

BA6149LS

Regulator, switching, 6 outputs

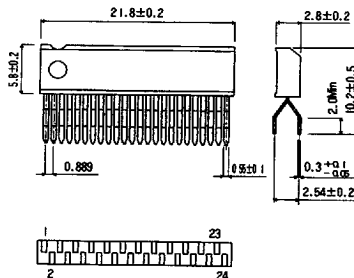
The BA6149LS is an IC that consists of six switching regulator circuits

Features

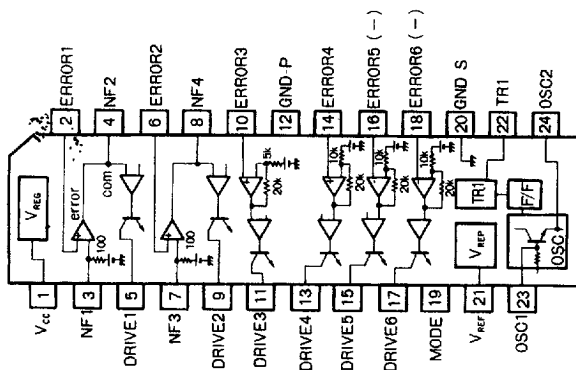
- available in an SZIP24 package
- control circuits for all regulator circuits are contained in the IC
- high efficiency pulse width modulation system is used
- triangular wave generator produces a very clean stable output
- six output voltages
- output voltages can be switched on and off (except 5 V output)

Dimensions (Units : mm)

BA6149LS (SZIP24)



Block diagram



Standard & Memory ICs

ROHM

591

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BA6149LS Voltage regulator—switching**Absolute maximum ratings ($T_a = 25^\circ\text{C}$)**

Parameter	Symbol	Limits	Unit	Conditions
Power supply voltage	V_{CC}	20	V	
Power dissipation	P_d	500	mW	Reduce power by 5 mW/ $^\circ\text{C}$ for each degree above 25°C .
Drive current	I_d	30	mA	
Operational temperature	T_{opr}	$-10 \sim +70$	$^\circ\text{C}$	
Storage temperature	T_{stg}	$-25 \sim +125$	$^\circ\text{C}$	

Electrical characteristics ($T_a = 25^\circ\text{C}$, $V_{CC} = 12\text{ V}$) (Sheet 1 of 2)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Power supply voltage	V_{CC}	8		18	V	
Circuit current	I_{CC}		7	11	mA	
Reference voltage	V_{ref}	2.38	2.53	2.68	V	
Triangular wave oscillation frequency	f_T	100.88	101.88	102.88	kHz	$f_0 = 815\text{ kHz}$
5 V system output voltage	V_{05}	4.7	5.0	5.3	V	$I_L = 227\text{ mA}$
9 V system output voltage	V_{09}	8.60	9.15	9.70	V	$I_L = 100\text{ mA}$
M1 system output voltage	V_{CY}	4.5	5	5.5	V	$I_L = 100\text{ mA}$
M2 system output voltage	V_{CA}	3.0	3.5	4.0	V	$I_L = 50\text{ mA}$
M3 system output voltage	V_{SR}	3.0	3.5	4.0	V	$I_L = 55\text{ mA}$
M4 system output voltage	V_{TR}	3.0	3.5	4.0	V	$I_L = 200\text{ mA}$
M1 input regulation	V_{r1}	40	80	160	mV	$I_L = 100\text{ mA}$, $10 \leq V_{CC} \leq 16$
M2 input regulation	V_{r2}	30	60	120	mV	$I_L = 50\text{ mA}$, $10 \leq V_{CC} \leq 16$
M3 input regulation	V_{r3}	30	60	120	mV	$I_L = 55\text{ mA}$, $10 \leq V_{CC} \leq 16$
M4 input regulation	V_{r4}	30	60	120	mV	$I_L = 200\text{ mA}$, $10 \leq V_{CC} \leq 16$
Low level power-saving mode	V_L	0		1.5	V	
High level power-saving mode	V_H	3.5		6	V	All output voltage $< 0.5\text{ V}$ except for V_{05}
9 V system error amplifier open loop gain	G_{09}	70			dB	
5 V system error amplifier open loop gain	V_{05}	70			dB	
9 V system ripple	R_{p9}		2	5	mV _{pk-pk}	$I_L = 100\text{ mA}$
5 V system ripple	R_{p5}		2	5	mV _{pk-pk}	$I_L = 227\text{ mA}$
M system ripple	R_{PM}		30	50	mV _{pk-pk}	$I_L = 100\text{ mA}$

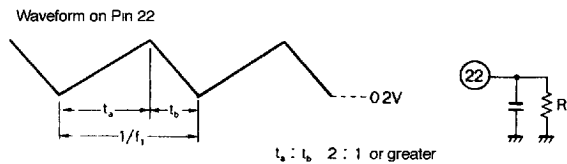
Electrical characteristics ($T_a = 25^\circ\text{C}$, $V_{CC} = 12\text{ V}$) (Sheet 2 of 2)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
9 V system error amplifier closed loop gain	G_{V9}	35	38	41	dB	$R_N = 10\text{ k}\Omega$, $f = 100\text{ kHz}$
5 V system error amplifier closed loop gain	G_{V5}	34.5	37.5	40.5	dB	$R_N = 10\text{ k}\Omega$, $f = 100\text{ kHz}$
9 V system error amplifier phase characteristics	ϕ_9		55	70	deg	$f = 100\text{ kHz}$
5 V system error amplifier phase characteristics	ϕ_5		55	70	deg	$f = 100\text{ kHz}$

Precautions for use**Oscillation frequency**

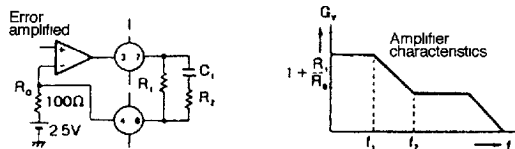
The maximum oscillation frequency (f_{OMax}) is about 850 kHz. The actual triangular frequency (f_T) is $f_O/8$.

Make sure to set the resistance R_T such that in the triangular wave, $t_a \geq 67\%$, as shown in the figure below.

**DC gain**

The 5 V and 9 V system error amplifier DC gain is determined by the feedback resistor (R_1).

Make sure to use a resistor such that $10\text{ k}\Omega \leq R_1 \leq 100\text{ k}\Omega$.

**Error amplifier**

The motor system error amplifier DC gain is set internally as follows:

$$G_{\text{OM}1} \cong 14\text{ dB}, G_{\text{OM}2} \cong 10\text{ dB}, G_{\text{OM}3} = G_{\text{OM}4} \cong 10\text{ dB},$$

For the M3 and M4 systems, the input/output phase characteristics run in reverse.



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