ABLIC
MinebeaMitsumi Group

Product Catalog

Linear Regulators (LDO Regulators), Voltage Detectors, Watchdog Timers

2022

ABLIC Inc.

Table of Contents

S-1317 Series

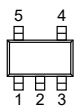
5.5 V INPUT, 100 mA CMOS VOLTAGE REGULATOR WITH 0.35 µA SUPER LOW CURRENT CONSUMPTION

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV) (Ta = +25°C)
- Dropout voltage: 20 mV typ. (2.5 V output product, at I_{OUT} = 10 mA) (Ta = +25°C)
- Current consumption during operation: 0.35 µA typ. (Ta = +25°C)
- Output current: Possible to output 100 mA (at $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input capacitor: A ceramic capacitor can be used. (1.0 µF or more)
- Output capacitor: A ceramic capacitor can be used. (1.0 µF to 100 µF)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- 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.

SOT-23-5



1 VIN
2 VSS
3 NC
4 NC
5 VOUT

HSNT-4(1010)

1 VOUT
2 VSS
3 NC
4 VIN

S-1318 Series

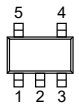
5.5 V INPUT, 100 mA, 95 nA SUPER LOW CURRENT CONSUMPTION VOLTAGE REGULATOR

Features

- Output voltage: 1.2 V, 1.8 V, 2.2 V, 2.3 V, 2.5 V, 2.8 V, 3.0 V, 3.3 V
- Input voltage: 1.7 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.2 V output product: ±15 mV) (Ta = +25°C)
- Dropout voltage: 45 mV typ. (2.5 V output product, at I_{OUT} = 10 mA) (Ta = +25°C)
- Current consumption : During operation: 95 nA typ.
  During power-off: 2 nA typ.
- Output current: Possible to output 75 mA
  (1.2 V output product, at $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
  Possible to output 100 mA (1.8 V, 2.2 V, 2.3 V, 2.5 V, 2.8 V, 3.0 V, 3.3 V output product, at $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input capacitor: A ceramic capacitor can be used (1.0 µF or more)
- Output capacitor: A ceramic capacitor can be used (1.0 µF or more)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor
- Built-in ON / OFF circuit: Ensures long battery life
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" 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.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1112/1122 Series

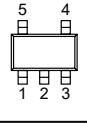
HIGH RIPPLE-REJECTION AND LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.5 V to 5.5 V, selectable in 0.1 V step
- Output voltage accuracy: ±1.0%
- Dropout voltage: 190 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 50 µA typ., 90 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Output capacitor: A ceramic capacitor of 0.47 µF or more can be used.
- Ripple rejection: 80 dB typ. (f = 1.0 kHz)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON/OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.

SOT-23-5



	S-1112	S-1122
1	VIN	VOUT
2	VSS	VSS
3	ON/OFF	VIN
4	NC	ON/OFF
5	VOUT	NC

SNT-6A(H)

	S-1112
1	NC
2	VSS
3	ON/OFF
4	VIN
5	VSS
6	VOUT

S-T111 Series

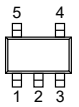
HIGH RIPPLE-REJECTION LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.5 V to 5.5 V, selectable in 0.1 V step
- Output voltage accuracy: ±1.0%
- Dropout voltage: 190 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 50 µA typ., 90 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 µF or more can be used.
- Ripple rejection: 80 dB typ. (f = 1.0 kHz)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON/OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.

SOT-23-5



1 ON/OFF
2 VSS
3 NC
4 VOUT
5 VIN

S-1167 Series

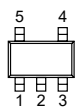
ULTRA LOW CURRENT CONSUMPTION, HIGH RIPPLE REJECTION AND LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.5 V to 5.5 V, selectable in 0.1 V step
- Input voltage: 2.0 V to 6.5 V
- Output voltage accuracy: ±1.0%
- Dropout voltage: 150 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 9 µA typ., 16 µA max.
  During power-off: 0.1 µA typ., 0.9 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 µF or more can be used.
- Ripple rejection: 70 dB typ. (3.0 V output product, f = 1.0 kHz)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON / OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

*1. Attention should be paid to the power dissipation of the package when the output current is large.
*2. Refer to "■ **Product Name Structure**" for details.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

SNT-6A(H)

1 VOUT
2 VSS
3 NC
4 ON/OFF
5 VSS
6 VIN

S-1323 Series

HIGH RIPPLE-REJECTION AND SMALL PACKAGE CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.5 V to 5.5 V, selectable in 0.1 V step
- Output voltage accuracy: ±1.0%
- Current consumption: During operation: 70 µA typ., 90 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 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 ON/OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

*1. Attention should be paid to the power dissipation of the package when the output current is large.
*2. Refer to "■ **Product Name Structure**" for details.

SC-82AB

1 VOUT
2 VSS
3 ON/OFF
4 VIN

SNT-4A

1 VOUT
2 VIN
3 ON/OFF
4 VSS

S-1200 Series

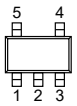
HIGH RIPPLE-REJECTION LOW DROPOUT LOW INPUT-AND-OUTPUT CAPACITANCE CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.5 V to 5.5 V, selectable in 0.1 V step
- Input voltage: 2.0 V to 10.0 V
- Output voltage accuracy: ±1.0%
- Dropout voltage: 140 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 18 µA typ., 40 µA max.
  During power-off: 0.01 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 µF or more can be used.
- Ripple rejection: 70 dB typ. (f = 1.0 kHz, 1.5 V ≤ V_{OUT} ≤ 3.0 V)
  65 dB typ. (f = 1.0 kHz, 3.1 V ≤ V_{OUT} ≤ 5.5 V)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON/OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = –40°C to + 85°C
- Lead-free, Sn 100%, halogen-free*2

*1. Attention should be paid to the power dissipation of the package when the output current is large.
*2. Refer to "■ **Product Name Structure**" for details.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

HSNT-6A

1 VOUT
2 NC
3 VSS
4 ON/OFF
5 NC
6 VIN

SNT-6A(H)

1 VOUT
2 VSS
3 NC
4 ON/OFF
5 VSS
6 VIN

S-L2980 Series

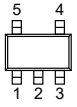
HIGH RIPPLE-REJECTION AND LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.5 V to 6.0 V, selectable in 0.1 V steps
- Output voltage accuracy: ±2.0 %
- Dropout voltage: 120 mV typ. (3.0 V output product, I_{OUT}=50 mA)
- Current consumption: During operation: 90 µA typ., 140 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)}$+1.0 V)*1
- Output capacitor: A ceramic capacitor of 1.0 µF or more can be used.
  (A ceramic capacitor of 2.2 µF or more can be used for the products whose output voltage is 1.7 V or less.)
- Ripple rejection: 70 dB typ. (f=1.0 kHz)
- Built-in ON/OFF circuit: Ensures long battery life.
- Operation temperature range: Ta=–40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

*1. Attention should be paid to the power dissipation of the package when the load is large.
*2. Refer to "■ **Product Name Structure**" for details.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

S-1312 Series

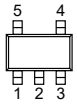
5.5 V INPUT, 150 mA VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 160 mV typ. (2.8 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 20 µA typ., 30 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.22 µF or more can be used.
- Ripple rejection: 75 dB typ. (1.2 V output product, f = 1.0 kHz)
  70 dB typ. (2.85 V output product, 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 ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Attention should be paid to the power dissipation of the package when the output current is large.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

HSNT-4(0808)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1312xxxH Series

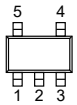
105°C OPERATION, 5.5 V INPUT, 150 mA VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 160 mV typ. (2.8 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 20 µA typ., 30 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.22 µF or more can be used.
- Ripple rejection: 75 dB typ. (1.2 V output product, f = 1.0 kHz)
  70 dB typ. (2.85 V output product, 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 ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +105°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.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1335 Series

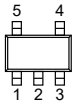
5.5 V INPUT, 150 mA VOLTAGE REGULATOR WITH SOFT-START FUNCTION

