

## 300 mA LDO REGULATOR

No.EA-236-240517

### OUTLINE

The RP114x is a CMOS-based voltage regulator IC with high output voltage accuracy, low supply current, low dropout, and high ripple rejection. This IC consists of a voltage reference unit, an error amplifier, resistors for setting output voltage, a short current limit circuit, a chip enable circuit, and so on. The RP114x features a minimum input voltage from 1.4V and the output voltage, which can be set from 0.8V to 3.6V (in 0.1V step). The output voltage of this IC is internally fixed. This IC perform with low dropout voltage due to built-in transistor with low ON resistance. Low supply current and a chip enable function prolong the battery life of each system. The ripple rejection, line transient response and load transient response of the RP114x is excellent, thus this IC is very suitable for the power supply for hand-held communication equipment. Since the packages for this IC are DFN(PL)1010-4、DFN(PL)1010-4B、SC-88A、SOT-23-5, therefore high density mounting of the IC on boards is possible.

### FEATURES

- Supply Current..... Typ. 50 $\mu$ A
- Standby Current..... Typ. 0.1 $\mu$ A
- Input Voltage Range ..... 1.4V to 5.25V
- Output Voltage Range<sup>(1)</sup>..... 0.8V to 3.6V (0.1V steps)
- Output Voltage Accuracy.....  $\pm 1.0\%$  ( $V_{SET} > 2.0V$ ,  $T_a = 25^\circ C$ )
- Temperature-Drift Coefficient of Output Voltage..... Typ.  $\pm 80ppm/^\circ C$
- Dropout Voltage..... Typ. 0.25V ( $I_{OUT} = 300mA$ ,  $V_{SET} = 2.8V$ )
- Ripple Rejection..... Typ. 75dB ( $f = 1kHz$ )
- Line Regulation..... Typ. 0.02%/V
- Packages ..... DFN(PL)1010-4、DFN(PL)1010-4B、  
SC-88A、SOT-23-5
- Built-in Fold Back Protection Circuit ..... Typ. 60mA (Current at short mode)
- Ceramic capacitors are recommended to be used with this IC ..... 1.0 $\mu$ F or more

### APPLICATIONS

- Power source for portable communication equipment.
- Power source for electrical appliances such as cameras, VCRs and camcorders.
- Power source for battery-powered equipment.

<sup>(2)</sup> For other voltages, please refer to *Product-specific Electrical Characteristics*.

## SELECTION GUIDE

The set output voltage, the auto discharge function<sup>(1)</sup>, and the package type for the ICs are user-selectable options.

| Product Name        | Package        | Quantity per Reel | Pb Free | Halogen Free |
|---------------------|----------------|-------------------|---------|--------------|
| RP114Kxx1*(y)-TR    | DFN(PL)1010-4  | 10,000 pcs        | Yes     | Yes          |
| RP114Kxx1*(y)-TRB   | DFN(PL)1010-4B | 10,000 pcs        | Yes     | Yes          |
| RP114Qxx2*(y)-TR-FE | SC-88A         | 3,000 pcs         | Yes     | Yes          |
| RP114Nxx1*(y)-TR-FE | SOT-23-5       | 3,000 pcs         | Yes     | Yes          |

xx: Specify the set output voltage within the range of 0.8 V (08) to 3.6 V (36) in 0.1 V step.

(y): If the output voltage includes the 3rd digit, indicate the digit of 0.01V.

Ex. If the output voltage is 1.25V, RP114K121\*5-TR

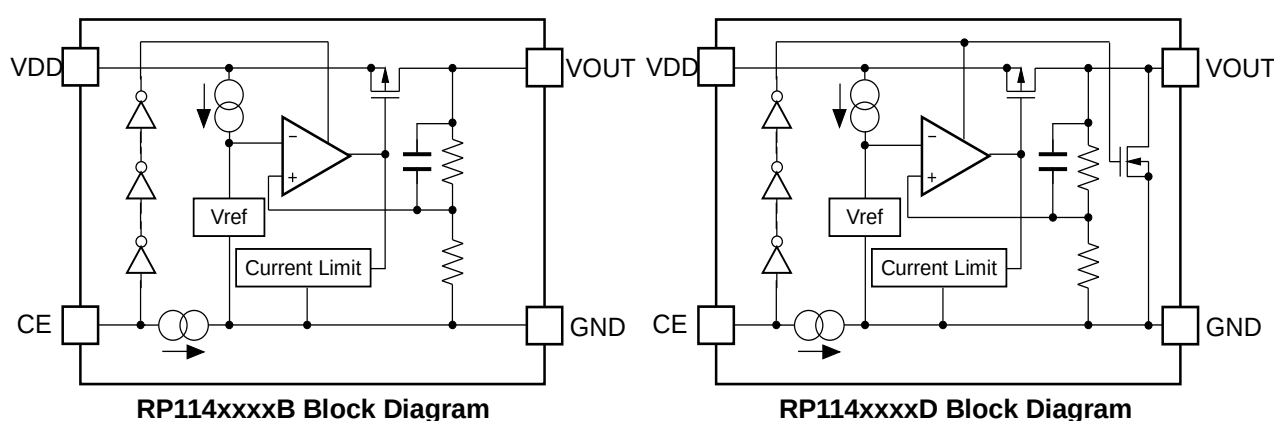
If the output voltage is 1.85V, RP114K181\*5-TR

\*: Specify a combination of the CE pin polarity and the auto-discharge function.

(B) "H" Active, without Auto-Discharge function

(D) "H" Active, with Auto-Discharge function

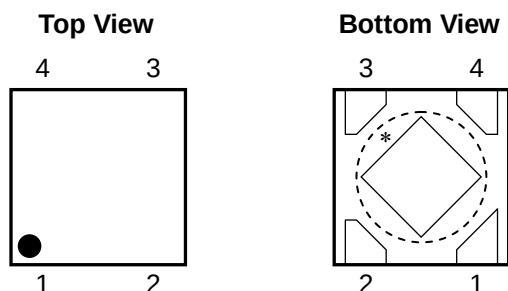
## BLOCK DIAGRAMS



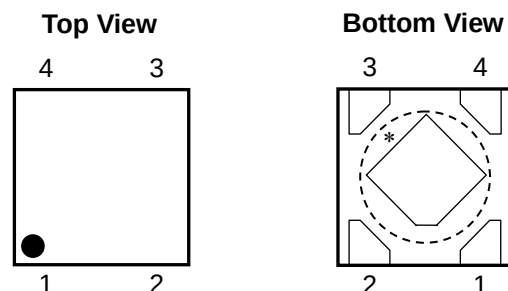
<sup>(1)</sup> Auto-Discharge function quickly lowers the output voltage to 0V by releasing the electrical charge in the external capacitor when the chip enable signal is switched from the active mode to the standby mode.

## PIN DESCRIPTIONS

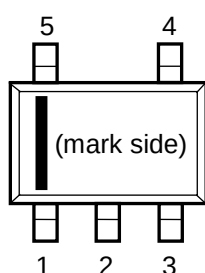
RP114K [DFN(PL)1010-4]



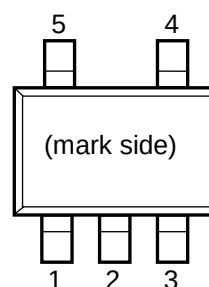
RP114K [DFN(PL)1010-4B]



RP114Q (SC-88A)



RP114N (SOT-23-5)



RP114K Pin Description [DFN(PL)1010-4 / DFN(PL)1010-4B]

| Pin No | Symbol | Pin Description              |
|--------|--------|------------------------------|
| 1      | VOUT   | Output Pin                   |
| 2      | GND    | Ground Pin                   |
| 3      | CE     | Chip Enable Pin ("H" Active) |
| 4      | VDD    | Input Pin                    |

\* Tab is GND level. (They are connected to the reverse side of this IC.) The tab is better to be connected to the GND, but leaving it open is also acceptable.

RP114Q Pin Description (SC-88A)

| Pin No | Symbol | Description                  |
|--------|--------|------------------------------|
| 1      | CE     | Chip Enable Pin ("H" Active) |
| 2      | NC     | No Connection                |
| 3      | GND    | Ground Pin                   |
| 4      | VOUT   | Output Pin                   |
| 5      | VDD    | Input Pin                    |

**RP114N Pin Description (SOT-23-5)**

| Pin No | Symbol | Description                  |
|--------|--------|------------------------------|
| 1      | VDD    | Input Pin                    |
| 2      | GND    | Ground Pin                   |
| 3      | CE     | Chip Enable Pin ("H" Active) |
| 4      | NC     | No Connection                |
| 5      | VOUT   | Output Pin                   |

## ABSOLUTE MAXIMUM RATINGS

| Symbol    | Item                             |                                 | Rating                 | Unit               |
|-----------|----------------------------------|---------------------------------|------------------------|--------------------|
| $V_{IN}$  | Input Voltage                    |                                 | 6.0                    | V                  |
| $V_{CE}$  | Input Voltage (CE Pin)           |                                 | 6.0                    | V                  |
| $V_{OUT}$ | Output Voltage                   |                                 | $-0.3$ to $V_{IN}+0.3$ | V                  |
| $I_{OUT}$ | Output Current                   |                                 | 400                    | mA                 |
| $P_D$     | Power Dissipation <sup>(1)</sup> | DFN(PL)1010-4, JEDEC STD. 51    | 800                    | mW                 |
|           |                                  | DFN(PL)1010-4B, JEDEC STD. 51   | 800                    |                    |
|           |                                  | SC-88A,<br>Our Evaluation Board | 380                    |                    |
|           |                                  | SOT-23-5, JEDEC STD. 51         | 660                    |                    |
| $T_j$     | Junction Temperature Range       |                                 | $-40$ to $125$         | $^{\circ}\text{C}$ |
| $T_{stg}$ | Storage Temperature Range        |                                 | $-55$ to $125$         | $^{\circ}\text{C}$ |

### ABSOLUTE MAXIMUM RATINGS

Electronic and mechanical stress momentarily exceeded absolute maximum ratings may cause the permanent damages and may degrade the life time and safety for both device and system using the device in the field. The functional operation at or over these absolute maximum ratings are not assured.

## RECOMMENDED OPERATING CONDITIONS

| Symbol   | Item                        | Rating                     | Unit               |
|----------|-----------------------------|----------------------------|--------------------|
| $V_{IN}$ | Input Voltage               | 1.4 to 5.25 <sup>(2)</sup> | V                  |
| $T_a$    | Operating Temperature Range | $-40$ to $85$              | $^{\circ}\text{C}$ |

### RECOMMENDED OPERATING CONDITIONS

All of electronic equipment should be designed that the mounted semiconductor devices operate within the recommended operating conditions. The semiconductor devices cannot operate normally over the recommended operating conditions, even if when they are used over such ratings by momentary electronic noise or surge. And the semiconductor devices may receive serious damage when they continue to operate over the recommended operating conditions.

<sup>(2)</sup> Refer to *POWER DISSIPATION* for detailed information.

<sup>(1)</sup> If the input voltage exceeds the maximum value of 5.25 V for some reasons, the operational accumulated time becomes up to 500 hours at 5.5V.

## ELECTRICAL CHARACTERISTICS

$V_{IN} = V_{SET}^{(1)} + 1.0 \text{ V}$  ( $V_{SET} > 1.5 \text{ V}$ ),  $V_{IN} = 2.5 \text{ V}$  ( $V_{SET} \leq 1.5 \text{ V}$ ),  $I_{OUT} = 1 \text{ mA}$ ,  $C_{IN} = C_{OUT} = 1.0 \mu\text{F}$ , unless otherwise noted.

The specifications in   are guaranteed by design engineering at  $-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$ .

### RP114xxxB/D Electrical Characteristics

( $T_a = 25^\circ\text{C}$ )

| Symbol                          | Item                                              | Conditions                                                                                                                                                                              | Min.                                                              | Typ.                                                                                   | Max.                                                                                   | Unit                  |
|---------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------|
| $V_{OUT}$                       | Output Voltage                                    | $T_a = 25^\circ\text{C}$                                                                                                                                                                | $V_{SET} > 2.0 \text{ V}$                                         | $\times 0.99$                                                                          | $\times 1.01$                                                                          | V                     |
|                                 |                                                   |                                                                                                                                                                                         | $V_{SET} \leq 2.0 \text{ V}$                                      | -20                                                                                    | +20                                                                                    | mV                    |
|                                 |                                                   | $-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$                                                                                                                                      | $V_{SET} > 2.0 \text{ V}$                                         | <span style="border: 1px solid black; padding: 0 2px;"><math>\times 0.97</math></span> | <span style="border: 1px solid black; padding: 0 2px;"><math>\times 1.03</math></span> | V                     |
|                                 |                                                   |                                                                                                                                                                                         | $V_{SET} \leq 2.0 \text{ V}$                                      | <span style="border: 1px solid black; padding: 0 2px;">-60</span>                      | <span style="border: 1px solid black; padding: 0 2px;">+60</span>                      | mV                    |
| $I_{OUT}$                       | Output Current                                    |                                                                                                                                                                                         | <span style="border: 1px solid black; padding: 0 2px;">300</span> |                                                                                        |                                                                                        | mA                    |
| $\Delta V_{OUT}/\Delta I_{OUT}$ | Load Regulation                                   | $1 \text{ mA} \leq I_{OUT} \leq 300 \text{ mA}$                                                                                                                                         |                                                                   | 15                                                                                     | <span style="border: 1px solid black; padding: 0 2px;">40</span>                       | mV                    |
| $V_{DIF}$                       | Dropout Voltage                                   | Please refer to <i>Product-specific Electrical Characteristics</i> attached.                                                                                                            |                                                                   |                                                                                        |                                                                                        |                       |
| $I_{SS}$                        | Supply Current                                    | $I_{OUT} = 0 \text{ mA}$                                                                                                                                                                |                                                                   | 50                                                                                     | <span style="border: 1px solid black; padding: 0 2px;">75</span>                       | $\mu\text{A}$         |
| $I_{standby}$                   | Standby Current                                   | $V_{CE} = 0 \text{ V}$                                                                                                                                                                  |                                                                   | 0.1                                                                                    | 1.0                                                                                    | $\mu\text{A}$         |
| $\Delta V_{OUT}/\Delta V_{IN}$  | Line Regulation                                   | $V_{SET} + 0.5 \text{ V} \leq V_{IN} \leq 5.25 \text{ V}$<br>( $V_{IN} \geq 1.4 \text{ V}$ )                                                                                            |                                                                   | 0.02                                                                                   | <span style="border: 1px solid black; padding: 0 2px;">0.10</span>                     | %/V                   |
| $R_R$                           | Ripple Rejection                                  | $f = 1 \text{ kHz}$ , Ripple $0.2 \text{ V}_{p-p}$ ,<br>$V_{IN} = V_{SET} + 1 \text{ V}$ , $I_{OUT} = 30 \text{ mA}$<br>(When $V_{SET} \leq 2.0 \text{ V}$ , $V_{IN} = 3.0 \text{ V}$ ) |                                                                   | 75                                                                                     |                                                                                        | dB                    |
| $\Delta V_{OUT}/\Delta T_a$     | Output Voltage Temperature Coefficient            | $-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$                                                                                                                                      |                                                                   | $\pm 80$                                                                               |                                                                                        | ppm/ $^\circ\text{C}$ |
| $I_{SC}$                        | Short Current Limit                               | $V_{OUT} = 0 \text{ V}$                                                                                                                                                                 |                                                                   | 60                                                                                     |                                                                                        | mA                    |
| $I_{PD}$                        | CE Pull-down Current                              |                                                                                                                                                                                         |                                                                   | 0.3                                                                                    | <span style="border: 1px solid black; padding: 0 2px;">0.6</span>                      | $\mu\text{A}$         |
| $V_{CEH}$                       | CE Input Voltage "H"                              |                                                                                                                                                                                         | <span style="border: 1px solid black; padding: 0 2px;">1.0</span> |                                                                                        |                                                                                        | V                     |
| $V_{CEL}$                       | CE Input Voltage "L"                              |                                                                                                                                                                                         |                                                                   |                                                                                        | <span style="border: 1px solid black; padding: 0 2px;">0.4</span>                      | V                     |
| $e_n$                           | Output Noise                                      | $\text{BW} = 10 \text{ Hz to } 100 \text{ kHz}$ ,<br>$I_{OUT} = 30 \text{ mA}$                                                                                                          |                                                                   | 75                                                                                     |                                                                                        | $\mu\text{V}_{rms}$   |
| $R_{LOW}$                       | Low Output Nch. On Resistance<br>(RP114xxxD Only) | $V_{IN} = 4.0 \text{ V}$ , $V_{CE} = 0 \text{ V}$                                                                                                                                       |                                                                   | 50                                                                                     |                                                                                        | $\Omega$              |

All test items listed under Electrical Characteristics are done under the pulse load condition ( $T_j \approx T_a = 25^\circ\text{C}$ ) except for Output Noise, Ripple Rejection, and Output Voltage Temperature Coefficient.

