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S-1711 Series

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

www.sii-ic.com

The S-1711 Series is a 2-channel positive voltage regulator with a low dropout voltage, high-accuracy output voltage, and low current consumption (150 mA output current) developed based on CMOS technology.
A 1.0 μF small ceramic capacitor can be used, and a 2-circuit voltage regulator with ±1.0% high-accuracy output voltage is incorporated in SOT-23-6 or super-small SNT-6A package. A/ B/ E/ F type is provided with a discharge shunt function allowing high-speed output response when the ON/OFF pin is used.
Compared with the conventional 150 mA output current 2-channel CMOS voltage regulators, high-density mounting is realized by using super-small SNT-6A package and a small ceramic capacitor. Also, the low current consumption makes the S-1711 Series ideal for mobile devices.

■ 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: 200 mV typ. (3.0 V output product, I_{OUT} = 150 mA)
- Current consumption: During operation: 70 μA typ., 90 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 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.
- Pull-up or 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*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.

■ Applications

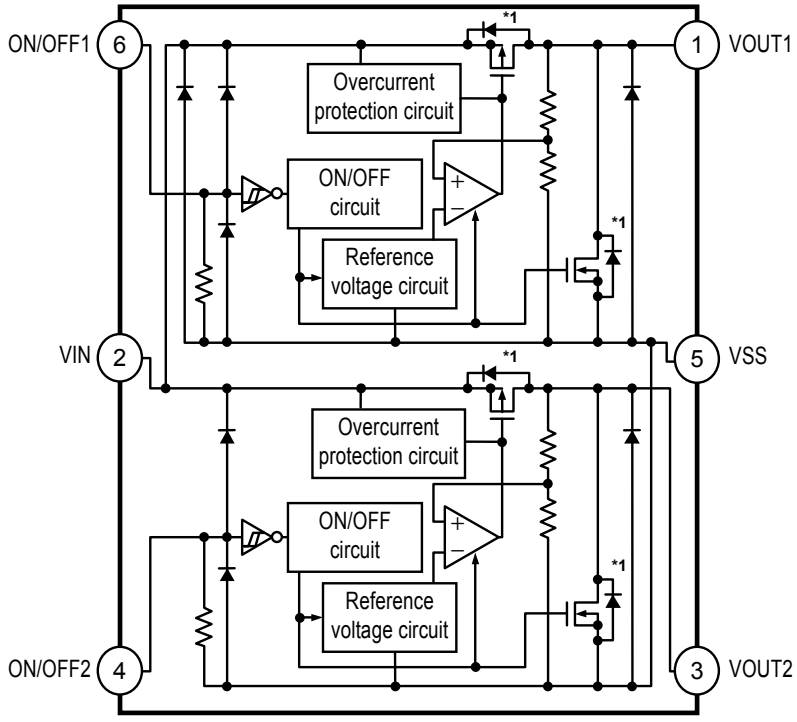
- Constant-voltage power supply for cellular phone
- Constant-voltage power supply for battery-powered device
- Constant-voltage power supply for home electric/electronic appliance

■ Packages

- SNT-6A
- SOT-23-6

■ Block Diagrams

1. S-1711 Series A type

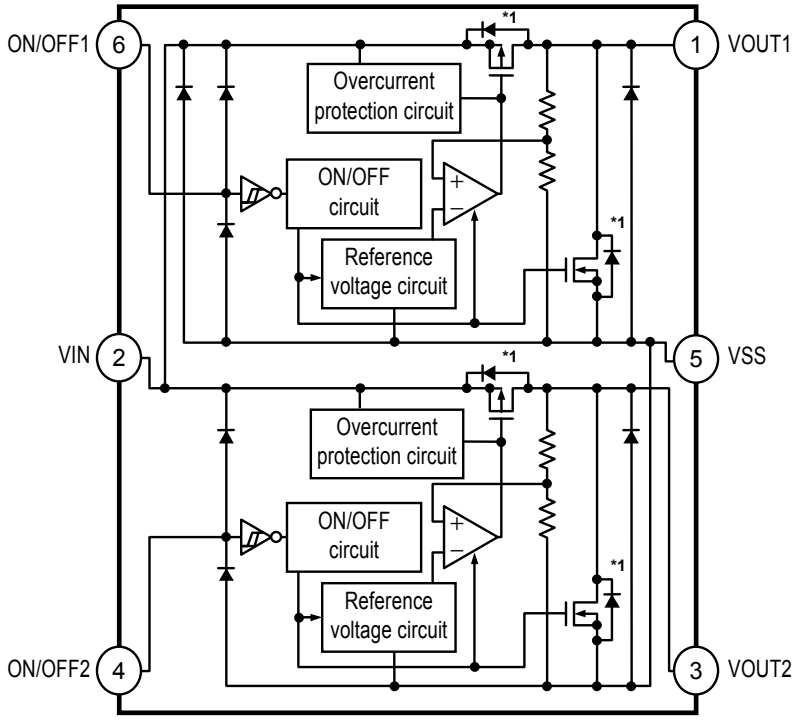


Function	Status
ON/OFF logic	Active "H"
Discharge shunt function	Available
Pull-up resistor	None
Pull-down resistor	Available

***1.** Parasitic diode

Figure 1

2. S-1711 Series B type

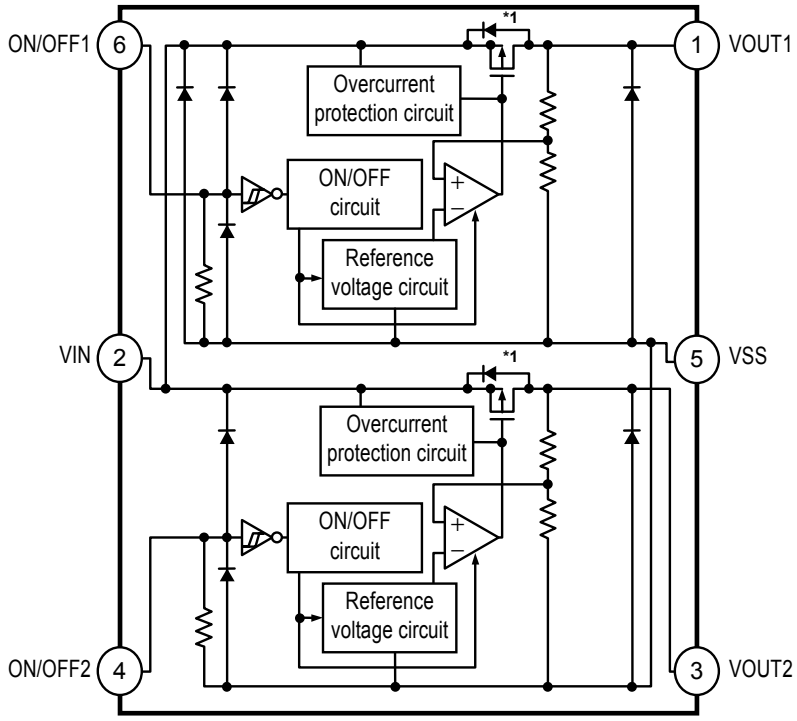


Function	Status
ON/OFF logic	Active "H"
Discharge shunt function	Available
Pull-up resistor	None
Pull-down resistor	None

***1.** Parasitic diode

Figure 2

3. S-1711 Series C type

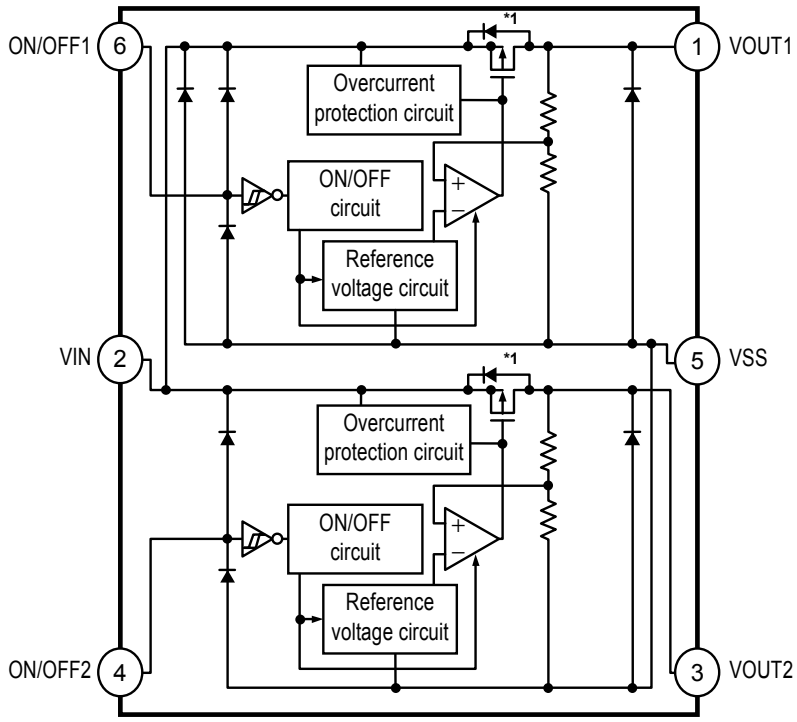


Function	Status
ON/OFF logic	Active "H"
Discharge shunt function	None
Pull-up resistor	None
Pull-down resistor	Available

