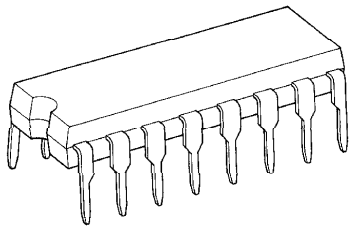
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA2003P, TA2003F

AM / FM RADIO IC

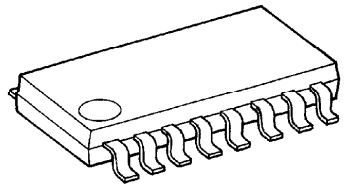
The TA2003P, TA2003F are AM / FM Radio IC (FM F / E + AM / FM IF) which are designed for AM / FM Radios. Combining with the TA7368P (Mono PW IC), a suitable AM / FM Radio System is able to be constituted.

TA2003P



DIP16-P-300-2.54A

TA2003F



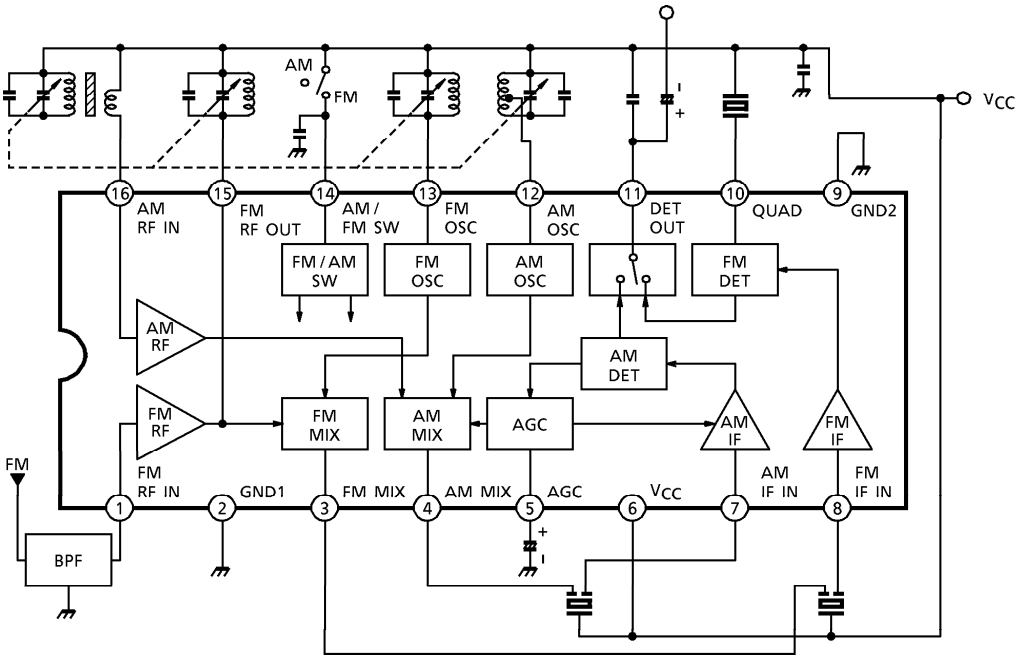
SSOP16-P-225-1.00A

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

FEATURES

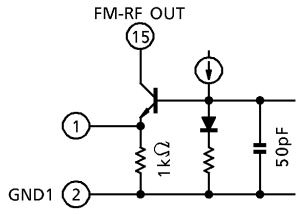
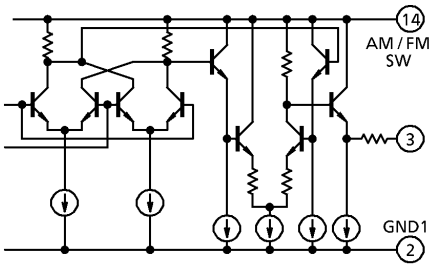
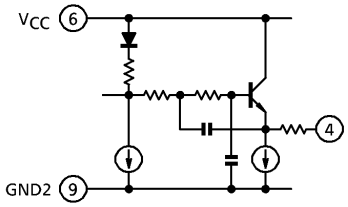
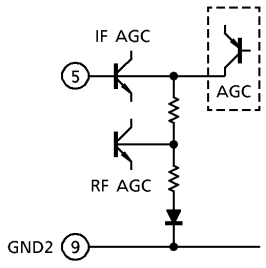
- FM IFT, AM IFT and FM Detector Coil are not needed.
- Pin compatible of TA8164P.
- Operating Supply Voltage Range
  : $V_{CC\ (opr)}$ = 1.8~7V (Ta = 25°C)

