

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA8224H

## MULTI OUTPUT VOLTAGE REGULATOR FOR CD PLAYER

The TA8224H is voltage regulator IC, designed for compact disc player use, built in 3 outputs and reset circuit.

In addition, protection of over voltage, output to GND short and thermal shut down are involved.

### FEATURES

- 3 Regulated Voltage Outputs

$V_{OUT1}$  (for  $\mu$ -com system) . . . . fixed voltage output  
:  $V_{OUT1} = 5\text{ V (Typ.)} / 100\text{ mA (MAX.)}$

$V_{OUT2}$  (for servo system) . . . . . fixed voltage output  
:  $V_{OUT2} = 5\text{ V (Typ.)} / 300\text{ mA (MAX.)}$

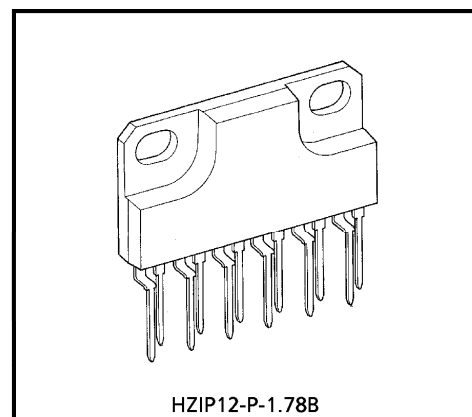
$V_{OUT3}$  (for driver) . . . . . adjustable voltage output  
:  $V_{OUT3} = 8\text{ V (Typ.)} / 1.2\text{ A (MAX.)}$

- Built-in Reset Circuit . . . . . 2 input, 1 output  
: Reset Sense Voltage  $V_R \leq 3.4\text{ V (Ta = 25}^\circ\text{C)}$

- Built-in Stand-by Circuit  
: STB1 for  $V_{OUT1}$ ,  $V_{OUT2}$ ,  $V_{OUT3}$   
: STB2 for  $V_{OUT2}$ ,  $V_{OUT3}$

- Built-in Various Protection Circuits  
: Over Voltage, Output to GND Short, Thermal Shut Down

- Input Operating Voltage Range  
:  $V_{IN(\text{opr})} = 7.5\sim 20\text{ V}$   
:  $V_{IN(\text{opr})} = 7.5\sim 24\text{ V (Operating } V_{OUT1}\text{ only)}$



HZIP12-P-1.78B

Weight : 4.04 g (Typ.)

980910EBA2

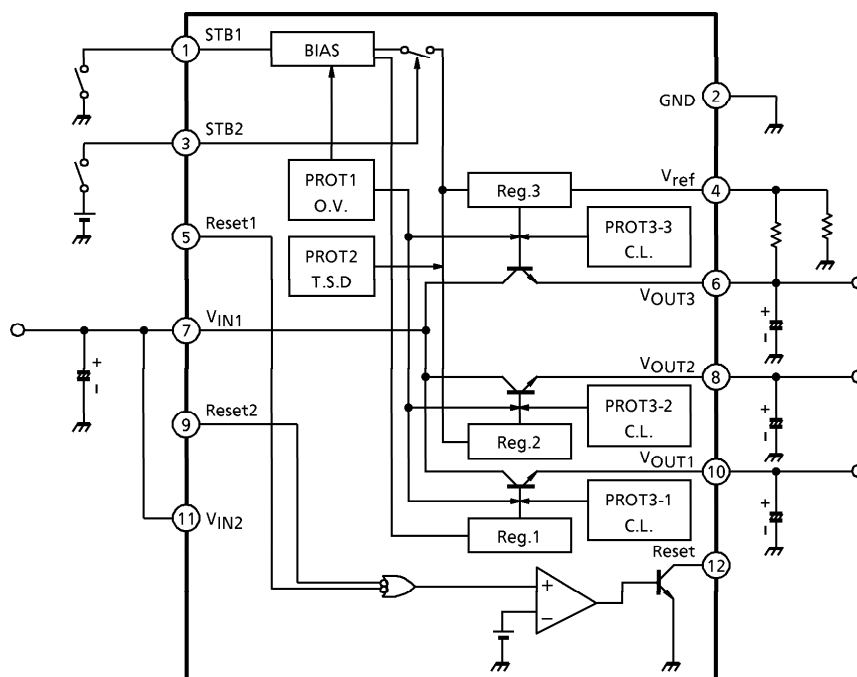
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BLOCK DIAGRAM



PROT1 : Over Voltage  
 PROT2 : Thermal Shut Down  
 PROT3 : Current Limiter for Output-GND Short

EXPLANATION FOR EACH TERMINAL

PIN No.	SYMBOL	FUNCTION	REMARKS
1	STB1	Stand-by switch for VOUT1, VOUT2, VOUT3	GND terminal for bias circuit. ① → GND : ON, ① → OPEN : OFF
2	GND	GND	GND is except for bias circuit.
3	STB2	Stand-by switch	$V_{STB2} \geq 3.0V$ : ON, $V_{STB2} \leq 1.2V$ : OFF
4	Vref	Reference for VOUT3	VOUT3 is decide a ratio of R1 to R2.
5	Reset1	Reset Input 1	$V_{R1} \geq 3.75V$ : OFF, $V_{R1} \leq 3.4V$ : RESET
6	VOUT3	Adjustable voltage output	Adjust by external resistor R1 and R2
7	VIN1	Input terminal 1	Driver stage supply terminal
8	VOUT2	5 V output	Output fixed 5 V.
9	Reset2	Reset input 2	$V_{R2} \geq 3.75V$ : OFF, $V_{R2} \leq 3.4V$ : RESET
10	VOUT1	5 V output	Output fixed 5 V.
11	VIN2	Input 2	Pre stage supply terminal
12	Reset	Reset output	Open collector

