

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA2132BP, TA2132BF

AM/FM Radio IC

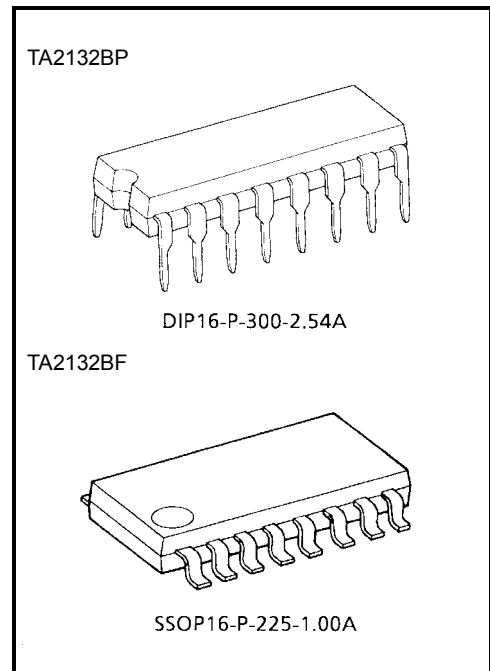
TA2132BP, TA2132BF are AM/FM Radio IC (FM F/E + AM/FM IF) which are designed for AM/FM Radios.

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

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: ($V_{CC} = 3\text{ V}$, $T_a = 25^\circ\text{C}$)
 $I_{CCq}(\text{FM}) = 7.3\text{ mA (typ.)}$
 $I_{CCq}(\text{AM}) = 3.6\text{ mA (typ.)}$
- 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.)

The diagram illustrates the internal architecture of a radio receiver, organized into two main horizontal sections. The top section, labeled 1 through 16, represents the RF and IF stages, while the bottom section, labeled 1 through 8, represents the baseband and audio stages.

Top Section (RF and IF Stages):

- 16 AM RF IN:** The input for AM signals, connected to an **AM RF** amplifier.
- 15 FM RF OUT:** The output for FM signals, connected to an **FM/AM** switch.
- 14 AM/FM SW:** A switch that routes signals between the AM and FM paths.
- 13 FM OSC:** The FM oscillator output, connected to the **FM OSC** block.
- 12 AM OSC:** The AM oscillator output, connected to the **AM OSC** block.
- 11 AFC:** The Automatic Frequency Control output, connected to the **AF BUFF** block.
- 10 DET OUT:** The detector output, connected to the **FM DET** block.
- 9 QUAD:** The quad output, connected to the **FM DET** block.

Bottom Section (Baseband and Audio Stages):

- 1 FM RF IN:** The input for FM signals, connected to a **BPF** (Band Pass Filter) and then to the **FM MIX** block.
- 2 RF GND:** The RF ground connection.
- 3 MIX OUT:** The mixer output, connected to the **FM MIX** block.
- 4 AGC:** The Automatic Gain Control output, connected to the **AGC** block.
- 5 VCC:** The power supply connection.
- 6 FM IF IN:** The FM intermediate frequency input, connected to the **FM IF** block.
- 7 AM IF IN:** The AM intermediate frequency input, connected to the **AM IF** block.
- 8 GND:** The ground connection.

Internal Blocks and Connections:

- AM RF:** Amplifier for AM signals.
- FM/AM:** Switch for selecting between FM and AM modes.
- FM OSC:** FM oscillator.
- AM OSC:** AM oscillator.
- AGC:** Automatic Gain Control block.
- FM MIX:** FM mixer.
- AM MIX:** AM mixer.
- FM IF:** FM intermediate frequency amplifier.
- AM IF:** AM intermediate frequency amplifier.
- AM DET:** AM detector.
- FM DET:** FM detector.
- AF BUFF:** Audio frequency buffer.

