

SANKEN SWITCHING REGULATOR HYBRID IC

Type: STR-S6301

1. Scope:

The present specifications shall only apply to Sanken Switching Regulator Hybrid IC, type STR-S6301.

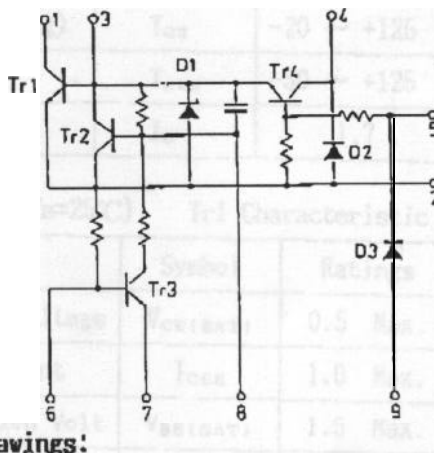
2. General

2.1 Category: Hybrid IC incorporated with a 3-layer Silicon Transistor,

2.2 Construction: Plastic Mold Package (Transfer Mold).

2.3 Application: Direct control, R.C.C. type Switching Regulator featuring Drive Circuit and the Over Current Protection. (using Photo Coupler as primary/secondary isolation element)

3. Equivalent Circuit



- 1. Collector
- 2. Emitter/Common (Power Tr.)
- 3. Base
- 4. Drive Control
- 5. Current Detector
- 6. Current Detector Base
- 7. Earth/Current Detector
- 8. Drive Tr2 Base
- 9. Photo Coupler (-)

4. Appearance and Outline Drawings:

4.1 Appearance

The body shall be clean and shall not bear any stain, rust or flaw.

4.2 Outline Drawings

Refer to Page 9.

4.3 Marking

The type number and lot number shall be legitimately be marked by laser printing. Refer to Page 9.

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**5. Maximum Ratings (Ta=25°C)**

Description	Symbol	Rating	Unit	Conditions
Tr1 Collector-Emitter Voltage	$V_{CEX}$	500	V	※1
Pin# 4-2 Applying Voltage	$V_{2-4}$	12	V	
Pin# 2-5 Applying Voltage	$V_{2-5}$	12	V	
Pin# 5-9 Applying Voltage	$V_{5-4}$	30	V	
Pin# 7-6 Applying Voltage	$V_{7-6}$	5	V	
Tr1 Collector Current	$I_{C(Tr1)}$	10(Pulse:20)	A	※2
Tr4 Collector Current	$I_{C(Tr4)}$	500	mA	
D2 Forward Current	$I_{IN(D2)}$	500	mA	
D3 Forward Current	$I_{IN(D3)}$	100	mA	
Max. Power Dissipation	$P_d$	3.2	W	No fin ※3
		2.7		$T_d = 100^\circ\text{C}$ ※3
Tr1 Junction Temperature	$T_j$	+150	°C	
Frame Temperature (Operating)	$T_{c2}$	-20 ~ +125	°C	※4
Storage Temperature	$T_{stg}$	-30 ~ +125	°C	
Max. Output Current	$I_d$	1.7	A	$V_o = 115V$ ※5

**8. Electrical Characteristic (Ta=25°C) Tr1 Characteristic**

Description	Symbol	Rating	Unit	Conditions
Collector Saturation Voltage	$V_{CE(SAT)}$	0.5 Max.	V	$I_d = 6A, I_B = 1.2A$
Collector Cut-Off Current	$I_{CEX}$	1.0 Max.	mA	$V_{CE} = 500V, V_{BE} = -1.5V$
Base-Emitter Saturation Volt;	$V_{BE(SAT)}$	1.5 Max.	V	$I_d = 6A, I_B = 1.2A$
DC Current Gain	$h_{FE}$	15~40		$V_{CE} = 4V, I_C = 1A$
Thermal Resistance	$\theta_{j-c2}$	0.7	°C/W	Junction~Internal Frame
Switching Time	$t_d$	10 Max.	µs	Measuring Circuit #1
	$t_r$	0.6 Max.		

