LOW DROPOUT CMOS VOLTAGE REGULATOR

The S-814 Series is a low dropout voltage, high output voltage accuracy and low current consumption positive voltage regulator developed utilizing CMOS technology.
Built-in low ON-resistance transistors provide low dropout voltage and large output current. The ON/OFF circuit ensures long battery life.
Various types of output capacitors can be used in the S-814 Series compared with the past CMOS voltage regulators. (i.e., Small ceramic capacitors can also be used in the S-814 Series.)
The SOT-23-5 miniaturized package and the SOT-89-5 packages are recommended to use for configuring portable devices and large output current applications, respectively.

■ 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 110 mA (3.0 V output product, V_{IN}=4 V)*1
  Possible to output 180 mA (5.0 V output product, V_{IN}=6 V)*1
- Output capacitor: A ceramic capacitor of 0.47 μF or more can be used.
- Built-in ON/OFF circuit: Ensures long battery life.
- Built-in short-circuit protection circuit
- 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.

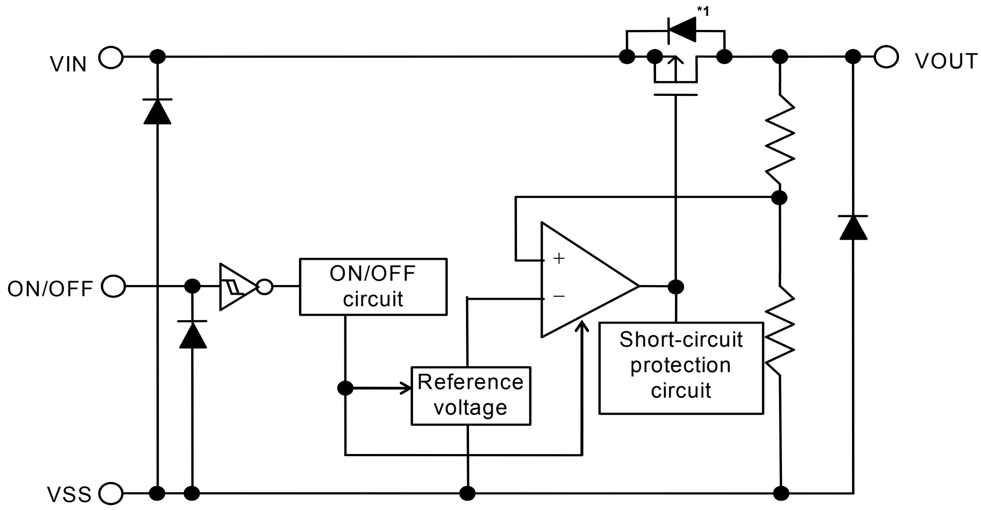
■ Applications

- Constant-voltage power source for battery-powered device, personal communication device, and home electric appliance.

■ Packages

- SOT-23-5
- SOT-89-5

■ Block Diagram



***1.** Parasitic diode

Figure 1

■ Product Name Structure

1. Product Name

S-814 x xx A xx- xxx T2 x

- x (last): Environmental code
  - U: Lead-free (Sn 100%), halogen-free
  - G: Lead-free (for details, please contact our sales office)
- T2: IC direction in tape specifications*1
- xxx: Product code*2
- xx-: Package code
  - MC: SOT-23-5
  - UC: SOT-89-5
- xx: Output voltage
  - 20 to 60
  - (e.g., When output voltage is 2.0 V, it is expressed as 20.)
- x (first): Product type*3
  - A: ON/$\overline{\text{OFF}}$ pin positive logic
  - B: $\overline{\text{ON}}$/OFF pin negative logic

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

2. Packages

Package Name	Drawing Code		
	Package	Tape	Reel
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

3. Product Name List

Table 1

Output voltage	SOT-23-5	SOT-89-5
2.0 V±2.0 %	S-814A20AMC-BCKT2x	S-814A20AUC-BCKT2x
2.1 V±2.0 %	S-814A21AMC-BCLT2x	S-814A21AUC-BCLT2x
2.2 V±2.0 %	S-814A22AMC-BCMT2x	S-814A22AUC-BCMT2x
2.3 V±2.0 %	S-814A23AMC-BCNT2x	S-814A23AUC-BCNT2x
2.4 V±2.0 %	S-814A24AMC-BCOT2x	S-814A24AUC-BCOT2x
2.5 V±2.0 %	S-814A25AMC-BCPT2x	S-814A25AUC-BCPT2x
2.6 V±2.0 %	S-814A26AMC-BCQT2x	S-814A26AUC-BCQT2x
2.7 V±2.0 %	S-814A27AMC-BCRT2x	S-814A27AUC-BCRT2x
2.8 V±2.0 %	S-814A28AMC-BCST2x	S-814A28AUC-BCST2x
2.9 V±2.0 %	S-814A29AMC-BCTT2x	S-814A29AUC-BCTT2x
3.0 V±2.0 %	S-814A30AMC-BCUT2x	S-814A30AUC-BCUT2x
3.1 V±2.0 %	S-814A31AMC-BCVT2x	S-814A31AUC-BCVT2x
3.2 V±2.0 %	S-814A32AMC-BCWT2x	S-814A32AUC-BCWT2x
3.3 V±2.0 %	S-814A33AMC-BCXT2x	S-814A33AUC-BCXT2x
3.4 V±2.0 %	S-814A34AMC-BCYT2x	S-814A34AUC-BCYT2x
3.5 V±2.0 %	S-814A35AMC-BCZT2x	S-814A35AUC-BCZT2x
3.6 V±2.0 %	S-814A36AMC-BDAT2x	S-814A36AUC-BDAT2x
3.7 V±2.0 %	S-814A37AMC-BDBT2x	S-814A37AUC-BDBT2x
3.8 V±2.0 %	S-814A38AMC-BDCT2x	S-814A38AUC-BDCT2x
3.9 V±2.0 %	S-814A39AMC-BDDT2x	S-814A39AUC-BDDT2x
4.0 V±2.0 %	S-814A40AMC-BDET2x	S-814A40AUC-BDET2x
4.1 V±2.0 %	S-814A41AMC-BDFT2x	S-814A41AUC-BDFT2x
4.2 V±2.0 %	S-814A42AMC-BDGT2x	S-814A42AUC-BDGT2x
4.3 V±2.0 %	S-814A43AMC-BDHT2x	S-814A43AUC-BDHT2x
4.4 V±2.0 %	S-814A44AMC-BDIT2x	S-814A44AUC-BDIT2x
4.5 V±2.0 %	S-814A45AMC-BDJT2x	S-814A45AUC-BDJT2x
4.6 V±2.0 %	S-814A46AMC-BDKT2x	S-814A46AUC-BDKT2x
4.7 V±2.0 %	S-814A47AMC-BDLT2x	S-814A47AUC-BDLT2x
4.8 V±2.0 %	S-814A48AMC-BDMT2x	S-814A48AUC-BDMT2x
4.9 V±2.0 %	S-814A49AMC-BDNT2x	S-814A49AUC-BDNT2x
5.0 V±2.0 %	S-814A50AMC-BDOT2x	S-814A50AUC-BDOT2x
5.1 V±2.0 %	S-814A51AMC-BDPT2x	S-814A51AUC-BDPT2x
5.2 V±2.0 %	S-814A52AMC-BDQT2x	S-814A52AUC-BDQT2x
5.3 V±2.0 %	S-814A53AMC-BDRT2x	S-814A53AUC-BDRT2x
5.4 V±2.0 %	S-814A54AMC-BDST2x	S-814A54AUC-BDST2x
5.5 V±2.0 %	S-814A55AMC-BDTT2x	S-814A55AUC-BDTT2x
5.6 V±2.0 %	S-814A56AMC-BDUT2x	S-814A56AUC-BDUT2x
5.7 V±2.0 %	S-814A57AMC-BDVT2x	S-814A57AUC-BDVT2x
5.8 V±2.0 %	S-814A58AMC-BDWT2x	S-814A58AUC-BDWT2x
5.9 V±2.0 %	S-814A59AMC-BDXT2x	S-814A59AUC-BDXT2x
6.0 V±2.0 %	S-814A60AMC-BDYT2x	S-814A60AUC-BDYT2x

Remark 1. Please contact our sales office for type B products.
2. x: G or U
3. Please select products of environmental code = U for Sn 100%, halogen-free products.

■ Pin Configurations

SOT-23-5
Top view

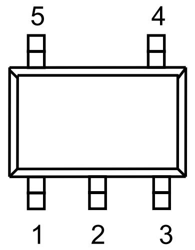


Figure 2

Table 2

Pin No.	Symbol	Pin description
1	VIN	Voltage input pin
2	VSS	GND pin
3	ON/OFF	ON/OFF pin
4	NC*1	No connection
5	VOUT	Voltage output pin

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

SOT-89-5
Top view

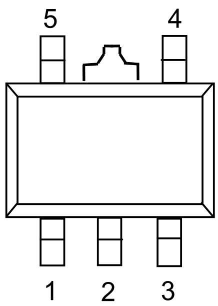


Figure 3

Table 3

Pin No.	Symbol	Pin description
1	VOUT	Voltage output pin
2	VSS	GND pin
3	NC*1	No connection
4	ON/OFF	ON/OFF pin
5	VIN	Voltage input pin

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

■ Absolute Maximum Ratings

Table 4

(Ta=25°C unless otherwise specified)

Item		Symbol	Absolute maximum rating	Unit
Input voltage		V_{IN}	V_{SS}–0.3 to V_{SS}+12	V
		$V_{ON/OFF}$	V_{SS}–0.3 to V_{SS}+12	V
Output voltage		V_{OUT}	V_{SS}–0.3 to V_{IN}+0.3	V
Power dissipation	SOT-23-5	P_D	250 (When not mounted on board)	mW
			600*1	mW
	SOT-89-5		500 (When not mounted on board)	mW
			1000*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 on 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.

