

TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

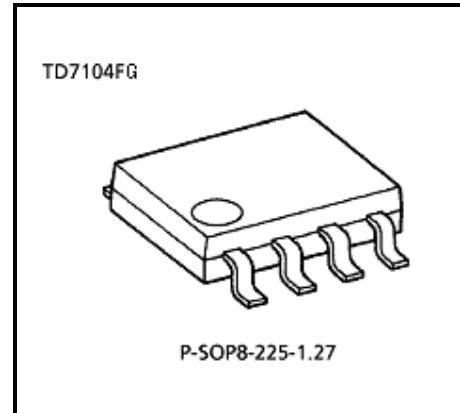
TD7104FG

ECL Prescaler for Digital Synthesized Tuner

The TD7104FG is a general-purpose fixed dividing prescaler developed for digital tuning system of the PLL frequency synthesizer type, and can operate at up to 1 GHz.

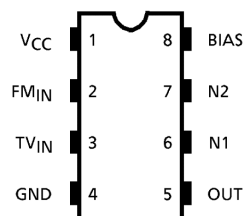
Features

- Maximum operating frequency 1 GHz (at 1 / 8 dividing mode)
- Dividing ratios of 1 / 8, 1 / 4, and 1 / 2 are available.
- 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 standby circuit

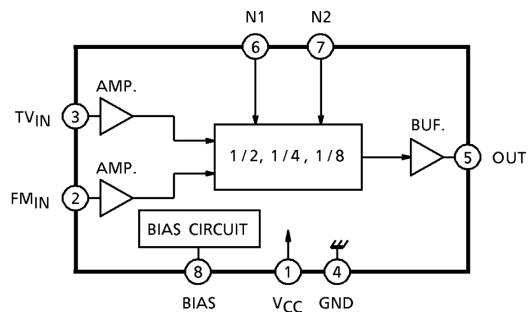


Weight
P-SOP8- 225-1.27 : 76 mg (typ.)

Pin Connection



Block Diagram



Pin Function

Pin No.	Symbol	Pin Name	Function And Description	Remarks
1	V _{CC}	Power supply terminal	Applies voltage of V _{CC} = 3.0 to 5.5V	—
2	FM _{IN}	FM local OSC. signal input terminal	Inputs local oscillation signal in FM band. f _{IN} = 50 to 200MHz, FM _{IN} input signal is output by a 1 / 1 dividing ratio (buffer amplifier).	Built-in input Amp. provided
3	TV _{IN}	TV local OSC. signal input terminal	Inputs local oscillation signal in TV band. F _{IN} = 50M to 1.0GHz, TV _{IN} input signal is output by a 1 / 8, 1 / 4, or 1 / 2 dividing ratio, which is controlled through 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 _{IN} 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 to low to convert the IC is to stand-by mode.	—

Truth Table

Receiving Band	Input Terminal	Operating Frequency Range	Dividing Ratio	N1	N2
FM	FM _{IN}	50M~200MHz	÷1	0	0
TV	TV _{IN}	50M~400MHz	÷2	1	0
		100M~500MHz	÷4	0	1
		100M~1.0GHz	÷8	1	1

Maximum Ratings (Ta = 25°C)

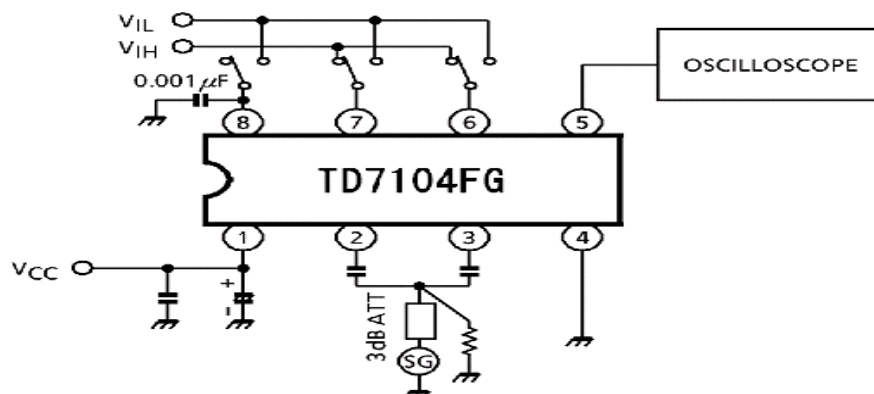
Characteristic	Symbol	Rating	Unit
Power supply voltage	V _{CC}	6.5	V
Power dissipation	P _D	450 (200) (*)	mW
Input voltage	V _{in}	-0.3~V _{CC} + 0.3	V
Operating temperature	T _{opr}	-30~75	°C
Storage temperature	T _{stg}	-55~150	°C

