

**SANYO**

No.1709C

**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.

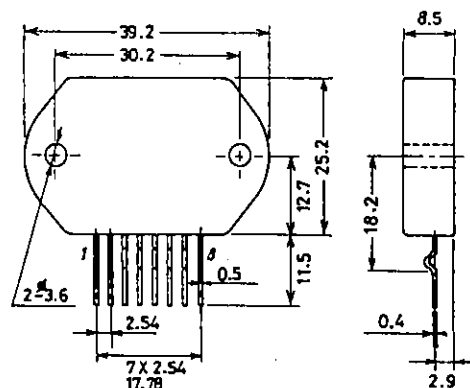
**Maximum Ratings at Ta = 25°C**

|                            |                   |             | unit |
|----------------------------|-------------------|-------------|------|
| Maximum DC Input Voltage   | $V_{in(DC) \max}$ | 40          | V    |
| Maximum Output Current     | $I_O \max$        | 3           | A    |
| Operating Case Temperature | $T_c$             | 105         | °C   |
| Junction Temperature       | $T_j$             | 150         | °C   |
| Storage Temperature        | $T_{stg}$         | -30 to +105 | °C   |

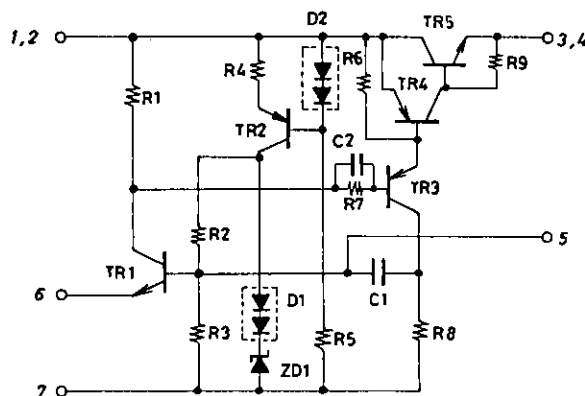
**Operating Characteristics at Ta = 25°C, See specified Test Circuit.**

|                         |       |                                        | min | typ | max | unit  |
|-------------------------|-------|----------------------------------------|-----|-----|-----|-------|
| Output Voltage          | $V_O$ | $V_i = 12V, I_O = 1.5A$                | 4.9 | 5.0 | 5.1 | V     |
| Line Regulation         |       | $V_i = 10 \text{ to } 15V, I_O = 1.5A$ |     | 70  | 100 | mV    |
| Load Regulation         |       | $V_i = 12V, I_O = 0.5 \text{ to } 3A$  |     | 30  | 60  | mV    |
| Efficiency              |       | $V_i = 12V, I_O = 1.5A$                |     | 72  |     | %     |
| Frequency               | f     | $V_i = 12V, I_O = 1.5A$                |     | 35  |     | kHz   |
| Temperature Coefficient |       | $V_i = 12V, I_O = 1.5A$                |     | 1   |     | mV/°C |

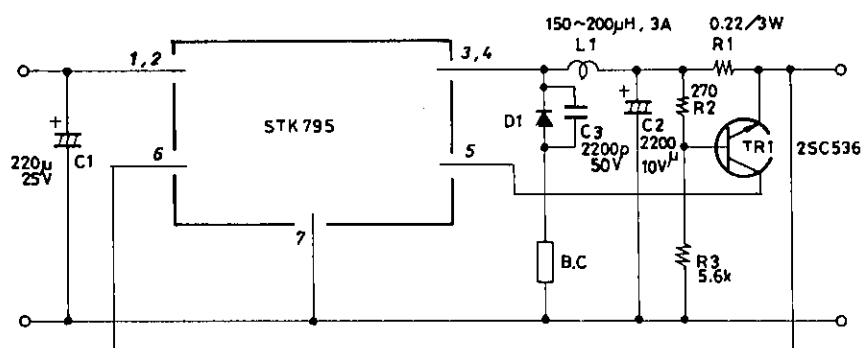
**Package Dimensions 4063A**  
(unit: mm)



