

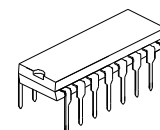
AM/FM RADIO RECEIVER

DESCRIPTION

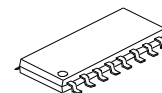
The SA2003 is AM/FM radio IC (FM F/E+AM/FM IF) which is designed for AM/FM radios. Combining with the UTC7368 (Mono PW IC), a suitable AM/FM radio system is able to be constituted.

FEATURES

- * FM IFT, AM IFT and FM detector coil are not needed.
- * Pin compatible of TA8164P.
- * Operating supply voltage range: $V_{cc(opr)}=1.8\sim7V$ ($T_a=25^\circ C$)



DIP-16-300-2.54

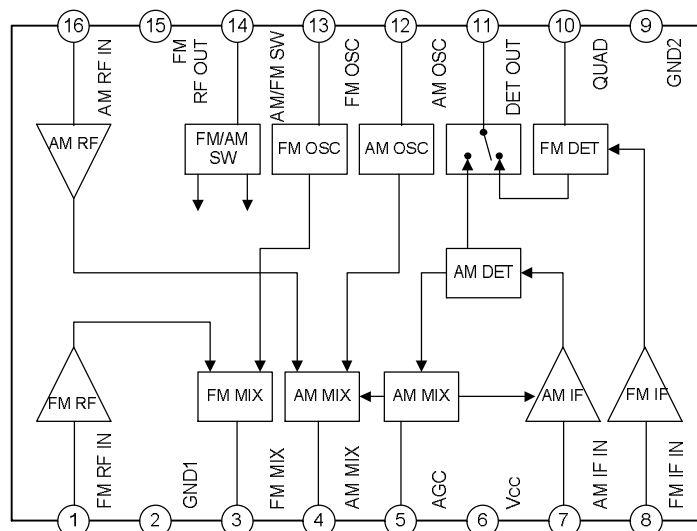


SOP-16-225-1.27

ORDERING INFORMATION

Device	Package
SA2003	DIP-16-300-2.54
SA2003S	SOP-16-225-1.27

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS ($T_{amb}=25^\circ C$)

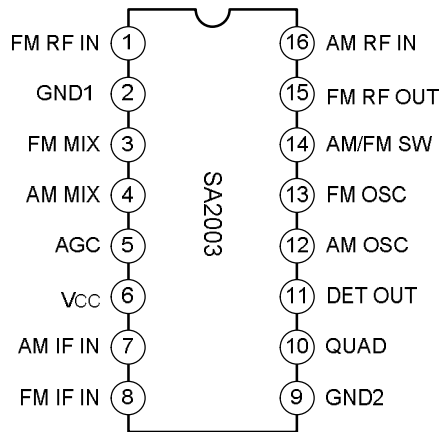
Characteristic	Symbol	Ratings	Unit
Supply Voltage	V_{cc}	8	V
Power Dissipation	DIP-16	750	mW
	SOP-16	350	
Operating Temperature	T_{opr}	$-25\sim75$	$^\circ C$
Storage Temperature	T_{stg}	$-55\sim150$	$^\circ C$

NOTE: Derated above $T_{amb}=25^\circ C$ in the proportion of $6mW/^\circ C$ for SA2003 and of $2.8 mW/^\circ C$ for SA2002S.

