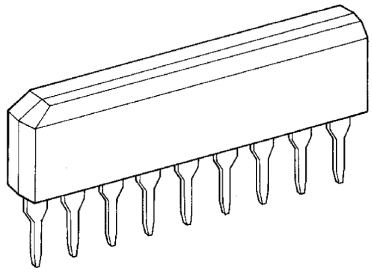
TOSHIBA Biplar Linear Integrated Circuit Silicon Monolithic

TA7343AP

FM PLL MPX

The TA7343AP is PLL FM stereo multiplex IC.
It is suitable for automotive applications and portable radio applications because of space merit by the package and wide supply voltage range.



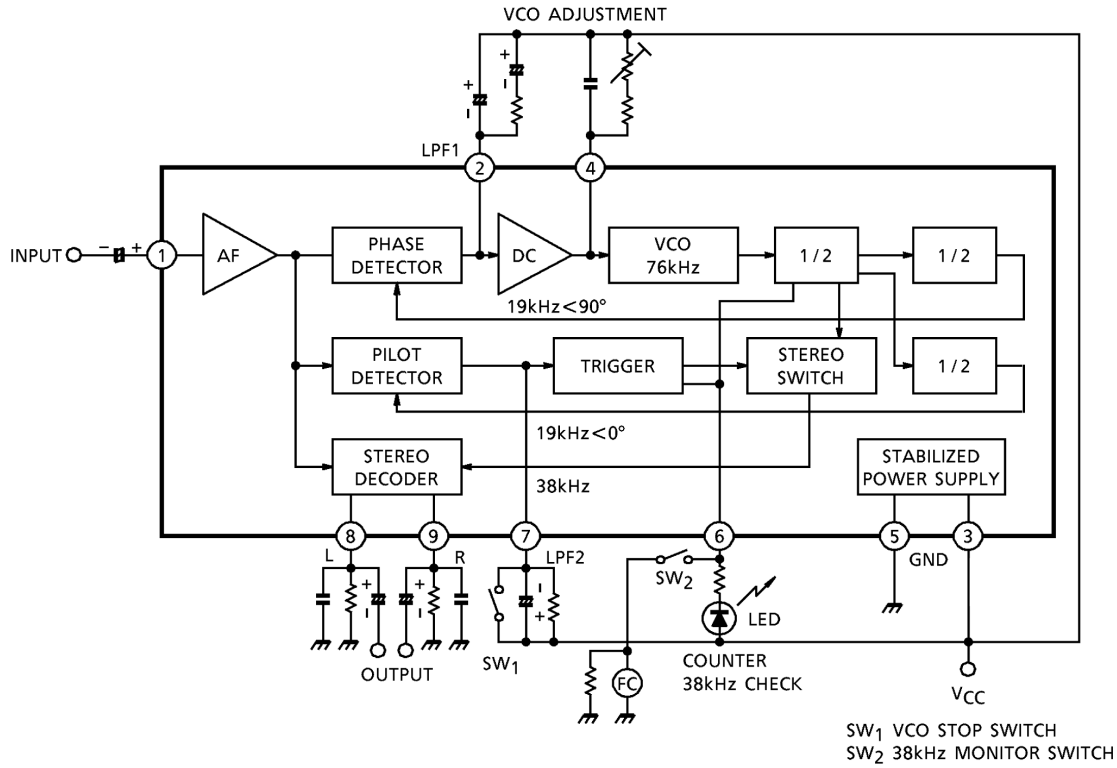
SIP9-P-2.54A

Weight: 0.92g (typ.)

Features

- Excellent stereo LED sensitivity
  : $V_{L\ (ON)}$ = 9mV_{rms} (typ.)
- Suitable for LED driving: I_{LED} = 20mA (max.)
- Recommendable input voltage range
  : V_{in} = 200~700mV_{rms}
- Operating supply voltage range: V_{CC} = 3.5~12V
- Excellent channel separation through entire audio frequency range: Sep = 45dB (typ.)
- Low distortion: THD = 0.08% (typ.) at V_{in} = 200mV_{rms} (stereo)
- Built−in compulsive monaural function. (The VCO is stopped when the pin(7) is connected with the power supply line, and then the stereo indicator is turn off.)
- Easy adjustment (the monitored free running frequency of VCO is 38kHz at pin(6).)

