

**SANKEN SWITCHING REGULATOR HYRRTD IC**

**Type : STR-S6301**

**1. Scope:**

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

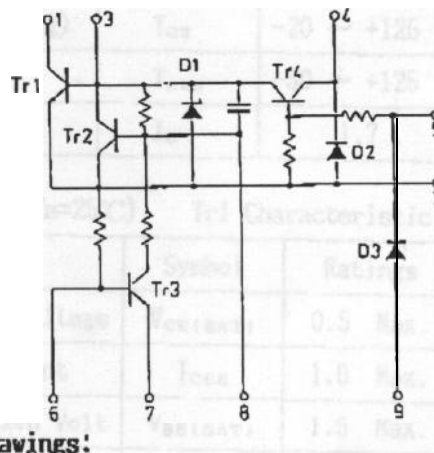
**2. General**

**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. Collector
- 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.

# SANKEN ELECTRIC COMPANY, LTD.

## 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		$T_d, T_r=100^\circ\text{C}$ ※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	$t_{on}$ $t_r$	10 Max. 0.6 Max.	μs	Measuring Circuit #1

※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

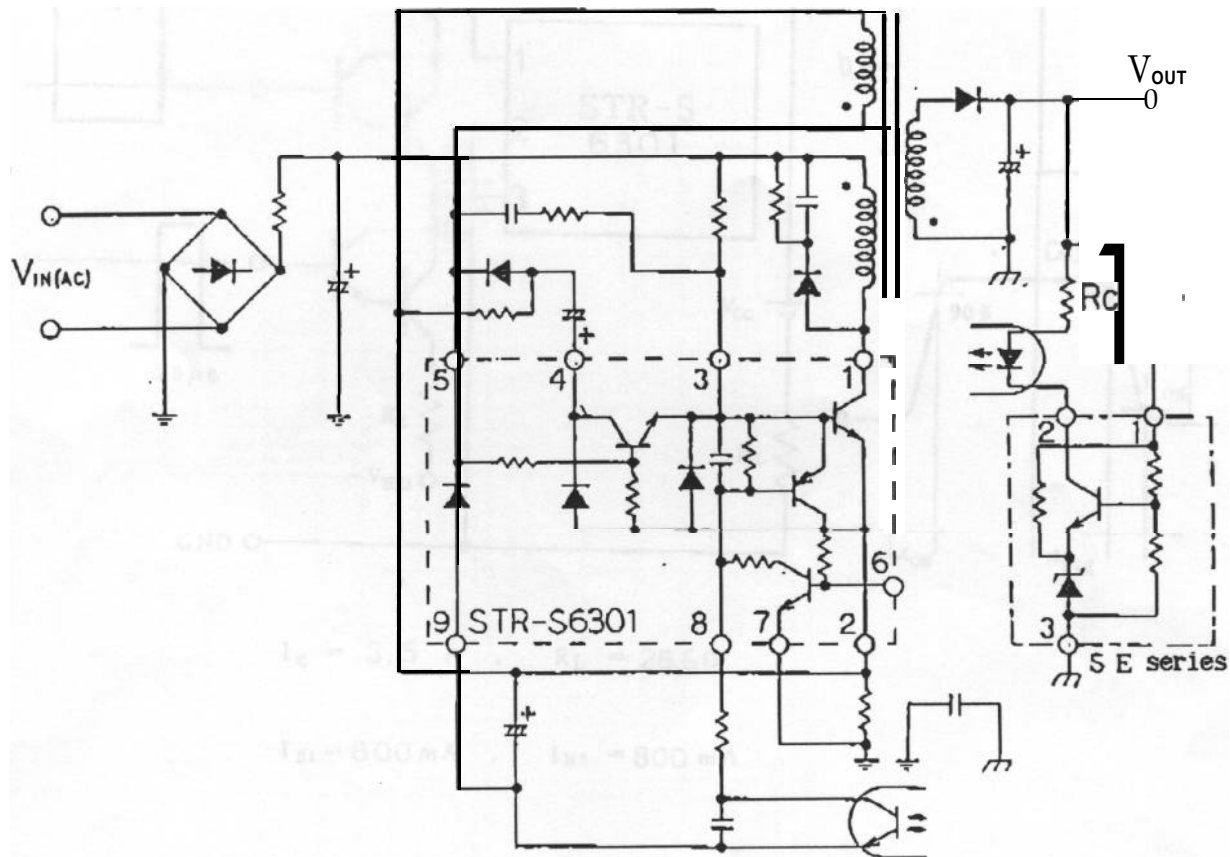
7. Suggested method of attaching heatsink

