

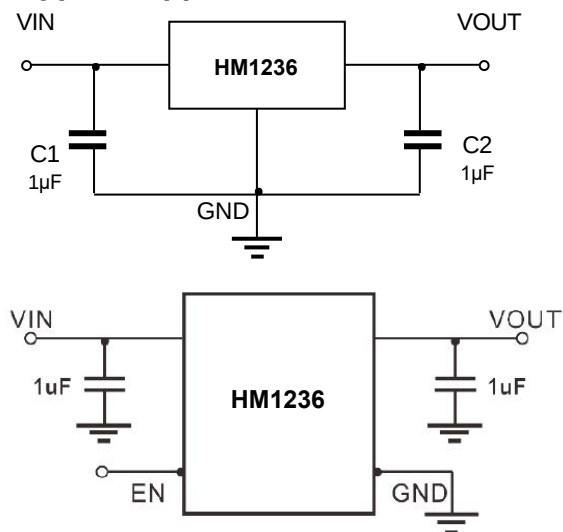
## 5.5V 300mA Low Dropout Linear Regulator

### ■ Description

HM1236 is a high ripple rejection, low power consumption, low dropout CMOS voltage regulator with short circuit protection. Its quiescent current at no-load is as low as 0.5uA, and it can provide 300mA output current under the condition that the input and output voltage difference is extremely small, and still maintain a good regulation rate, which is very suitable for portable battery-powered products, voice and imaging equipment products.

HM1236 retains all common features of low dropout regulators, including low dropout PMOS pass devices, short circuit protection and thermal shutdown.

### ■ Typical Application Circuit



### ■ Features

- $\pm 2\%$  output voltage tolerance over temperature
- VIN range up to 5.5V
- Ultra-low quiescent current 0.5uA
- When the output current is 300mA, the input and output voltage difference is 500mV
- Built-in Thermal Protection
- Built-in Overcurrent Protection

### ■ Application

- Portable battery powered devices (wearable watches, body fat scales, etc.)
- Security (cameras, dash cams, etc.)
- Mobile terminals (POS machines, power banks, etc.)
- Smart meters (electricity, gas, etc.)
- Sensors

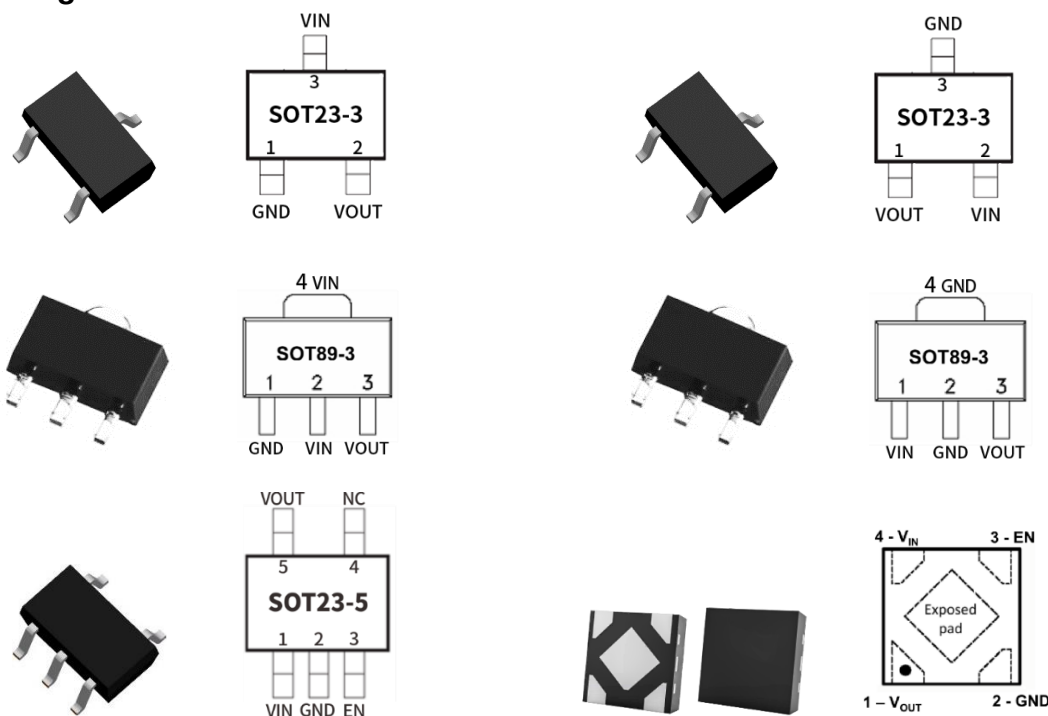
### ■ Package (RoHS Compliant)