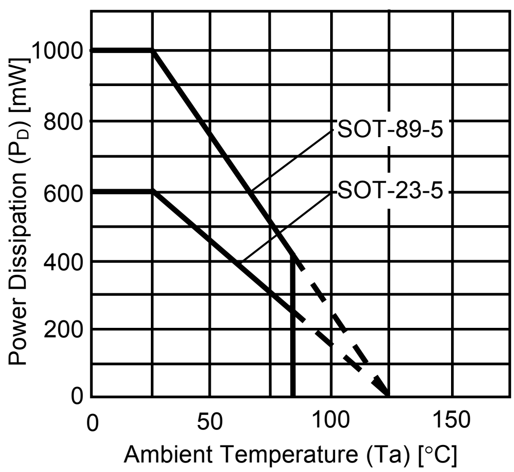


Figure 4 Power Dissipation of Package (When Mounted on Board)

■ Electrical Characteristics

Table 5

(Ta=25°C unless otherwise specified)

Item	Symbol	Condition		Min.	Typ.	Max.	Units	Test circuit
Output voltage*1	$V_{OUT(E)}$	$V_{IN}=V_{OUT(S)}+1$ V, $I_{OUT}=30$ mA		$V_{OUT(S)}$ ×0.98	$V_{OUT(S)}$	$V_{OUT(S)}$ ×1.02	V	1
Output current*2	I_{OUT}	$V_{OUT(S)}+1$ V$\leq V_{IN}\leq$10 V	2.0 V$\leq V_{OUT(S)}\leq$2.9 V	100*3	—	—	mA	3
			3.0 V$\leq V_{OUT(S)}\leq$3.9 V	110*3	—	—	mA	3
			4.0 V$\leq V_{OUT(S)}\leq$4.9 V	135*3	—	—	mA	3
			5.0 V$\leq V_{OUT(S)}\leq$6.0 V	180*3	—	—	mA	3
Dropout voltage*4	V_{drop}	$I_{OUT}=60$ mA	2.0 V$\leq V_{OUT(S)}\leq$2.4 V	—	0.51	0.87	V	1
			2.5 V$\leq V_{OUT(S)}\leq$2.9 V	—	0.38	0.61	V	1
			3.0 V$\leq V_{OUT(S)}\leq$3.4 V	—	0.30	0.44	V	1
			3.5 V$\leq V_{OUT(S)}\leq$3.9 V	—	0.24	0.33	V	1
			4.0 V$\leq V_{OUT(S)}\leq$4.4 V	—	0.20	0.26	V	1
			4.5 V$\leq V_{OUT(S)}\leq$4.9 V	—	0.18	0.22	V	1
			5.0 V$\leq V_{OUT(S)}\leq$5.4 V	—	0.17	0.21	V	1
			5.5 V$\leq V_{OUT(S)}\leq$6.0 V	—	0.17	0.20	V	1
Line regulation 1	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	$V_{OUT(S)}+0.5$ V$\leq V_{IN}\leq$10 V, $I_{OUT}=30$ mA		—	0.05	0.2	%/V	1
Line regulation 2	$\frac{\Delta V_{OUT2}}{\Delta V_{IN} \bullet V_{OUT}}$	$V_{OUT(S)}+0.5$ V$\leq V_{IN}\leq$10 V, $I_{OUT}=10$ μA		—	0.05	0.2	%/V	1
Load regulation	ΔV_{OUT3}	$V_{IN}=V_{OUT(S)}+1$ V, 10 μA$\leq I_{OUT}\leq$80 mA		—	30	50	mV	1
Output voltage temperature coefficient*5	$\frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}$	$V_{IN}=V_{OUT(S)}+1$ V, $I_{OUT}=30$ mA, −40°C≤Ta≤+85°C		—	±100	—	ppm/°C	1
Current consumption during operation	I_{SS1}	$V_{IN}=V_{OUT(S)}+1$ V, ON/OFF pin=ON, No load		—	30	40	μA	2
Current consumption during power-off	I_{SS2}	$V_{IN}=V_{OUT(S)}+1$ V, ON/OFF pin=OFF, No load		—	0.1	0.5	μA	2
Input voltage	V_{IN}	—		—	—	10	V	1
ON/OFF pin input voltage "H"	V_{SH}	$V_{IN}=V_{OUT(S)}+1$ V, $R_L=1$ kΩ, Judged at V_{OUT} level		1.5	—	—	V	4
ON/OFF pin input voltage "L"	V_{SL}	$V_{IN}=V_{OUT(S)}+1$ V, $R_L=1$ kΩ, Judged at V_{OUT} level		—	—	0.3	V	4
ON/OFF pin input current "H"	I_{SH}	$V_{IN}=V_{OUT(S)}+1$ V, $V_{ON/OFF}=7$ V		−0.1	—	0.1	μA	4
ON/OFF pin input current "L"	I_{SL}	$V_{IN}=V_{OUT(S)}+1$ V, $V_{ON/OFF}=0$ V		−0.1	—	0.1	μA	4
Short current limit	I_{OS}	$V_{IN}=V_{OUT(S)}+1$ V, VOUT pin=0 V		—	70	—	mA	3
Ripple rejection	$\lvert RR \rvert$	$V_{IN}=V_{OUT(S)}+1$ V, f=100 Hz, ΔVrip=0.5 Vrms, $I_{OUT}=30$ mA		—	45	—	dB	5

***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.** The output current can be at least this value.
Use load amperage not exceeding this value.

***4.** $V_{drop}=V_{IN1}{}^{*1}-(V_{OUT(E)}\times 0.98)$

***1.** V_{IN1} is the input voltage at which the output voltage becomes 98% of $V_{OUT(E)}$ after gradually decreasing the input voltage.

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

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

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

■ Test Circuits

1.

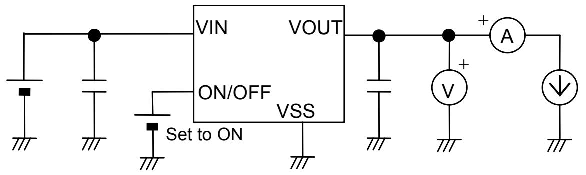


Figure 5

2.

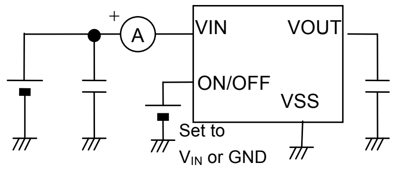


Figure 6

3.

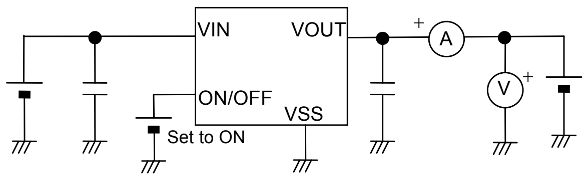


Figure 7

4.

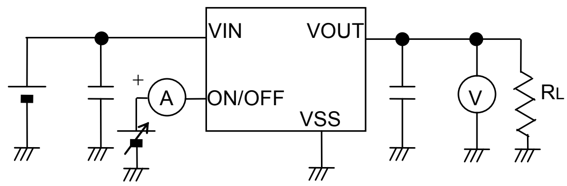


Figure 8

5.

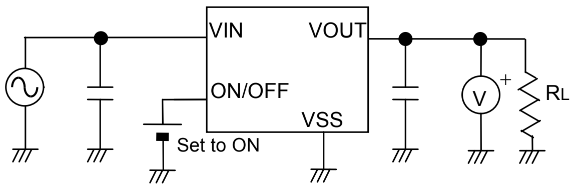
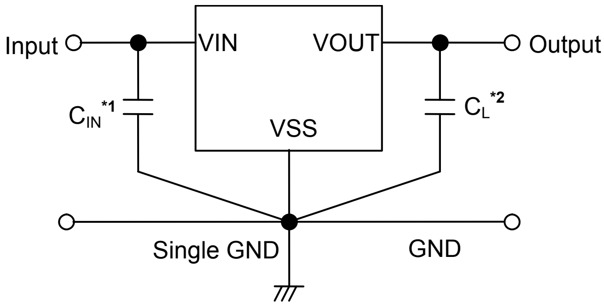


Figure 9

■ Standard Circuit



***1.** C_{IN} is a capacitor used to stabilize input.
***2**. In addition to a tantalum capacitor, a ceramic capacitor of 0.47 μF or more can be used in C_L.

Figure 10

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

■ 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

ESR is the abbreviation for Equivalent Series Resistance. The low ESR output capacitor (C_L) can be used in the S-814 Series.

3. Output voltage (V_{OUT})

The accuracy of the output voltage is ensured at ±2.0% under the specified conditions*1 of input voltage, output current, and temperature, which differ depending upon the product items.

***1.** The condition differs depending upon each product.

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

4. Line regulation 1 (ΔV_{OUT1}) and Line regulation 2 (ΔV_{OUT2})

Indicates the input voltage dependencies of output voltage. That is, the value shows how much the output voltage changes due to a change in the input voltage with the output current remained unchanged.

5. Load regulation (ΔV_{OUT3})

Indicates the output current dependencies of output voltage. That is, the value shows how much the output voltage changes due to a change in the output current with the input voltage remained unchanged.

6. Dropout voltage (V_{drop})

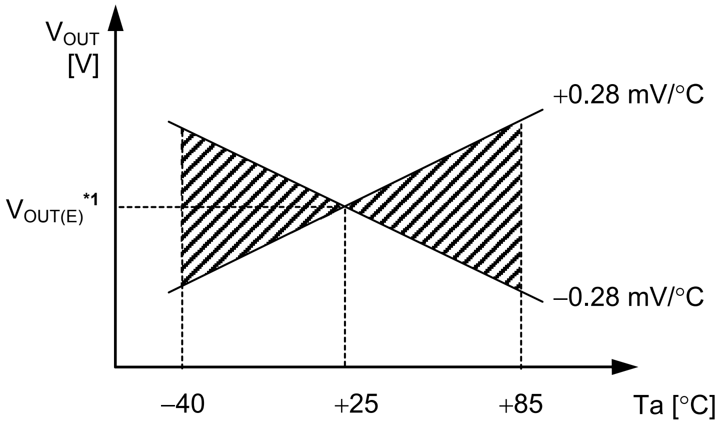
Indicates the difference between input voltage (V_{IN1}) and the output voltage when; decreasing input voltage (V_{IN}) gradually until the output voltage has dropped out to the value of 98% of the actual output voltage ($V_{OUT(E)}$).

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

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

The shaded area in **Figure 11** is the range where V_{OUT} varies in the operation temperature range when the output voltage temperature coefficient is ±100 ppm/°C.

Example of S-814A28A typ. product



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

Figure 11

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

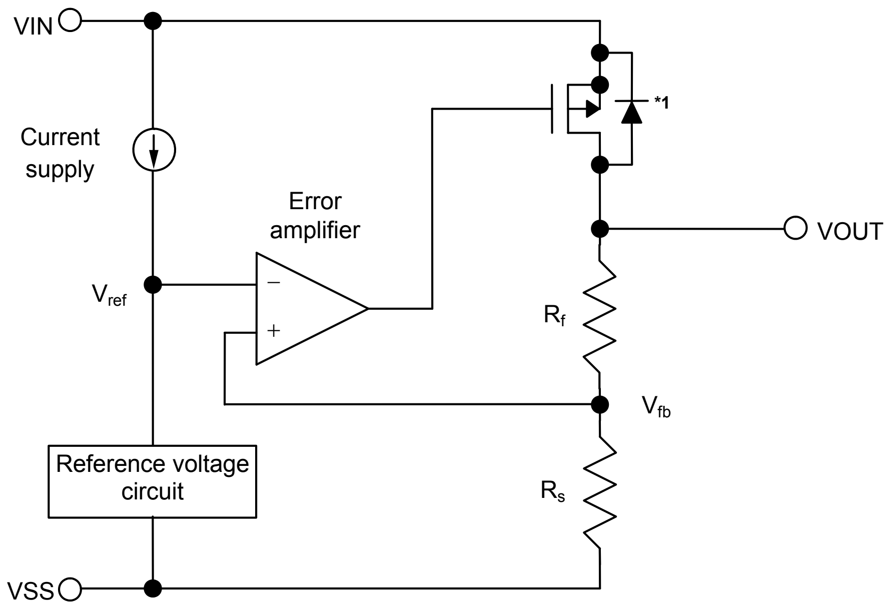
$$\frac{\Delta V_{OUT}}{\Delta Ta}\left[mV/°C\right]^{*1} = V_{OUT(S)}\left[V\right]^{*2} \times \frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}\left[ppm/°C\right]^{*3} \div 1000$$

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

■ Operation

1. Basic operation

Figure 12 shows the block diagram of the S-814 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 12

2. Output transistor

In the S-814 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 VOUT pin through a parasitic diode to VIN pin, when the potential of V_{OUT} became higher than V_{IN}.