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Input Voltage	V <sub>CC</sub>	30	V
Power Dissipation	P <sub>D</sub> (Note)	25	W
Operating Temperature	T <sub>opr</sub>	- 25~75	°C
Storage Temperature	T <sub>stg</sub>	- 55~150	°C

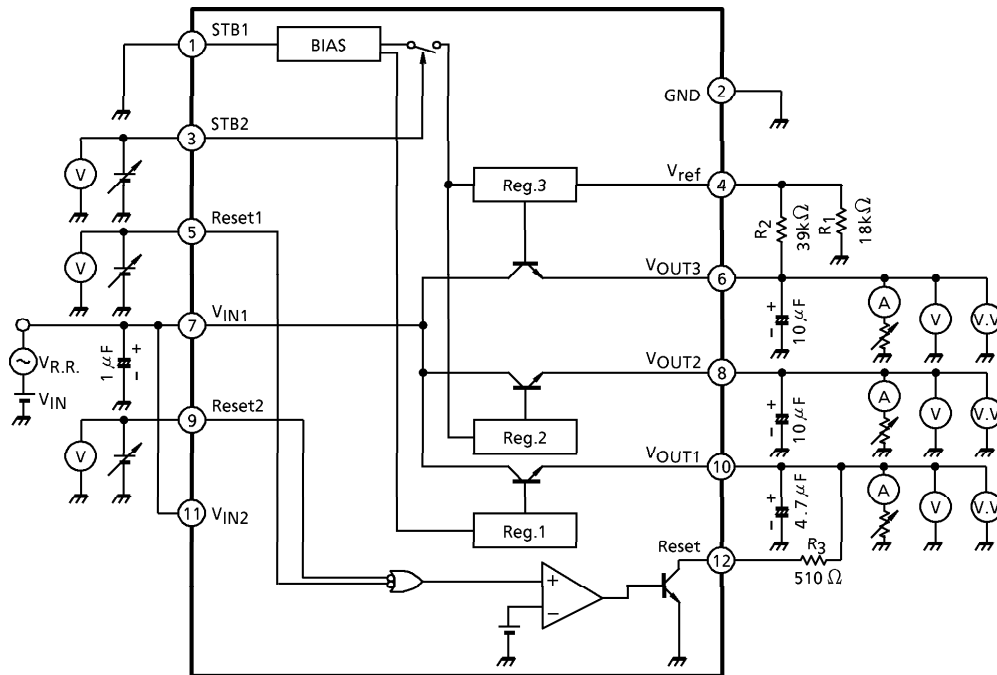
(Note) Derated above Ta = 25°C in the proportion of 200 mW/°C.

