STR9000 Series

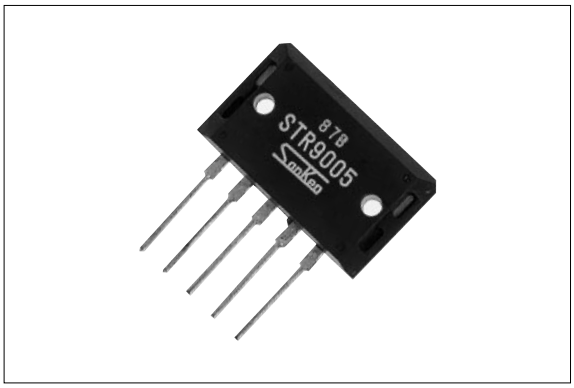
5-Terminal, Low Dropout Voltage Dropper Type

■Features

- 5-terminal regulator with two screw mount package
- Output current: 4.0A
- Low dropout voltage :V_{DIF}≤1V (at I_O=4A)
- Fine adjustment of output voltage
- Output ON/OFF control
- Built-in foldback overcurrent protection circuits

■Applications

- For stabilization of the secondary stage of switching power supplies
- Electronic equipment



■Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Ratings		Unit
		STR9005	STR9012/9015	
DC Input Voltage	V_{IN}	25	30	V
DC Output Current	I_O	4.0		V
Power Dissipation	P_{D1}	75(T_C=25°C)		W
	P_{D2}	3.2(Without heatsink, stand-alone operation)		W
Junction Temperature	T_j	–30 to +125		°C
Ambient Operating Temperature	T_{op}	–20 to +100		°C
Storage Temperature	T_{stg}	–30 to +125		°C
Thermal Resistance (junction to case)	$R_{th(j-c)}$	1.25		°C/W

■Electrical Characteristics

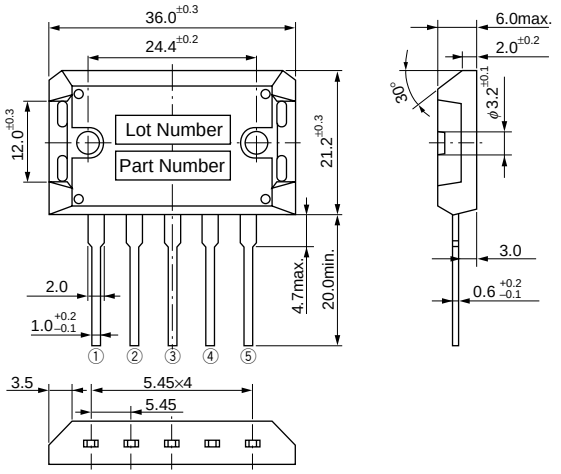
(T_a=25°C)

Parameter	Symbol	Ratings									Unit
		STR9005			STR9012			STR9015			
		min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	
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
	Conditions	V_{IN}=8V, 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
	Conditions	I_O=2.0A									
				1.0			1.0			1.0	
	Conditions	I_O=4.0A									
Line Regulation	ΔV_{OLINE}		10	30		30	80		50	100	mV
	Conditions	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_{OLOAD}		40	100		80	200		100	200	mV
	Conditions	V_{IN}=8V, 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	$\Delta V_O/\Delta T_a$		±0.5			±1.5			±1.5		mV/°C
Ripple Rejection	R_{REJ}		54			54			54		dB
	Conditions	f=100 to 120Hz									
Overcurrent Protection Starting Current	I_{S1}	4.1			4.1			4.1			A
	Conditions	V_{IN}=8V			V_{IN}=16V			V_{IN}=20V			
Output ON/OFF Control Voltage (Voltage between terminal 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
	Conditions	V_{IN}=8V, I_O=0A			V_{IN}=15V, I_O=0A			V_{IN}=20V, I_O=0A			

*Output is turned on when voltage between terminal No.3 and 5 is less than 0.6V, and turned off if more than 2.0V.