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

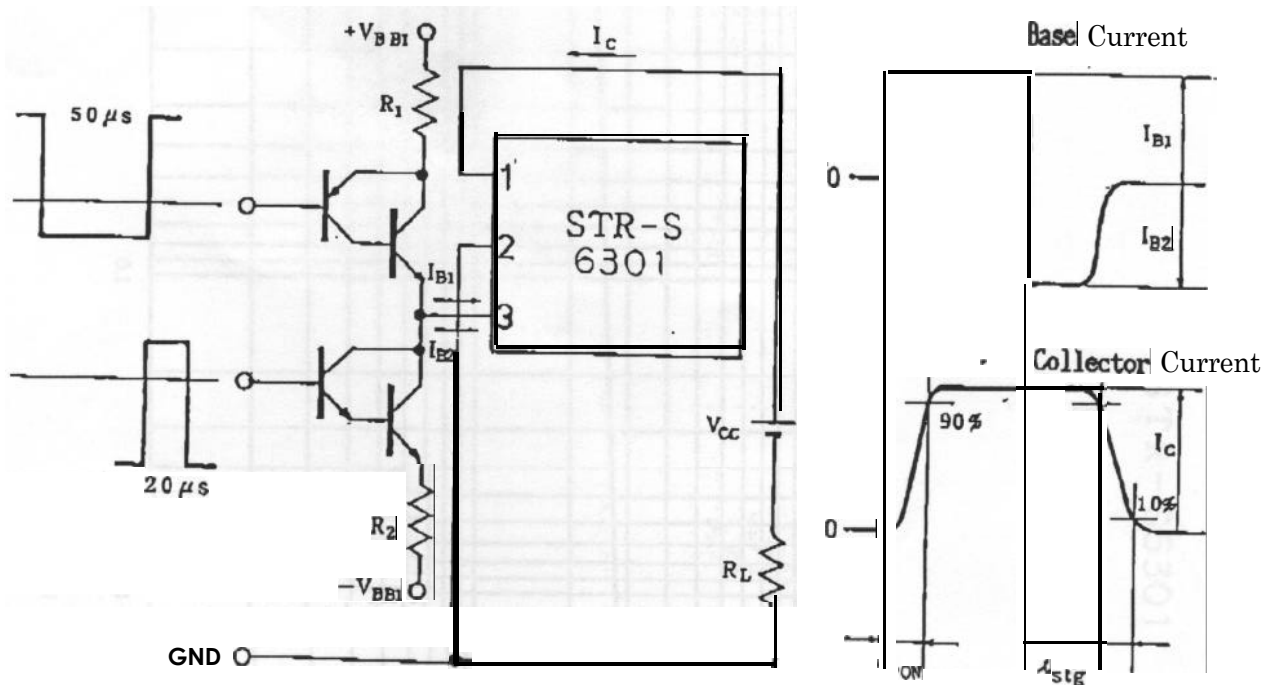
8. Other Conditions

- 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



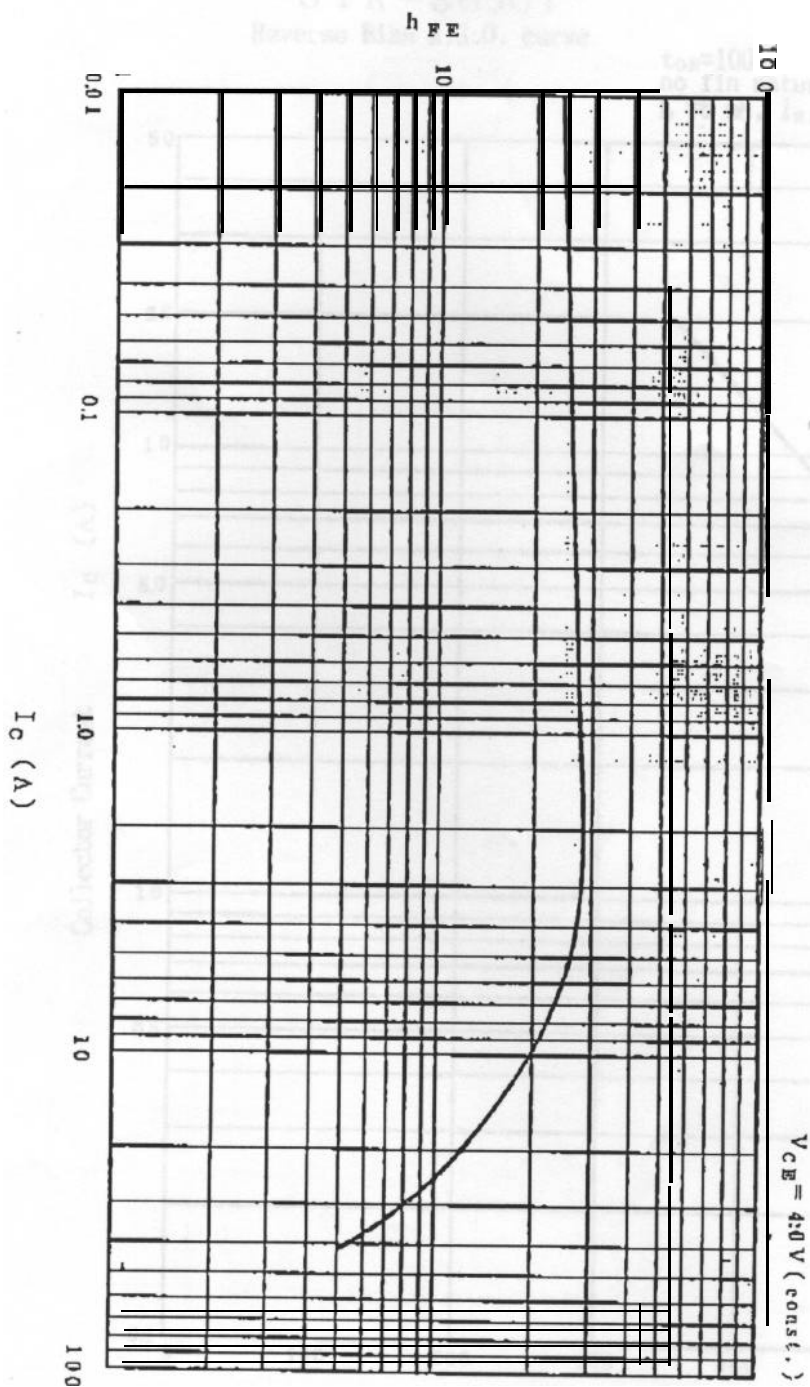
Measuring circuit, (Switching time)



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

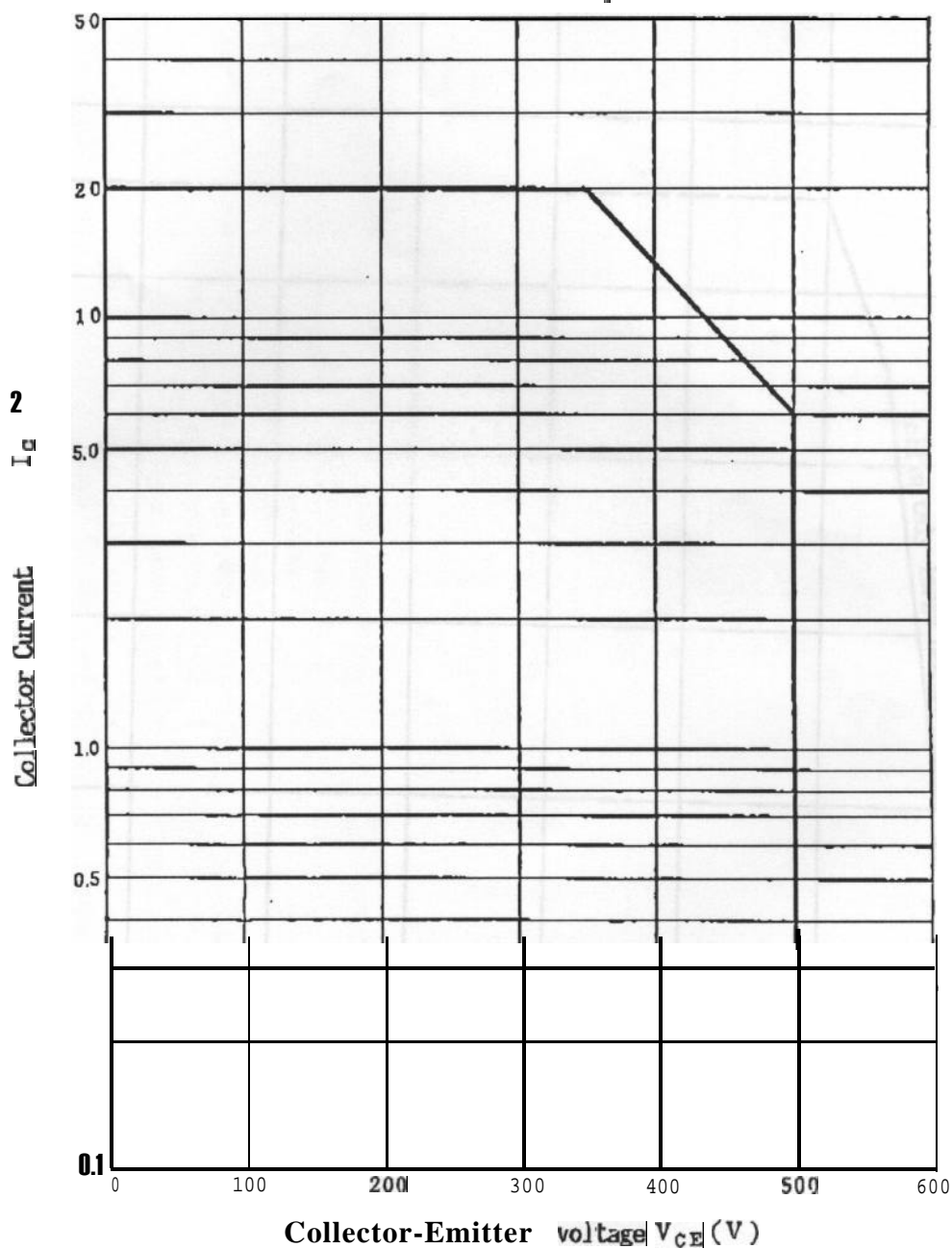
$$I_{B1} = 800 \text{ mA} , I_{B2} = 800 \text{ mA}$$