Block Diagram



Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Supply voltage	V_{CC}	12	V
LED voltage	V_{LED}	16	V
LED current	I_{LED}	20	mA
Power dissipation	P_D (Note)	500	mW
Operating temperature	T_{opr}	−30~75	°C
Storage temperature	T_{stg}	−55~155	°C

(Note) Derated above Ta = 25°C in the proportion of 4mW / °C

Elecrical Characteristics

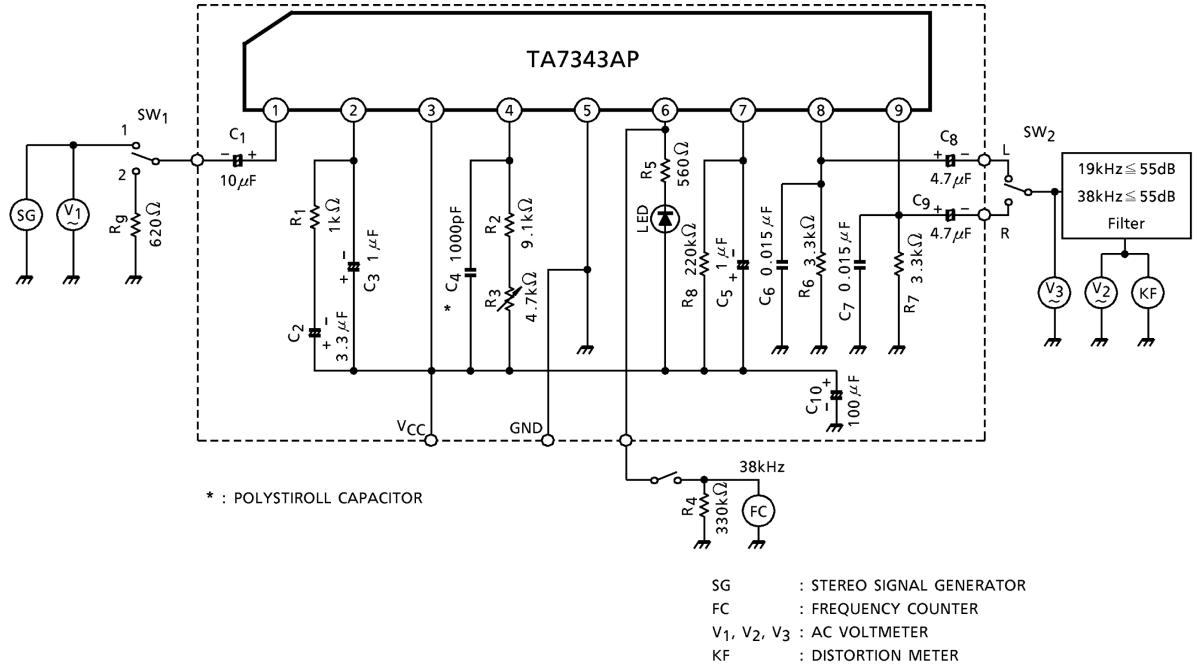
1. DC Characteristics (Ta = 25°C, V_{CC} = 8V, terminal voltage at no signal)

Pin No.	Characteristic	Symbol	Typ.	Unit
1	INPUT	V1	3.5	V
2	LPF 1	V2	6.6	V
3	V_{CC}	V3	8.0	V
4	VCO	V4	7.1	V
5	GND	V5	0	V
6	ST LED	V6	—	V
7	LPF 2	V7	7.4	V
8	L−ch OUTPUT	V8	4.0	V
9	R−ch OUTPUT	V9	4.0	V