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 VIN pin and VOUT pin is turned off, reducing current consumption significantly. The VOUT pin enters the Vss level due to internally divided resistance of several MΩ between VOUT pin and VSS pin.
Furthermore, the structure of the ON/OFF pin is as shown in **Figure 13**. Since the ON/OFF pin is neither pulled down nor pulled up internally, do not use it in the floating status. In addition, please note that current consumption increases if a voltage of 0.3 V to V_{IN}–0.3 V is applied to the ON/OFF pin. When not using the ON/OFF pin, connect it to the VIN pin in case of the product A type, connect it to the VSS pin in B type.

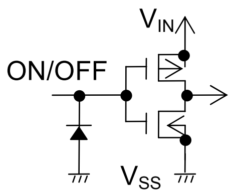


Figure 13

Table 6

Product type	ON/OFF pin	Internal circuit	VOUT pin voltage	Current consumption
A	“H”: ON	Operate	Set value	I_{SS1}
A	“L”: OFF	Stop	V_{SS} level	I_{SS2}
B	“H”: OFF	Stop	V_{SS} level	I_{SS2}
B	“L”: ON	Operate	Set value	I_{SS1}

4. Short-circuit protection circuit

The S-814 Series incorporates a short-circuit protection circuit to protect the output transistor against short-circuiting between VOUT pin and VSS pin.
The short-circuit protection circuit controls output current as shown in “**1. Output voltage (V_{OUT}) vs. Output current (I_{OUT}) (When load current increases)**” in “**■ Characteristics (Typical Data)**”, and prevents output current of approx. 70 mA or more from flowing even if VOUT pin and VSS pin are shorted. However, the short-circuit protection circuit does not protect thermal shutdown. Be sure that input voltage and load current do not exceed the specified power dissipation level.
When output current is large and a difference between input and output voltages is large even if not shorted, the short-circuit protection circuit may start functioning and the output current may be controlled to the specified amperage. For details, refer to “**3. Maximum output current (I_{OUTmax}) vs. Input voltage (V_{IN})**” in“**■ Characteristics (Typical Data)**”.

■ Selection of Output Capacitor (C_L)

Mount an output capacitor between VOUT pin and VSS pin for phase compensation. The S-814 Series enables customers to use a ceramic capacitor as well as a tantalum or an aluminum electrolytic capacitor.

- A ceramic capacitor or an OS capacitor:
  Use a capacitor of 0.47 μF or more.
- A tantalum or an aluminum electrolytic capacitor:
  Use a capacitor of 0.47 μF or more and ESR of 10 Ω or less.

Pay special attention not to cause an oscillation due to an increase in ESR at low temperatures, when you use the aluminum electrolytic capacitor. Evaluate the capacitor taking into consideration its performance including temperature characteristics.
Overshoot and undershoot characteristics differ depending upon the type of the output capacitor you select. Refer to C_L dependencies of "**1. Transient Response Characteristics (S-814A30A, Typical data, Ta=25°C)**" in "■ **Reference Data**".

■ Precautions

- Wiring patterns for the VIN pin, the VOUT pin and GND should be designed so that the impedance is low. When mounting an output capacitor between the VOUT pin and the VSS pin (C_L) and a capacitor for stabilizing the input between the VIN pin and the VSS pin (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 (10 μA or less).
- Generally a series regulator may cause oscillation, depending on the selection of external parts. The following conditions are recommended for the S-814 Series. However, be sure to perform sufficient evaluation under the actual usage conditions for selection, including evaluation of temperature characteristics.

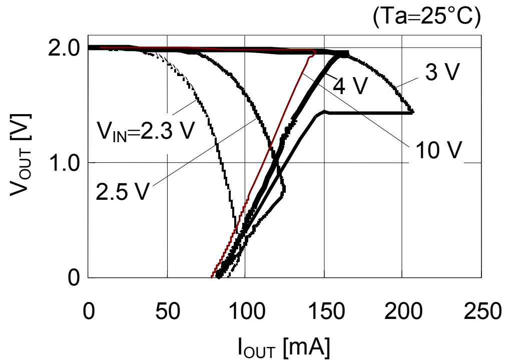
Output capacitor (C_L):	0.47 μF or more
Equivalent Series Resistance (ESR):	10 Ω or less
Input series resistance (R_{IN}):	10 Ω or less

- 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.
- 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.
- In determining the output current, attention should be paid to the output current value specified in **Table 5** in "■ **Electrical Characteristics**" and footnote ***3** of the table.
- Do not apply an electrostatic discharge to this IC that exceeds the performance ratings of the built-in electrostatic protection circuit.
- 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.

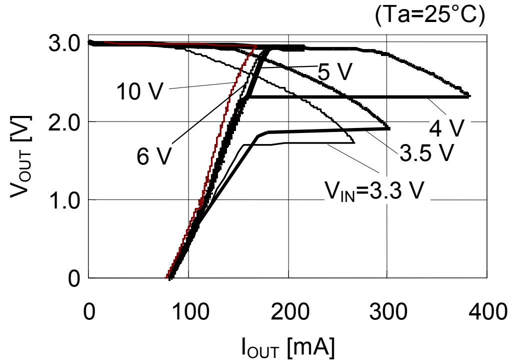
■ Characteristics (Typical data)

1. Output voltage (V_{OUT}) vs. Output current (I_{OUT}) (When load current increases)

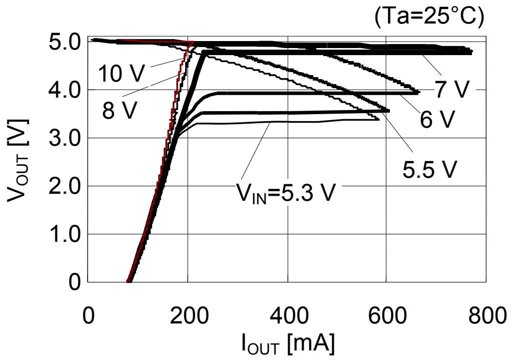
S-814A20A



S-814A30A



S-814A50A

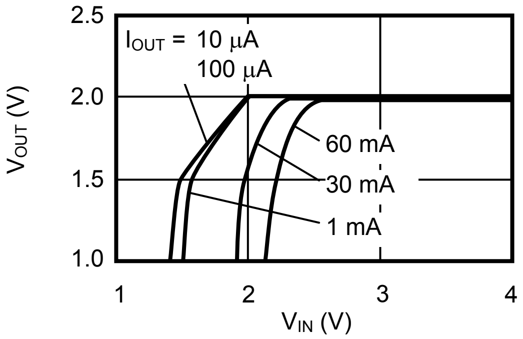


Remark In determining the output current, attention should be paid to the following.

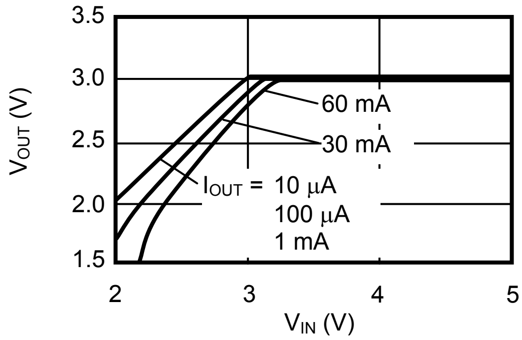
1. The minimum output current value and footnote ***3** in **Table 5** in **"■ Electrical Characteristics"**.
2. The package power dissipation.

2. Output voltage (V_{OUT}) vs. Input voltage (V_{IN})

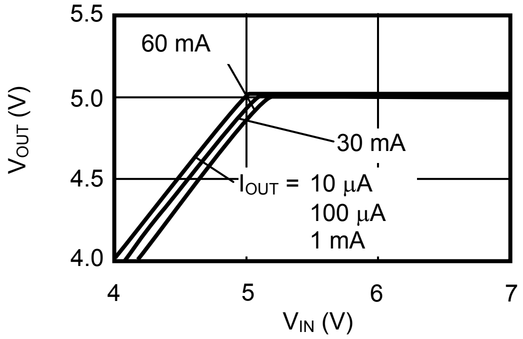
S-814A20A (Ta = 25°C)



S-814A30A (Ta = 25°C)

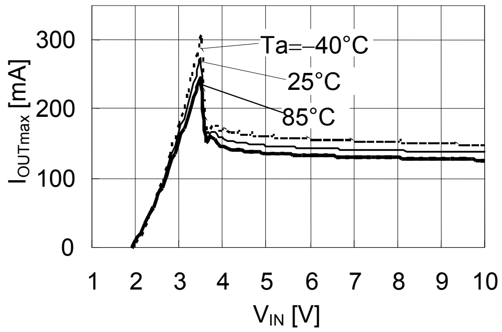


S-814A50A (Ta = 25°C)

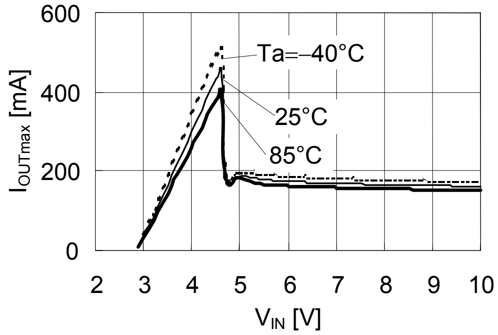


3. Maximum output current (I_{OUTmax}) vs. Input voltage (V_{IN})

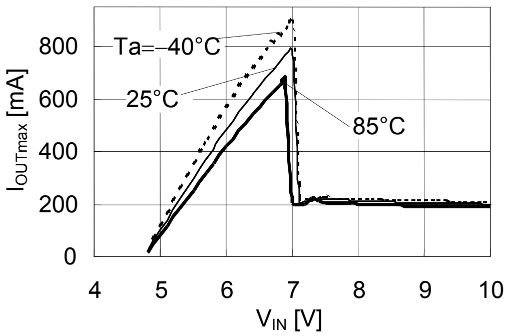
S-814A20A



S-814A30A



S-814A50A

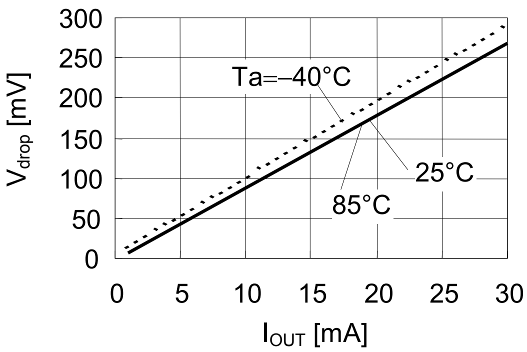


Remark In determining the output current, attention should be paid to the following.

