RICOH

RP131x SERIES

LOW ON RESISTANCE / LOW VOLTAGE 1A LDO

NO.EA-174-080405

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, resister net for setting output voltage, a current limit circuits for over-current and thermal-shutdown circuits.

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

Since the packages for these ICs are DFN(PLP)1820-6, SOT-89-5 and HSOP-6J with high power dissipation, high density mounting of the ICs on boards is possible.

FEATURES

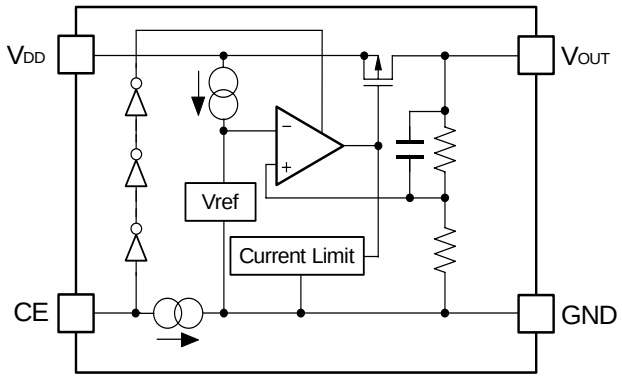
- Output Current ..... Min. 1A
- Supply Current ..... Typ. 65μA
- Standby Current ..... Typ. 0.15μA
- Input Voltage Range ..... 1.6V to 6.5V
- Output Voltage..... Stepwise setting with a step of 0.1V in the range of 0.8V to 5.0V
- Dropout Voltage..... Typ. 0.5V (V_{OUT}=2.8V, I_{OUT}=1A)
- Ripple Rejection ..... 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 ..... HSOP-6J, SOT-89-5, DFN(PLP)1820-6
- Built-in Inrush current limit circuit ..... Typ. 500 mA
- 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 ($V_{OUT} \leqq 3.6V$)
  4.7μF or more ($V_{OUT} > 3.6V$)

APPLICATIONS

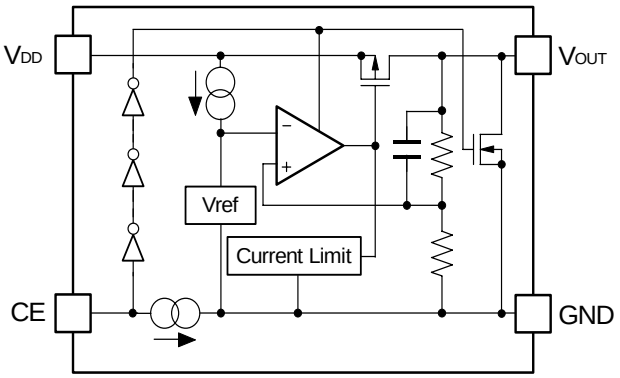
- Power source for battery-powered equipment.
- Power source for portable communication equipment.
- Power source for electrical appliances such as cameras, VCRs and camcorders.
- Power source for Notebook PC.
- Power source for home appliances.

BLOCK DIAGRAMS

RP131xxx1B



RP131xxx1D



SELECTION GUIDE

The output voltage, auto discharge function*, and the taping type for the ICs can be selected at the user's request.

The selection can be made with designating the part number as shown below;

RP131xxx1x-xx-x ←Part Number
↑↑ ↑ ↑ ↑
a b c d e

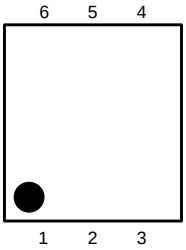
Code	Contents
a	Designation of Package Type; K : DFN(PLP)1820-6 H : SOT-89-5 S : HSOP-6J
b	Setting Output Voltage (V_{OUT}); Stepwise setting with a step of 0.1V in the range of 0.8V to 5.0V is possible. Exceptions: 1.25V=RP131x121x5-xx-x, 1.85V=RP131x181x5-xx-x, 2.85V=RP131x281x5-xx-x
c	Designation of Mask Option; B : active high, without auto discharge function* at OFF state. D : active high, with auto discharge function* at OFF state.
d	Designation of Taping Type; T1 : SOT-89-5 TR : DFN(PLP)1820-6 E2 : HSOP-6J Refer to Taping Specifications.
e	Designation of composition of pin plating; -F : Lead free solder plating (SOT-89-5, HSOP-6J) None : Au plating (DFN(PLP)1820-6)

*) When the mode is into standby with CE signal, auto discharge transistor turns on, and it makes the turn-off speed faster than normal type.

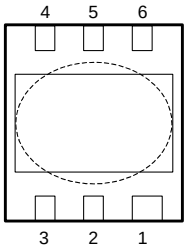
PIN CONFIGURATIONS

● **DFN(PLP)1820-6***

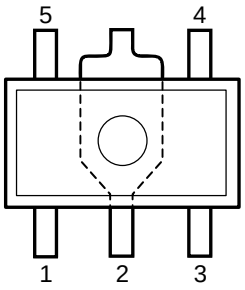
Top View



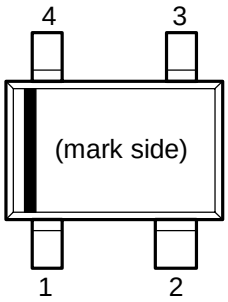
Bottom View



● **SOT-89-5**



● **HSOP-6J**



PIN DESCRIPTIONS

● **DFN(PLP)1820-6***

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

*) Tab in the ◌ parts have GND level.
(They are connected to the back side of this IC.)
Do not connect to other wires or land patterns.
When you use this IC, please make sure be wired with 1pin with 2pin and 5pin with 6pin.

● **SOT-89-5**

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

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
I_{OUT}	Output Current (DC)	1.4	A
P_D	Power Dissipation (DFN(PLP)1820-6)*	880	mW
	Power Dissipation (SOT-89-5)*	900	
	Power Dissipation (HSOP-6J)*	1700	
Topt	Operating Temperature Range	−40 to 85	°C
Tstg	Storage Temperature Range	−55 to 125	°C

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

ABSOLUTE MAXIMUM RATINGS

Absolute Maximum ratings are threshold limit values that must not be exceeded ever for an instant under any conditions. Moreover, such values for any two items must not be reached simultaneously. Operation above these absolute maximum ratings may cause degradation or permanent damage to the device. These are stress ratings only and do not necessarily imply functional operation below these limits.

ELECTRICAL CHARACTERISTICS

V_{IN}=Set V_{OUT}+1V

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
I_{OUT}	Output Current			1			A
$\Delta V_{OUT}/\Delta I_{OUT}$	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_{DD}=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 ∗If V_{OUT} ≦ 1.1V, V_{IN}=1.6V			0.05	0.1	%/V
RR	Ripple Rejection	Ripple 0.2Vp-p I_{OUT}=100mA	f=1kHz (V_{OUT} ≦ 3.3V)		70		dB
			f=1kHz (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
Ilim	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 Topt=25°C except for Output Noise, Ripple Rejection, Output Voltage Temperature Coefficient, Dropout Voltage at 1A Output Current and Thermal Shutdown items.

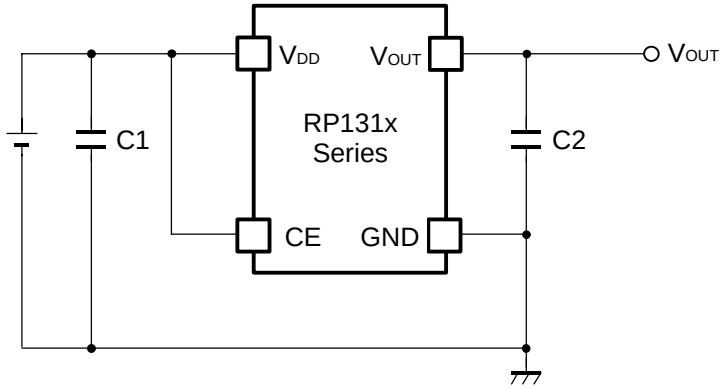
- **Dropout Voltage by Output Voltage**

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} ≦ 5.0		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_{opt}=25°C except for Output Noise, Ripple Rejection, Output Voltage Temperature Coefficient, Dropout Voltage at 1A Output Current and Thermal Shutdown items.

TYPICAL APPLICATION



Recommendation value of the external capacitors

V_{OUT}	Capacitors		
$V_{OUT} \leqq 3.6V$	C1	Kyocera 2.2μF (size:1005)	[CM05X5R225M04AB]
	C2	Kyocera 2.2μF (size:1608)	[CM105X5R225K06AB]
$V_{OUT} > 3.6V$	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).

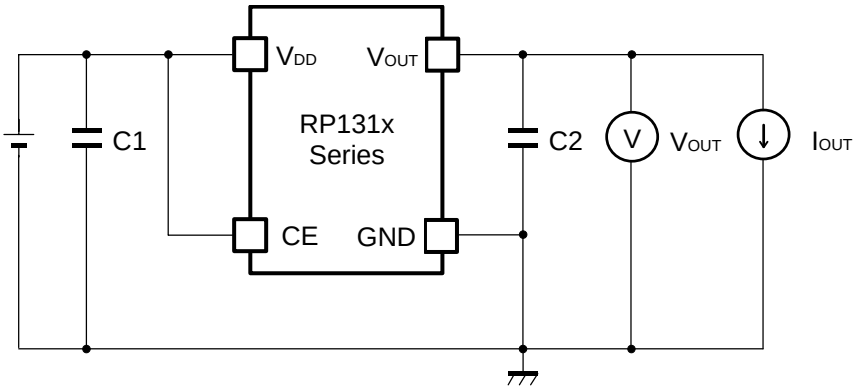
If a tantalum capacitor is used, and its ESR of C2 is large, the loop oscillation may result. Because of this, select C2 carefully considering its frequency characteristics.

PCB Layout

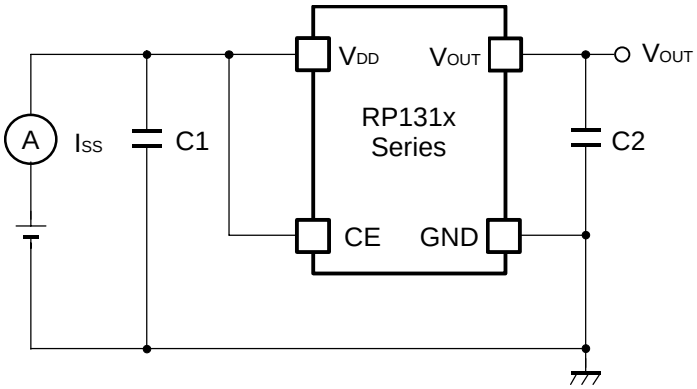
Make V_{DD} and GND lines sufficient. If their impedance is high, noise pickup or unstable operation may result. Connect a capacitor C1 between V_{DD} and GND pin with a capacitance value as "Recommendation value of the external capacitors" above or more, and as close as possible to the pins.