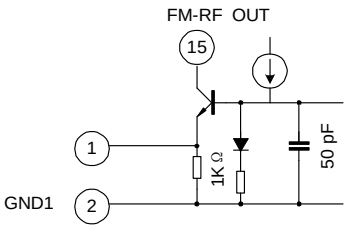
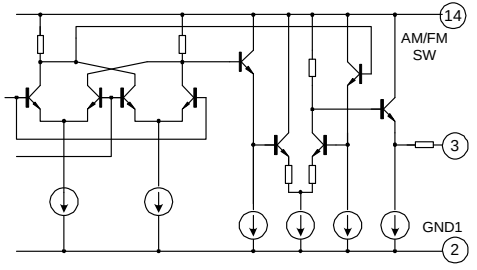
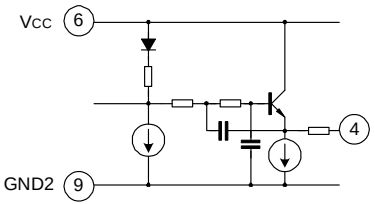
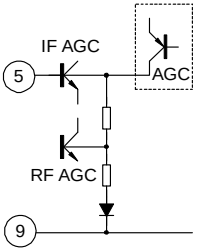
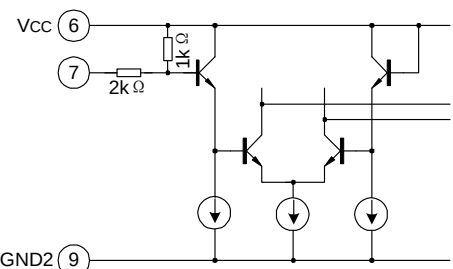
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $T_a=25^{\circ}\text{C}$, $V_{CC}=3\text{ V}$, F/E : $f=98\text{ MHz}$, $f_m=1\text{ kHz}$; FM IF : $f=10.7\text{ MHz}$, $\Delta f=\pm 22.5\text{ kHz}$, $f_m=1\text{ kHz}$; AM : $f=1\text{ MHz}$, $\text{MOD}=30\%$, $f_m=1\text{ kHz}$)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply Current		$I_{CC}(\text{FM})$	FM mode, $V_{in}=0$	--	10.5	16.5	mA
		$I_{CC}(\text{AM})$	AM mode, $V_{in}=0$	--	5.0	8.0	
F/E	Input Limiting Voltage	$V_{in}(\text{lim})$	-3dB limiting point	--	12	--	$\text{dB}\mu\text{V EMF}$
	Quiescent Sensitivity	QS	S/N=40dB	--	12	--	$\text{dB}\mu\text{V EMF}$
	Local OSC Voltage	V_{osc}	$f_{osc}=108\text{ MHz}$	160	240	320	mVrms
	Local OSC Stop Voltage	$V_{stop}(\text{FM})$	$V_{in}=0$	--	1.2	--	V
FM IF	Input Limiting Voltage	$V_{in}(\text{lim})\text{ IF}$	-3dB limiting point	42	47	52	$\text{dB}\mu\text{V EMF}$
	Recovered Output Voltage	V_{OD}	$V_{in}=80\text{ dB}\mu\text{V EMF}$	50	70	90	mVrms
	Signal to Noise Ratio	S/N	$V_{in}=80\text{ dB}\mu\text{V EMF}$	--	62	--	dB
	Total Harmonic Distortion	THD	$V_{in}=80\text{ dB}\mu\text{V EMF}$	--	0.4	--	%
	AM Rejection Ratio	AMR	$V_{in}=80\text{ dB}\mu\text{V EMF}$	--	33	--	dB
AM	Voltage Gain	GV	$V_{in}=27\text{ dB}\mu\text{V EMF}$	15	32	50	mVrms
	Recovered Output Voltage	V_{OD}	$V_{in}=60\text{ dB}\mu\text{V EMF}$	35	60	85	mVrms
	Signal to Noise Ratio	S/N	$V_{in}=60\text{ dB}\mu\text{V EMF}$	--	43	--	dB
	Total Harmonic Distortion	THD	$V_{in}=60\text{ dB}\mu\text{V EMF}$	--	1.0	--	%
	Local OSC Stop Voltage	$V_{stop}(\text{AM})$	$V_{in}=0$	--	1.6	--	V

PIN CONFIGURATION

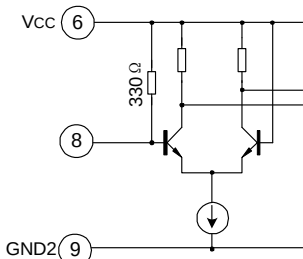
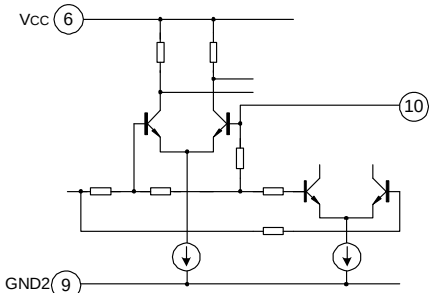
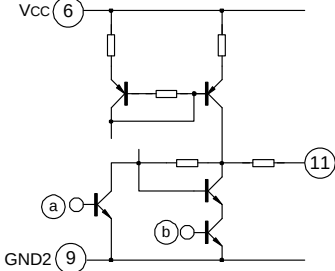
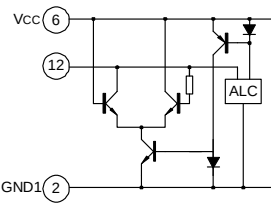
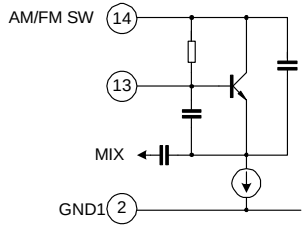


