
0.6% ACCURACY LOW NOISE 300mA LDO REGULATOR

NO.EA-167-160425

OUTLINE

The RP101x Series are CMOS-based voltage regulator ICs with high output voltage accuracy, extremely low supply current, low ON-resistance, and high ripple rejection. Each of these ICs consists of a voltage reference unit, an error amplifier, resistor-net for voltage setting, a current limit circuit, and a chip enable circuit.

These ICs perform with low dropout voltage and a chip enable function. The line transient response and load transient response of the RP101x Series are excellent, thus these ICs are very suitable for the power supply for hand-held communication equipment.

The output voltage of these ICs is fixed with high accuracy. Since the packages for these ICs are SOT-23-5 and DFN(PLP)1612-4 (t=0.6mm type) or DFN(PLP)1612-4B (t=0.4mm type), therefore high density mounting of the ICs on boards is possible.

FEATURES

- Supply CurrentTyp. 18 μ A
- Standby CurrentTyp. 0.1 μ A
- Dropout Voltage.....Typ. 0.13V ($I_{OUT}=150\text{mA}$, $V_{OUT}=2.8\text{V}$)
- Ripple RejectionTyp. 75dB (f=1kHz)
- Temperature-Drift Coefficient of Output VoltageTyp. $\pm 30\text{ppm}/^\circ\text{C}$
- Line RegulationTyp. 0.02%/V
- Output Voltage Accuracy $\pm 0.6\%$
- Packages.....DFN(PLP)1612-4, DFN(PLP)1612-4B, SOT-23-5
- Input Voltage Range.....1.7V to 5.25V
- Output Voltage Range.....1.2V to 3.3V (0.1V steps)
(For other voltages, please refer to MARK INFORMATIONS.)
- Built-in Fold Back Protection Circuit.....Typ. 40mA (Current at short mode)
- Ceramic capacitors are recommended to be used with this IC 1.0 μ F or more

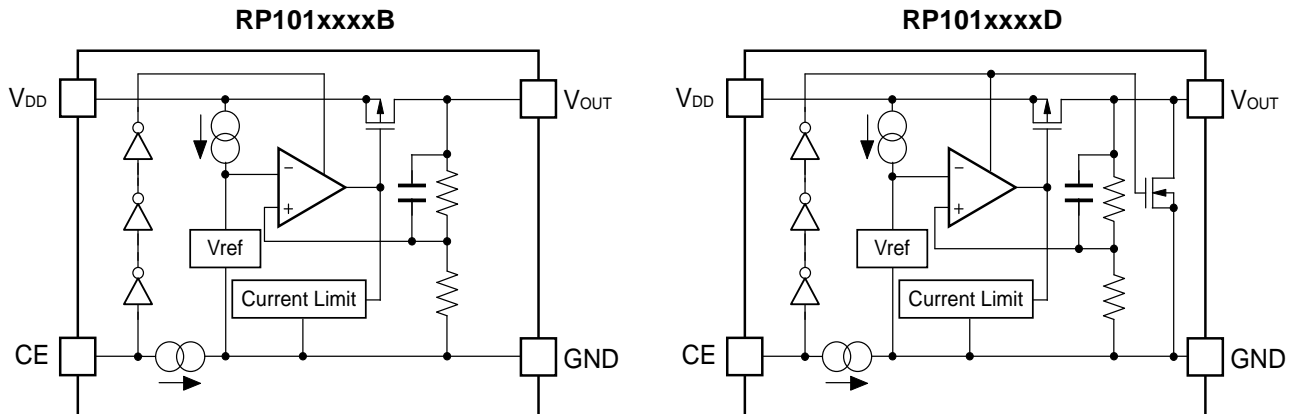
APPLICATIONS

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

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BLOCK DIAGRAMS



SELECTION GUIDE

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

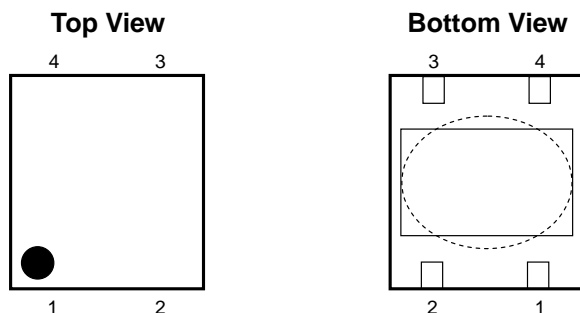
Product Name	Package	Quantity per Reel	Pb Free	Halogen Free
RP101Kxx1*-TR	DFN(PLP)1612-4 (t=0.6mm)	5,000 pcs	Yes	Yes
RP101Kxx2*-TR	DFN(PLP)1612-4B (t=0.4mm)	5,000 pcs	Yes	Yes
RP101Nxx1*-TR-FE	SOT-23-5	3,000 pcs	Yes	Yes

xx: The output voltage can be designated in the range from 1.2V(12) to 3.3V(33) in 0.1V steps.
(For other voltages, please refer to MARK INFORMATIONS.)

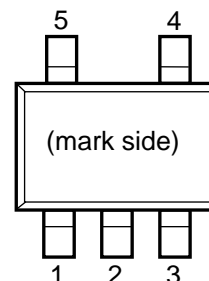
* : CE pin polarity and auto discharge function at off state are options as follows.
(B) "H" active, without auto discharge function at off state
(D) "H" active, with auto discharge function at off state

PIN CONFIGURATIONS

• DFN(PLP)1612-4, DFN(PLP)1612-4B



• SOT-23-5



PIN DESCRIPTIONS

• DFN(PLP)1612-4, DFN(PLP)1612-4B

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

*) Tab is GND level. (They are connected to the reverse side of this IC.)

The tab is better to be connected to the GND, but leaving it open is also acceptable.

• SOT-23-5

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

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ABSOLUTE MAXIMUM RATINGS

Symbol	Item	Rating	Unit
V_{IN}	Input Voltage	6.0	V
V_{CE}	Input Voltage (CE Pin)	6.0	V
V_{OUT}	Output Voltage	-0.3 to $V_{IN}+0.3$	V
I_{OUT}	Output Current	310	mA
P_D	Power Dissipation (DFN(PLP)1612-4) *	610	mW
	Power Dissipation (DFN(PLP)1612-4B) *	580	
	Power Dissipation (SOT-23-5) *	420	
T_{opt}	Operating Temperature Range	-40 to 85	°C
T_{stg}	Storage Temperature Range	-55 to 125	°C

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

ABSOLUTE MAXIMUM RATINGS

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

ELECTRICAL CHARACTERISTICS

● RP101xxxxB/D

$V_{IN} = \text{Set } V_{OUT} + 1V$, $I_{OUT} = 1mA$, $C_{IN} = C_{OUT} = 1\mu F$, unless otherwise noted.

$T_{opt} = 25^{\circ}C$

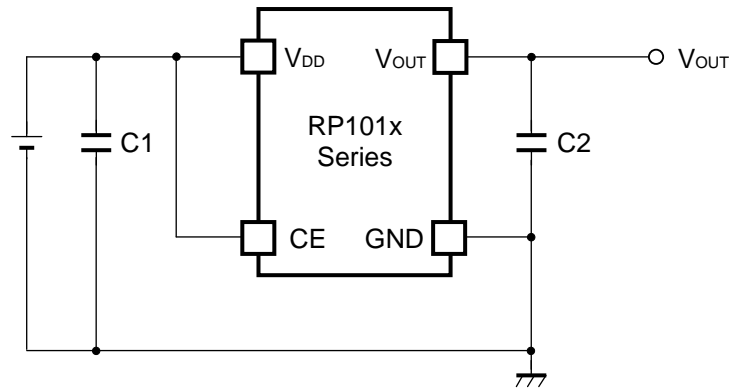
Symbol	Item	Conditions	Min.	Typ.	Max.	Unit	
V_{OUT}	Output Voltage	$V_{OUT} > 2.0V$	$\times 0.994$		$\times 1.006$	V	
		$V_{OUT} \leq 2.0V$	-12		+12	mV	
I_{OUT}	Output Current		300			mA	
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	Load Regulation	$1mA \leq I_{OUT} \leq 150mA$		20	40	mV	
V_{DIF}	Dropout Voltage	$I_{OUT} = 150mA$	$1.2V \leq V_{OUT} < 1.5V$		0.40	0.50	V
			$1.5V \leq V_{OUT} < 1.7V$		0.24	0.38	
			$1.7V \leq V_{OUT} < 2.0V$		0.21	0.34	
			$2.0V \leq V_{OUT} < 2.5V$		0.17	0.30	
			$2.5V \leq V_{OUT} < 2.8V$		0.14	0.25	
			$2.8V \leq V_{OUT} \leq 3.3V$		0.13	0.23	
I_{SS}	Supply Current	$I_{OUT} = 0mA$		18	25	μA	
$I_{standby}$	Standby Current	$V_{CE} = 0V$		0.1	2.0	μA	
$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Line Regulation	$\text{Set } V_{OUT} + 0.5V \leq V_{IN} \leq 5.0V$		0.02	0.10	%/V	
RR	Ripple Rejection	$f = 1kHz$, Ripple 0.2Vp-p $V_{IN} = \text{Set } V_{OUT} + 1V$, $I_{OUT} = 30mA$ (In case that $V_{OUT} \leq 2.0V$, $V_{IN} = 3.0V$)		75		dB	
V_{IN}	Input Voltage*1		1.7		5.25	V	
$\frac{\Delta V_{OUT}}{\Delta T_{opt}}$	Output Voltage Temperature Coefficient	$-40^{\circ}C \leq T_{opt} \leq 85^{\circ}C$		± 30		ppm/ $^{\circ}C$	
I_{SC}	Short Current Limit	$V_{OUT} = 0V$		40		mA	
I_{PD}	CE Pull-down Current			0.3		μA	
V_{CEH}	CE Input Voltage "H"		1.1			V	
V_{CEL}	CE Input Voltage "L"				0.3	V	
en	Output Noise	$BW = 10Hz \text{ to } 100kHz$ $I_{OUT} = 30mA$		30		μV_{rms}	
R_{LOW}	Low Output Nch Tr. ON Resistance (of D version)	$V_{IN} = 4.0V$, $V_{CE} = 0V$		30		Ω	

*) The maximum Input Voltage of the ELECTRICAL CHARACTERISTICS is 5.25V. In case of exceeding this specification, the IC must be operated on condition that the Input Voltage is up to 5.5V and the total operating time is within 500hrs.

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



(External Components)

C2 1.0 μ F MURATA: GRM155B31A105KE15

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 1.0 μ F or more capacity.

