

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

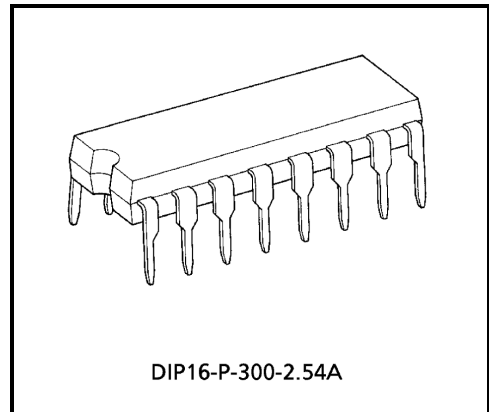
TA8186P

AM / FM IF + MPX

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

Features

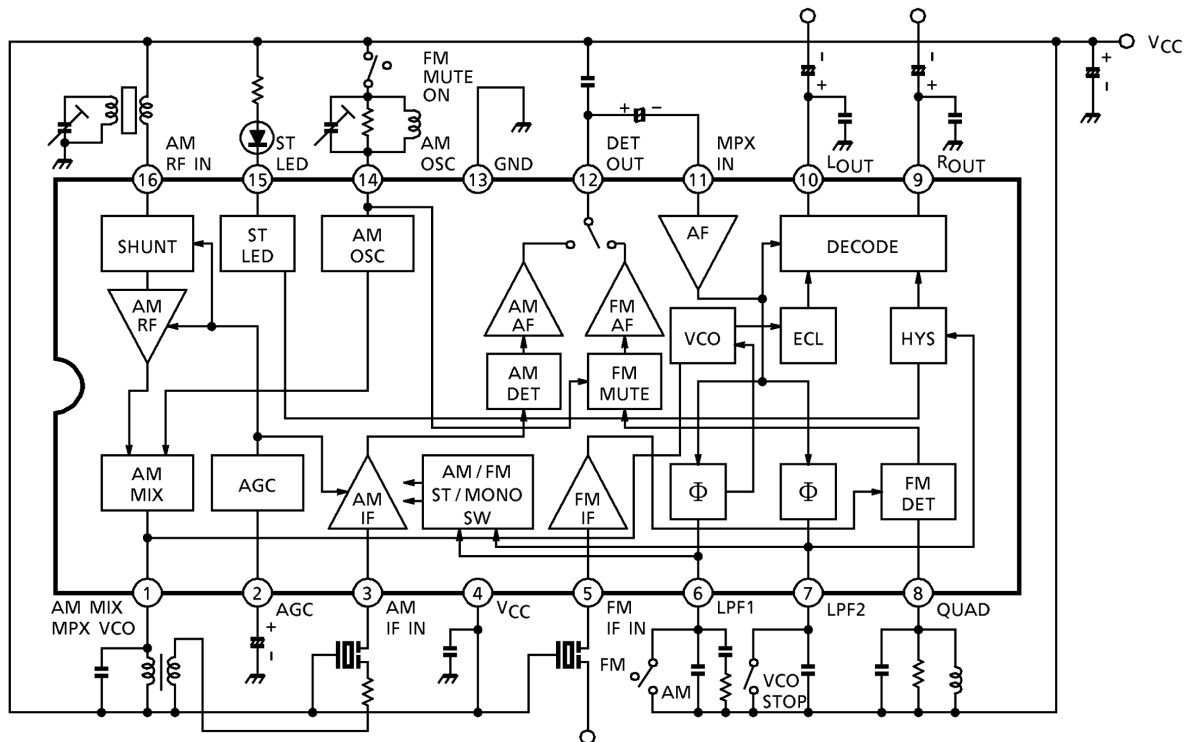
- Compact package (DIP16), and small number of external parts.
- AM IFT is also used for VCO resonator.
- Built-in FM soft muting circuit.
- Operating supply voltage range:
 $V_{CC(opr)} = 3.5\sim 13V$ ($T_a = 25^\circ C$)
 At FM soft mute using:
 $V_{CC(opr)} = 3.5\sim 9V$ ($T_a = 25^\circ C$)



