

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

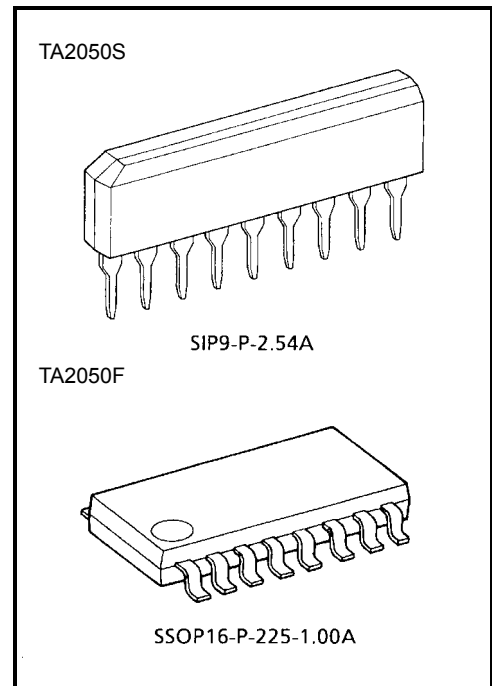
TA2050S, TA2050F

Ground Isolator IC

TA2050S/F are ground isolator IC designed for car audio equipments. These IC contains dual channel differential amplifier with built-in feedback resistors. The effect of ground noise due to difference grounding points on car chassis between head unit and other component unit can be reduced by high common mode rejection performance. Non-inverting and inverting application are available.

Features

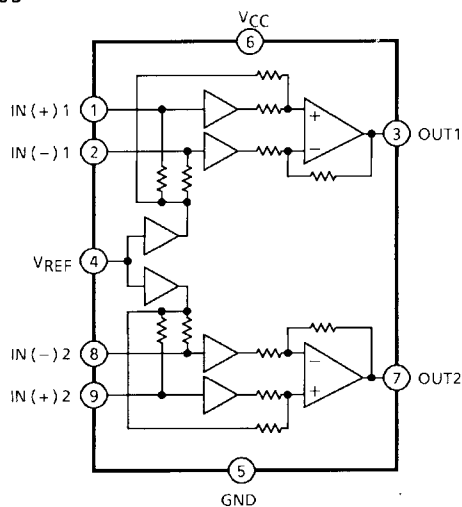
- Dual channel differential amplifier
- Built-in feedback Resistor
- High common mode rejection ratio
: CMRR = 60dB (typ.) ($V_{CC} = 8\text{ V}$, $f = 1\text{ kHz}$, $V_{CM} = 1\text{ Vrms}$)
- Low noise
: $V_{NO} = 1.7\text{ }\mu\text{Vrms}$ (typ.)
($V_{CC} = 8\text{ V}$, $R_g = 620\text{ }\Omega$, Filter = 20 Hz~20 kHz)
- Low distortion
: THD = 0.002% (typ.) ($V_{CC} = 8\text{ V}$, $f = 1\text{ kHz}$, $V_{IN} = 1\text{ Vrms}$)
- Package
: TA2050S Single-inline 9 pins (SIP-9)
TA2050F 1 mm pitch flat package 16 pins (MFP-16)
- Operating supply voltage range
: $V_{CC}(\text{opr}) = 5\sim 10\text{ V}$ ($T_a = 25^\circ\text{C}$)



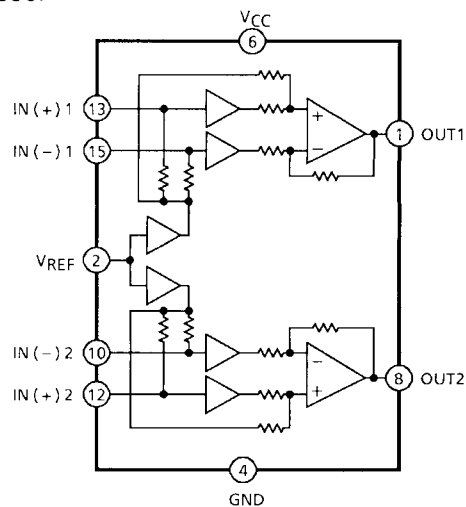
Weight
SIP9-P-2.54A : 0.92 g (typ.)
SSOP16-P-225-1.00A: 0.14 g (typ.)