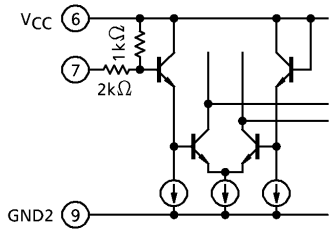
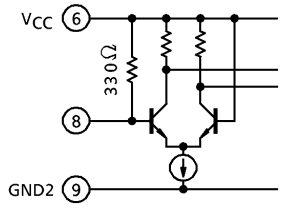
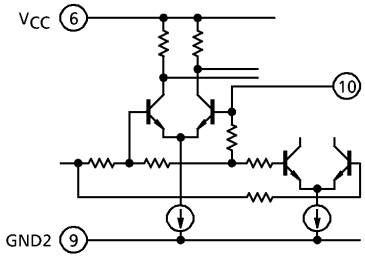
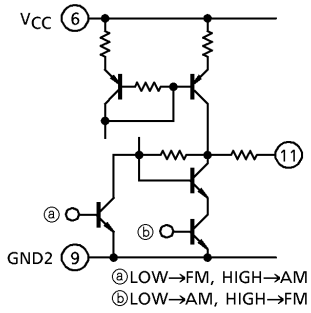
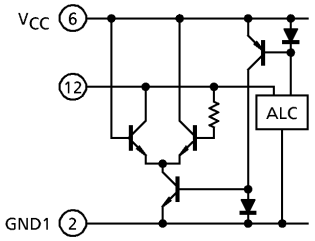
BLOCK DIAGRAM

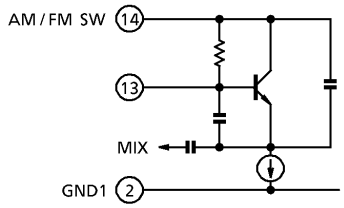
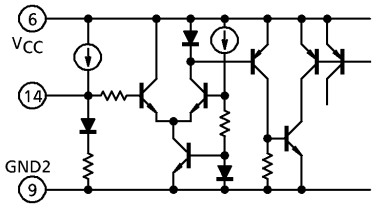
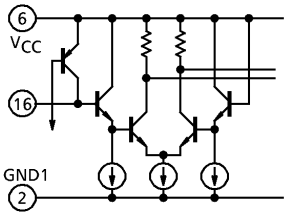


EXPLANATION OF TERMINAL

TERMINAL VOLTAGE : Typical DC voltage at Ta = 25°C, V_{CC} = 3V and no signal with Test Circuit 1

PIN No.	SYMBOL	CONTENTS	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V)	
				AM	FM
1	FM RF IN	Input of FM RF Amplifier		0	0.7
2	GND1	GND for RF, OSC and MIX Stage	—	0	0
3	FM MIX	Output of FM MIX		0.4	1.7
4	AM MIX	Output of AM MIX		0.6	0
5	AGC	By-pass of AM AGC		0	0
6	V_{CC}	—	—	3.0	3.0

PIN No.	SYMBOL	CONTENTS	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V)	
				AM	FM
7	AM IF IN	Input of AM IF Amplifier		3.0	3.0
8	FM IF IN	Input of FM IF Amplifier		3.0	3.0
9	GND2	GND for IF stage	—	0	0
10	QUAD	FM QUAD Detector Ceramic Discriminator is connected. Recommendation CDA10.7MG31 (MURATA MFG.CO., LTD)		2.5	2.2
11	DET OUT	Output of FM / AM Detector		1.4	1.1
12	AM OSC	AM Local Oscillator Terminal Oscillator Coil is connected.		3.0	3.0