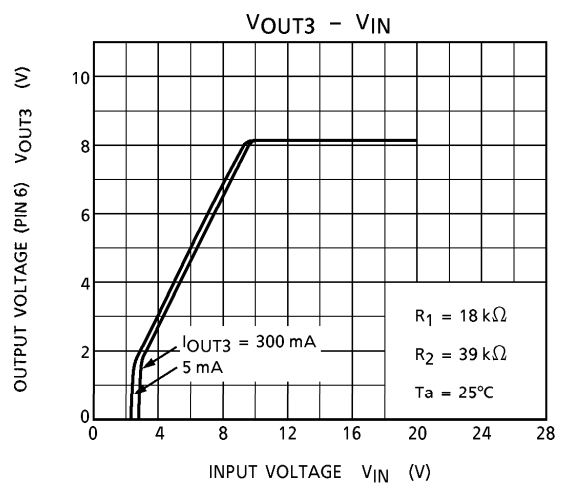
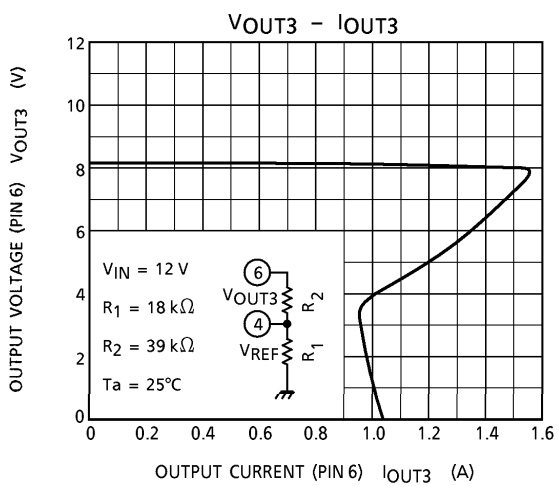
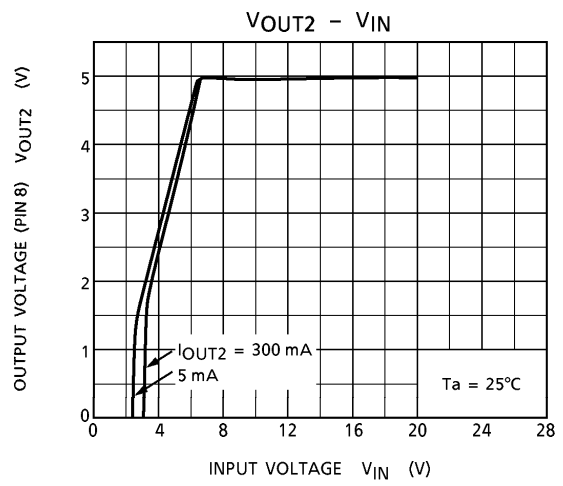
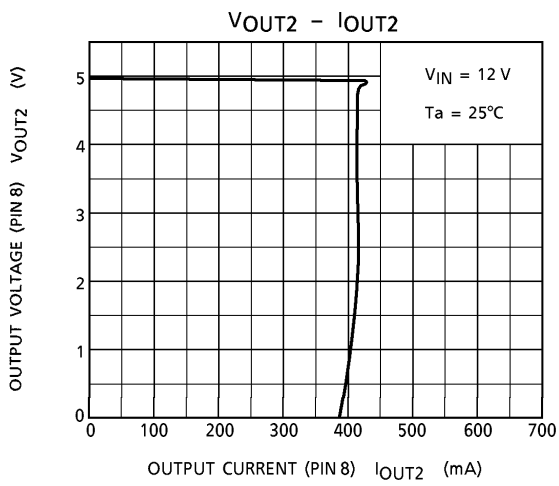
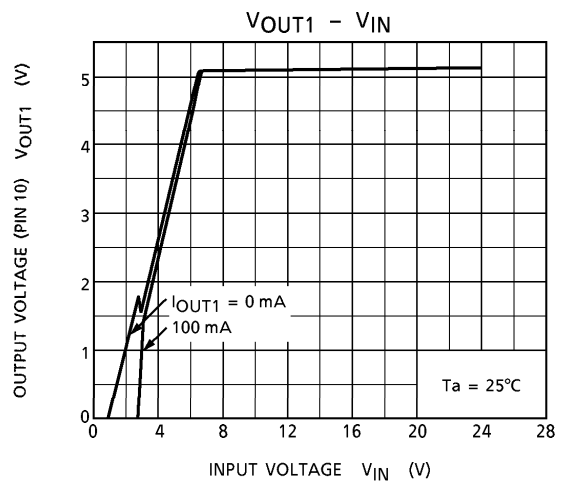
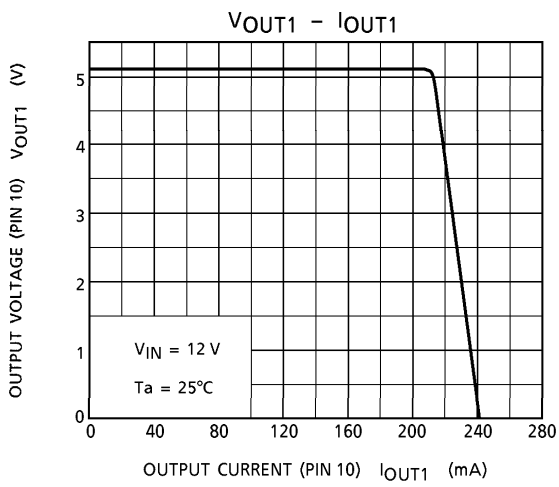
## ELECTRICAL CHARACTERISTICS