Features

- Output voltage: 1.0 V to 3.6 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 70 mV typ. (2.8 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 36 µA typ., 54 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 µF or more can be used.
- Ripple rejection: 70 dB typ. (f = 10 kHz, $V_{OUT(S)} \leq 2.5$ V)
  80 dB typ. (f = 1.0 kHz)
- Built-in soft-start circuit: The rising time of output voltage immediately after power-on or after the ON / OFF pin is set to ON is adjustable.
  The soft-start time of SOT-23-5 can be switched to t_{SS0} = 0.1 ms typ. / t_{SS1} = 1.0 ms typ. with the SST pin.
  The soft-start time of SC-82AB is fixed to t_{SS0} = 0.1 ms typ.
  The soft-start time of HSNT-4 (1010) is fixed to either t_{SS0} = 0.1 ms typ. or t_{SS1} = 1.0 ms typ.
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Attention should be paid to the power dissipation of the package when the output current is large.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 SST
5 VOUT

SC-82AB

1 ON/OFF
2 VSS
3 VOUT
4 VIN

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-13R1 Series

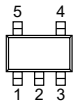
5.5 V INPUT, 150 mA VOLTAGE REGULATOR WITH REVERSE CURRENT PROTECTION

Features

- Output voltage: 1.2 V to 4.0 V, selectable in 0.05 V step
- Input voltage: 2.0 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.2 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 150 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 5 µA typ., 9 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 µF or more can be used.
- Ripple rejection: 70 dB typ. (3.0 V output product, f = 1.0 kHz)
- Reverse current protection function: I_{REV} = 0.09 µA max.
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Prevents damage caused by heat.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

*1. Attention should be paid to the power dissipation of the package when the output current is large.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

SC-82AB

1 ON/OFF
2 VSS
3 VOUT
4 VIN

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1313 Series

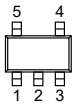
5.5 V INPUT, 200 mA VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step.
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 170 mV typ. (2.8 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 0.9 µA typ., 1.35 µA max.
  During power-off: 0.01 µA typ., 0.1 µA max.
- Output current: Possible to output 200 mA ($V_{OUT(S)} \geq 1.4$ V, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 µF or more can be used.
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Prevents damage caused by heat.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

*1. Attention should be paid to the power dissipation of the package when the output current is large.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

SC-82AB

1 ON/OFF
2 VSS
3 VOUT
4 VIN

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

HSNT-4(0808)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1313xxxH Series

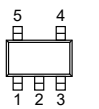
105°C OPERATION, 5.5 V INPUT, 200 mA VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step.
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 170 mV typ. (2.8 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 0.9 µA typ., 1.35 µA max.
  During power-off: 0.01 µA typ., 0.1 µA max.
- Output current: Possible to output 200 mA ($V_{OUT(S)} \geq 1.4$ V, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input capacitor: A ceramic capacitor can be used. (0.1 µF or more)
- Output capacitor: A ceramic capacitor can be used. (0.1 µF or more)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor
- Built-in thermal shutdown circuit: Detection temperature 150°C typ.
- Built-in ON / OFF circuit: Ensures long battery life
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +105°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.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

SC-82AB

1 ON/OFF
2 VSS
3 VOUT
4 VIN

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

HSNT-4(0808)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1315 Series

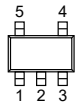
5.5 V INPUT, 200 mA, OUTPUT CAPACITOR-LESS VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 4.2 V, selectable in 0.05 V step
- Input voltage: 1.4 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 224 mV typ. (3.0 V output product, I_{OUT} = 200 mA)
- Current consumption: During operation: 7 µA typ., 13 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 200 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 µF or more can be used for the input capacitor.
  Output capacitor is unnecessary, or a ceramic capacitor of 10 µF or less can be used.
- Ripple rejection: 65 dB typ. (1.0 V output product, f = 1.0 kHz)
  60 dB typ. (2.8 V output product, f = 1.0 kHz)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Attention should be paid to the power dissipation of the package when the output current is large.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

HSNT-6(1212)

1 VOUT
2 VSS
3 NC
4 ON/OFF
5 NC
6 VIN

S-1324 Series

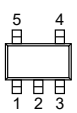
5.5 V INPUT, 200 mA, LOW NOISE VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step.
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 170 mV typ. (2.8 V output product, at I_{OUT} = 100 mA)
- Current consumption: During operation: 7 µA typ., 12 µA max.
  During power-off: 0.01 µA typ., 0.1 µA max.
- Output current: Possible to output 100 mA
  (at 1.0 V ≤ $V_{OUT(S)}$ < 1.2 V, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
  Possible to output 200 mA
  (at $V_{OUT(S)} \geq 1.2$ V, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input capacitor: A ceramic capacitor can be used. (1.0 µF or more)
- Output capacitor: A ceramic capacitor can be used. (1.0 µF or more)
- Output noise: 17 µVrms typ. (at BW = 10 Hz to 100 kHz)
- Ripple rejection: 65 dB typ.(at f = 1.0 kHz)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor
- Built-in thermal shutdown circuit: Detection temperature 150°C typ.
- Built-in ON / OFF circuit: Ensures long battery life
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" 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.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

SC-82AB

1 ON/OFF
2 VSS
3 VOUT
4 VIN

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1206 Series

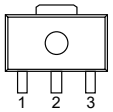
ULTRA LOW CURRENT CONSUMPTION AND LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.2 V to 5.2 V, selectable in 0.05 V step
- Input voltage: 1.7 V to 6.5 V
- Output voltage accuracy: ±1.0% (1.2 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 150 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 1.0 µA typ., 1.5 µA max.
- Output current: Possible to output 250 mA (3.0 V output product, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 µF or more can be used.
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

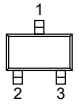
***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.

SOT-89-3



1 VSS
2 VIN
3 VOUT

SOT-23-3



1 VIN
2 VSS
3 VOUT

SNT-6A(H)

1 VOUT
2 VIN
3 VSS
4 NC
5 VIN
6 NC

S-1132 Series

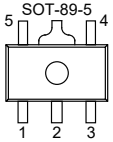
HIGH RIPPLE-REJECTION AND LOW DROPOUT MIDDLE OUTPUT CURRENT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.5 V to 5.5 V, selectable in 0.1 V step
- Input voltage: 2.0 V to 6.5 V
- Output voltage accuracy: ±1.0%
- Dropout voltage: 130 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 20 µA typ., 40 µA max.
  During power-off: 0.01 µA typ., 1.0 µA max.
- Output current: Possible to output 300 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 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 ON/OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

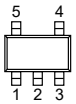
*1. Attention should be paid to the power dissipation of the package when the output current is large.
*2. Refer to "■ **Product Name Structure**" for details.

SOT-89-5



1 VOUT
2 VSS
3 NC
4 ON/OFF
5 VIN

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

SNT-6A(H)

1 VOUT
2 VSS
3 NC
4 ON/OFF
5 VSS
6 VIN

S-1133 Series

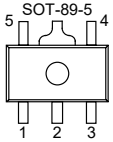
HIGH RIPPLE-REJECTION AND LOW DROPOUT MIDDLE-OUTPUT CURRENT CMOS VOLTAGE REGULATOR

Features

- Output voltage (internally set): 1.2 V to 6.0 V, selectable in 0.1 V step.
- Output voltage (externally set): 1.8 V to 8.2 V, settable via external resistor (S-1133B00/S-1133A00)
- Input voltage: 2.0 V to 10 V
- Output voltage accuracy: ±1.0% (1.2 V to 1.4 V output product: ±15 mV)
- Dropout voltage: 130 mV typ. (3.0 V output product, I_{OUT} = 100 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 300 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 µF or more can be used.
  (A ceramic capacitor of 2.2 µF or more can be used for products whose output voltage is 1.7 V or less.)
- Ripple rejection: 70 dB typ. (1.2 V output product, 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 ON / OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

*1. Attention should be paid to the power dissipation of the package when the output current is large.
*2. Refer to "■ **Product Name Structure**" for details.

