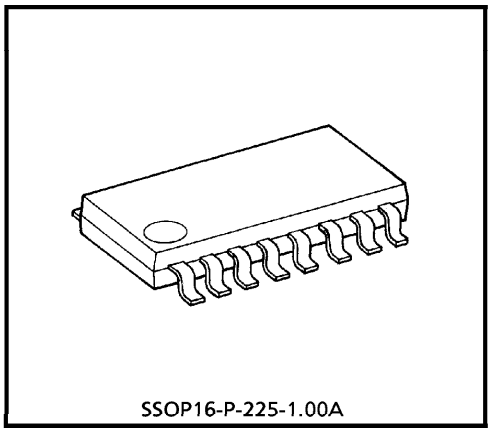
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8637BF

VHF MODULATOR FOR VCR OR VDP



Weight : 0.14g (Typ.)

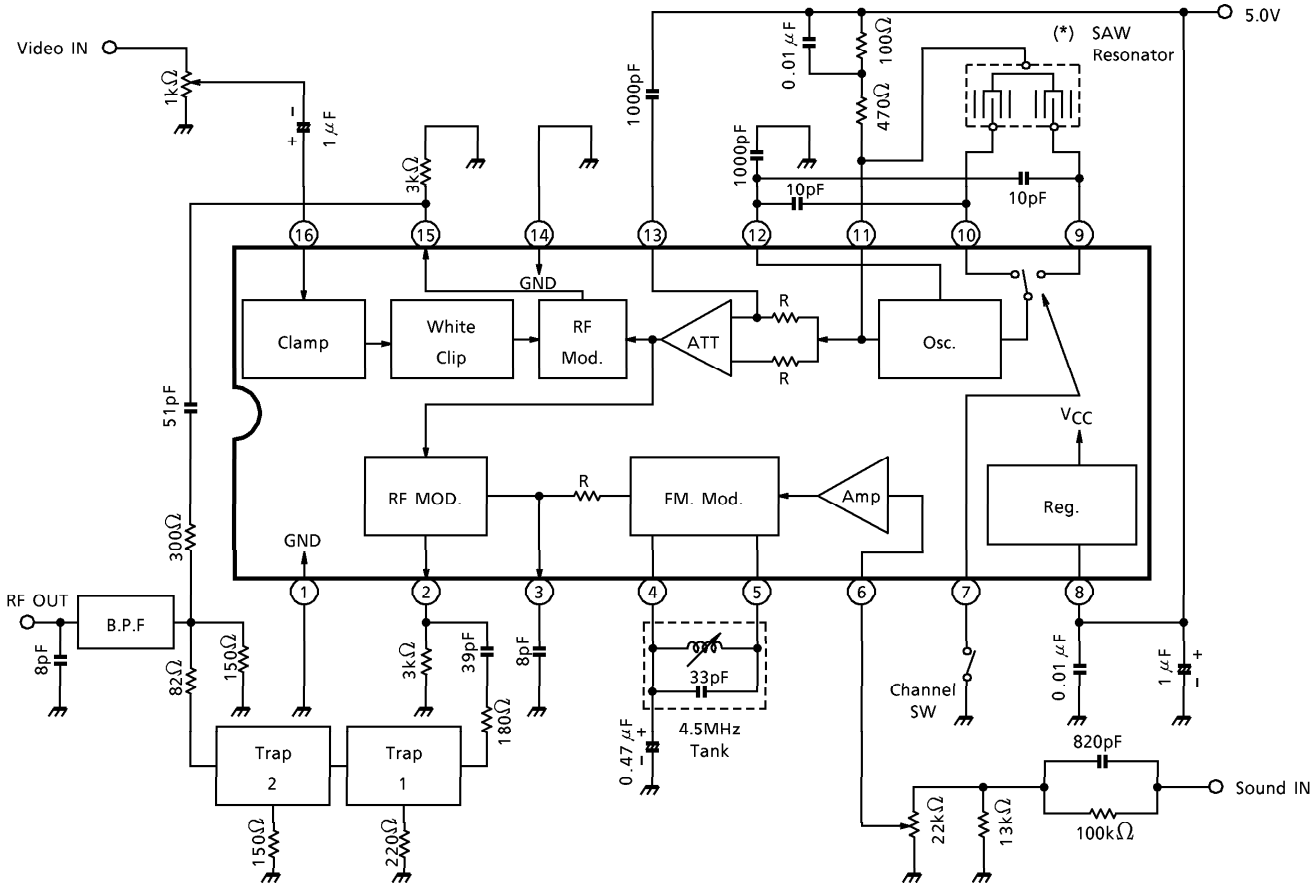
FEATURES

- 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

000707EBA1

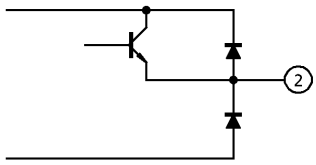
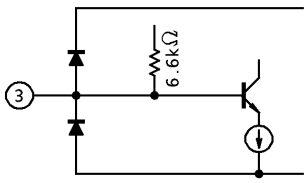
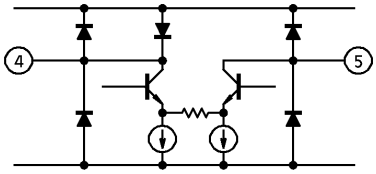
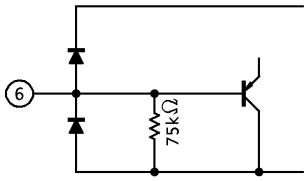
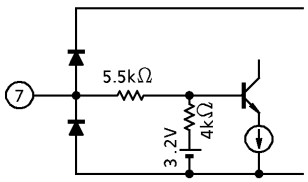
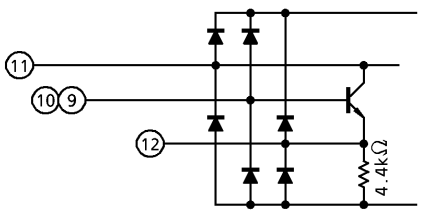
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  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
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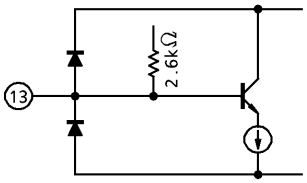
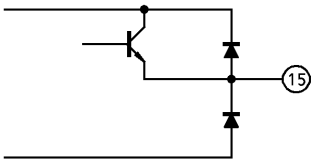
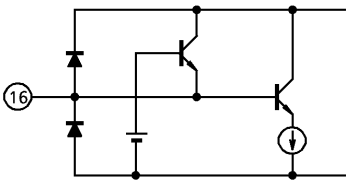
BLOCK DIAGRAM & APPLICATION CIRCUIT



(*) 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) : PIN 9 LOW : PIN 10
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 3mW / °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	ΔV_O (f_{p1})	—	V_O (f_{p1}) (Ta = −10~70°C) − V_O (f_{p1}) (Ta = 25°C)		—	—	±2	dB
