

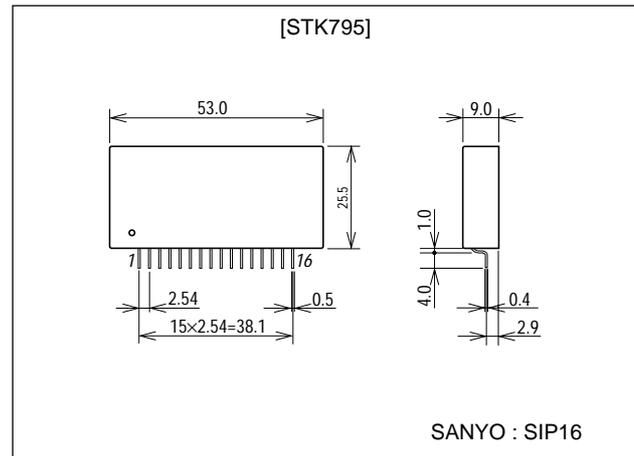
**STK795****Chopper Type Voltage Regulator****Features**

- Self-oscillation type chopper regulator power IC using Sanyo's original IMST (Insulated Metal Substrate Technology) substrate.
- The STK795, being a 5V chopper IC, is more advantageous in the following points as compared with series regulator (dropper type) ICs.
 1. Possible to provide a 5V output power supply circuit with high efficiency.
 2. Since the input voltage range is wide, no more than one rectifying/smoothing circuit is required to provide a multi-output power supply circuit which also delivers 12V or 24V output.
- Functional trimming is used to set 5V output with high accuracy.
- Cutoff function to cut off output voltage by external signal.
- Contains a transistor for overcurrent protector (foldback characteristic) and possible to set the protection level externally.

Package Dimensions

unit:mm

4063A

**Specifications****Maximum Ratings** at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum DC Input Voltage	$V_{in(DC) \max}$		40	V
Maximum Output Current	$I_O \max$		3	A
Operating Substrate Temperature	T_c		105	$^\circ\text{C}$
Junction Temperature	T_j		150	$^\circ\text{C}$
Storage temperature	T_{stg}		-30 to +105	$^\circ\text{C}$

Operating Characteristics at $T_a = 25^\circ\text{C}$, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Voltage	V_O	$V_{IN}=12\text{V}, I_O=1.5\text{A}$	4.9	5.0	5.1	V
Line Regulation		$V_{IN}=10 \text{ to } 15\text{V}, I_O=1.5\text{A}$		70	100	mV
Load Regulation		$V_{IN}=12\text{V}, I_O=0.5 \text{ to } 3\text{A}$		30	60	mV
Efficiency		$V_{IN}=12\text{V}, I_O=1.5\text{A}$		72		%
Frequency	f	$V_{IN}=12\text{V}, I_O=1.5\text{A}$		35		kHz
Temperature Coefficient		$V_{IN}=12\text{V}, I_O=1.5\text{A}$		1		mV/ $^\circ\text{C}$

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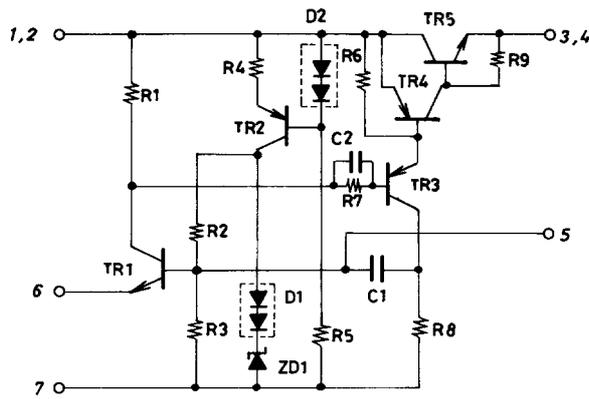
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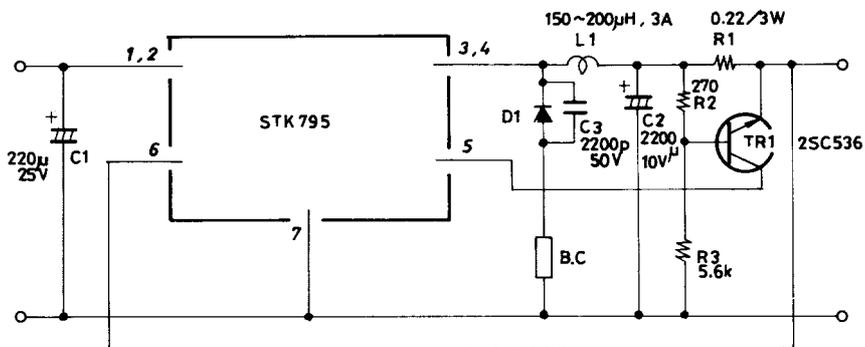
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STK795

