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S-13A1 Series

HIGH RIPPLE-REJECTION LOW DROPOUT HIGH OUTPUT CURRENT CMOS VOLTAGE REGULATOR

www.sii-ic.com

Rev.2.1_00

The S-13A1 Series is a positive voltage regulator with a low dropout voltage, high-accuracy output voltage, and low current consumption developed based on CMOS technology.
A 2.2 μF small ceramic capacitor can be used, and the very small dropout voltage and the large output current due to the built-in transistor with low on-resistance are provided. The S-13A1 Series includes a load current protection circuit that prevents the output current from exceeding the current capacity of the output transistor and a thermal shutdown circuit that prevents damage due to overheating. In addition to the types in which output voltage is set inside the IC, a type for which output voltage can be set via an external resistor is added to a lineup. Also, the S-13A1 Series includes an inrush current limit circuit to limit the excess inrush current generated at power-on or at the time when the ON / OFF pin is set to ON. High heat radiation HSOP-8A and HSOP-6 or small SOT-89-5 and HSNT-6A packages realize high-density mounting.

■ Features

- Output voltage (internally set): 1.0 V to 3.5 V, selectable in 0.05 V step
- Output voltage (externally set): 1.05 V to 5.0 V, settable via external resistor (HSOP-8A, HSOP-6 and SOT-89-5 only)
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (internally set, 1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 70 mV typ. (3.0 V output product, I_{OUT} = 300 mA)
- Current consumption: During operation: 60 μA typ., 90 μA max.
  During power-off: 0.1 μA typ., 1.0 μA max.
- Output current: Possible to output 1000 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 2.2 μF or more can be used.
- Ripple rejection: 70 dB typ. (f = 1.0 kHz)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Prevents damage caused by heat.
- Built-in inrush current limit circuit: Limits excessive inrush current generated at power-on or at the time when the ON / OFF pin is set to ON.
  For types in which output voltage is internally set of HSOP-8A, HSOP-6 and SOT-89-5 inrush current limit time can be changed via an external capacitor (C_{SS}).
  Inrush current limit time 0.7 ms typ.
  (types in which output voltage is internally set of HSOP-8A, HSOP-6 SOT-89-5, C_{SS} = 1.0 nF)
  Inrush current limit time 0.4 ms typ.
  (types in which output voltage is internally set of HSOP-8A, HSOP-6, SOT-89-5, SSC pin = open)
  Inrush current limit time 0.4 ms typ.
  (types in which output voltage is externally set of HSOP-8A, HSOP-6, SOT-89-5, types in which output voltage is internally set of HSNT-6A*2)
- Built-in ON / OFF circuit: Ensures long battery life.
- Pull-down resistor is selectable.
- Discharge shunt function is selectable.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Please make sure that the loss of the IC will not exceed the power dissipation when the output current is large.
***2.** Types in which output voltage is externally set are unavailable.

■ Applications

- Constant-voltage power supply for battery-powered device
- Constant-voltage power supply for TV, notebook PC and home electric appliance
- Constant-voltage power supply for portable equipment

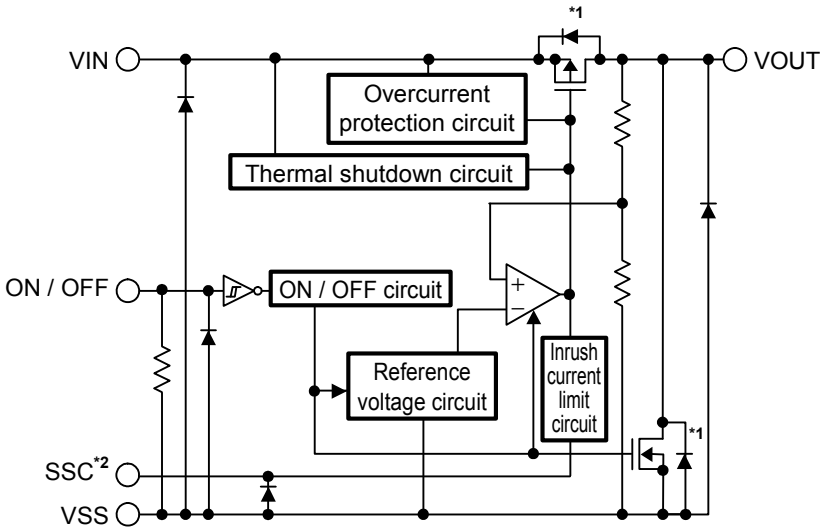
■ Packages

- HSOP-8A
- HSOP-6
- SOT-89-5
- HSNT-6A

■ Block Diagrams

1. Types in which output voltage is internally set

1. 1 S-13A1 Series A type (S-13A1Axx)

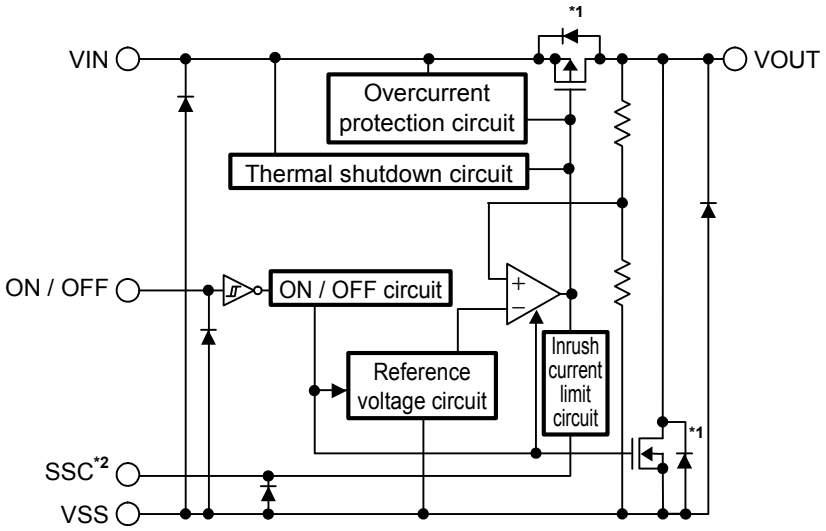


Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Available
Pull-down resistor	Available

***1.** Parasitic diode
***2.** HSOP-8A, HSOP-6, SOT-89-5 only.

Figure 1

1. 2 S-13A1 Series B type (S-13A1Bxx)

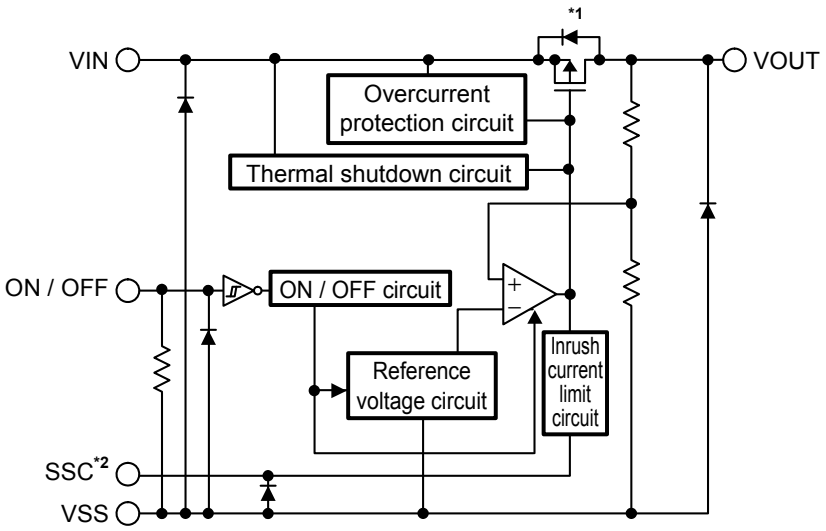


Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Available
Pull-down resistor	Unavailable

***1.** Parasitic diode
***2.** HSOP-8A, HSOP-6, SOT-89-5 only.

Figure 2

1. 3 S-13A1 Series C type (S-13A1Cxx)

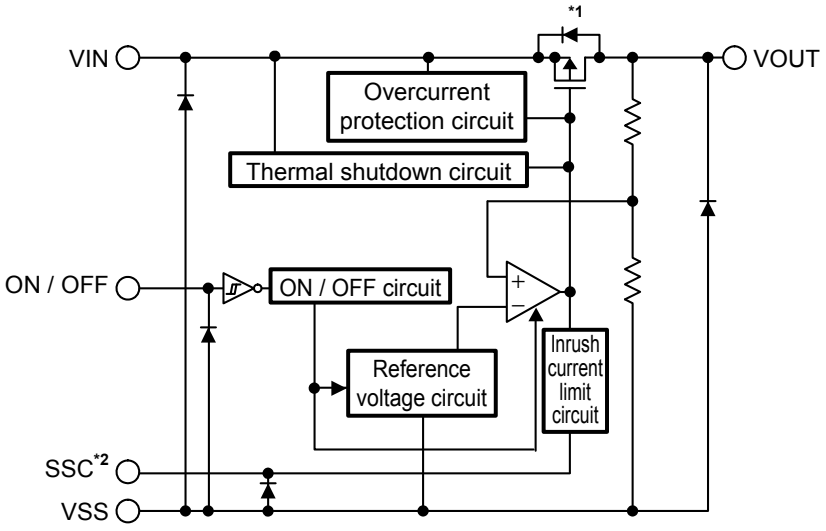


Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Unavailable
Pull-down resistor	Available

***1.** Parasitic diode
***2.** HSOP-8A, HSOP-6, SOT-89-5 only.

Figure 3

1. 4 S-13A1 Series D type (S-13A1Dxx)



