

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

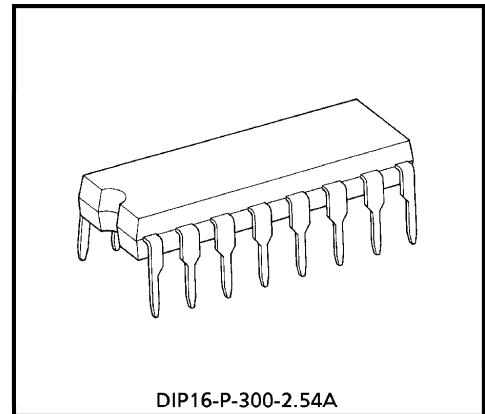
# TA8186P

## AM / FM IF + MPX

TA8186P is the AM/FM IF+MPX system IC, which is designed for radio cassette recorders and music centers.

### FEATURES

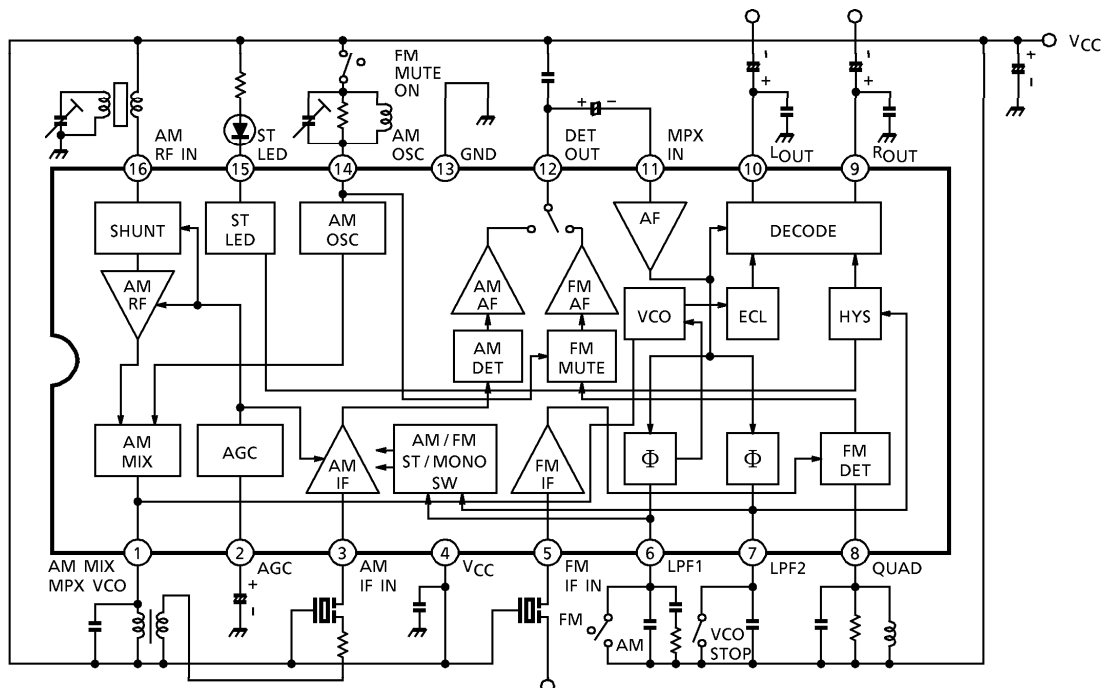
- Compact package (DIP16), and small number of external parts.
- AM IFT is also used for VCO resonator.
- Built-in FM soft muting circuit.
- Operating supply voltage range :  
 $V_{CC} (opr) = 3.5 \sim 13V (T_a = 25^\circ C)$   
 At FM soft mute using :  
 $V_{CC} (opr) = 3.5 \sim 9V (T_a = 25^\circ C)$



Weight : 1.00g (Typ.)

※ Handle with care to prevent devices from deteriorations by static electricity.

### BLOCK DIAGRAM



961001EBA2

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**TERMINAL EXPLANATION** (Terminal voltage shows the typical value at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 6\text{V}$ , and non-signal test circuit)

PIN No.	TERMINAL NAME	CONTENTS	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V)	
				FM	AM
1	AM MIX MPX VCO	<ul style="list-style-type: none"> <li>• AM mixer output terminal</li> <li>• AM IFT is also used for VCO resonator</li> </ul>		6.0	6.0
2	AGC	AM AGC terminal It is necessary to connect external capacitance		0.4	0.3
3	AM IF IN	AM IF Amp input terminal		6.0	6.0
4	V <sub>CC</sub>	Power supply	—	6.0	6.0
5	FM IF IN	FM IF Amp input terminal		6.0	6.0
6	LPF1	<ul style="list-style-type: none"> <li>• LPF terminal for phase detector</li> <li>• Bias terminal for AM/FM switch circuit</li> </ul> $V_6 = V_{CC} \rightarrow \text{AM}$ $V_6 = \text{Open} \rightarrow \text{FM}$		4.3 (At VCO STOP 5.6)	6.0

