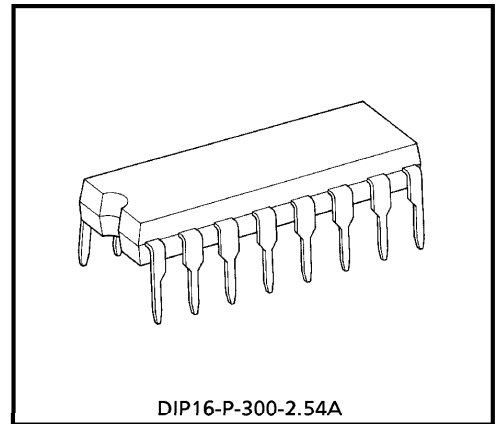


TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

**TA8637BP****VHF MODULATOR FOR VCR OR VDP****FEATURES**

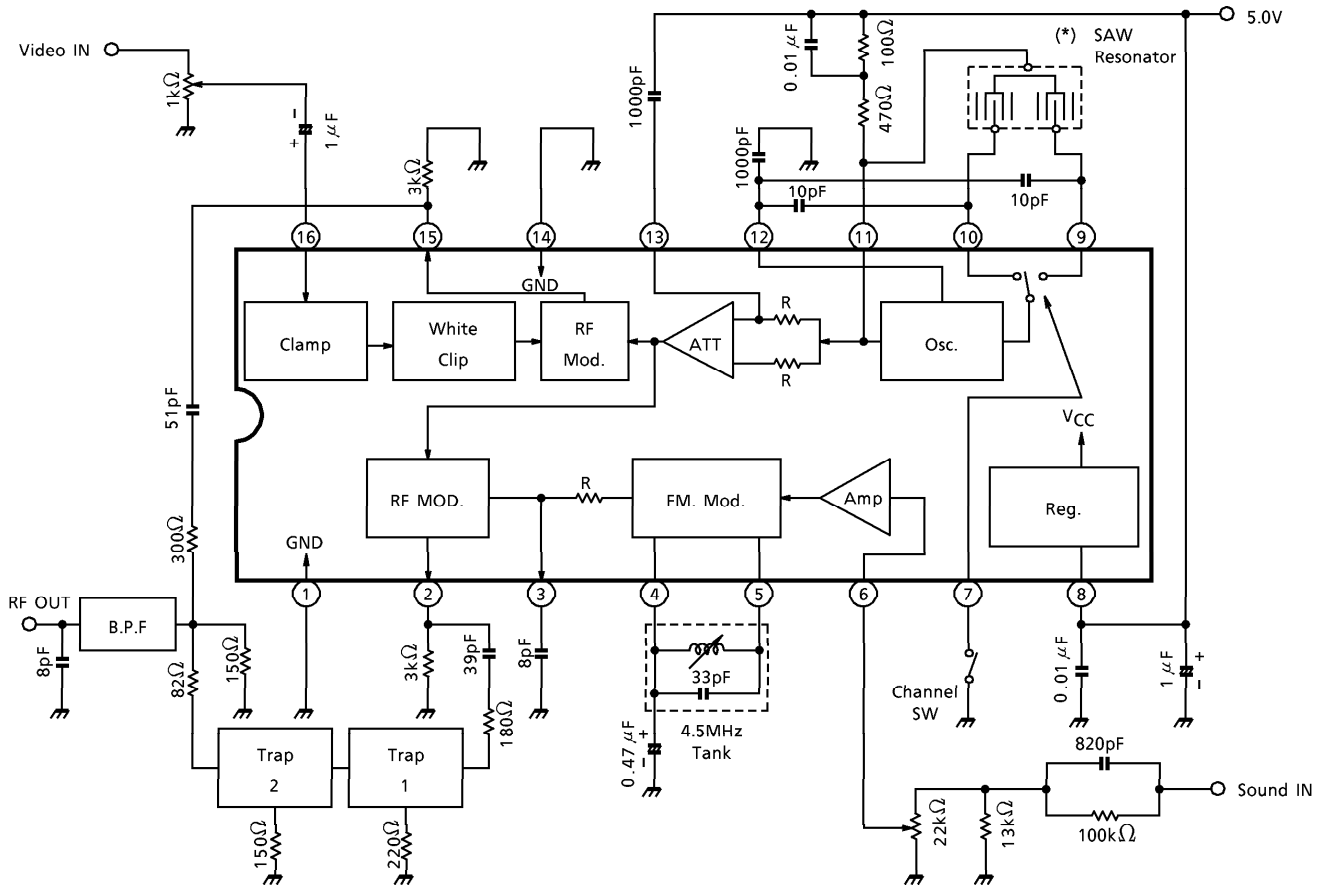
- Video clamp
- White clip
- Main carrier oscillator
- Main carrier attenuator
- Video Modulator
- Sound Modulator
- Sound FM Modulator
- Channel Switch
- Low power operation
- Adjustable output level and V/A ratio with external resistance.
- Minimum number of external parts required.
- Regulator circuit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