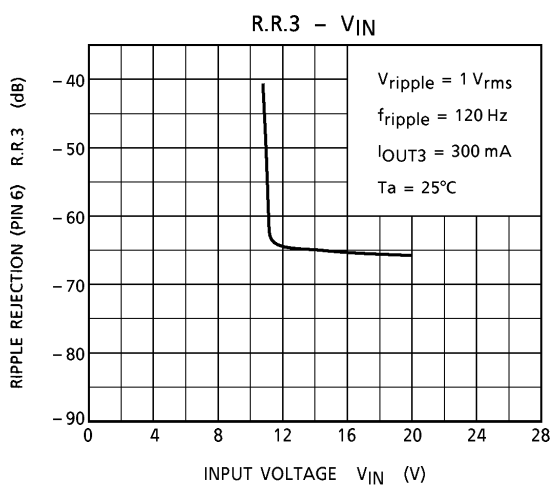
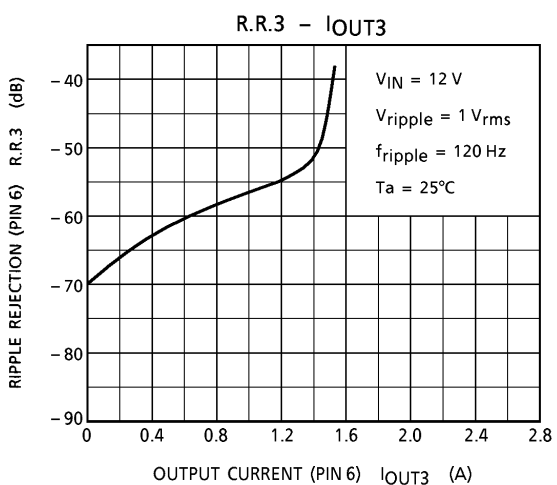
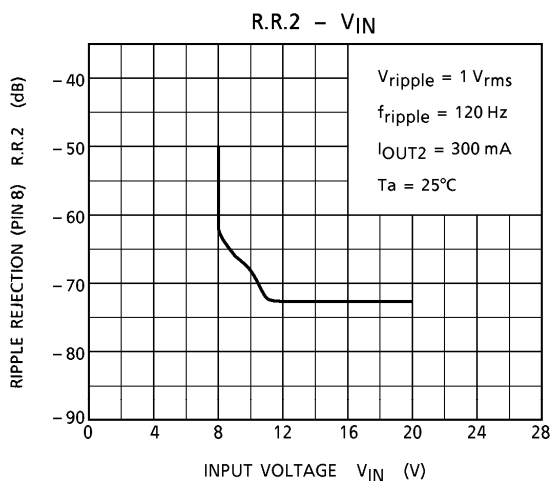
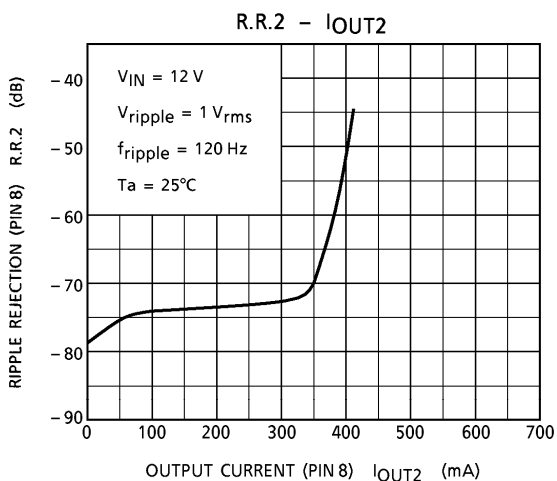
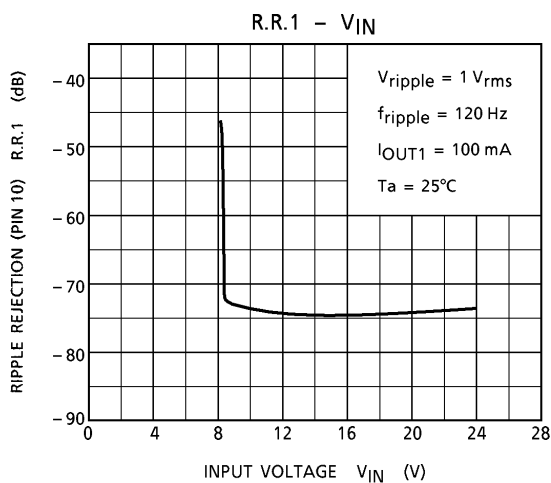
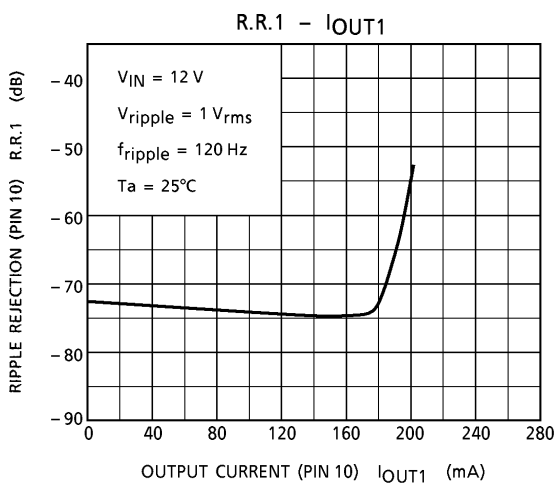
(Unless otherwise specified,  $V_{IN} = 12\text{ V}$ ,  $I_{OUT1} = 100\text{ mA}$ ,  $I_{OUT2} = 300\text{ mA}$ ,  $I_{OUT3} = 300\text{ mA}$ ,  $T_a = 25^\circ\text{C}$ )