***1.** Parasitic diode

Figure 3

4. S-1711 Series D type

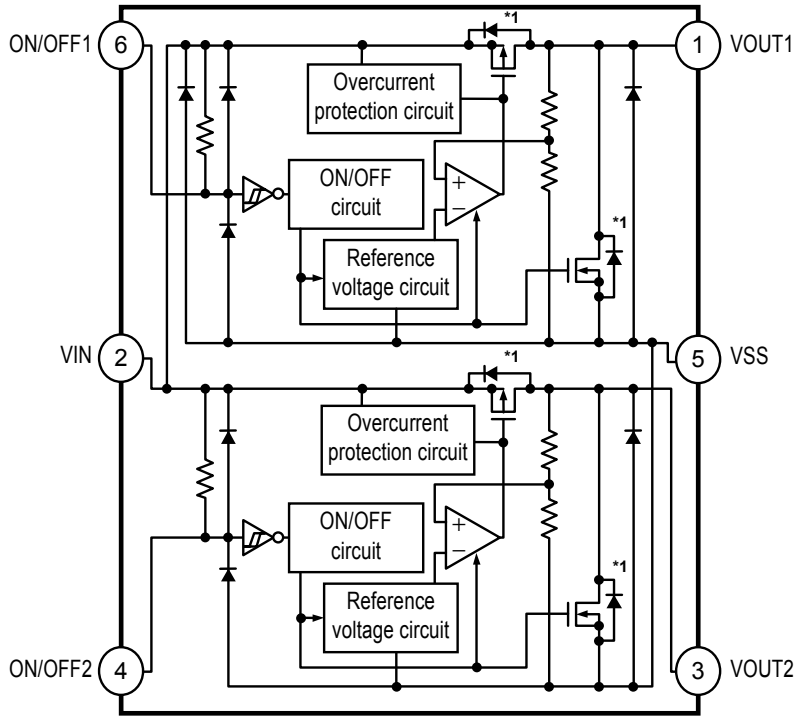


Function	Status
ON/OFF logic	Active "H"
Discharge shunt function	None
Pull-up resistor	None
Pull-down resistor	None

***1.** Parasitic diode

Figure 4

5. S-1711 Series E type

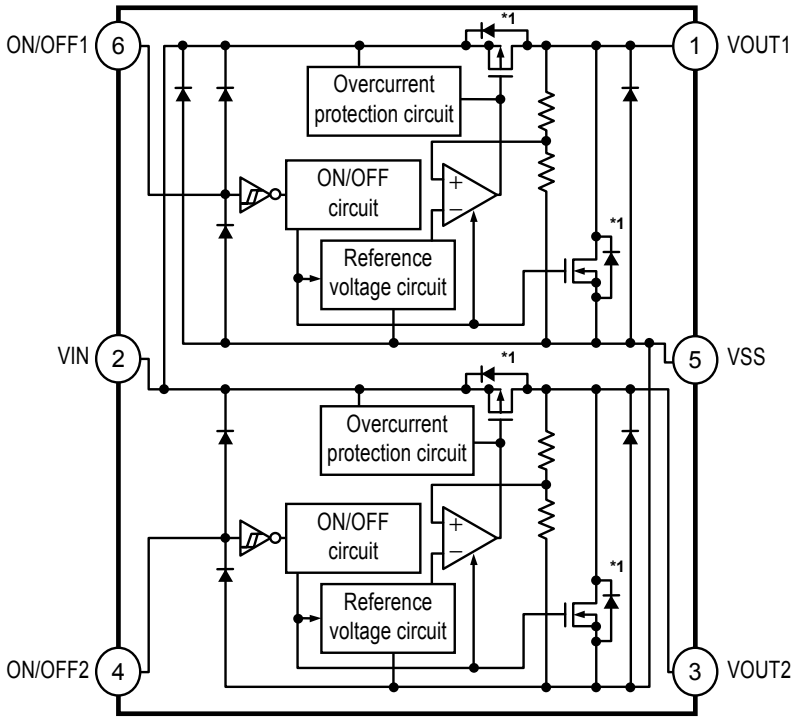


Function	Status
ON/OFF logic	Active "L"
Discharge shunt function	Available
Pull-up resistor	Available
Pull-down resistor	None

***1.** Parasitic diode

Figure 5

6. S-1711 Series F type

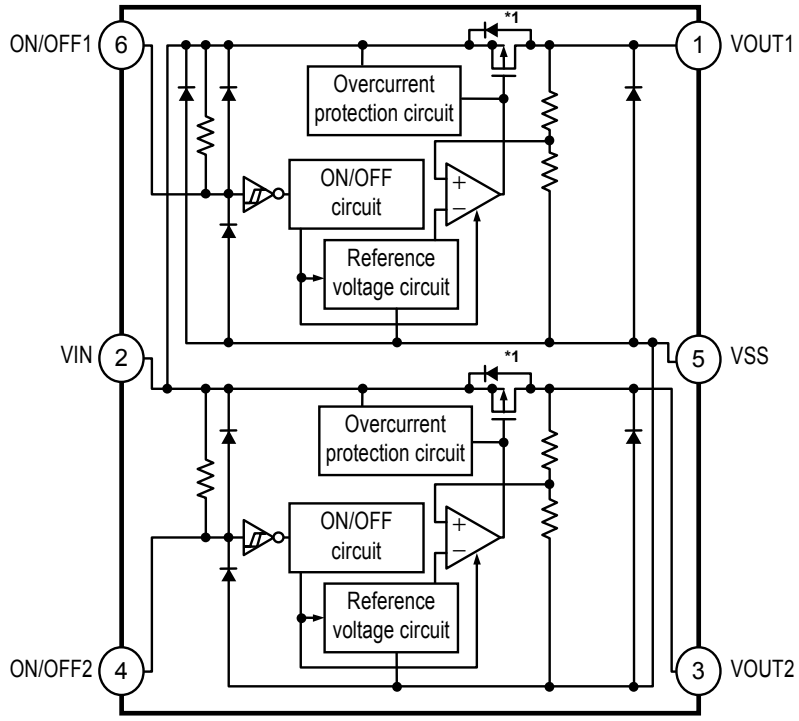


Function	Status
ON/OFF logic	Active "L"
Discharge shunt function	Available
Pull-up resistor	None
Pull-down resistor	None

***1.** Parasitic diode

Figure 6

7. S-1711 Series G type

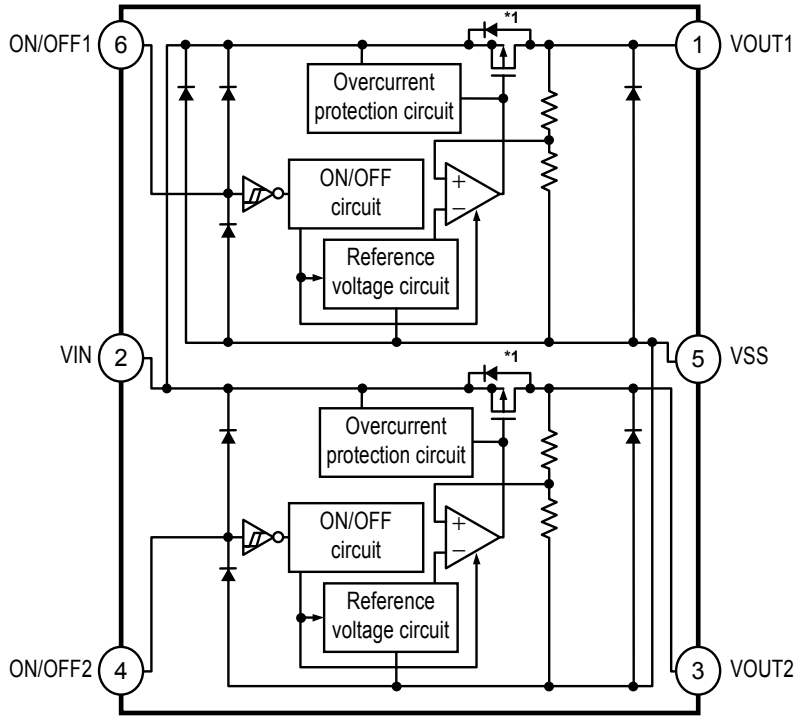


Function	Status
ON/OFF logic	Active "L"
Discharge shunt function	None
Pull-up resistor	Available
Pull-down resistor	None

***1.** Parasitic diode

Figure 7

8. S-1711 Series H type



Function	Status
ON/OFF logic	Active "L"
Discharge shunt function	None
Pull-up resistor	None
Pull-down resistor	None

