TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

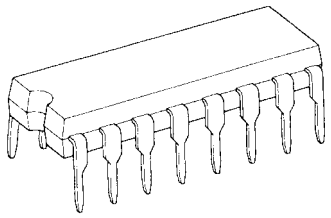
TA2132BP,TA2132BF

AM/FM Radio IC

TA2132BP, TA2132BF are AM/FM Radio IC (FM F/E + AM/FM IF) which are designed for AM/FM Radios.

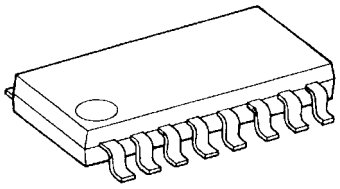
FM Local Oscillation Voltage is set up low relativity, for NEW FCC.

TA2132BP



DIP16-P-300-2.54A

TA2132BF



SSOP16-P-225-1.00A

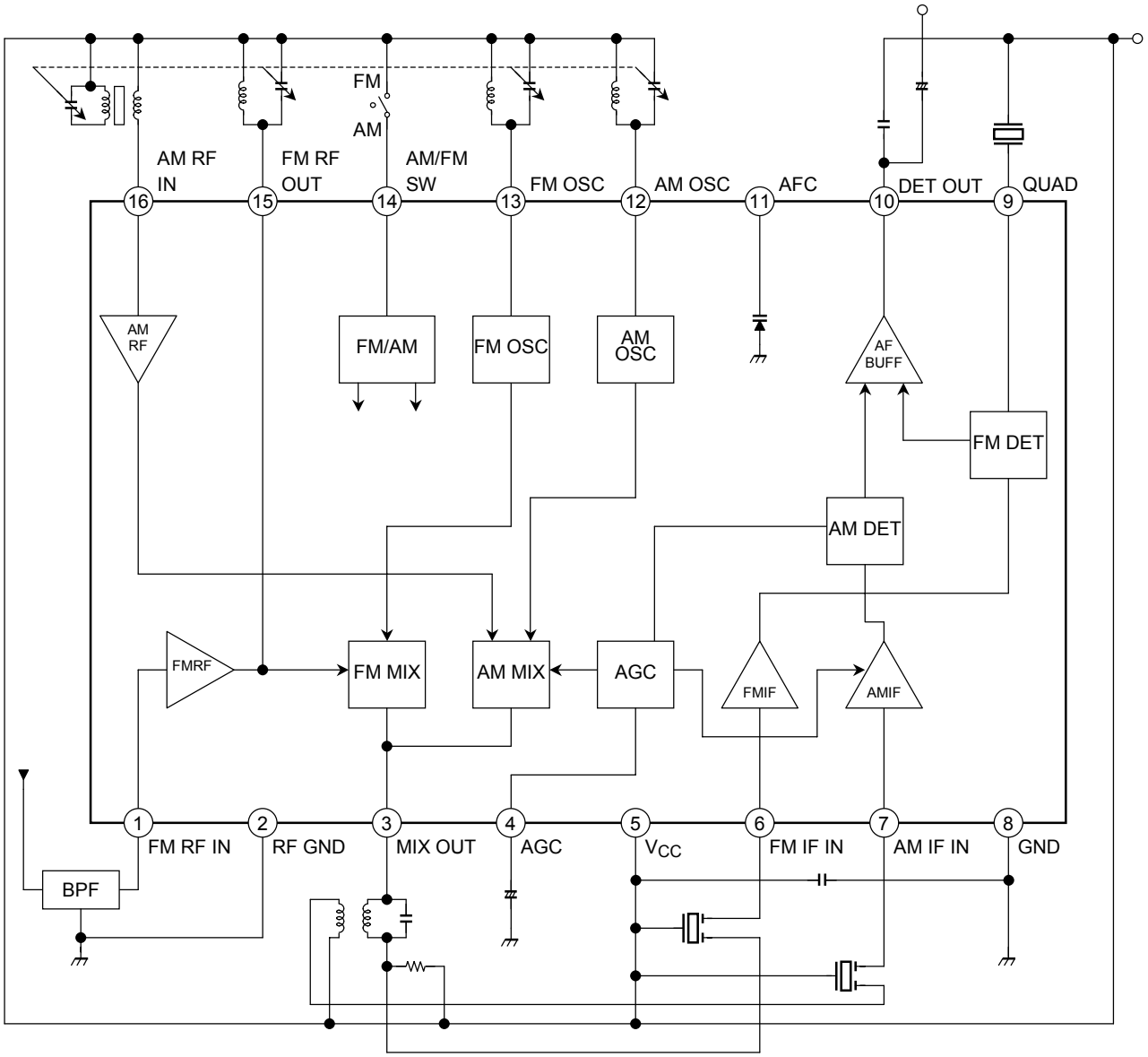
Weight
DIP16-P-300-2.54A : 1.00 g (typ.)
SSOP16-P-225-1.00A : 0.14 g (typ.)

