RICOH

RP131x SERIES

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

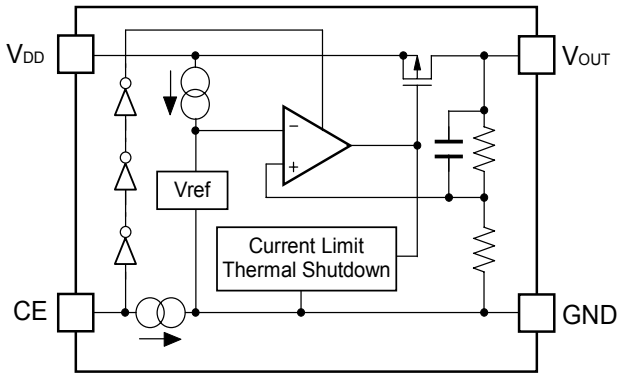
- Output Current ..... Min. 1A
- Supply Current ..... Typ. 65μA
- Standby Current ..... Typ. 0.15μA
- Input Voltage Range ..... 1.6V to 6.5V
- Output Voltage Range ..... 0.8V to 5.5V (0.1V steps)
  (For other voltages, please refer to MARK INFORMATIONS.)
- Dropout Voltage ..... Typ. 0.5V (V_{OUT}=2.8V, I_{OUT}=1A)
- Ripple Rejection ..... Typ. 70dB (f=1kHz, V_{OUT}=2.8V)
- Output Voltage Accuracy ..... ±1.0%
- Temperature-Drift Coefficient of Output Voltage ..... Typ. ±100ppm/°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°C
  Released Temperature ; Typ. 135°C
- Built-in Auto Discharge Function ..... D version
- Ceramic capacitors are recommended to be used with this IC .... 2.2μF or more (V_{OUT}≤3.6V)
  4.7μF or more (V_{OUT}>3.6V)

APPLICATIONS

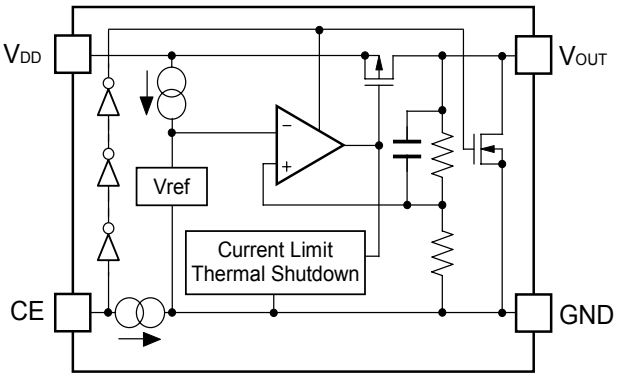
- Power source for battery-powered equipment.
- Power source for portable communication equipment.
- Power source for electrical appliances such as cameras, VCRs and camcorders.
- Power source for Notebook PC.
- Power source for home appliances.

BLOCK DIAGRAMS

RP131xxx1B



RP131xxx1D



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

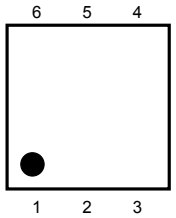
xx : The output voltage can be designated in the range from 0.8V(08) to 5.5V(55) in 0.1V steps.
(For other voltages, please refer to MARK INFORMATIONS.)

∗ : 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

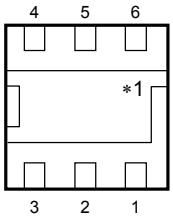
PIN CONFIGURATIONS

● **DFN1616-6B**

Top View

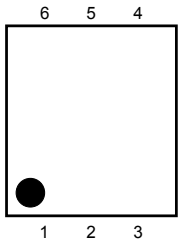


Bottom View

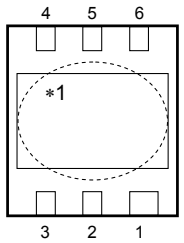


● **DFN(PLP)1820-6**

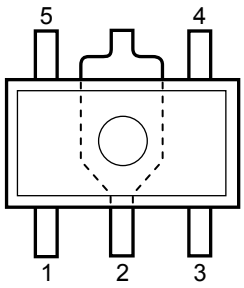
Top View



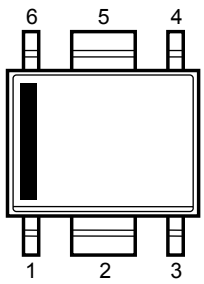
Bottom View



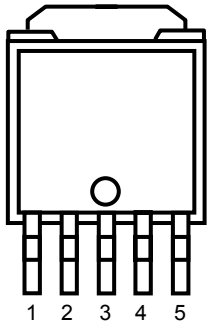
● **SOT-89-5**



● **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.

- **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	
Topt	Operating Temperature Range	−40 to 85	°C
Tstg	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.

ELECTRICAL CHARACTERISTICS

V_{IN}=Set V_{OUT}+1V, I_{OUT}=1mA
The specification in ☐ is checked and guaranteed by design engineering at −40°C≤Topt≤85°C, unless otherwise noted.

- **RP131xxx1B/D**

Topt=25°C

Symbol	Item	Conditions		Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	Topt=25°C	V_{OUT}>1.5V	×0.99		×1.01	V
			V_{OUT}≤1.5V	−15		15	mV
		−40°C≤Topt≤85°C	V_{OUT}>1.5V	×0.974		×1.018	V
			V_{OUT}≤1.5V	−40		27	mV
$\Delta V_{OUT}/\Delta I_{OUT}$	Load Regulation	0.1mA≤I_{OUT}≤300mA			20	40	mV
		0.1mA≤I_{OUT}≤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
Istandby	Standby Current	V_{CE}=0V, V_{IN}=6.5V			0.15	0.60	µA
$\Delta V_{OUT}/\Delta V_{IN}$	Line Regulation	Set V_{OUT}+0.5V≤V_{IN}≤6.5V ∗However, V_{IN}≥1.6V			0.05	0.1	%/V
RR	Ripple Rejection	f=1kHz Ripple 0.2Vp-p I_{OUT}=100mA	V_{OUT}≤3.3V		70		dB
			V_{OUT}>3.3V		60		
V_{IN}	Input Voltage			1.6		6.5	V
$\Delta V_{OUT}/\Delta Topt$	Output Voltage Temperature Coefficient	−40°C≤Topt≤85°C			±100		ppm /°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
en	Output Noise	BW=10Hz to 100kHz, I_{OUT}=1mA			45		µVrms
T_{TSD}	Thermal Shutdown Temperature	Junction Temperature			165		°C
T_{TSR}	Thermal Shutdown Released Temperature	Junction Temperature			135		°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°C≤Topt≤85°C, unless otherwise noted.
All of unit are tested and specified under load conditions such that Tj≈Topt=25°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**

Topt=25°C

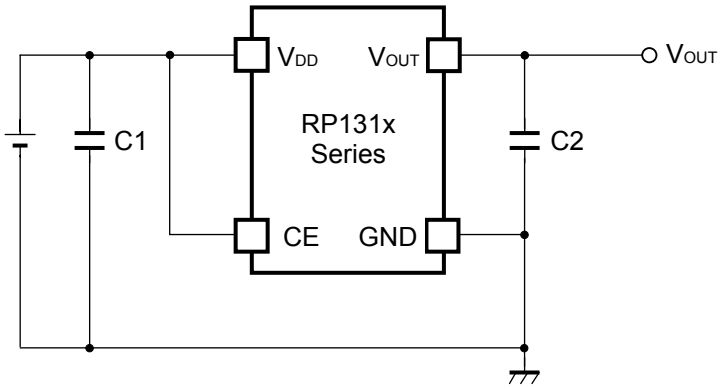
Output Voltage V_{OUT} (V)	Dropout Voltage V_{DIF} (V)					
	Condition	Typ.	Max.	Condition	Typ.	Max.
0.8 ≤ V_{OUT} < 0.9	I_{OUT}=300mA	0.600	0.780	I_{OUT}=1A	1.100	1.650
0.9 ≤ V_{OUT} < 1.0		0.550	0.690		1.050	1.500
1.0 ≤ V_{OUT} < 1.1		0.450	0.610		1.000	1.450
1.1 ≤ V_{OUT} < 1.2		0.340	0.540		0.930	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 Tj≈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

VOUT	Capacitors		
VOUT ≤ 3.6V	C1	Kyocera 2.2μF (size:1005)	[CM05X5R225M06AB]
	C2	Kyocera 2.2μF (size:1608)	[CM105X5R225K06AB]
VOUT > 3.6V	C1	Kyocera 2.2μF (size:1608)	[CM105X5R225K06AB]
	C2	Kyocera 4.7μF (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).

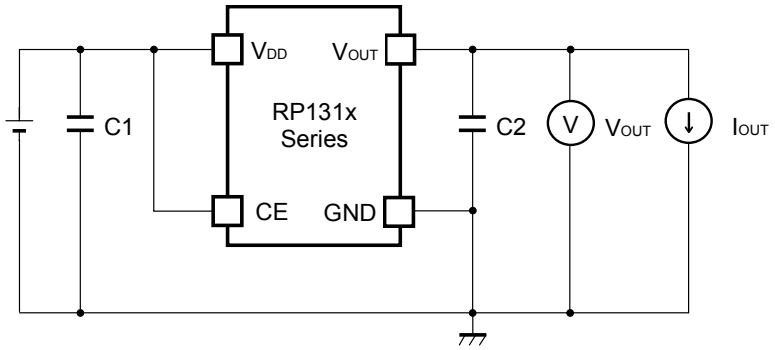
If a tantalum capacitor is used, and its ESR of C2 is large, the loop oscillation may result. Because of this, select C2 carefully considering its frequency characteristics.

PCB Layout

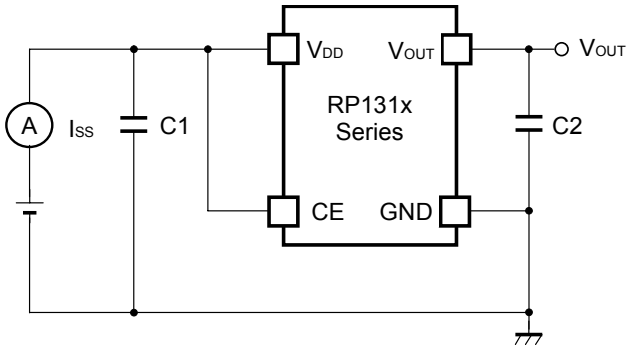
Make V_{DD} and GND lines sufficient. If their impedance is high, noise pickup or unstable operation may result. Connect a capacitor C1 between V_{DD} and GND pin with a capacitance value as "Recommendation value of the external capacitors" above or more, and as close as possible to the pins.

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

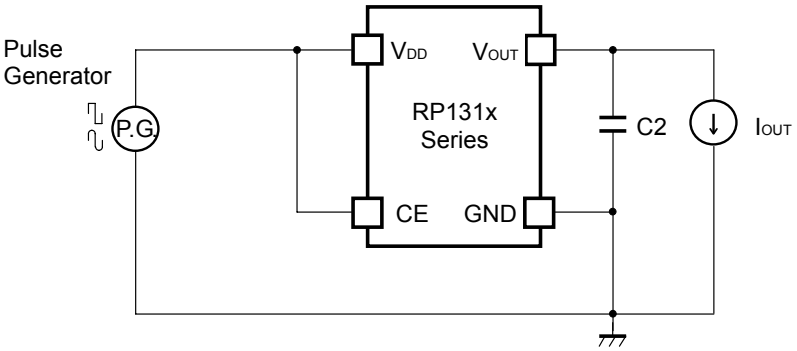
TEST CIRCUITS



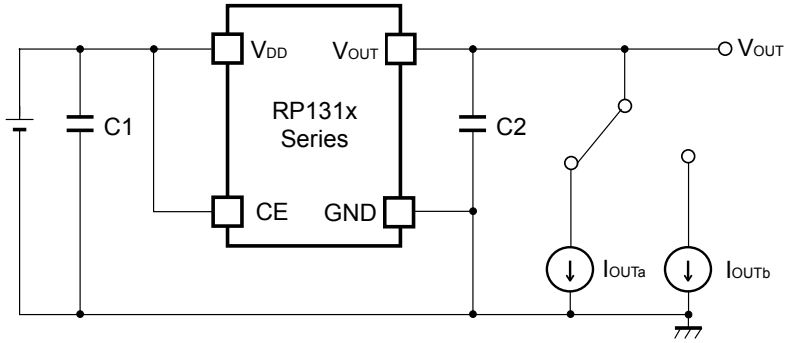
Basic Test Circuit



Test Circuit for Supply Current



Test Circuit for Ripple Rejection

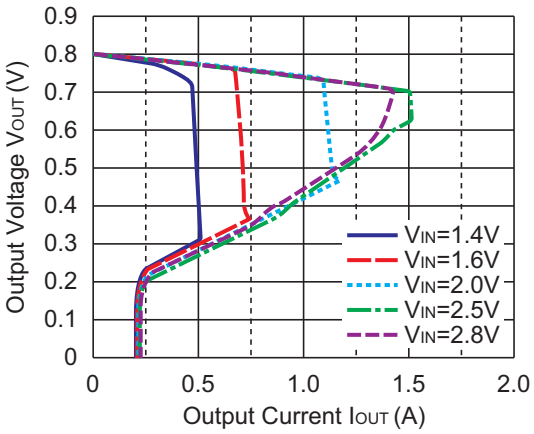


Test Circuit for Load Transient Response

TYPICAL CHARACTERISTICS

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

RP131x081x



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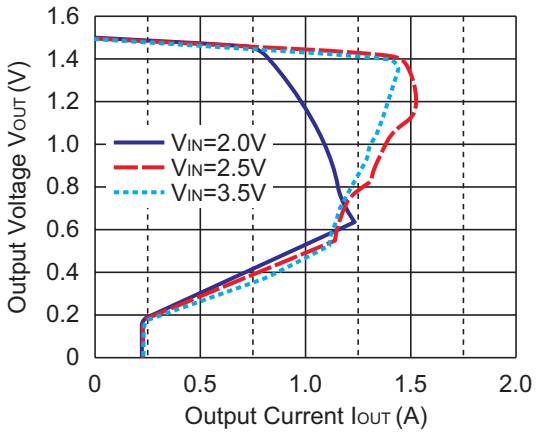