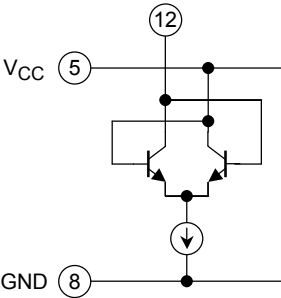
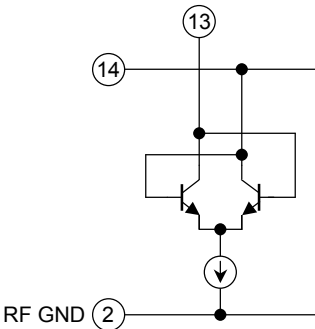
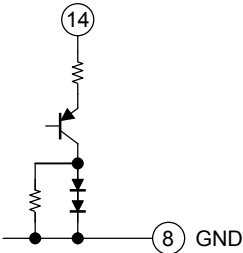
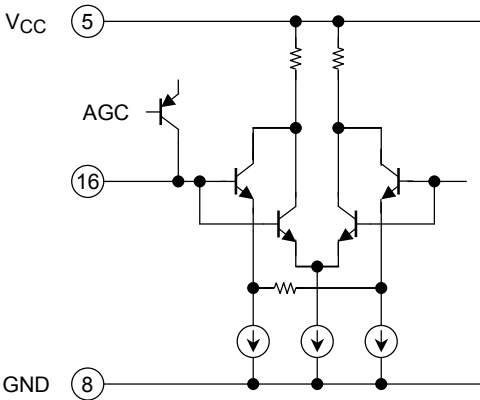
The diagram shows the flow of signals from the input (16 AM RF IN) through the RF stages (15 FM RF OUT, 14 AM/FM SW, 13 FM OSC, 12 AM OSC) to the baseband stages (1 FM RF IN, 2 RF GND, 3 MIX OUT, 4 AGC, 5 VCC, 6 FM IF IN, 7 AM IF IN, 8 GND). The output of the baseband stages is then processed by the detector (10 DET OUT) and the audio frequency buffer (11 AFC) to produce the final output (9 QUAD).

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		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 = VCC → FM V14 = OPEN → AM • VCC 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)