***1.** Parasitic diode

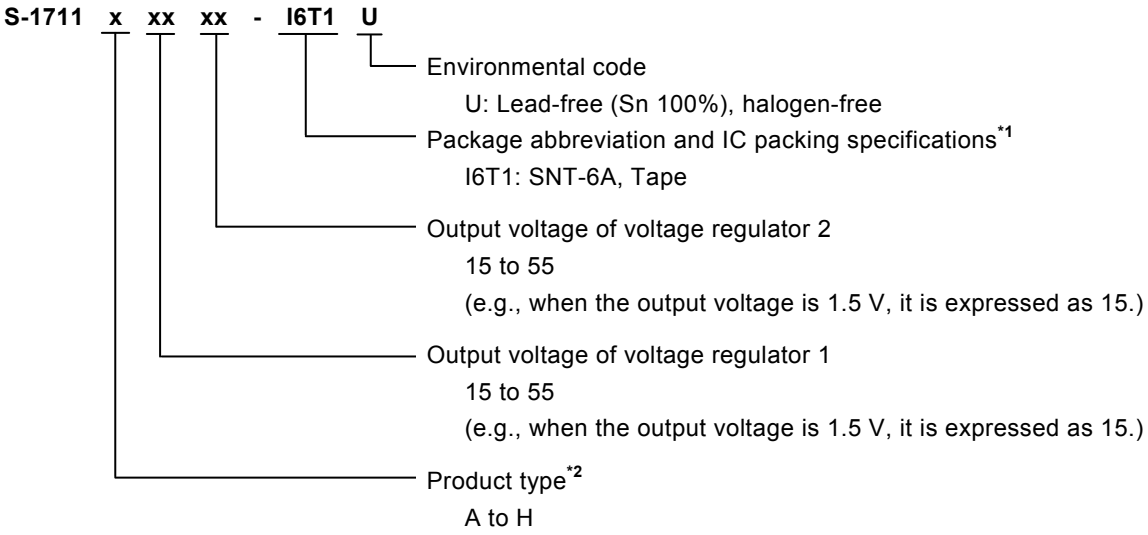
Figure 8

■ Product Name Structure

Users can select the product type, output voltage, and package type for the S-1711 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.

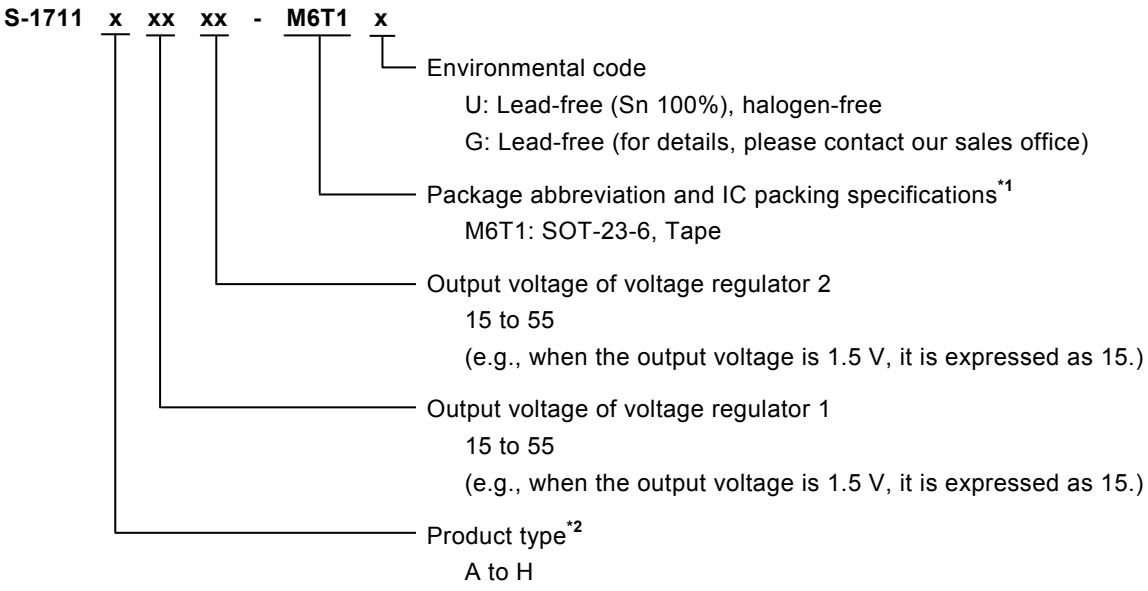
1. Product name

1. 1 SNT-6A



***1.** Refer to the tape drawing.
***2.** Refer to "**2. Function list of product type**".

1. 2 SOT-23-6



***1.** Refer to the tape drawing.
***2.** 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-up Resistor	Pull-down Resistor
A	Active “H”	Available	None	Available
B	Active “H”	Available	None	None
C	Active “H”	None	None	Available
D	Active “H”	None	None	None
E	Active “L”	Available	Available	None
F	Active “L”	Available	None	None
G	Active “L”	None	Available	None
H	Active “L”	None	None	None

3. Packages

Package Name	Drawing Code			
	Package	Tape	Reel	Land
SNT-6A	PG006-A-P-SD	PG006-A-C-SD	PG006-A-R-SD	PG006-A-L-SD
SOT-23-6	MP006-A-P-SD	MP006-A-C-SD	MP006-A-R-SD	—

4. Product name list

4. 1 S-1711 Series A type

ON/OFF logic: Active "H" Pull-up Resistor: None
Discharge Shunt Function: Available Pull-down Resistor: Available

Table 2 (1 / 2)

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
1.5 V ±1.0%	1.5 V ±1.0%	S-1711A1515-I6T1U	S-1711A1515-M6T1x
1.5 V ±1.0%	1.8 V ±1.0%	S-1711A1518-I6T1U	—
1.5 V ±1.0%	2.6 V ±1.0%	S-1711A1526-I6T1U	—
1.5 V ±1.0%	2.8 V ±1.0%	S-1711A1528-I6T1U	S-1711A1528-M6T1x
1.5 V ±1.0%	2.85 V ±1.0%	S-1711A152J-I6T1U	—
1.5 V ±1.0%	2.9 V ±1.0%	—	S-1711A1529-M6T1x
1.5 V ±1.0%	3.3 V ±1.0%	S-1711A1533-I6T1U	S-1711A1533-M6T1x
1.8 V ±1.0%	1.5 V ±1.0%	S-1711A1815-I6T1U	S-1711A1815-M6T1x
1.8 V ±1.0%	1.8 V ±1.0%	S-1711A1818-I6T1U	S-1711A1818-M6T1x
1.8 V ±1.0%	2.5 V ±1.0%	—	S-1711A1825-M6T1x
1.8 V ±1.0%	2.7 V ±1.0%	S-1711A1827-I6T1U	S-1711A1827-M6T1x
1.8 V ±1.0%	2.75 V ±1.0%	S-1711A182H-I6T1U	S-1711A182H-M6T1x
1.8 V ±1.0%	2.7 V ±1.0%	S-1711A1828-I6T1U	S-1711A1828-M6T1x
1.8 V ±1.0%	2.85 V ±1.0%	S-1711A182J-I6T1U	S-1711A182J-M6T1x
1.8 V ±1.0%	2.9 V ±1.0%	S-1711A1829-I6T1U	S-1711A1829-M6T1x
1.8 V ±1.0%	3.0 V ±1.0%	S-1711A1830-I6T1U	S-1711A1830-M6T1x
1.8 V ±1.0%	3.2 V ±1.0%	—	S-1711A1832-M6T1x
1.8 V ±1.0%	3.3 V ±1.0%	S-1711A1833-I6T1U	S-1711A1833-M6T1x
1.85 V ±1.0%	2.8 V ±1.0%	S-1711A1J28-I6T1U	S-1711A1J28-M6T1x
2.0 V ±1.0%	4.5 V ±1.0%	—	S-1711A2045-M6T1x
2.3 V ±1.0%	3.2 V ±1.0%	S-1711A2332-I6T1U	—
2.3 V ±1.0%	3.3 V ±1.0%	S-1711A2333-I6T1U	—
2.4 V ±1.0%	2.4 V ±1.0%	S-1711A2424-I6T1U	S-1711A2424-M6T1x
2.4 V ±1.0%	2.5 V ±1.0%	S-1711A2425-I6T1U	S-1711A2425-M6T1x
2.5 V ±1.0%	1.5 V ±1.0%	S-1711A2515-I6T1U	S-1711A2515-M6T1x
2.5 V ±1.0%	1.8 V ±1.0%	S-1711A2518-I6T1U	S-1711A2518-M6T1x
2.5 V ±1.0%	2.2 V ±1.0%	—	S-1711A2522-M6T1x
2.5 V ±1.0%	2.5 V ±1.0%	S-1711A2525-I6T1U	S-1711A2525-M6T1x
2.5 V ±1.0%	2.8 V ±1.0%	S-1711A2528-I6T1U	S-1711A2528-M6T1x
2.5 V ±1.0%	2.9 V ±1.0%	—	S-1711A2529-M6T1x
2.5 V ±1.0%	3.3 V ±1.0%	S-1711A2533-I6T1U	S-1711A2533-M6T1x
2.6 V ±1.0%	1.8 V ±1.0%	—	S-1711A2618-M6T1x
2.6 V ±1.0%	2.6 V ±1.0%	S-1711A2626-I6T1U	—
2.6 V ±1.0%	2.8 V ±1.0%	S-1711A2628-I6T1U	—
2.6 V ±1.0%	2.9 V ±1.0%	S-1711A2629-I6T1U	—
2.6 V ±1.0%	3.0 V ±1.0%	S-1711A2630-I6T1U	—
2.7 V ±1.0%	1.8 V ±1.0%	—	S-1711A2718-M6T1x
2.8 V ±1.0%	1.5 V ±1.0%	S-1711A2815-I6T1U	S-1711A2815-M6T1x
2.8 V ±1.0%	1.8 V ±1.0%	S-1711A2818-I6T1U	S-1711A2818-M6T1x
2.8 V ±1.0%	1.9 V ±1.0%	—	S-1711A2819-M6T1x
2.8 V ±1.0%	2.5 V ±1.0%	—	S-1711A2825-M6T1x

Table 2 (2 / 2)

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
2.8 V ±1.0%	2.8 V ±1.0%	S-1711A2828-I6T1U	S-1711A2828-M6T1x
2.8 V ±1.0%	2.9 V ±1.0%	S-1711A2829-I6T1U	S-1711A2829-M6T1x
2.8 V ±1.0%	3.0 V ±1.0%	S-1711A2830-I6T1U	S-1711A2830-M6T1x
2.8 V ±1.0%	3.1 V ±1.0%	S-1711A2831-I6T1U	—
2.8 V ±1.0%	3.2 V ±1.0%	S-1711A2832-I6T1U	S-1711A2832-M6T1x
2.8 V ±1.0%	3.3 V ±1.0%	S-1711A2833-I6T1U	S-1711A2833-M6T1x
2.85 V ±1.0%	1.5 V ±1.0%	S-1711A2J15-I6T1U	—
2.85 V ±1.0%	1.8 V ±1.0%	S-1711A2J18-I6T1U	—
2.85 V ±1.0%	2.85 V ±1.0%	S-1711A2J2J-I6T1U	S-1711A2J2J-M6T1x
2.85 V ±1.0%	3.0 V ±1.0%	—	S-1711A2J30-M6T1x
2.85 V ±1.0%	3.3 V ±1.0%	S-1711A2J33-I6T1U	—
2.9 V ±1.0%	2.9 V ±1.0%	S-1711A2929-I6T1U	S-1711A2929-M6T1x
2.9 V ±1.0%	3.3 V ±1.0%	—	S-1711A2933-M6T1x
3.0 V ±1.0%	1.5 V ±1.0%	S-1711A3015-I6T1U	S-1711A3015-M6T1x
3.0 V ±1.0%	1.8 V ±1.0%	S-1711A3018-I6T1U	S-1711A3018-M6T1x
3.0 V ±1.0%	2.5 V ±1.0%	S-1711A3025-I6T1U	S-1711A3025-M6T1x
3.0 V ±1.0%	2.8 V ±1.0%	S-1711A3028-I6T1U	—
3.0 V ±1.0%	3.0 V ±1.0%	S-1711A3030-I6T1U	S-1711A3030-M6T1x
3.0 V ±1.0%	3.3 V ±1.0%	S-1711A3033-I6T1U	S-1711A3033-M6T1x
3.1 V ±1.0%	2.8 V ±1.0%	S-1711A3128-I6T1U	—
3.3 V ±1.0%	1.8 V ±1.0%	S-1711A3318-I6T1U	—
3.3 V ±1.0%	2.5 V ±1.0%	—	S-1711A3325-M6T1x
3.3 V ±1.0%	2.8 V ±1.0%	—	S-1711A3328-M6T1x
3.3 V ±1.0%	3.0 V ±1.0%	—	S-1711A3330-M6T1x
3.3 V ±1.0%	3.3 V ±1.0%	S-1711A3333-I6T1U	S-1711A3333-M6T1x
3.3 V ±1.0%	4.8 V ±1.0%	S-1711A3348-I6T1U	S-1711A3348-M6T1x
3.3 V ±1.0%	5.0 V ±1.0%	S-1711A3350-I6T1U	—
3.4 V ±1.0%	3.4 V ±1.0%	S-1711A3434-I6T1U	—
4.0 V ±1.0%	2.0 V ±1.0%	—	S-1711A4020-M6T1x
5.0 V ±1.0%	2.5 V ±1.0%	S-1711A5025-I6T1U	S-1711A5025-M6T1x
5.0 V ±1.0%	3.0 V ±1.0%	S-1711A5030-I6T1U	—

Remark 1. Please contact our sales office for products with specifications other than the above.
2. x: G or U
3. Please select products of environmental code = U for Sn 100%, halogen-free products.

4. 2 S-1711 Series B type

ON/OFF logic: Active “H” Pull-up Resistor: None
Discharge Shunt Function: Available Pull-down Resistor: None

Table 3

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
1.5 V ±1.0%	1.8 V ±1.0%	S-1711B1518-I6T1U	S-1711B1518-M6T1x
1.5 V ±1.0%	2.8 V ±1.0%	S-1711B1528-I6T1U	—
1.5 V ±1.0%	2.9 V ±1.0%	—	S-1711B1529-M6T1x
1.8 V ±1.0%	2.5 V ±1.0%	S-1711B1825-I6T1U	S-1711B1825-M6T1x
1.8 V ±1.0%	2.8 V ±1.0%	S-1711B1828-I6T1U	S-1711B1828-M6T1x
1.8 V ±1.0%	3.2 V ±1.0%	—	S-1711B1832-M6T1x
1.8 V ±1.0%	3.3 V ±1.0%	S-1711B1833-I6T1U	S-1711B1833-M6T1x
2.5 V ±1.0%	1.5 V ±1.0%	—	S-1711B2515-M6T1x
2.5 V ±1.0%	1.8 V ±1.0%	S-1711B2518-I6T1U	S-1711B2518-M6T1x
2.5 V ±1.0%	2.8 V ±1.0%	S-1711B2528-I6T1U	S-1711B2528-M6T1x
2.6 V ±1.0%	1.8 V ±1.0%	—	S-1711B2618-M6T1x
2.7 V ±1.0%	1.8 V ±1.0%	—	S-1711B2718-M6T1x
2.8 V ±1.0%	1.5 V ±1.0%	S-1711B2815-I6T1U	S-1711B2815-M6T1x
2.8 V ±1.0%	1.8 V ±1.0%	S-1711B2818-I6T1U	S-1711B2818-M6T1x
2.8 V ±1.0%	2.5 V ±1.0%	—	S-1711B2825-M6T1x
2.8 V ±1.0%	2.8 V ±1.0%	S-1711B2828-I6T1U	S-1711B2828-M6T1x
2.8 V ±1.0%	3.3 V ±1.0%	S-1711B2833-I6T1U	—
3.0 V ±1.0%	3.0 V ±1.0%	—	S-1711B3030-M6T1x
3.0 V ±1.0%	3.3 V ±1.0%	S-1711B3033-I6T1U	S-1711B3033-M6T1x
3.0 V ±1.0%	3.6 V ±1.0%	—	S-1711B3036-M6T1x
3.3 V ±1.0%	3.3 V ±1.0%	S-1711B3333-I6T1U	S-1711B3333-M6T1x

Remark 1. Please contact our sales office for products with specifications other than the above.
2. x: G or U
3. Please select products of environmental code = U for Sn 100%, halogen-free products.

4. 3 S-1711 Series C type

ON/OFF logic: Active “H” Pull-up Resistor: None
Discharge Shunt Function: None Pull-down Resistor: Available

Table 4

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
1.5 V ±1.0%	1.5 V ±1.0%	S-1711C1515-I6T1U	S-1711C1515-M6T1x
1.8 V ±1.0%	1.5 V ±1.0%	S-1711C1815-I6T1U	S-1711C1815-M6T1x
1.8 V ±1.0%	2.5 V ±1.0%	—	S-1711C1825-M6T1x
1.8 V ±1.0%	2.7 V ±1.0%	S-1711C1827-I6T1U	S-1711C1827-M6T1x
1.8 V ±1.0%	2.75 V ±1.0%	S-1711C182H-I6T1U	S-1711C182H-M6T1x
1.8 V ±1.0%	2.8 V ±1.0%	S-1711C1828-I6T1U	—
1.8 V ±1.0%	3.2 V ±1.0%	—	S-1711C1832-M6T1x
1.85 V ±1.0%	2.8 V ±1.0%	S-1711C1J28-I6T1U	S-1711C1J28-M6T1x
2.4 V ±1.0%	2.4 V ±1.0%	S-1711C2424-I6T1U	S-1711C2424-M6T1x
2.4 V ±1.0%	2.5 V ±1.0%	S-1711C2425-I6T1U	S-1711C2425-M6T1x
2.5 V ±1.0%	1.5 V ±1.0%	S-1711C2515-I6T1U	S-1711C2515-M6T1x
2.5 V ±1.0%	1.8 V ±1.0%	S-1711C2518-I6T1U	S-1711C2518-M6T1x
2.5 V ±1.0%	2.5 V ±1.0%	S-1711C2525-I6T1U	S-1711C2525-M6T1x
2.8 V ±1.0%	1.5 V ±1.0%	S-1711C2815-I6T1U	S-1711C2815-M6T1x
2.8 V ±1.0%	1.8 V ±1.0%	S-1711C2818-I6T1U	S-1711C2818-M6T1x
2.8 V ±1.0%	2.8 V ±1.0%	S-1711C2828-I6T1U	S-1711C2828-M6T1x
2.8 V ±1.0%	2.9 V ±1.0%	S-1711C2829-I6T1U	S-1711C2829-M6T1x
2.8 V ±1.0%	3.0 V ±1.0%	S-1711C2830-I6T1U	S-1711C2830-M6T1x
2.8 V ±1.0%	3.3 V ±1.0%	S-1711C2833-I6T1U	S-1711C2833-M6T1x
2.85 V ±1.0%	2.85 V ±1.0%	S-1711C2J2J-I6T1U	S-1711C2J2J-M6T1x
2.9 V ±1.0%	2.9 V ±1.0%	S-1711C2929-I6T1U	S-1711C2929-M6T1x
3.0 V ±1.0%	1.5 V ±1.0%	S-1711C3015-I6T1U	S-1711C3015-M6T1x
3.0 V ±1.0%	1.8 V ±1.0%	S-1711C3018-I6T1U	S-1711C3018-M6T1x
3.0 V ±1.0%	2.5 V ±1.0%	S-1711C3025-I6T1U	S-1711C3025-M6T1x
3.0 V ±1.0%	3.0 V ±1.0%	S-1711C3030-I6T1U	S-1711C3030-M6T1x
3.0 V ±1.0%	3.3 V ±1.0%	S-1711C3033-I6T1U	S-1711C3033-M6T1x
3.1 V ±1.0%	3.1 V ±1.0%	—	S-1711C3131-M6T1x

Remark 1. Please contact our sales office for products with specifications other than the above.
2. x: G or U
3. Please select products of environmental code = U for Sn 100%, halogen-free products.

4. 4 S-1711 Series D type

ON/OFF logic: Active “H” Pull-up Resistor: None
Discharge Shunt Function: None Pull-down Resistor: None

Table 5

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
1.8 V ±1.0%	2.5 V ±1.0%	—	S-1711D1825-M6T1x
1.8 V ±1.0%	2.6 V ±1.0%	—	S-1711D1826-M6T1x
1.8 V ±1.0%	2.8 V ±1.0%	S-1711D1828-I6T1U	S-1711D1828-M6T1x
1.8 V ±1.0%	3.2 V ±1.0%	—	S-1711D1832-M6T1x
1.9 V ±1.0%	2.5 V ±1.0%	S-1711D1925-I6T1U	S-1711D1925-M6T1x
2.5 V ±1.0%	1.8 V ±1.0%	S-1711D2518-I6T1U	S-1711D2518-M6T1x
2.5 V ±1.0%	2.8 V ±1.0%	S-1711D2528-I6T1U	S-1711D2528-M6T1x
2.5 V ±1.0%	2.85 V ±1.0%	S-1711D252J-I6T1U	—
2.6 V ±1.0%	2.9 V ±1.0%	—	S-1711D2629-M6T1x
2.8 V ±1.0%	1.5 V ±1.0%	S-1711D2815-I6T1U	S-1711D2815-M6T1x
2.85 V ±1.0%	2.85 V ±1.0%	S-1711D2J2J-I6T1U	—
4.2 V ±1.0%	3.0 V ±1.0%	—	S-1711D4230-M6T1x

4. 5 S-1711 Series E type

ON/OFF logic: Active “L” Pull-up Resistor: Available
Discharge Shunt Function: Available Pull-down Resistor: None

Table 6

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
1.8 V ±1.0%	3.3 V ±1.0%	—	S-1711E1833-M6T1x
2.8 V ±1.0%	1.8 V ±1.0%	S-1711E2818-I6T1U	S-1711E2818-M6T1x
3.3 V ±1.0%	3.3 V ±1.0%	—	S-1711E3333-M6T1x

4. 6 S-1711 Series F type

ON/OFF logic: Active “L” Pull-up Resistor: None
Discharge Shunt Function: Available Pull-down Resistor: None

Table 7

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
2.8 V ±1.0%	1.8 V ±1.0%	S-1711F2818-I6T1U	—

Remark 1. Please contact our sales office for products with specifications other than the above.
2. x: G or U
3. Please select products of environmental code = U for Sn 100%, halogen-free products.

4. 7 S-1711 Series G type

ON/OFF logic: Active “L” Pull-up Resistor: Available
Discharge Shunt Function: None Pull-down Resistor: None

Table 8

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
2.8 V ±1.0%	3.0 V ±1.0%	S-1711G2830-I6T1U	—

4. 8 S-1711 Series H type

ON/OFF logic: Active “L” Pull-up Resistor: None
Discharge Shunt Function: None Pull-down Resistor: None

Table 9

Voltage Regulator 1 Output Voltage	Voltage Regulator 2 Output Voltage	SNT-6A	SOT-23-6
2.5 V ±1.0%	1.8 V ±1.0%	—	S-1711H2518-M6T1x

Remark 1. Please contact our sales office for products with specifications other than the above.
2. x: G or U
3. Please select products of environmental code = U for Sn 100%, halogen-free products.

■ Pin Configurations

SNT-6A
Top view

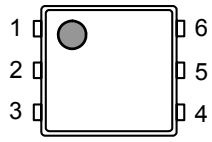


Figure 9

Table 10

Pin No.	Symbol	Description
1	VOUT1	Output voltage pin 1
2	VIN	Input voltage pin
3	VOUT2	Output voltage pin 2
4	ON/OFF2	ON/OFF pin 2
5	VSS	GND pin
6	ON/OFF1	ON/OFF pin 1

SOT-23-6
Top view

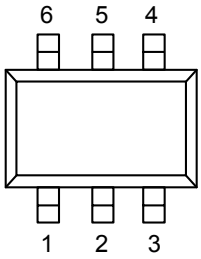


Figure 10

Table 11

Pin No.	Symbol	Description
1	VOUT1	Output voltage pin 1
2	VIN	Input voltage pin
3	VOUT2	Output voltage pin 2
4	ON/OFF2	ON/OFF pin 2
5	VSS	GND pin
6	ON/OFF1	ON/OFF pin 1

■ Absolute Maximum Ratings

Table 12

(Ta = 25°C unless otherwise specified)

Item		Symbol	Absolute Maximum Rating	Unit
Input voltage		V_{IN}	V_{SS}–0.3 to V_{SS}+7	V
		$V_{ON/OFF1}$, $V_{ON/OFF2}$	V_{SS}–0.3 to V_{IN}+0.3	V
Output voltage		V_{OUT1}, V_{OUT2}	V_{SS}–0.3 to V_{IN}+0.3	V
Power dissipation	SNT-6A	P_D	400*1	mW
	SOT-23-6		300 (When not mounted on board)	mW
			650*1	mW
Operation ambient temperature		T_{opr}	–40 to +85	°C
Storage temperature		T_{stg}	–40 to +125	°C

***1.** When mounted on board

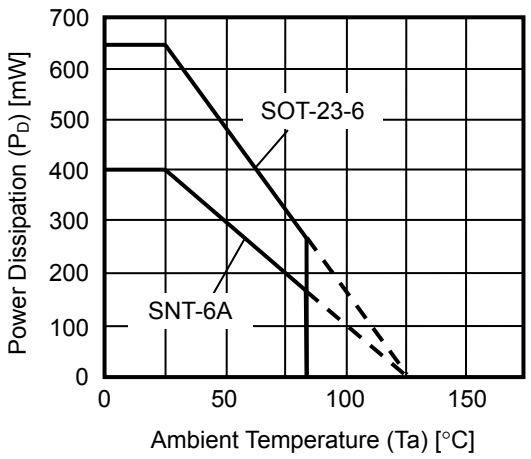
[Mounted board]

(1) Board size: 114.3 mm × 76.2 mm × t1.6 mm

(2) Name: JEDEC STANDARD51-7

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.