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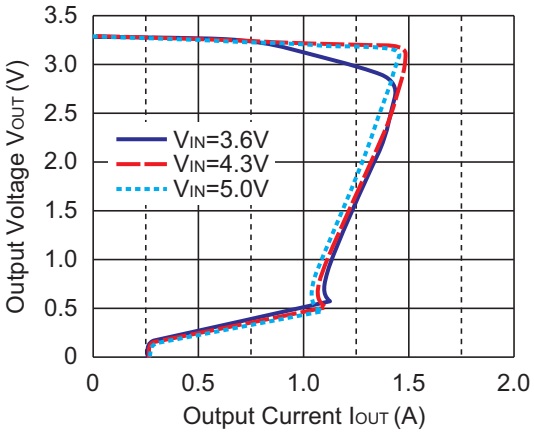

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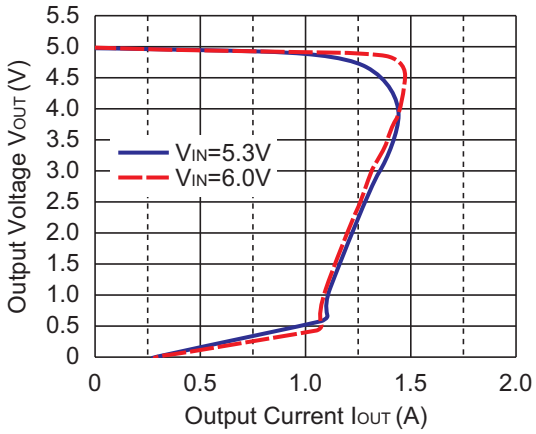
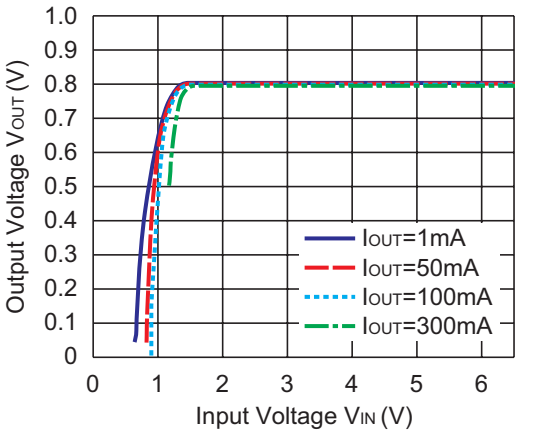


2) Output Voltage vs. Input Voltage (T_{opt}=25°C)

RP131x081x



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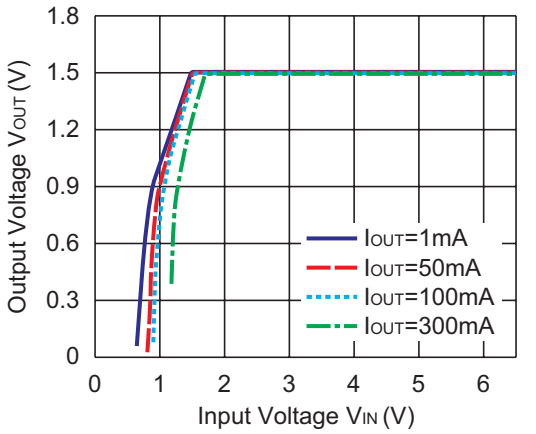

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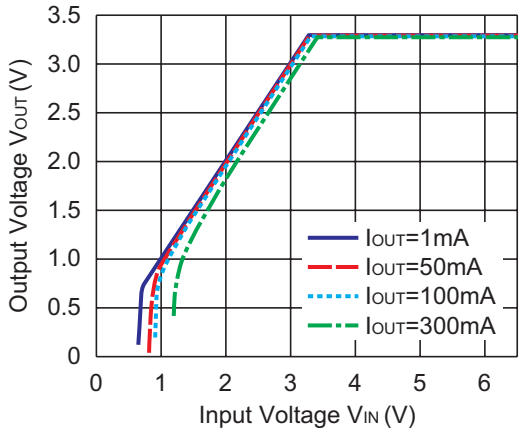

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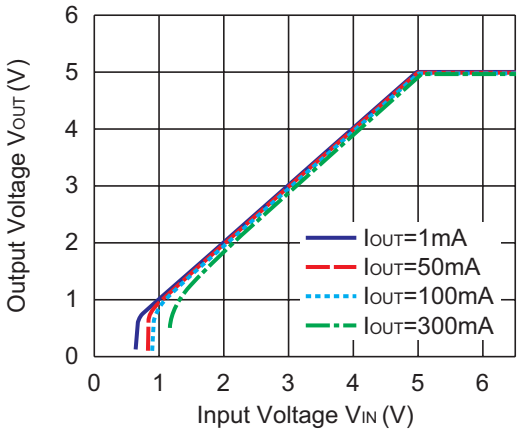
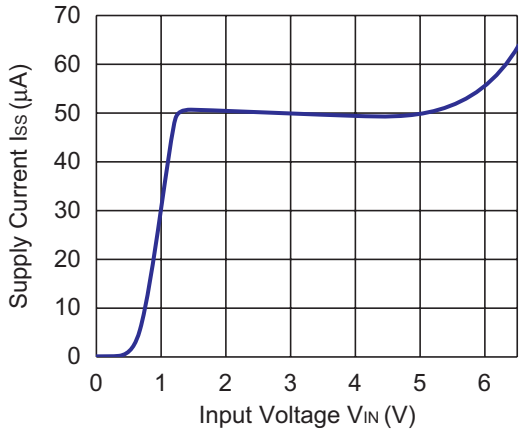


3) Supply Current vs. Input Voltage (Topt=25°C)

RP131x081x



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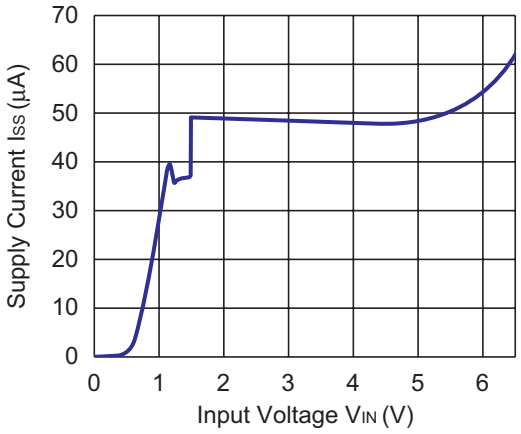

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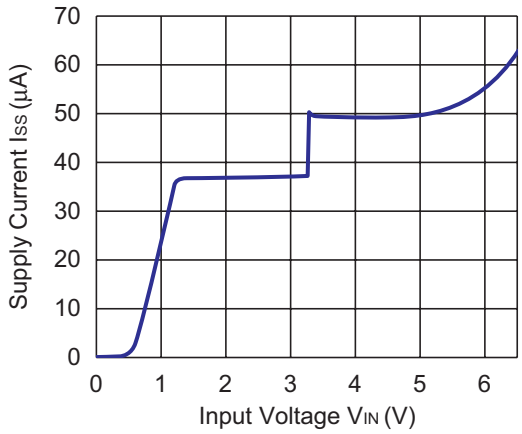

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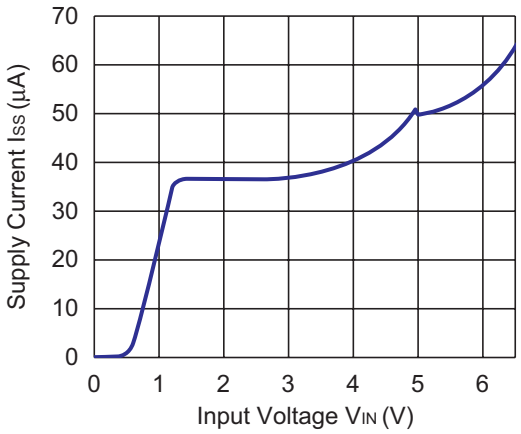
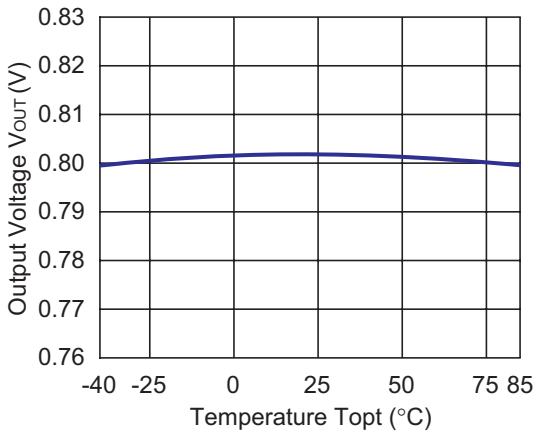


4) Output Voltage vs. Temperature

RP131x081x



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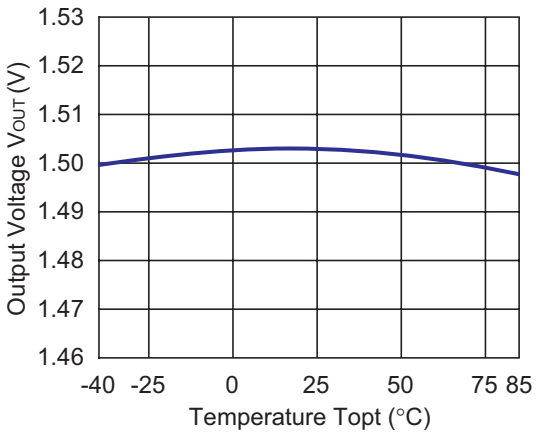

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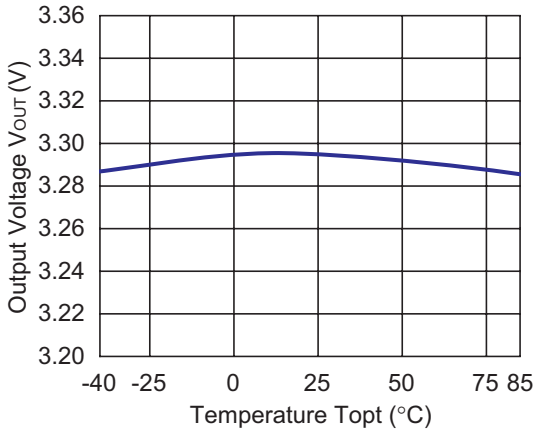

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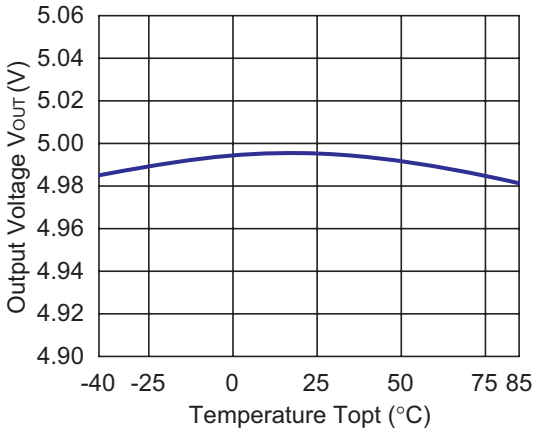
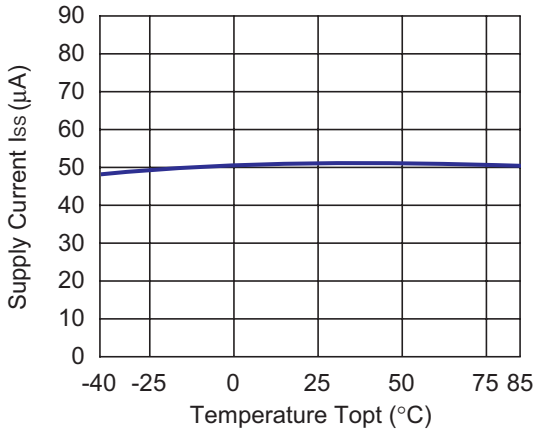
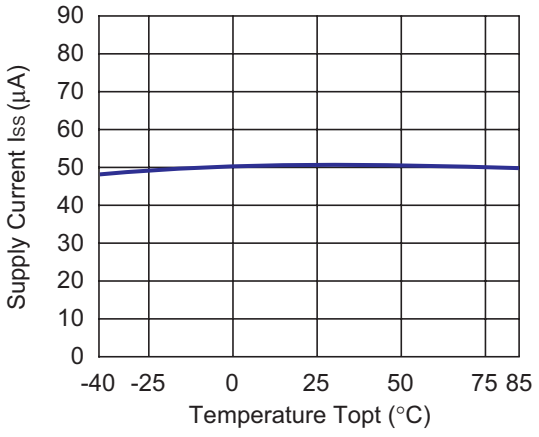