<sup>(8)</sup>  $V_{SET}$ : Set Output Voltage

The specifications in   are guaranteed by design engineering at  $-40^{\circ}\text{C} \leq T_a \leq 85^{\circ}\text{C}$ .

**Dropout Voltage by Set Output Voltage**

(Ta=25°C)

| Set Output Voltage<br>$V_{\text{SET}}$ (V) | Dropout Voltage $V_{\text{DIF}}$ (V) |       |                                                                     |
|--------------------------------------------|--------------------------------------|-------|---------------------------------------------------------------------|
|                                            | Condition                            | Typ.  | Max.                                                                |
| $V_{\text{SET}}=0.8$                       | $I_{\text{OUT}}=300\text{mA}$        | 0.560 | <span style="border: 1px solid black; padding: 0 5px;">0.720</span> |
| $V_{\text{SET}}=0.9$                       |                                      | 0.510 | <span style="border: 1px solid black; padding: 0 5px;">0.650</span> |
| $1.0 \leq V_{\text{SET}} < 1.2$            |                                      | 0.460 | <span style="border: 1px solid black; padding: 0 5px;">0.590</span> |
| $1.2 \leq V_{\text{SET}} < 1.4$            |                                      | 0.390 | <span style="border: 1px solid black; padding: 0 5px;">0.500</span> |
| $1.4 \leq V_{\text{SET}} < 1.7$            |                                      | 0.350 | <span style="border: 1px solid black; padding: 0 5px;">0.440</span> |
| $1.7 \leq V_{\text{SET}} < 2.1$            |                                      | 0.300 | <span style="border: 1px solid black; padding: 0 5px;">0.390</span> |
| $2.1 \leq V_{\text{SET}} < 2.5$            |                                      | 0.260 | <span style="border: 1px solid black; padding: 0 5px;">0.340</span> |
| $2.5 \leq V_{\text{SET}} < 3.0$            |                                      | 0.250 | <span style="border: 1px solid black; padding: 0 5px;">0.300</span> |
| $3.0 \leq V_{\text{SET}} \leq 3.6$         |                                      | 0.220 | <span style="border: 1px solid black; padding: 0 5px;">0.290</span> |

**Product-specific Electrical Characteristics**

The specifications in   are guaranteed by design engineering at  $-40^{\circ}\text{C} \leq T_a \leq 85^{\circ}\text{C}$ .

| Product Name | V <sub>OUT</sub> [V] (Ta = 25°C) |       |       | V <sub>OUT</sub> [V] (−40°C ≤ Ta ≤ 85°C)                            |       |                                                                     | V <sub>DIF</sub> [V] |                                                                     |
|--------------|----------------------------------|-------|-------|---------------------------------------------------------------------|-------|---------------------------------------------------------------------|----------------------|---------------------------------------------------------------------|
|              | Min.                             | Typ.  | Max.  | Min.                                                                | Typ.  | Max.                                                                | Typ.                 | Max.                                                                |
| RP114x081x   | 0.780                            | 0.800 | 0.820 | <span style="border: 1px solid black; padding: 0 2px;">0.740</span> | 0.800 | <span style="border: 1px solid black; padding: 0 2px;">0.860</span> | 0.560                | <span style="border: 1px solid black; padding: 0 2px;">0.720</span> |
| RP114x091x   | 0.880                            | 0.900 | 0.920 | <span style="border: 1px solid black; padding: 0 2px;">0.840</span> | 0.900 | <span style="border: 1px solid black; padding: 0 2px;">0.960</span> | 0.510                | <span style="border: 1px solid black; padding: 0 2px;">0.650</span> |
| RP114x101x   | 0.980                            | 1.000 | 1.020 | <span style="border: 1px solid black; padding: 0 2px;">0.940</span> | 1.000 | <span style="border: 1px solid black; padding: 0 2px;">1.060</span> | 0.460                | <span style="border: 1px solid black; padding: 0 2px;">0.590</span> |
| RP114x101x5  | 1.030                            | 1.050 | 1.070 | <span style="border: 1px solid black; padding: 0 2px;">0.990</span> | 1.050 | <span style="border: 1px solid black; padding: 0 2px;">1.110</span> |                      |                                                                     |
| RP114x111x   | 1.080                            | 1.100 | 1.120 | <span style="border: 1px solid black; padding: 0 2px;">1.040</span> | 1.100 | <span style="border: 1px solid black; padding: 0 2px;">1.160</span> |                      |                                                                     |
| RP114x111x5  | 1.130                            | 1.150 | 1.170 | <span style="border: 1px solid black; padding: 0 2px;">1.090</span> | 1.150 | <span style="border: 1px solid black; padding: 0 2px;">1.210</span> |                      |                                                                     |
| RP114x121x   | 1.180                            | 1.200 | 1.220 | <span style="border: 1px solid black; padding: 0 2px;">1.140</span> | 1.200 | <span style="border: 1px solid black; padding: 0 2px;">1.260</span> | 0.390                | <span style="border: 1px solid black; padding: 0 2px;">0.500</span> |
| RP114x121x5  | 1.230                            | 1.250 | 1.270 | <span style="border: 1px solid black; padding: 0 2px;">1.190</span> | 1.250 | <span style="border: 1px solid black; padding: 0 2px;">1.310</span> |                      |                                                                     |
| RP114x131x   | 1.280                            | 1.300 | 1.320 | <span style="border: 1px solid black; padding: 0 2px;">1.240</span> | 1.300 | <span style="border: 1px solid black; padding: 0 2px;">1.360</span> |                      |                                                                     |
| RP114x131x5  | 1.330                            | 1.350 | 1.370 | <span style="border: 1px solid black; padding: 0 2px;">1.290</span> | 1.350 | <span style="border: 1px solid black; padding: 0 2px;">1.410</span> |                      |                                                                     |
| RP114x141x   | 1.380                            | 1.400 | 1.420 | <span style="border: 1px solid black; padding: 0 2px;">1.340</span> | 1.400 | <span style="border: 1px solid black; padding: 0 2px;">1.460</span> | 0.350                | <span style="border: 1px solid black; padding: 0 2px;">0.440</span> |
| RP114x151x   | 1.480                            | 1.500 | 1.520 | <span style="border: 1px solid black; padding: 0 2px;">1.440</span> | 1.500 | <span style="border: 1px solid black; padding: 0 2px;">1.560</span> |                      |                                                                     |
| RP114x161x   | 1.580                            | 1.600 | 1.620 | <span style="border: 1px solid black; padding: 0 2px;">1.540</span> | 1.600 | <span style="border: 1px solid black; padding: 0 2px;">1.660</span> |                      |                                                                     |
| RP114x171x   | 1.680                            | 1.700 | 1.720 | <span style="border: 1px solid black; padding: 0 2px;">1.640</span> | 1.700 | <span style="border: 1px solid black; padding: 0 2px;">1.760</span> | 0.300                | <span style="border: 1px solid black; padding: 0 2px;">0.390</span> |
| RP114x171x5  | 1.730                            | 1.750 | 1.770 | <span style="border: 1px solid black; padding: 0 2px;">1.690</span> | 1.750 | <span style="border: 1px solid black; padding: 0 2px;">1.810</span> |                      |                                                                     |
| RP114x181x   | 1.780                            | 1.800 | 1.820 | <span style="border: 1px solid black; padding: 0 2px;">1.740</span> | 1.800 | <span style="border: 1px solid black; padding: 0 2px;">1.860</span> |                      |                                                                     |
| RP114x181x5  | 1.830                            | 1.850 | 1.870 | <span style="border: 1px solid black; padding: 0 2px;">1.790</span> | 1.850 | <span style="border: 1px solid black; padding: 0 2px;">1.910</span> |                      |                                                                     |
| RP114x191x   | 1.880                            | 1.900 | 1.920 | <span style="border: 1px solid black; padding: 0 2px;">1.840</span> | 1.900 | <span style="border: 1px solid black; padding: 0 2px;">1.960</span> |                      |                                                                     |
| RP114x201x   | 1.980                            | 2.000 | 2.020 | <span style="border: 1px solid black; padding: 0 2px;">1.940</span> | 2.000 | <span style="border: 1px solid black; padding: 0 2px;">2.060</span> | 0.260                | <span style="border: 1px solid black; padding: 0 2px;">0.340</span> |
| RP114x211x   | 2.079                            | 2.100 | 2.121 | <span style="border: 1px solid black; padding: 0 2px;">2.037</span> | 2.100 | <span style="border: 1px solid black; padding: 0 2px;">2.163</span> |                      |                                                                     |
| RP114x221x   | 2.178                            | 2.200 | 2.222 | <span style="border: 1px solid black; padding: 0 2px;">2.134</span> | 2.200 | <span style="border: 1px solid black; padding: 0 2px;">2.266</span> |                      |                                                                     |
| RP114x231x   | 2.277                            | 2.300 | 2.323 | <span style="border: 1px solid black; padding: 0 2px;">2.231</span> | 2.300 | <span style="border: 1px solid black; padding: 0 2px;">2.369</span> |                      |                                                                     |
| RP114x241x   | 2.376                            | 2.400 | 2.424 | <span style="border: 1px solid black; padding: 0 2px;">2.328</span> | 2.400 | <span style="border: 1px solid black; padding: 0 2px;">2.472</span> | 0.250                | <span style="border: 1px solid black; padding: 0 2px;">0.300</span> |
| RP114x251x   | 2.475                            | 2.500 | 2.525 | <span style="border: 1px solid black; padding: 0 2px;">2.425</span> | 2.500 | <span style="border: 1px solid black; padding: 0 2px;">2.575</span> |                      |                                                                     |
| RP114x261x   | 2.574                            | 2.600 | 2.626 | <span style="border: 1px solid black; padding: 0 2px;">2.522</span> | 2.600 | <span style="border: 1px solid black; padding: 0 2px;">2.678</span> |                      |                                                                     |
| RP114x271x   | 2.673                            | 2.700 | 2.727 | <span style="border: 1px solid black; padding: 0 2px;">2.619</span> | 2.700 | <span style="border: 1px solid black; padding: 0 2px;">2.781</span> |                      |                                                                     |
| RP114x281x   | 2.772                            | 2.800 | 2.828 | <span style="border: 1px solid black; padding: 0 2px;">2.716</span> | 2.800 | <span style="border: 1px solid black; padding: 0 2px;">2.884</span> |                      |                                                                     |
| RP114x281x5  | 2.822                            | 2.850 | 2.879 | <span style="border: 1px solid black; padding: 0 2px;">2.765</span> | 2.850 | <span style="border: 1px solid black; padding: 0 2px;">2.936</span> |                      |                                                                     |
| RP114x291x   | 2.871                            | 2.900 | 2.929 | <span style="border: 1px solid black; padding: 0 2px;">2.813</span> | 2.900 | <span style="border: 1px solid black; padding: 0 2px;">2.987</span> |                      |                                                                     |
| RP114x301x   | 2.970                            | 3.000 | 3.030 | <span style="border: 1px solid black; padding: 0 2px;">2.910</span> | 3.000 | <span style="border: 1px solid black; padding: 0 2px;">3.090</span> | 0.220                | <span style="border: 1px solid black; padding: 0 2px;">0.290</span> |
| RP114x301x5  | 3.020                            | 3.050 | 3.081 | <span style="border: 1px solid black; padding: 0 2px;">2.959</span> | 3.050 | <span style="border: 1px solid black; padding: 0 2px;">3.142</span> |                      |                                                                     |
| RP114x311x   | 3.069                            | 3.100 | 3.131 | <span style="border: 1px solid black; padding: 0 2px;">3.007</span> | 3.100 | <span style="border: 1px solid black; padding: 0 2px;">3.193</span> |                      |                                                                     |
| RP114x321x   | 3.168                            | 3.200 | 3.232 | <span style="border: 1px solid black; padding: 0 2px;">3.104</span> | 3.200 | <span style="border: 1px solid black; padding: 0 2px;">3.296</span> |                      |                                                                     |
| RP114x331x   | 3.267                            | 3.300 | 3.333 | <span style="border: 1px solid black; padding: 0 2px;">3.201</span> | 3.300 | <span style="border: 1px solid black; padding: 0 2px;">3.399</span> |                      |                                                                     |
| RP114x341x   | 3.366                            | 3.400 | 3.434 | <span style="border: 1px solid black; padding: 0 2px;">3.298</span> | 3.400 | <span style="border: 1px solid black; padding: 0 2px;">3.502</span> |                      |                                                                     |
| RP114x341x5  | 3.416                            | 3.450 | 3.485 | <span style="border: 1px solid black; padding: 0 2px;">3.347</span> | 3.450 | <span style="border: 1px solid black; padding: 0 2px;">3.554</span> |                      |                                                                     |
| RP114x351x   | 3.465                            | 3.500 | 3.535 | <span style="border: 1px solid black; padding: 0 2px;">3.395</span> | 3.500 | <span style="border: 1px solid black; padding: 0 2px;">3.605</span> |                      |                                                                     |
| RP114x361x   | 3.564                            | 3.600 | 3.636 | <span style="border: 1px solid black; padding: 0 2px;">3.492</span> | 3.600 | <span style="border: 1px solid black; padding: 0 2px;">3.708</span> |                      |                                                                     |