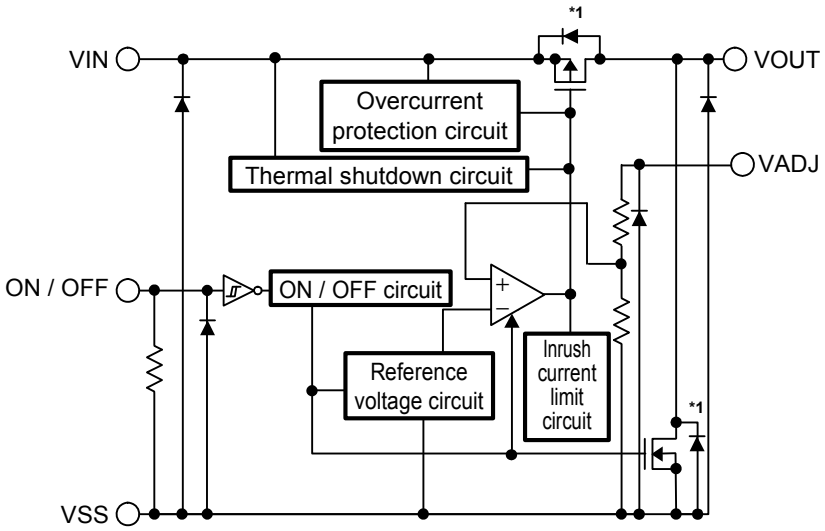
Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Unavailable
Pull-down resistor	Unavailable

***1.** Parasitic diode
***2.** HSOP-8A, HSOP-6, SOT-89-5 only.

Figure 4

2. Types in which output voltage is externally set (HSOP-8A, HSOP-6 and SOT-89-5 only)

2. 1 S-13A1 Series A type (S-13A1A00)

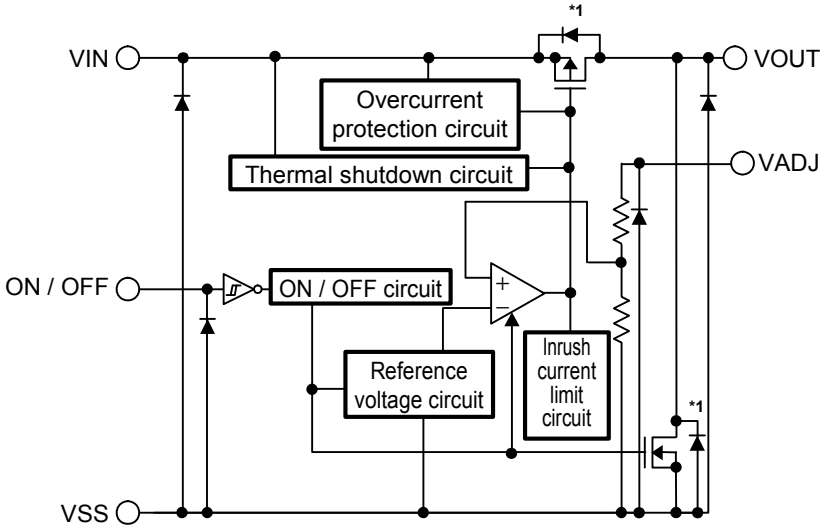


Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Available
Pull-down resistor	Available

***1.** Parasitic diode

Figure 5

2. 2 S-13A1 Series B type (S-13A1B00)

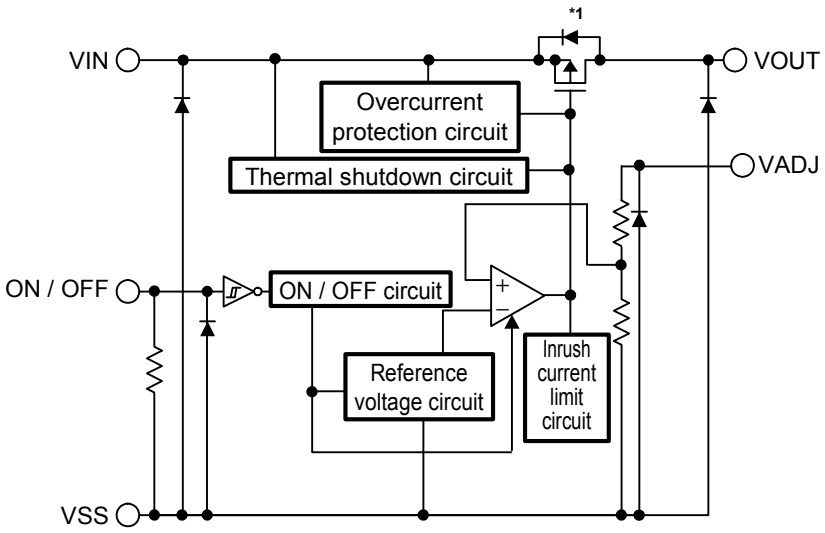


Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Available
Pull-down resistor	Unavailable

***1.** Parasitic diode

Figure 6

2. 3 S-13A1 Series C type (S-13A1C00)

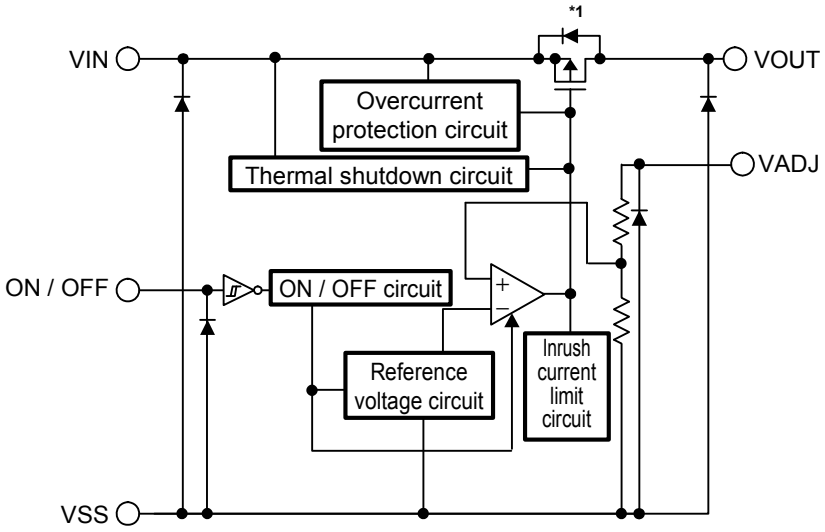


Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Unavailable
Pull-down resistor	Available

***1.** Parasitic diode

Figure 7

2. 4 S-13A1 Series D type (S-13A1D00)



Function	Status
ON / OFF logic	Active "H"
Discharge shunt function	Unavailable
Pull-down resistor	Unavailable

***1.** Parasitic diode

Figure 8

■ Product Name Structure

Users can select the product type, output voltage, and package type for the S-13A1 Series. Refer to "**1. Product name**" regarding the contents of product name, "**2. Function list of product type**" regarding the product type, "**3. Packages**" regarding the package drawings, "**4. Product name list**" regarding details of the product name.

1. Product name

1. 1 HSOP-8A, HSOP-6, SOT-89-5

S-13A1 x xx - xxxx U 3

- Environmental code
  - U: Lead-free (Sn 100%), halogen-free
- Package abbreviation and IC packing specifications*1
  - E8T1: HSOP-8A, Tape
  - E6T1: HSOP-6, Tape
  - U5T1: SOT-89-5, Tape
- Output voltage*2
  - 00: Externally set
  - 10 to 35: Internally set
  - (e.g., when the output voltage is 1.0 V, it is expressed as 10.)
- Product type*3
  - A to D

***1.** Refer to the tape drawing.
***2.** If you request the product which has 0.05 V step, contact our sales office.
***3.** Refer to "**2. Function list of product type**".

1. 2 HSNT-6A

S-13A1 x xx - A6T1 U 3

- Environmental code
  - U: Lead-free (Sn 100%), halogen-free
- Package abbreviation and IC packing specifications*1
  - A6T1: HSNT-6A, Tape
- Output voltage*2
  - 10 to 35: Internally set*3
  - (e.g., when the output voltage is 1.0 V, it is expressed as 10.)
- Product type*4
  - A to D

***1.** Refer to the tape drawing.
***2.** If you request the product which has 0.05 V step, contact our sales office.
***3.** Types in which output voltage is externally set are unavailable.
***4.** Refer to "**2. Function list of product type**".