5) Supply Current vs. Temperature

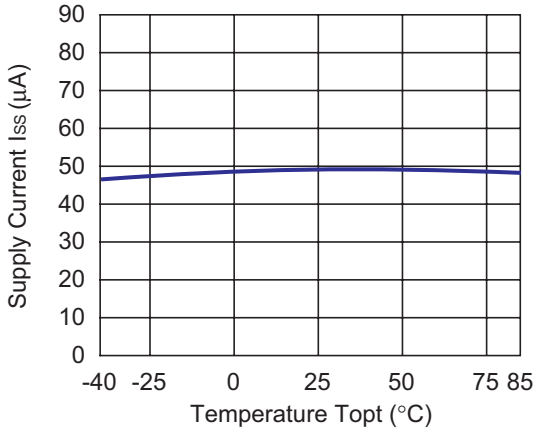
RP131x081x



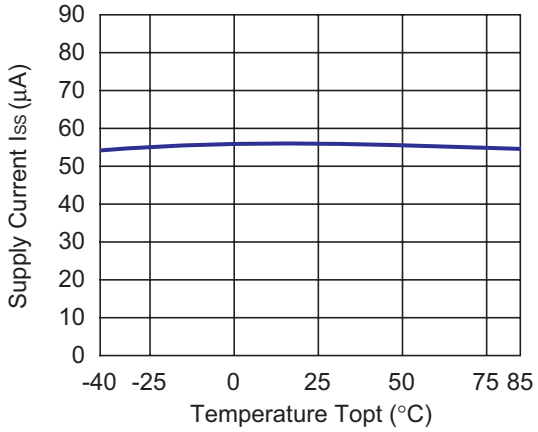
RP131x151x



RP131x331x

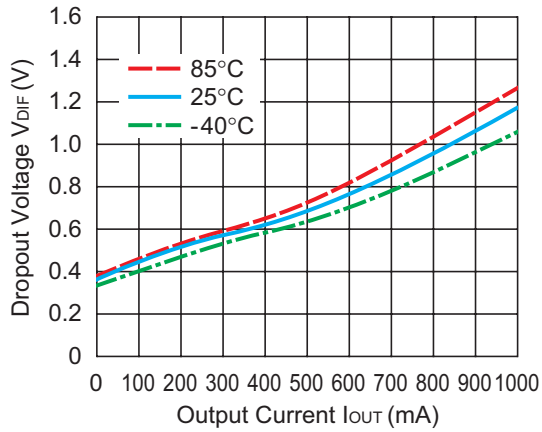


RP131x501x



6) Dropout Voltage vs. Output Current

RP131x081x



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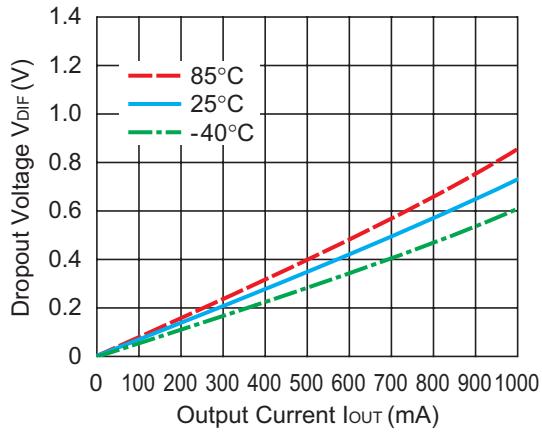
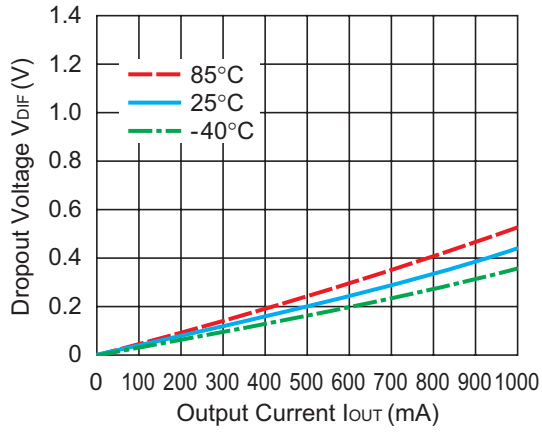


RP131x331x



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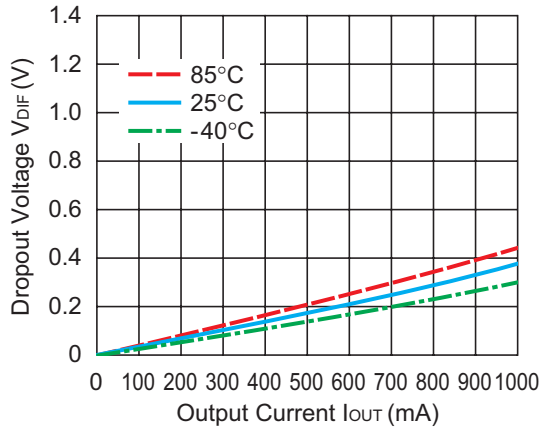
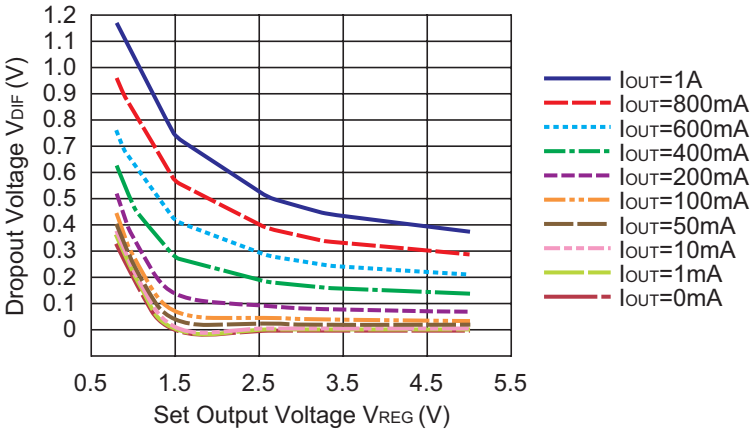
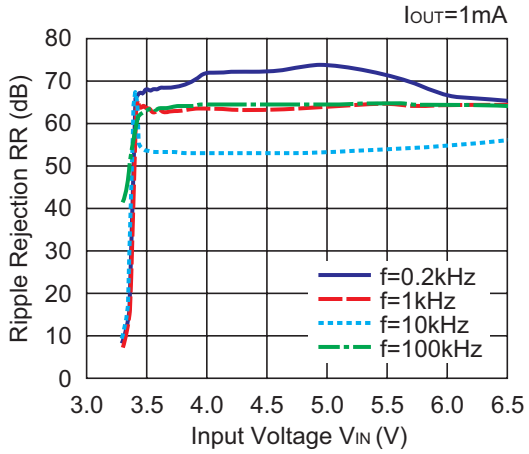


7) Dropout Voltage vs. Set Output Voltage

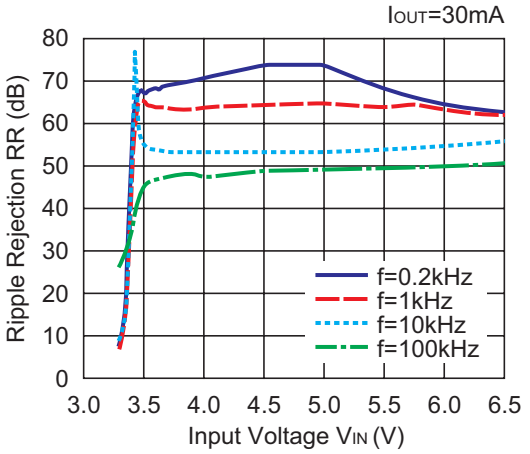


8) Ripple Rejection vs. Input Bias Voltage (C1=none, C2=Ceramic 1.0µF, Ripple=0.2Vp-p, Topt=25°C)

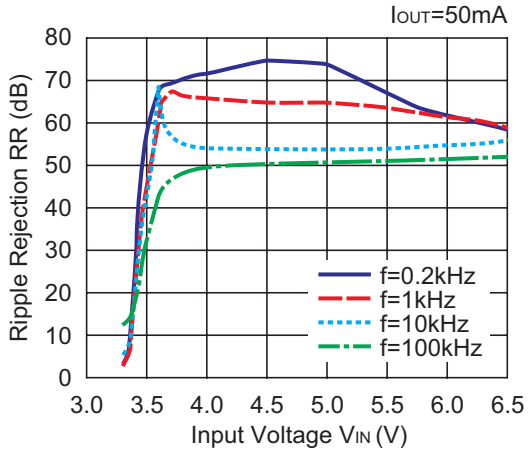
RP131x331x



RP131x331x



RP131x331x



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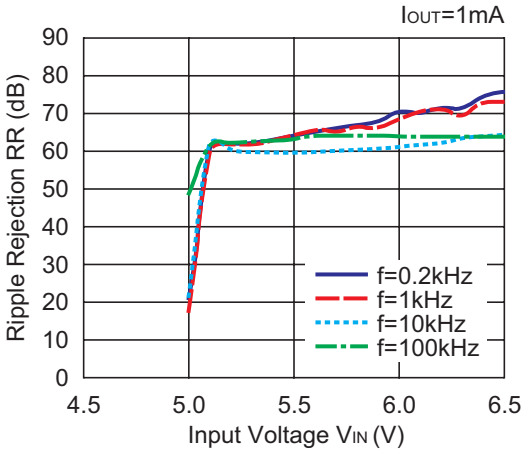
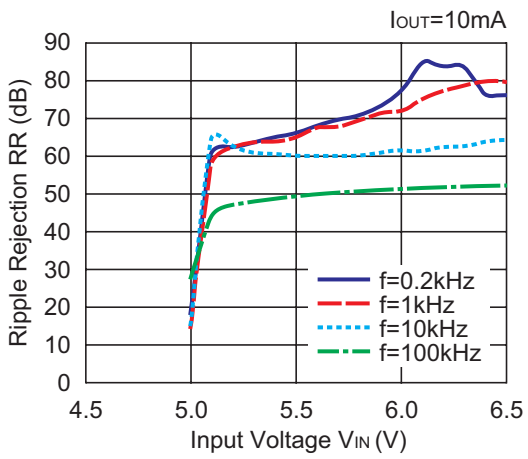
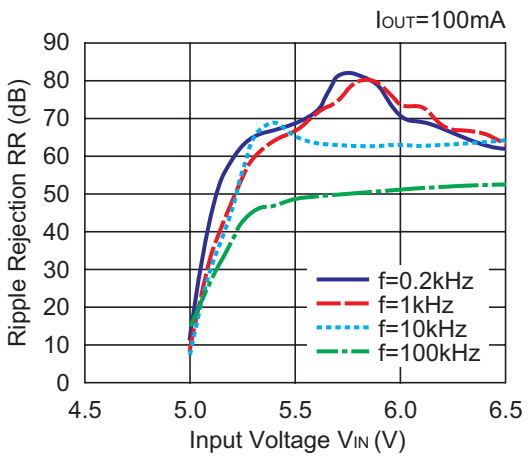


RP131x501x

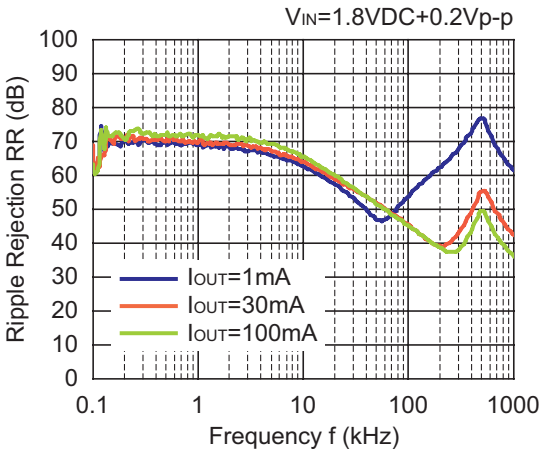


RP131x501x

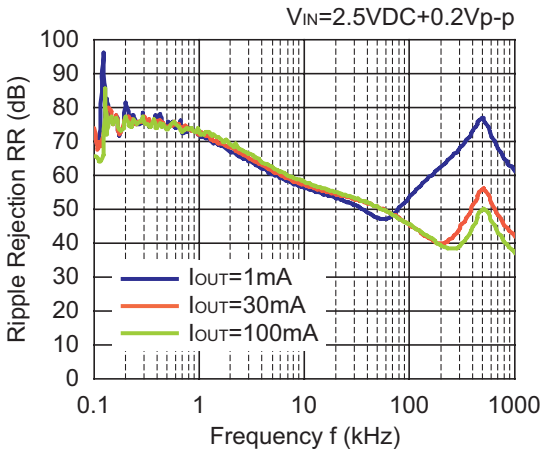


9) Ripple Rejection vs. Frequency (C1=none, C2=Ceramic 4.7µF, Topt=25°C)

RP131x081x



RP131x151x



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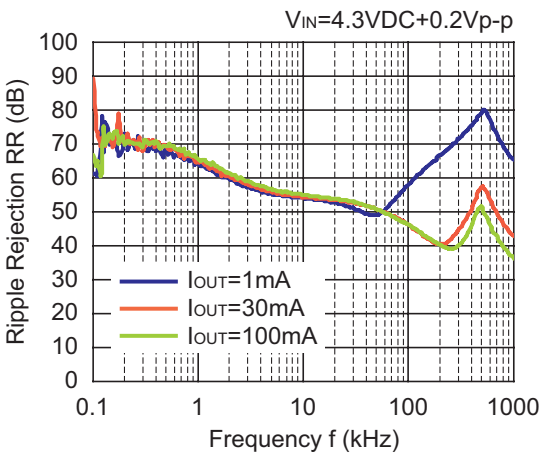

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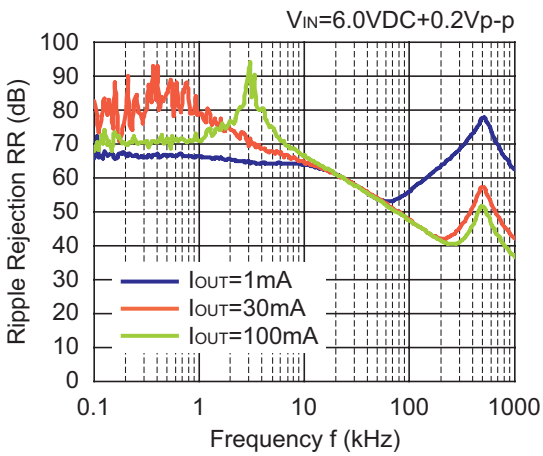
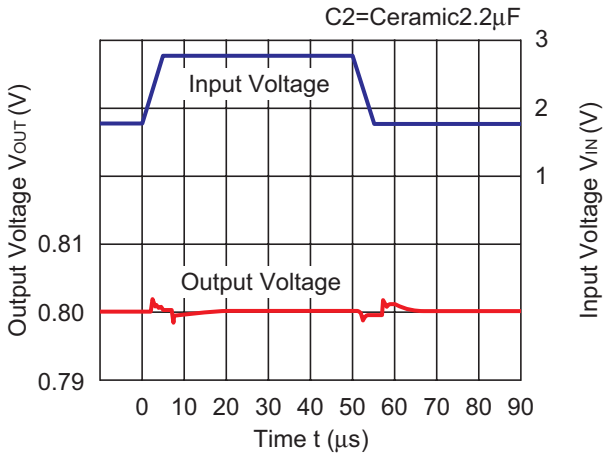


10) Input Transient Response (I_{OUT}=100mA, tr=tf=5µs, C1=none, Topt=25°C)