Ceramic capacitors have different temperature characteristics and bias characteristics depending on their dimensions and manufacturers. If the setting voltage is 2.5V or more and the capacitor's dimensions for V_{OUT} equal to 1.0mm by 0.5mm or smaller than that, the capacitance value might be extremely low. As a result, the capacitance might be much less than expected. In such cases, the operation might be unstable at low temperature. (–20°C or less) In that case, use a larger capacity, or a large dimensions' capacitor. (For example 1.6mm by 0.8mm)

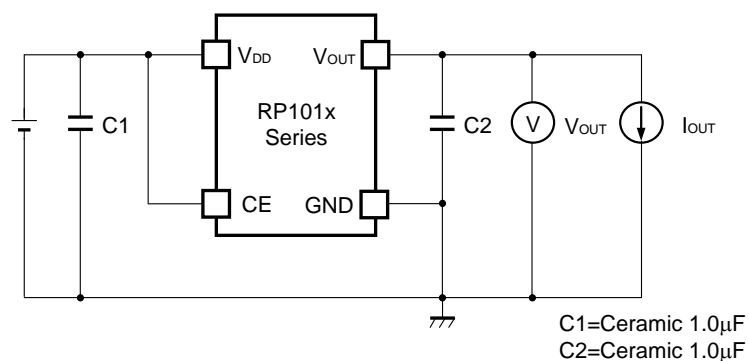
If a tantalum capacitor is selected as an output capacitor, large ESR may be a cause of unstable operation. Evaluate the operation of PCB with considerable frequency characteristics.

PCB Layout

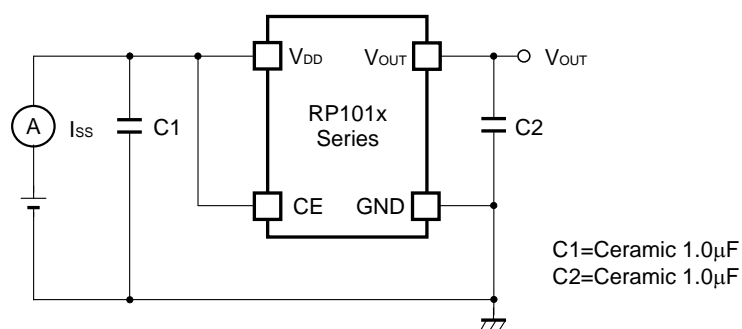
Make V_{DD} and GND lines sufficient. If their impedance is high, noise pickup or unstable operation may result. Connect a capacitor C1 with a capacitance value as much as 1.0 μ F or more between V_{DD} and GND pin, and as close as possible to the pins.

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

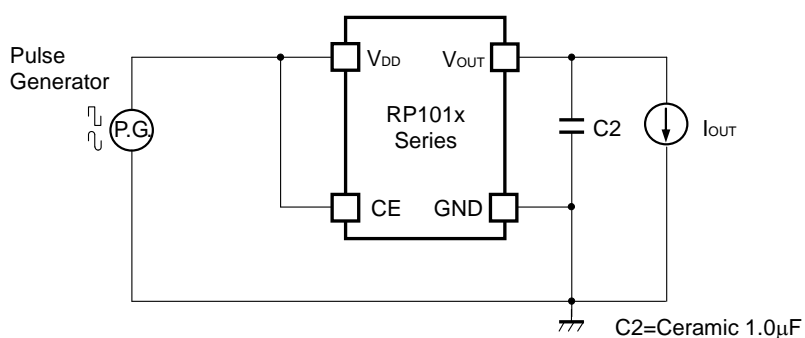
TEST CIRCUITS



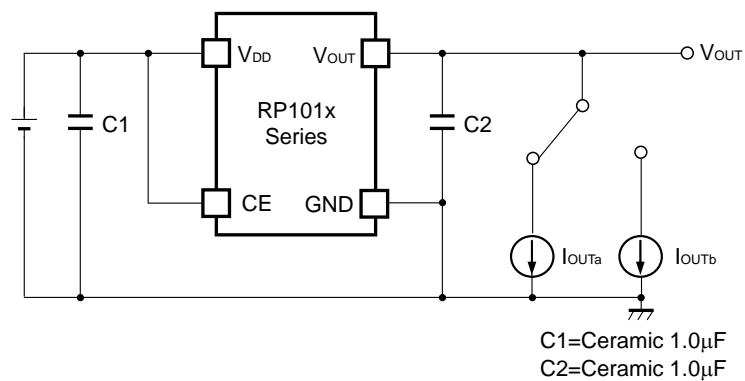
Basic Test Circuit



Test Circuit for Supply Current



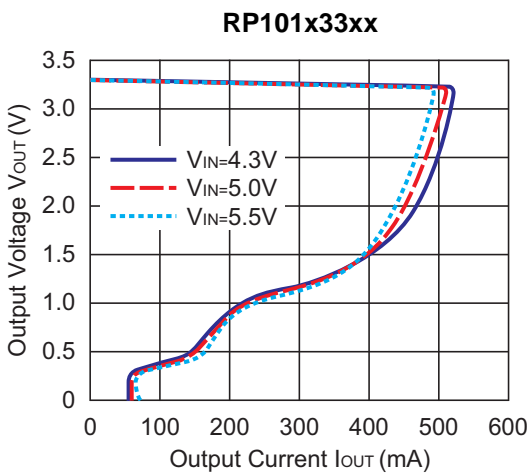
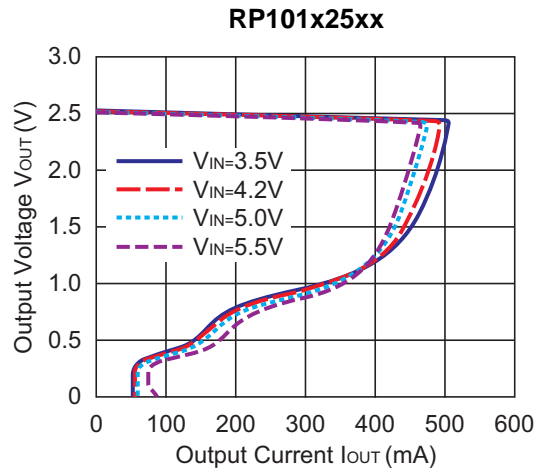
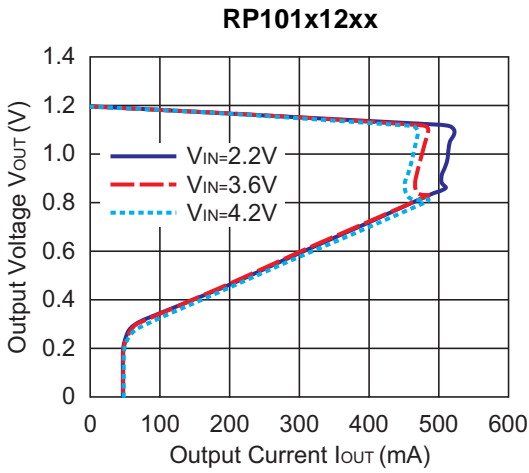
Test Circuit for Ripple Rejection



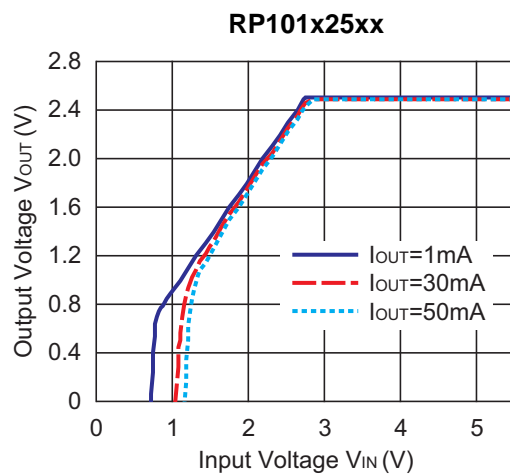
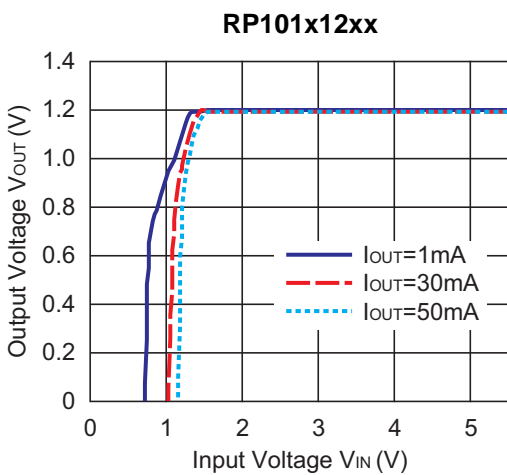
Test Circuit for Load Transient Response

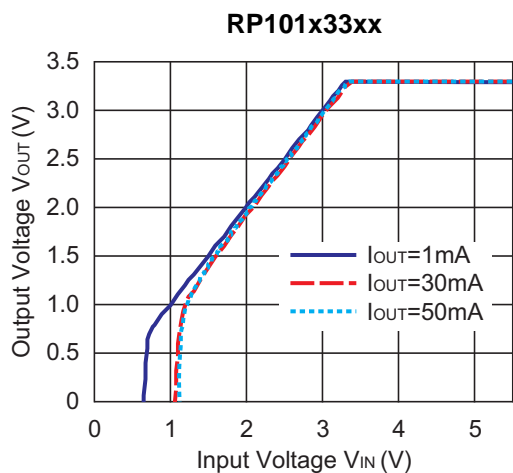
TYPICAL CHARACTERISTICS

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

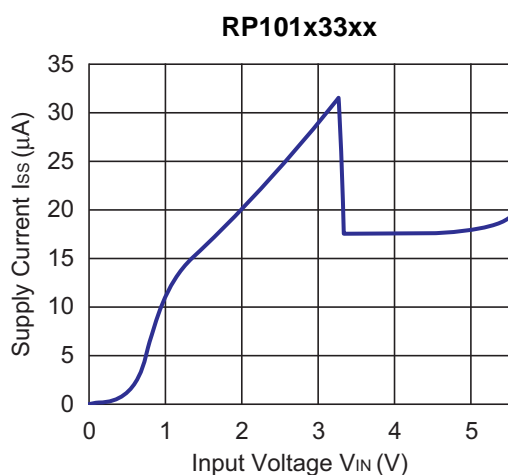
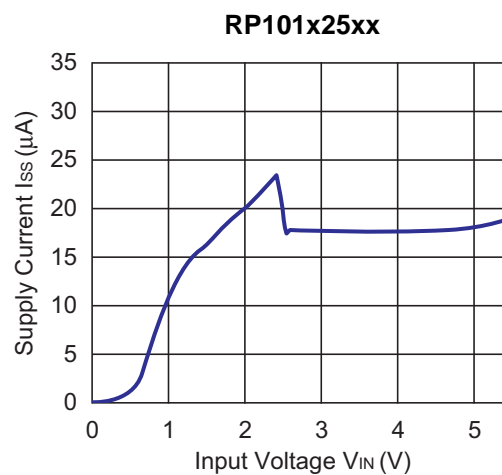
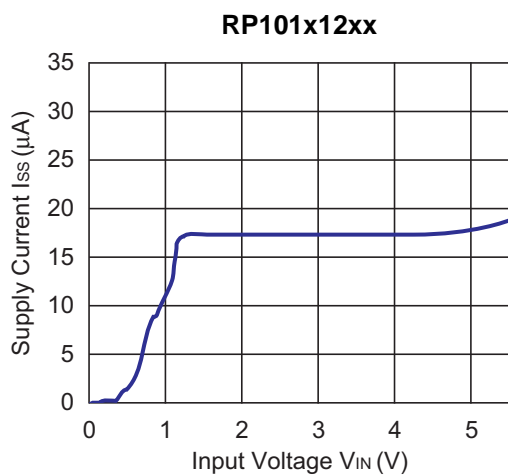