PIN No.	SYMBOL	CONTENTS	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V)	
				AM	FM
13	FM OSC	FM Local Oscillator Terminal Oscillator Coil is connected.		0.9	3.0
14	AM / FM SW	AM / FM switch connected to Pin⑭ V_{CC}→FM mode Pin⑭ OPEN→AM mode		0.9	3.0
15	FM RF OUT	FM RF Coil is connected.	cf. PIN①	3.0	3.0
16	AM RF IN	Input of AM RF Amplifier		3.0	3.0

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	8	V
Power Dissipation	DIP-16	P_D (Note)	750	mW
	SSOP-16		350	
Operating Temperature		T_{opr}	−25~75	°C
Storage Temperature		T_{stg}	−55~150	°C

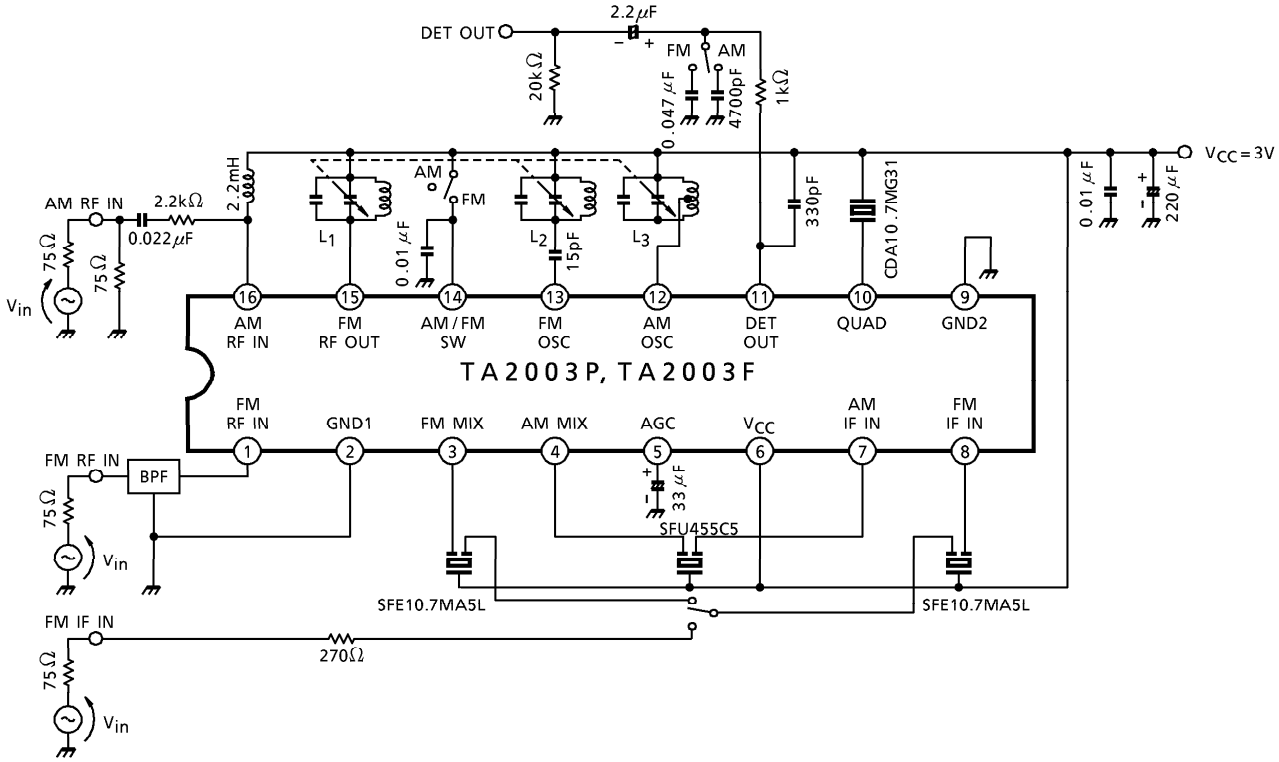
(Note) Derated above Ta = 25°C in the proportion of 6mW / °C for TA2003P and of 2.8mW / °C for TA2003F.