## TEST CIRCUITS

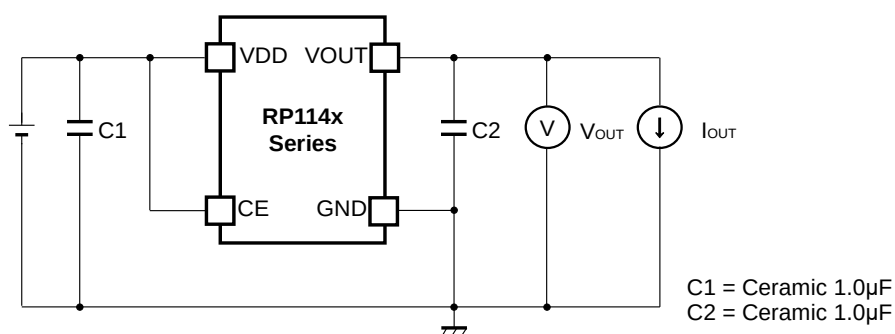


Figure 1. Basic Test Circuit

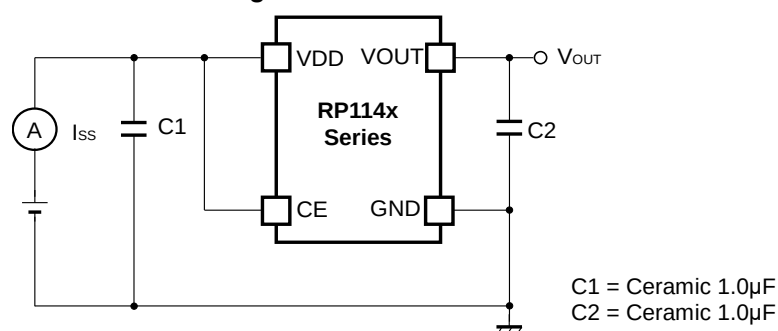


Figure 2. Test Circuit for Supply Current

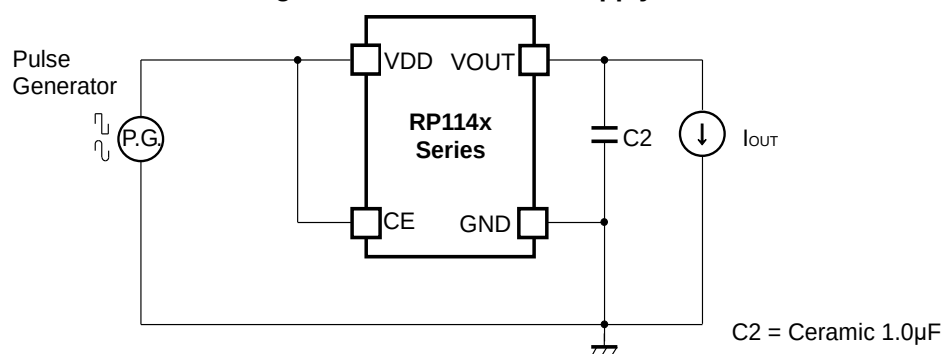


Figure 3. Test Circuit for Ripple Rejection

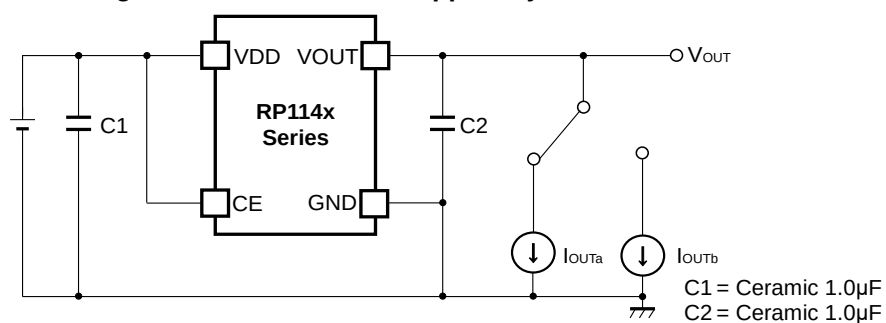


Figure 4. Test Circuit for Load Transient Response

## TECHNICAL NOTES ON EXTERNAL COMPONENTS

When using these ICs, consider the following points:

### Phase Compensation

In this IC, phase compensation is made for securing stable operation even if the load current is varied. For this purpose, use a capacitor C2 with 1.0 $\mu$ F or more and good ESR (Equivalent Series Resistance).

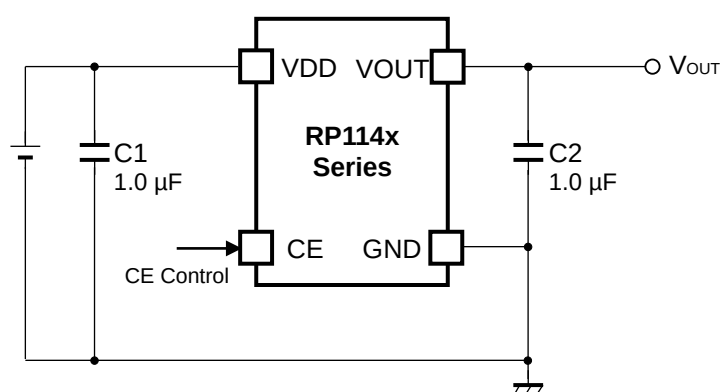
(Note: If additional ceramic capacitors are connected with parallel to the output pin with an output capacitor for phase compensation, the operation might be unstable. Because of this, test this IC with as same external components as ones to be used on the PCB.)

### PCB Layout

Make V<sub>DD</sub> and GND lines sufficient. If their impedance is high, noise pickup or unstable operation may result. Connect a capacitor C1 with a capacitance value as much as 1.0 $\mu$ F or more between VDD and GND pins, and as close as possible to the pins.

Set external components, especially the output capacitor C2, as close as possible to the IC, and make wiring as short as possible.

### Typical Application Circuit



## ESR vs. Output Current

When using these ICs, consider the following points:

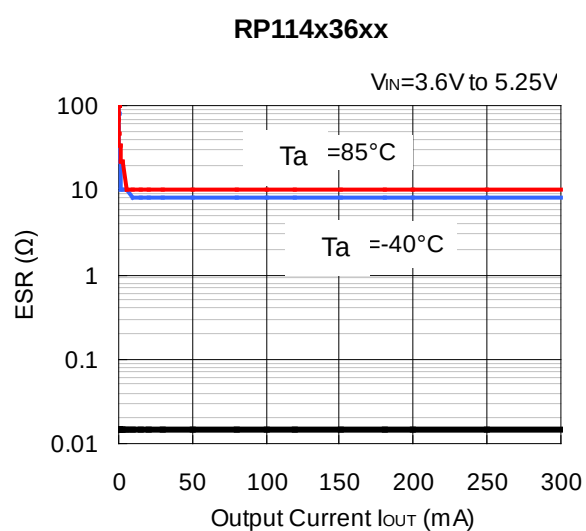
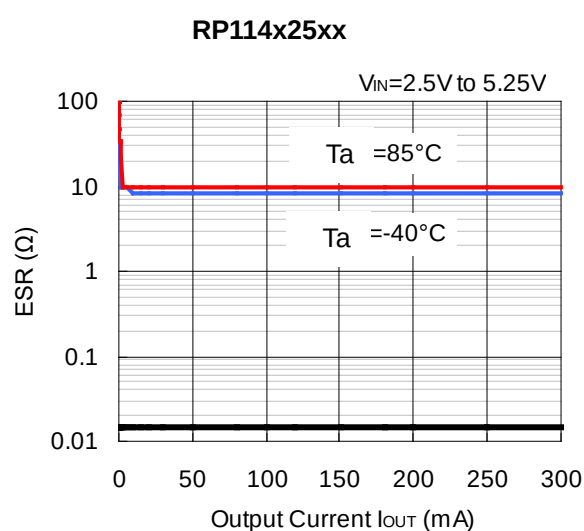
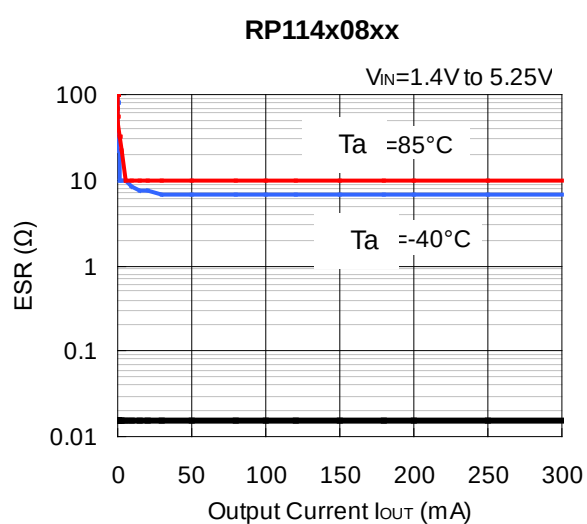
The relations between  $I_{OUT}$  (Output Current) and ESR of an output capacitor are shown below. The conditions when the white noise level is under  $40\mu V$  (Avg.) are marked as the hatched area in the graph.

### Measurement conditions

Frequency Band: 10Hz to 2MHz

Temperature :  $-40^{\circ}C$  to  $85^{\circ}C$

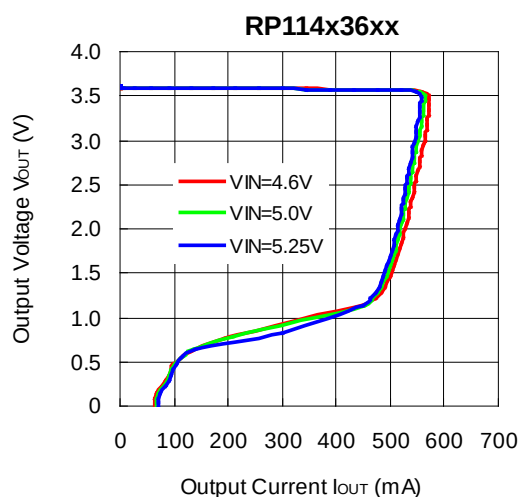
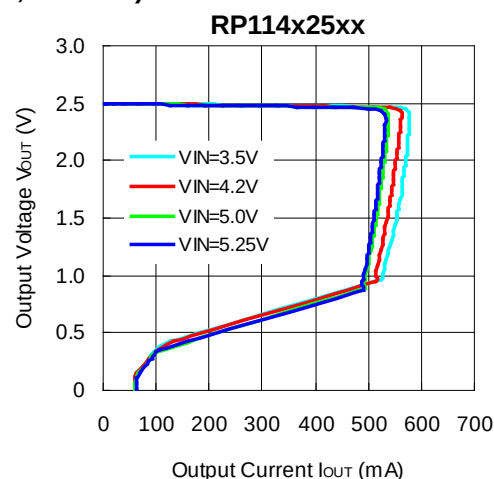
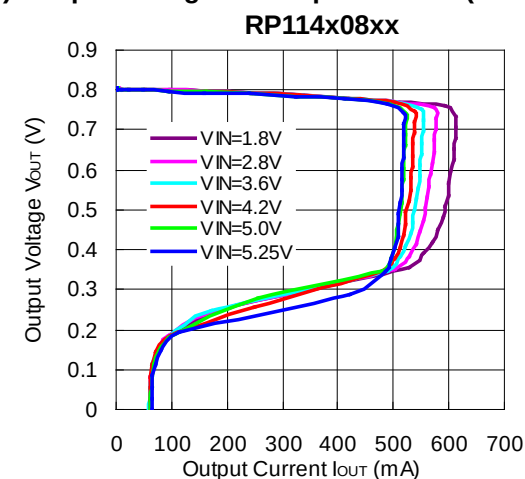
C1, C2 :  $1.0\mu F$



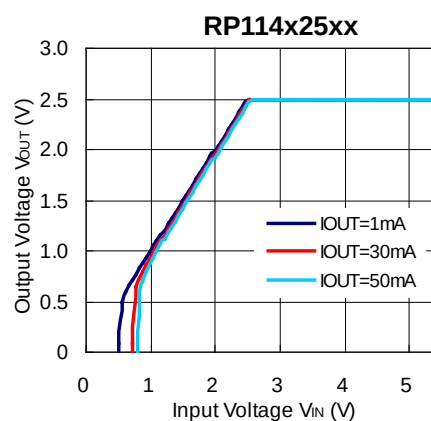
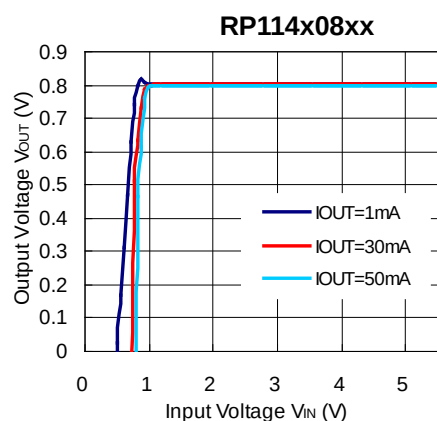
## TYPICAL CHARACTERISTICS

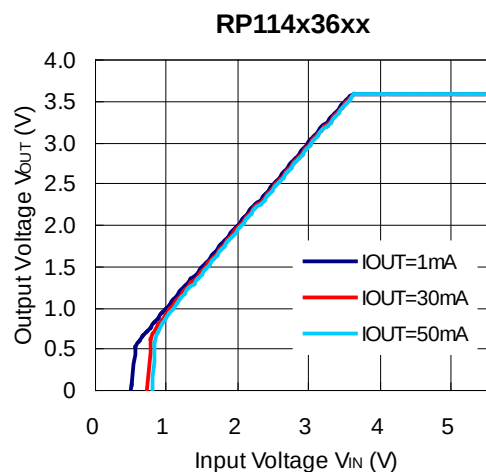
Note: Typical Characteristics are intended to be used as reference data; they are not guaranteed.

### 1) Output Voltage vs. Output Current ( $C_1=1.0\mu\text{F}$ , $C_2=1.0\mu\text{F}$ , $T_a=25^\circ\text{C}$ )

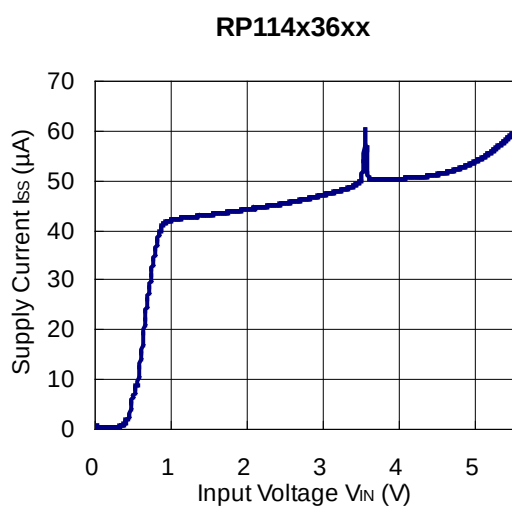
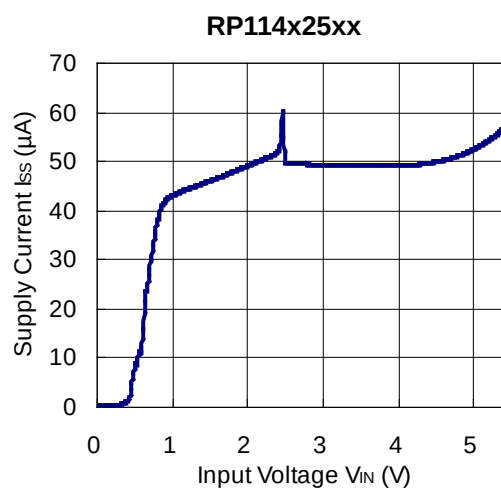
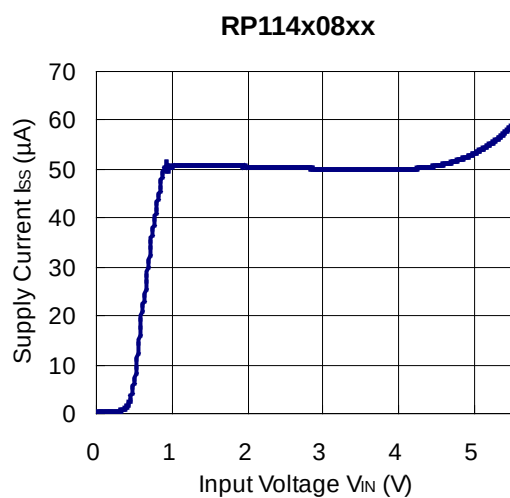


