

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

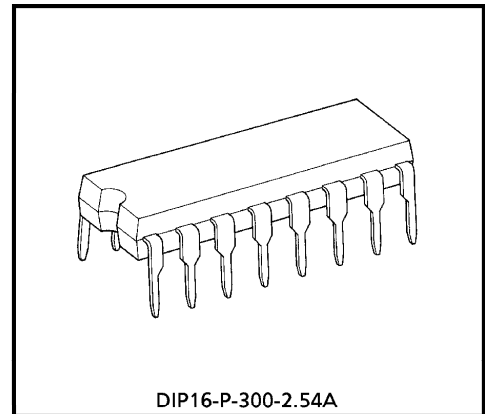
TA8186P

AM / FM IF + MPX

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

FEATURES

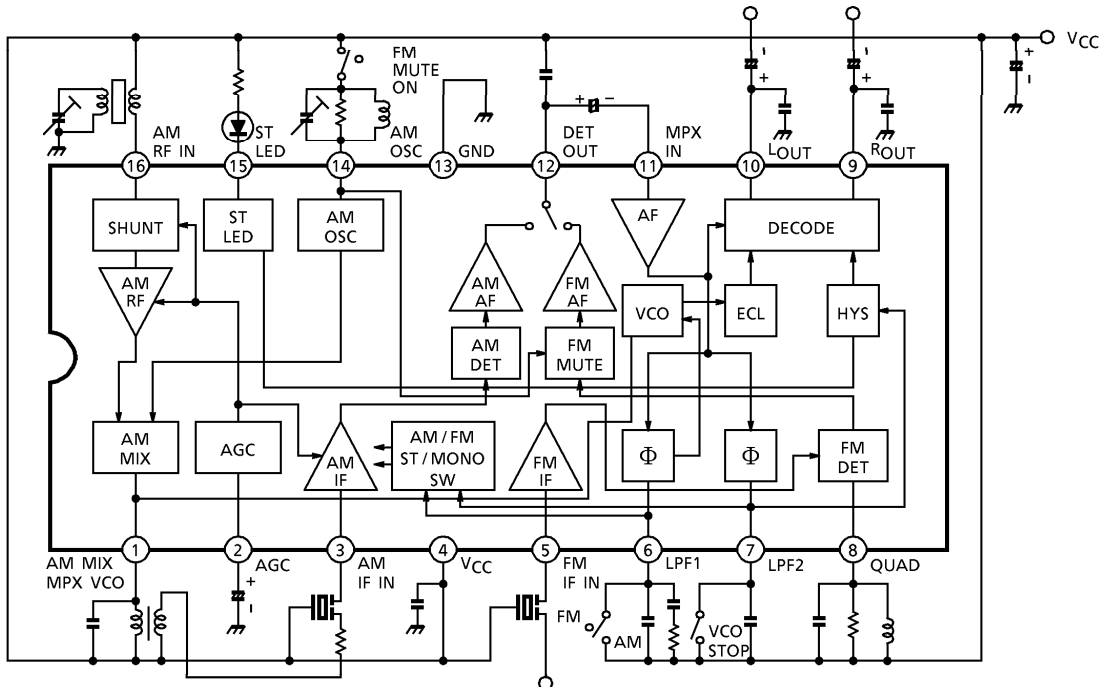
- Compact package (DIP16), and small number of external parts.
- AM IFT is also used for VCO resonator.
- Built-in FM soft muting circuit.
- Operating supply voltage range :
 $V_{CC} (opr) = 3.5 \sim 13V (T_a = 25^\circ C)$
 At FM soft mute using :
 $V_{CC} (opr) = 3.5 \sim 9V (T_a = 25^\circ C)$



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"> • AM mixer output terminal • AM IFT is also used for VCO resonator 		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 _{CC}	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"> • LPF terminal for phase detector • Bias terminal for AM/FM switch circuit $V_6 = V_{CC} \rightarrow \text{AM}$ $V_6 = \text{Open} \rightarrow \text{FM}$		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"> ● LPF terminal for synchronous detector ● VCO stop terminal $V_7 = V_{CC} \rightarrow$ VCO Stop 		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"> • AM OSC terminal • Bias terminal for FM soft mute switch circuit $V_{14} = \text{Open} \rightarrow \text{FM MUTE ON}$		6.0 (At FM MUTE ON) 5.4	6.0
15	ST LED	<ul style="list-style-type: none"> • Stereo LED terminal • VCO monitor terminal 		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 $6\text{mW}/^\circ\text{C}$.