2. Function list of product type

Table 1

Product Type	ON / OFF Logic	Discharge Shunt Function	Pull-down Resistor	Output Voltage	Inrush Current Limit Time	Package
A	Active "H"	Available	Available	Internally set	Adjustable via an external capacitor (C_{SS})	HSOP-8A, HSOP-6, SOT-89-5
					Fixed to 0.4 ms typ.*1	HSNT-6A
				Externally set	Fixed to 0.4 ms typ.*1	HSOP-8A, HSOP-6, SOT-89-5
B	Active "H"	Available	Unavailable	Internally set	Adjustable via an external capacitor (C_{SS})	HSOP-8A, HSOP-6, SOT-89-5
					Fixed to 0.4 ms typ.*1	HSNT-6A
				Externally set	Fixed to 0.4 ms typ.*1	HSOP-8A, HSOP-6, SOT-89-5
C	Active "H"	Unavailable	Available	Internally set	Adjustable via an external capacitor (C_{SS})	HSOP-8A, HSOP-6, SOT-89-5
					Fixed to 0.4 ms typ.*1	HSNT-6A
				Externally set	Fixed to 0.4 ms typ.*1	HSOP-8A, HSOP-6, SOT-89-5
D	Active "H"	Unavailable	Unavailable	Internally set	Adjustable via an external capacitor (C_{SS})	HSOP-8A, HSOP-6, SOT-89-5
					Fixed to 0.4 ms typ.*1	HSNT-6A
				Externally set	Fixed to 0.4 ms typ.*1	HSOP-8A, HSOP-6, SOT-89-5

***1.** Inrush current limit time is fixed to 0.4 ms typ. that can not be changed.

3. Packages

Table 2 Package Drawing Codes

Package Name	Dimension	Tape	Reel	Land	Stencil Opening
HSOP-8A	FH008-Z-P-SD FH008-Z-P-S1	FH008-Z-C-SD FH008-Z-C-S1	FH008-Z-R-SD	FH008-Z-L-SD	–
HSOP-6	FH006-A-P-SD	FH006-A-C-SD	FH006-A-R-S1	FH006-A-L-SD	–
SOT-89-5	UP005-A-P-SD	UP005-A-C-SD	UP005-A-R-SD	–	–
HSNT-6A	PJ006-A-P-SD	PJ006-A-C-SD	PJ006-A-R-SD	PJ006-A-LM-SD	PJ006-A-LM-SD

4. Product name list

4. 1 S-13A1 Series A type

ON / OFF logic: Active "H"
Discharge shunt function: Available Pull-down resistor: Available

Table 3

Output Voltage	HSOP-8A	HSOP-6	SOT-89-5	HSNT-6A
Externally set	S-13A1A00-E8T1U3	S-13A1A00-E6T1U3	S-13A1A00-U5T1U3	–
1.0 V ± 15 mV	S-13A1A10-E8T1U3	S-13A1A10-E6T1U3	S-13A1A10-U5T1U3	S-13A1A10-A6T1U3
1.1 V ± 15 mV	S-13A1A11-E8T1U3	S-13A1A11-E6T1U3	S-13A1A11-U5T1U3	S-13A1A11-A6T1U3
1.2 V ± 15 mV	S-13A1A12-E8T1U3	S-13A1A12-E6T1U3	S-13A1A12-U5T1U3	S-13A1A12-A6T1U3
1.25 V ± 15 mV	S-13A1A1C-E8T1U3	S-13A1A1C-E6T1U3	S-13A1A1C-U5T1U3	S-13A1A1C-A6T1U3
1.3 V ± 15 mV	S-13A1A13-E8T1U3	S-13A1A13-E6T1U3	S-13A1A13-U5T1U3	S-13A1A13-A6T1U3
1.4 V ± 15 mV	S-13A1A14-E8T1U3	S-13A1A14-E6T1U3	S-13A1A14-U5T1U3	S-13A1A14-A6T1U3
1.5 V ± 1.0%	S-13A1A15-E8T1U3	S-13A1A15-E6T1U3	S-13A1A15-U5T1U3	S-13A1A15-A6T1U3
1.6 V ± 1.0%	S-13A1A16-E8T1U3	S-13A1A16-E6T1U3	S-13A1A16-U5T1U3	S-13A1A16-A6T1U3
1.7 V ± 1.0%	S-13A1A17-E8T1U3	S-13A1A17-E6T1U3	S-13A1A17-U5T1U3	S-13A1A17-A6T1U3
1.8 V ± 1.0%	S-13A1A18-E8T1U3	S-13A1A18-E6T1U3	S-13A1A18-U5T1U3	S-13A1A18-A6T1U3
1.85 V ± 1.0%	S-13A1A1J-E8T1U3	S-13A1A1J-E6T1U3	S-13A1A1J-U5T1U3	S-13A1A1J-A6T1U3
1.9 V ± 1.0%	S-13A1A19-E8T1U3	S-13A1A19-E6T1U3	S-13A1A19-U5T1U3	S-13A1A19-A6T1U3
2.0 V ± 1.0%	S-13A1A20-E8T1U3	S-13A1A20-E6T1U3	S-13A1A20-U5T1U3	S-13A1A20-A6T1U3
2.1 V ± 1.0%	S-13A1A21-E8T1U3	S-13A1A21-E6T1U3	S-13A1A21-U5T1U3	S-13A1A21-A6T1U3
2.2 V ± 1.0%	S-13A1A22-E8T1U3	S-13A1A22-E6T1U3	S-13A1A22-U5T1U3	S-13A1A22-A6T1U3
2.3 V ± 1.0%	S-13A1A23-E8T1U3	S-13A1A23-E6T1U3	S-13A1A23-U5T1U3	S-13A1A23-A6T1U3
2.4 V ± 1.0%	S-13A1A24-E8T1U3	S-13A1A24-E6T1U3	S-13A1A24-U5T1U3	S-13A1A24-A6T1U3
2.5 V ± 1.0%	S-13A1A25-E8T1U3	S-13A1A25-E6T1U3	S-13A1A25-U5T1U3	S-13A1A25-A6T1U3
2.6 V ± 1.0%	S-13A1A26-E8T1U3	S-13A1A26-E6T1U3	S-13A1A26-U5T1U3	S-13A1A26-A6T1U3
2.7 V ± 1.0%	S-13A1A27-E8T1U3	S-13A1A27-E6T1U3	S-13A1A27-U5T1U3	S-13A1A27-A6T1U3
2.8 V ± 1.0%	S-13A1A28-E8T1U3	S-13A1A28-E6T1U3	S-13A1A28-U5T1U3	S-13A1A28-A6T1U3
2.85 V ± 1.0%	S-13A1A2J-E8T1U3	S-13A1A2J-E6T1U3	S-13A1A2J-U5T1U3	S-13A1A2J-A6T1U3
2.9 V ± 1.0%	S-13A1A29-E8T1U3	S-13A1A29-E6T1U3	S-13A1A29-U5T1U3	S-13A1A29-A6T1U3
3.0 V ± 1.0%	S-13A1A30-E8T1U3	S-13A1A30-E6T1U3	S-13A1A30-U5T1U3	S-13A1A30-A6T1U3
3.1 V ± 1.0%	S-13A1A31-E8T1U3	S-13A1A31-E6T1U3	S-13A1A31-U5T1U3	S-13A1A31-A6T1U3
3.2 V ± 1.0%	S-13A1A32-E8T1U3	S-13A1A32-E6T1U3	S-13A1A32-U5T1U3	S-13A1A32-A6T1U3
3.3 V ± 1.0%	S-13A1A33-E8T1U3	S-13A1A33-E6T1U3	S-13A1A33-U5T1U3	S-13A1A33-A6T1U3
3.4 V ± 1.0%	S-13A1A34-E8T1U3	S-13A1A34-E6T1U3	S-13A1A34-U5T1U3	S-13A1A34-A6T1U3
3.5 V ± 1.0%	S-13A1A35-E8T1U3	S-13A1A35-E6T1U3	S-13A1A35-U5T1U3	S-13A1A35-A6T1U3

Remark Please contact our sales office for products with specifications other than the above.

4. 2 S-13A1 Series B type

ON / OFF logic: Active "H"
Discharge shunt function: Available Pull-down resistor: Unavailable