- SOT23-3
- SOT23-5
- SOT89-3
- DFN1X1-4L

### ■ Ordering Information

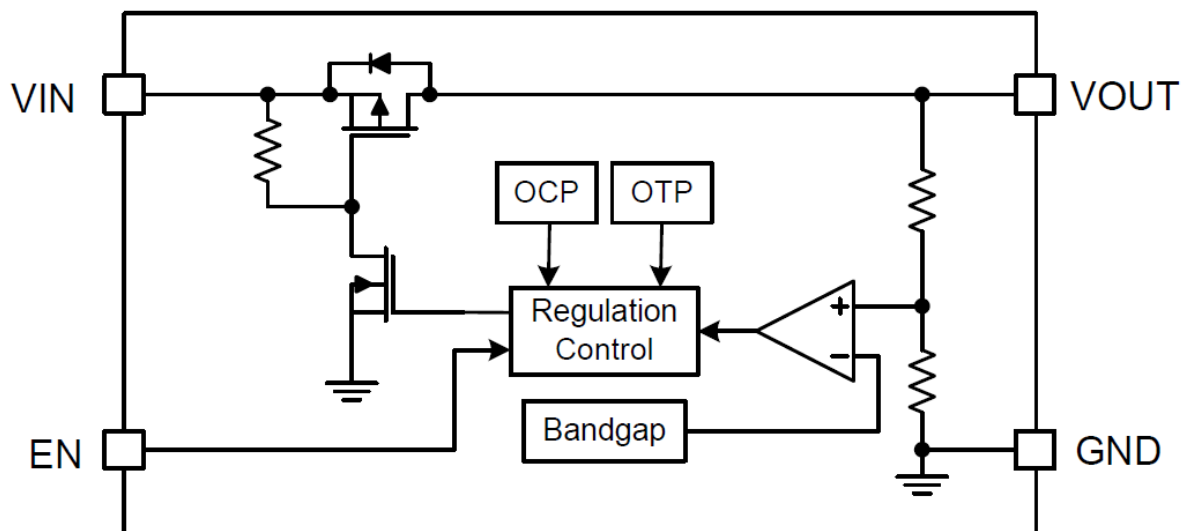
| Part Number | Input voltage (V) | Output voltage (V) | Maximum output current (mA) | Quiescent Current (uA) | Output precision | PSRR (dB@ 1KHz) | Dropout (mV) | Enable |
|-------------|-------------------|--------------------|-----------------------------|------------------------|------------------|-----------------|--------------|--------|
| HM1236      | 2.5~5.5           | 1.2~5.0            | 300                         | 0.5                    | $\pm 2\%$        | 45              | 150@100mA    | ✓      |

## ■ Pin configuration



| Pin Name | SOT23-3 |   | SOT89-3 |     | SOT23-5 | DFN1X1-4L | Pin Function       |
|----------|---------|---|---------|-----|---------|-----------|--------------------|
| VOUT     | 2       | 1 | 3       | 3   | 5       | 1         | Output Voltage Pin |
| GND      | 1       | 3 | 1       | 2、4 | 2       | 2         | Ground             |
| VIN      | 3       | 2 | 2、4     | 1   | 1       | 4         | Input Voltage Pin  |
| EN       | —       | — | —       | —   | 3       | 3         | Enable Pin         |
| NC       | —       | — | —       | —   | 4       | —         | Not connected      |

## ■ Functional block diagram



## ■ Absolute Maximum Ratings

| Project                               | Symbol    | Value       | Units |
|---------------------------------------|-----------|-------------|-------|
| Input voltage                         | $V_{IN}$  | -0.3 ~ +6.5 | V     |
| Lead Temperature (Soldering, 10 sec.) | —         | 300         | °C    |
| Storage Temperature                   | $T_{stg}$ | -65 ~ +150  | °C    |
| Junction Temperature                  | $T_J$     | 125         | °C    |

## ■ Recommended Operating Conditions

| Project              | Symbol   | Value      | Units |
|----------------------|----------|------------|-------|
| Input voltage        | $V_{IN}$ | 2.5 ~ 5.5  | V     |
| Junction Temperature | $T_J$    | -40 ~ +125 | °C    |