	ΔV_O (f_{p2})	—	V_O (f_{p2}) (Ta = −10~70°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-p}, white	S_1 = 2	72	77	82	%
	m_{p2}	1		S_1 = 1				
Video Modulation Factor Temperature Stability	Δm_{p1}	1	m_{p1} (Ta = −10~70°C) − m_{p1} (Ta = 25°C)		—	—	±3	%
	Δm_{p2}	1	m_{p2} (Ta = −10~70°C) − m_{p2} (Ta = 25°C)					
Video Modulation Factor Difference	Δm_p	1	$m_{p1} - m_{p2}$		—	—	±1.5	%
Max. Video Modulation Factor	m_{p2} (Max.)	1	S_1 = 1, S_2 = 1, S_3 = 2 V_{i1} = 2.0V_{p-p}, white		88	93	97	%
Max. Video Modulation Temperature Drift	Δm_{p2} (Max.)	1	Ta = −10~70°C m_{p2} (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)	S_1 = 2	—	±2	±5	%
	DG_2	2		S_1 = 1				
Defferential Phase	DP_1	2	S_2 = 1, S_3 = 2, V_{i1} = 0.45V_{p-p}, Stair case, (Note 2)	S_1 = 2	—	±2	±5	°
	DP_2	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 = 0~60°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 ($dB\mu V$) = V_O + 107 + 16 ($dB\mu V$)

(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 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.