Equivalent Circuit



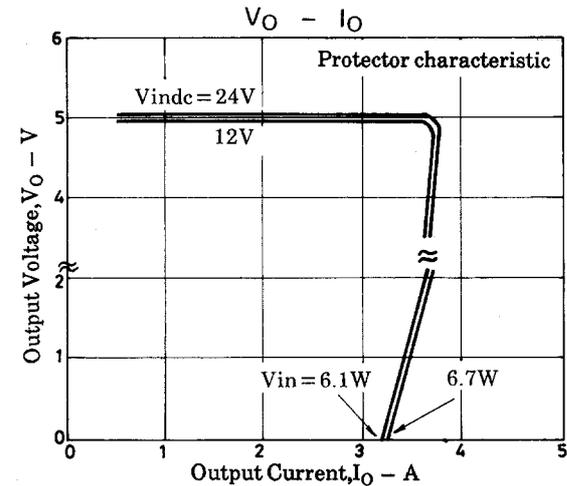
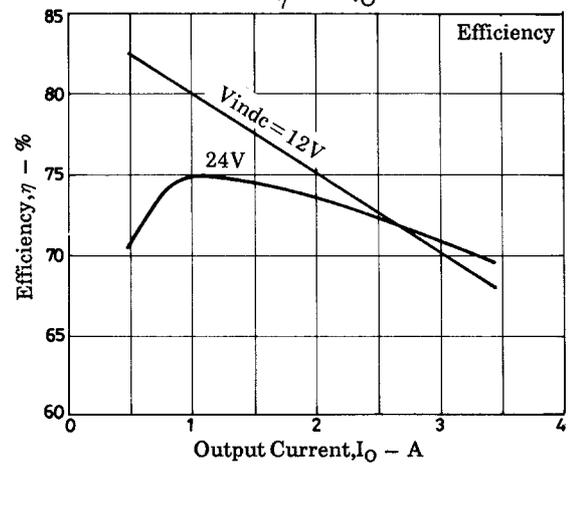
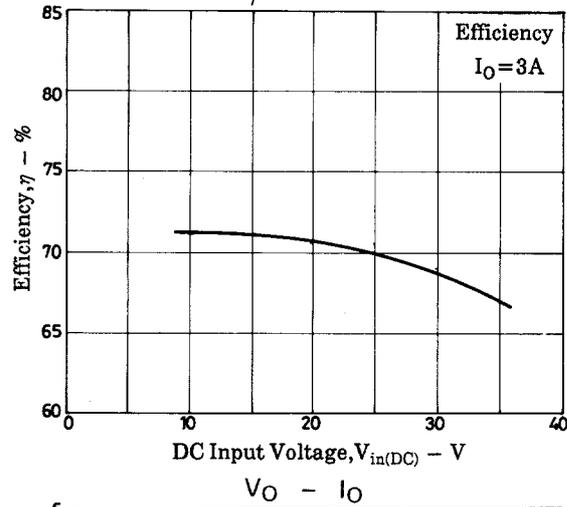
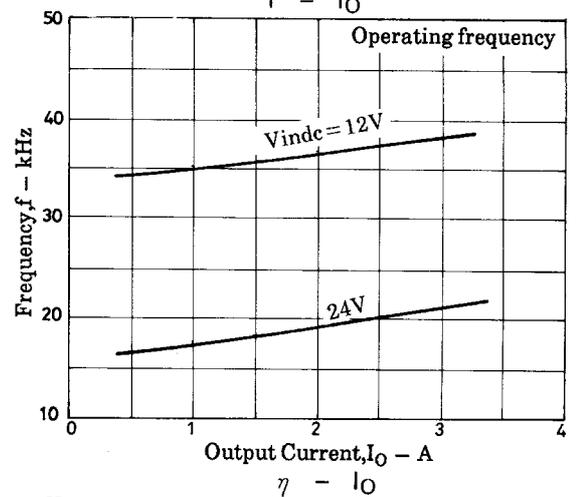
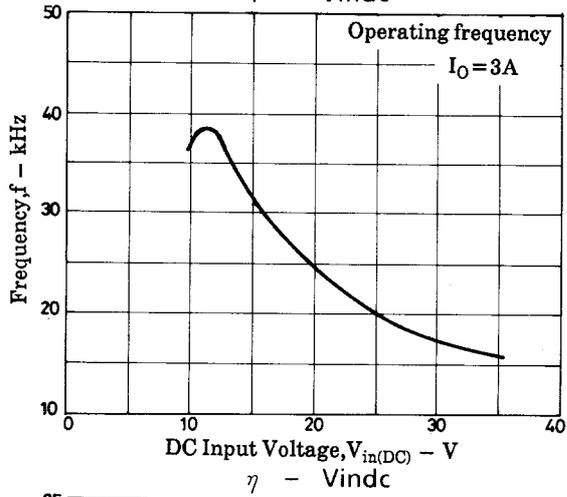
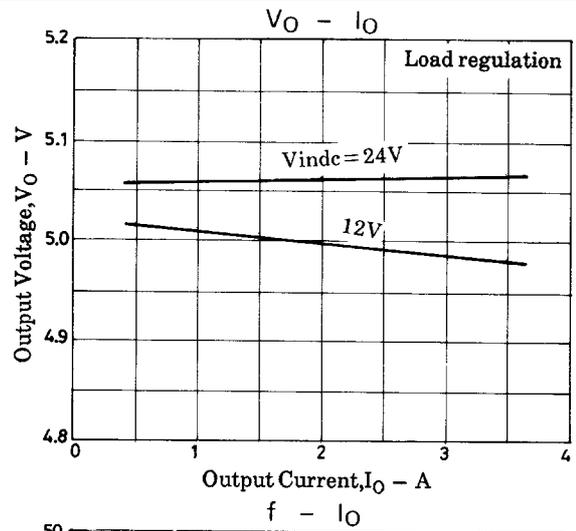
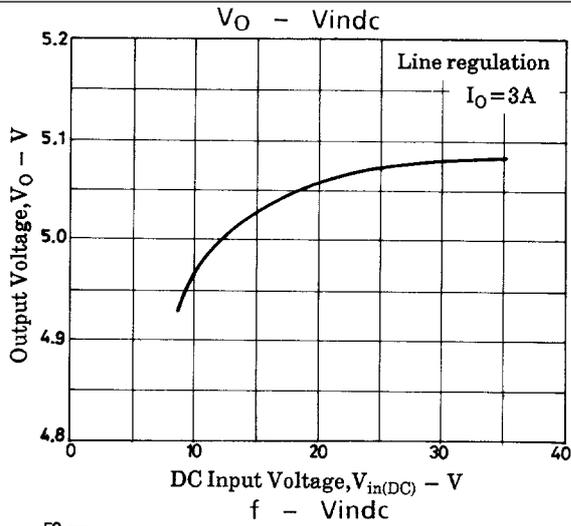
Test Circuit