2) Output Voltage vs. Input Voltage ($C_1=1.0\mu\text{F}$, $C_2=1.0\mu\text{F}$, $T_{\text{opt}}=25^\circ\text{C}$)





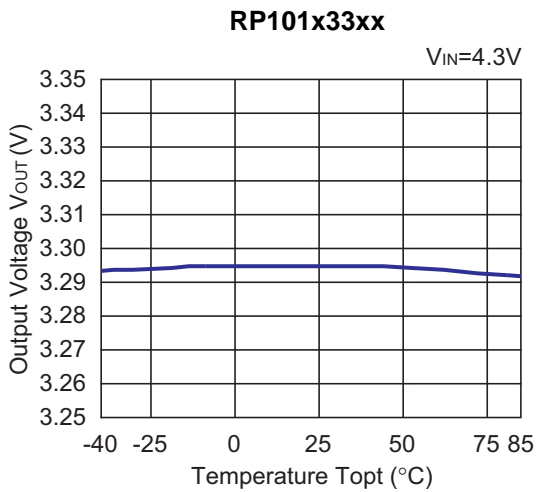
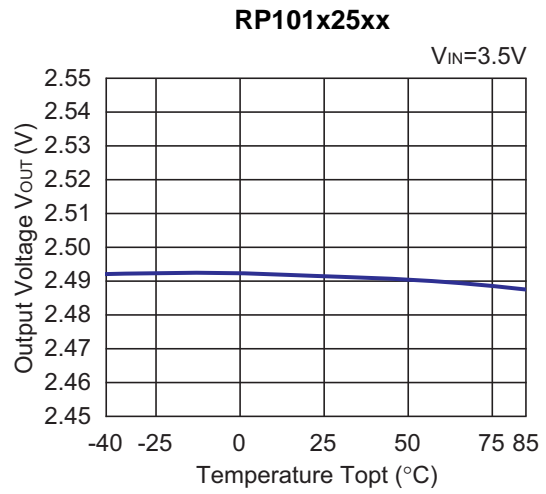
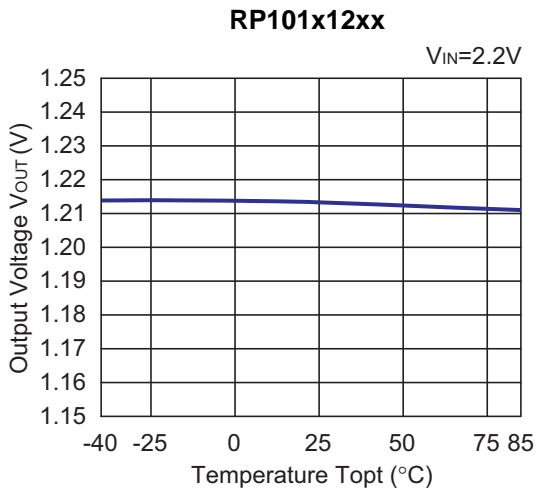
3) Supply Current vs. Input Voltage (C1=1.0μF, C2=1.0μF, T_{opt}=25°C)



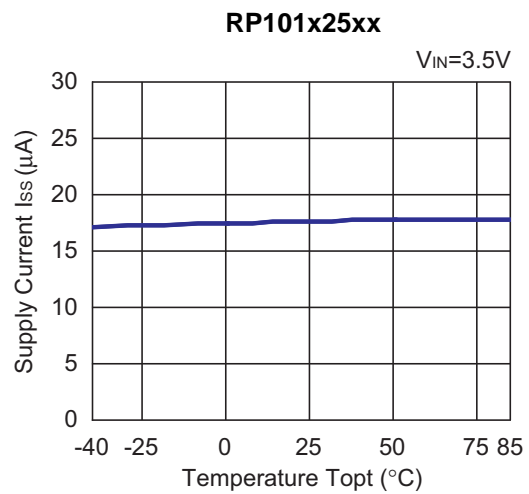
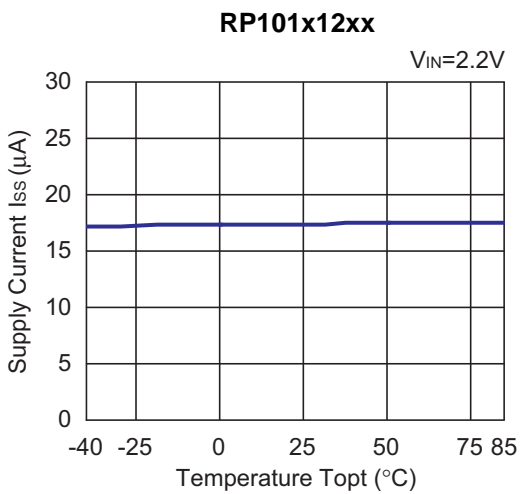
RP101x

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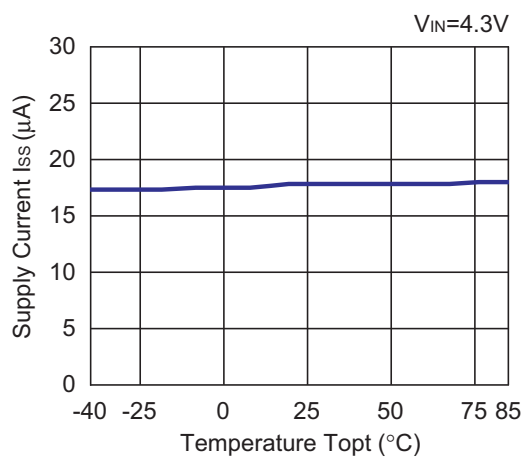
4) Output Voltage vs. Temperature ($C1=1.0\mu\text{F}$, $C2=1.0\mu\text{F}$, $I_{\text{OUT}}=1\text{mA}$)



5) Supply Current vs. Temperature ($C1=1.0\mu\text{F}$, $C2=1.0\mu\text{F}$, $I_{\text{OUT}}=0\text{mA}$)

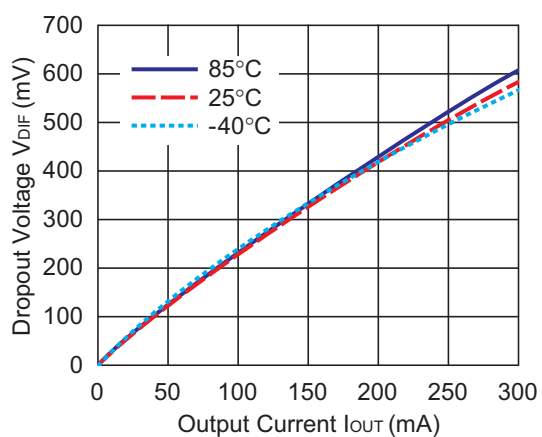


RP101x33xx

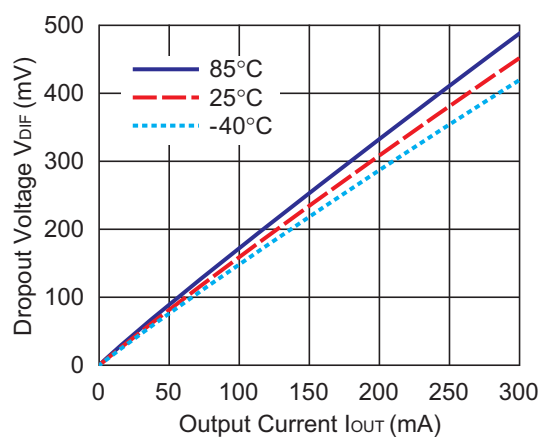


6) Dropout Voltage vs. Output Current ($C1=1.0\mu F$, $C2=1.0\mu F$)