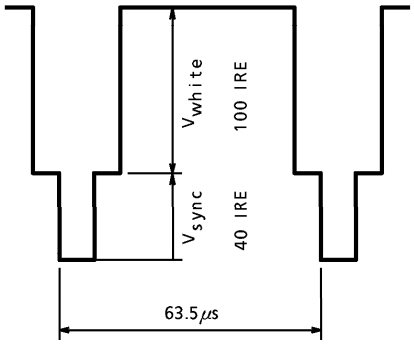
(Note 4) Connect Va + 0.2 (V) and Va − 0.2 (V) to V_1 (Va ; #6 terminals open voltage) then measure each frequency and calculate by

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

(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)

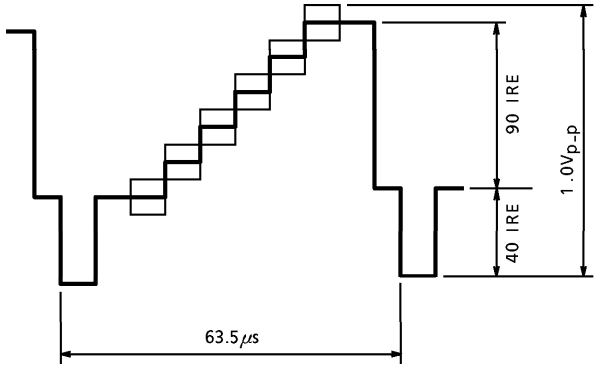
Input wave form

White signal