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 V, Ta = 25°C)
  I_{CCq} (FM) = 7.3 mA (typ.)
  I_{CCq} (AM) = 3.6 mA (typ.)
- Operating supply voltage range: V_{CC} = 1.8~7 V (Ta = 25°C)

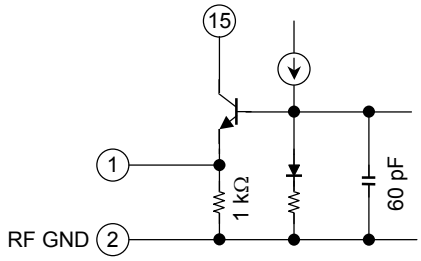
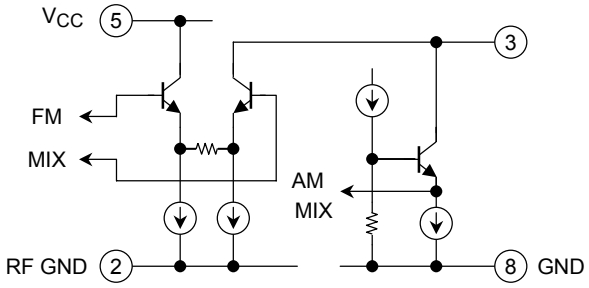
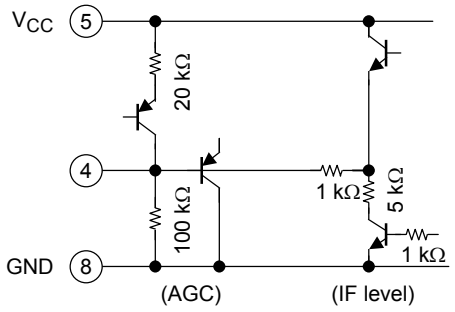
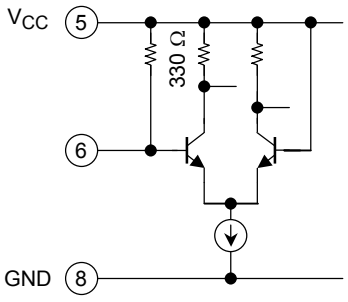
Note: The IC may be destroyed due to incorrect orientation of device's mounting.

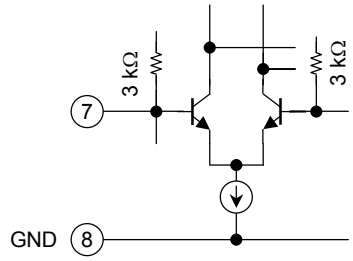
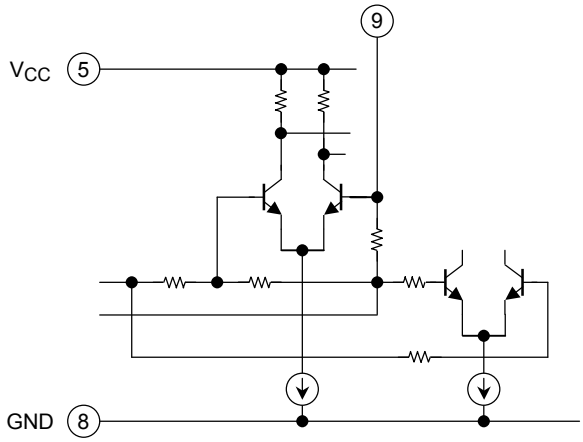
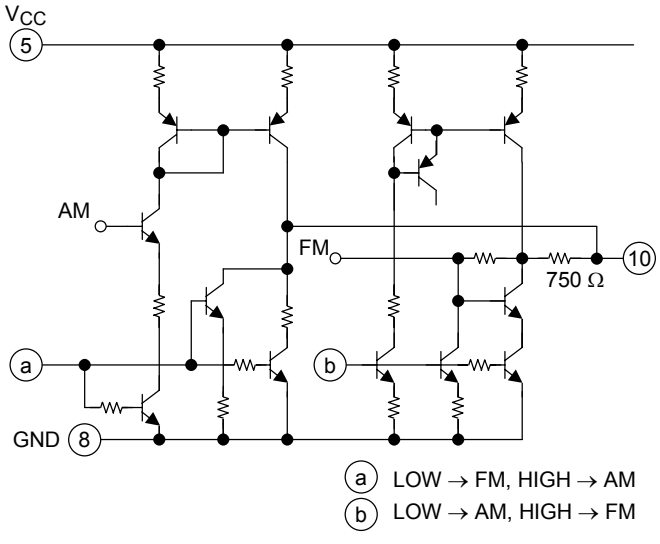
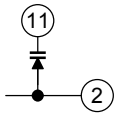
Block Diagram

