

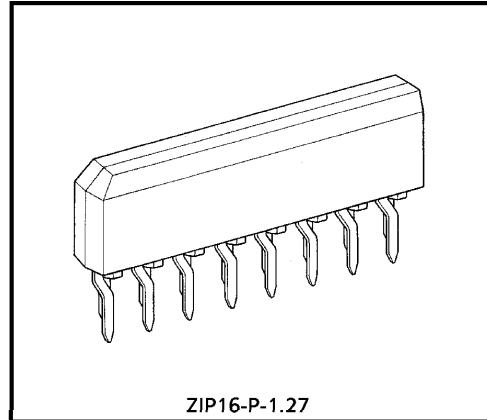
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8194Z**MUTING IC**

The TA8194Z is a muting IC to prevent the "POP" noise made at time of power ON and OFF of audio equipments.

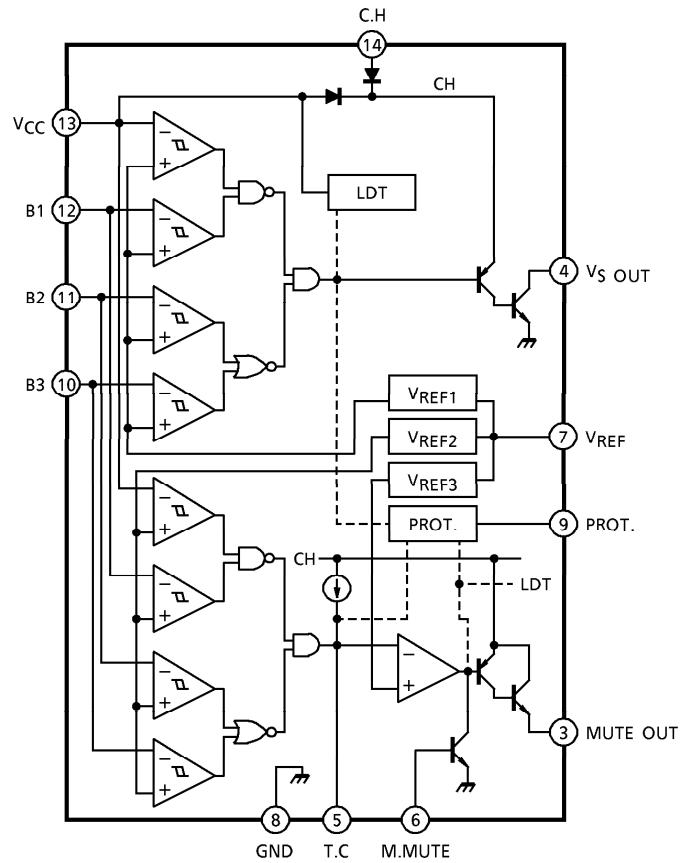
This IC has 4 sensor terminals, muting control terminal and supply control terminal. In case of sensing voltage rising, muting control signal occurs and after that supply control signal occurs and muting signal maintains for 1s. In case of sensing voltage setting, muting control signal occurs and after that supply control signal stops.

This IC also has manual muting terminal and protection function.

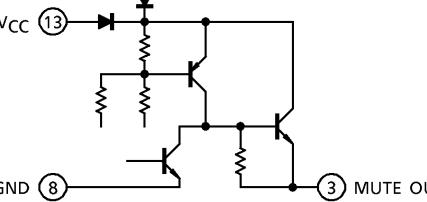
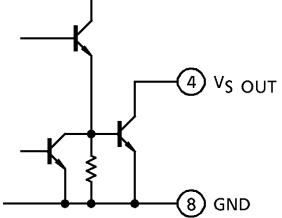
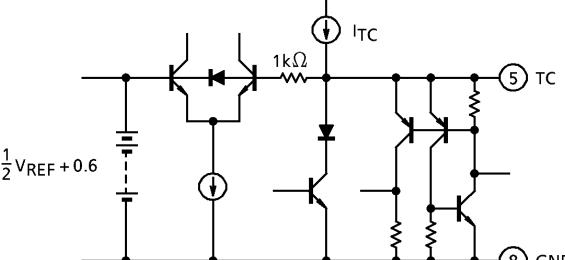
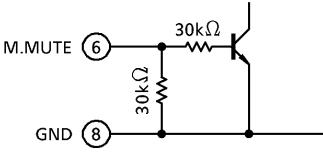
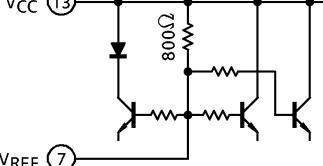
**FEATURES**