### 2) Output Voltage vs. Input Voltage ( $C_1=1.0\mu\text{F}$ , $C_2=1.0\mu\text{F}$ , $T_a=25^\circ\text{C}$ )

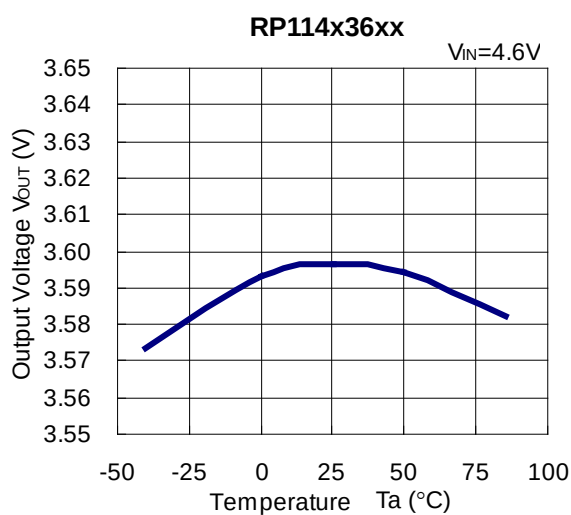
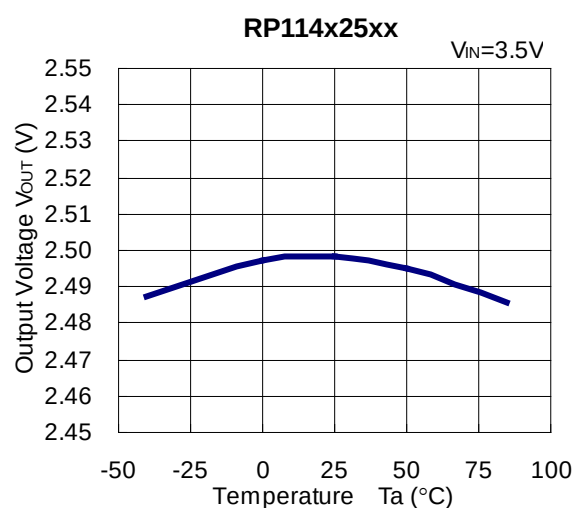
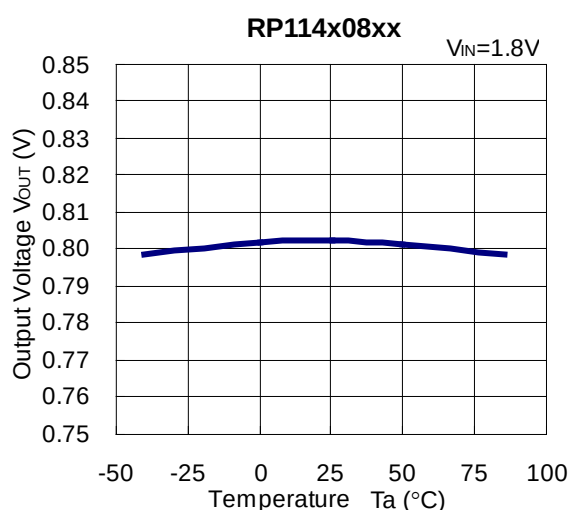




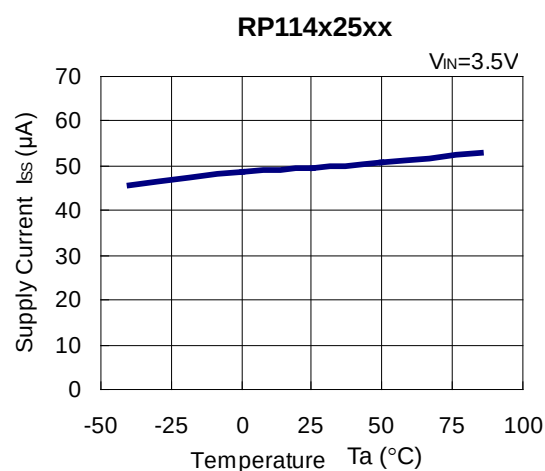
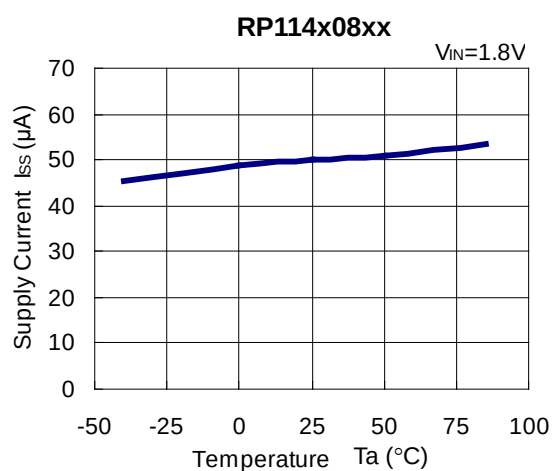
**3) Supply Current vs. Input Voltage ( $C_1=1.0\mu\text{F}$ ,  $C_2=1.0\mu\text{F}$ ,  $T_a=25^\circ\text{C}$ )**

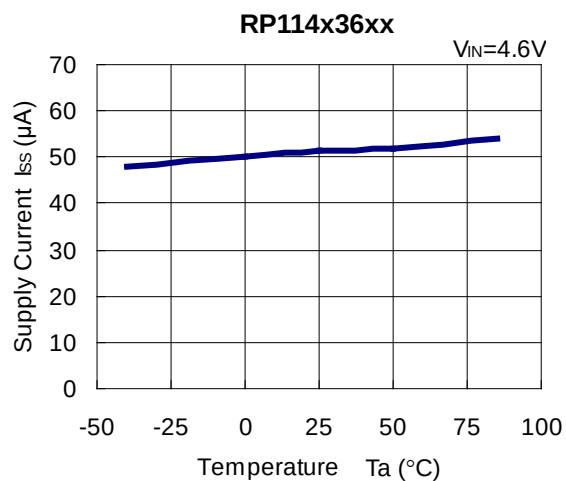


4) Output Voltage vs. Temperature (C1=1.0μF, C2=1.0μF, I<sub>OUT</sub>=1mA)

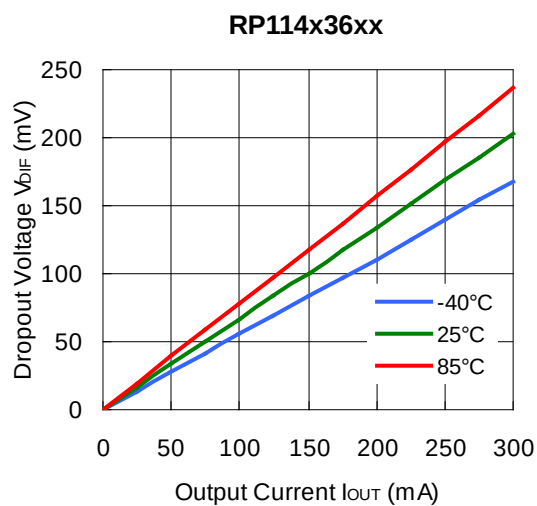
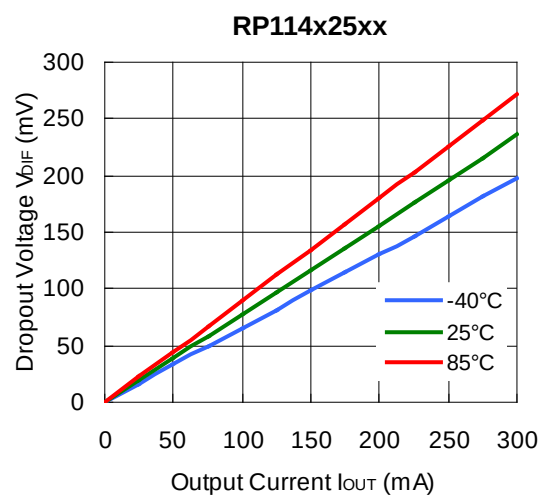
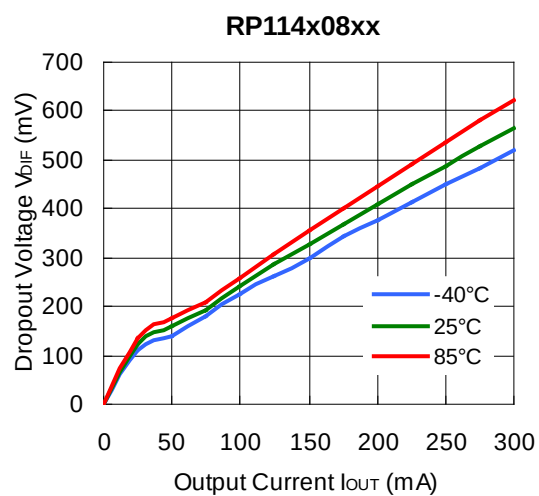


5) Supply Current vs. Temperature (C1=1.0μF, C2=1.0μF, I<sub>OUT</sub>=0mA)

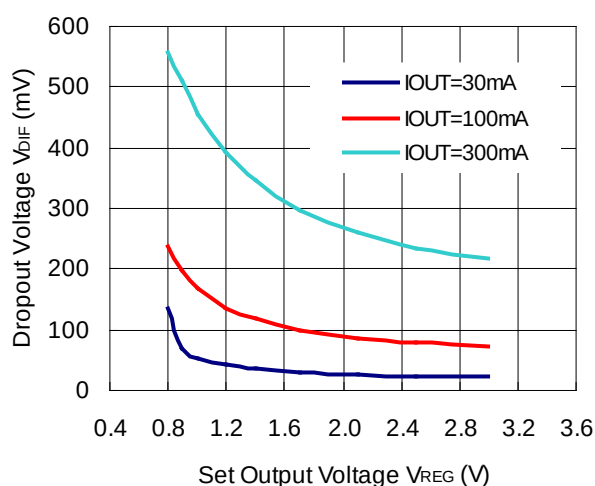




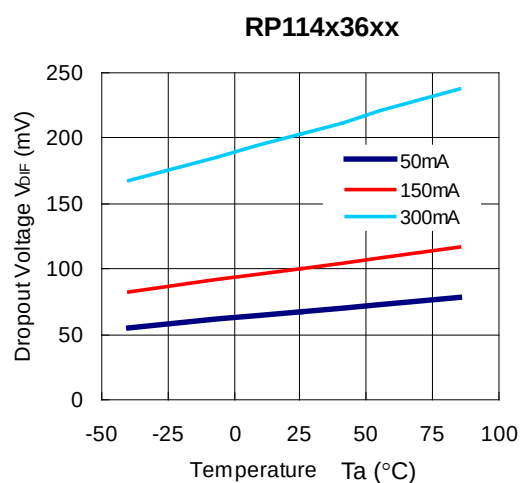
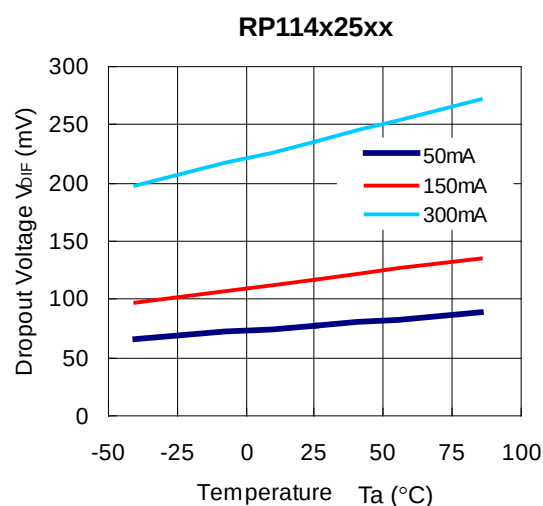
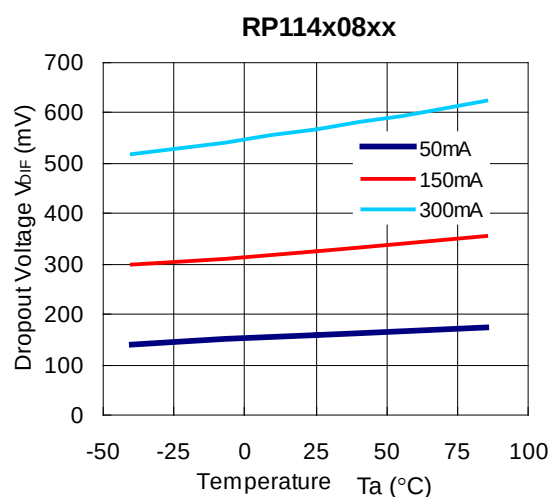
**6) Dropout Voltage vs. Output Current ( $C1=1.0\mu F$ ,  $C2=1.0\mu F$ )**



7) Dropout Voltage vs. Set Output Voltage (C1=1.0μF, C2=1.0μF, Ta=25°C)

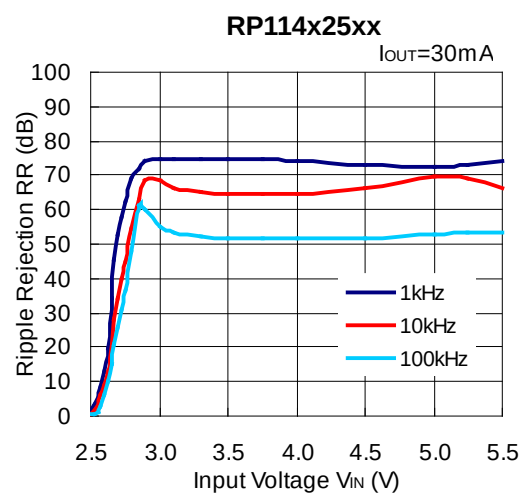
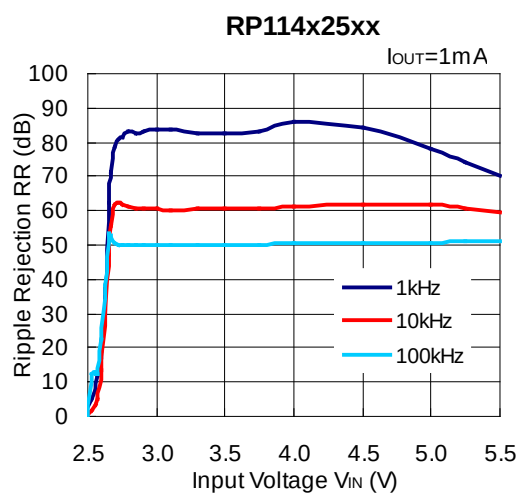


8) Dropout Voltage vs. Temperature (C1=none, C2=1.0μF)