Block Diagram

TA2050S



TA2050F



(*) 3, 5, 7, 9, 11, 14, 16 pin : NC

Terminal Explanation

Terminal Name		Symbol	Contents	Equivalent Circuit
S	F			
1	13	IN (+) 1	Noninverting input terminal for channel 1. This terminal is biased by resistor (100 kΩ (typ.)) from internal reference amplifier.	
2	15	IN (-) 1	Inverting line input terminal for channel 1. This terminal is biased by resistor (100 kΩ (typ.)) from internal reference amplifier.	
3	1	OUT1	Channel 1 output terminal. Output resistor is 100 Ω (typ.)	
4	2	VREF	Reference voltage terminal. Individual built-in reference amp for each channel.	
5	4	GND	—	—
6	6	VCC	—	—
7	8	OUT2	Channel 2 output terminal. Output resistor is 100 Ω (typ.)	Same as OUT1
8	10	IN (-) 2	Channel 2 output terminal. Output resistor is 100 Ω (typ.)	Same as IN (+) 1, IN (-) 1
9	12	IN (+) 2	Channel 2 output terminal. Output resistor is 100 Ω (typ.)	
—	3	N.C	Non. connection terminal for TA2050F.	—
	5			
	7			
	9			
	11			
	14			
	16			

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Supply voltage		V _{CC}	15	V
Power dissipation	TA2050S	P _D (Note)	900	mW
	TA2050F		350	
Operating temperature		T _{opr}	-30~85	°C
Storage temperature		T _{stg}	-55~150	°C

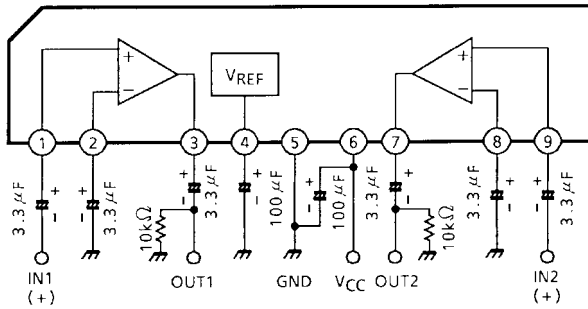
Note: Derated above Ta = 25°C in the proportion of 7.2 mW/°C for TA2050S, 2.8 mW/°C for TA2050F.

Electrical Characteristics (unless otherwise specified, V_{CC} = 8 V, f = 1 kHz, R_L = 10 kΩ, noninverting configuration, Ta = 25°C)

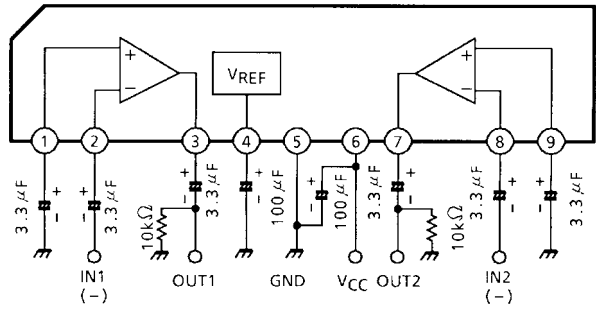
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Quiescent current	I _{CCQ}	—	V _{in} = 0	6	9	15	mA
Voltage gain	G _V	—	—	-1	0	+1	dB
Maximum output voltage	V _{OM} (1)	—	Noninverting, THD = 1%	1.3	1.7	—	V _{rms}
	V _{OM} (2)	—	Inverting, THD = 1%	1.0	1.2	—	
Total harmonic distortion	THD	—	V _{out} = 1 V _{rms} Filter BW = 400 Hz~30 kHz	—	0.002	0.01	%
Cross talk	C.T.	—	V _{in} = 1 V _{rms}	—	-86	-75	dB
Input resistance	R _{IN}	—	—	—	100	—	kΩ
Output resistance	R _{OUT}	—	—	—	100	—	Ω
Output noise voltage	V _{NO}	—	R _g = 620 Ω DIN AUDIO Weighting	—	1.7	3.0	μV _{rms}
Common mode rejection ratio	CMRR	—	—	—	-60	-50	dB
Maximum common mode input voltage	V _{CM} (MAX)	—	CMRR = -50 dB	1.0	1.6	—	V _{rms}
Ripple rejection ratio	R.R.	—	f = 100 Hz	—	-57	-50	dB