SOT-89-5



S-1133x12~S-1133x60	S-1133B00, S-1133A00
1 NC	1 VADJ
2 VSS	2 VSS
3 ON/OFF	3 ON/OFF
4 VIN	4 VIN
5 VOUT	5 VOUT

SNT-8A

S-1133x12~S-1133x60	S-1133B00, S-1133A00
1 VOUT	1 VOUT
2 VOUT	2 VOUT
3 NC	3 VADJ
4 NC	4 NC
5 VSS	5 VSS
6 ON/OFF	6 ON/OFF
7 VIN	7 VIN
8 VIN	8 VIN

S-1135 Series

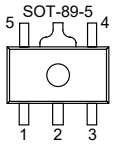
5.5 V INPUT, 300 mA VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product : ±15 mV)
- Dropout voltage: 160 mV typ. (2.6 V output product, I_{OUT} = 300 mA)
- Current consumption: During operation: 45 µA typ., 65 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 300 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors : A ceramic capacitor of 1.0 µF or more can be used.
- Ripple rejection: 70 dB typ. (1.0 V output product, f = 1.0 kHz)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down / pull-up function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

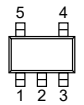
*1. Attention should be paid to the power dissipation of the package when the output current is large.
*2. Refer to "■ **Product Name Structure**" for details.

SOT-89-5



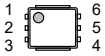
1 VOUT
2 VSS
3 NC
4 ON/OFF
5 VIN

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

HSNT-6A



1 VOUT
2 VSS
3 NC
4 ON/OFF
5 NC
6 VIN

S-1137 Series

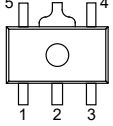
5.5 V INPUT, 300 mA VOLTAGE REGULATOR WITH SOFT-START FUNCTION

Features

- Output voltage: 1.2 V to 3.5 V, selectable in 0.05 V step
- Input voltage: 1.7 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.2 V to 1.45 V output product : ±15 mV)
- Dropout voltage: 210 mV typ. (2.8 V output product, I_{OUT} = 300 mA)
- Current consumption: During operation: 45 µA typ., 65 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 300 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 µF or more can be used.
- Ripple rejection: 70 dB typ. (f = 1.0 kHz)
- Built-in soft-start circuit: Soft-start time : 0.7 ms typ. (C_{SS} = 1.0 nF)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

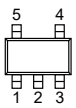
***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.

SOT-89-5



1 VOUT
2 VSS
3 SSC
4 ON/OFF
5 VIN

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 SSC
5 VOUT

SNT-6A(H)

1 VOUT
2 VSS
3 SSC
4 ON/OFF
5 VSS
6 VIN

S-1333 Series

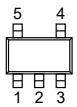
5.5 V INPUT, 300 mA VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 3.5 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV)
- Dropout voltage: 160 mV typ. (2.8 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 25 µA typ., 38 µA max.
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 300 mA ($V_{OUT(S)} \geq 1.3$ V, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 µF or more can be used.
- Ripple rejection: 75 dB typ. (1.6 V output product, f = 1.0 kHz)
  70 dB typ. (2.85 V output product, 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 ON / OFF circuit: Ensures long battery life.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Attention should be paid to the power dissipation of the package when the output current is large.

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

HSNT-4(1010)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

HSNT-4(0808)

1 VOUT
2 VSS
3 ON/OFF
4 VIN

S-1213 Series

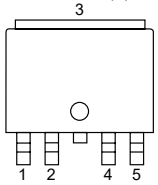
105°C OPERATION, 36 V INPUT, 500 mA VOLTAGE REGULATOR

Features

- Output voltage (internally set): 1.8 V, 3.0 V, 3.3 V, 5.0 V, 8.0 V, 12.0 V, 15.0 V
- Output voltage (externally set): 1.8 V to 30.0 V, settable via external resistor
- Input voltage: 2.8 V to 36.0 V
- Output voltage accuracy: ±1.0% (Ta = +25°C)
- Current consumption: During operation: 5.0 µA typ.(Ta = +25°C)
  During power-off: 0.1 µA typ.(Ta = +25°C)
- Output current: Possible to output 500 mA (at $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor can be used. (1.0 µF or more)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
  (with a detection function of the difference between input and output voltage)
- Built-in thermal shutdown circuit: Detection temperature 170°C typ.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function is available.
  Pull-down function is available.
- Operation temperature range: Ta = –40°C to +105°C
- Lead-free (Sn 100%), halogen-free

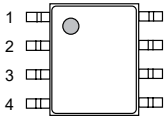
***1.** Please make sure that the loss of the IC will not exceed the power dissipation when the output current is large.
***2.** Contact our sales representatives for details.

TO-252-5S(A)



S-1213B18,30,33, 50,80,C0,F0	S-1213B00
1 VIN	VIN
2 ON/OFF	ON/OFF
3 VSS	VSS
4 NC	VADJ
5 VOUT	VOUT

HSOP-8A



S-1213B18,30,33, 50,80,C0,F0	S-1213B00
1 VIN	VIN
2 NC	NC
3 NC	NC
4 ON/OFF	ON/OFF
5 VSS	VSS
6 NC	NC
7 NC	VADJ
8 VOUT	VOUT

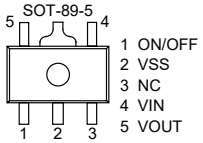
S-1155 Series

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

Features

• Output voltage:	1.0 V to 5.0 V, selectable in 0.05 V step
• Input voltage:	1.5 V to 5.5 V
• Output voltage accuracy:	±1.0% (1.0 V to 1.45 V output product: ±15 mV)
• Dropout voltage:	70 mV typ. (3.0 V output product, I_{OUT} = 200 mA)
• Current consumption:	During operation: 70 μA typ., 90 μA max. (3.0 V output product) During power-off: 0.1 μA typ., 1.0 μA max.
• Output current:	Possible to output 500 mA (3.0 V output product, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
• Input and output capacitors:	A ceramic capacitor of 4.7 μF or more can be used.
• Ripple rejection:	70 dB typ. (1.0 V output product, 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 at power-on.
• Built-in ON/OFF circuit:	Ensures long battery life.
• Operation temperature range:	Ta = −40°C to +85°C
• Lead-free, Sn 100%, halogen-free*2	

***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.



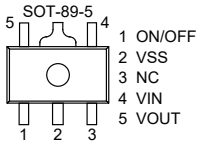
S-1170 Series

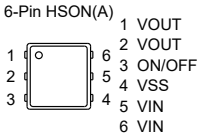
HIGH RIPPLE-REJECTION AND LOW DROPOUT HIGH OUTPUT CURRENT CMOS VOLTAGE REGULATOR

Features

• Output voltage:	1.5 V to 5.5 V, selectable in 0.1 V step
• Output voltage accuracy:	±1.0%
• Dropout voltage:	120 mV typ. (3.0 V output product, I_{OUT} = 300 mA)
• Current consumption:	During operation: 80 μA typ., 160 μA max. During power-off: 0.1 μA typ., 1.0 μA max.
• Output current:	Possible to output 800 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
• Input and output capacitors:	A ceramic capacitor of 4.7 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 ON/OFF circuit:	Ensures long battery life.
• Operation temperature range:	Ta = −40°C to +85°C
• Lead-free, Sn 100%, halogen-free*2	

***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.





S-1214 Series

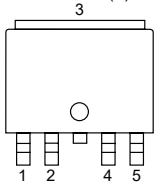
105°C OPERATION, 36 V INPUT, 1000 mA VOLTAGE REGULATOR

Features

- Output voltage (internally set): 1.8 V, 3.0 V, 3.3 V, 5.0 V, 8.0 V, 12.0 V, 15.0 V
- Output voltage (externally set): 1.8 V to 30.0 V, settable via external resistor
- Input voltage: 2.8 V to 36.0 V
- Output voltage accuracy: ±1.0% (Ta = +25°C)
- Current consumption: During operation: 5.0 μA typ.(Ta = +25°C)
  During power-off: 0.1 μA typ.(Ta = +25°C)
- Output current: Possible to output 1000 mA (at $V_{IN} \geq V_{OUT(S)} + 2.0$ V)*1
- Input and output capacitors: A ceramic capacitor can be used. (1.0 μF or more)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor. (with a detection function of the difference between input and output voltage)
- Built-in thermal shutdown circuit: Detection temperature 170°C typ.
- Built-in ON / OFF circuit: Ensures long battery life. Discharge shunt function is available. Pull-down function is available.
- Operation temperature range: Ta = −40°C to +105°C
- Lead-free (Sn 100%), halogen-free

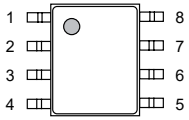
***1.** Please make sure that the loss of the IC will not exceed the power dissipation when the output current is large.
***2.** Contact our sales representatives for details.