PIN DESCRIPTION TERMINAL VOLTAGE : Typical DC voltage at Ta=25°C,VCC=3V and no signal with Test Circuit 1

Pin No.	Symbol	Internal Circuit	Terminal Voltage (V)	
			AM	FM
1	FM RF IN		0	0.7
2	GND1	-	0	0
3	FM MIX		0.4	1.7
4	AM MIX		0.6	0
5	AGC		0	0
6	VCC	-	3.0	3.0
7	AM IF IN		3.0	3.0

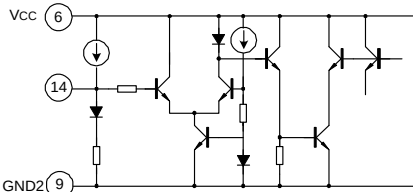
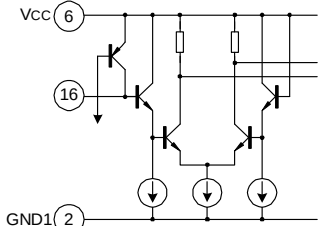
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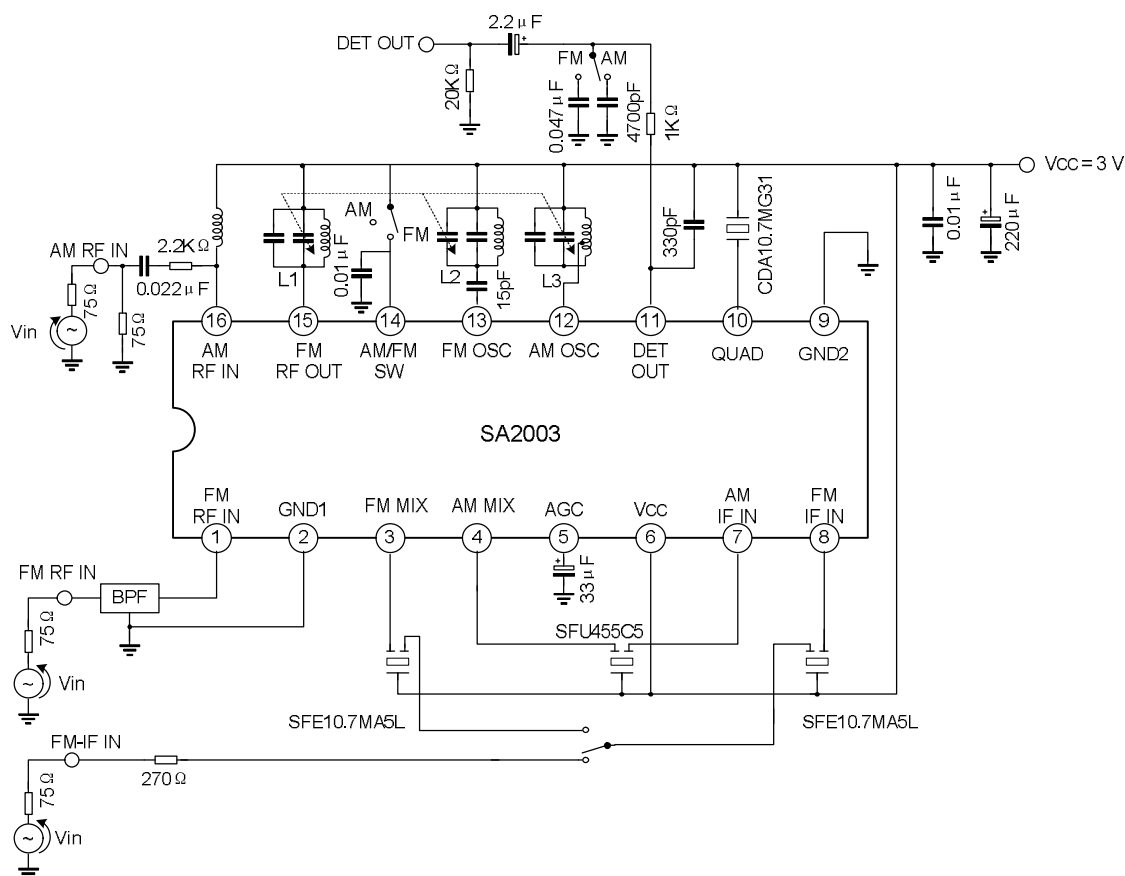
Pin No.	Symbol	Internal Circuit	Terminal Voltage (V)	
			AM	FM
8	FM IF IN		3.0	3.0
9	GND2	-	0	0
10	QUAD		2.5	2.2
11	DET OUT	 (a) LOW → FM, HIGH → AM (b) LOW → AM, HIGH → FM	1.4	1.1
12	AM OSC		3.0	3.0
13	FM OSC		0.9	3.0