Unit (resistance: Ω, capacitance: F)

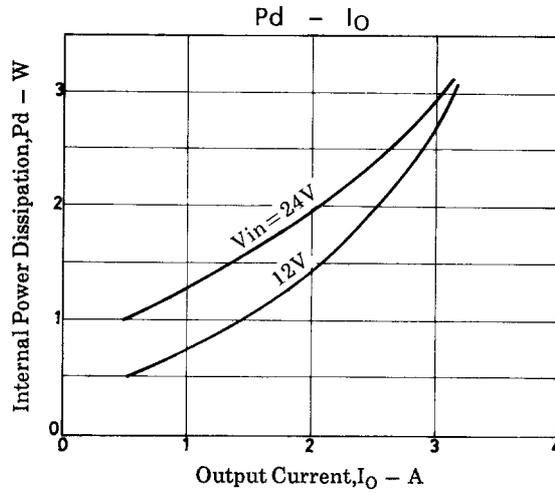
- Note)
- D1 : Schottky barrier diode SB40-05.
 - B. C. : Beads core, 2 to 3µH.
 - C3, B. C. are used to reduce switching spike noise.
 - TR1 is used to provide overcurrent protection.
If no protection is required, remove TR1.
 - A current of 0.5A min. must flow in the load.

STK795



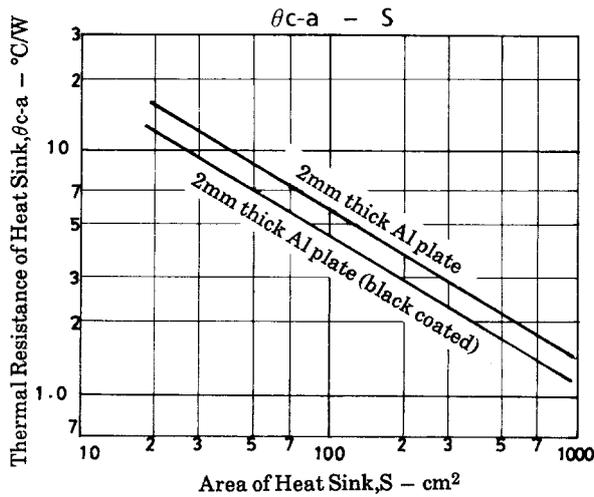
Thermal Design

The total internal power dissipation in the IC is related to the output current as shown below. Assuming $V_{in(DC)}=12V$, output current=3A, the total internal power dissipation is 2.7W.



Assuming that the IC case temperature (Al plate) is 85°C (Tc max=105°C) and the temperature inside equipment is 60°C max., the thermal resistance required of the heat sink is as shown below.

$$\theta_{c-a} = \frac{85^{\circ}C - 60^{\circ}C}{2.7W} = 9.3^{\circ}C/W$$



For 2mm thick Al plate (black coated), the area is 30cm². (55×55×2t)

Junction temperature Tj of the power transistor which forms a main heat source is calculated as follows :

The thermal resistance of the power transistor is : $\theta_{j-c}=6.2^{\circ}C/W$

Therefore, Tj is calculated using $T_j = P_d \times \theta_{j-c} + T_c$.

$$T_j = 2.7W \times 6.2^{\circ}C/W + 85^{\circ}C = 101.7^{\circ}C$$

Since the actual thermal resistance of the heat sink greatly depends on various conditions such as the layout of equipment or ventilation, allow an ample margin in thermal design.

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