Table 4

Output Voltage	HSOP-8A	HSOP-6	SOT-89-5	HSNT-6A
Externally set	S-13A1B00-E8T1U3	S-13A1B00-E6T1U3	S-13A1B00-U5T1U3	–
1.0 V ± 15 mV	S-13A1B10-E8T1U3	S-13A1B10-E6T1U3	S-13A1B10-U5T1U3	S-13A1B10-A6T1U3
1.1 V ± 15 mV	S-13A1B11-E8T1U3	S-13A1B11-E6T1U3	S-13A1B11-U5T1U3	S-13A1B11-A6T1U3
1.2 V ± 15 mV	S-13A1B12-E8T1U3	S-13A1B12-E6T1U3	S-13A1B12-U5T1U3	S-13A1B12-A6T1U3
1.25 V ± 15 mV	S-13A1B1C-E8T1U3	S-13A1B1C-E6T1U3	S-13A1B1C-U5T1U3	S-13A1B1C-A6T1U3
1.3 V ± 15 mV	S-13A1B13-E8T1U3	S-13A1B13-E6T1U3	S-13A1B13-U5T1U3	S-13A1B13-A6T1U3
1.4 V ± 15 mV	S-13A1B14-E8T1U3	S-13A1B14-E6T1U3	S-13A1B14-U5T1U3	S-13A1B14-A6T1U3
1.5 V ± 1.0%	S-13A1B15-E8T1U3	S-13A1B15-E6T1U3	S-13A1B15-U5T1U3	S-13A1B15-A6T1U3
1.6 V ± 1.0%	S-13A1B16-E8T1U3	S-13A1B16-E6T1U3	S-13A1B16-U5T1U3	S-13A1B16-A6T1U3
1.7 V ± 1.0%	S-13A1B17-E8T1U3	S-13A1B17-E6T1U3	S-13A1B17-U5T1U3	S-13A1B17-A6T1U3
1.8 V ± 1.0%	S-13A1B18-E8T1U3	S-13A1B18-E6T1U3	S-13A1B18-U5T1U3	S-13A1B18-A6T1U3
1.85 V ± 1.0%	S-13A1B1J-E8T1U3	S-13A1B1J-E6T1U3	S-13A1B1J-U5T1U3	S-13A1B1J-A6T1U3
1.9 V ± 1.0%	S-13A1B19-E8T1U3	S-13A1B19-E6T1U3	S-13A1B19-U5T1U3	S-13A1B19-A6T1U3
2.0 V ± 1.0%	S-13A1B20-E8T1U3	S-13A1B20-E6T1U3	S-13A1B20-U5T1U3	S-13A1B20-A6T1U3
2.1 V ± 1.0%	S-13A1B21-E8T1U3	S-13A1B21-E6T1U3	S-13A1B21-U5T1U3	S-13A1B21-A6T1U3
2.2 V ± 1.0%	S-13A1B22-E8T1U3	S-13A1B22-E6T1U3	S-13A1B22-U5T1U3	S-13A1B22-A6T1U3
2.3 V ± 1.0%	S-13A1B23-E8T1U3	S-13A1B23-E6T1U3	S-13A1B23-U5T1U3	S-13A1B23-A6T1U3
2.4 V ± 1.0%	S-13A1B24-E8T1U3	S-13A1B24-E6T1U3	S-13A1B24-U5T1U3	S-13A1B24-A6T1U3
2.5 V ± 1.0%	S-13A1B25-E8T1U3	S-13A1B25-E6T1U3	S-13A1B25-U5T1U3	S-13A1B25-A6T1U3
2.6 V ± 1.0%	S-13A1B26-E8T1U3	S-13A1B26-E6T1U3	S-13A1B26-U5T1U3	S-13A1B26-A6T1U3
2.7 V ± 1.0%	S-13A1B27-E8T1U3	S-13A1B27-E6T1U3	S-13A1B27-U5T1U3	S-13A1B27-A6T1U3
2.8 V ± 1.0%	S-13A1B28-E8T1U3	S-13A1B28-E6T1U3	S-13A1B28-U5T1U3	S-13A1B28-A6T1U3
2.85 V ± 1.0%	S-13A1B2J-E8T1U3	S-13A1B2J-E6T1U3	S-13A1B2J-U5T1U3	S-13A1B2J-A6T1U3
2.9 V ± 1.0%	S-13A1B29-E8T1U3	S-13A1B29-E6T1U3	S-13A1B29-U5T1U3	S-13A1B29-A6T1U3
3.0 V ± 1.0%	S-13A1B30-E8T1U3	S-13A1B30-E6T1U3	S-13A1B30-U5T1U3	S-13A1B30-A6T1U3
3.1 V ± 1.0%	S-13A1B31-E8T1U3	S-13A1B31-E6T1U3	S-13A1B31-U5T1U3	S-13A1B31-A6T1U3
3.2 V ± 1.0%	S-13A1B32-E8T1U3	S-13A1B32-E6T1U3	S-13A1B32-U5T1U3	S-13A1B32-A6T1U3
3.3 V ± 1.0%	S-13A1B33-E8T1U3	S-13A1B33-E6T1U3	S-13A1B33-U5T1U3	S-13A1B33-A6T1U3
3.4 V ± 1.0%	S-13A1B34-E8T1U3	S-13A1B34-E6T1U3	S-13A1B34-U5T1U3	S-13A1B34-A6T1U3
3.5 V ± 1.0%	S-13A1B35-E8T1U3	S-13A1B35-E6T1U3	S-13A1B35-U5T1U3	S-13A1B35-A6T1U3

Remark Please contact our sales office for products with specifications other than the above.

4. 3 S-13A1 Series C type

ON / OFF logic: Active "H"
Discharge shunt function: Unavailable Pull-down resistor: Available

Table 5

Output Voltage	HSOP-8A	HSOP-6	SOT-89-5	HSNT-6A
Externally set	S-13A1C00-E8T1U3	S-13A1C00-E6T1U3	S-13A1C00-U5T1U3	–
1.0 V ± 15 mV	S-13A1C10-E8T1U3	S-13A1C10-E6T1U3	S-13A1C10-U5T1U3	S-13A1C10-A6T1U3
1.1 V ± 15 mV	S-13A1C11-E8T1U3	S-13A1C11-E6T1U3	S-13A1C11-U5T1U3	S-13A1C11-A6T1U3
1.2 V ± 15 mV	S-13A1C12-E8T1U3	S-13A1C12-E6T1U3	S-13A1C12-U5T1U3	S-13A1C12-A6T1U3
1.25 V ± 15 mV	S-13A1C1C-E8T1U3	S-13A1C1C-E6T1U3	S-13A1C1C-U5T1U3	S-13A1C1C-A6T1U3
1.3 V ± 15 mV	S-13A1C13-E8T1U3	S-13A1C13-E6T1U3	S-13A1C13-U5T1U3	S-13A1C13-A6T1U3
1.4 V ± 15 mV	S-13A1C14-E8T1U3	S-13A1C14-E6T1U3	S-13A1C14-U5T1U3	S-13A1C14-A6T1U3
1.5 V ± 1.0%	S-13A1C15-E8T1U3	S-13A1C15-E6T1U3	S-13A1C15-U5T1U3	S-13A1C15-A6T1U3
1.6 V ± 1.0%	S-13A1C16-E8T1U3	S-13A1C16-E6T1U3	S-13A1C16-U5T1U3	S-13A1C16-A6T1U3
1.7 V ± 1.0%	S-13A1C17-E8T1U3	S-13A1C17-E6T1U3	S-13A1C17-U5T1U3	S-13A1C17-A6T1U3
1.8 V ± 1.0%	S-13A1C18-E8T1U3	S-13A1C18-E6T1U3	S-13A1C18-U5T1U3	S-13A1C18-A6T1U3
1.85 V ± 1.0%	S-13A1C1J-E8T1U3	S-13A1C1J-E6T1U3	S-13A1C1J-U5T1U3	S-13A1C1J-A6T1U3
1.9 V ± 1.0%	S-13A1C19-E8T1U3	S-13A1C19-E6T1U3	S-13A1C19-U5T1U3	S-13A1C19-A6T1U3
2.0 V ± 1.0%	S-13A1C20-E8T1U3	S-13A1C20-E6T1U3	S-13A1C20-U5T1U3	S-13A1C20-A6T1U3
2.1 V ± 1.0%	S-13A1C21-E8T1U3	S-13A1C21-E6T1U3	S-13A1C21-U5T1U3	S-13A1C21-A6T1U3
2.2 V ± 1.0%	S-13A1C22-E8T1U3	S-13A1C22-E6T1U3	S-13A1C22-U5T1U3	S-13A1C22-A6T1U3
2.3 V ± 1.0%	S-13A1C23-E8T1U3	S-13A1C23-E6T1U3	S-13A1C23-U5T1U3	S-13A1C23-A6T1U3
2.4 V ± 1.0%	S-13A1C24-E8T1U3	S-13A1C24-E6T1U3	S-13A1C24-U5T1U3	S-13A1C24-A6T1U3
2.5 V ± 1.0%	S-13A1C25-E8T1U3	S-13A1C25-E6T1U3	S-13A1C25-U5T1U3	S-13A1C25-A6T1U3
2.6 V ± 1.0%	S-13A1C26-E8T1U3	S-13A1C26-E6T1U3	S-13A1C26-U5T1U3	S-13A1C26-A6T1U3
2.7 V ± 1.0%	S-13A1C27-E8T1U3	S-13A1C27-E6T1U3	S-13A1C27-U5T1U3	S-13A1C27-A6T1U3
2.8 V ± 1.0%	S-13A1C28-E8T1U3	S-13A1C28-E6T1U3	S-13A1C28-U5T1U3	S-13A1C28-A6T1U3
2.85 V ± 1.0%	S-13A1C2J-E8T1U3	S-13A1C2J-E6T1U3	S-13A1C2J-U5T1U3	S-13A1C2J-A6T1U3
2.9 V ± 1.0%	S-13A1C29-E8T1U3	S-13A1C29-E6T1U3	S-13A1C29-U5T1U3	S-13A1C29-A6T1U3
3.0 V ± 1.0%	S-13A1C30-E8T1U3	S-13A1C30-E6T1U3	S-13A1C30-U5T1U3	S-13A1C30-A6T1U3
3.1 V ± 1.0%	S-13A1C31-E8T1U3	S-13A1C31-E6T1U3	S-13A1C31-U5T1U3	S-13A1C31-A6T1U3
3.2 V ± 1.0%	S-13A1C32-E8T1U3	S-13A1C32-E6T1U3	S-13A1C32-U5T1U3	S-13A1C32-A6T1U3
3.3 V ± 1.0%	S-13A1C33-E8T1U3	S-13A1C33-E6T1U3	S-13A1C33-U5T1U3	S-13A1C33-A6T1U3
3.4 V ± 1.0%	S-13A1C34-E8T1U3	S-13A1C34-E6T1U3	S-13A1C34-U5T1U3	S-13A1C34-A6T1U3
3.5 V ± 1.0%	S-13A1C35-E8T1U3	S-13A1C35-E6T1U3	S-13A1C35-U5T1U3	S-13A1C35-A6T1U3

Remark Please contact our sales office for products with specifications other than the above.