ELECTRICAL CHARACTERISTICS

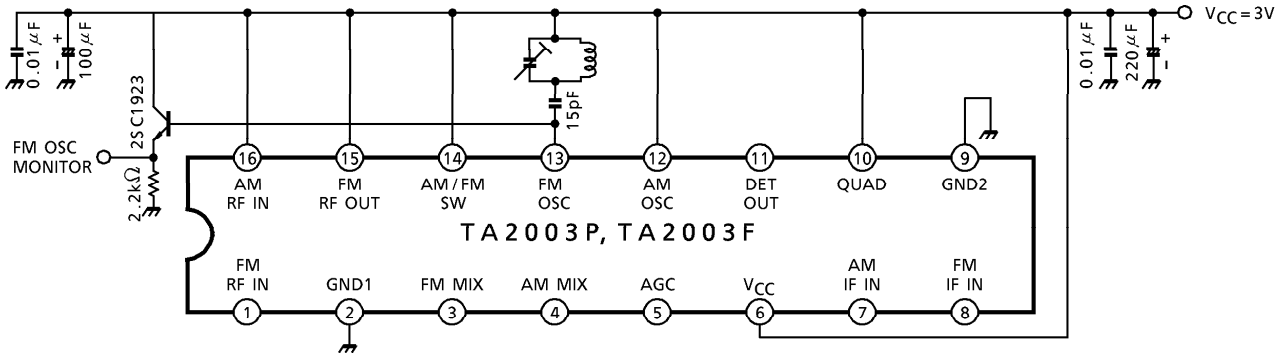
Unless otherwise specified, Ta = 25°C, V_{CC} = 3V, F / E : f = 98MHz, f_m = 1kHz
FM IF : f = 10.7MHz, Δf = ±22.5kHz, f_m = 1kHz
AM : f = 1MHz, MOD = 30%, f_m = 1kHz

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC} (FM)	1	FM mode, V_{in} = 0	—	10.5	16.5	mA
		I_{CC} (AM)	1	AM mode, V_{in} = 0	—	5.0	8.0	
F / E	Input Limiting Voltage	$V_{in\ (lim)}$	1	−3dB limiting point	—	12	—	dBμV EMF
	Quiescent Sensitivity	Q_S	1	S / N = 30dB	—	12	—	dBμV EMF
	Local OSC Voltage	V_{OSC}	2	f_{OSC} = 108MHz	160	240	320	mV_{rms}
	Local OSC Stop Voltage	V_{stop} (FM)	2	V_{in} = 0	—	1.2	—	V
FM IF	Input Limiting Voltage	$V_{in\ (lim)\ IF}$	1	−3dB limiting point	42	47	52	dBμV EMF
	Recovered Output Voltage	V_{OD}	1	V_{in} = 80dBμV EMF	50	70	90	mV_{rms}
	Signal To Noise Ratio	S / N	1	V_{in} = 80dBμV EMF	—	62	—	dB
	Total Harmonic Distortion	THD	1	V_{in} = 80dBμV EMF	—	0.4	—	%
	AM Rejection Ratio	AMR	1	V_{in} = 80dBμV EMF	—	33	—	dB
AM	Voltage Gain	G_V	1	V_{in} = 27dBμV EMF	15	32	50	mV_{rms}
	Recovered Output Voltage	V_{OD}	1	V_{in} = 60dBμV EMF	35	60	85	mV_{rms}
	Signal To Noise Ratio	S / N	1	V_{in} = 60dBμV EMF	—	43	—	dB
	Total Harmonic Distortion	THD	1	V_{in} = 60dBμV EMF	—	1.0	—	%
	Local OSC Stop Voltage	V_{stop} (AM)	1	V_{in} = 0	—	1.6	—	V