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PIN No.	TERMINAL NAME	CONTENTS	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V)	
				FM	AM
7	LPF2	<ul style="list-style-type: none"> <li>● LPF terminal for synchronous detector</li> <li>● VCO stop terminal <math>V_7 = V_{CC} \rightarrow</math> VCO Stop</li> </ul>		4.3	6.0
8	QUAD	FM QUAD detector terminal FM QUAD coil is connected.		6.0	6.0
9	Rout	MPX audio output terminal		3.5	3.5
10	Lout			3.5	3.5
11	MPX IN	MPX input terminal		3.3	3.3
12	DET OUT	FM / AM detector output terminal		1.3	1.3
13	GND	GND terminal	—	0	0

PIN No.	TERMINAL NAME	CONTENTS	INTERNAL CIRCUIT	TERMINAL VOLTAGE (V)	
				FM	AM
14	AM OSC	<ul style="list-style-type: none"> <li>• AM OSC terminal</li> <li>• Bias terminal for FM soft mute switch circuit</li> </ul> $V_{14} = \text{Open} \rightarrow \text{FM MUTE ON}$		6.0 (At FM MUTE ON) 5.4	6.0
15	ST LED	<ul style="list-style-type: none"> <li>• Stereo LED terminal</li> <li>• VCO monitor terminal</li> </ul>		5.4	5.4
16	AM RF IN	AM RF Amp input terminal ( $R_{in} = 1M\Omega$ , at $f_{in} = 1\text{MHz}$ )		6.0	6.0

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$V_{CC}$	15	V
LED Current	$I_{LED}$	10	mA
LED Voltage	$V_{LED}$	15	V
Power Dissipation	$P_D$ (Note)	750	mW
Operating Temperature	$T_{opr}$	-25~75	°C
Storage Temperature	$T_{stg}$	-55~150	°C

(Note) Derated above  $T_a = 25^\circ\text{C}$  in the proportion of  $6\text{mW}/^\circ\text{C}$ .

