

TD6102P

ECL PRESCALLER

TD6102P is an ECL that has been developed as a prescaller for FM/AM PLL synthesizer tuner, and with 1/4 and 1/8 dividing function, performs 25kHz, 50kHz and 75kHz shifting operations. In combination with TC9123BP and TC9124AP, a highly efficient synthesizer tuner can be constituted.

- Within a range of temperature from $-20 \sim +75^{\circ}\text{C}$, the following operations are assured:

FM input 150MHz
 AM input 10MHz

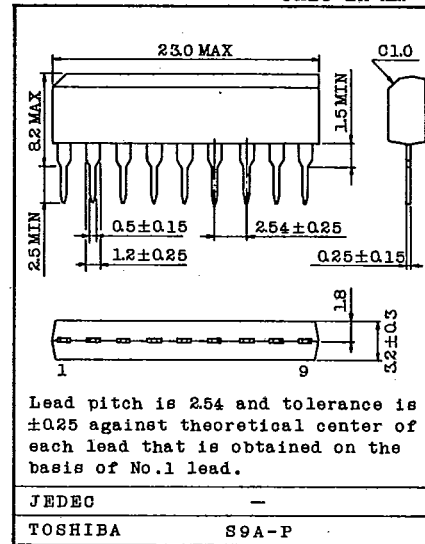
- Corresponding to fluctuation in IF selection circuit, 25kHz, 50kHz and 75kHz Shiftings (at time 100kHz step) are possible.
- Switching of FM input and AM input is possible.
- Under FM mode it is possible to select 1/4 and 1/8 dividing ratio (Under AM mode, no division can made).
- Because of built-in AC amplifier, operable at low input level.

FM input $\geq 150\text{mVrms}$. AM input $\geq 50\text{mVrms}$.

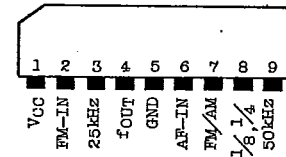
MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	VCC	8	V
Power dissipation	PD	600	mW
Operating Temperature	Topr	$-20 \sim 75$	$^{\circ}\text{C}$
Storage Temperature	Tstg	$-55 \sim 150$	$^{\circ}\text{C}$

Unit in mm



PIN CONNECTION



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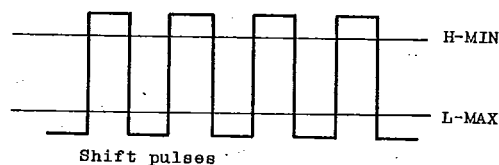
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FUNCTIONS AND USING METHODS OF PIN.

SYMBOL	DESCRIPTION	CONDITIONS	REMARKS
VCC	Power terminal	4.5 ~ 8.0 (V) is applied.	
f _{FM-IN}	FM input terminal	f _{FM-IN} =1.0MHz ~ 150MHz (sine wave) Input voltage \geq 150mVrms.	
25kHz	25kHz Shift pulse input terminal	Operates Under AC mode Operates at the trailing edge of input pulse.	NOTE. 1
f _{out}	Output terminal	Output Voltage \geq 1.7 Vp-p (VCC=7.5 \pm 0.5(V))	(at 1/8 mode)
GND	Ground terminal	Ground	
f _{AM-IN}	AM input terminal	f _{AM-IN} (MAX)=10MHz (sine wave) Input Voltage \geq 50mVrms.	
FM/AM	FM input and AM selecting terminal	Selection can be made under DC mode. FM at H-Level and AM at L-Level.	NOTE. 2
1/8, 1/4	Dividing ratio Selecting terminal	Selection can be made under DC mode. 1/8 at H-Level and 1/4 at L-Level.	NOTE. 2
50kHz	50kHz Shift pulse input terminal	Operates under AC mode. Operates at the trailing edge of input pulse.	NOTE. 1

