

TA2132BPG, TA2132BFG

AM/FM Radio IC

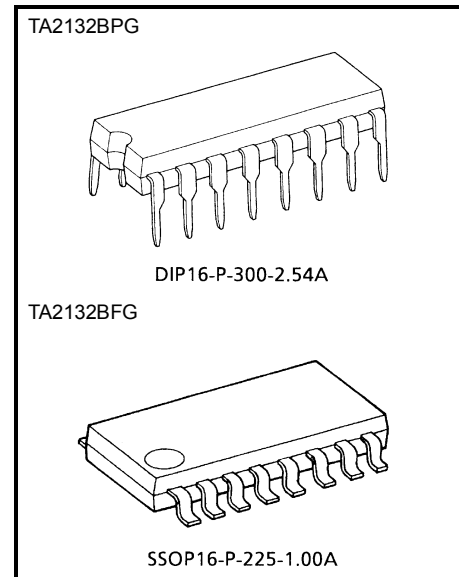
TA2132BPG, TA2132BFG are AM/FM Radio IC (FM F/E + AM/FM IF) which are designed for AM/FM Radios.

FM Local Oscillation Voltage is set up low relativity, for NEW FCC.

Features

- For NEW FCC.
- AM detector coil, FM IFT, IF coupling condenser are not needed.
- For adopting ceramic discriminator, it is not necessary to adjust the FM quad detector circuit.
- Built-in varactor diode for AFC
- Low supply current: ($V_{CC} = 3\text{ V}$, $T_a = 25^\circ\text{C}$)
 ICC_q (FM) = 7.3 mA (typ.)
 ICC_q (AM) = 3.6 mA (typ.)
- Operating supply voltage range: $V_{CC} = 1.8\sim 7\text{ V}$ ($T_a = 25^\circ\text{C}$)

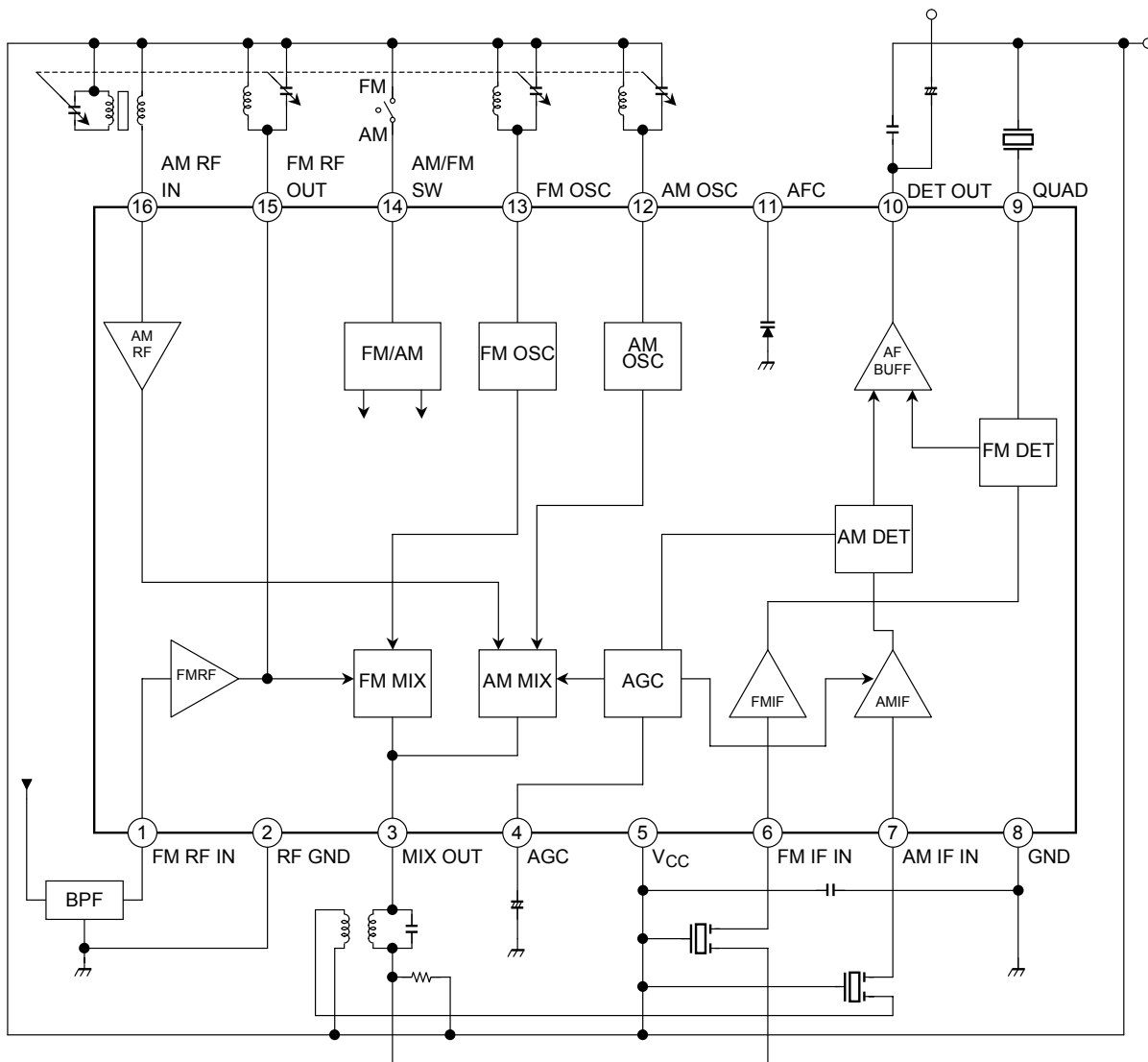
Note: The IC may be destroyed due to incorrect orientation of device's mounting.