(TO be continued)

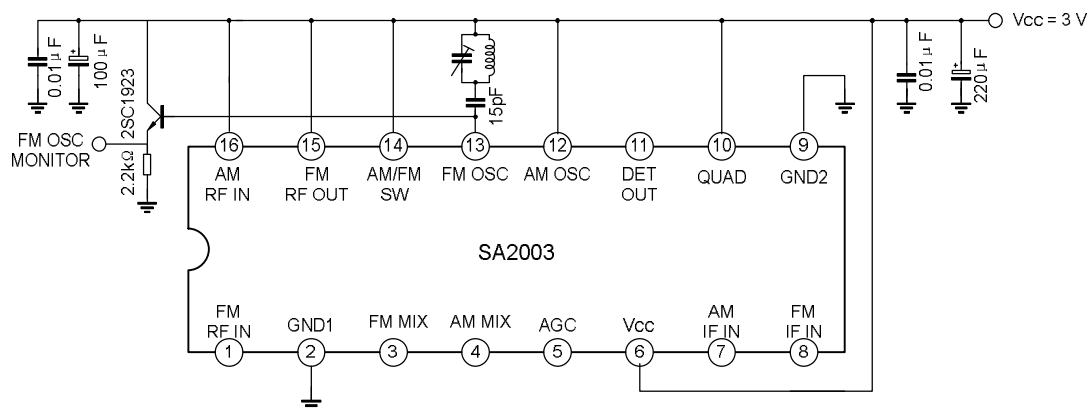
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Pin No.	Symbol	Internal Circuit	Terminal Voltage (V)	
			AM	FM
14	AM/FM SW		0.9	3.0
15	FM RF OUT	Cf. PIN①	3.0	3.0
16	AM RF IN		3.0	3.0

TEST CIRCUIT 1



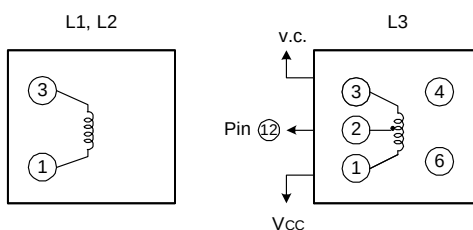
TEST CIRCUIT 2



COIL DATA

Coil No.	Test Freq.	L (μH)	Co (pF)	Q ₀	Turns					Wire(mm)	Reference
					1-2	2-3	1-3	1-4	4-6		
L1 FM RF	100MHz	--	--	100	--	--	--	2 $\frac{1}{4}$	--	0.5 UEW	(s)0258-000-021
L2 FM OSC	100MHz	--	--	100	--	--	1 $\frac{3}{4}$	--	--	0.5 UEW	(s)0258-000-020
L3 AM OSC	796kHz	268	--	125	14	86	--	--	--	0.06 UEW	(s)2157-2239-213A

