SI-3000R Seires

5-Terminal, Multi-Function, Full-Mold, Low Dropout Voltage Dropper Type with Reset Function

■Features

- Reset signal output (As the output rises it sends a reset signal to the micro-computer to secure normal operation of the system. As the output drops a reset signal is also sent out to protect the system.)
- Reset signal detection output voltage level Voth is 92% of output voltage in the standard specification. Models with different setting values for different needs are scheduled to be added to the series.
- Delay time for reset signal can be adjusted freely by external capacitor.
- Compact full-mold package (equivalent to TO220)
- Output current: 1.5A
- Low dropout voltage :$V_{DIF} \leq 1V$ (at I_O=1.5A)
  Applicable to battery driven equipment with built-in microcomputer.
- Built-in droping type overcurrent, overvoltage, thermal protection circuits
- Low circuit current I_D=typ.1.5mA(I_O=0A)

■Applications

- Microcomputer-controlled equipment
- Battery-driven micro-computer-controlled equipment

■Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Ratings	Unit
		SI-3050R	
DC Input Voltage	V_{IN}	35	V
Voltage of Rest Signal Output Terminal	V_{RST}	V_{IN}	V
DC Output Current	I_O	1.5[*1]	A
Power Dissipation	P_{D1}	18(With infinite heatsink)	W
	P_{D2}	1.5(Without heatsink, stand-alone operation)	W
Junction Temperature	T_j	−30 to +125	°C
Ambient Operating Temperature	T_{OP}	−30 to +105	°C
Storage Temperature	T_{stg}	−30 to +125	°C
Thermal Resistance (junction to case)	$R_{th(j-c)}$	5.5	°C/W
Thermal Resistance (junction to ambient air)	$R_{th(j-a)}$	66.7(Without heatsink, stand-alone operation)	°C/W

■Electrical Characteristics

<div align="right">(T_a=25°C unless otherwise specified)</div>

$(T_a=25°C$ unless otherwise specified)

| Parameter		Symbol	Ratings SI-3050R			Unit
			min.	typ.	max.	
Input Voltage		V_{IN}	6[*2]		30[*1]	V
Output Voltage		V_O	4.80	5.00	5.20	V
		Conditions	V_{IN}=8V, I_O=1.0A			
Dropout Voltage		V_{DIF}			0.5	V
		Conditions	I_O≤1.0A			
					1.0	
		Conditions	I_O≤1.5A			
Line Regulation		ΔV_{OLINE}			30	mV
		Conditions	V_{IN}=6 to 15V, I_O=1.0A			
Load Regulation		ΔV_{OLOAD}			100	mV
		Conditions	V_{IN}=8V, I_O=0 to 1.5A			
Ripple Rejection		R_{REJ}		54		dB
		Conditions	V_{IN}=8V, f=100 to 120Hz			
Quiescent Circuit Current		I_q		1.5	5.0	mA
		Conditions	V_{IN}=8V, I_O=0A			
Overcurrent Protection Starting Current (Drooping Type)		I_{S1}	1.6			A
		Conditions	V_{IN}=8V			
Limited Current at Overcurrent Protection Operation		I_{S2}	1.6			A
		Conditions	V_{IN}=8V			
DLY Terminal	Threshold	V_{DLyth}	2.7	2.9	3.1	V
	Source	I_{DLY}	25	35	45	μA
Reset Threshold Voltage Level (Voth: Threshold Output Voltage)		V_{oth}/V_O	90	92	94	%
Reset Threshold Voltage Hysteresis		ΔV_{oth}	50	100	150	mV
V_{RST} Terminal[*4]	H-level Output Voltage	V_{RSTH}	V_{CC}−1			V
	L-level Output Voltage	V_{RSTL}			0.8	V
	Sink Current at H level	I_{RSTH}			−20	μA
	Source Current at L level	I_{RSTL}	−16			mA

*1: $V_{IN(max)}$ and $I_{O(max)}$ are restricted by the relation $P_{D(max)}=(V_{IN}-V_O)•I_O=18(W)$.

*2: Refer to the dropout voltage.(Refer to Setting Dc Input Voltage on page 7.)

*3: Is1 is specified at −5(%) drop point of output voltage Vo on the condition that V_{IN}=8V, I_O=1.0A.

*4: Reset signal output terminal V_{RST} is an open-collector output. Use a pull-up resistor when connecting it to a logic circuit.