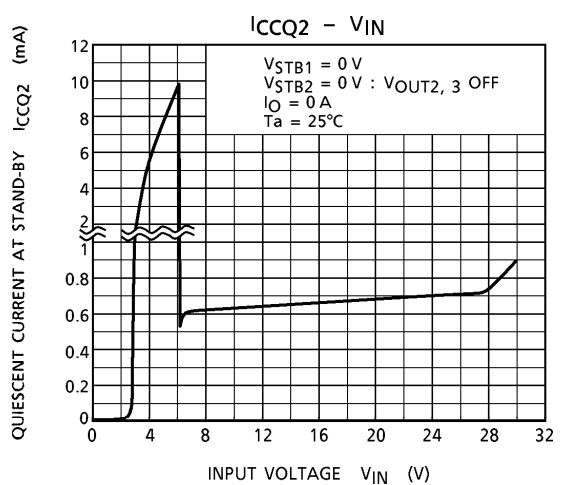
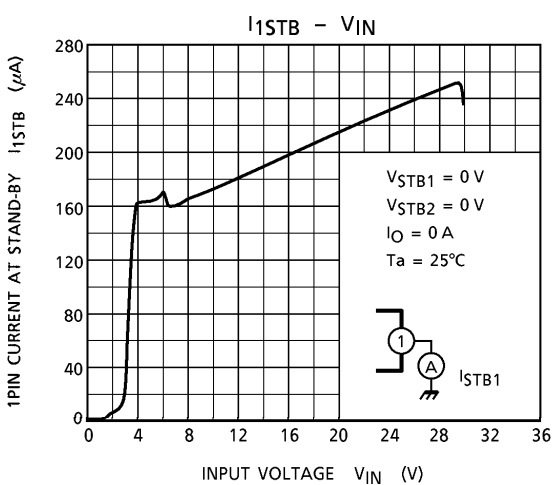
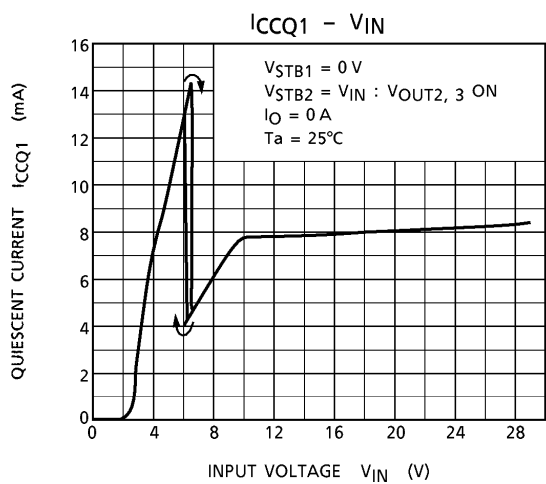
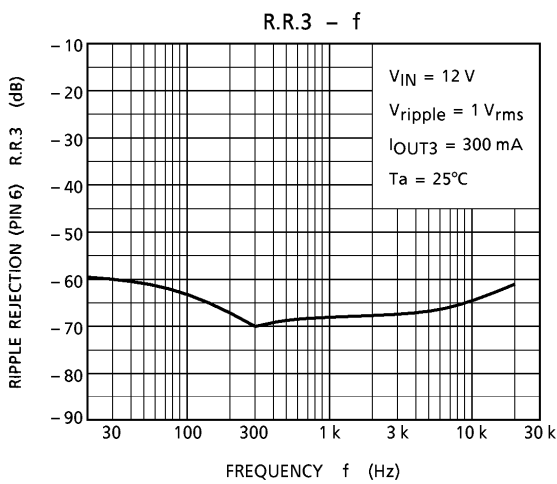
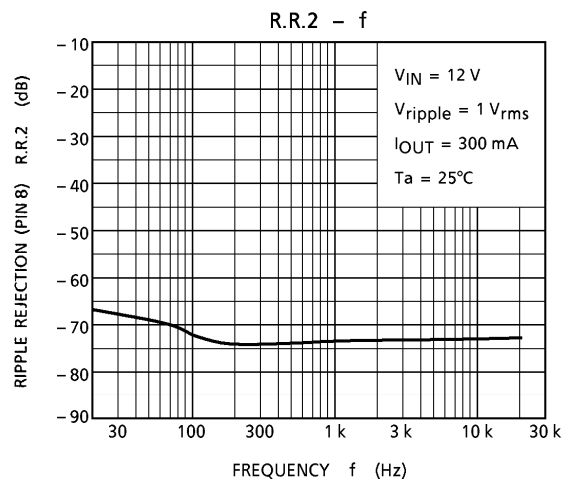
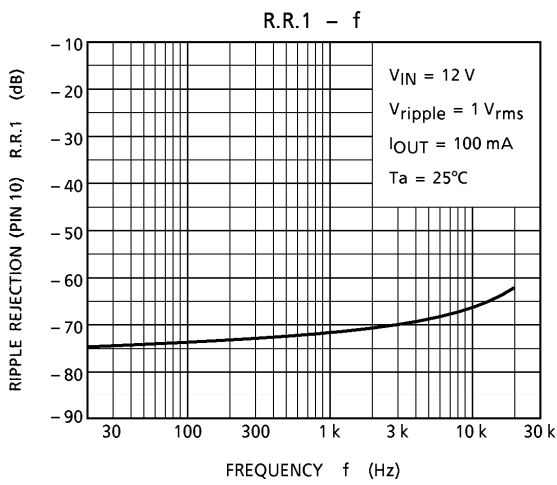
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Output Voltage	$V_{OUT1}$	—	—	4.8	5.0	5.3	V	
	$V_{OUT2}$	—	—	4.8	5.0	5.3		
	$V_{OUT3}$	—	$R_1 = 18\text{ k}\Omega$ , $R_2 = 39\text{ k}\Omega$	7.7	8.0	8.3		
Input Regulation	Reg1. line	—	$7.5\text{ V} \leq V_{IN} \leq 24\text{ V}$	—	20	100	mV	
	Reg2. line	—	$7.5\text{ V} \leq V_{IN} \leq 20\text{ V}$	—	20	100		
	Reg3. line	—	$10.3\text{ V} \leq V_{IN} \leq 20\text{ V}$	—	20	150		
Load Regulation	Reg1. load	—	$0\text{ mA} \leq I_{OUT1} \leq 100\text{ mA}$	—	20	100	mV	
	Reg2. load	—	$5\text{ mA} \leq I_{OUT2} \leq 300\text{ mA}$	—	20	100		
	Reg3. load	—	$5\text{ mA} \leq I_{OUT3} \leq 300\text{ mA}$ $5\text{ mA} \leq I_{OUT3} \leq 1.2\text{ A}$	—	20	100		
Ripple Rejection Ratio	R.R.1	—	$V_{in} = 1\text{ V}_{\text{rms}}$ $f = 120\text{ Hz}$	$10\text{ V} \leq V_{IN} \leq 24\text{ V}$	60	70	—	dB
	R.R.2	—		$11\text{ V} \leq V_{IN} \leq 20\text{ V}$	60	70	—	
	R.R.3	—		$12\text{ V} \leq V_{IN} \leq 20\text{ V}$	52	64	—	
Dropout Voltage	$V_{D1}$	—	$V_{IN} = 6\text{ V}$	—	1.8	—	V	
	$V_{D2}$	—	$V_{IN} = 6\text{ V}$	—	1.8	—		
	$V_{D3}$	—	$V_{IN} = 8\text{ V}$	—	1.5	—		
Maximum Output Current	$I_{MAX1}$	—	—	100	200	—	mA	
	$I_{MAX2}$	—		300	400	—		
	$I_{MAX3}$	—		1.2	1.5	—		A
Output Short Current	$I_{SC1}$	—	—	—	250	—	mA	
	$I_{SC2}$	—		—	400	—		
	$I_{SC3}$	—		—	1.0	—		A
Output Noise Voltage	$V_{no1}$	—	—	—	180	—	$\mu\text{V}$	
	$V_{no2}$	—		—	230	—		
	$V_{no3}$	—		—	260	—		
Output Voltage Temperature Coefficient	$T_{CVO1}$	—	—	—	0.5	—	mV/ $^\circ\text{C}$	
	$T_{CVO2}$	—		—	-1.1	—		
	$T_{CVO3}$	—		—	-1.2	—		
Bias Current	$I_B$	—	$I_{OUT1}=0\text{ mA}$ , $V_{OUT2, 3}\text{-OFF}$	—	0.6	1.2	mA	
Reset	Reset Sense Voltage	$V_R$	—	3.4	—	3.75	V	
	Hysteresis Voltage	$\Delta V_H$	—	—	60	—	mV	
	Output Saturation Voltage	$V_{sat}$	—	$R_3 = 510\ \Omega$	—	0.3	1.0	V
	Sensing Voltage Temperature Coefficient	$T_c\ VO4$	—	—	—	0.5	—	mV/ $^\circ\text{C}$
Stand-by Current	$I_{lstb}$	—	$V_1 = 0\text{ V}$ , $V_{OUT2, 3}\text{-OFF}$	—	180	300	$\mu\text{A}$	
Threshold Voltage	$V_{Sstb2}$	—	—	1.2	—	3.0	V	