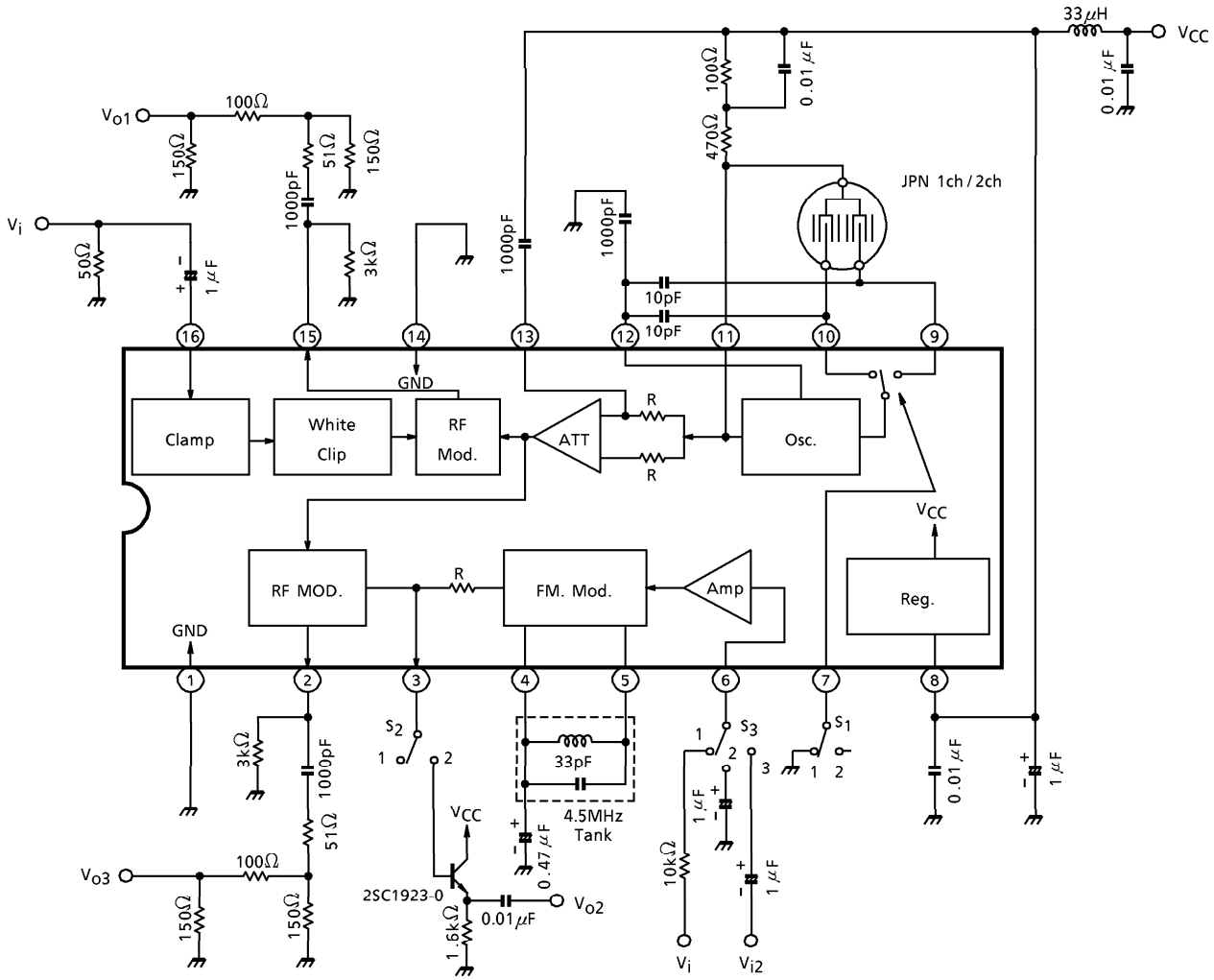


Stair case signal

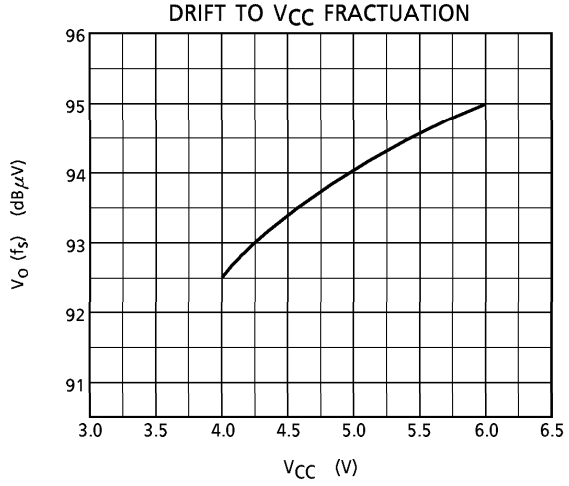
APL 50% sub carrier 20 IRE



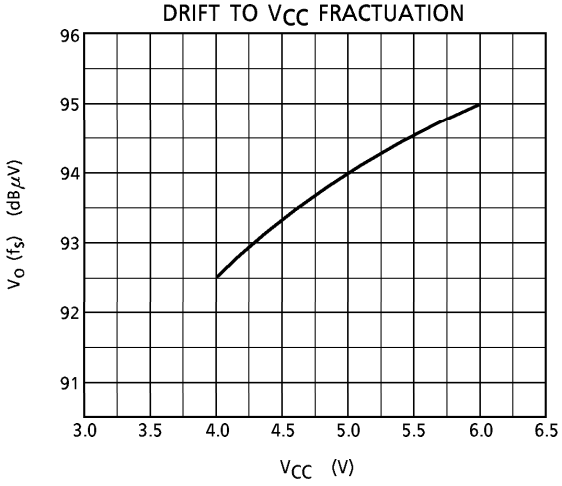
TEST CIRCUIT



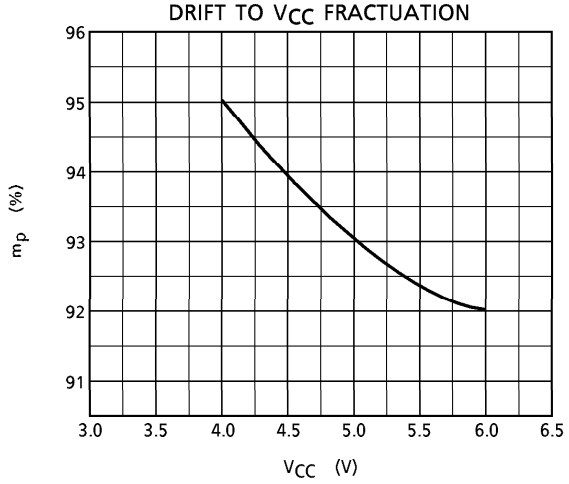
VIDEO RF OUTPUT LEVEL
DRIFT TO V_{CC} FRACTUATION



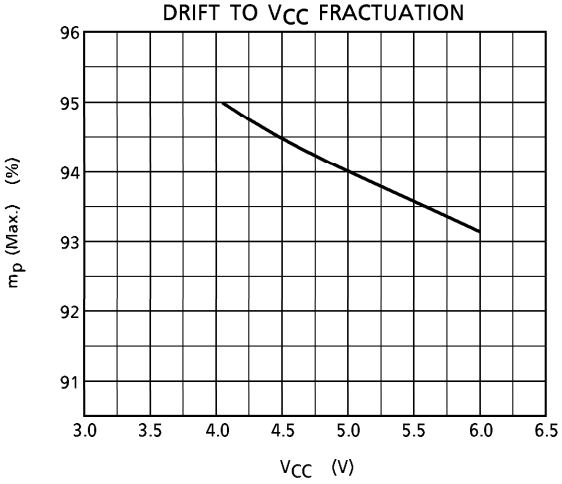
SOUND RF OUTPUT LEVEL
DRIFT TO V_{CC} FRACTUATION