NOTE. 1 H-Level and L-Level of shift pulses to be applied to 25kHz and 50kHz input terminals shall be set at the following Level:

$$H\text{-MIN} \geq V_{CC} - 2.5(V), L\text{-MAX} \leq V_{CC} - 4.0(V)$$



NOTE. 2 H-Level and L-Level for FM/AM and 1/8 and 1/4 selection shall be set at the following Level:

$$H\text{-MIN} \geq V_{CC} - 0.5(V)$$

$$L\text{-MAX} \leq V_{CC} - 1.5(V)$$

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ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $V_{CC}=5.0V$, $T_a=25^\circ C$)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Supply Current	I_{CC}		-	-	25	35	mA	
Input Voltage	FM	V_{IN-FM}	2	-	150	-	mVrms	
	AM (Note 3)	V_{IN-AM}	1	-	50	-		
Operating Frequency	FM	f_{FM}	1, 2	Input Voltage=150mVrms, sine wave		1.0	150	MHz
	AM	f_{AM}	1	Input Voltage=50mVrms, sine wave		-	10	
Output Amplitude (Note 4)	FM	V_{out-FM}	1	$V_{CC}=7.5 \pm 0.5V$, 1/8-mode. $f_{FM}=150MHz$		1.7	2.0	Vp-p
	AM	V_{out-AM}	1	$V_{CC}=7.5 \pm 0.5V$ $f_{AM}=10MHz$		1.7	2.0	
FM/AM, 1/8, 1/4 Selection Voltage	"H" Level	V_H	1	-	4.5	-	V	
	"L" Level	V_L	1	-	-	3.5		
25kHz, 50kHz Shift Pulse Voltage	"H" Level	$V_{H-shift}$		-	2.5	-	V	
	"L" Level	$V_{L-shift}$		-	-	1.0		
Input Resistance	2 Pin	R_{i2}		$f_{FM}=150MHz$		-	600	Ω
	6 Pin	R_{i6}		$f_{AM}=10MHz$		-	1.1	k Ω
Recommended Supply Voltage	V_{CC}			-	4.5	-	5.5	V

NOTE. 3 When both FM and AM inputs are simultaneously applied AM input voltage shall be 1/3 of FM input voltage or more.

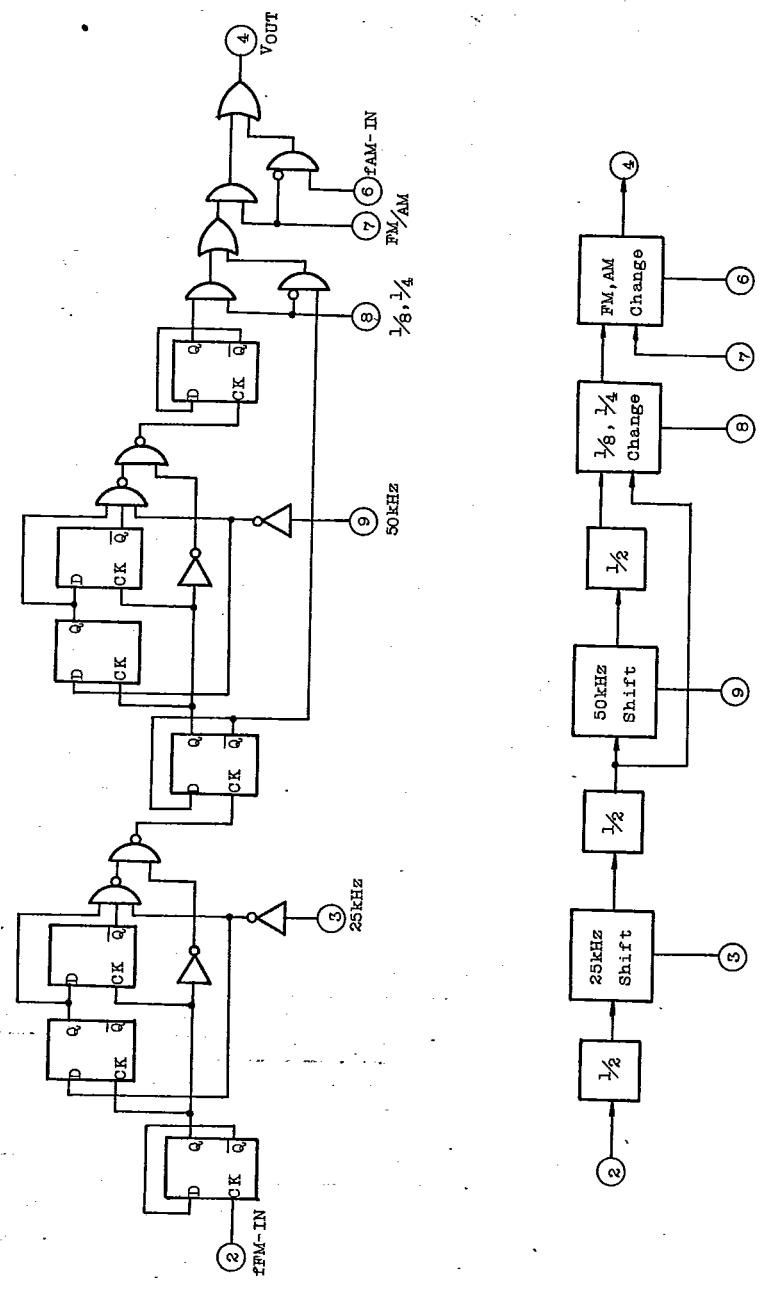
NOTE. 4 When a 22k Ω resistor is externally inserted between pin 4 and GND, following output voltage are obtained at time of $V_{CC}=5.0 \pm 0.5V$: $V_{OUT-FM} \geq 1.7 V_{p-p}$ (1/8 mode)
 $V_{OUT-AM} \geq 1.7 V_{p-p}$. Under 1/4 mode, following output voltage is obtained: $V_{OUT-FM} = 1.0 V_{p-p}$ (typ.)