4. 4 S-13A1 Series D type

ON / OFF logic: Active "H"
Discharge shunt function: Unavailable Pull-down resistor: Unavailable

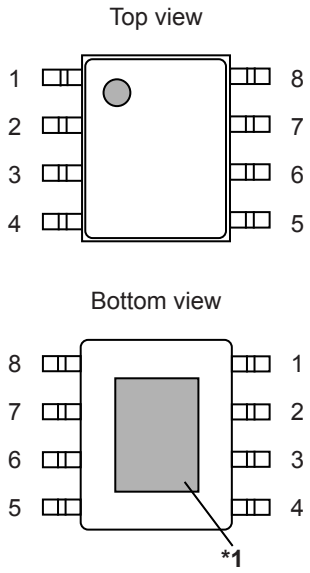
Table 6

Output Voltage	HSOP-8A	HSOP-6	SOT-89-5	HSNT-6A
Externally set	S-13A1D00-E8T1U3	S-13A1D00-E6T1U3	S-13A1D00-U5T1U3	–
1.0 V ± 15 mV	S-13A1D10-E8T1U3	S-13A1D10-E6T1U3	S-13A1D10-U5T1U3	S-13A1D10-A6T1U3
1.1 V ± 15 mV	S-13A1D11-E8T1U3	S-13A1D11-E6T1U3	S-13A1D11-U5T1U3	S-13A1D11-A6T1U3
1.2 V ± 15 mV	S-13A1D12-E8T1U3	S-13A1D12-E6T1U3	S-13A1D12-U5T1U3	S-13A1D12-A6T1U3
1.25 V ± 15 mV	S-13A1D1C-E8T1U3	S-13A1D1C-E6T1U3	S-13A1D1C-U5T1U3	S-13A1D1C-A6T1U3
1.3 V ± 15 mV	S-13A1D13-E8T1U3	S-13A1D13-E6T1U3	S-13A1D13-U5T1U3	S-13A1D13-A6T1U3
1.4 V ± 15 mV	S-13A1D14-E8T1U3	S-13A1D14-E6T1U3	S-13A1D14-U5T1U3	S-13A1D14-A6T1U3
1.5 V ± 1.0%	S-13A1D15-E8T1U3	S-13A1D15-E6T1U3	S-13A1D15-U5T1U3	S-13A1D15-A6T1U3
1.6 V ± 1.0%	S-13A1D16-E8T1U3	S-13A1D16-E6T1U3	S-13A1D16-U5T1U3	S-13A1D16-A6T1U3
1.7 V ± 1.0%	S-13A1D17-E8T1U3	S-13A1D17-E6T1U3	S-13A1D17-U5T1U3	S-13A1D17-A6T1U3
1.8 V ± 1.0%	S-13A1D18-E8T1U3	S-13A1D18-E6T1U3	S-13A1D18-U5T1U3	S-13A1D18-A6T1U3
1.85 V ± 1.0%	S-13A1D1J-E8T1U3	S-13A1D1J-E6T1U3	S-13A1D1J-U5T1U3	S-13A1D1J-A6T1U3
1.9 V ± 1.0%	S-13A1D19-E8T1U3	S-13A1D19-E6T1U3	S-13A1D19-U5T1U3	S-13A1D19-A6T1U3
2.0 V ± 1.0%	S-13A1D20-E8T1U3	S-13A1D20-E6T1U3	S-13A1D20-U5T1U3	S-13A1D20-A6T1U3
2.1 V ± 1.0%	S-13A1D21-E8T1U3	S-13A1D21-E6T1U3	S-13A1D21-U5T1U3	S-13A1D21-A6T1U3
2.2 V ± 1.0%	S-13A1D22-E8T1U3	S-13A1D22-E6T1U3	S-13A1D22-U5T1U3	S-13A1D22-A6T1U3
2.3 V ± 1.0%	S-13A1D23-E8T1U3	S-13A1D23-E6T1U3	S-13A1D23-U5T1U3	S-13A1D23-A6T1U3
2.4 V ± 1.0%	S-13A1D24-E8T1U3	S-13A1D24-E6T1U3	S-13A1D24-U5T1U3	S-13A1D24-A6T1U3
2.5 V ± 1.0%	S-13A1D25-E8T1U3	S-13A1D25-E6T1U3	S-13A1D25-U5T1U3	S-13A1D25-A6T1U3
2.6 V ± 1.0%	S-13A1D26-E8T1U3	S-13A1D26-E6T1U3	S-13A1D26-U5T1U3	S-13A1D26-A6T1U3
2.7 V ± 1.0%	S-13A1D27-E8T1U3	S-13A1D27-E6T1U3	S-13A1D27-U5T1U3	S-13A1D27-A6T1U3
2.8 V ± 1.0%	S-13A1D28-E8T1U3	S-13A1D28-E6T1U3	S-13A1D28-U5T1U3	S-13A1D28-A6T1U3
2.85 V ± 1.0%	S-13A1D2J-E8T1U3	S-13A1D2J-E6T1U3	S-13A1D2J-U5T1U3	S-13A1D2J-A6T1U3
2.9 V ± 1.0%	S-13A1D29-E8T1U3	S-13A1D29-E6T1U3	S-13A1D29-U5T1U3	S-13A1D29-A6T1U3
3.0 V ± 1.0%	S-13A1D30-E8T1U3	S-13A1D30-E6T1U3	S-13A1D30-U5T1U3	S-13A1D30-A6T1U3
3.1 V ± 1.0%	S-13A1D31-E8T1U3	S-13A1D31-E6T1U3	S-13A1D31-U5T1U3	S-13A1D31-A6T1U3
3.2 V ± 1.0%	S-13A1D32-E8T1U3	S-13A1D32-E6T1U3	S-13A1D32-U5T1U3	S-13A1D32-A6T1U3
3.3 V ± 1.0%	S-13A1D33-E8T1U3	S-13A1D33-E6T1U3	S-13A1D33-U5T1U3	S-13A1D33-A6T1U3
3.4 V ± 1.0%	S-13A1D34-E8T1U3	S-13A1D34-E6T1U3	S-13A1D34-U5T1U3	S-13A1D34-A6T1U3
3.5 V ± 1.0%	S-13A1D35-E8T1U3	S-13A1D35-E6T1U3	S-13A1D35-U5T1U3	S-13A1D35-A6T1U3

Remark Please contact our sales office for products with specifications other than the above.

■ Pin Configurations

1. HSOP-8A



***1.** Connect the heat sink of backside at shadowed area to the board, and set electric potential GND.
However, do not use it as the function of electrode.

Figure 9

Table 7 Types in Which Output Voltage is Internally Set

Pin No.	Symbol	Description
1	VOUT	Output voltage pin
2	ON / OFF	ON / OFF pin
3	NC*1	No connection
4	VSS	GND pin
5	SSC*2	Inrush current limit pin
6	NC*1	No connection
7	NC*1	No connection
8	VIN	Input voltage pin

***1.** The NC pin is electrically open.
The NC pin can be connected to the VIN pin or the VSS pin.

***2.** Connect a capacitor between the SSC pin and the VSS pin.
The inrush current limit time of the VOUT pin at power-on or at the time when the ON / OFF pin is set to ON can be adjusted according to the capacitance.
Moreover, the SSC pin is available even when it is open.
For details, refer to "**■ Selection of Capacitor for Inrush Current Limit (C_{SS}) (Types in Which Output Voltage is Internally Set of HSOP-8A, HSOP-6, SOT-89-5)**".

Table 8 Types in Which Output Voltage is Externally Set

Pin No.	Symbol	Description
1	VOUT	Output voltage pin
2	VADJ	Output voltage adjustment pin
3	NC*1	No connection
4	VSS	GND pin
5	ON / OFF	ON / OFF pin
6	NC*1	No connection
7	NC*1	No connection
8	VIN	Input voltage pin

***1.** The NC pin is electrically open.
The NC pin can be connected to the VIN pin or the VSS pin.

2. HSOP-6

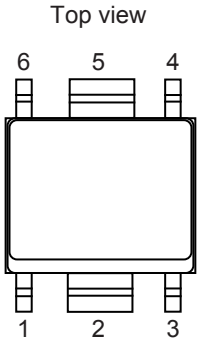


Figure 10

Table 9 Types in Which Output Voltage is Internally Set

Pin No.	Symbol	Description
1	VOUT	Output voltage pin
2	VSS	GND pin
3	ON / OFF	ON / OFF pin
4	SSC*1	Inrush current limit pin
5	VSS	GND pin
6	VIN	Input voltage pin

***1.** Connect a capacitor between the SSC pin and the VSS pin.
The inrush current limit time of the VOUT pin at power-on or at the time when the ON / OFF pin is set to ON can be adjusted according to the capacitance.
Moreover, the SSC pin is available even when it is open.
For details, refer to "**■ Selection of Capacitor for Inrush Current Limit (C_{SS}) (Types in Which Output Voltage is Internally Set of HSOP-8A, HSOP-6, SOT-89-5)**".

Table 10 Types in Which Output Voltage is Externally Set

Pin No.	Symbol	Description
1	VOUT	Output voltage pin
2	VSS	GND pin
3	VADJ	Output voltage adjustment pin
4	ON / OFF	ON / OFF pin
5	VSS	GND pin
6	VIN	Input voltage pin

3. SOT-89-5

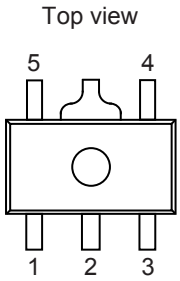


Figure 11

Table 11 Types in Which Output Voltage is Internally Set

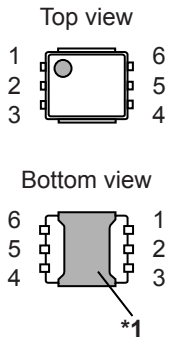
Pin No.	Symbol	Description
1	ON / OFF	ON / OFF pin
2	VSS	GND pin
3	SSC*1	Inrush current limit pin
4	VIN	Input voltage pin
5	VOUT	Output voltage pin

***1.** Connect a capacitor between the SSC pin and the VSS pin.
The inrush current limit time of the VOUT pin at power-on or at the time when the ON / OFF pin is set to ON can be adjusted according to the capacitance.
Moreover, the SSC pin is available even when it is open.
For details, refer to "■ **Selection of Capacitor for Inrush Current Limit (C_{SS}) (Types in Which Output Voltage is Internally Set of HSOP-8A, HSOP-6, SOT-89-5)**".