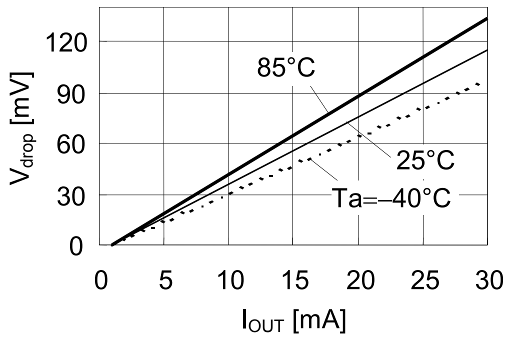
1. The minimum output current value and footnote ***3** in **Table 5** in **"■ Electrical Characteristics**".
2. The package power dissipation.

4. Dropout voltage (V_{drop}) vs. Output current (I_{OUT})

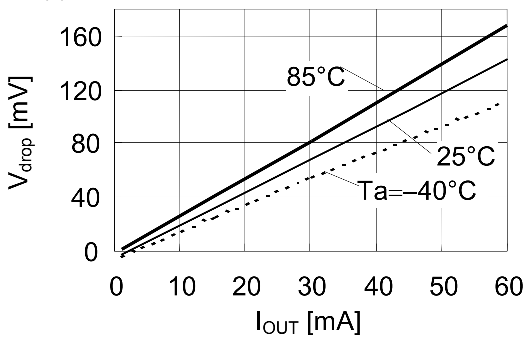
S-814A20A



S-814A30A

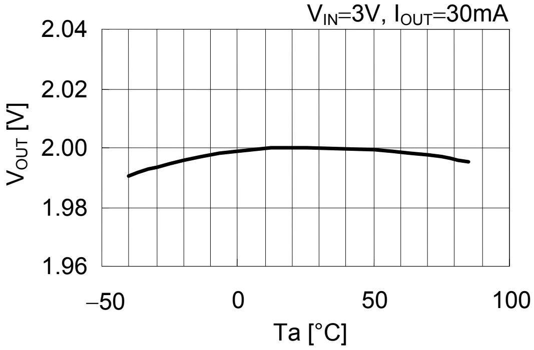


S-814A50A

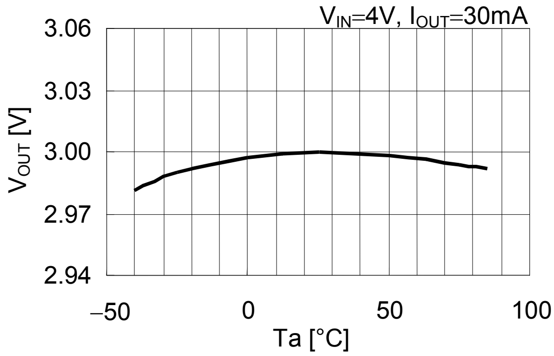


5. Output voltage (V_{OUT}) vs. Ambient temperature (Ta)

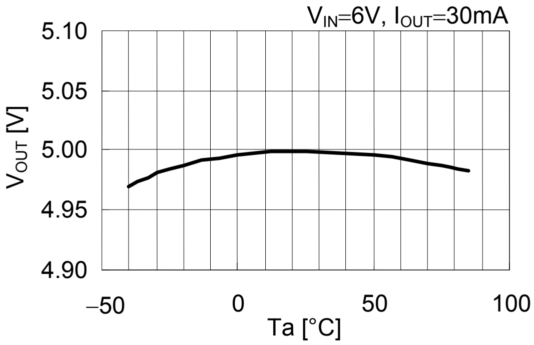
S-814A20A



S-814A30A

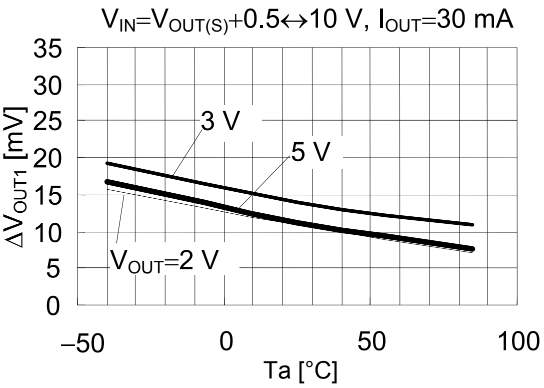


S-814A50A



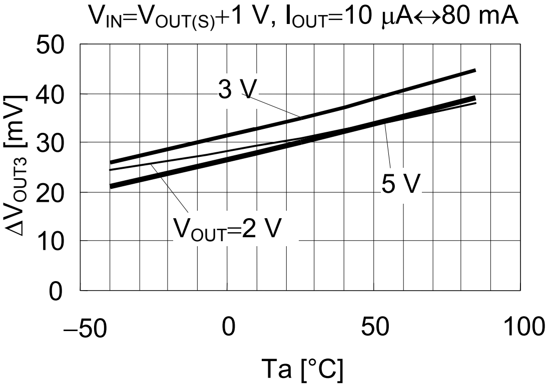
6. Line regulation (ΔV_{OUT1}) vs. Ambient temperature (Ta)

S-814A20A/S-814A30A/S-814A50A



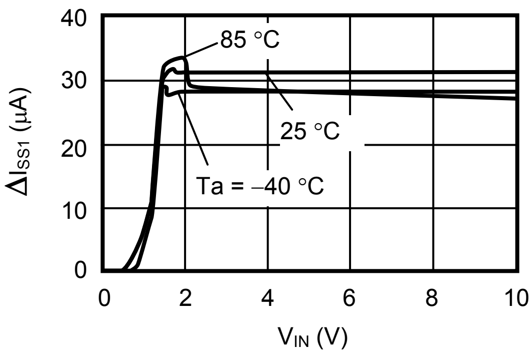
7. Load regulation (ΔV_{OUT3}) vs. Ambient temperature (Ta)

S-814A20A/S-814A30A/S-814A50A

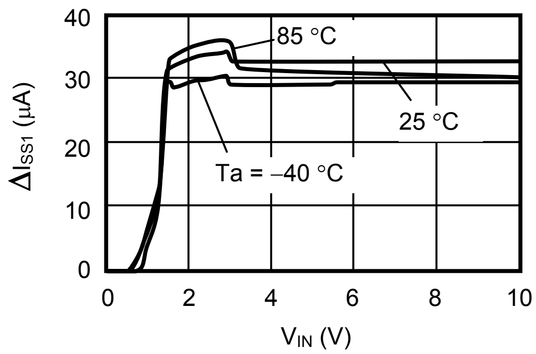


8. Current consumption (ΔI_{SS1}) vs. Input voltage (V_{IN})

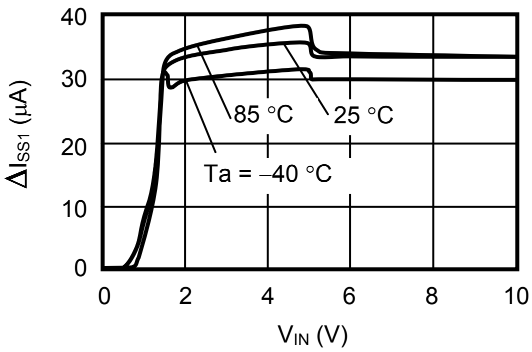
S-814A20A



S-814A30A

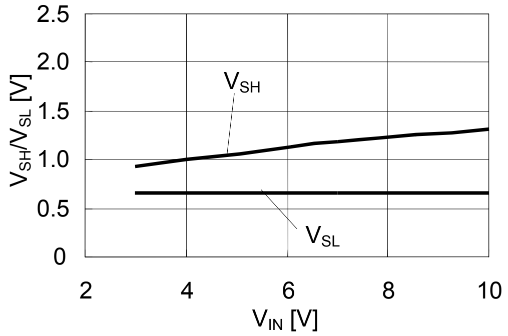


S-814A50A

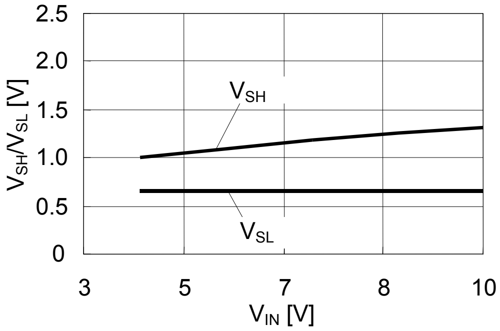


9. Threshold voltage of ON/OFF pin (V_{SH}/V_{SL}) vs. Input voltage (V_{IN})

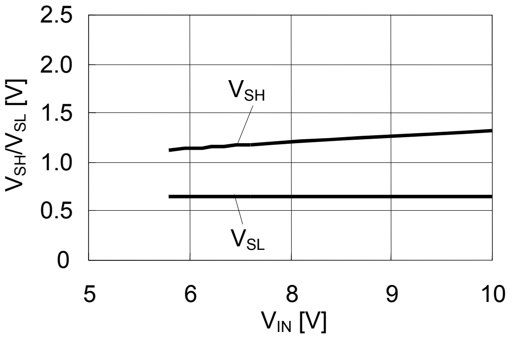
S-814A20A



S-814A30A

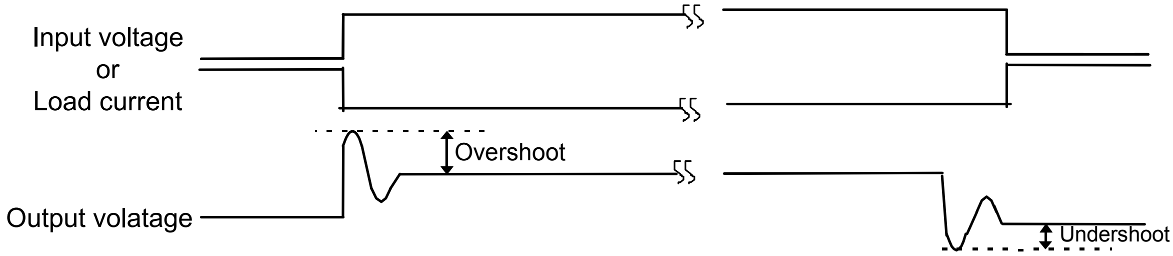


S-814A50A



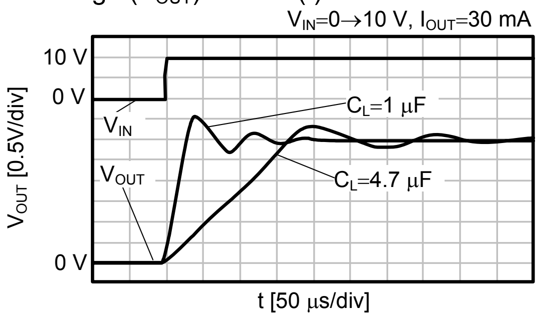
■ Reference Data

1. Transient Response Characteristics (S-814A30A, Typical data, Ta=25°C)

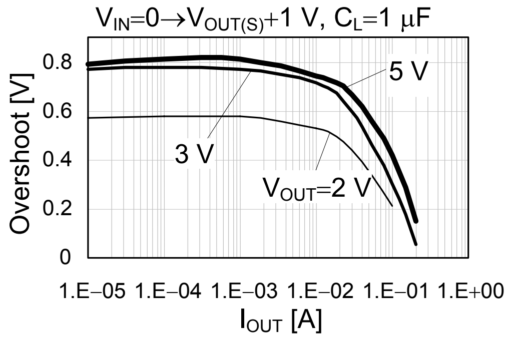


1-1. At power on

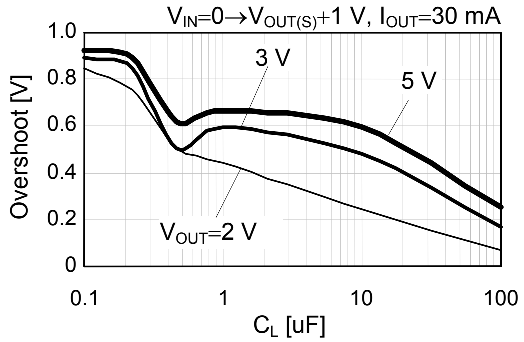
Output voltage (V_{OUT}) – Time (t)