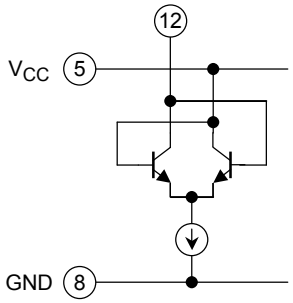
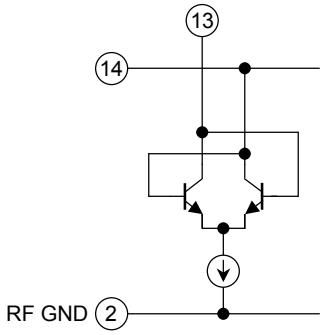
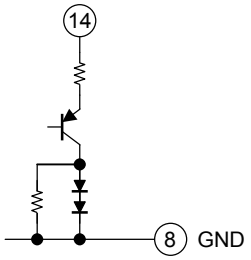
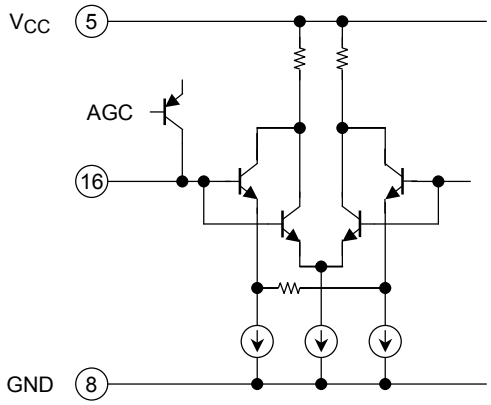


Explanation of Terminals

(Terminal Voltage: Typical DC voltage at no signal with test circuit, V_{CC} = 3 V, Ta = 25°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		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 V14 = V_{CC} → FM V14 = OPEN → 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)

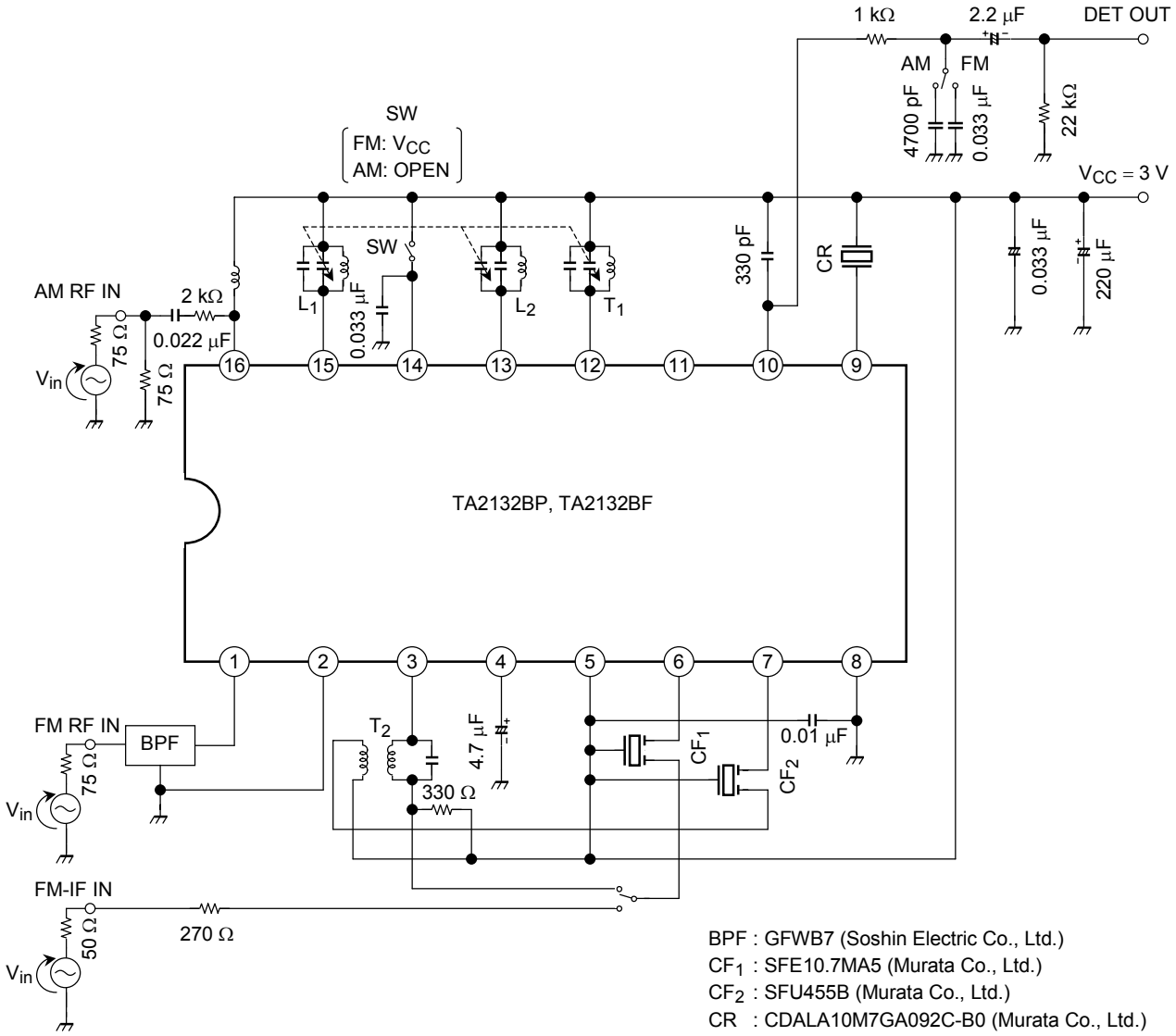
Characteristics		Symbol	Rating	Unit
Supply voltage		V_{CC}	8	V
Power dissipation	TA2132BP	P_D (Note 1)	750	mW
	TA2132BF		350	
Operating temperature		T_{opr}	−25~75	°C
Storage temperature		T_{stg}	−55~150	°C

