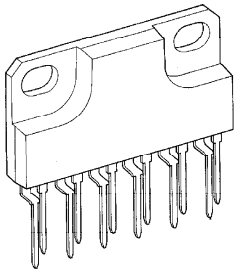
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT

TA8224H

SILICON MONOLITHIC

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.



HZIP12-P-1.78B

Weight : 4.04g (Typ.)

FEATURES

- 3 Regulated Voltage Outputs

  V_{OUT1} (for μ-com system) .... fixed voltage output
  : V_{OUT1} = 5V (Typ.) / 100mA (MAX.)
  V_{OUT2} (for servo system) ..... fixed voltage output
  : V_{OUT2} = 5V (Typ.) / 300mA (MAX.)
  V_{OUT3} (for driver) ..... adjustable voltage output
  : V_{OUT3} = 8V (Typ.) / 1.2A (MAX.)

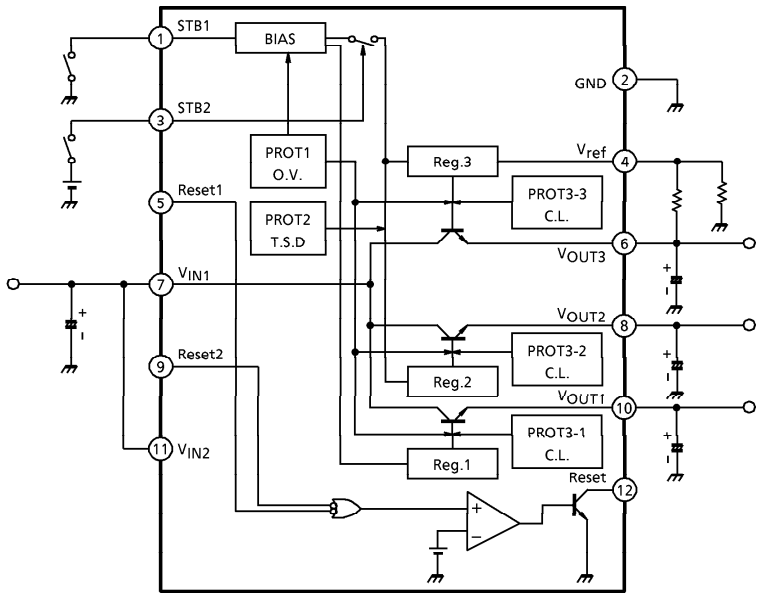
- Built-in Reset Circuit ..... 2 input, 1 output
  : Reset Sense Voltage $V_R \leqq 3.4V$ (Ta = 25°C)

- 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
  : $V_{IN\ (opr)}$ = 7.5~20V
  : $V_{IN\ (opr)}$ = 7.5~24V (Operating V_{OUT1} only)

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 V_{OUT1}, V_{OUT2}, V_{OUT3}	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	$V_{STB2} \geqq 3.0V$: ON, $V_{STB2} \leqq 1.2V$: OFF
4	V_{ref}	Reference for V_{OUT3}	V_{OUT3} is decide a ratio of R_1 to R_2.
5	Reset1	Reset Input 1	$V_{R1} \geqq 3.75V$: OFF, $V_{R1} \leqq 3.4V$: RESET
6	V_{OUT3}	Adjustable voltage output	Adjust by external resistor R_1 and R_2
7	V_{IN1}	Input terminal 1	Driver stage supply terminal
8	V_{OUT2}	5V output	Output fixed 5V.
9	Reset2	Reset input 2	$V_{R2} \geqq 3.75V$: OFF, $V_{R2} \leqq 3.4V$: RESET
10	V_{OUT1}	5V output	Output fixed 5V.
11	V_{IN2}	Input 2	Pre stage supply terminal
12	Reset	Reset output	Open collector

MAXIMUM RATINGS (Ta = 25°C)

