

LOW ON RESISTANCE / LOW VOLTAGE 1A LDO

NO.EA-174-160426

OUTLINE

The RP131x Series are voltage-regulators with a built-in low ON-resistance transistor and output current is 1A capability. These ICs are capable of the low input voltage (Min.1.6V) and also the minimum output voltage can be set from 0.8V. (The output voltage is fixed in the IC.)

Each of these ICs consists of a voltage reference unit, an error amplifier, a resistor net for setting output voltage, a chip enable circuit, current limit circuits for over-current and short, and a thermal-shutdown circuit.

A standby mode with ultra low supply current can be realized with the chip enable function.

The packages for these ICs are DFN1616-6B and DFN(PLP)1820-6 which are suitable for high density mounting of the ICs on boards. SOT-89-5, HSOP-6J and TO-252-5-P2 with high power dissipation are also available.

FEATURES

- Output Current Min. 1A
- Supply Current Typ. 65 μ A
- Standby Current Typ. 0.15 μ A
- Input Voltage Range 1.6V to 6.5V
- Output Voltage Range 0.8V to 5.5V (0.1V steps)
(For other voltages, please refer to MARK INFORMATIONS.)
- Dropout Voltage..... Typ. 0.5V ($V_{OUT}=2.8V$, $I_{OUT}=1A$)
- Ripple Rejection Typ. 70dB ($f=1kHz$, $V_{OUT}=2.8V$)
- Output Voltage Accuracy $\pm 1.0\%$
- Temperature-Drift Coefficient of Output Voltage Typ. $\pm 100ppm/^{\circ}C$
- Line Regulation Typ. 0.05%/V
- Load Regulation Typ. 20mV at $I_{OUT}=300mA$, Typ. 80mV at $I_{OUT}=1A$
- Packages DFN1616-6B, DFN(PLP)1820-6, SOT-89-5, HSOP-6J, TO-252-5-P2
- Built-in Inrush current limit circuit Typ. 500mA
- Built-in Fold-Back Protection Circuit Typ. 250mA (Current at short mode)
- Built-in Thermal Shutdown Circuit Thermal Shutdown Temperature ; Typ. 165 $^{\circ}C$
Released Temperature ; Typ. 135 $^{\circ}C$
- Built-in Auto Discharge Function D version
- Ceramic capacitors are recommended to be used with this IC 2.2 μ F or more ($V_{OUT}\leq 3.6V$)
4.7 μ F or more ($V_{OUT}> 3.6V$)

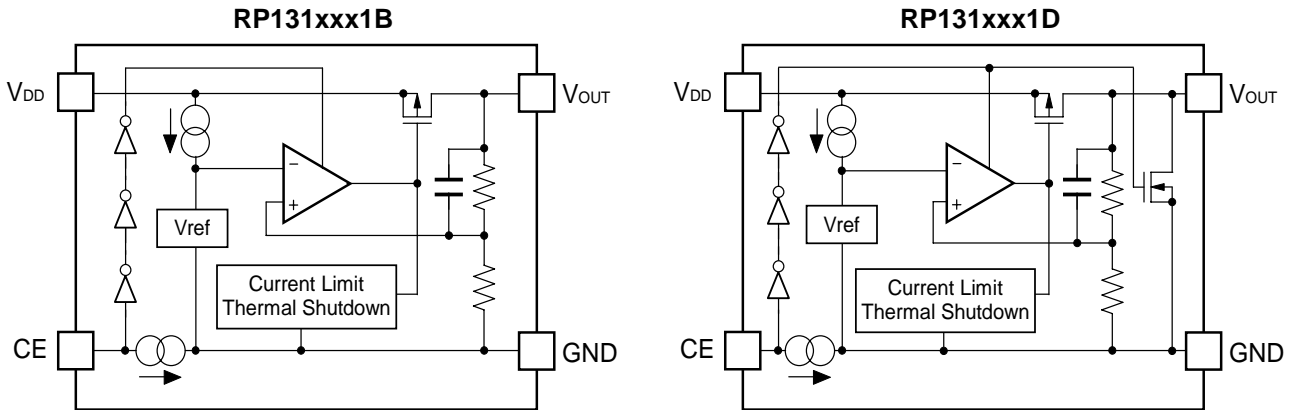
APPLICATIONS

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

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BLOCK DIAGRAMS



SELECTION GUIDE

The output voltage, auto discharge function, package for the ICs can be selected at the user's request.

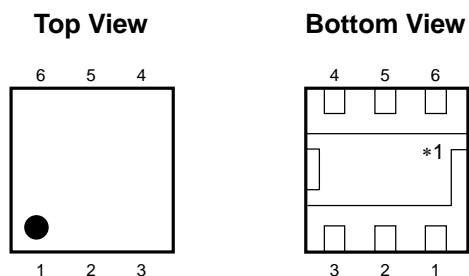
| Product Name | Package | Quantity per Reel | Pb Free | Halogen Free |
|------------------|----------------|-------------------|---------|--------------|
| RP131Lxx1*-TR | DFN1616-6B | 5,000 pcs | Yes | Yes |
| RP131Kxx1*-TR | DFN(PLP)1820-6 | 5,000 pcs | Yes | Yes |
| RP131Hxx1*-T1-FE | SOT-89-5 | 1,000 pcs | Yes | Yes |
| RP131Sxx1*-E2-FE | HSOP-6J | 1,000 pcs | Yes | Yes |
| RP131Jxx1*-T1-FE | TO-252-5-P2 | 3,000 pcs | Yes | Yes |

xx : The output voltage can be designated in the range from 0.8V(08) to 5.5V(55) in 0.1V steps.
(For other voltages, please refer to MARK INFORMATIONS.)

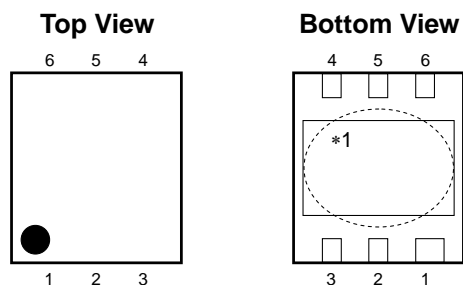
* : The auto discharge function at off state are options as follows.
(B) without auto discharge function at off state
(D) with auto discharge function at off state

PIN CONFIGURATIONS

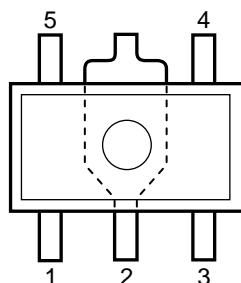
● DFN1616-6B



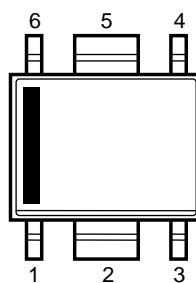
● DFN(PLP)1820-6



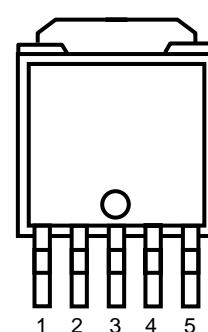
● SOT-89-5



● HSOP-6J



● TO-252-5-P2



PIN DESCRIPTIONS

● DFN1616-6B

| Pin No. | Symbol | Pin Description |
|---------|-----------|------------------------------|
| 1 | V_{OUT} | Output Pin*2 |
| 2 | V_{OUT} | Output Pin*2 |
| 3 | GND | Ground Pin |
| 4 | CE | Chip Enable Pin ("H" Active) |
| 5 | V_{DD} | Input Pin*2 |
| 6 | V_{DD} | Input Pin*2 |

*1) 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.

*2) When you use this IC, please make sure be wired with 1pin with 2pin and 5pin with 6pin.

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• DFN(PLP)1820-6

| Pin No. | Symbol | Pin Description |
|---------|------------------|------------------------------|
| 1 | V _{OUT} | Output Pin*2 |
| 2 | V _{OUT} | Output Pin*2 |
| 3 | GND | Ground Pin |
| 4 | CE | Chip Enable Pin ("H" Active) |
| 5 | V _{DD} | Input Pin*2 |
| 6 | V _{DD} | Input Pin*2 |

*1) 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.

*2) When you use this IC, please make sure be wired with 1pin with 2pin and 5pin with 6pin.

• SOT-89-5

| Pin No. | Symbol | Pin Description |
|---------|------------------|------------------------------|
| 1 | NC | No Connection |
| 2 | GND | Ground Pin |
| 3 | CE | Chip Enable Pin ("H" Active) |
| 4 | V _{DD} | Input Pin |
| 5 | V _{OUT} | Output Pin |

• HSOP-6J

| Pin No. | Symbol | Pin Description |
|---------|------------------|------------------------------|
| 1 | V _{OUT} | Output Pin |
| 2 | GND | Ground Pin*3 |
| 3 | NC | No Connection |
| 4 | CE | Chip Enable Pin ("H" Active) |
| 5 | GND | Ground Pin*3 |
| 6 | V _{DD} | Input Pin |

*3) When you use this IC, please make sure be wired with 2pin and 5pin.

• TO-252-5-P2

| Pin No. | Symbol | Pin Description |
|---------|------------------|------------------------------|
| 1 | V _{OUT} | Output Pin |
| 2 | GND | Ground Pin*4 |
| 3 | GND | Ground Pin*4 |
| 4 | CE | Chip Enable Pin ("H" Active) |
| 5 | V _{DD} | Input Pin |

*4) When you use this IC, please make sure be wired with 2pin and 3pin.

ABSOLUTE MAXIMUM RATINGS

| Symbol | Item | Rating | Unit |
|------------------|-------------------------------------|------------------------------|------|
| V _{IN} | Input Voltage | 7.0 | V |
| V _{CE} | Input Voltage (CE Pin) | -0.3 to 7.0 | V |
| V _{OUT} | Output Voltage | -0.3 to V _{IN} +0.3 | V |
| P _D | Power Dissipation (DFN1616-6B)* | 640 | mW |
| | Power Dissipation (DFN(PLP)1820-6)* | 880 | |
| | Power Dissipation (SOT-89-5)* | 900 | |
| | Power Dissipation (HSOP-6J)* | 1700 | |
| | Power Dissipation (TO-252-5-P2)* | 1900 | |
| T _{opt} | Operating Temperature Range | -40 to 85 | °C |
| T _{stg} | Storage Temperature Range | -55 to 125 | °C |

*) For Power Dissipation, please refer to PACKAGE INFORMATION.

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 is not assured.

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ELECTRICAL CHARACTERISTICS $V_{IN} = \text{Set } V_{OUT} + 1V, I_{OUT} = 1mA$ The specification in is checked and guaranteed by design engineering at $-40^{\circ}\text{C} \leq T_{opt} \leq 85^{\circ}\text{C}$, unless otherwise noted.● **RP131xxx1B/D** $T_{opt} = 25^{\circ}\text{C}$

| Symbol | Item | Conditions | Min. | Typ. | Max. | Unit | |
|-----------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----|
| V_{OUT} | Output Voltage | $T_{opt} = 25^{\circ}\text{C}$ | $V_{OUT} > 1.5V$ | $\times 0.99$ | | $\times 1.01$ | V |
| | | | $V_{OUT} \leq 1.5V$ | -15 | | 15 | mV |
| | | $-40^{\circ}\text{C} \leq T_{opt} \leq 85^{\circ}\text{C}$ | $V_{OUT} > 1.5V$ | $\times 0.974$ | | $\times 1.018$ | V |
| | | | $V_{OUT} \leq 1.5V$ | -40 | | 27 | mV |
| $\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$ | Load Regulation | $0.1mA \leq I_{OUT} \leq 300mA$ | | 20 | 40 | mV | |
| | | $0.1mA \leq I_{OUT} \leq 1A$ | | 80 | 120 | | |
| V_{DIF} | Dropout Voltage | Refer to the following table | | | | | |
| I_{SS} | Supply Current | $I_{OUT} = 0mA$ ($V_{IN} = 6.5V$) | | 65 | 90 | μA | |
| $I_{standby}$ | Standby Current | $V_{CE} = 0V, V_{IN} = 6.5V$ | | 0.15 | 0.60 | μA | |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN}}$ | Line Regulation | Set $V_{OUT} + 0.5V \leq V_{IN} \leq 6.5V$ *However, $V_{IN} \geq 1.6V$ | | 0.05 | 0.1 | %/V | |
| RR | Ripple Rejection | $f = 1kHz$ Ripple 0.2Vp-p $I_{OUT} = 100mA$ | $V_{OUT} \leq 3.3V$ | | 70 | dB | |
| | | | $V_{OUT} > 3.3V$ | | 60 | | |
| V_{IN} | Input Voltage | | 1.6 | | 6.5 | V | |
| $\frac{\Delta V_{OUT}}{\Delta T_{opt}}$ | Output Voltage Temperature Coefficient | $-40^{\circ}\text{C} \leq T_{opt} \leq 85^{\circ}\text{C}$ | | ± 100 | | ppm/ $^{\circ}\text{C}$ | |
| I_{LIM} | Output Current Limit | | 1 | | | A | |
| I_{SC} | Short Current Limit | $V_{OUT} = 0V$ | | 250 | | mA | |
| I_{PD} | CE Pull-down Current | | | 0.3 | | μA | |
| V_{CEH} | CE Input Voltage "H" | | 1.0 | | | V | |
| V_{CEL} | CE Input Voltage "L" | | | | 0.4 | V | |
| e_n | Output Noise | $BW = 10Hz$ to $100kHz, I_{OUT} = 1mA$ | | 45 | | μV_{rms} | |
| T_{TSD} | Thermal Shutdown Temperature | Junction Temperature | | 165 | | $^{\circ}\text{C}$ | |
| T_{TSR} | Thermal Shutdown Released Temperature | Junction Temperature | | 135 | | $^{\circ}\text{C}$ | |
| R_{LOW} | Low Output Nch Tr. ON Resistance (of D version) | $V_{IN} = 4.0V, V_{CE} = 0V$ | | 30 | | Ω | |

The specification in is checked and guaranteed by design engineering at $-40^{\circ}\text{C} \leq T_{opt} \leq 85^{\circ}\text{C}$, unless otherwise noted.All of unit are tested and specified under load conditions such that $T_j \approx T_{opt} = 25^{\circ}\text{C}$ except for Output Noise, Ripple Rejection, Output Voltage Temperature Coefficient, Dropout Voltage at 1A Output Current and Thermal Shutdown items.

• Dropout Voltage by Output Voltage

T_{opt}=25°C

| Output Voltage V _{OUT} (V) | Dropout Voltage V _{DIF} (V) | | | | | |
|----------------------------------------|--------------------------------------|-------|-------|----------------------|-------|-------|
| | Condition | Typ. | Max. | Condition | Typ. | Max. |
| 0.8 ≤ V _{OUT} < 0.9 | I _{OUT} =300mA | 0.600 | 0.780 | I _{OUT} =1A | 1.100 | 1.650 |
| 0.9 ≤ V _{OUT} < 1.0 | | 0.550 | 0.690 | | 1.050 | 1.500 |
| 1.0 ≤ V _{OUT} < 1.1 | | 0.450 | 0.610 | | 1.000 | 1.450 |
| 1.1 ≤ V _{OUT} < 1.2 | | 0.340 | 0.540 | | 0.930 | 1.420 |
| 1.2 ≤ V _{OUT} < 1.5 | | 0.290 | 0.500 | | 0.900 | 1.380 |
| 1.5 ≤ V _{OUT} < 2.6 | | 0.230 | 0.310 | | 0.700 | 1.100 |
| 2.6 ≤ V _{OUT} < 3.3 | | 0.150 | 0.180 | | 0.500 | 0.750 |
| 3.3 ≤ V _{OUT} ≤ 5.5 | | 0.140 | 0.170 | | 0.450 | 0.650 |

The specification in is checked and guaranteed by design engineering at -40°C ≤ T_{opt} ≤ 85°C, unless otherwise noted.

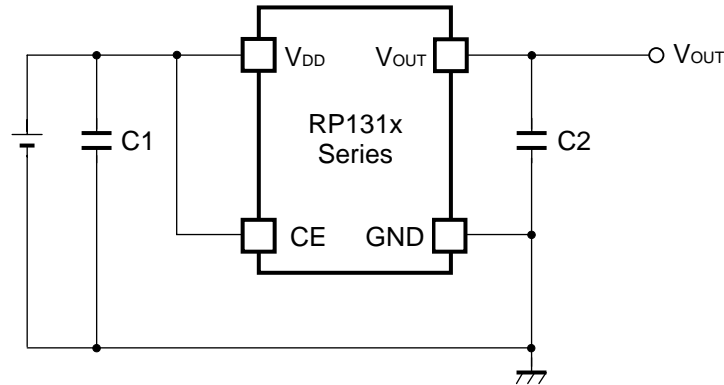
All of unit are tested and specified under load conditions such that T_j ≈ T_{opt} = 25°C except for Output Noise, Ripple Rejection, Output Voltage Temperature Coefficient, Dropout Voltage at 1A Output Current and Thermal Shutdown items.

RECOMMENDED OPERATING CONDITIONS (ELECTRICAL CHARACTERISTICS)

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 conditions by momentary electronic noise or surge.

And the semiconductor devices may receive serious damage when they continue to operate over the recommended operating conditions.

TYPICAL APPLICATION



Recommendation value of the external capacitors

| V_{OUT} | Capacitors | |
|---------------------|------------|----------------------------------------------------|
| $V_{OUT} \leq 3.6V$ | C1 | Kyocera 2.2 μ F (size:1005) [CM05X5R225M06AB] |
| | C2 | Kyocera 2.2 μ F (size:1608) [CM105X5R225K06AB] |
| $V_{OUT} > 3.6V$ | C1 | Kyocera 2.2 μ F (size:1608) [CM105X5R225K06AB] |
| | C2 | Kyocera 4.7 μ F (size:1608) [CM105X5R475M06AB] |

TECHNICAL NOTES

When using these ICs, consider the following points:

Phase Compensation

In these ICs, phase compensation is made for securing stable operation even if the load current is varied. For this purpose, use a capacitor C2 with good frequency characteristics and ESR (Equivalent Series Resistance).