- 4 sensor terminals : V_{CC} , B₁, B₂, B₃
- Muting circuit control signal output
- Power supply circuit control signal output
- Manual muting control terminal
- Protection function terminal
- Operating supply voltage range : V_{CC} (opr.) = 8~18.0V (Ta = 25°C)

BLOCK DIAGRAM



TERMINAL EXPLANATION

PIN No.	FUNCTION	EQUIVALENT CIRCUIT
3	MUTE OUT	
	Muting Control Signal Output	
4	VS OUT	
	Supply Control Signal Output	
5	TC (Timing Condenser)	
	Muting Time Condenser Terminal	
6	M. MUTE (Manual Mute)	
	$V_6 \geq 0.8V \rightarrow \text{MUTE OUT} = \text{ON}$	
7	V_{REF} (Reference Voltage)	
	Reference Voltage for Comparator	

PIN No.	FUNCTION	EQUIVALENT CIRCUIT
9	PROT. (Protection)	
	$V_g \geq 0.8V \rightarrow \text{MUTE OUT} = \text{ON}$, $V_S \text{ OUT} = \text{OFF}$	
10	B3 Voltage Sense Terminal-3	
11	B2 Voltage Sense Terminal-2	
12	B1 Voltage Sense Terminal-1	
13	V_{CC}	
	Supply Terminal Voltage Sense Terminal	
14	CH (Charge Hold)	
	Back Up Capacitor Terminal at V_{CC} OFF	

OPERATING DESCRIPTION

The TA8194Z is a muting control IC to prevent pop noise made at time of power ON and OFF of audio equipments.

This IC has built-in 4 terminals for sensing bias line voltage of audio equipment.

According to sensing voltage rising and setting, this IC occurs muting control signal and supply control signal.