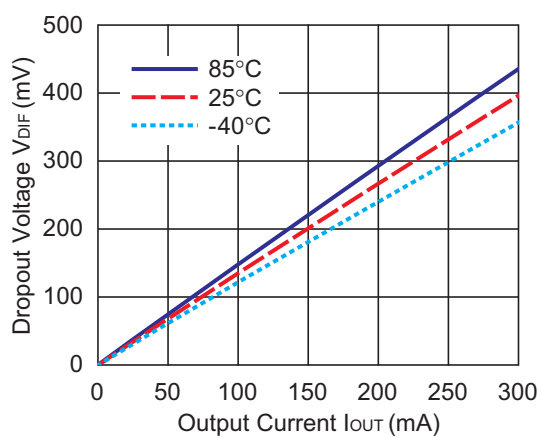
RP101x12xx



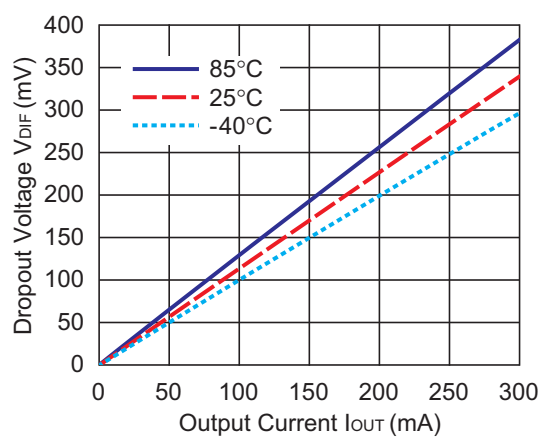
RP101x15xx



RP101x17xx



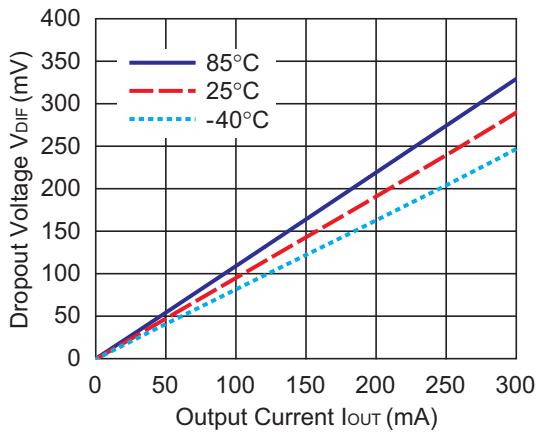
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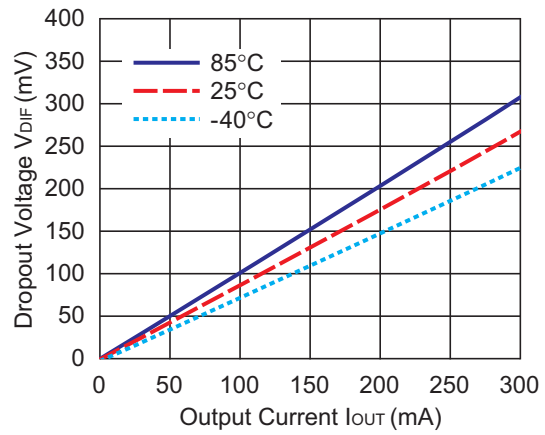
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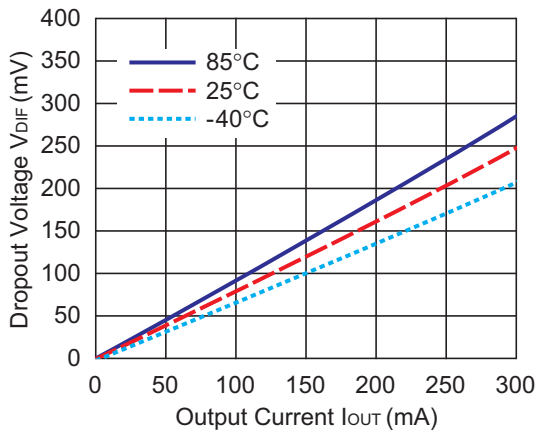
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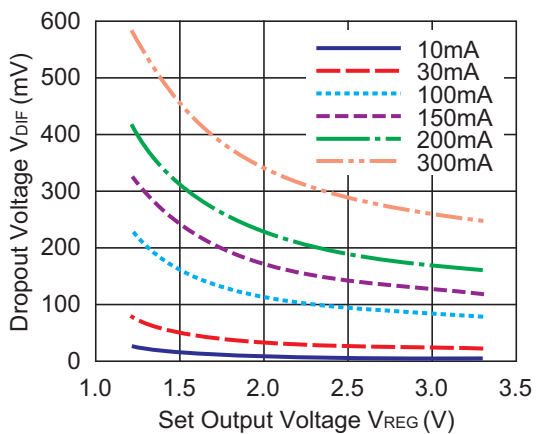
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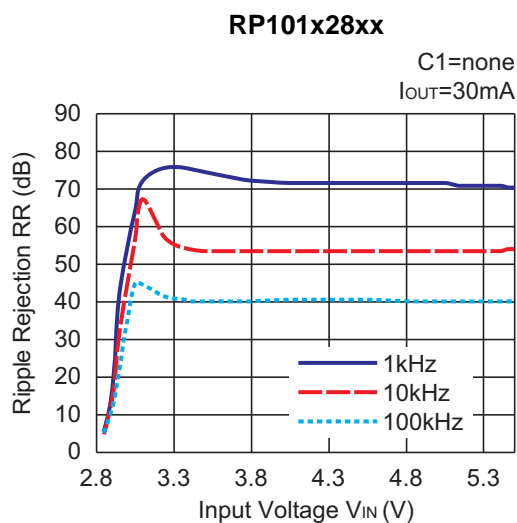
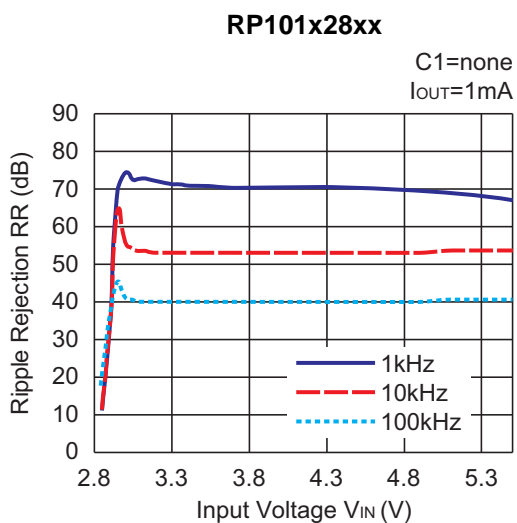
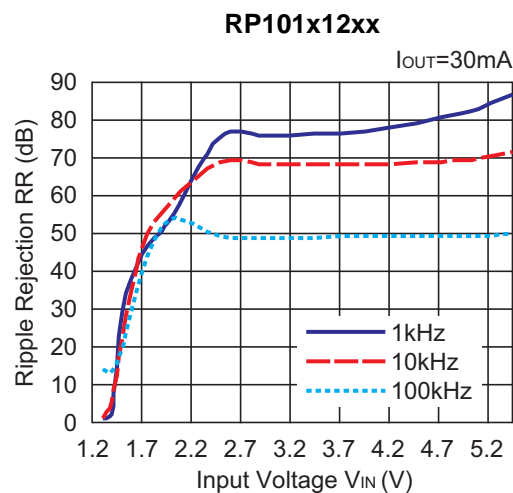
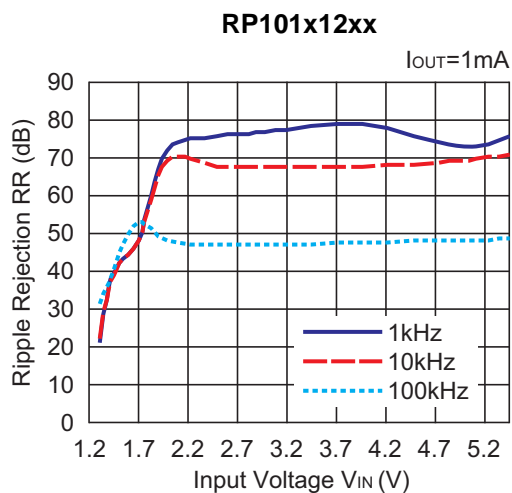
RP101x33xx



7) Dropout Voltage vs. Set Output Voltage ($C1=1.0\mu F$, $C2=1.0\mu F$, $T_{opt}=25^\circ C$)



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



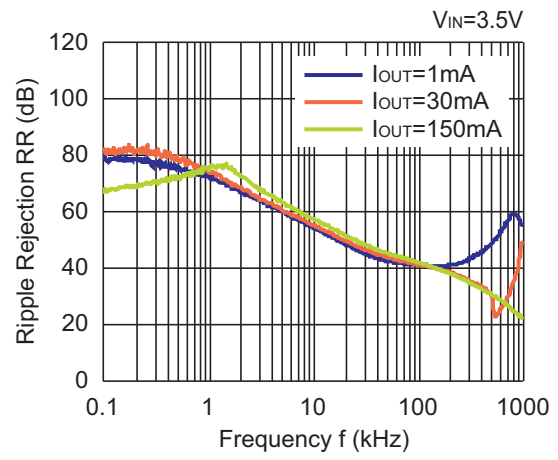
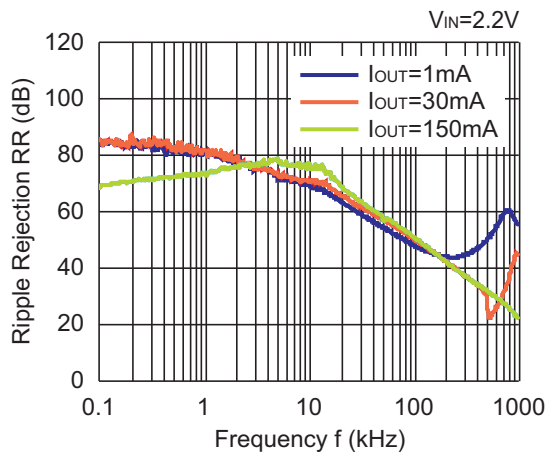
9) Ripple Rejection vs. Frequency (C1=none, C2=1.0μF, Ripple=0.2Vp-p)

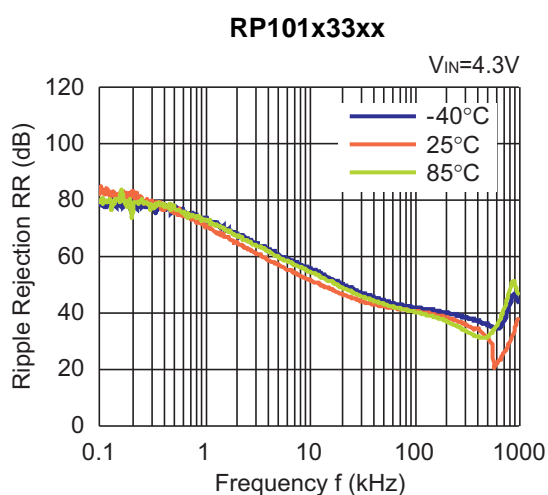
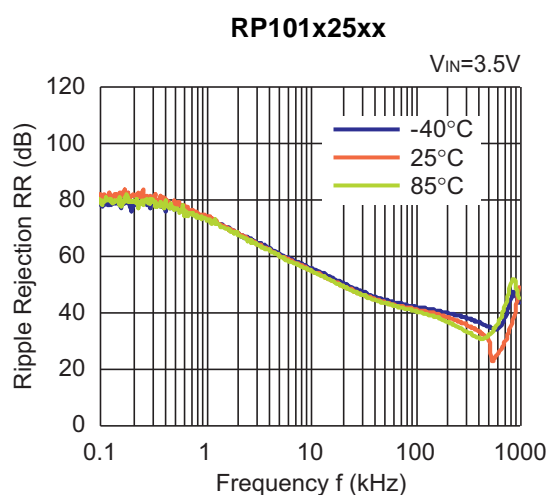
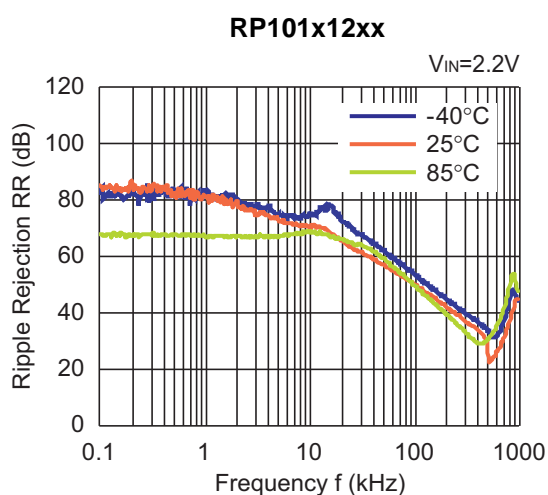
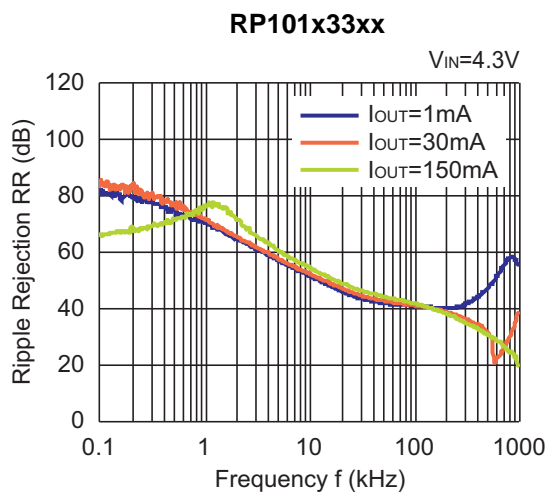
RP101x12xx