2. AC Characteristics (unless otherwise specified, Ta = 25°C, V_{CC} = 8V, f = 1kHz)

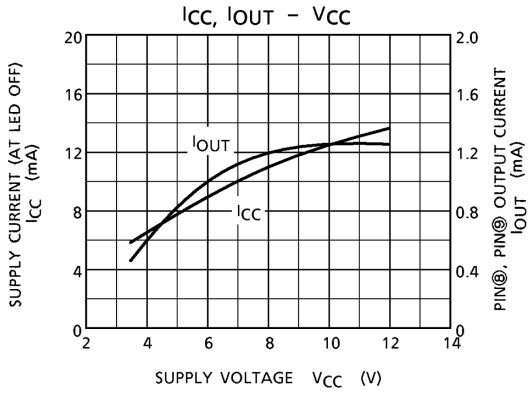
Characteristic		Symbol	Test Circuit	Test Condition		Min.	Typ.	Max.	Unit
Supply current		I_{CC}	—	at LED off		—	11	18	mA
Input resistance		R_{IN}	—			—	33	—	kΩ
Max. Composite signal input voltage		V_{in} max (stereo)	—	L + R = 90%, P = 10% THD = 1%		—	900	—	mV_{rms}
Separation		Sep	—	L + R = 180mV_{rms} P = 20mV_{rms}		36	45	—	dB
Total harmonic distortion	Monaural	THD (monaural)	—	V_{in} = 200mV_{rms}		—	0.08	0.3	%
	Stereo	THD (stereo)	—	L + R = 180mV_{rms} P = 20mV_{rms}		—	0.08	—	
Voltage gain		G_V	—	V_{in} = 200mV_{rms}		−2.0	0	2.0	dB
Channel balance		CB	—	V_{in} = 200mV_{rms}		—	0	1.5	dB
Stereo LED sensitivity	On	$V_{L\ (ON)}$	—	Pilot input		—	9	15	mV_{rms}
	Off	$V_{L\ (OFF)}$	—			2	6	—	
Stereo LED hysteresis		V_H	—	To turn off from LED turn on		—	3	—	mV_{rms}
Capture range		CR	—	P = 20mV_{rms}		—	±3	—	%
Carrier leak	19kHz	CL	—	P = 20mV_{rms} L + R = 180mV_{rms}		—	34	—	dB
	38kHz					—	42	—	
SCA rejection ratio		SCA rej	—	P = 20mV_{rms} L + R = 160mV_{rms} SCA = 20mV_{rms} f_{SCA} = 67kHz		—	70	—	dB
Signal to noise ratio		S / N	—	V_{in} = 200mV_{rms} f = 1kHz, R_g = 620Ω		—	74	—	dB
Output current (Pin(8), Pin(9))		I_{OUT}	—	R_L = 3.3kΩ	V_{CC} = 3.5V	—	0.3	0.6	mA
					V_{CC} = 8.0V	—	1.2	1.8	
					V_{CC} = 12V	—	1.4	2.1	