RP131x081x



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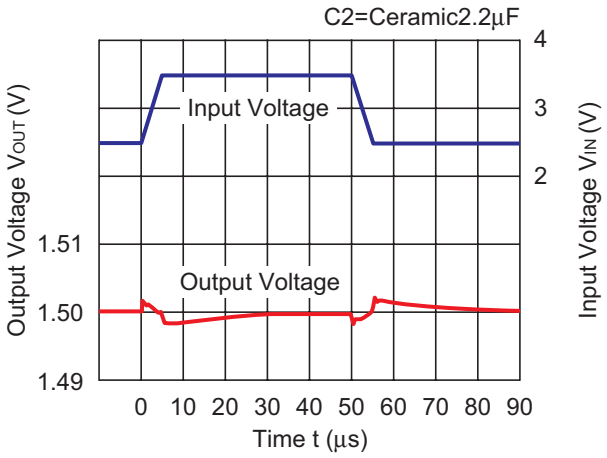
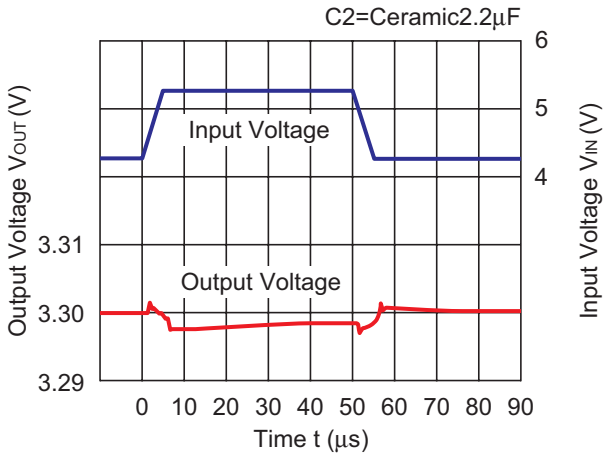
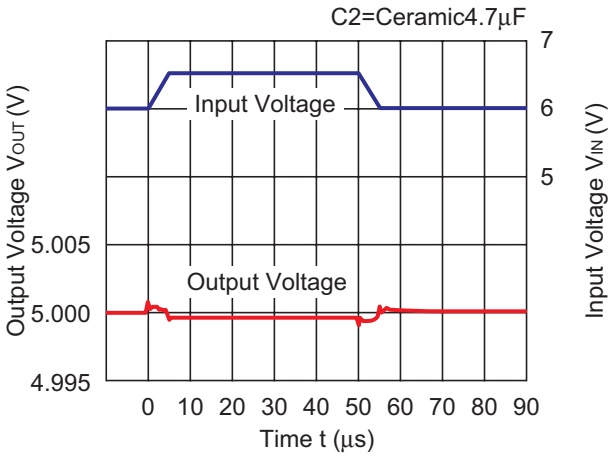


RP131x331x

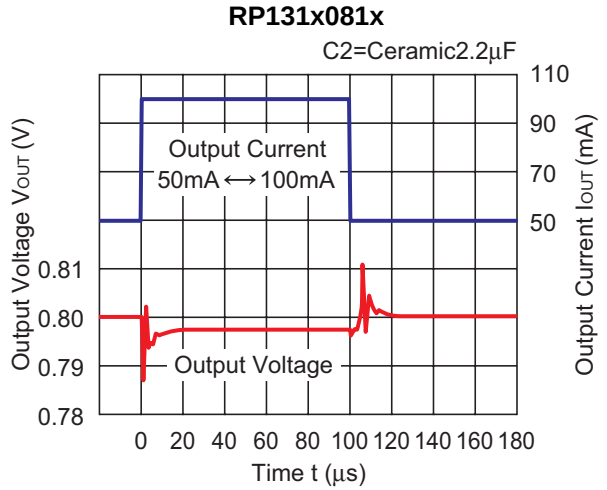


RP131x501x

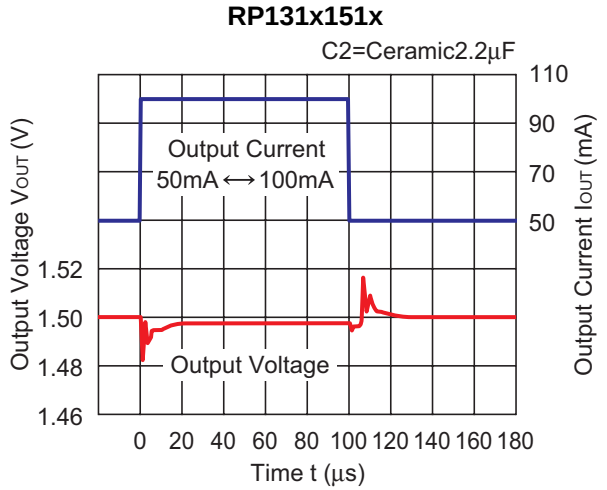


11) Load Transient Response (tr=tf=0.5µs, C1=Ceramic 2.2µF, V_{IN}=V_{OUT}+1.0V, Topt=25°C)

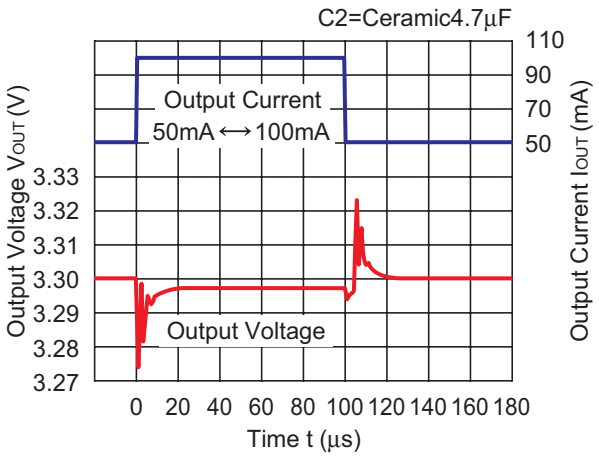
RP131x081x



RP131x151x



RP131x331x



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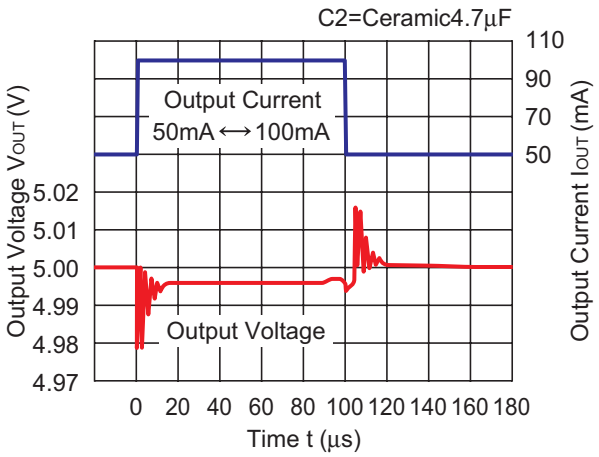

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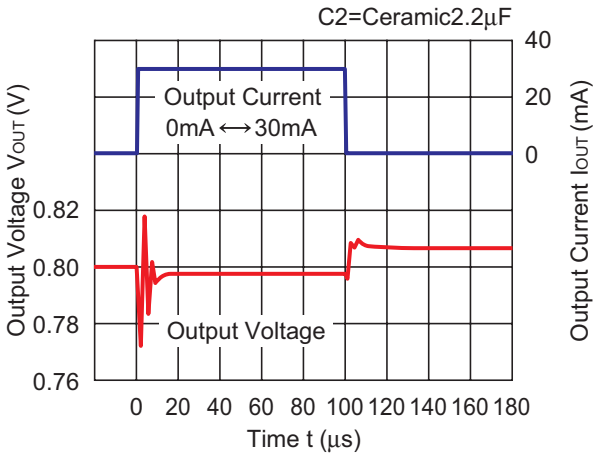

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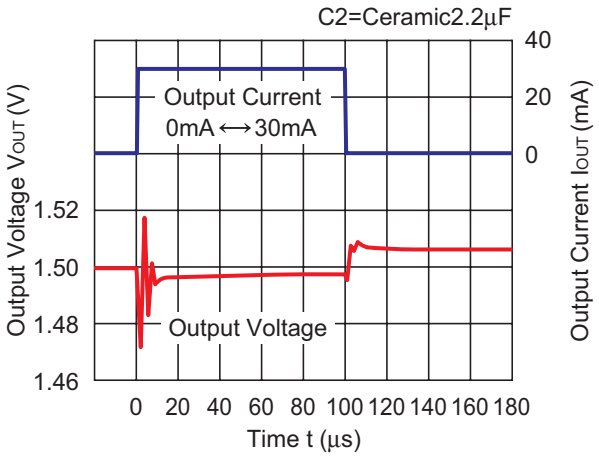

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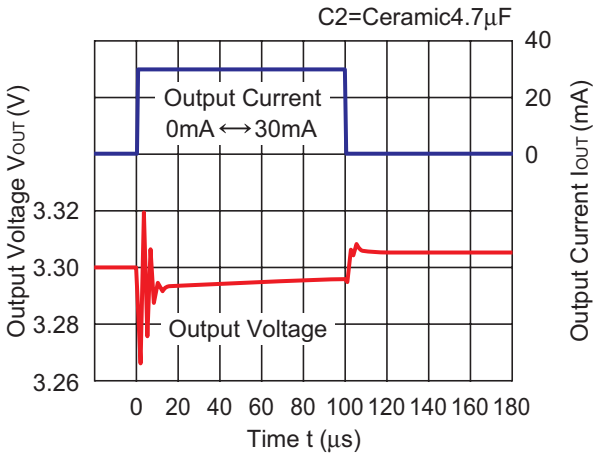
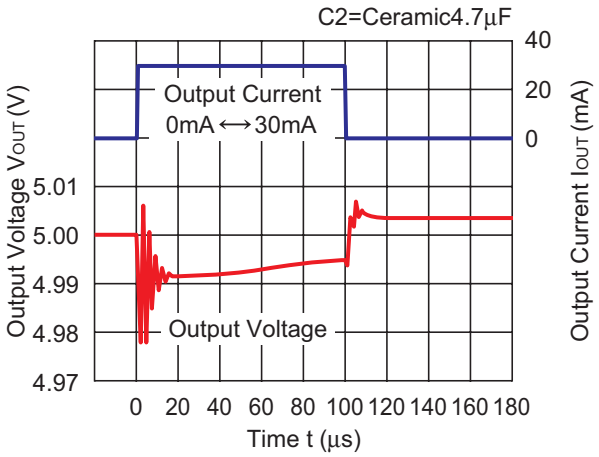


RP131x501x



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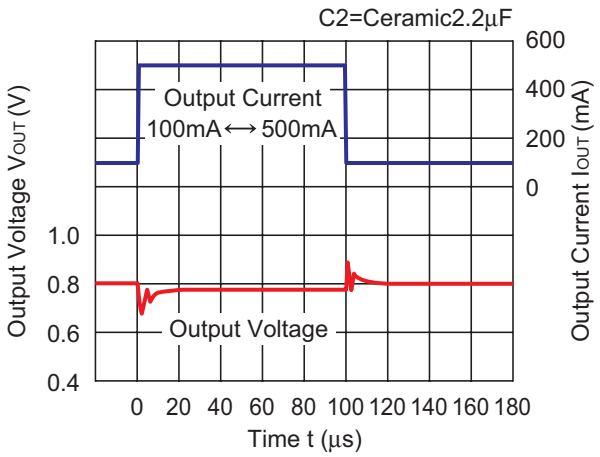

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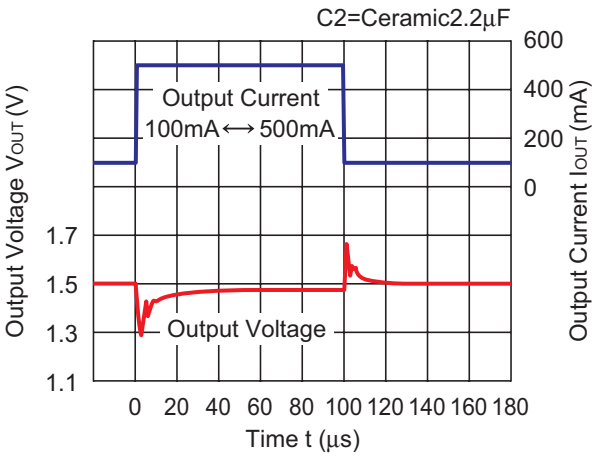
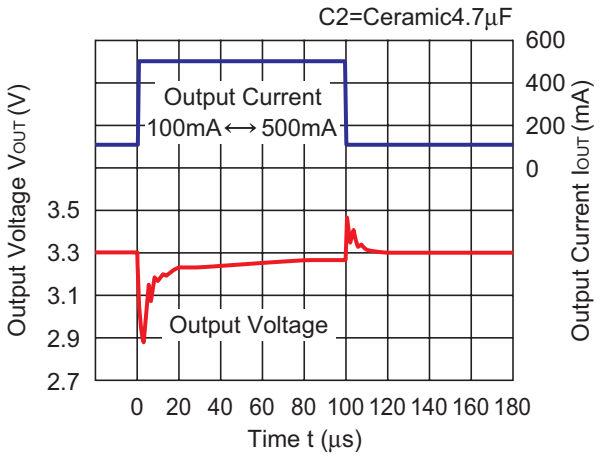