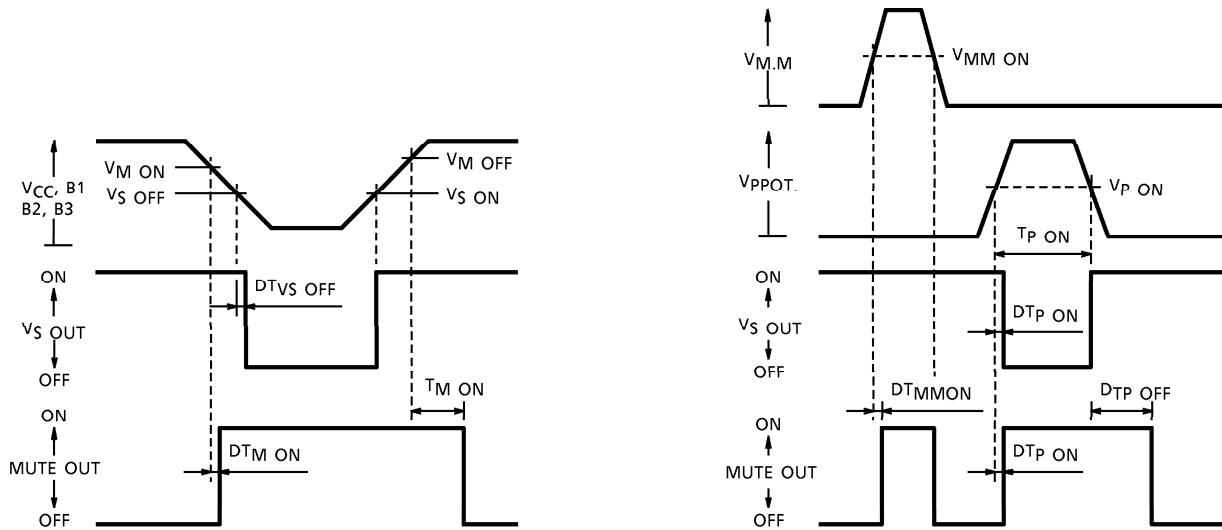
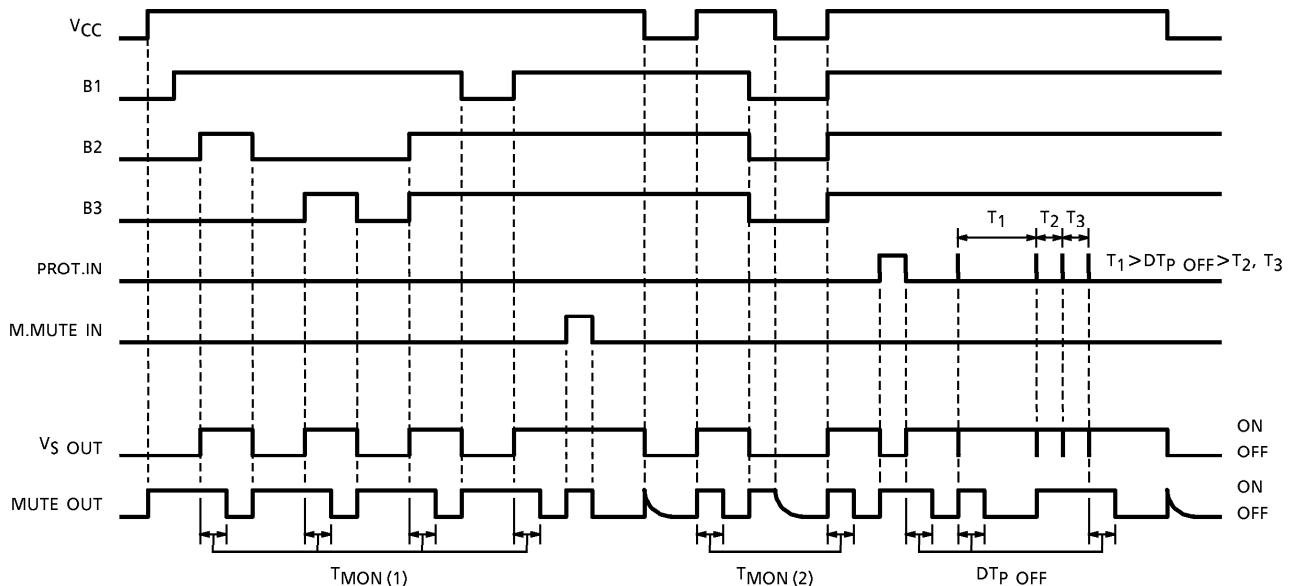
Followings are basic operation of this IC, refer to TIMING CHART : page 6.

- (1) Muting control signal occurs at V_{CC} ON under any condition of B1, B2, B3 sensing voltage.
- (2) Muting control signal occurs at V_S output OFF.
- (3) Muting control signal stops after (T_M ON) s at V_S output ON.
Muting time (T_M ON) depends on capacitor value connected to TC terminal : pin⑤.
(T_M ON) is 1.0~1.1s (Typ.) under condition of $C_{TC} = 10\mu F$.
The above are applied in case sensing voltage rises fast enough.
Muting control OFF sense voltage : (V_M OFF) is higher than V_S ON sense voltage (V_{VS} ON), so in case sensing voltage rises slowly, the period sensing voltage rising from (V_{VS} ON) to (V_M ON) should be counted.
- (4) Muting control signal occurs at V_{CC} OFF. In this case, muting time depends on capacitor value connected to CH terminal : Pin⑭. This capacitor is back-up capacitor at V_{CC} OFF. Muting control signal operation at V_{CC} OFF is by charge of this capacitor.
- (5) Manual muting control terminal : pin⑥.
Muting control signal occurs by adding H-level signal at manual mute control terminal under any condition of V_S control output.
- (6) V_S control output signal occurs at condition of sensing terminal voltage is following.
$$V_{CC} \cdot B1 \cdot (B2 + B3) = \text{H-level}$$
- (7) Sense voltage of V_S ON/OFF and muting ON/OFF control are set individually, so control signal output operate sequentially as follows.
 - Sensing voltage rising : V_S control output signal stop after muting control signal occurs.
(V_M ON > V_{VS} OFF)
 - Sensing voltage setting : Muting control signal stops after (T_M ON) s at sensing voltage setting to (V_M OFF) after V_S control output occurs. (V_{VS} ON < V_M OFF)

