

**TOSHIBA**

**TD7104P/F**

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

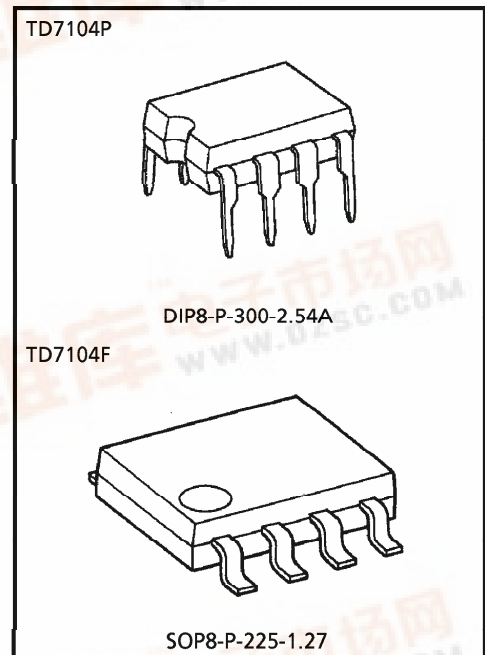
# TD7104P, TD7104F

## ECL PRESCALER FOR DIGITAL SYNTHESIZED TUNER

TD7104P, TD7104F are general-purpose fixed dividing prescaler developed for digital tuning system of PLL frequency synthesizer type, and can operate up to 1GHz.

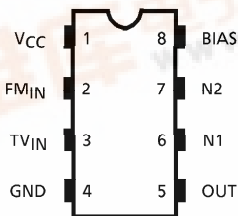
### FEATURES

- Maximum operating frequency 1GHz.  
(at 1/8 dividing mode)
- Dividing ratios of 1/8, 1/4, and 1/2 are provided.
- Independent TV and FM inputs are provided.  
In FM mode, this IC can function as a buffer amplifier (1/1 dividing).
- The built-in input amplifier contributes to realizing high input voltage sensitivity.
- Built-in stand-by circuit

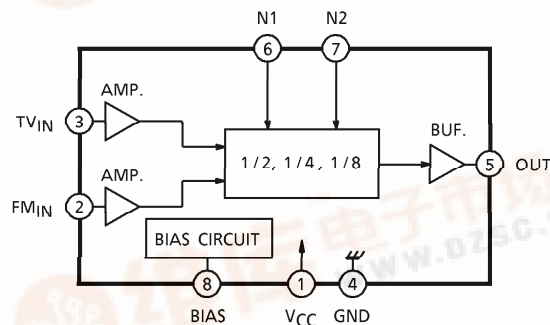


Weight  
 DIP8-P-300-2.54A : 0.45g (Typ.)  
 SOP8-P-225-1.27 : 0.76g (Typ.)

### PIN CONNECTION

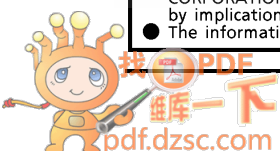


### BLOCK DIAGRAM



980508EBA2

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## PIN FUNCTION

PIN No.	SYMBOL	PIN NAME	FUNCTION AND DESCRIPTION	REMARKS
1	V <sub>CC</sub>	Power supply terminal	Applies voltage of V <sub>CC</sub> = 3.0 to 5.5V.	—
2	FM <sub>IN</sub>	FM local OSC. signal input terminal	Inputs local oscillation signal in FM band. f <sub>IN</sub> = 50 to 200MHz, FM <sub>IN</sub> input signal is output by 1/1 dividing (buffer amplifier).	Built-in input Amp. provided
3	TV <sub>IN</sub>	TV local OSC. signal input terminal	Inputs local oscillation signal in TV band. F <sub>IN</sub> = 50M to 1.0GHz, TV <sub>IN</sub> input signal is output by 1/8, 1/4, or 1/2 dividing, which is controlled with N1 and N2 input.	Built-in input Amp. provided
4	GND	Ground terminal	Grounds.	—
5	OUT	Dividing signal output terminal	Outputs dividing signal.	—
6	N1	Dividing ratio selecting control terminal	These inputs control the selection of a dividing ratio among 1/1, 1/2, 1/4, and 1/8. FM <sub>IN</sub> terminal is selected at N1 = N2 = "L" level (1/1 dividing). The truth table is shown below.	—
7	N2			
8	BIAS	BIAS terminal	Connects capacitors on bias circuit. Change this pin into Low, the IC is turned stand-by mode.	—

## TRUTH TABLE

RECEIVING BAND	INPUT TERMINAL	OPERATING FREQUENCY RANGE	DIVIDING RATIO	N1	N2
FM	FM <sub>IN</sub>	50M~200MHz	÷ 1	0	0
TV	TV <sub>IN</sub>	50M~400MHz	÷ 2	1	0
		100M~500MHz	÷ 4	0	1
		100M~1.0GHz	÷ 8	1	1