Note 1: Deleted above Ta = 25°C in the proportion of 6 mW/°C for TA2132BP and of 2.8 mW/°C for TA2132BF.

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)

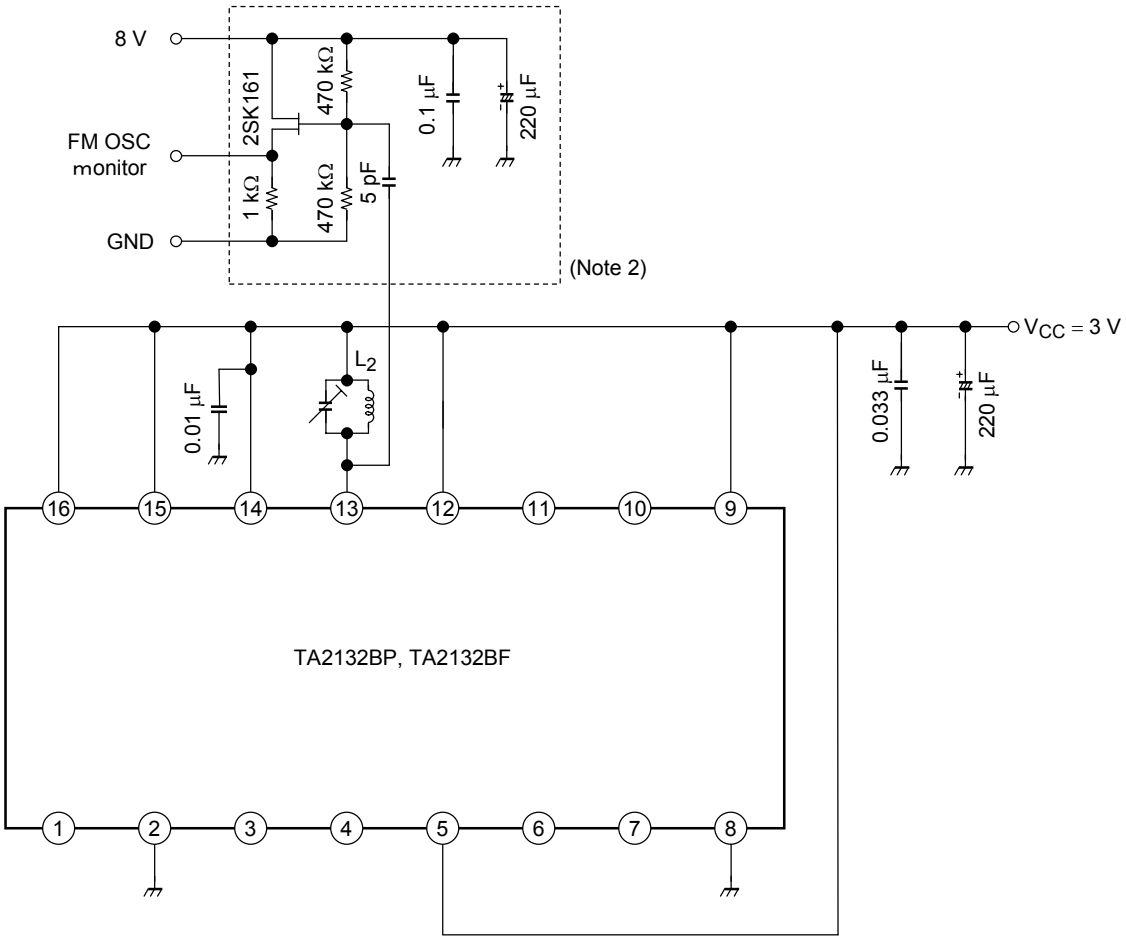
Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Supply current		$I_{CC\ (FM)}$	1	FM mode, V_{in} = 0	—	7.3	11.0	mA
		$I_{CC\ (AM)}$	1	AM mode, V_{in} = 0	—	3.6	7.0	
F/E	Input limiting voltage	$V_{in\ (lim)}$	1	−3dB limiting point	—	10	—	dBμV EMF
	Quiescent sensitivity	Q_S	1	S/N = 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	mVrms
	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	mVrms
	Recovered output voltage	V_{OD}	1	V_{in} = 60dBμV EMF	55	80	110	mVrms
	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