Test Circuit

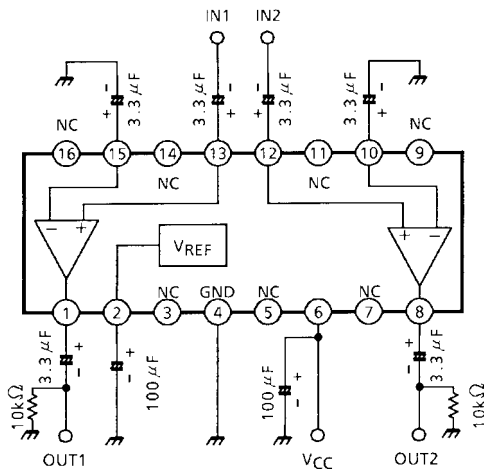
TA2050S non-inverting circuit



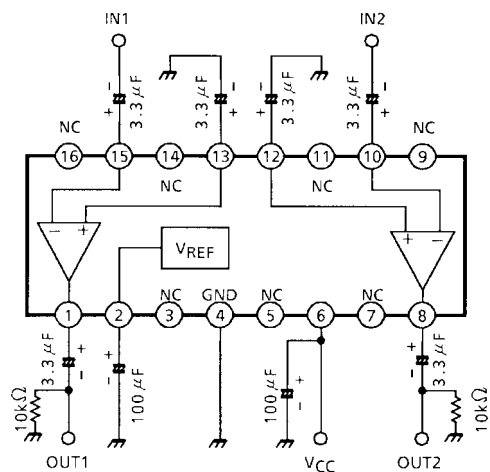
TA2050S inverting circuit

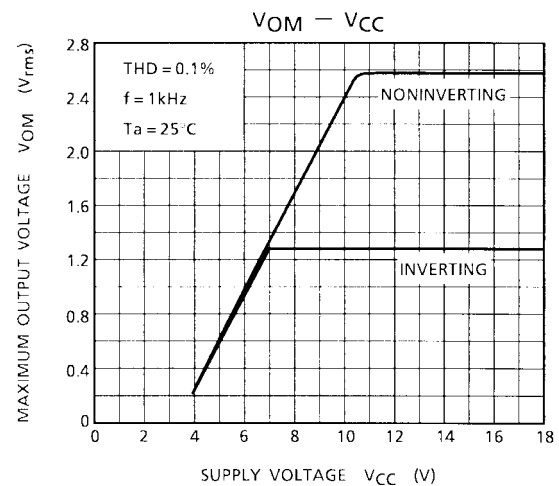