(*) Flat package

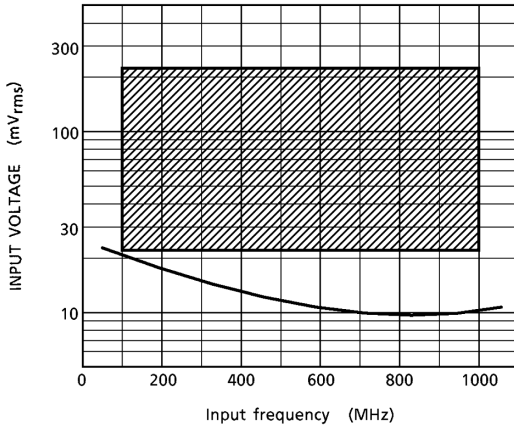
Electrical Characteristics (unless otherwise specified, V_{CC} = 3.0~6.0V, Ta = -30~75°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit	
Power supply voltage	V _{CC}	—	—	3.0	~	6.0	V	
Operating supply current	I _{CC1}	—	V _{CC} = 5.0V, ÷8, ÷4	—	14	20	mA	
	I _{CC2}	—	V _{CC} = 5.0V, ÷2	—	11	18		
	I _{CC3}	—	V _{CC} = 5.0V, FM mode	—	7	13		
Stand-by current	I _{CS}	—	V _{CC} = 5.0V, BIAS = GND	—	30	70	µA	
Operating frequency range	f _{IN1}	1	÷8, TV _{IN}	100	—	1000	MHz	
	f _{IN2}		÷4, TV _{IN}	100	—	500		
	f _{IN3}		÷2, TV _{IN}	50	—	400		
	f _{IN4}		FM mode, FM _{IN}	50	—	200		
Input voltage range	V _{IN1}	1	TV _{IN} (÷8, ÷4)	22.0	—	220	mV _{rms}	
	V _{IN2}		TV _{IN} (÷2)	f _{IN} = 50~100MHz 22.0	—	220		
	V _{IN3}		FM _{IN}	f _{IN} = 100~400MHz 22.0	—	220		
Output amplitude	V _{OUT}	1	Out, C _L = 3pF	0.4	0.5	—	V _{p-p}	
Input voltage	"H" level	V _{IH}	—	N1, N2, BIAS	2.5	—	V _{CC}	V
	"L" level	V _{IL}	—	N1, N2, BIAS	0	—	0.8	
Input current	"H" level	I _{IH}	—	N1, N2, BIAS, V _{CC} = 5.0V V _{IH} = 4.0V	—	—	100	µA
	"L" level	I _{IL}	—	N1, N2, BIAS, V _{CC} = 5.0V V _{IL} = 1.0V	—	—	10	

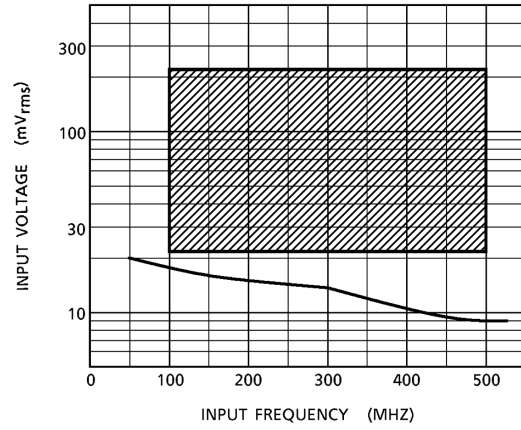
Test Circuit 1 (input voltage sensitivity)



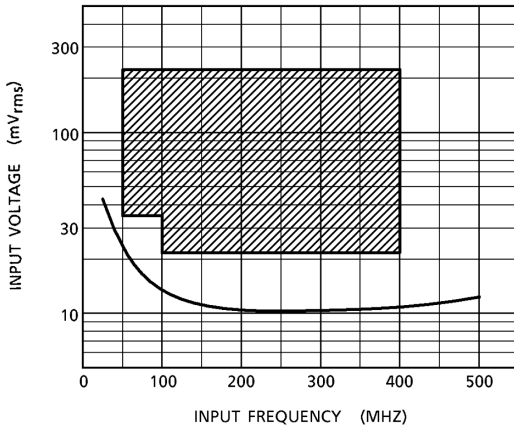
1/8 MODE INPUT VOLTAGE SENSITIVITY
($V_{CC} = 5.0V, T_a = 25^\circ C$)