RP131x331x



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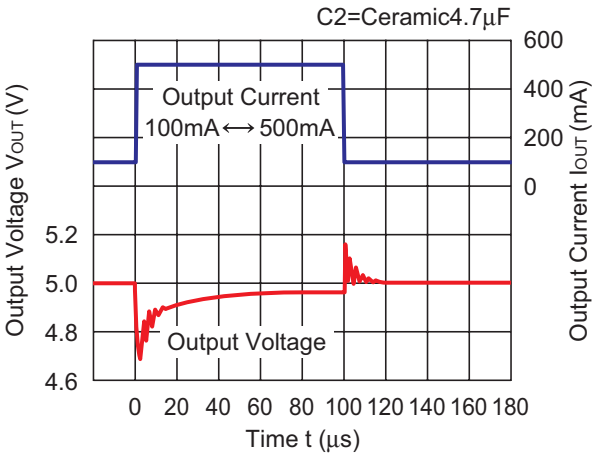
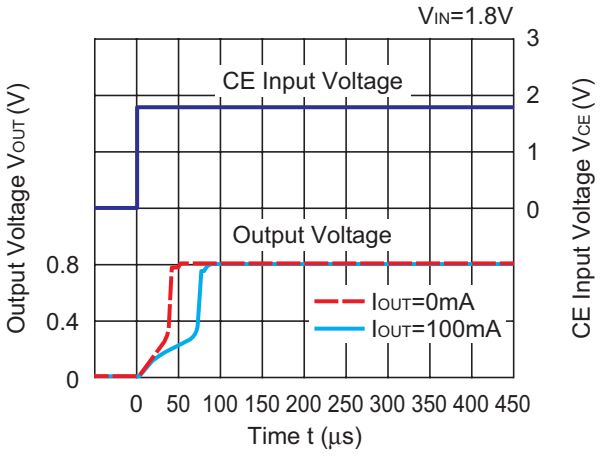
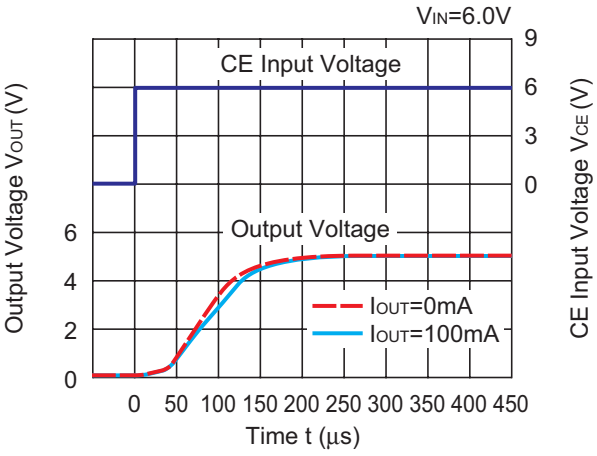


12) Turn On Speed with CE pin (C1=Ceramic 2.2µF, C2=Ceramic 4.7µF, Topt=25°C)

RP131x081x

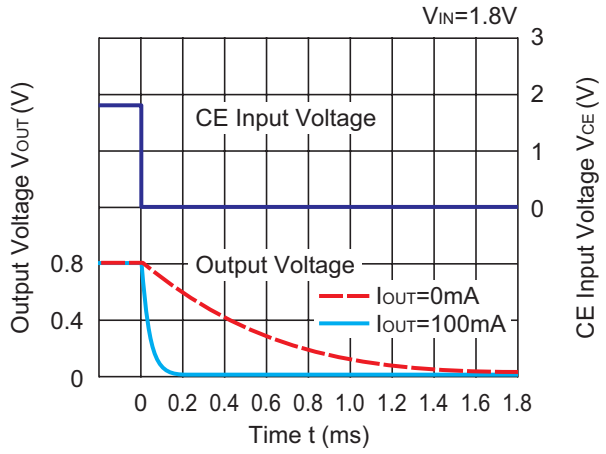


RP131x501x

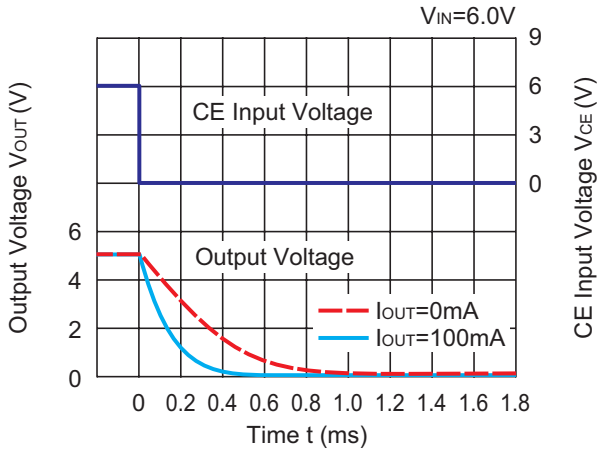


13) Turn Off Speed with CE pin (D Version) (C1=Ceramic 2.2µF, C2=Ceramic 4.7µF, Topt=25°C)

RP131x081D

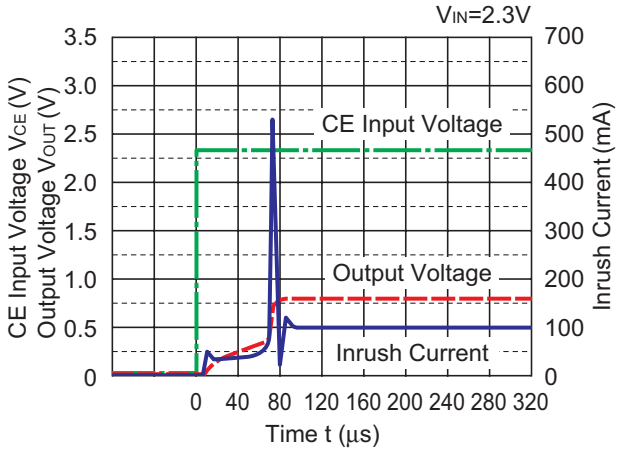


RP131x501D

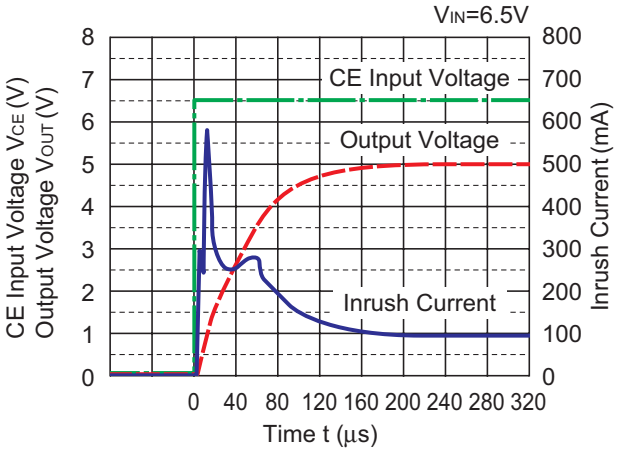


14) Inrush Current at turning on (C1=Ceramic 2.2µF, C2=Ceramic 4.7µF, Topt=25°C)

RP131x081x

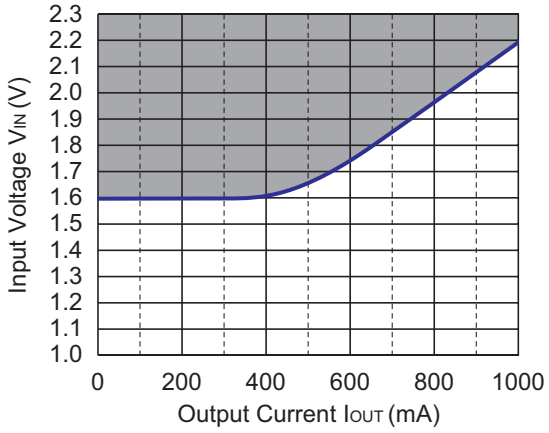


RP131x501x



15) Minimum Operating Voltage

RP131x081x



Hatched area is available for 0.8V output.

ESR vs. Output Current

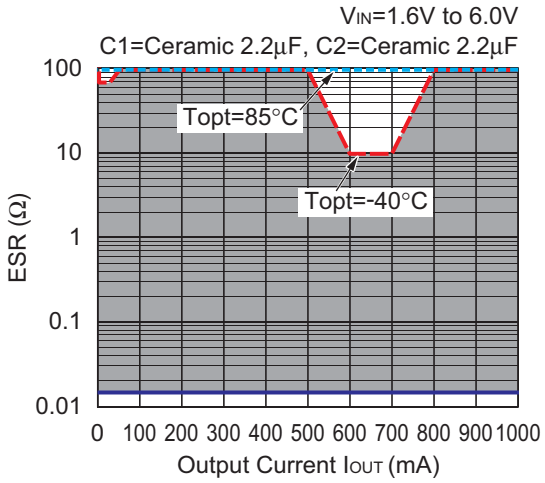
When using these ICs, consider the following points:

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 40μV (Avg.) are marked as the hatched area in the graph.

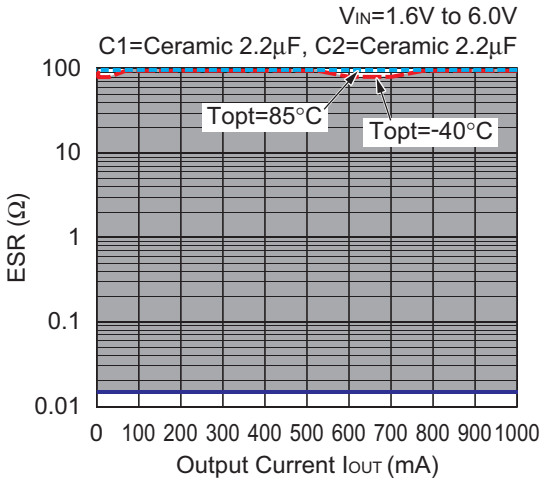
Measurement conditions

Frequency Band : 10Hz to 3MHz
Temperature : −40°C to 85°C
C1 : 2.2μF (Kyocera, CM05X5R225M04AD)
C2 : 2.2μF (Kyocera, CM105X5R225K06AE)
4.7μF (Kyocera, CM105X5R475M06AB)

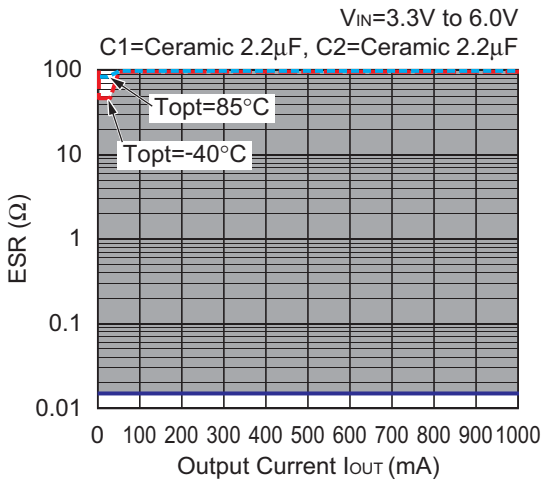
RP131x081x



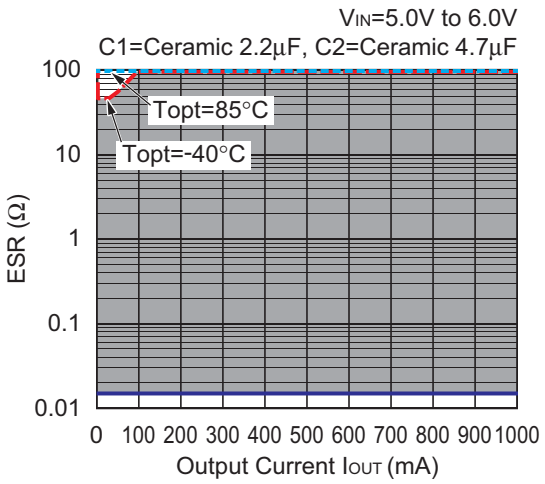
RP131x151x



RP131x331x



RP131x501x



PACKAGE INFORMATION

Power Dissipation (DFN1616-6B)

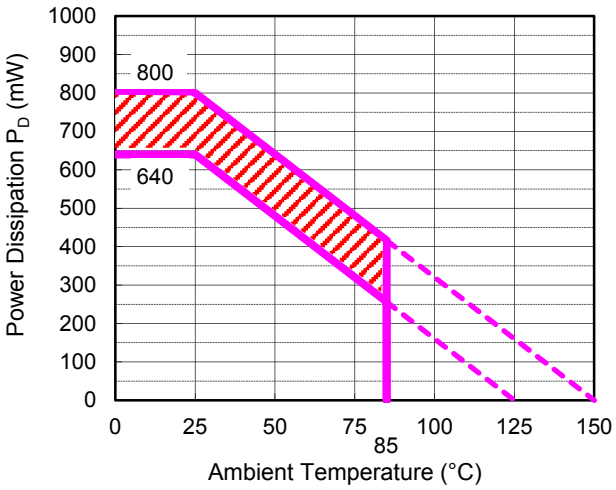
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

* Measurement Conditions

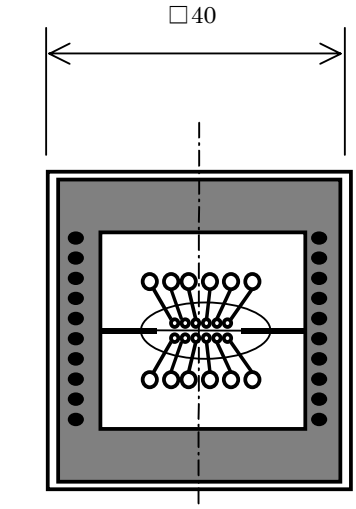
	Standard Test Land Pattern
Environment	Mounting on Board (Wind velocity=0m/s)
Board Material	Glass cloth epoxy plastic (Double-sided)
Board Dimensions	40mm*40mm*1.6mm
Copper Ratio	Top side: Approx. 50%, Back side: Approx. 50%
Through-holes	ϕ 0.5mm * 32pcs

Measurement Result (Ta=25ºC)

	Standard Test Land Pattern
Power Dissipation	640mW (Tjmax=125ºC) 820mW (Tjmax=150ºC)
Thermal Resistance	θja = (125-25ºC)/0.64W= 156ºC/W
	θjc=23ºC/W



Power Dissipation



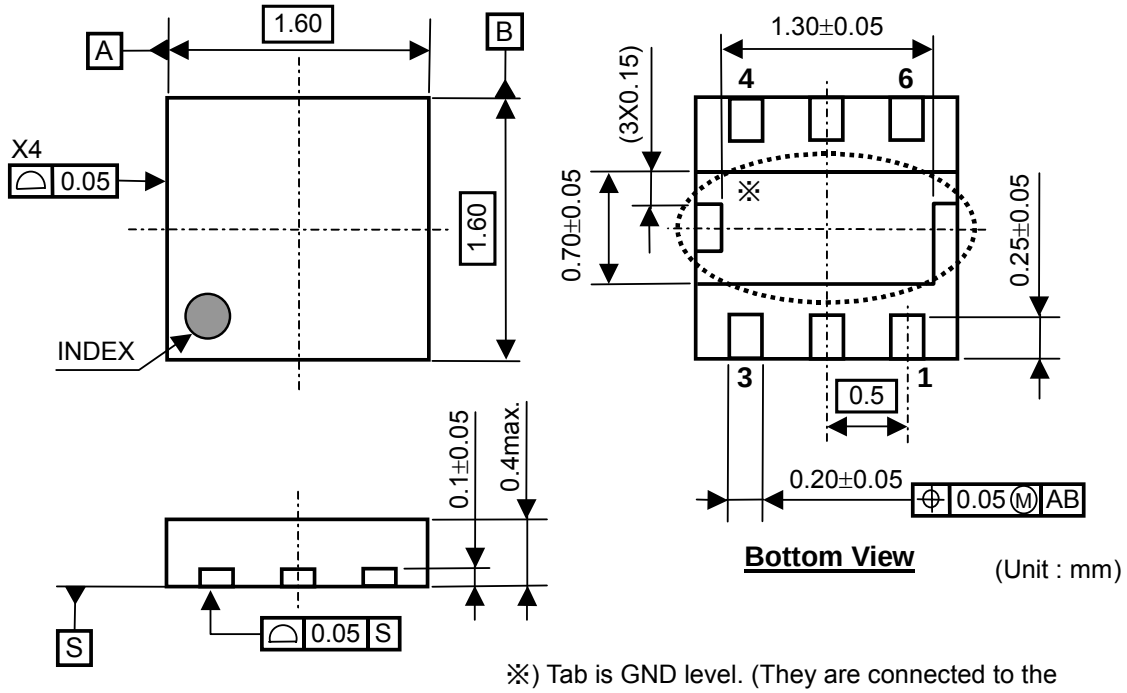
Measurement Board Pattern

IC Mount Area (Unit: mm)

