# Input voltage 8V Current 400mA Voltage Regulator

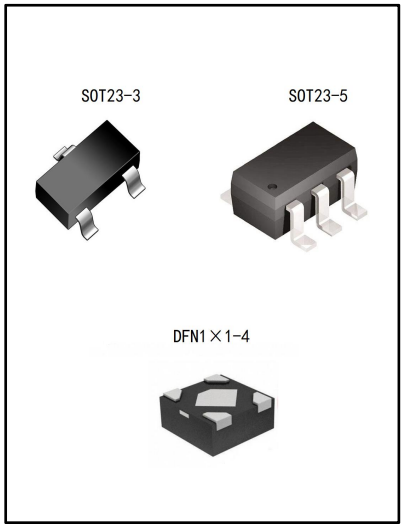
# SSP7615

## General Description

The SSP7615 is a high accuracy, low noise, high speed CMOS Linear regulator with low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. The devices offer a new level of cost effective performance in cellular phones, laptop and notebook computers, and other portable devices.

The current limiter's fold-back circuit also operates as a short circuit protection and an output current limiter at the output pin.

The SSP7615 regulators are available in standard SOT23-3, SOT23-5 and DFN1×1-4 packages. Standard products are Pb-free and Halogen-free.




## Features

- Input voltage:1.5V~8V
- Output range:1.2V~5.0V
- Maximum output current: 400mA @ VOUT=3.3V
- PSRR: 60dB @1KHz
- Dropout voltage:200mV @ IOUT=100mA
- Quiescent current: 0.5μA Typ.
- Shut-down current: <1μA
- Recommend capacitor:1μF
- Built-in Short-Circuit Protection, Current Limiter

## Applications

- Radio control systems
- Cellphones, radiophone, digital cameras
- Bluetooth, wireless handsets
- Others portable consumer equipments

## Order specification

| Part No | Package | Manner of Packing | Devices per bag/reel |
|---|---|---|---|
| SSP7615-XXMR | SOT23-3 | Reel | 3000PCS/REEL |
| SSP7615-XXM5R | SOT23-5 | Reel | 3000PCS/REEL |
| SSP7615-XXDFR | DFN1×1-4 | Reel | 10000PCS/REEL |

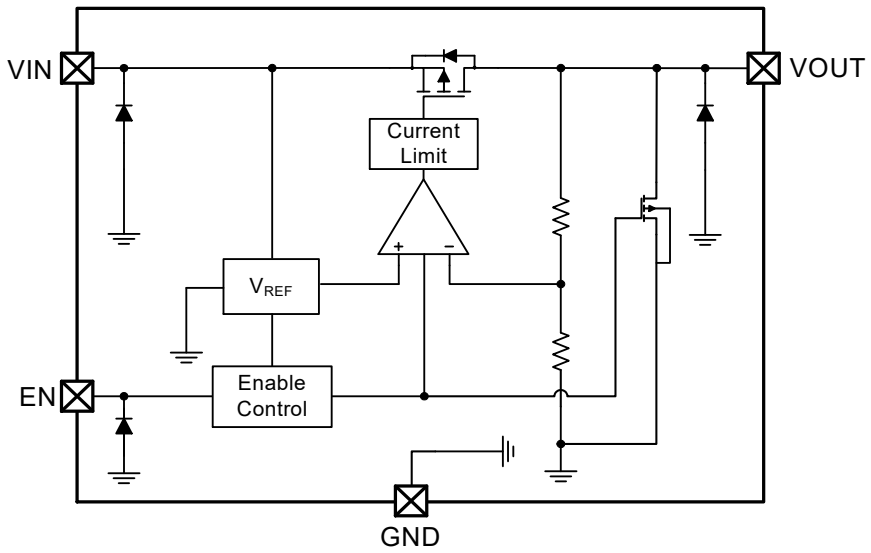
Note: XX indicates 1.2V~5.0V by 0.1V step. For example, 33 means product outputs 3.3V

## Type selection guide

SSP7615-①②③④⑤

| Designator | Symbol | Description |
|---|---|---|
| ①② | Integer | Output Voltage(1.2~5.0V) |
| ③④ | M | Package:SOT23-3 |
| | M5 | Package:SOT23-5 |
| | DF | Package: DFN1×1-4 |
| ⑤ | R | RoHS / Pb Free |
| | G | Halogen Free |