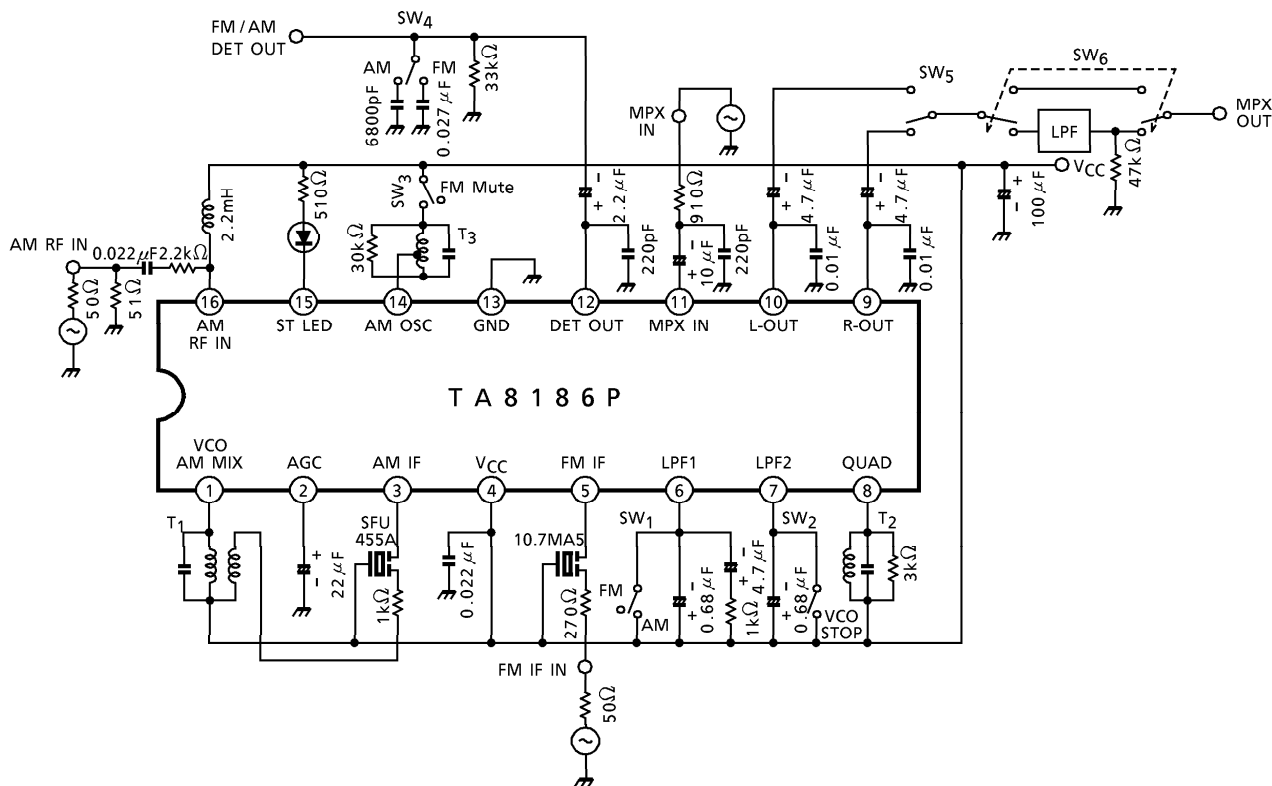
**ELECTRICAL CHARACTERISTICS**

Unless otherwise specified,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 6\text{V}$ ,  
 FM IF :  $f = 10.7\text{MHz}$ ,  $\Delta f = \pm 22.5\text{kHz}$ ,  $f_m = 1\text{kHz}$   
 AM :  $f = 1\text{MHz}$ ,  $\text{MOD} = 30\%$ ,  $f_m = 1\text{kHz}$   
 MPX :  $f_m = 1\text{kHz}$

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Supply Current		$I_{CC}$ (FM)	1	FM Mode, $V_{in} = 0$	—	17.0	25.0	mA	
		$I_{CC}$ (AM)	1	AM Mode, $V_{in} = 0$	—	15.0	22.0		
FM IF	Input Limiting Voltage	$V_{in}$ (lim)	1	-3dB limiting point	38	43	48	$\text{dB}\mu\text{V}$ EMF	
	Recovered Output Voltage	$V_{OD}$	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	55	80	110	$\text{mV}_{\text{rms}}$	
	Signal To Noise Ratio	S/N	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	—	70	—	dB	
	Total Harmonic Distortion	THD	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	—	0.1	—	%	
	AM Rejection Ratio	AMR	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	—	45	—	dB	
AM	Gain	$G_V$	1	$V_{in} = 26\text{dB}\mu\text{V}$ EMF	20	35	50	$\text{mV}_{\text{rms}}$	
	Recovered Output Voltage	$V_{OD}$	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	55	80	110	$\text{mV}_{\text{rms}}$	
	Signal To Noise Ratio	S/N	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	—	42	—	dB	
	Total Harmonic Distortion	THD	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	—	1.0	—	%	
Pin 12 Output Resistance		$R_{12}$	1	FM Mode	—	1.5	—	$\text{k}\Omega$	
				AM Mode	—	10	—		
MPX	Input Resistance		$R_{IN}$	1	—	—	33	$\text{k}\Omega$	
	Output Resistance		$R_{OUT}$	1	—	—	5		
	Max. Composite Signal Input Voltage		$V_{in}$ MAX (Stereo)	1	L + R = 90%, P = 10% THD = 3%, SW→LPF : ON	—	800	—	$\text{mV}_{\text{rms}}$
	Separator		Sep	1	L + R = 180 $\text{mV}_{\text{rms}}$ P = 20 $\text{mV}_{\text{rms}}$ SW→LPF : ON	$f_m = 100\text{Hz}$ $f_m = 1\text{kHz}$ $f_m = 10\text{kHz}$	— 35 —	43 43 —	dB
	Total Harmonic Distortion	Monaural	THD (Monaural)	1	$V_{in} = 200\text{mV}_{\text{rms}}$ (Mono)	—	0.2	—	
		Stereo	THD (Stereo)		L + R = 180 $\text{mV}_{\text{rms}}$ P = 20 $\text{mV}_{\text{rms}}$ SW→LPF : ON	—	0.2	—	
	Voltage Gain		$G_V$ (MPX)	1	$V_{in} = 200\text{mV}_{\text{rms}}$ (Mono)	-2	0	2	dB
Channel Balance		C.B.	1	$V_{in} = 200\text{mV}_{\text{rms}}$ (Mono)	-2	0	2	dB	

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
MPX	Stereo LED Sensitivity	ON	$V_L$ (ON)	1	Pilot input	—	10	16	$mV_{rms}$
		OFF	$V_L$ (OFF)			2	6	—	
	Stereo LED Hysteresis		$V_H$	1	To LED turn off from LED turn on	—	4	—	$mV_{rms}$
	Capture Range		C.R.	1	$P = 20mV_{rms}$	—	$\pm 4$	—	%
	Signal To Noise Ratio		S/N	1	$V_{in} = 200mV_{rms}$ (Mono)	—	78	—	dB