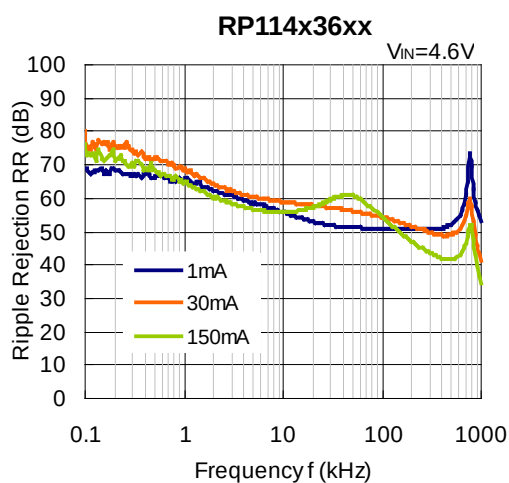
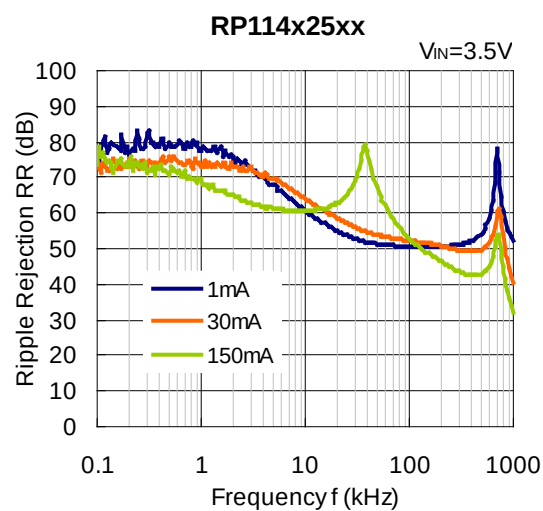
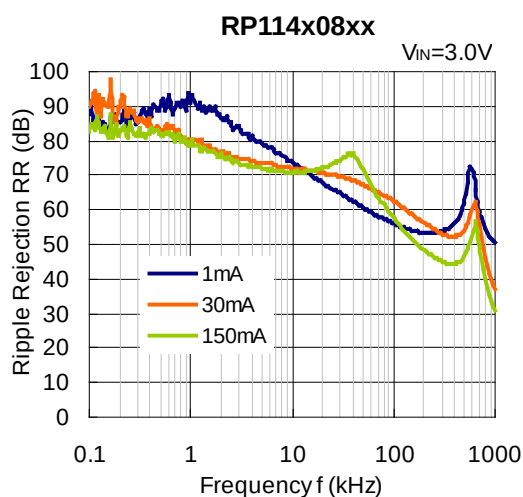




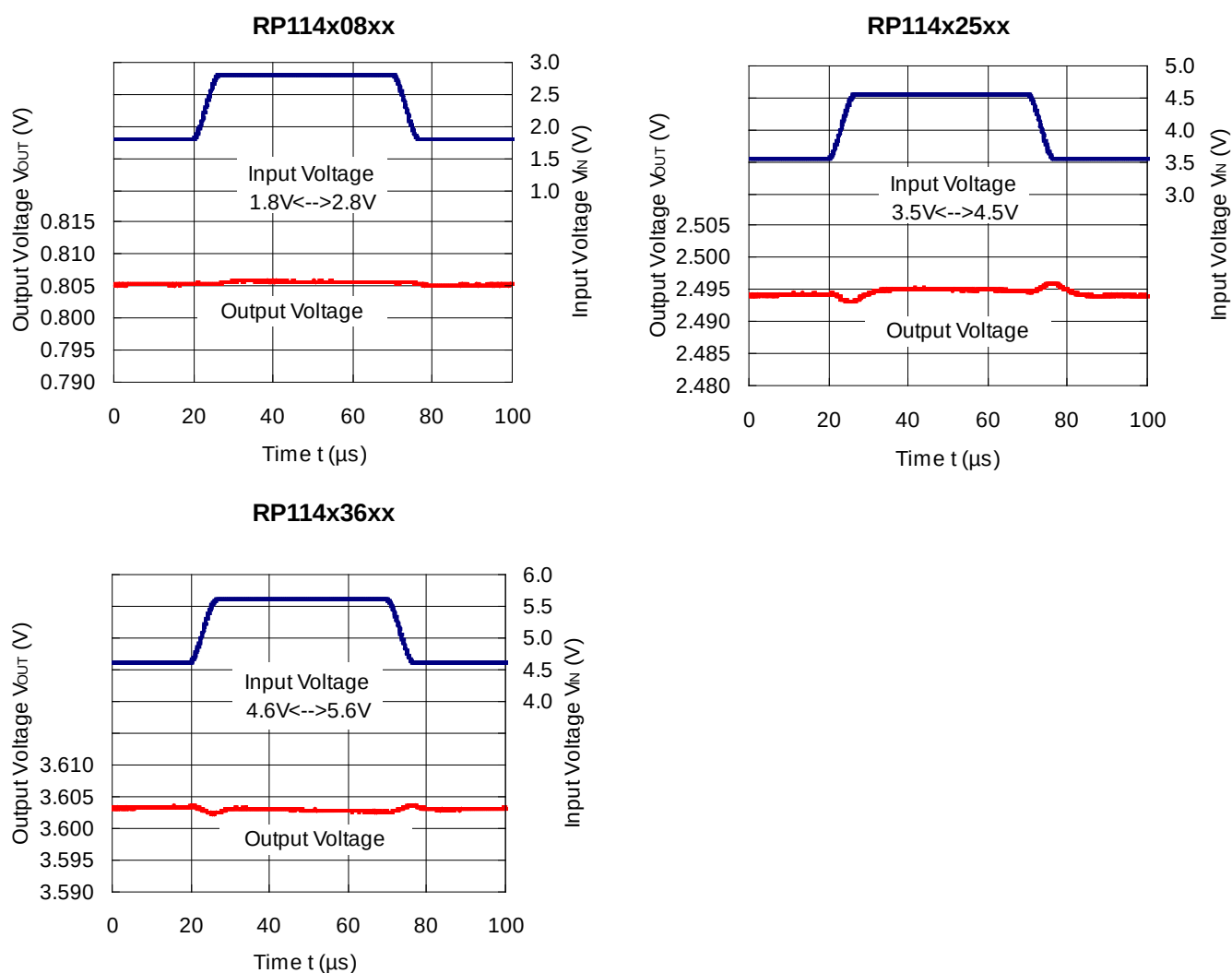
9) Ripple Rejection vs. Input Voltage (C1=none, C2=1.0μF, Ripple=0.2Vp-p, Ta=25°C)



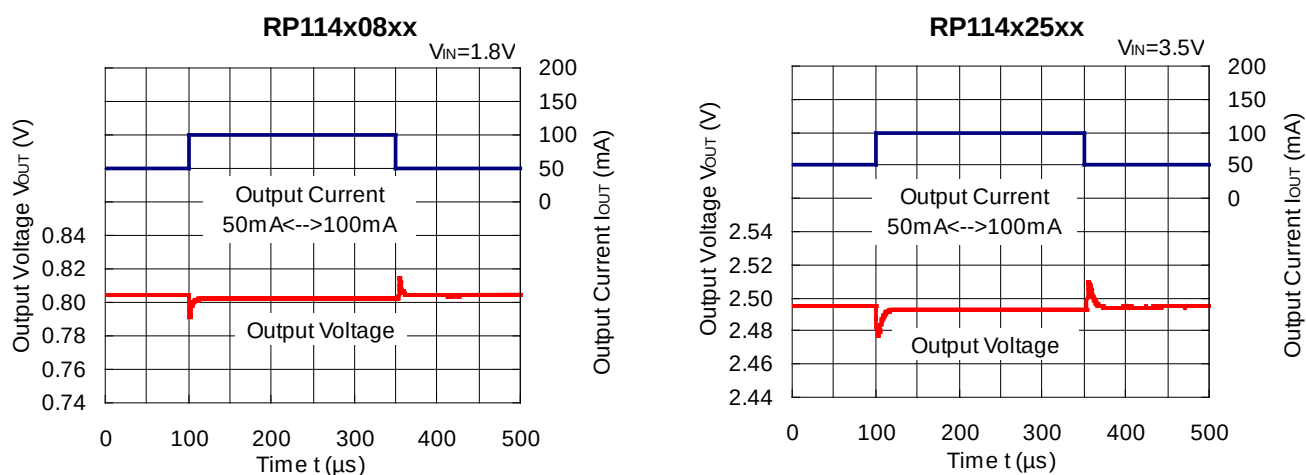
10) Ripple Rejection vs. Frequency (C1=none, C2=1.0μF, Ta=25°C)

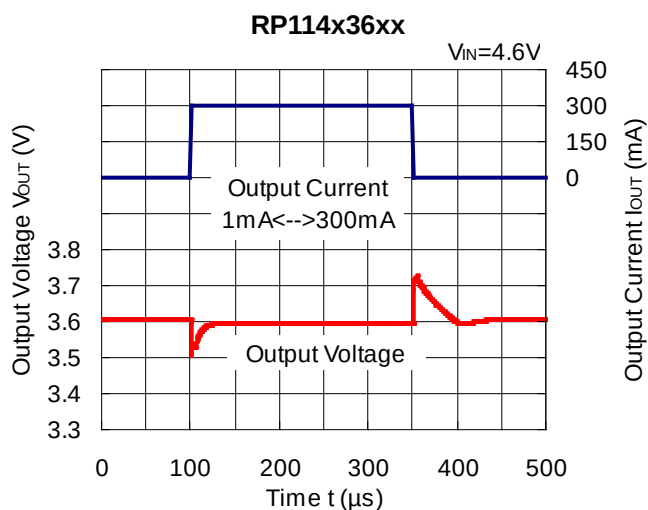
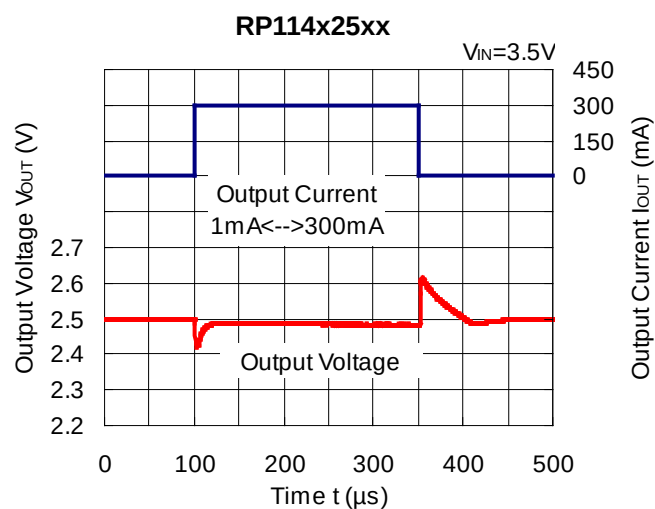
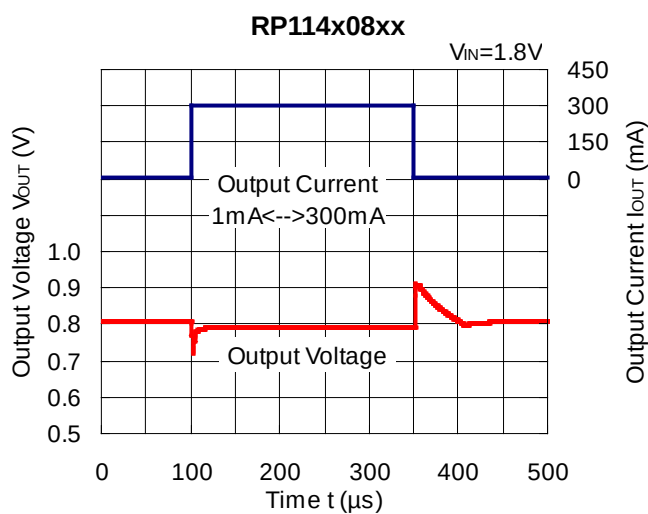
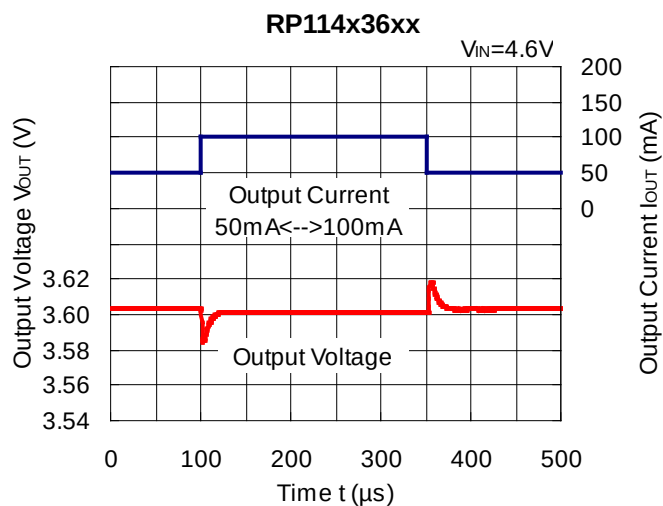


11) Input Transient Response ( $I_{OUT}=30mA$ ,  $t_r=t_f=5\mu s$ ,  $T_a=25^\circ C$ )

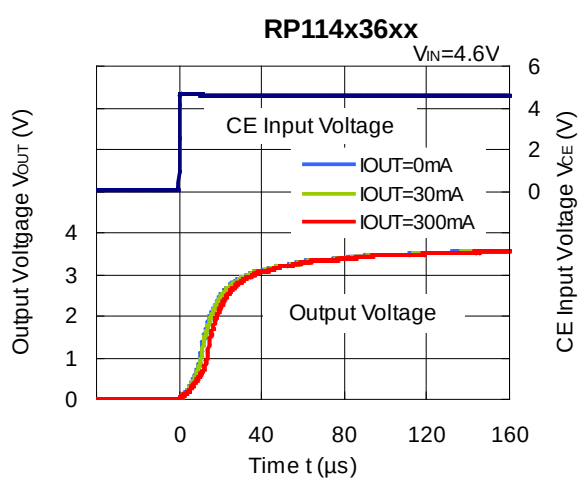
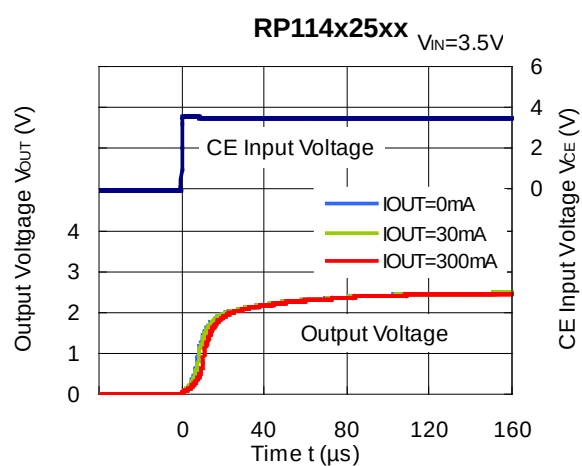
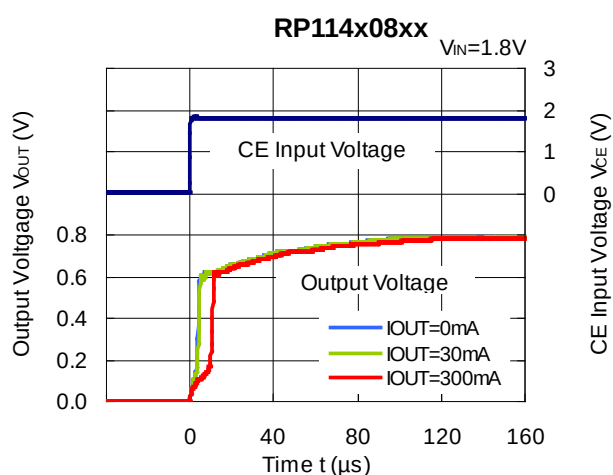


12) Load Transient Response ( $C1=1.0\mu F$ ,  $C2=1.0\mu F$ ,  $t_r=t_f=0.5\mu s$ ,  $T_a=25^\circ C$ )