## Block Diagram



## Pin Assignment

SOT23-3（Top View）

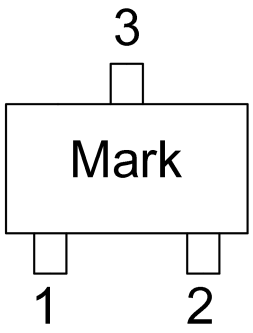



Table 1：SSP7615-XXMR series（SOT23-3 PKG）

| PIN NO. | PIN NAME | FUNCTION |
|---|---|---|
| 1 | GND | GND pin |
| 2 | VOUT | Output voltage pin |
| 3 | VIN | Input voltage pin |

SOT23-5（Top View）

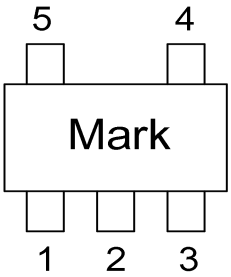



Table 2：SSP7615-XXM5R series（SOT23-5 PKG）

| PIN NO. | PIN NAME | FUNCTION |
|---|---|---|
| 1 | VIN | Input |
| 2 | GND | Ground |
| 3 | EN | Enable(Active high, not floating) |
| 4 | NC | Not connected |
| 5 | VOUT | Output |

DFN1×1-4（Top View）

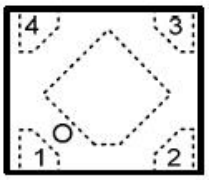



Table 3：SSP7615-XXDFR series（DFN1×1-4 PKG）

| PIN NO. | PIN NAME | FUNCTION |
|---|---|---|
| 1 | VOUT | Output |
| 2 | GND | Ground |
| 3 | EN | Enable(Active high, not floating) |
| 4 | VIN | Input |

## Functional Description

The SSP7615 is a high accuracy, low noise, high speed CMOS Linear regulator with low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small.

## Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | -0.3~8 | V |
| Max Output Current | $I_{OUT}$ | 450 | mA |
| Operating Temperature | Topr | -40~85 | ℃ |
| Storage Temperature | Tstg | -55~150 | ℃ |
| Package Lead Soldering Temperature | Tsol | 260 | ℃ |
| Junction Temperature | Tj | -40~125 | ℃ |

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

## Thermal Information

| Parameter | Symbol | Package | Max. | Unit |
|---|---|---|---|---|
| Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink) | $\theta_{JA}$ | SOT23-3 | 500 | ℃/W |
| | | SOT23-5 | 500 | ℃/W |
| | | DFN1×1-4 | 200 | ℃/W |
| Power Dissipation | $P_D$ | SOT23-3 | 0.40 | W |
| | | SOT23-5 | 0.40 | W |
| | | DFN1×1-4 | 0.40 | W |

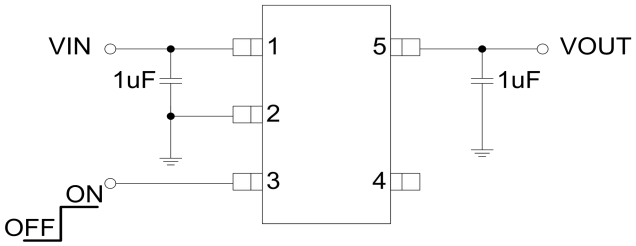
Note: $P_D$ is measured at Ta= 25℃

## Electrical Characteristics

The following specifications apply for VOUT =3.3V, TA=25℃, unless specified otherwise.