TEST CIRCUIT

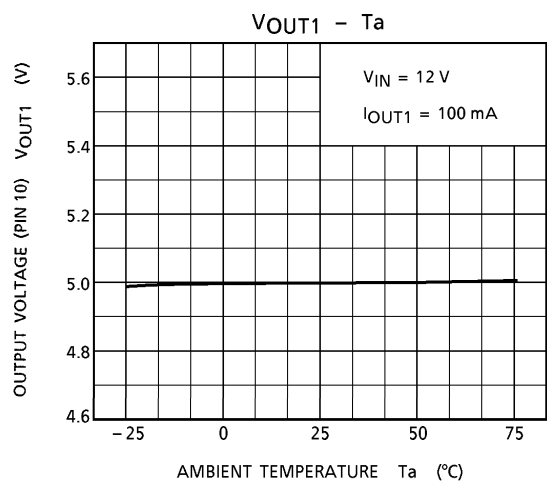
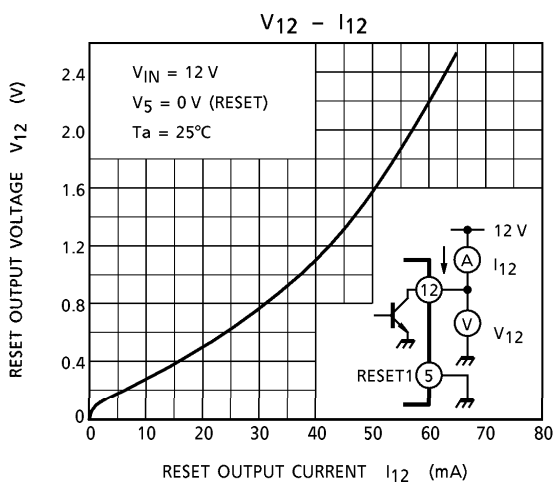
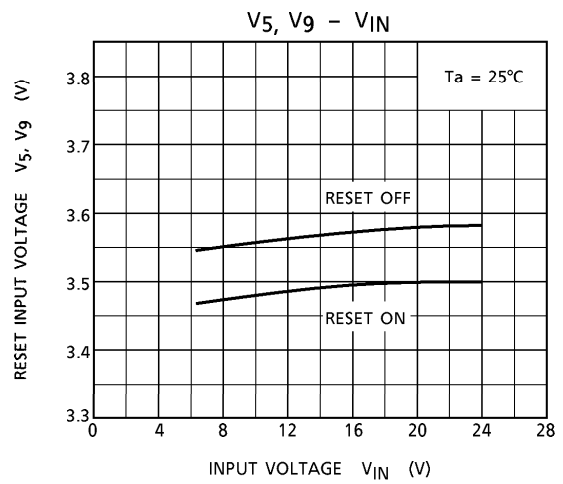
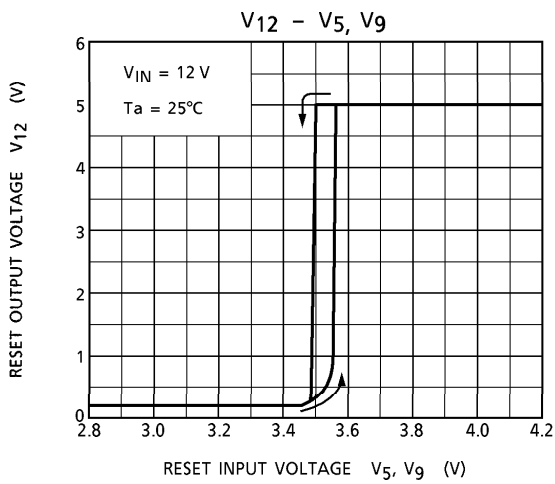
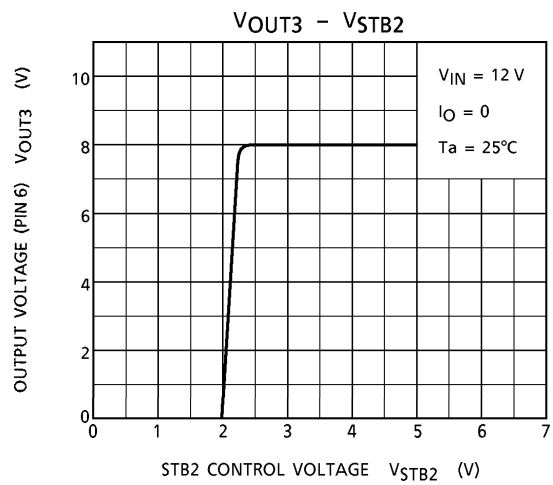
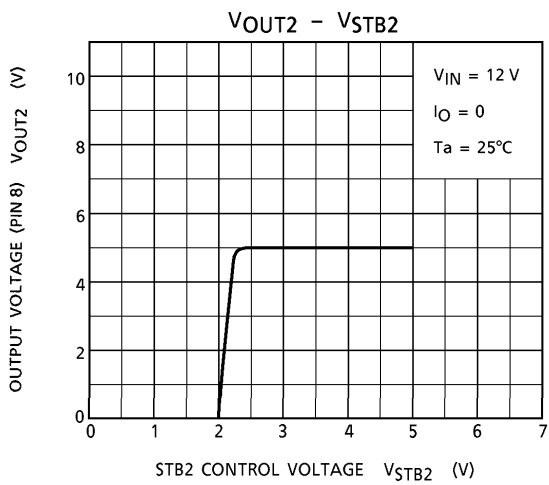