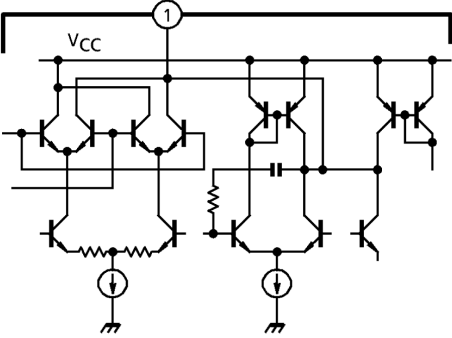
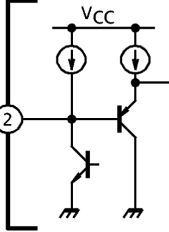
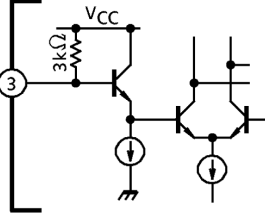
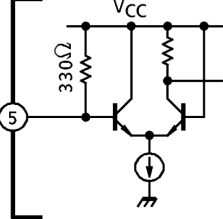
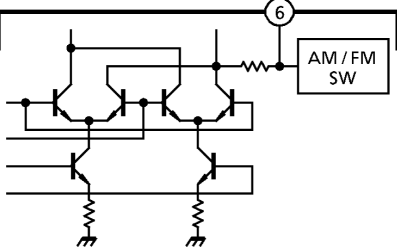
Weight: 1.00g (typ.)

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

Block Diagram



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

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	R _{out}	MPX audio output terminal		3.5	3.5
10	L _{out}			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 OCS 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 ($T_a = 25^\circ\text{C}$)

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	$^\circ\text{C}$
Storage temperature	T_{stg}	-55~150	$^\circ\text{C}$

(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: $f = 10.7\text{MHz}$, $\Delta f = \pm 22.5\text{kHz}$, $f_m = 1\text{kHz}$

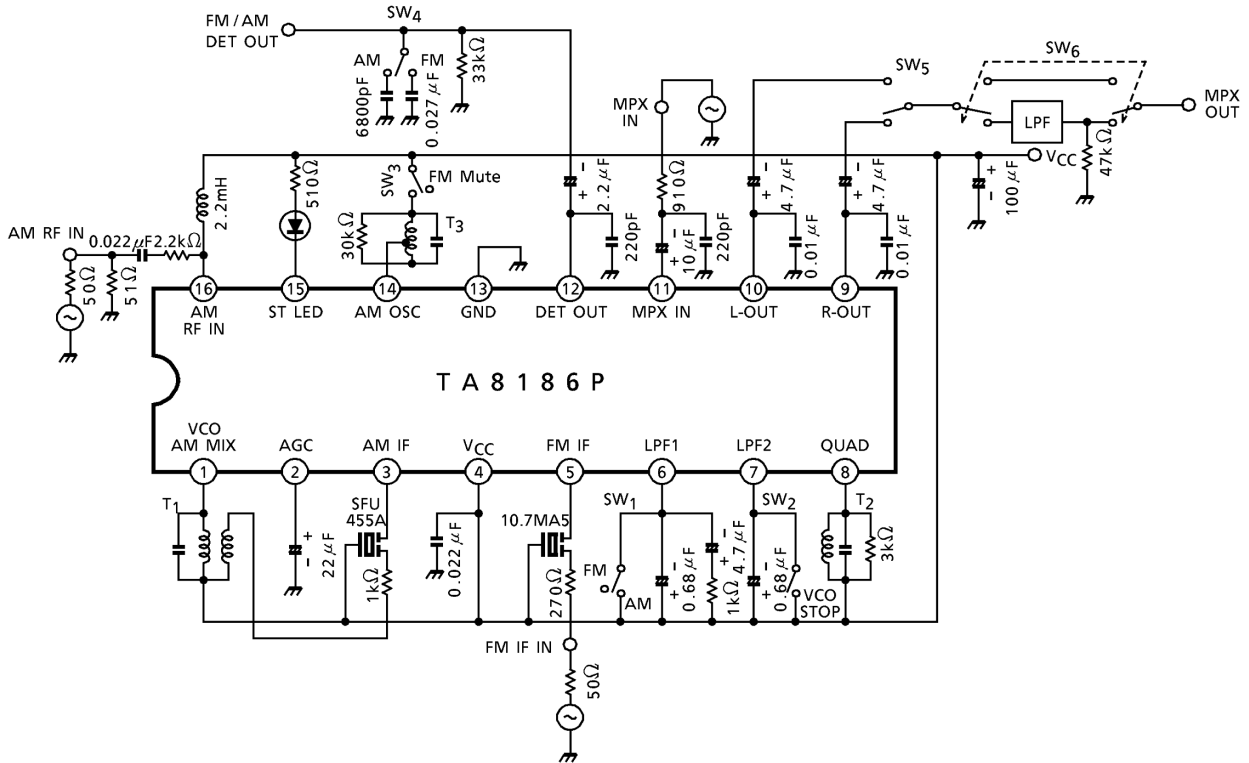
AM: $f = 1\text{MHz}$, $\text{MOD} = 30\%$, $f_m = 1\text{kHz}$

