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.)
$$(V_{CC} = 8V, f = 1kHz, V_{CM} = 1V_{rms})$$

Low Noise

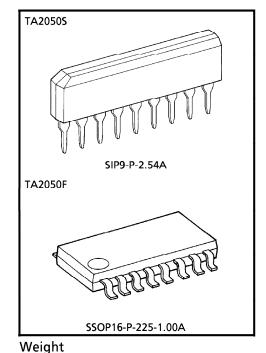
:
$$V_{NO} = 1.7 \mu V_{rms}$$
 (Typ.)
($V_{CC} = 8V$, $R_q = 620\Omega$, Filter = $20 \text{Hz} \sim 20 \text{kHz}$)

Low Distortion

: THD =
$$0.002\%$$
 (Typ.) (V_{CC} = 8V, f = 1kHz, V_{IN} = $1V_{rms}$)

- Package
 - : TA2050S Single-Inline 9pins (SIP-9) TA2050F 1mm pitch Flat package 16pins (MFP-16)
- Operating Supply Voltage Range

:
$$V_{CC (opr)} = 5 \sim 10V (Ta = 25^{\circ}C)$$



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

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- operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

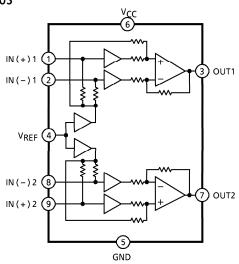
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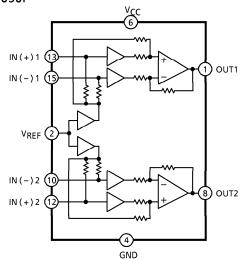
 The information contained herein is subject to change without notice.

BLOCK DIAGRAM

TA2050S



TA2050F



※ 3, 5, 7, 9, 11, 14, 16pin: 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 (100k Ω (Typ.)) from internal reference amplifier.	IN (+) 1 IN (-) 1 C 300			
2	15	IN (–) 1	Inverting line input terminal for channel 1. This terminal is biased by resistor (100k Ω (Typ.)) from internal reference amplifier.	V _{REF}			
3	1	OUT1	Channel 1 output terminal. Output resistor is 100 Ω (Typ.).	VCC VCC OUT1			
4	2	V_{REF}	Reference voltage terminal. Individual built-in reference amp for each channel.	V _{REF} V _X			
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.).	33			
_	3 5 7 9 11 14 16	N.C	Non. connection terminal for TA2050F.	_			

MAXIMUM RATINGS (Ta = 25°C)

CHARACTER	RISTIC	SYMBOL	RATING	UNIT		
Supply Voltage		Vcc	15	V		
Payer Dissipation	TA2050S	D= /Nata\	900	mW		
Power Dissipation	TA2050F	P _D (Note)	350	'''VV		
Operating Temper	ature	T _{opr}	- 30~85	°C		
Storage Temperati	ıre	T _{stg}	- 55∼150	°C		

(Note) Derated above $Ta = 25^{\circ}C$ in the proportion of 7.2mW/°C for TA2050S, 2.8mW/°C for TA2050F.

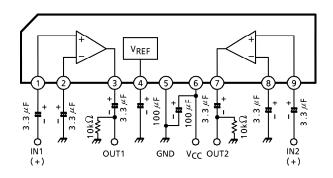
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $V_{CC} = 8V$, f = 1kHz, $R_L = 10k\Omega$, noninverting configuration, $Ta = 25^{\circ}C$)