There are muting period before and after at V_S control signal stops and occurs.
- (8) Sense voltage of V_S ON/OFF and muting ON/OFF control have hysteresis voltage of 0.2~0.3V.
- (9) Protection function terminal : pin⑨.
 - Adding H-level control signal : V_S control signal stops and Muting control signal occurs.
 - Adding L-level control signal from H-level : V_S control signal occurs and after the period : D_{TP} OFF, muting control signal stops.

D_{TP} OFF depends on capacitor value connected to TC terminal as T_M ON.

TIMING CHART

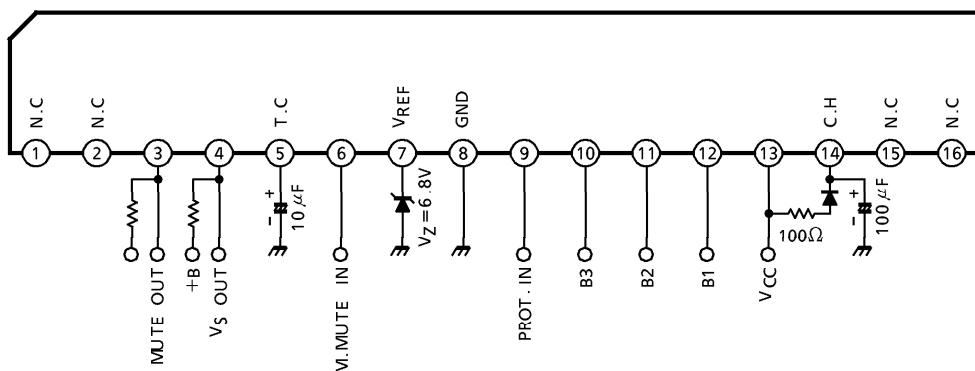
MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