DIP16-P-300-2.54A  
Weight : 1.11g (Typ.)

000707EBA1

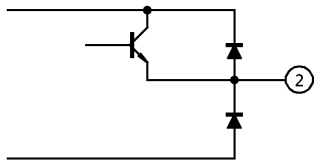
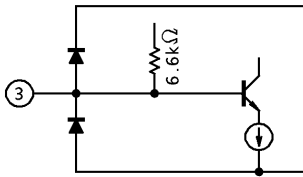
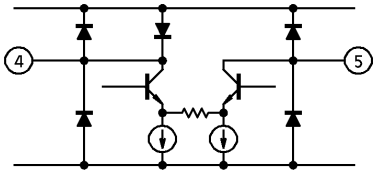
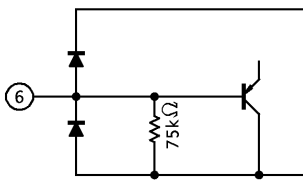
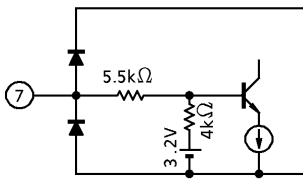
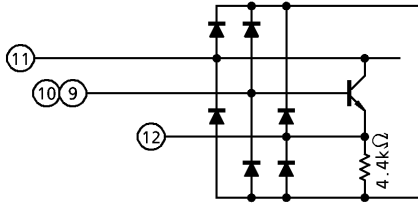
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BLOCK DIAGRAM & APPLICATION CIRCUIT



(\*) 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	VCC	(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 <sub>CC</sub>	7	V
Power Dissipation	P <sub>D</sub> (Note)	750	mA
Input Signal Voltage	e <sub>in</sub>	2.5	V <sub>p-p</sub>
Input Voltage at Pin 7	V <sub>in</sub>	GND - 0.3~V <sub>CC</sub> + 0.3	V
Operating Temperature	T <sub>opr</sub>	- 10~70	°C
Storage Temperature	T <sub>stg</sub>	- 55~150	°C

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

ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5.0V$ ,  $T_a = 25^\circ C$ )