TEST CIRCUIT 1



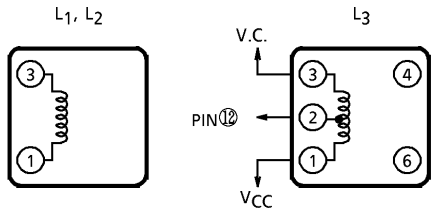
TEST CIRCUIT 2



COIL DATA (Test circuit)

COIL No.	TEST FREQ. (Hz)	L (μH)	C_o (pF)	Q_o	TURNS					WIRE (mmϕ)	REFERENCE
					1-2	2-3	1-3	1-4	4-6		
L_1 FM RF	100M	—	—	100	—	—	—	$2\frac{1}{4}$	—	0.5 UEW	Ⓢ0258-000-021
L_2 FM OSC	100M	—	—	100	—	—	$1\frac{3}{4}$	—	—	0.5 UEW	Ⓢ0258-000-020
L_3 AM OSC	796k	268	—	125	14	86	—	—	—	0.06 UEW	Ⓢ2157-2239-213A

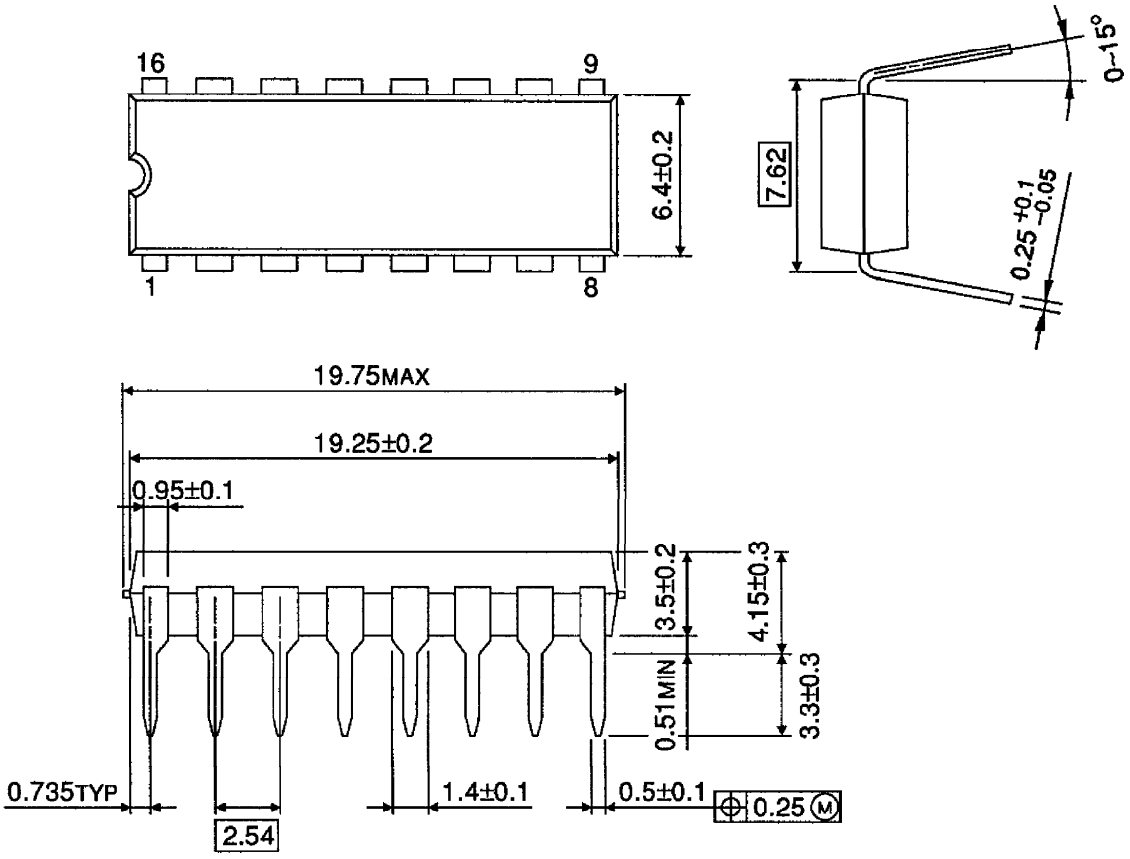
Ⓢ : SUMIDA ELECTRIC CO., LTD.



OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm

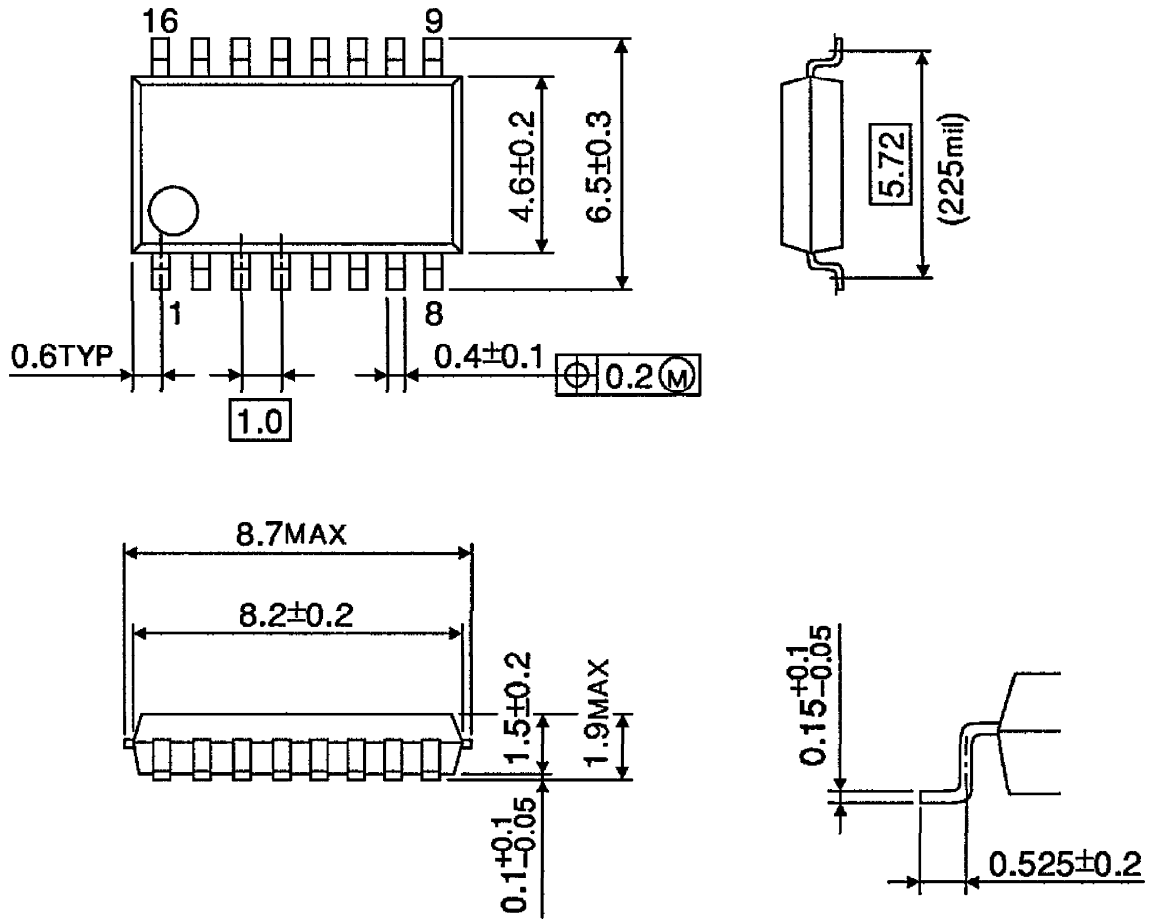


Weight : 1.00g (Typ.)

OUTLINE DRAWING

SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)