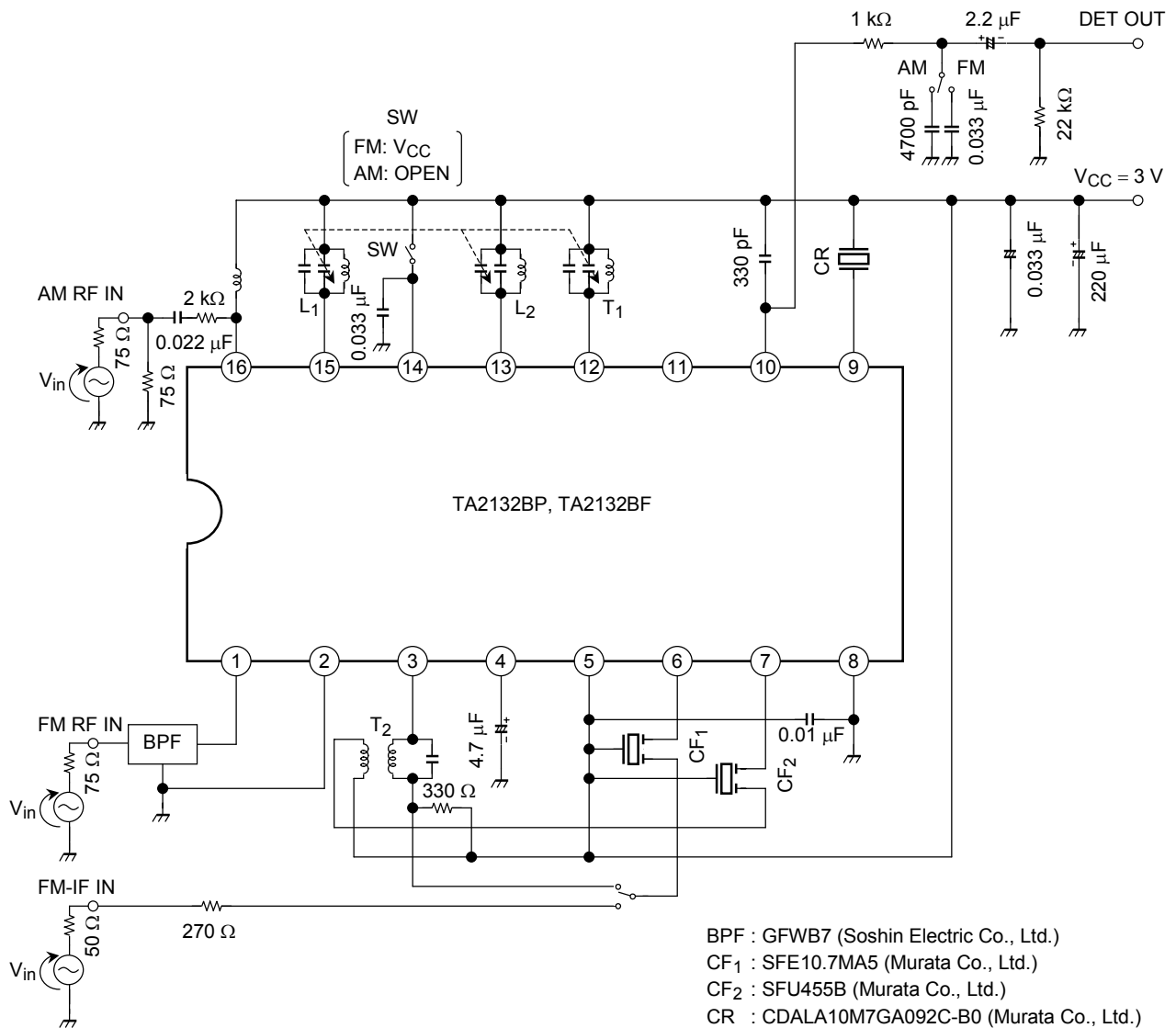
Characteristics		Symbol	Rating	Unit
Supply voltage		V _{CC}	8	V
Power dissipation	TA2132BP	P _D (Note 1)	750	mW
	TA2132BF		350	
Operating temperature		T _{opr}	-25~75	°C
Storage temperature		T _{stg}	-55~150	°C

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	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



The schematic diagram illustrates the internal circuitry of the TA2132BP and TA2132BF integrated circuits. It is divided into two main sections: an FM OSC monitor and the main audio amplifier.

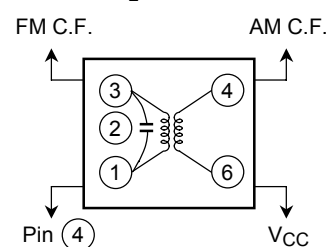
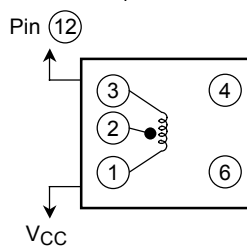
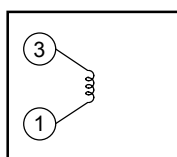
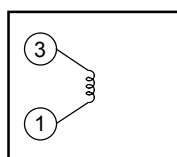
FM OSC Monitor Section (Note 2): This section is enclosed in a dashed box and includes an 8V supply, an FM OSC monitor input, and a GND connection. It features a 2SK161 transistor, a 1 kΩ resistor, a 470 kΩ resistor, a 470 kΩ resistor, a 5 pF capacitor, a 0.1 μF capacitor, and a 220 μF capacitor.

Main Amplifier Section: This section includes a 3V VCC supply, a 0.01 μF capacitor, a 0.033 μF capacitor, and a 220 μF capacitor. The circuit is labeled TA2132BP, TA2132BF.