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | 1.5 | -- | 8 | V |
| Output Range | $V_{OUT}$ | $I_{OUT}$=1mA | -2 | $V_{OUT}$ | 2 | % |
| Quiescent Current | $I_Q$ | $V_{OUT}$=3.3V, $I_{OUT}$=0 | -- | 0.45 | -- | μA |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$=$V_{EN}$=4.5V | -- | 400 | -- | mA |
| Dropout Voltage | $V_{DROP}$ | $V_{OUT}$=3.3V, $I_{OUT}$=100mA | -- | 200 | -- | mV |
| | | $V_{OUT}$=3.3V, $I_{OUT}$=200mA | -- | 400 | -- | mV |
| Line Regulation | $\triangle V_{LINE}$ | $V_{IN}$=2.7~5.5V, $I_{OUT}$=1mA | -- | 0.01 | 0.15 | %/V |
| Load Regulation | $\triangle V_{LOAD}$ | $V_{OUT}$=3.3V, $I_{OUT}$=1~300mA | -- | 200 | -- | mV |
| Short Current | $I_{SHORT}$ | $V_{EN}$=$V_{IN}$, $V_{OUT}$ Short to GND with 1Ω | -- | 35 | -- | mA |
| Shut-down Current | $I_{SHDN}$ | $V_{EN}$=0V | -- | -- | 1 | μA |
| Power Supply Rejection Rate | PSRR | $V_{IN}$=5$V_{DC}$+0.5$V_{P-P}$ F=1KHz, $I_{OUT}$=10mA | | 60 | | dB |
| EN logic high voltage | $V_{ENH}$ | $V_{IN}$=5.5V, $I_{OUT}$=1mA | 1.2 | -- | VIN | V |
| EN logic low voltage | $V_{ENL}$ | $V_{IN}$=5.5V, $V_{OUT}$=0V | -- | -- | 0.4 | V |
| EN Input Current | $I_{EN}$ | $V_{EN}$= 0 to 5.5V | -- | -- | 1 | μA |

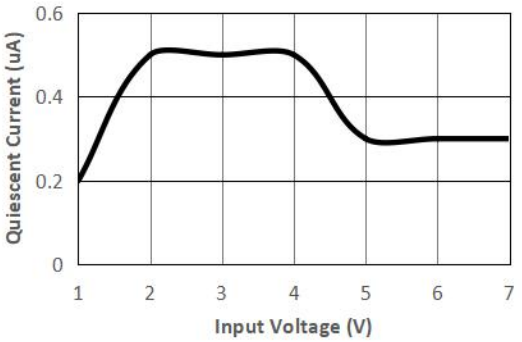
## Application Circuits

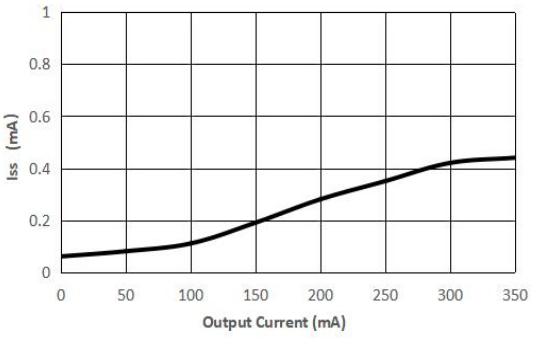



## Typical Performance Characteristics

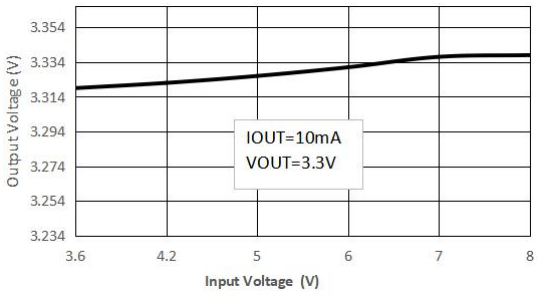
$C_{IN}$=1μF,$C_{OUT}$=1μF,$V_{IN}$=4.5V,$V_{OUT}$=3.3V,SOT23-5,$T_A$=25℃
(unless specified otherwise.Package:SOT23-5L)