## ■ Electrical Characteristics

$V_{IN} = V_{OUT} + 1V$ ,  $I_{OUT} = 1mA$ ,  $C_{IN} = C_{OUT} = 1\mu F$ ,  $T_J = 25^\circ C$ , unless otherwise specified

| Symbol            | Parameter                    | Test Conditions                         | Min | Typ | Max | Units   |
|-------------------|------------------------------|-----------------------------------------|-----|-----|-----|---------|
| $V_{OUT}$         | Output Voltage Accuracy      |                                         | -2% |     | 2%  | V       |
| $\Delta V_{LINE}$ | Line Regulation              | $V_{IN} = V_{OUT} + 1V \sim 5.5V$       |     | 20  | 50  | mV      |
| $\Delta V_{LOAD}$ | Load Regulation              | $I_{OUT} = 1mA \sim 300mA$              |     | 1.5 |     | %       |
| $V_{DROP}$        | Dropout Voltage              | $I_{OUT} = 100mA$ ,<br>$V_{OUT} = 3.3V$ |     | 150 |     | mV      |
|                   |                              | $I_{OUT} = 300mA$ ,<br>$V_{OUT} = 3.3V$ |     | 500 |     | mV      |
| $I_Q$             | Quiescent Current            |                                         |     | 0.5 | 1   | $\mu A$ |
| $I_{CL}$          | Current Limit                |                                         | 360 | 560 |     | mA      |
| $V_{ENHI}$        | Enable high level            |                                         | 0.6 |     |     | V       |
| $V_{ENLO}$        | Enable low level             |                                         |     |     | 0.2 | V       |
| PSRR              | Power-supply rejection ratio | $f = 1KHz$                              |     | 45  |     | dB      |
| $T_{SD}$          | Thermal Shutdown             |                                         |     | 150 |     | °C      |
| $T_{SDHY}$        | Thermal Shutdown Hy          |                                         |     | 20  |     | °C      |

## ■ Typical Characteristics

$V_{IN} = V_{OUT} + 1V$ ,  $I_{OUT} = 1mA$ ,  $V_{OUT} = 3.3V$ ,  $C_{IN} = C_{OUT} = 1\mu F$ ,  $T_J = 25^\circ C$ , unless otherwise specified

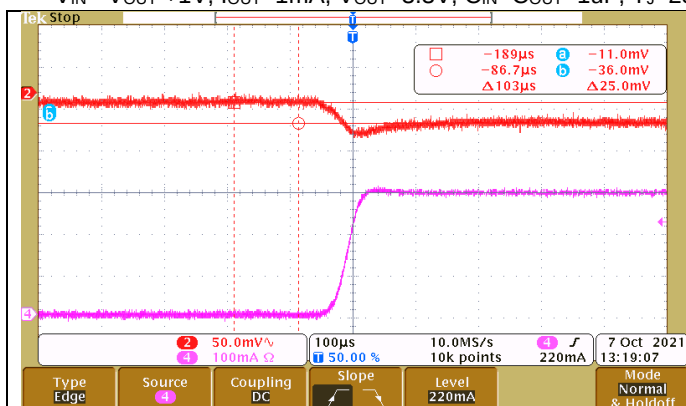


Fig 1. Load Transient (1mA~300mA)

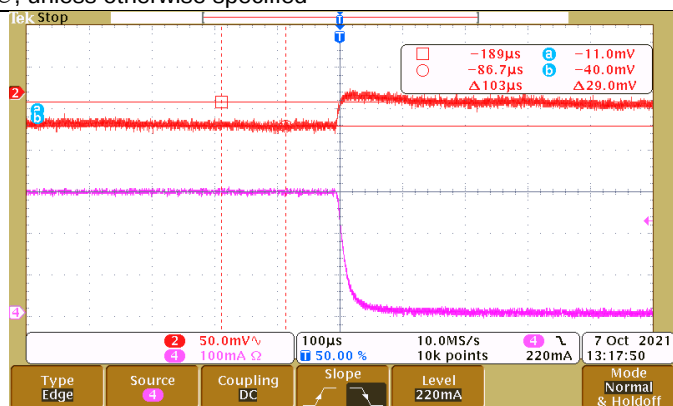


Fig 2. Load Transient (300mA~1mA)