**MAXIMUM RATINGS** (Ta = 25°C)

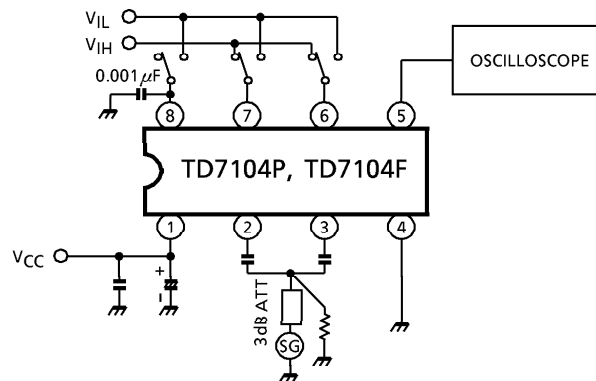
CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V <sub>CC</sub>	6.5	V
Power Dissipation	P <sub>D</sub>	450 (200) (*)	mW
Input Voltage	V <sub>in</sub>	-0.3~V <sub>CC</sub> +0.3	V
Operating Temperature	T <sub>opr</sub>	-30~75	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C

(\*) Flat Package

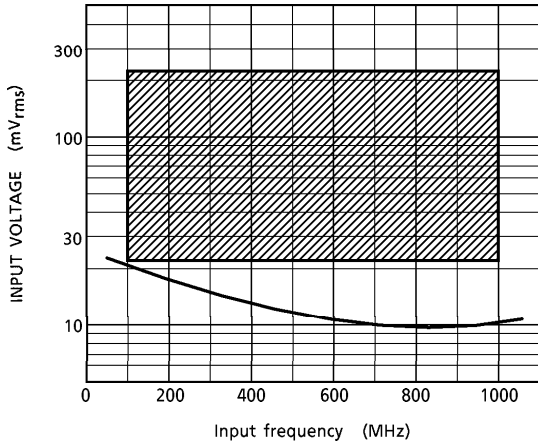
**ELECTRICAL CHARACTERISTICS** (Unless otherwise specified, V<sub>CC</sub> = 3.0~6.0V, Ta = -30~75°C)

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Power Supply Voltage	V <sub>CC</sub>	—	—	3.0	~	6.0	V	
Operating Supply Current	I <sub>CC1</sub>	—	V <sub>CC</sub> = 5.0V, ÷8, ÷4	—	14	20	mA	
	I <sub>CC2</sub>	—	V <sub>CC</sub> = 5.0V, ÷2	—	11	18		
	I <sub>CC3</sub>	—	V <sub>CC</sub> = 5.0V, FM mode	—	7	13		
Stand-by Current	I <sub>CS</sub>	—	V <sub>CC</sub> = 5.0V, BIAS = GND	—	30	70	μA	
Operating Frequency Range	f <sub>IN1</sub>	1	÷8, TV <sub>IN</sub>	100	—	1000	MHz	
	f <sub>IN2</sub>		÷4, TV <sub>IN</sub>	100	—	500		
	f <sub>IN3</sub>		÷2, TV <sub>IN</sub>	50	—	400		
	f <sub>IN4</sub>		FM mode, FM <sub>IN</sub>	50	—	200		
Input Voltage Range	V <sub>IN1</sub>	1	TV <sub>IN</sub> (÷8, ÷4)	22.0	—	220	mV <sub>rms</sub>	
	V <sub>IN2</sub>		TV <sub>IN</sub> (÷2)	f <sub>IN</sub> = 50~100MHz	35.0	—		220
				f <sub>IN</sub> = 100~400MHz	22.0	—		220
V <sub>IN3</sub>	FM <sub>IN</sub>	22.0	—	220				
Output Amplitude	V <sub>OUT</sub>	1	OUT, C <sub>L</sub> = 3pF	0.4	0.5	—	V <sub>p-p</sub>	
Input Voltage	"H" Level	V <sub>IH</sub>	N1, N2, BIAS	2.5	—	V <sub>CC</sub>	V	
	"L" Level	V <sub>IL</sub>	N1, N2, BIAS	0	—	0.8		
Input Current	"H" Level	I <sub>IH</sub>	N1, N2, BIAS, V <sub>CC</sub> = 5.0V V <sub>IH</sub> = 4.0V	—	—	100	μA	
	"L" Level	I <sub>IL</sub>	N1, N2, BIAS, V <sub>CC</sub> = 5.0V V <sub>IL</sub> = 1.0V	—	—	10		