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

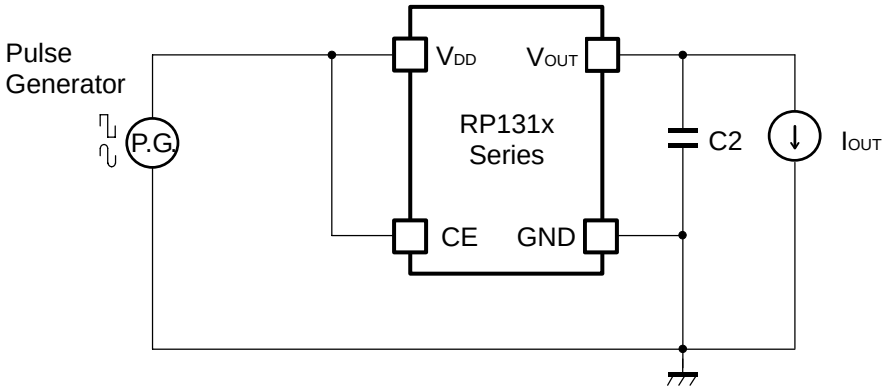
TEST CIRCUITS



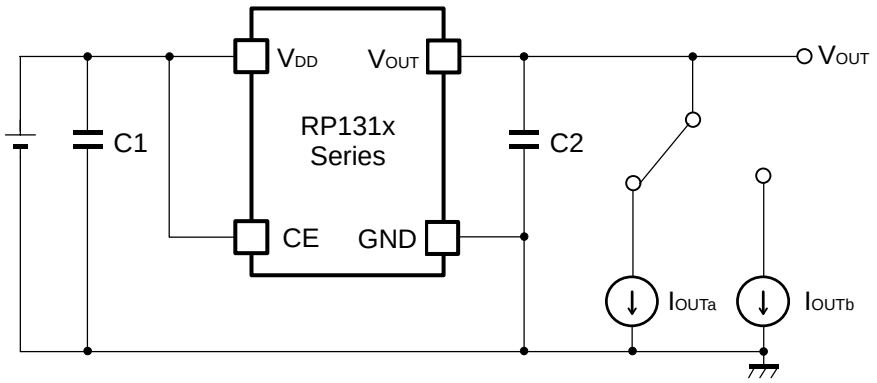
Basic Test Circuit



Test Circuit for Supply Current



Test Circuit for Ripple Rejection

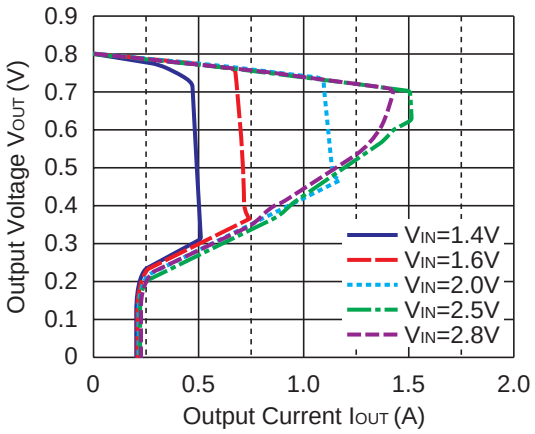


Test Circuit for Load Transient Response

TYPICAL CHARACTERISTICS

1) Output Voltage vs. Output Current (Topt=25°C)

RP131x081x



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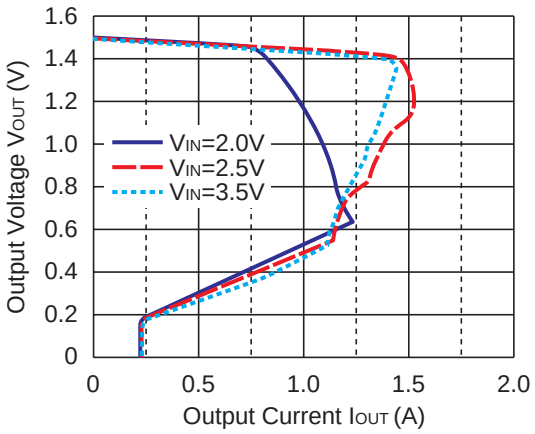

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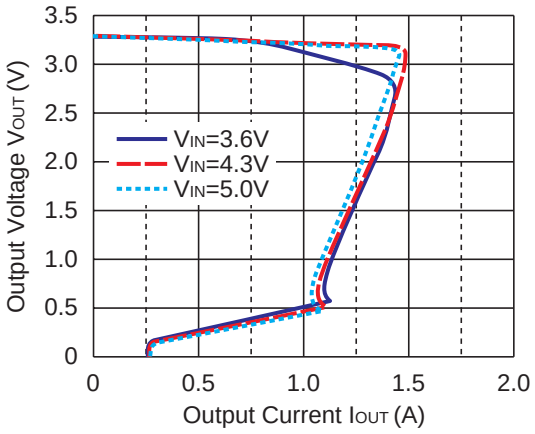

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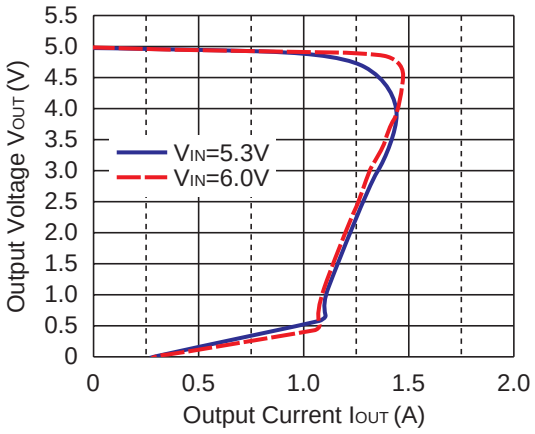
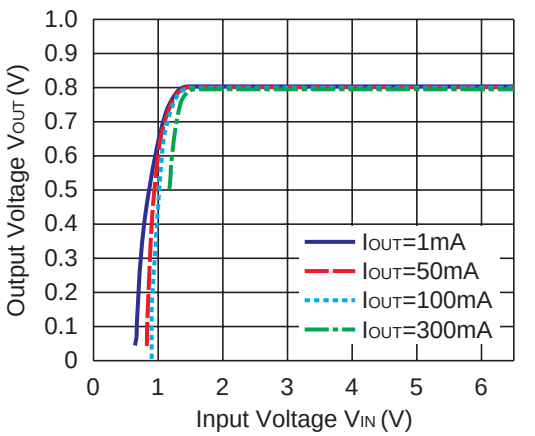


2) Output Voltage vs. Input Voltage (Topt=25°C)

RP131x081x



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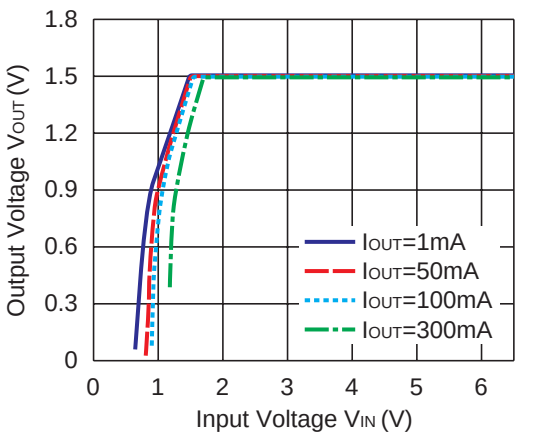

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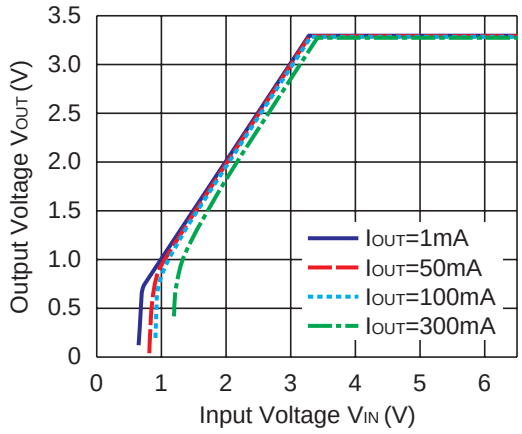

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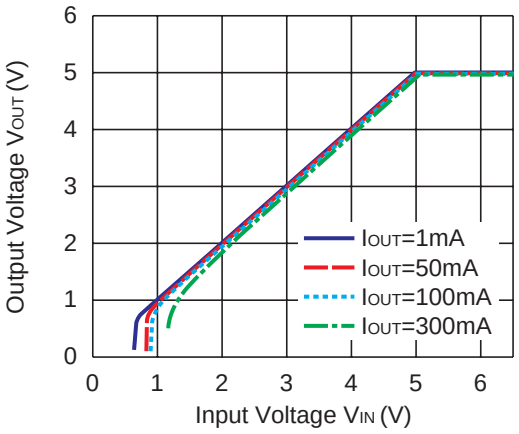
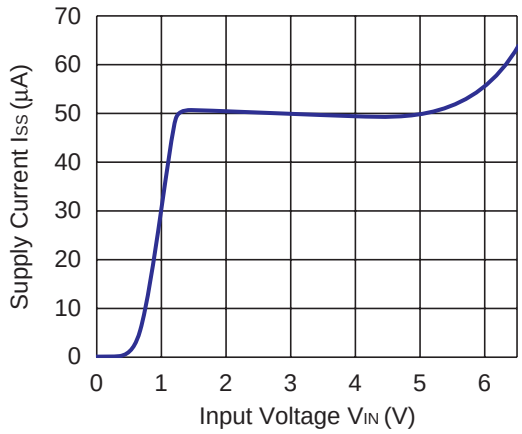


3) Supply Current vs. Input Voltage (Topt=25°C)

RP131x081x



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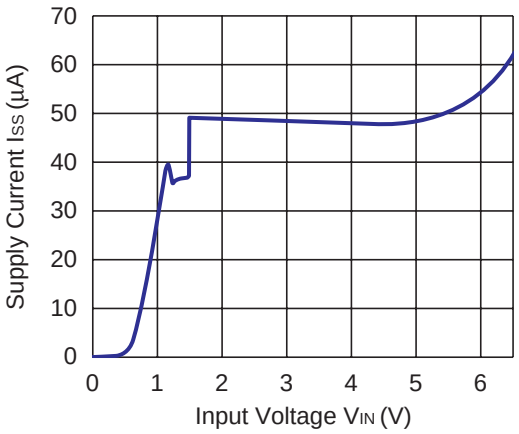

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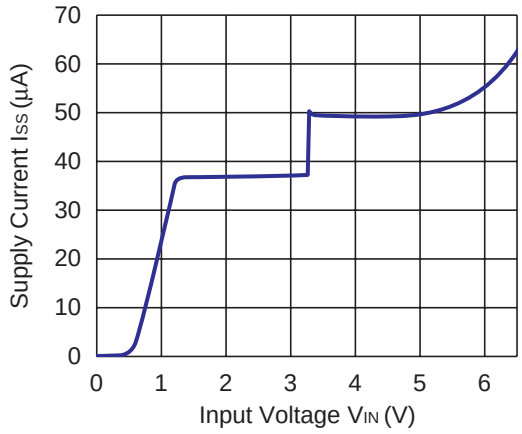

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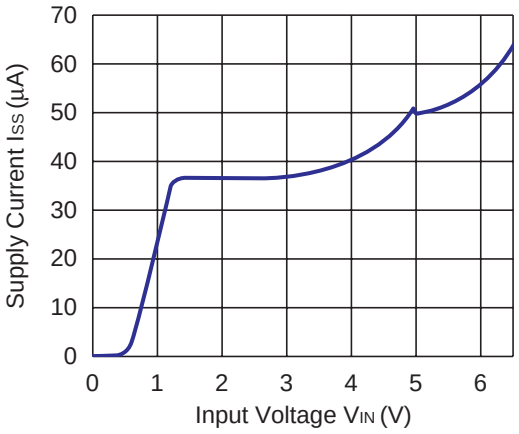
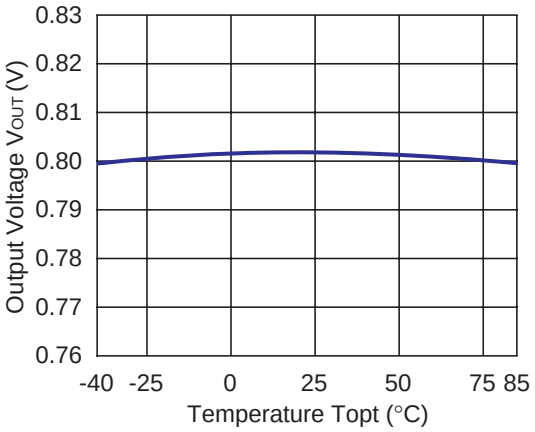


4) Output Voltage vs. Temperature

RP131x081x



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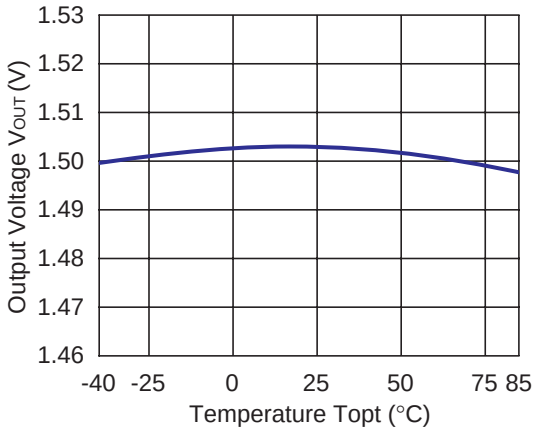

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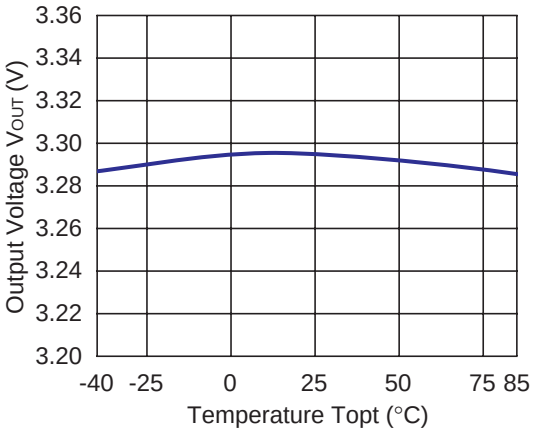