■**Reset Signal Output Timing Chart**

The delay time t_{DLY} of the reset signal can be calculated from the following formula:

$$t_{DLY} = \frac{V_{DLYth}}{I_{DLY}} \times C_{DLY}$$

*I_{DLY} is the current flowing from the DLY terminal shown in the standard connection circuit diagram.

■**Outline Drawing**   (unit:mm)

Plastic Mold Package Type
Flammability: UL94V-0
Weight: Approx. 2.3g

Terminal Connections

① GND
② DELAY
③ Vo
④ Rest Signal output
⑤ VIN

Forming No. 1101
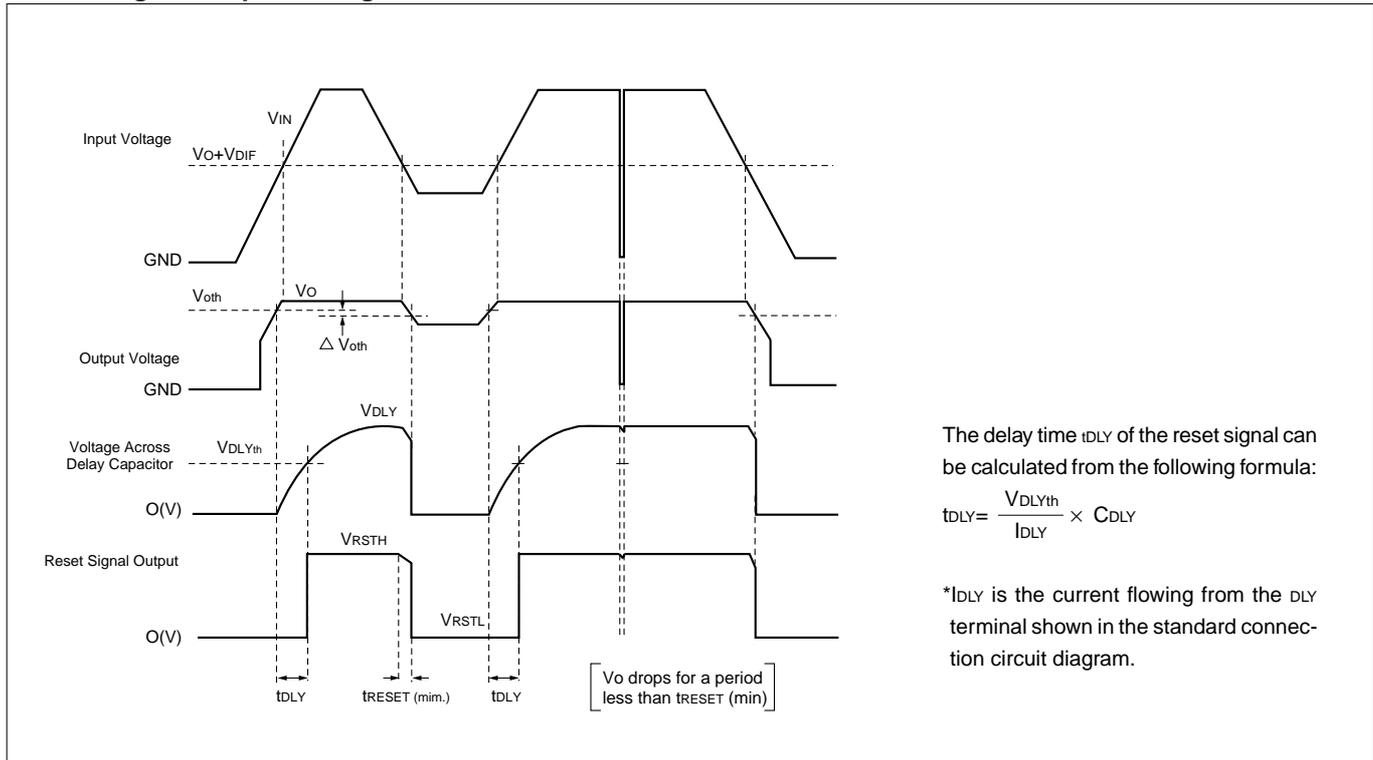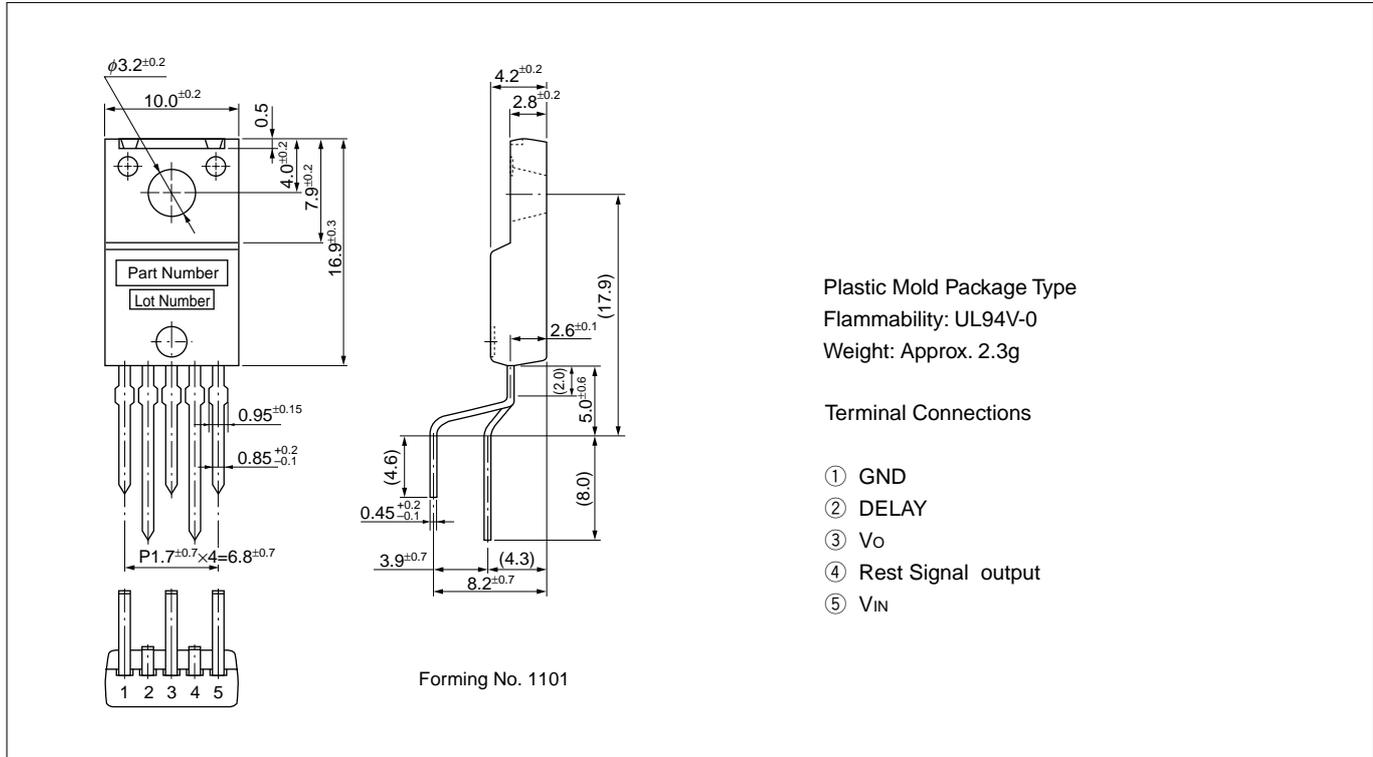
■**Block Diagram**
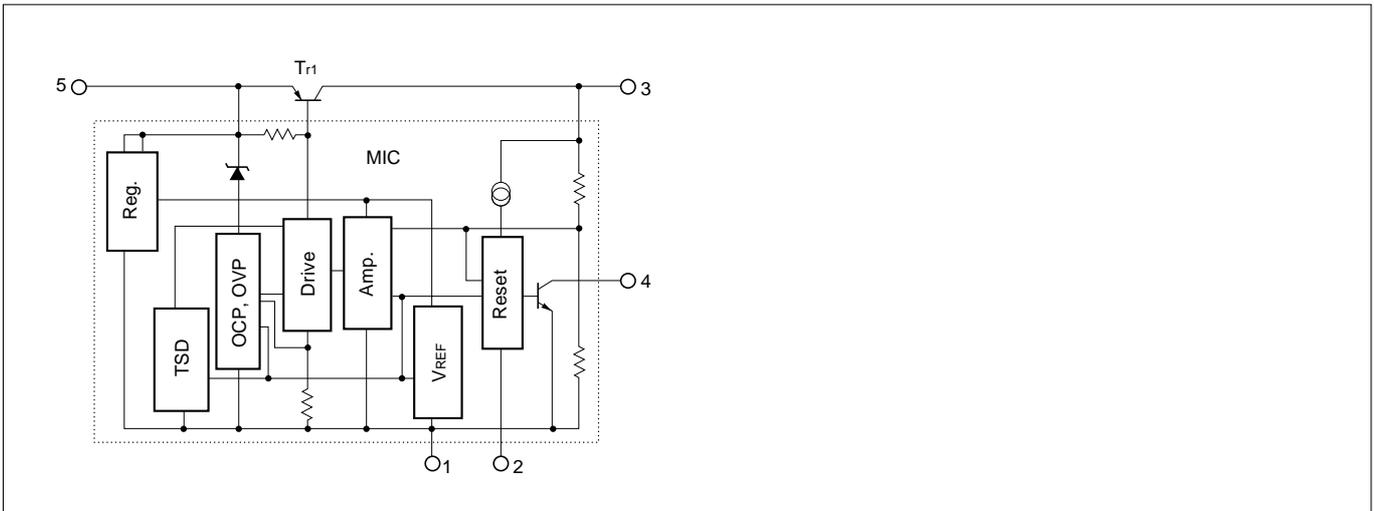
■**Standard External Circuit**