MPX: $f_m = 1\text{kHz}$

Characteristic		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit		
Supply current		$I_{CC}(\text{FM})$	1	FM mode, $V_{in} = 0$	—	17.0	25.0	mA		
		$I_{CC}(\text{AM})$	1	AM mode, $V_{in} = 0$	—	15.0	22.0			
FM IF	Input limiting voltage	$V_{in}(\text{lim})$	1	-3dB limiting point	38	43	48	dB μV EMF		
	Recovered output voltage	V_{OD}	1	$V_{in} = 80\text{dB}\mu\text{V}$ EMF	55	80	110	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	mV $_{\text{rms}}$		
	Recovered output voltage	V_{OD}	1	$V_{in} = 60\text{dB}\mu\text{V}$ EMF	55	80	110	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	—	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		$V_{in \text{ max (stereo)}}$	1	L + R = 90%, P = 10% THD = 3%, SW \rightarrow LPF: On	—	800	—	mV $_{\text{rms}}$	
	Separator		Sep	1	L + R = 180mV $_{\text{rms}}$ P = 20mV $_{\text{rms}}$ SW \rightarrow 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 = 180mV $_{\text{rms}}$ P = 20mV $_{\text{rms}}$ SW \rightarrow LPF: On							—
Voltage gain		$G_V(\text{MPX})$	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 Circuit	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

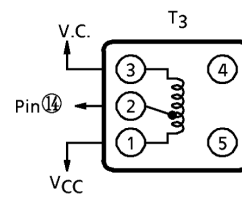
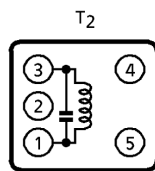
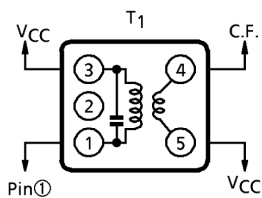


Coil Data

Coil No.	F	L (µH)	C ₀ (pF)	Q ₀	Turn				Wire (mmφ)	Ref
					1-2	2-3	1-3	4-6		
T ₁ AM IFT	455kHz	—	180	120	—	—	180	15	0.06 UEW	(S) 2150-2162-165
		—	180	50↑	—	—	158	14	0.07φ2 UEW	(T) A7LCS-11432X
T ₂ FM DET	10.7MHz	—	82	110	—	—	13	—	0.12 UEW	(S) 4152-4095-015
		—	82	80↑	—	—	11	—	0.1φ2 UEW	(T) A119ACS-19118Z
T ₃ AM OSC	796kHz	288	—	115	13	73	—	—	0.08 UEW	(S) 4147-1356-038
		288	—	105↑	16	88	—	—	0.07φ2 UEW	(T) 7TRS-11433Y

(S): SUMIDA ELECTRIC Co., Ltd.