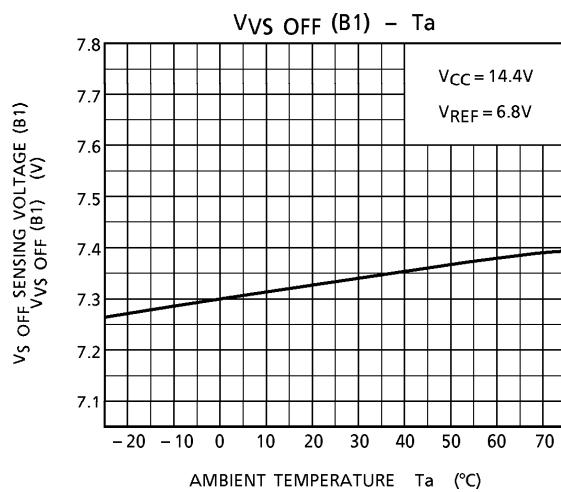
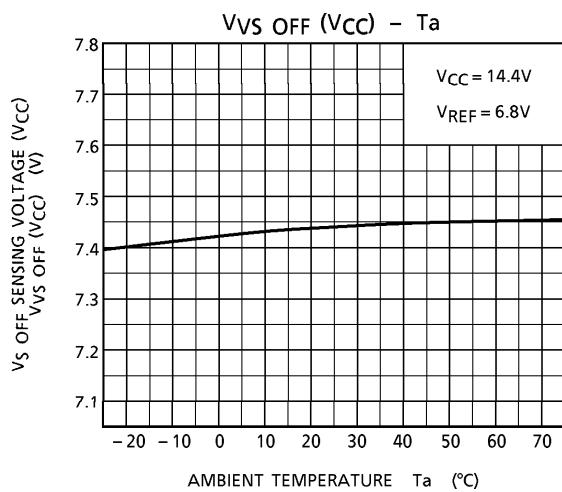
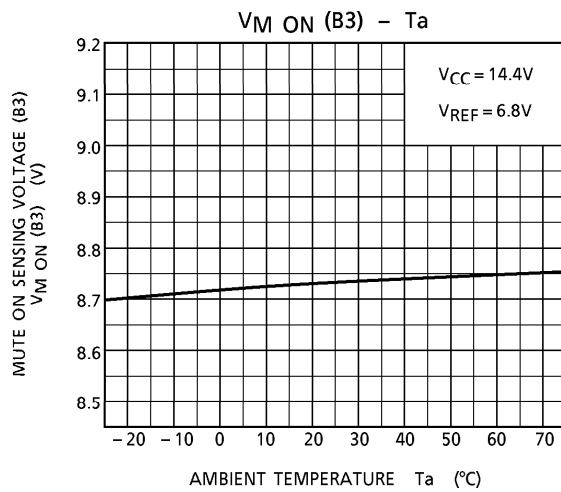
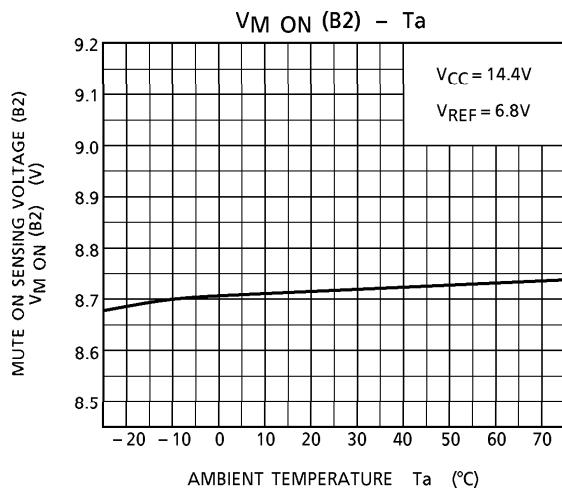
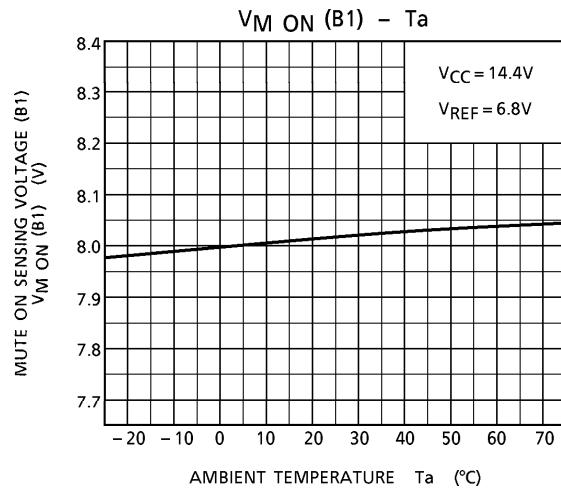
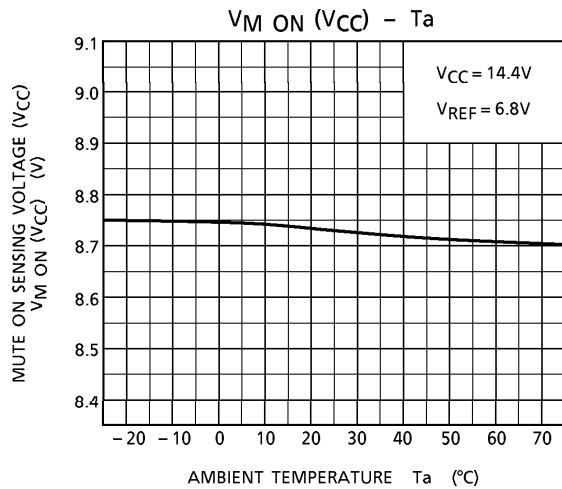
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	25	V
Power Dissipation	P_D	750	mW
Operating Temperature	T_{opr}	-30~85	°C
Storage Temperature	T_{stg}	-55~150	°C

