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# 6.5 V INPUT, 300 mA VOLTAGE REGULATOR

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Rev.4.3_00

The S-1132 Series is a positive voltage regulator with a low dropout voltage, high-accuracy output voltage, and low current consumption (300 mA output current) developed based on CMOS technology.
A 0.1 µF small ceramic capacitor can be used. It operates with low current consumption of 20 µA typ. A built-in overcurrent protection circuit prevents the output current from exceeding the current capacity of the output transistor.
Compared with the conventional 300 mA output current CMOS voltage regulators, high-density mounting is realized by using the super-small SNT-6A(H) package and a 0.1µF small ceramic capacitor.
Also, the low current consumption makes the S-1132 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: 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.

## ■ Applications

- Power supply for battery-powered device
- Power supply for personal communication device
- Power supply for home electric appliance
- Power supply for cellular phone

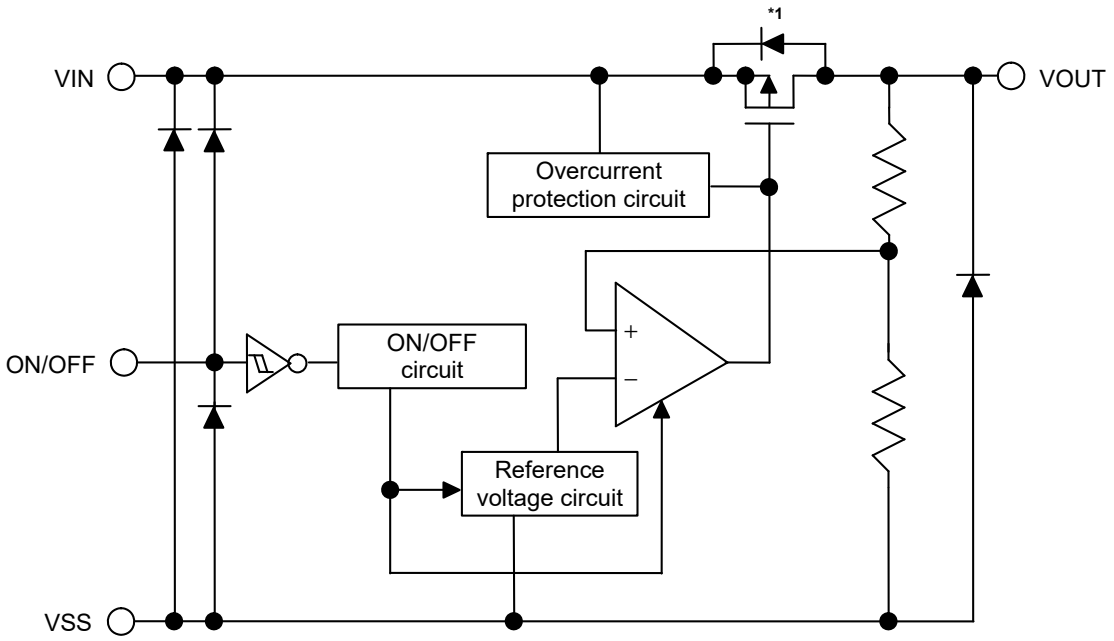
## ■ Packages

- SOT-23-5
- SOT-89-5
- SNT-6A(H)



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## ■ Block Diagram




***1.** Parasitic diode

**Figure 1**



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## ■ Product Name Structure

Users can select the product type, output voltage, and package type for the S-1132 Series. Refer to "**1. Product name**" regarding the contents of product name "**2. Packages**" regarding the package drawings "**3. Product name list**" regarding details of the product name.

### 1. Product name

#### 1. 1 SOT-23-5, SOT-89-5

**S-1132 x xx - xxxx x**

- Environmental code
  - U: Lead-free (Sn 100%), halogen-free
  - G: Lead-free (for details, please contact our sales representatives)
- Package abbreviation and IC packing specifications*1
  - M5T1: SOT-23-5, Tape
  - U5T1: SOT-89-5, Tape
- Output voltage
  - 15 to 55
  - (e.g., when the output voltage is 1.5 V, it is expressed as 15.)
- Product type*2
  - A: ON/OFF pin negative logic
  - B: ON/OFF pin positive logic

***1.** Refer to the tape drawing.
***2.** Refer to "**3. ON/OFF pin**" in "**■ Operation**".

#### 1. 2 SNT-6A(H)

**S-1132 x xx - I6T2 U**

- Environmental code
  - U: Lead-free (Sn 100%), halogen-free
- Package abbreviation and IC packing specifications*1
  - I6T2: SNT-6A(H), Tape
- Output voltage
  - 15 to 55
  - (e.g., when the output voltage is 1.5 V, it is expressed as 15.)
- Product type*2
  - A: ON/OFF pin negative logic
  - B: ON/OFF pin positive logic

***1.** Refer to the tape drawing.
***2.** Refer to "**3. ON/OFF pin**" in "**■ Operation**".

### 2. Packages

| Package Name | Drawing Code | | | |
|---|---|---|---|---|
| | Package | Tape | Reel | Land |
| SOT-23-5 | MP005-A-P-SD | MP005-A-C-SD | MP005-A-R-SD | — |
| SOT-89-5 | UP005-A-P-SD | UP005-A-C-SD | UP005-A-R-SD | — |
| SNT-6A(H) | PI006-A-P-SD | PI006-A-C-SD | PI006-A-R-SD | PI006-A-L-SD |



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## 3. Product name list

**Table 1**

| Output Voltage | SOT-23-5 | SOT-89-5 | SNT-6A(H) |
|---|---|---|---|
| 1.8 V ± 1.0% | S-1132B18-M5T1x | S-1132B18-U5T1x | S-1132B18-I6T2U |
| 2.5 V ± 1.0% | S-1132B25-M5T1x | S-1132B25-U5T1x | S-1132B25-I6T2U |
| 3.3 V ± 1.0% | S-1132B33-M5T1x | S-1132B33-U5T1x | S-1132B33-I6T2U |

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



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## ■ Pin Configurations

SOT-23-5
Top view

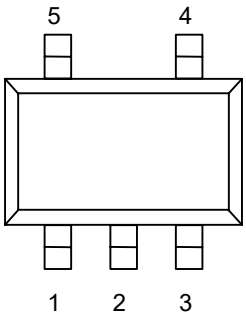



**Figure 2**

**Table 2**

| Pin No. | Symbol | Description |
|---|---|---|
| 1 | VIN | Input voltage pin |
| 2 | VSS | GND pin |
| 3 | ON/OFF | ON/OFF pin |
| 4 | NC*1 | No connection |
| 5 | VOUT | Output voltage pin |

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

SOT-89-5
Top view

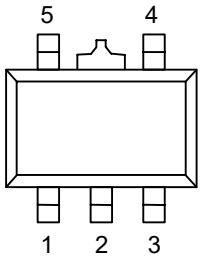



**Figure 3**

**Table 3**

| Pin No. | Symbol | Description |
|---|---|---|
| 1 | VOUT | Output voltage pin |
| 2 | VSS | GND pin |
| 3 | NC*1 | No connection |
| 4 | ON/OFF | ON/OFF pin |
| 5 | VIN | Input voltage pin |

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

SNT-6A(H)
Top view

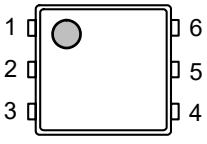



**Figure 4**

**Table 4**

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

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



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## ■ Absolute Maximum Ratings

**Table 5**

(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 |
| | | $V_{ON/OFF}$ | $V_{SS}$ – 0.3 to $V_{IN}$ + 0.3 | V |
| Output voltage | | $V_{OUT}$ | $V_{SS}$ – 0.3 to $V_{IN}$ + 0.3 | V |
| Power dissipation | SOT-23-5 | $P_D$ | 300 (When not mounted on board) | mW |
| | | | 600*1 | mW |
| | SOT-89-5 | | 500 (When not mounted on board) | mW |
| | | | 1000*1 | mW |
| | SNT-6A(H) | | 500*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) Board 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.**

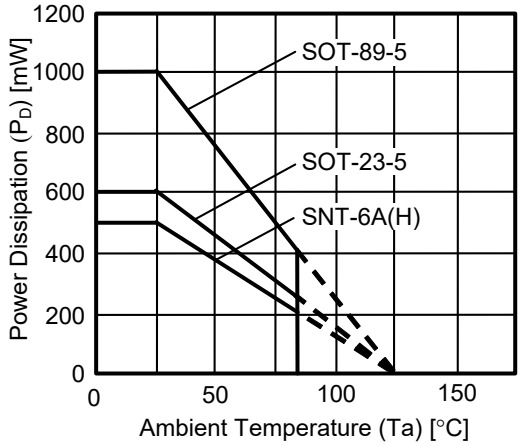



**Figure 5 Power Dissipation of Package (When Mounted on Board)**



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## ■ Electrical Characteristics

**Table 6**

(Ta = 25°C unless otherwise specified)

| Item | Symbol | Condition | | Min. | Typ. | Max. | Unit | Test Circuit |
|---|---|---|---|---|---|---|---|---|
| Output voltage*1 | $V_{OUT(E)}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, $I_{OUT} = 100$ mA | | $V_{OUT(S)} \times 0.99$ | $V_{OUT(S)}$ | $V_{OUT(S)} \times 1.01$ | V | 1 |
| Output current*2 | $I_{OUT}$ | $V_{IN} \geq V_{OUT(S)} + 1.0$ V | | 300*5 | — | — | mA | 3 |
| Dropout voltage*3 | $V_{drop}$ | $I_{OUT} = 100$ mA | 1.5 V ≤ $V_{OUT(S)}$ ≤ 1.9 V | 0.50 | 0.54 | 0.58 | V | 1 |
| | | | 2.0 V ≤ $V_{OUT(S)}$ ≤ 2.4 V | — | 0.15 | 0.23 | V | 1 |
| | | | 2.5 V ≤ $V_{OUT(S)}$ ≤ 2.9 V | — | 0.14 | 0.21 | V | 1 |
| | | | 3.0 V ≤ $V_{OUT(S)}$ ≤ 3.2 V | — | 0.13 | 0.19 | V | 1 |
| | | | 3.3 V ≤ $V_{OUT(S)}$ ≤ 5.5 V | — | 0.10 | 0.15 | V | 1 |
| Line regulation | $\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$ | $V_{OUT(S)} + 0.5$ V ≤ $V_{IN}$ ≤ 6.5 V, $I_{OUT} = 100$ mA | | — | 0.01 | 0.2 | % / V | 1 |
| Load regulation | $\Delta V_{OUT2}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, 1.0 mA ≤ $I_{OUT}$ ≤ 100 mA | | — | 15 | 40 | mV | 1 |
| Output voltage temperature coefficient*4 | $\frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, $I_{OUT} = 30$ mA, –40°C ≤ Ta ≤ 85°C | | — | ±100 | — | ppm/°C | 1 |
| Current consumption during operation | $I_{SS1}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, ON/OFF pin = ON, no load | | — | 20 | 40 | μA | 2 |
| Current consumption during power-off | $I_{SS2}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, ON/OFF pin = OFF, no load | | — | 0.01 | 1.0 | μA | 2 |
| Input voltage | $V_{IN}$ | — | | 2.0 | — | 6.5 | V | — |
| ON/OFF pin input voltage “H” | $V_{SH}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, $R_L = 1.0$ kΩ | | 1.5 | — | — | V | 4 |
| ON/OFF pin input voltage “L” | $V_{SL}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, $R_L = 1.0$ kΩ | | — | — | 0.25 | V | 4 |
| ON/OFF pin input current “H” | $I_{SH}$ | $V_{IN} = 6.5$ V, $V_{ON/OFF} = 6.5$ V | | –0.1 | — | 0.1 | μA | 4 |
| ON/OFF pin input current “L” | $I_{SL}$ | $V_{IN} = 6.5$ V, $V_{ON/OFF} = 0$ V | | –0.1 | — | 0.1 | μA | 4 |
| Ripple rejection | $\lvert RR \rvert$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, f = 1.0 kHz, $\Delta V_{rip} = 0.5$ Vrms, $I_{OUT} = 50$ mA | 1.5 V ≤ $V_{OUT(S)}$ ≤ 3.0 V | — | 70 | — | dB | 5 |
| | | | 3.1 V ≤ $V_{OUT(S)}$ ≤ 5.5 V | — | 65 | — | dB | 5 |
| Short-circuit current | $I_{short}$ | $V_{IN} = V_{OUT(S)} + 1.0$ V, ON/OFF pin = ON, $V_{OUT} = 0$ V | | — | 250 | — | mA | 3 |