TEST CIRCUIT

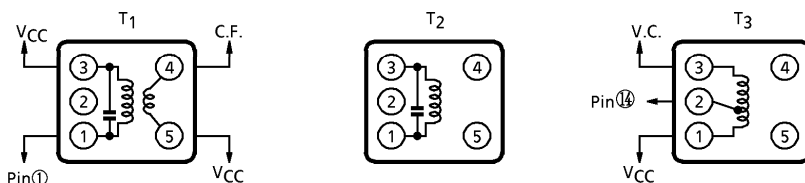


COIL DATA

COIL No.	f	L ( $\mu$ H)	C <sub>0</sub> (pF)	Q <sub>0</sub>	TURN				WIRE (mm $\phi$ )	REF
					1-2	2-3	1-3	4-6		
T <sub>1</sub> AM IFT	455kHz	—	180	120	—	—	180	15	0.06 UEW	Ⓢ2150-2162-165
		—	180	50 $\uparrow$	—	—	158	14	0.07 $\phi$ 2 UEW	ⓉA7LCS-11432X
T <sub>2</sub> FM DET	10.7MHz	—	82	110	—	—	13	—	0.12 UEW	Ⓢ4152-4095-015
		—	82	80 $\uparrow$	—	—	11	—	0.1 $\phi$ 2 UEW	ⓉA119ACS-19118Z
T <sub>3</sub> AM OSC	796kHz	288	—	115	13	73	—	—	0.08 UEW	Ⓢ4147-1356-038
		288	—	105 $\uparrow$	16	88	—	—	0.07 $\phi$ 2 UEW	Ⓣ7TRS-11433Y

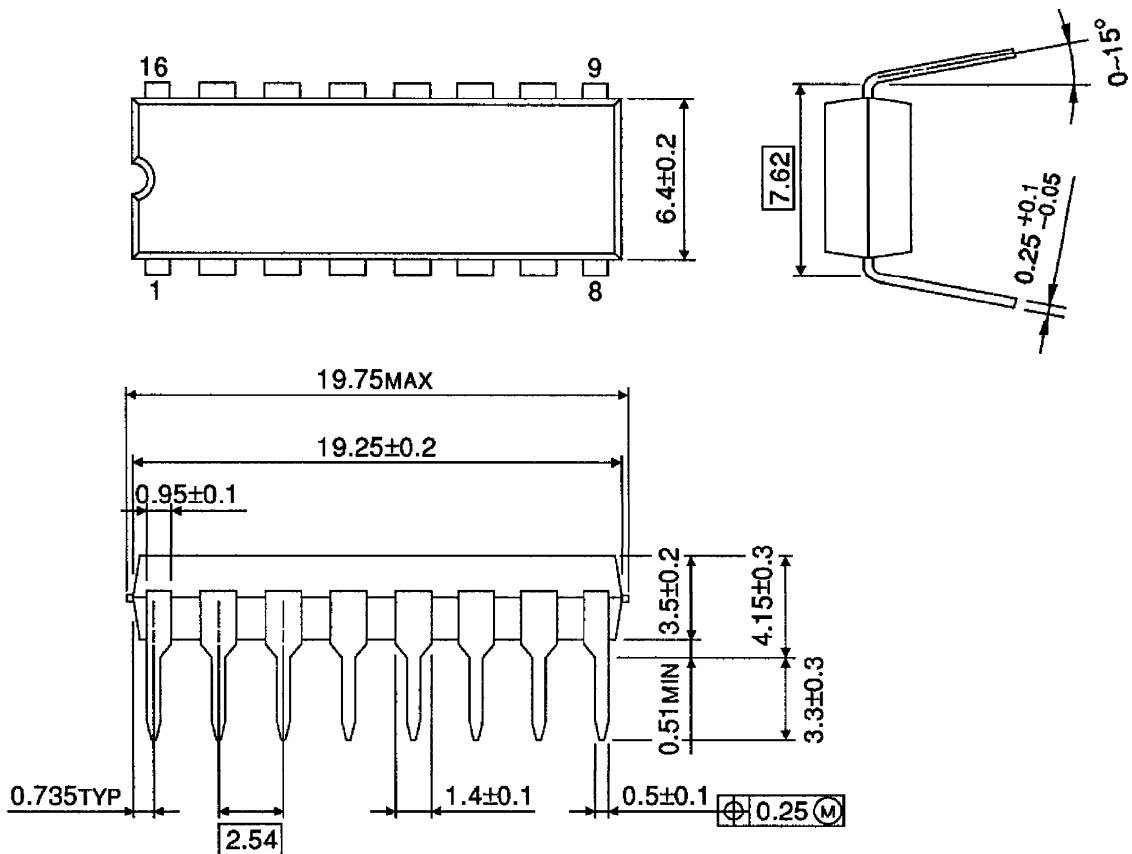
Ⓢ : SUMIDA ELECTRIC Co., Ltd.

Ⓣ : TOKO Co., Ltd.



**OUTLINE DRAWING**  
DIP16-P-300-2.54A

Unit : mm



Weight : 1.00g (Typ.)