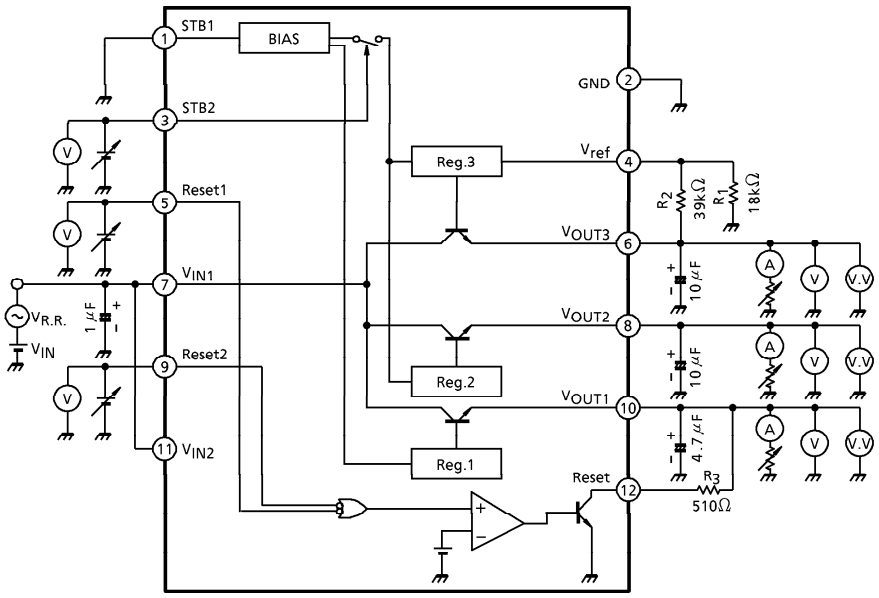
CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Input Voltage	V_{CC}	30	V
Power Dissipation	P_D (Note)	25	W
Operating Temperature	T_{opr}	− 25~75	°C
Storage Temperature	T_{stg}	− 55~150	°C

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

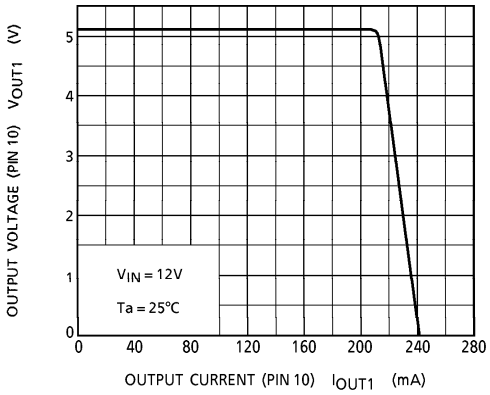
ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, V_{IN} = 12V, I_{OUT1} = 100mA, I_{OUT2} = 300mA, I_{OUT3} = 300mA, Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	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 = 18kΩ, R_2 = 39kΩ		7.7	8.0	8.3	
Input Regulation		Reg1. line	—	7.5V ≦ V_{IN} ≦ 24V		—	20	100	mV
		Reg2. line	—	7.5V ≦ V_{IN} ≦ 20V		—	20	100	
		Reg3. line	—	10.3V ≦ V_{IN} ≦ 20V		—	20	150	
Load Regulation		Reg1. load	—	0mA ≦ I_{OUT1} ≦ 100mA		—	20	100	mV
		Reg2. load	—	5mA ≦ I_{OUT2} ≦ 300mA		—	20	100	
		Reg3. load	—	5mA ≦ I_{OUT3} ≦ 300mA		—	20	100	
				5mA ≦ I_{OUT3} ≦ 1.2A		—	50	—	
Ripple Rejection Ratio		R.R.1	—	V_{in} = 1V_{rms} f = 120Hz	10V ≦ V_{IN} ≦ 24V	60	70	—	dB
		R.R.2	—		11V ≦ V_{IN} ≦ 20V	60	70	—	
		R.R.3	—		12V ≦ V_{IN} ≦ 20V	52	64	—	
Dropout Voltage		V_{D1}	—	V_{IN} = 6V		—	1.8	—	V
		V_{D2}	—	V_{IN} = 6V		—	1.8	—	
		V_{D3}	—	V_{IN} = 8V		—	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	—	μV
		V_{no2}	—			—	230	—	
		V_{no3}	—			—	260	—	
Output Voltage Temperature Coefficient		T_{CVO1}	—	—		—	0.5	—	mV / °C
		T_{CVO2}	—			—	− 1.1	—	
		T_{CVO3}	—			—	− 1.2	—	
Bias Current		I_B	—	I_{OUT1}-0mA, $V_{OUT2, 3}$-OFF		—	0.6	1.2	mA
Reset	Reset Sense Voltage	V_R	—	—		3.4	—	3.75	V
	Hysteresis Voltage	ΔV_H	—	—		—	60	—	mV
	Output Saturation Voltage	V_{sat}	—	R_3 = 510Ω		—	0.3	1.0	V
	Sensing Voltage Temperature Coefficient	Tc VO4	—	—		—	0.5	—	mV / °C
Stand-by Current		I_{Istb}	—	V_1 = 0V, $V_{OUT2, 3}$-OFF		—	180	300	μA
Threshold Voltage		V_{Sstb2}	—	—		1.2	—	3.0	V