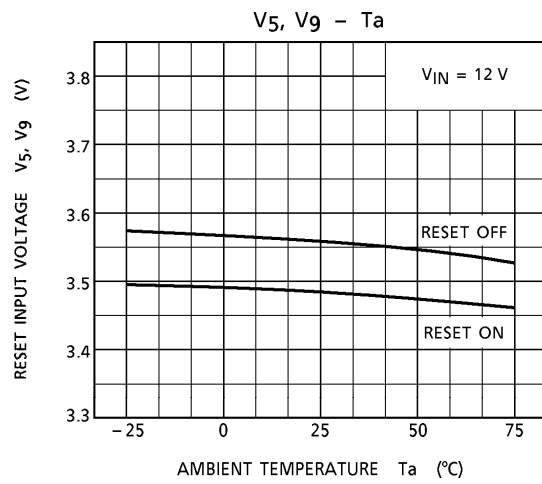
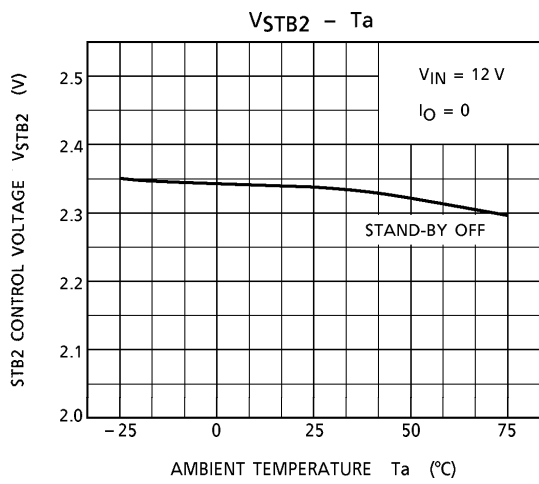
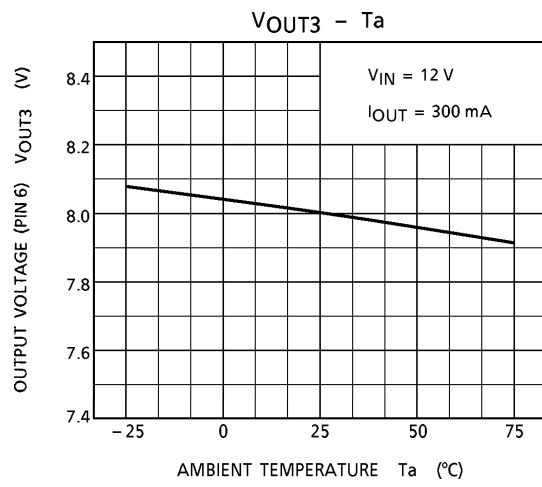
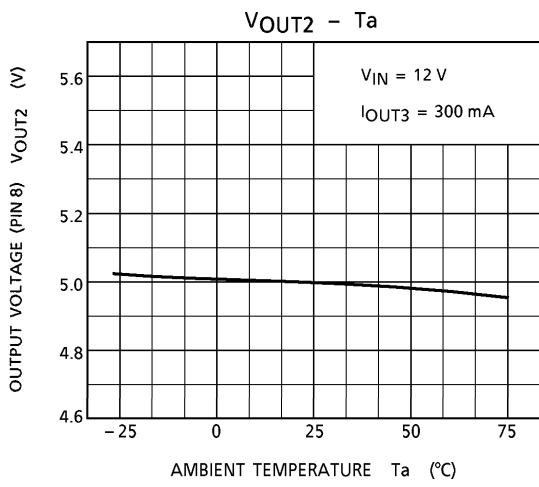