TO-252-5S(A)



S-1214B18,30,33, 50,80,C0,F0	S-1214B00
1 VIN	VIN
2 ON/OFF	ON/OFF
3 VSS	VSS
4 NC	VADJ
5 VOUT	VOUT

HSOP-8A



S-1214B18,30,33, 50,80,C0,F0	S-1214B00
1 VIN	VIN
2 NC	NC
3 NC	NC
4 ON/OFF	ON/OFF
5 VSS	VSS
6 NC	NC
7 NC	VADJ
8 VOUT	VOUT

S-1172 Series

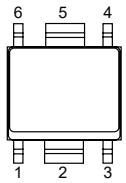
HIGH RIPPLE-REJECTION LOW DROPOUT HIGH OUTPUT CURRENT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.0 V to 5.0 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (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: 70 μA typ., 90 μA max. (3.0 V output product)
  During power-off: 0.1 μA typ., 1.0 μA max.
- Output current: Possible to output 1000 mA (3.0 V output product, $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 4.7 μF or more can be used.
- Ripple rejection: 70 dB typ. (1.0 V output product, 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 at power-on.
- Built-in ON/OFF circuit: Ensures Long battery life.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

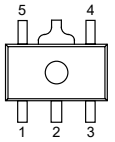
***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.

HSOP-6



1 VOUT
2 VSS
3 ON/OFF
4 NC
5 VSS
6 VIN

SOT-89-5



1 ON/OFF
2 VSS
3 NC
4 VIN
5 VOUT

S-13A1 Series

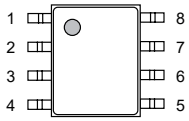
5.5 V INPUT, 1000 mA VOLTAGE REGULATOR

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.
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

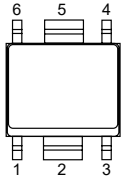
*1. Please make sure that the loss of the IC will not exceed the power dissipation when the output current is large.
*2. Types in which output voltage is externally set are unavailable.

HSOP-8A



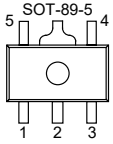
	S-13A1x10~13A1x35	S-13A1x00
1	VOUT	VOUT
2	ON/OFF	VADJ
3	NC	NC
4	VSS	VSS
5	SSC	ON/OFF
6	NC	NC
7	NC	NC
8	VIN	VIN

HSOP-6



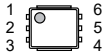
	S-13A1x10~13A1x35	S-13A1x00
1	VOUT	VOUT
2	VSS	VSS
3	ON/OFF	VADJ
4	SSC	ON/OFF
5	VSS	VSS
6	VIN	VIN

SOT-89-5



	S-13A1x10~13A1x35	S-13A1x00
1	ON/OFF	VADJ
2	VSS	VSS
3	SSC	ON/OFF
4	VIN	VIN
5	VOUT	VOUT

HSNT-6A



	S-13A1x10~13A1x35
1	VOUT
2	VOUT
3	ON/OFF
4	VSS
5	VIN
6	VIN

S-812C Series

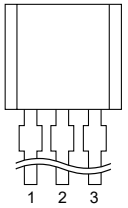
16 V INPUT, 75 mA VOLTAGE REGULATOR

Features

- Output voltage: 2.0 V to 6.0 V, selectable in 0.1 V step
- Input voltage: 16 V max.
- Output voltage accuracy: ±2.0%
- Dropout voltage: 120 mV typ. (5.0 V output product, I_{OUT} = 10 mA)
- Current consumption: During operation: 1.0 µA typ., 1.8 µA max. (3.0 V output product)
- Output current: Possible to output 50 mA (3.0 V output product, V_{IN} = 5 V)*1
  Possible to output 75 mA (5.0 V output product, V_{IN} = 7 V)*1
- Built-in ON/OFF circuit: Selectable available / unavailable of power-off function
  Selectable active "H" / "L" in the regulator
- Built-in short-circuit protection circuit: Selectable available / unavailable of short-circuit protection circuit
  Available short-circuit protection: Short-circuit current 40 mA typ.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

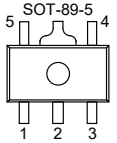
*1. Attention should be paid to the power dissipation of the package when the load is large.
*2. Refer to "■ **Product Name Structure**" for details.

TO-92



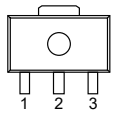
1	VSS
2	VIN
3	VOUT

SOT-89-5



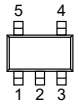
	B type	A/E type
1	VOUT	VOUT
2	VIN	VIN
3	VSS	VSS
4	ON/OFF	NC
5	NC	NC

SOT-89-3



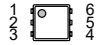
1	VSS
2	VIN
3	VOUT

SOT-23-5



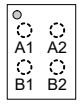
	B type	A/E type
1	VSS	VSS
2	VIN	VIN
3	VOUT	VOUT
4	NC	NC
5	ON/OFF	NC

SNT-6A(H)



1	NC
2	VIN
3	VOUT
4	VSS
5	VIN
6	ON/OFF

WLP-4R



A1	VOUT
B1	VIN
A2	VSS
B2	ON/OFF

S-817 Series

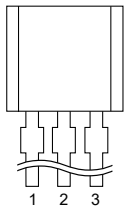
SUPER-SMALL PACKAGE CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.1 V to 6.0 V, selectable in 0.1 V step
- Output voltage accuracy: ±2.0%
- Dropout voltage: 160 mV typ. (5.0 V output product, I_{OUT} = 10 mA)
- Current consumption: During operation: 1.2 μA typ., 2.5 μA max.
- Output current: Possible to output 50 mA (3.0 V output product, V_{IN}=5 V)*1
  Possible to output 75 mA (5.0 V output product, V_{IN}=7 V)*1
- Output capacitor: A ceramic capacitor of 0.1 μF or more can be used.
- Built-in short circuit protection: Only S-817A Series
- Line regulation: Stable operation at low load of 1 μA
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

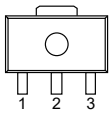
***1.** Attention should be paid to the power dissipation of the package when the load is large.
***2.** Refer to "■ **Product Name Structure**" for details.

TO-92



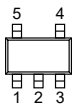
1 VSS
2 VIN
3 VOUT

SOT-89-3



1 VSS
2 VIN
3 VOUT

SOT-23-5



1 VSS
2 VIN
3 VOUT
4 NC
5 NC

SC-82AB

1 VSS
2 VIN
3 VOUT
4 NC

SNT-4A

1 VOUT
2 VIN
3 VSS
4 NC

S-816 Series

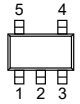
EXTERNAL TRANSISTOR TYPE CMOS VOLTAGE REGULATOR

Features

- Output voltage: 2.5 V to 6.0 V, selectable in 0.1 V step
- Input voltage: 16 V max.
- Output voltage accuracy: ± 2.0%
- Current consumption: During operation: 30 μA typ., 40 μA max.
  During power-off: 1 μA max.
- Built-in overcurrent (base current) protection circuit
- Built-in ON/OFF circuit: Ensures long battery life.
- Built-in current source (10 μA): No need for a base-emitter resistance.
- Operation temperature range: Ta =−40°C to +85°C
- Lead-free, Sn 100%, halogen-free*1

***1.** Refer to "■ **Product Name Structure**" for details.

SOT-23-5



1 EXT
2 VSS
3 ON/OFF
4 VIN
5 VOUT

S-818 Series

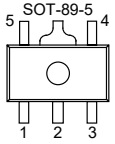
LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 2.0 V to 6.0 V, selectable in 0.1 V step
- Output voltage accuracy: ±2.0%
- Dropout voltage: 170 mV typ. (5.0 V output product, I_{OUT} = 60 mA)
- Current consumption: During operation: 30 μA typ., 40 μA max.
  During power-off: 100 nA typ., 500 nA max.
- Output current: Possible to output 200 mA (3.0 V output product, V_{IN} = 4 V)*1
  Possible to output 300 mA (5.0 V output product, V_{IN} = 6 V)*1
- Output capacitor: A ceramic capacitor of 2 μF or more can be used.
- Built-in ON/OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

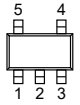
***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.