(1) When mounted on board



(2) When not mounted on board

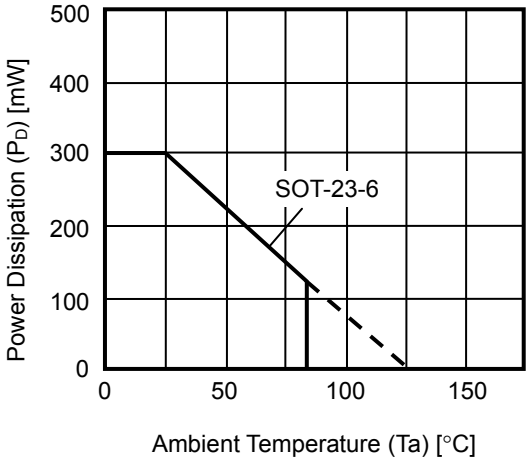


Figure 11 Power Dissipation of Package

■ Electrical Characteristics

Table 13

Total (2 circuits) (Ta = 25°C unless otherwise specified)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Test Circuit
Current consumption	I_{SS}	V_{IN} = 6.5 V, no load	—	140	180	μA	1

Voltage regulator 1 or Voltage regulator 2 (Per circuit) (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} = 30 mA		$V_{OUT(S)}$ × 0.99	$V_{OUT(S)}$	$V_{OUT(S)}$ × 1.01	V	2, 3
Output current*2	I_{OUT}	V_{IN} ≥ $V_{OUT(S)}$ + 1.0 V		150*5	—	—	mA	4, 5
Dropout voltage*3	V_{drop}	I_{OUT} = 150 mA	$V_{OUT(S)}$ = 1.5 V	0.50	0.54	0.58	V	2, 3
			$V_{OUT(S)}$ = 1.6 V	0.40	0.44	0.48	V	2, 3
			$V_{OUT(S)}$ = 1.7 V	0.30	0.34	0.39	V	2, 3
			1.8 V ≤ $V_{OUT(S)}$ ≤ 2.0 V	0.20	0.26	0.39	V	2, 3
			2.1 V ≤ $V_{OUT(S)}$ ≤ 2.7 V	—	0.24	0.36	V	2, 3
			2.8 V ≤ $V_{OUT(S)}$ ≤ 5.5 V	—	0.20	0.35	V	2, 3
Line regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	$V_{OUT(S)}$ + 0.5 V ≤ V_{IN} ≤ 6.5 V, I_{OUT} = 30 mA		—	0.02	0.1	% / V	2, 3
Load regulation	ΔV_{OUT2}	V_{IN} = $V_{OUT(S)}$ + 1.0 V, 1.0 mA ≤ I_{OUT} ≤ 150 mA		—	20	40	mV	2, 3
Output voltage temperature coefficient*4	$\frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}$	V_{IN} = $V_{OUT(S)}$ + 1.0 V, I_{OUT} = 30 mA, −40°C ≤ Ta ≤ +85°C		—	±100	—	ppm / °C	2, 3
Current consumption during operation	I_{SS1}	V_{IN} = $V_{OUT(S)}$ + 1.0 V, ON/OFF pin = ON, no load		—	70	90	μA	1
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	1
Input voltage	V_{IN}	—		2.0	—	6.5	V	1
ON/OFF pin input voltage "H"	V_{SH}	V_{IN} = $V_{OUT(S)}$ + 1.0 V, R_L = 1.0 kΩ		1.5	—	—	V	6, 7
ON/OFF pin input voltage "L"	V_{SL}	V_{IN} = $V_{OUT(S)}$ + 1.0 V, R_L = 1.0 kΩ		—	—	0.3	V	6, 7
ON/OFF pin input current "H"	I_{SH}	V_{IN} = 6.5 V, $V_{ON/OFF}$ = 6.5 V	A/ C type	1.0	2.5	4.2	μA	6, 7
			B/ D/ E/ F/ G/ H type	−0.1	—	0.1	μA	
ON/OFF pin input current "L"	I_{SL}	V_{IN} = 6.5 V, $V_{ON/OFF}$ = 0 V	E/ G type	1.0	2.5	4.2	μA	6, 7
			A/ B/ C/ D/ F/ H type	−0.1	—	0.1	μA	
Ripple rejection	$\lvert RR \rvert$	V_{IN} = $V_{OUT(S)}$ + 1.0 V, f = 1.0 kHz, ΔV_{rip} = 0.5 Vrms, I_{OUT} = 30 mA		—	70	—	dB	8, 9
Short-circuit current	I_{short}	V_{IN} = $V_{OUT(S)}$ + 1.0 V, ON/OFF pin = ON, V_{OUT} = 0 V		—	170	—	mA	4, 5

S-1711 Series A/B/E/F type (With discharge shunt function)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Test Circuit
"L" output Nch ON resistance	R_{LOW}	V_{OUT} = 0.1 V, V_{IN} = 6.5 V	—	100	—	Ω	4, 5

S-1711 Series A/C/E/G type (With pull-up/pull-down resistor)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Test Circuit
Power-off pull-up/pull-down resistor	R_{PD}	—	1.0	2.6	5.0	MΩ	6, 7

***1.** $V_{OUT(S)}$: Set output voltage
$V_{OUT(E)}$: Actual output voltage
Output voltage when fixing I_{OUT}(=30 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} = 150 mA.
V_{IN1} is the input voltage at which the output voltage becomes 98% of V_{OUT3} after gradually decreasing the input voltage.

***4.** A change in the temperature of the output voltage [mV/°C] is calculated using the following equation.

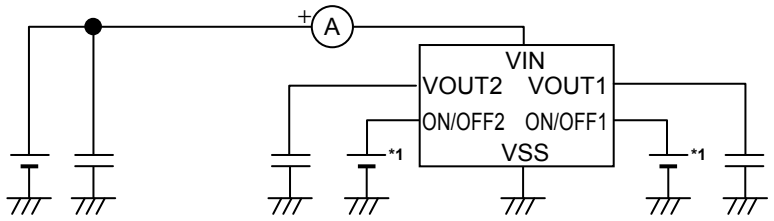
$$\frac{\Delta V_{OUT}}{\Delta Ta}\ [\text{mV/°C}]^{*1} = V_{OUT(S)}\ [\text{V}]^{*2} \times \frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}\ [\text{ppm/°C}]^{*3} \div 1000$$

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

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

■ Test Circuits

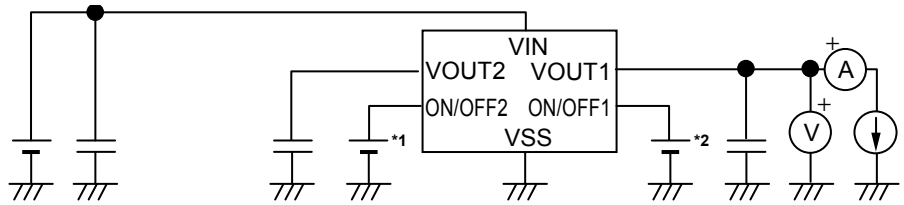
1.



***1.** Set to V_{IN} or GND

Figure 12

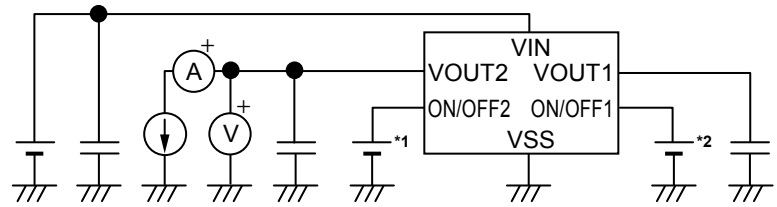
2.



***1.** Set to OFF
***2.** Set to ON

Figure 13

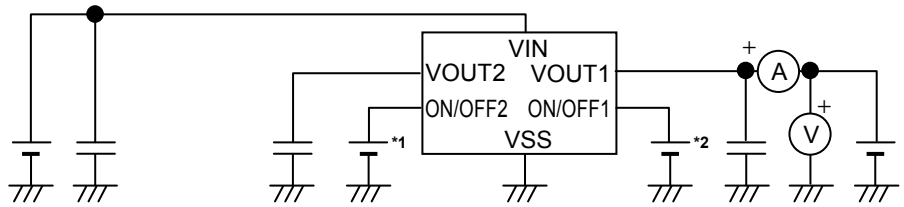
3.



***1.** Set to ON
***2.** Set to OFF

Figure 14

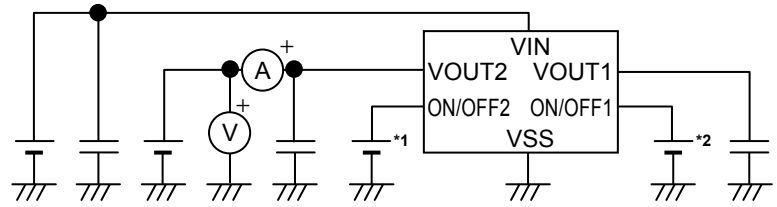
4.