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

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

***3.** $V_{drop} = V_{IN1} - (V_{OUT3} \times 0.98)$
$V_{OUT3}$ is the output voltage when $V_{IN} = V_{OUT(S)}$ + 1.0 V and $I_{OUT}$ = 100 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.



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## ■ Test Circuits

1.

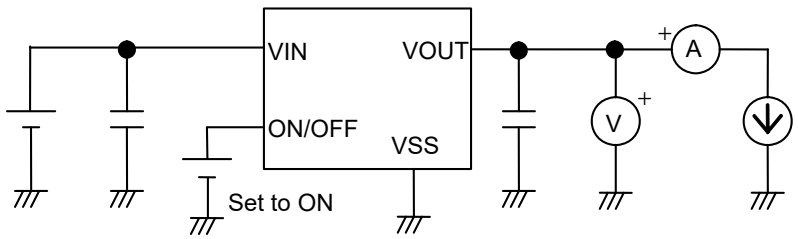



**Figure 6**

2.

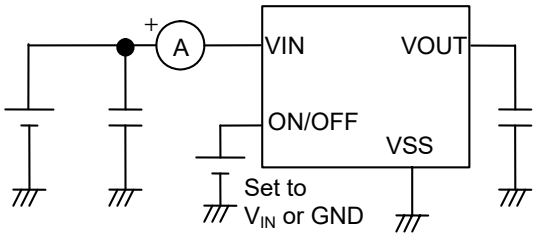



**Figure 7**

3.

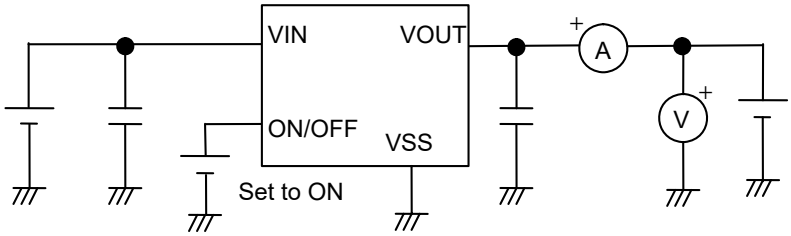



**Figure 8**

4.

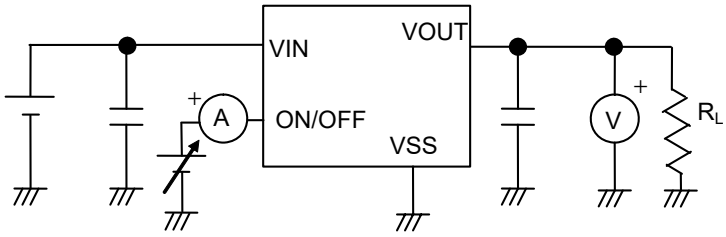



**Figure 9**

5.

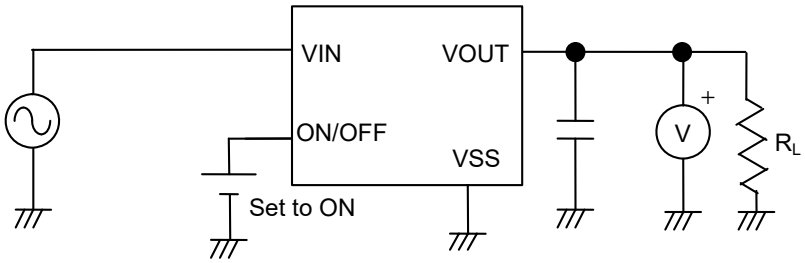
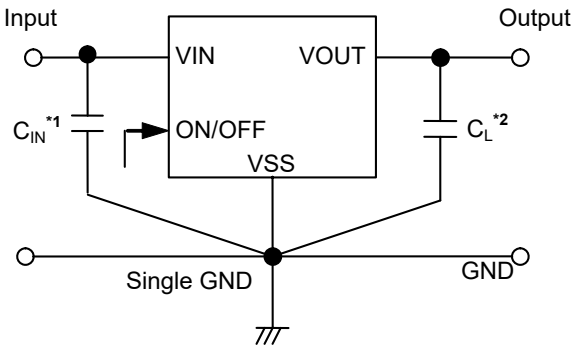



**Figure 10**



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## ■ Standard Circuit




***1.** $C_{IN}$ is a capacitor for stabilizing the input.
***2.** A ceramic capacitor of 0.1 µF or more can be used as $C_L$.

**Figure 11**

**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 ($C_{IN}$): | 0.1 µF or more |
| Output capacitor ($C_L$): | 0.1 µF or more |
| ESR of output capacitor: | 2.0 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.**

## ■ Selection of Input and Output Capacitors ($C_{IN}$, $C_L$)

The S-1132 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 0.1 µF or more in the entire temperature range. However, when using an OS capacitor, a tantalum capacitor, or an aluminum electrolytic capacitor, the capacitance must be 0.1 µF or more, and the ESR must be 2.0 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 value for an application is 0.1 µF or more for $C_{IN}$ and 0.1 µF or more for $C_L$; however, when selecting the output capacitor, perform sufficient evaluation, including evaluation of temperature characteristics, on the actual device.



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## ■ 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-1132 Series enables use of a low ESR capacitor, such as a ceramic capacitor, for the output capacitor ($C_L$). A capacitor whose ESR is 2.0 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)" 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 ($\Delta V_{OUT2}$)

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.

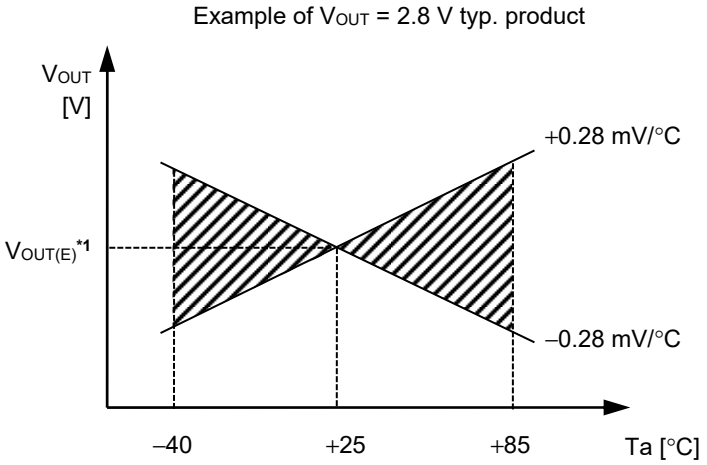
$V_{drop} = V_{IN1} - (V_{OUT3} \times 0.98)$



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

The shaded area in **Figure 12** 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 12**

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

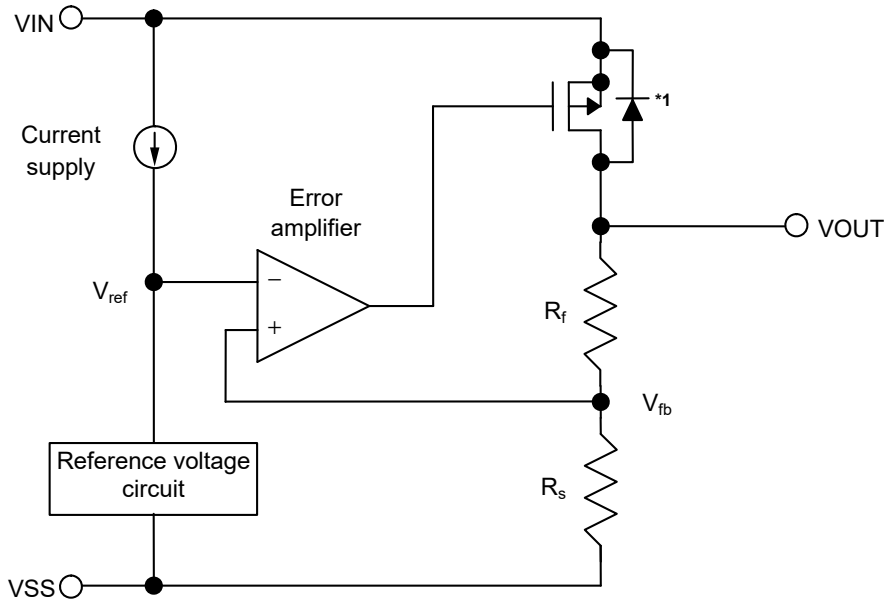


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# ■ Operation

## 1. Basic operation

**Figure 13** shows the block diagram of the S-1132 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 13**

## 2. Output transistor

In the S-1132 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 $V_{IN}$.



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### 3. ON/OFF pin

This pin starts and stops 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. The VOUT pin becomes the $V_{SS}$ level due to the internally divided resistance of several hundreds kΩ between the VOUT pin and VSS pin.
The structure of the ON/OFF pin is as shown in **Figure 14**. Since the ON/OFF pin is neither pulled down nor pulled up internally, do not use it in the floating status. In addition, note that the current consumption increases if a voltage of 0.3 V to $V_{IN}$ – 0.3 V is applied to the ON/OFF pin. When the ON/OFF pin is not used, connect it to the VSS pin if the product type is “A” and to the VIN pin if it is “B”.