C_0 : Output capacitor (Approx. 200μF)
*1 C_1 : Oscillation prevention capacitor (C_1: Approx. 47μF)
The distance between terminals No.5 (V_{IN}) and No.1 (GND) must be made as short as possible. If the input line is inductive or in the case of long wiring, a capacitor of approximately 0.33μF with superior high frequency characteristics must be connected in parallel. Tantalum capacitors are recommended for C_1 and C_0, particularly at low temperatures.
*2 C_{DLY} : Delay capacitor (reset output)
*3 R_1 : Pull-up resistor (300Ω or above)
*4 D_1 ⎤ : Protection diodes
   D_2 ⎦ These diodes are required for protection against reverse biasing of the input and output. Sanken EU2Z is recommended.

■**T_a-P_D Characteristics**

$$P_D = I_O \bullet [V_{IN}(mean) - V_O]$$

■Typical Characteristics

(Ta=25°C)

Io vs. VDIF Characteristics

Dropout Voltage V_{DIF} (V) vs. Output Current Io (A)
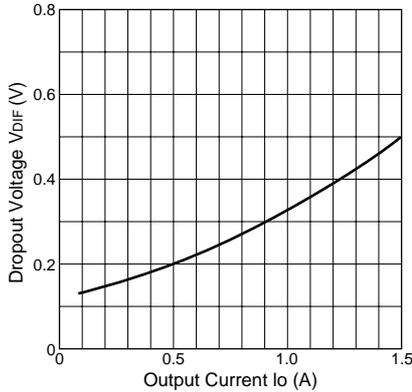
Temperature Coefficient of Output Voltage
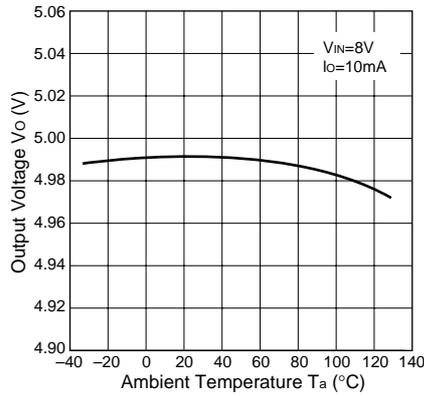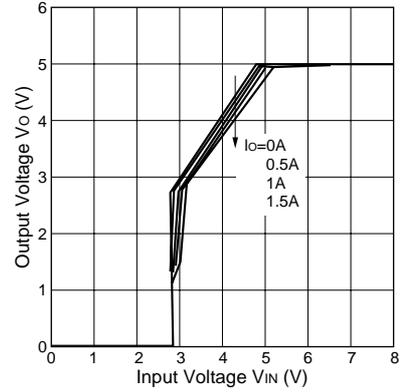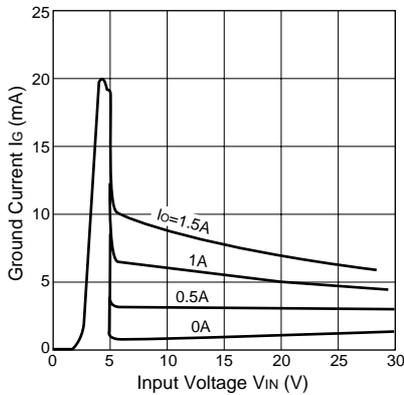
V_{IN}=8V
Io=10mA