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LOGIC & BLOCK DIAGRAM

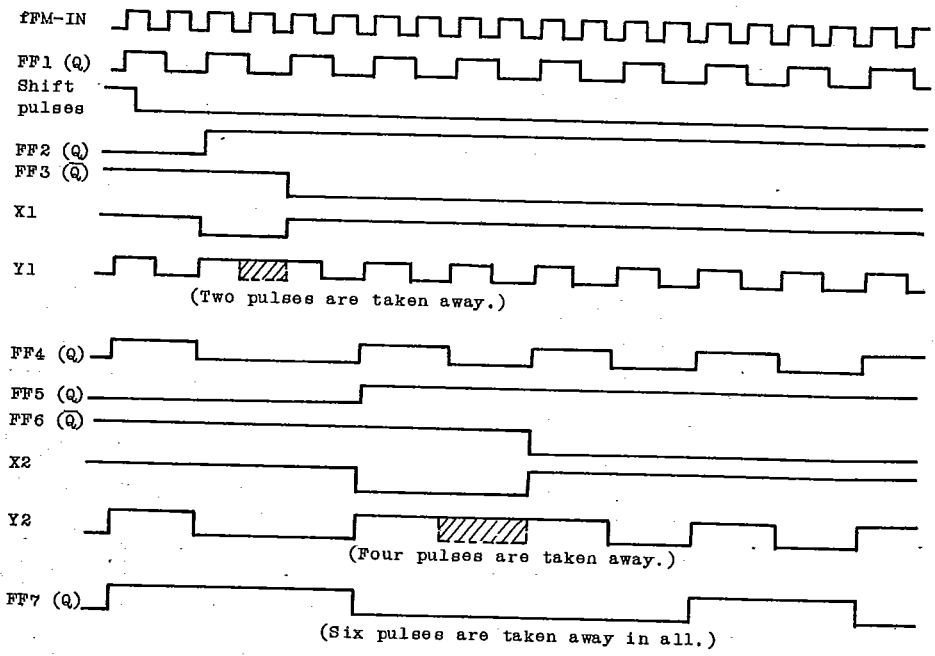
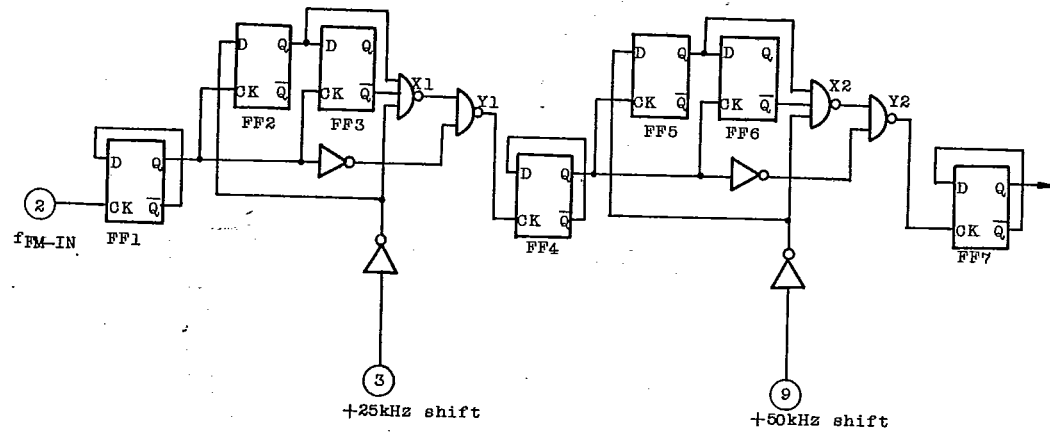