SOT-89-5



1 VOUT
2 VSS
3 NC
4 ON/OFF
5 VIN

SOT-23-5



1 VIN
2 VSS
3 ON/OFF
4 NC
5 VOUT

S-87x Series

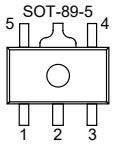
HIGH WITHSTAND-VOLTAGE VOLTAGE REGULATOR WITH RESET FUNCTION

Features

- Accuracy of output voltage: ±2.4 %
  2.5 V to 5.8 V (0.1 V step)
- Accuracy of detection voltage: ±2.4 % (For the F type, the release voltage is ±1.1 %)
  2.1 V to 11.3 V (0.1 V step)
- Low I/O voltage difference: 0.15 V typ. (at I_{OUT}=30 mA, V_{OUT}=5.0 V)
  0.45 V typ. (at I_{OUT}=30 mA, V_{OUT}=3.0 V)
- Low current consumption: At Operation mode: 8 μA max.
  At Shutdown mode: 3.5 μA max. (Available for the C/E/G type)
- Wide operating voltage range: 24 V max.
- Wide operating temperature range: −40°C to +85°C
- Built-in delay circuit or shutdown circuit
- Built-in short-circuit protection circuit
- Lead-free, Sn 100%, halogen-free*1

***1.** Refer to "■ **Product Name Structure**" for details.

SOT-89-5



	A/B/F type	C/G type	E type
1	VOUT	VOUT	VOUT
2	VSS	VSS	VSS
3	CD	VPF	SENSE
4	VOR	VOR	VOR
5	VIN	VIN	VIN

S-1740/1741 Series

5.5 V INPUT, 100 mA VOLTAGE REGULATOR WITH SUPPLY VOLTAGE DIVIDED OUTPUT

Features

Regulator block

- Output voltage: V_{OUT} = 1.0 V to 3.5 V, selectable in 0.05 V step
- Input voltage: V_{IN} = 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product: ±15 mV) (Ta = +25°C)
- Dropout voltage: 20 mV typ. (2.5 V output product, at I_{OUT} = 10 mA) (Ta = +25°C)
- Current consumption during operation: I_{SS1} = 0.35 µA typ. (Ta = +25°C)
- Output current: Possible to output 100 mA (at $V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1
- Input capacitor: A ceramic capacitor can be used. (1.0 µF or more)
- Output capacitor: A ceramic capacitor can be used. (1.0 µF to 100 µF)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.

Supply voltage divider block

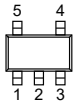
- Output voltage: $V_{PMOUT} = V_{IN}/2$ (S-1740 Series)
  $V_{PMOUT} = V_{IN}/3$ (S-1741 Series)
- Current consumption during operation: I_{SS1P} = 0.15 µA typ. (Ta = +25°C)
- Output capacitor: A ceramic capacitor can be used. (100 nF to 220 nF)
- Built-in enable circuit: Ensures long battery life.

Overall

- 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.

SOT-23-5 A/C type



1 VIN
2 VSS
3 PMEN
4 PMOUT
5 VOUT

HSNT-6(1212) A/C type

1 VOUT
2 VSS
3 PMOUT
4 PMEN
5 NC
6 VIN

HSNT-4(1010) G type

1 VOUT
2 VSS
3 PMOUT
4 VIN

S-1701 Series

HIGH RIPPLE-REJECTION LOW DROPOUT CMOS VOLTAGE REGULATOR WITH RESET FUNCTION

Features

Regulator block

- Output voltage: 1.5 V to 5.0 V, selectable in 0.1 V step
- Input voltage: 2.0 V to 6.5 V
- Output voltage accuracy: ±1.0%
- Current consumption During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 400 mA ($V_{IN} \geq V_{OUT(S)} + 2.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 1.0 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 ON/OFF circuit: Ensures long battery life.

Detector block

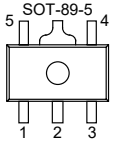
- Detection voltage: 1.5 V to 5.5 V, selectable in 0.1 V step
- Detection voltage accuracy: ±1.0%
- Input voltage: 0.8 V to 6.5 V
- Output mode: Nch open-drain active low output
- No need of an external capacitor for delay
- Three delay time settings: No delay (60 µs), 50 ms, 100 ms

Whole regulator

- Current consumption During operation: 85 µA typ.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

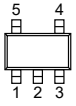
*1. Attention should be paid to the power dissipation of the package when the output current is large.
*2. Refer to "■ **Product Name Structure**" for details.

SOT-89-5



	A~M type	N~T type	U~Z type
1	VIN	VIN	VIN
2	VSS	VSS	VSS
3	VOUT	VOUT	VOUT
4	VDOUT	VDOUT	VDOUT
5	ON/OFF	SENSE	NC

SOT-23-5



	A~M type	N~T type	U~Z type
1	VIN	VIN	VIN
2	VSS	VSS	VSS
3	ON/OFF	SENSE	NC
4	VDOUT	VDOUT	VDOUT
5	VOUT	VOUT	VOUT

S-13D1 Series

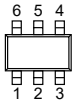
5.5 V INPUT, 150 mA, 2-CIRCUIT VOLTAGE REGULATOR WITH DELAY FUNCTION

Features

- Output voltage: 1.0 V to 3.6 V, selectable in 0.05 V step
- Input voltage: 1.5 V to 5.5 V
- Output voltage accuracy: ±1.0% (1.0 V to 1.45 V output product : ±15 mV)
- Dropout voltage: 80 mV typ. (2.8 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 39 µA typ., 58 µA max. (per circuit)
  During power-off: 0.1 µA typ., 1.0 µA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1 (per circuit)
- Input and output capacitors: A ceramic capacitor of 0.22 µF or more can be used.
- Ripple rejection: 70 dB typ. (3.6 V output product, f = 1.0 kHz)
- Delay function is selectable.
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Prevents damage caused by heat.
- Built-in ON / OFF circuit: Ensures long battery life
  Discharge shunt function "available" / "unavailable" is selectable.
  Pull-down function "available" / "unavailable" is selectable.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Attention should be paid to the power dissipation of the package when the output current is large.

SOT-23-6



1 ON/OFF1
2 VIN
3 ON/OFF2
4 VOUT2
5 VSS
6 VOUT1

HSNT-6(1212)

1 VOUT1
2 VOUT2
3 VSS
4 ON/OFF2
5 VIN
6 ON/OFF1

S-1721 Series

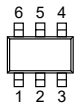
SUPER-SMALL PACKAGE 2-CIRCUIT HIGH RIPPLE-REJECTION LOW CURRENT CONSUMPTION LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 1.2 V to 5.0 V, selectable in 0.05 V step
- Input voltage: 1.7 V to 6.5 V
- Output voltage accuracy: ±1.0%
- Dropout voltage: 130 mV typ. (3.0 V output product, I_{OUT} = 100 mA)
- Current consumption: During operation: 25 μA typ., 45 μA max. (3.0 V output product, per circuit)
  During power-off: 0.1 μA typ., 1.0 μA max.
- Output current: Possible to output 150 mA ($V_{IN} \geq V_{OUT(S)} + 1.0$ V)*1 (per circuit)
- Input and output capacitors: A ceramic capacitor of 1.0 μF or more can be used.
- Ripple rejection: 80 dB typ. (products having the output under 1.8 V, f = 1.0 kHz)
- Built-in overcurrent protection circuit: limits overcurrent of output transistor.
- Built-in ON/OFF circuit: Ensures long battery life.
- Pull-up or pull-down resistor is selectable.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free*2

***1.** Attention should be paid to the power dissipation of the package when the output current is large.
***2.** Refer to "■ **Product Name Structure**" for details.