RP101x25xx

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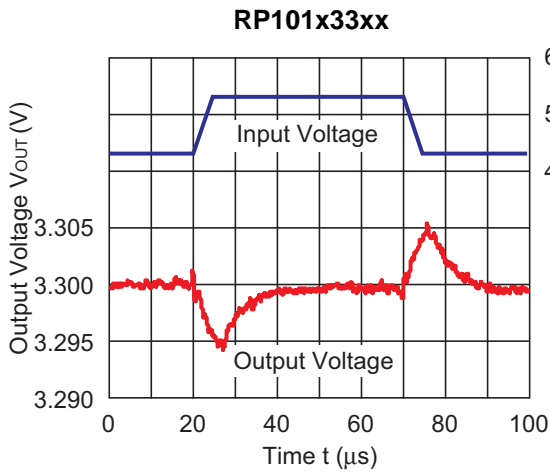
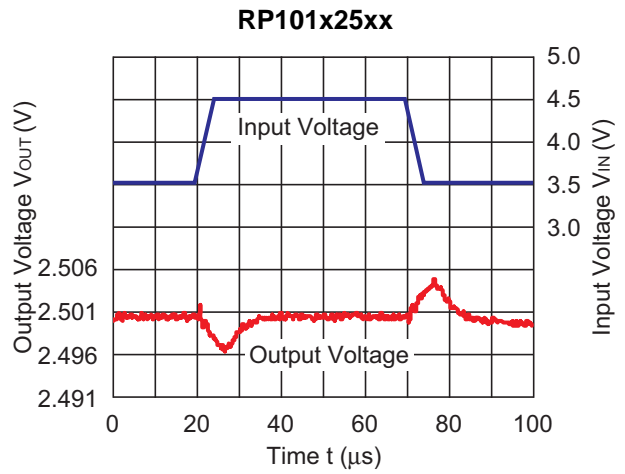
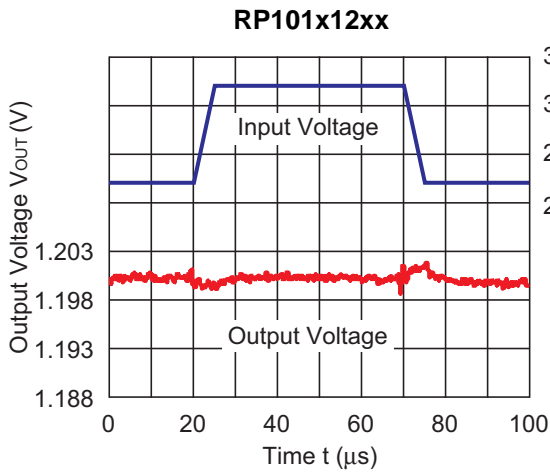




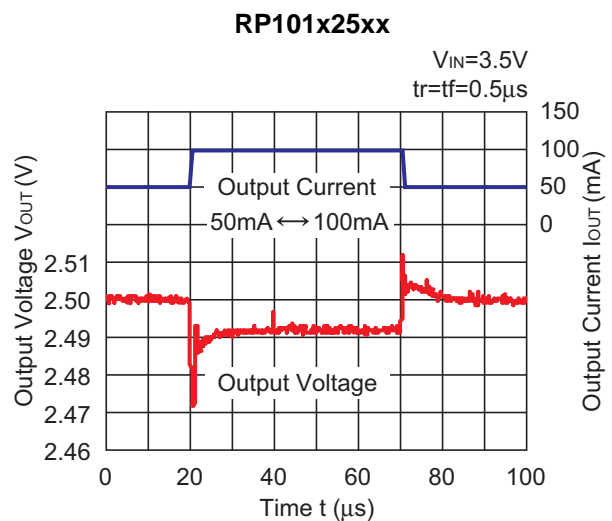
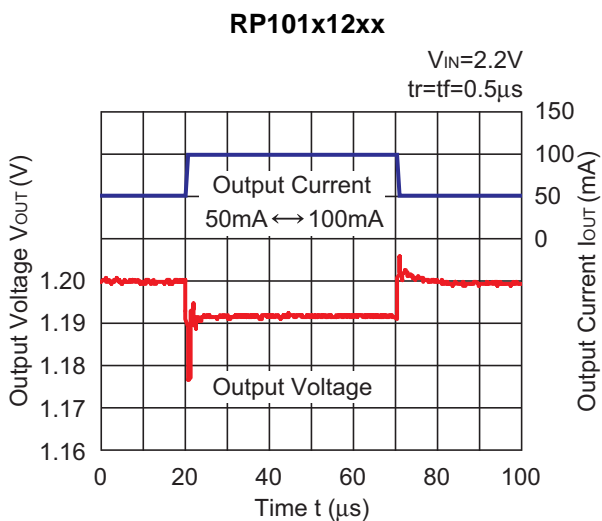
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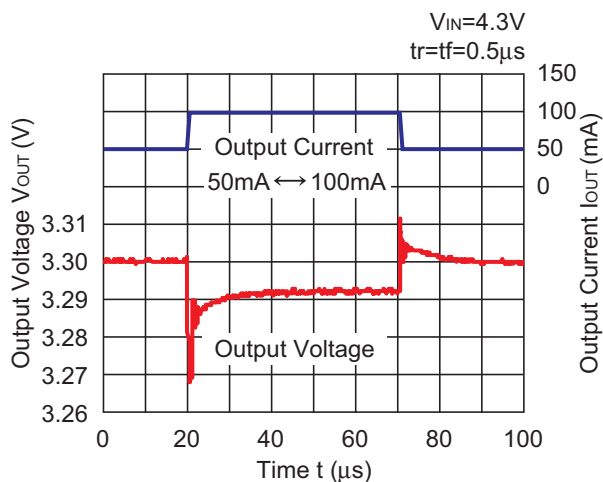
10) Input Transient Response ($I_{OUT}=30mA$, $t_r=t_f=5\mu s$, $T_{opt}=25^\circ C$)



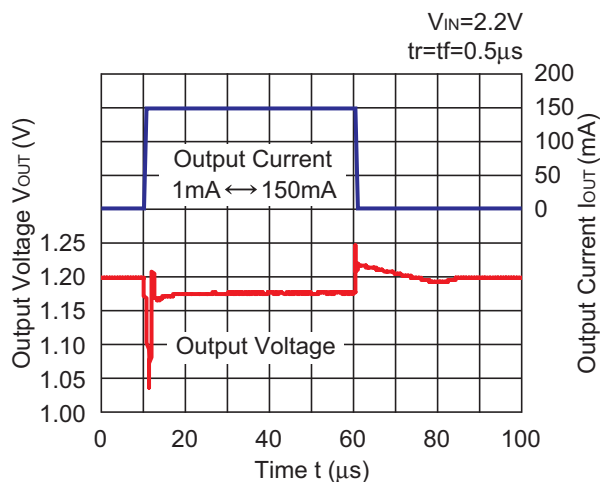
11) Load Transient Response ($C_2=1.0\mu F$, $T_{opt}=25^\circ C$)



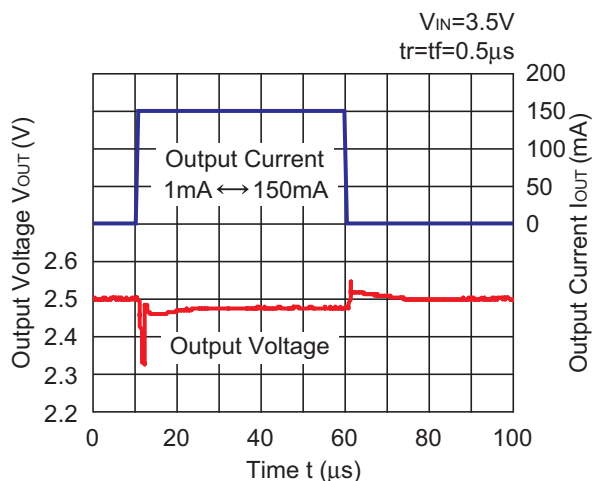
RP101x33xx



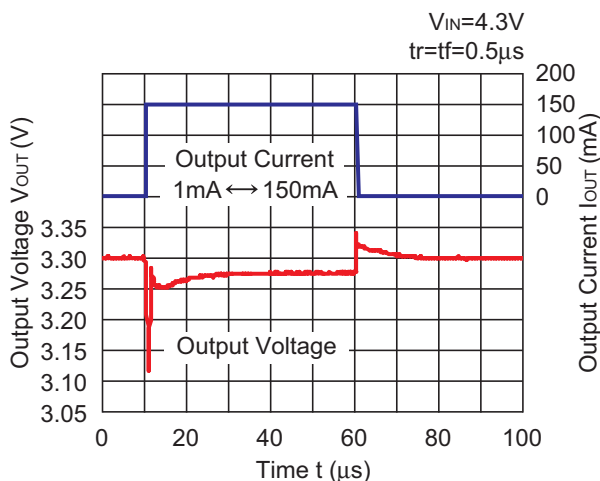
RP101x12xx



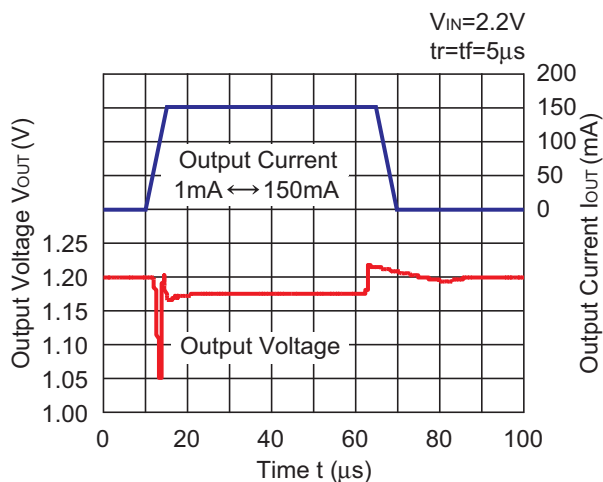
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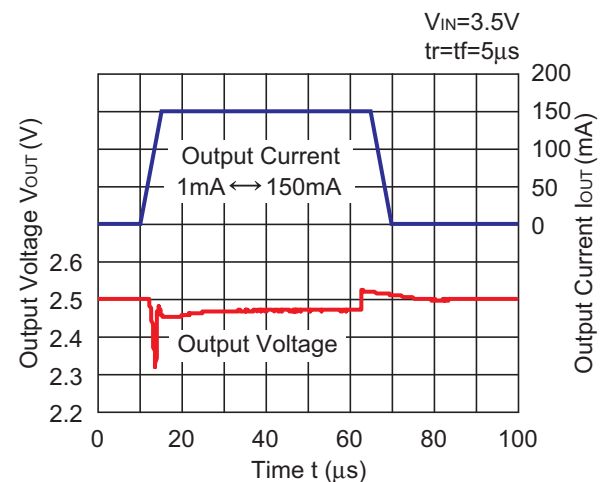
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RP101x12xx



