

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

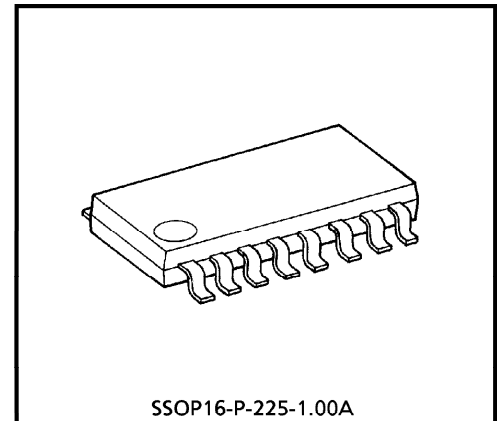
TA2055F**FILTER IC FOR Σ - Δ MODULATION SYSTEM DA CONVERTER**

TA2055F is an analog filter IC for Σ - Δ modulation system DA converter.

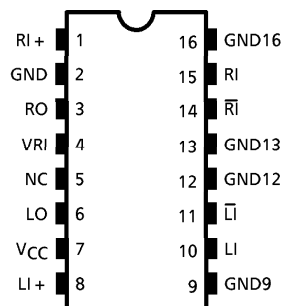
Using the TA2055F in combination the TC9237BF, TC9270F (the Σ - Δ modulation system DA converter with a built-in digital filter), it is possible to construct a DA conversion system with less external parts.

FEATURES

- Built-in CR for LPFs and output (differential) amplifiers for the left and right channel.
- Single power supply operation.
- Noise distortion factor and S/N ratio are as follows (when operating at +5V single power supply) :
 Noise distortion factor : -93dB (Typ.)
 S/N : 100dB (Typ.)



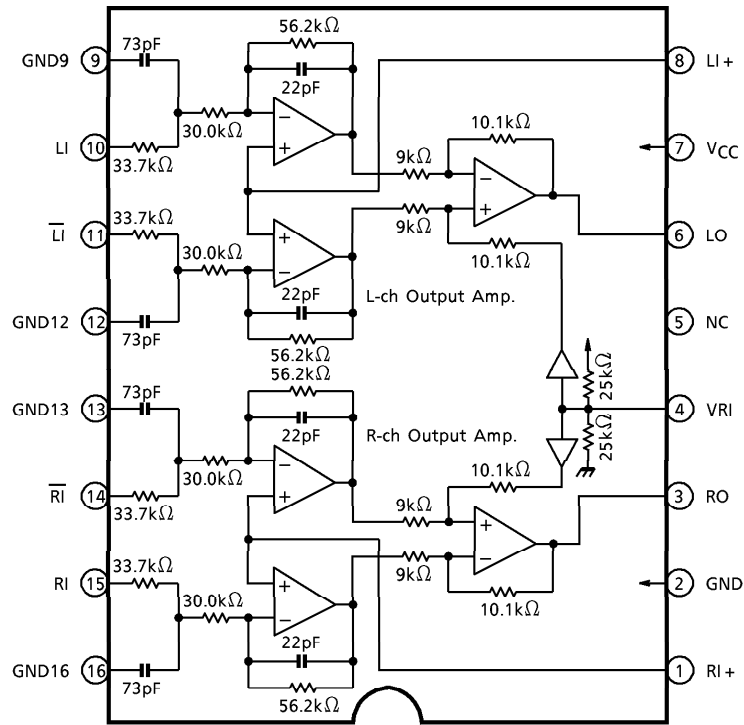
Weight : 0.14g (Typ.)

PIN CONNECTION (Top view)

980910EBA1

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BLOCK DIAGRAM



DESCRIPTION OF PIN FUNCTIONS

PIN No.	SYMBOL	I/O	FUNCTION & OPERATION	REMARKS
1	RI +	I	R channel operational amplifier forward input pin. Connect to VRI.	—
2	GND	—	Ground pin.	—
3	RO	O	R channel analog output pin.	—
4	VRI	—	Reference voltage pin. ($V_{CC}/2$)	See the block diagram
5	NC	—	Non-connecting pin. NC pin is used in the open state.	—
6	LO	O	L channel analog output pin.	—
7	VCC	—	Supply voltage pin.	—
8	LI +	I	L channel operational amplifier forward input pin. Connect to VRI.	—
9	GND9	—	Ground pin for L channel reverse input side filter.	—
10	LI	I	L channel forward input pin.	Connect to LO of TC9270F
11	LI-bar	I	L channel reverse input pin.	Connect to LO-bar of TC9270F
12	GND12	—	Ground pin for L channel forward input side filter.	—
13	GND13	—	Ground pin for R channel forward input side filter.	—
14	RI-bar	I	R channel reverse input pin.	Connect to RO-bar of TC9270F
15	RI	I	R channel forward input pin.	Connect to RO of TC9270F
16	GND16	—	Ground pin for R channel reverse input side filter.	—

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	11	V
Power Dissipation	P _D	350 (*)	mW
Operating Temperature	T _{opr}	-35~85	°C
Storage Temperature	T _{stg}	-55~150	°C

(*) Reduce 2.8mW/°C at Ta = above 25°C.