The above graph shows the Power Dissipation of the package based on Tjmax=125ºC and Tjmax=150ºC. 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

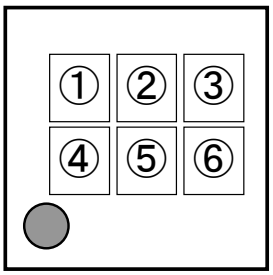
Package Dimensions (DFN1616-6B)



(Unit : mm)

※) 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	**C B 0 1**	0.8V
RP131L091B	**C B 0 2**	0.9V
RP131L101B	**C B 0 3**	1.0V
RP131L111B	**C B 0 4**	1.1V
RP131L121B	**C B 0 5**	1.2V
RP131L121B5	**C B 0 6**	1.25V
RP131L131B	**C B 0 7**	1.3V
RP131L141B	**C B 0 8**	1.4V
RP131L151B	**C B 0 9**	1.5V
RP131L161B	**C B 1 0**	1.6V
RP131L171B	**C B 1 1**	1.7V
RP131L181B	**C B 1 2**	1.8V
RP131L181B5	**C B 1 3**	1.85V
RP131L191B	**C B 1 4**	1.9V
RP131L201B	**C B 1 5**	2.0V
RP131L211B	**C B 1 6**	2.1V
RP131L221B	**C B 1 7**	2.2V
RP131L231B	**C B 1 8**	2.3V
RP131L241B	**C B 1 9**	2.4V
RP131L251B	**C B 2 0**	2.5V
RP131L261B	**C B 2 1**	2.6V
RP131L271B	**C B 2 2**	2.7V
RP131L281B	**C B 2 3**	2.8V
RP131L281B5	**C B 2 4**	2.85V
RP131L291B	**C B 2 5**	2.9V
RP131L301B	**C B 2 6**	3.0V
RP131L311B	**C B 2 7**	3.1V
RP131L321B	**C B 2 8**	3.2V
RP131L331B	**C B 2 9**	3.3V
RP131L341B	**C B 3 0**	3.4V
RP131L351B	**C B 3 1**	3.5V
RP131L361B	**C B 3 2**	3.6V
RP131L371B	**C B 3 3**	3.7V
RP131L381B	**C B 3 4**	3.8V
RP131L391B	**C B 3 5**	3.9V
RP131L401B	**C B 3 6**	4.0V
RP131L411B	**C B 3 7**	4.1V
RP131L421B	**C B 3 8**	4.2V
RP131L431B	**C B 3 9**	4.3V
RP131L441B	**C B 4 0**	4.4V
RP131L451B	**C B 4 1**	4.5V
RP131L461B	**C B 4 2**	4.6V
RP131L471B	**C B 4 3**	4.7V
RP131L481B	**C B 4 4**	4.8V
RP131L491B	**C B 4 5**	4.9V
RP131L501B	**C B 4 6**	5.0V
RP131L101B5	**C B 4 7**	1.05V
RP131L511B	**C B 4 8**	5.1V
RP131L521B	**C B 4 9**	5.2V
RP131L531B	**C B 5 0**	5.3V
RP131L541B	**C B 5 1**	5.4V
RP131L551B	**C B 5 2**	5.5V

RP131Lxx1D

Part Number	①②③④	Vset
RP131L081D	**C C 0 1**	0.8V
RP131L091D	**C C 0 2**	0.9V
RP131L101D	**C C 0 3**	1.0V
RP131L111D	**C C 0 4**	1.1V
RP131L121D	**C C 0 5**	1.2V
RP131L121D5	**C C 0 6**	1.25V
RP131L131D	**C C 0 7**	1.3V
RP131L141D	**C C 0 8**	1.4V
RP131L151D	**C C 0 9**	1.5V
RP131L161D	**C C 1 0**	1.6V
RP131L171D	**C C 1 1**	1.7V
RP131L181D	**C C 1 2**	1.8V
RP131L181D5	**C C 1 3**	1.85V
RP131L191D	**C C 1 4**	1.9V
RP131L201D	**C C 1 5**	2.0V
RP131L211D	**C C 1 6**	2.1V
RP131L221D	**C C 1 7**	2.2V
RP131L231D	**C C 1 8**	2.3V
RP131L241D	**C C 1 9**	2.4V
RP131L251D	**C C 2 0**	2.5V
RP131L261D	**C C 2 1**	2.6V
RP131L271D	**C C 2 2**	2.7V
RP131L281D	**C C 2 3**	2.8V
RP131L281D5	**C C 2 4**	2.85V
RP131L291D	**C C 2 5**	2.9V
RP131L301D	**C C 2 6**	3.0V
RP131L311D	**C C 2 7**	3.1V
RP131L321D	**C C 2 8**	3.2V
RP131L331D	**C C 2 9**	3.3V
RP131L341D	**C C 3 0**	3.4V
RP131L351D	**C C 3 1**	3.5V
RP131L361D	**C C 3 2**	3.6V
RP131L371D	**C C 3 3**	3.7V
RP131L381D	**C C 3 4**	3.8V
RP131L391D	**C C 3 5**	3.9V
RP131L401D	**C C 3 6**	4.0V
RP131L411D	**C C 3 7**	4.1V
RP131L421D	**C C 3 8**	4.2V
RP131L431D	**C C 3 9**	4.3V
RP131L441D	**C C 4 0**	4.4V
RP131L451D	**C C 4 1**	4.5V
RP131L461D	**C C 4 2**	4.6V
RP131L471D	**C C 4 3**	4.7V
RP131L481D	**C C 4 4**	4.8V
RP131L491D	**C C 4 5**	4.9V
RP131L501D	**C C 4 6**	5.0V
RP131L101D5	**C C 4 7**	1.05V
RP131L511D	**C C 4 8**	5.1V
RP131L521D	**C C 4 9**	5.2V
RP131L531D	**C C 5 0**	5.3V
RP131L541D	**C C 5 1**	5.4V
RP131L551D	**C C 5 2**	5.5V

Power Dissipation (DFN(PLP)1820-6)

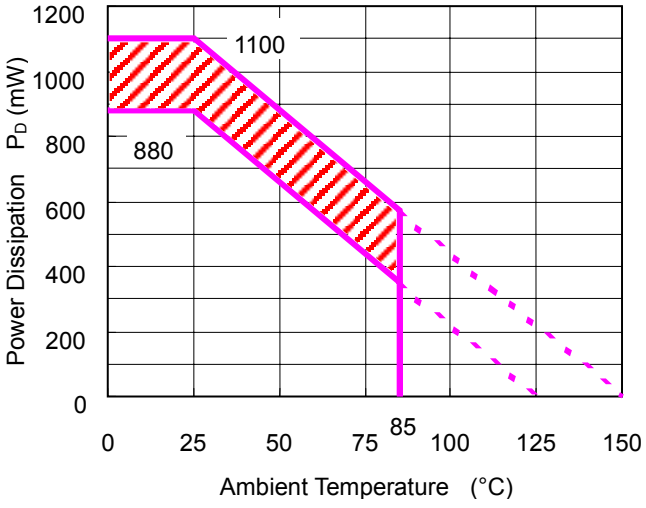
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

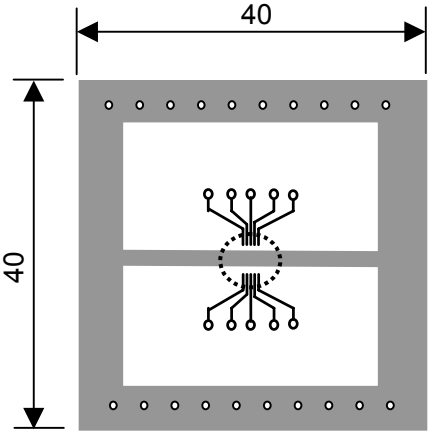
Measurement Conditions

	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	ϕ0.54mm * 30pcs

Measurement Result (Ta=25°C)

	Standard Land Pattern
Power Dissipation	880mW(Tjmax=125°C) 1100mW(Tjmax=150°C)
Thermal Resistance	θja=(125 - 25°C)/0.88W=114°C/W





Measurement Board Pattern

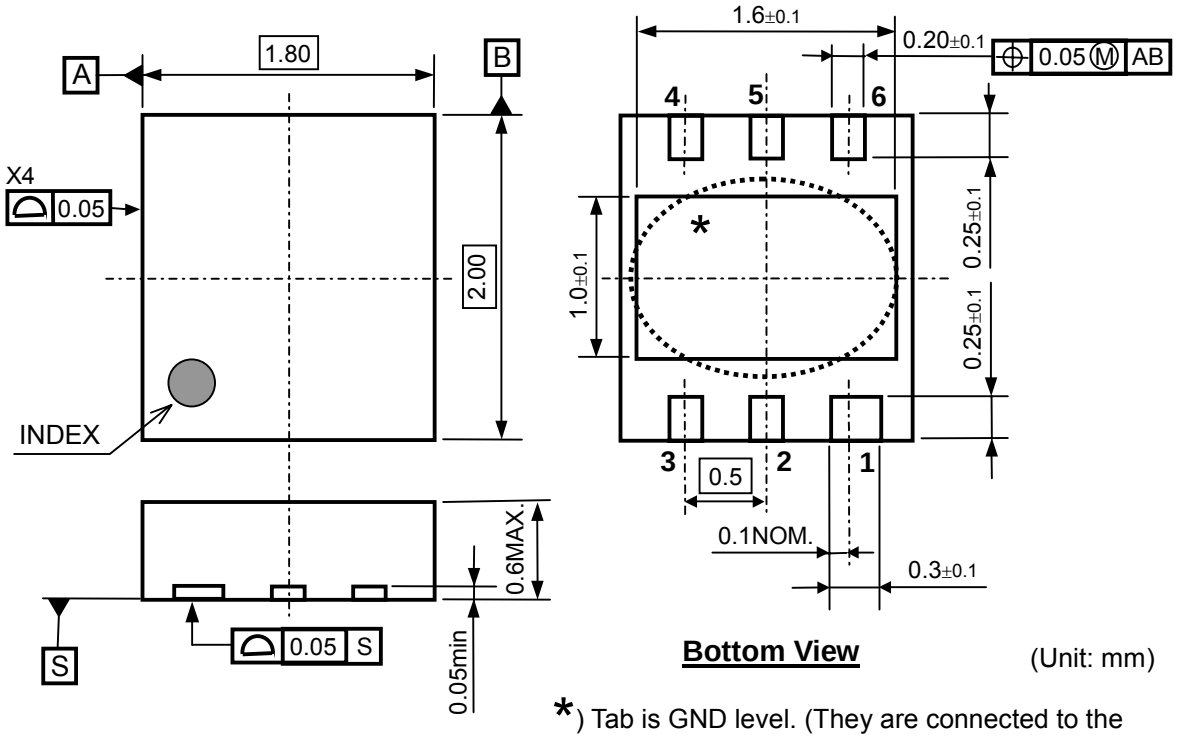
IC Mount Area Unit: mm

- The above graph shows the Power Dissipation of the package based on Tjmax=125°C and Tjmax=150°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)



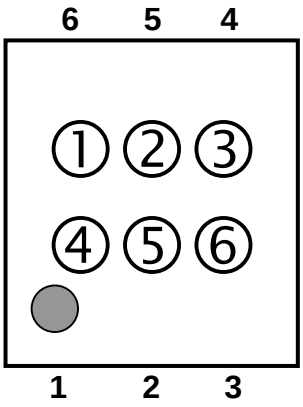
(Unit: mm)

*) 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	**A M 0 1**	0.8V
RP131K091B	**A M 0 2**	0.9V
RP131K101B	**A M 0 3**	1.0V
RP131K111B	**A M 0 4**	1.1V
RP131K121B	**A M 0 5**	1.2V
RP131K121B5	**A M 0 6**	1.25V
RP131K131B	**A M 0 7**	1.3V
RP131K141B	**A M 0 8**	1.4V
RP131K151B	**A M 0 9**	1.5V
RP131K161B	**A M 1 0**	1.6V
RP131K171B	**A M 1 1**	1.7V
RP131K181B	**A M 1 2**	1.8V
RP131K181B5	**A M 1 3**	1.85V
RP131K191B	**A M 1 4**	1.9V
RP131K201B	**A M 1 5**	2.0V
RP131K211B	**A M 1 6**	2.1V
RP131K221B	**A M 1 7**	2.2V
RP131K231B	**A M 1 8**	2.3V
RP131K241B	**A M 1 9**	2.4V
RP131K251B	**A M 2 0**	2.5V
RP131K261B	**A M 2 1**	2.6V
RP131K271B	**A M 2 2**	2.7V
RP131K281B	**A M 2 3**	2.8V
RP131K281B5	**A M 2 4**	2.85V
RP131K291B	**A M 2 5**	2.9V
RP131K301B	**A M 2 6**	3.0V
RP131K311B	**A M 2 7**	3.1V
RP131K321B	**A M 2 8**	3.2V
RP131K331B	**A M 2 9**	3.3V
RP131K341B	**A M 3 0**	3.4V
RP131K351B	**A M 3 1**	3.5V
RP131K361B	**A M 3 2**	3.6V
RP131K371B	**A M 3 3**	3.7V
RP131K381B	**A M 3 4**	3.8V
RP131K391B	**A M 3 5**	3.9V
RP131K401B	**A M 3 6**	4.0V
RP131K411B	**A M 3 7**	4.1V
RP131K421B	**A M 3 8**	4.2V
RP131K431B	**A M 3 9**	4.3V
RP131K441B	**A M 4 0**	4.4V
RP131K451B	**A M 4 1**	4.5V
RP131K461B	**A M 4 2**	4.6V
RP131K471B	**A M 4 3**	4.7V
RP131K481B	**A M 4 4**	4.8V
RP131K491B	**A M 4 5**	4.9V
RP131K501B	**A M 4 6**	5.0V
RP131K101B5	**A M 4 7**	1.05V
RP131K551B	**A M 4 8**	5.5V
RP131K511B	**A M 4 9**	5.1V
RP131K521B	**A M 5 0**	5.2V
RP131K531B	**A M 5 1**	5.3V
RP131K541B	**A M 5 2**	5.4V