**Table 7**

| Product Type | ON/OFF Pin | Internal Circuit | VOUT Pin Voltage | Current Consumption |
|---|---|---|---|---|
| A | “L”: ON | Operate | Set value | $I_{SS1}$ |
| A | “H”: OFF | Stop | $V_{SS}$ level | $I_{SS2}$ |
| B | “L”: OFF | Stop | $V_{SS}$ level | $I_{SS2}$ |
| B | “H”: ON | Operate | Set value | $I_{SS1}$ |

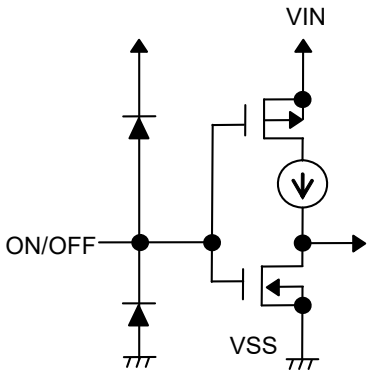



**Figure 14**



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## ■ Precautions

- Wiring patterns for the VIN, VOUT pins and GND should be designed so that the impedance is low. When mounting an output capacitor between the VOUT and VSS pins ($C_L$) and a capacitor for stabilizing the input between VIN and VSS pins ($C_{IN}$), the distance from the capacitors to these pins should be as short as possible.
- Note that generally the output voltage may increase when a series regulator is used at low load current (1.0 mA or less).
- Note that generally the output voltage may increase due to the leakage current from an output driver when a series regulator is used at high temperature.
- Generally a series regulator may cause oscillation, depending on the selection of external parts. The following conditions are recommended for the S-1132 Series. However, be sure to perform sufficient evaluation under the actual usage conditions for selection, including evaluation of temperature characteristics.

  | | |
  |---|---|
  | Input capacitor ($C_{IN}$): | 0.1 μF or more |
  | Output capacitor ($C_L$): | 0.1 μF or more |
  | Equivalent series resistance (ESR): | 2.0 Ω or less |

- The voltage regulator may oscillate when the impedance of the power supply is high and the input capacitance is small or an input capacitor is not connected.
- If the output capacitance is small, power supply's fluctuation and the characteristics of load fluctuation become worse. Sufficiently evaluate the output voltage's fluctuation with the actual device.
- Overshoot may occur in the output voltage momentarily if the voltage is rapidly raised at power-on or when the power supply fluctuates. Sufficiently evaluate the output voltage at power-on with the actual device.
- The application conditions for the input voltage, the output voltage, and the load current should not exceed the package power dissipation.
- Do not apply an electrostatic discharge to this IC that exceeds the performance ratings of the built-in electrostatic protection circuit.
- In determining the output current, attention should be paid to the output current value specified in **Table 6** in "■ **Electrical Characteristics**" and footnote ***5** of the table.
- ABLIC Inc. claims no responsibility for any disputes arising out of or in connection with any infringement by products including this IC of patents owned by a third party.

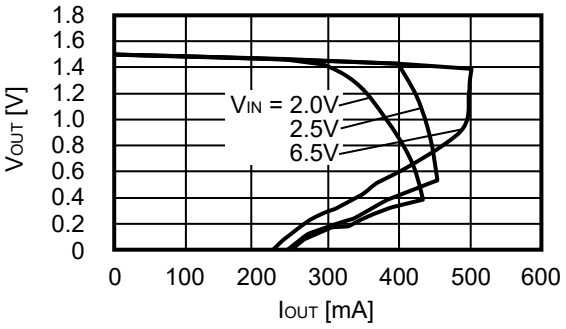


Downloaded from Arrow.com.

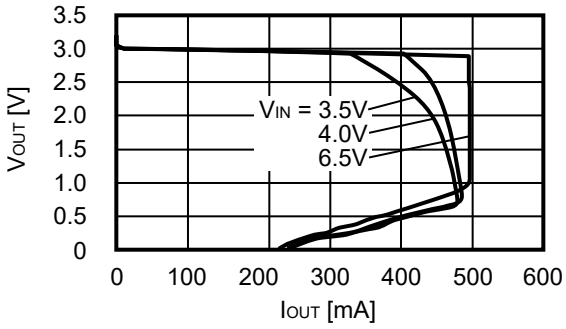
## ■ Characteristics (Typical Data)

### 1. Output Voltage vs. Output Current (When Load Current Increases) (Ta = 25°C)

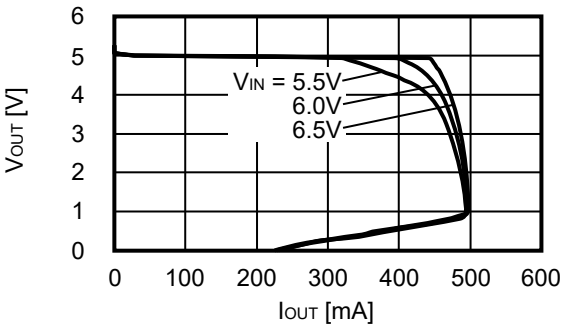
**1. 1 $V_{OUT}$ = 1.5 V**




**1. 2 $V_{OUT}$ = 3.0 V**



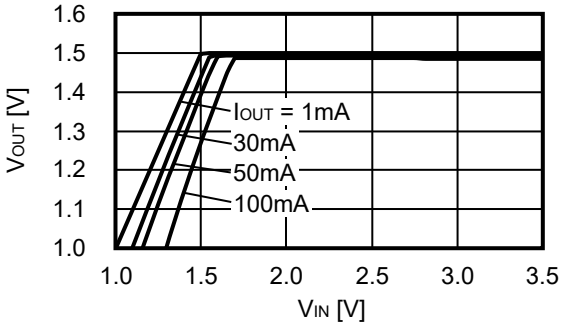

**1. 3 $V_{OUT}$ = 5.0 V**



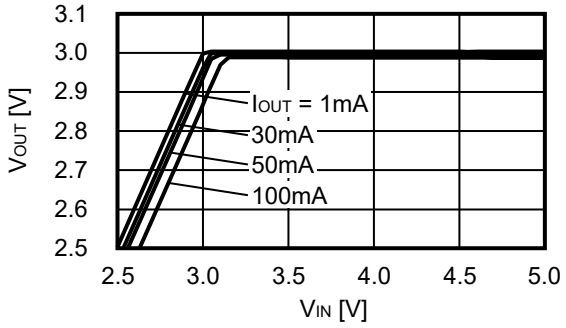

**Remark** In determining the output current, attention should be paid to the following.
**1.** The minimum output current value and footnote ***5** of **Table 6** in "■ **Electrical Characteristics**"
**2.** The package power dissipation

### 2. Output Voltage vs. Input Voltage (Ta = 25°C)

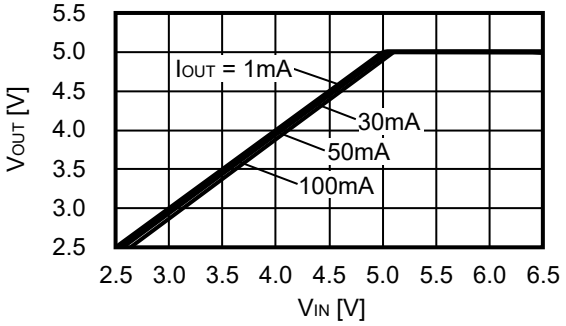
**2. 1 $V_{OUT}$ = 1.5 V**




**2. 2 $V_{OUT}$ = 3.0 V**




**2. 3 $V_{OUT}$ = 5.0 V**

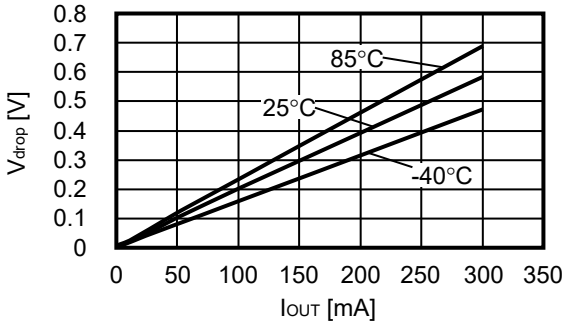




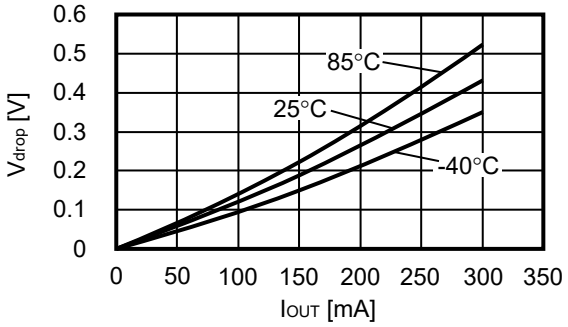

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## 3. Dropout Voltage vs. Output Current

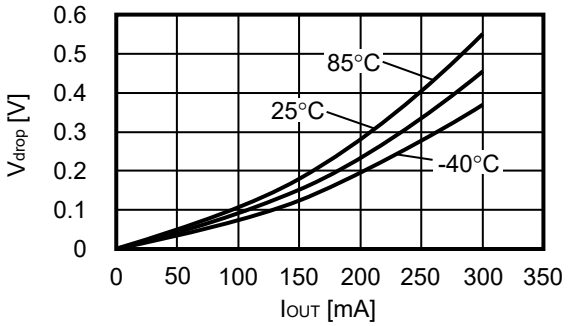
### 3. 1 $V_{OUT}$ = 1.5 V



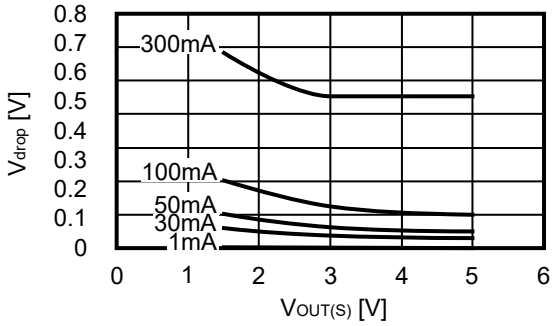

### 3. 2 $V_{OUT}$ = 3.0 V




### 3. 3 $V_{OUT}$ = 5.0 V




## 4. Dropout Voltage vs. Set Output Voltage

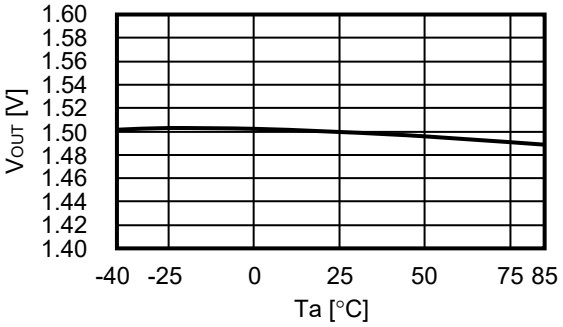




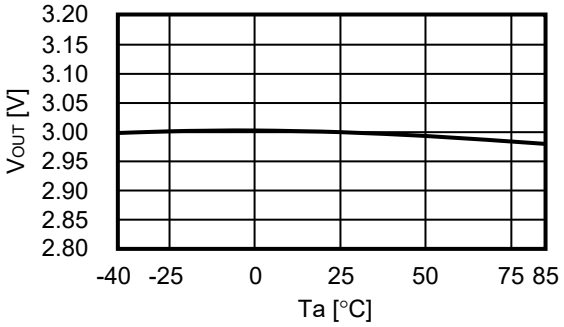

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## 5. Output Voltage vs. Ambient Temperature

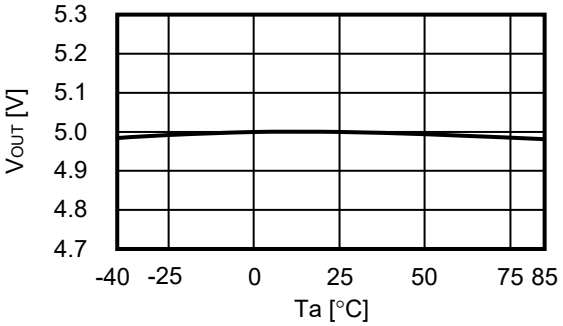
### 5. 1 $V_{OUT}$ = 1.5 V




### 5. 2 $V_{OUT}$ = 3.0 V

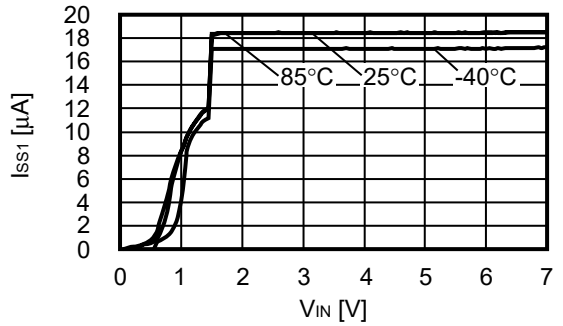



### 5. 3 $V_{OUT}$ = 5.0 V

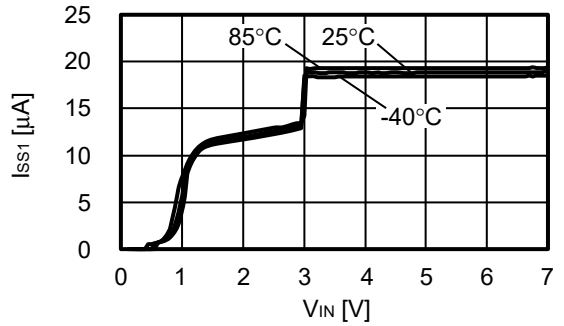



## 6. Current Consumption vs. Input Voltage

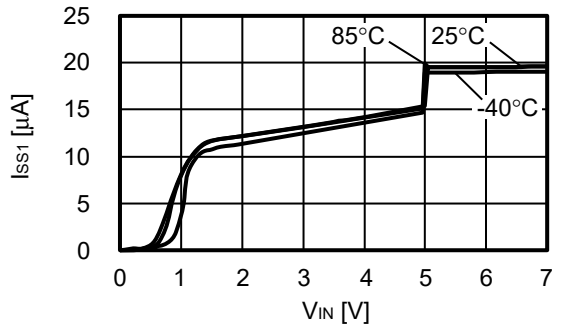
### 6. 1 $V_{OUT}$ = 1.5 V




### 6. 2 $V_{OUT}$ = 3.0 V




### 6. 3 $V_{OUT}$ = 5.0 V

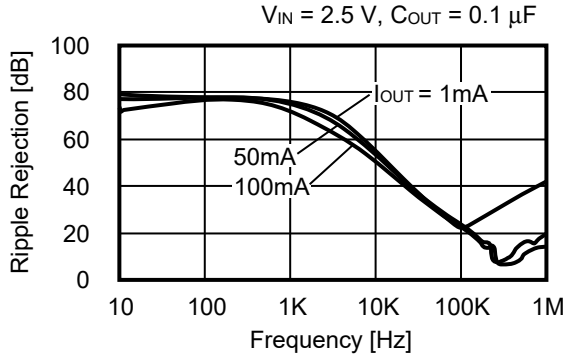




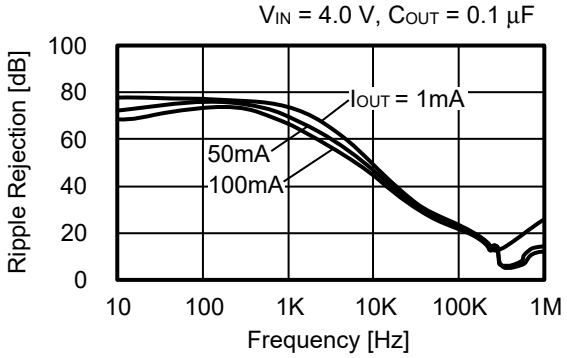

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## 7. Ripple Rejection (Ta = 25°C)

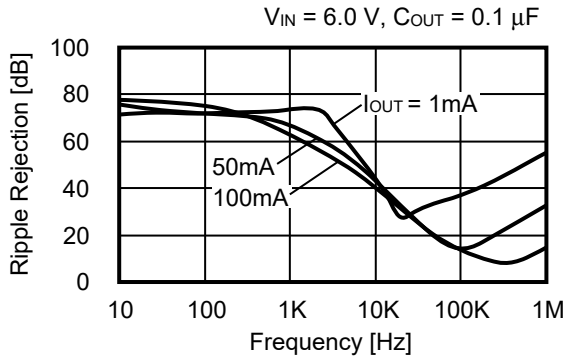
### 7. 1 $V_{OUT}$ = 1.5 V




### 7. 2 $V_{OUT}$ = 3.0 V




### 7. 3 $V_{OUT}$ = 5.0 V





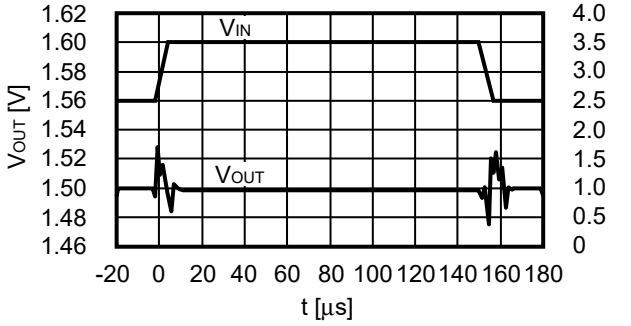

Downloaded from Arrow.com.

## ■ Reference Data

### 1. Input Transient Response Characteristics (Ta = 25°C)

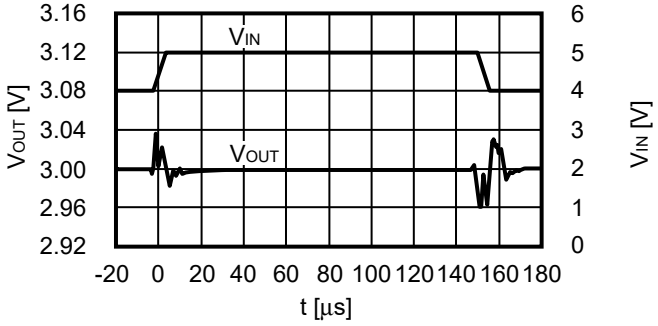
#### 1. 1 $V_{OUT}$ = 1.5 V

$I_{OUT}$ = 100 mA, $t_r$ = $t_f$ = 5.0 µs, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF




#### 1. 2 $V_{OUT}$ = 3.0 V

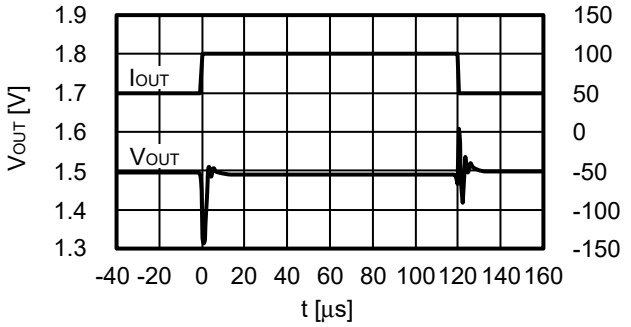
$I_{OUT}$ = 100 mA, $t_r$ = $t_f$ = 5.0 µs, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF




### 2. Load Transient Response Characteristics (Ta = 25°C)

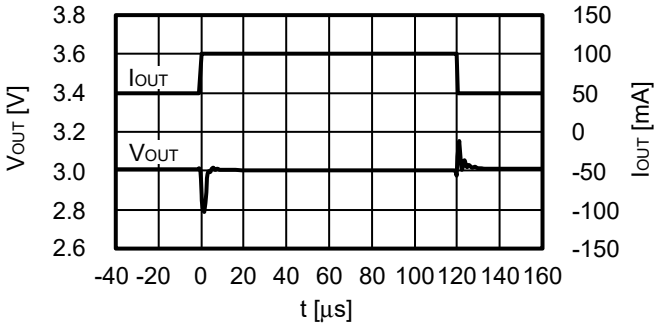
#### 2. 1 $V_{OUT}$ = 1.5 V

$V_{IN}$ = 2.5 V, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF, $I_{OUT}$ = 50 mA ↔ 100 mA



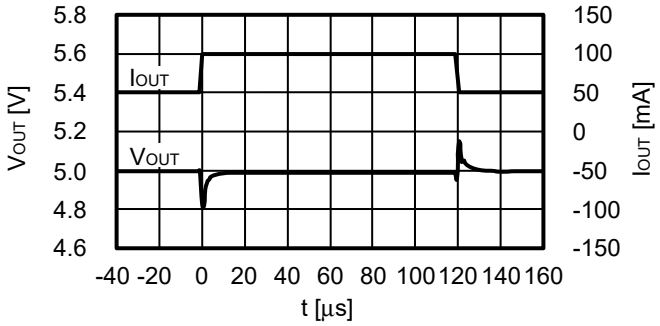

#### 2. 2 $V_{OUT}$ = 3.0 V

$V_{IN}$ = 4.0 V, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF, $I_{OUT}$ = 50 mA ↔ 100 mA




#### 2. 3 $V_{OUT}$ = 5.0 V

$V_{IN}$ =6.0 V, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF, $I_{OUT}$ = 50 mA ↔ 100 mA



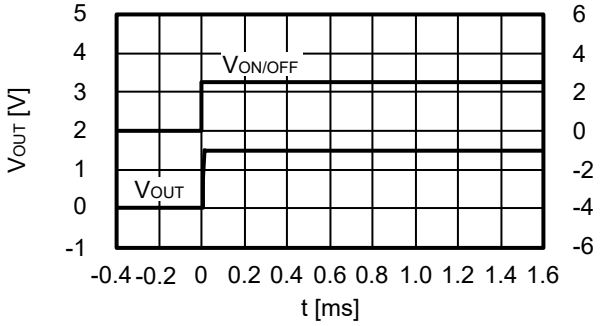



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## 3. ON / OFF Pin Transient Response Characteristics (Ta = 25°C)

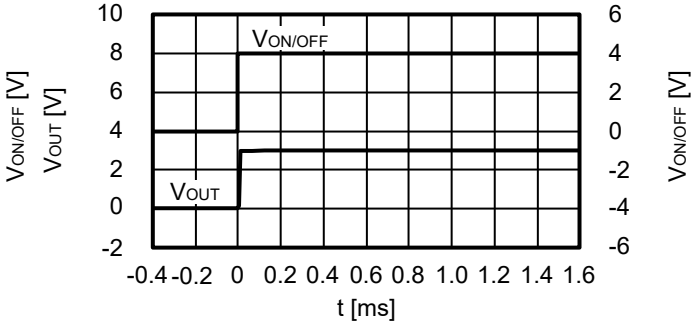
### 3. 1 $V_{OUT}$ = 1.5 V

$V_{IN}$ = 2.5 V, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF, $I_{OUT}$ = 80 mA



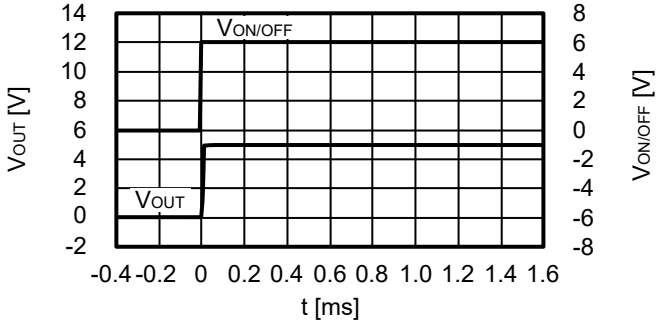

### 3. 2 $V_{OUT}$ = 3.0 V

$V_{IN}$ = 4.0 V, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF, $I_{OUT}$ = 80 mA




### 3. 3 $V_{OUT}$ = 5.0 V

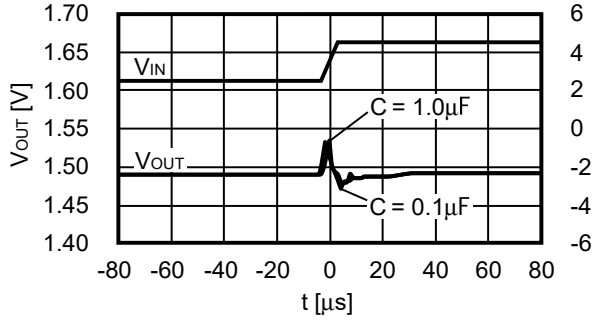
$V_{IN}$ = 6.0 V, $C_{OUT}$ = 0.1 µF, $C_{IN}$ = 0.1 µF, $I_{OUT}$ = 80 mA



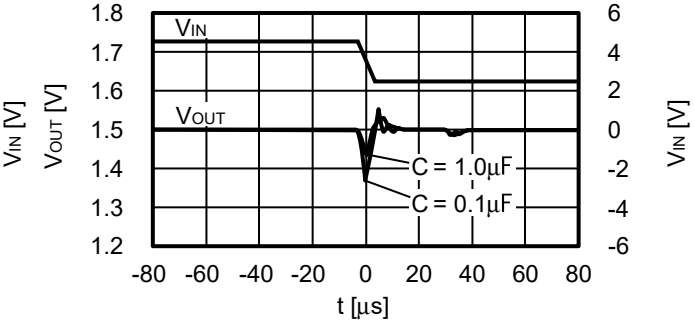

## 4. Input transient response characteristics vs. Capacity Value characteristics (Ta = 25°C)

### 4. 1 $V_{OUT}$ = 1.5 V

$V_{IN}$ = 2.5 V → 4.5 V, $t_r$ = 5 µF, $I_{OUT}$ = 100 mA



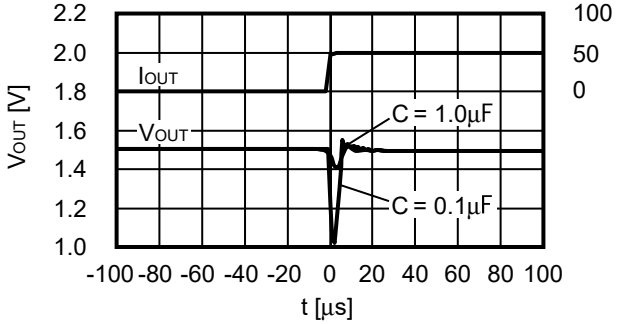

$V_{IN}$ = 4.5 V → 2.5 V, $t_r$ = 5 µF, $I_{OUT}$ = 100 mA



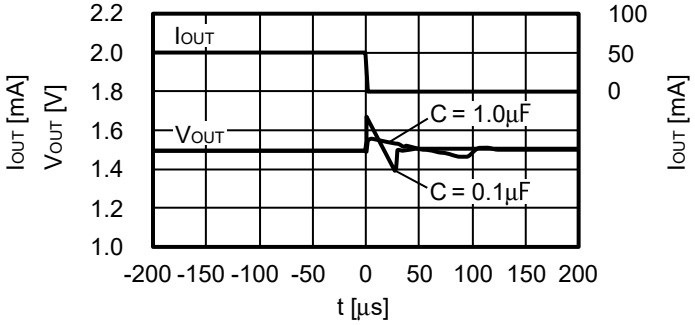

## 5. Load transient response characteristics vs. Capacity Value characteristics (Ta = 25°C)

### 5. 1 $V_{OUT}$ = 1.5 V

$V_{IN}$ = 2.5 V, $I_{OUT}$ = 1 mA → 50 mA




$V_{IN}$ = 2.5 V, $I_{OUT}$ = 50 mA → 1 mA



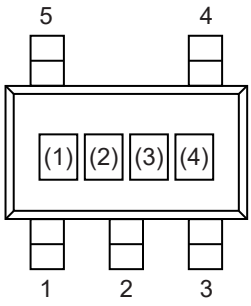



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## ■ Marking Specifications

### 1. SOT-23-5

Top view




(1) to (3): Product code (Refer to **Product name vs. Product code**)
(4): Lot number

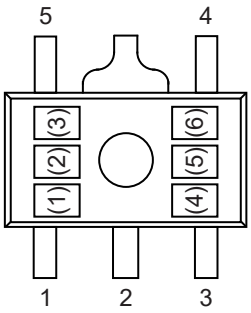
**Product name vs. Product code**

| Product name | Product code | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| S-1132B18-M5T1x | Q | L | D |
| S-1132B25-M5T1x | Q | L | K |
| S-1132B33-M5T1x | Q | L | S |

**Remark 1.** x: G or U
**2.** Please select products of environmental code = U for Sn 100%, halogen-free products.

### 2. SOT-89-5

Top view




(1) to (3): Product code (Refer to **Product name vs. Product code**)
(4) to (6): Lot number

**Product name vs. Product code**

| Product name | Product code | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| S-1132B18-U5T1x | Q | L | D |
| S-1132B25-U5T1x | Q | L | K |
| S-1132B33-U5T1x | Q | L | S |

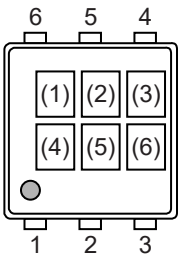
**Remark 1.** x: G or U
**2.** Please select products of environmental code = U for Sn 100%, halogen-free products.



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### 3. SNT-6A(H)

Top view



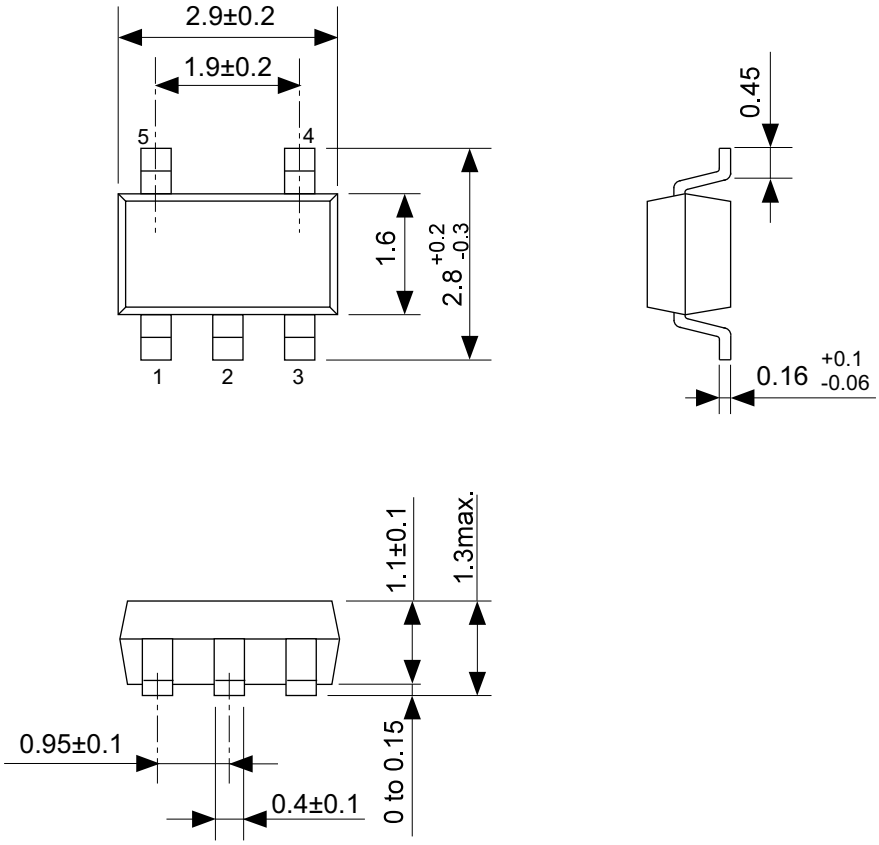

(1) to (3): Product code (Refer to **Product name vs. Product code**)
(4) to (6): Lot number

**Product name vs. Product code**

| Product name | Product code | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| S-1132B18-I6T2U | Q | L | D |
| S-1132B25-I6T2U | Q | L | K |
| S-1132B33-I6T2U | Q | L | S |



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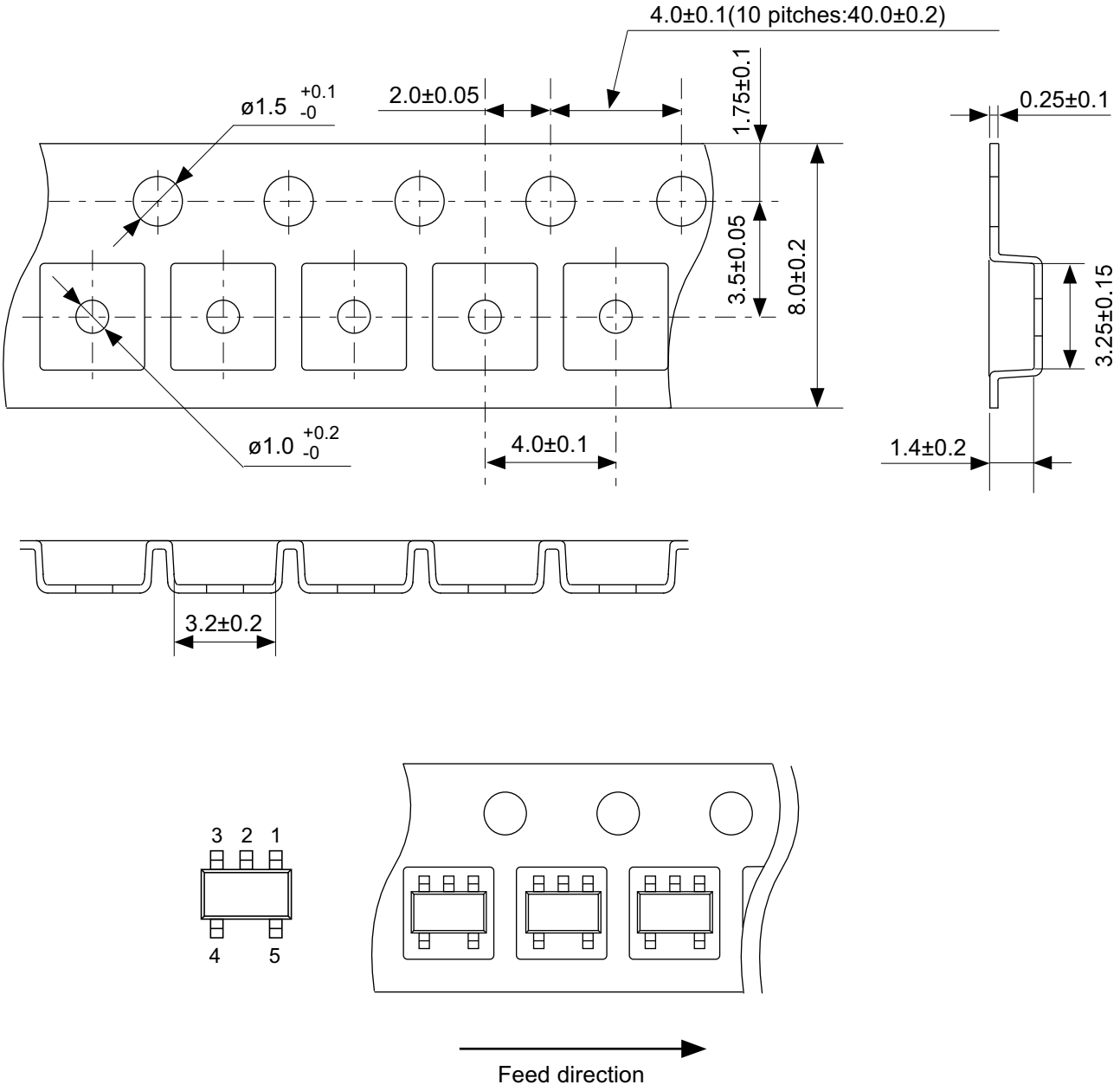