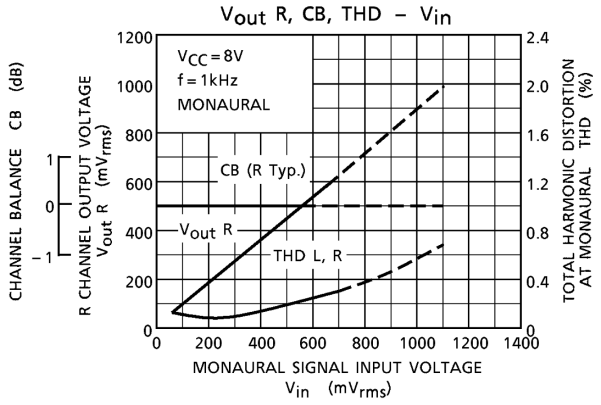
Test Circuit

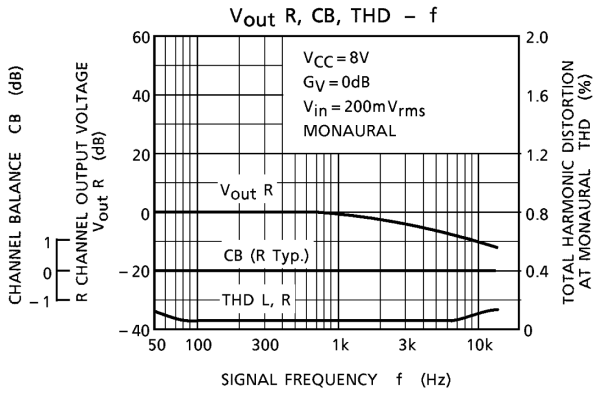


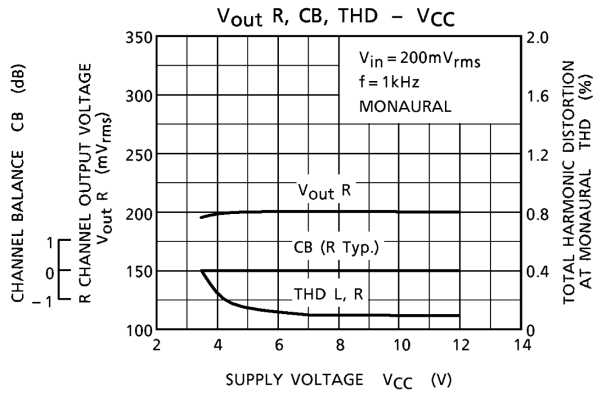
External Parts Table

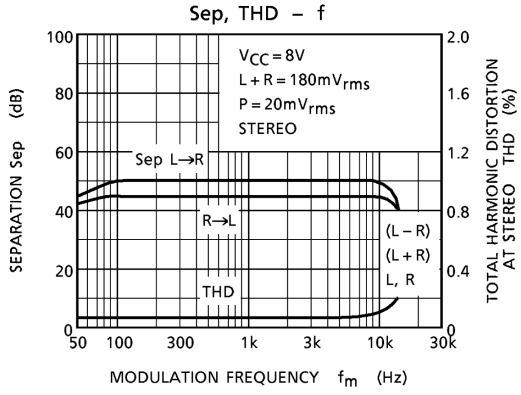
Parts No.	Typical	Purpose	Influence		Note
			Smaller than typ.	Greater than typ.	
C_1	10μF	Coupling	Separation is bad at 50~300Hz	"POP" noise is high	Input
C_2	3.3μF	LPF at PLL	THD is bad at 5~10kHz (stereo)	Narrow capture range	—
C_3	1μF				
R_1	1kΩ				
C_4	1000pF	VCO free running frequency adjustment	C_4: Small → wide capture range and large glitter C_4: Large → narrow capture range		—
R_2	9.1kΩ				
R_3	4.7kΩVR				
R_4	330kΩ	Monitor load	—		—
R_5	560Ω	Rush current limiter	IC is damaged by the rush current	LED is dark	$I_{LED} \leq 20mA$
LED	—	Stereo indicator	Usable for LED		
C_6	0.015μF	Load and diemphasis	Diemphasis (50μs)		C_6 = 0.022μF for 75μs
R_6	3.3kΩ		Output voltage is small	THD is bad for low V_{CC}	
C_7	0.015μF	Load and diemphasis	Diemphasis (50μs)		C_7 = 0.022μF for 75μs
R_7	3.3kΩ		Output voltage is small	THD is bad for low V_{CC}	
C_8	4.7μF	Output coupling	Frequency response is bad	"POP" noise is large	L−ch
C_9	4.7μF	Output coupling			R−ch
R_8	220kΩ	LED sensitivity adjustment	$V_{L\ (ON)}$ is large	$V_{L\ (ON)}$ is small	—
C_5	1μF	LPF at LED	THD is bad at 50~300Hz	Slow LED response	—

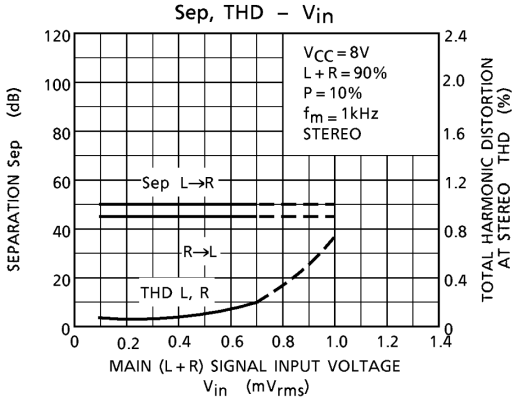

ICC, IOUT – VCC
SUPPLY CURRENT (AT LED OFF) ICC (mA)
PIN⑯, PIN⑰ OUTPUT CURRENT IOUT (mA)
IOUT
ICC
SUPPLY VOLTAGE VCC (V)


Vout R, CB, THD – Vin
VCC = 8V
f = 1kHz
MONAURAL
CB (R Typ.)
Vout R
THD L, R
CHANNEL BALANCE CB (dB)
R CHANNEL OUTPUT VOLTAGE Vout R (mVrms)
TOTAL HARMONIC DISTORTION AT MONAURAL THD (%)
MONAURAL SIGNAL INPUT VOLTAGE Vin (mVrms)