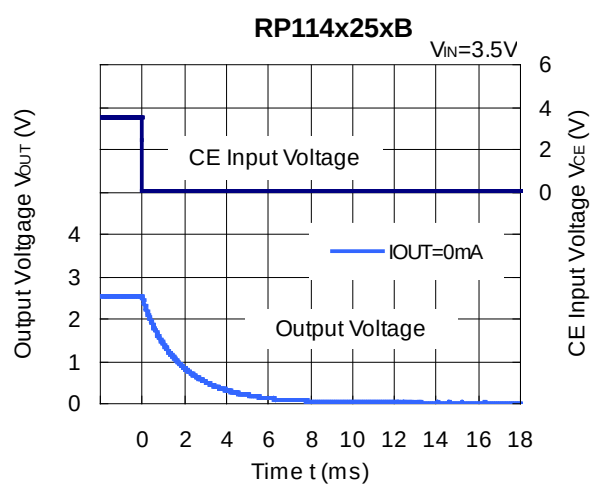
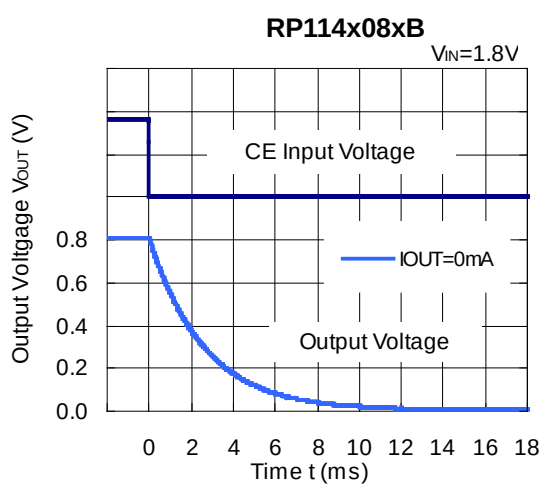




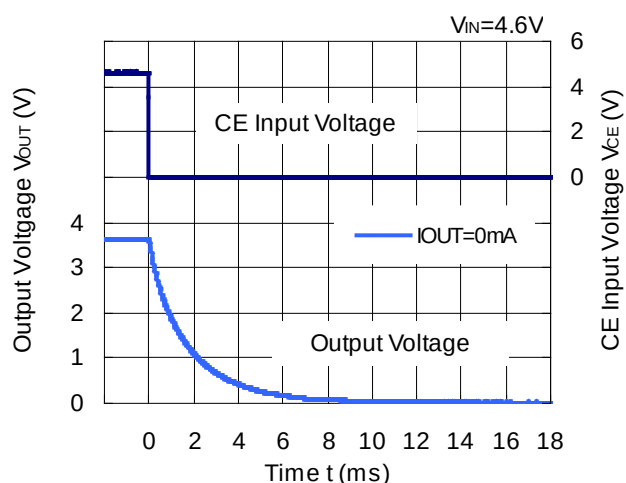
13) Turn On Speed with CE pin ( $C_1=1.0\mu\text{F}$ ,  $C_2=1.0\mu\text{F}$ ,  $T_a=25^\circ\text{C}$ )



14) Turn Off Speed with CE pin (B version) ( $C_1=1.0\mu\text{F}$ ,  $C_2=1.0\mu\text{F}$ ,  $T_a=25^\circ\text{C}$ )

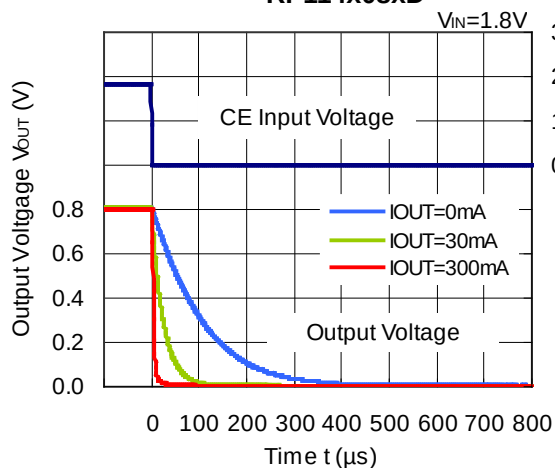


RP114x36xB

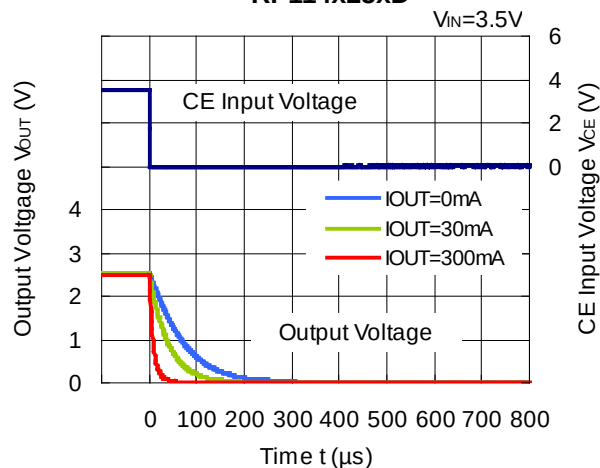


15) Turn Off Speed with CE pin (D version) ( $C1=1.0\mu F$ ,  $C2=1.0\mu F$ ,  $T_a=25^\circ C$ )

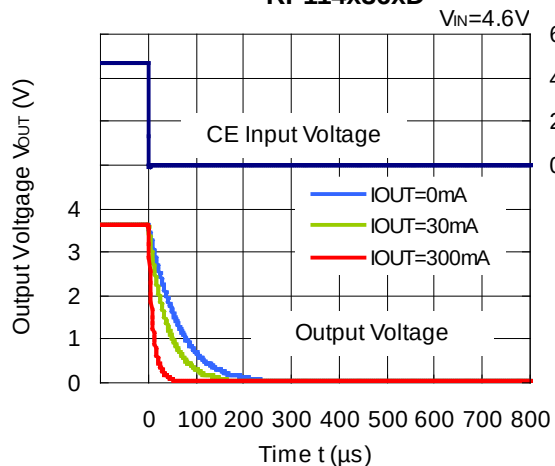
RP114x08xD



RP114x25xD



RP114x36xD



The power dissipation of the package is dependent on PCB material, layout, and environmental conditions. The following measurement conditions are based on JEDEC STD. 51-7.

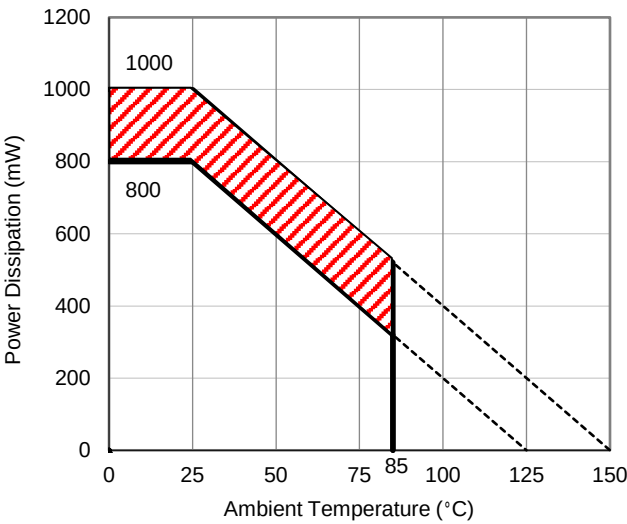
Measurement Conditions

| Item             | Measurement Conditions                                                                                                                                                                       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment      | Mounting on Board (Wind Velocity = 0 m/s)                                                                                                                                                    |
| Board Material   | Glass Cloth Epoxy Plastic (Four-Layer Board)                                                                                                                                                 |
| Board Dimensions | 76.2 mm × 114.3 mm × 0.8 mm                                                                                                                                                                  |
| Copper Ratio     | Outer Layer (First Layer): Less than 95% of 50 mm Square<br>Inner Layers (Second and Third Layers): Approx. 100% of 50 mm Square<br>Outer Layer (Fourth Layer): Approx. 100% of 50 mm Square |
| Through-holes    | φ 0.2 mm × 21 pcs                                                                                                                                                                            |

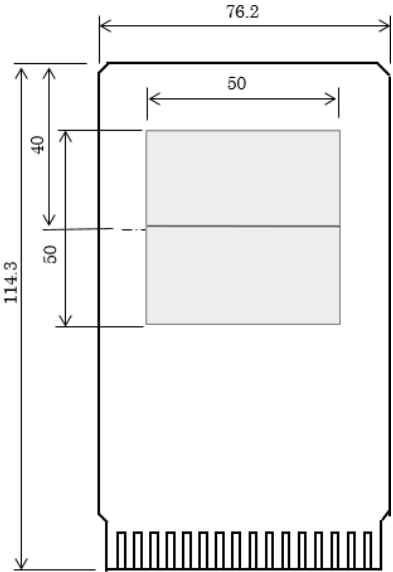
Measurement Result (Ta = 25°C, Tjmax = 125°C)

| Item                                     | Measurement Result |
|------------------------------------------|--------------------|
| Power Dissipation                        | 800 mW             |
| Thermal Resistance (θja)                 | θja = 125°C/W      |
| Thermal Characterization Parameter (ψjt) | ψjt = 58°C/W       |

θja: Junction-to-Ambient Thermal Resistance  
ψjt: Junction-to-Top Thermal Characterization Parameter



Power Dissipation vs. Ambient Temperature



Measurement Board Pattern

The above graph shows the power dissipation of the package at Tjmax = 125°C and Tjmax = 150°C. Operating the device in the hatched range might have a negative influence on its lifetime. The total hours of use and the total years of use must be limited as follows:

| Total Hours of Use | Total Years of Use (4 hours/day) |
|--------------------|----------------------------------|
| 13,000 hours       | 9 years                          |

### DFN(PL)1010-4 Package Dimensions

The power dissipation of the package is dependent on PCB material, layout, and environmental conditions. The following measurement conditions are based on JEDEC STD. 51-7.

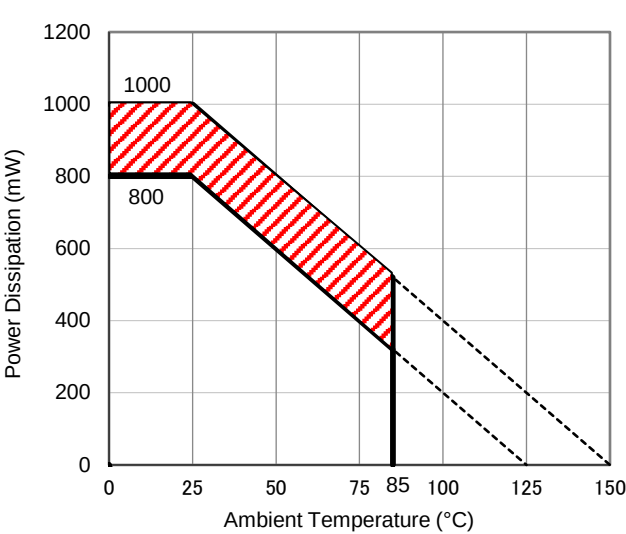
Measurement Conditions

| Item             | Measurement Conditions                                                                                                                                                                       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment      | Mounting on Board (Wind Velocity = 0 m/s)                                                                                                                                                    |
| Board Material   | Glass Cloth Epoxy Plastic (Four-Layer Board)                                                                                                                                                 |
| Board Dimensions | 76.2 mm × 114.3 mm × 0.8 mm                                                                                                                                                                  |
| Copper Ratio     | Outer Layer (First Layer): Less than 95% of 50 mm Square<br>Inner Layers (Second and Third Layers): Approx. 100% of 50 mm Square<br>Outer Layer (Fourth Layer): Approx. 100% of 50 mm Square |
| Through-holes    | φ 0.2 mm × 21 pcs                                                                                                                                                                            |

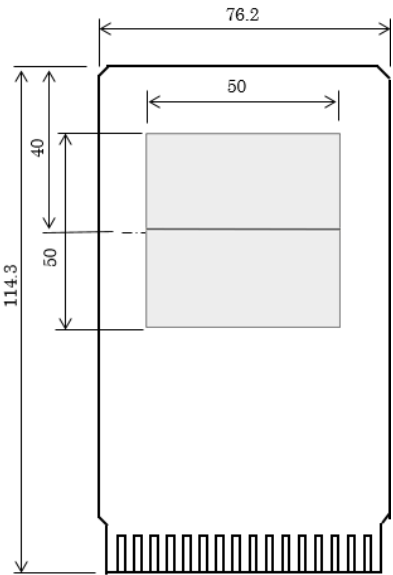
Measurement Result (Ta = 25°C, Tjmax = 125°C)

| Item                                     | Measurement Result |
|------------------------------------------|--------------------|
| Power Dissipation                        | 800 mW             |
| Thermal Resistance (θja)                 | θja = 125°C/W      |
| Thermal Characterization Parameter (ψjt) | ψjt = 58°C/W       |

θja: Junction-to-Ambient Thermal Resistance  
ψjt: Junction-to-Top Thermal Characterization Parameter



Power Dissipation vs. Ambient Temperature

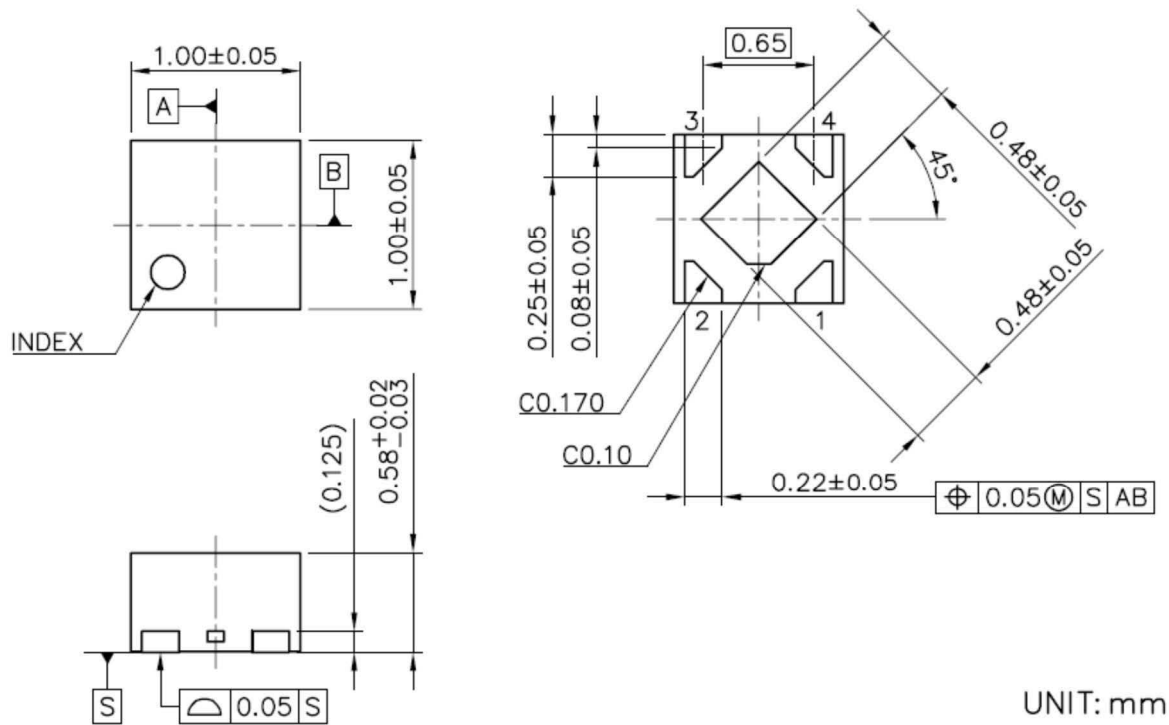


Measurement Board Pattern

The above graph shows the power dissipation of the package at Tjmax = 125°C and Tjmax = 150°C. Operating the device in the hatched range might have a negative influence on its lifetime. The total hours of use and the total years of use must be limited as follows:

| Total Hours of Use | Total Years of Use (4 hours/day) |
|--------------------|----------------------------------|
| 13,000 hours       | 9 years                          |

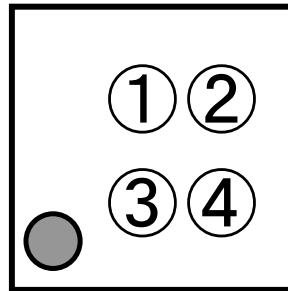




DFN(PL)1010-4B Package Dimensions

①②: Product Code ... Refer to *Part Marking List*

③④: Lot Number ... Alphanumeric Serial Number

**RP114K [DFN(PL)1010-4B], DFN(PL)1010-4 Part Markings****NOTICE**

There can be variation in the marking when different AOI (Automated Optical Inspection) equipment is used. In the case of recognizing the marking characteristic with AOI, please contact our sales or our distributor before attempting to use AOI.