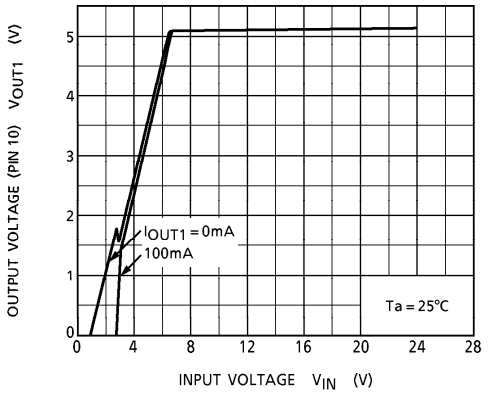
TEST CIRCUIT



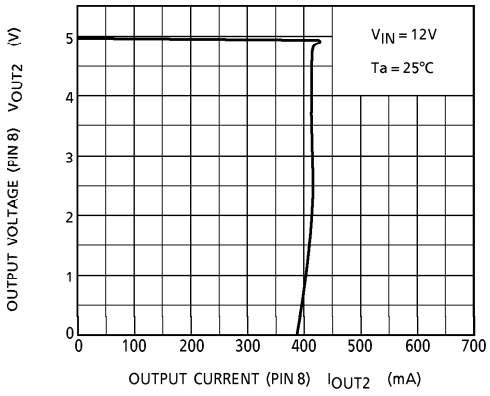
V_{OUT1} – I_{OUT1}



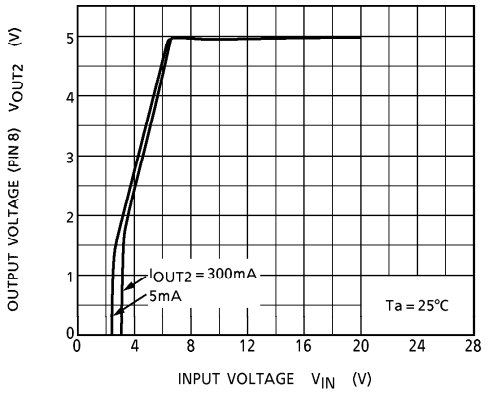
V_{OUT1} – V_{IN}



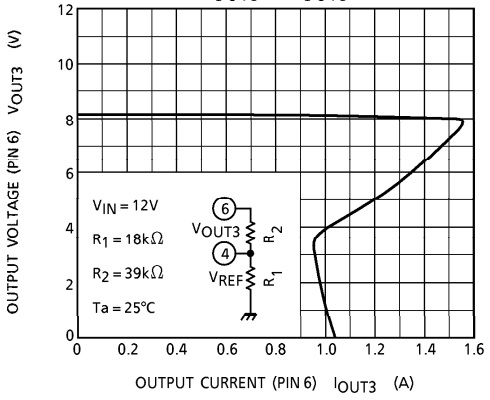
V_{OUT2} – I_{OUT2}



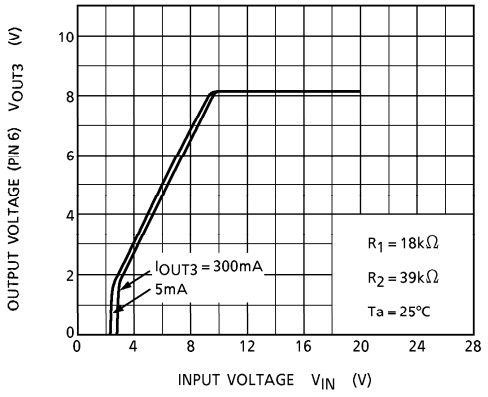
V_{OUT2} – V_{IN}