SOT-23-6



1 ON/OFF1
2 VIN
3 ON/OFF2
4 VOUT2
5 VSS
6 VOUT1

SNT-6A

1 ON/OFF2
2 VIN
3 ON/OFF1
4 VSS
5 VOUT1
6 VOUT2

S-1222B/D Series

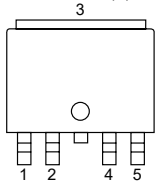
28 V INPUT, 200 mA VOLTAGE REGULATOR

Features

- Output voltage: 2.3 V to 12.0 V, selectable in 0.1 V step
- Input voltage: 3.0 V to 28 V
- Output voltage accuracy: ±1.0% (Ta = +25°C)
- Current consumption: During operation: 6.5 μA typ. (Ta = +25°C)
  During power-off: 0.1 μA typ. (Ta = +25°C)
- Output current: Possible to output 200 mA (at $V_{IN} \geq V_{OUT(S)} + 2.0$ V)*1
- Input capacitor: A ceramic capacitor can be used. (1.0 μF or more)
- Output capacitor: A ceramic capacitor can be used. (1.0 μF to 100 μF)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Detection temperature 165°C typ.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function is available.
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free, Sn 100%, halogen-free

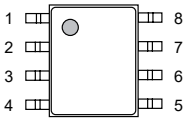
***1.** Please make sure that the loss of the IC will not exceed the power dissipation when the output current is large.

TO-252-5S(A)



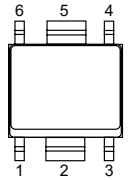
1 VOUT
2 ON/OFF
3 VSS
4 NC
5 VIN

HSOP-8A



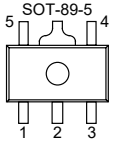
1 VOUT
2 NC
3 NC
4 ON/OFF
5 VSS
6 NC
7 NC
8 VIN

HSOP-6



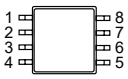
1 VOUT
2 VSS
3 ON/OFF
4 NC
5 VSS
6 VIN

SOT-89-5



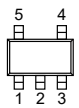
1 NC
2 VSS
3 VIN
4 VOUT
5 ON/OFF

HTMSOP-8



1 VOUT
2 NC
3 NC
4 ON/OFF
5 VSS
6 NC
7 NC
8 VIN

SOT-23-5



1 VIN
2 VSS
3 NC
4 ON/OFF
5 VOUT

DFN-6(1518)A

1 VOUT
2 NC
3 ON/OFF
4 NC
5 VSS
6 VIN

S-1212B/D Series

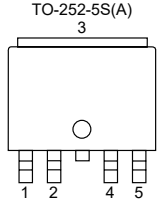
105°C OPERATION, 36 V INPUT, 250 mA VOLTAGE REGULATOR

Features

- Output voltage: 2.5 V to 16.0 V, selectable in 0.1 V step
- Input voltage: 3.0 V to 36 V
- Output voltage accuracy: ±2.0% (Ta = +25°C)
- Current consumption: During operation: 6.5 µA typ. (Ta = +25°C)
  During power-off: 0.1 µA typ. (Ta = +25°C)
- Output current: Possible to output 250 mA (at $V_{IN} \geq V_{OUT(S)} + 2.0$ V)*1
- Input capacitor: A ceramic capacitor can be used. (1.0 µF or more)
- Output capacitor: A ceramic capacitor can be used. (1.0 µF to 100 µF)
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Detection temperature 165°C typ.
- Built-in ON / OFF circuit: Ensures long battery life.
  Discharge shunt function is available.
- Operation temperature range: Ta = –40°C to +105°C
- Lead-free (Sn 100%), halogen-free

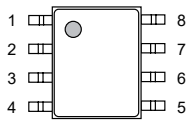
***1.** Please make sure that the loss of the IC will not exceed the power dissipation when the output current is large.

TO-252-5S(A)



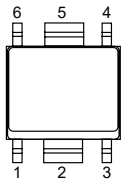
1 VOUT
2 ON/OFF
3 VSS
4 NC
5 VIN

HSOP-8A



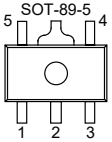
1 VOUT
2 NC
3 NC
4 ON/OFF
5 VSS
6 NC
7 NC
8 VIN

HSOP-6



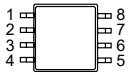
1 VOUT
2 VSS
3 ON/OFF
4 NC
5 VSS
6 VIN

SOT-89-5



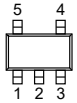
1 NC
2 VSS
3 VIN
4 VOUT
5 ON/OFF

HTMSOP-8



1 VOUT
2 NC
3 NC
4 ON/OFF
5 VSS
6 NC
7 NC
8 VIN

SOT-23-5



1 VIN
2 VSS
3 NC
4 ON/OFF
5 VOUT

S-1142A/B Series

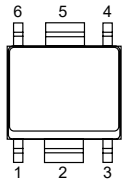
HIGH-WITHSTAND VOLTAGE LOW CURRENT CONSUMPTION LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 2.0 V to 15.0 V, selectable in 0.1 V step
- Input voltage: 3.0 V to 50 V
- Output voltage accuracy: ±1.0% (Tj = +25°C)
  ±3.0% (Tj = –40°C to +105°C)
- Current consumption: During operation: 4.0 µA typ., 9.0 µA max. (Ta = –40°C to +85°C)
  During power-off: 0.1 µA typ., 1.0 µA max. (Ta = –40°C to +85°C)
- Output current: Possible to output 200 mA ($V_{IN} \geq V_{OUT(S)} + 2.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 µF or more can be used.
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Prevents damage caused by heat.
- Built-in ON / OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Attention should be paid to the power dissipation of the package when the output current is large.

HSOP-6



1 VOUT
2 VSS
3 ON/OFF
4 NC
5 VSS
6 VIN

S-1142C/D Series

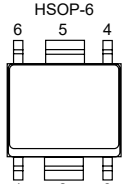
HIGH-WITHSTAND VOLTAGE LOW CURRENT CONSUMPTION LOW DROPOUT CMOS VOLTAGE REGULATOR

Features

- Output voltage: 2.0 V to 15.0 V, selectable in 0.1 V step
- Input voltage: 3.0 V to 50 V
- Output voltage accuracy: ±1.0% (Tj = +25°C)
  ±3.0% (Tj = –40°C to +105°C)
- Current consumption: During operation: 4.0 µA typ., 9.0 µA max. (Ta = –40°C to +85°C)
  During power-off: 0.1 µA typ., 1.0 µA max. (Ta = –40°C to +85°C)
- Output current: Possible to output 200 mA ($V_{IN} \geq V_{OUT(S)} + 2.0$ V)*1
- Input and output capacitors: A ceramic capacitor of 0.1 µF or more can be used.
- Built-in overcurrent protection circuit: Limits overcurrent of output transistor.
- Built-in thermal shutdown circuit: Prevents damage caused by heat.
- Built-in ON / OFF circuit: Ensures long battery life.
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