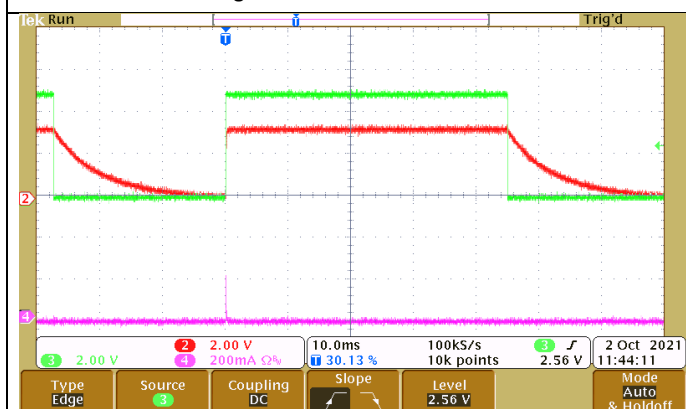


Fig 3. EN Start up

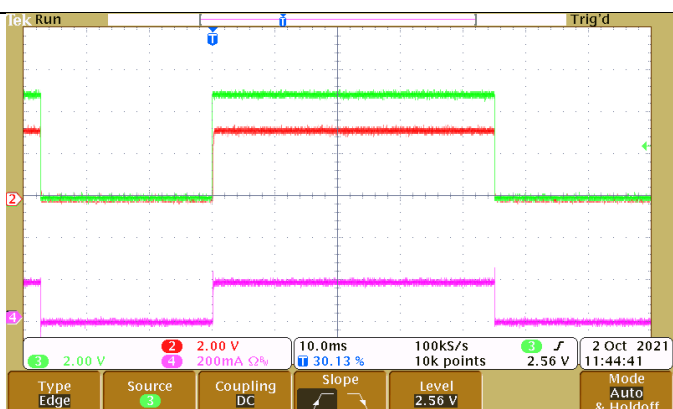


Fig 4. EN Start up (200mA load)