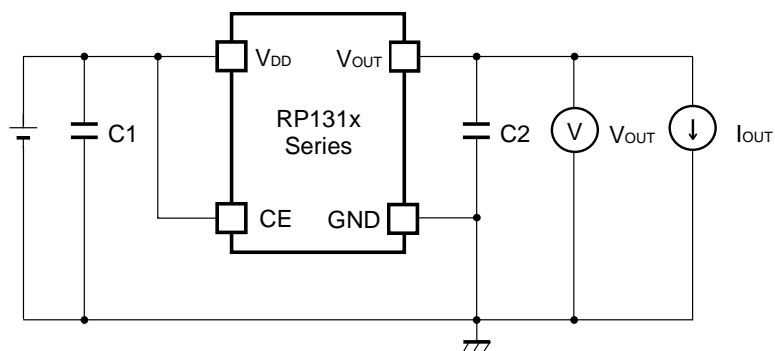
If a tantalum capacitor is used, and its ESR of C2 is large, the loop oscillation may result. Because of this, select C2 carefully considering its frequency characteristics.

PCB Layout

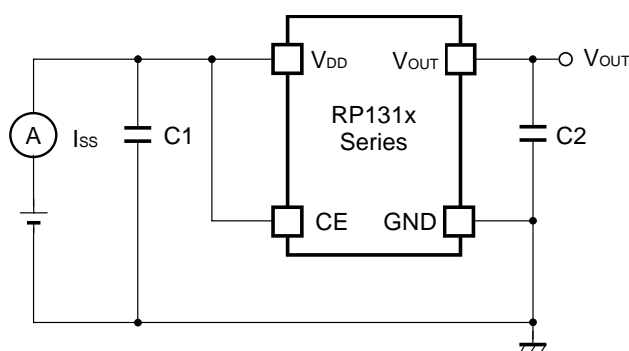
Make V_{DD} and GND lines sufficient. If their impedance is high, noise pickup or unstable operation may result. Connect a capacitor C1 between V_{DD} and GND pin with a capacitance value as "Recommendation value of the external capacitors" above or more, and as close as possible to the pins.

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

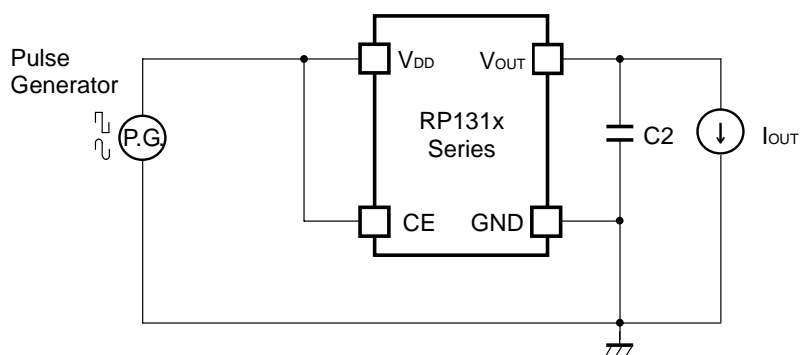
TEST CIRCUITS



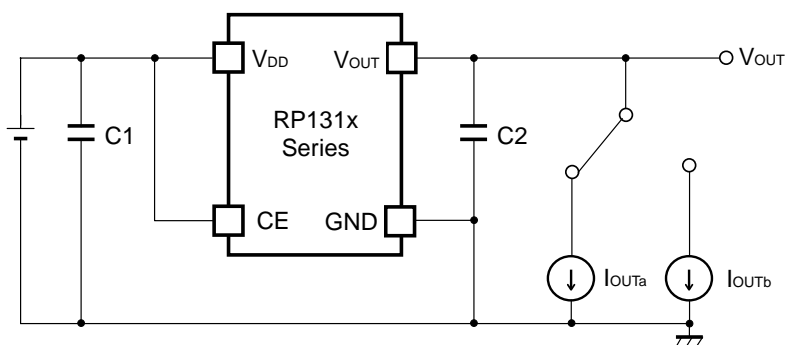
Basic Test Circuit



Test Circuit for Supply Current



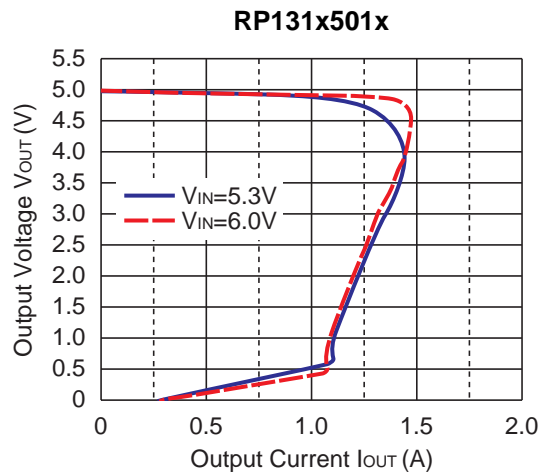
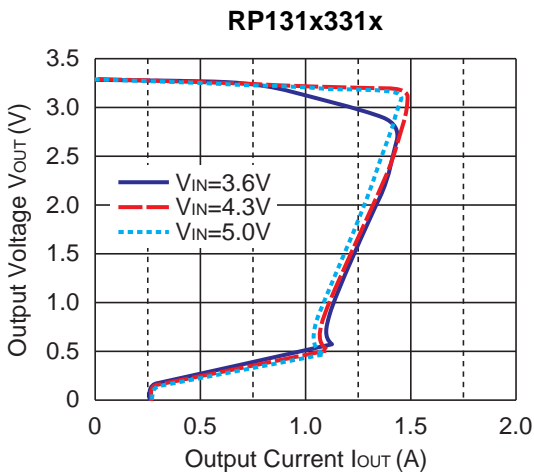
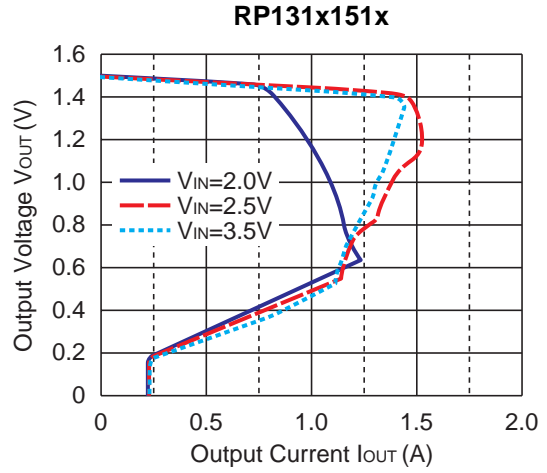
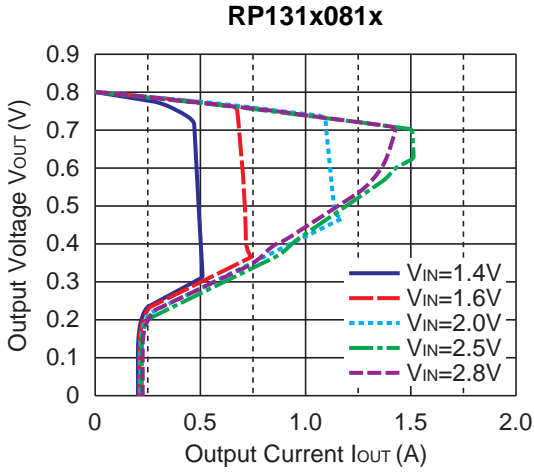
Test Circuit for Ripple Rejection



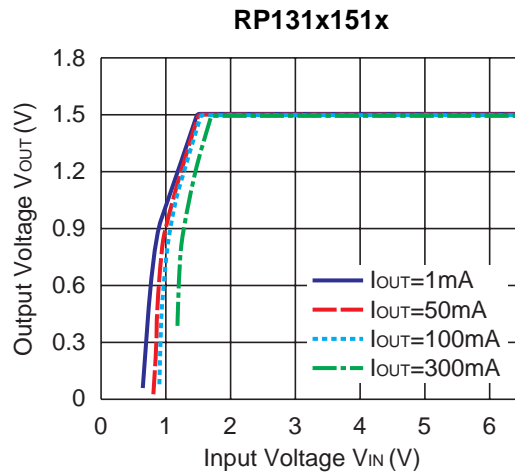
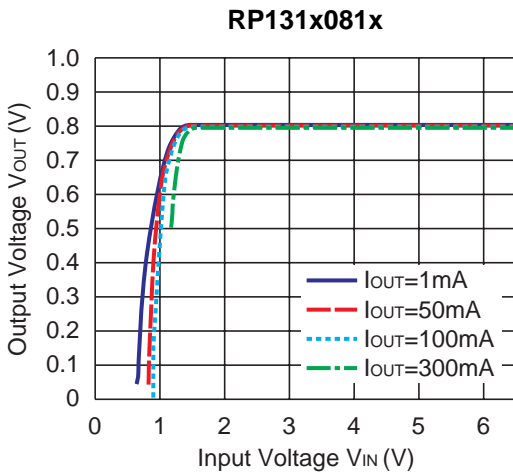
Test Circuit for Load Transient Response

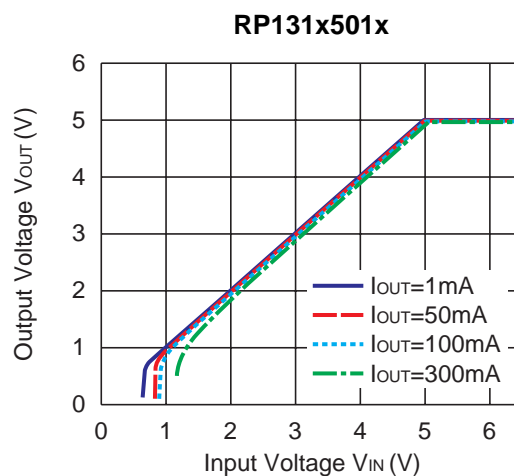
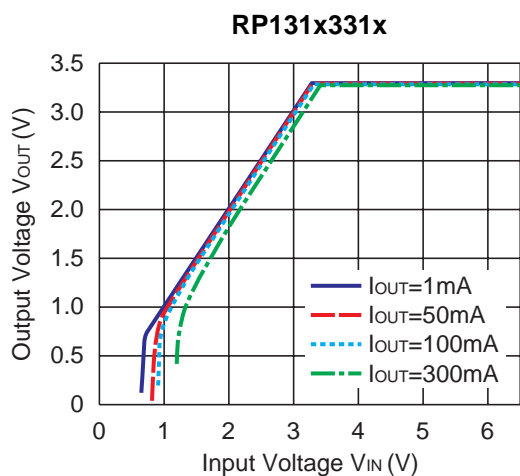
TYPICAL CHARACTERISTICS

1) Output Voltage vs. Output Current (T_{opt}=25°C)

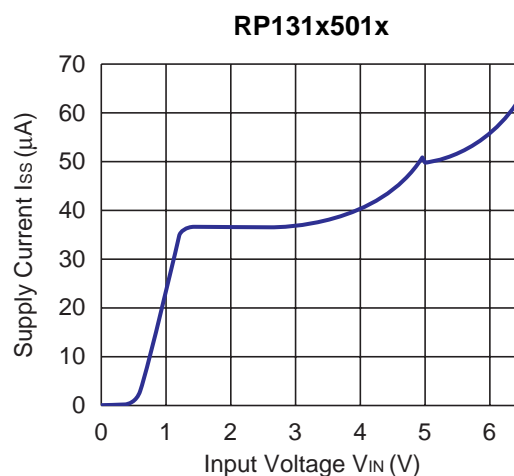
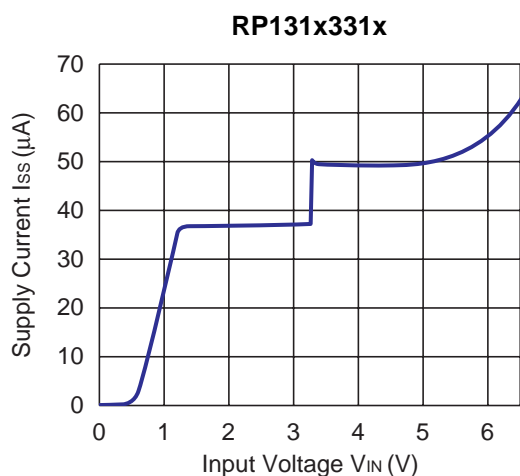
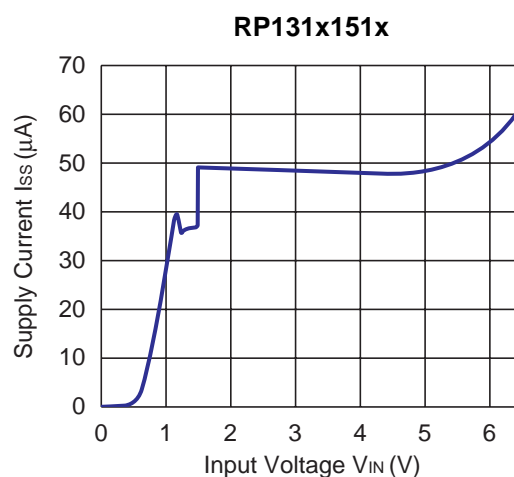
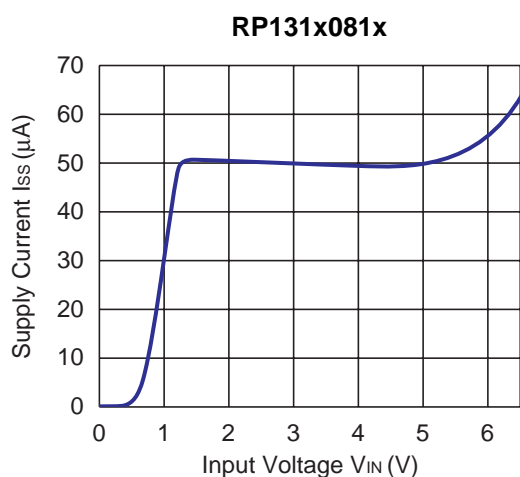


2) Output Voltage vs. Input Voltage (T_{opt}=25°C)

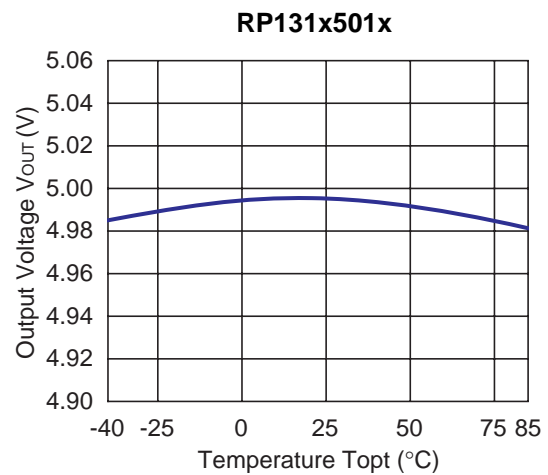
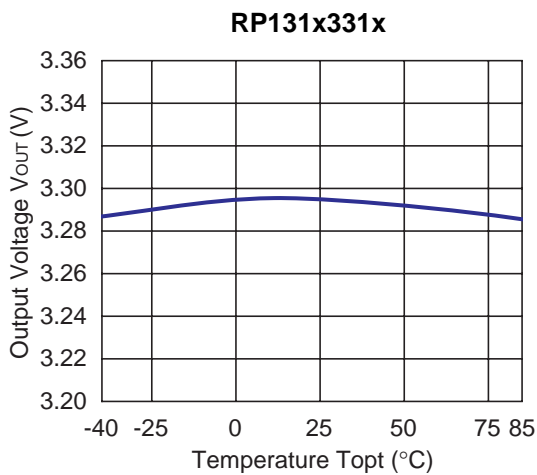
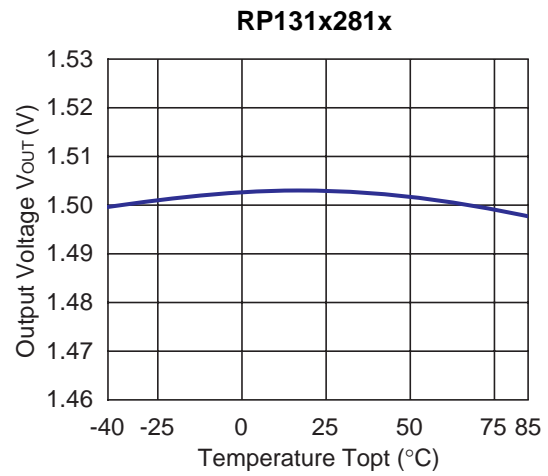
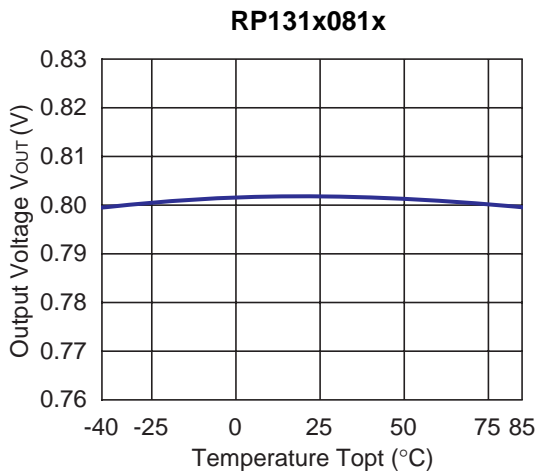
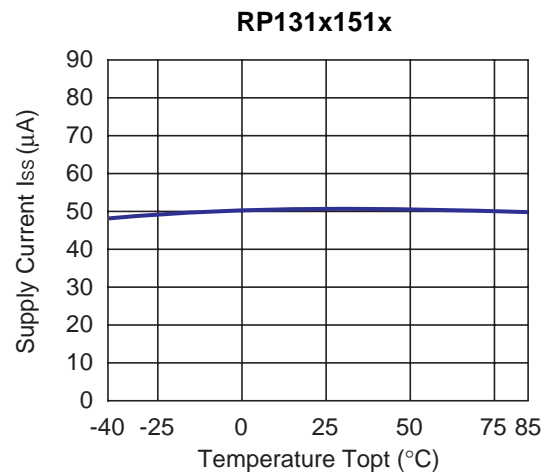
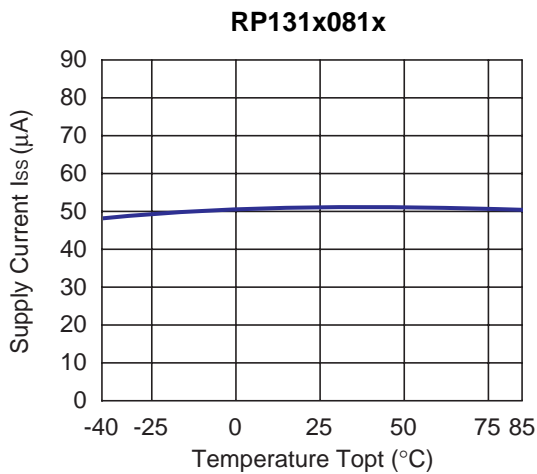