***1.** Attention should be paid to the power dissipation of the package when the output current is large.

HSOP-6



1 VOUT
2 VSS
3 ON/OFF
4 NC
5 VSS
6 VIN

S-1000 Series

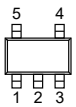
ULTRA-SMALL PACKAGE HIGH-PRECISION VOLTAGE DETECTOR

Features

- Ultra-low current consumption: 350 nA typ. (V_{DD} = detection voltage + 1.5 V)
- High-precision detection voltage: ±1.0%
- Operating voltage range: 0.95 to 5.5 V
- Hysteresis characteristics: 5% typ.
- Detection voltage: 1.5 to 4.6 V (0.1 V step)
- Output form: Nch open-drain output (Active “L”)
  CMOS output (Active “L”)
- Lead-free, Sn 100%, halogen-free*1

***1.** Refer to “■ **Product Name Structure**” for details.

SOT-23-5



1 OUT
2 VDD
3 VSS
4 NC
5 NC

SC-82AB

1 OUT
2 VDD
3 NC
4 VSS

SNT-4A

1 OUT
2 VSS
3 NC
4 VDD

S-808xxC Series

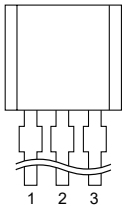
SUPER-SMALL PACKAGE HIGH-PRECISION VOLTAGE DETECTOR

Features

- Super-low current consumption: 1.3 µA typ. (detection voltage≤1.4 V, at V_{DD} = 1.5 V)
  0.8 µA typ. (detection voltage≥1.5 V, at V_{DD} = 3.5 V)
- High-precision detection voltage: ±2.0%
- Operating voltage range: 0.65 V to 5.0 V (detection voltage≤1.4 V)
  0.95 V to 10.0 V (detection voltage≥1.5 V)
- Hysteresis characteristics: 5% typ.
- Detection voltage: 0.8 V to 6.0 V (0.1 V step)
- Output form: Nch open-drain output (Active Low)
  CMOS output (Active Low)
- Lead-free, Sn 100%, halogen-free*1

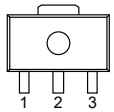
***1.** Refer to “■ **Product Name Structure**” for details.

TO-92



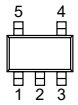
1 OUT
2 VDD
3 VSS

SOT-89-3



1 OUT
2 VDD
3 VSS

SOT-23-5



1 OUT
2 VDD
3 VSS
4 NC
5 NC

SC-82AB

1 OUT
2 VDD
3 NC
4 VSS

SNT-4A

1 OUT
2 VSS
3 NC
4 VDD

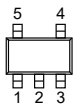
S-1009 Series

0.27 µA CURRENT CONSUMPTION VOLTAGE DETECTOR WITH DELAY FUNCTION (EXTERNAL DELAY TIME SETTING)

Features

- Detection voltage: 0.8 V to 4.6 V (0.1 V step)
- Detection voltage accuracy: ±0.5% (2.4 V ≤ $-V_{DET}$ ≤ 4.6 V)
  ±12 mV (0.8 V ≤ $-V_{DET}$ < 2.4 V)
- Current consumption: 270 nA typ. (1.2 V ≤ $-V_{DET}$ < 2.3 V)
- Operation voltage range: 0.6 V to 10.0 V (CMOS output product)
- Hysteresis width: 5% ±1%
- Delay time accuracy: ±15% (C_D = 4.7 nF)
- Output form: Nch open-drain output (active "L")
  CMOS output (active "L")
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SOT-23-5



1 OUT
2 VDD
3 VSS
4 NC
5 CD

SC-82AB

1 VSS
2 VDD
3 CD
4 OUT

SNT-4A

1 VSS
2 OUT
3 CD
4 VDD

S-809xxC Series

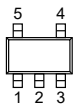
ULTRA-SMALL PACKAGE HIGH-PRECISION VOLTAGE DETECTOR WITH DELAY CIRCUIT (EXTERNAL DELAY TIME SETTING)

Features

- Ultra-low current consumption: 1.0 μA typ. (Detection voltage ≤ 1.4 V, at V_{DD}=2.0 V)
  1.1 μA typ. (Detection voltage ≥ 1.5 V, at V_{DD}=3.5 V)
- High-precision detection voltage: ±2.0 %
- Operating voltage range: 0.7 V to 10.0 V
- Hysteresis characteristics: 5 % typ.
- Detection voltage: 1.3 V to 6.0 V (0.1 V step)
- Output forms: Nch open-drain output (Active Low)
  CMOS output (Active Low)
- Lead-free, Sn 100%, halogen-free*1

***1.** Refer to "■ **Product Name Structure**" for details.

SOT-23-5



1 OUT
2 VDD
3 VSS
4 NC
5 CD

SC-82AB

1 VSS
2 VDD
3 CD
4 OUT

SNT-4A

1 VSS
2 OUT
3 CD
4 VDD

S-801 Series

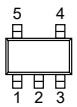
ULTRA-SMALL PACKAGE HIGH-PRECISION VOLTAGE DETECTOR WITH DELAY CIRCUIT (INTERNAL DELAY TIME SETTING)

Features

- Ultra-low current consumption: 1.3 μA typ. (at V_{DD}=3.5 V)
- High-precision detection voltage: ±2.0 %
- Operating voltage range: 0.95 V to 10.0 V
- Hysteresis characteristics: 60 mV typ.
- Detection voltage: 2.2 V to 6.0 V (0.1 V step)
- Three delay times: A type 50 ms typ.
  B type 100 ms typ.
  C type 200 ms typ.
- ON/OFF switching function of delay time (DS pin)
- Output forms: Nch open-drain output (Active Low)
  CMOS output (Active Low)
- Lead-free, Sn 100%, halogen-free*1

***1.** Refer to "■ **Product Name Structure**" for details.

SOT-23-5



1 DS
2 VSS
3 NC
4 OUT
5 VDD

SNT-4A

1 VSS
2 DS
3 VDD
4 OUT

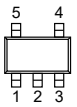
S-1003 Series

MANUAL RESET BUILT-IN DELAY CIRCUIT (EXTERNAL DELAY TIME SETTING) HIGH-ACCURACY VOLTAGE DETECTOR

Features

- Detection voltage: 1.2 V to 5.0 V (0.1 V step)
- Detection voltage accuracy: ±1.0% (2.2 V ≤ $-V_{DET}$ ≤ 5.0 V)
  ±22 mV (1.2 V ≤ $-V_{DET}$ < 2.2 V)
- Current consumption: 500 nA typ.
- Operation voltage range: 0.95 V to 10.0 V
- Hysteresis width: 5% ± 2%
- Manual reset function: MR pin logic active "L", active "H"
- Delay time accuracy: ±15% (C_D = 4.7 nF)
- Output form: Nch open-drain output (Active "L")
  CMOS output (Active "L")
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SOT-23-5



1 CD
2 VSS
3 MR
4 OUT
5 VDD

SNT-6A

1 CD
2 VDD
3 OUT
4 MR
5 NC
6 VSS

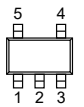
S-1002 Series

VOLTAGE DETECTOR WITH SENSE PIN

Features

- Detection voltage: 1.0 V to 5.0 V (0.1 V step)
- Detection voltage accuracy: ±1.0% (2.2 V ≤ $-V_{DET(S)}$ ≤ 5.0 V)
  ±22 mV (1.0 V ≤ $-V_{DET(S)}$ < 2.2 V)
- Current consumption: 500 nA typ.
- Operation voltage range: 0.95 V to 10.0 V
- Hysteresis width: 5% ± 2%
- Output form: Nch open-drain output (Active "L")
  CMOS output (Active "L")
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SOT-23-5



	NA/CA type	NB/CB type
1	OUT	OUT
2	VDD	VSS
3	VSS	VDD
4	NC	SENSE
5	SENSE	NC

SC-82AB

	NB/CB type
1	SENSE
2	VDD
3	OUT
4	VSS

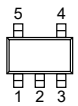
S-1004 Series

BUILT-IN DELAY CIRCUIT (EXTERNAL DELAY TIME SETTING) VOLTAGE DETECTOR WITH SENSE PIN

Features

- Detection voltage: 1.0 V to 5.0 V (0.1 V step)
- Detection voltage accuracy: ±1.0% (2.2 V ≤ $-V_{DET(S)}$ ≤ 5.0 V)
  ±22 mV (1.0 V ≤ $-V_{DET(S)}$ < 2.2 V)
- Current consumption: 500 nA typ.
- Operation voltage range: 0.95 V to 10.0 V
- Hysteresis width: 5% ± 2%
- Release delay time accuracy: ±15% (C_D = 4.7 nF, Ta = +25°C)
- Output form: Nch open-drain output (Active "L")
  CMOS output (Active "L")
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SOT-23-5