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	90	92	94	$dB_{\mu V}$
	$V_O(f_{p2})$	—					
Video RF Output Level Temperature Drift	$\Delta V_O(f_{p1})$	—	$V_O(f_{p1})$ ( $T_a = -10 \sim 70^\circ C$ ) $- V_O(f_{p1})$ ( $T_a = 25^\circ C$ )	—	—	$\pm 2$	dB
	$\Delta V_O(f_{p2})$	—	$V_O(f_{p2})$ ( $T_a = -10 \sim 70^\circ C$ ) $- V_O(f_{p2})$ ( $T_a = 25^\circ C$ )				
Video Modulation Factor	$m_{p1}$	1	$S_2 = 1, S_3 = 2$ $V_{i1} = 0.45V_{p-p}$ , white	72	77	82	%
	$m_{p2}$						
Video Modulation Factor Temperature Stability	$\Delta m_{p1}$	1	$m_{p1}$ ( $T_a = -10 \sim 70^\circ C$ ) $- m_{p1}$ ( $T_a = 25^\circ C$ )	—	—	$\pm 3$	%
	$\Delta m_{p2}$	1	$m_{p2}$ ( $T_a = -10 \sim 70^\circ C$ ) $- m_{p2}$ ( $T_a = 25^\circ C$ )				
Video Modulation Factor Difference	$\Delta m_p$	1	$m_{p1} - m_{p2}$	—	—	$\pm 1$	%
Max. Video Modulation Factor	$m_{p2}(\text{Max.})$	1	$S_1 = 1, S_2 = 1, S_3 = 2$ $V_{i1} = 2.0V_{p-p}$ , white	89	94	98	%
Max. Video Modulation Temperature Drift	$\Delta m_{p2}(\text{Max.})$	1	$T_a = -10 \sim 70^\circ C$ $m_{p2}(\text{Max.})$	89	94	98	%
Defferential Gain	$DG_1$	2	$S_2 = 1, S_3 = 2,$ $V_{i1} = 0.45V_{p-p}$ , Stair case, (Note 2)	—	$\pm 2$	$\pm 5$	%
	$DG_2$						
Defferential Phase	$DP_1$	2	$S_2 = 1, S_3 = 2,$ $V_{i1} = 0.45V_{p-p}$ , Stair case, (Note 2)	—	$\pm 2$	$\pm 5$	°
	$DP_2$						
Sound RF Output Level	$V_O(f_{s1})$	—	$S_2 = 1, S_3 = 2$ (Note 1) $V_{O3}$ : Sound RF level	81	83	86	$dB_{\mu V}$
	$V_O(f_{s2})$						
Sound FM Temperature Drift	$\Delta f_s$	—	$S_1 = 1, S_2 = 2, S_3 = 2$ (Note 3) $f_s$ ( $T_a = 0 \sim 60^\circ C$ ) $- f_s$ ( $T_a = 25^\circ C$ )	—	—	$\pm 10$	kHz
Sound FM Modulation Sensitivity	$\beta_s$	—	$S_1 = 1, S_2 = 2, S_3 = 1$ (Note 4)	0.36	0.43	0.52	kHz / mV
Sound Total Harmonic Distortion	THD	—	$S_1 = 1, S_2 = 2, S_3 = 3$ $V_{i2} = 1\text{kHz}$ (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

$$\text{Output Level (dB}\mu\text{V)} = V_O + 107 + 16 \text{ (dB}\mu\text{V)}$$

(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  $T_a = 25^\circ\text{C}$ , then measure a frequency drift at  $T_a = 0\sim 60^\circ\text{C}$  for at  $T_a = 25^\circ\text{C}$ .

This spec ( $\Delta f_s$ ) does not include TANK temperature coefficient.

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

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

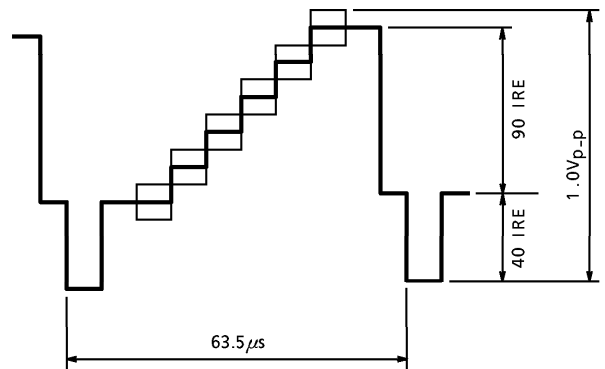
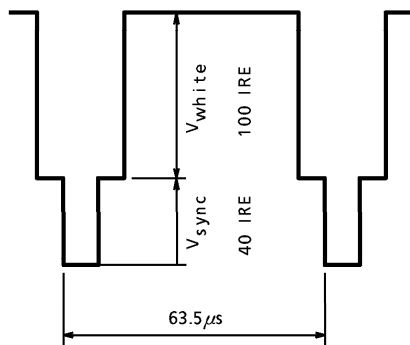
(Note 5) Adjust  $V_{i2}$  level so that FM deviation become  $\pm 20\text{kHz}$ , then measure THD after that demodulate by standard demodulator (for example tektronix 1450)