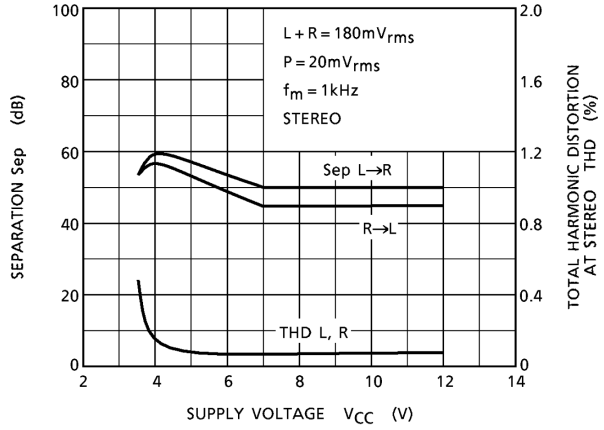

Vout R, CB, THD – f
VCC = 8V
GV = 0dB
Vin = 200mVrms
MONAURAL
Vout R
CB (R Typ.)
THD L, R
CHANNEL BALANCE CB (dB)
R CHANNEL OUTPUT VOLTAGE Vout R (dB)
TOTAL HARMONIC DISTORTION AT MONAURAL THD (%)
SIGNAL FREQUENCY f (Hz)


Vout R, CB, THD – VCC
Vin = 200mVrms
f = 1kHz
MONAURAL
Vout R
CB (R Typ.)
THD L, R
CHANNEL BALANCE CB (dB)
R CHANNEL OUTPUT VOLTAGE Vout R (mVrms)
TOTAL HARMONIC DISTORTION AT MONAURAL THD (%)
SUPPLY VOLTAGE VCC (V)

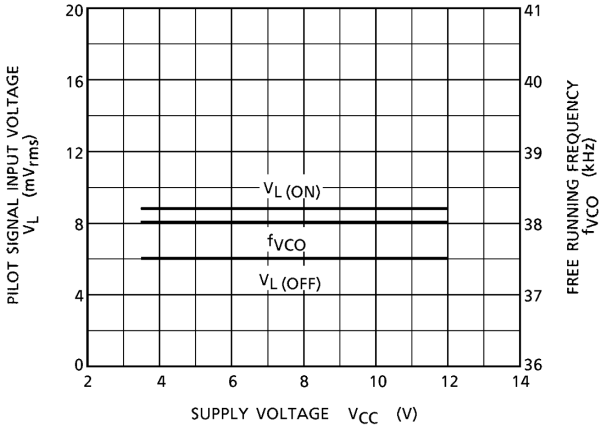

Sep, THD – f
VCC = 8V
L + R = 180mVrms
P = 20mVrms
STEREO
Sep L→R
R→L
(L – R)
(L + R)
L, R
THD
SEPARATION Sep (dB)
TOTAL HARMONIC DISTORTION AT STEREO THD (%)
MODULATION FREQUENCY fm (Hz)


Sep, THD – Vin
VCC = 8V
L + R = 90%
P = 10%
fm = 1kHz
STEREO
Sep L→R
R→L
THD L, R
SEPARATION Sep (dB)
TOTAL HARMONIC DISTORTION AT STEREO THD (%)
MAIN (L + R) SIGNAL INPUT VOLTAGE Vin (mVrms)