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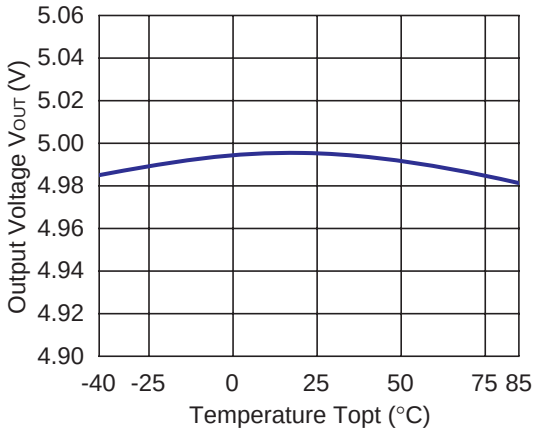
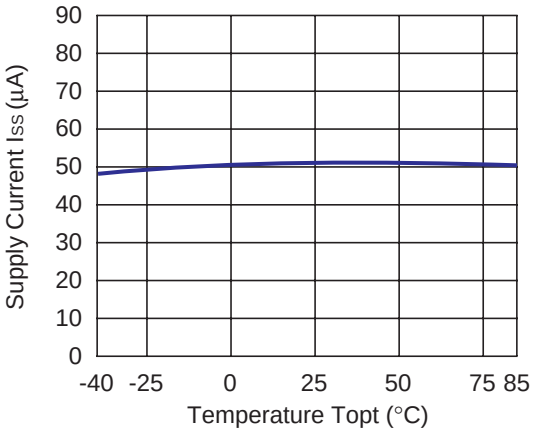


5) Supply Current vs. Temperature

RP131x081x



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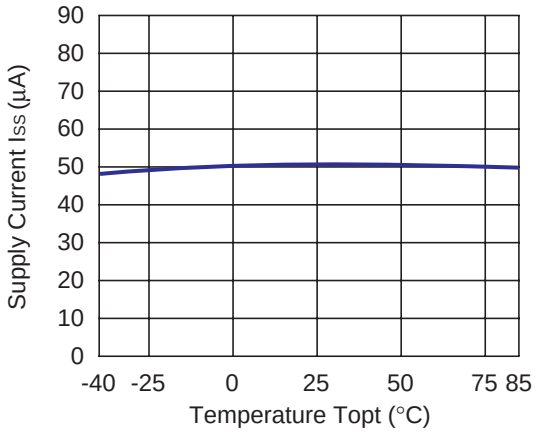

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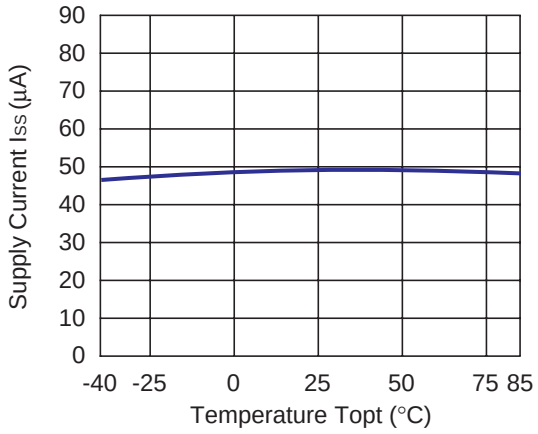

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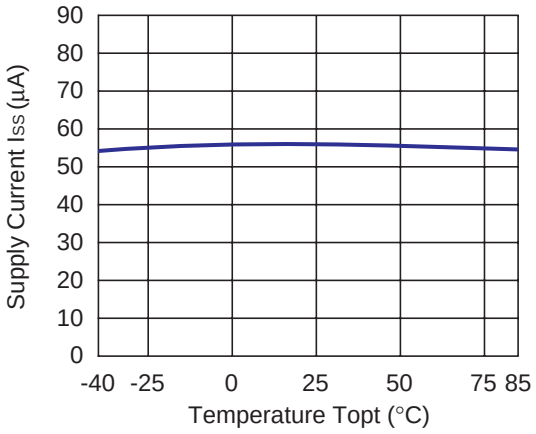
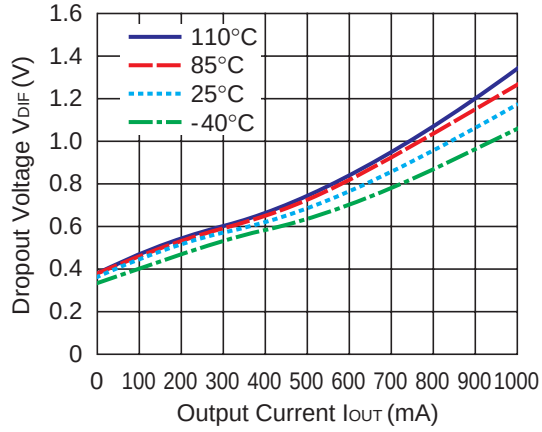
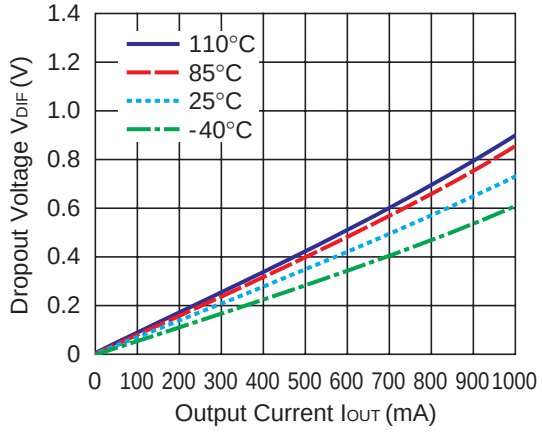


6) Dropout Voltage vs. Output Current

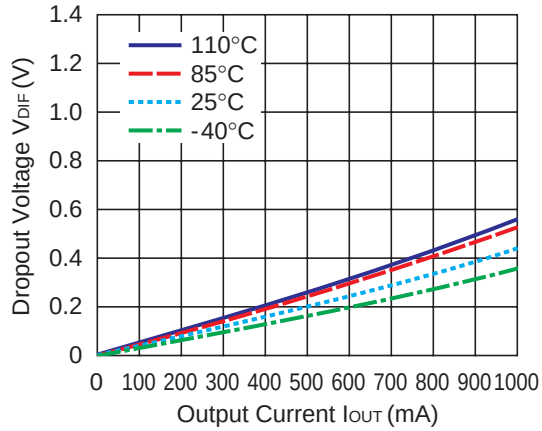
RP131x081x



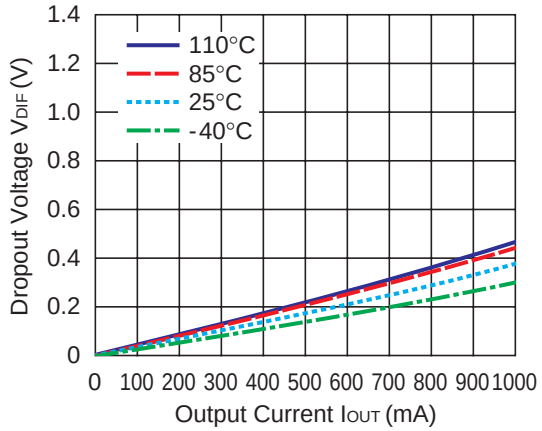
RP131x151x



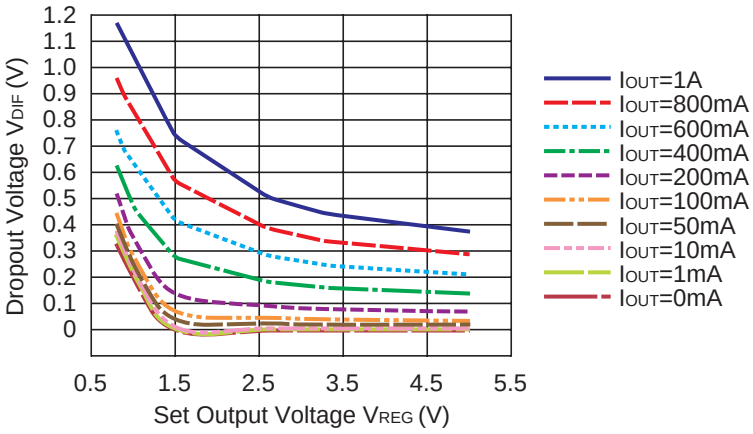
RP131x331x



RP131x501x

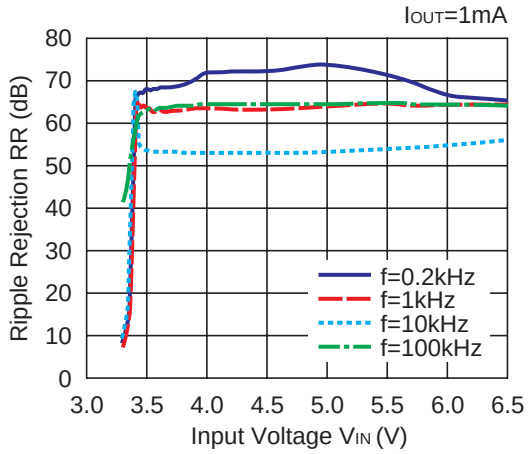


7) Dropout Voltage vs. Set Output Voltage

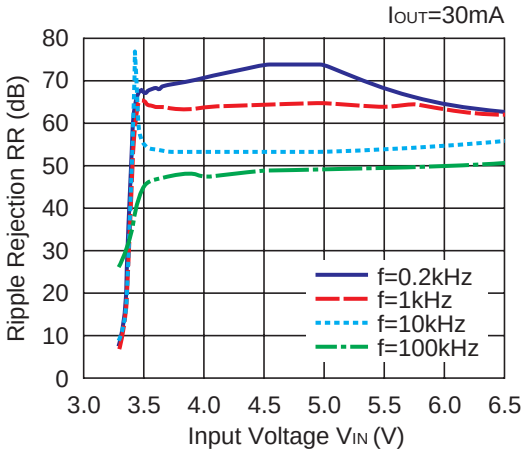


8) Ripple Rejection vs. Input Bias Voltage (C1=none, C2=Ceramic 1.0µF, Ripple=0.2Vp-p, Topt=25°C)