VIDEO MODULATION FACTOR
DRIFT TO V_{CC} FRACTUATION



MAXIMUM VIDEO MODULATION FACTOR
DRIFT TO V_{CC} FRACTUATION



(Note) TA8637BF does not divide the sound FM modulation sensitivity and video modulation rank classification.

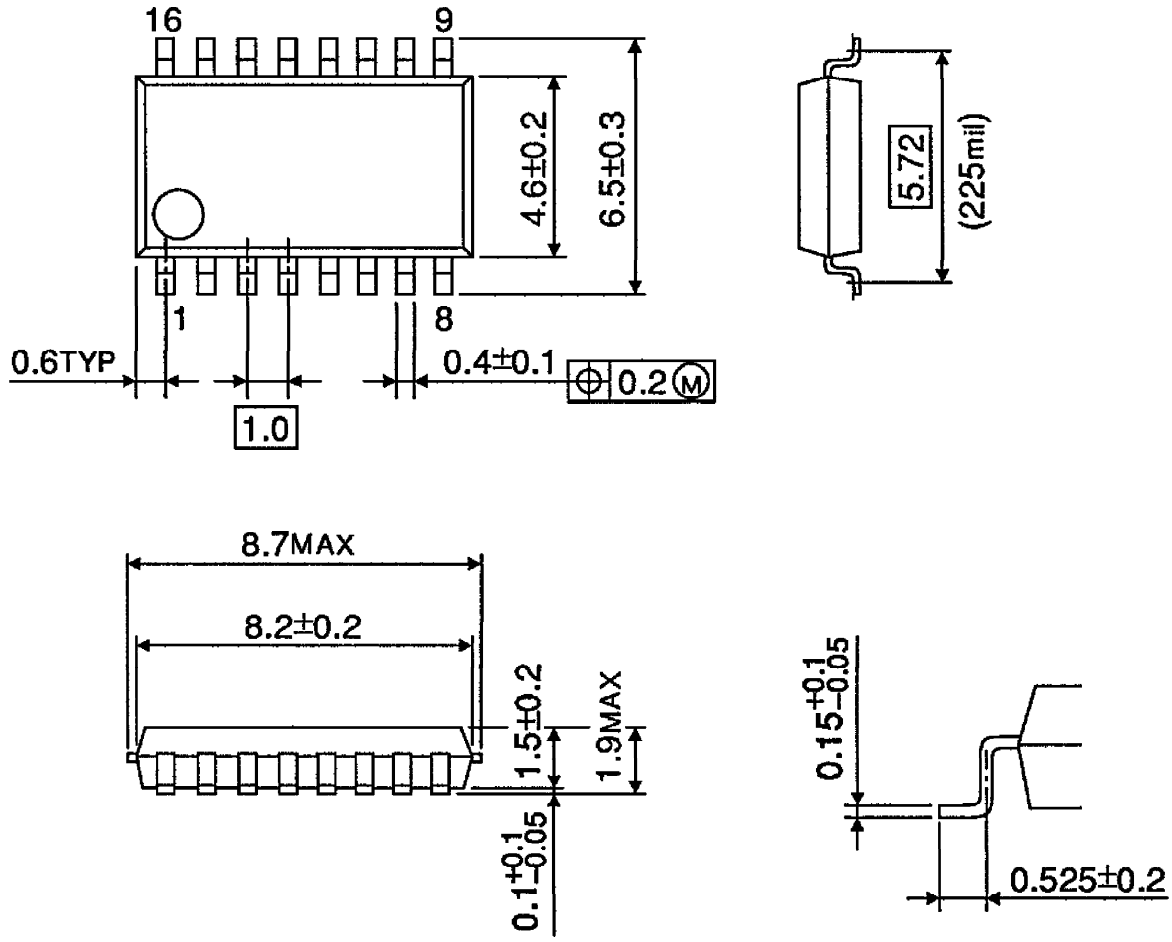
HANDLING PRECAUTIONS

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

SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)