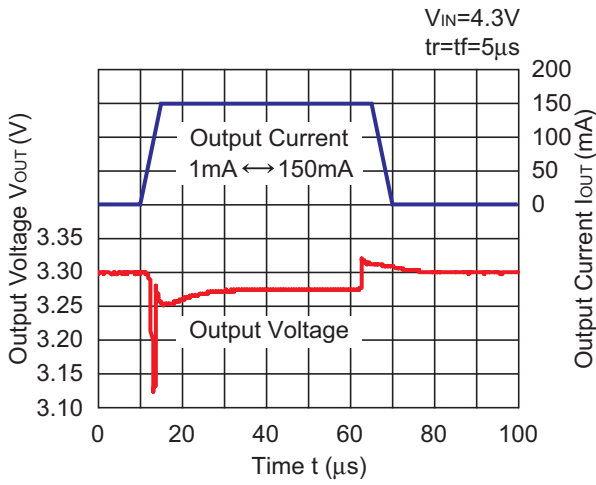
RP101x25xx



RP101x

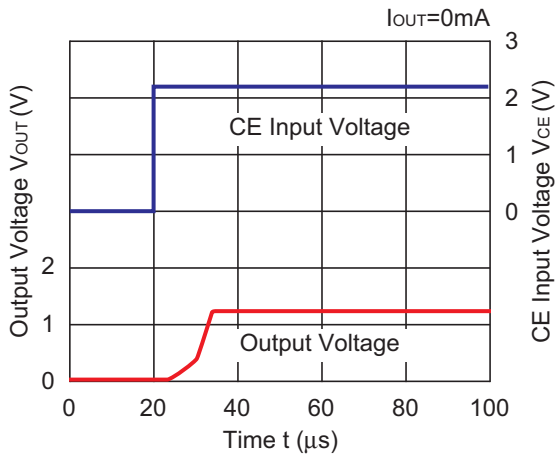
NO.EA-167-160425

RP101x33xx

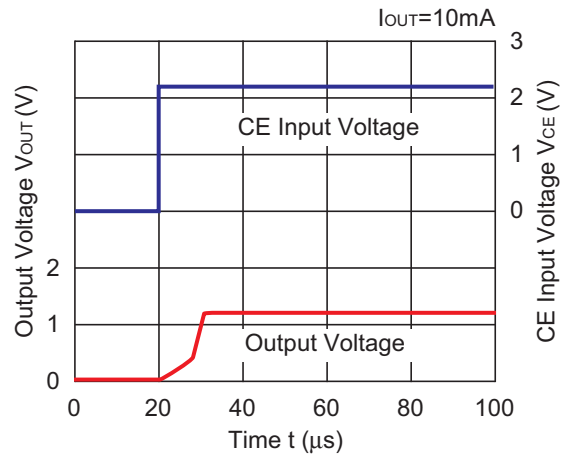


12) Turn On Speed with CE pin ($C_1=1.0\mu F$, $C_2=1.0\mu F$, $T_{opt}=25^\circ C$)

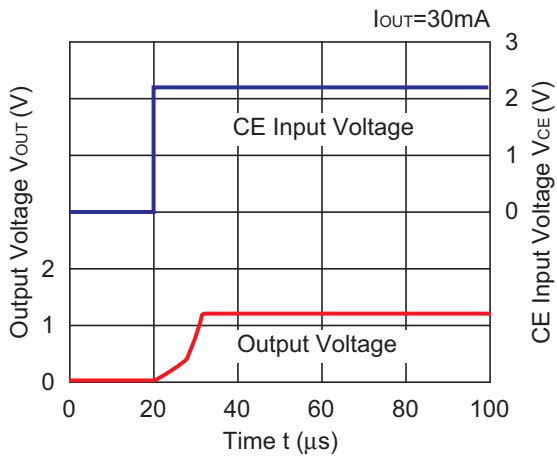
RP101x12xx



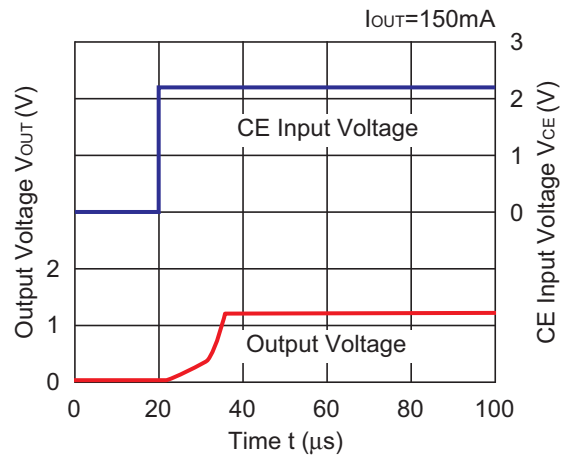
RP101x12xx

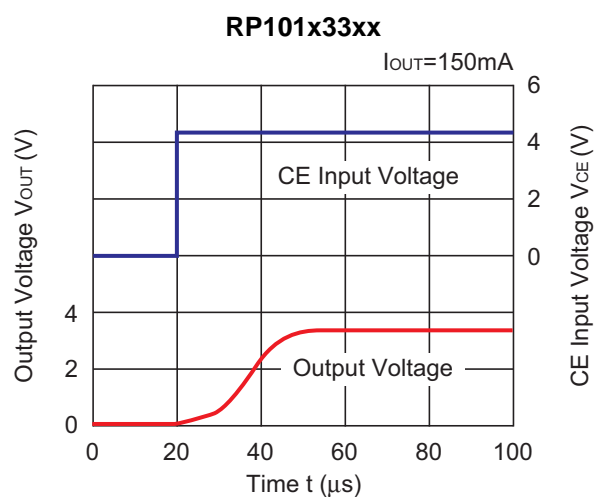
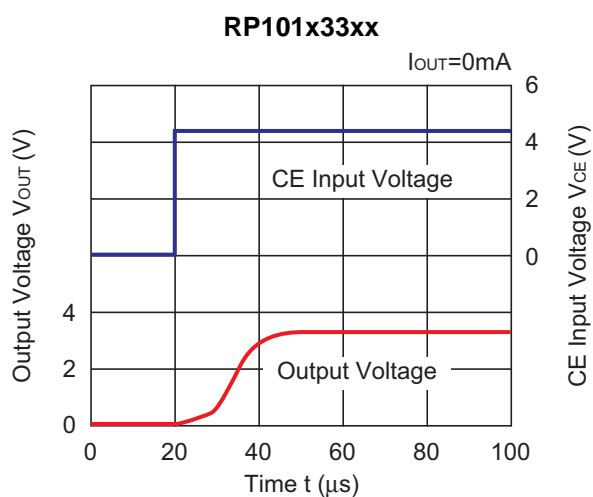
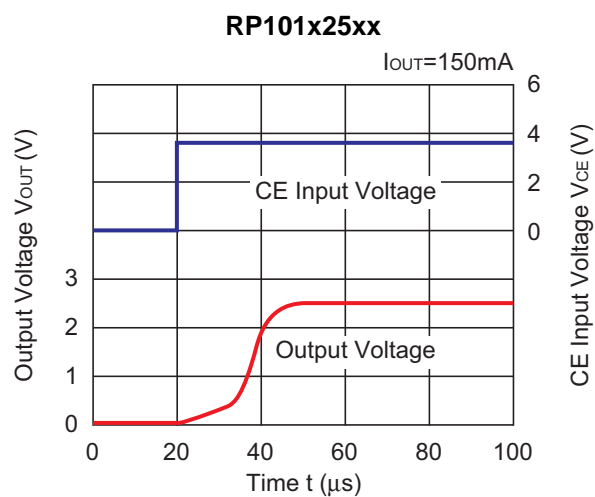
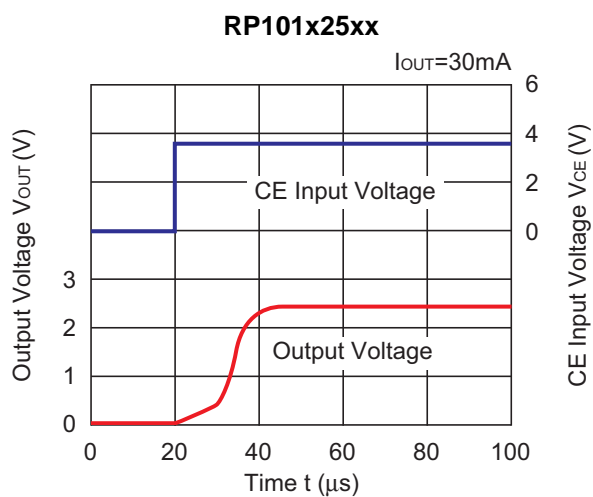
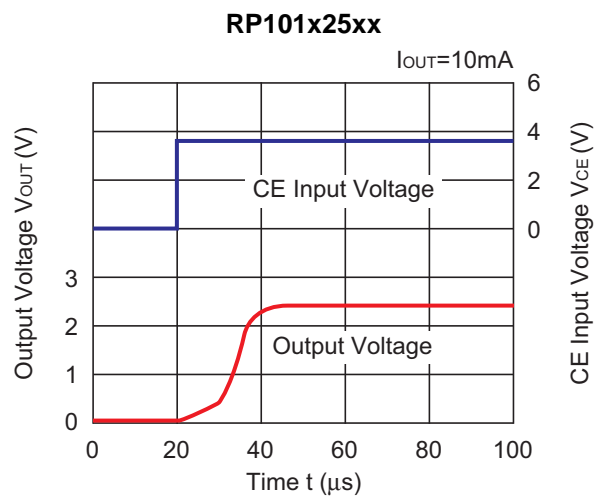
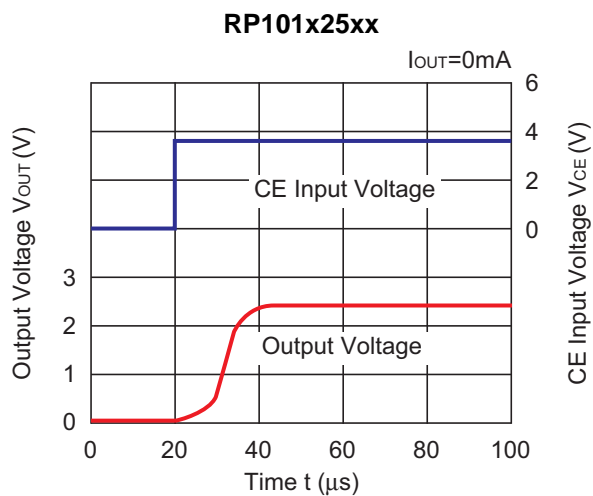