## Equivalent Circuit



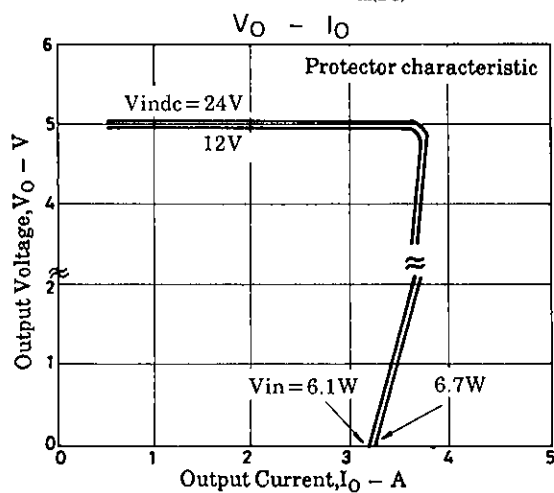
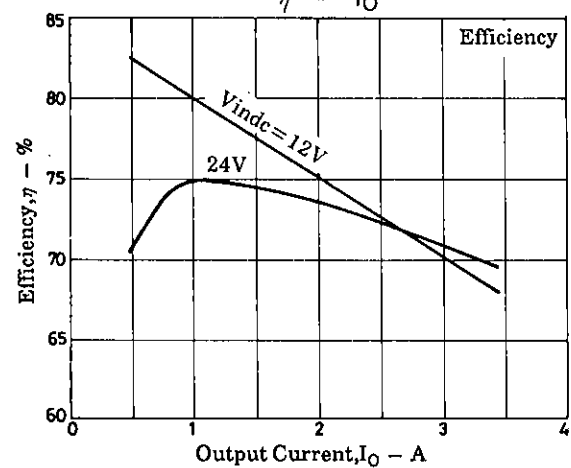
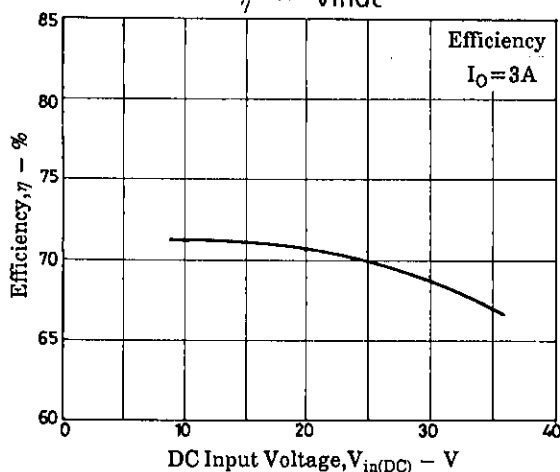
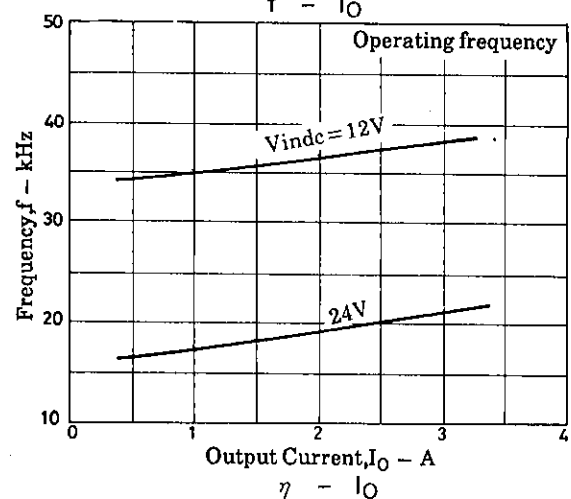
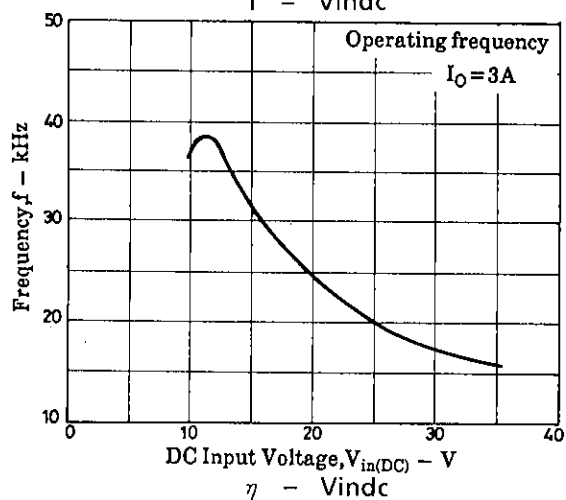
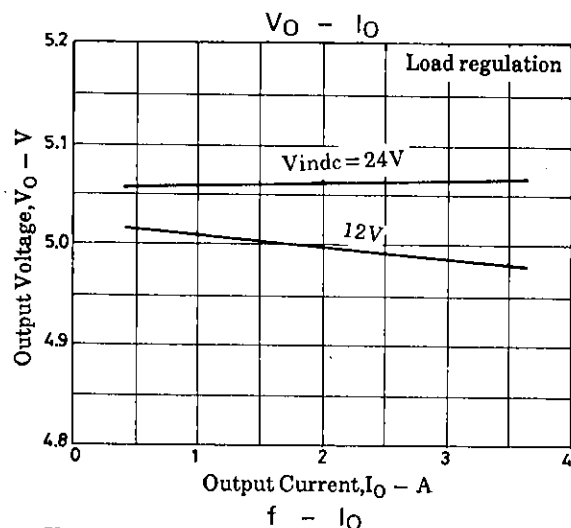
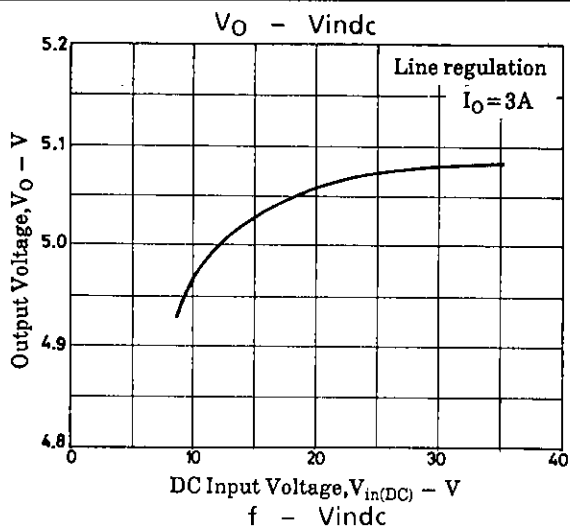
## Test Circuit