BPF : GFWB7 (Soshin Electric Co., Ltd.)
CF_1 : SFE10.7MA5 (Murata Co., Ltd.)
CF_2 : SFU455B (Murata Co., Ltd.)
CR : CDALA10M7GA092C-B0 (Murata Co., Ltd.)

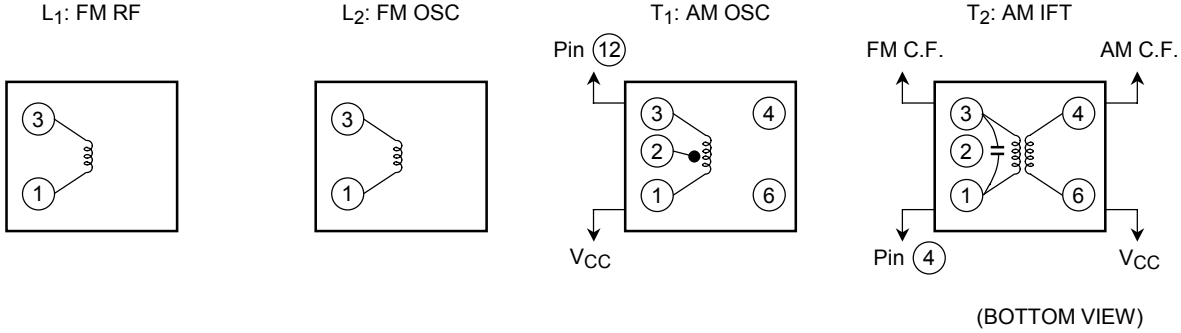
Test Circuit 2



Note 2: FET buff voltage gain ≃ 0dB

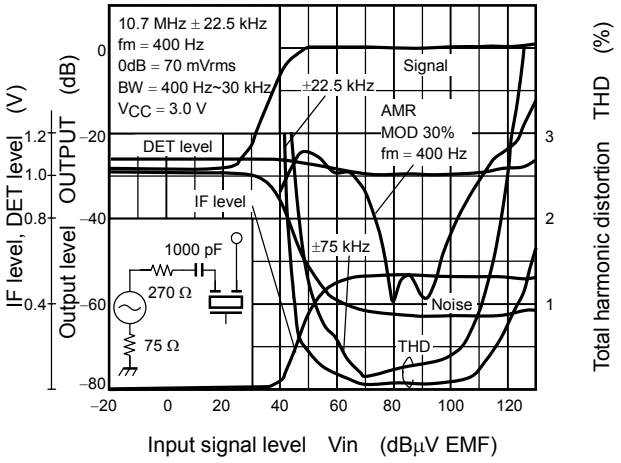
Coil Data

Coil No.	Test Freq.	L (μH)	Co (pF)	Qo	Turns					Wire (mmϕ)	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