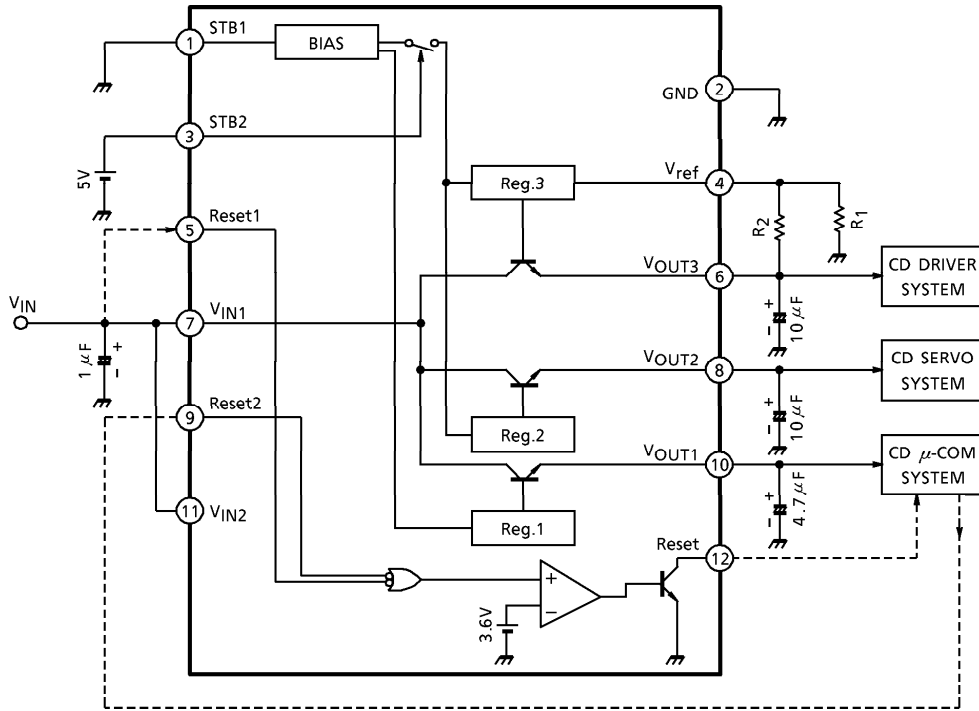






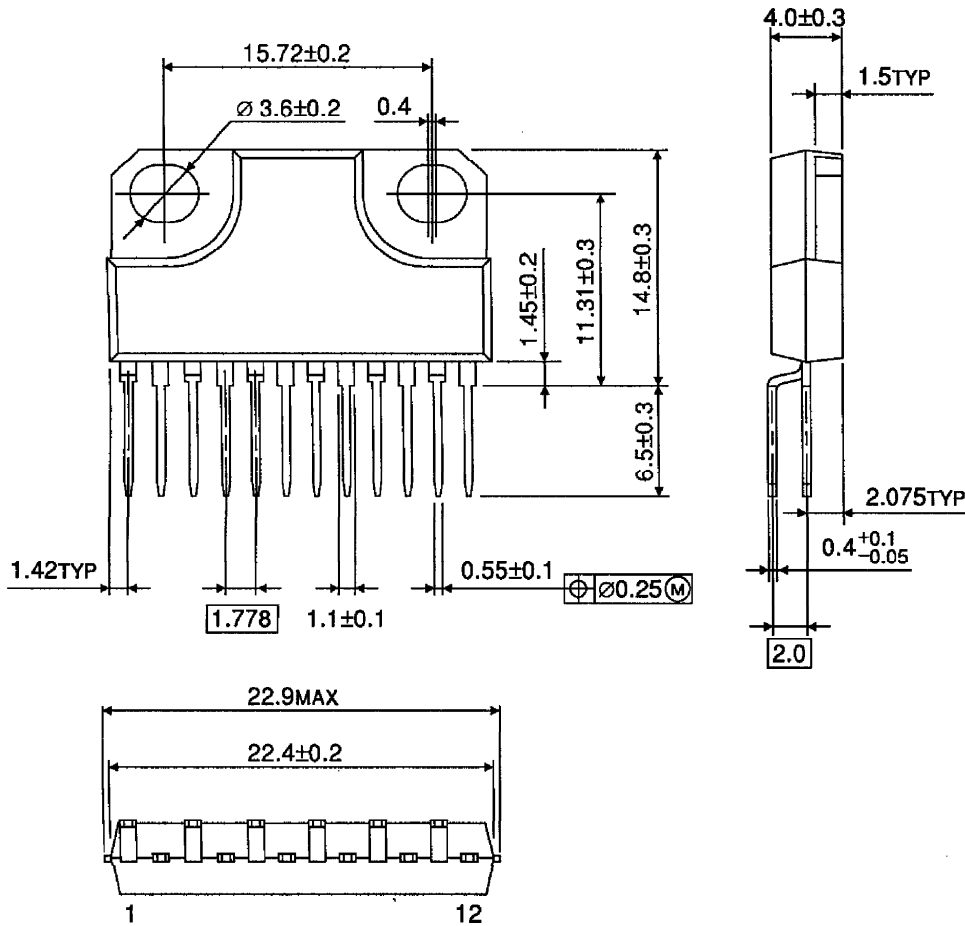


**APPLICATION CIRCUIT**



**OUTLINE DRAWING**  
HZIP12-P-1.78B

Unit : mm



Weight : 4.04 g (Typ.)