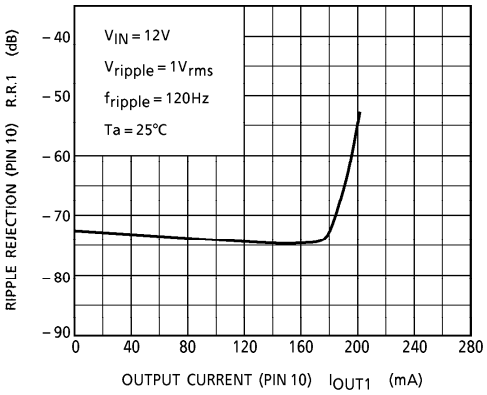
V_{OUT3} – I_{OUT3}



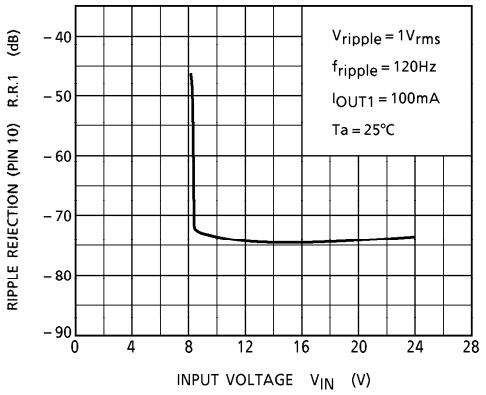
V_{OUT3} – V_{IN}



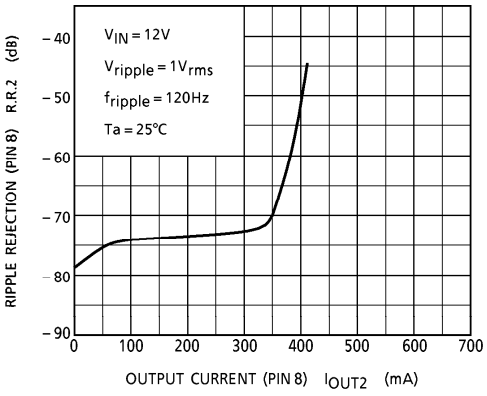
R.R.1 – I_{OUT1}



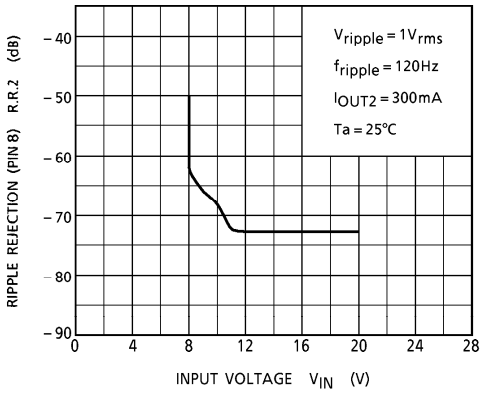
R.R.1 – V_{IN}



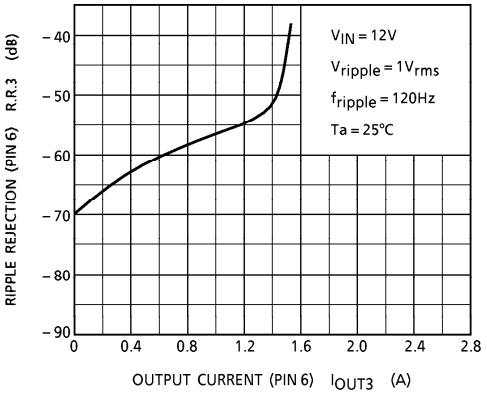
R.R.2 – I_{OUT2}