RP114Kxx1B Part Marking List

| Product Name | ①②  | Set Output Voltage |
|--------------|-----|--------------------|
| RP114K081B   | L 0 | 0.8V               |
| RP114K091B   | L 1 | 0.9V               |
| RP114K101B   | L 2 | 1.0V               |
| RP114K111B   | L 3 | 1.1V               |
| RP114K121B   | L 4 | 1.2V               |
| RP114K131B   | L 5 | 1.3V               |
| RP114K141B   | L 6 | 1.4V               |
| RP114K151B   | L 7 | 1.5V               |
| RP114K161B   | L 8 | 1.6V               |
| RP114K171B   | L 9 | 1.7V               |
| RP114K181B   | M 0 | 1.8V               |
| RP114K191B   | M 1 | 1.9V               |
| RP114K201B   | M 2 | 2.0V               |
| RP114K211B   | M 3 | 2.1V               |
| RP114K221B   | M 4 | 2.2V               |
| RP114K231B   | M 5 | 2.3V               |
| RP114K241B   | M 6 | 2.4V               |
| RP114K251B   | M 7 | 2.5V               |
| RP114K261B   | M 8 | 2.6V               |
| RP114K271B   | M 9 | 2.7V               |
| RP114K281B   | N 0 | 2.8V               |
| RP114K291B   | N 1 | 2.9V               |
| RP114K301B   | N 2 | 3.0V               |
| RP114K311B   | N 3 | 3.1V               |
| RP114K321B   | N 4 | 3.2V               |
| RP114K331B   | N 5 | 3.3V               |
| RP114K341B   | N 6 | 3.4V               |
| RP114K351B   | N 7 | 3.5V               |
| RP114K361B   | N 8 | 3.6V               |
| RP114K121B5  | N 9 | 1.25V              |
| RP114K181B5  | P 0 | 1.85V              |
| RP114K281B5  | P 1 | 2.85V              |
| RP114K341B5  | P 2 | 3.45V              |
| RP114K101B5  | P 3 | 1.05V              |
| RP114K171B5  | P 4 | 1.75V              |
| RP114K111B5  | P 5 | 1.15V              |
| RP114K131B5  | P 6 | 1.35V              |
| RP114K301B5  | P 9 | 3.05V              |

RP114Kxx1D Part Marking List

| Product Name | ①②  | Set Output Voltage |
|--------------|-----|--------------------|
| RP114K081D   | Q 0 | 0.8V               |
| RP114K091D   | Q 1 | 0.9V               |
| RP114K101D   | Q 2 | 1.0V               |
| RP114K111D   | Q 3 | 1.1V               |
| RP114K121D   | Q 4 | 1.2V               |
| RP114K131D   | Q 5 | 1.3V               |
| RP114K141D   | Q 6 | 1.4V               |
| RP114K151D   | Q 7 | 1.5V               |
| RP114K161D   | Q 8 | 1.6V               |
| RP114K171D   | Q 9 | 1.7V               |
| RP114K181D   | R 0 | 1.8V               |
| RP114K191D   | R 1 | 1.9V               |
| RP114K201D   | R 2 | 2.0V               |
| RP114K211D   | R 3 | 2.1V               |
| RP114K221D   | R 4 | 2.2V               |
| RP114K231D   | R 5 | 2.3V               |
| RP114K241D   | R 6 | 2.4V               |
| RP114K251D   | R 7 | 2.5V               |
| RP114K261D   | R 8 | 2.6V               |
| RP114K271D   | R 9 | 2.7V               |
| RP114K281D   | S 0 | 2.8V               |
| RP114K291D   | S 1 | 2.9V               |
| RP114K301D   | S 2 | 3.0V               |
| RP114K311D   | S 3 | 3.1V               |
| RP114K321D   | S 4 | 3.2V               |
| RP114K331D   | S 5 | 3.3V               |
| RP114K341D   | S 6 | 3.4V               |
| RP114K351D   | S 7 | 3.5V               |
| RP114K361D   | S 8 | 3.6V               |
| RP114K121D5  | S 9 | 1.25V              |
| RP114K181D5  | T 0 | 1.85V              |
| RP114K281D5  | T 1 | 2.85V              |
| RP114K341D5  | T 2 | 3.45V              |
| RP114K101D5  | T 3 | 1.05V              |
| RP114K171D5  | T 4 | 1.75V              |
| RP114K111D5  | T 5 | 1.15V              |
| RP114K131D5  | T 6 | 1.35V              |
| RP114K301D5  | T 9 | 3.05V              |

The power dissipation of the package is dependent on PCB material, layout, and environmental conditions. The following conditions are used in this measurement.

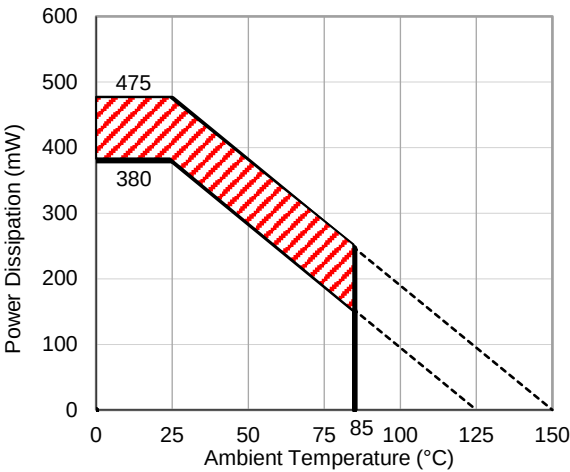
Measurement Conditions

| Item             | Our Evaluation Board                              |
|------------------|---------------------------------------------------|
| Environment      | Mounting on Board (Wind Velocity = 0 m/s)         |
| Board Material   | Glass Cloth Epoxy Plastic (Double-Sided Board)    |
| Board Dimensions | 40 mm × 40 mm × 1.6 mm                            |
| Copper Ratio     | Top Side: Approx. 50%<br>Bottom Side: Approx. 50% |
| Through-holes    | φ 0.5 mm × 44 pcs                                 |

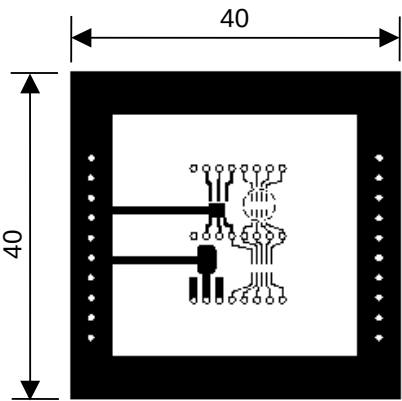
Measurement Result (Ta = 25°C, Tjmax = 125°C)

| Item                                     | Our Evaluation Board |
|------------------------------------------|----------------------|
| Power Dissipation                        | 380 mW               |
| Thermal Resistance (θja)                 | θja = 263°C/W        |
| Thermal Characterization Parameter (ψjt) | ψjt = 75°C/W         |

θja: Junction-to-Ambient Thermal Resistance  
ψjt: Junction-to-Top Thermal Characterization Parameter



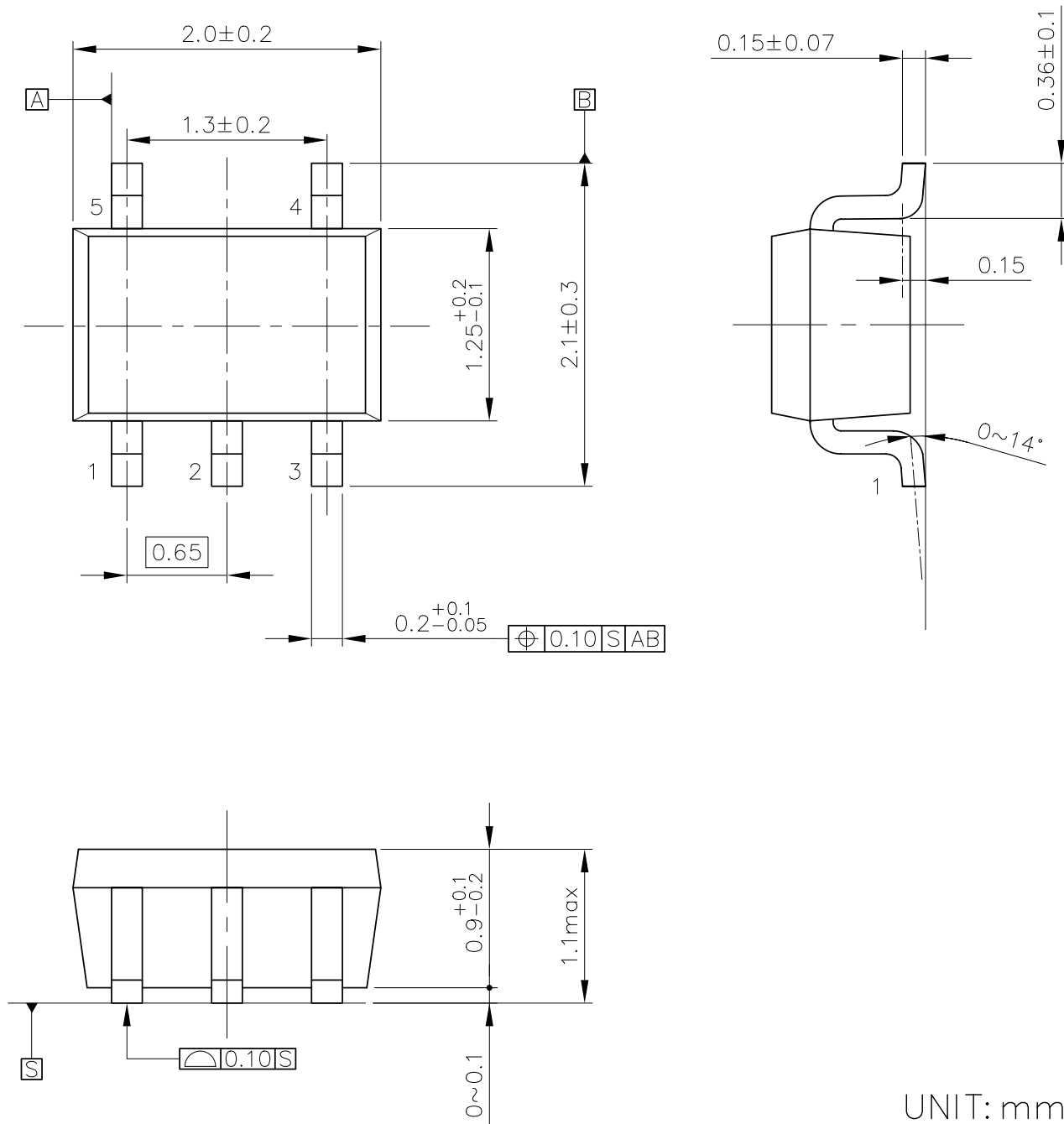
Power Dissipation vs. Ambient Temperature



Measurement Board Pattern

The above graph shows the power dissipation of the package at Tjmax = 125°C and Tjmax = 150°C. Operating the device in the hatched range might have a negative influence on its lifetime. The total hours of use and the total years of use must be limited as follows:

| Total Hours of Use | Total Years of Use (4 hours/day) |
|--------------------|----------------------------------|
| 13,000 hours       | 9 years                          |

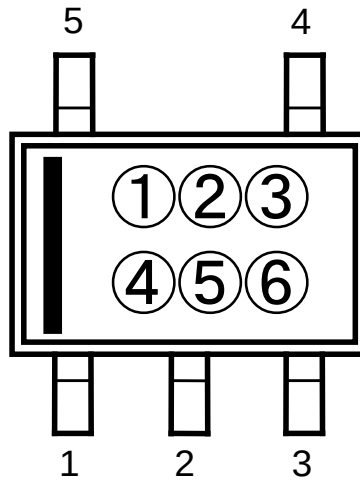


UNIT:mm

SC-88A Package Dimensions

①②③④: Product Code … Refer to *Part Marking List*

⑤⑥: Lot Number … Alphanumeric Serial Number



**RP114Q (SC-88A) Part Markings**

**NOTICE**

There can be variation in the marking when different AOI (Automated Optical Inspection) equipment is used. In the case of recognizing the marking characteristic with AOI, please contact our sales or our distributor before attempting to use AOI.

RP114Qxx2B Part Marking List

| Product Name | ①②③④           | Set Output Voltage |
|--------------|----------------|--------------------|
| RP114Q082B   | <b>A G 0 8</b> | 0.8 V              |
| RP114Q092B   | <b>A G 0 9</b> | 0.9 V              |
| RP114Q102B   | <b>A G 1 0</b> | 1.0 V              |
| RP114Q112B   | <b>A G 1 1</b> | 1.1 V              |
| RP114Q122B   | <b>A G 1 2</b> | 1.2 V              |
| RP114Q132B   | <b>A G 1 3</b> | 1.3 V              |
| RP114Q142B   | <b>A G 1 4</b> | 1.4 V              |
| RP114Q152B   | <b>A G 1 5</b> | 1.5 V              |
| RP114Q162B   | <b>A G 1 6</b> | 1.6 V              |
| RP114Q172B   | <b>A G 1 7</b> | 1.7 V              |
| RP114Q182B   | <b>A G 1 8</b> | 1.8 V              |
| RP114Q192B   | <b>A G 1 9</b> | 1.9 V              |
| RP114Q202B   | <b>A G 2 0</b> | 2.0 V              |
| RP114Q212B   | <b>A G 2 1</b> | 2.1 V              |
| RP114Q222B   | <b>A G 2 2</b> | 2.2 V              |
| RP114Q232B   | <b>A G 2 3</b> | 2.3 V              |
| RP114Q242B   | <b>A G 2 4</b> | 2.4 V              |
| RP114Q252B   | <b>A G 2 5</b> | 2.5 V              |
| RP114Q262B   | <b>A G 2 6</b> | 2.6 V              |
| RP114Q272B   | <b>A G 2 7</b> | 2.7 V              |
| RP114Q282B   | <b>A G 2 8</b> | 2.8 V              |
| RP114Q292B   | <b>A G 2 9</b> | 2.9 V              |
| RP114Q302B   | <b>A G 3 0</b> | 3.0 V              |
| RP114Q312B   | <b>A G 3 1</b> | 3.1 V              |
| RP114Q322B   | <b>A G 3 2</b> | 3.2 V              |
| RP114Q332B   | <b>A G 3 3</b> | 3.3 V              |
| RP114Q342B   | <b>A G 3 4</b> | 3.4 V              |
| RP114Q352B   | <b>A G 3 5</b> | 3.5 V              |
| RP114Q362B   | <b>A G 3 6</b> | 3.6 V              |
| RP114Q122B5  | <b>A G 3 7</b> | 1.25 V             |
| RP114Q182B5  | <b>A G 3 8</b> | 1.85 V             |
| RP114Q282B5  | <b>A G 3 9</b> | 2.85 V             |
| RP114Q342B5  | <b>A G 4 0</b> | 3.45 V             |
| RP114Q102B5  | <b>A G 4 1</b> | 1.05 V             |
| RP114Q302B5  | <b>A G 4 2</b> | 3.05 V             |