※1 : Reference  $V_{CE0} = 400V$  Min.

※2 : The Pulse applies to the condition of Reverse Bias ASO curve.

※3 :  $T_{c1}$  denotes the temperature of resin beneath the Power Transistor.

※4 :  $T_{c2}$  denotes the internal frame temperature. Recommended  $T_{c2} = 100^\circ\text{C}$ .

※5 : Refer to the Real Operating Circuit

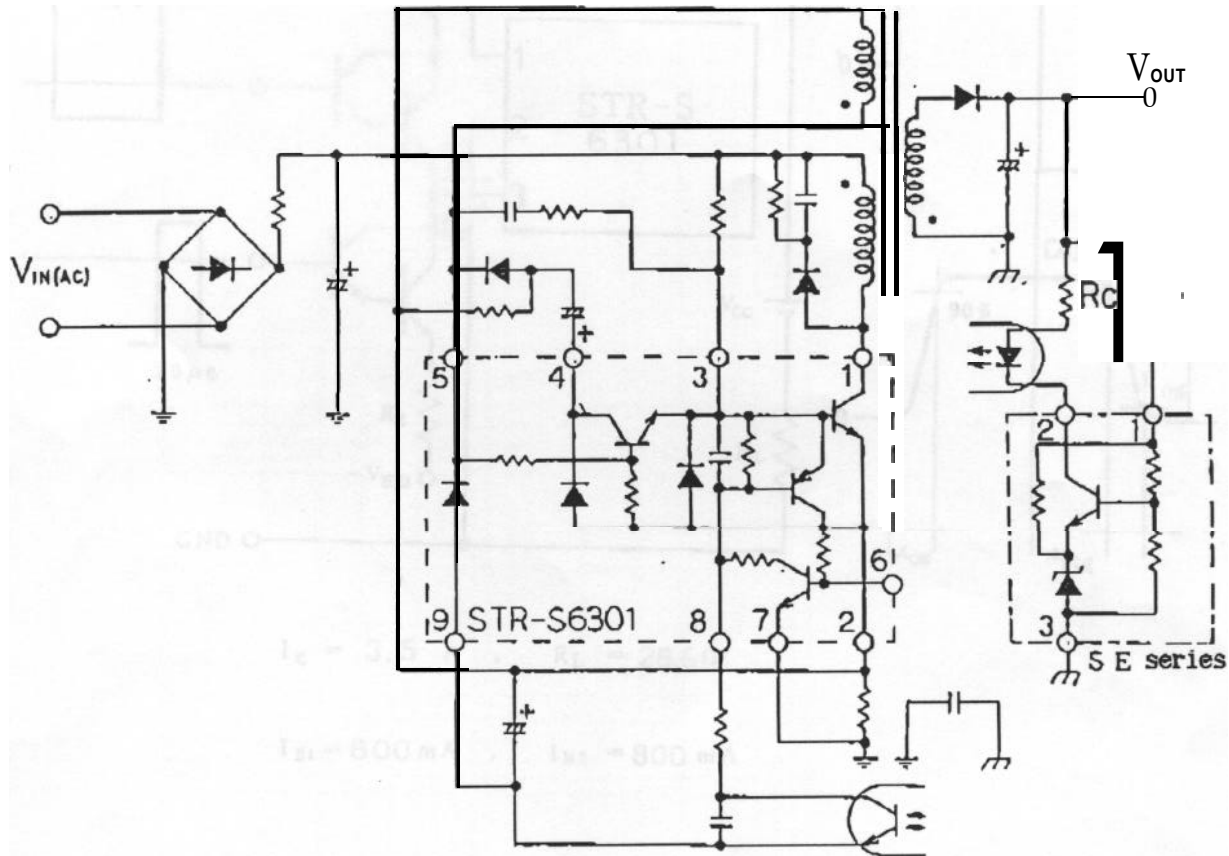
## 7. Suggested method of attaching heatsink