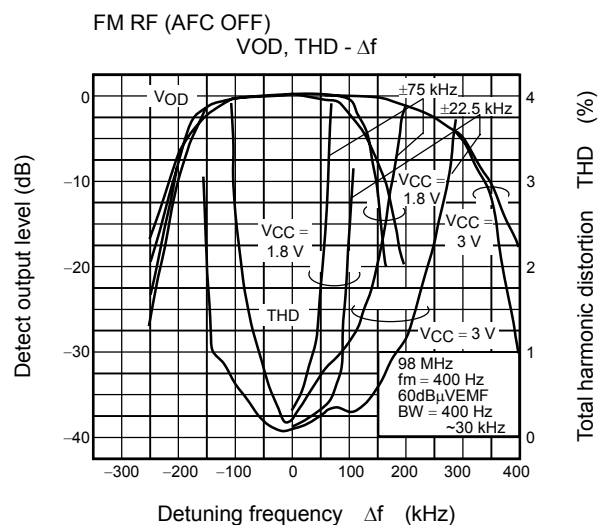
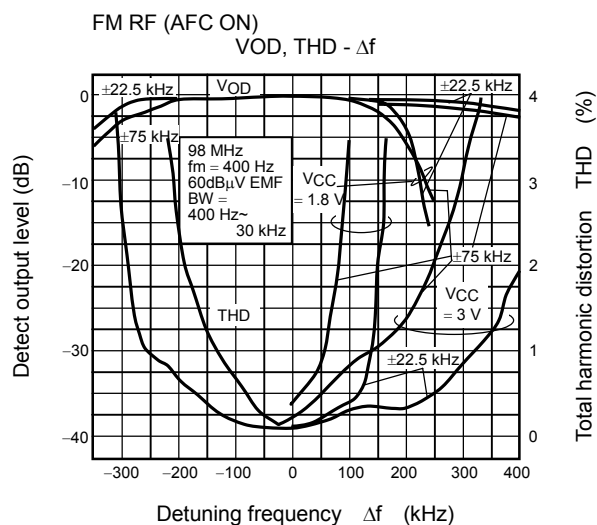
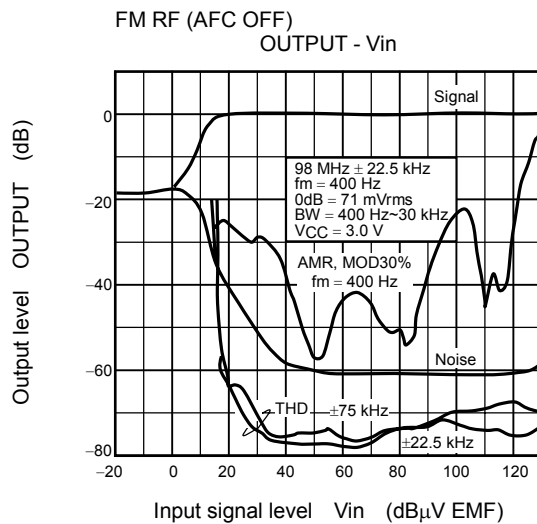
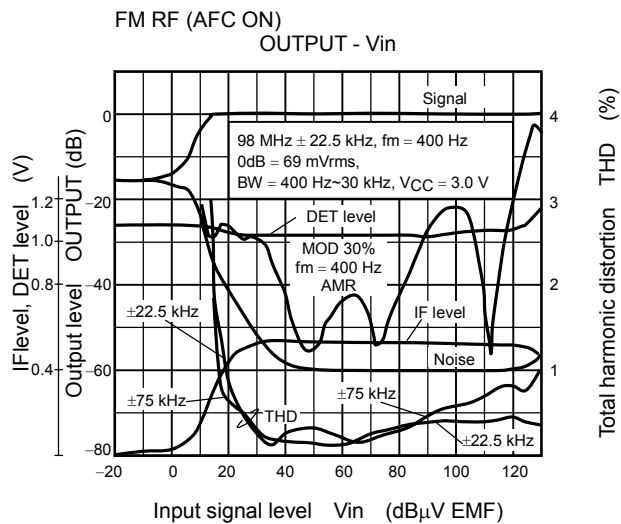
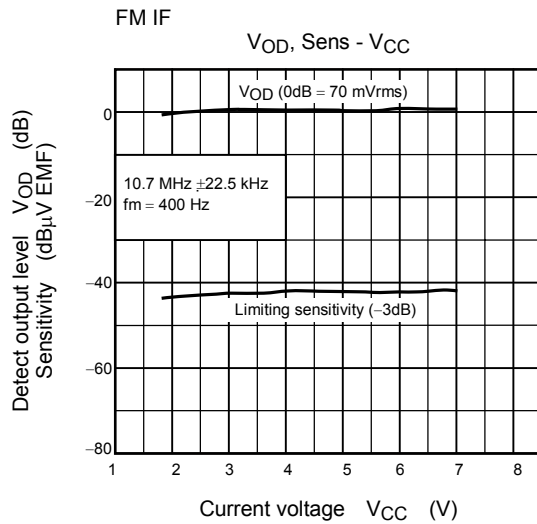
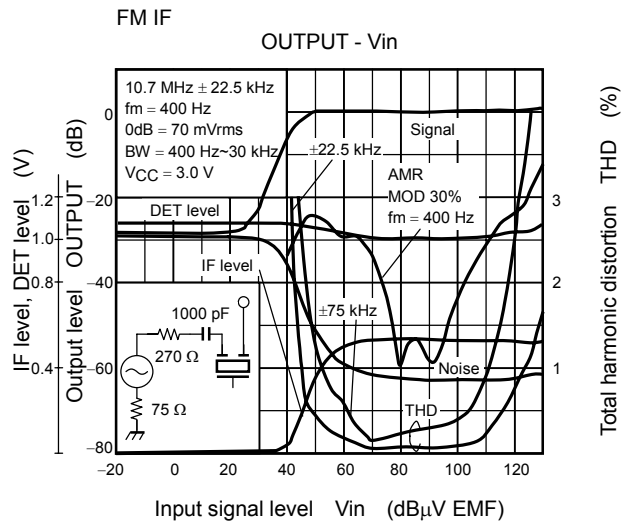
Coil Data