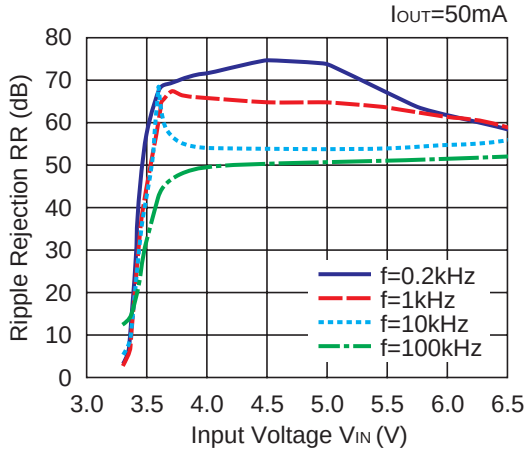
RP131x331x



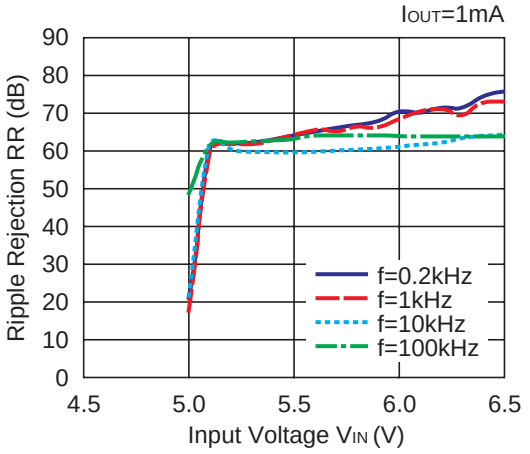
RP131x331x



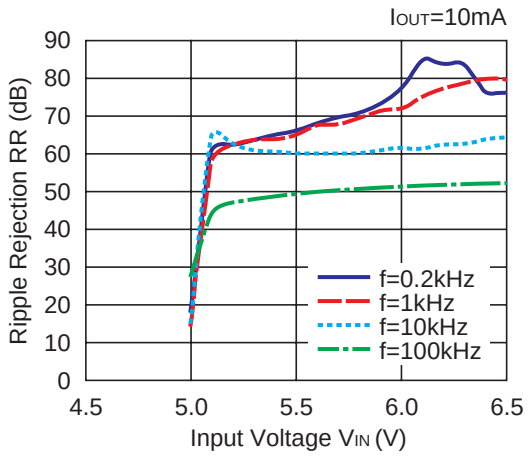
RP131x331x



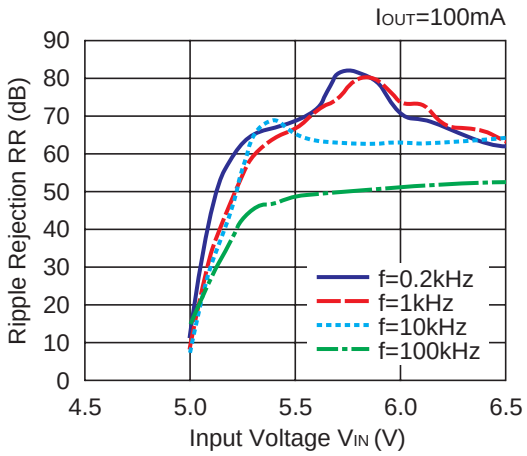
RP131x501x



RP131x501x

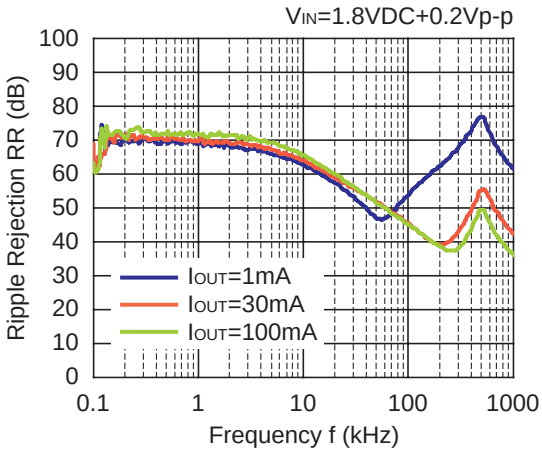


RP131x501x

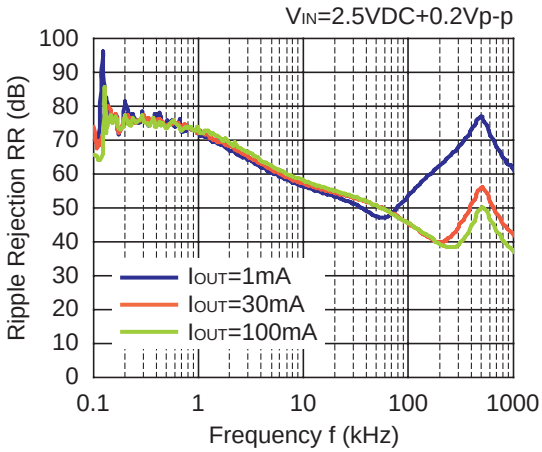


9) Ripple Rejection vs. Frequency (C1=none, C2=Ceramic 4.7µF, Topt=25°C)

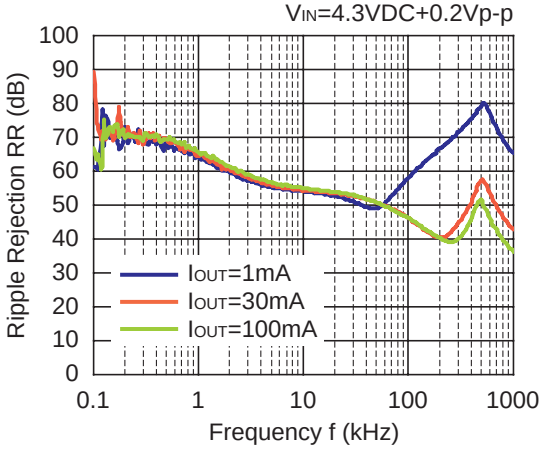
RP131x081x



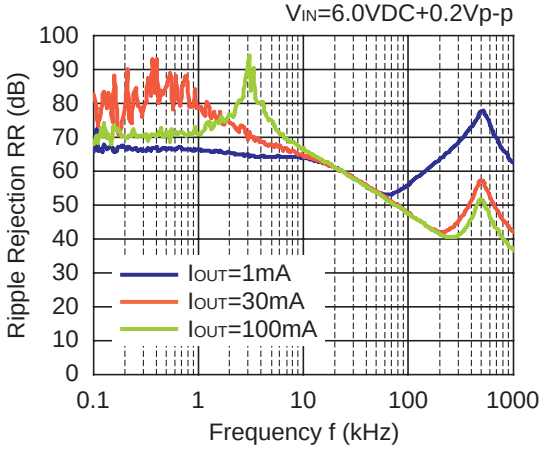
RP131x151x



RP131x331x

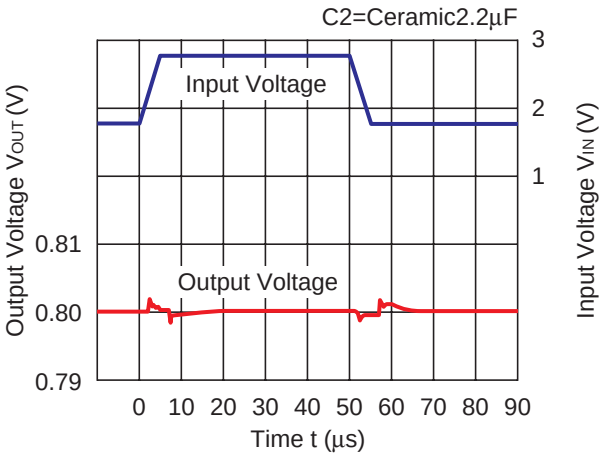


RP131x501x

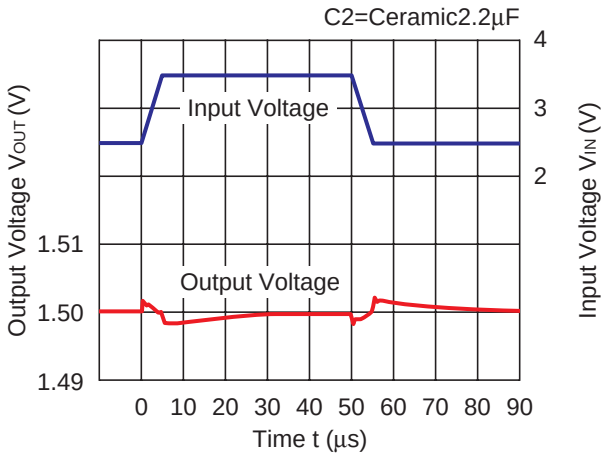


10) Input Transient Response (I_{OUT}=100mA, tr=tf=5µs, C1=none, Topt=25°C)

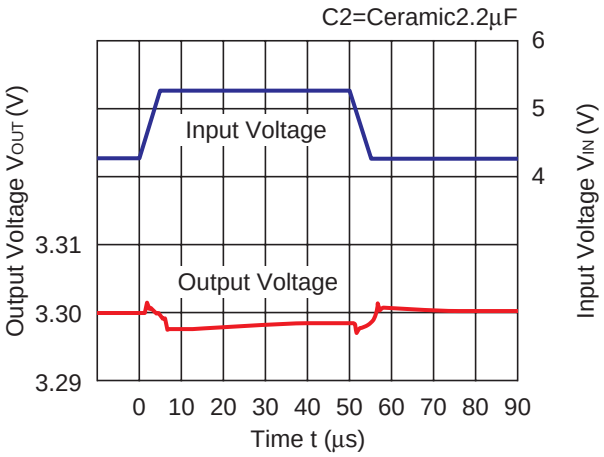
RP131x081x



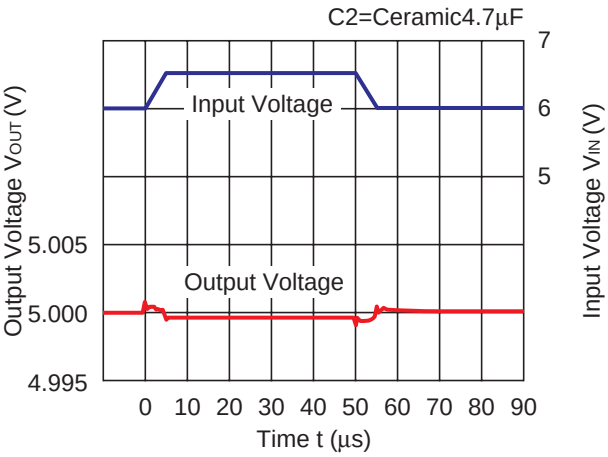
RP131x151x



RP131x331x

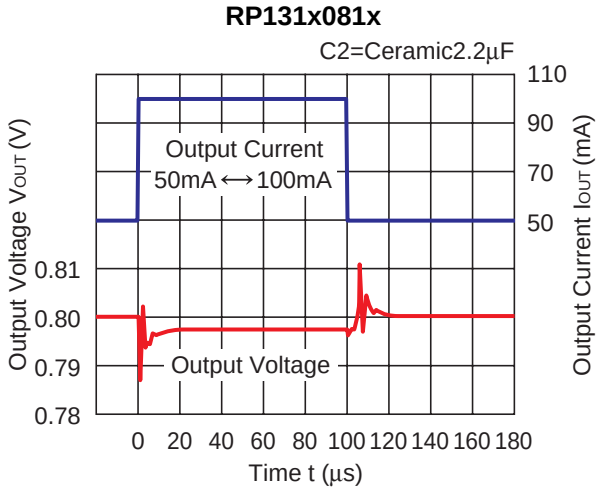


RP131x501x

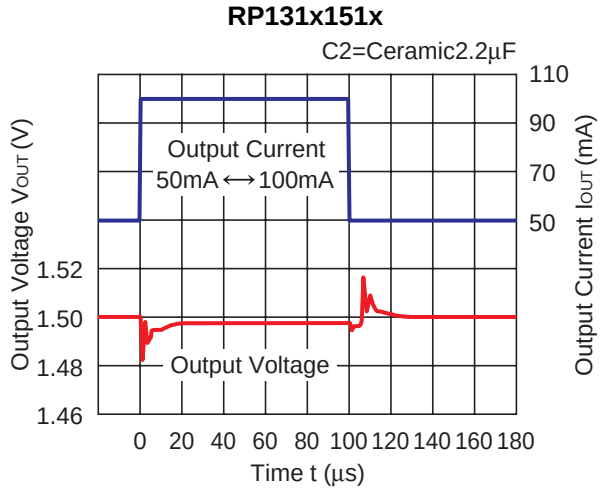


11) Load Transient Response (tr=tf=0.5µs, C1=Ceramic 2.2µF, V_{IN}=V_{OUT}+1.0V, Topt=25°C)

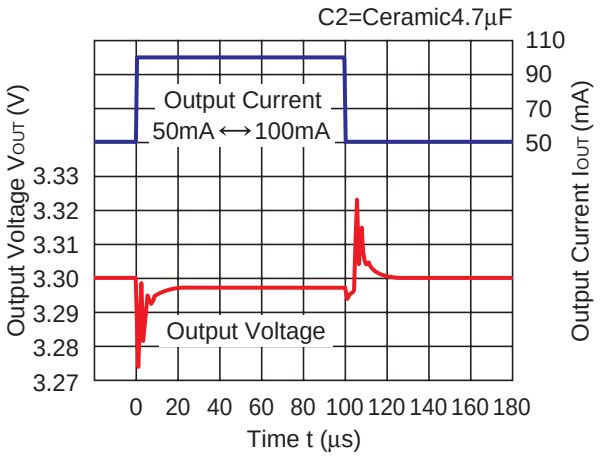
RP131x081x



RP131x151x



RP131x331x



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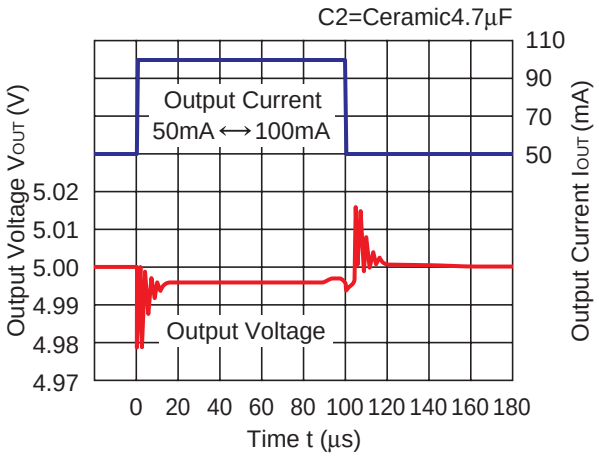