■Outline Drawing

(unit:mm)

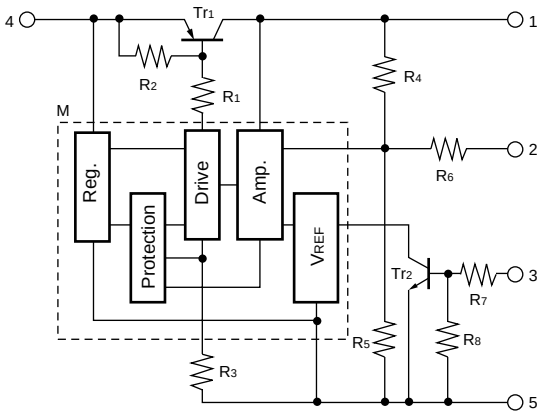


Plastic Mold Package Type
Flammability: UL94V-0
Weight: Approx. 14.5g

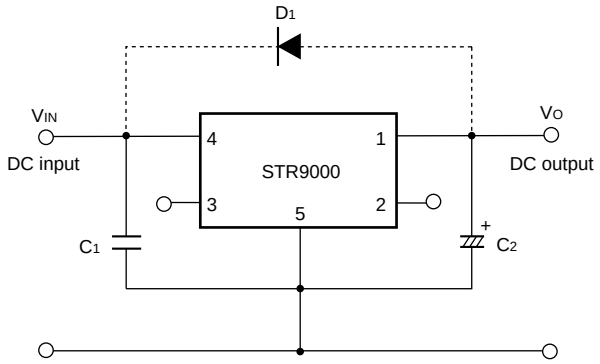
Terminal Connections

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

■Block Diagram



■Standard External Circuit



C_1: Oscillation prevention capacitor (approx. 0.33µF)
Connection to terminal No.4 must be made as short as possible.

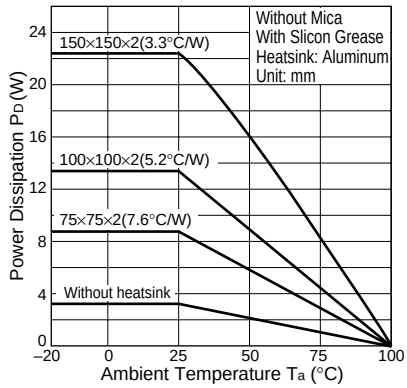
C_2: Output capacitor (47 to 100µF)
Connection to terminal No.1 must be made as short as possible.

D_1: Protection diode (RM1Z)
Required for protection against reverse biasing of input and output.

Note 1: Prevention of oscillation at low temperatures
At low temperatures, oscillation may occur unless an output capacitor with good tanδ is used. Be sure to connect a tantalum capacitor (approx. 10µF) in parallel with output capacitor C_2.

Note 2: An isolation type diode is provided from input to ground and also from output to ground. These may be destroyed if the device is reverse biased. In this case, use a diode with low V_F to protect them.

■T_a-P_D Characteristics

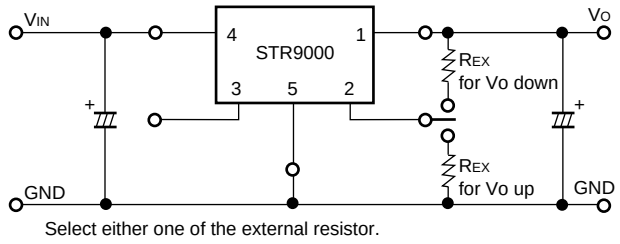


External Variable Output Voltage Circuit

1. Variable output voltage with a single external resistor

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

<Standard External Circuit>

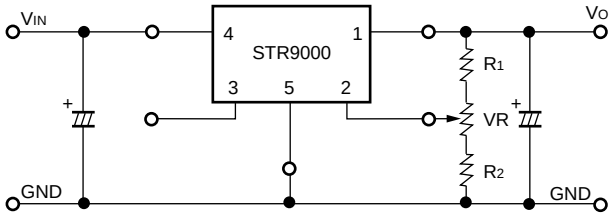


Select either one of the external resistor.

2. Fine adjustment of output voltage

The output voltage may be finely adjusted by using terminals No.1, No.2 and No. 5 as shown in the following connections.

