

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.

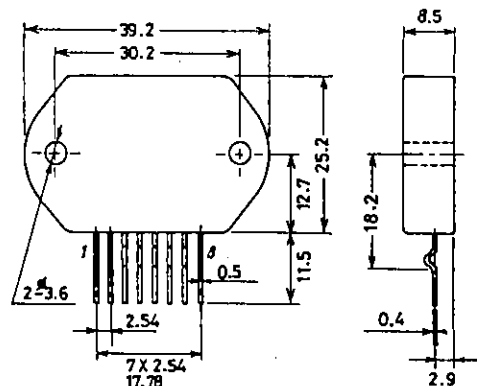
Maximum Ratings at Ta = 25°C

			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

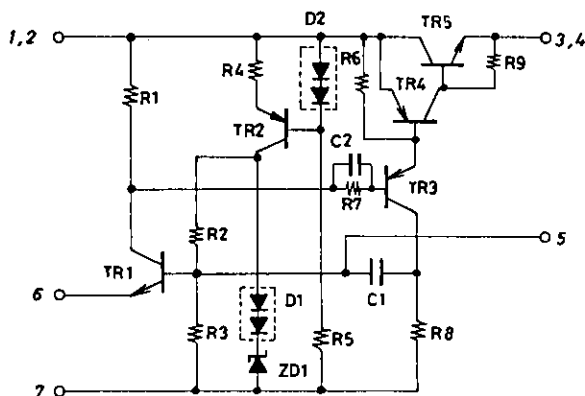
Operating Characteristics at Ta = 25°C, See specified Test Circuit.

			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

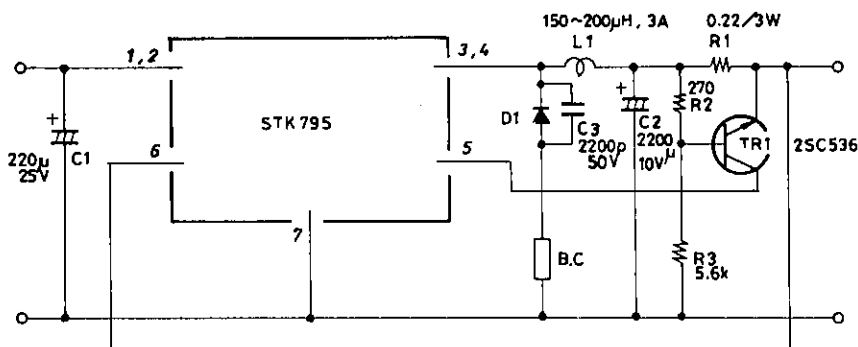
Package Dimensions 4063A
(unit : mm)



Equivalent Circuit



Test Circuit



Unit (resistance: Ω, capacitance: F)