No. MP005-A-P-SD-1.3

| | |
|---|---|
| TITLE | SOT235-A-PKG Dimensions |
| No. | MP005-A-P-SD-1.3 |
| ANGLE | |
| UNIT | mm |
| | |

**ABLIC Inc.**

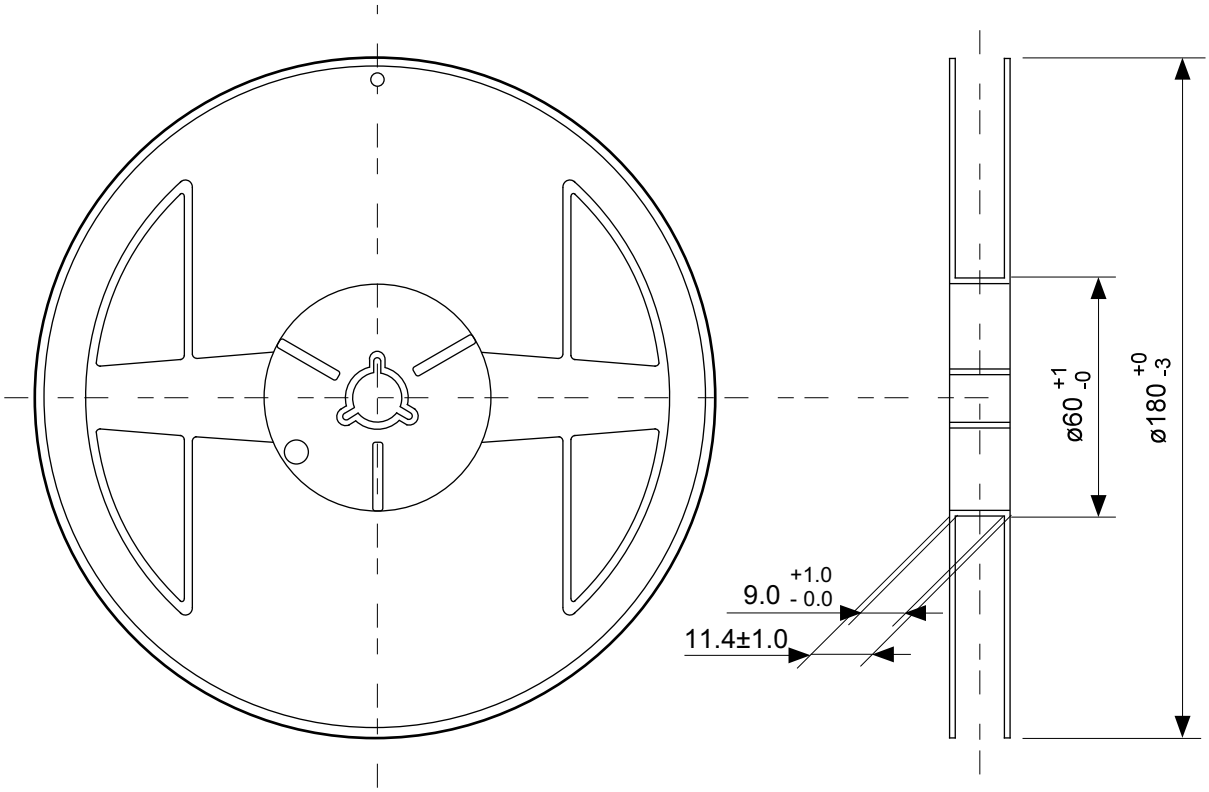
Downloaded from Arrow.com.



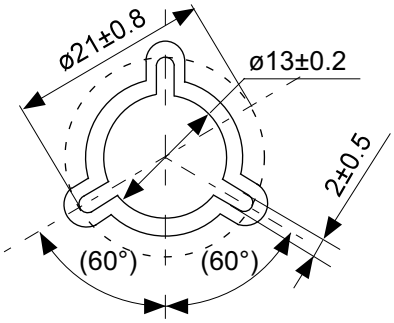

No. MP005-A-C-SD-2.1

| | |
|---|---|
| TITLE | SOT235-A-Carrier Tape |
| No. | MP005-A-C-SD-2.1 |
| ANGLE | |
| UNIT | mm |
| | |
| **ABLIC Inc.** | |

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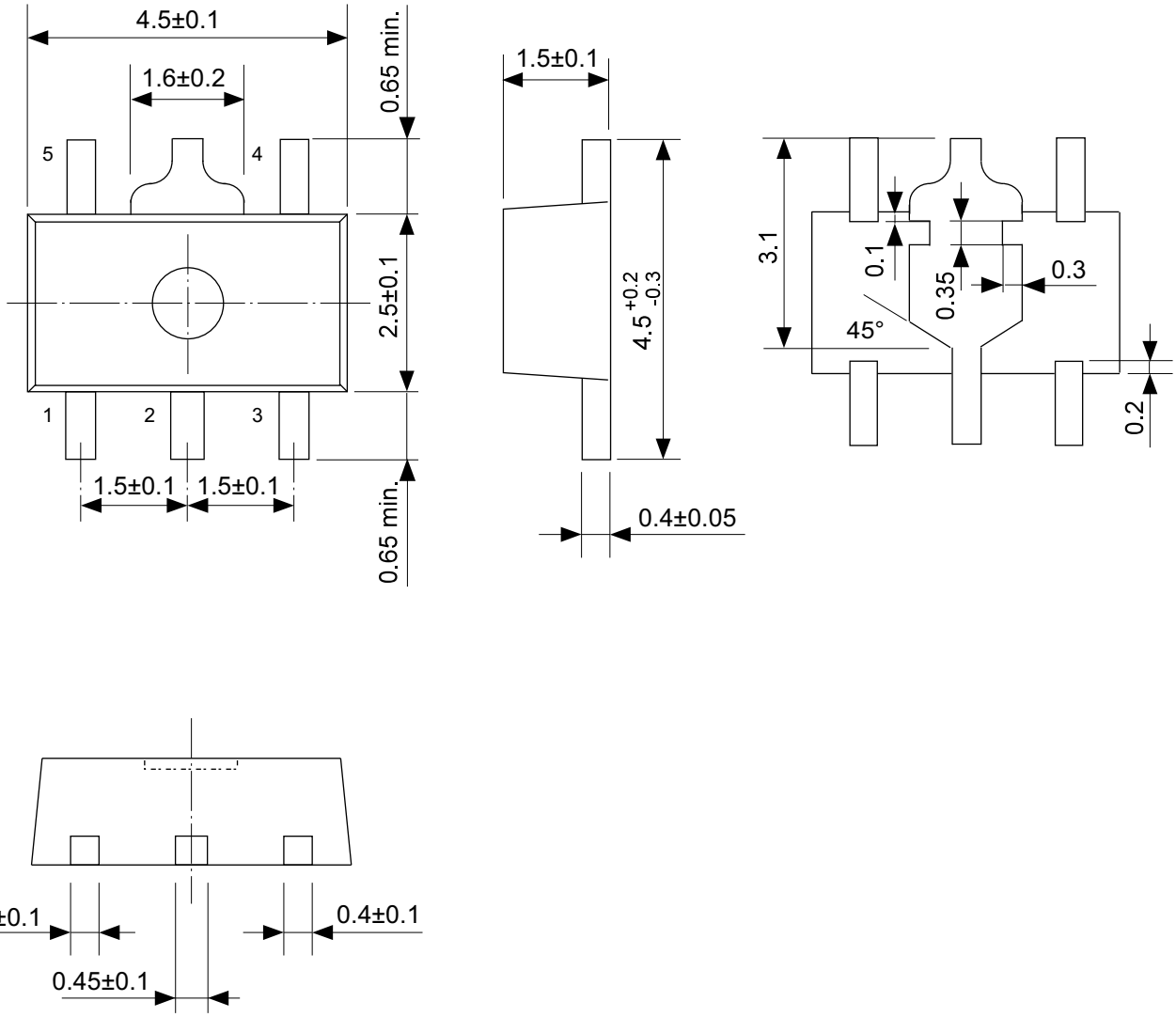

Enlarged drawing in the central part




No. MP005-A-R-SD-2.0

| | | | |
|---|---|---|---|
| TITLE | SOT235-A-Reel | | |
| No. | MP005-A-R-SD-2.0 | | |
| ANGLE | | QTY. | 3,000 |
| UNIT | mm | | |
| | | | |
| ABLIC Inc. | | | |