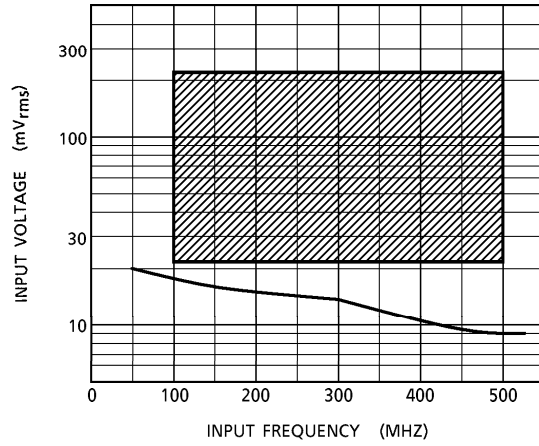
**TEST CIRCUIT 1** (Input voltage sensitivity)



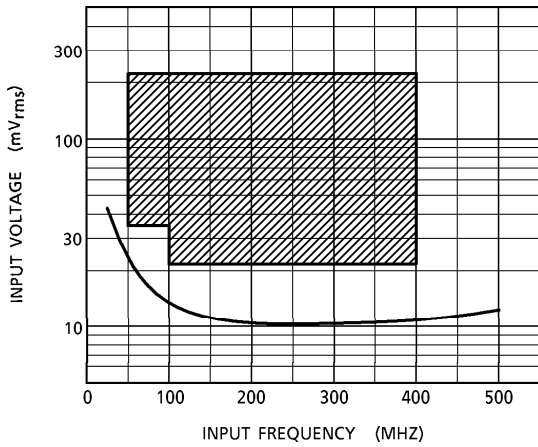
1/8 MODE INPUT VOLTAGE SENSITIVITY  
( $V_{CC} = 5.0V, T_a = 25^\circ C$ )



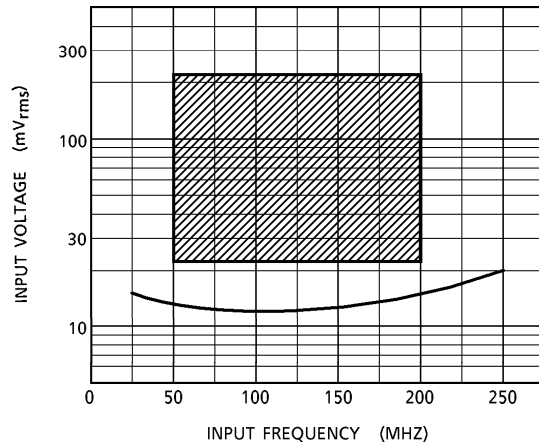
1/4 MODE INPUT VOLTAGE SENSITIVITY  
( $V_{CC} = 5.0V, T_a = 25^\circ C$ )




1/2 MODE INPUT VOLTAGE SENSITIVITY  
( $V_{CC} = 5.0V, T_a = 25^\circ C$ )



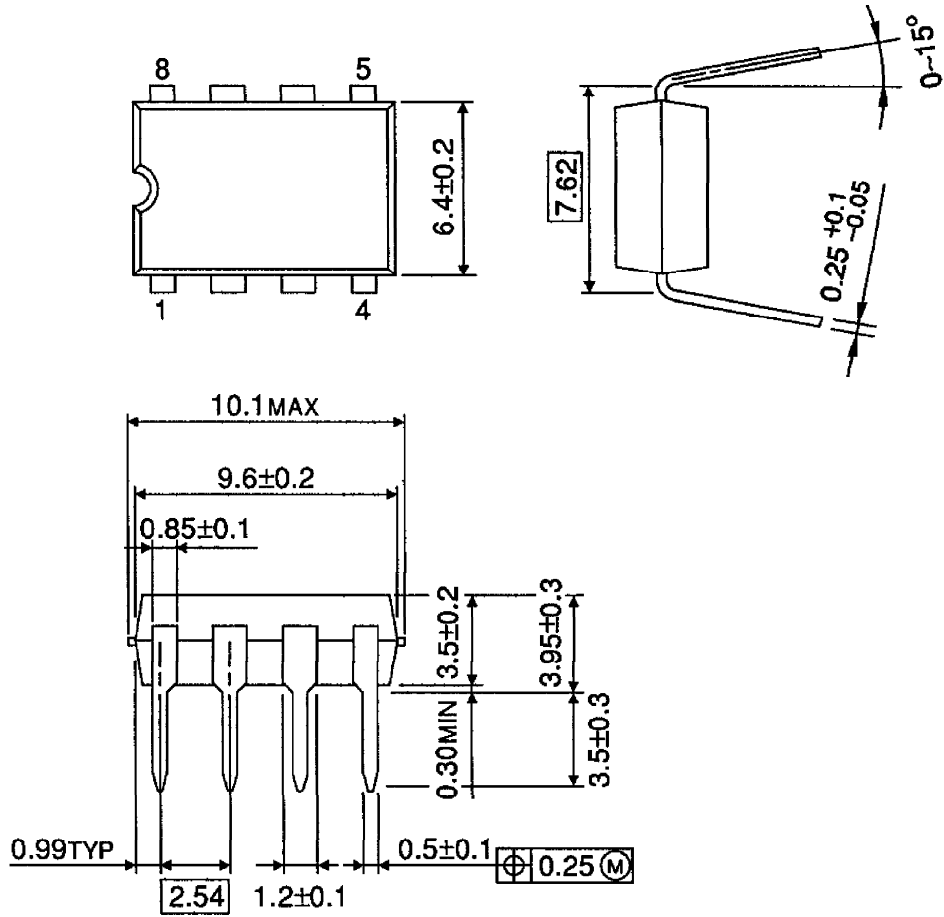
1/1 MODE INPUT VOLTAGE SENSITIVITY  
( $V_{CC} = 5.0V, T_a = 25^\circ C$ )