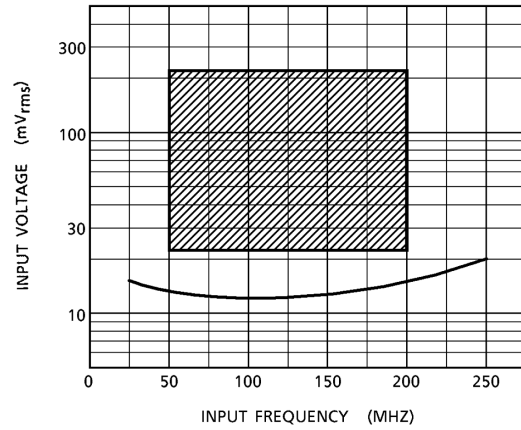
1/4 MODE INPUT VOLTAGE SENSITIVITY
($V_{CC} = 5.0V, T_a = 25^\circ C$)




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



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

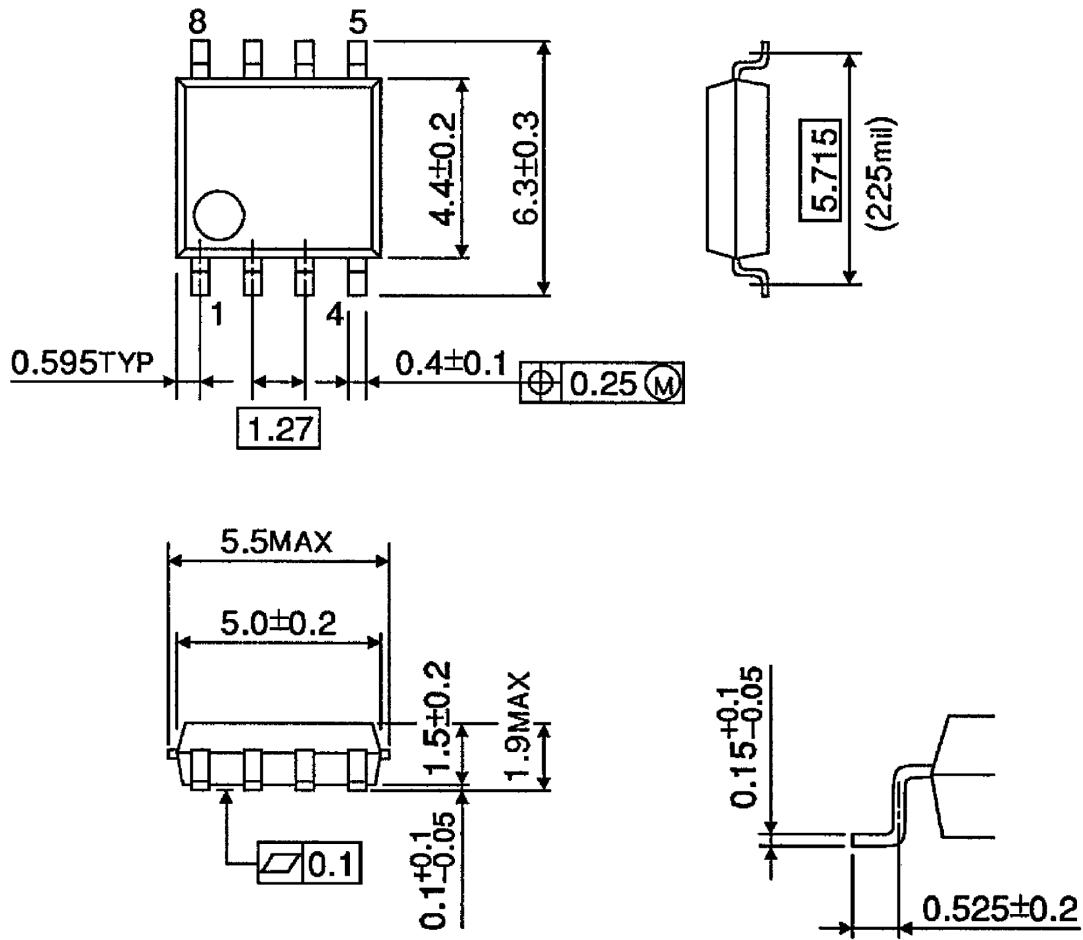


(Note)  Operating range ($V_{CC} = 3.0\sim 6.0V, T_a = -30\sim 75^\circ C$)

Package Dimensions

SOP8-P-225-1.27

Unit : mm



Weight: 76 mg (typ.)

Regarding solderability, the following conditions have been confirmed:

- Solderability
 - (1) Use of Sn-63Pb solder bath
 - solder bath temperature = 230°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux
 - (2) Use of Sn-3.0Ag-0.5Cu solder bath
 - solder bath temperature = 245°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

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