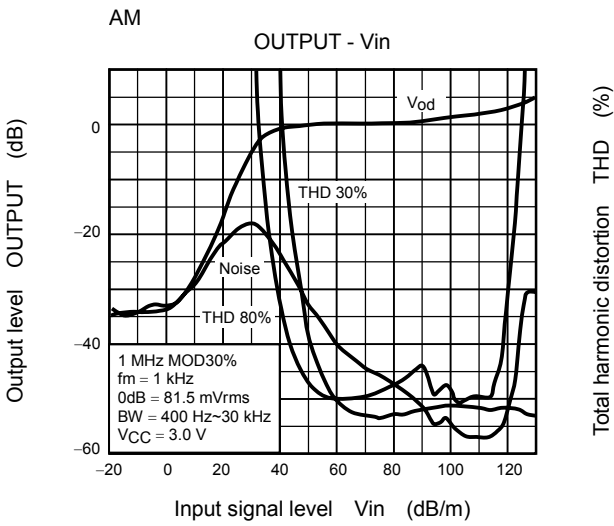
Coil No.	Test Freq.	L (μH)	Co (pF)	Qo	Turns					Wire (mmφ)	Reference
					1-2	2-3	1-3	1-4	4-6		
L ₁ FM RF	100 MHz	—	—	79	—	—	—	2 $\frac{1}{2}$	—	0.16UEW	Toko Co., Ltd. 666SNF-305NK
L ₂ FM OSC	100 MHz	—	—	76	—	—	—	2	—	0.16UEW	Toko Co., Ltd. 666SNF-306NK
T ₁ AM OSC	796 kHz	268	—	65	19	95	—	—	—	0.05UEW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