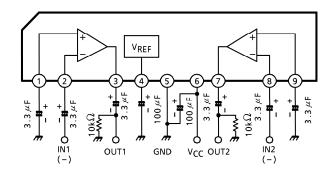
CHARACTERISTIC	SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Quiescent Current	lccQ	_	$V_{in} = 0$	6	9	15	mA	
Voltage Gain	Gγ	_	_	– 1	0	+ 1	dB	
Maximum Output Voltage	V _{OM} (1)	_	Noninverting, THD = 1%	1.3	1.7	_	V	
Waximum Output Voltage	V _{OM} (2)	_	Inverting, THD = 1%	1.0	1.2	_	V _{rms}	
Total Harmonic Distortion	THD		V _{out} = 1V _{rms} Filter BW = 400Hz~30kHz	_	0.002	0.01	%	
Cross Talk	C.T.	_	$V_{in} = 1V_{rms}$	—	- 86	- 75	dB	
Imput Resistance	R _{IN}	_	_	_	100	_	kΩ	
Output Resistance	ROUT	_	_	-	100	_	Ω	
Output Noise Voltage	V _{NO}	_	$R_g = 620\Omega$ DIN AUDIO Weighting	_	1.7	3.0	μ V $_{rms}$	
Common Mode Rejection Ratio	CMRR	1	_	_	- 60	- 50	dB	
Maximum Common mode Input Voltage	V _{CM} (MAX)		CMRR = -50dB	1.0	1.6	1	V _{rms}	
Ripple Rejection Ratio	R.R.	_	f = 100Hz	_	- 57	- 50	dB	