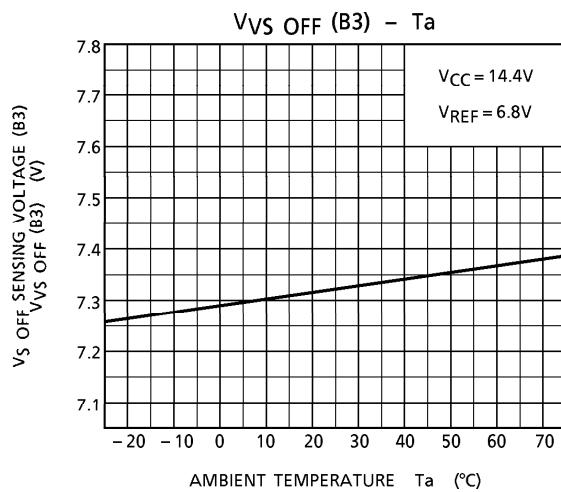
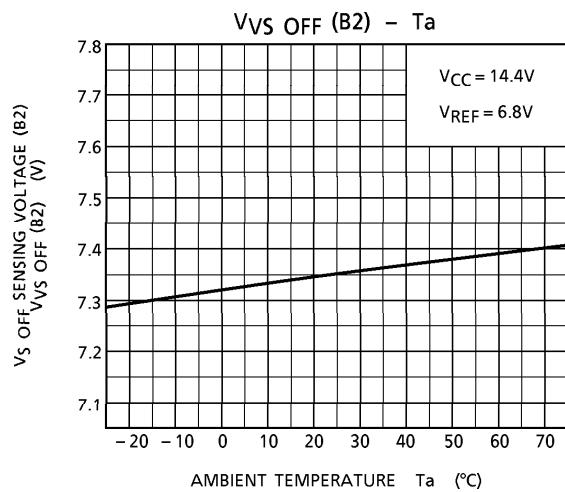
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $V_{CC} = 14.4V$, $V_{REF} = 6.8V$, $T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	—	—	19	40	mA
Reference Current	I_{REF}	—	—	7.3	9.5	13.5	mA
Mute On Sense Voltage	V_M ON (1)	—	V_{CC} , B2, B3	8.5	8.7	8.9	V
	V_M ON (2)	—	B1	7.75	8.0	8.25	
Mute Off Sense Voltage	V_M OFF (1)	—	V_{CC} , B2, B3	—	9.0	9.2	V
	V_M OFF (2)	—	B1	—	8.2	9.2	
Mute Out Saturation Voltage	V_{OUT} ML	—	I_M OUT = 10mA	—	1.9	2.5	V
Mute On Dearly Time	DT_M ON	—	—	—	—	10	μs
V_S On Mute Time	T_M ON (1)	—	B1 or B2 or B3 → ON	0.7	1.0	1.4	s
	T_M ON (2)	—	$V_{CC} \rightarrow$ ON	0.8	1.1	1.5	
V_S On Sense Voltage	V_{VS} ON (1)	—	V_{CC}	—	7.4	8.1	V
	V_{VS} ON (2)	—	B1, B2, B3	—	7.3	8.1	
V_S Off Sense Voltage	V_{VS} OFF	—	V_{CC} , B1, B2 B3	7.3	7.6	8.0	V
V_S Out Voltage	V_{OUT} VS	—	$I_{VS} = -20mA$	—	0.25	1.0	V
V_S Off Dearly Time	DT_{VS} OFF	—	—	—	—	10	μs
Protector On Trigger Voltage	V_P ON	—	—	0.8	—	—	V
Protector On Trigger Time	T_P ON	—	$V_P = 14.4V$	10	—	—	μs
Protector On Dearly Time	DT_P ON	—	$V_P = 14.4V$	—	—	10	μs
Protector On Input Current	I_P IN	—	V_P IN = 1V	—	—	0.1	mA
Protector Off Delay Time	DT_P OFF	—	—	0.7	—	1.5	s
Manual Mute On Sense Voltage	V_{MM} ON	—	—	0.8	—	—	V
Manual Mute On Dearly Time	DT_{MM} ON	—	$V_{MM} = 13.4V$	—	—	10	μs
Manual Mute On Input Current	I_{MM} IN	—	V_{MM} IN = 1V	—	—	0.1	mA