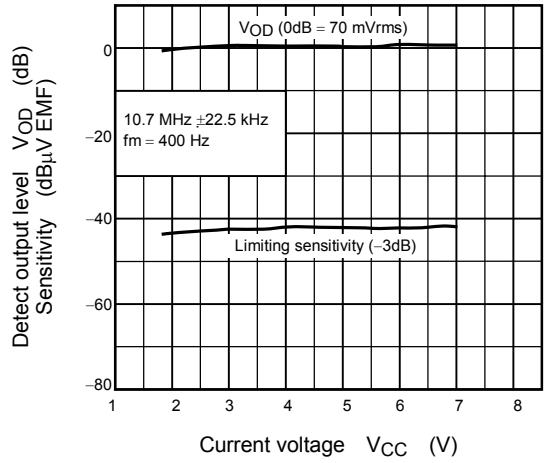
FM IF

OUTPUT - Vin



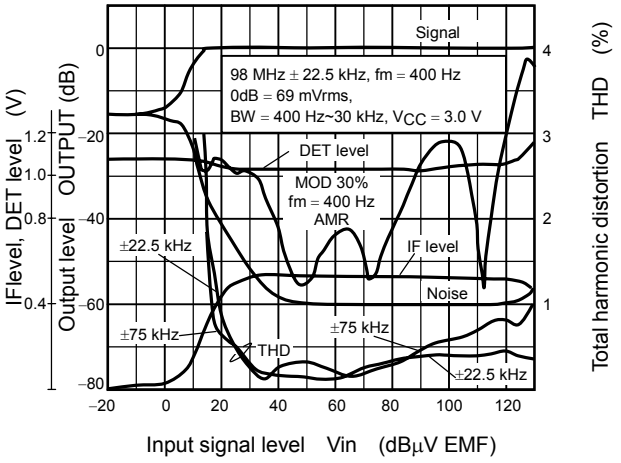
FM IF

V_{OD}, Sens - V_{CC}



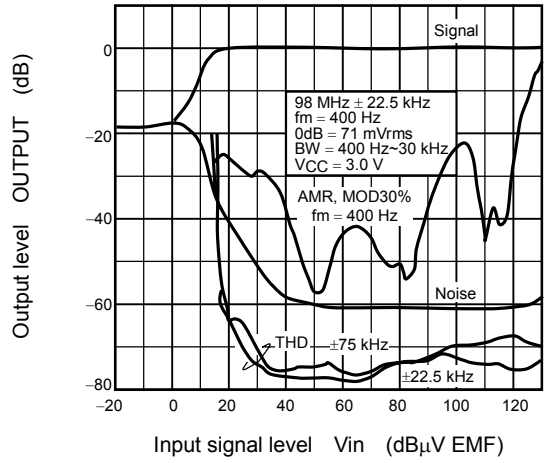
FM RF (AFC ON)

OUTPUT - Vin



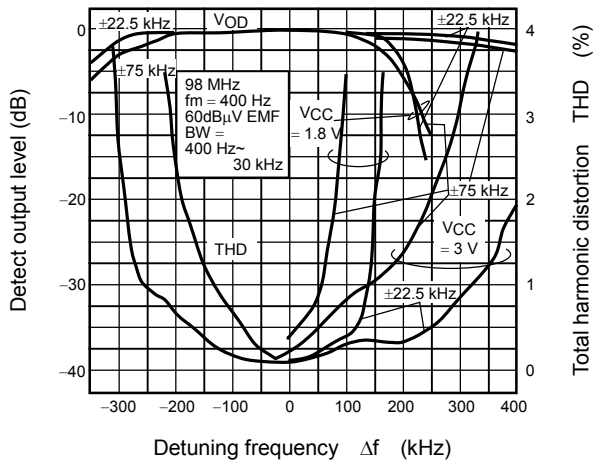
FM RF (AFC OFF)

OUTPUT - Vin



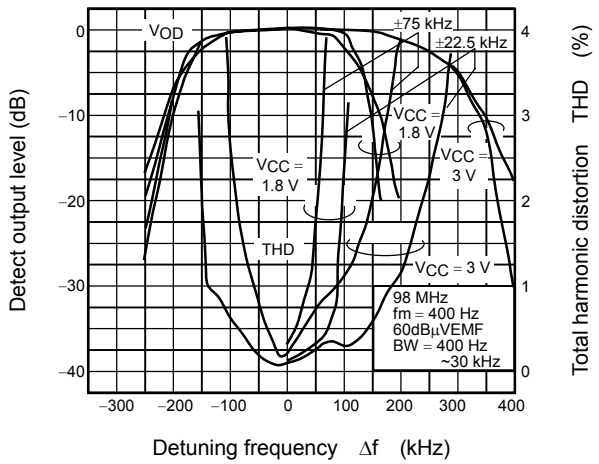
FM RF (AFC ON)