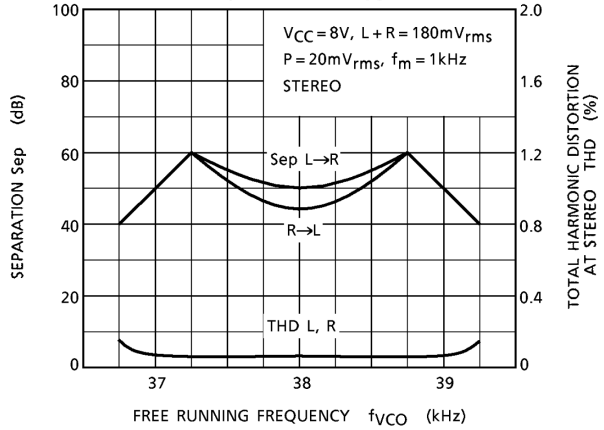
Sep, THD – V_{CC}



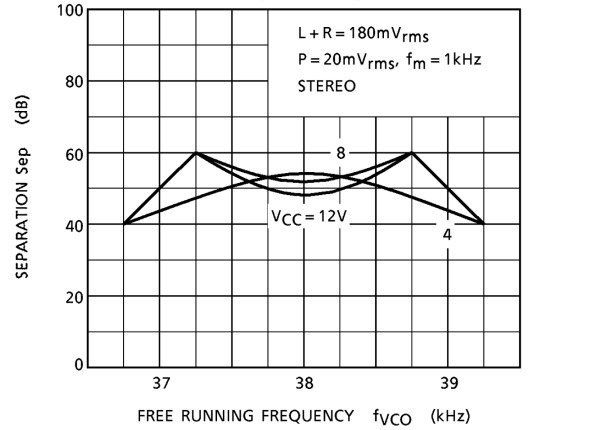
V_L, f_{VCO} – V_{CC}



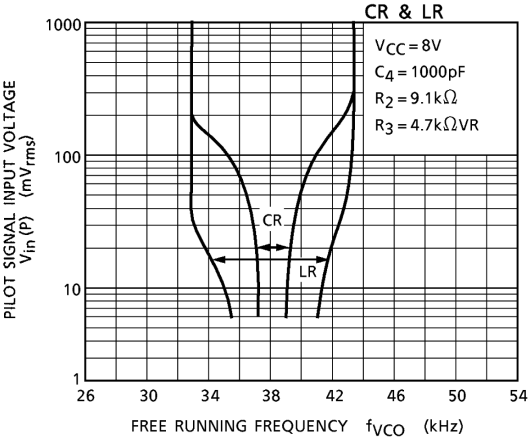
Sep, THD – f_{VCO}



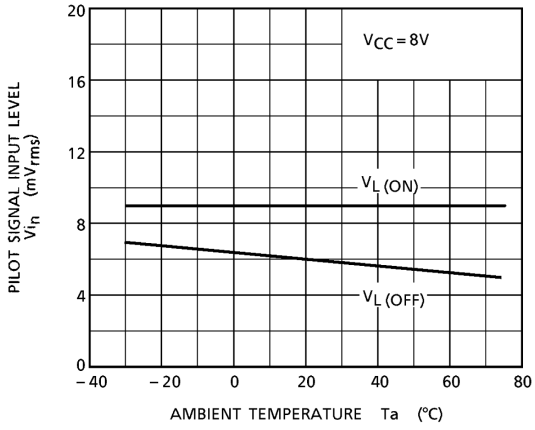
Sep, – f_{VCO}

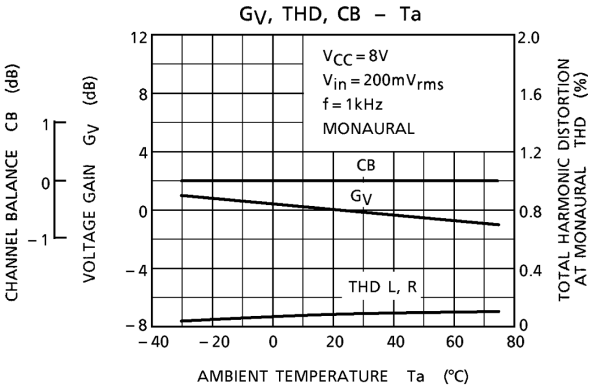


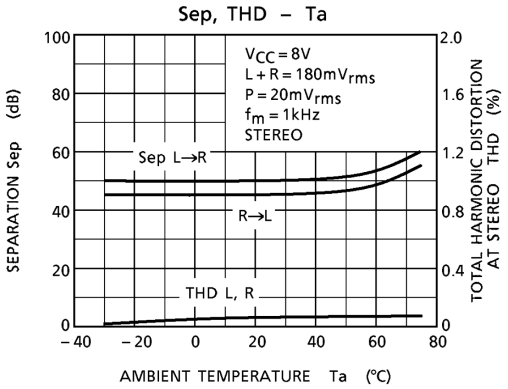
CAPTURE RANGE & LOCK RANGE CR & LR