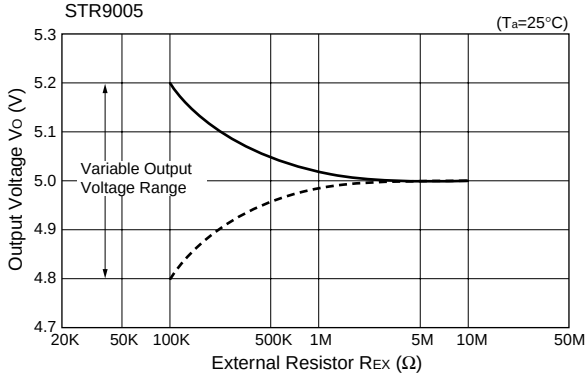
<Standard External Circuit>



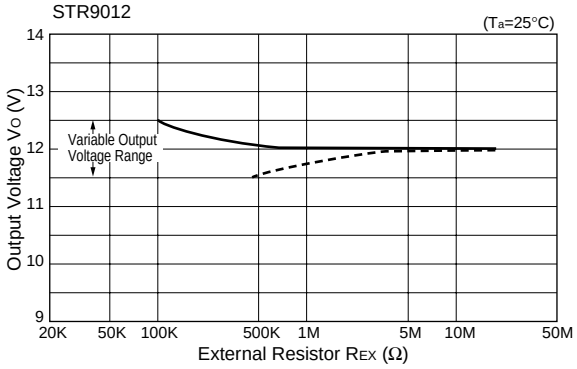
Note: The fine adjustment range of output voltage for the STR9000 series is ±0.5V max for STR9012 and +1.0V/-2.0V max for STR9015. Adjustment exceeding these values may cause start-up errors.

① Typical Characteristics of Variable Output Voltage

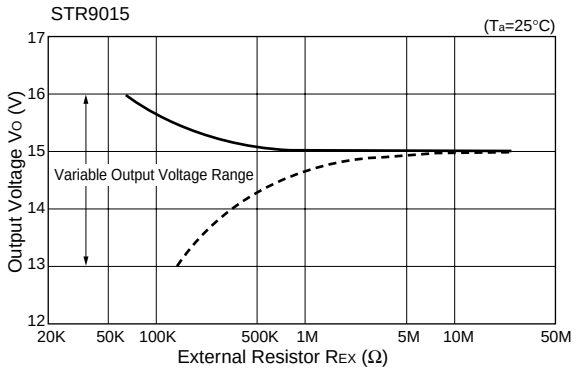
STR9005



STR9012



STR9015

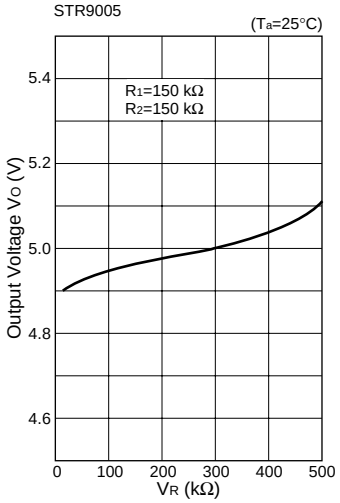


: Insertion of resistor between terminals No. 2 and No. 5

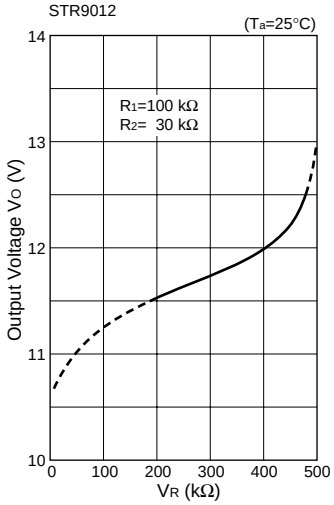
: Insertion of resistor between terminals No. 2 and No. 1

② Typical Characteristics of Fine Output Voltage Adjustment

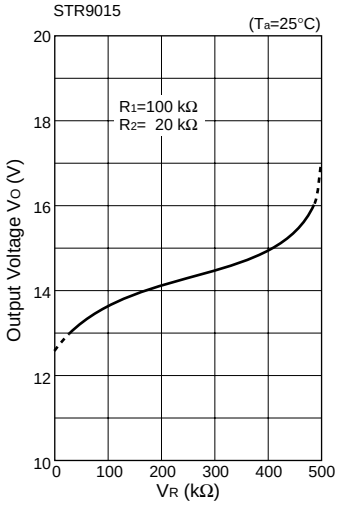
STR9005



STR9012



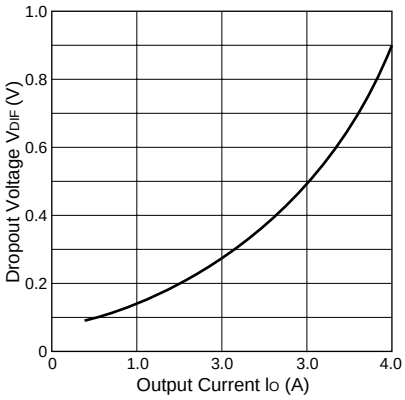
STR9015



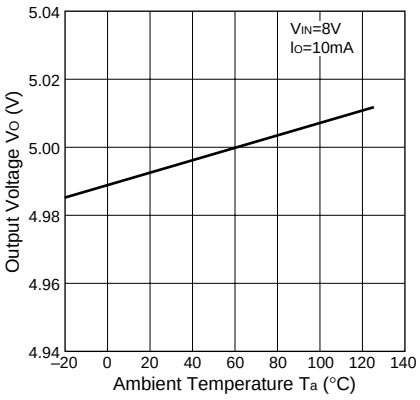
■Typical Characteristics

(T_a=25°C)