RP131Kxx1D

Part Number	①②③④	Vset
RP131K081D	**A N 0 1**	0.8V
RP131K091D	**A N 0 2**	0.9V
RP131K101D	**A N 0 3**	1.0V
RP131K111D	**A N 0 4**	1.1V
RP131K121D	**A N 0 5**	1.2V
RP131K121D5	**A N 0 6**	1.25V
RP131K131D	**A N 0 7**	1.3V
RP131K141D	**A N 0 8**	1.4V
RP131K151D	**A N 0 9**	1.5V
RP131K161D	**A N 1 0**	1.6V
RP131K171D	**A N 1 1**	1.7V
RP131K181D	**A N 1 2**	1.8V
RP131K181D5	**A N 1 3**	1.85V
RP131K191D	**A N 1 4**	1.9V
RP131K201D	**A N 1 5**	2.0V
RP131K211D	**A N 1 6**	2.1V
RP131K221D	**A N 1 7**	2.2V
RP131K231D	**A N 1 8**	2.3V
RP131K241D	**A N 1 9**	2.4V
RP131K251D	**A N 2 0**	2.5V
RP131K261D	**A N 2 1**	2.6V
RP131K271D	**A N 2 2**	2.7V
RP131K281D	**A N 2 3**	2.8V
RP131K281D5	**A N 2 4**	2.85V
RP131K291D	**A N 2 5**	2.9V
RP131K301D	**A N 2 6**	3.0V
RP131K311D	**A N 2 7**	3.1V
RP131K321D	**A N 2 8**	3.2V
RP131K331D	**A N 2 9**	3.3V
RP131K341D	**A N 3 0**	3.4V
RP131K351D	**A N 3 1**	3.5V
RP131K361D	**A N 3 2**	3.6V
RP131K371D	**A N 3 3**	3.7V
RP131K381D	**A N 3 4**	3.8V
RP131K391D	**A N 3 5**	3.9V
RP131K401D	**A N 3 6**	4.0V
RP131K411D	**A N 3 7**	4.1V
RP131K421D	**A N 3 8**	4.2V
RP131K431D	**A N 3 9**	4.3V
RP131K441D	**A N 4 0**	4.4V
RP131K451D	**A N 4 1**	4.5V
RP131K461D	**A N 4 2**	4.6V
RP131K471D	**A N 4 3**	4.7V
RP131K481D	**A N 4 4**	4.8V
RP131K491D	**A N 4 5**	4.9V
RP131K501D	**A N 4 6**	5.0V
RP131K101D5	**A N 4 7**	1.05V
RP131K551D	**A N 4 8**	5.5V
RP131K511D	**A N 4 9**	5.1V
RP131K521D	**A N 5 0**	5.2V
RP131K531D	**A N 5 1**	5.3V
RP131K541D	**A N 5 2**	5.4V

Power Dissipation (SOT-89-5)

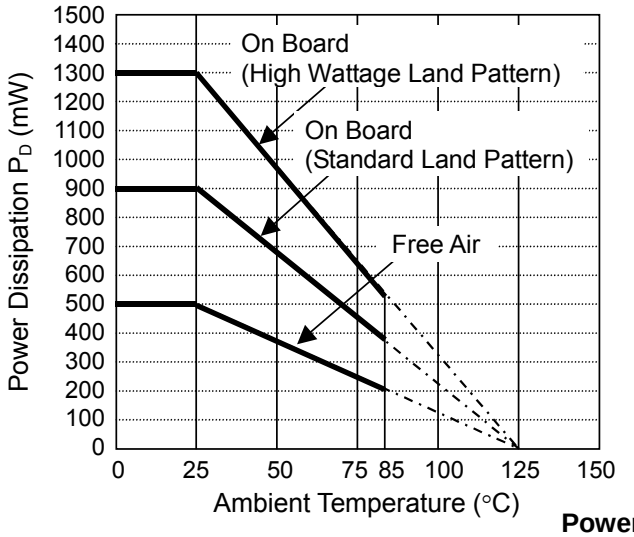
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

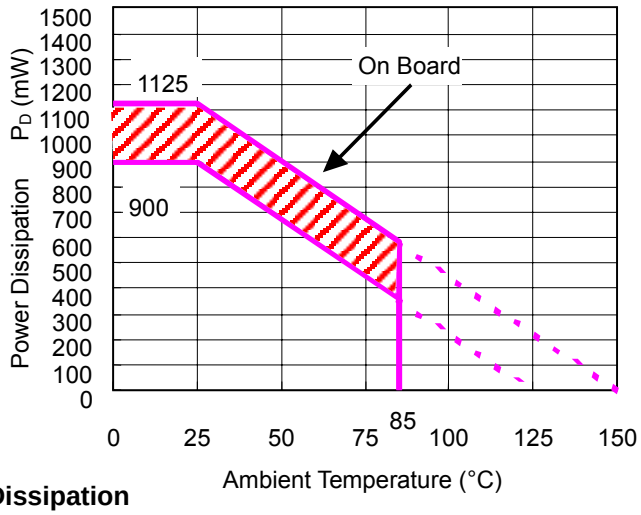
Measurement Conditions

	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	ϕ0.85mm ∗ 10pcs	-

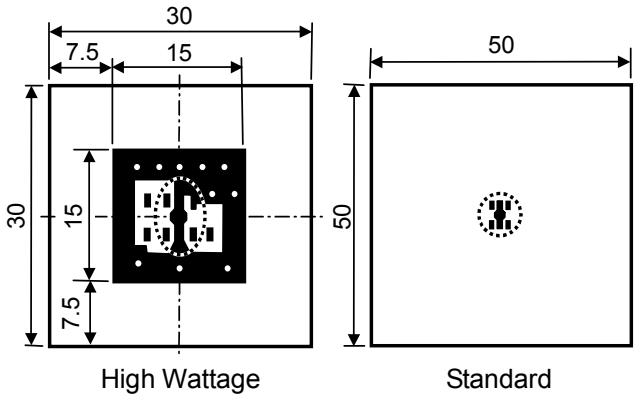
Measurement Result (Ta=25°C)

	High Wattage Land Pattern	Standard Land Pattern	Free Air
Power Dissipation	1300mW	900mW (Tjmax=125°C) 1125mW (Tjmax=150°C)	500mW
Thermal Resistance	77°C/W	111°C/W	200°C/W





Power Dissipation



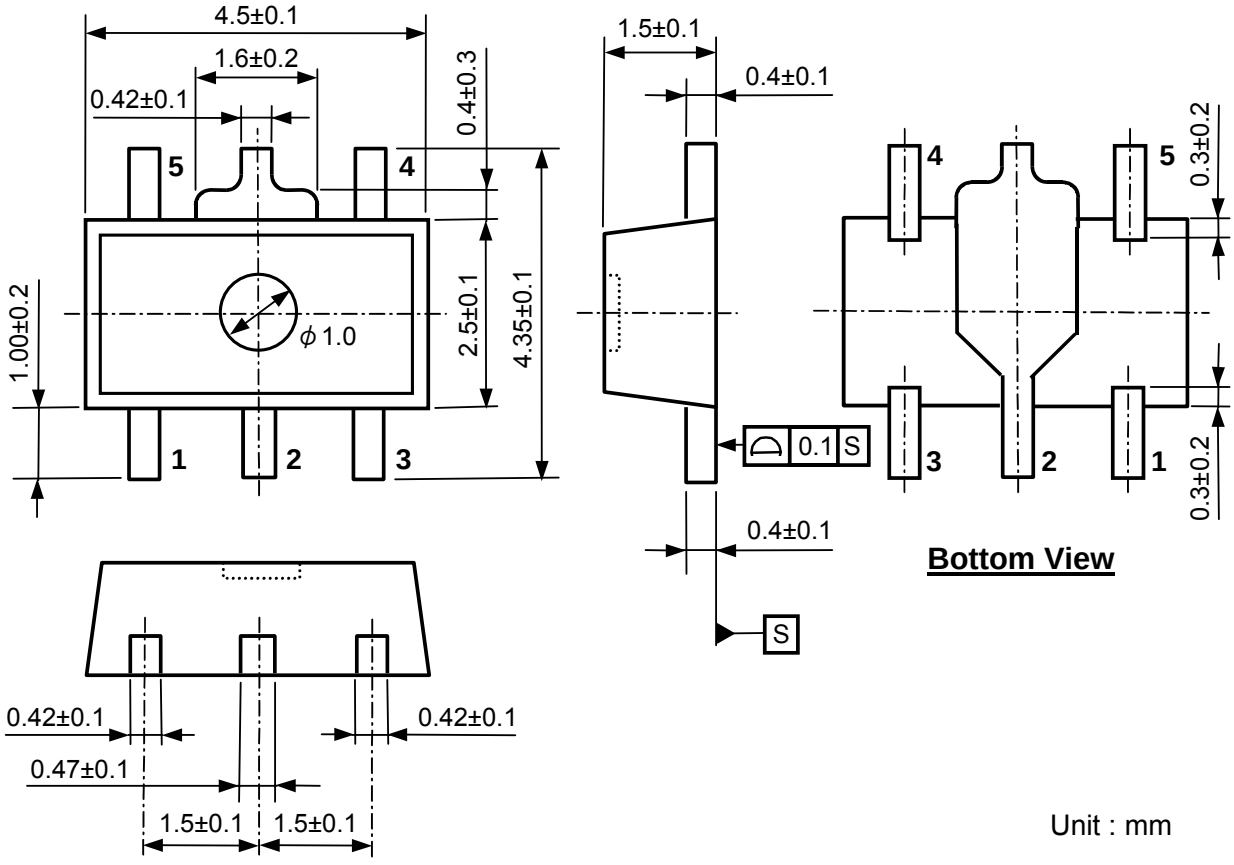
Measurement Board Pattern

IC Mount Area Unit: mm

- The above graph shows the Power Dissipation of the package based on Tjmax=125°C and Tjmax=150°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

Package Dimensions (SOT-89-5)

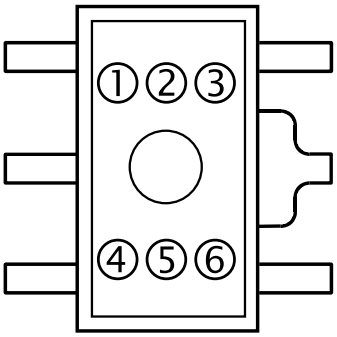


Unit : mm

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

Power Dissipation (HSOP-6J)

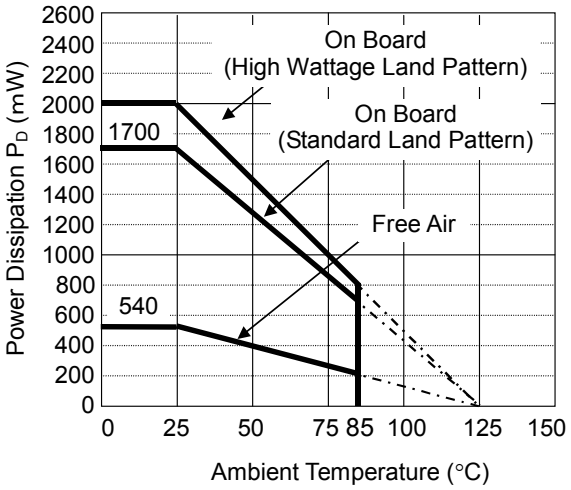
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

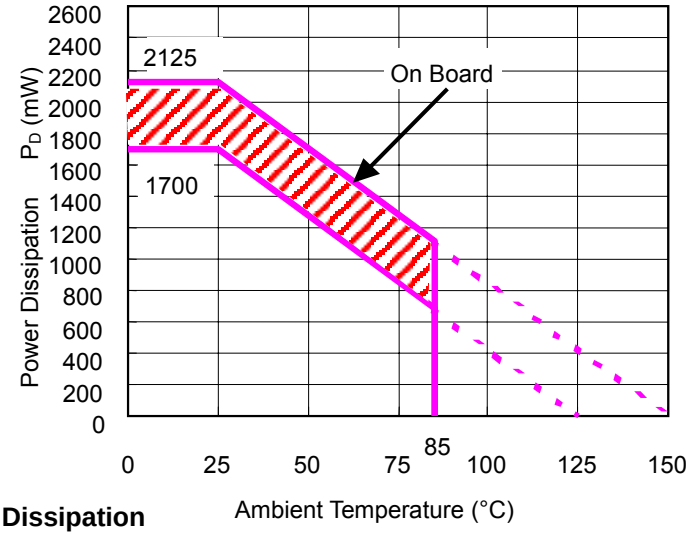
Measurement Conditions

	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	ϕ0.5mm * 44pcs	ϕ0.5mm * 44pcs

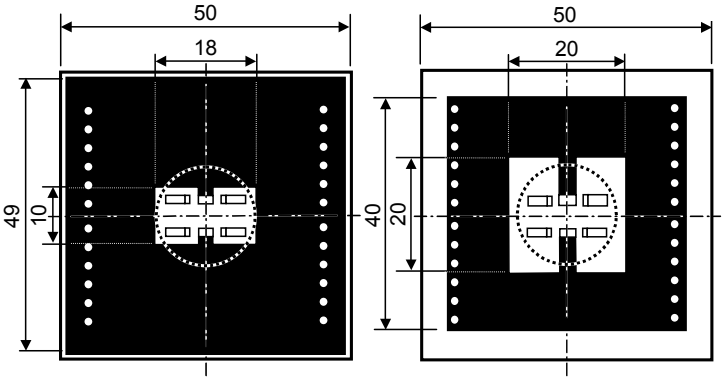
Measurement Result (Ta=25°C)