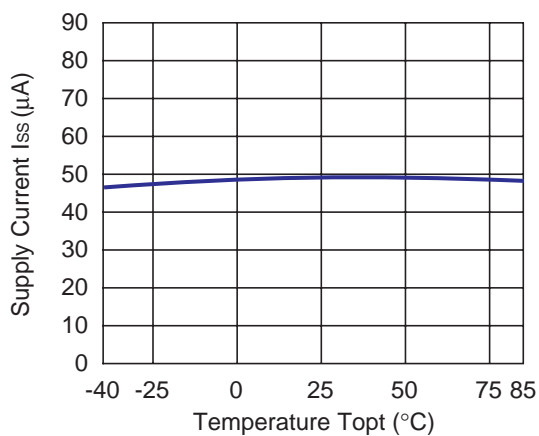
3) Supply Current vs. Input Voltage (Topt=25°C)



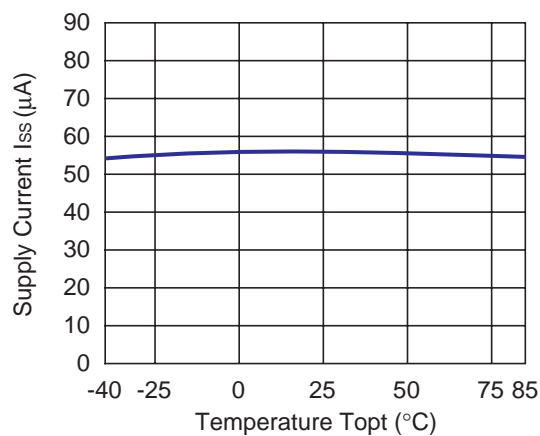
RP131xNO.EA-174-160426

4) Output Voltage vs. Temperature**5) Supply Current vs. Temperature**

RP131x331x

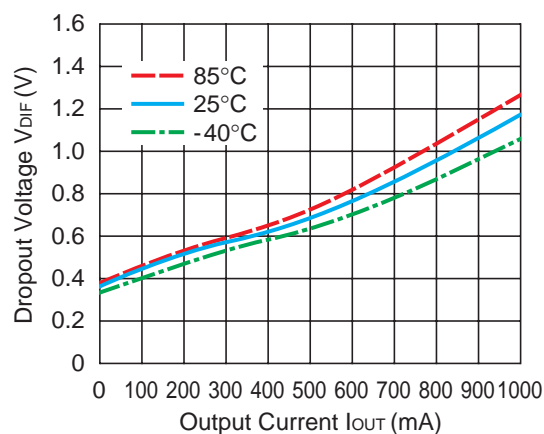


RP131x501x

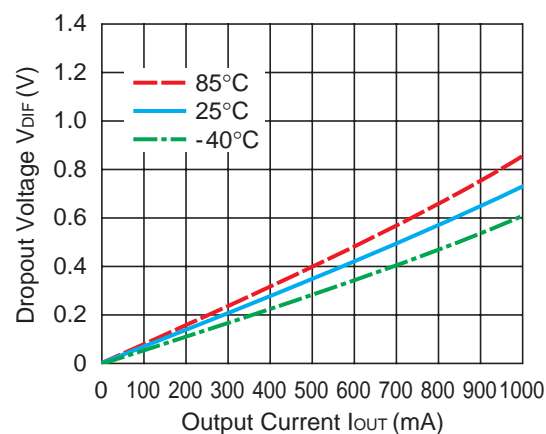


6) Dropout Voltage vs. Output Current

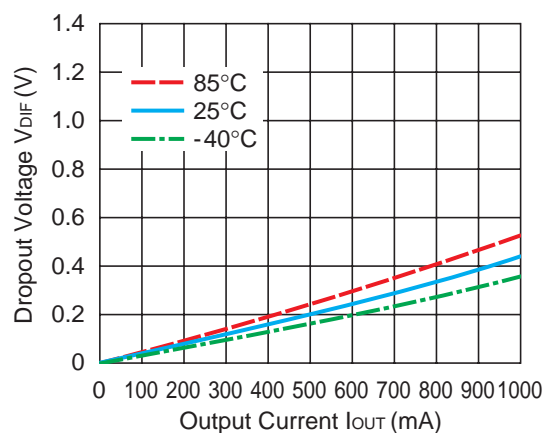
RP131x081x



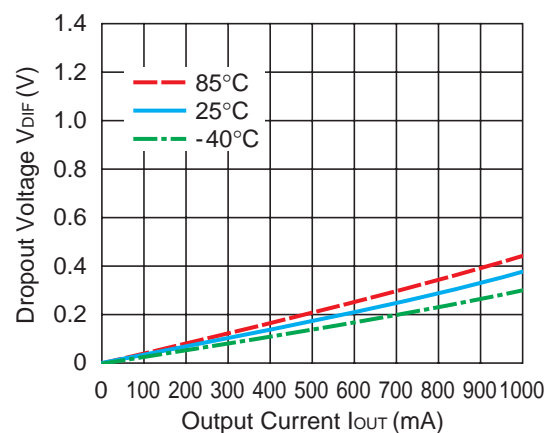
RP131x151x



RP131x331x



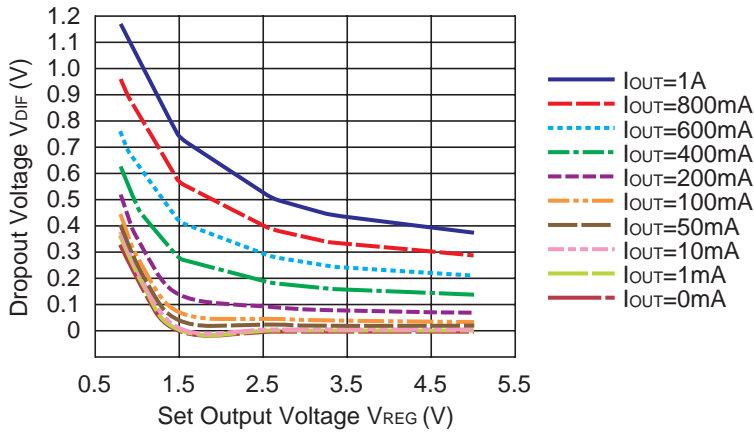
RP131x501x



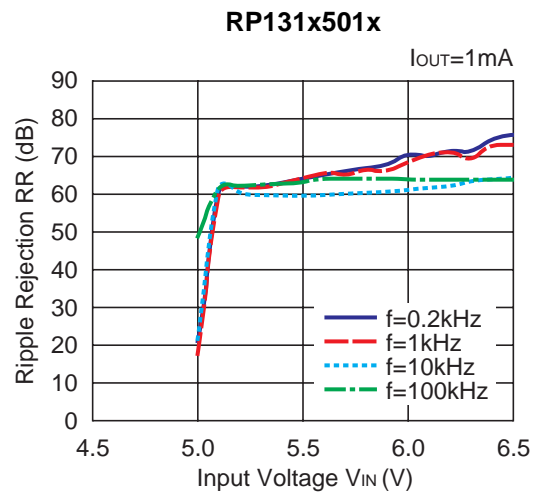
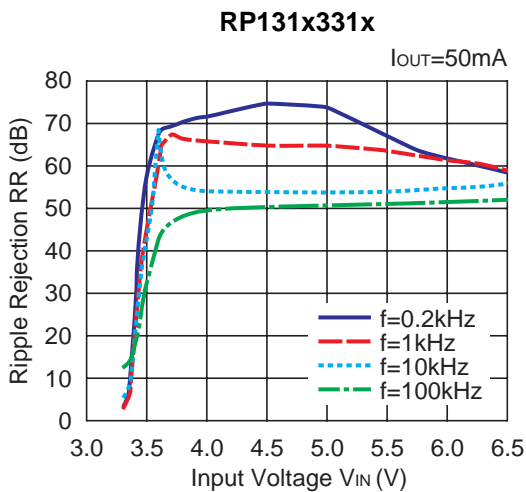
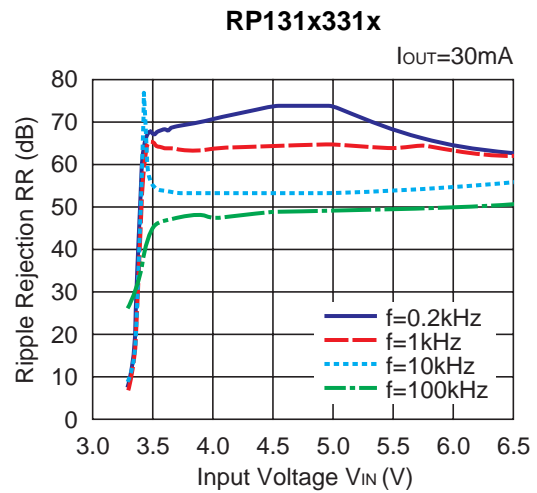
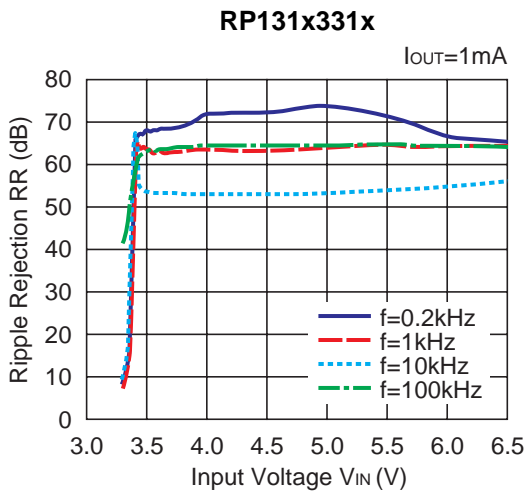
RP131x

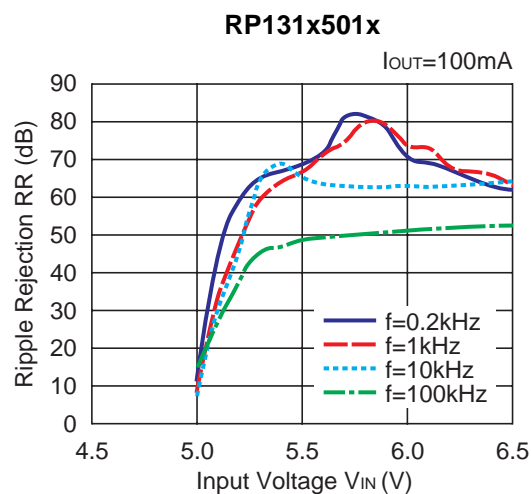
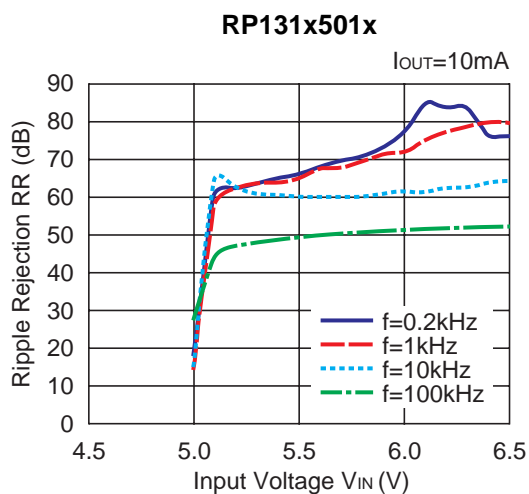
NO.EA-174-160426

7) Dropout Voltage vs. Set Output Voltage

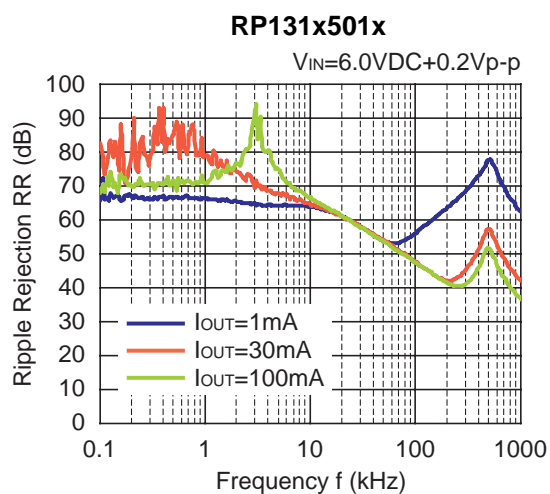
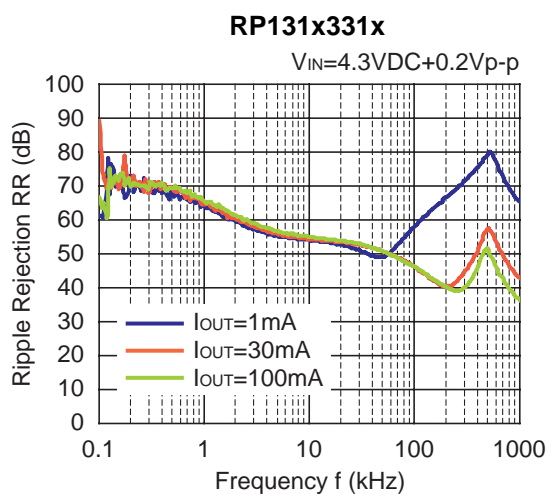
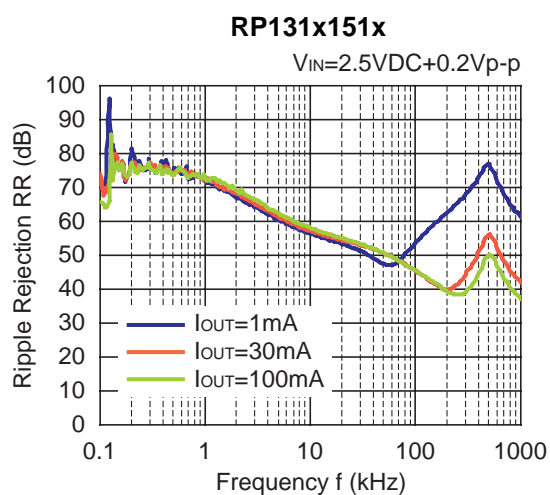
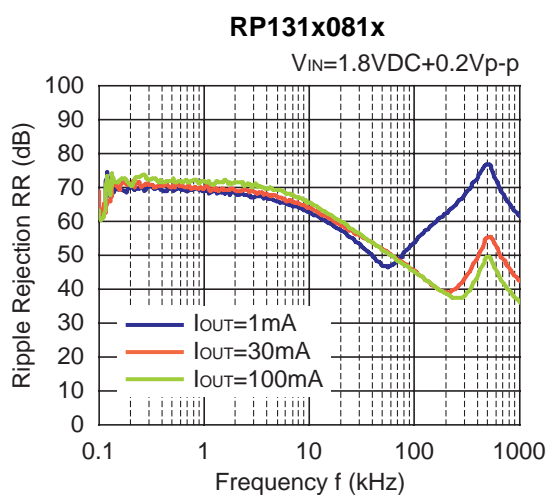


8) Ripple Rejection vs. Input Bias Voltage ($C1=none$, $C2=Ceramic\ 1.0\mu F$, $Ripple=0.2V_{pp}$, $T_{opt}=25^{\circ}C$)





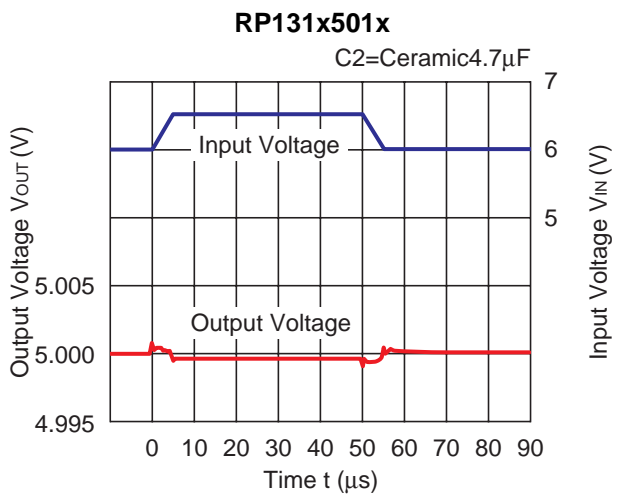
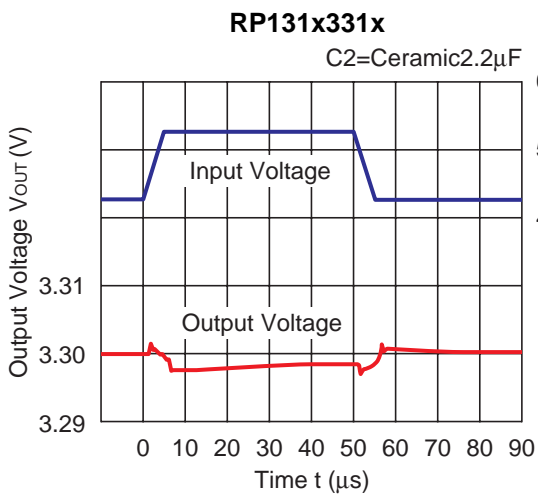
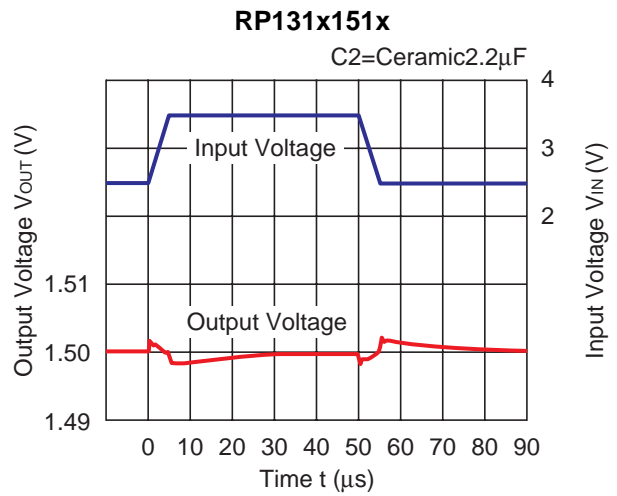
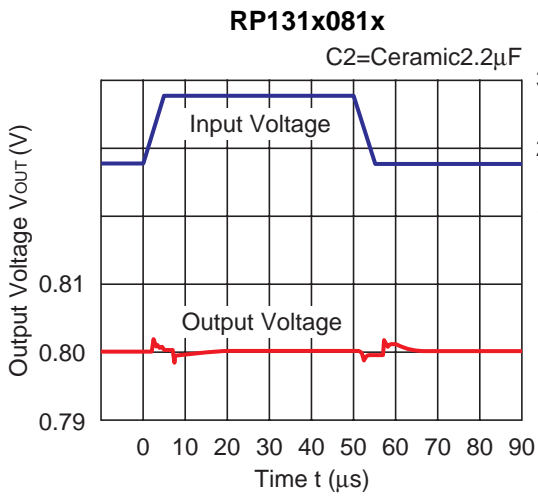
9) Ripple Rejection vs. Frequency ($C1=none$, $C2=Ceramic\ 4.7\mu F$, $T_{opt}=25^{\circ}C$)