RP114Qxx2D Part Marking List

| Product Name | ①②③④           | Set Output Voltage |
|--------------|----------------|--------------------|
| RP114Q082D   | <b>A H 0 8</b> | 0.8 V              |
| RP114Q092D   | <b>A H 0 9</b> | 0.9 V              |
| RP114Q102D   | <b>A H 1 0</b> | 1.0 V              |
| RP114Q112D   | <b>A H 1 1</b> | 1.1 V              |
| RP114Q122D   | <b>A H 1 2</b> | 1.2 V              |
| RP114Q132D   | <b>A H 1 3</b> | 1.3 V              |
| RP114Q142D   | <b>A H 1 4</b> | 1.4 V              |
| RP114Q152D   | <b>A H 1 5</b> | 1.5 V              |
| RP114Q162D   | <b>A H 1 6</b> | 1.6 V              |
| RP114Q172D   | <b>A H 1 7</b> | 1.7 V              |
| RP114Q182D   | <b>A H 1 8</b> | 1.8 V              |
| RP114Q192D   | <b>A H 1 9</b> | 1.9 V              |
| RP114Q202D   | <b>A H 2 0</b> | 2.0 V              |
| RP114Q212D   | <b>A H 2 1</b> | 2.1 V              |
| RP114Q222D   | <b>A H 2 2</b> | 2.2 V              |
| RP114Q232D   | <b>A H 2 3</b> | 2.3 V              |
| RP114Q242D   | <b>A H 2 4</b> | 2.4 V              |
| RP114Q252D   | <b>A H 2 5</b> | 2.5 V              |
| RP114Q262D   | <b>A H 2 6</b> | 2.6 V              |
| RP114Q272D   | <b>A H 2 7</b> | 2.7 V              |
| RP114Q282D   | <b>A H 2 8</b> | 2.8 V              |
| RP114Q292D   | <b>A H 2 9</b> | 2.9 V              |
| RP114Q302D   | <b>A H 3 0</b> | 3.0 V              |
| RP114Q312D   | <b>A H 3 1</b> | 3.1 V              |
| RP114Q322D   | <b>A H 3 2</b> | 3.2 V              |
| RP114Q332D   | <b>A H 3 3</b> | 3.3 V              |
| RP114Q342D   | <b>A H 3 4</b> | 3.4 V              |
| RP114Q352D   | <b>A H 3 5</b> | 3.5 V              |
| RP114Q362D   | <b>A H 3 6</b> | 3.6 V              |
| RP114Q122D5  | <b>A H 3 7</b> | 1.25 V             |
| RP114Q182D5  | <b>A H 3 8</b> | 1.85 V             |
| RP114Q282D5  | <b>A H 3 9</b> | 2.85 V             |
| RP114Q342D5  | <b>A H 4 0</b> | 3.45 V             |
| RP114Q102D5  | <b>A H 4 1</b> | 1.05 V             |
| RP114Q302D5  | <b>A H 4 2</b> | 3.05 V             |

The power dissipation of the package is dependent on PCB material, layout, and environmental conditions. The following measurement conditions are based on JEDEC STD. 51-7.

Measurement Conditions

| Item             | Measurement Conditions                                                                                                                                                                       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment      | Mounting on Board (Wind Velocity = 0 m/s)                                                                                                                                                    |
| Board Material   | Glass Cloth Epoxy Plastic (Four-Layer Board)                                                                                                                                                 |
| Board Dimensions | 76.2 mm × 114.3 mm × 0.8 mm                                                                                                                                                                  |
| Copper Ratio     | Outer Layer (First Layer): Less than 95% of 50 mm Square<br>Inner Layers (Second and Third Layers): Approx. 100% of 50 mm Square<br>Outer Layer (Fourth Layer): Approx. 100% of 50 mm Square |
| Through-holes    | φ 0.3 mm × 7 pcs                                                                                                                                                                             |

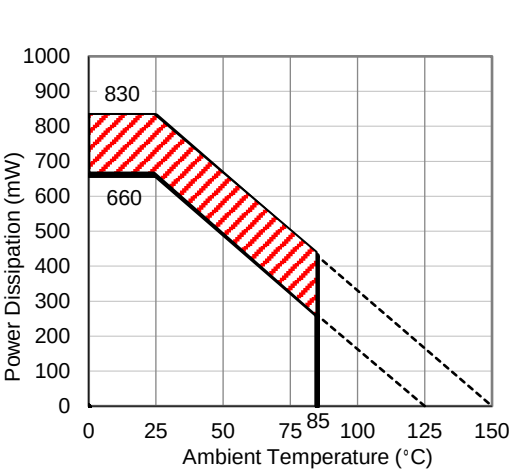
Measurement Result

(Ta = 25°C, Tjmax = 125°C)

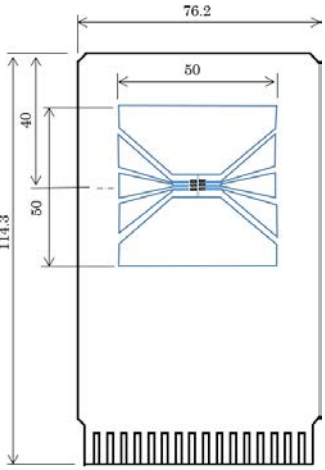
| Item                                     | Measurement Result |
|------------------------------------------|--------------------|
| Power Dissipation                        | 660 mW             |
| Thermal Resistance (θja)                 | θja = 150°C/W      |
| Thermal Characterization Parameter (ψjt) | ψjt = 51°C/W       |

θja: Junction-to-Ambient Thermal Resistance

ψjt: Junction-to-Top Thermal Characterization Parameter



Power Dissipation vs. Ambient Temperature

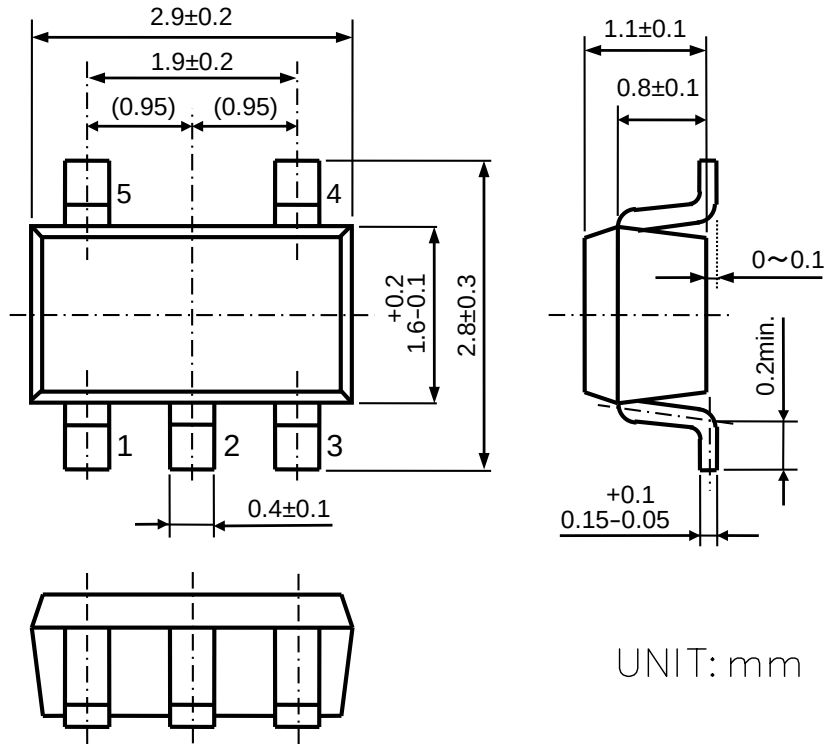


Measurement Board Pattern

The above graph shows the power dissipation of the package at Tjmax = 125°C and Tjmax = 150°C. Operating the device in the hatched range might have a negative influence on its lifetime. The total hours of use and the total years of use must be limited as follows:

| Total Hours of Use | Total Years of Use (4 hours/day) |
|--------------------|----------------------------------|
| 13,000 hours       | 9 years                          |

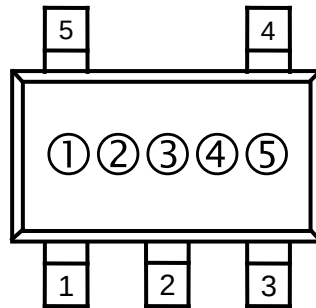




### SOT-23-5 Package Dimensions

①②③: Product Code ... Refer to *Part Marking List*

④⑤: Lot Number ... Alphanumeric Serial Number



**RP114N (SOT-23-5) Part Markings**

**NOTICE**

There can be variation in the marking when different AOI (Automated Optical Inspection) equipment is used. In the case of recognizing the marking characteristic with AOI, please contact our sales or our distributor before attempting to use AOI.

## PART MARKINGS

## RP114N

MK-RP114N-JE-B

RP114Nxx1B Part Marking List

| Product Name | ①②③   | Set Output Voltage |
|--------------|-------|--------------------|
| RP114N081B   | Q A A | 0.8 V              |
| RP114N091B   | Q A B | 0.9 V              |
| RP114N101B   | Q A C | 1.0 V              |
| RP114N111B   | Q A D | 1.1 V              |
| RP114N121B   | Q A E | 1.2 V              |
| RP114N131B   | Q A F | 1.3 V              |
| RP114N141B   | Q A G | 1.4 V              |
| RP114N151B   | Q A H | 1.5 V              |
| RP114N161B   | Q A J | 1.6 V              |
| RP114N171B   | Q A K | 1.7 V              |
| RP114N181B   | Q A L | 1.8 V              |
| RP114N191B   | Q A M | 1.9 V              |
| RP114N201B   | Q A N | 2.0 V              |
| RP114N211B   | Q A P | 2.1 V              |
| RP114N221B   | Q A Q | 2.2 V              |
| RP114N231B   | Q A R | 2.3 V              |
| RP114N241B   | Q A S | 2.4 V              |
| RP114N251B   | Q A T | 2.5 V              |
| RP114N261B   | Q A U | 2.6 V              |
| RP114N271B   | Q A V | 2.7 V              |
| RP114N281B   | Q A W | 2.8 V              |
| RP114N291B   | Q A X | 2.9 V              |
| RP114N301B   | Q A Y | 3.0 V              |
| RP114N311B   | Q A Z | 3.1 V              |
| RP114N321B   | R A A | 3.2 V              |
| RP114N331B   | R A B | 3.3 V              |
| RP114N341B   | R A C | 3.4 V              |
| RP114N351B   | R A D | 3.5 V              |
| RP114N361B   | R A E | 3.6 V              |
| RP114N121B5  | R A F | 1.25 V             |
| RP114N181B5  | R A G | 1.85 V             |
| RP114N281B5  | R A H | 2.85 V             |
| RP114N341B5  | R A J | 3.45 V             |
| RP114N101B5  | R A K | 1.05 V             |
| RP114N301B5  | R A L | 3.05 V             |

RP114Nxx1D Part Marking List

| Product Name | ①②③   | Set Output Voltage |
|--------------|-------|--------------------|
| RP114N081D   | Q B A | 0.8 V              |
| RP114N091D   | Q B B | 0.9 V              |
| RP114N101D   | Q B C | 1.0 V              |
| RP114N111D   | Q B D | 1.1 V              |
| RP114N121D   | Q B E | 1.2 V              |
| RP114N131D   | Q B F | 1.3 V              |
| RP114N141D   | Q B G | 1.4 V              |
| RP114N151D   | Q B H | 1.5 V              |
| RP114N161D   | Q B J | 1.6 V              |
| RP114N171D   | Q B K | 1.7 V              |
| RP114N181D   | Q B L | 1.8 V              |
| RP114N191D   | Q B M | 1.9 V              |
| RP114N201D   | Q B N | 2.0 V              |
| RP114N211D   | Q B P | 2.1 V              |
| RP114N221D   | Q B Q | 2.2 V              |
| RP114N231D   | Q B R | 2.3 V              |
| RP114N241D   | Q B S | 2.4 V              |
| RP114N251D   | Q B T | 2.5 V              |
| RP114N261D   | Q B U | 2.6 V              |
| RP114N271D   | Q B V | 2.7 V              |
| RP114N281D   | Q B W | 2.8 V              |
| RP114N291D   | Q B X | 2.9 V              |
| RP114N301D   | Q B Y | 3.0 V              |
| RP114N311D   | Q B Z | 3.1 V              |
| RP114N321D   | R B A | 3.2 V              |
| RP114N331D   | R B B | 3.3 V              |
| RP114N341D   | R B C | 3.4 V              |
| RP114N351D   | R B D | 3.5 V              |
| RP114N361D   | R B E | 3.6 V              |
| RP114N121D5  | R B F | 1.25 V             |
| RP114N181D5  | R B G | 1.85 V             |
| RP114N281D5  | R B H | 2.85 V             |
| RP114N341D5  | R B J | 3.45 V             |
| RP114N101D5  | R B K | 1.05 V             |
| RP114N301D5  | R B L | 3.05 V             |

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  - Equipment Used in the Deep Sea
  - Power Generator Control Equipment (nuclear, steam, hydraulic, etc.)
  - Life Maintenance Medical Equipment
  - Fire Alarms / Intruder Detectors
  - Vehicle Control Equipment (automotive, airplane, railroad, ship, etc.)
  - Various Safety Devices
  - Traffic control system
  - Combustion equipment

In case your company desires to use this product for any applications other than general electronic equipment mentioned above, make sure to contact our company in advance. Note that the important requirements mentioned in this section are not applicable to cases where operation requirements such as application conditions are confirmed by our company in writing after consultation with your company.

6. We are making our continuous effort to improve the quality and reliability of our products, but semiconductor products are likely to fail with certain probability. In order to prevent any injury to persons or damages to property resulting from such failure, customers should be careful enough to incorporate safety measures in their design, such as redundancy feature, fire containment feature and fail-safe feature. We do not assume any liability or responsibility for any loss or damage arising from misuse or inappropriate use of the products.
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8. **Quality Warranty**
  - 8-1. **Quality Warranty Period**

In the case of a product purchased through an authorized distributor or directly from us, the warranty period for this product shall be one (1) year after delivery to your company. For defective products that occurred during this period, we will take the quality warranty measures described in section 8-2. However, if there is an agreement on the warranty period in the basic transaction agreement, quality assurance agreement, delivery specifications, etc., it shall be followed.
  - 8-2. **Quality Warranty Remedies**

When it has been proved defective due to manufacturing factors as a result of defect analysis by us, we will either deliver a substitute for the defective product or refund the purchase price of the defective product.

Note that such delivery or refund is sole and exclusive remedies to your company for the defective product.
  - 8-3. **Remedies after Quality Warranty Period**

With respect to any defect of this product found after the quality warranty period, the defect will be analyzed by us. On the basis of the defect analysis results, the scope and amounts of damage shall be determined by mutual agreement of both parties. Then we will deal with upper limit in Section 8-2. This provision is not intended to limit any legal rights of your company.
9. Anti-radiation design is not implemented in the products described in this document.
10. The X-ray exposure can influence functions and characteristics of the products. Confirm the product functions and characteristics in the evaluation stage.
11. WLCSP products should be used in light shielded environments. The light exposure can influence functions and characteristics of the products under operation or storage.
12. Warning for handling Gallium and Arsenic (GaAs) products (Applying to GaAs MMIC, Photo Reflector). These products use Gallium (Ga) and Arsenic (As) which are specified as poisonous chemicals by law. For the prevention of a hazard, do not burn, destroy, or process chemically to make them as gas or power. When the product is disposed of, please follow the related regulation and do not mix this with general industrial waste or household waste.
13. Please contact our sales representatives should you have any questions or comments concerning the products or the technical information.



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