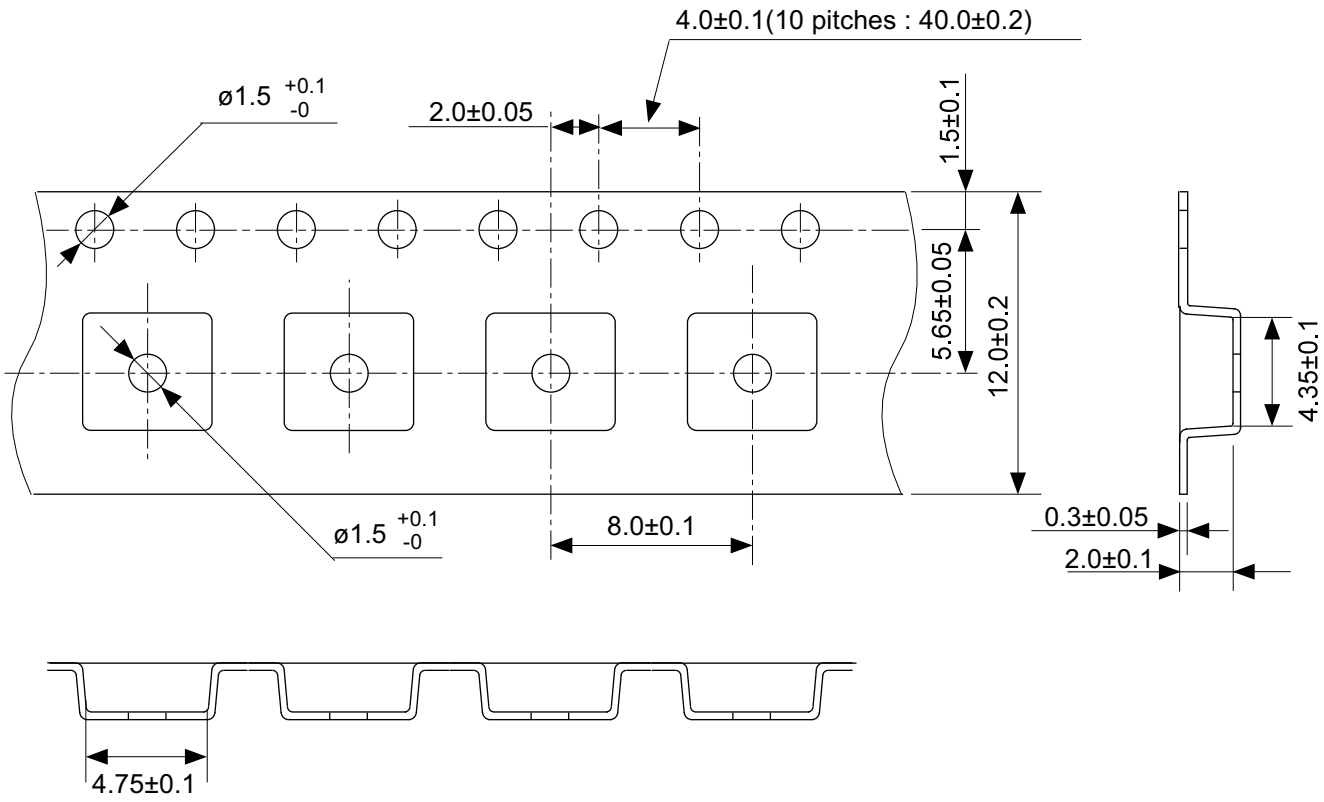
Downloaded from Arrow.com.

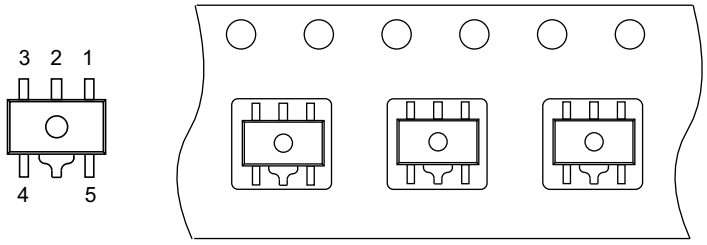



No. UP005-A-P-SD-2.0

| | |
|---|---|
| TITLE | SOT895-A-PKG Dimensions |
| No. | UP005-A-P-SD-2.0 |
| ANGLE | |
| UNIT | mm |
| | |
| **ABLIC Inc.** | |

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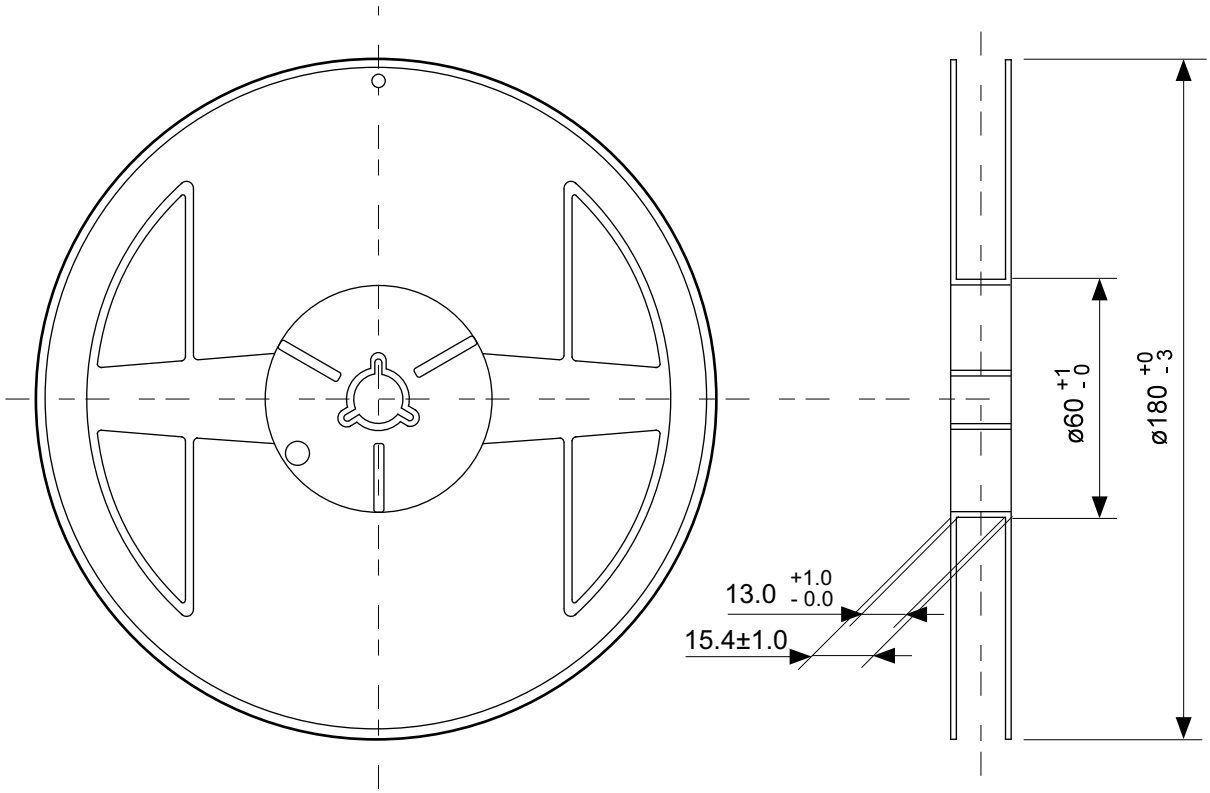




Feed direction

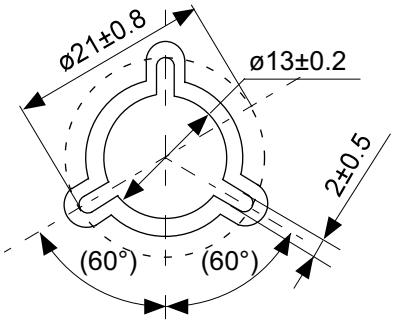
No. UP005-A-C-SD-2.0

| | |
|---|---|
| TITLE | SOT895-A-Carrier Tape |
| No. | UP005-A-C-SD-2.0 |
| ANGLE | |
| UNIT | mm |
| | |
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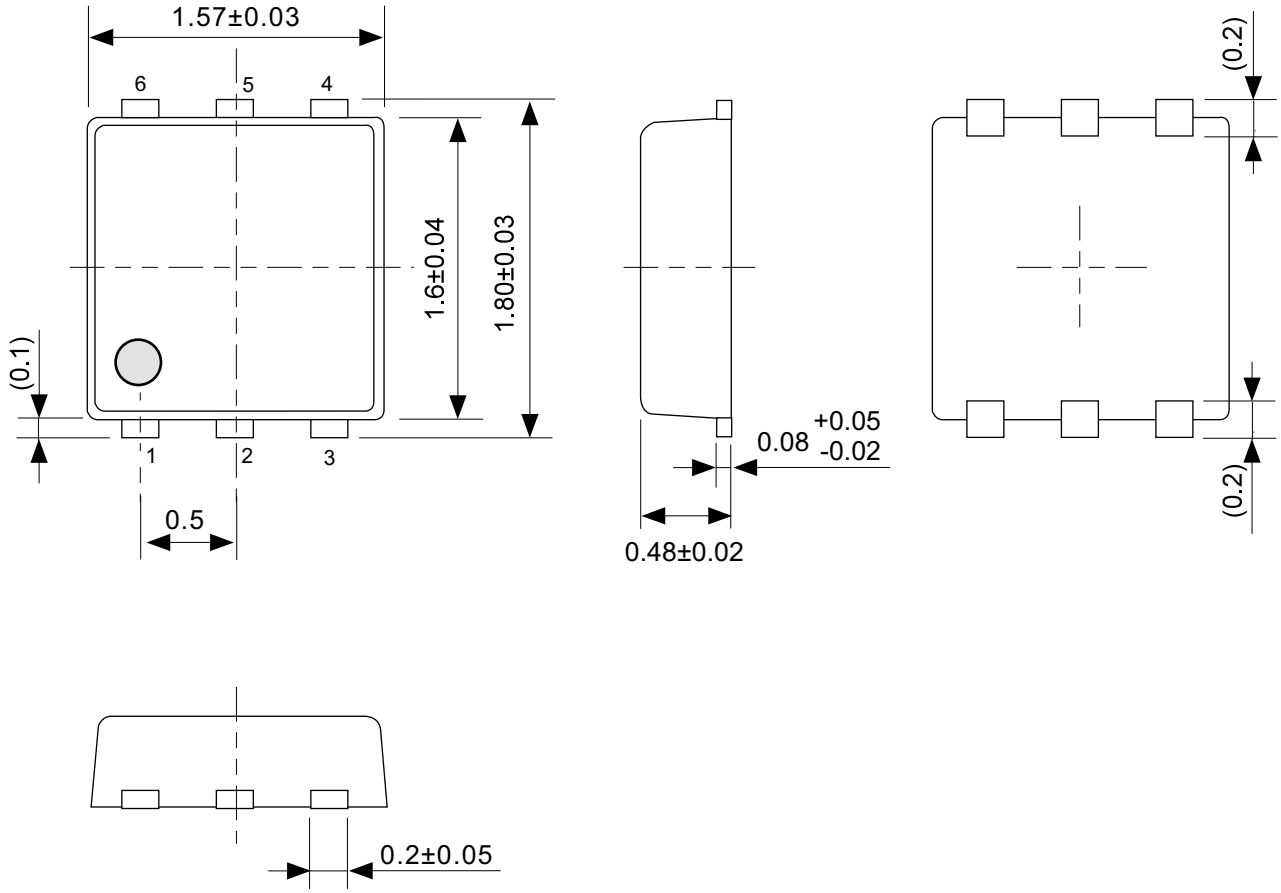

