

### 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.

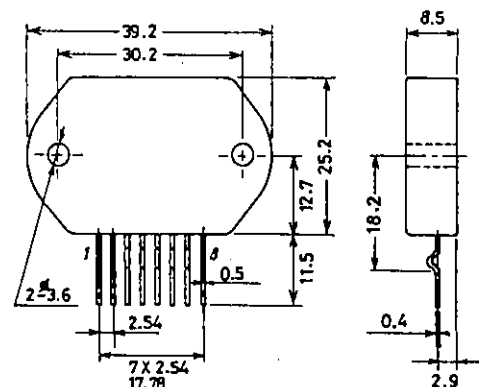
### Maximum Ratings at $T_a = 25^\circ\text{C}$

|                            |                          |             | unit             |
|----------------------------|--------------------------|-------------|------------------|
| Maximum DC Input Voltage   | $V_{in(DC)} \text{ max}$ | 40          | V                |
| Maximum Output Current     | $I_O \text{ max}$        | 3           | A                |
| Operating Case 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.

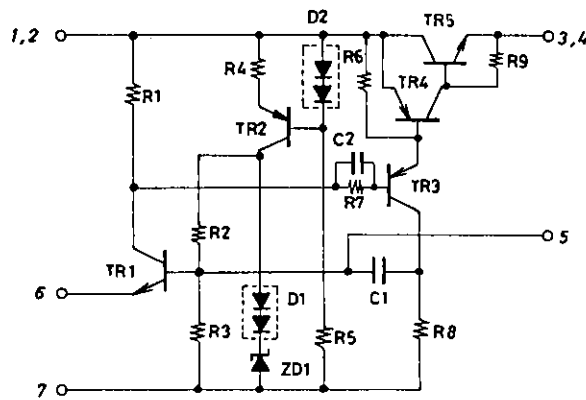
|                         |       |  | min | typ | max | unit                 |
|-------------------------|-------|--|-----|-----|-----|----------------------|
| Output Voltage          | $V_O$ | $V_i = 12\text{V}, I_O = 1.5\text{A}$                | 4.9 | 5.0 | 5.1 | V                    |
| Line Regulation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