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V_{CC} = 5V, Ta = 25°C)

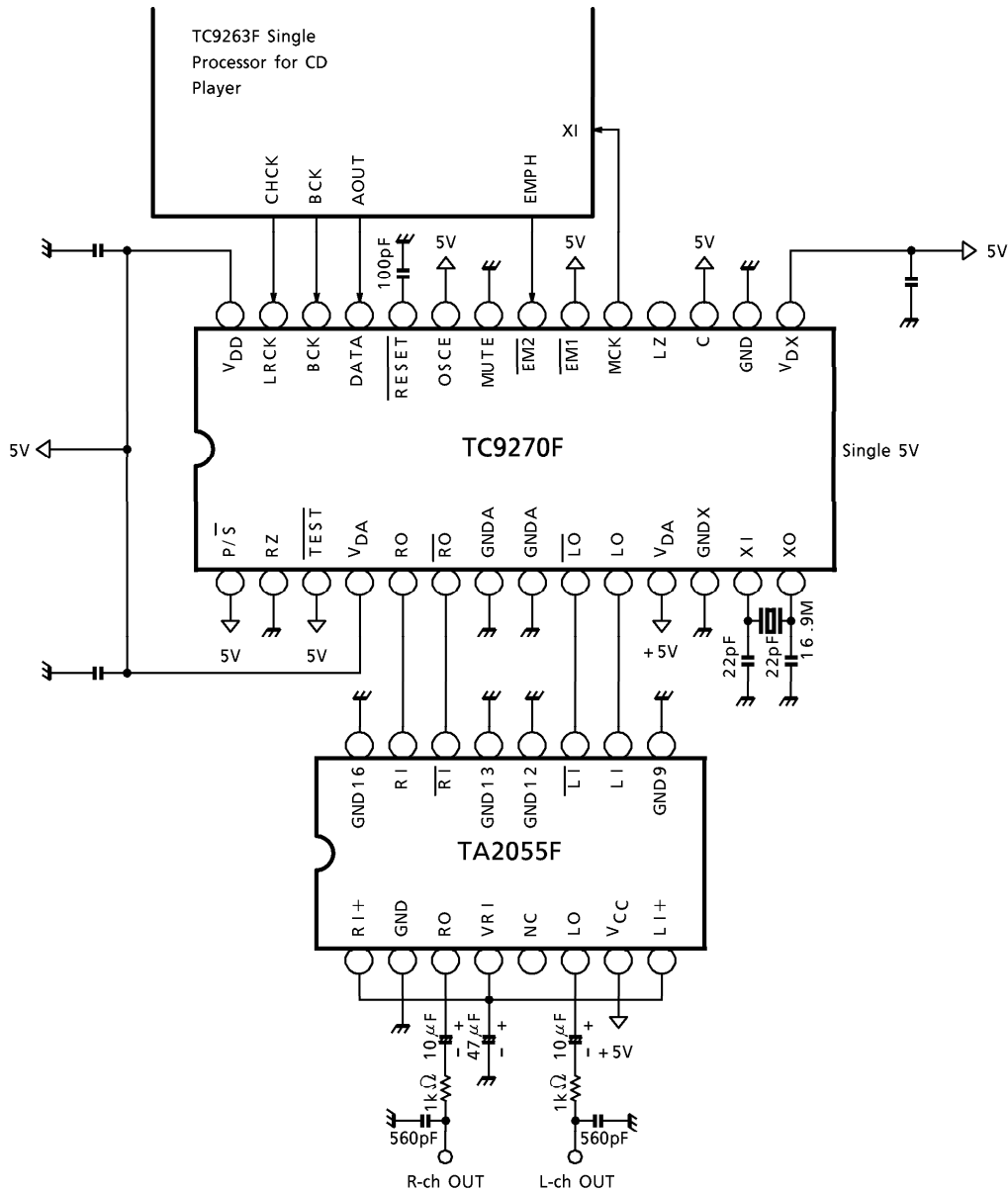
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Supply Voltage	V _{CC}	—	Ta = -35~85°C	4.5	5.0	10	V
Operating Supply Current	I _{CCQ} (1)	—	At no signal	7.5	10.0	12.5	mA
	I _{CCQ} (2)	—	At no signal, V _{CC} = 10V	8.2	11.0	13.8	
Reference Voltage	V _{RI}	—	—	2.45	2.50	2.55	V
Noise Distortion Factor	THD (1)	1	1kHz, V _O = 950mV _{rms}	—	-93	-90	dB
	THD (2)		10kHz, V _O = 950mV _{rms}	—	-93	-90	
	THD (3)		1kHz, V _O = 95mV _{rms}	—	-78	-75	
Cross Talk	CT	1	1kHz, V _O = 950mV _{rms}	—	-100	-95	dB
Attenuation	ATT (1)	1	40kHz, V _O = -10dBV _{rms}	0.51	0.71	1.41	dB
	ATT (2)		80kHz, V _O = -10dBV _{rms}	1.50	2.70	4.50	
Max. Output Level	V _{omax}	1	1kHz, THD = 1%	1.20	1.25	—	V _{rms}
Differential Balance	G _{VB}	1	1kHz, 1.1dBV _{rms} In-phase input	—	—	-40	dB
LR Output Difference	G _{VD}	1	1kHz, 1.1dBV _{rms} Differential input	—	0	0.5	dB