- 1) Suggested Torque: 6 ~ 8 (kgf · cm)
- 2) Suggested Silicone Grease: C-746 SHIN-ETSU CHEMICALS  
YG6260 TOSHIBA SILICONE  
SC102 TORAY SILICONE

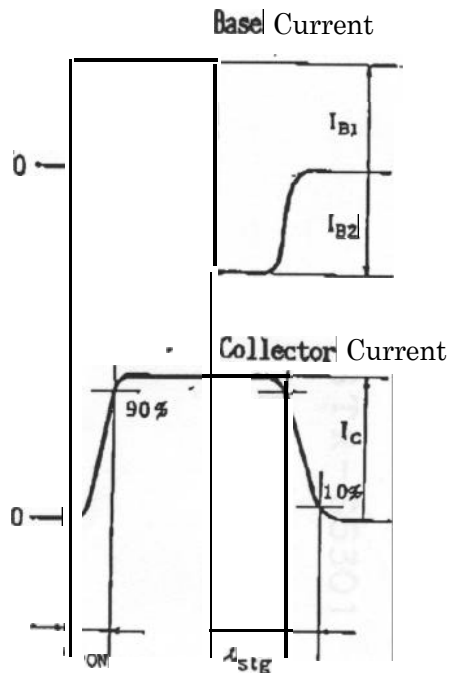
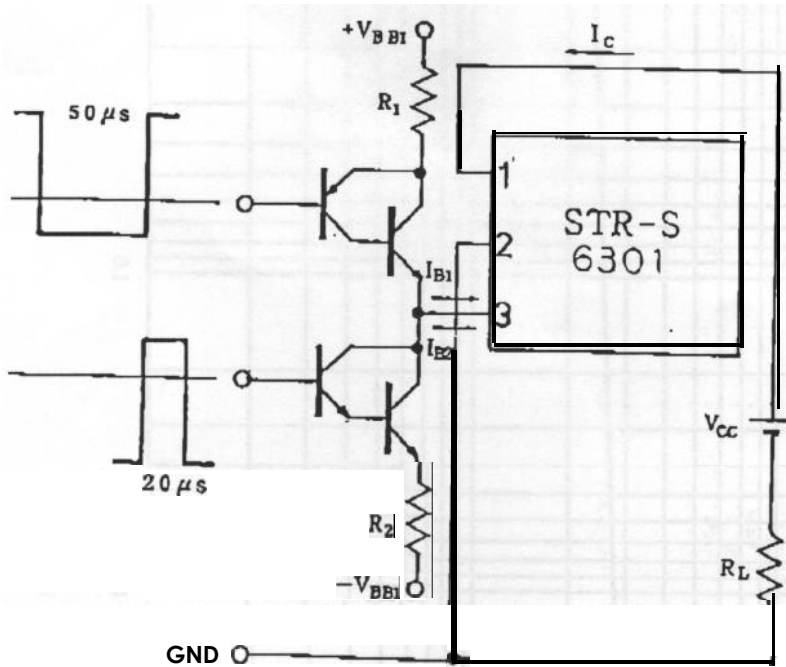
## 8. Other Conditions

- 1) This product is designed and built, for use under the normal environment.  
It is susceptible to the radiation.
- 2) As this product is recognized as the Strategic Material which is under control of the Trade & Export Law, an export licence granted by the government is required for exportation,

Real Operating Circuit



Measuring circuit, (Switching time)