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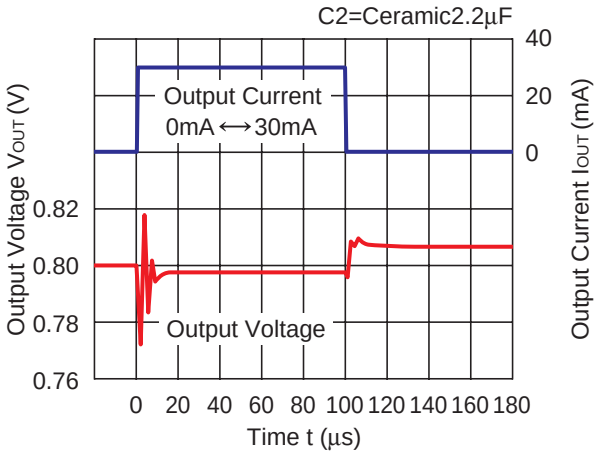

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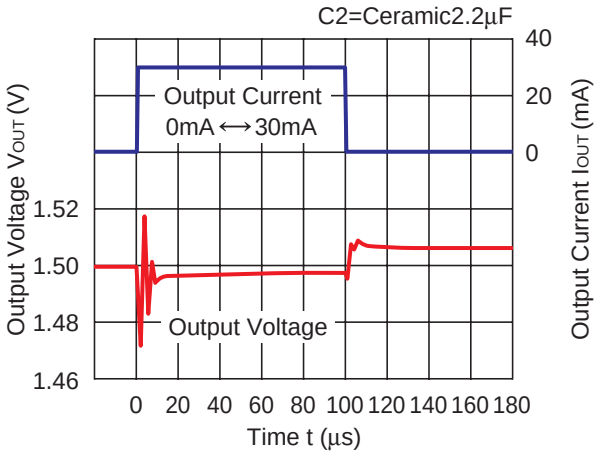

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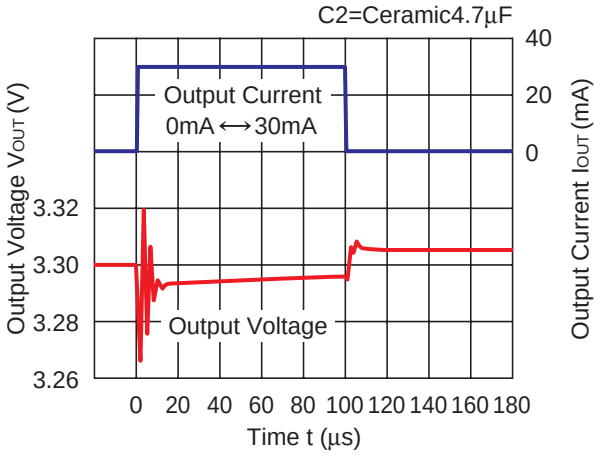
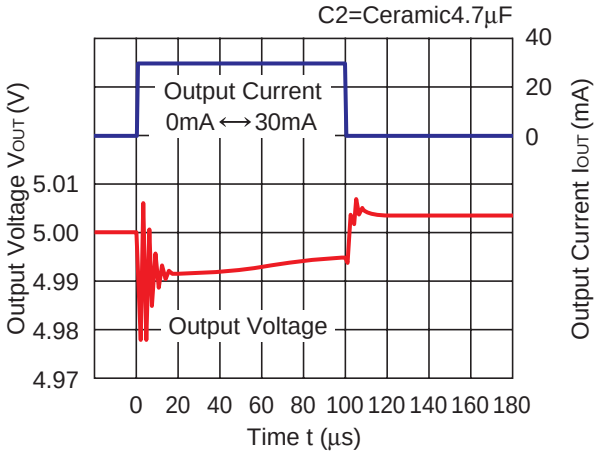


RP131x501x



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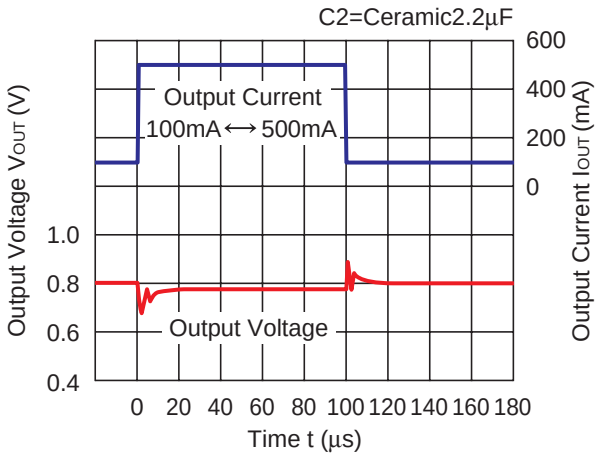
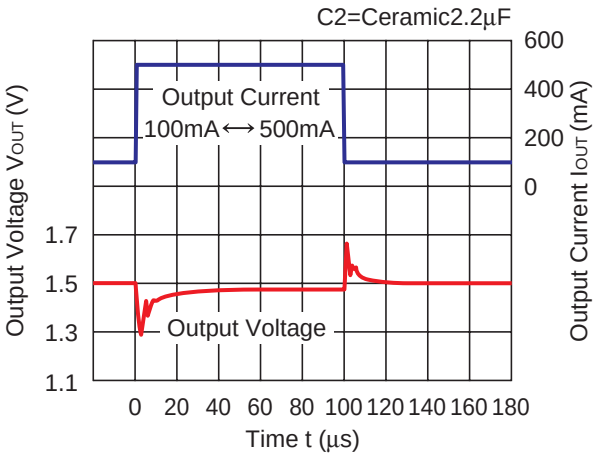


RP131x151x



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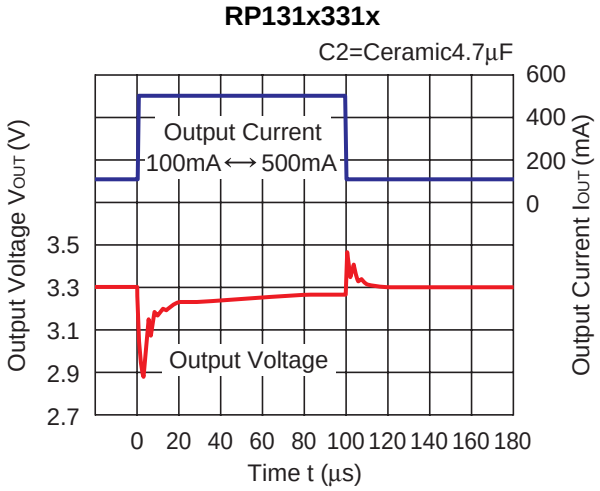

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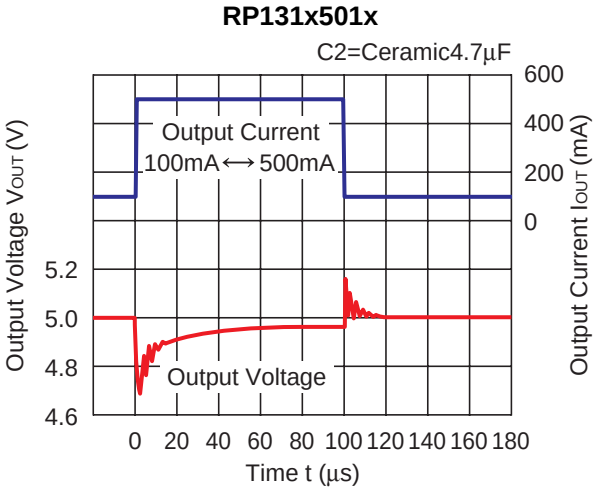
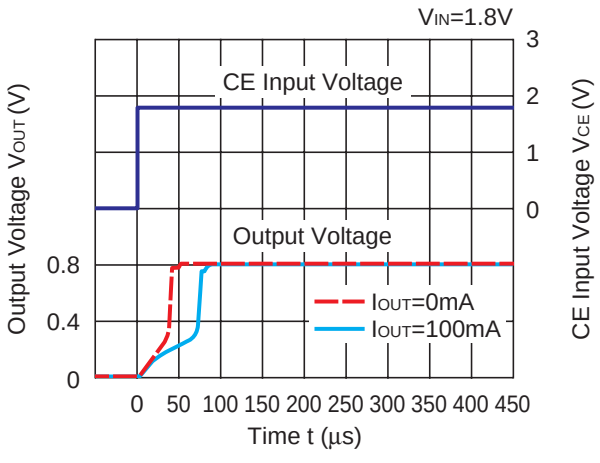
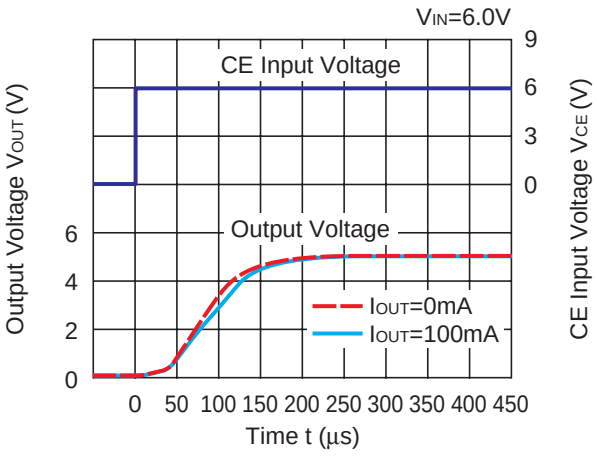


12) Turn On Speed with CE pin (C1=Ceramic 2.2µF, C2=Ceramic 4.7µF, Topt=25°C)

RP131x081x

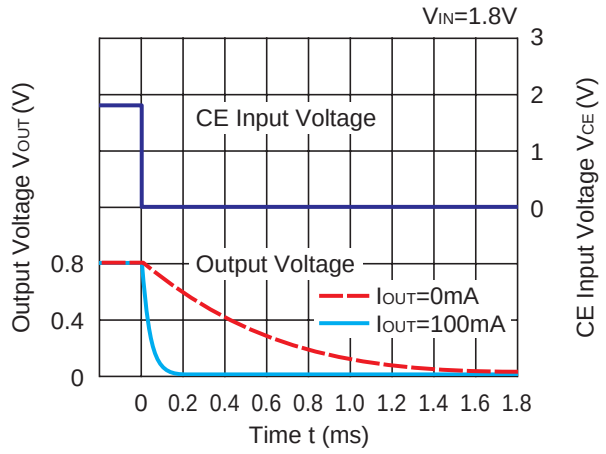


RP131x501x

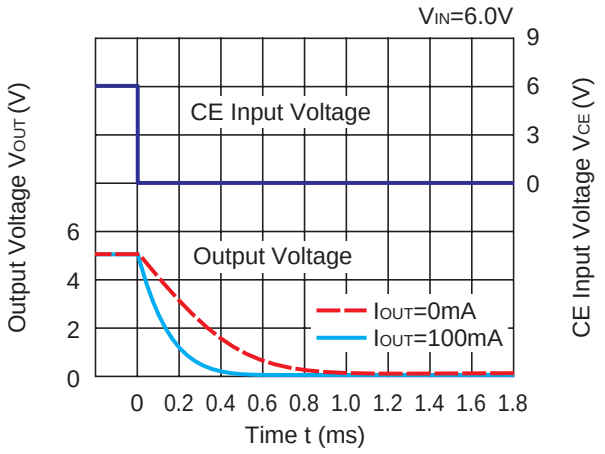


13) Turn Off Speed with CE pin (D Version) (C1=Ceramic 2.2µF, C2=Ceramic 4.7µF, Topt=25°C)

RP131x081D

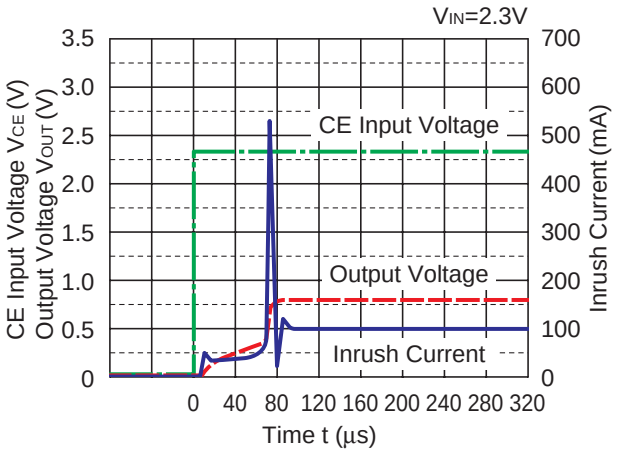


RP131x501D

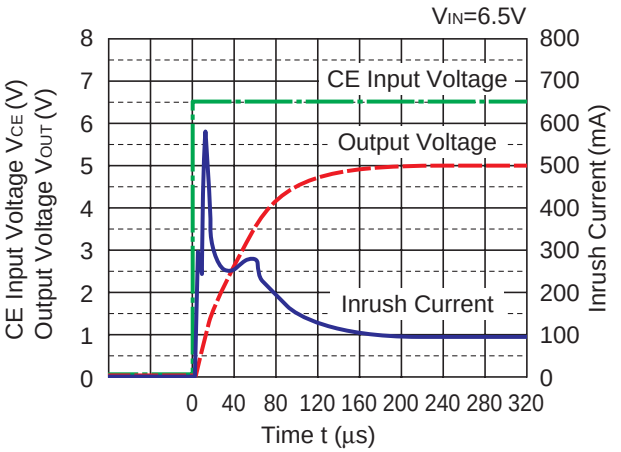


14) Inrush Current at turning on (C1=Ceramic 2.2µF, C2=Ceramic 4.7µF, Topt=25°C)

RP131x081x

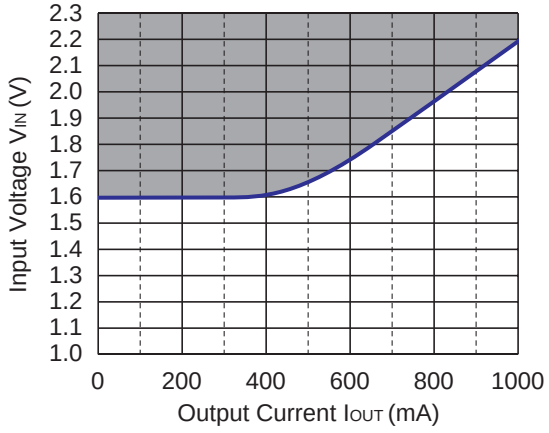


RP131x501x



15) Minimum Operating Voltage

RP131x081x



Hatched area is available for 0.8V output.