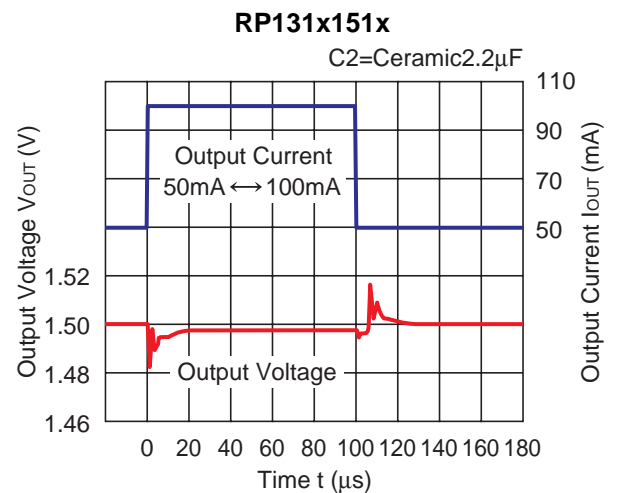
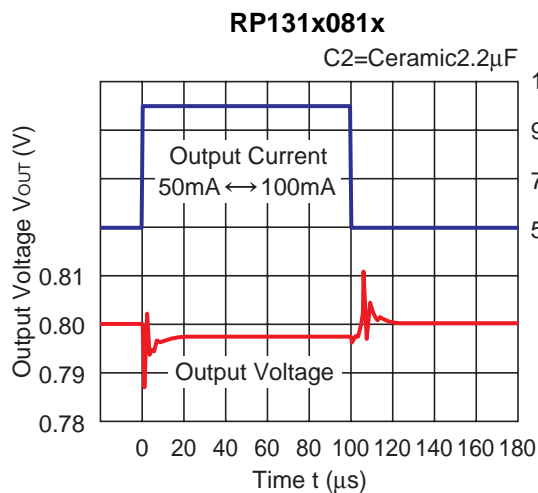
RP131x

NO.EA-174-160426

10) Input Transient Response ($I_{OUT}=100\text{mA}$, $t_r=t_f=5\mu\text{s}$, $C_1=\text{none}$, $T_{opt}=25^\circ\text{C}$)

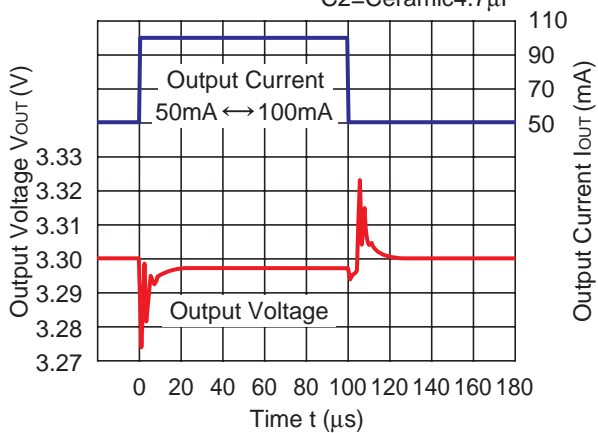


11) Load Transient Response ($t_r=t_f=0.5\mu\text{s}$, $C_1=\text{Ceramic } 2.2\mu\text{F}$, $V_{IN}=V_{OUT}+1.0\text{V}$, $T_{opt}=25^\circ\text{C}$)



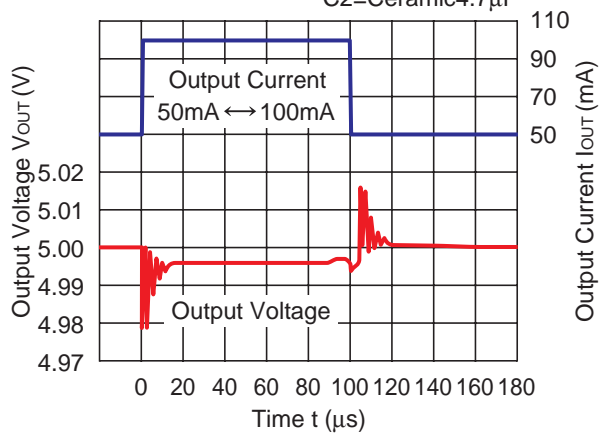
RP131x331x

C2=Ceramic4.7 μ F



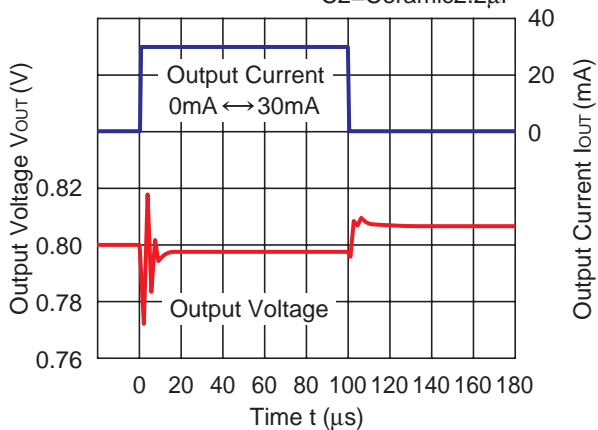
RP131x501x

C2=Ceramic4.7 μ F



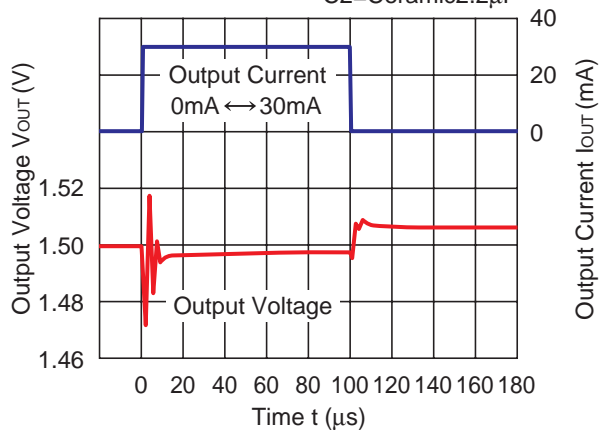
RP131x081x

C2=Ceramic2.2 μ F



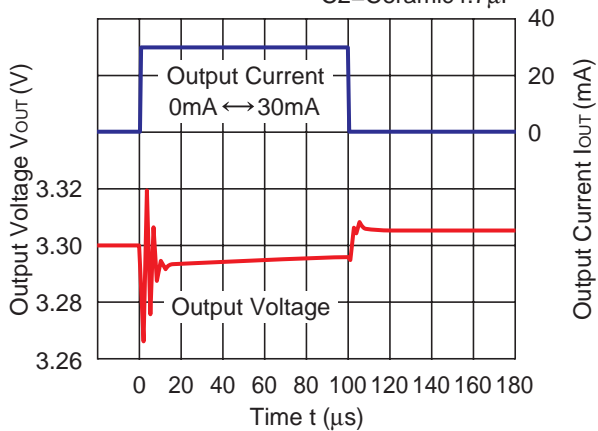
RP131x151x

C2=Ceramic2.2 μ F



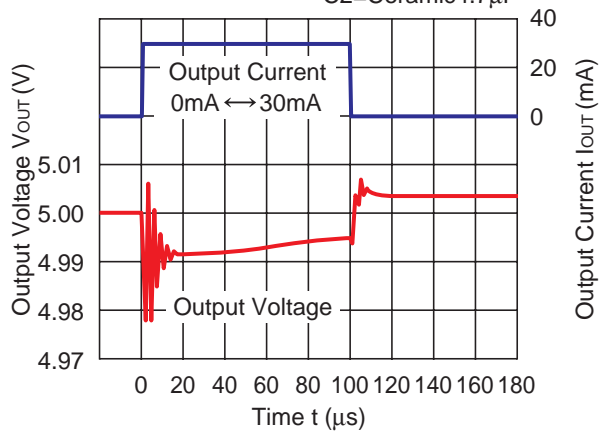
RP131x331x

C2=Ceramic4.7 μ F



RP131x501x

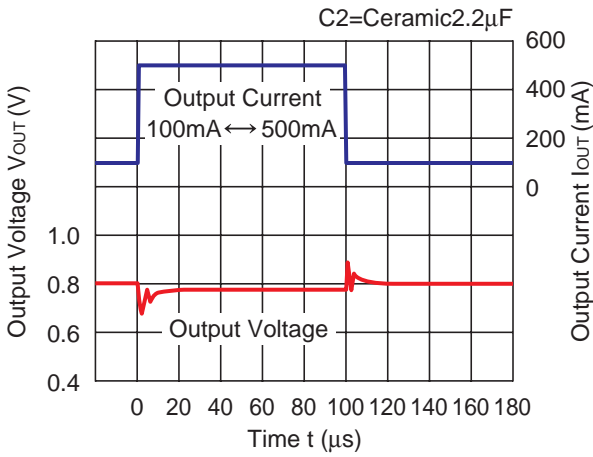
C2=Ceramic4.7 μ F



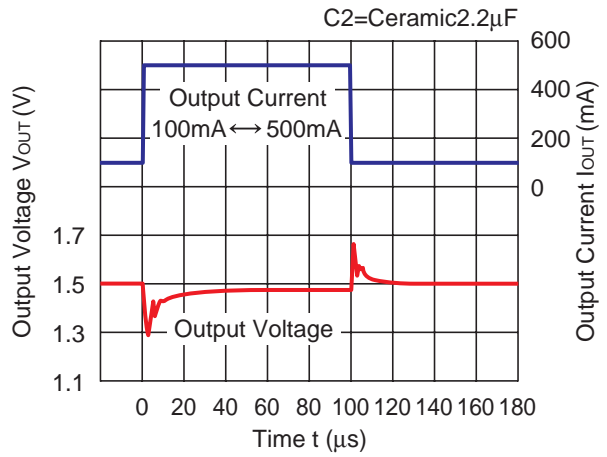
RP131x

NO.EA-174-160426

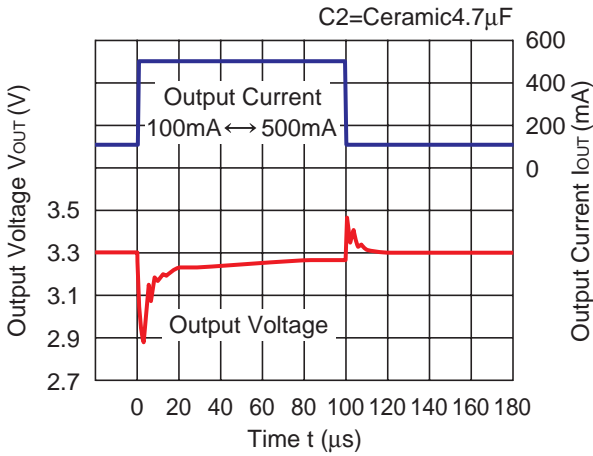
RP131x081x



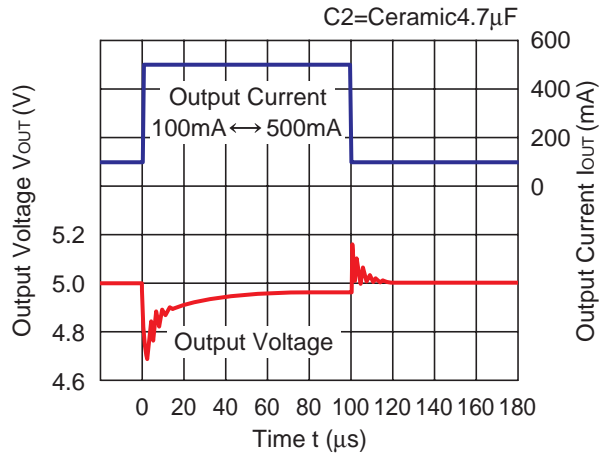
RP131x151x



RP131x331x

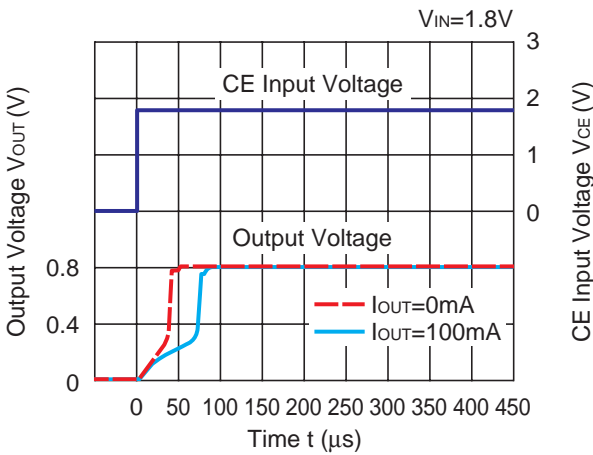


RP131x501x

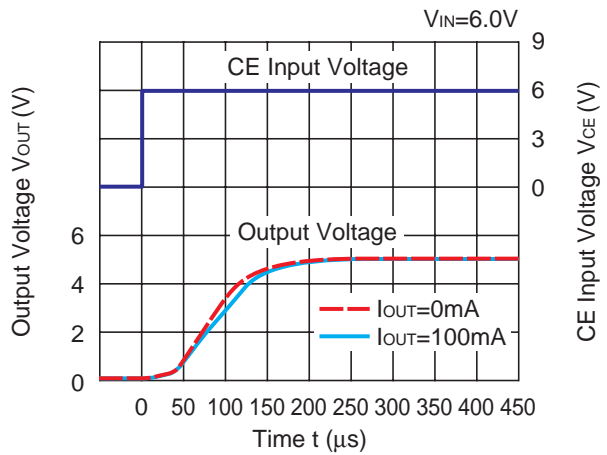


12) Turn On Speed with CE pin (C1=Ceramic 2.2 μ F, C2=Ceramic 4.7 μ F, T_{opt}=25°C)

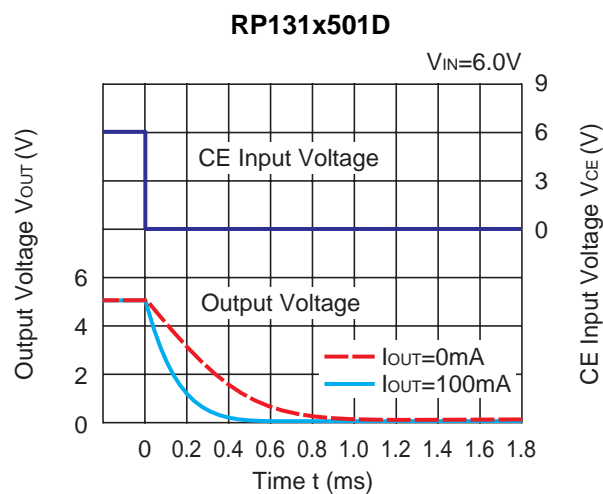
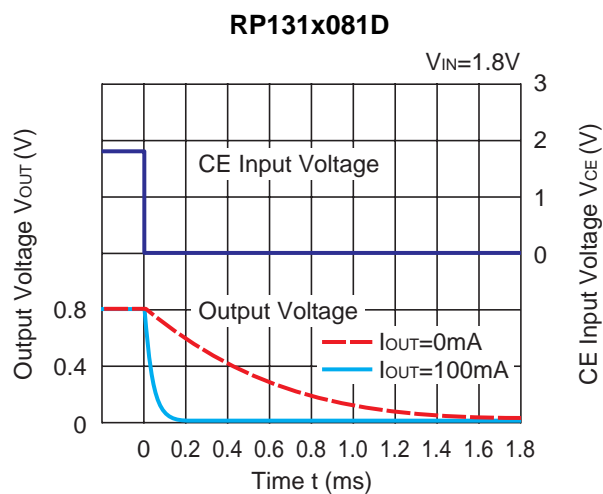
RP131x081x



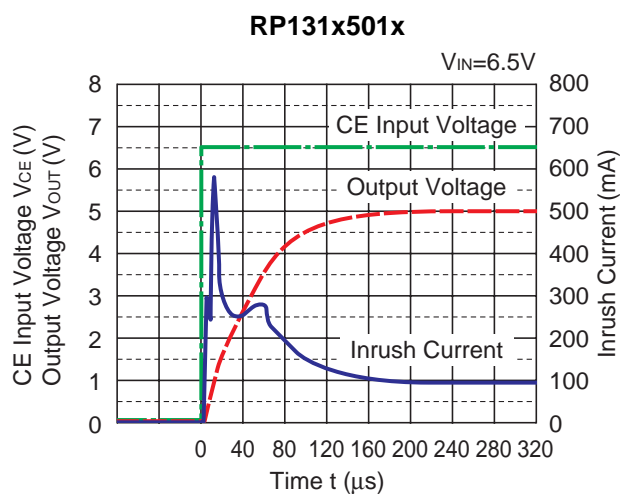
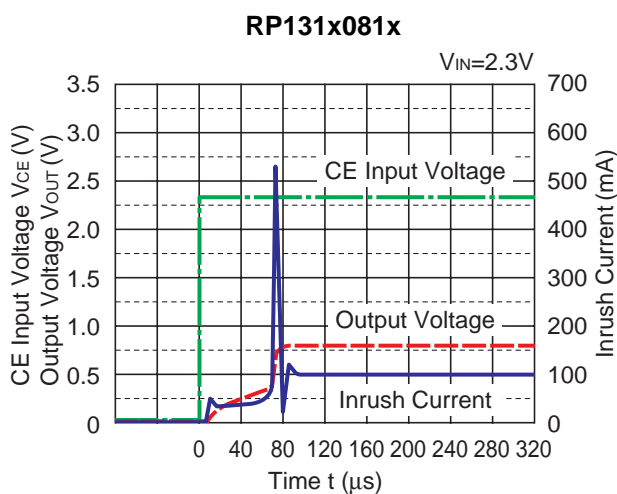
RP131x501x



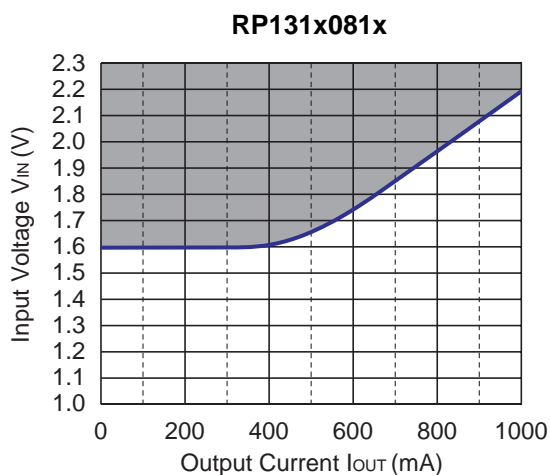
13) Turn Off Speed with CE pin (D Version) (C1=Ceramic 2.2μF, C2=Ceramic 4.7μF, T_{opt}=25°C)



14) Inrush Current at turning on (C1=Ceramic 2.2μF, C2=Ceramic 4.7μF, T_{opt}=25°C)



15) Minimum Operating Voltage



Hatched area is available for 0.8V output.