	High Wattage Land Pattern	Standard Land Pattern	Free Air
Power Dissipation	2000mW	1700mW (Tjmax=125°C) 2125mW (Tjmax=150°C)	540mW
Thermal Resistance	50°C/W	59°C/W	185°C/W





Power Dissipation



High Wattage **Standard**

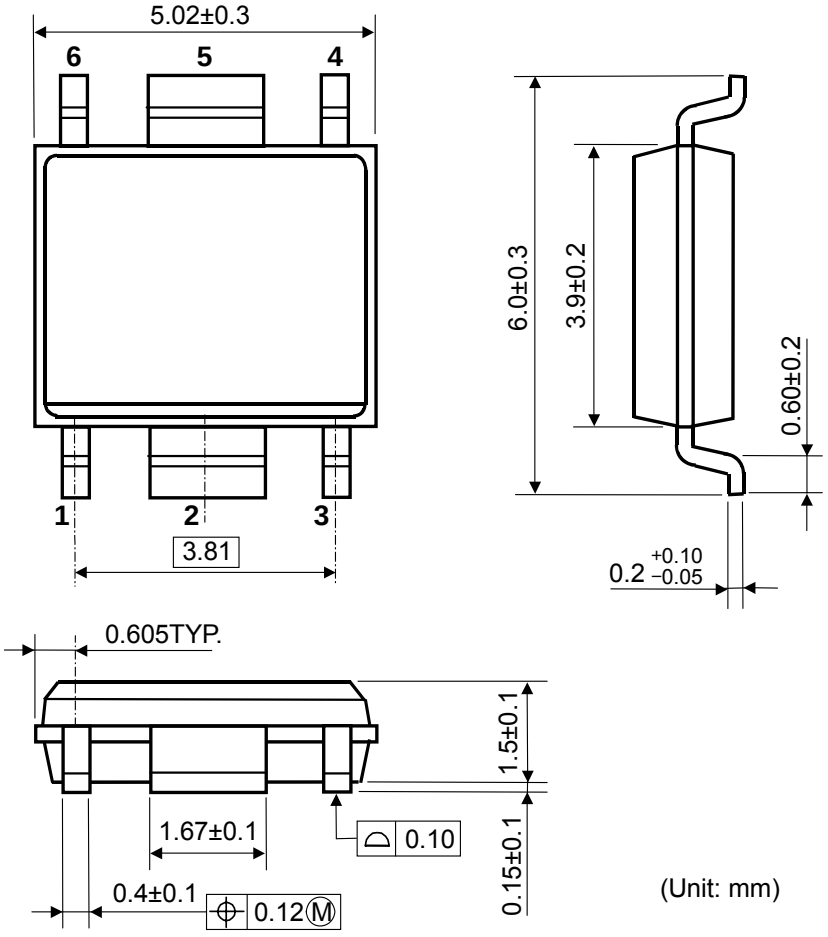
Measurement Board Pattern

IC Mount Area Unit: mm

- The above graph shows the Power Dissipation of the package based on Tjmax=125°C and Tjmax=150°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
1,500 hours

Package Dimensions (HSOP-6J)

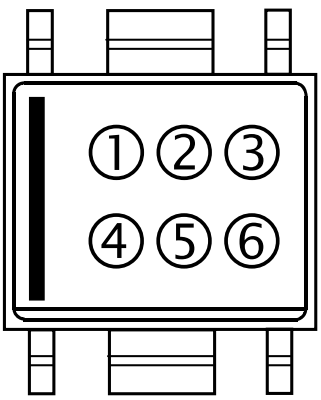


(Unit: mm)

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)

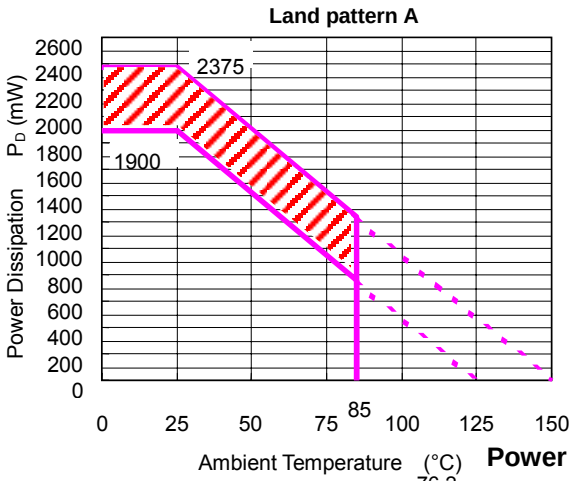
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

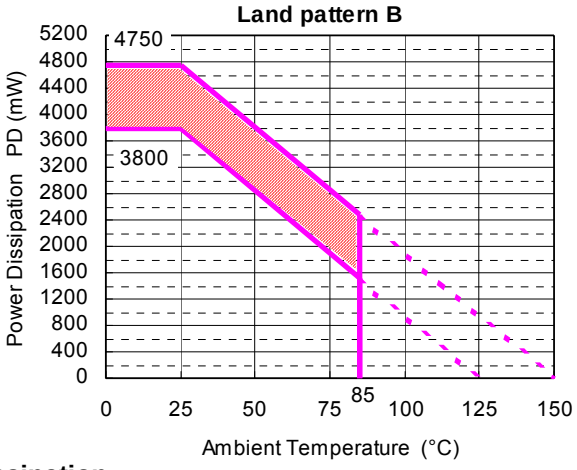
Measurement conditions

	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

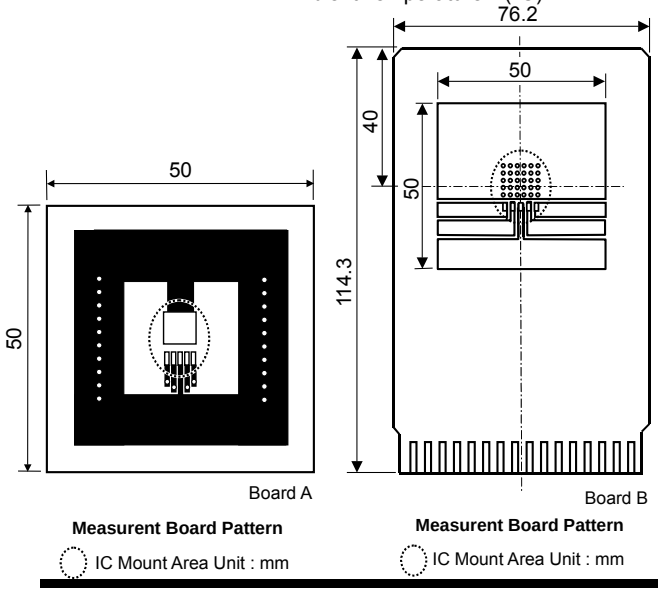
Measurement Results (Ta=25°C)

	Land pattern A	Land pattern B
Power Dissipation	1900mW (Tjmax=125°C) 2375mW (Tjmax=150°C)	3800mW (Tjmax=125°C) 4750mW (Tjmax=150°C)
Thermal Resistance	θja=(125-25°C)/1.9W= 53°C/W	θja= (125-25°C)/3.8W = 26°C/W
	θjc= 17°C/W	θjc= 7°C/W





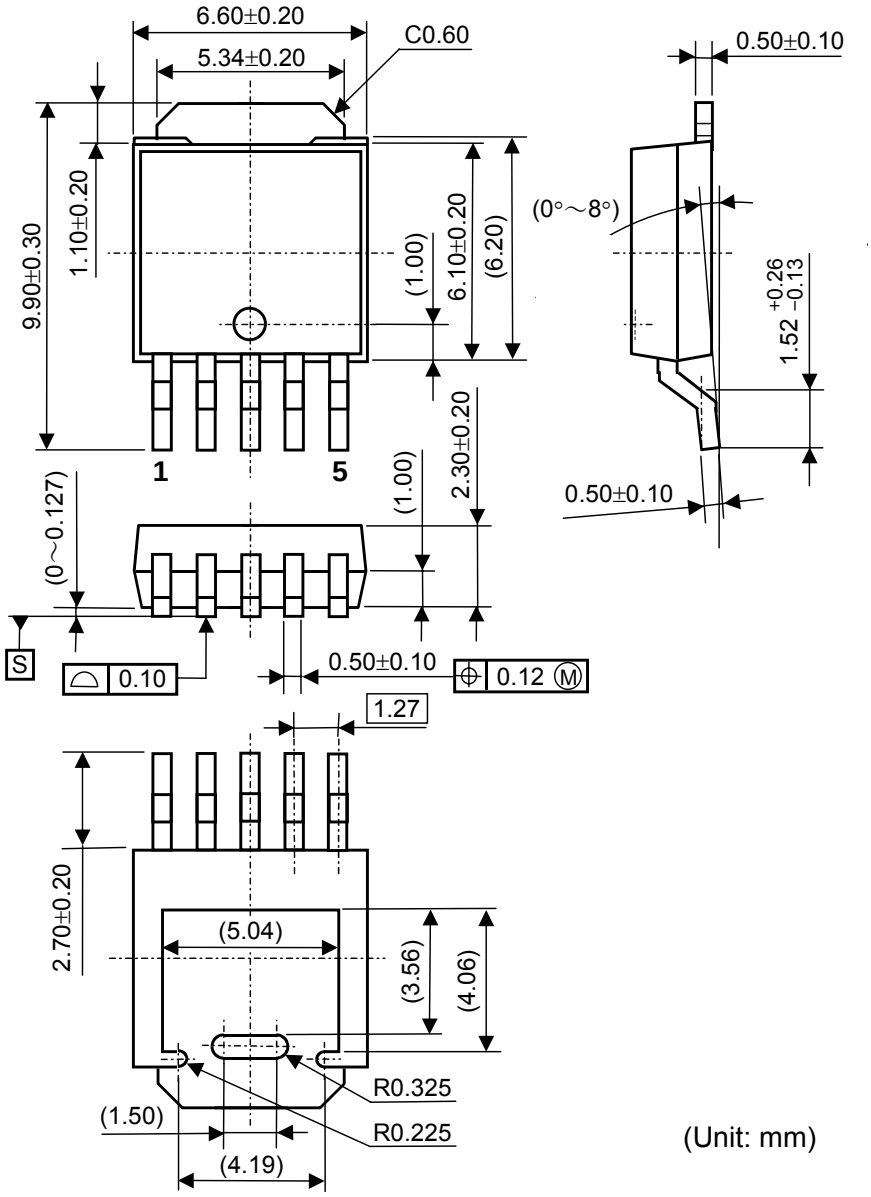
Power Dissipation



- The above graph shows the Power Dissipation of the package based on Tjmax=125°C and Tjmax=150°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.

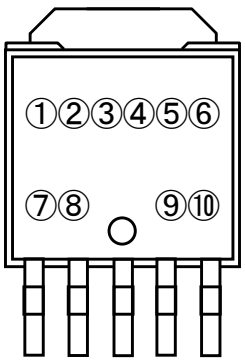
Operating Time	Estimated years (Operating four hours/day)
13,000 hours	9years

Package Dimensions (TO-252-5-P2)



(Unit: mm)

Mark Specifications (TO-252-5-P2)



①②③④⑤⑥⑦⑧: Refer to RP131J Series Mark Specification Table.

⑨⑩: 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
RP131J101B5	**D 1 J 1 0 1 D 5**	1.05V

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RP131H101D-T1-FE RP131S331D-E2-FE RP131S331B-E2-FE RP131H181D-T1-FE RP131H181B-T1-FE RP131H501B-T1-FE RP131S151B-E2-FE RP131S101B-E2-FE RP131S301D-E2-FE RP131J151D-T1-FE RP131H451D-T1-FE RP131H251B-T1-FE RP131S281D-E2-FE RP131S251D-E2-FE RP131S151D-E2-FE RP131J121D-T1-FE RP131H251D-T1-FE RP131S501D-E2-FE RP131S451D-E2-FE RP131H151D-T1-FE RP131H331B-T1-FE RP131H121D-T1-FE RP131S101D-E2-FE RP131S121B-E2-FE RP131H121B-T1-FE RP131H301D-T1-FE RP131S121D-E2-FE RP131H151B-T1-FE RP131H501D-T1-FE RP131H331D-T1-FE RP131S501B-E2-FE RP131S181B-E2-FE RP131S251B-E2-FE RP131S181D-E2-FE RP131K431B-TR RP131K251D-TR RP131S341B-E2-FE RP131K441D-TR RP131S321B-E2-FE RP131K101B-TR RP131H221D-T1-FE RP131H351B-T1-FE RP131K081B-TR RP131K101D-TR RP131K081D-TR RP131S521D-E2-FE RP131K121D-TR RP131K331D-TR RP131H121D5-T1-FE RP131H201D-T1-FE RP131H421B-T1-FE RP131K151D-TR RP131K181D-TR RP131K501B-TR RP131K501D-TR RP131K121B-TR RP131H361D-T1-FE RP131H131B-T1-FE RP131S401B-E2-FE RP131K251B-TR RP131S121B5-E2-FE RP131K411B-TR RP131J331D-T1-FE RP131S341D-E2-FE RP131K341D-TR RP131H111D-T1-FE RP131H131D-T1-FE RP131H141D-T1-FE RP131H181D5-T1-FE RP131H211D-T1-FE RP131H281B-T1-FE RP131S291D-E2-FE RP131S301B-E2-FE RP131S351D-E2-FE RP131S361D-E2-FE RP131S401D-E2-FE RP131S421D-E2-FE RP131S131B-E2-FE RP131S131D-E2-FE RP131S181D5-E2-FE RP131S261B-E2-FE RP131S261D-E2-FE RP131S281B-E2-FE RP131S081D-E2-FE RP131S091B-E2-FE RP131S091D-E2-FE RP131S111B-E2-FE RP131S111D-E2-FE RP131S121D5-E2-FE RP131L181D-TR RP131L251D-TR RP131L331D-TR RP131L471D-TR RP131L501D-TR RP131S081B-E2-FE RP131K461D-TR RP131K511B-TR RP131K511D-TR RP131K551B-TR RP131L121D-TR