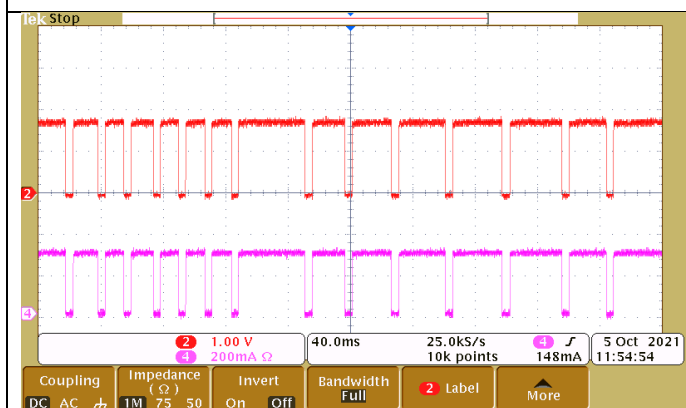


Fig 5.  $V_{IN} = 5V$ ,  $V_{OUT} = 1.8V$ , heavy load OTP

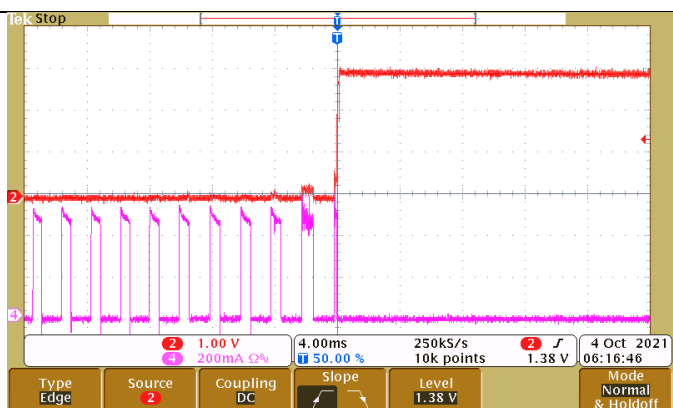


Fig 6.  $V_{OUT}$  short to GND and release

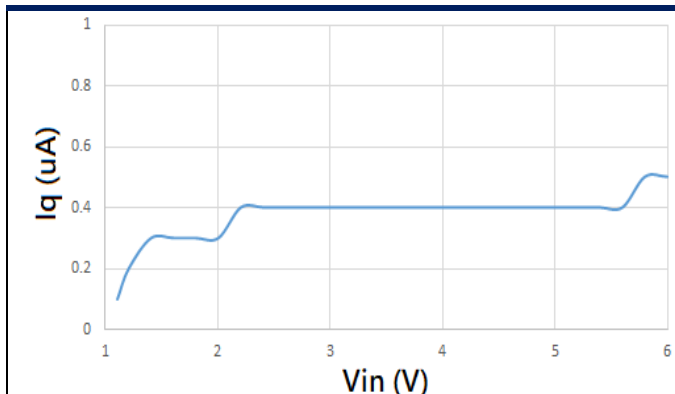


Fig 7.  $I_q$  vs  $V_{in}$  ( $I_{out} = 0mA$ )

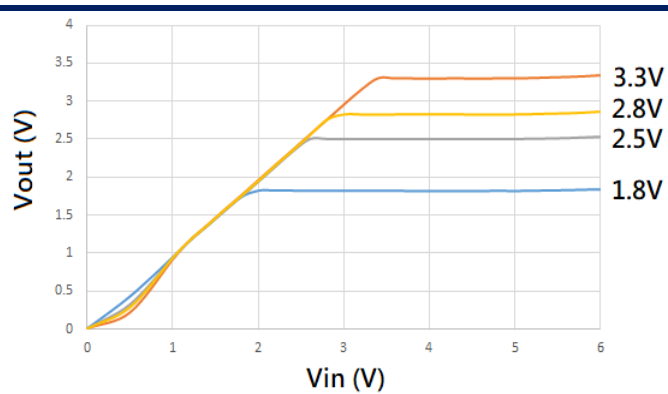


Fig 8.  $V_{out}$  vs  $V_{in}$  ( $I_{out} = 1mA$ )

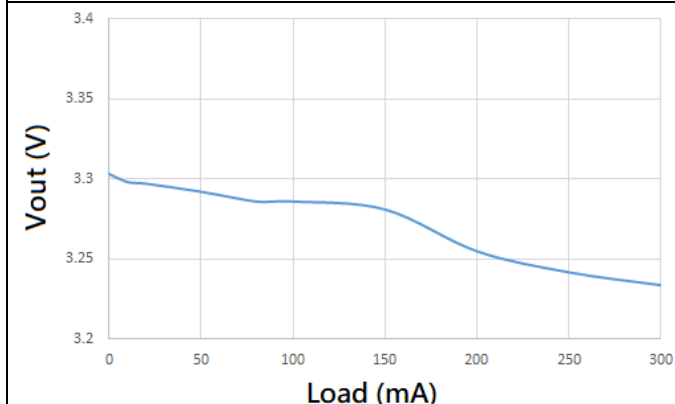


Fig 9.  $V_{out}$  vs Load

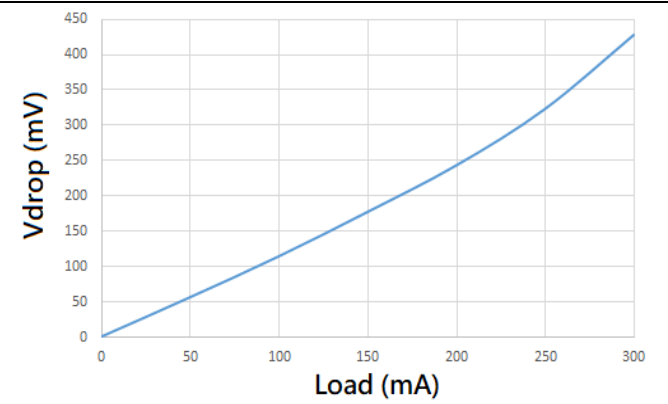


Fig 10.  $V_{drop}$  vs Load

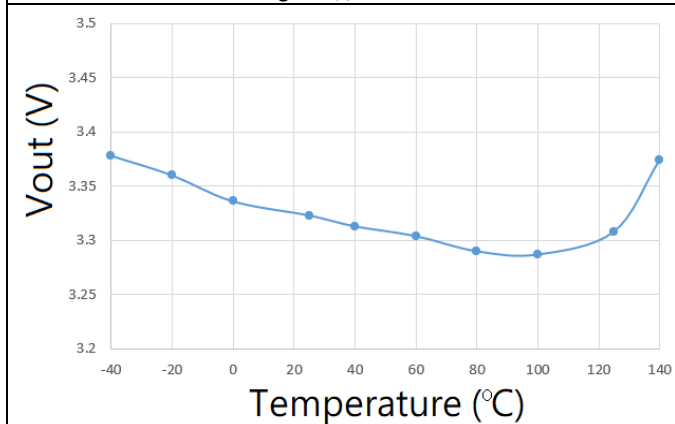


Fig 11.  $V_{out}$  vs Temperature ( $I_{out} = 1mA$ )