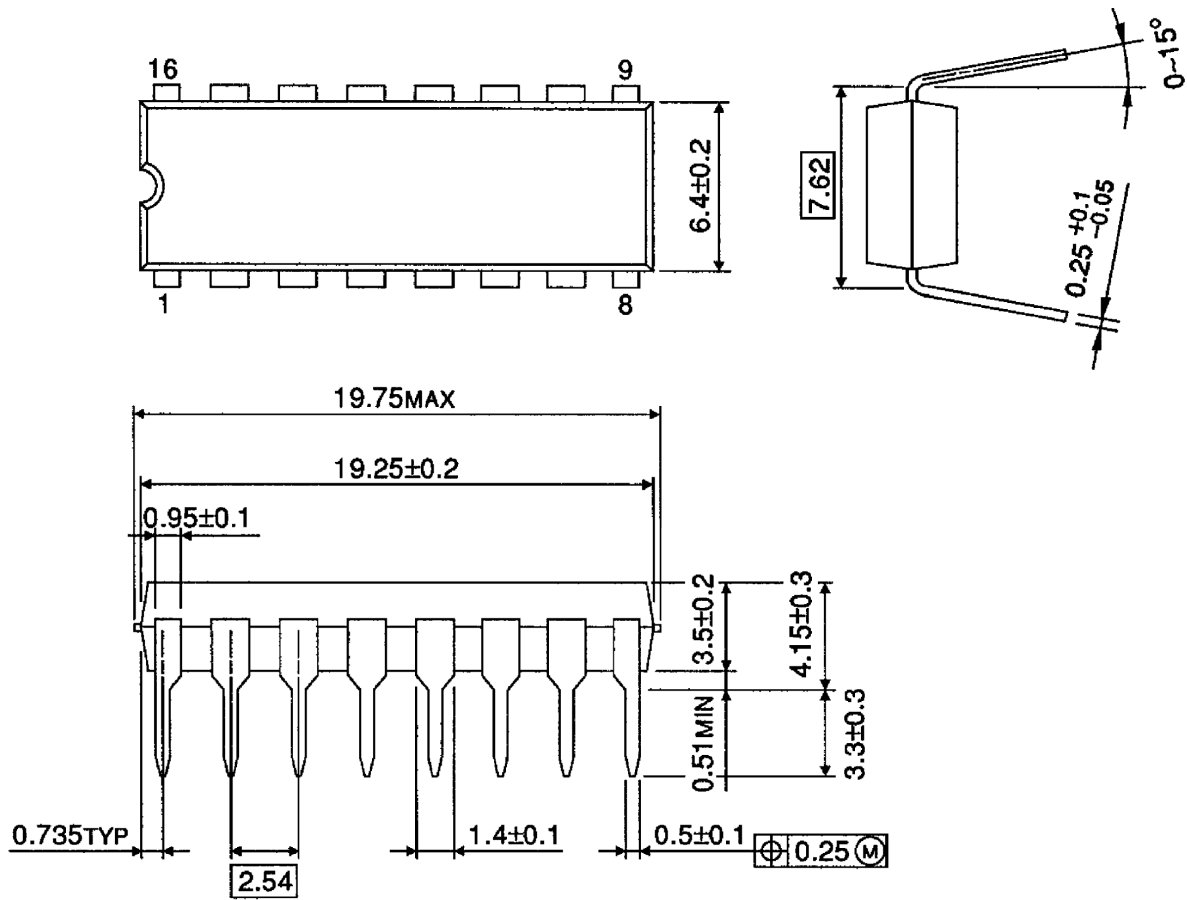
(T): TOKO Co., Ltd.



Package Dimensions

DIP16-P-300-2.54A

Unit : mm



Weight: 1.00g (typ.)

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