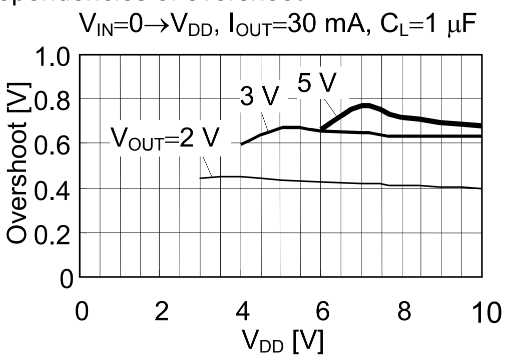
Load dependencies of overshoot



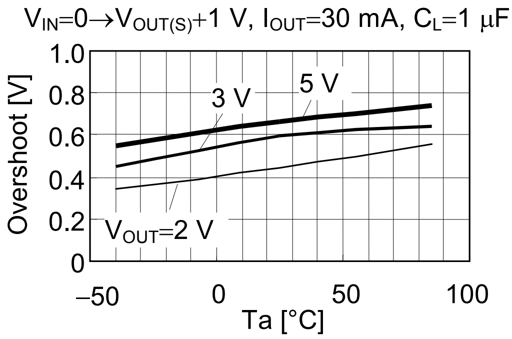
C_L dependencies of overshoot



V_{DD} dependencies of overshoot

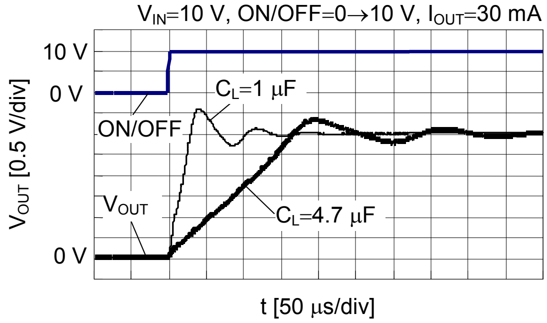


Temperature dependencies of overshoot

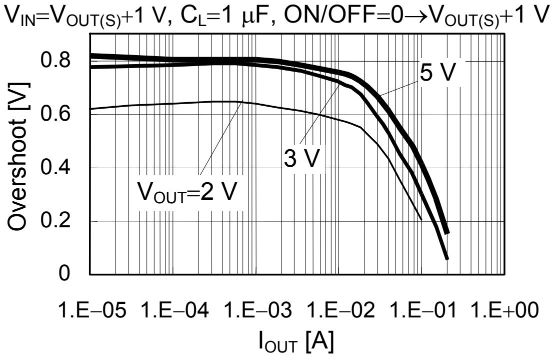


1-2. At power ON/OFF control

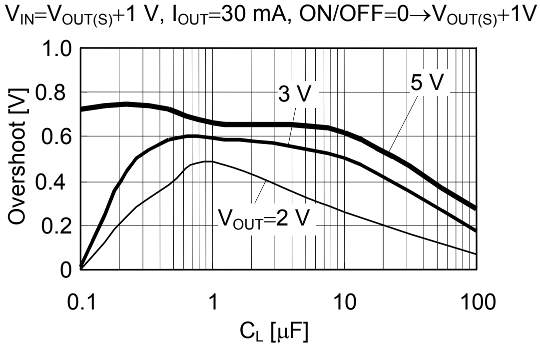
Output voltage (V_{OUT}) – Time (t)



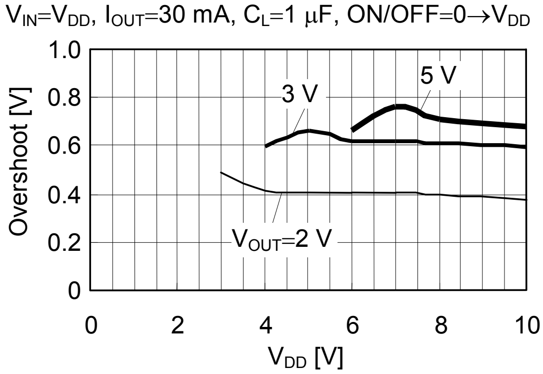
Load dependencies of overshoot



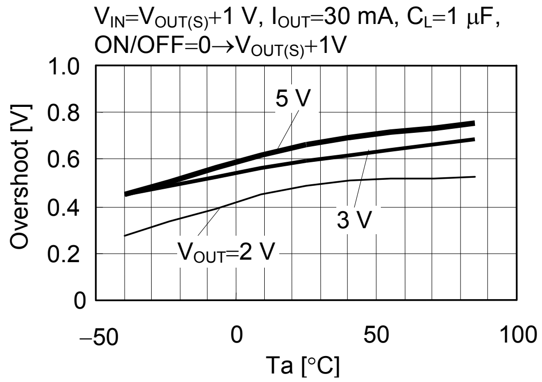
C_L dependencies of overshoot



V_{DD} dependencies of overshoot



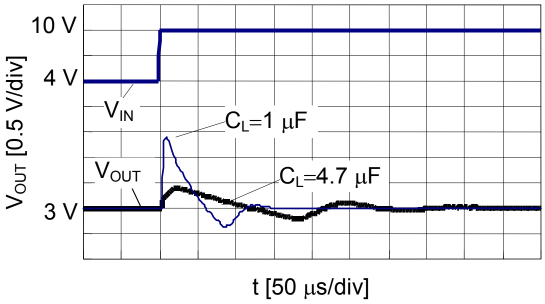
Temperature dependencies of overshoot



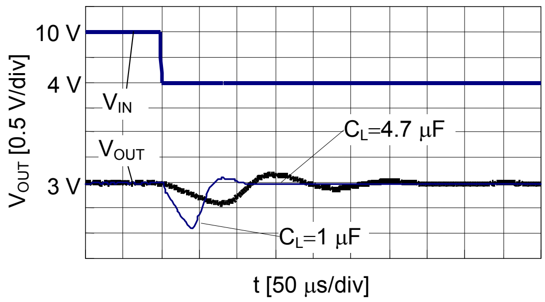
1-3. At power fluctuation

Output voltage (V_{OUT}) – Time (t)