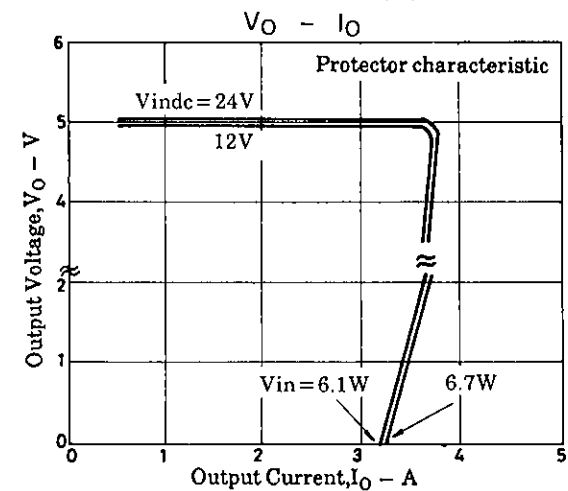
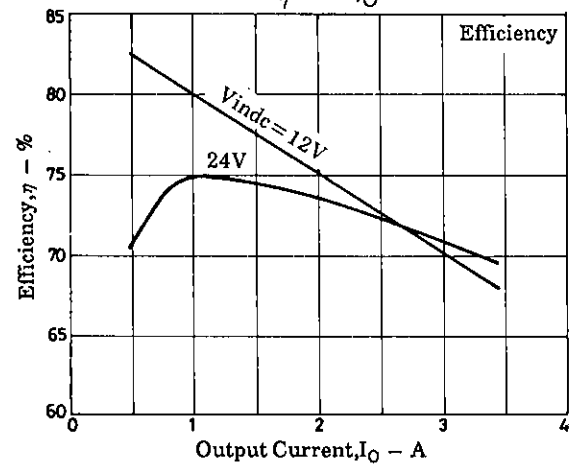
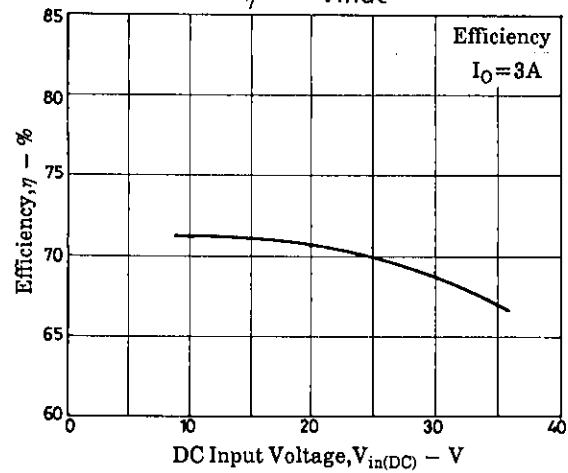
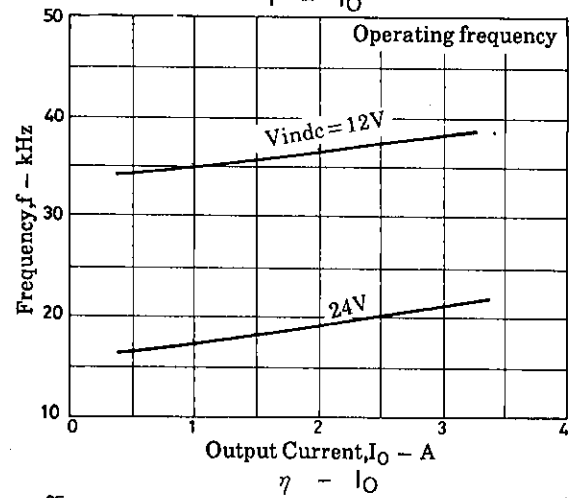
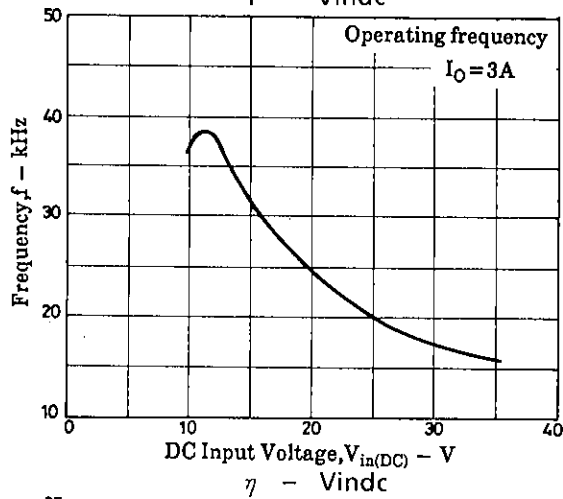
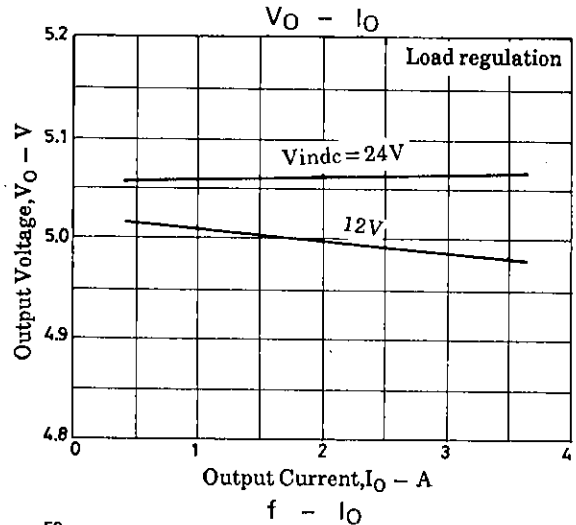
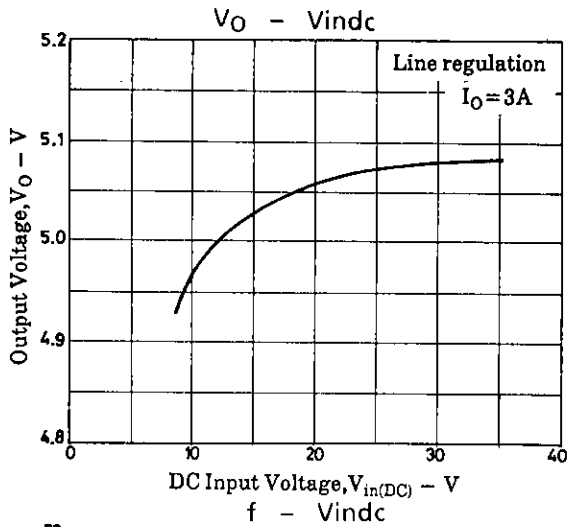
- Note) · D1 : Schottky barrier diode SB40-05
 · B.C. : Beads core, 2 to 3µH
 · C3, B.C. are used to reduce switching spike noise.
 · TR1 is used to provide overcurrent protection.
 If no protection is required, remove TR1.
 · A current of 0.5A min. must flow in the load.