TEST CIRCUIT



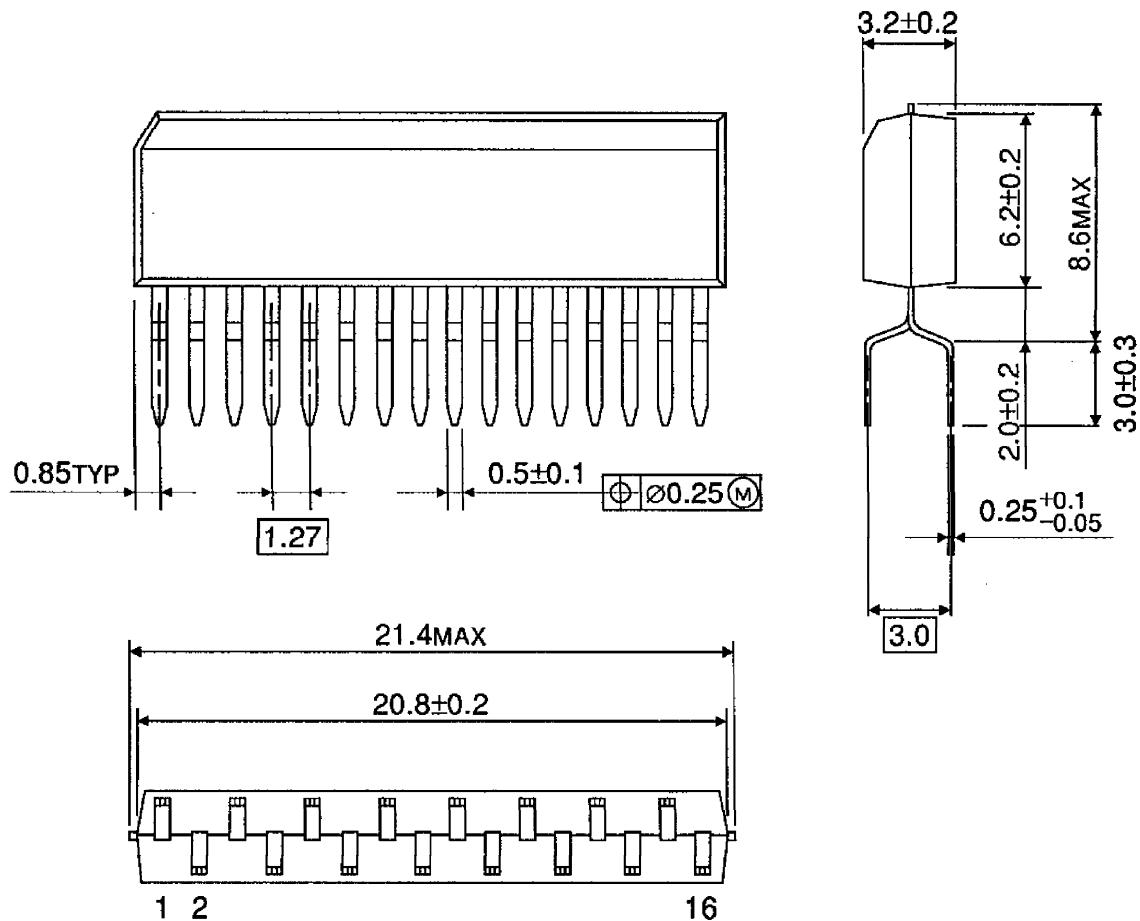




PACKAGE DIMENSIONS

ZIP16-P-1.27

Unit : mm



Weight : 0.99g (Typ.)

RESTRICTIONS ON PRODUCT USE

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