Input wave form

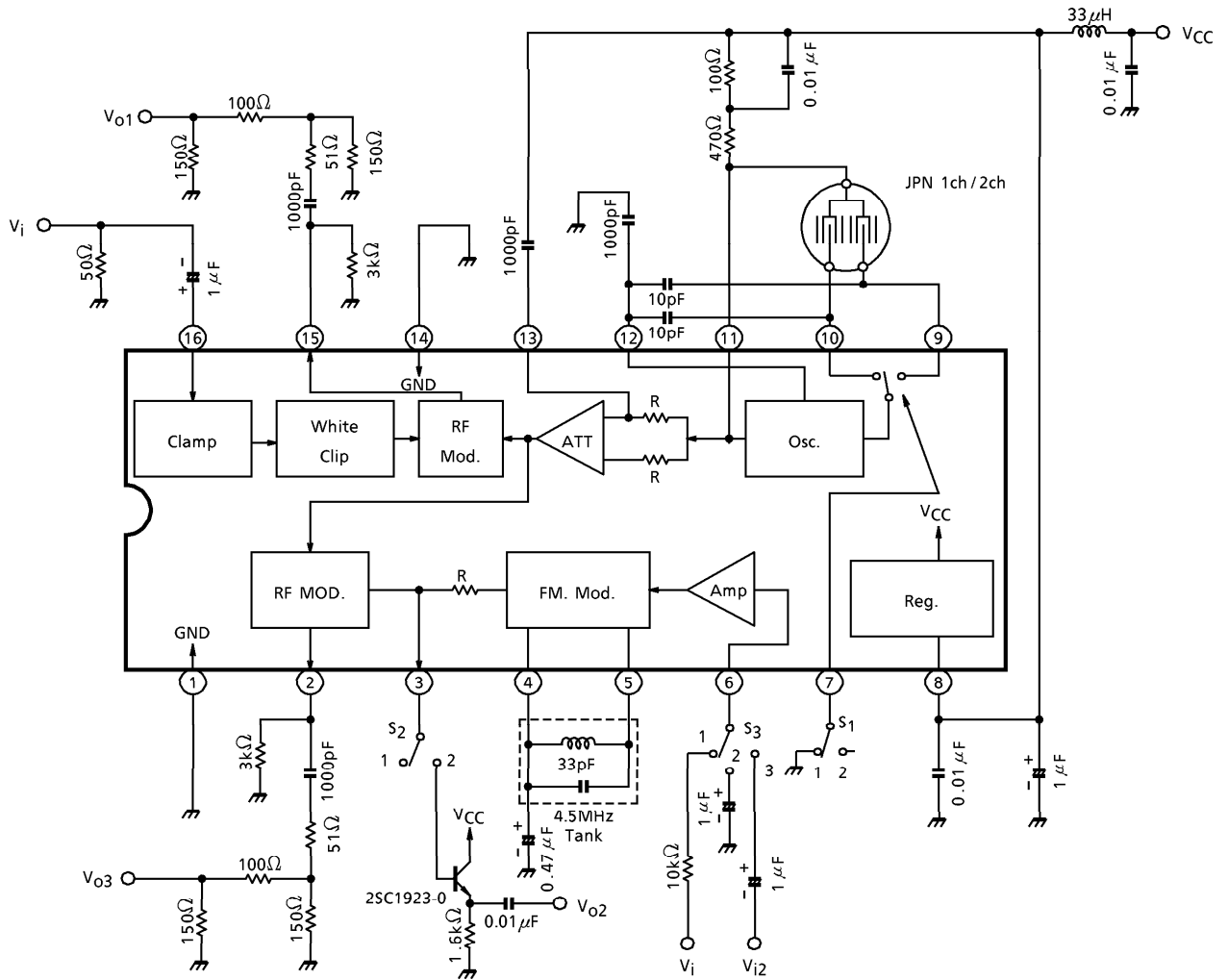
White signal

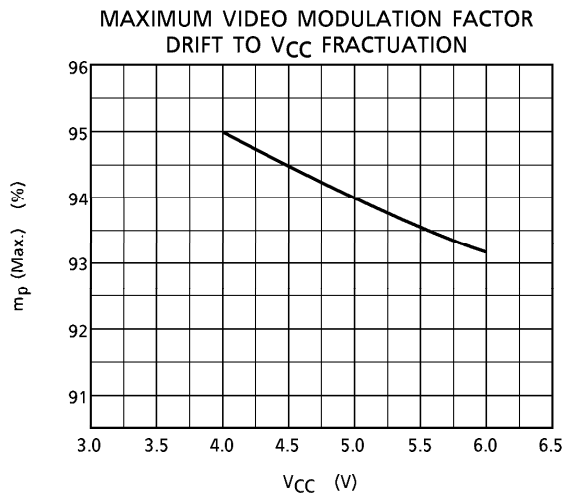
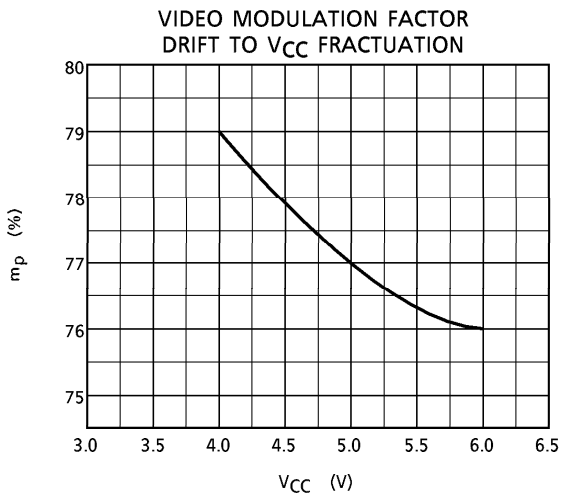
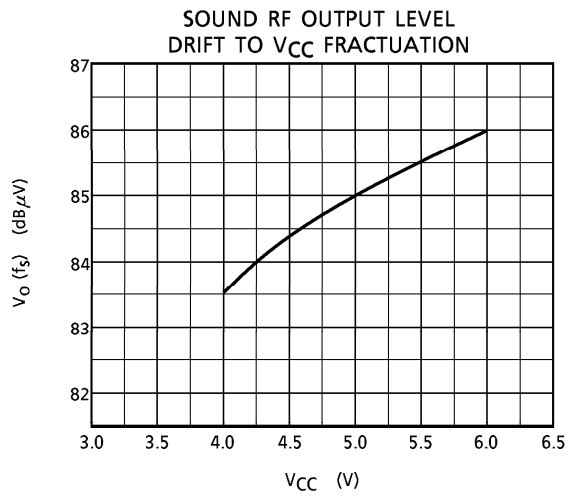
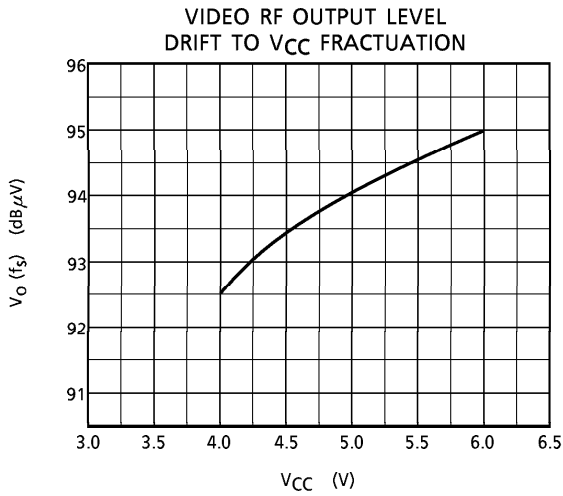
Stair case signal

APL 50% sub carrier 20 IRE



TEST CIRCUIT





**SOUND, VIDEO MODULATION RANK CLASSIFICATION**

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.



**HANDLING PRECAUTIONS**

1. The device should not be inserted into or removed from the test jig while the voltage is being applied: otherwise the device may be degraded or break down.

Do not abruptly increase or decrease the power supply to the device either.

Overshoot or chattering of the power supply may cause the IC to be degraded.

To avoid this filters should be incorporated on the power supply line.

2. The application circuits described in this datasheet are given only as system examples for evaluating the device's performance. Toshiba Intend neither to recommend the configuration or related values of the peripheral circuits nor to manufacture such application system in large quantities.

Please note that high-frequency characteristics of the device may vary depending on the external components, mounting method and other factors relating to the application design.