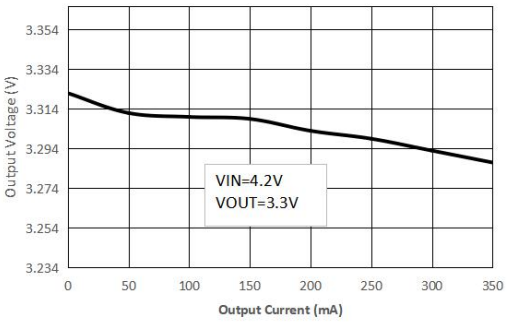
(1) Quiescent current vs Input voltage



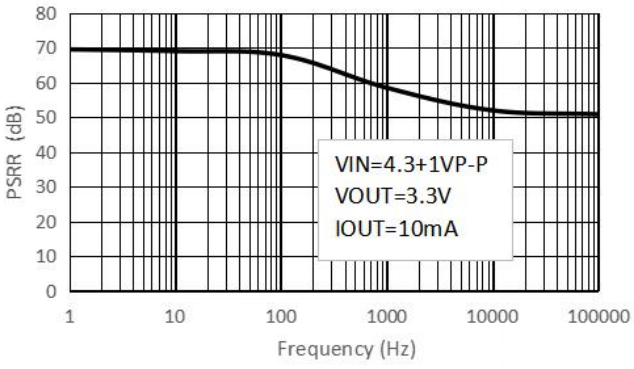




(2) Output Voltage vs Input voltage

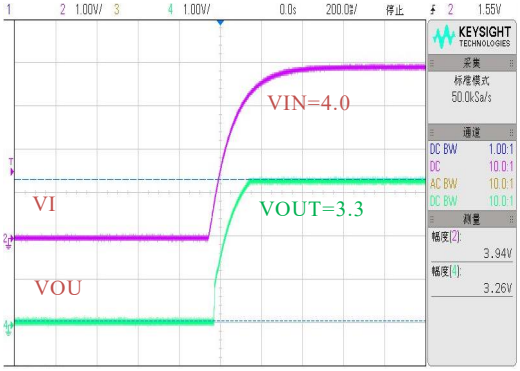


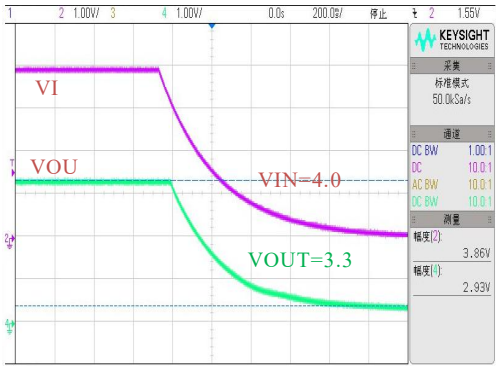




(3) PSRR vs Frequency

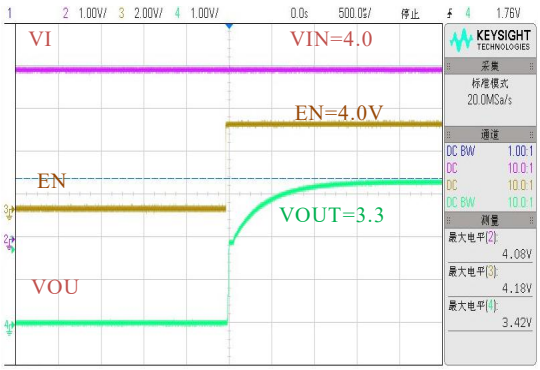


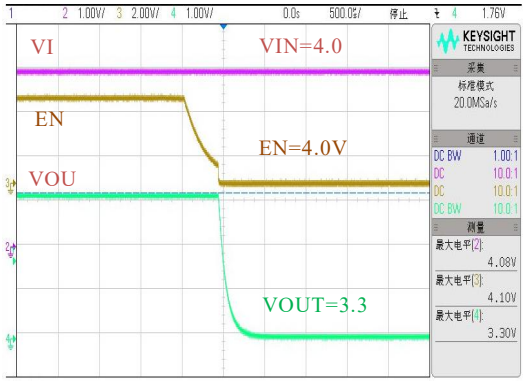
## Power ON / OFF



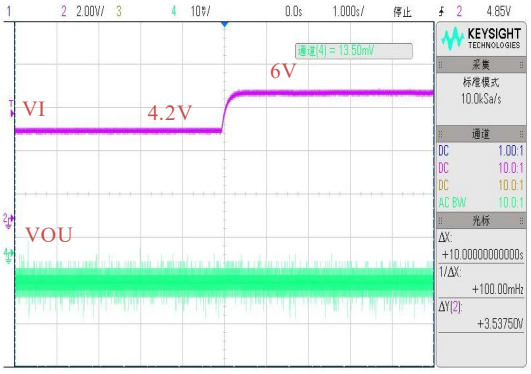



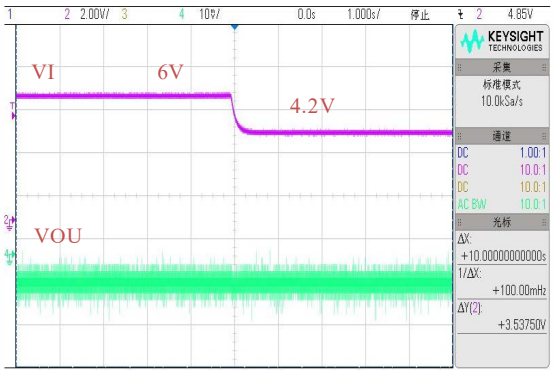

## EN ON/OFF



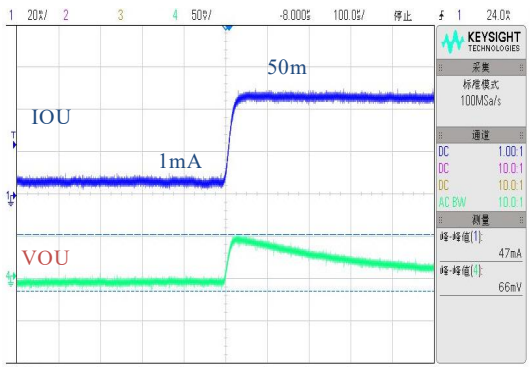



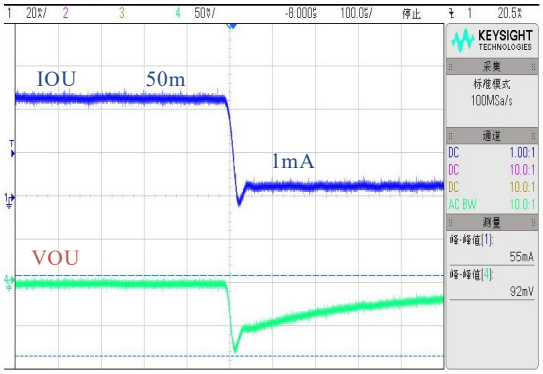

## Line Transient




## Load Transient



## Application Information

In general, all the capacitors need to be low leakage. Any leakage the capacitors have will reduce efficiency, increase the quiescent current.

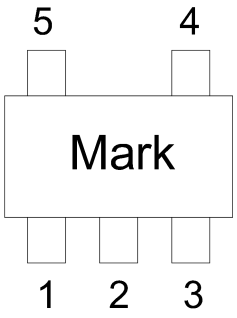
A recent trend in the design of portable devices has been to use ceramic capacitors to filter DC-DC converter inputs. Ceramic capacitors are often chosen because of their small size, low equivalent series resistance (ESR) and high RMS current capability. Also, recently, designers have been looking to ceramic capacitors due to shortages of tantalum capacitors.

Unfortunately, using ceramic capacitors for input filtering can cause problems. Applying a voltage step to a ceramic capacitor causes a large current surge that stores energy in the inductance of the power leads. A large voltage spike is created when the stored energy is transferred from these inductance into the ceramic capacitor. These voltage spikes can easily be twice the amplitude of the input voltage step.

Many types of capacitors can be used for input bypassing, however, caution must be exercised when using multi layer ceramic capacitors (MLCC). Because of the self-resonant be generated under some start-up conditions, such as connecting the LDO input to a live power source.

The LDO also requires an output capacitor for loop stability. Connect a 1uF tantalum capacitor from OUT to GND close to the pins. For improved transient response, this output capacitor may be ceramic.