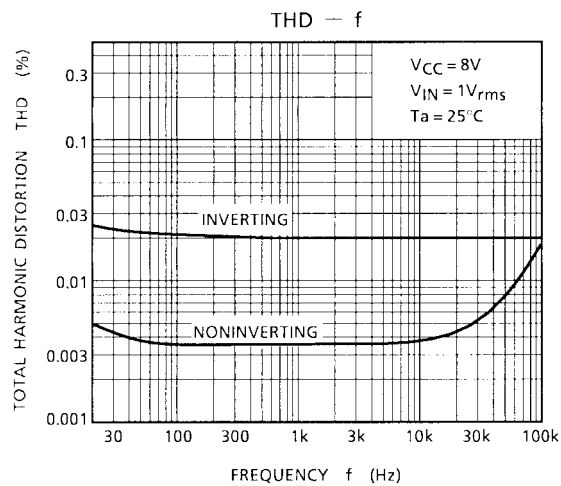
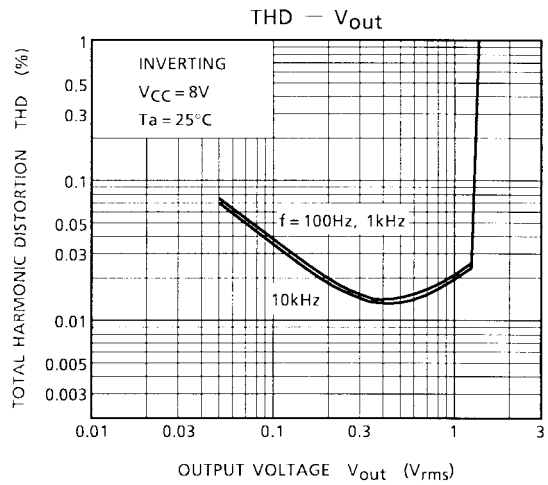
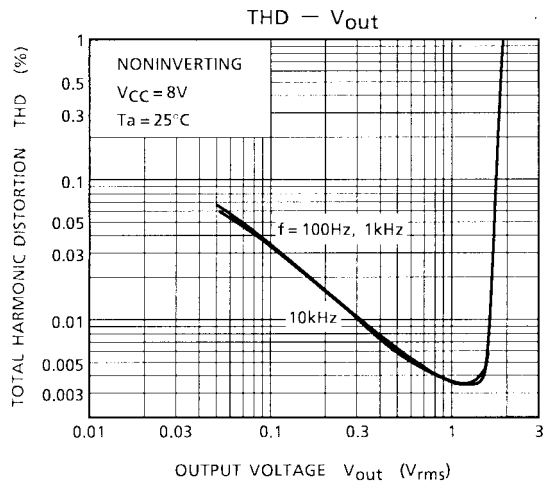
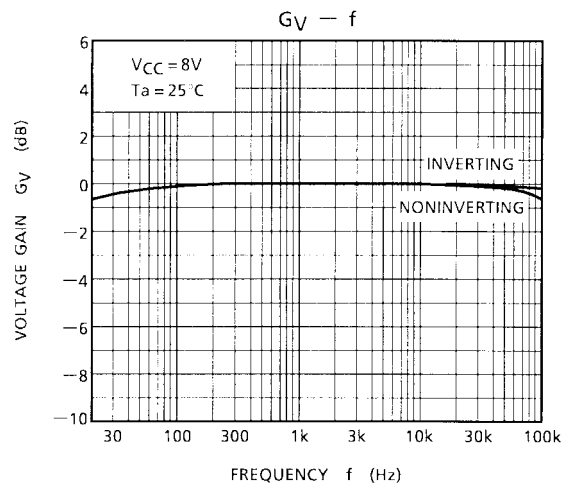
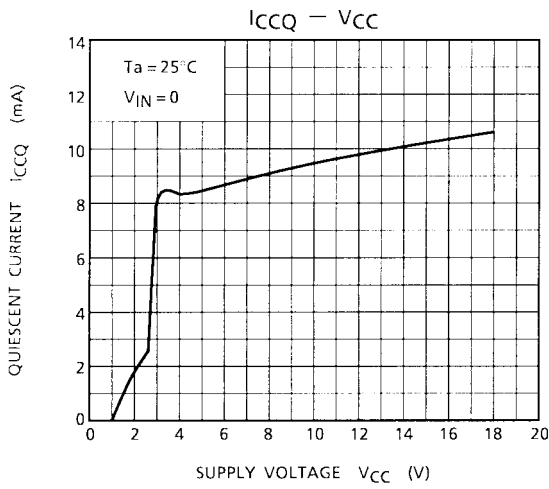