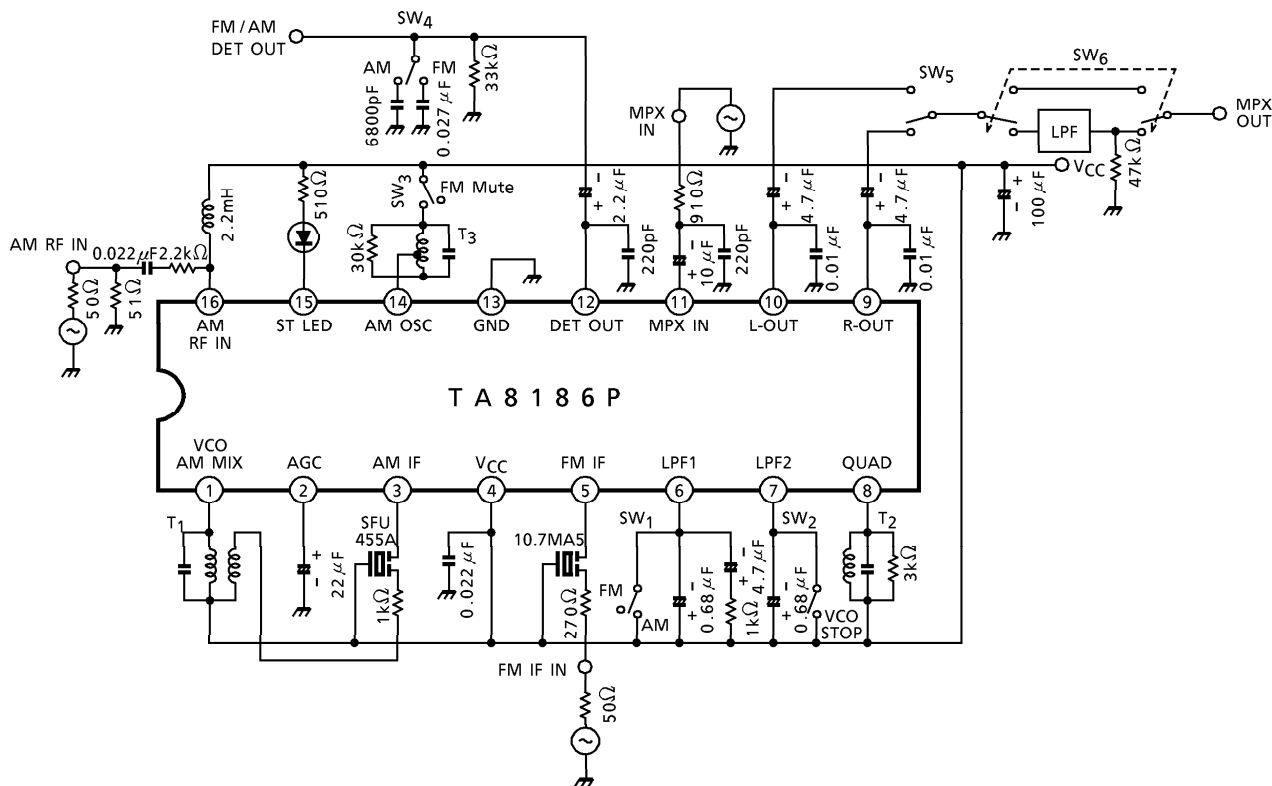
ELECTRICAL CHARACTERISTICS

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	mV_{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	mV_{rms}	
	Recovered Output Voltage	V_{OD}	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	55	80	110	mV_{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	—	k Ω	
				AM Mode	—	10	—		
MPX	Input Resistance		R_{IN}	1	—	—	33	k Ω	
	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	—	mV_{rms}
	Separator		Sep	1	L + R = 180 mV_{rms} P = 20 mV_{rms} SW→LPF : ON	$f_m = 100\text{Hz}$	—	43	dB
						$f_m = 1\text{kHz}$	35	43	
						$f_m = 10\text{kHz}$	—	43	
	Total Harmonic Distortion	Monaural	THD (Monaural)	1	$V_{in} = 200\text{mV}_{\text{rms}}$ (Mono)	—	0.2	—	%
Stereo		THD (Stereo)	L + R = 180 mV_{rms} P = 20 mV_{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	$P = 20mV_{rms}$	—	± 4	—	%
	Signal To Noise Ratio		S/N	1	$V_{in} = 200mV_{rms}$ (Mono)	—	78	—	dB