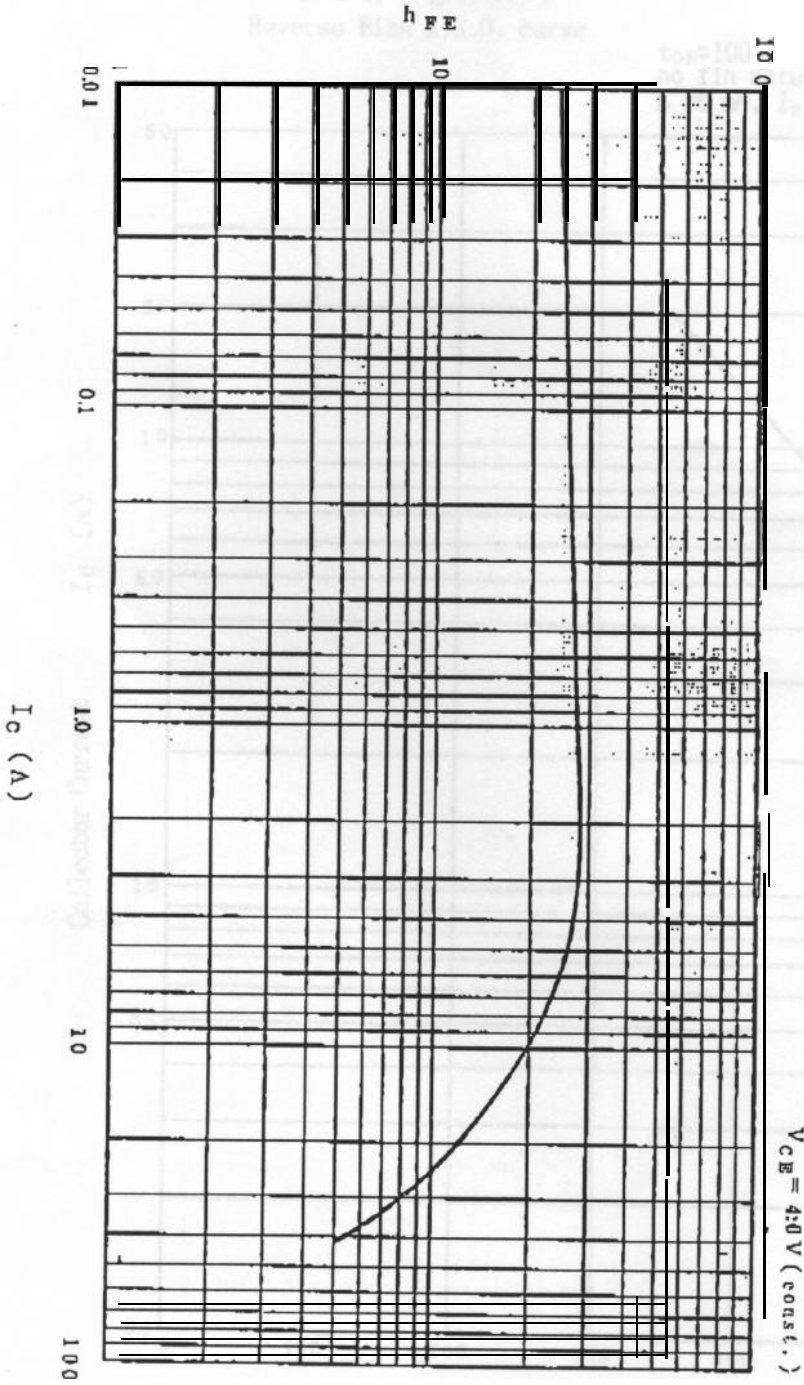


$$I_d = 3.5 \text{ A} , R_L = 28.6 \Omega$$

$$I_{B1} = 800 \text{ mA} , I_{B2} = 800 \text{ mA}$$