RP101x12xx



RP101x12xx

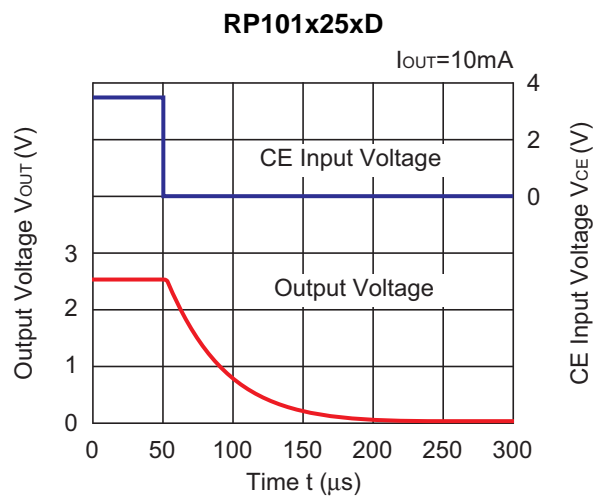
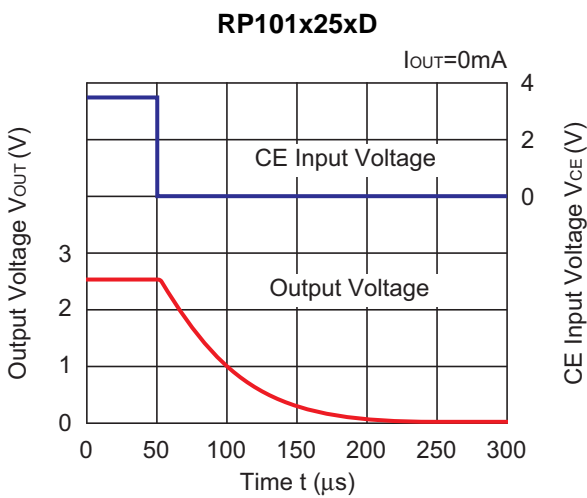
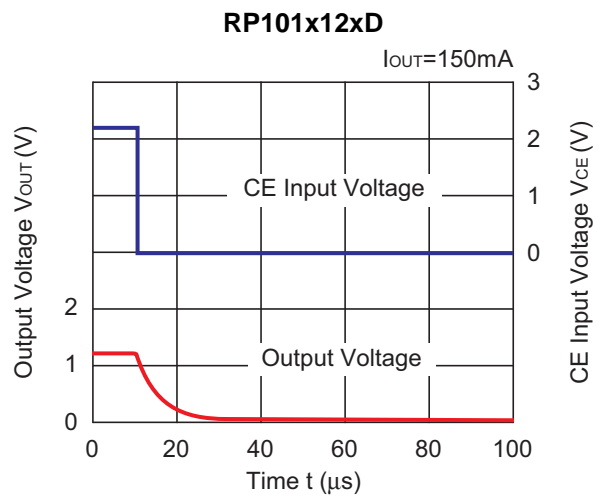
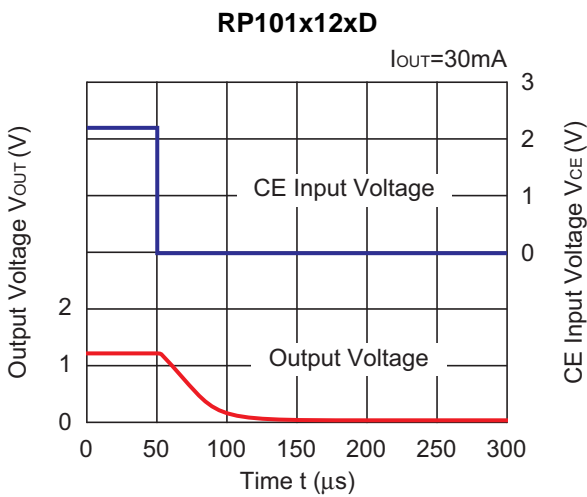
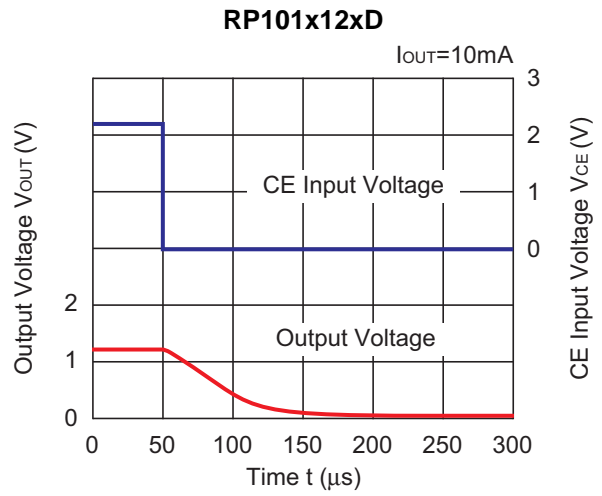
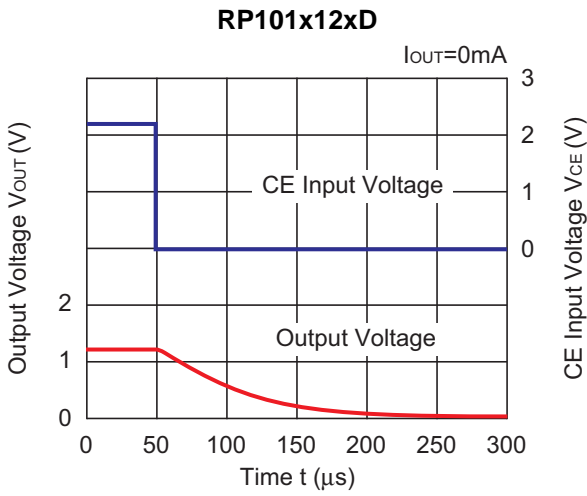




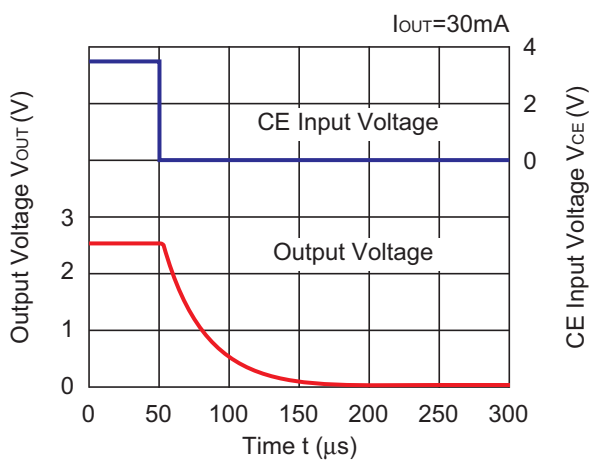
RP101x

NO.EA-167-160425

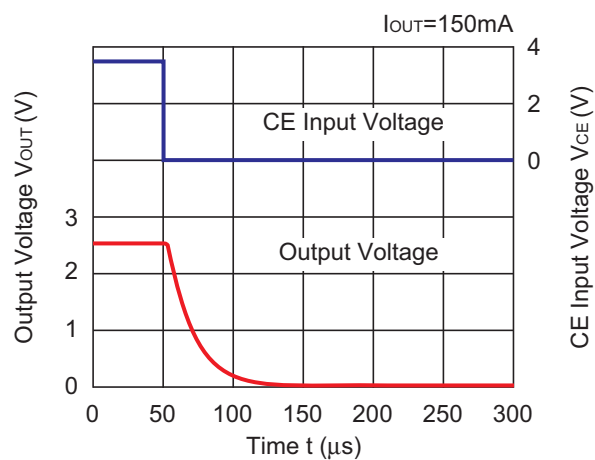
13) Turn Off Speed with CE pin (D Version) (C1=1.0μF, C2=1.0μF, T_{opt}=25°C)



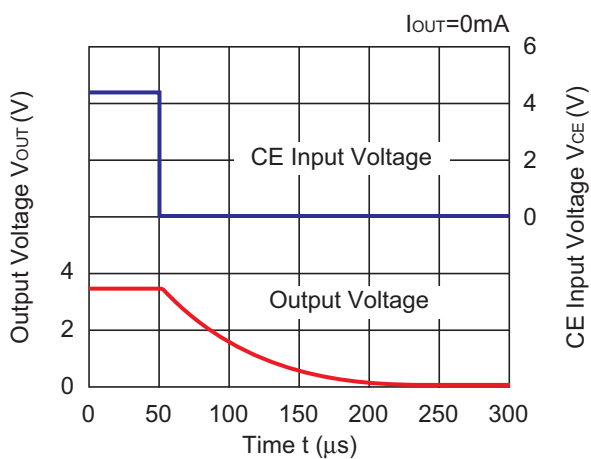
RP101x25xD



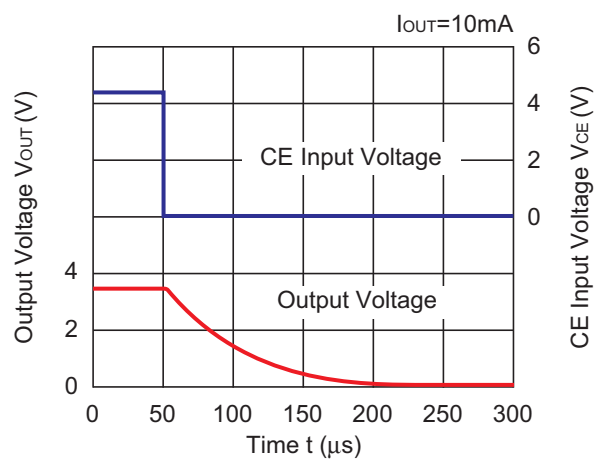
RP101x25xD



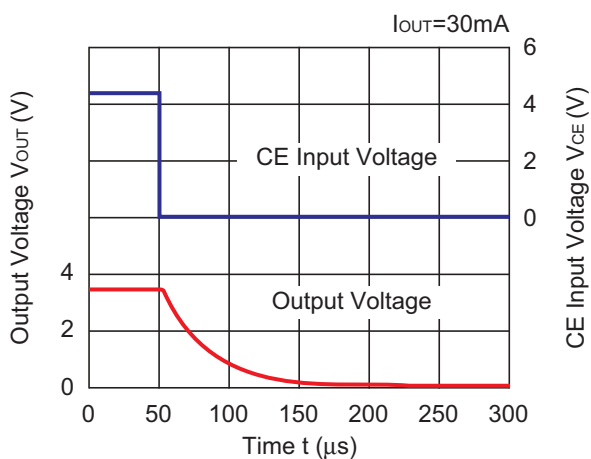
RP101x33xD



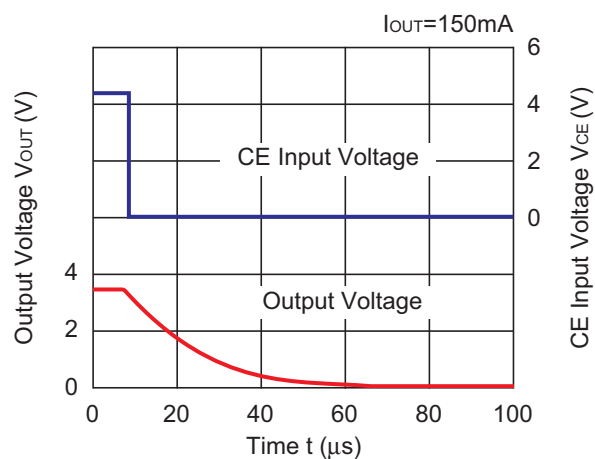
RP101x33xD



RP101x33xD



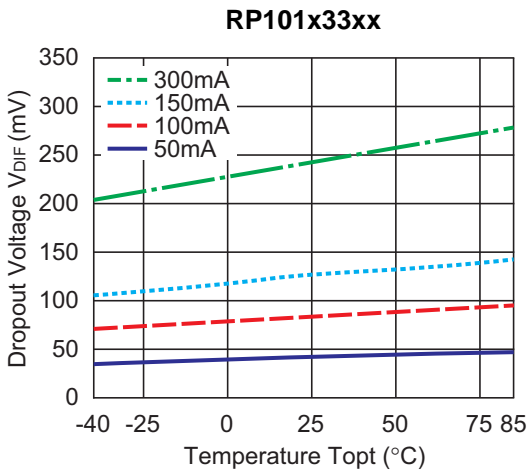
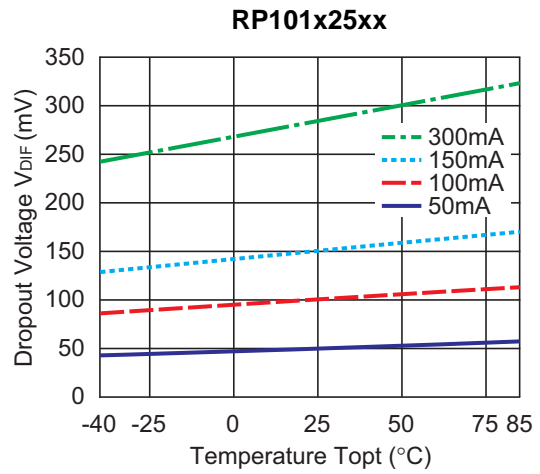
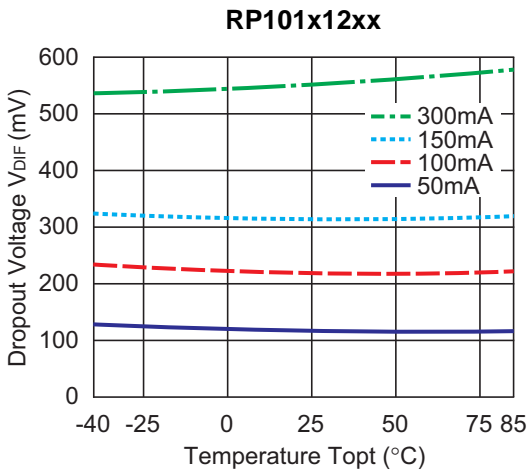
RP101x33xD



