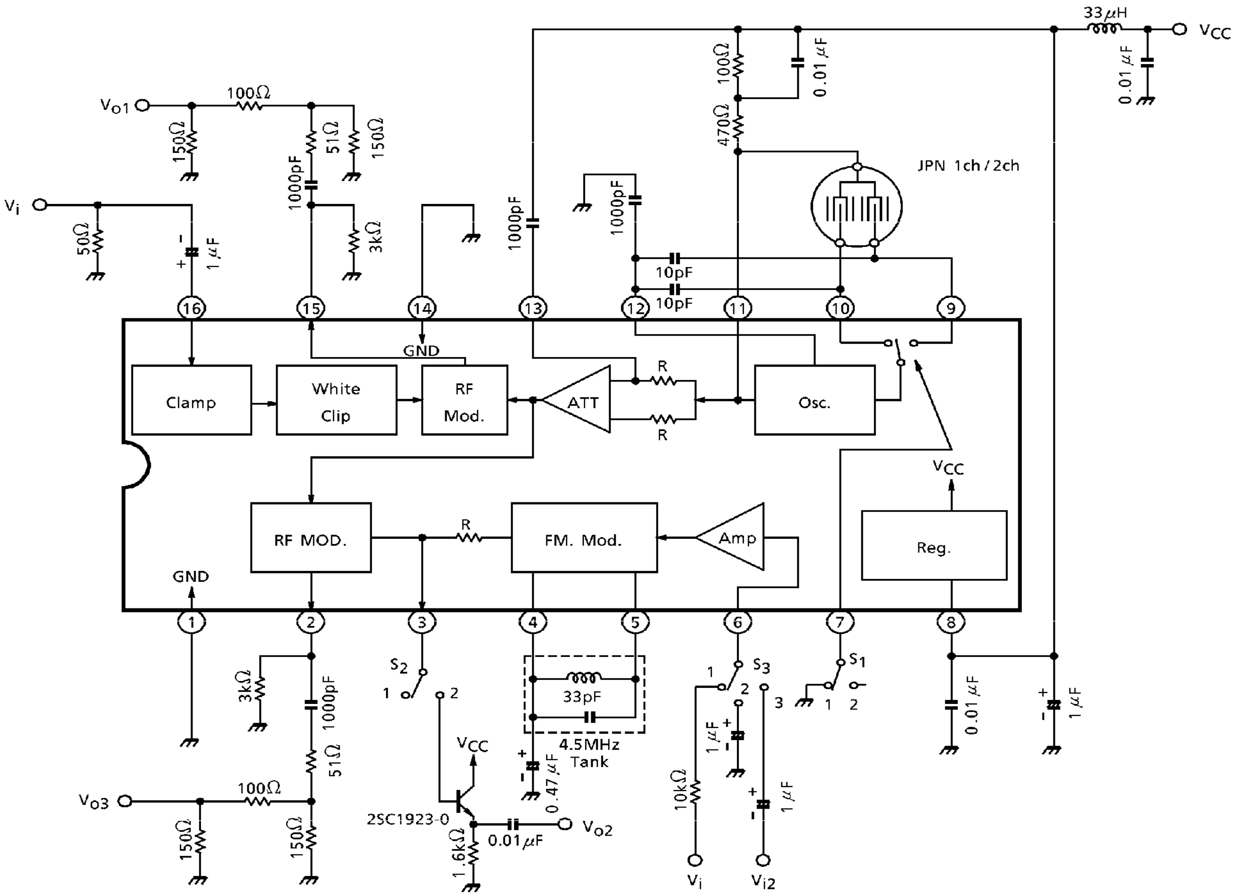


Stair case signal

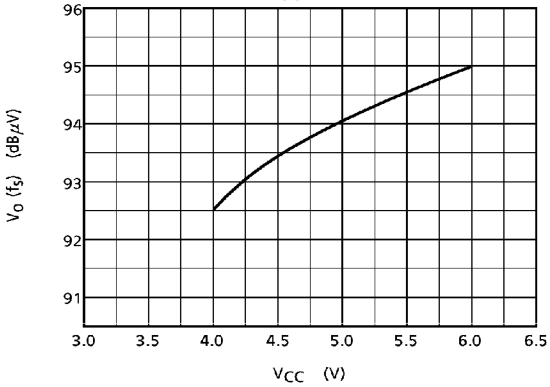
APL 50% sub carrier 20 IRE



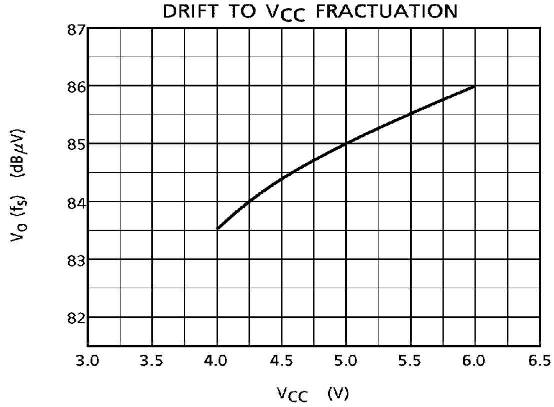
TEST CIRCUIT



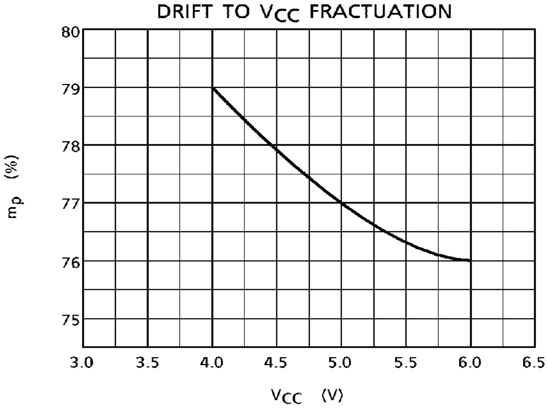
VIDEO RF OUTPUT LEVEL
DRIFT TO V_{CC} FRACTUATION