V_{IN}=4.0→10 V, I_{OUT}=30 mA

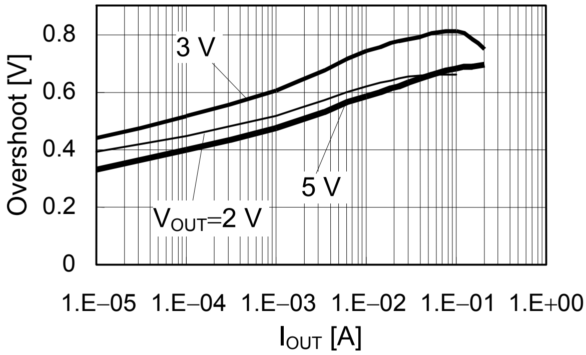


V_{IN}=10→4.0 V, I_{OUT}=30 mA



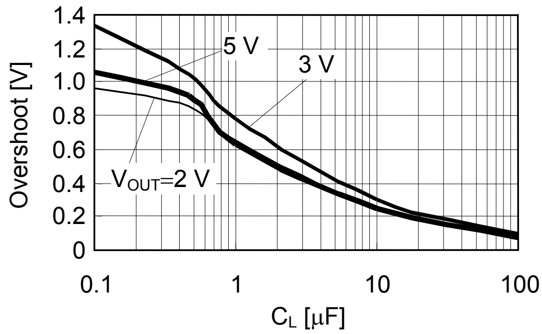
Load dependencies of overshoot

V_{IN}=$V_{OUT(S)}$+1 V→$V_{OUT(S)}$+2 V, C_L=1 μF



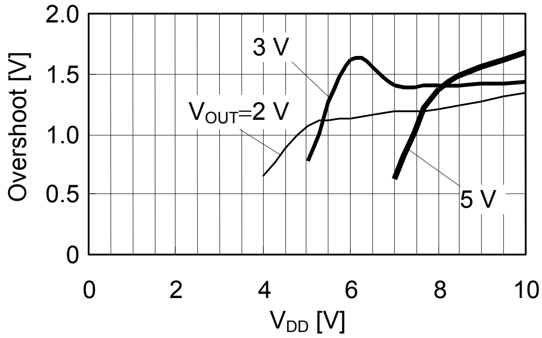
C_L dependencies of overshoot

V_{IN}=$V_{OUT(S)}$+1 V→$V_{OUT(S)}$+2 V, I_{OUT}=30 mA



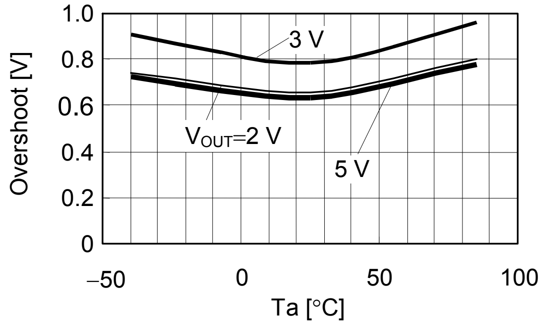
V_{DD} dependencies of overshoot

V_{IN}=$V_{OUT(S)}$+1 V→V_{DD}, I_{OUT}=30 mA, C_L=1 μF



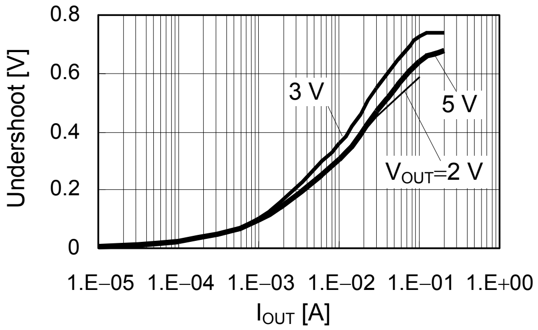
Temperature dependencies of overshoot

V_{IN}=$V_{OUT(S)}$+1 V→$V_{OUT(S)}$+2 V, I_{OUT}=30 mA, C_L=1 μF



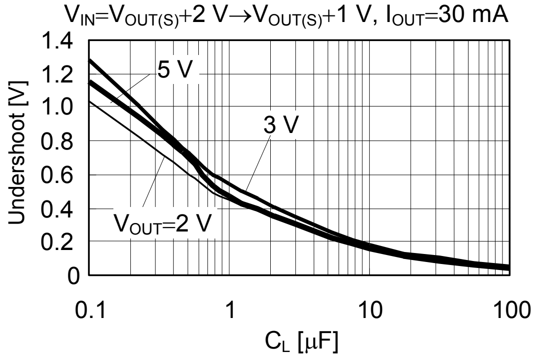
Load dependencies of undershoot

V_{IN}=$V_{OUT(S)}$+2 V→$V_{OUT(S)}$+1 V, C_L=1 μF

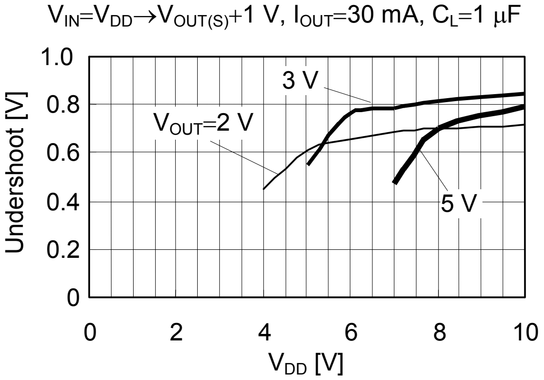


C_L dependencies of undershoot

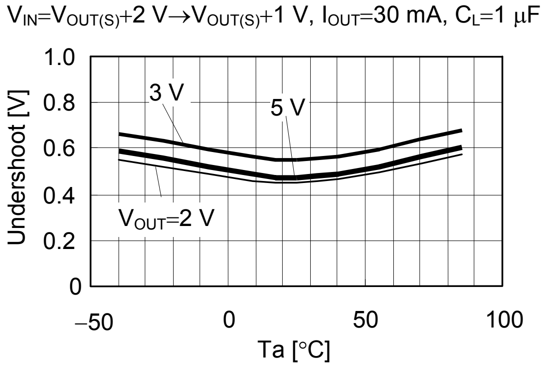
V_{IN}=$V_{OUT(S)}$+2 V→$V_{OUT(S)}$+1 V, I_{OUT}=30 mA



V_{DD} dependencies of undershoot



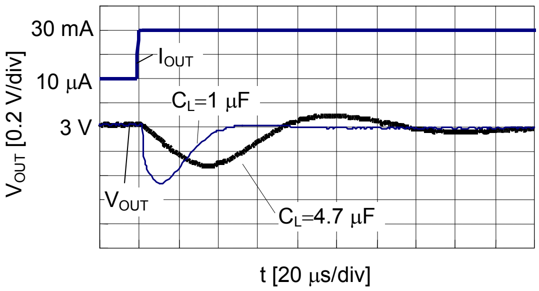
Temperature dependencies of undershoot



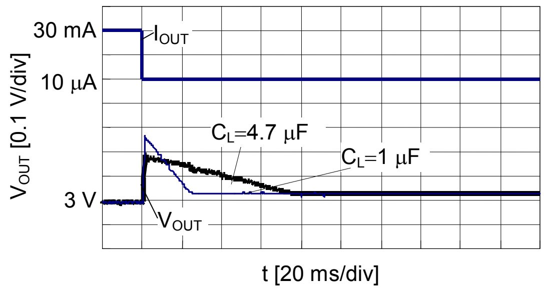
1-4. At load fluctuation

Output voltage (V_{OUT}) – Time (t)

I_{OUT}=10 µA→30 mA, V_{IN}=4 V

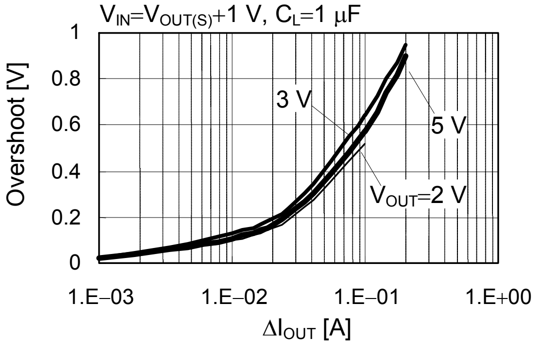


I_{OUT}=30 mA→10 µA, V_{IN}=4 V



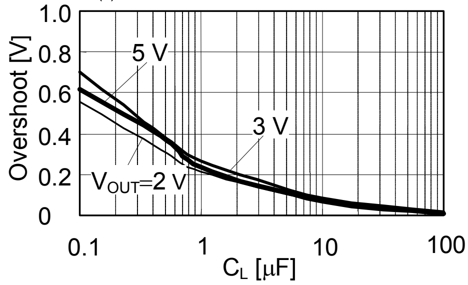
Load current dependencies of overshoot

$V_{IN}=V_{OUT(S)}$+1 V, C_L=1 µF



C_L dependencies of overshoot

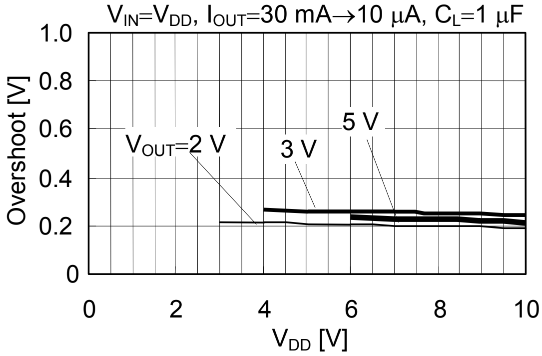
$V_{IN}=V_{OUT(s)}$+1 V, I_{OUT}=30 mA→10 µA



Remark ΔI_{OUT} shows larger load current at load current fluctuation. Smaller current at load current fluctuation is fixed to 10 µA.
i.e. ΔI_{OUT}=1.E–02 [A] means load current fluctuation from 10 mA to 10 µA.

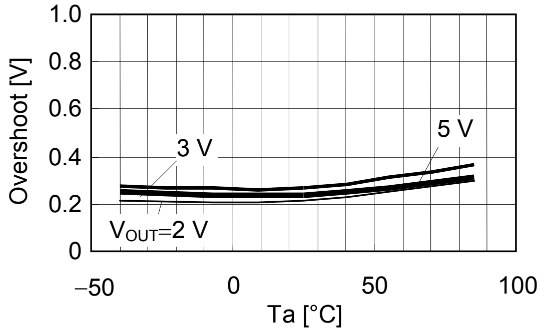
V_{DD} dependencies of overshoot

$V_{IN}=V_{DD}$, I_{OUT}=30 mA→10 µA, C_L=1 µF

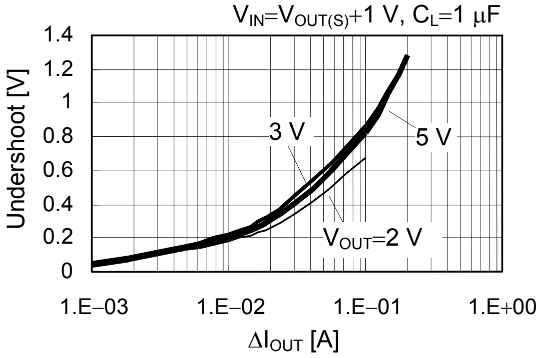


Temperature dependencies of overshoot

$V_{IN}=V_{OUT(S)}$+1 V, I_{OUT}=30 mA→10 µA, C_L=1 µF

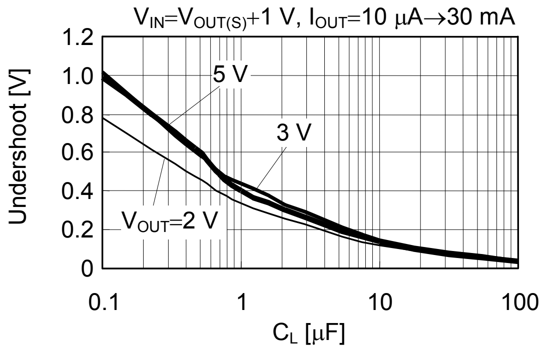


Load current dependencies of undershoot

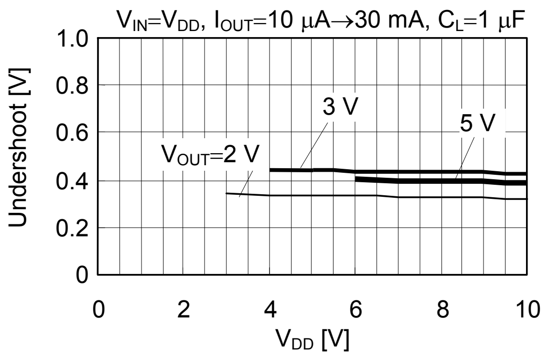


Remark ΔI_{OUT} shows larger load current at load current fluctuation. Lower current at load current fluctuation is fixed to 10 μA.
i.e. ΔI_{OUT}=1.E−02 [A] means load current fluctuation from 10 μA to 10 mA.