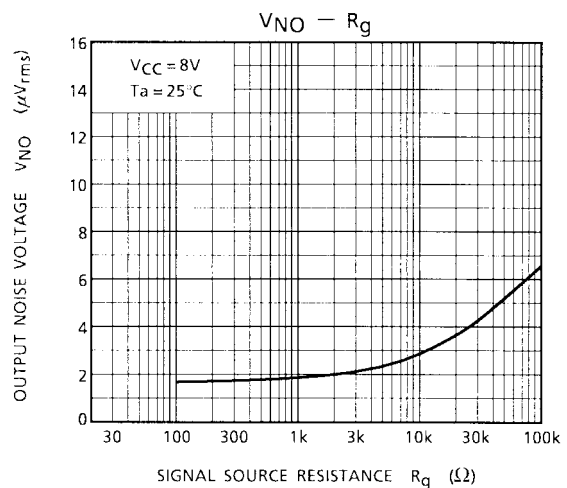
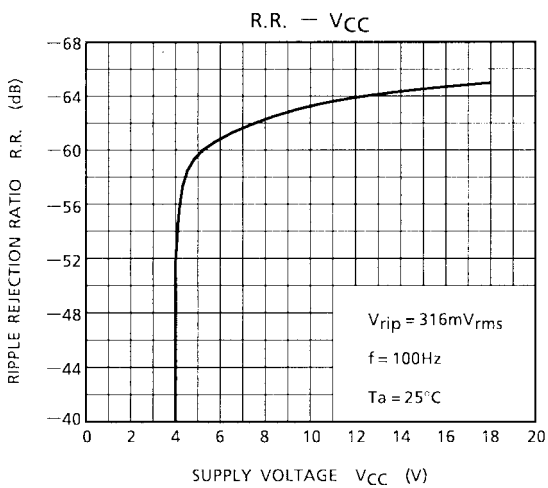
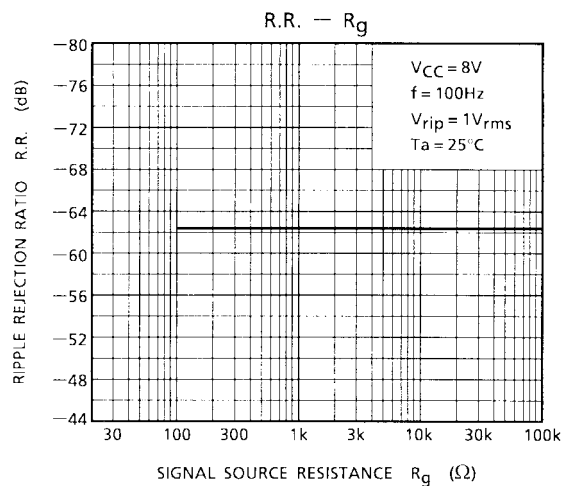
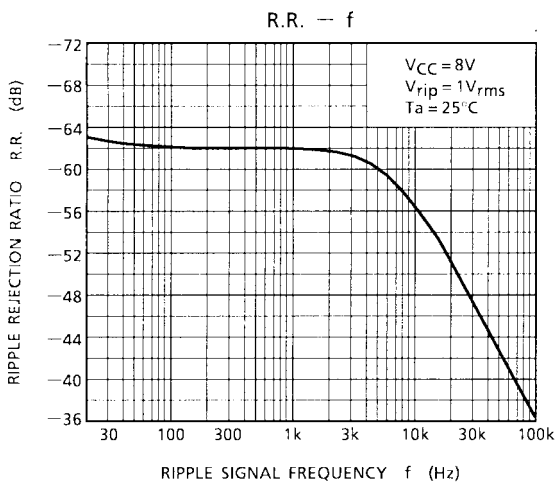
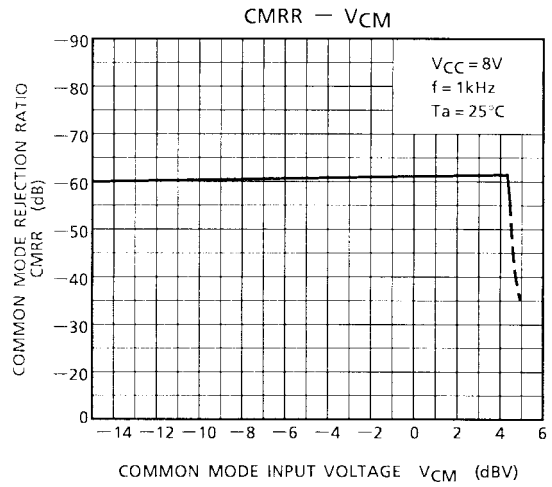
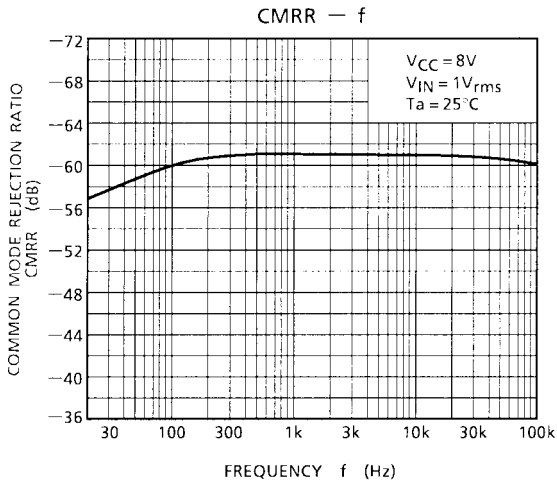
TA2050F non-inverting circuit

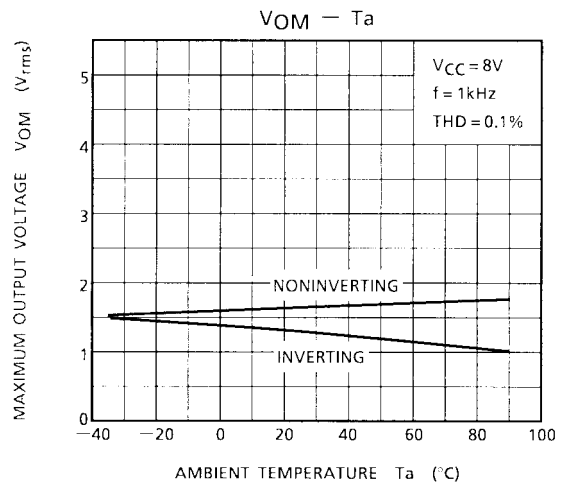
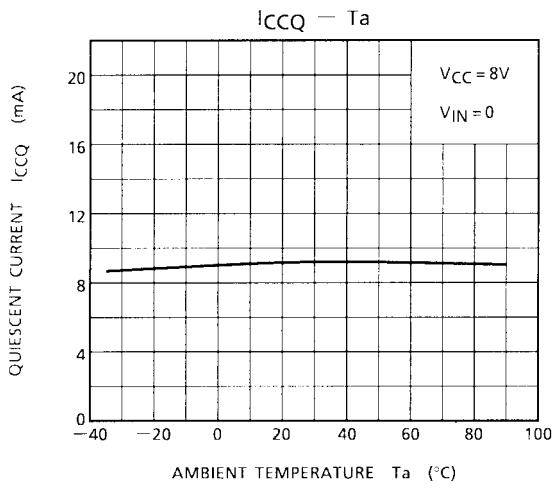