Unit (resistance:  $\Omega$ , capacitance: F)

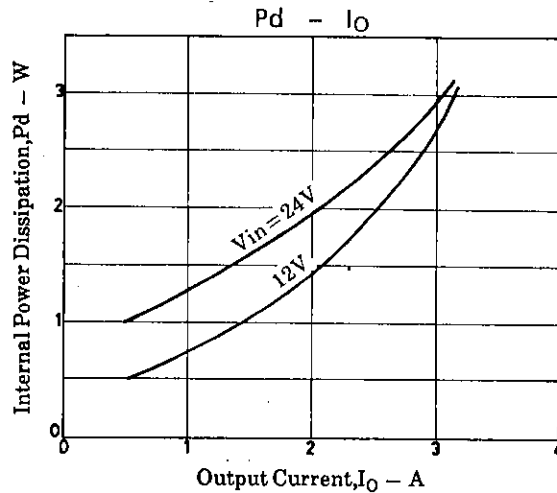
- Note) · D1 : Schottky barrier diode SB40-05  
 · B.C. : Beads core, 2 to  $3\mu\text{H}$   
 · C3, B.C. are used to reduce switching spike noise.  
 · TR1 is used to provide overcurrent protection.  
 If no protection is required, remove TR1.  
 · A current of 0.5A min. must flow in the load.

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### Thermal Design

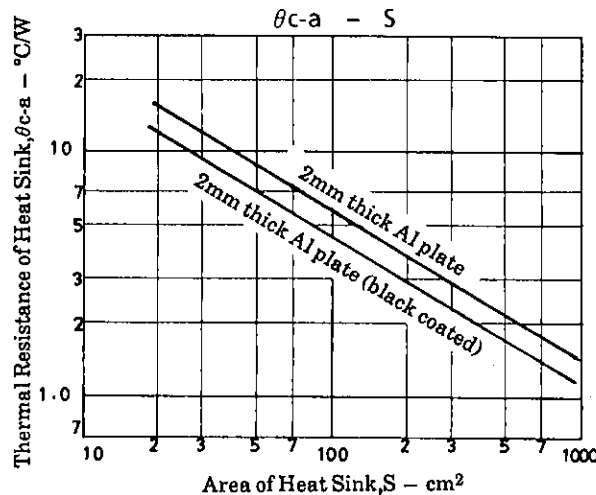
The total internal power dissipation in the IC is related to the output current as shown below. Assuming  $V_{in(DC)} = 12V$ , output current = 3A, the total internal power dissipation is 2.7W.



Assuming that the IC case temperature (Al plate) is  $85^\circ C$  ( $T_c \text{ max} = 105^\circ C$ ) and the temperature inside equipment is  $60^\circ C$  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  $30cm^2$ . ( $55 \times 55 \times 2t$ )

Junction temperature  $T_j$  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,  $T_j$  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.