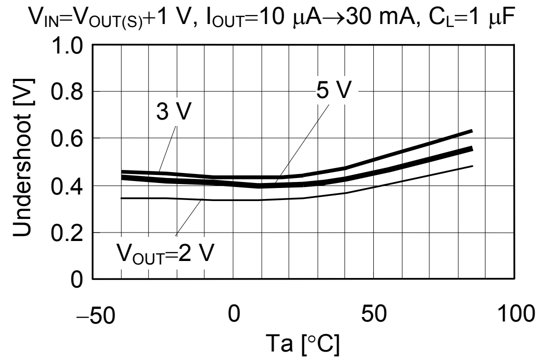
C_L dependence of undershoot

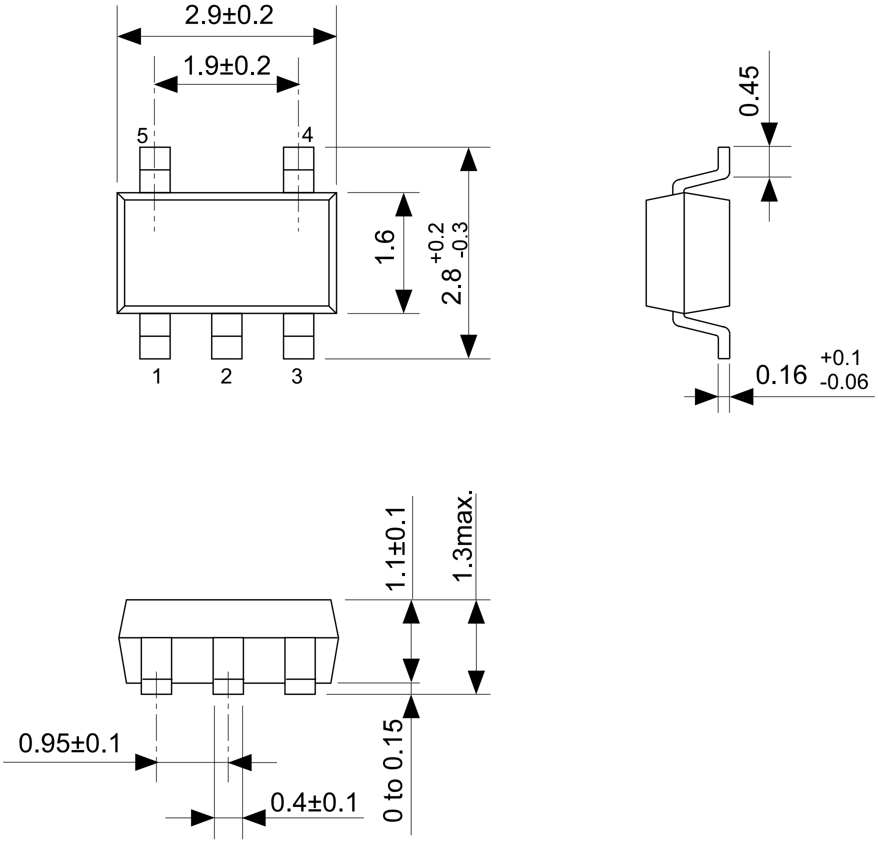


V_{DD} dependencies of undershoot



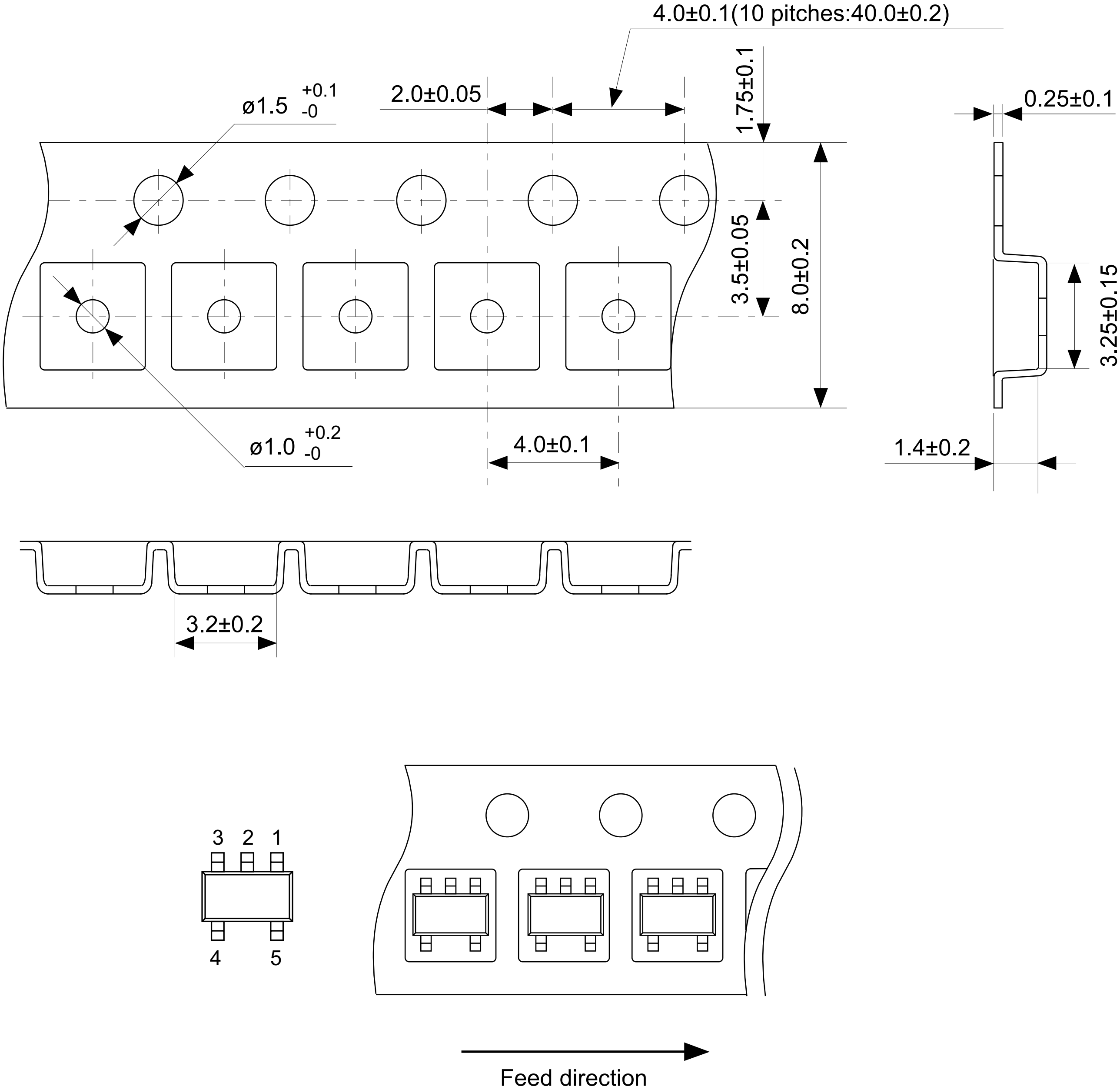
Temperature dependencies of undershoot





No. MP005-A-P-SD-1.3

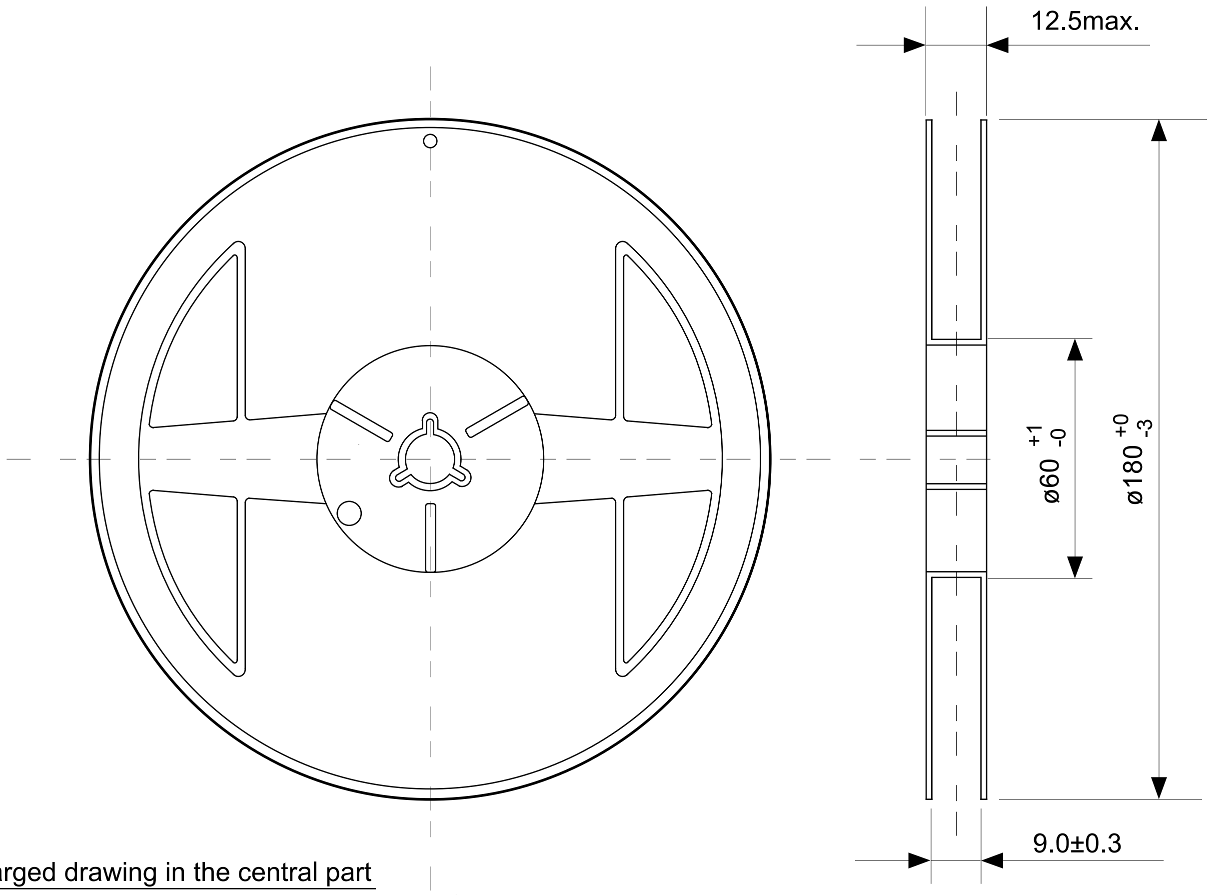
TITLE	SOT235-A-PKG Dimensions
No.	MP005-A-P-SD-1.3
ANGLE	
UNIT	mm
ABLIC Inc.	



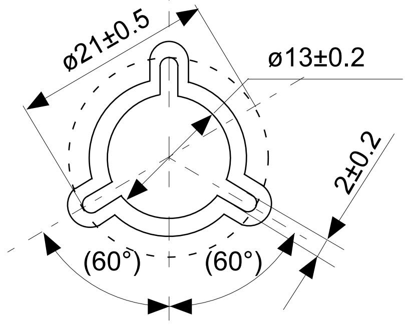
No. MP005-A-C-SD-2.1

TITLE	SOT235-A-Carrier Tape
No.	MP005-A-C-SD-2.1
ANGLE	
UNIT	mm

ABLIC Inc.