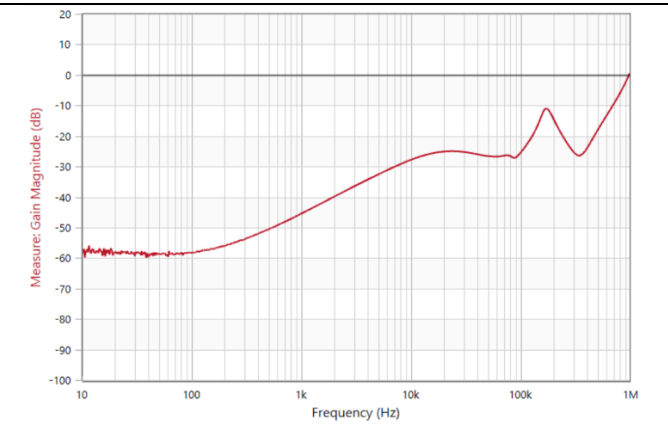
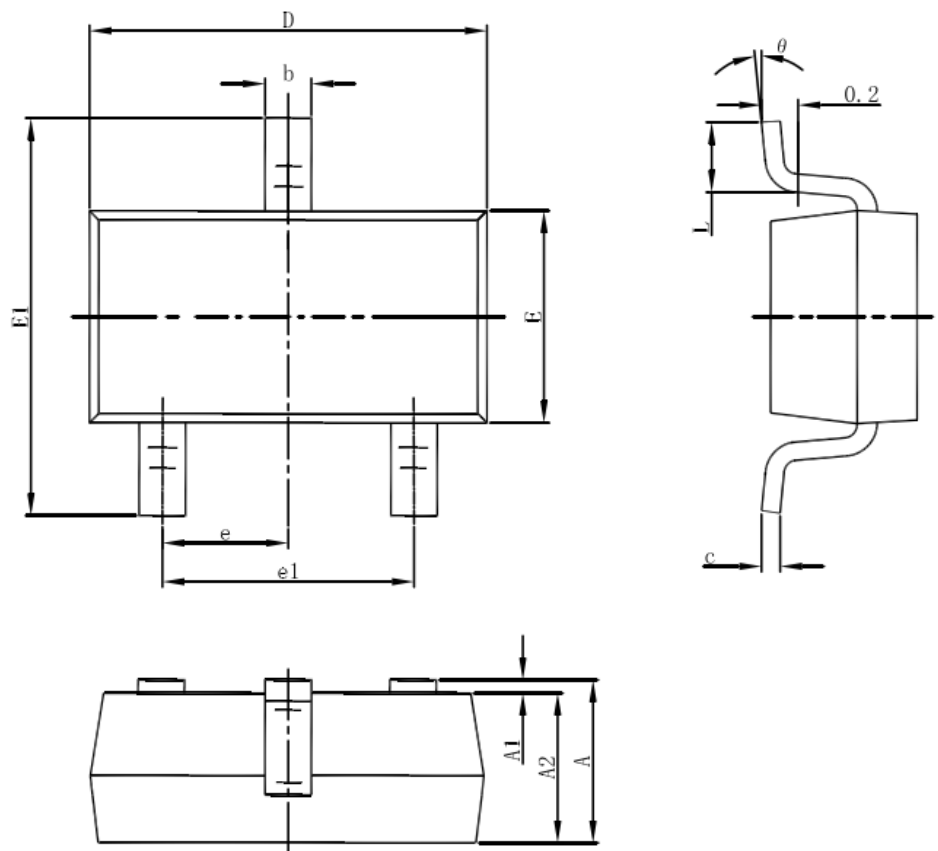


Fig 12. PSRR vs 频率 ( $V_{in} = 3.8V$ ,  $V_{out} = 1.8V$ ,  $I_{out} = 100mA$ )

SOT23-3 Package Information



| 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 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |