STR9000 Series

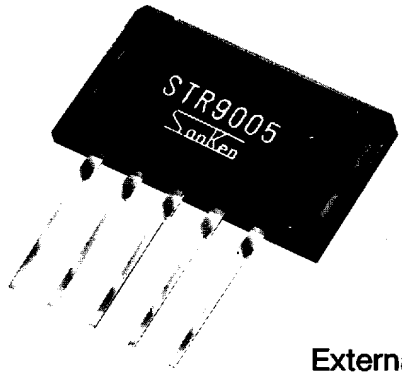
Dropper Type — Low-Dropout Voltage Type

Features

- Input/output voltage difference of less than 1V during operation
- Reduces power loss for electronic equipment
- Small size with 4 A output
- An easy-to-use 5-pin plastic-mold regulator
- Capable of remote ON/OFF
- Capable of fine adjustment of output voltage
- Built-in foldback current protection circuit
- High reliability due to use of SANKEN's semiconductor elements

Applications

- For battery- operated VTR cameras, 8 mm cameras and automotive appliances
- For various types of electronic equipment including micro computers, personal computers, floppy disk drives, CATV sets, VTRs, video disks, and printers
- For stabilization of secondary side of multi-output switching regulators



External Vieu

■ Absolute maximum Ratings (Ta = 25°C)

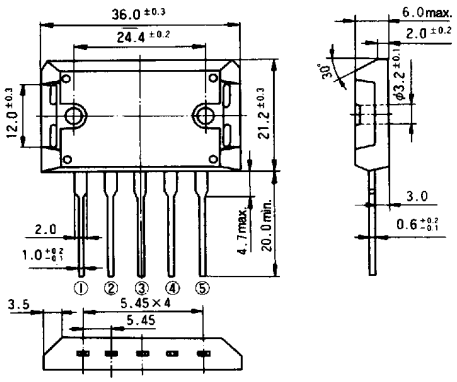
Description	Symbol	Ratings			Unit
		STR9005	STR9012	STR9015	
DC Input Voltage	V_{IN}	25	30	30	V
DC Output Current	I_O	4.0			A
Power Dissipation	P_D	75(Tc = 25°C)			W
		3.2 (no fin)			
Junction Temperature	Tj	−30 to +125			°C
Operating Case Temperature	Tc	−20 to +100			°C
Storage Temperature	Tstg	−30 to +125			°C
Thermal Resistance (between junction and case)	$R_{th(j-c)}$	1.25 max.			°C/W

■ Electrical Characteristics (Ta = 25°C)

Description	Symbol	Ratings									Unit
		STR9005			STR9012			STR9015			
		min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	
DC Input Voltage	V_{IN}	6		15	13		25	16		25	V
Output Voltage	V_O	4.9	5.0	5.1	11.8	12.0	12.2	14.8	15.0	15.2	V
	Condition	V_{IN} = 8.0V, I_O = 2.0A			V_{IN} = 16V, I_O = 2.0A			V_{IN} = 20V, I_O = 2.0A			
Dropout Voltage	V_{DIF}			0.5			0.5			0.5	V
	Condition	I_O = 2.0A									
	V_{DIF}			1.0			1.0			1.0	V
	Condition	I_O = 4.0A									
Line Regulation	ΔV_{LINE}		10	30		30	80		50	100	mV
	Condition	V_{IN} = 6 to 15V, I_O = 2.0A			V_{IN} = 13 to 25V, I_O = 2.0A			V_{IN} = 16 to 25V, I_O = 2.0A			
Load Regulation	ΔV_{LOAD}		40	100		80	200		100	200	mV
	Condition	V_{IN} = 8.0V, I_O = 0 to 3.0A			V_{IN} = 16V, I_O = 0 to 3.0A			V_{IN} = 20V, I_O = 0 to 3.0A			
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$		±0.5			±1.5			±1.5		mV/°C
Ripple Rejection	R_{REJ}		54			54			54		dB
	Condition	f = 100 to 120Hz									
Foldback Current	I_{S1}	4.1			4.1			4.1			A
	Condition	V_{IN} = 8.0V			V_{IN} = 16V			V_{IN} = 20V			
Output ON/OFF Control Vtg. * (Vtg. between pin No.3 and 5)	$V_{O(ON)}$			0.6			0.6			0.6	V
	$V_{O(OFF)}$	2.0			2.0			2.0			V
Voltage with output off	V_O			0.5			0.5			0.5	V
	Condition	V_{IN} = 8.0V, I_O = 0A			V_{IN} = 15V, I_O = 0A			V_{IN} = 20V, I_O = 0A			

* Output is turned on with voltage of less than 0.6 V between pin No.3 and 5, and turned off at more than 2.0 V.

■Outline Drawing/Pin Connections (unit : mm)



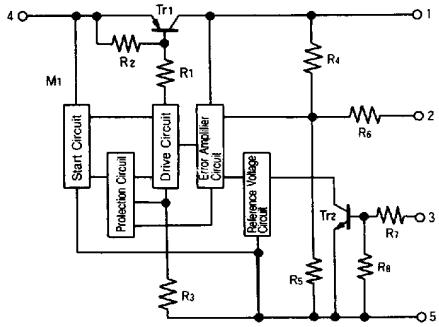
Full Plastic Mold Package Type
Flammability : UL94V-O or equivalent

Pin Connections

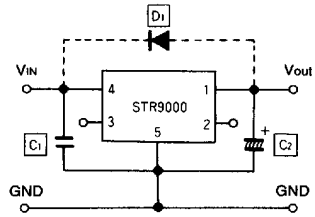
① Output (backside of case)
② Output Fine Adjustment
③ Output ON/OFF Control
④ Input
⑤ Ground

Weight : Approx. 14.5g

■Equivalent Circuit



■External Circuit



C1 : Oscillation Prevention Capacitor (approx. 0.33 μF)
Connection with pin No.4 shall be made as short as possible.

C2 : Output Capacitor (47 to 100 μF, 50 V)
Connection with pin No.1 shall be made as short as possible.

D1 : Protection Diode (RM1Z)
Required when between input and output is reverse biased. However, it is not required if the output capacitor is less than 100 μF.

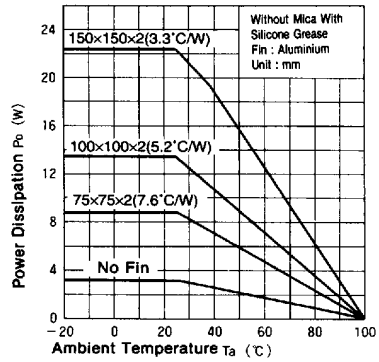
Note 1 : Prevention of oscillation at low temperature
When an output capacitor with smaller tanδ is not used at low temperature, oscillation may happen. Be sure to connect tantalum capacitor (approx. 10 μF) in parallel with output capacitor C_2.

Note 2 : As an isolation type diode is provided between input ~ ground and output ~ ground, they may be destroyed when reverse biased. In that case, use a diode with low V_F to prevent them.

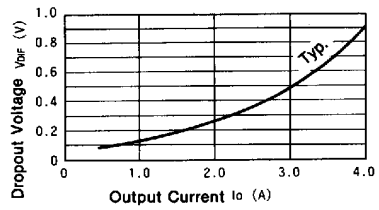
Refer to the 13th page for other precautions.

■Typical Operating Characteristics

Power Dissipation



Io vs. VDIF Characteristics

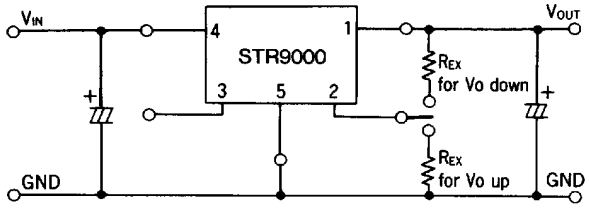


Output Voltage Adjustable Circuit

1. Adjustment of output voltage by single external resistor

The output voltage of STR9000 series may be decreased by inserting a resistor between the pin No.1 (output pin) and the pin No.2 (output fine adjustment pin). On the other hand, the output voltage may be increased by inserting a resistor between the pin No.2 and 5 (ground pin).

<External Circuit>

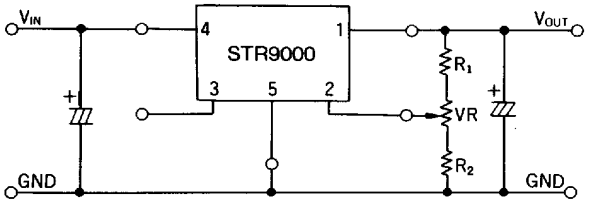


Select either one of the external resistors.

2. Fine adjustment of output voltage

The output voltage may be finely adjusted by using the pins 1, 2 and 5 as shown in the following connections.

<External Circuit>

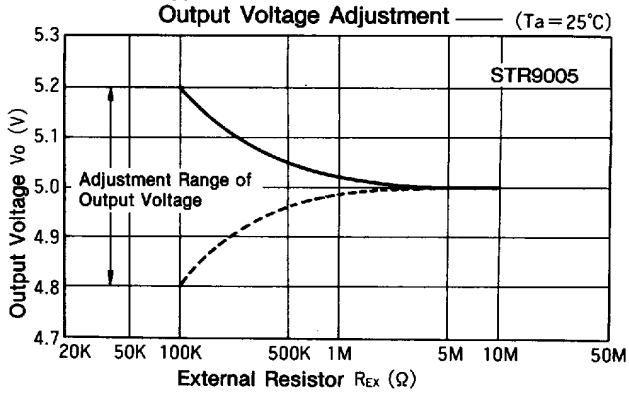


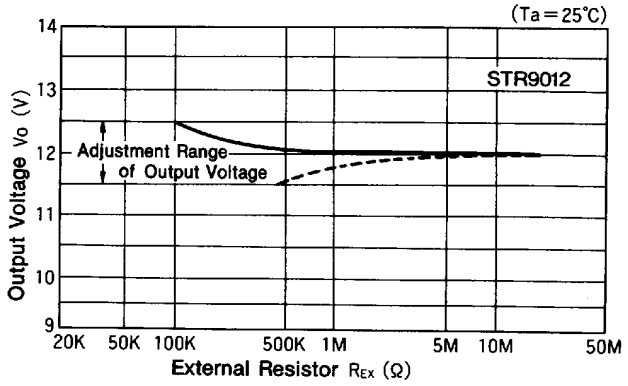
Note: Fine adjustment of output voltage

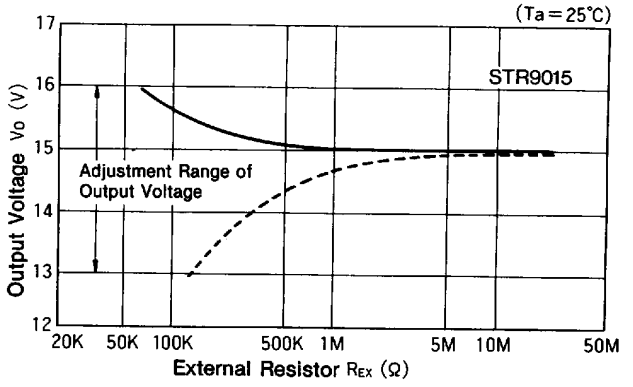
The fine adjustment range of output voltage for STR9000 series are max. ±0.2 V for STR9005, ±0.5 V for STR9012 and +1.0 V/−2.0 V for STR9015.

Adjustment exceeding these values may cause starting error.

① Typical Characteristics of Output Voltage Adjustment







—— : Insertion of resistor between the pins 2 and 5
····· : Insertion of resistor between the pins 2 and 1

② Typical Characteristics of Output Voltage Fine Adjustment