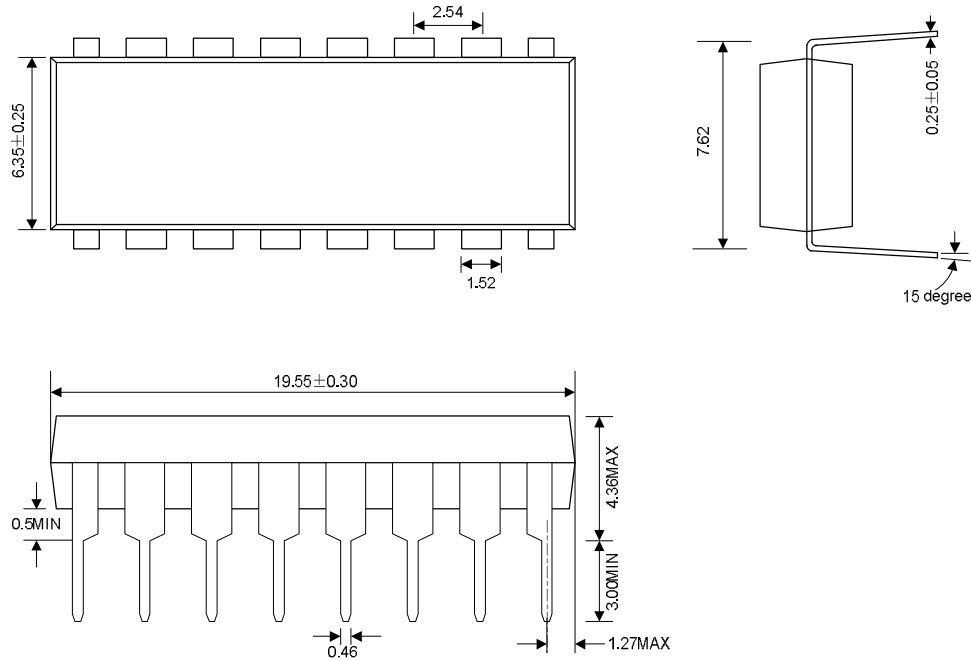
(s): Sumida electric co., ltd.



PACKAGE OUTLINE

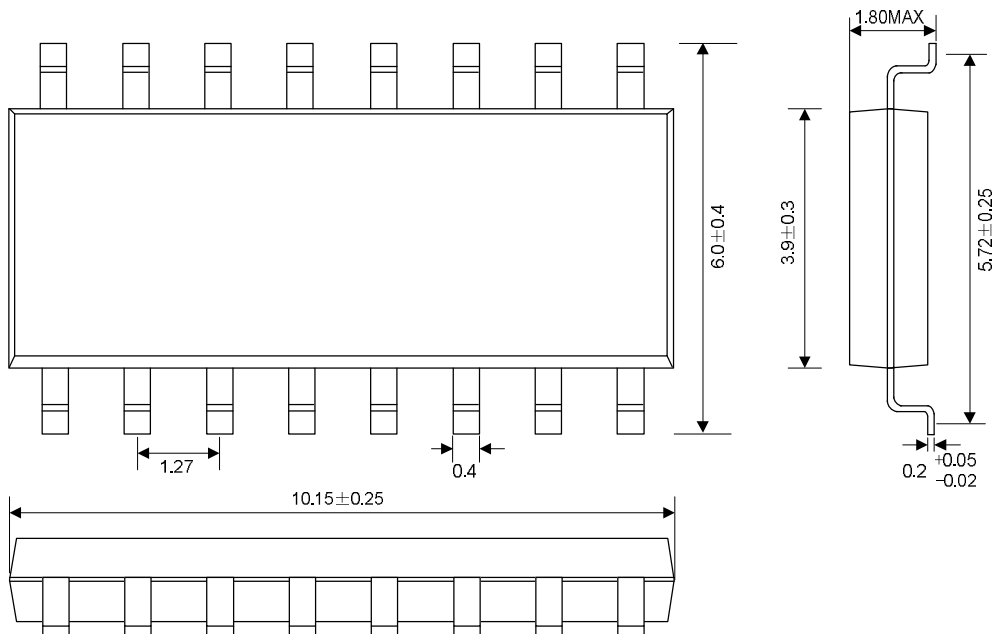
DIP-16-300-2.54

UNIT: mm



SOP-16-225-1.27

UNIT: mm



ATTACH

Revision History

Data	REV	Description	Page
2001.02.01	1.0	Original	
2002.05.09	1.1	The " SA2003" change to "SA1003"	
2002.12.03	1.2	The " SA1003" change to "SA2003"	
2003.08.26	1.3	Modify the "TEST CIRCUIT 2"	7