Output Voltage V_O (V) vs. Ambient Temperature T_a (°C)

Rise Characteristics

Io=0A
0.5A
1A
1.5A

Output Voltage V_O (V) vs. Input Voltage V_{IN} (V)

Circuit Current

Io=1.5A
1A
0.5A
0A

Ground Current I_G (mA) vs. Input Voltage V_{IN} (V)

Overcurrent Protection Characteristics

V_{IN}=30V
25V
20V
8V
15V
6V

Output Voltage V_O (V) vs. Output Current Io (A)

Thermal Protection Characteristics

V_{IN}=8V
Io=10mA

Output Voltage V_O (V) vs. Case Temperature T_C (°C)
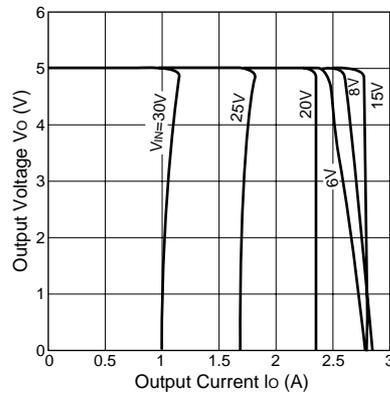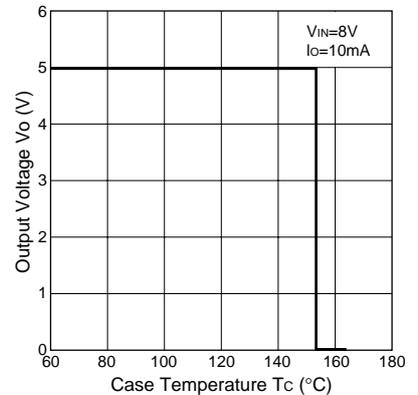
Note on Thermal Protection:
The thermal protection circuit is intended for protection against heat during instantaneous short-circuiting. Its operation is not guaranteed for short-circuiting over extended periods of time.

Reset Output vs. VO Characteristics

V_{IN}=8V Io=0A
R_L=510Ω

Reset Output Voltage V_{RST} (V) vs. Output Voltage V_O (V)
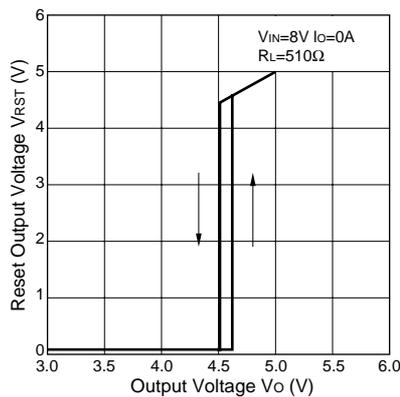
Reset Output vs. DLY Terminal Voltage Characteristics

V_{IN}=8V Io=0A
R_L=510Ω

Reset Output Voltage V_{RST} (V) vs. DLY Terminal Voltage V_{DLY} (V)
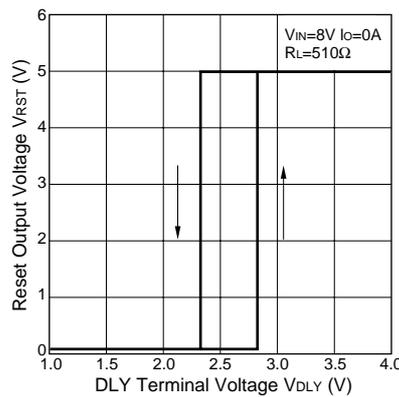
Reset Signal Delay Time tDLY(sec)

V_{IN}=8V
Io=0A

Delay Time t_{DLY} (sec.) vs. Delay Capacitor Capacitance C_{DLY} (F)