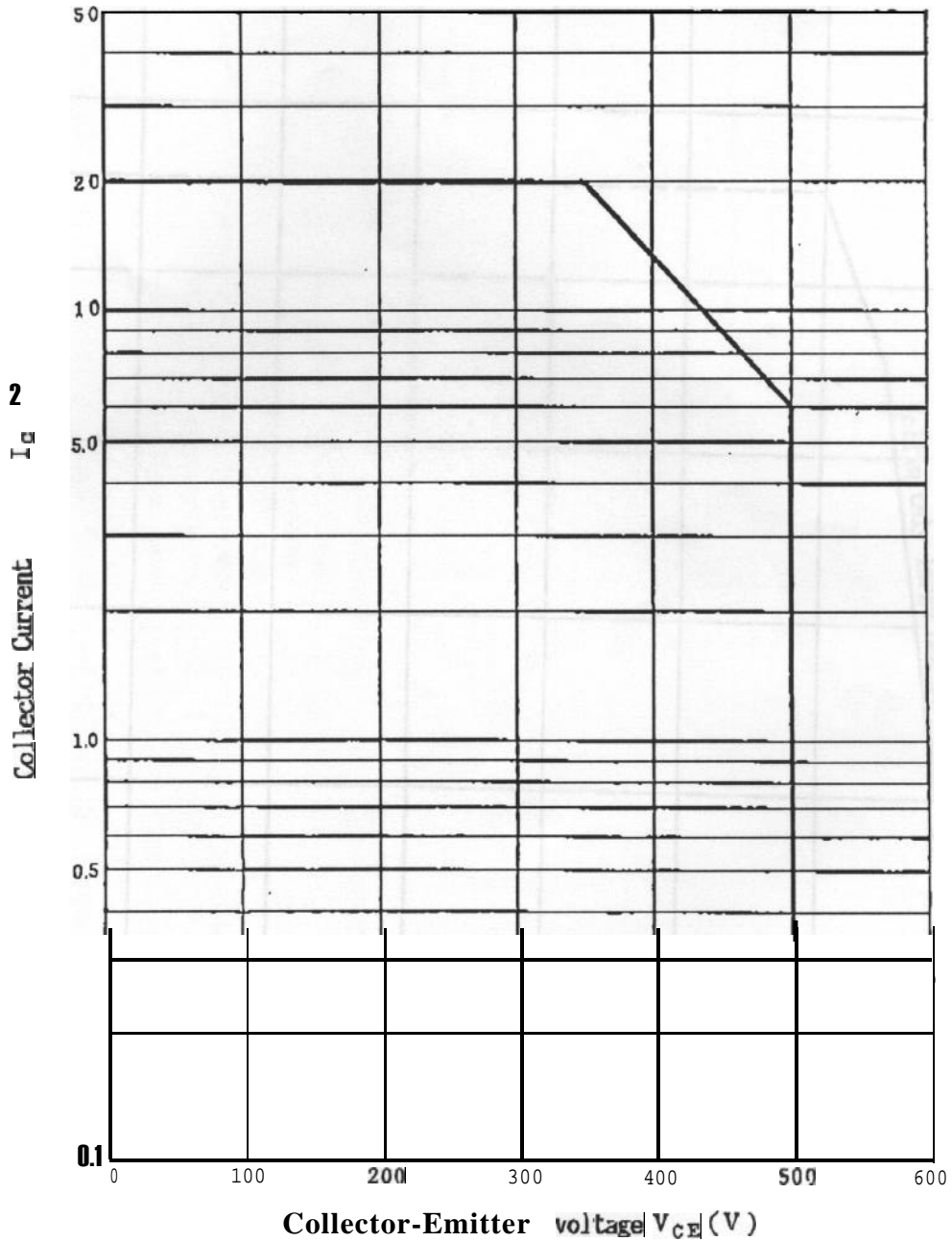
STR-S6301

$I_C - h_{FE}$  Characteristic



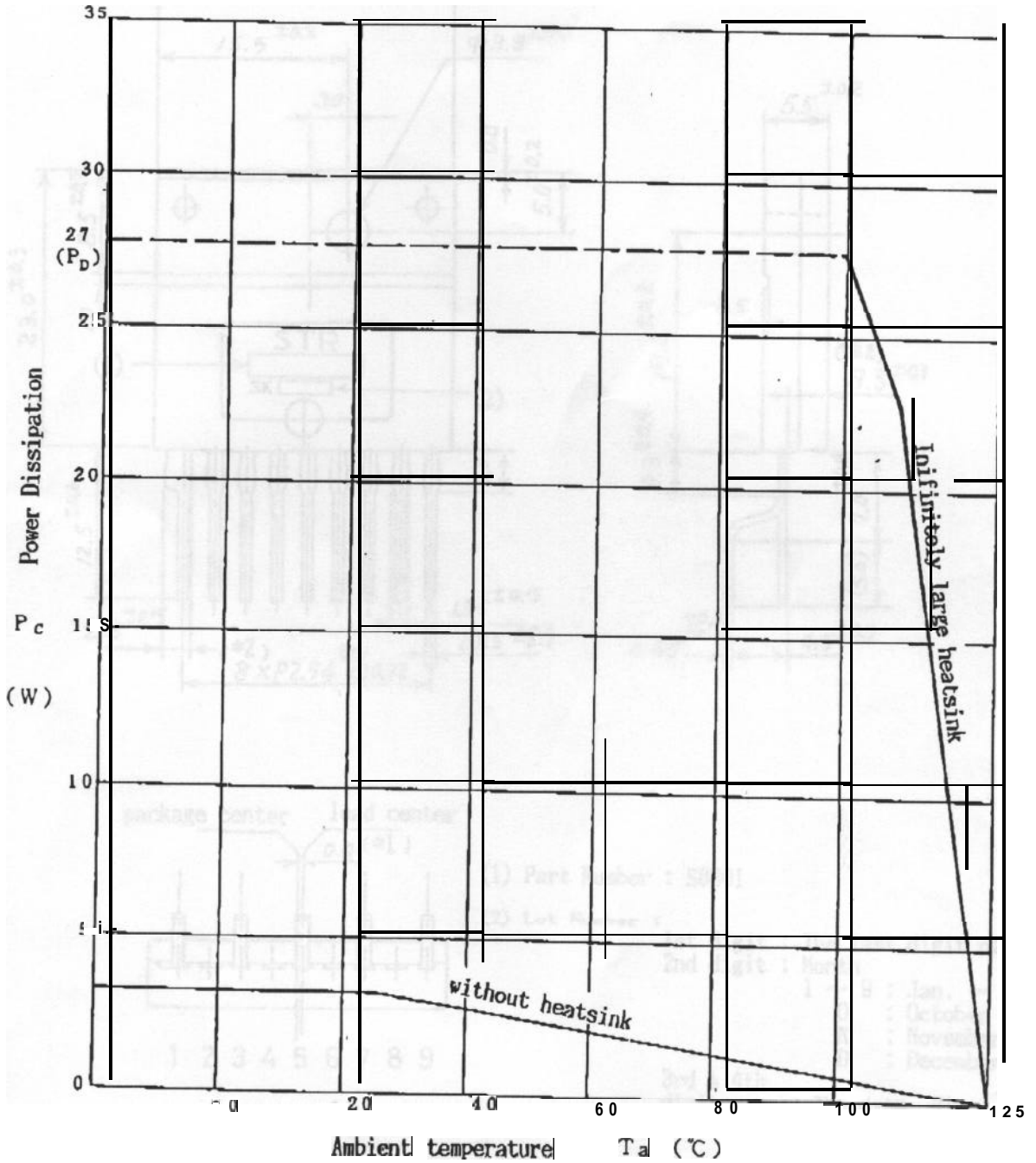
STR-S6301  
Reverse Bias A.S.O. curve

$t_{ON}=100 \mu\text{sec}$  (duty : 1% or less)  
no fin natural cooling ( $T_a=25^\circ\text{C}$ )  
 $L \square 6 \text{ mH}, I_{B1}=3.5\text{A}, I_{B2}=0.5\text{A}$