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 $40\mu\text{V}$ (Avg.) are marked as the hatched area in the graph.

Measurement conditions

Frequency Band : 10Hz to 3MHz

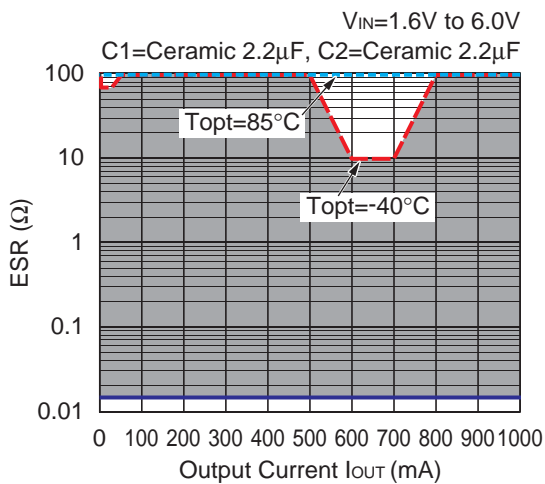
Temperature : -40°C to 85°C

C1 : $2.2\mu\text{F}$ (Kyocera, CM05X5R225M04AD)

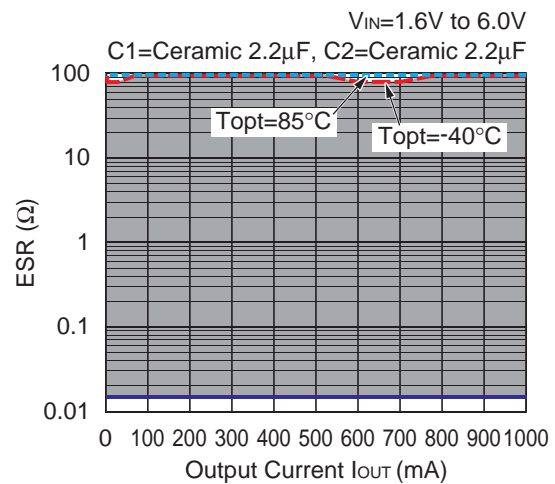
C2 : $2.2\mu\text{F}$ (Kyocera, CM105X5R225K06AE)

$4.7\mu\text{F}$ (Kyocera, CM105X5R475M06AB)

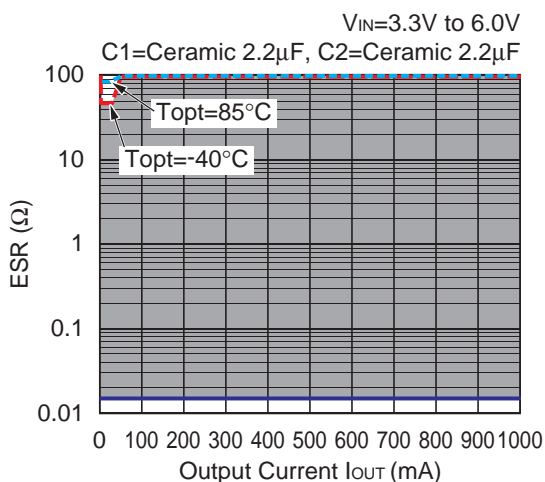
RP131x081x



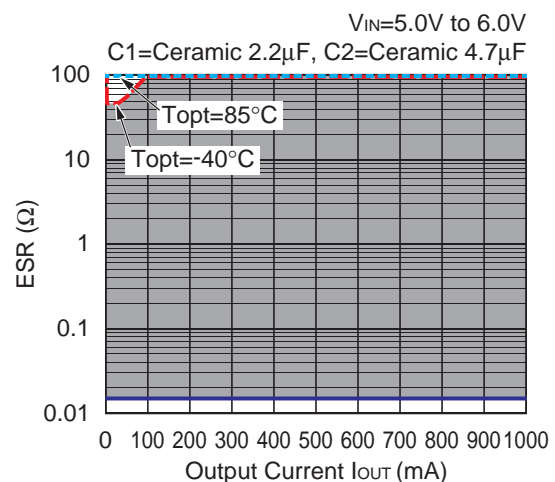
RP131x151x



RP131x331x



RP131x501x



PACKAGE INFORMATION

Power Dissipation (DFN1616-6B)

This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

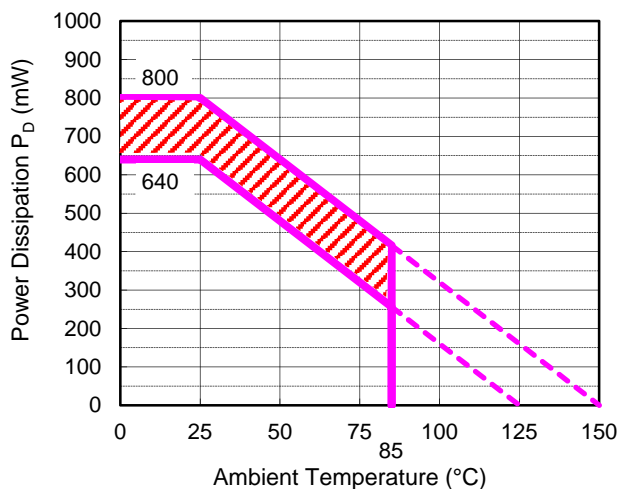
* Measurement Conditions

| | |
|------------------|-----------------------------------------------|
| | Standard Test Land Pattern |
| Environment | Mounting on Board (Wind velocity=0m/s) |
| Board Material | Glass cloth epoxy plastic (Double-sided) |
| Board Dimensions | 40mm*40mm*1.6mm |
| Copper Ratio | Top side: Approx. 50%, Back side: Approx. 50% |
| Through-holes | ϕ 0.5mm * 32pcs |

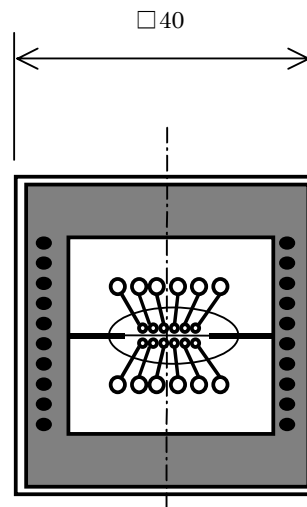
Measurement Result

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

| | |
|--------------------|-----------------------------------------------------------------------------------------------------------------|
| | Standard Test Land Pattern |
| Power Dissipation | 640mW ($T_{j\text{max}}=125^\circ\text{C}$) 820mW ($T_{j\text{max}}=150^\circ\text{C}$) |
| Thermal Resistance | $\theta_{ja} = (125-25^\circ\text{C})/0.64\text{W} = 156^\circ\text{C/W}$ $\theta_{jc} = 23^\circ\text{C/W}$ |



Power Dissipation



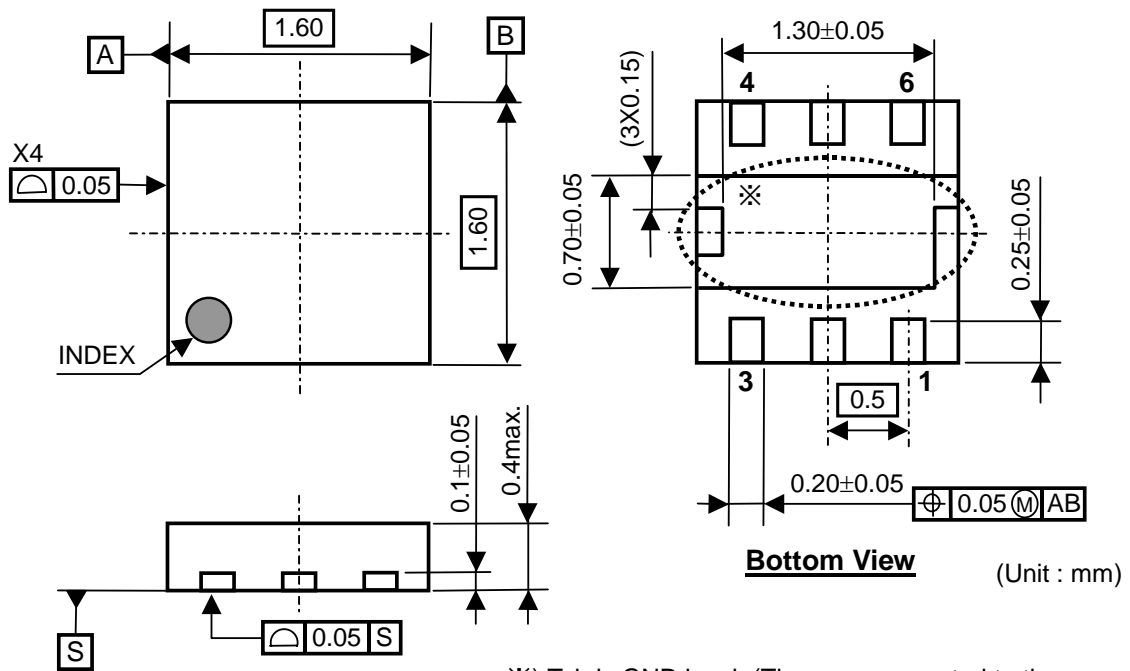
Measurement Board Pattern

○ IC Mount Area (Unit: mm)

The above graph shows the Power Dissipation of the package based on $T_{j\text{max}}=125^\circ\text{C}$ and $T_{j\text{max}}=150^\circ\text{C}$. Operating the IC in the shaded area in the graph might have an influence it's lifetime. Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

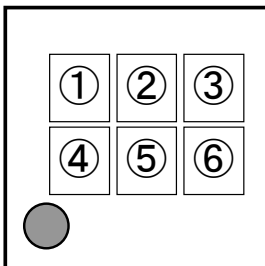
| | |
|----------------|-----------------------------------------------|
| Operating Time | Estimated years (Operating four hours/day) |
| 13,000 hours | 9years |

RP131xNO.EA-174-160426

Package Dimensions (DFN1616-6B)

※) 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.

Mark Specifications (DFN1616-6B)

①②③④: Product Code ... Refer to RP131L Series Mark Specification Table.

⑤⑥: Lot Number ... Alphanumeric Serial Number

RP131L Series Mark Specification Table

PKG: DFN1616-6B

RP131Lxx1B

| Part Number | ①②③④ | Vset |
|-------------|--------------|-------|
| RP131L081B | CB 01 | 0.8V |
| RP131L091B | CB 02 | 0.9V |
| RP131L101B | CB 03 | 1.0V |
| RP131L111B | CB 04 | 1.1V |
| RP131L121B | CB 05 | 1.2V |
| RP131L121B5 | CB 06 | 1.25V |
| RP131L131B | CB 07 | 1.3V |
| RP131L141B | CB 08 | 1.4V |
| RP131L151B | CB 09 | 1.5V |
| RP131L161B | CB 10 | 1.6V |
| RP131L171B | CB 11 | 1.7V |
| RP131L181B | CB 12 | 1.8V |
| RP131L181B5 | CB 13 | 1.85V |
| RP131L191B | CB 14 | 1.9V |
| RP131L201B | CB 15 | 2.0V |
| RP131L211B | CB 16 | 2.1V |
| RP131L221B | CB 17 | 2.2V |
| RP131L231B | CB 18 | 2.3V |
| RP131L241B | CB 19 | 2.4V |
| RP131L251B | CB 20 | 2.5V |
| RP131L261B | CB 21 | 2.6V |
| RP131L271B | CB 22 | 2.7V |
| RP131L281B | CB 23 | 2.8V |
| RP131L281B5 | CB 24 | 2.85V |
| RP131L291B | CB 25 | 2.9V |
| RP131L301B | CB 26 | 3.0V |
| RP131L311B | CB 27 | 3.1V |
| RP131L321B | CB 28 | 3.2V |
| RP131L331B | CB 29 | 3.3V |
| RP131L341B | CB 30 | 3.4V |
| RP131L351B | CB 31 | 3.5V |
| RP131L361B | CB 32 | 3.6V |
| RP131L371B | CB 33 | 3.7V |
| RP131L381B | CB 34 | 3.8V |
| RP131L391B | CB 35 | 3.9V |
| RP131L401B | CB 36 | 4.0V |
| RP131L411B | CB 37 | 4.1V |
| RP131L421B | CB 38 | 4.2V |
| RP131L431B | CB 39 | 4.3V |
| RP131L441B | CB 40 | 4.4V |
| RP131L451B | CB 41 | 4.5V |
| RP131L461B | CB 42 | 4.6V |
| RP131L471B | CB 43 | 4.7V |
| RP131L481B | CB 44 | 4.8V |
| RP131L491B | CB 45 | 4.9V |
| RP131L501B | CB 46 | 5.0V |
| RP131L101B5 | CB 47 | 1.05V |
| RP131L511B | CB 48 | 5.1V |
| RP131L521B | CB 49 | 5.2V |
| RP131L531B | CB 50 | 5.3V |
| RP131L541B | CB 51 | 5.4V |
| RP131L551B | CB 52 | 5.5V |

RP131Lxx1D

| Part Number | ①②③④ | Vset |
|-------------|--------------|-------|
| RP131L081D | CC 01 | 0.8V |
| RP131L091D | CC 02 | 0.9V |
| RP131L101D | CC 03 | 1.0V |
| RP131L111D | CC 04 | 1.1V |
| RP131L121D | CC 05 | 1.2V |
| RP131L121D5 | CC 06 | 1.25V |
| RP131L131D | CC 07 | 1.3V |
| RP131L141D | CC 08 | 1.4V |
| RP131L151D | CC 09 | 1.5V |
| RP131L161D | CC 10 | 1.6V |
| RP131L171D | CC 11 | 1.7V |
| RP131L181D | CC 12 | 1.8V |
| RP131L181D5 | CC 13 | 1.85V |
| RP131L191D | CC 14 | 1.9V |
| RP131L201D | CC 15 | 2.0V |
| RP131L211D | CC 16 | 2.1V |
| RP131L221D | CC 17 | 2.2V |
| RP131L231D | CC 18 | 2.3V |
| RP131L241D | CC 19 | 2.4V |
| RP131L251D | CC 20 | 2.5V |
| RP131L261D | CC 21 | 2.6V |
| RP131L271D | CC 22 | 2.7V |
| RP131L281D | CC 23 | 2.8V |
| RP131L281D5 | CC 24 | 2.85V |
| RP131L291D | CC 25 | 2.9V |
| RP131L301D | CC 26 | 3.0V |
| RP131L311D | CC 27 | 3.1V |
| RP131L321D | CC 28 | 3.2V |
| RP131L331D | CC 29 | 3.3V |
| RP131L341D | CC 30 | 3.4V |
| RP131L351D | CC 31 | 3.5V |
| RP131L361D | CC 32 | 3.6V |
| RP131L371D | CC 33 | 3.7V |
| RP131L381D | CC 34 | 3.8V |
| RP131L391D | CC 35 | 3.9V |
| RP131L401D | CC 36 | 4.0V |
| RP131L411D | CC 37 | 4.1V |
| RP131L421D | CC 38 | 4.2V |
| RP131L431D | CC 39 | 4.3V |
| RP131L441D | CC 40 | 4.4V |
| RP131L451D | CC 41 | 4.5V |
| RP131L461D | CC 42 | 4.6V |
| RP131L471D | CC 43 | 4.7V |
| RP131L481D | CC 44 | 4.8V |
| RP131L491D | CC 45 | 4.9V |
| RP131L501D | CC 46 | 5.0V |
| RP131L101D5 | CC 47 | 1.05V |
| RP131L511D | CC 48 | 5.1V |
| RP131L521D | CC 49 | 5.2V |
| RP131L531D | CC 50 | 5.3V |
| RP131L541D | CC 51 | 5.4V |
| RP131L551D | CC 52 | 5.5V |

RP131x

NO.EA-174-160426

Power Dissipation (DFN(PLP)1820-6)

This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

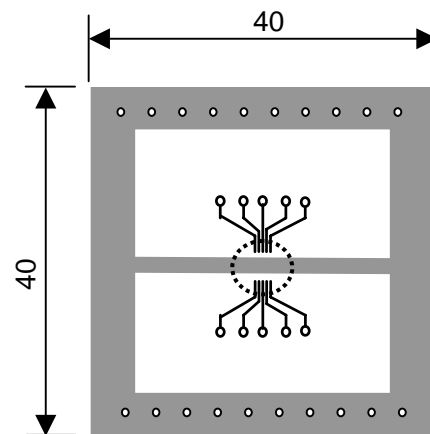
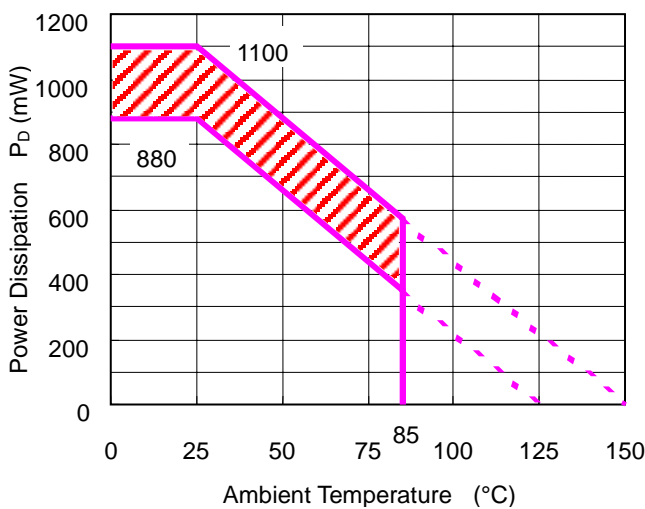
Measurement Conditions

| | Standard Land Pattern |
|------------------|-----------------------------------------------|
| Environment | Mounting on Board (Wind velocity=0m/s) |
| Board Material | Glass cloth epoxy plastic (Double-sided) |
| Board Dimensions | 40mm * 40mm * 1.6mm |
| Copper Ratio | Top side: Approx. 50%, Back side: Approx. 50% |
| Through-hole | $\phi 0.54\text{mm} * 30\text{pcs}$ |