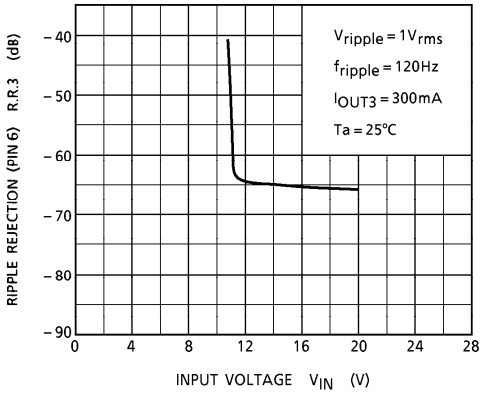
R.R.2 – V_{IN}



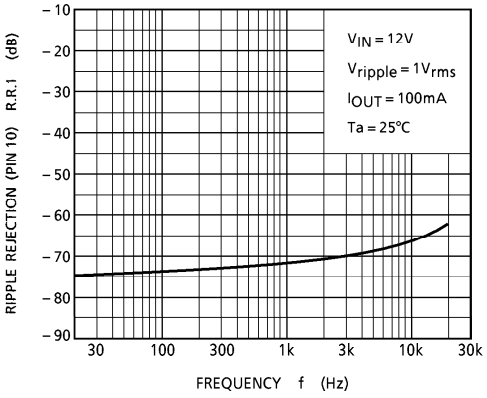
R.R.3 – I_{OUT3}



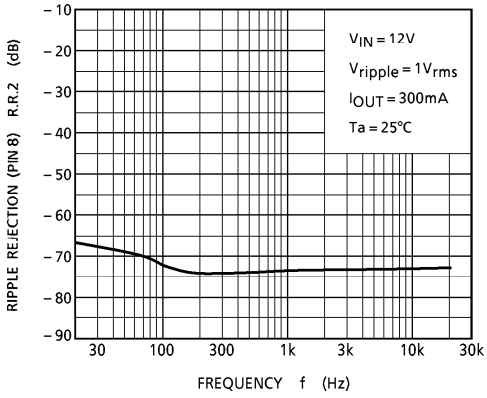
R.R.3 – V_{IN}



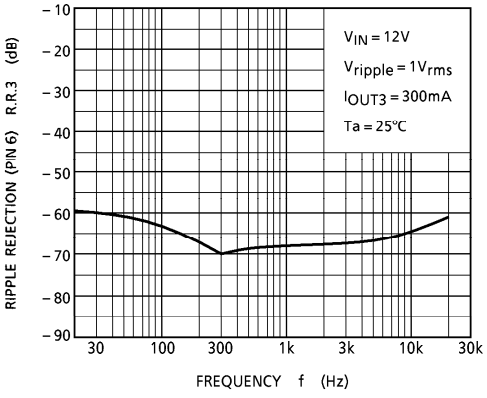
R.R.1 – f



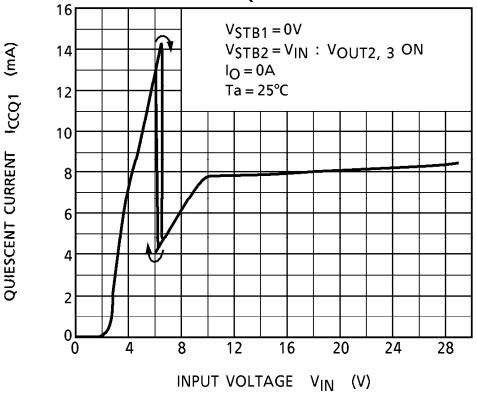
R.R.2 – f



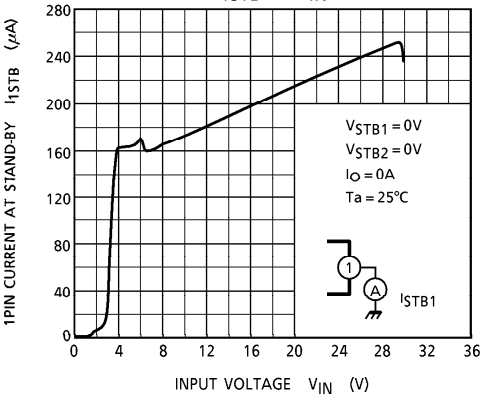
R.R.3 – f



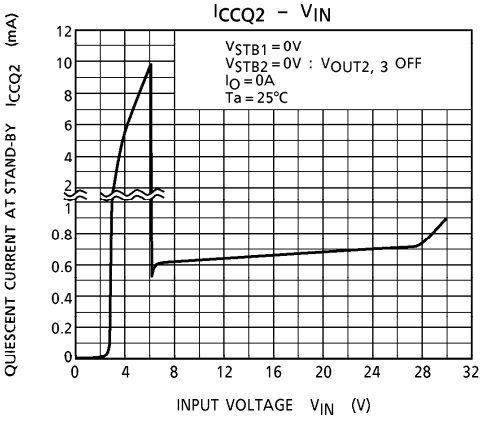
I_{CCQ1} – V_{IN}



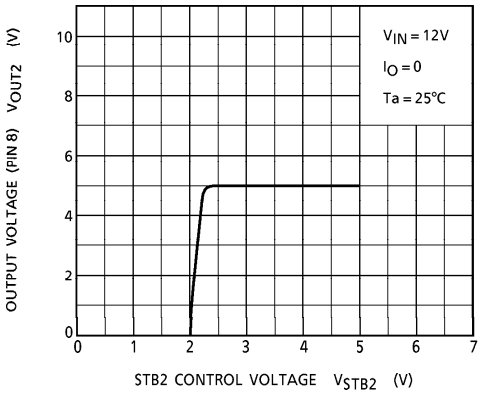
I_{1STB} – V_{IN}



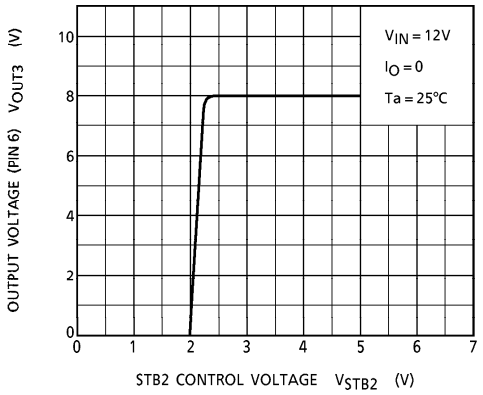
I_{CCQ2} – V_{IN}



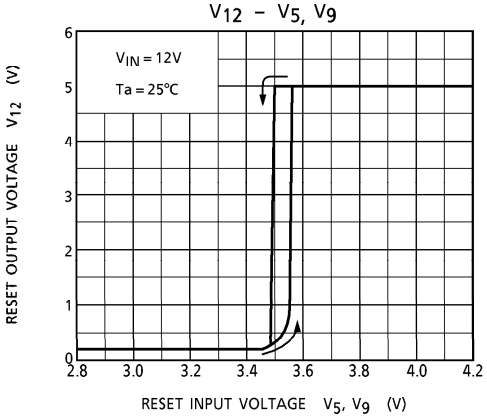
V_{OUT2} – V_{STB2}



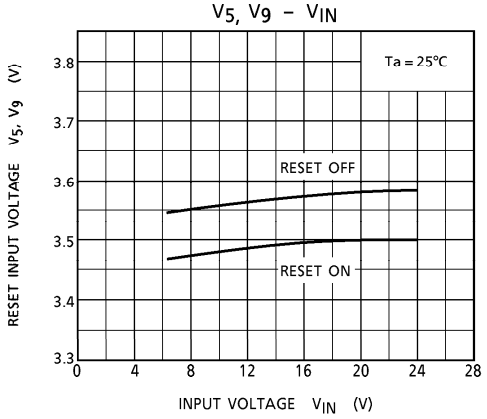