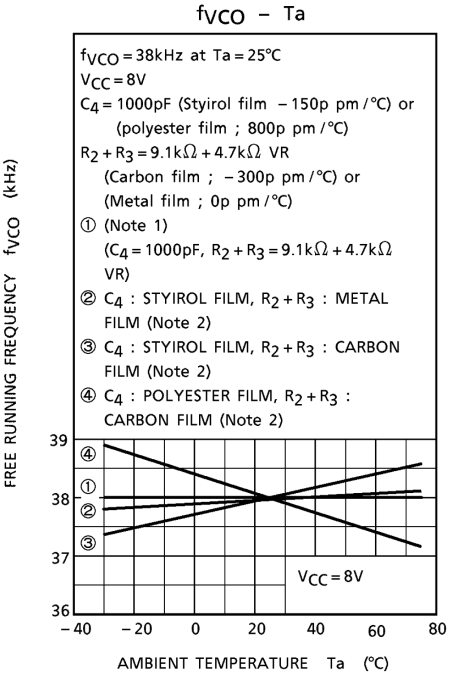


V_L – Ta





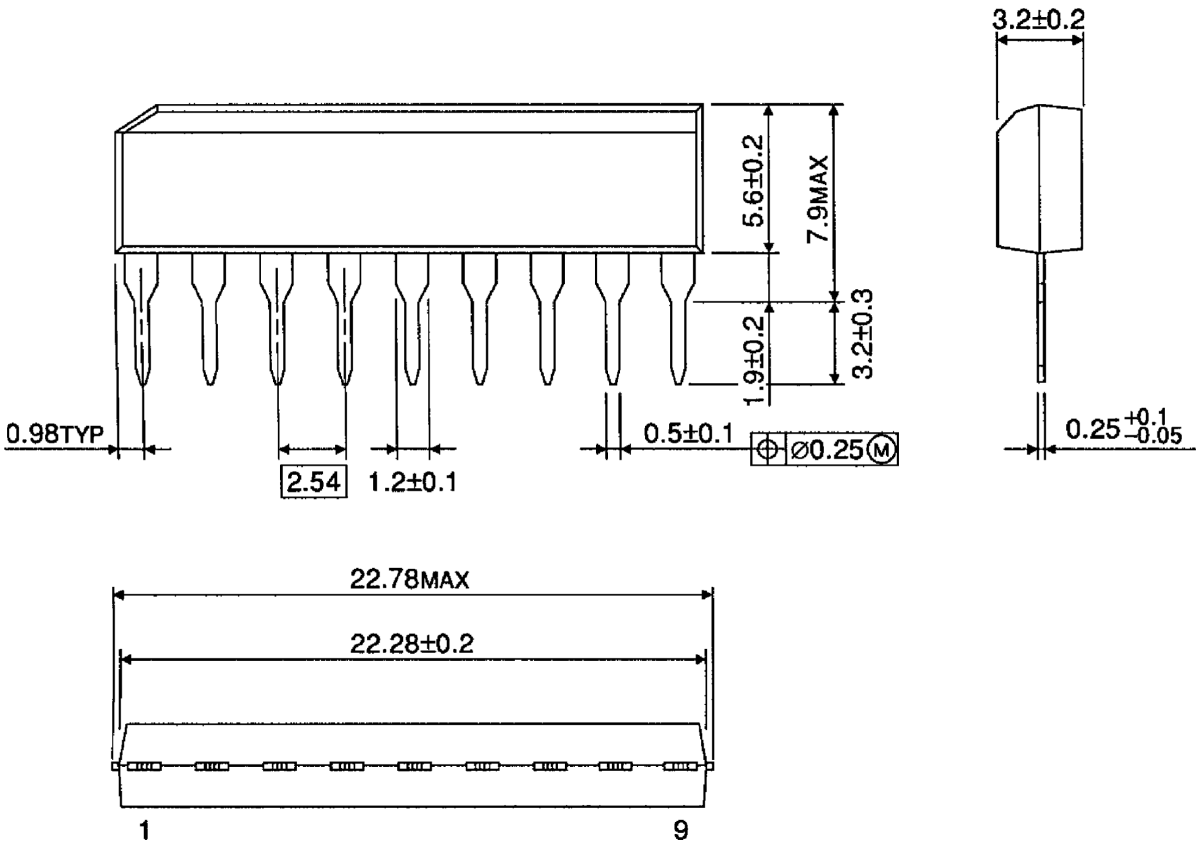




(Note 1) ① : With IC only put into a temperature test chamber
(Note 2) ②③④ : With IC, resistors and capacitors put into a temperature test chamber

Package Dimensions

SIP9-P-2.54A Unit : mm



Weight: 0.92g (typ.)

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