Measurement Result

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

| | Standard Land Pattern |
|--------------------|-----------------------------------------------------------------------------------------------|
| Power Dissipation | 880mW($T_{j\text{max}}=125^\circ\text{C}$) 1100mW($T_{j\text{max}}=150^\circ\text{C}$) |
| Thermal Resistance | $\theta_{ja}=(125 - 25^\circ\text{C})/0.88\text{W}=114^\circ\text{C/W}$ |



Measurement Board Pattern

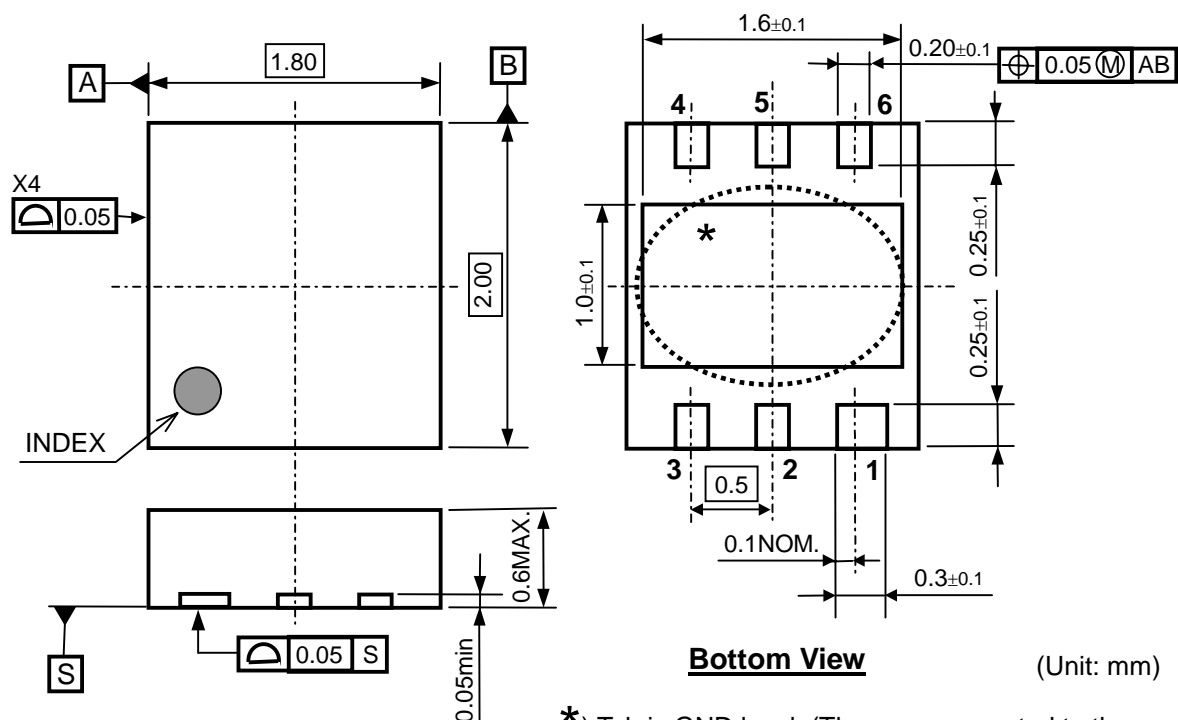
○ IC Mount Area Unit: mm

- The above graph shows the Power Dissipation of the package based on $T_{j\text{max}}=125^\circ\text{C}$ and $T_{j\text{max}}=150^\circ\text{C}$. Operating the IC in the shaded area in the graph might have an influence it's lifetime.

Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

| Operating Time | Estimated years (Operating four hours/day) |
|----------------|-----------------------------------------------|
| 13,000 hours | 9years |

Package Dimensions (DFN(PLP)1820-6)

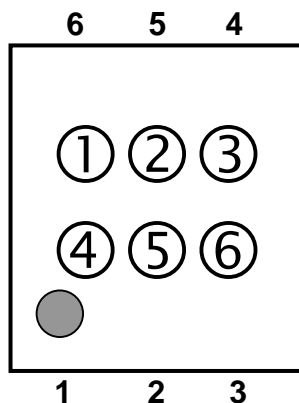


*) Tab is GND level. (They are connected to the reverse side of this IC.)
 The tab is better to be connected to the GND, but leaving it open is also acceptable.

Mark Specifications (DFN(PLP)1820-6)

①②③④: Product Code ... Refer to RP131K Series Mark Specification Table.

⑤⑥: Lot Number ... Alphanumeric Serial Number



RP131K Series Mark Specification Table

PKG: DFN(PLP)1820-6

RP131Kxx1B

| Part Number | ①②③④ | Vset |
|-------------|--------------|-------|
| RP131K081B | AM 01 | 0.8V |
| RP131K091B | AM 02 | 0.9V |
| RP131K101B | AM 03 | 1.0V |
| RP131K111B | AM 04 | 1.1V |
| RP131K121B | AM 05 | 1.2V |
| RP131K121B5 | AM 06 | 1.25V |
| RP131K131B | AM 07 | 1.3V |
| RP131K141B | AM 08 | 1.4V |
| RP131K151B | AM 09 | 1.5V |
| RP131K161B | AM 10 | 1.6V |
| RP131K171B | AM 11 | 1.7V |
| RP131K181B | AM 12 | 1.8V |
| RP131K181B5 | AM 13 | 1.85V |
| RP131K191B | AM 14 | 1.9V |
| RP131K201B | AM 15 | 2.0V |
| RP131K211B | AM 16 | 2.1V |
| RP131K221B | AM 17 | 2.2V |
| RP131K231B | AM 18 | 2.3V |
| RP131K241B | AM 19 | 2.4V |
| RP131K251B | AM 20 | 2.5V |
| RP131K261B | AM 21 | 2.6V |
| RP131K271B | AM 22 | 2.7V |
| RP131K281B | AM 23 | 2.8V |
| RP131K281B5 | AM 24 | 2.85V |
| RP131K291B | AM 25 | 2.9V |
| RP131K301B | AM 26 | 3.0V |
| RP131K311B | AM 27 | 3.1V |
| RP131K321B | AM 28 | 3.2V |
| RP131K331B | AM 29 | 3.3V |
| RP131K341B | AM 30 | 3.4V |
| RP131K351B | AM 31 | 3.5V |
| RP131K361B | AM 32 | 3.6V |
| RP131K371B | AM 33 | 3.7V |
| RP131K381B | AM 34 | 3.8V |
| RP131K391B | AM 35 | 3.9V |
| RP131K401B | AM 36 | 4.0V |
| RP131K411B | AM 37 | 4.1V |
| RP131K421B | AM 38 | 4.2V |
| RP131K431B | AM 39 | 4.3V |
| RP131K441B | AM 40 | 4.4V |
| RP131K451B | AM 41 | 4.5V |
| RP131K461B | AM 42 | 4.6V |
| RP131K471B | AM 43 | 4.7V |
| RP131K481B | AM 44 | 4.8V |
| RP131K491B | AM 45 | 4.9V |
| RP131K501B | AM 46 | 5.0V |
| RP131K101B5 | AM 47 | 1.05V |
| RP131K551B | AM 48 | 5.5V |
| RP131K511B | AM 49 | 5.1V |
| RP131K521B | AM 50 | 5.2V |
| RP131K531B | AM 51 | 5.3V |
| RP131K541B | AM 52 | 5.4V |

RP131Kxx1D

| Part Number | ①②③④ | Vset |
|-------------|--------------|-------|
| RP131K081D | AN 01 | 0.8V |
| RP131K091D | AN 02 | 0.9V |
| RP131K101D | AN 03 | 1.0V |
| RP131K111D | AN 04 | 1.1V |
| RP131K121D | AN 05 | 1.2V |
| RP131K121D5 | AN 06 | 1.25V |
| RP131K131D | AN 07 | 1.3V |
| RP131K141D | AN 08 | 1.4V |
| RP131K151D | AN 09 | 1.5V |
| RP131K161D | AN 10 | 1.6V |
| RP131K171D | AN 11 | 1.7V |
| RP131K181D | AN 12 | 1.8V |
| RP131K181D5 | AN 13 | 1.85V |
| RP131K191D | AN 14 | 1.9V |
| RP131K201D | AN 15 | 2.0V |
| RP131K211D | AN 16 | 2.1V |
| RP131K221D | AN 17 | 2.2V |
| RP131K231D | AN 18 | 2.3V |
| RP131K241D | AN 19 | 2.4V |
| RP131K251D | AN 20 | 2.5V |
| RP131K261D | AN 21 | 2.6V |
| RP131K271D | AN 22 | 2.7V |
| RP131K281D | AN 23 | 2.8V |
| RP131K281D5 | AN 24 | 2.85V |
| RP131K291D | AN 25 | 2.9V |
| RP131K301D | AN 26 | 3.0V |
| RP131K311D | AN 27 | 3.1V |
| RP131K321D | AN 28 | 3.2V |
| RP131K331D | AN 29 | 3.3V |
| RP131K341D | AN 30 | 3.4V |
| RP131K351D | AN 31 | 3.5V |
| RP131K361D | AN 32 | 3.6V |
| RP131K371D | AN 33 | 3.7V |
| RP131K381D | AN 34 | 3.8V |
| RP131K391D | AN 35 | 3.9V |
| RP131K401D | AN 36 | 4.0V |
| RP131K411D | AN 37 | 4.1V |
| RP131K421D | AN 38 | 4.2V |
| RP131K431D | AN 39 | 4.3V |
| RP131K441D | AN 40 | 4.4V |
| RP131K451D | AN 41 | 4.5V |
| RP131K461D | AN 42 | 4.6V |
| RP131K471D | AN 43 | 4.7V |
| RP131K481D | AN 44 | 4.8V |
| RP131K491D | AN 45 | 4.9V |
| RP131K501D | AN 46 | 5.0V |
| RP131K101D5 | AN 47 | 1.05V |
| RP131K551D | AN 48 | 5.5V |
| RP131K511D | AN 49 | 5.1V |
| RP131K521D | AN 50 | 5.2V |
| RP131K531D | AN 51 | 5.3V |
| RP131K541D | AN 52 | 5.4V |

Power Dissipation (SOT-89-5)

This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

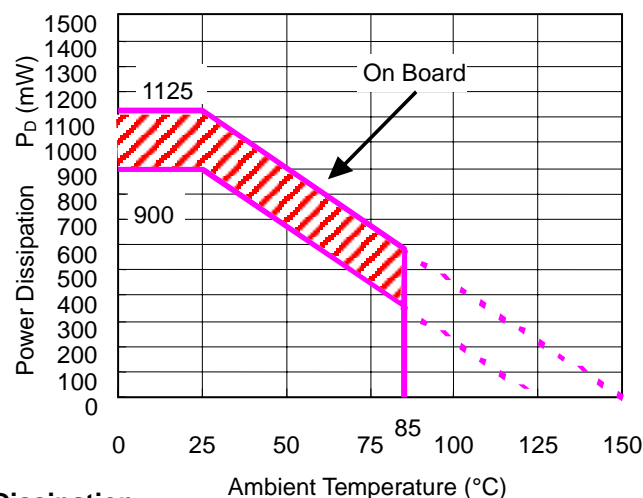
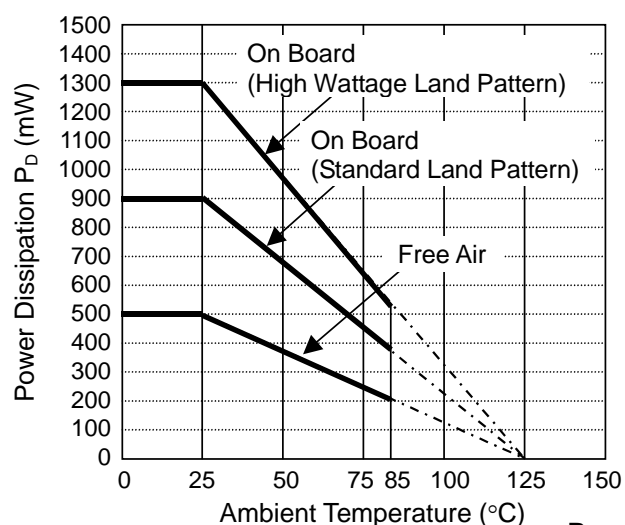
Measurement Conditions

| | High Wattage Land Pattern | Standard Land Pattern |
|------------------|--------------------------------------------------|--------------------------------------------------|
| Environment | Mounting on Board (Wind velocity=0m/s) | Mounting on Board (Wind velocity=0m/s) |
| Board Material | Glass cloth epoxy plastic (Double-sided) | Glass cloth epoxy plastic (Double-sided) |
| Board Dimensions | 30mm * 30mm * 1.6mm | 50mm * 50mm * 1.6mm |
| Copper Ratio | Top side: Approx. 20% Back side: Approx. 100% | Top side: Approx. 10% Back side: Approx. 100% |
| Through-hole | ϕ 0.85mm * 10pcs | - |

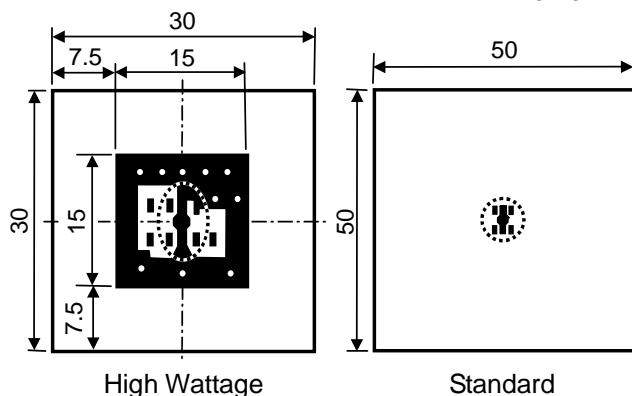
Measurement Result

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

| | High Wattage Land Pattern | Standard Land Pattern | Free Air |
|--------------------|---------------------------|-----------------------------------------------------------------------------------|----------|
| Power Dissipation | 1300mW | 900mW ($T_{jmax}=125^\circ\text{C}$) 1125mW ($T_{jmax}=150^\circ\text{C}$) | 500mW |
| Thermal Resistance | 77°C/W | 111°C/W | 200°C/W |



Power Dissipation



Measurement Board Pattern

○ IC Mount Area Unit: mm

- The above graph shows the Power Dissipation of the package based on $T_{jmax}=125^\circ\text{C}$ and $T_{jmax}=150^\circ\text{C}$.

Operating the IC in the shaded area in the graph might have an influence it's lifetime.

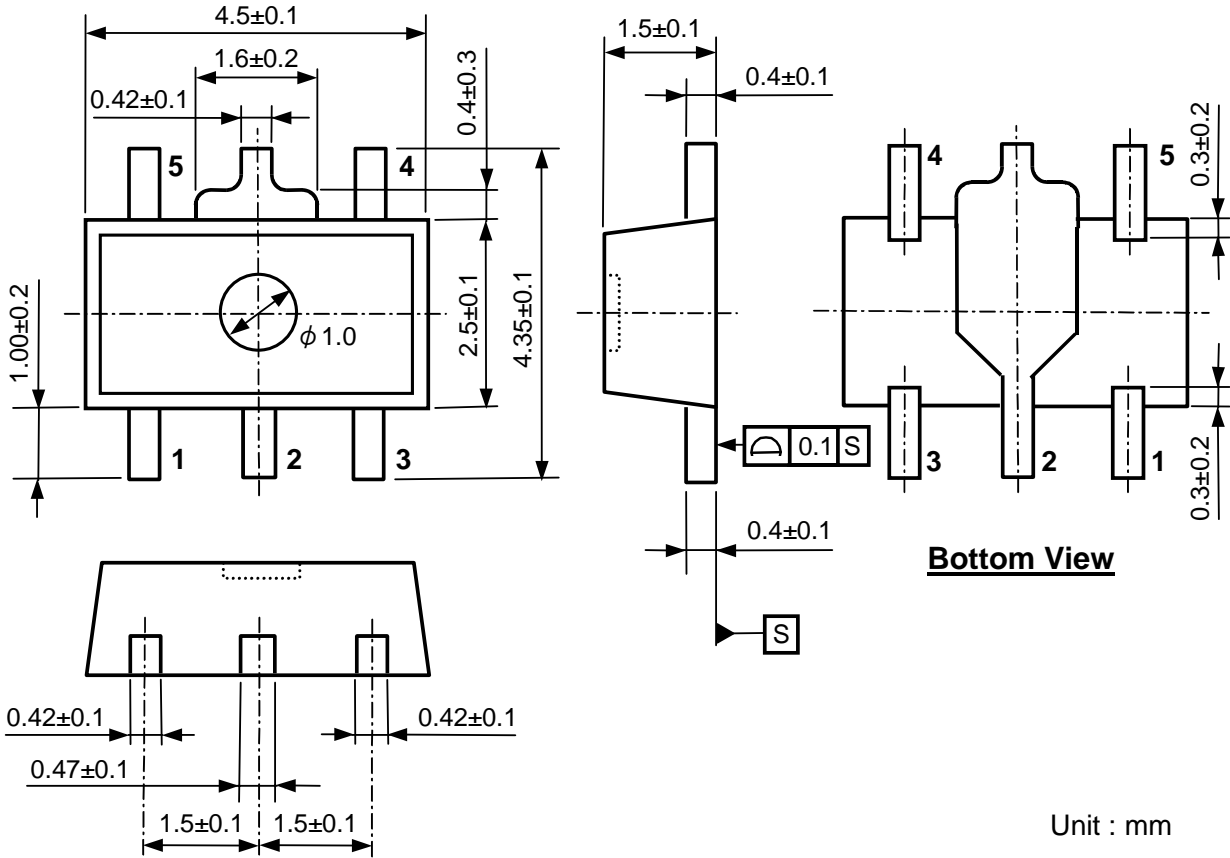
Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

| Operating Time | Estimated years (Operating four hours/day) |
|----------------|-----------------------------------------------|
| 4,500 hours | 3years |

RP131x

NO.EA-174-160426

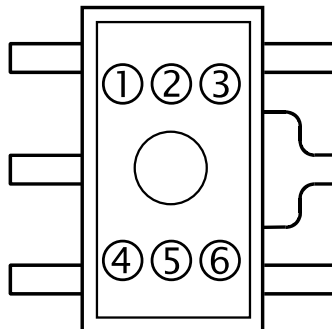
Package Dimensions (SOT-89-5)



Mark Specifications (SOT-89-5)

①②③④: Product Code ... Refer to RP131H Series Mark Specification Table.