TA2050F inverting circuit



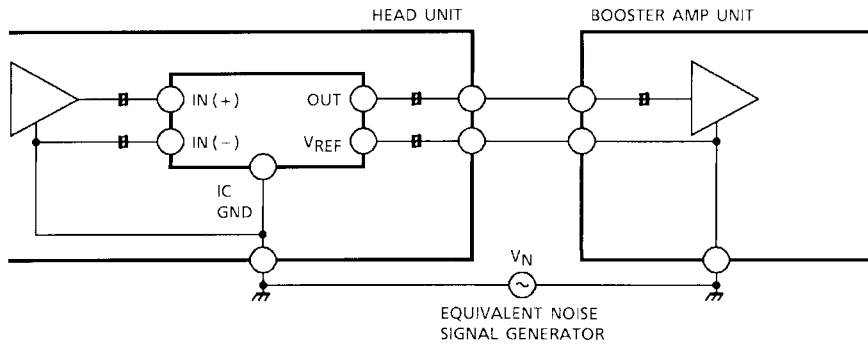




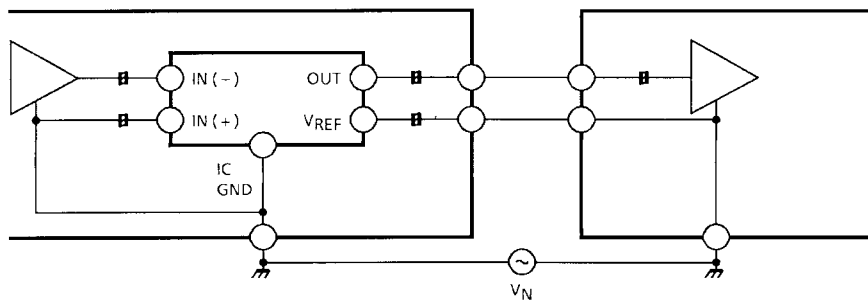


Application Block Diagram

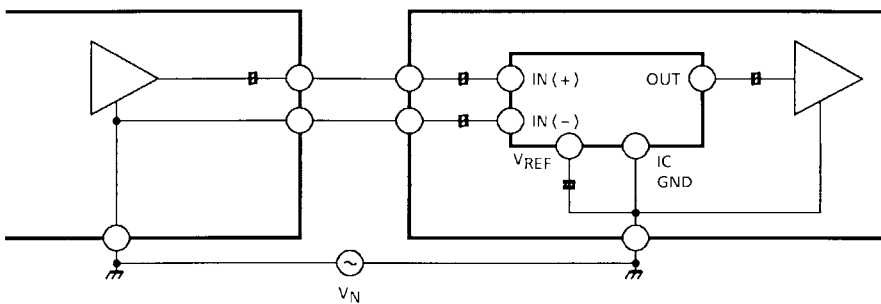
1. Noninverting line output



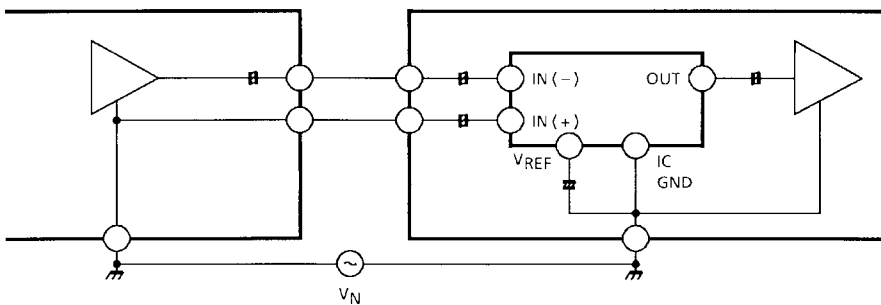
2. Inverting line output



3. Noninverting line input



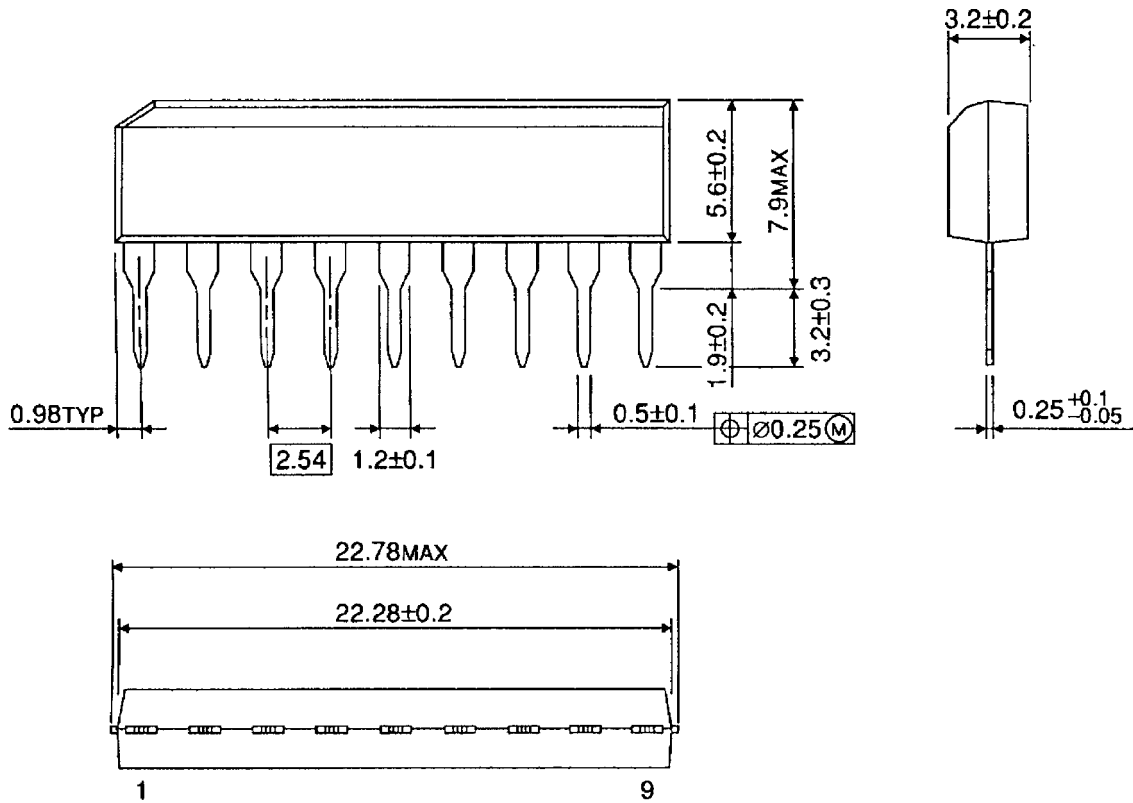
4. Inverting line input