TEST CIRCUIT

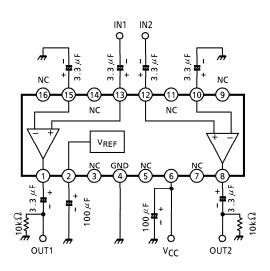
TA2050S non-inverting circuit



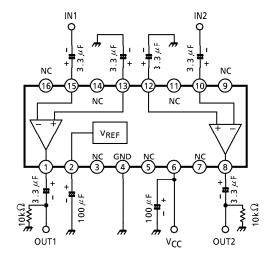
TA2050S inverting circuit

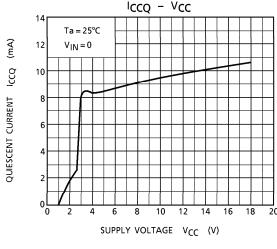


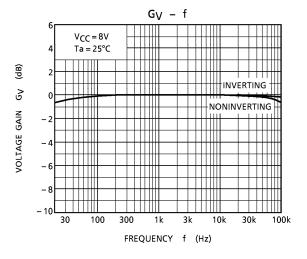
TA2050F non-inverting circuit

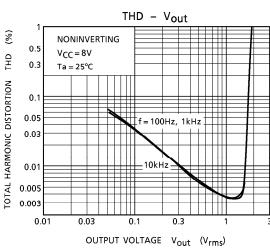


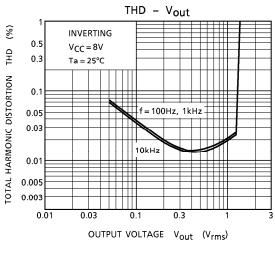
TA2050F inverting circuit

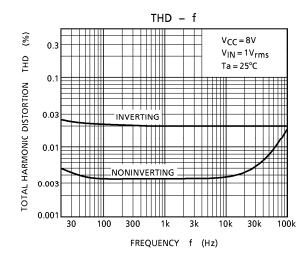


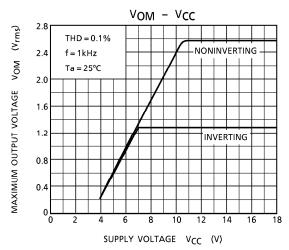


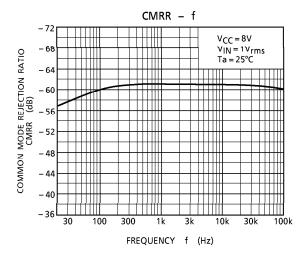


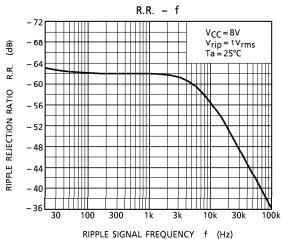


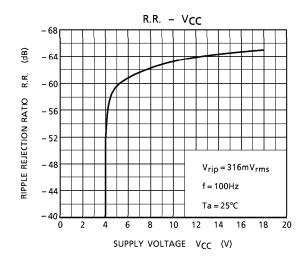


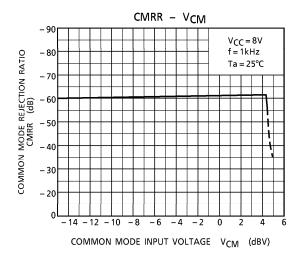


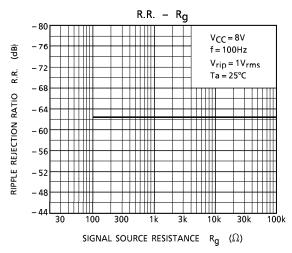


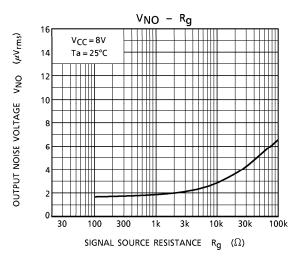


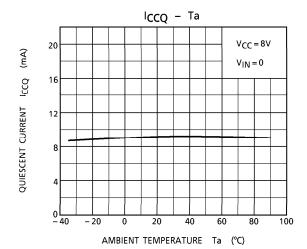


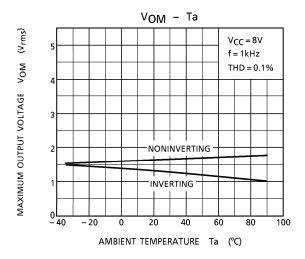






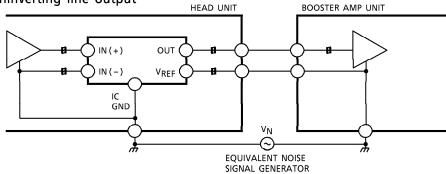




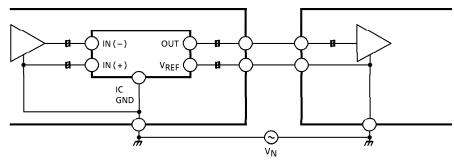


APPLICATION BLOCK DIAGRAM

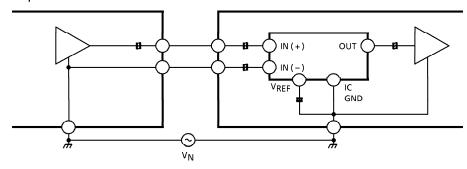
(1) Noninverting line output



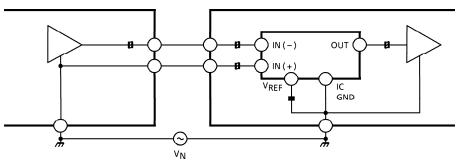
(2) Inverting line output



(3) Noninverting line input

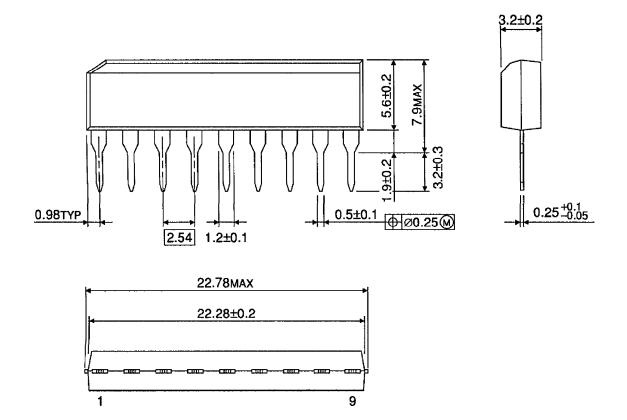


(4) Inverting line input



OUTLINE DRAWING

SIP9-P-2.54A Unit: mm

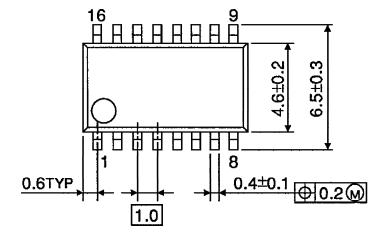


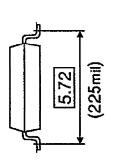
Weight: 0.92g (Typ.)

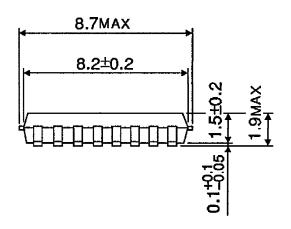
Unit: mm

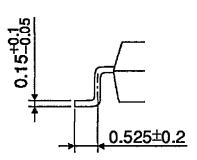
OUTLINE DRAWING

SSOP16-P-225-1.00A









Weight: 0.14g (Typ.)