## Marking Description



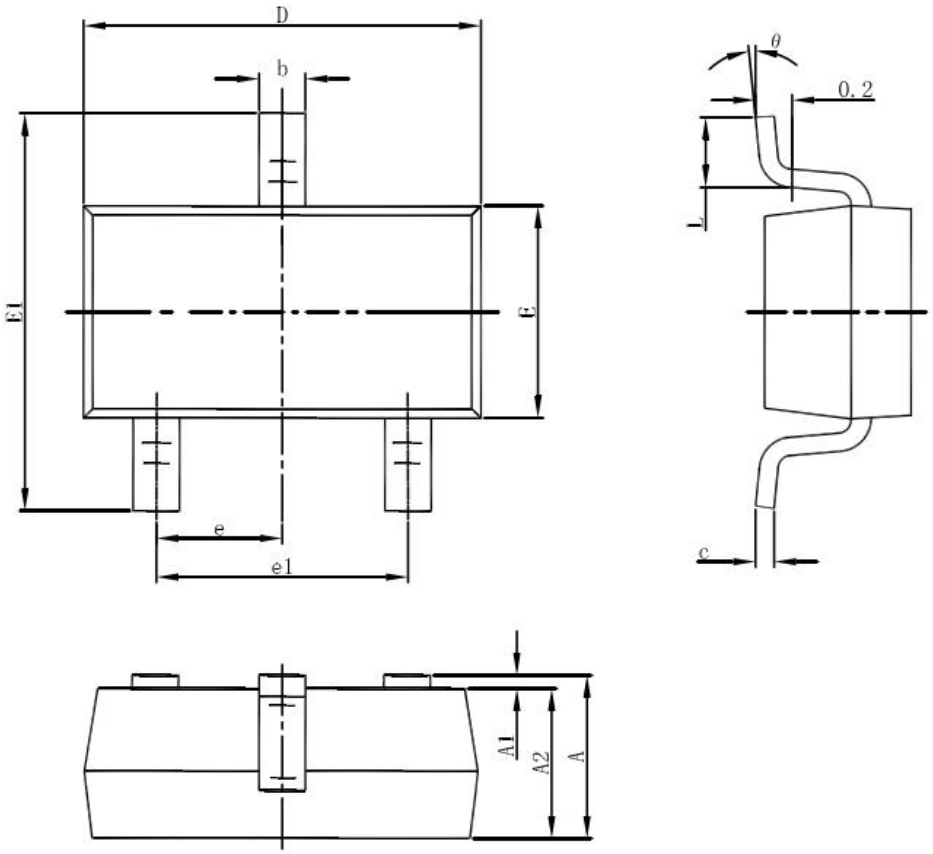

① product code: 4

② output voltage code:

| Symbol | Voltage (V) | Symbol | Voltage (V) | Symbol | Voltage (V) | Symbol | Voltage (V) |
|---|---|---|---|---|---|---|---|
| a | 0.9 | A | 3.5 | n | 2.2 | N | 4.8 |
| b | 1.0 | B | 3.6 | o | 2.3 | O | 4.9 |
| c | 1.1 | C | 3.7 | P | 2.4 | P | 5.0 |
| d | 1.2 | D | 3.8 | q | 2.5 | Q | 5.1 |
| e | 1.3 | E | 3.9 | r | 2.6 | R | 5.2 |
| f | 1.4 | F | 4.0 | s | 2.7 | S | 5.3 |
| g | 1.5 | G | 4.1 | t | 2.8 | T | 5.4 |
| h | 1.6 | H | 4.2 | u | 2.9 | U | 5.5 |
| i | 1.7 | I | 4.3 | v | 3.0 | V | 5.6 |
| j | 1.8 | J | 4.4 | w | 3.1 | W | 5.7 |
| k | 1.9 | K | 4.5 | x | 3.2 | X | 5.8 |
| l | 2.0 | L | 4.6 | y | 3.3 | Y | 5.9 |
| m | 2.1 | M | 4.7 | z | 3.4 | Z | 6.0 |