***1.** Set to OFF
***2.** Set to V_{IN} or GND

Figure 15

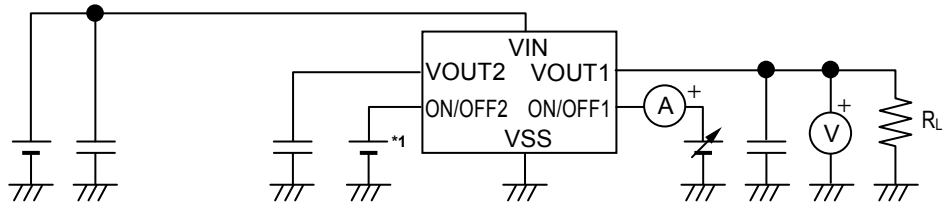
5.



***1.** Set to V_{IN} or GND
***2.** Set to OFF

Figure 16

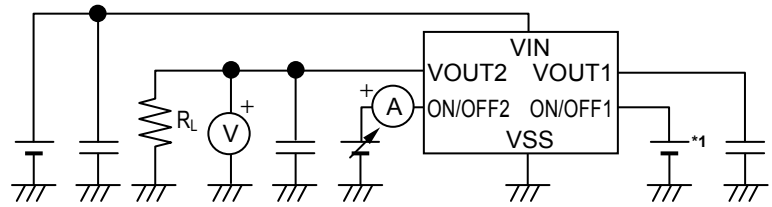
6.



***1.** Set to OFF

Figure 17

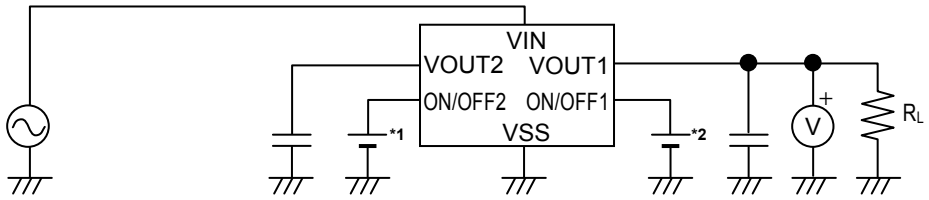
7.



***1.** Set to OFF

Figure 18

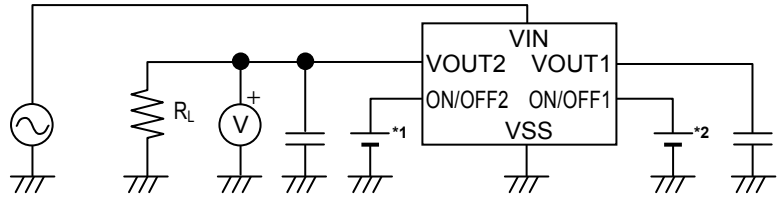
8.



***1.** Set to OFF
***2.** Set to ON

Figure 19

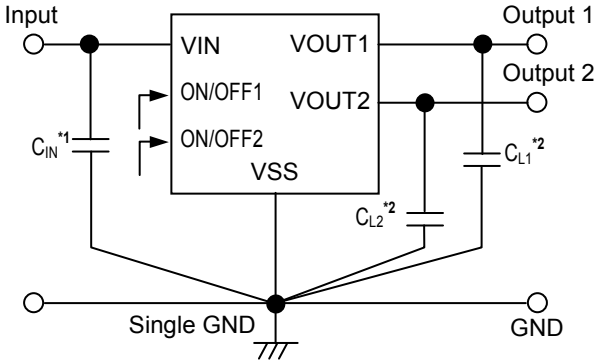
9.



***1.** Set to ON
***2.** Set to OFF

Figure 20

■ Standard Circuit



***1.** C_{IN} is a capacitor for stabilizing the input.
***2.** A ceramic capacitor of 1.0 μF or more can be used for C_{L1} and C_{L2}.

Figure 21

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

■ Condition of Application

Input capacitor (C_{IN}):	1.0 μF or more
Output capacitor (C_{L1}, C_{L2}):	1.0 μF or more
ESR of output capacitor:	1.0 Ω or less

Caution Generally a series regulator may cause oscillation, depending on the selection of external parts. Confirm that no oscillation occurs in the application for which the above capacitors are used.
Use input/output capacitor which has good temperature characteristics (conforming to the ceramic capacitor EIA X5R (JIS B) characteristics).

■ Selection of Input and Output Capacitors (C_{IN}, C_{L1}, C_{L2})

The S-1711 Series requires an output capacitor between the VOUT and VSS pins for phase compensation. Operation is stabilized by a ceramic capacitor with an output capacitance of 1.0 μF or more in the entire temperature range. When using an OS capacitor, a tantalum capacitor, or an aluminum electrolytic capacitor, the capacitance must be 1.0 μF or more, and the ESR must be 1.0 Ω or less.
The value of the output overshoot or undershoot transient response varies depending on the value of the output capacitor. The required capacitance of the input capacitor differs depending on the application.
The recommended capacitance for an application is $C_{IN} \geq 1.0$ μF, $C_{L1} \geq 1.0$ μF, $C_{L2} \geq 1.0$ μF; however, when selecting the output capacitor, perform sufficient evaluation, including evaluation of temperature characteristics, on the actual device.

■ Explanation of Terms

1. Low dropout voltage regulator

This voltage regulator has the low dropout voltage due to its built-in low on-resistance transistor.

2. Low ESR

A capacitor whose ESR (Equivalent Series Resistance) is low. The S-1711 Series enables use of a low ESR capacitor, such as a ceramic capacitor, for the output capacitor C_{L1}, C_{L2}. ESR of 1.0 Ω or less can be used.

3. Output voltage (V_{OUT})

The accuracy of the output voltage is ensured at ±1.0% under the specified conditions of fixed input voltage[*1], fixed output current, and fixed temperature.

***1.** Differs depending on the product.

Caution If the above conditions change, the output voltage value may vary and exceed the accuracy range of the output voltage. Refer to "■ Electrical Characteristics" and "■ Characteristics (Typical Data) (Per circuit)" for details.

4. Line regulation $\left(\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}\right)$

Indicates the dependency of the output voltage on the input voltage. That is, the values show how much the output voltage changes due to a change in the input voltage with the output current remaining unchanged.

5. Load regulation (ΔV_{OUT2})

Indicates the dependency of the output voltage on the output current. That is, the values show how much the output voltage changes due to a change in the output current with the input voltage remaining unchanged.

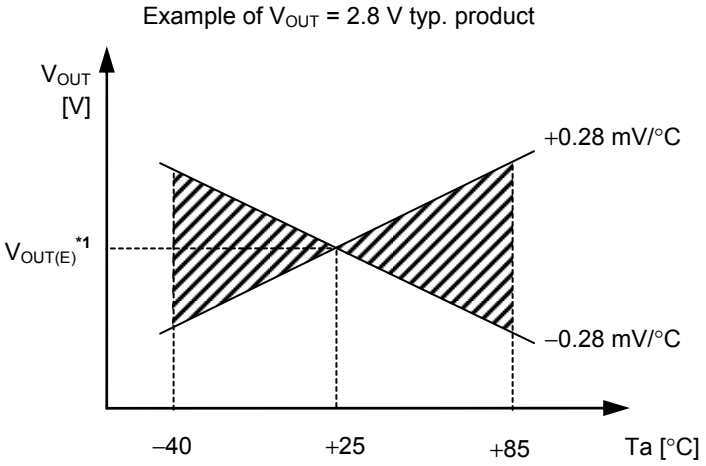
6. Dropout voltage (V_{drop})

Indicates the difference between input voltage (V_{IN1}) and the output voltage when; decreasing input voltage (V_{IN}) gradually until the output voltage has dropped out to the value of 98% of output voltage (V_{OUT3}), which is at V_{IN} = $V_{OUT(S)}$ + 1.0 V.

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

7. Output voltage temperature coefficient $\left(\frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}\right)$

The shaded area in **Figure 22** is the range where V_{OUT} varies in the operation temperature range when the output voltage temperature coefficient is ±100 ppm/°C.



***1.** $V_{OUT(E)}$ is the value of the output voltage measured at Ta = +25°C.

Figure 22

A change in the temperature of the output voltage [mV/°C] is calculated using the following equation.