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

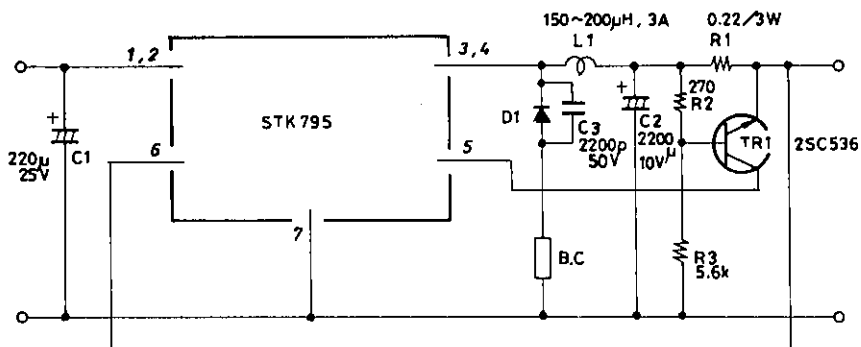


# STK795

## Equivalent Circuit



## Test Circuit



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

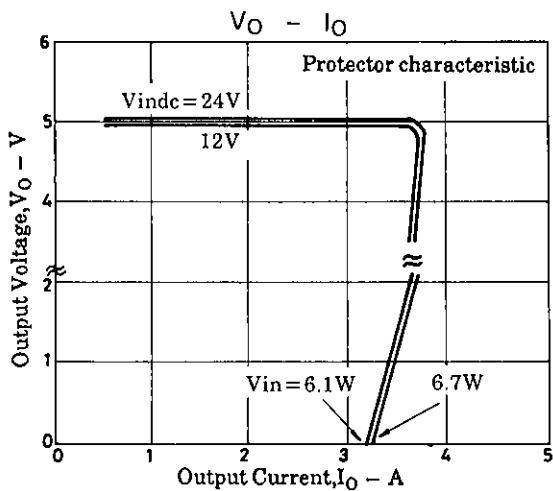
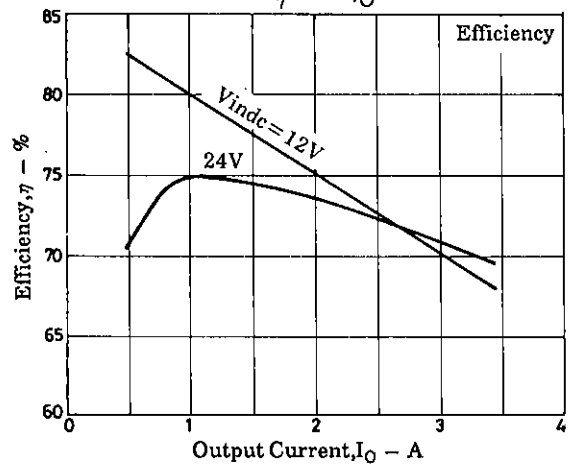
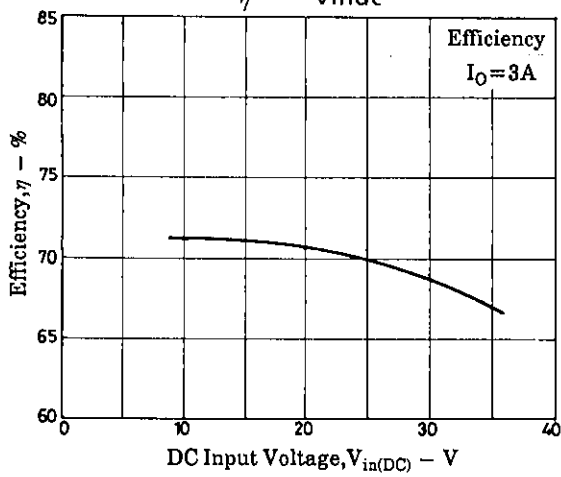
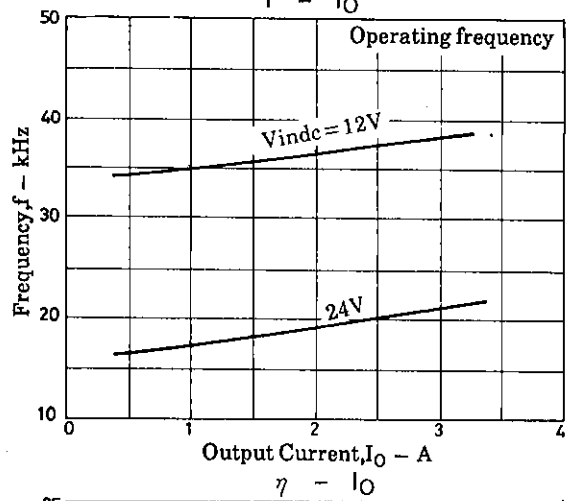
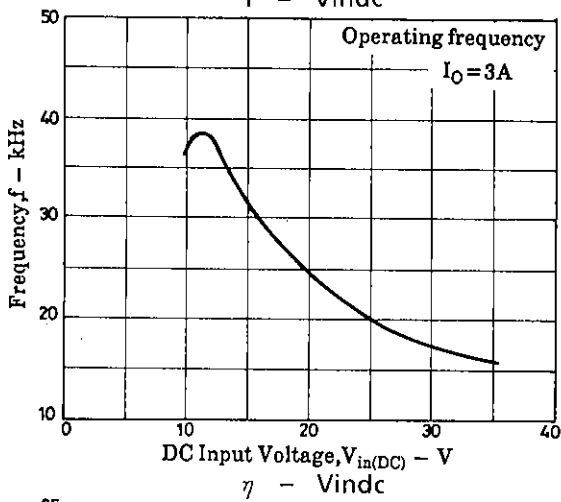
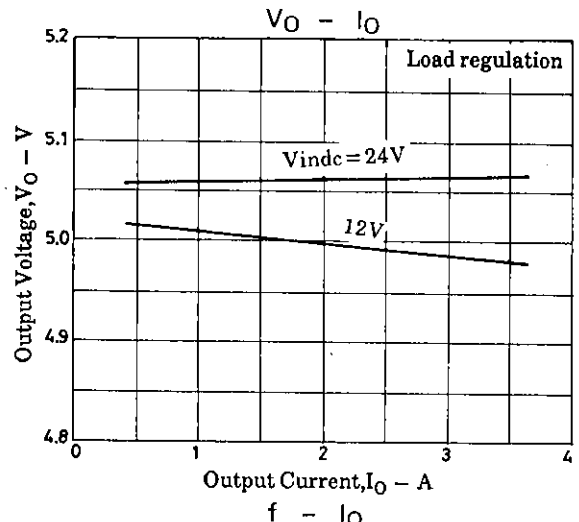
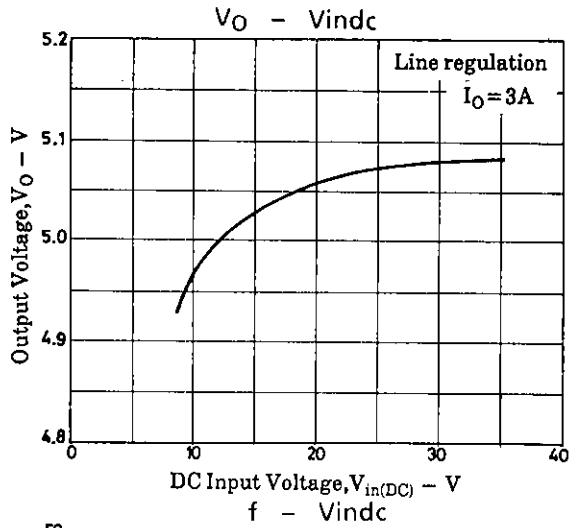
- Note) · D1 : Schottky barrier diode SB40-05  
 · B.C. : Beads core, 2 to 3 $\mu$ H  
 · C3, B.C. are used to reduce switching spike noise.  
 · TR1 is used to provide overcurrent protection.  
 If no protection is required, remove TR1.  
 · A current of 0.5A min. must flow in the load.