TEST CIRCUIT

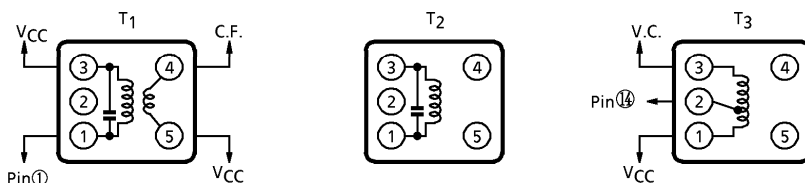


COIL DATA

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

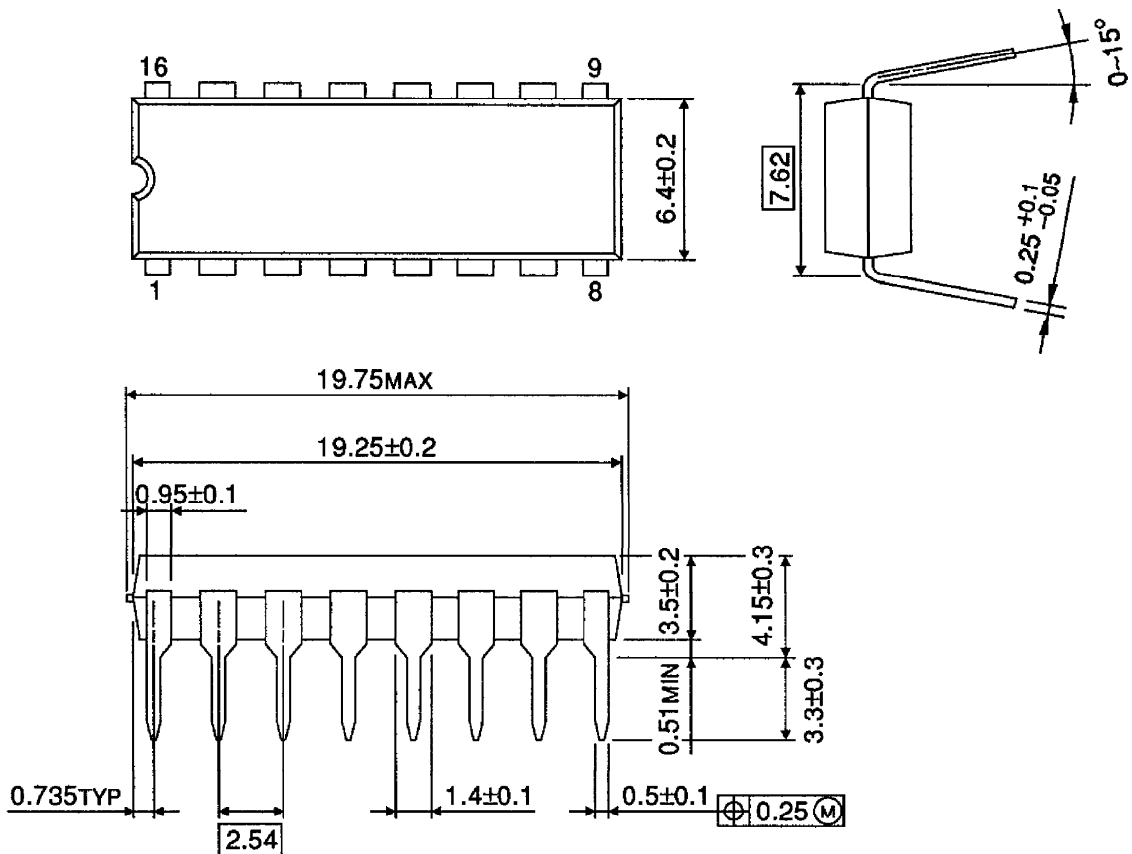
Ⓢ : SUMIDA ELECTRIC Co., Ltd.

Ⓣ : TOKO Co., Ltd.



OUTLINE DRAWING
DIP16-P-300-2.54A

Unit : mm



Weight : 1.00g (Typ.)