Weight

DIP16-P-300-2.54A : 1.00 g (typ.)
SSOP16-P-225-1.00A : 0.14 g (typ.)

Block Diagram



Explanation of Terminals

(Terminal Voltage: Typical DC voltage at no signal with test circuit, $V_{CC} = 3\text{ V}$, $T_a = 25^\circ\text{C}$)

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			AM	FM
1	FM RF IN		0	0.8
2	RF GND (GND for FM RF, FM OSC stage)	—	0	0
3	MIX OUT		3.0	2.9
4	AGC (FM IF level output)		0	0
5	V_{CC} (V_{CC} for AM, FM IF stage)	—	3.0	3.0
6	FM IF IN		3.0	3.0

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			AM	FM
7	AM IF IN		2.3	2.6
8	GND (GND for AM, FM IF stage)	—	0	0
9	QUAD		2.5	2.2
10	DET OUT	(a) LOW → FM, HIGH → AM (b) LOW → AM, HIGH → FM	1.0	0.9
11	AFC		—	—

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			AM	FM
12	AM OSC		3.0	3.0
13	FM OSC		3.0	3.0
14	AM/FM SW • SW condition $V_{14} = V_{CC} \rightarrow \text{FM}$ $V_{14} = \text{OPEN} \rightarrow \text{AM}$ • V_{CC} for FM RF, FM OSC stage		—	3.0
15	FM RF OUT	Cf-Pin 1	3.0	3.0
16	AM RF IN		3.0	3.0

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Supply voltage		V _{CC}	8	V
Power dissipation	TA2132BPG	P _D (Note 1)	750	mW
	TA2132BFG		350	
Operating temperature		T _{opr}	-25~75	°C
Storage temperature		T _{stg}	-55~150	°C

Note 1: Deleted above Ta = 25°C in the proportion of 6 mW/°C for TA2132BPG and of 2.8 mW/°C for TA2132BFG.