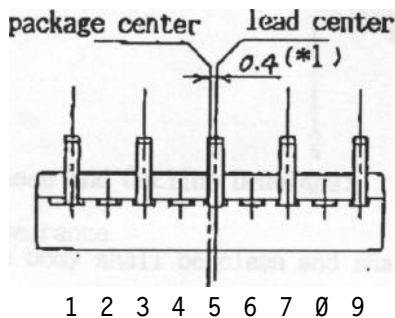
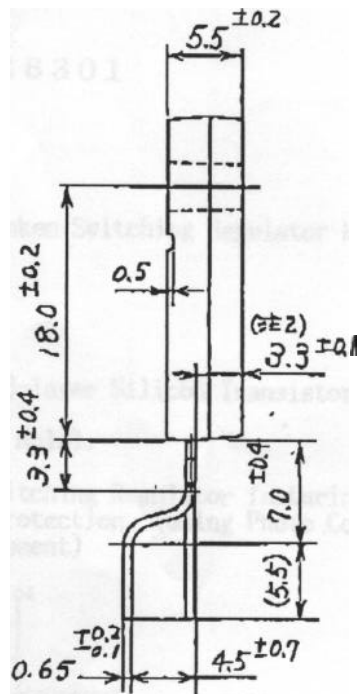
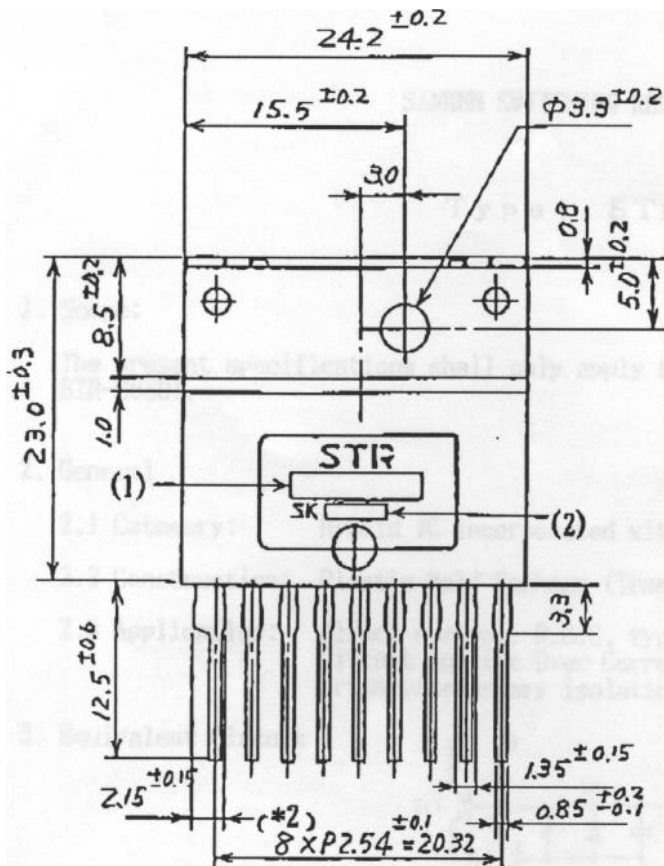


# SANKEN ELECTRIC COMPANY, LTD.

STR-S6000 series derating curve







(1) Part Number : S6301

(2) Lot Number :

1st digit : The last digit of AD year  
 2nd digit : Month  
 1 ~ 9 : Jan. ~ Sept.  
 0 : October  
 N : November  
 D : December  
 3rd & 4th digits : The date 01 ~ 31

\*1: The lead center is offset by 0.4mm from the center of the package.  
 \*2: The dimension measured at the closest point to the My.

## Difference of STR-S6301 and STR-S6301A

Regarding the above mentions that the STR-S6301A  $h_{FE}$  20-40 ( $V_{CE} = 4V$ ,  $I_C = 1A$ ) the STR-S6301  $h_{FE}$  15-40 ( $V_{CE} = 4V$ ,  $I_C = 1A$ ) are difference place.