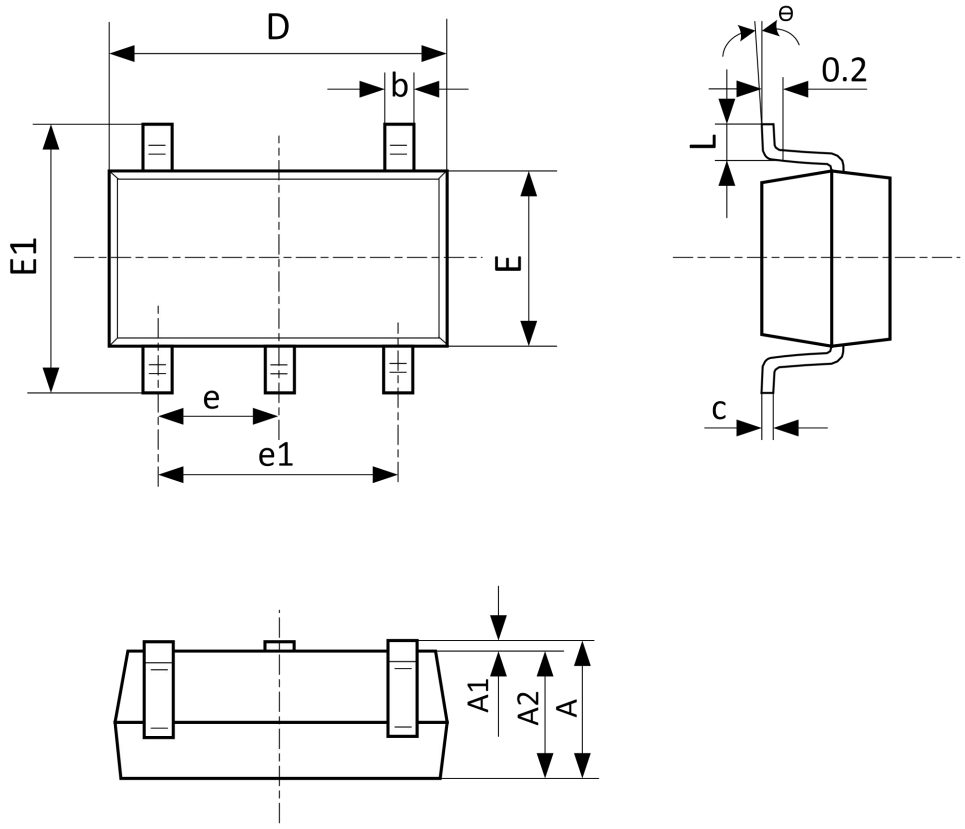
③④: The last two of them are based on the time of this product which is the first time into production, the third is the year of this product first time into production, such as expressed in "1" in 2021, in "2" in 2022 and the forth is the mouth of this product first time into production, it can be in 1 ~ 9 , which is expressed in "0" in October, in November with an "A", in December with "B"; . For example: 4y16 represents SSP7615-33M5R product is first put into production in June in 2021.