STR-S6301

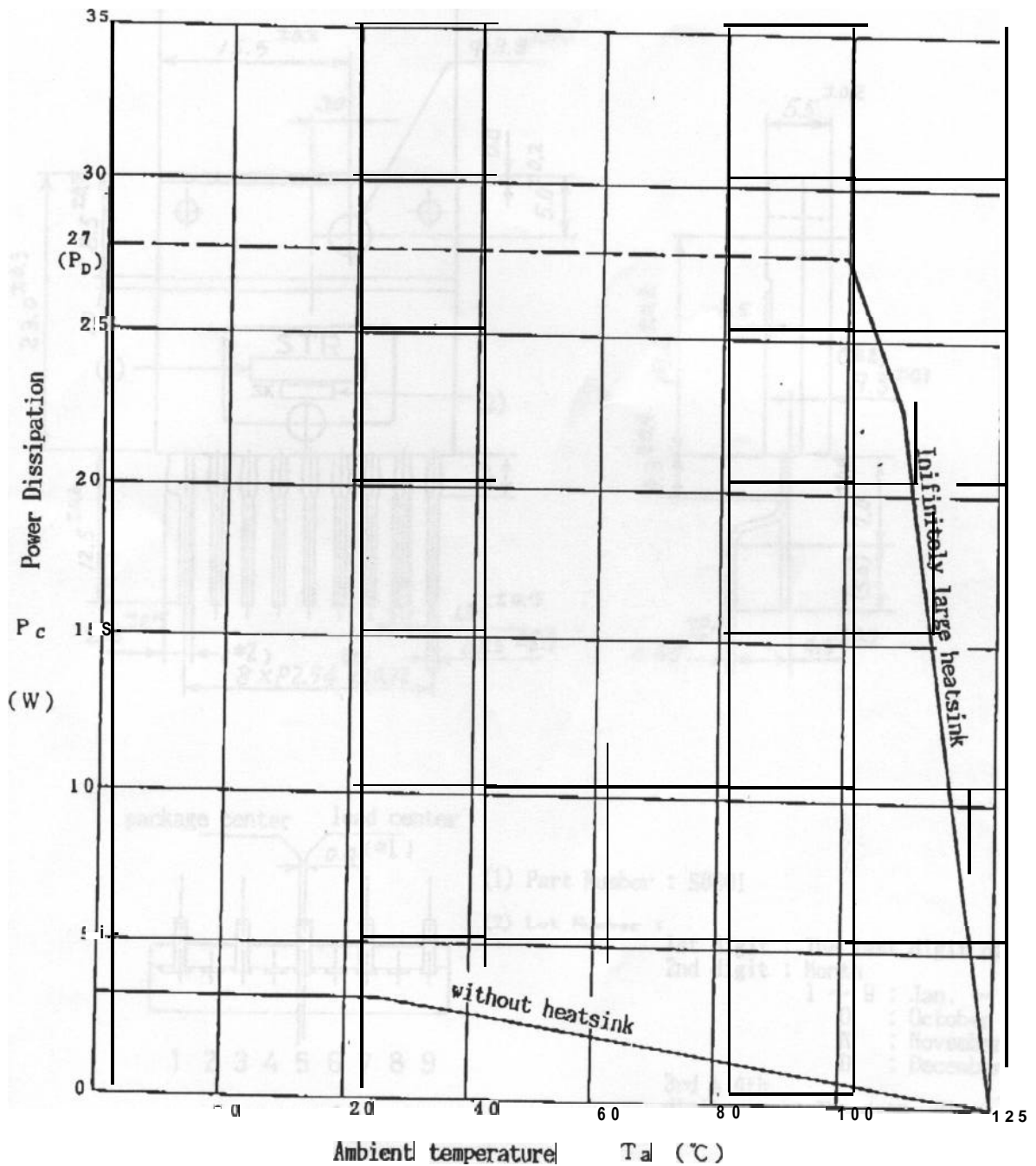
 $I_C - h_{FE}$  Characteristic

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

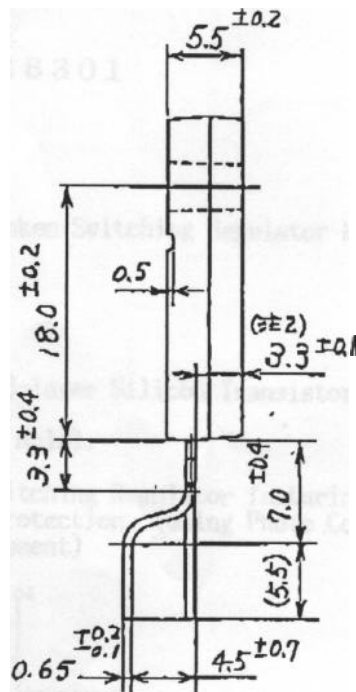
$t_{ON}=100\ \mu\text{sec}$  (duty : 1% or less)  
no fin natural cooling ( $T_a=25^\circ\text{C}$ )  
 $L \square 6\ \text{mH}, I_{B1}=3.5\text{A}, I_{B2}=0.5\text{A}$



STR-S6000 series derating curve







## 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.