	NA/CA type	NB/CB type
1	OUT	OUT
2	VDD	VSS
3	VSS	VDD
4	CD	SENSE
5	SENSE	CD

SNT-6A

	NA/CA type
1	OUT
2	VDD
3	SENSE
4	CD
5	NC
6	VSS

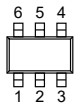
S-1011 Series

HIGH-WITHSTAND VOLTAGE BUILT-IN DELAY CIRCUIT (EXTERNAL DELAY TIME SETTING) VOLTAGE DETECTOR

Features

- Detection voltage: 3.0 V to 10.0 V (0.05 V step) (SENSE detection product)
  3.6 V to 10.0 V (0.05 V step) (VDD detection product)
- Detection voltage accuracy: ±1.5% (A / C / E / G type)
- Detection delay time accuracy: ±20% (C_N = 3.3 nF)
- Release delay time accuracy: ±20% (C_P = 3.3 nF)
- Current consumption: 600 nA typ.
- Operation voltage range: 1.8 V to 36.0 V
- Hysteresis width: "Available" (5.0% typ.) / "unavailable" is selectable.
- Output form: Nch open-drain output
- Operation temperature range: Ta = −40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SOT-23-6



	A/C/J/L type	E/G/N/Q type
1	VDD	VDD
2	NC	SENSE
3	OUT	OUT
4	CP	CP
5	VSS	VSS
6	CN	CN

S-1410/1411 Series

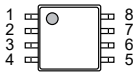
105°C OPERATION, 3.8 µA CURRENT CONSUMPTION WATCHDOG TIMER WITH RESET FUNCTION

Features

- Detection voltage: 2.0 V to 5.0 V, selectable in 0.1 V step
- Detection voltage accuracy: ±1.5%
- Input voltage: V_{DD} = 0.9 V to 6.0 V
- Hysteresis width: 5% typ.
- Current consumption during watchdog timer operation: 3.8 µA typ.
- Reset time-out period: 14.5 ms typ. (C_{POR} = 2200 pF)
- Watchdog time-out period: 24.6 ms typ. (C_{WDT} = 470 pF)
- Watchdog operation is switchable: Enable, Disable
- Watchdog operation voltage range: V_{DD} = 2.5 V to 6.0 V
- Watchdog mode switching function*1: Time-out mode, window mode
- Watchdog input edge is selectable: Rising edge, falling edge, both rising and falling edges
- Product type is selectable: S-1410 Series (Product with $\overline{W}$ / T pin (Output: $\overline{WDO}$ pin)) S-1411 Series (Product without $\overline{W}$ / T pin (Output: $\overline{RST}$ pin, $\overline{WDO}$ pin))
- Operation temperature range: Ta = −40°C to +105°C
- Lead-free (Sn 100%), halogen-free

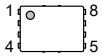
*1. The S-1411 Series is fixed to the window mode.

TMSOP-8



	S-1410	S-1411
1	$\overline{W}$/T	$\overline{RST}$
2	CPOR	CPOR
3	CWDT	CWDT
4	VSS	VSS
5	$\overline{WEN}$	$\overline{WEN}$
6	$\overline{WDO}$	$\overline{WDO}$
7	WDI	WDI
8	VDD	VDD

HSNT-8(2030)



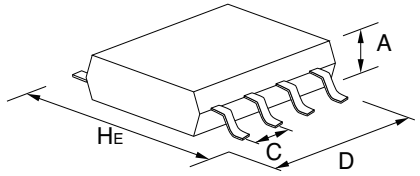
	S-1410	S-1411
1	$\overline{W}$/T	$\overline{RST}$
2	CPOR	CPOR
3	CWDT	CWDT
4	VSS	VSS
5	$\overline{WEN}$	$\overline{WEN}$
6	$\overline{WDO}$	$\overline{WDO}$
7	WDI	WDI
8	VDD	VDD

Package List

Package Type	Pin Count	Package Name	Package Size (mm)			Pitch (mm)
			HE	D	A (max.)	C
Lead insertion type	3	TO-92	7.0	5.2	4.2	2.5/1.27
	3	TO-92S	4.95	4.1	1.62	2.5/1.27
Flat-lead type	3	SOT-89-3	4.0	4.5	1.6	1.5
	5	SOT-89-5	4.5	4.5	1.6	1.5
Gull-wing type	4	SC-82AB	2.1	2.0	1.1	1.3
	5	SC-88A	2.1	2.0	1.1	0.65
	3	SOT-23-3	2.8	2.9	1.3	1.9
	3	SOT-23-3S	2.8	2.9	1.2	1.9
	3	TSOT-23-3S	2.85	2.9	0.8	1.9
	5	SOT-23-5	2.8	2.9	1.3	0.95
	6	SOT-23-6	2.8	2.9	1.35	0.95
	6	SOT-23-6W	2.8	2.9	1.3	0.95
	8	8-Pin SOP (JEDEC)	6.0	5.02	1.75	1.27
	8	8-Pin TSSOP	6.4	3.0	1.1	0.65
	8	8-Pin TSSOP	6.4	3.0	1.1	0.65
	16	16-Pin TSSOP	6.4	5.1	1.1	0.65
	20	20-Pin TSSOP	6.4	6.5	1.2	0.65
	24	24-Pin SSOP	7.6	7.9	1.4	0.65
	8	TMSOP-8	4.0	2.9	0.8	0.65
	8	HTMSOP-8	4.0	2.9	0.8	0.65
	16	HTSSOP-16	6.4	5.12	1.1	0.65
	6	HSOP-6	6.0	5.02	1.75	1.91
	8	HSOP-8A	6.0	5.02	1.68	1.27
	8	HSOP-8A	6.0	5.02	1.65	1.27
	8	HSOP-8Q	6.0	5.02	1.68	1.27
	5	TO-252-5S(A)	6.5	6.5	1.4	1.27
	9	TO-252-9S	6.5	6.5	1.4	0.65

Package Type	Pin Count	Package Name	Package Size (mm)			Pitch (mm)
			HE	D	A (max.)	C
Non-lead type	6	6-Pin HSON(A)	3.0	2.9	0.9	0.95
	6	SON-6C	2.55	1.56	0.65	0.5
	4	SNT-4A	1.6	1.2	0.5	0.65
	6	SNT-6A SNT-6A(H)	1.8	1.57	0.5	0.5
	8	SNT-8A	2.46	1.97	0.5	0.5
	4	HSNT-4(0808)	0.8	0.8	0.4	0.4
	4	HSNT-4(0808)B	0.8	0.8	0.41	0.4
	4	HSNT-4(1010)	1.0	1.0	0.4	0.65
	4	HSNT-4(1010)B	1.0	1.0	0.41	0.65
	6	HSNT-6(1212)	1.2	1.2	0.4	0.4
	6	HSNT-6A	2.46	1.96	0.5	0.5
	6	HSNT-6(2025)	2.46	1.96	0.5	0.5
	8	HSNT-8(1616)	1.6	1.6	0.4	0.4
	8	HSNT-8(2030)	3.0	2.0	0.5	0.5
	6	DFN-6(1414)A	1.4	1.4	0.6	0.5
	6	DFN-6(1518)A	1.8	1.5	0.33	0.5
	8	DFN-8(1616)A	1.6	1.6	0.6	0.4
	8	DFN-8(2030)	3.0	2.0	0.5	0.5
	8	DFN-8(2030)A	3.0	2.0	0.6	0.5
	8	DFN-8(2030)B	3.0	2.0	0.8	0.5

Remark Please contact our sales representatives regarding WLP package products.



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