Package Dimensions

SIP9-P-2.54A

Unit : mm

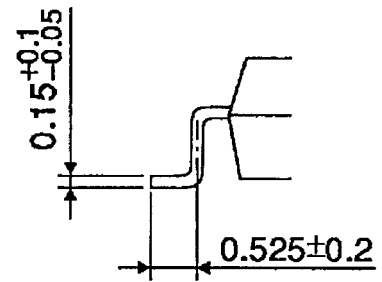
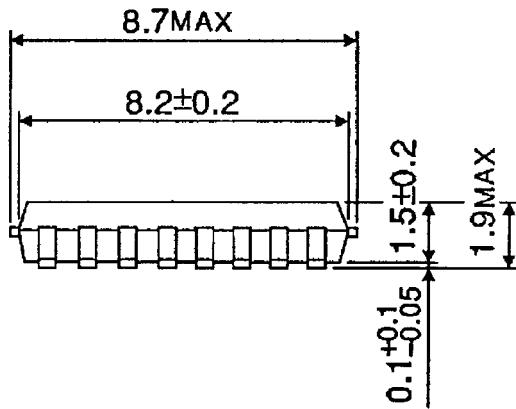
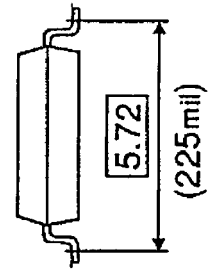
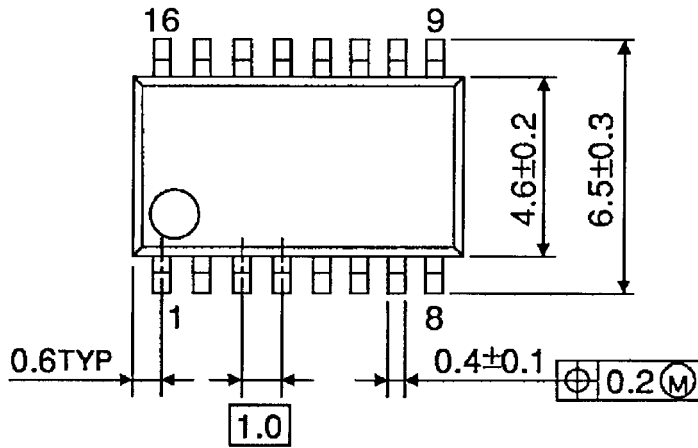


Weight: 0.92 g (typ.)

Package Dimensions

SSOP16-P-225-1.00A

Unit : mm



Weight: 0.14 g (typ.)

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