ESR vs. Output Current

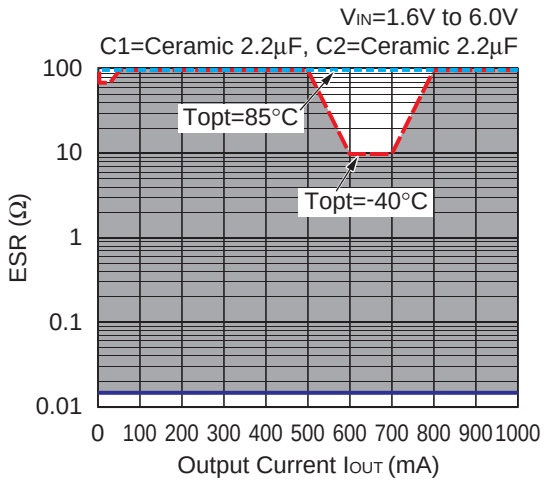
When using these ICs, consider the following points:

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.

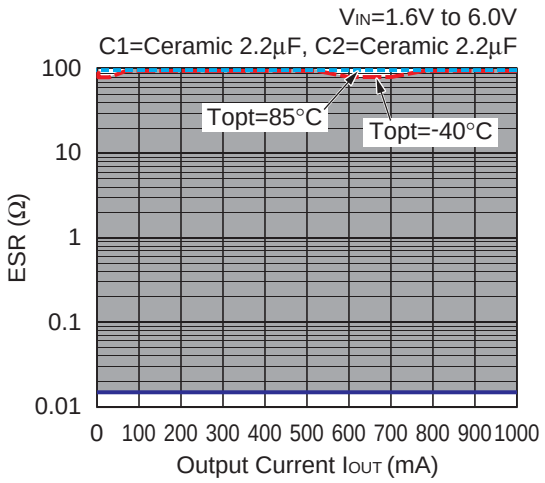
Measurement conditions

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)

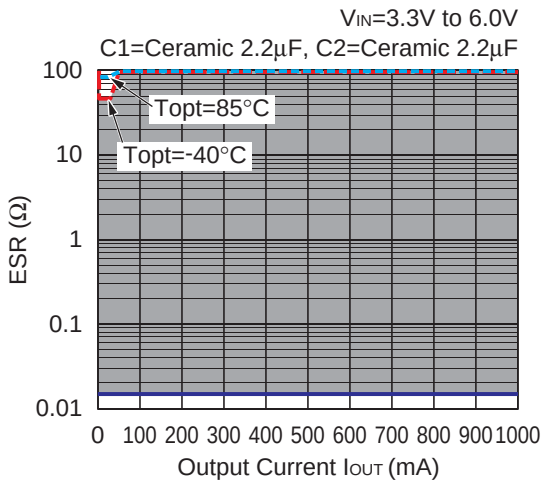
RP131x081x



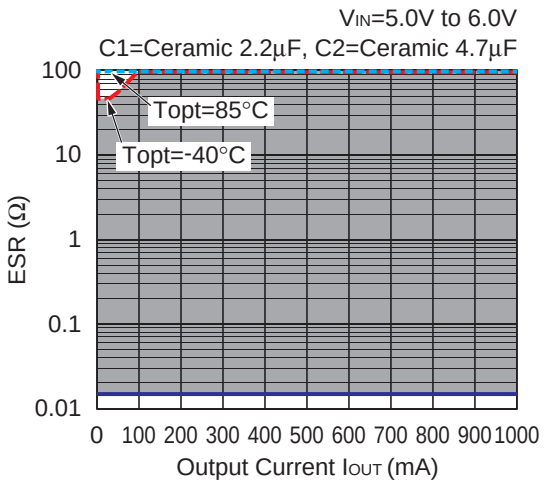
RP131x151x



RP131x331x



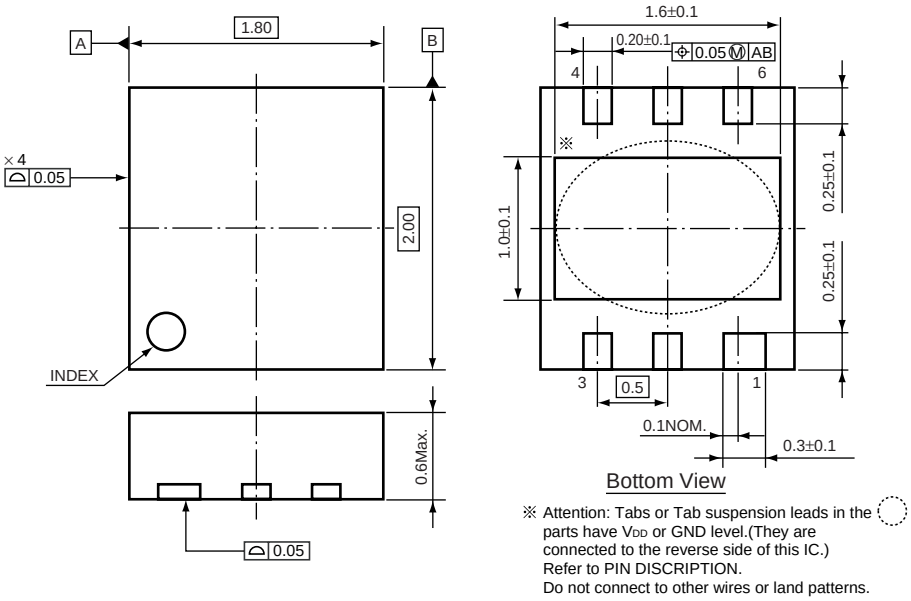
RP131x501x



- **DFN(PLP)1820-6**

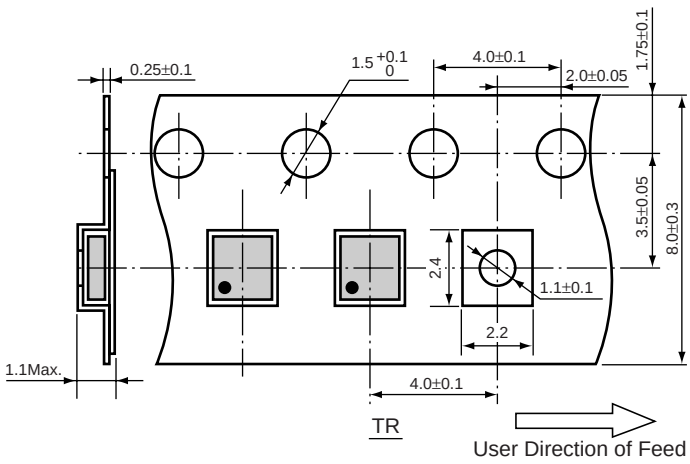
Unit: mm

PACKAGE DIMENSIONS



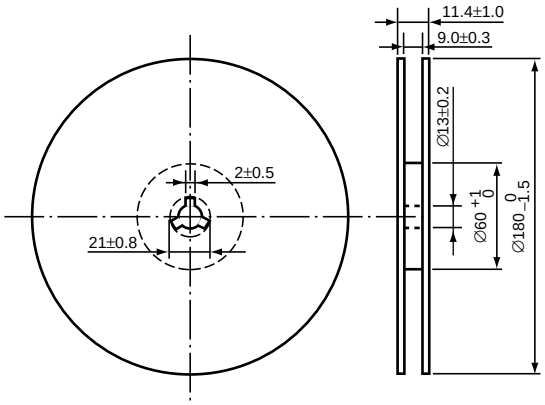
※ Attention: Tabs or Tab suspension leads in the parts have V_{DD} or GND level.(They are connected to the reverse side of this IC.) Refer to PIN DISCRIPTION. Do not connect to other wires or land patterns.

TAPING SPECIFICATION



TAPING REEL DIMENSIONS REUSE REEL (EIAJ-RRM-08Bc)

(1reel=5000pcs)
(R5323K,R5325K : 1reel=3000pcs)



POWER DISSIPATION (DFN(PLP)1820-6)

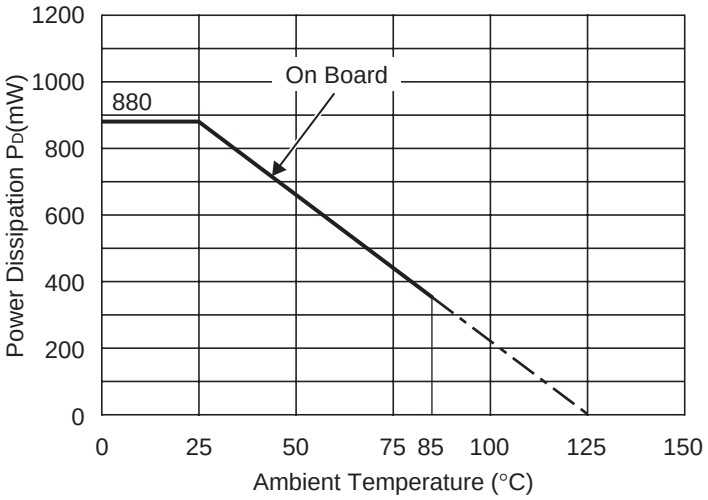
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

Measurement Conditions

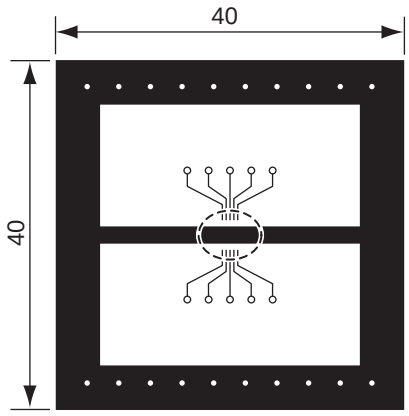
	Standard Land Pattern
Environment	Mounting on Board (Wind velocity=0m/s)
Board Material	Glass cloth epoxy plastic (Double sided)
Board Dimensions	40mm × 40mm × 1.6mm
Copper Ratio	Top side : Approx. 50% , Back side : Approx. 50%
Through-hole	ϕ0.54mm × 30pcs