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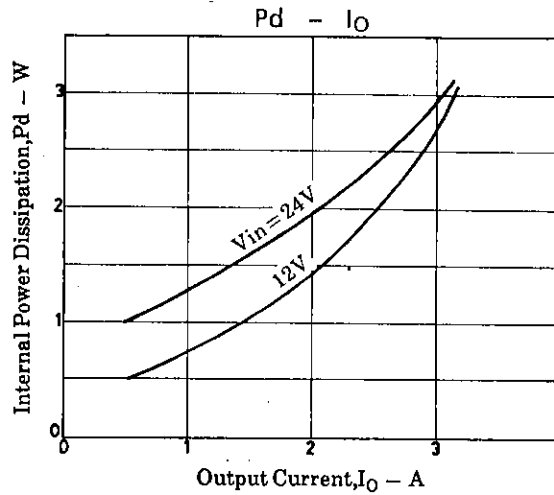
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Thermal Design

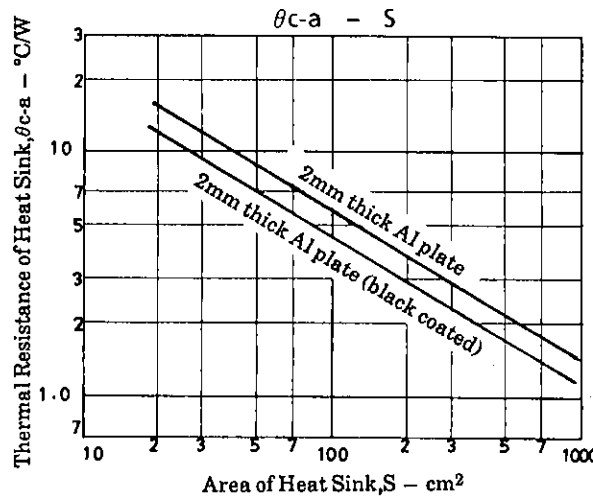
The total internal power dissipation in the IC is related to the output current as shown below. Assuming $V_{in(DC)} = 12V$, output current = 3A, the total internal power dissipation is 2.7W.



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 30cm². (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.