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BEHAVIOUR OF 25kHz SHIFT AND 50kHz SHIFT CIRCUITS

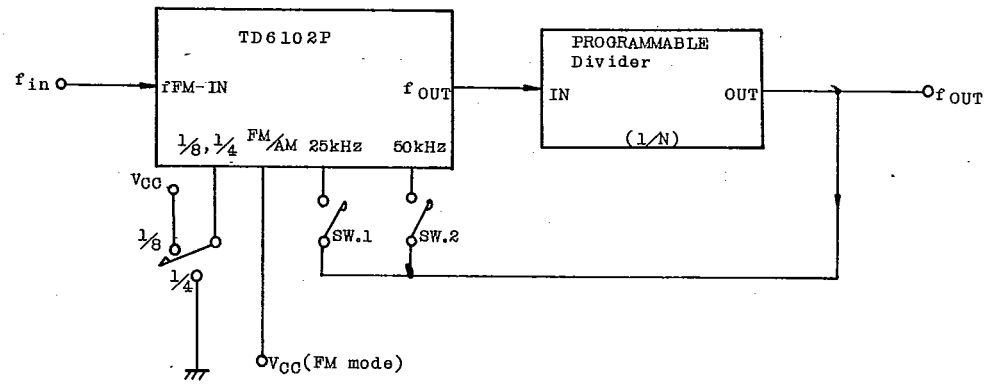


TIMING CHART

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When shift pulses are applied to 25kHz and 50kHz shift terminals, two input pulses and four input pulses are taken away, respectively. When this function is applied to such a system as shown below, frequency dividing ratio can be changed.



MODE	25kHz SW.1	50kHz SW.2	DIVIDING RATIO (f_{IN}/f_{OUT})	REMARKS
FM mode	off	off	8N	
1/8 mode	on	off	8N + 2	Corresponds to draw-out of two pulses.
	off	on	8N + 4	Corresponds to draw-out of four pulses.
	on	on	8N + 6	Corresponds to draw-out of six pulses.
FM mode	off	off	4N	
1/4 mode *	on	off	4N + 2	Corresponds to draw-out of two pulses.

* Under 1/4 mode, 50kHz shift does not operate.

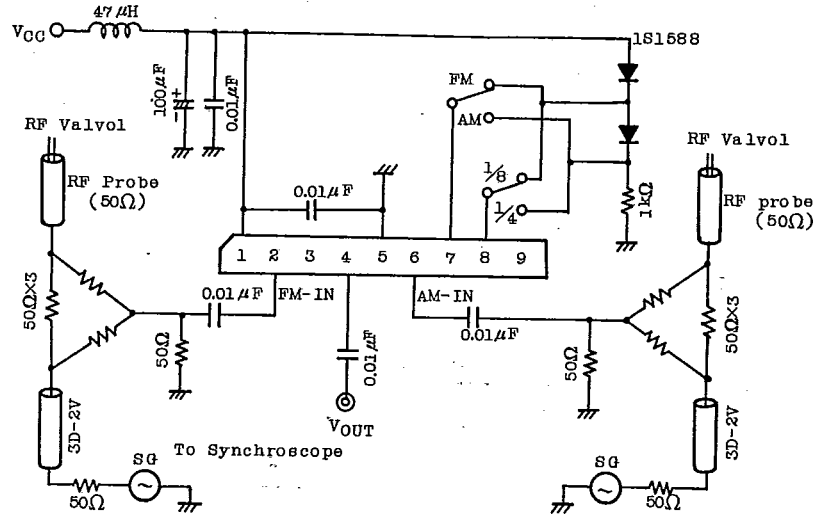
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TEST CIRCUITS

TEST CIRCUIT (1) FOR f_{FM} , f_{AM} , V_{OUT-FM} and V_{OUT-AM}



TEST CIRCUIT (2) for f_{FM} 25kHz-shift and 50kHz-shift