Electrical Characteristics (Unless otherwise specified, Ta = 25°C, V_{CC} = 3 V,

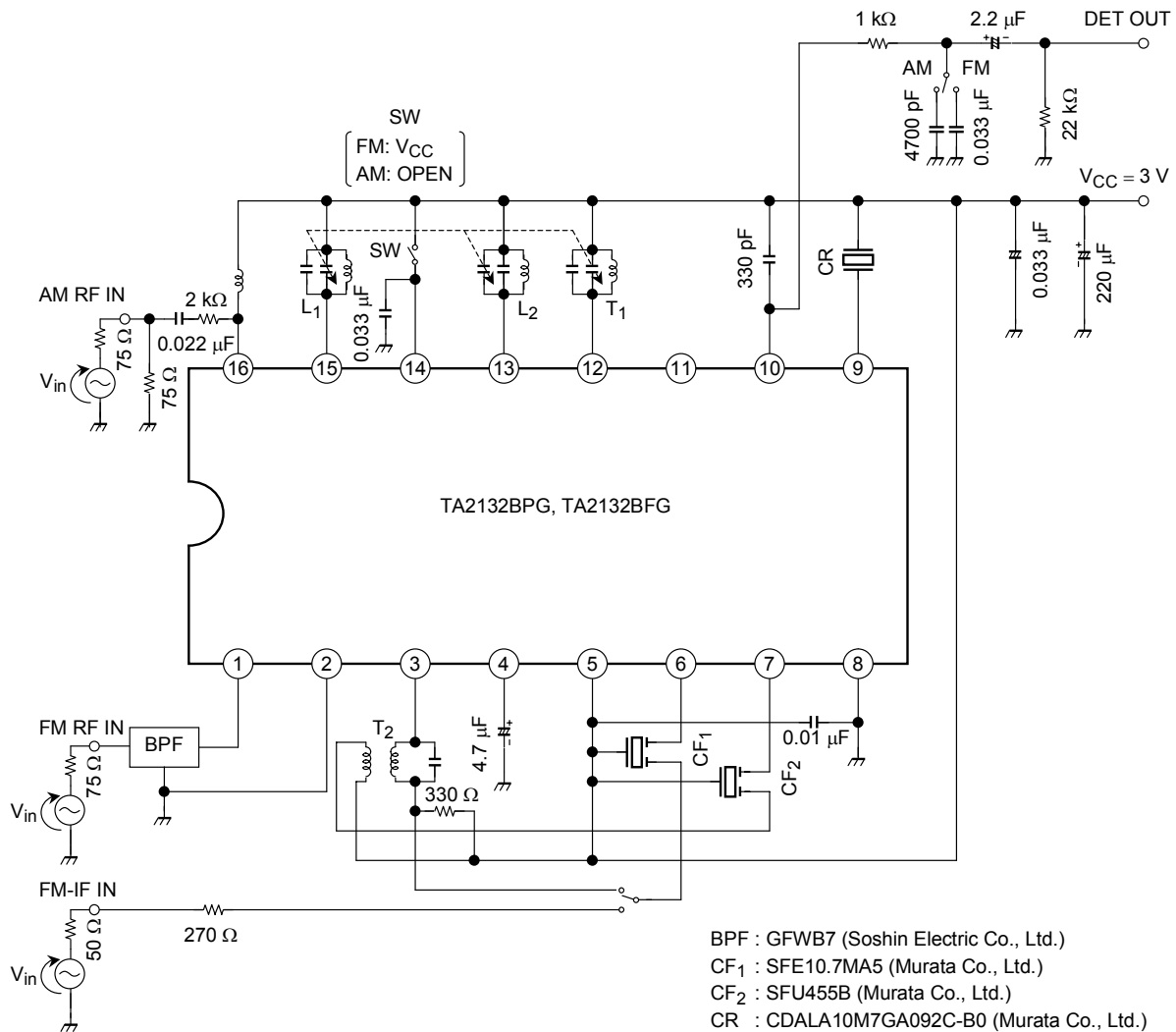
F/E : f = 98 MHz, f_m = 1 kHz