(Note)  Operating range ( $V_{CC} = 3.0\sim 6.0V, T_a = -30\sim 75^\circ C$ )

**OUTLINE DRAWING**  
DIP8-P-300-2.54A

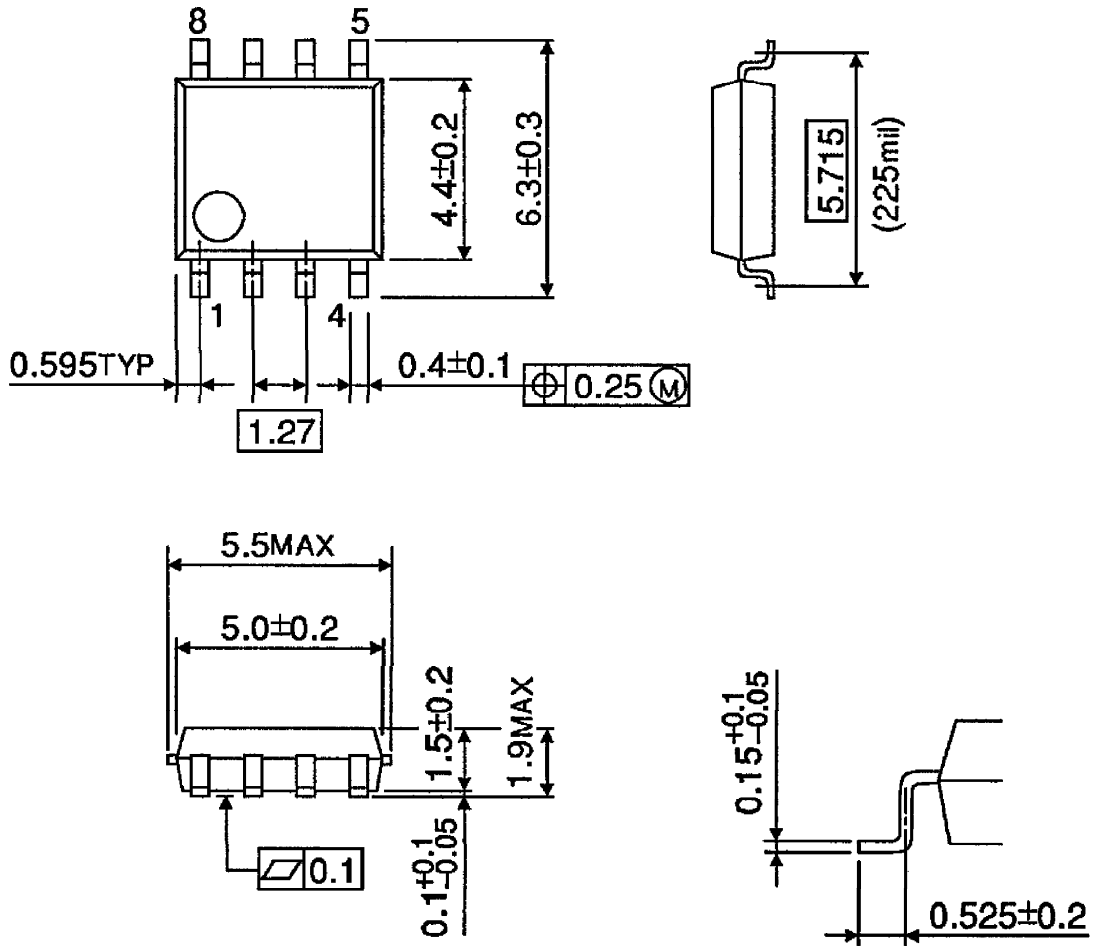
Unit : mm



Weight : 0.45g (Typ.)

OUTLINE DRAWING  
SOP8-P-225-1.27

Unit : mm



Weight : 0.76g (Typ.)