## Package Information（SOT23-3）



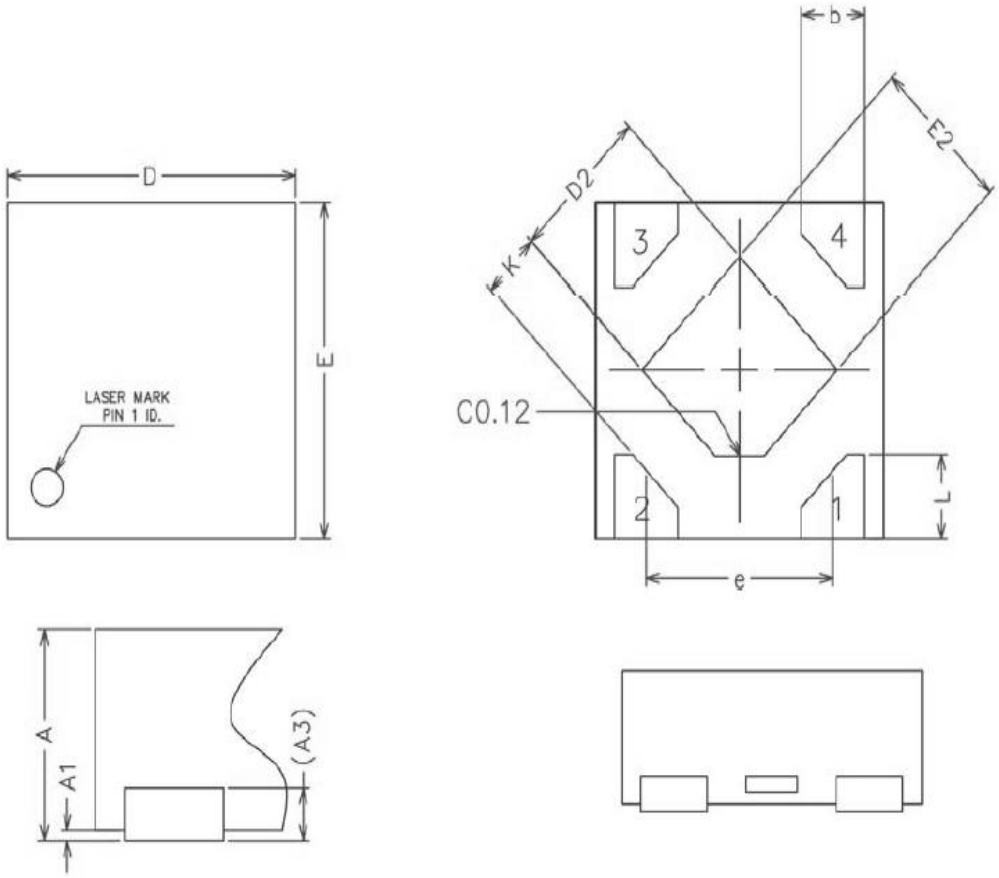

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

## Package Information（SOT23-5）




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

## Package Information（DFN1×1-4）




| Symbol | Dimensions In Millimeters | | |
|---|---|---|---|
| | Min. | NOM | Max. |
| A | 0.34 | 0.37 | 0.40 |
| A1 | 0.00 | 0.02 | 0.05 |
| A3 | | 0.100REF | |
| b | 0.17 | 0.22 | 0.27 |
| D | 0.95 | 1.00 | 1.05 |
| E | 0.95 | 1.00 | 1.05 |
| D2 | 0.43 | 0.48 | 0.53 |
| E2 | 0.43 | 0.48 | 0.53 |
| L | 0.20 | 0.25 | 0.30 |
| e | - | 0.65 | - |
| K | 0.15 | - | - |

## Special Instructions

The company reserves the right of final interpretation of this specification.

## Version Change Description

| | | |
|---|---|---|
| Version：V1.2 | Author：Yangyang | Time：2021.12.9 |
| Modify the record： | | |
| 1. Re-typesetting the manual and checking some data | | |
| Version：V1.3 | Author：Yangyang | Time：2022.3.30 |
| Modify the record： | | |
| 1. Update absolute maximum ratings and electrical characteristics | | |

# Statement

The information in the usage specification is correct at the time of publication, Shanghai Siproin Microelectronics Co. has the right to change and interpret the specification, and reserves the right to modify the product without prior notice. Users can obtain the latest version information from our official website or other effective channels before confirmation, and verify whether the relevant information is complete and up to date.

With any semiconductor product, there is a certain possibility of failure or failure under certain conditions. The buyer is responsible for complying with safety standards and taking safety measures when using the product for system design and complete machine manufacturing. The product is not authorized to be used as a critical component in life-saving or life-sustaining products or systems, in order to avoid potential failure risks that may cause personal injury or property loss.

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** Linear Voltage Regulators ***category:***

***Click to view products by*** Siproin ***manufacturer:***

Other Similar products are found below :

LV56831P-E LV5684PVD-XH MCDTSA6-2R L7815ACV-DG PQ3DZ53U LV56801P-E TLE42794G L78L05CZ/1SX L78LR05DL-MA-E 636416C 714954EB ZMR500QFTA LV5680P-E L78M15CV-DG L79M05T-E TLS202A1MBVHTSA1 L78LR05D-MA-E NCV317MBTG NTE7227 MP2018GZD-33-P MP2018GZD-5-P LV5680NPVC-XH LT1054CN8 MP2018GZD-5-Z MP2018GZD-33-Z AT55EL50ESE APL5934DKAI-TRG 78L05U 78L05 CL9193A15L5M CL9036A30F4M CL9036A18F4M CL9036A25F4M CL9036A28F4M CL9036A33F4M CL9906A18F4N CL9906A30F4N CL9908A30F4M CL9908A33F4M CL9908A18F4M CL9908A28F4M TL431ACM/TR TL431AIM/TR LM78L05ACM/TR HT7812ARMZ HT7805ARMZ HT317LRHZ HXY6206I-3.0 HXY6206I-3.3 XC6206P252MR XC6206P282MR