FM IF : f = 10.7 MHz, Δf = ±75 kHz, f_m = 1 kHz

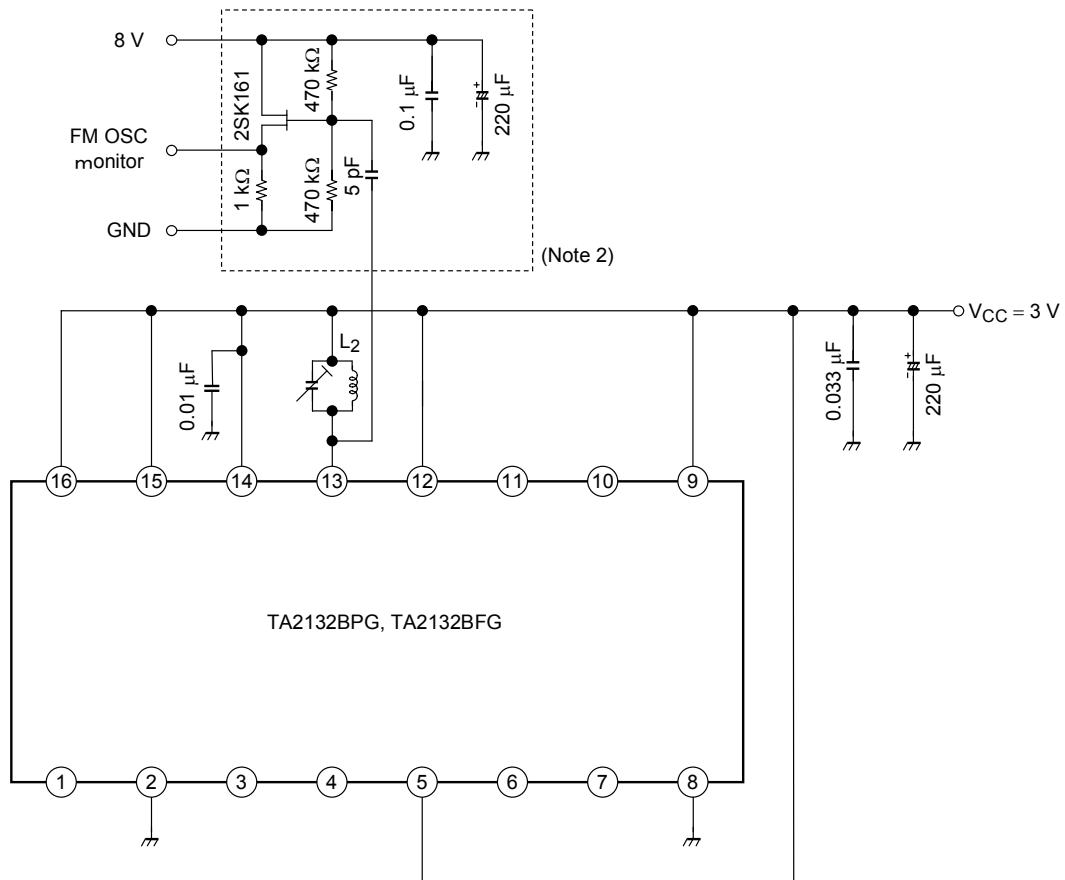
AM : f = 1 MHz, MOD = 30%, f_m = 1 kHz)

Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Supply current		I _{CC} (FM)	1	FM mode, V _{in} = 0	—	7.3	11.0	mA
		I _{CC} (AM)	1	AM mode, V _{in} = 0	—	3.6	7.0	
F/E	Input limiting voltage	V _{in} (lim)	1	-3dB limiting point	—	10	—	dBμV EMF
	Quiescent sensitivity	Q _S	1	S/N = 40dB	—	15	—	dBμV EMF
	Local OSC voltage	V _{OSC}	2	f _{OSC} = 108 MHz	—	130	—	mV _{rms}
FM IF	Input limiting voltage	V _{in} (lim) IF	1	-3dB limiting point	38	43	48	dBμV EMF
	Recovered output voltage	V _{OD}	1	V _{in} = 80dBμV EMF	180	240	300	mV _{rms}
	Signal to noise ratio	S/N	1	V _{in} = 80dBμV EMF	—	72	—	dB
	Total harmonic distortion	THD	1	V _{in} = 80dBμV EMF	—	0.5	—	%
	AM rejection ratio	AMR	1	V _{in} = 80dBμV EMF	—	60	—	dB
AM	Voltage gain	G _V	1	V _{in} = 28dBμV EMF	20	38	75	mV _{rms}
	Recovered output voltage	V _{OD}	1	V _{in} = 60dBμV EMF	55	80	110	mV _{rms}
	Signal to noise ratio	S/N	1	V _{in} = 60dBμV EMF	—	41	—	dB
	Total harmonic distortion	THD	1	V _{in} = 60dBμV EMF	—	1.0	—	%

Test Circuit 1



Test Circuit 2

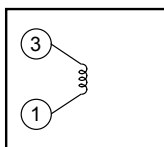


Note 2: FET buff voltage gain $\approx 0\text{dB}$

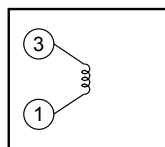
Coil Data

Coil No.	Test Freq.	L (μH)	Co (pF)	Qo	Turns					Wire (mm ϕ)	Reference
					1-2	2-3	1-3	1-4	4-6		
L ₁ FM RF	100 MHz	—	—	79	—	—	—	2 $\frac{1}{2}$	—	0.16UEW	Toko Co., Ltd. 666SNF-305NK
L ₂ FM OSC	100 MHz	—	—	76	—	—	—	2	—	0.16UEW	Toko Co., Ltd. 666SNF-306NK
T ₁ AM OSC	796 kHz	268	—	65	19	95	—	—	—	0.05UEW	Toko Co., Ltd. 5PNR-5146Y
T ₂ AM IFT	455 kHz	—	470	60	—	—	109	—	7	0.05UEW	Toko Co., Ltd. 5PLG-5147X

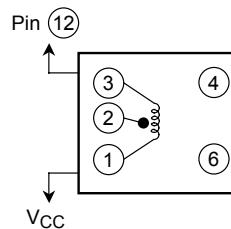
L₁: FM RF



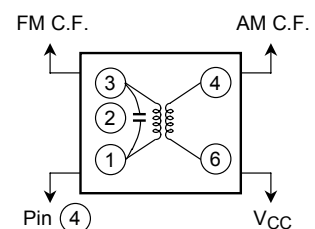
L₂: FM OSC



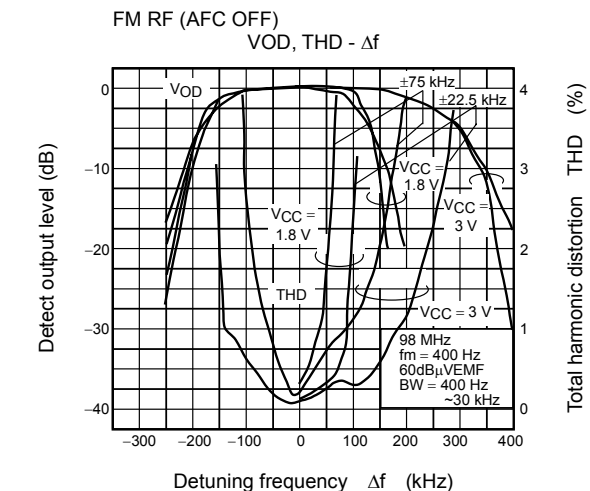
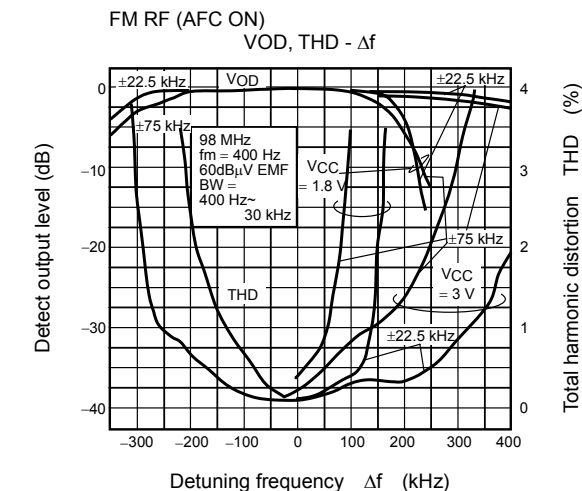
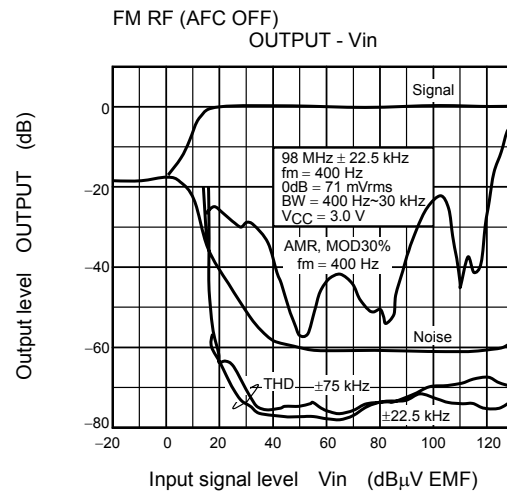
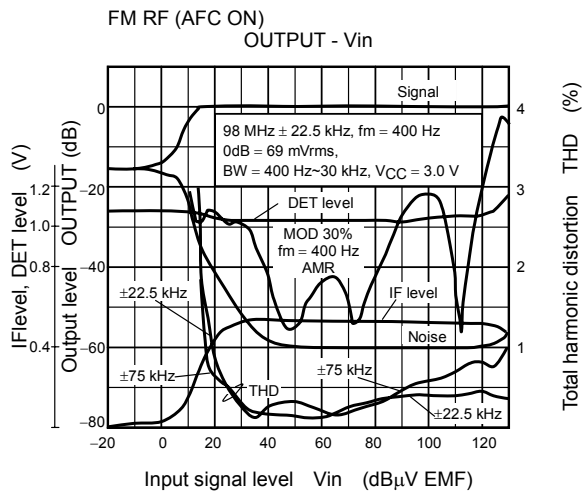
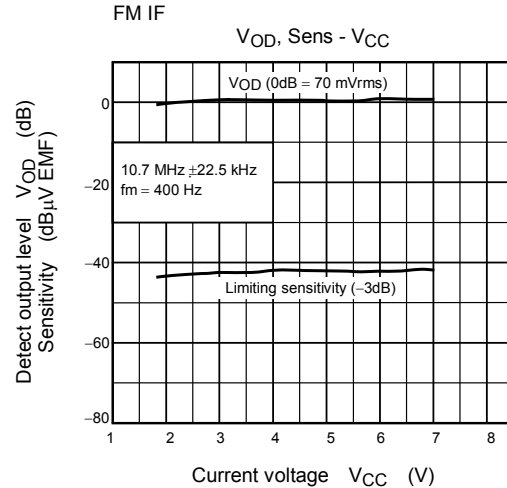
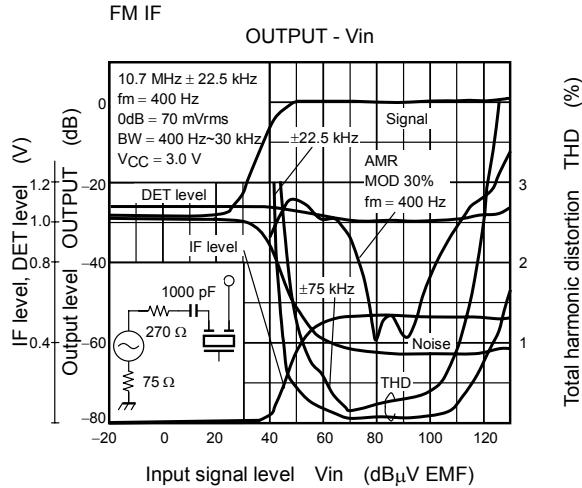
T₁: AM OSC