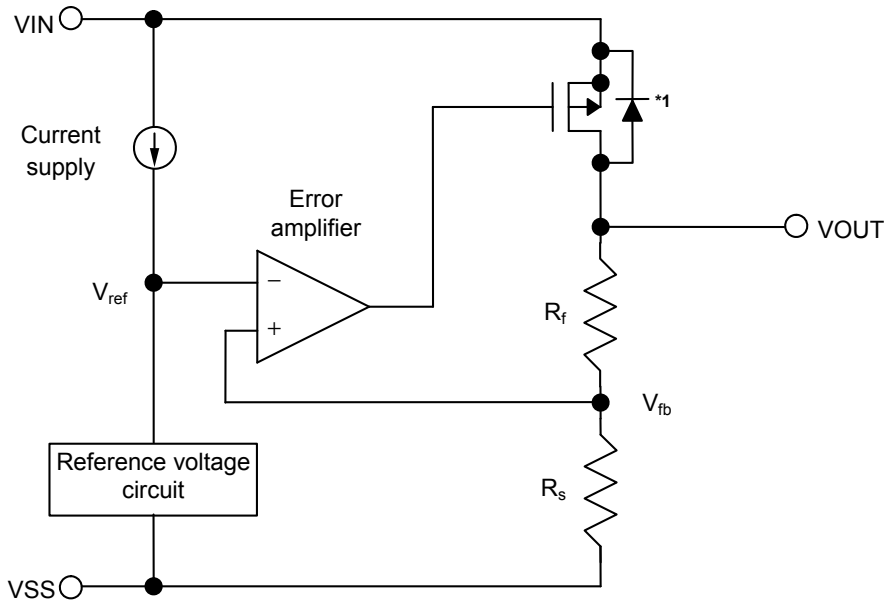
$$\frac{\Delta V_{OUT}}{\Delta Ta}\ [mV/°C]^{*1} = V_{OUT(S)}\ [V]^{*2} \times \frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}\ [ppm/°C]^{*3} \div 1000$$

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

■ Operation

1. Basic operation

Figure 23 shows the block diagram of the S-1711 Series.
The error amplifier compares the reference voltage (V_{ref}) with feedback voltage (V_{fb}), which is the output voltage resistance-divided by feedback resistors (R_s and R_f). It supplies the gate voltage necessary to maintain the constant output voltage which is not influenced by the input voltage and temperature change, to the output transistor.



***1**. Parasitic diode

Figure 23

2. Output transistor

In the S-1711 Series, a low on-resistance P-channel MOS FET is used as the output transistor.
Be sure that V_{OUT} does not exceed V_{IN} + 0.3 V to prevent the voltage regulator from being damaged due to reverse current flowing from the VOUT pin through a parasitic diode to the VIN pin, when the potential of V_{OUT} became higher than V_{IN}.

3. ON/OFF pin 1 and 2

These pins start and stop the regulator.

When the ON/OFF pin is set to OFF level, the entire internal circuit stops operating, and the built-in P-channel MOS FET output transistor between the VIN pin and the VOUT pin is turned off, reducing current consumption significantly.
Since the S-1711 Series A/ B/ E/ F type has a built-in discharge shunt circuit to discharge the output capacitance, the VOUT pin is forcibly set to V_{SS} level. In the S-1711 Series C/ D/ G/ H type, the VOUT pin is set to V_{SS} level through several hundred kΩ internal divided resistors between the VOUT pin and the VSS pin. Note that the current consumption increases when a voltage of 0.3 V to V_{IN} – 0.3 V is applied to the ON/OFF pin.

The ON/OFF pin is configured as shown in **Figure 24** and **Figure 25**. In the S-1711 Series A/ C/ E/ G type, the ON/OFF pin is internally pulled up or pulled down to the VSS pin in the floating status, so the VOUT pin is set to the V_{SS} level. In the S-1711 Series B/ D/ F/ H type, the ON/OFF pin is not internally pulled up or pulled down, so do not use the ON/OFF pin in the floating status. When not using the ON/OFF pin, connect it to the VIN pin in the product B/ D type, and connect it to the VSS pin in F/ H type.

Table 14

Product Type	ON/OFF Pin	Internal Circuit	VOUT Pin Voltage	Current Consumption
A/ B/ C/ D	"H": ON	Operate	Set value	I_{SS1}*1
A/ B/ C/ D	"L": OFF	Stop	V_{SS} level	I_{SS2}
E/ F/ G/ H	"H": OFF	Stop	V_{SS} level	I_{SS2}
E/ F/ G/ H	"L": ON	Operate	Set value	I_{SS1}*1

***1**. Note that the IC's current consumption increases as much as current flows into the pull-up/pull-down resistor when; the ON/OFF pin is connected to the VIN pin in the A/ C type, the ON/OFF pin is connected to the VSS pin in the E/ G type (Refer to **Figure 24**).

(1) S-1711 Series A/ C/ E/ G Type

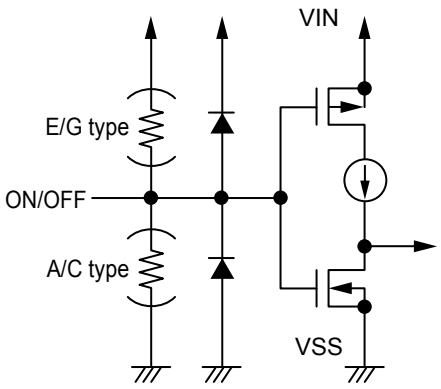


Figure 24

(2) S-1711 Series B/ D/ F/ H Type

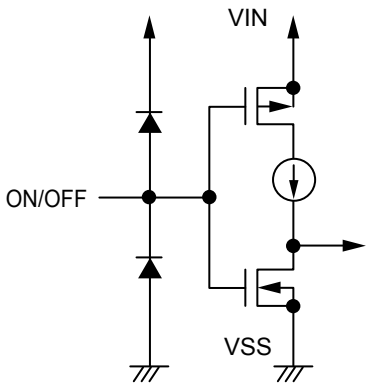
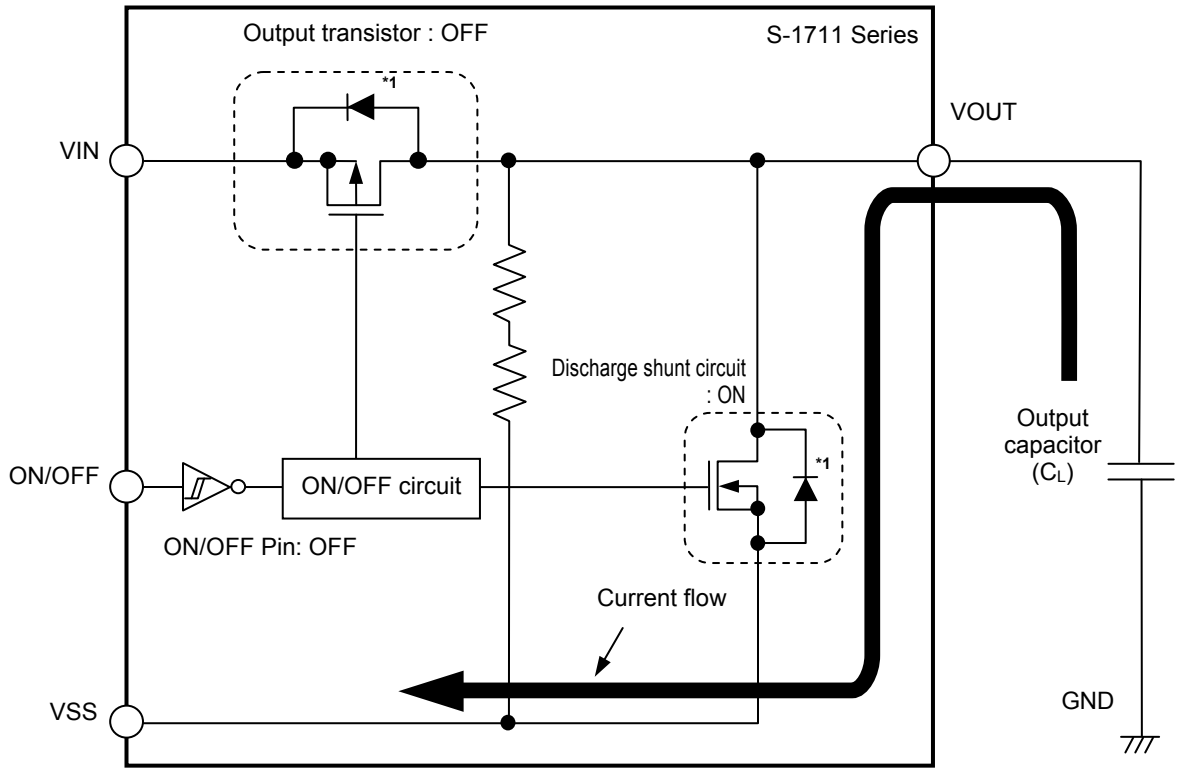


Figure 25

4. Discharge shunt function (S-1711 Series A/ B/ E/ F type)

The S-1711 Series A/ B/ E/ F type has a built-in discharge shunt circuit to discharge the output capacitance. When the ON/OFF pin is set to OFF level, turns the output transistor off, and turns the discharge shunt circuit on so that the output capacitor discharges. These types allow the VOUT pin to reach V_{SS} level faster than the S-1711 Series C / D / G / H type that does not have a discharge shunt circuit.



1. Parasitic diode

Figure 26

5. Pull-down/pull-up resistor (S-1711 Series A/ C/ E/ G type)

In the S-1711 Series A/ C/ E/ G type, the ON/OFF pin is internally pulled up to the VIN pin or pulled down to the VSS pin in the floating status, so the VOUT pin is set to the V_{SS} level.

Note that the IC's current consumption increases as much as current flows into the pull-up / pull-down resistor when; the ON / OFF pin is connected to the VIN pin in the A / C type, the ON / OFF pin is connected to the VSS pin in the E / G type.