VOD, THD - Δf

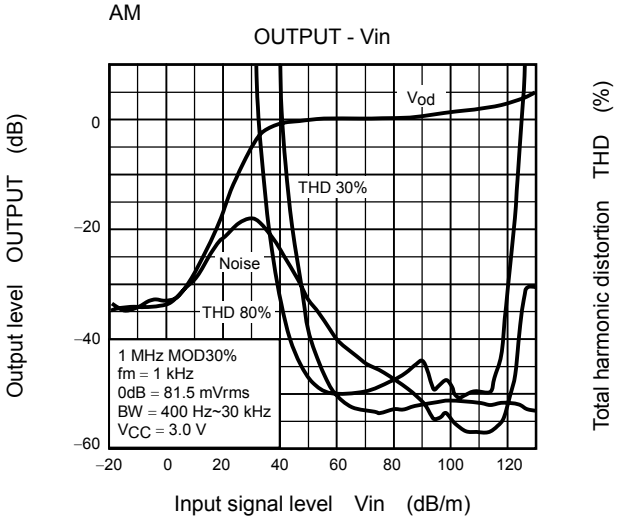


FM RF (AFC OFF)

VOD, THD - Δf

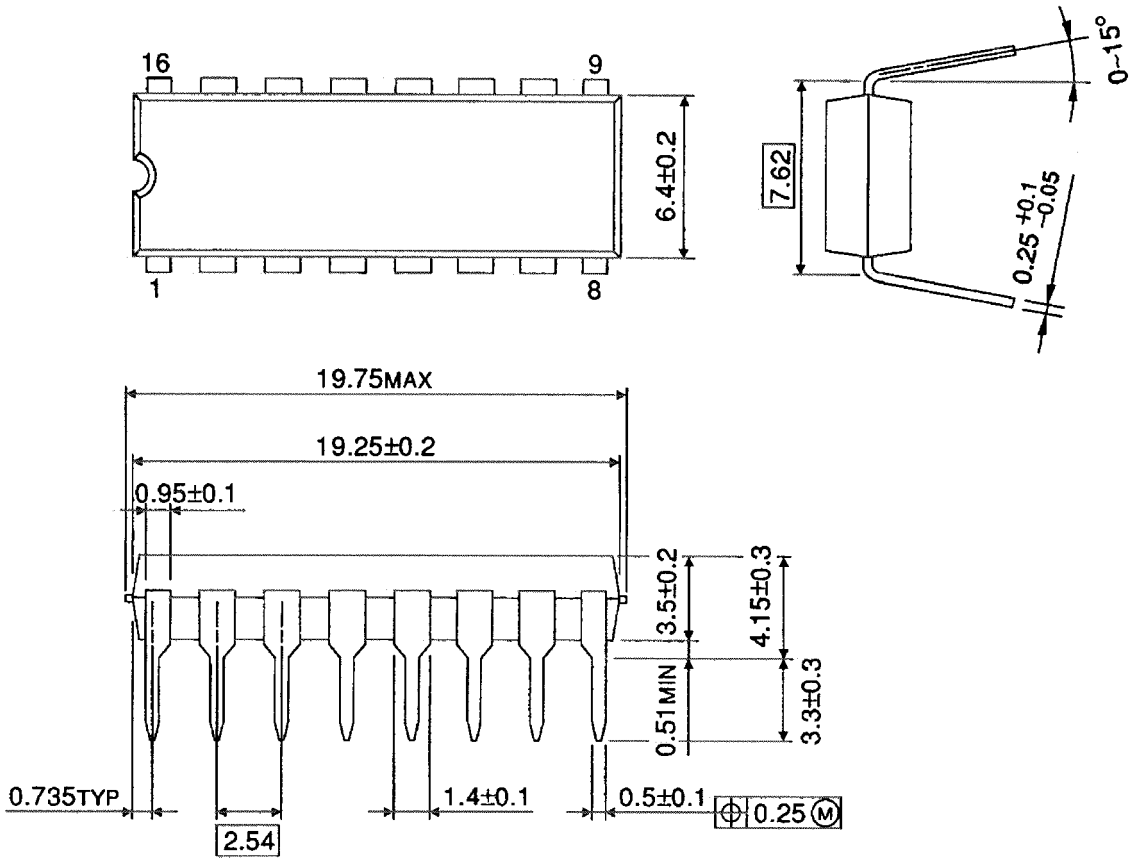


AM


OUTPUT - Vin
Output level OUTPUT (dB)
Total harmonic distortion THD (%)
Input signal level Vin (dB/m)
Vod
THD 30%
Noise
THD 80%
1 MHz MOD30%
fm = 1 kHz
0dB = 81.5 mVrms
BW = 400 Hz~30 kHz
VCC = 3.0 V
0
−20
−40
−60
−20
0
20
40