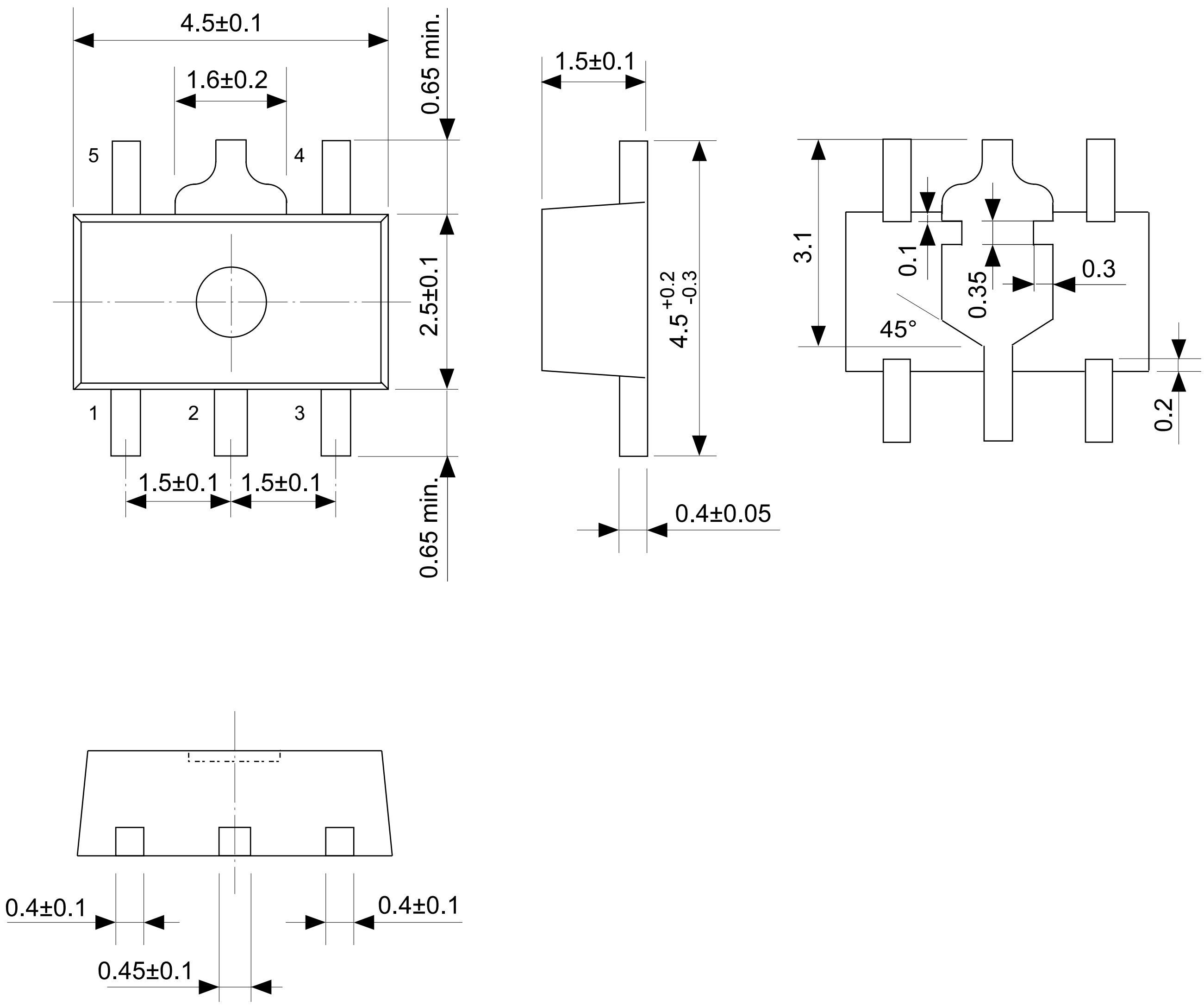
Enlarged drawing in the central part



No. MP005-A-R-SD-1.1

TITLE	SOT235-A-Reel		
No.	MP005-A-R-SD-1.1		
ANGLE		QTY.	3,000
UNIT	mm		

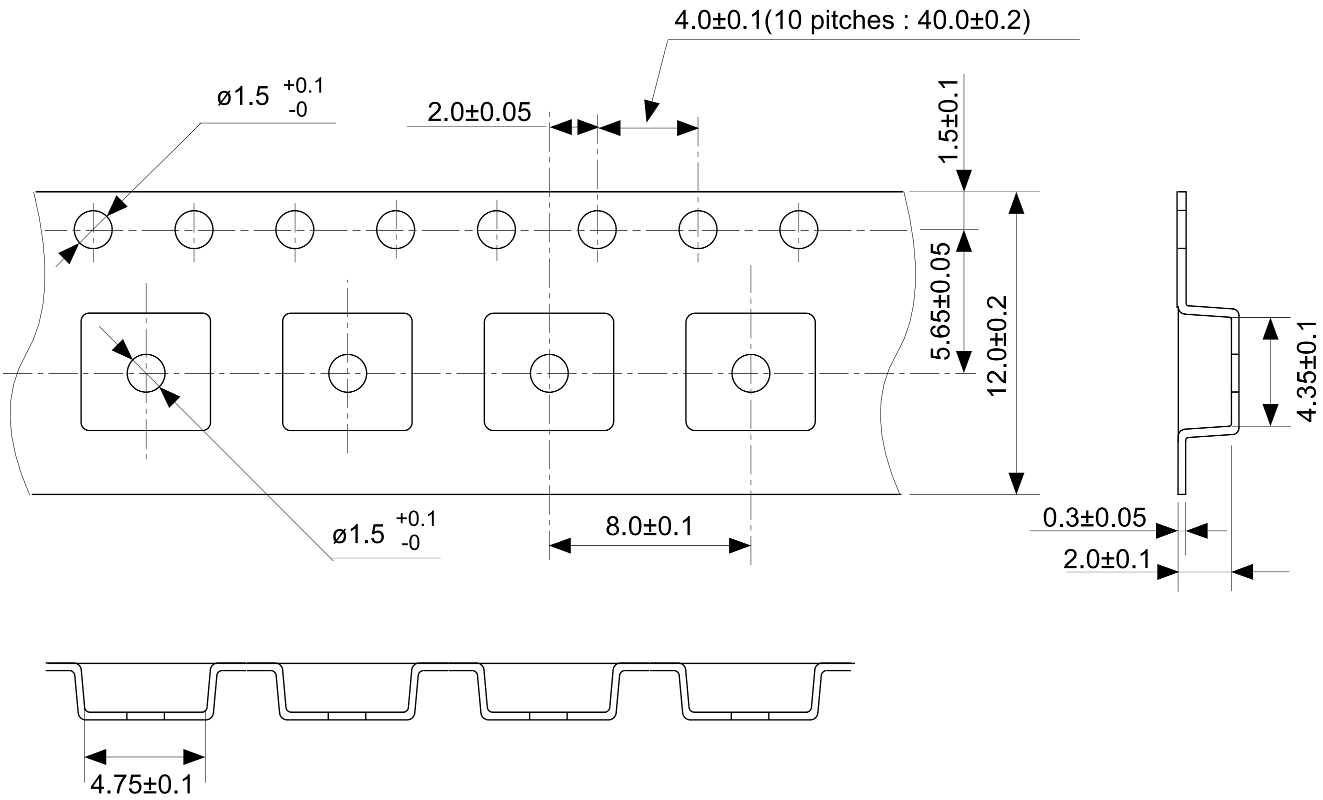
ABLIC Inc.

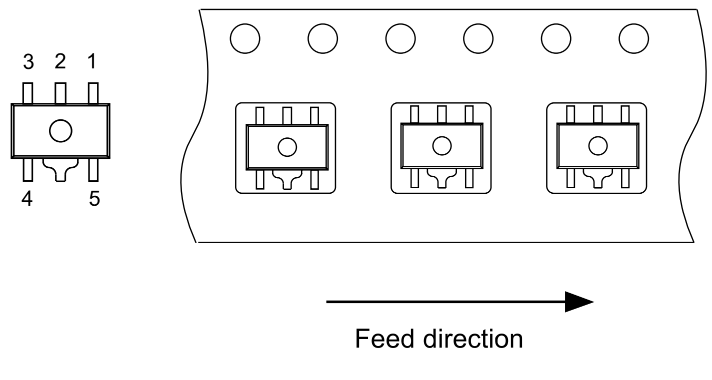


No. UP005-A-P-SD-2.0

TITLE	SOT895-A-PKG Dimensions
No.	UP005-A-P-SD-2.0
ANGLE	
UNIT	mm

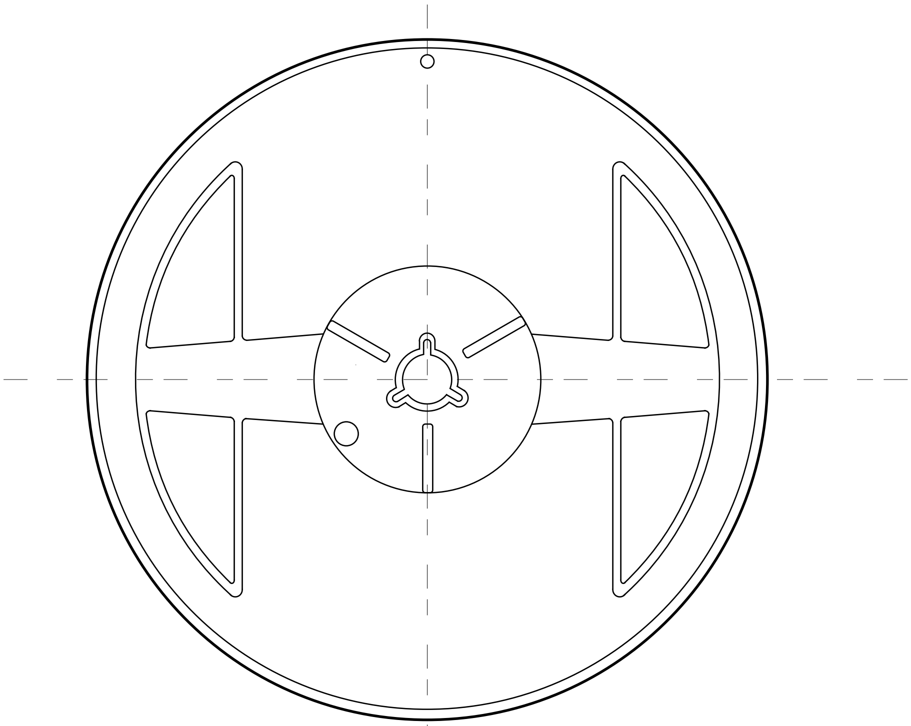
ABLIC Inc.

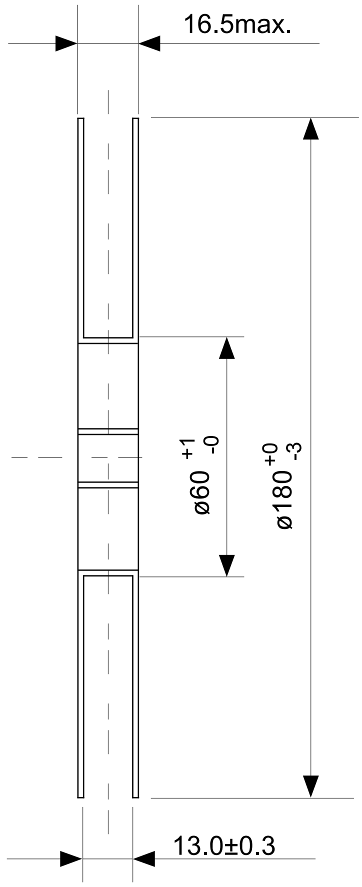




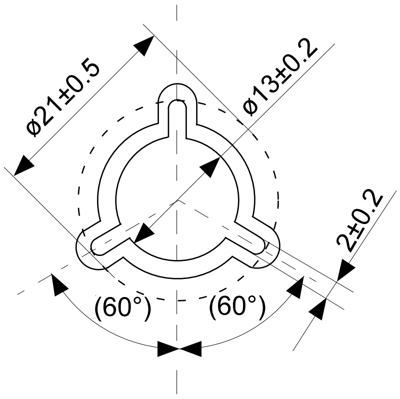
No. UP005-A-C-SD-2.0

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





Enlarged drawing in the central part



No. UP005-A-R-SD-1.1

TITLE	SOT895-A-Reel		
No.	UP005-A-R-SD-1.1		
ANGLE		QTY.	1,000
UNIT	mm		

ABLIC Inc.

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2.2-2018.06

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