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

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



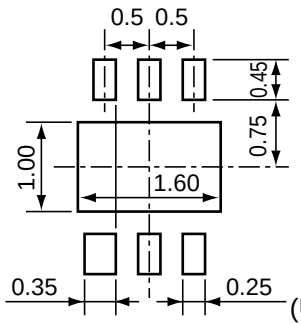
Power Dissipation



Measurement Board Pattern

IC Mount Area Unit : mm

RECOMMENDED LAND PATTERN

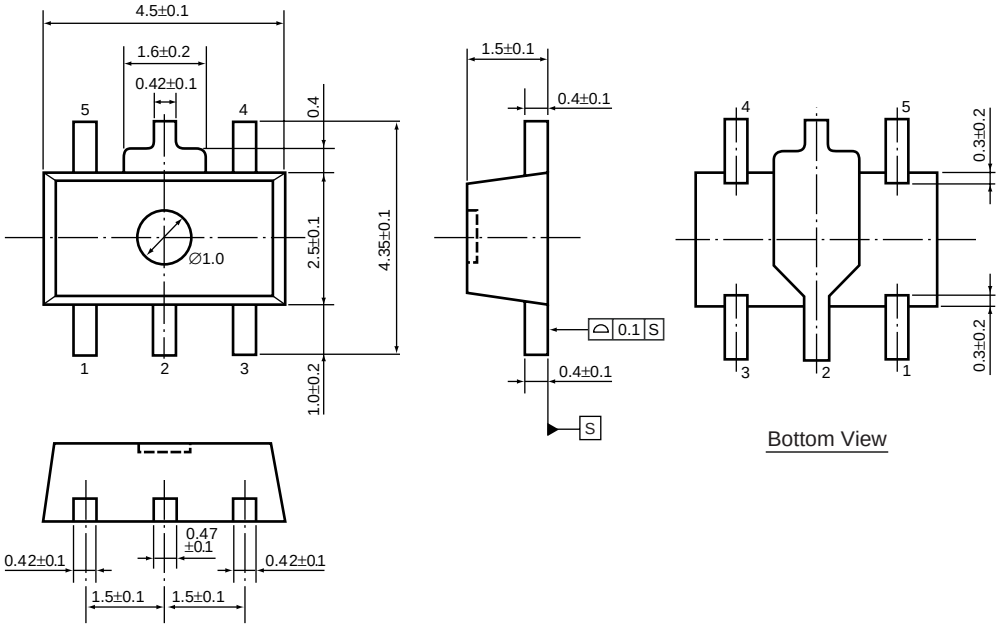


(Unit: mm)

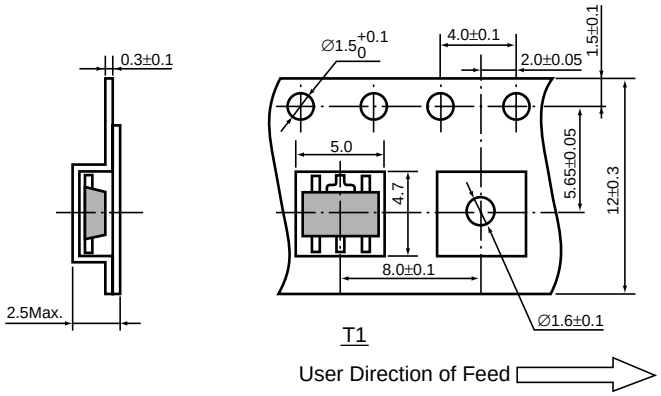
- **SOT-89-5**

Unit: mm

PACKAGE DIMENSIONS

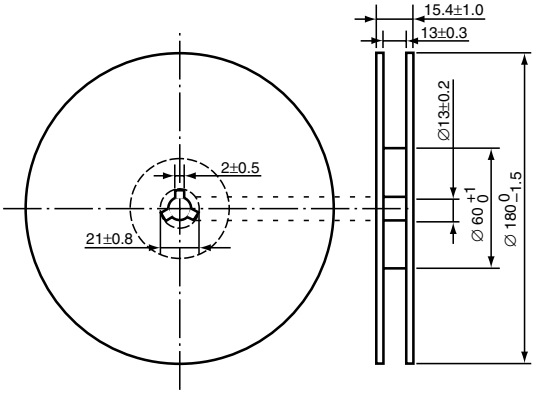


TAPING SPECIFICATION (T1: Standard Type)



TAPING REEL DIMENSIONS REUSE REEL (EIAJ-RRM-12Bc)

(1reel=1000pcs)



POWER DISSIPATION (SOT-89-5)

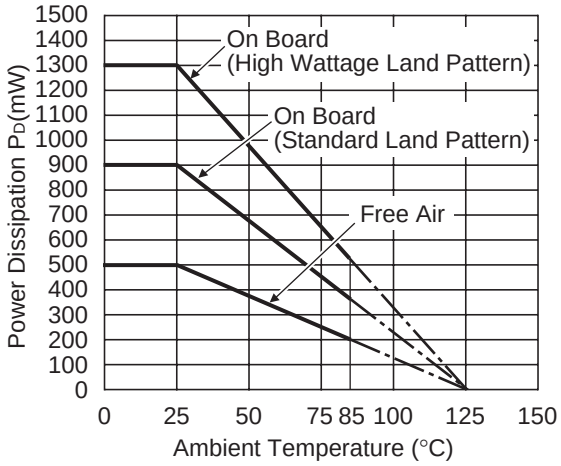
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

Measurement Conditions

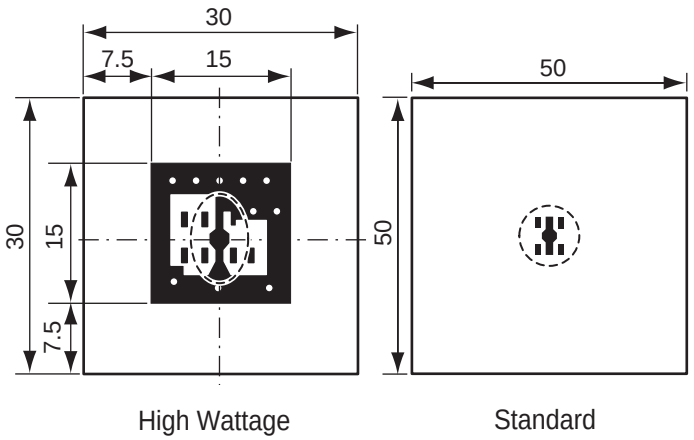
	High Wattage Land Pattern	Standard Land Pattern
Environment	Mounting on Board (Wind velocity=0m/s)	Mounting on Board (Wind velocity=0m/s)
Board Material	Glass cloth epoxy plastic (Double sided)	Glass cloth epoxy plastic (Double sided)
Board Dimensions	30mm × 30mm × 1.6mm	50mm × 50mm × 1.6mm
Copper Ratio	Top side : Approx. 20% , Back side : Approx. 100%	Top side : Approx. 10% , Back side : Approx. 100%
Through-hole	ϕ0.85mm × 10pcs	-

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

	High Wattage Land Pattern	Standard Land Pattern	Free Air
Power Dissipation	1300mW	900mW	500mW
Thermal Resistance	77°C/W	111°C/W	200°C/W



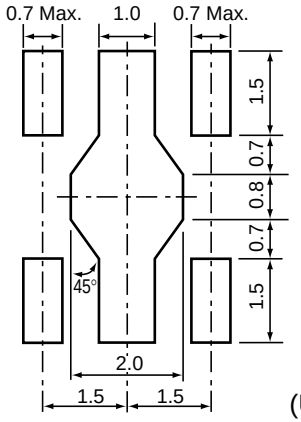
Power Dissipation



Measurement Board Pattern

IC Mount Area (Unit : mm)

RECOMMENDED LAND PATTERN (SOT-89-5)

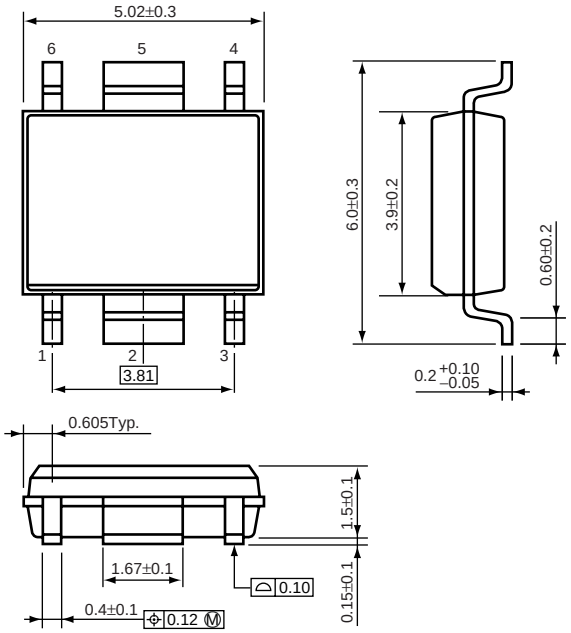


(Unit : mm)

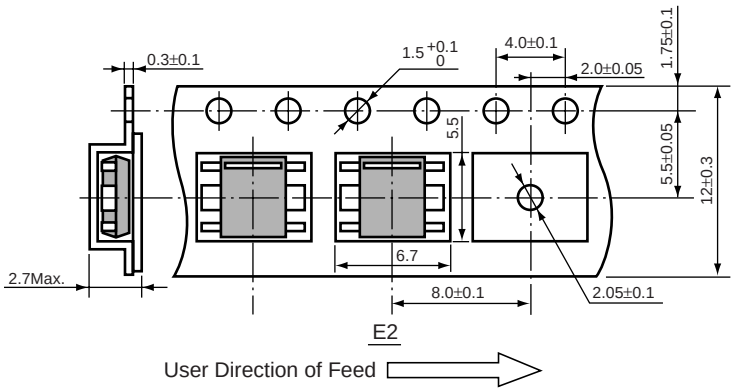
- **HSOP-6J**

Unit: mm

PACKAGE DIMENSIONS

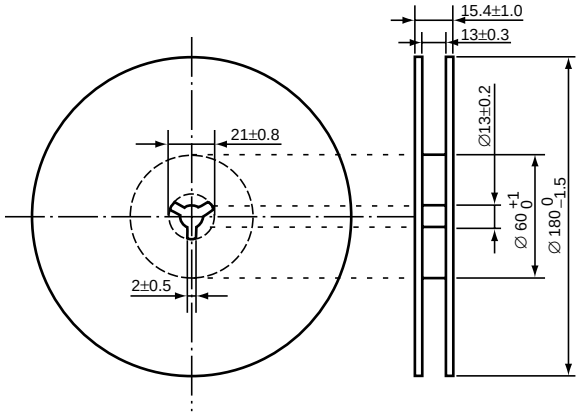


TAPING SPECIFICATION



TAPING REEL DIMENSIONS REUSE REEL (EIAJ-RRM-12Bc)

(1reel=1000pcs)



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:

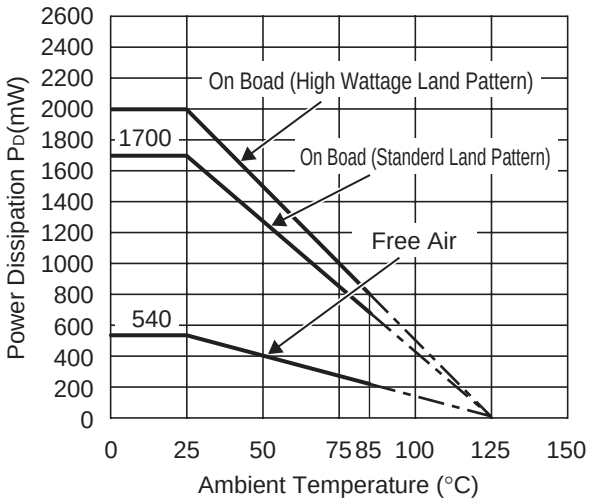
Measurement Conditions

	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 plactic (Double sided)	Glass cloth epoxy plactic (Double sided)
Board Dimensions	50mm × 50mm × 1.6mm	50mm × 50mm × 1.6mm
Copper Ratio	90%	50%
Through-hole	ϕ0.5mm × 44pcs	ϕ0.5mm × 44pcs

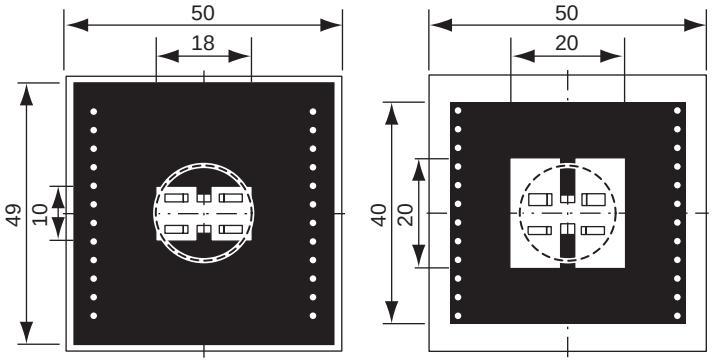
Measurement Result

(Topt=25°C,Tjmax=125°C)

	High Wattage Land Pattern	Standard Land Pattern	Free Air
Power Dissipation	2000mW	1700mW	540mW
Thermal Resistance	50°C/W	59°C/W	185°C/W