Enlarged drawing in the central part




No. UP005-A-R-SD-2.0

| | | | |
|---|---|---|---|
| TITLE | SOT895-A-Reel | | |
| No. | UP005-A-R-SD-2.0 | | |
| ANGLE | | QTY. | 1,000 |
| UNIT | mm | | |
| | | | |
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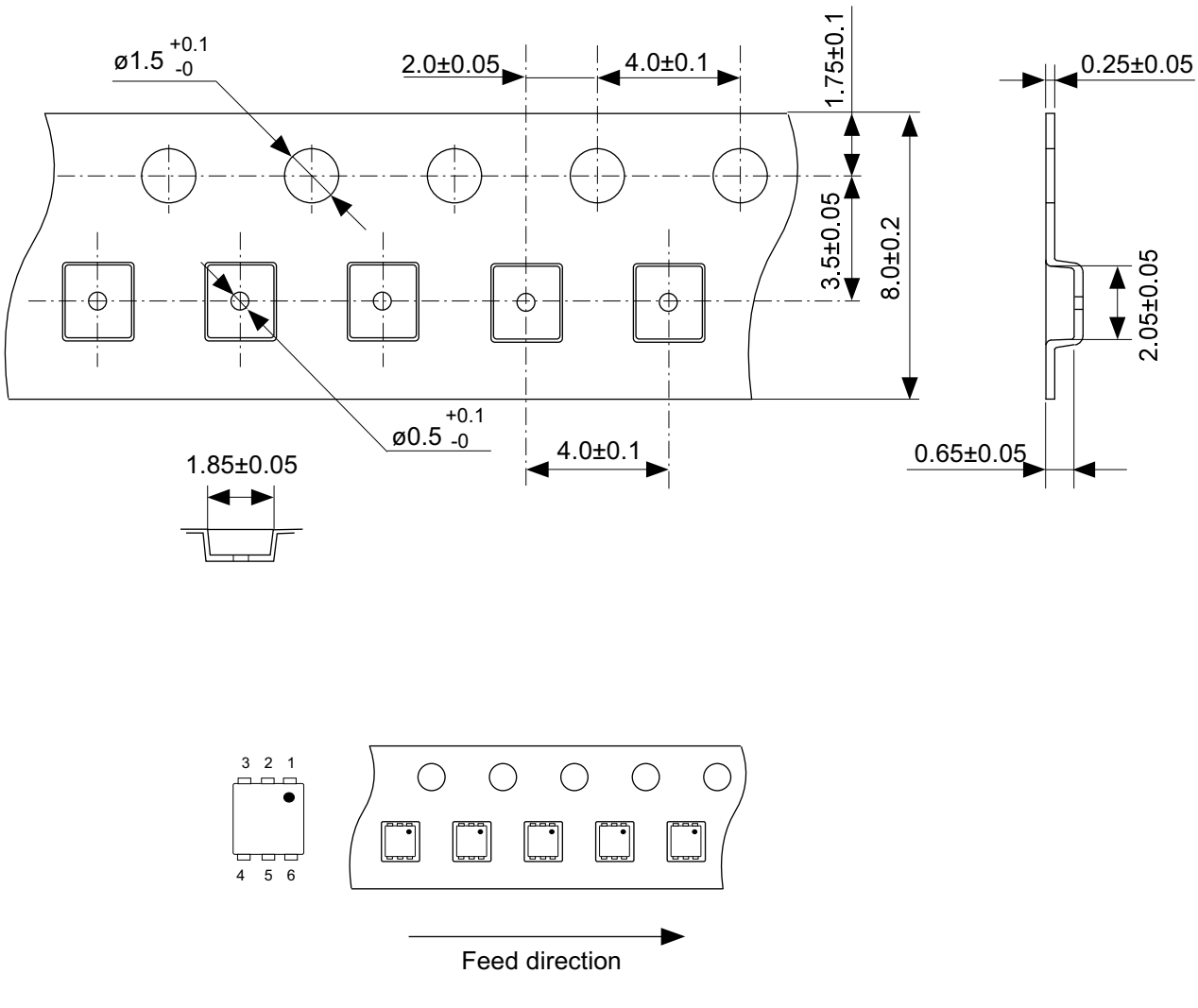
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No. PI006-A-P-SD-2.1

| | |
|---|---|
| TITLE | SNT-6A(H)-A-PKG Dimensions |
| No. | PI006-A-P-SD-2.1 |
| ANGLE | |
| UNIT | mm |
| | |
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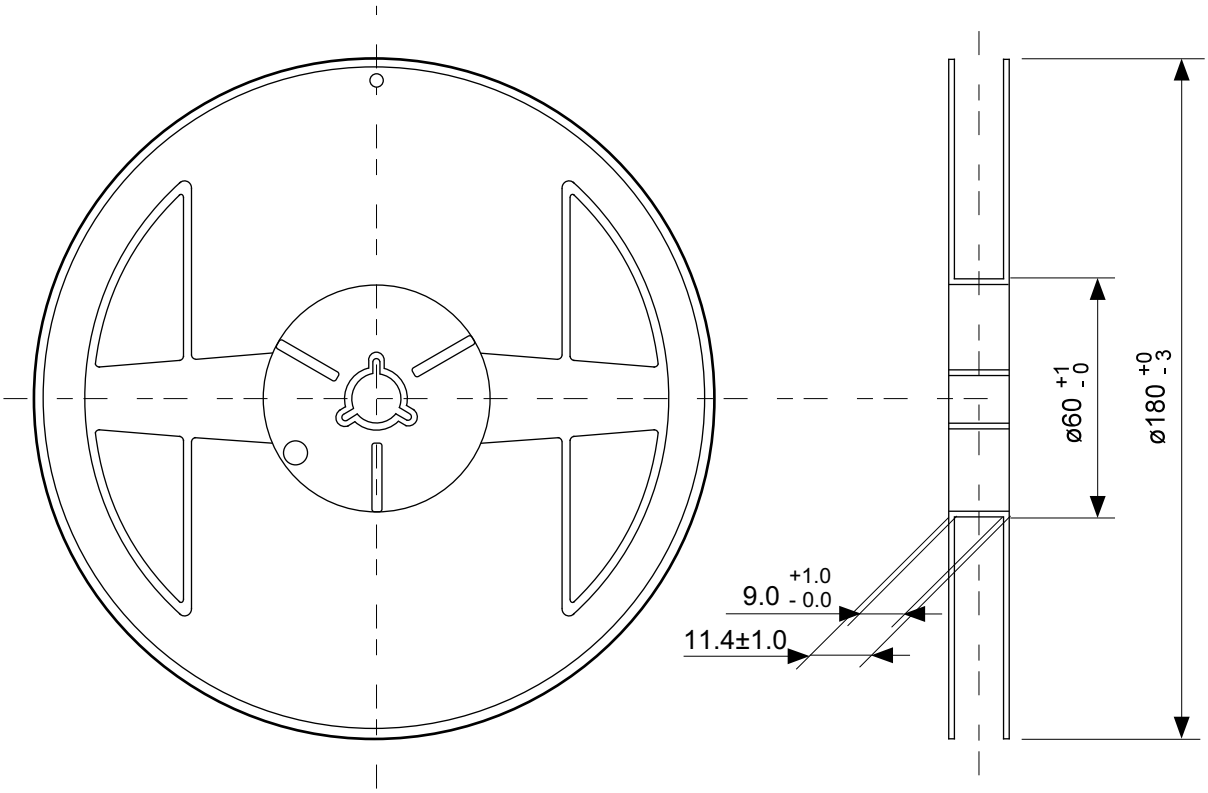




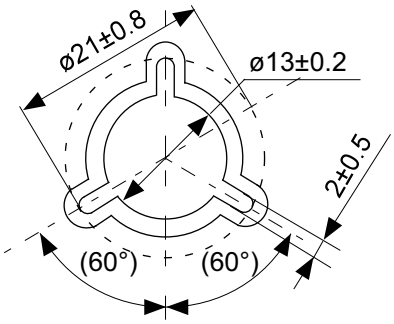
No. PI006-A-C-SD-2.0

| | |
|---|---|
| TITLE | SNT-6A(H)-A-Carrier Tape |
| No. | PI006-A-C-SD-2.0 |
| ANGLE | |
| UNIT | mm |
| | |
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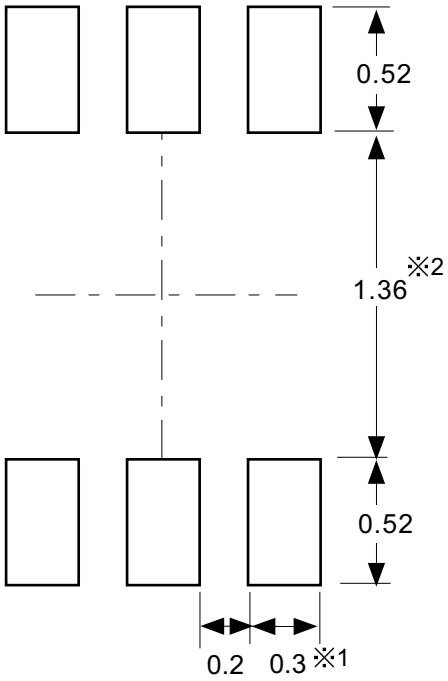

Enlarged drawing in the central part




No. PI006-A-R-SD-2.0

| | | | |
|---|---|---|---|
| TITLE | SNT-6A(H)-A-Reel | | |
| No. | PI006-A-R-SD-2.0 | | |
| ANGLE | | QTY. | 5,000 |
| UNIT | mm | | |
| | | | |
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※1. ランドパターンの幅に注意してください (0.25 mm min. / 0.30 mm typ.)。
※2. パッケージ中央にランドパターンを広げないでください (1.30 mm ~ 1.40 mm)。

**注意 1. パッケージのモールド樹脂下にシルク印刷やハンダ印刷などしないでください。**
**2. パッケージ下の配線上のソルダーレジストなどの厚みをランドパターン表面から0.03 mm 以下にしてください。**
**3. マスク開口サイズと開口位置はランドパターンと合わせてください。**
**4. 詳細は〝SNTパッケージ活用の手引き〟を参照してください。**

※1. Pay attention to the land pattern width (0.25 mm min. / 0.30 mm typ.).
※2. Do not widen the land pattern to the center of the package (1.30 mm to 1.40 mm).

**Caution 1. Do not do silkscreen printing and solder printing under the mold resin of the package.**
**2. The thickness of the solder resist on the wire pattern under the package should be 0.03 mm or less from the land pattern surface.**
**3. Match the mask aperture size and aperture position with the land pattern.**
**4. Refer to "SNT Package User's Guide" for details.**

※1. 请注意焊盘模式的宽度 (0.25 mm min. / 0.30 mm typ.)。
※2. 请勿向封装中间扩展焊盘模式 (1.30 mm ~ 1.40 mm)。

**注意 1. 请勿在树脂型封装的下面印刷丝网、焊锡。**
**2. 在封装下、布线上的阻焊膜厚度 (从焊盘模式表面起) 请控制在 0.03 mm 以下。**
**3. 钢网的开口尺寸和开口位置请与焊盘模式对齐。**
**4. 详细内容请参阅 "SNT 封装的应用指南"。**

No. PI006-A-L-SD-4.1

| | |
|---|---|
| TITLE | SNT-6A(H)-A<br>-Land Recommendation |
| No. | PI006-A-L-SD-4.1 |
| ANGLE | |
| UNIT | mm |
| | |
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