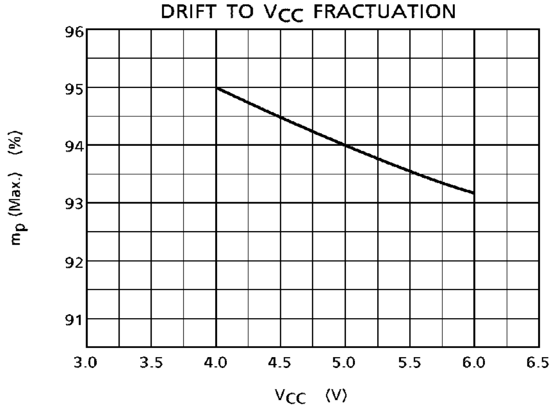
SOUND RF OUTPUT LEVEL
DRIFT TO V_{CC} FRACTUATION



VIDEO MODULATION FACTOR
DRIFT TO V_{CC} FRACTUATION



MAXIMUM VIDEO MODULATION FACTOR
DRIFT TO V_{CC} FRACTUATION



SOUND, VIDEO MODULATION RANK CLASSFICATION

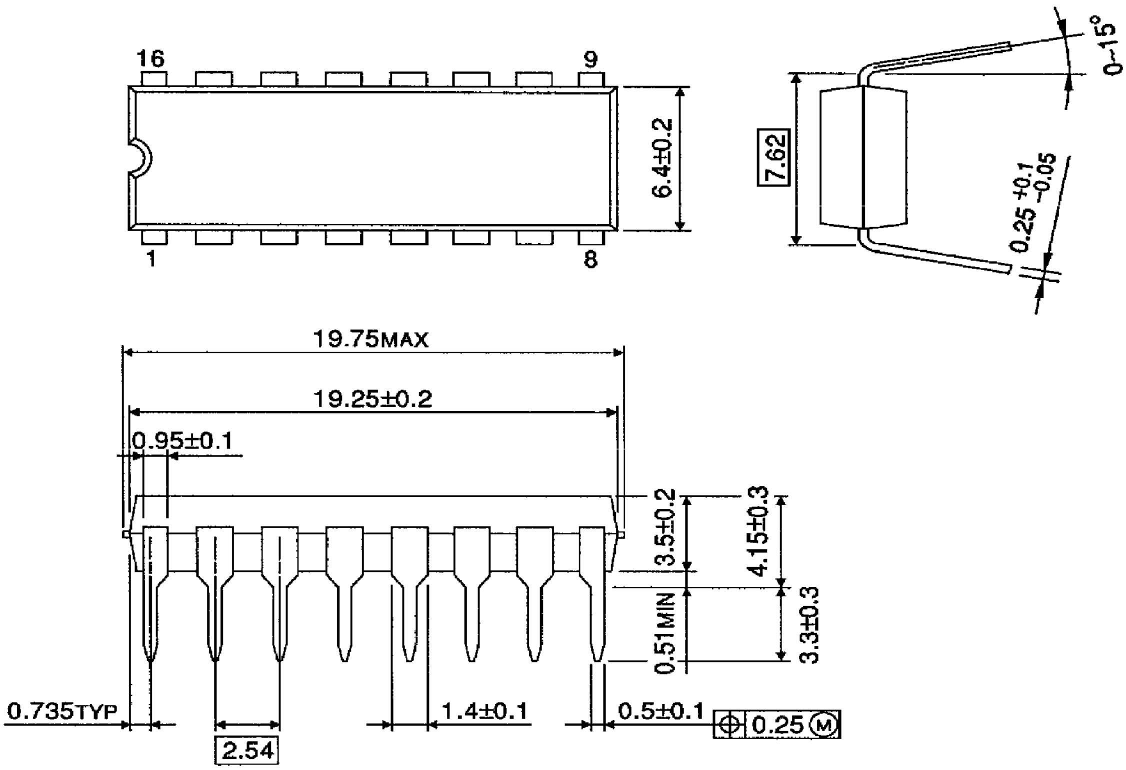
RANK	SOUND FM MODULATION SENSITIVITY				VIDEO MODULATION FACT				MARK
	MIN	TYP.	MAX	UNIT	MIN	TYP.	MAX	UNIT	
1	0.36	0.39	0.42	kHz / mV	72	75	78	%	Green
2	0.39	0.43	0.46		72	75	78		Yellow
3	0.44	0.48	0.52		72	75	78		Red
4	0.36	0.39	0.42		76	79	82		Blue
5	0.39	0.43	0.46		76	79	82		Orange
6	0.44	0.48	0.52		76	79	82		Purple

(Note) TA8637BP does not receive the rank classification specification when ordering.

OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm



Weight : 1.11g (Typ.)