(Note 1) When the TC9270F and +5V single power supply are operated
: Full scale = 950mV_{rms} (Typ.).

(Note 2) The amount of attenuations is based on 1 kHz, V_O = -10dBV_{rms}.

(Note 3) Measuring circuit-1 : indicates the measuring circuit.

APPLICATION CIRCUIT EXAMPLE

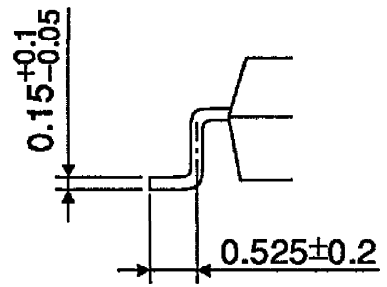
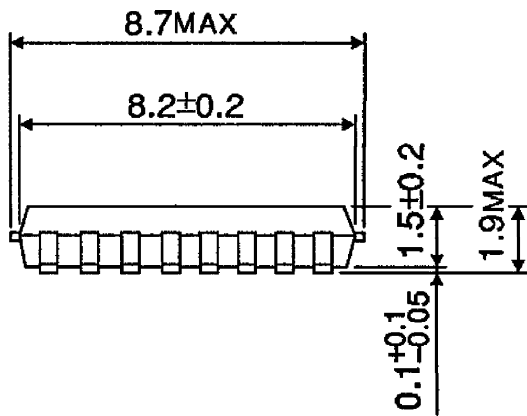
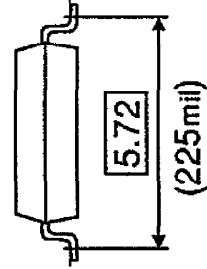
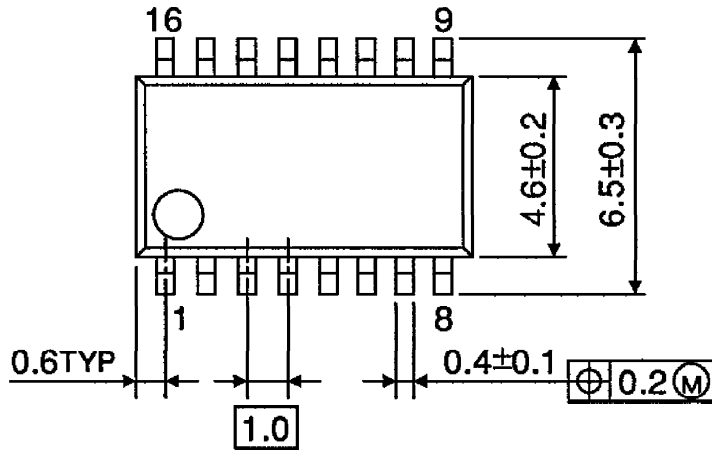


(Cautions)

- Quality of crystal oscillation waveform largely effects S/N ratio. Further, this is also true when system clock is input externally through the XI pin of pin⑬.
- Suppress glitch of input signals (LRCK, BCK, DATA) as could as possible.
- The wiring between the TC9270F output and the analog filter amplifier input must be made the shortest
- The capacitor between V_{DA} and GND_A shall be connected as close to the pin as possible.
- NC pin is used in the open state.

PACKAGE DIMENSIONS
SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)