⑤⑥: Lot Number ... Alphanumeric Serial Number



RP131H Series Mark Specification Table

PKG: SOT-89-5

RP131Hxx1B

| Part Number | ①②③④ | Vset |
|-------------|----------------|-------|
| RP131H081B | U 0 8 B | 0.8V |
| RP131H091B | U 0 9 B | 0.9V |
| RP131H101B | U 1 0 B | 1.0V |
| RP131H111B | U 1 1 B | 1.1V |
| RP131H121B | U 1 2 B | 1.2V |
| RP131H131B | U 1 3 B | 1.3V |
| RP131H141B | U 1 4 B | 1.4V |
| RP131H151B | U 1 5 B | 1.5V |
| RP131H161B | U 1 6 B | 1.6V |
| RP131H171B | U 1 7 B | 1.7V |
| RP131H181B | U 1 8 B | 1.8V |
| RP131H191B | U 1 9 B | 1.9V |
| RP131H201B | U 2 0 B | 2.0V |
| RP131H211B | U 2 1 B | 2.1V |
| RP131H221B | U 2 2 B | 2.2V |
| RP131H231B | U 2 3 B | 2.3V |
| RP131H241B | U 2 4 B | 2.4V |
| RP131H251B | U 2 5 B | 2.5V |
| RP131H261B | U 2 6 B | 2.6V |
| RP131H271B | U 2 7 B | 2.7V |
| RP131H281B | U 2 8 B | 2.8V |
| RP131H291B | U 2 9 B | 2.9V |
| RP131H301B | U 3 0 B | 3.0V |
| RP131H311B | U 3 1 B | 3.1V |
| RP131H321B | U 3 2 B | 3.2V |
| RP131H331B | U 3 3 B | 3.3V |
| RP131H341B | U 3 4 B | 3.4V |
| RP131H351B | U 3 5 B | 3.5V |
| RP131H361B | U 3 6 B | 3.6V |
| RP131H371B | U 3 7 B | 3.7V |
| RP131H381B | U 3 8 B | 3.8V |
| RP131H391B | U 3 9 B | 3.9V |
| RP131H401B | U 4 0 B | 4.0V |
| RP131H411B | U 4 1 B | 4.1V |
| RP131H421B | U 4 2 B | 4.2V |
| RP131H431B | U 4 3 B | 4.3V |
| RP131H441B | U 4 4 B | 4.4V |
| RP131H451B | U 4 5 B | 4.5V |
| RP131H461B | U 4 6 B | 4.6V |
| RP131H471B | U 4 7 B | 4.7V |
| RP131H481B | U 4 8 B | 4.8V |
| RP131H491B | U 4 9 B | 4.9V |
| RP131H501B | U 5 0 B | 5.0V |
| RP131H511B | U 5 1 B | 5.1V |
| RP131H521B | U 5 2 B | 5.2V |
| RP131H531B | U 5 3 B | 5.3V |
| RP131H541B | U 5 4 B | 5.4V |
| RP131H551B | U 5 5 B | 5.5V |
| RP131H121B5 | U 0 1 B | 1.25V |
| RP131H181B5 | U 0 2 B | 1.85V |
| RP131H281B5 | U 0 3 B | 2.85V |
| RP131H101B5 | U 0 4 B | 1.05V |

RP131Hxx1D

| Part Number | ①②③④ | Vset |
|-------------|----------------|-------|
| RP131H081D | U 0 8 D | 0.8V |
| RP131H091D | U 0 9 D | 0.9V |
| RP131H101D | U 1 0 D | 1.0V |
| RP131H111D | U 1 1 D | 1.1V |
| RP131H121D | U 1 2 D | 1.2V |
| RP131H131D | U 1 3 D | 1.3V |
| RP131H141D | U 1 4 D | 1.4V |
| RP131H151D | U 1 5 D | 1.5V |
| RP131H161D | U 1 6 D | 1.6V |
| RP131H171D | U 1 7 D | 1.7V |
| RP131H181D | U 1 8 D | 1.8V |
| RP131H191D | U 1 9 D | 1.9V |
| RP131H201D | U 2 0 D | 2.0V |
| RP131H211D | U 2 1 D | 2.1V |
| RP131H221D | U 2 2 D | 2.2V |
| RP131H231D | U 2 3 D | 2.3V |
| RP131H241D | U 2 4 D | 2.4V |
| RP131H251D | U 2 5 D | 2.5V |
| RP131H261D | U 2 6 D | 2.6V |
| RP131H271D | U 2 7 D | 2.7V |
| RP131H281D | U 2 8 D | 2.8V |
| RP131H291D | U 2 9 D | 2.9V |
| RP131H301D | U 3 0 D | 3.0V |
| RP131H311D | U 3 1 D | 3.1V |
| RP131H321D | U 3 2 D | 3.2V |
| RP131H331D | U 3 3 D | 3.3V |
| RP131H341D | U 3 4 D | 3.4V |
| RP131H351D | U 3 5 D | 3.5V |
| RP131H361D | U 3 6 D | 3.6V |
| RP131H371D | U 3 7 D | 3.7V |
| RP131H381D | U 3 8 D | 3.8V |
| RP131H391D | U 3 9 D | 3.9V |
| RP131H401D | U 4 0 D | 4.0V |
| RP131H411D | U 4 1 D | 4.1V |
| RP131H421D | U 4 2 D | 4.2V |
| RP131H431D | U 4 3 D | 4.3V |
| RP131H441D | U 4 4 D | 4.4V |
| RP131H451D | U 4 5 D | 4.5V |
| RP131H461D | U 4 6 D | 4.6V |
| RP131H471D | U 4 7 D | 4.7V |
| RP131H481D | U 4 8 D | 4.8V |
| RP131H491D | U 4 9 D | 4.9V |
| RP131H501D | U 5 0 D | 5.0V |
| RP131H511D | U 5 1 D | 5.1V |
| RP131H521D | U 5 2 D | 5.2V |
| RP131H531D | U 5 3 D | 5.3V |
| RP131H541D | U 5 4 D | 5.4V |
| RP131H551D | U 5 5 D | 5.5V |
| RP131H121D5 | U 0 1 D | 1.25V |
| RP131H181D5 | U 0 2 D | 1.85V |
| RP131H281D5 | U 0 3 D | 2.85V |
| RP131H101D5 | U 0 4 D | 1.05V |

RP131x

NO.EA-174-160426

Power Dissipation (HSOP-6J)

This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

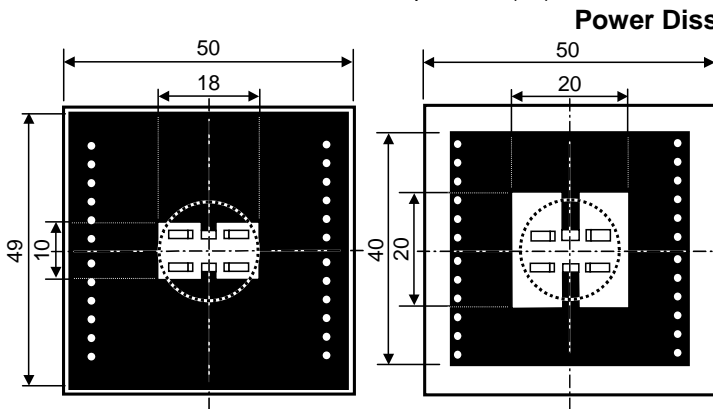
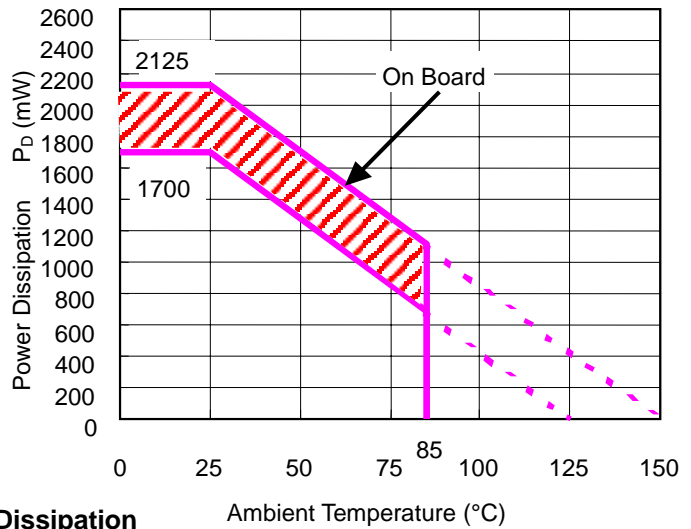
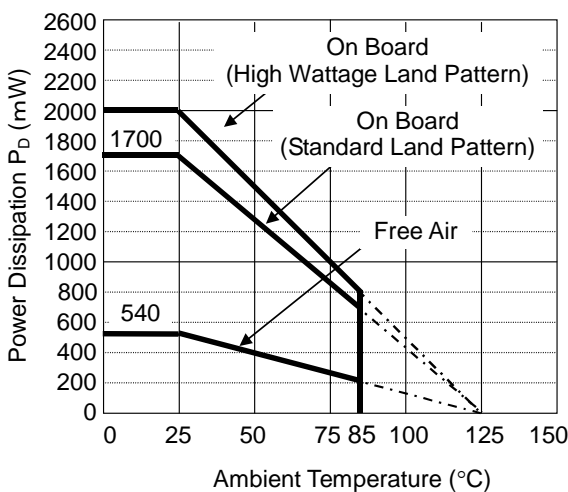
Measurement Conditions

| | High Wattage Land Pattern | Standard Land Pattern |
|------------------|------------------------------------------|------------------------------------------|
| Environment | Mounting on Board (Wind velocity=0m/s) | Mounting on Board (Wind velocity=0m/s) |
| Board Material | Glass cloth epoxy plastic (Double-sided) | Glass cloth epoxy plastic (Double-sided) |
| Board Dimensions | 50mm * 50mm * 1.6mm | 50mm * 50mm * 1.6mm |
| Copper Ratio | 90% | 50% |
| Through-hole | $\phi 0.5\text{mm} * 44\text{pcs}$ | $\phi 0.5\text{mm} * 44\text{pcs}$ |

Measurement Result

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

| | High Wattage Land Pattern | Standard Land Pattern | Free Air |
|--------------------|---------------------------|--------------------------------------------------------------------------------------------------|-----------------------|
| Power Dissipation | 2000mW | 1700mW ($T_{j\text{max}}=125^\circ\text{C}$) 2125mW ($T_{j\text{max}}=150^\circ\text{C}$) | 540mW |
| Thermal Resistance | 50°C/W | 59°C/W | 185°C/W |



High Wattage

Standard

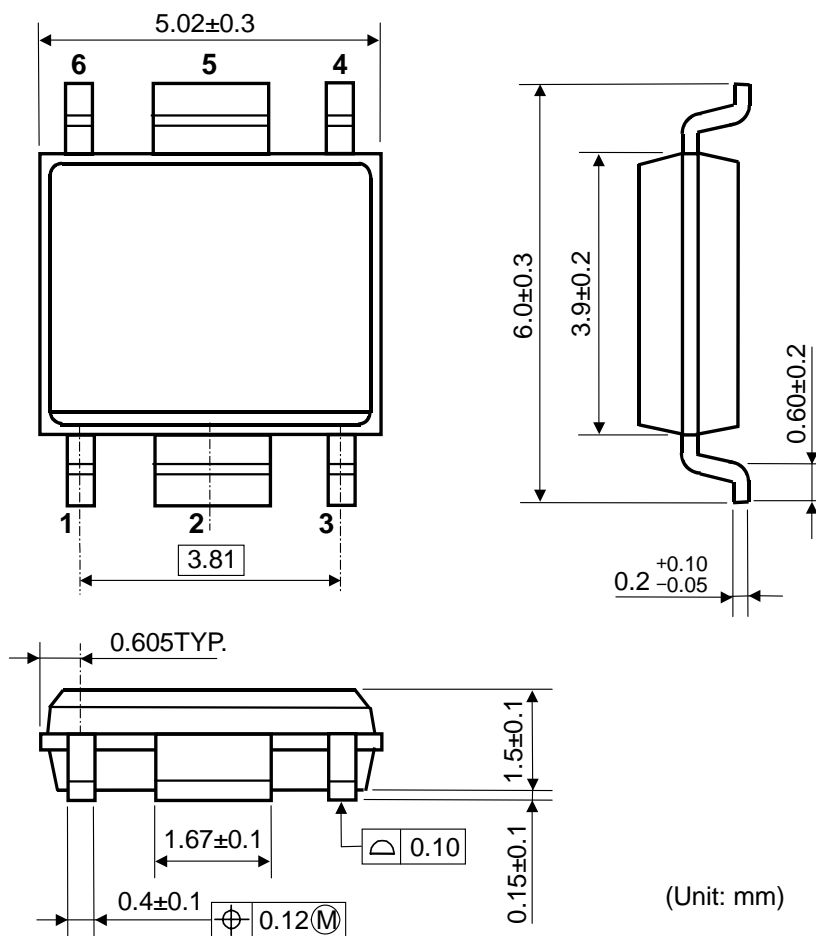
Measurement Board Pattern

○ IC Mount Area Unit: mm

- The above graph shows the Power Dissipation of the package based on $T_{j\text{max}}=125^\circ\text{C}$ and $T_{j\text{max}}=150^\circ\text{C}$. Operating the IC in the shaded area in the graph might have an influence its lifetime. Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

| |
|----------------|
| Operating Time |
| 1,500 hours |

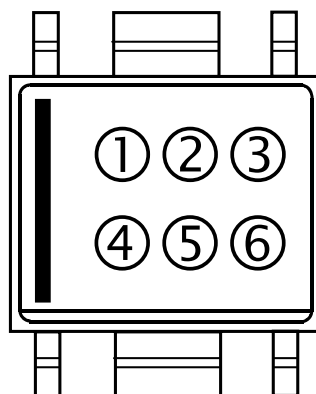
Package Dimensions (HSOP-6J)



Mark Specifications (HSOP-6J)

①②③④: Product Code ... Refer to RP131S Series Mark Specification Table.

⑤⑥: Lot Number ... Alphanumeric Serial Number



RP131S Series Mark Specification Table

PKG: HSOP-6J

RP131Sxx1B

| Part Number | ①②③④ | Vset |
|-------------|----------------|-------|
| RP131S081B | G 0 8 B | 0.8V |
| RP131S091B | G 0 9 B | 0.9V |
| RP131S101B | G 1 0 B | 1.0V |
| RP131S111B | G 1 1 B | 1.1V |
| RP131S121B | G 1 2 B | 1.2V |
| RP131S131B | G 1 3 B | 1.3V |
| RP131S141B | G 1 4 B | 1.4V |
| RP131S151B | G 1 5 B | 1.5V |
| RP131S161B | G 1 6 B | 1.6V |
| RP131S171B | G 1 7 B | 1.7V |
| RP131S181B | G 1 8 B | 1.8V |
| RP131S191B | G 1 9 B | 1.9V |
| RP131S201B | G 2 0 B | 2.0V |
| RP131S211B | G 2 1 B | 2.1V |
| RP131S221B | G 2 2 B | 2.2V |
| RP131S231B | G 2 3 B | 2.3V |
| RP131S241B | G 2 4 B | 2.4V |
| RP131S251B | G 2 5 B | 2.5V |
| RP131S261B | G 2 6 B | 2.6V |
| RP131S271B | G 2 7 B | 2.7V |
| RP131S281B | G 2 8 B | 2.8V |
| RP131S291B | G 2 9 B | 2.9V |
| RP131S301B | G 3 0 B | 3.0V |
| RP131S311B | G 3 1 B | 3.1V |
| RP131S321B | G 3 2 B | 3.2V |
| RP131S331B | G 3 3 B | 3.3V |
| RP131S341B | G 3 4 B | 3.4V |
| RP131S351B | G 3 5 B | 3.5V |
| RP131S361B | G 3 6 B | 3.6V |
| RP131S371B | G 3 7 B | 3.7V |
| RP131S381B | G 3 8 B | 3.8V |
| RP131S391B | G 3 9 B | 3.9V |
| RP131S401B | G 4 0 B | 4.0V |
| RP131S411B | G 4 1 B | 4.1V |
| RP131S421B | G 4 2 B | 4.2V |
| RP131S431B | G 4 3 B | 4.3V |
| RP131S441B | G 4 4 B | 4.4V |
| RP131S451B | G 4 5 B | 4.5V |
| RP131S461B | G 4 6 B | 4.6V |
| RP131S471B | G 4 7 B | 4.7V |
| RP131S481B | G 4 8 B | 4.8V |
| RP131S491B | G 4 9 B | 4.9V |
| RP131S501B | G 5 0 B | 5.0V |
| RP131S511B | G 5 1 B | 5.1V |
| RP131S521B | G 5 2 B | 5.2V |
| RP131S531B | G 5 3 B | 5.3V |
| RP131S541B | G 5 4 B | 5.4V |
| RP131S551B | G 5 5 B | 5.5V |
| RP131S121B5 | G 0 1 B | 1.25V |
| RP131S181B5 | G 0 2 B | 1.85V |
| RP131S281B5 | G 0 3 B | 2.85V |
| RP131S101B5 | G 0 4 B | 1.05V |