60
80
100
120

Package Dimensions

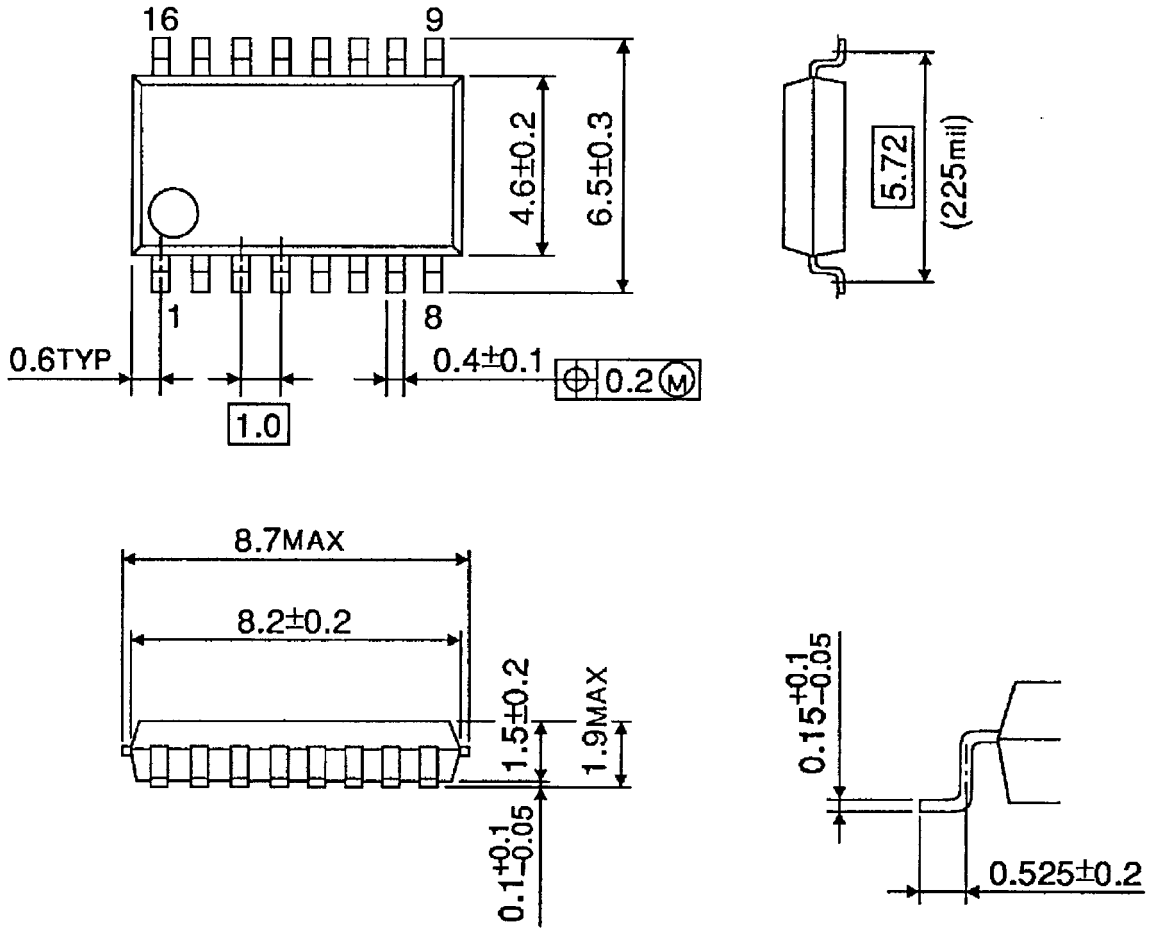
DIP16-P-300-2.54A Unit : mm



Weight: 1.00 g (typ.)

Package Dimensions

SSOP16-P-225-1.00A Unit : mm



Weight: 0.14 g (typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

- 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.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.