Table 12 Types in Which Output Voltage is Externally Set

Pin No.	Symbol	Description
1	VADJ	Output voltage adjustment pin
2	VSS	GND pin
3	ON / OFF	ON / OFF pin
4	VIN	Input voltage pin
5	VOUT	Output voltage pin

4. HSNT-6A



***1.** Connect the heatsink of backside at shadowed area to the board, and set electric potential open or GND.
However, do not use it as the function of electrode.

Figure 12

Table 13 Types in Which Output Voltage is Internally Set[*1]

Pin No.	Symbol	Description
1	VOUT[*2]	Output voltage pin
2	VOUT[*2]	Output voltage pin
3	ON / OFF	ON / OFF pin
4	VSS	GND pin
5	VIN[*3]	Input voltage pin
6	VIN[*3]	Input voltage pin

***1.** Types in which output voltage is externally set are unavailable.
***2.** Although pins of number 1 and 2 are connected internally, be sure to short-circuit them nearest in use.
***3.** Although pins of number 5 and 6 are connected internally, be sure to short-circuit them nearest in use.

■ Absolute Maximum Ratings

Table 14

(Ta = +25°C unless otherwise specified)

Item	Symbol	Absolute Maximum Rating	Unit
Input voltage	V_{IN}	V_{SS} − 0.3 to V_{SS} + 6.0	V
	$V_{ON / OFF}$	V_{SS} − 0.3 to V_{SS} + 6.0	V
	V_{SSC}	V_{SS} − 0.3 to V_{IN} + 0.3	V
	V_{VADJ}	V_{SS} − 0.3 to V_{SS} + 6.0	V
Output voltage	V_{OUT}	V_{SS} − 0.3 to V_{IN} + 0.3	V
Output current	I_{OUT}	1000	mA
Operation ambient temperature	T_{opr}	−40 to +85	°C
Storage temperature	T_{stg}	−40 to +125	°C

Caution The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

■ Thermal Resistance Value

Table 15

Item	Symbol	Condition		Min.	Typ.	Max.	Unit
Junction-to-ambient thermal resistance*1	θ_{ja}	HSOP-8A	Board A	–	104	–	°C/W
			Board B	–	74	–	°C/W
			Board C	–	39	–	°C/W
			Board D	–	37	–	°C/W
			Board E	–	31	–	°C/W
		HSOP-6	Board A	–	96	–	°C/W
			Board B	–	74	–	°C/W
			Board C	–	–	–	°C/W
			Board D	–	44	–	°C/W
			Board E	–	41	–	°C/W
		SOT-89-5	Board A	–	119	–	°C/W
			Board B	–	84	–	°C/W
			Board C	–	–	–	°C/W
			Board D	–	46	–	°C/W
			Board E	–	35	–	°C/W
		HSNT-6A	Board A	–	195	–	°C/W
			Board B	–	157	–	°C/W
			Board C	–	–	–	°C/W
			Board D	–	–	–	°C/W
			Board E	–	–	–	°C/W

***1.** Test environment: compliance with JEDEC STANDARD JESD51-2A

Remark Refer to "■ **Power Dissipation**" and "**Test Board**" for details.

■ Electrical Characteristics

1. Types in which output voltage is internally set (S-13A1x10 to S-13A1x35)

Table 16 (1 / 2)

(Ta = +25°C unless otherwise specified)

Item	Symbol	Condition		Min.	Typ.	Max.	Unit	Test Circuit
Output voltage[*1]	$V_{OUT(E)}$	$V_{IN} = V_{OUT(S)} + 1.0$ V, I_{OUT} = 100 mA	1.0 V ≤ $V_{OUT(S)}$ < 1.5 V	$V_{OUT(S)} - 0.015$	$V_{OUT(S)}$	$V_{OUT(S)} + 0.015$	V	1
			1.5 V ≤ $V_{OUT(S)}$ ≤ 3.5 V	$V_{OUT(S)} \times 0.99$	$V_{OUT(S)}$	$V_{OUT(S)} \times 1.01$	V	1
Output current[*2]	I_{OUT}	$V_{IN} \geq V_{OUT(S)} + 1.0$ V		1000[*5]	–	–	mA	3
Dropout voltage[*3]	V_{drop}	I_{OUT} = 300 mA	1.0 V ≤ $V_{OUT(S)}$ < 1.1 V	0.50	0.54	0.58	V	1
			1.1 V ≤ $V_{OUT(S)}$ < 1.2 V	–	0.44	0.48	V	1
			1.2 V ≤ $V_{OUT(S)}$ < 1.3 V	–	0.34	0.38	V	1
			1.3 V ≤ $V_{OUT(S)}$ < 1.4 V	–	0.24	0.28	V	1
			1.4 V ≤ $V_{OUT(S)}$ < 1.5 V	–	0.14	0.18	V	1
			1.5 V ≤ $V_{OUT(S)}$ < 2.6 V	–	0.10	0.15	V	1
			2.6 V ≤ $V_{OUT(S)}$ ≤ 3.5 V	–	0.07	0.10	V	1
		I_{OUT} = 1000 mA	1.0 V ≤ $V_{OUT(S)}$ < 1.1 V	–	0.90	–	V	1
			1.1 V ≤ $V_{OUT(S)}$ < 1.2 V	–	0.80	–	V	1
			1.2 V ≤ $V_{OUT(S)}$ < 1.3 V	–	0.70	–	V	1
			1.3 V ≤ $V_{OUT(S)}$ < 1.4 V	–	0.60	–	V	1
			1.4 V ≤ $V_{OUT(S)}$ < 1.5 V	–	0.50	–	V	1
			1.5 V ≤ $V_{OUT(S)}$ < 2.0 V	–	0.40	–	V	1
			2.0 V ≤ $V_{OUT(S)}$ < 2.6 V	–	0.32	–	V	1
			2.6 V ≤ $V_{OUT(S)}$ ≤ 3.5 V	–	0.23	–	V	1
Line regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	$V_{OUT(S)} + 0.5$ V ≤ V_{IN} ≤ 5.5 V, I_{OUT} = 100 mA		–	0.05	0.2	%/V	1
Load regulation	ΔV_{OUT2}	$V_{IN} = V_{OUT(S)} + 1.0$ V, 1 mA ≤ I_{OUT} ≤ 300 mA		–20	–3	20	mV	1
Output voltage temperature coefficient[*4]	$\frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}$	$V_{IN} = V_{OUT(S)} + 1.0$ V, I_{OUT} = 100 mA, –40°C ≤ Ta ≤ +85°C		–	±100	–	ppm/°C	1
Current consumption during operation	I_{SS1}	$V_{IN} = V_{OUT(S)} + 1.0$ V, ON / OFF pin = ON, no load		–	60	90	µA	2
Current consumption during power-off	I_{SS2}	$V_{IN} = V_{OUT(S)} + 1.0$ V, ON / OFF pin = OFF, no load		–	0.1	1.0	µA	2
Input voltage	V_{IN}	–		1.5	–	5.5	V	–
ON / OFF pin input voltage "H"	V_{SH}	$V_{IN} = V_{OUT(S)} + 1.0$ V, R_L = 1.0 kΩ determined by V_{OUT} output level		1.0	–	–	V	4
ON / OFF pin input voltage "L"	V_{SL}	$V_{IN} = V_{OUT(S)} + 1.0$ V, R_L = 1.0 kΩ determined by V_{OUT} output level		–	–	0.3	V	4
ON / OFF pin input current "H"	I_{SH}	V_{IN} = 5.5 V, $V_{ON / OFF}$ = 5.5 V	B / D type (without pull-down resistor)	–0.1	–	0.1	µA	4
			A / C type (with pull-down resistor)	1.0	2.5	5.0	µA	4
ON / OFF pin input current "L"	I_{SL}	V_{IN} = 5.5 V, $V_{ON / OFF}$ = 0 V		–0.1	–	0.1	µA	4
Ripple rejection	| RR |	$V_{IN} = V_{OUT(S)} + 1.0$ V, f = 1.0 kHz, ΔV_{rip} = 0.5 Vrms, I_{OUT} = 100 mA	1.0 V ≤ $V_{OUT(S)}$ < 1.2 V	–	70	–	dB	5
			1.2 V ≤ $V_{OUT(S)}$ < 3.0 V	–	65	–	dB	5
			3.0 V ≤ $V_{OUT(S)}$ ≤ 3.5 V	–	60	–	dB	5
Short-circuit current	I_{short}	$V_{IN} = V_{OUT(S)} + 1.0$ V, ON / OFF pin = ON, V_{OUT} = 0 V		–	200	–	mA	3
Thermal shutdown detection temperature	T_{SD}	Junction temperature		–	150	–	°C	–
Thermal shutdown release temperature	T_{SR}	Junction temperature		–	120	–	°C	–

Table 16 (2 / 2)

(Ta = +25°C unless otherwise specified)

Item	Symbol	Condition		Min.	Typ.	Max.	Unit	Test Circuit
Inrush current limit time	t_{RUSH}	HSOP-8A, HSOP-6, SOT-89-5	V_{IN} = $V_{OUT(S)}$ + 1.0 V, ON / OFF pin = ON, I_{OUT} = 1000 mA, C_{SS} = 1.0 nF	–	0.7	–	ms	6
			V_{IN} = $V_{OUT(S)}$ + 1.0 V, ON / OFF pin = ON, I_{OUT} = 1000 mA, C_{SS} = 0 nF	–	0.4	–	ms	6
		HSNT-6A	V_{IN} = $V_{OUT(S)}$ + 1.0 V, ON / OFF pin = ON, I_{OUT} = 1000 mA	–	0.4	–	ms	6
"L" output Nch ON resistance	R_{LOW}	V_{IN} = 5.5 V, V_{OUT} = 0.1 V	A / B type (with discharge shunt function)	–	35	–	Ω	3
Power-off pull-down resistance	R_{PD}	–	A / C type (with pull-down resistor)	1.1	2.2	5.5	MΩ	4

***1.** $V_{OUT(S)}$: Set output voltage
$V_{OUT(E)}$: Actual output voltage
Output voltage when fixing I_{OUT} (= 100 mA) and inputting $V_{OUT(S)}$ + 1.0 V

***2.** The output current at which the output voltage becomes 95% of $V_{OUT(E)}$ after gradually increasing the output current.