Power Dissipation

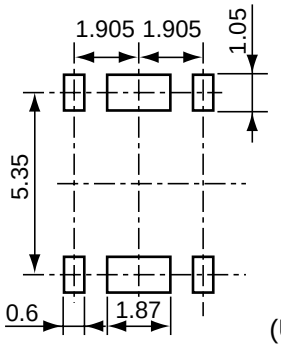


High Wattage **Standard**

Measurement Board Pattern

IC Mount Area Unit : mm

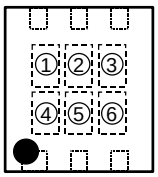
RECOMMENDED LAND PATTERN (HSOP-6J)



(Unit: mm)

RP131K SERIES MARK SPECIFICATION

- **DFN(PLP)1820-6**



① to ④ : Product Code (Refer to Part Number vs. Product Code)

⑤, ⑥ : Lot Number

- **Part Number vs. Product Code**

Part Number	Product Code			
	①	②	③	④
RP131K081B	A	M	0	1
RP131K091B	A	M	0	2
RP131K101B	A	M	0	3
RP131K111B	A	M	0	4
RP131K121B	A	M	0	5
RP131K121B5	A	M	0	6
RP131K131B	A	M	0	7
RP131K141B	A	M	0	8
RP131K151B	A	M	0	9
RP131K161B	A	M	1	0
RP131K171B	A	M	1	1
RP131K181B	A	M	1	2
RP131K181B5	A	M	1	3
RP131K191B	A	M	1	4
RP131K201B	A	M	1	5
RP131K211B	A	M	1	6
RP131K221B	A	M	1	7
RP131K231B	A	M	1	8
RP131K241B	A	M	1	9
RP131K251B	A	M	2	0
RP131K261B	A	M	2	1
RP131K271B	A	M	2	2
RP131K281B	A	M	2	3
RP131K281B5	A	M	2	4
RP131K291B	A	M	2	5

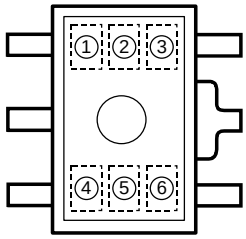
Part Number	Product Code			
	①	②	③	④
RP131K301B	A	M	2	6
RP131K311B	A	M	2	7
RP131K321B	A	M	2	8
RP131K331B	A	M	2	9
RP131K341B	A	M	3	0
RP131K351B	A	M	3	1
RP131K361B	A	M	3	2
RP131K371B	A	M	3	3
RP131K381B	A	M	3	4
RP131K391B	A	M	3	5
RP131K401B	A	M	3	6
RP131K411B	A	M	3	7
RP131K421B	A	M	3	8
RP131K431B	A	M	3	9
RP131K441B	A	M	4	0
RP131K451B	A	M	4	1
RP131K461B	A	M	4	2
RP131K471B	A	M	4	3
RP131K481B	A	M	4	4
RP131K491B	A	M	4	5
RP131K501B	A	M	4	6
RP131K101B5	A	M	4	7

Part Number	Product Code			
	①	②	③	④
RP131K081D	A	N	0	1
RP131K091D	A	N	0	2
RP131K101D	A	N	0	3
RP131K111D	A	N	0	4
RP131K121D	A	N	0	5
RP131K121D5	A	N	0	6
RP131K131D	A	N	0	7
RP131K141D	A	N	0	8
RP131K151D	A	N	0	9
RP131K161D	A	N	1	0
RP131K171D	A	N	1	1
RP131K181D	A	N	1	2
RP131K181D5	A	N	1	3
RP131K191D	A	N	1	4
RP131K201D	A	N	1	5
RP131K211D	A	N	1	6
RP131K221D	A	N	1	7
RP131K231D	A	N	1	8
RP131K241D	A	N	1	9
RP131K251D	A	N	2	0
RP131K261D	A	N	2	1
RP131K271D	A	N	2	2
RP131K281D	A	N	2	3
RP131K281D5	A	N	2	4
RP131K291D	A	N	2	5

Part Number	Product Code			
	①	②	③	④
RP131K301D	A	N	2	6
RP131K311D	A	N	2	7
RP131K321D	A	N	2	8
RP131K331D	A	N	2	9
RP131K341D	A	N	3	0
RP131K351D	A	N	3	1
RP131K361D	A	N	3	2
RP131K371D	A	N	3	3
RP131K381D	A	N	3	4
RP131K391D	A	N	3	5
RP131K401D	A	N	3	6
RP131K411D	A	N	3	7
RP131K421D	A	N	3	8
RP131K431D	A	N	3	9
RP131K441D	A	N	4	0
RP131K451D	A	N	4	1
RP131K461D	A	N	4	2
RP131K471D	A	N	4	3
RP131K481D	A	N	4	4
RP131K491D	A	N	4	5
RP131K501D	A	N	4	6
RP131K101D5	A	N	4	7

RP131H SERIES MARK SPECIFICATION

- **SOT-89-5**



①　　: U (fixed)
②, ③ : Setting Voltage
④　　: Type (B, D)
⑤, ⑥ : Lot Number

} (Refer to Part Number vs. Product Code)

- **Part Number vs. Product Code**

Part Number	Product Code			
	①	②	③	④
RP131H081B	U	0	8	B
RP131H091B	U	0	9	B
RP131H101B	U	1	0	B
RP131H111B	U	1	1	B
RP131H121B	U	1	2	B
RP131H131B	U	1	3	B
RP131H141B	U	1	4	B
RP131H151B	U	1	5	B
RP131H161B	U	1	6	B
RP131H171B	U	1	7	B
RP131H181B	U	1	8	B
RP131H191B	U	1	9	B
RP131H201B	U	2	0	B
RP131H211B	U	2	1	B
RP131H221B	U	2	2	B
RP131H231B	U	2	3	B
RP131H241B	U	2	4	B
RP131H251B	U	2	5	B
RP131H261B	U	2	6	B
RP131H271B	U	2	7	B
RP131H281B	U	2	8	B
RP131H291B	U	2	9	B
RP131H301B	U	3	0	B
RP131H311B	U	3	1	B
RP131H321B	U	3	2	B
RP131H331B	U	3	3	B
RP131H341B	U	3	4	B
RP131H351B	U	3	5	B
RP131H361B	U	3	6	B
RP131H371B	U	3	7	B
RP131H381B	U	3	8	B
RP131H391B	U	3	9	B

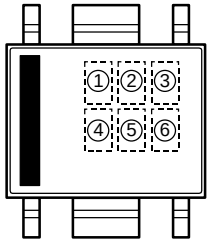
Part Number	Product Code			
	①	②	③	④
RP131H401B	U	4	0	B
RP131H411B	U	4	1	B
RP131H421B	U	4	2	B
RP131H431B	U	4	3	B
RP131H441B	U	4	4	B
RP131H451B	U	4	5	B
RP131H461B	U	4	6	B
RP131H471B	U	4	7	B
RP131H481B	U	4	8	B
RP131H491B	U	4	9	B
RP131H501B	U	5	0	B
RP131H121B5	U	0	1	B
RP131H181B5	U	0	2	B
RP131H281B5	U	0	3	B
RP131H101B5	U	0	4	B

Part Number	Product Code			
	①	②	③	④
RP131H081D	U	0	8	D
RP131H091D	U	0	9	D
RP131H101D	U	1	0	D
RP131H111D	U	1	1	D
RP131H121D	U	1	2	D
RP131H131D	U	1	3	D
RP131H141D	U	1	4	D
RP131H151D	U	1	5	D
RP131H161D	U	1	6	D
RP131H171D	U	1	7	D
RP131H181D	U	1	8	D
RP131H191D	U	1	9	D
RP131H201D	U	2	0	D
RP131H211D	U	2	1	D
RP131H221D	U	2	2	D
RP131H231D	U	2	3	D
RP131H241D	U	2	4	D
RP131H251D	U	2	5	D
RP131H261D	U	2	6	D
RP131H271D	U	2	7	D
RP131H281D	U	2	8	D
RP131H291D	U	2	9	D
RP131H301D	U	3	0	D
RP131H311D	U	3	1	D
RP131H321D	U	3	2	D
RP131H331D	U	3	3	D
RP131H341D	U	3	4	D
RP131H351D	U	3	5	D
RP131H361D	U	3	6	D
RP131H371D	U	3	7	D
RP131H381D	U	3	8	D
RP131H391D	U	3	9	D

Part Number	Product Code			
	①	②	③	④
RP131H401D	U	4	0	D
RP131H411D	U	4	1	D
RP131H421D	U	4	2	D
RP131H431D	U	4	3	D
RP131H441D	U	4	4	D
RP131H451D	U	4	5	D
RP131H461D	U	4	6	D
RP131H471D	U	4	7	D
RP131H481D	U	4	8	D
RP131H491D	U	4	9	D
RP131H501D	U	5	0	D
RP131H121D5	U	0	1	D
RP131H181D5	U	0	2	D
RP131H281D5	U	0	3	D
RP131H101D5	U	0	4	D

RP131S SERIES MARK SPECIFICATION

- **HSOP-6J**



① : G (fixed)
②, ③ : Setting Voltage
④ : Type (B, D)
⑤, ⑥ : Lot Number

} (Refer to Part Number vs. Product Code)

- **Part Number vs. Product Code**

Part Number	Product Code			
	①	②	③	④
RP131S081B	G	0	8	B
RP131S091B	G	0	9	B
RP131S101B	G	1	0	B
RP131S111B	G	1	1	B
RP131S121B	G	1	2	B
RP131S131B	G	1	3	B
RP131S141B	G	1	4	B
RP131S151B	G	1	5	B
RP131S161B	G	1	6	B
RP131S171B	G	1	7	B
RP131S181B	G	1	8	B
RP131S191B	G	1	9	B
RP131S201B	G	2	0	B
RP131S211B	G	2	1	B
RP131S221B	G	2	2	B
RP131S231B	G	2	3	B
RP131S241B	G	2	4	B
RP131S251B	G	2	5	B
RP131S261B	G	2	6	B
RP131S271B	G	2	7	B
RP131S281B	G	2	8	B
RP131S291B	G	2	9	B
RP131S301B	G	3	0	B
RP131S311B	G	3	1	B
RP131S321B	G	3	2	B
RP131S331B	G	3	3	B
RP131S341B	G	3	4	B
RP131S351B	G	3	5	B
RP131S361B	G	3	6	B
RP131S371B	G	3	7	B
RP131S381B	G	3	8	B
RP131S391B	G	3	9	B

Part Number	Product Code			
	①	②	③	④
RP131S401B	G	4	0	B
RP131S411B	G	4	1	B
RP131S421B	G	4	2	B
RP131S431B	G	4	3	B
RP131S441B	G	4	4	B
RP131S451B	G	4	5	B
RP131S461B	G	4	6	B
RP131S471B	G	4	7	B
RP131S481B	G	4	8	B
RP131S491B	G	4	9	B
RP131S501B	G	5	0	B
RP131S121B5	G	0	1	B
RP131S181B5	G	0	2	B
RP131S281B5	G	0	3	B
RP131S101B5	G	0	4	B

Part Number	Product Code			
	①	②	③	④
RP131S081D	G	0	8	D
RP131S091D	G	0	9	D
RP131S101D	G	1	0	D
RP131S111D	G	1	1	D
RP131S121D	G	1	2	D
RP131S131D	G	1	3	D
RP131S141D	G	1	4	D
RP131S151D	G	1	5	D
RP131S161D	G	1	6	D
RP131S171D	G	1	7	D
RP131S181D	G	1	8	D
RP131S191D	G	1	9	D
RP131S201D	G	2	0	D
RP131S211D	G	2	1	D
RP131S221D	G	2	2	D
RP131S231D	G	2	3	D
RP131S241D	G	2	4	D
RP131S251D	G	2	5	D
RP131S261D	G	2	6	D
RP131S271D	G	2	7	D
RP131S281D	G	2	8	D
RP131S291D	G	2	9	D
RP131S301D	G	3	0	D
RP131S311D	G	3	1	D
RP131S321D	G	3	2	D
RP131S331D	G	3	3	D
RP131S341D	G	3	4	D
RP131S351D	G	3	5	D
RP131S361D	G	3	6	D
RP131S371D	G	3	7	D
RP131S381D	G	3	8	D
RP131S391D	G	3	9	D

Part Number	Product Code			
	①	②	③	④
RP131S401D	G	4	0	D
RP131S411D	G	4	1	D
RP131S421D	G	4	2	D
RP131S431D	G	4	3	D
RP131S441D	G	4	4	D
RP131S451D	G	4	5	D
RP131S461D	G	4	6	D
RP131S471D	G	4	7	D
RP131S481D	G	4	8	D
RP131S491D	G	4	9	D
RP131S501D	G	5	0	D
RP131S121D5	G	0	1	D
RP131S181D5	G	0	2	D
RP131S281D5	G	0	3	D
RP131S101D5	G	0	4	D