Therefore, the characteristics of application circuits must be evaluated at the responsibility of the users incorporating the device into their design.

Toshiba only guarantee the quality and characteristics of the device as described in this detasheet and do not assume any responsibility for the customers application design.

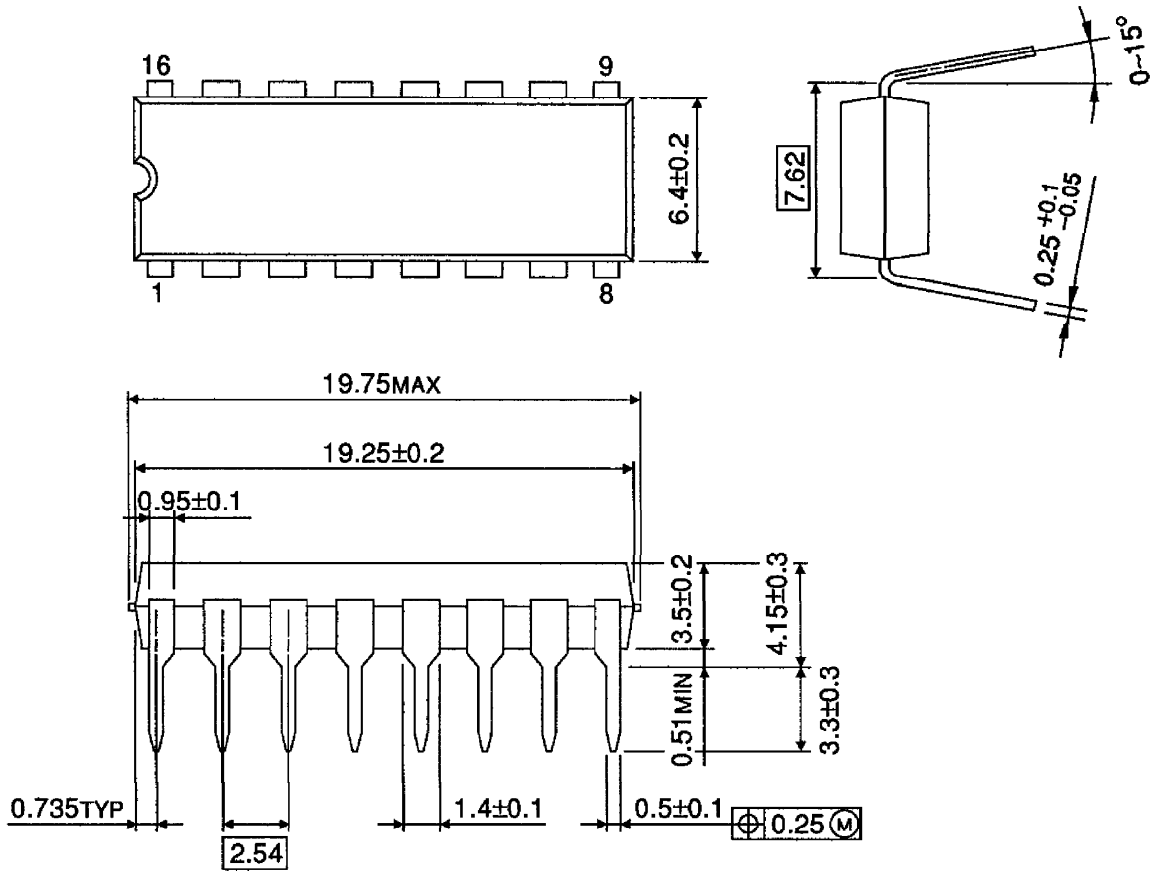
3. In order to better understand the quality and reliability of Toshiba semiconductor products and to incorporate them into design in an appropriate manner, please refer to the latest Semiconductor Reliability Handbook (Integrated Circuit) published by Toshiba Semiconductor Company.

The handbook can also be viewed online at

<http://www.semicon.toshiba.co.jp/noseek/us/sinrai/sinraifm.htm>

PACKAGE DIMENSIONS  
DIP16-P-300-2.54A

Unit : mm



Weight : 1.11g (Typ.)