***3.** $V_{drop} = V_{IN1} - (V_{OUT3} \times 0.98)$
V_{OUT3} is the output voltage when V_{IN} = $V_{OUT(S)}$ + 1.0 V and I_{OUT} = 300 mA, 1000 mA.
V_{IN1} is the input voltage at which the output voltage becomes 98% of V_{OUT3} after gradually decreasing the input voltage.

***4.** The change in temperature [mV/°C] is calculated using the following equation.

$$\frac{\Delta V_{OUT}}{\Delta Ta}\ [mV/°C]^{*1} = V_{OUT(S)}\ [V]^{*2} \times \frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}\ [ppm/°C]^{*3} \div 1000$$

***1.** Change in temperature of the output voltage
***2.** Set output voltage
***3.** Output voltage temperature coefficient

***5.** The output current can be at least this value.
Due to limitation of the package power dissipation, this value may not be satisfied. Attention should be paid to the power dissipation when the output current is large.
This specification is guaranteed by design.

2. Types in which output voltage is externally set (S-13A1x00, HSOP-8A, HSOP-6, SOT-89-5 only)

Table 17

(Ta = +25°C unless otherwise specified)

Item	Symbol	Condition		Min.	Typ.	Max.	Unit	Test Circuit
Output voltage of adjust pin[*1]	V_{VADJ}	$V_{VADJ} = V_{OUT}$, $V_{IN} = V_{OUT(S)} + 1.0$ V, I_{OUT} = 100 mA		0.985	1.0	1.015	V	7
Output voltage range	V_{ROUT}	–		1.05	–	5.00	V	13
Internal resistance value of adjust pin	R_{VADJ}	–		–	400	–	kΩ	–
Output current[*2]	I_{OUT}	$V_{IN} \geq V_{OUT(S)} + 1.0$ V		1000[*5]	–	–	mA	9
Dropout voltage[*3]	V_{drop}	$V_{VADJ} = V_{OUT}$, I_{OUT} = 300 mA, $V_{OUT(S)}$ = 1.0 V		0.50	0.54	0.58	V	7
		$V_{VADJ} = V_{OUT}$, I_{OUT} = 1000 mA, $V_{OUT(S)}$ = 1.0 V		–	0.90	–	V	7
Line regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	$V_{VADJ} = V_{OUT}$, $V_{OUT(S)} + 0.5$ V ≤ V_{IN} ≤ 5.5 V, I_{OUT} = 100 mA		–	0.05	0.2	%/V	7
Load regulation	ΔV_{OUT2}	$V_{VADJ} = V_{OUT}$, $V_{IN} = V_{OUT(S)} + 1.0$ V, 1 mA ≤ I_{OUT} ≤ 300 mA		–20	–3	20	mV	7
Output voltage temperature coefficient[*4]	$\frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}$	$V_{IN} = V_{OUT(S)} + 1.0$ V, I_{OUT} = 100 mA, –40°C ≤ Ta ≤ +85°C		–	±100	–	ppm/°C	7
Current consumption during operation	I_{SS1}	$V_{VADJ} = V_{OUT}$, $V_{IN} = V_{OUT(S)} + 1.0$ V, ON / OFF pin = ON, no load		–	60	90	µA	8
Current consumption during power-off	I_{SS2}	$V_{VADJ} = V_{OUT}$, $V_{IN} = V_{OUT(S)} + 1.0$ V, ON / OFF pin = OFF, no load		–	0.1	1.0	µA	8
Input voltage	V_{IN}	–		1.5	–	5.5	V	–
ON / OFF pin input voltage "H"	V_{SH}	$V_{IN} = V_{OUT(S)} + 1.0$ V, R_L = 1.0 kΩ determined by V_{OUT} output level		1.0	–	–	V	10
ON / OFF pin input voltage "L"	V_{SL}	$V_{IN} = V_{OUT(S)} + 1.0$ V, R_L = 1.0 kΩ determined by V_{OUT} output level		–	–	0.3	V	10
ON / OFF pin input current "H"	I_{SH}	V_{IN} = 5.5 V, $V_{ON / OFF}$ = 5.5 V	B / D type (without pull-down resistor)	–0.1	–	0.1	µA	10
			A / C type (with pull-down resistor)	1.0	2.5	5.0	µA	10
ON / OFF pin input current "L"	I_{SL}	V_{IN} = 5.5 V, $V_{ON / OFF}$ = 0 V		–0.1	–	0.1	µA	10
Ripple rejection	| RR |	$V_{VADJ} = V_{OUT}$, $V_{IN} = V_{OUT(S)} + 1.0$ V, f = 1.0 kHz, ΔV_{rip} = 0.5 Vrms, I_{OUT} = 100 mA, V_{OUT} = 1.0 V		–	70	–	dB	11
Short-circuit current	I_{short}	$V_{IN} = V_{OUT(S)} + 1.0$ V, ON / OFF pin = ON, V_{OUT} = 0 V		–	200	–	mA	9
Thermal shutdown detection temperature	T_{SD}	Junction temperature		–	150	–	°C	–
Thermal shutdown release temperature	T_{SR}	Junction temperature		–	120	–	°C	–
Inrush current limit time	t_{RUSH}	$V_{IN} = V_{OUT(S)} + 1.0$ V, ON / OFF pin = ON, I_{OUT} = 1000 mA		–	0.4	–	ms	12
"L" output Nch ON resistance	R_{LOW}	V_{IN} = 5.5 V, V_{OUT} = 0.1 V	A / B type (with discharge shunt function)	–	35	–	Ω	9
Power-off pull-down resistor	R_{PD}	–	A / C type (with pull-down resistor)	1.1	2.2	5.5	MΩ	10

***1.** $V_{OUT(S)}$: Set output voltage (= 1.0 V)

***2.** The output current at which the output voltage becomes 95% of V_{VADJ} after gradually increasing the output current.

***3.** $V_{drop} = V_{IN1} - (V_{OUT3} \times 0.98)$

V_{OUT3} is the output voltage when $V_{IN} = V_{OUT(S)} + 1.0$ V and $I_{OUT} = 300$ mA, 1000 mA.

V_{IN1} is the input voltage at which the output voltage becomes 98% of V_{OUT3} after gradually decreasing the input voltage.

***4.** The change in temperature [mV/°C] is calculated using the following equation.

$$\frac{\Delta V_{OUT}}{\Delta Ta}\ [\text{mV/°C}]^{*1} = V_{OUT(S)}\ [\text{V}]^{*2} \times \frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}\ [\text{ppm/°C}]^{*3} \div 1000$$

***1.** Change in temperature of the output voltage

***2.** Set output voltage

***3.** Output voltage temperature coefficient

***5.** The output current can be at least this value.

Due to limitation of the package power dissipation, this value may not be satisfied. Attention should be paid to the power dissipation when the output current is large.

This specification is guaranteed by design.