T₂: AM IFT



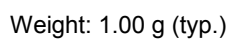
(BOTTOM VIEW)





DIP16-P-300-2.54A

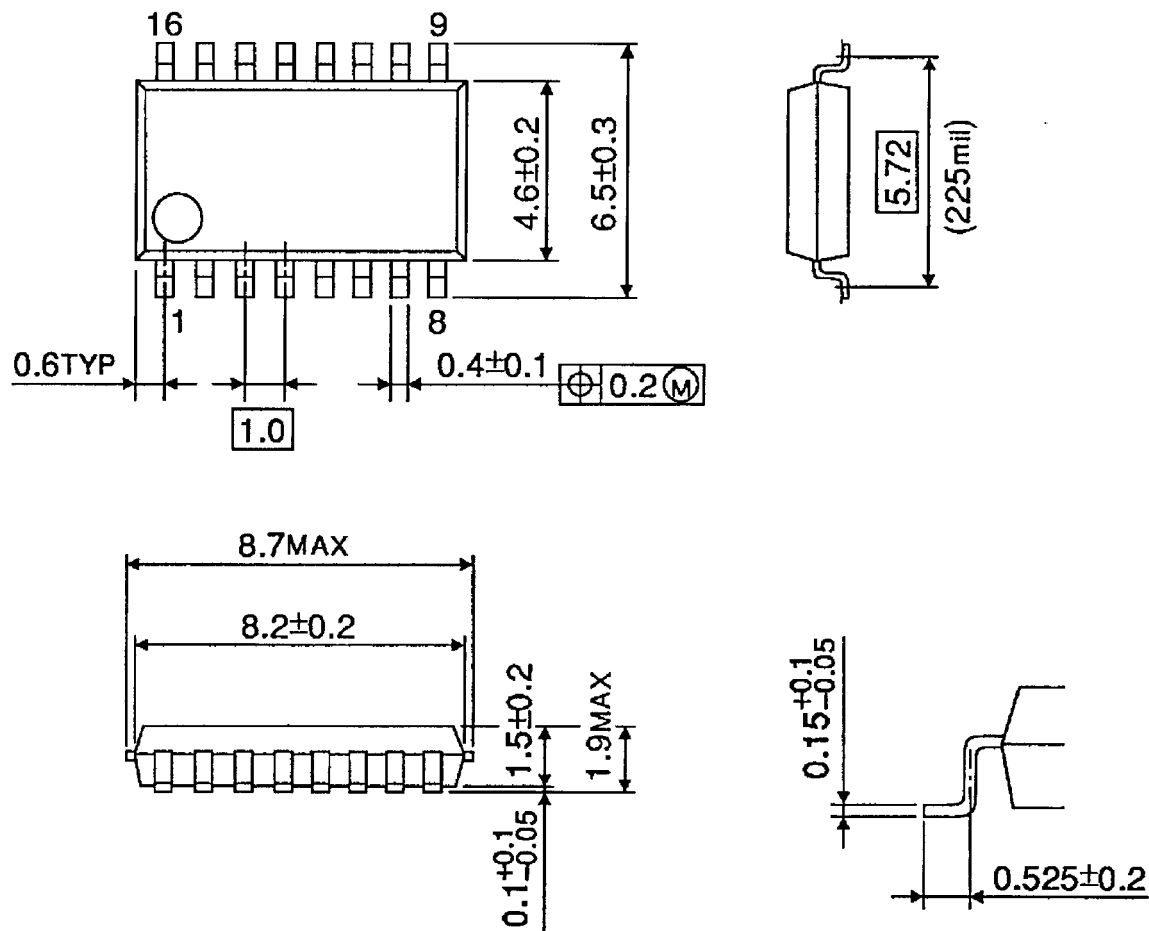
Unit : mm



Package Dimensions

SSOP16-P-225-1.00A

Unit : mm



Weight: 0.14 g (typ.)

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