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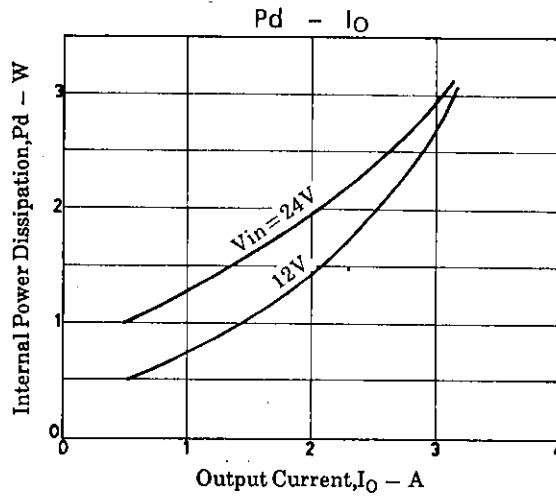
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**Thermal Design**

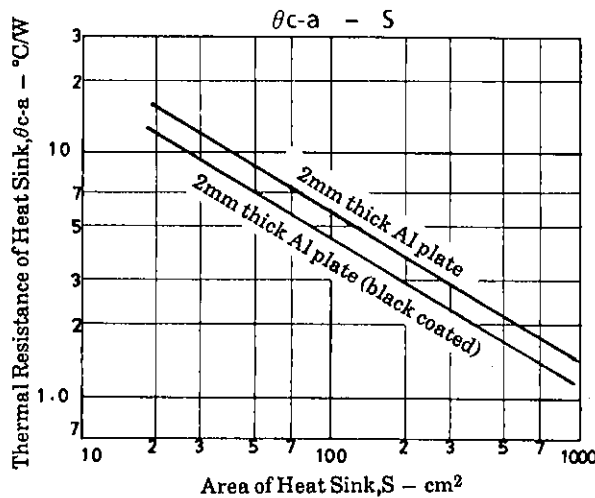
The total internal power dissipation in the IC is related to the output current as shown below. Assuming  $V_{in(DC)} = 12V$ , output current = 3A, the total internal power dissipation is 2.7W.



Assuming that the IC case temperature (Al plate) is 85°C ( $T_c \text{ max} = 105^\circ\text{C}$ ) and the temperature inside equipment is 60°C max., the thermal resistance required of the heat sink is as shown below.

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

$$= 9.3^\circ\text{C/W}$$



For 2mm thick Al plate (black coated), the area is 30cm<sup>2</sup>. (55 × 55 × 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 :  $\theta_{j-c} = 6.2^\circ\text{C/W}$

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

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

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.