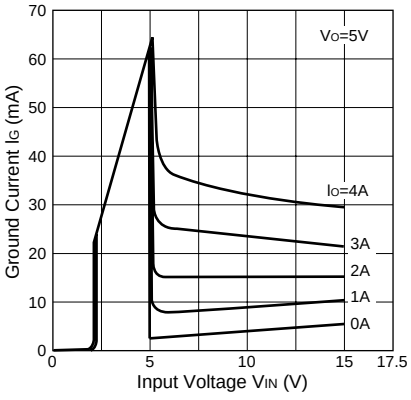
I_O vs. V_{DIF} Characteristics



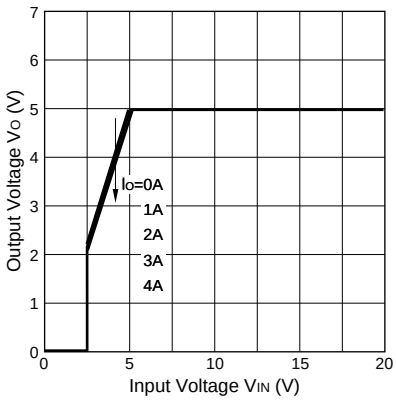
Temperature Coefficient of Output Voltage(STR9005)



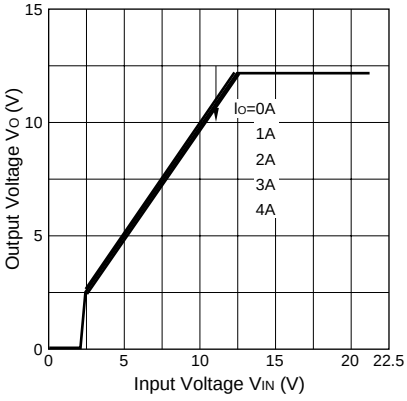
Circuit Current(STR9005)



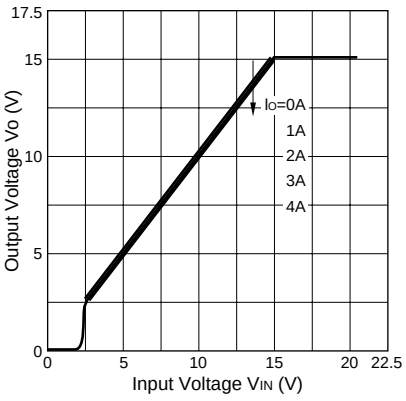
Rise Characteristics(STR9005)



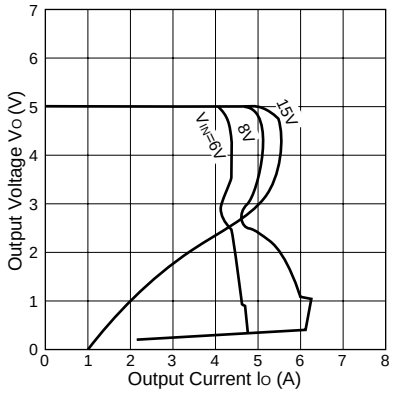
Rise Characteristics(STR9012)



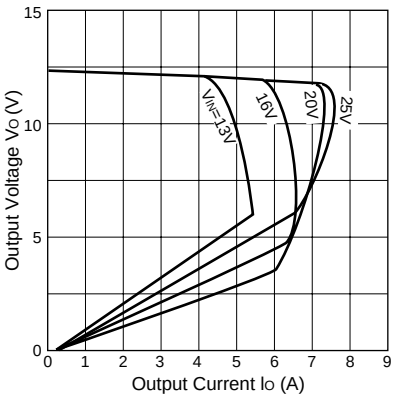
Rise Characteristics(STR9015)



Overcurrent Protection Characteristics(STR9005)



Overcurrent Protection Characteristics(STR9012)



Overcurrent Protection Characteristics(STR9015)