■ Test Circuits

1. Types in which output voltage is internally set (S-13A1x10 to S-13A1x35)

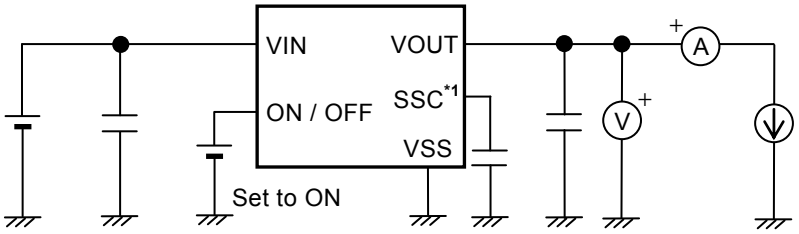


Figure 13 Test Circuit 1

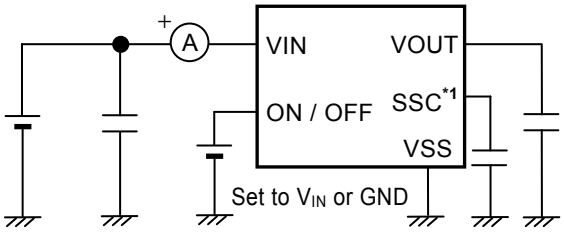


Figure 14 Test Circuit 2

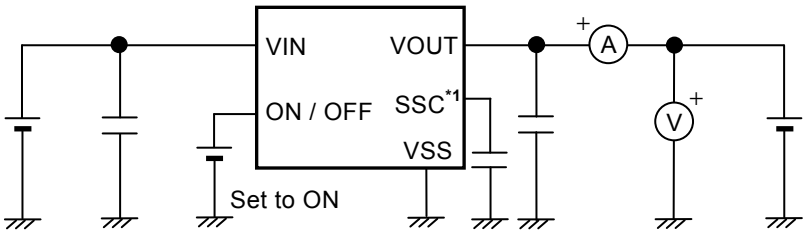


Figure 15 Test Circuit 3

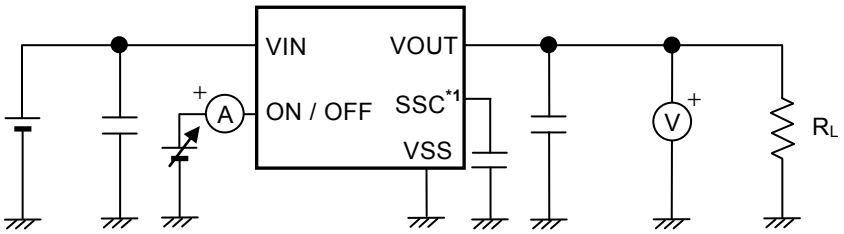


Figure 16 Test Circuit 4

***1.** HSOP-8A, HSOP-6, SOT-89-5 only.

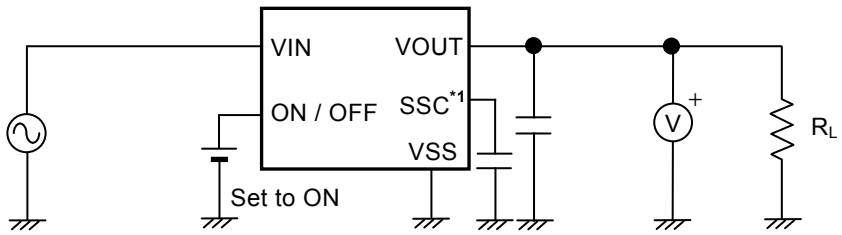


Figure 17 Test Circuit 5

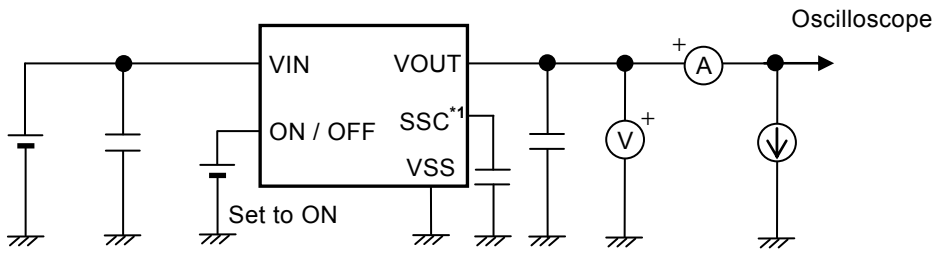


Figure 18 Test Circuit 6

1. HSOP-8A, HSOP-6, SOT-89-5 only.

2. Types in which output voltage is externally set (S-13A1x00, HSOP-8A, HSOP-6, SOT-89-5 only)

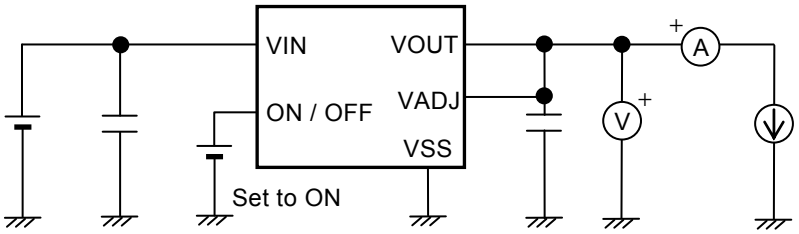


Figure 19 Test Circuit 7

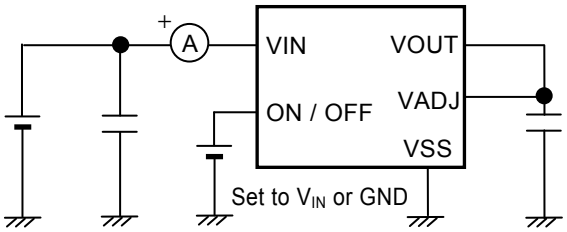


Figure 20 Test Circuit 8

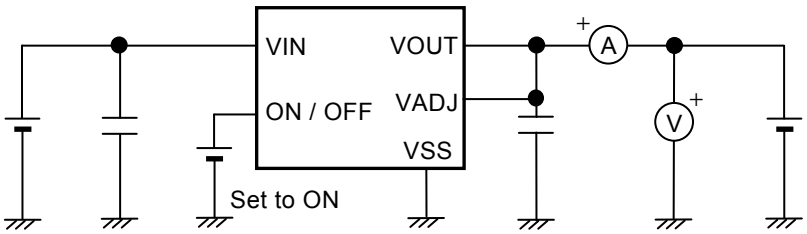


Figure 21 Test Circuit 9

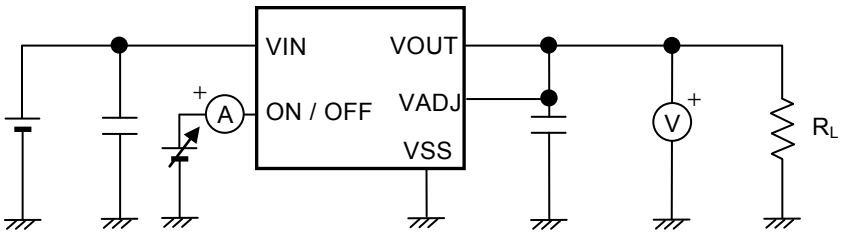


Figure 22 Test Circuit 10

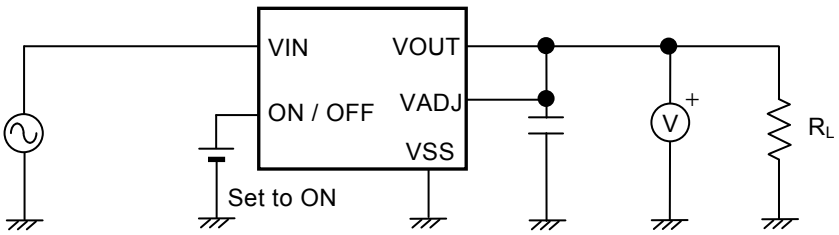


Figure 23 Test Circuit 11

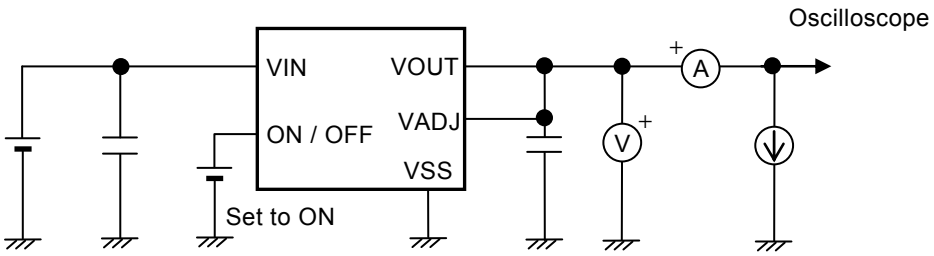


Figure 24 Test Circuit 12

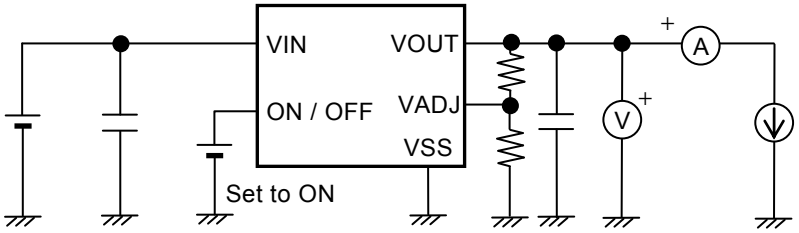
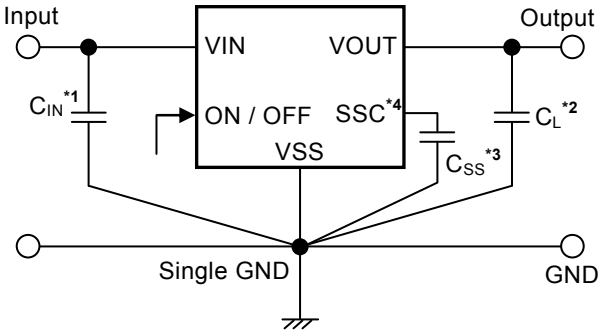


Figure 25 Test Circuit 13

■ Standard Circuits

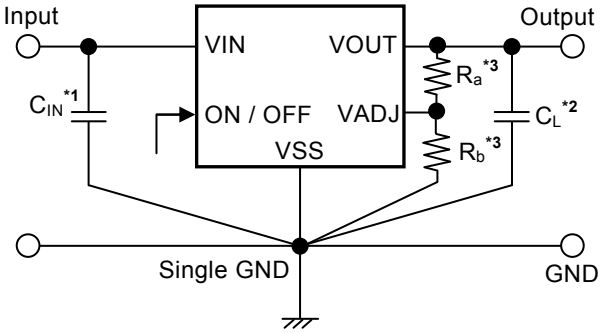
1. Types in which output voltage is internally set (S-13A1x10 to S-13A1x35)



***1.** C_{IN} is a capacitor for stabilizing the input.
***2.** A ceramic capacitor of 2.2 μF or more can be used as C_L.
***3.** A ceramic capacitor of 22 nF or less can be used as C_{SS}.
***4.** HSOP-8A, HSOP-6, SOT-89-5 only.

Figure 26

2. Types in which output voltage is externally set (S-13A1x00, HSOP-8A, HSOP-6, SOT-89-5 only)



***1.** C_{IN} is a capacitor for stabilizing the input.
***2.** A ceramic capacitor of 2.2 μF or more can be used as C_L.
***3.** Resistor of 0.1 kΩ to 606 kΩ as R_a, 2 kΩ to 200 kΩ as R_b can be used.

Figure 27

Caution **The above connection diagram and constant will not guarantee successful operation. Perform thorough evaluation using the actual application to set the constant.**