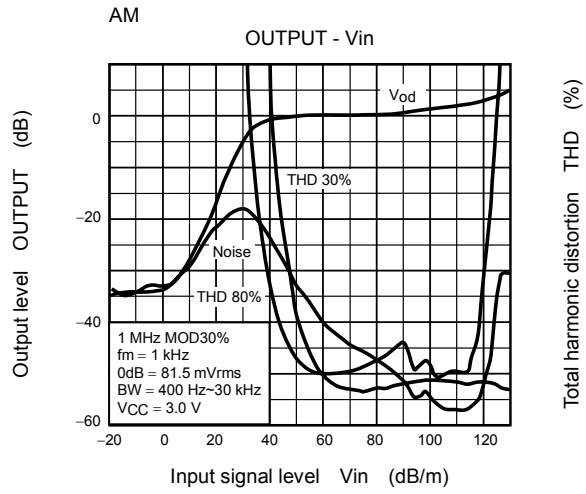


T₂: AM IFT



(BOTTOM VIEW)

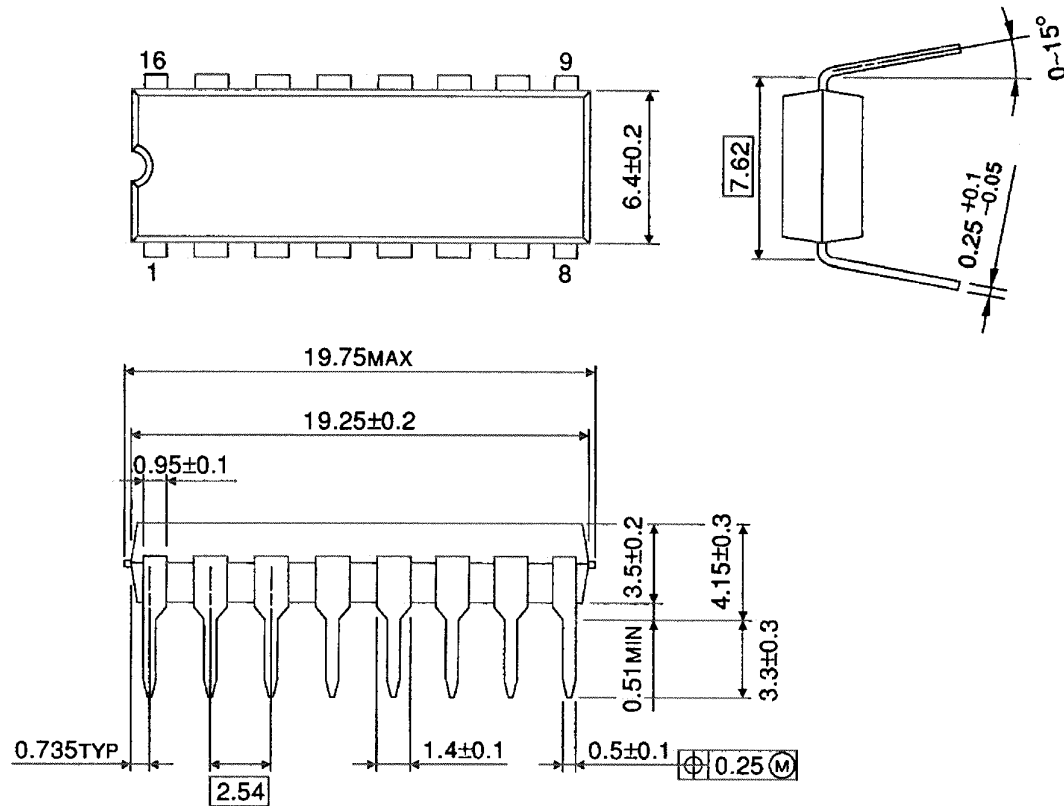




Package Dimensions

DIP16-P-300-2.54A

Unit : mm

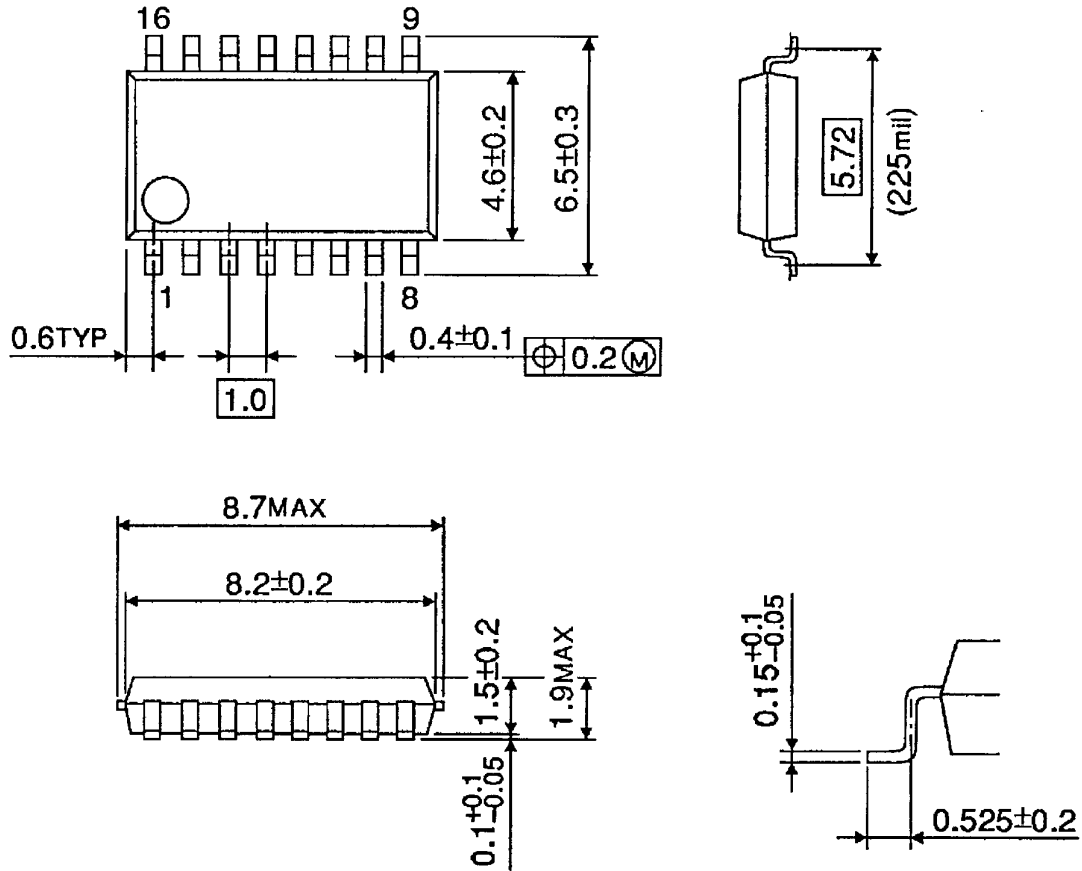


Weight: 1.00 g (typ.)

Package Dimensions

SSOP16-P-225-1.00A

Unit : mm



Weight: 0.14 g (typ.)

About solderability, following conditions were confirmed

- Solderability

- (1) Use of Sn-63Pb solder Bath

- solder bath temperature = 230°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

- (2) Use of Sn-3.0Ag-0.5Cu solder Bath

- solder bath temperature = 245°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

RESTRICTIONS ON PRODUCT USE

030619EBA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
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..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.