V_{OUT3} – V_{STB2}



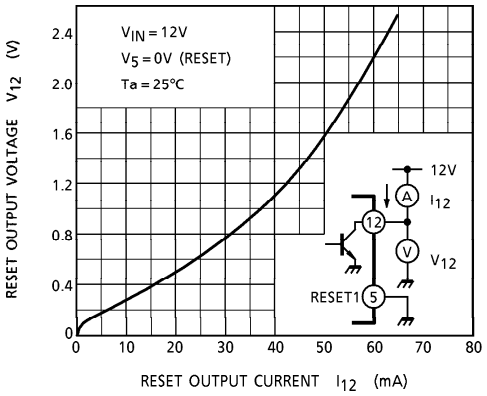
V_{12} – V_5, V_9



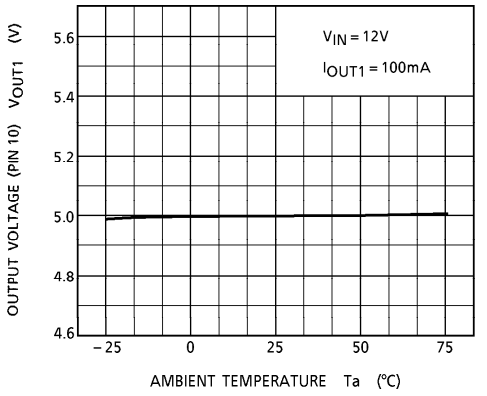
V_5, V_9 – V_{IN}



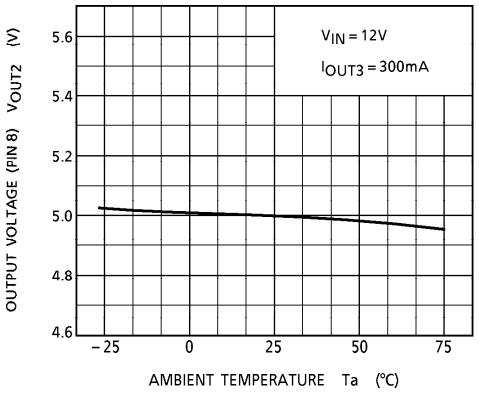
V_{12} – I_{12}



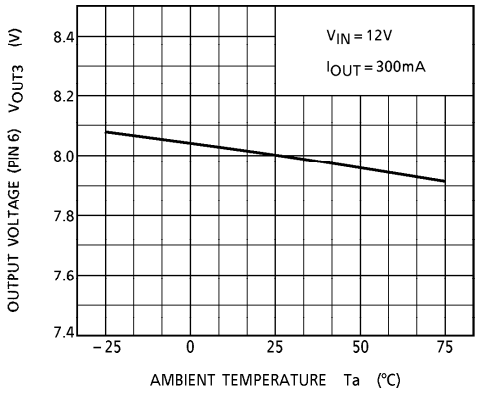
V_{OUT1} – Ta



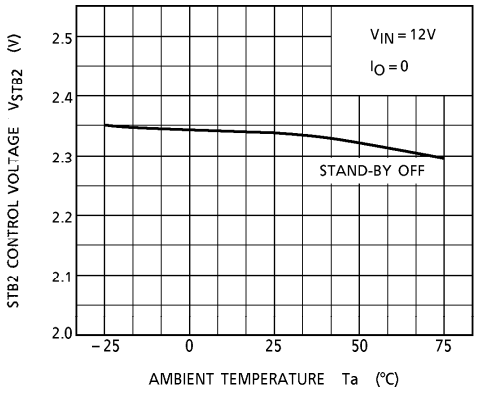
V_{OUT2} – Ta