RP131Sxx1D

| Part Number | ①②③④ | Vset |
|-------------|----------------|-------|
| RP131S081D | G 0 8 D | 0.8V |
| RP131S091D | G 0 9 D | 0.9V |
| RP131S101D | G 1 0 D | 1.0V |
| RP131S111D | G 1 1 D | 1.1V |
| RP131S121D | G 1 2 D | 1.2V |
| RP131S131D | G 1 3 D | 1.3V |
| RP131S141D | G 1 4 D | 1.4V |
| RP131S151D | G 1 5 D | 1.5V |
| RP131S161D | G 1 6 D | 1.6V |
| RP131S171D | G 1 7 D | 1.7V |
| RP131S181D | G 1 8 D | 1.8V |
| RP131S191D | G 1 9 D | 1.9V |
| RP131S201D | G 2 0 D | 2.0V |
| RP131S211D | G 2 1 D | 2.1V |
| RP131S221D | G 2 2 D | 2.2V |
| RP131S231D | G 2 3 D | 2.3V |
| RP131S241D | G 2 4 D | 2.4V |
| RP131S251D | G 2 5 D | 2.5V |
| RP131S261D | G 2 6 D | 2.6V |
| RP131S271D | G 2 7 D | 2.7V |
| RP131S281D | G 2 8 D | 2.8V |
| RP131S291D | G 2 9 D | 2.9V |
| RP131S301D | G 3 0 D | 3.0V |
| RP131S311D | G 3 1 D | 3.1V |
| RP131S321D | G 3 2 D | 3.2V |
| RP131S331D | G 3 3 D | 3.3V |
| RP131S341D | G 3 4 D | 3.4V |
| RP131S351D | G 3 5 D | 3.5V |
| RP131S361D | G 3 6 D | 3.6V |
| RP131S371D | G 3 7 D | 3.7V |
| RP131S381D | G 3 8 D | 3.8V |
| RP131S391D | G 3 9 D | 3.9V |
| RP131S401D | G 4 0 D | 4.0V |
| RP131S411D | G 4 1 D | 4.1V |
| RP131S421D | G 4 2 D | 4.2V |
| RP131S431D | G 4 3 D | 4.3V |
| RP131S441D | G 4 4 D | 4.4V |
| RP131S451D | G 4 5 D | 4.5V |
| RP131S461D | G 4 6 D | 4.6V |
| RP131S471D | G 4 7 D | 4.7V |
| RP131S481D | G 4 8 D | 4.8V |
| RP131S491D | G 4 9 D | 4.9V |
| RP131S501D | G 5 0 D | 5.0V |
| RP131S511D | G 5 1 D | 5.1V |
| RP131S521D | G 5 2 D | 5.2V |
| RP131S531D | G 5 3 D | 5.3V |
| RP131S541D | G 5 4 D | 5.4V |
| RP131S551D | G 5 5 D | 5.5V |
| RP131S121D5 | G 0 1 D | 1.25V |
| RP131S181D5 | G 0 2 D | 1.85V |
| RP131S281D5 | G 0 3 D | 2.85V |
| RP131S101D5 | G 0 4 D | 1.05V |

Power Dissipation (TO-252-5-P2)

This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

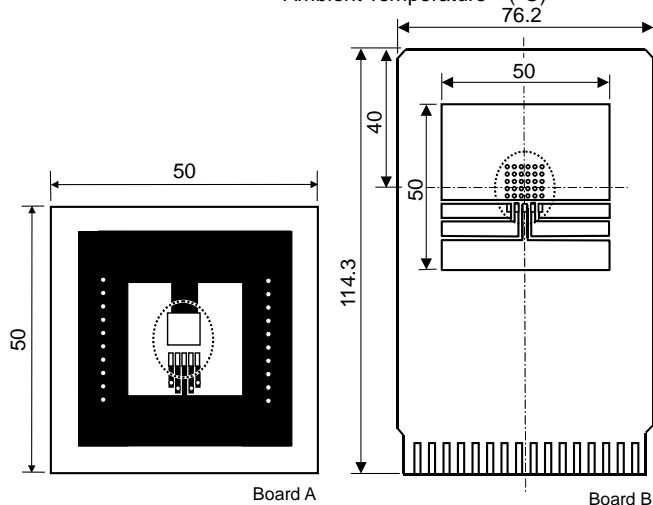
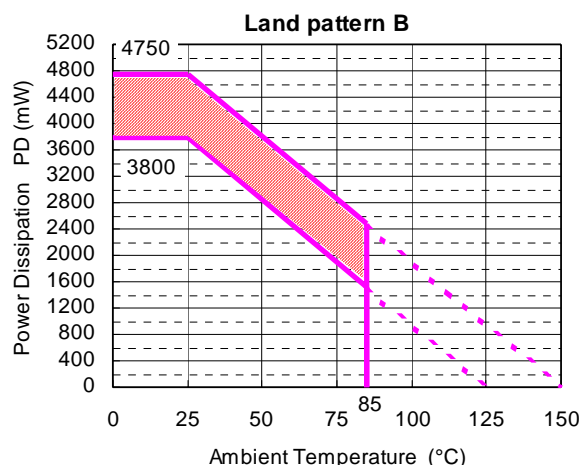
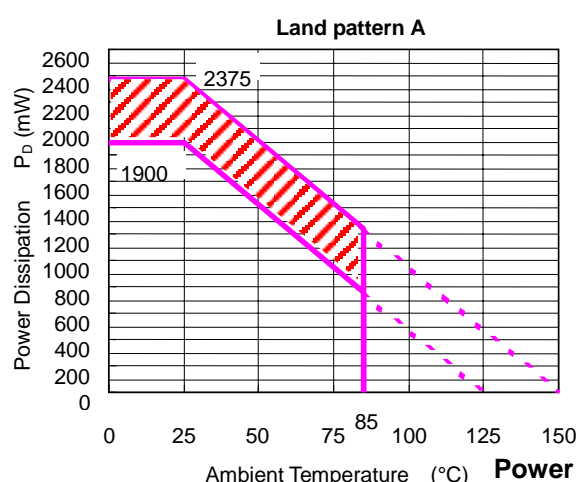
Measurement conditions

| | Land Pattern A | Land Pattern B |
|------------------|--------------------------------------------------|------------------------------------------------|
| Environment | Mounting on board (Wind velocity 0m/s) | Mounting on board (Wind velocity 0m/s) |
| Board Material | Glass cloth epoxy plastic (Double-layers) | Glass cloth epoxy plastic (Four-layers) |
| Board Dimensions | 50mm * 50mm * 1.6mm | 76.2mm * 114.3mm * 0.8mm |
| Copper Ratio | Top side: Approx. 50%, Back side: Approx. 50% | Top, Back side: Approx. 96%, 2nd, 3rd: 100% |
| Through - hole | ϕ 0.5mm * 24pcs | ϕ 0.4mm * 30pcs |

Measurement Results

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

| | Land pattern A | Land pattern B |
|--------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Power Dissipation | 1900mW ($T_{jmax}=125^\circ\text{C}$) 2375mW ($T_{jmax}=150^\circ\text{C}$) | 3800mW ($T_{jmax}=125^\circ\text{C}$) 4750mW ($T_{jmax}=150^\circ\text{C}$) |
| Thermal Resistance | $\theta_{ja}=(125-25^\circ\text{C})/1.9\text{W}= 53^\circ\text{C/W}$ $\theta_{jc}= 17^\circ\text{C/W}$ | $\theta_{ja}= (125-25^\circ\text{C})/3.8\text{W} = 26^\circ\text{C/W}$ $\theta_{jc}= 7^\circ\text{C/W}$ |



- The above graph shows the Power Dissipation of the package based on $T_{jmax}=125^\circ\text{C}$ and $T_{jmax}=150^\circ\text{C}$. Operating the IC in the shaded area in the graph might have an influence it's lifetime. Operating time must be within the time limit described in the table below, in case of operating in the shaded area.

| Operating Time | Estimated years (Operating four hours/day) |
|----------------|-----------------------------------------------|
| 13,000 hours | 9years |

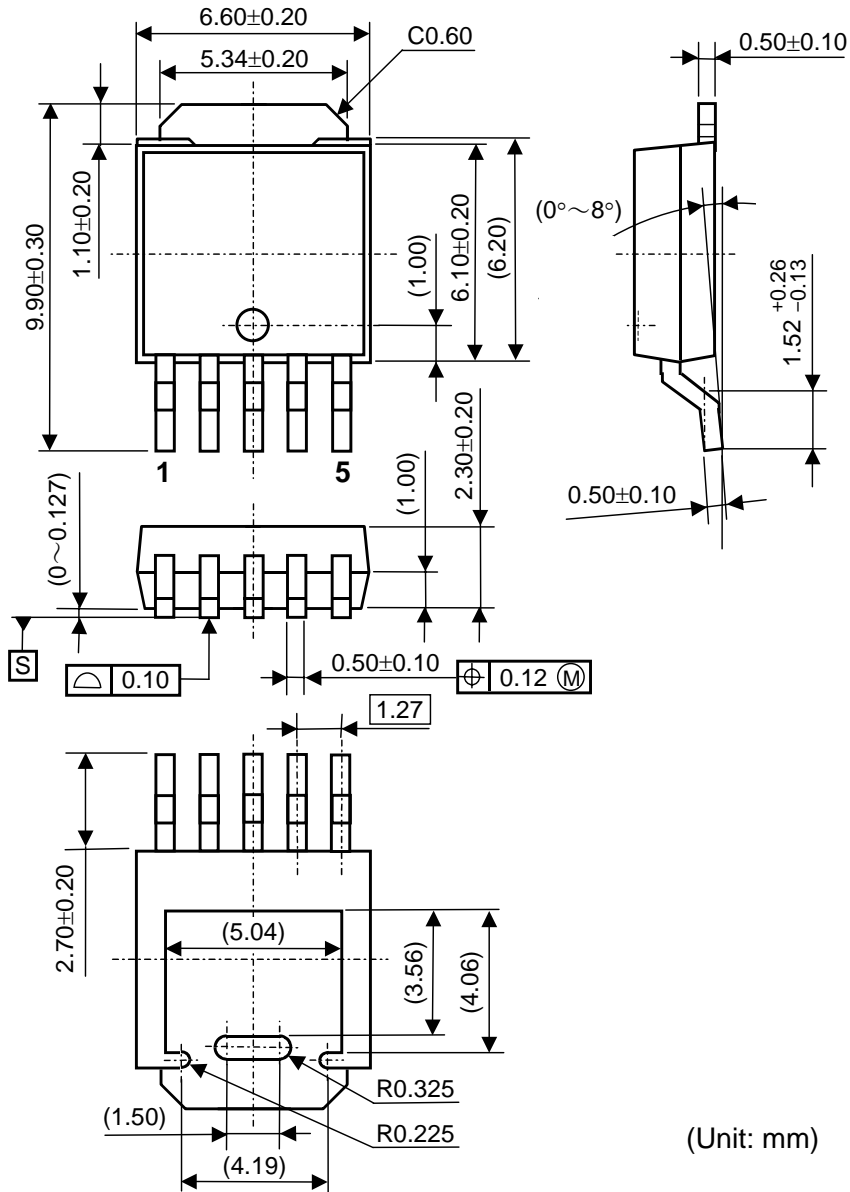
Measurent Board Pattern
 IC Mount Area Unit : mm

Measurent Board Pattern
 IC Mount Area Unit : mm

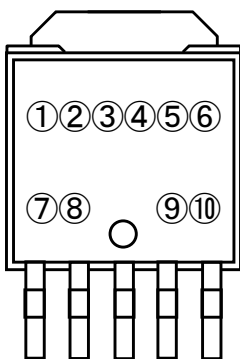
RP131x

NO.EA-174-160426

Package Dimensions (TO-252-5-P2)



Mark Specifications (TO-252-5-P2)



① ② ③ ④ ⑤ ⑥ ⑦ ⑧ : Refer to RP131J Series Mark Specification Table.

⑨ ⑩ : Lot Number ... Alphanumeric Serial Number

RP131J Series Mark Specification Table

PKG: TO-252-5

RP131Jxx1B

| Part Number | ①②③④⑤⑥⑦⑧ | Vset |
|-------------|------------------------|-------|
| RP131J081B | D 1 J 0 8 1 B | 0.8V |
| RP131J091B | D 1 J 0 9 1 B | 0.9V |
| RP131J101B | D 1 J 1 0 1 B | 1.0V |
| RP131J111B | D 1 J 1 1 1 B | 1.1V |
| RP131J121B | D 1 J 1 2 1 B | 1.2V |
| RP131J131B | D 1 J 1 3 1 B | 1.3V |
| RP131J141B | D 1 J 1 4 1 B | 1.4V |
| RP131J151B | D 1 J 1 5 1 B | 1.5V |
| RP131J161B | D 1 J 1 6 1 B | 1.6V |
| RP131J171B | D 1 J 1 7 1 B | 1.7V |
| RP131J181B | D 1 J 1 8 1 B | 1.8V |
| RP131J191B | D 1 J 1 9 1 B | 1.9V |
| RP131J201B | D 1 J 2 0 1 B | 2.0V |
| RP131J211B | D 1 J 2 1 1 B | 2.1V |
| RP131J221B | D 1 J 2 2 1 B | 2.2V |
| RP131J231B | D 1 J 2 3 1 B | 2.3V |
| RP131J241B | D 1 J 2 4 1 B | 2.4V |
| RP131J251B | D 1 J 2 5 1 B | 2.5V |
| RP131J261B | D 1 J 2 6 1 B | 2.6V |
| RP131J271B | D 1 J 2 7 1 B | 2.7V |
| RP131J281B | D 1 J 2 8 1 B | 2.8V |
| RP131J291B | D 1 J 2 9 1 B | 2.9V |
| RP131J301B | D 1 J 3 0 1 B | 3.0V |
| RP131J311B | D 1 J 3 1 1 B | 3.1V |
| RP131J321B | D 1 J 3 2 1 B | 3.2V |
| RP131J331B | D 1 J 3 3 1 B | 3.3V |
| RP131J341B | D 1 J 3 4 1 B | 3.4V |
| RP131J351B | D 1 J 3 5 1 B | 3.5V |
| RP131J361B | D 1 J 3 6 1 B | 3.6V |
| RP131J371B | D 1 J 3 7 1 B | 3.7V |
| RP131J381B | D 1 J 3 8 1 B | 3.8V |
| RP131J391B | D 1 J 3 9 1 B | 3.9V |
| RP131J401B | D 1 J 4 0 1 B | 4.0V |
| RP131J411B | D 1 J 4 1 1 B | 4.1V |
| RP131J421B | D 1 J 4 2 1 B | 4.2V |
| RP131J431B | D 1 J 4 3 1 B | 4.3V |
| RP131J441B | D 1 J 4 4 1 B | 4.4V |
| RP131J451B | D 1 J 4 5 1 B | 4.5V |
| RP131J461B | D 1 J 4 6 1 B | 4.6V |
| RP131J471B | D 1 J 4 7 1 B | 4.7V |
| RP131J481B | D 1 J 4 8 1 B | 4.8V |
| RP131J491B | D 1 J 4 9 1 B | 4.9V |
| RP131J501B | D 1 J 5 0 1 B | 5.0V |
| RP131J511B | D 1 J 5 1 1 B | 5.1V |
| RP131J521B | D 1 J 5 2 1 B | 5.2V |
| RP131J531B | D 1 J 5 3 1 B | 5.3V |
| RP131J541B | D 1 J 5 4 1 B | 5.4V |
| RP131J551B | D 1 J 5 5 1 B | 5.5V |
| RP131J121B5 | D 1 J 1 2 1 B 5 | 1.25V |
| RP131J181B5 | D 1 J 1 8 1 B 5 | 1.85V |
| RP131J281B5 | D 1 J 2 8 1 B 5 | 2.85V |
| RP131J101B5 | D 1 J 1 0 1 B 5 | 1.05V |

RP131Jxx1D

| Part Number | ①②③④⑤⑥⑦⑧ | Vset |
|-------------|------------------------|-------|
| RP131J081D | D 1 J 0 8 1 D | 0.8V |
| RP131J091D | D 1 J 0 9 1 D | 0.9V |
| RP131J101D | D 1 J 1 0 1 D | 1.0V |
| RP131J111D | D 1 J 1 1 1 D | 1.1V |
| RP131J121D | D 1 J 1 2 1 D | 1.2V |
| RP131J131D | D 1 J 1 3 1 D | 1.3V |
| RP131J141D | D 1 J 1 4 1 D | 1.4V |
| RP131J151D | D 1 J 1 5 1 D | 1.5V |
| RP131J161D | D 1 J 1 6 1 D | 1.6V |
| RP131J171D | D 1 J 1 7 1 D | 1.7V |
| RP131J181D | D 1 J 1 8 1 D | 1.8V |
| RP131J191D | D 1 J 1 9 1 D | 1.9V |
| RP131J201D | D 1 J 2 0 1 D | 2.0V |
| RP131J211D | D 1 J 2 1 1 D | 2.1V |
| RP131J221D | D 1 J 2 2 1 D | 2.2V |
| RP131J231D | D 1 J 2 3 1 D | 2.3V |
| RP131J241D | D 1 J 2 4 1 D | 2.4V |
| RP131J251D | D 1 J 2 5 1 D | 2.5V |
| RP131J261D | D 1 J 2 6 1 D | 2.6V |
| RP131J271D | D 1 J 2 7 1 D | 2.7V |
| RP131J281D | D 1 J 2 8 1 D | 2.8V |
| RP131J291D | D 1 J 2 9 1 D | 2.9V |
| RP131J301D | D 1 J 3 0 1 D | 3.0V |
| RP131J311D | D 1 J 3 1 1 D | 3.1V |
| RP131J321D | D 1 J 3 2 1 D | 3.2V |
| RP131J331D | D 1 J 3 3 1 D | 3.3V |
| RP131J341D | D 1 J 3 4 1 D | 3.4V |
| RP131J351D | D 1 J 3 5 1 D | 3.5V |
| RP131J361D | D 1 J 3 6 1 D | 3.6V |
| RP131J371D | D 1 J 3 7 1 D | 3.7V |
| RP131J381D | D 1 J 3 8 1 D | 3.8V |
| RP131J391D | D 1 J 3 9 1 D | 3.9V |
| RP131J401D | D 1 J 4 0 1 D | 4.0V |
| RP131J411D | D 1 J 4 1 1 D | 4.1V |
| RP131J421D | D 1 J 4 2 1 D | 4.2V |
| RP131J431D | D 1 J 4 3 1 D | 4.3V |
| RP131J441D | D 1 J 4 4 1 D | 4.4V |
| RP131J451D | D 1 J 4 5 1 D | 4.5V |
| RP131J461D | D 1 J 4 6 1 D | 4.6V |
| RP131J471D | D 1 J 4 7 1 D | 4.7V |
| RP131J481D | D 1 J 4 8 1 D | 4.8V |
| RP131J491D | D 1 J 4 9 1 D | 4.9V |
| RP131J501D | D 1 J 5 0 1 D | 5.0V |
| RP131J511D | D 1 J 5 1 1 D | 5.1V |
| RP131J521D | D 1 J 5 2 1 D | 5.2V |
| RP131J531D | D 1 J 5 3 1 D | 5.3V |
| RP131J541D | D 1 J 5 4 1 D | 5.4V |
| RP131J551D | D 1 J 5 5 1 D | 5.5V |
| RP131J121D5 | D 1 J 1 2 1 D 5 | 1.25V |
| RP131J181D5 | D 1 J 1 8 1 D 5 | 1.85V |
| RP131J281D5 | D 1 J 2 8 1 D 5 | 2.85V |
| RP131J101D5 | D 1 J 1 0 1 D 5 | 1.05V |



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