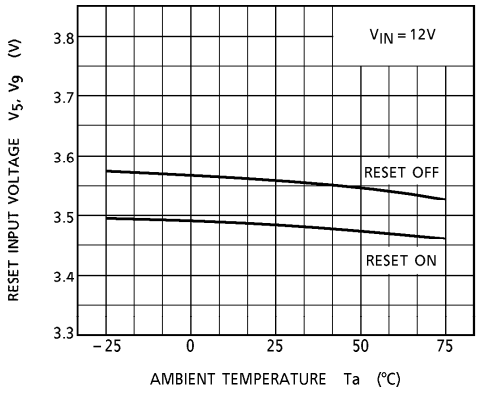
V_{OUT3} – Ta



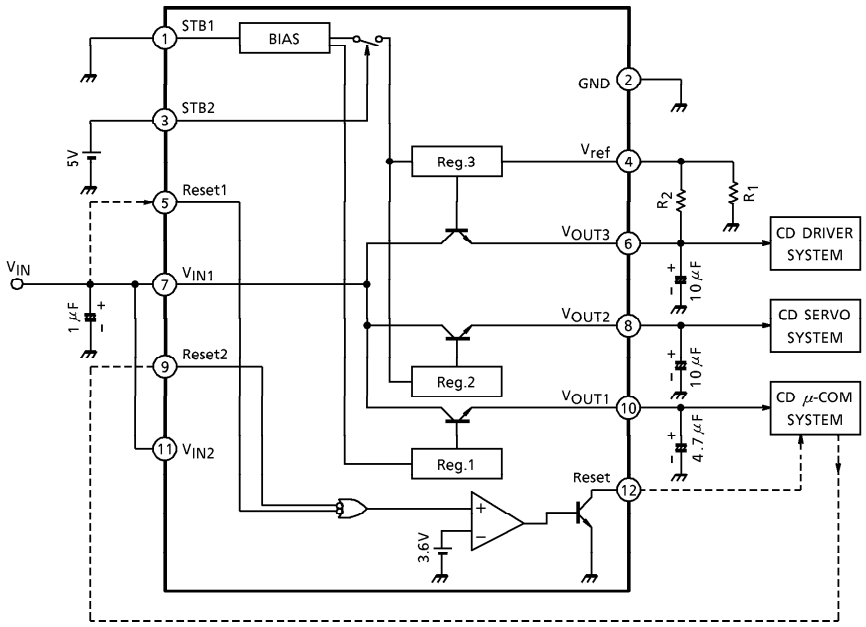
V_{STB2} – Ta



V_5, V_9 – Ta



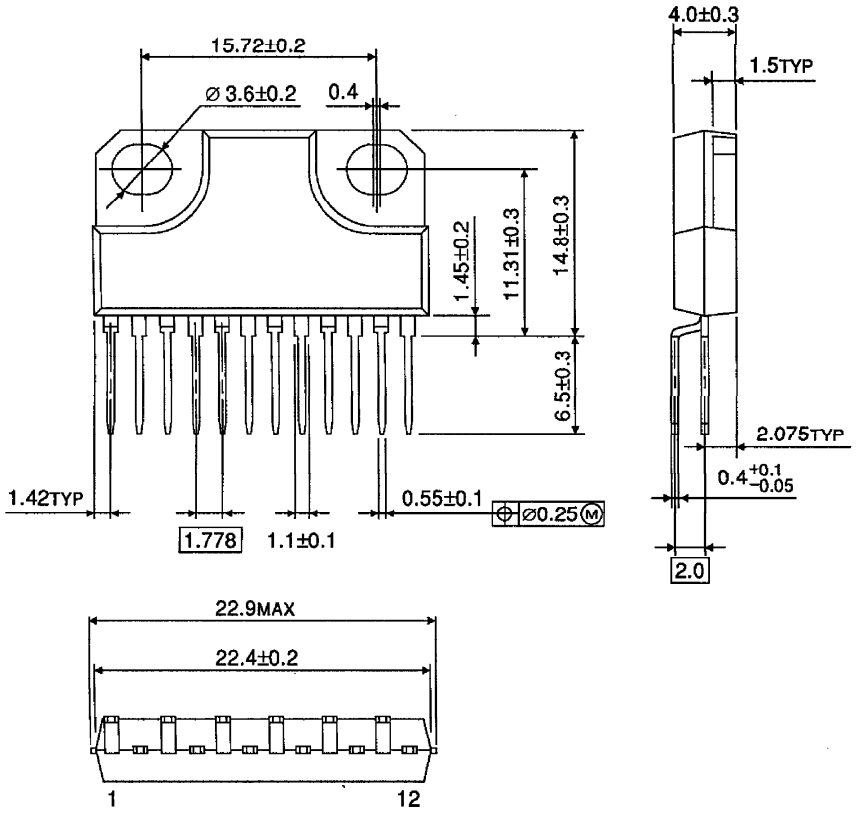
APPLICATION CIRCUIT



OUTLINE DRAWING

HZIP12-P-1.78B

Unit : mm



Weight : 4.04g (Typ.)

TA8224H – 12*
1996-09-02
TOSHIBA CORPORATION