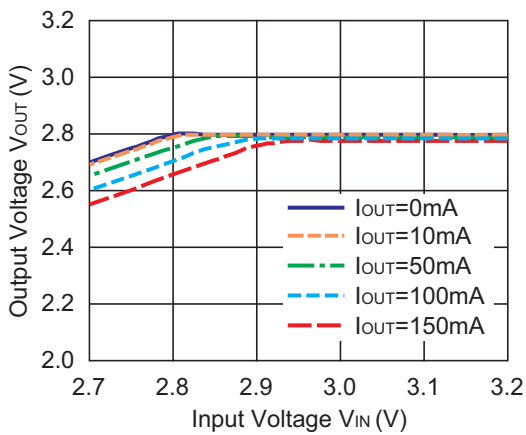
RP101x

NO.EA-167-160425

14) Dropout Voltage vs. Temperature (C1=1.0μF, C2=1.0μF)



15) Output Voltage vs. Input Voltage (C1=1.0μF, C2=1.0μF)



ESR vs. Output Current

When using these ICs, consider the following points:

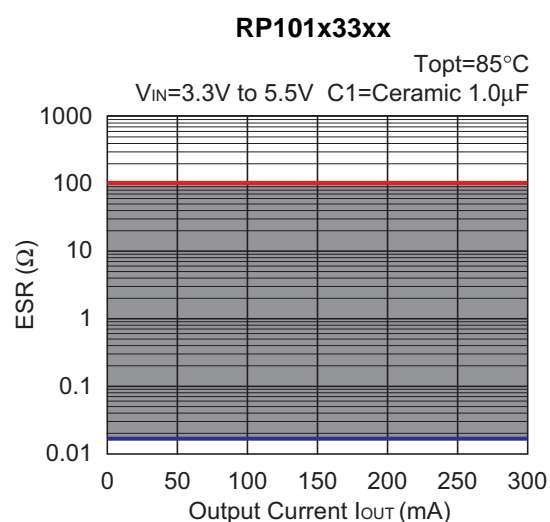
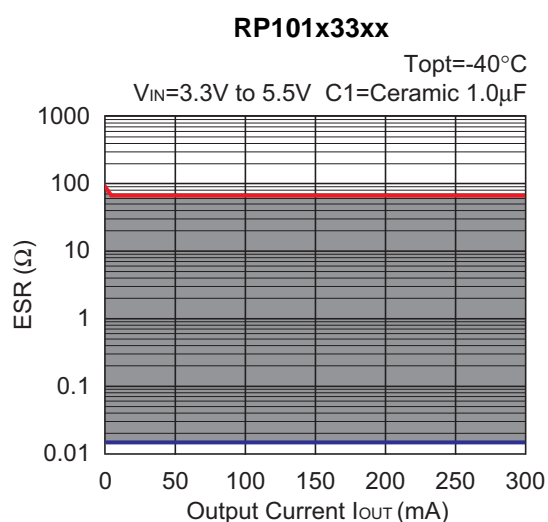
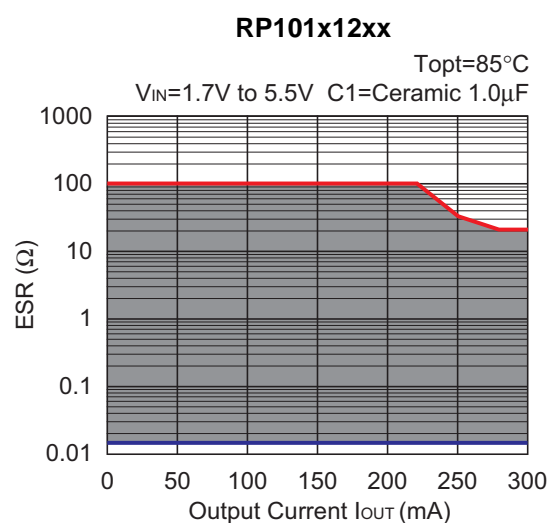
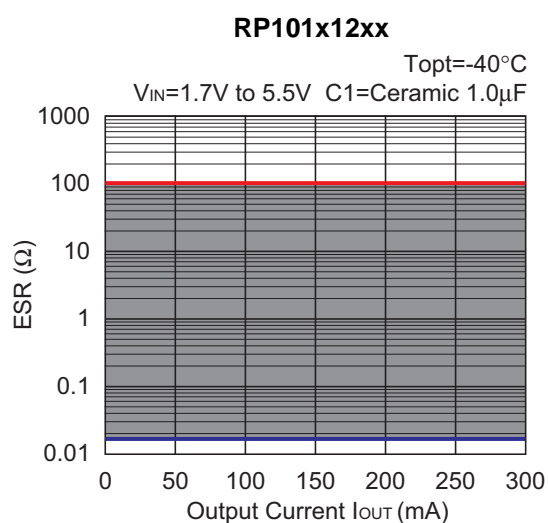
The relations between I_{OUT} (Output Current) and ESR of an output capacitor are shown below.

The conditions when the white noise level is under $40\mu\text{V}$ (Avg.) are marked as the hatched area in the graph.

Measurement conditions

Frequency Band : 10Hz to 2MHz

Temperature : -40°C to 85°C



PACKAGE INFORMATION

Power Dissipation (DFN(PLP)1612-4)

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

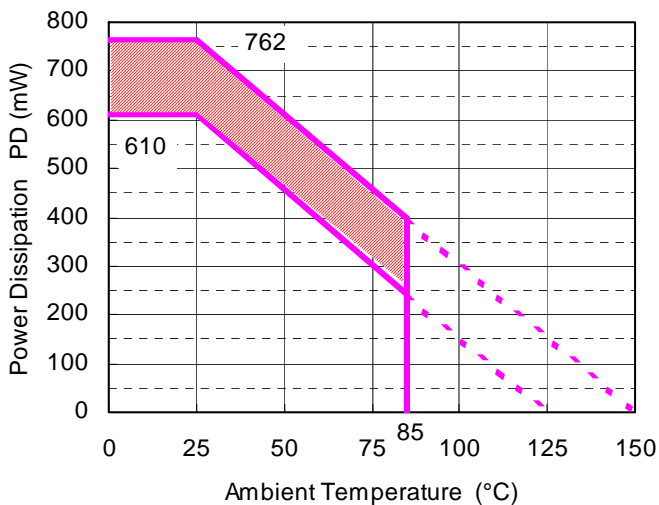
Measurement Conditions

	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 0.54mm * 24pcs

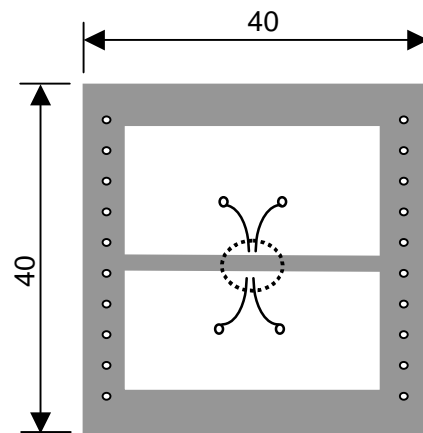
Measurement Result

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

	Standard Test Land Pattern
Power Dissipation	610mW ($T_{jmax}=125^\circ\text{C}$) 762mW($T_{jmax}=150^\circ\text{C}$)
Thermal Resistance	$\theta_{ja} = (125-25^\circ\text{C})/0.61\text{W} = 164^\circ\text{C/W}$ $\theta_{jc} = 48^\circ\text{C/W}$



Power Dissipation



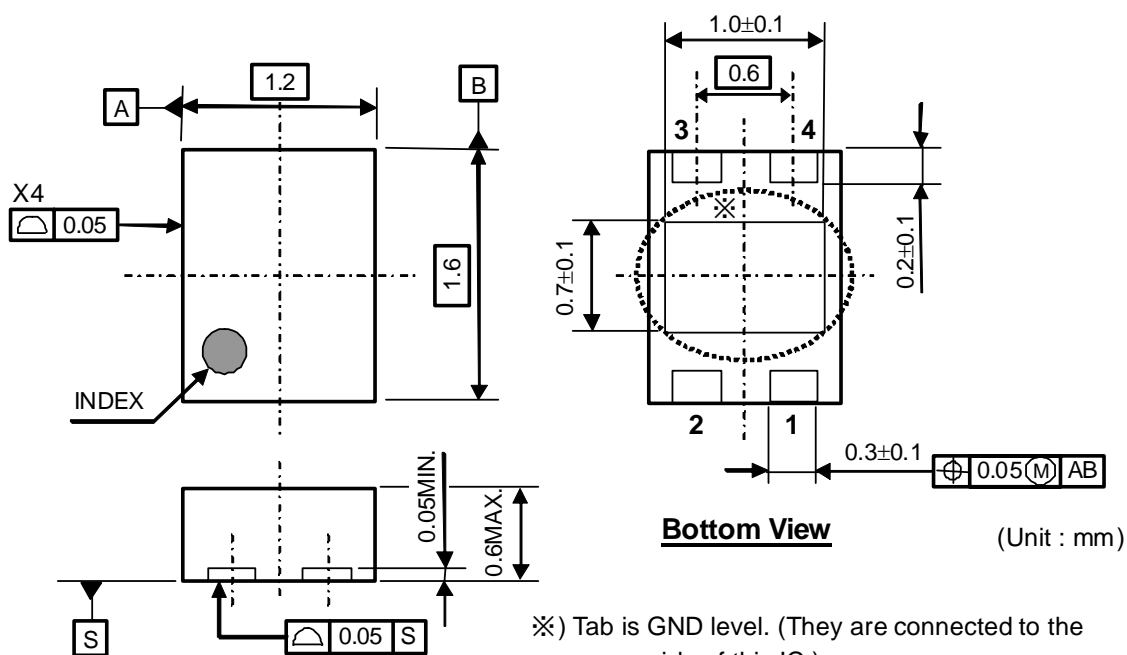
Measurent Board Pattern

 IC Mount Area Unit : mm

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

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

Package Dimensions (DFN(PLP)1612-4)

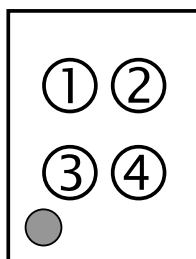


※) Tab is GND level. (They are connected to the reverse side of this IC.)

The tab is better to be connected to the GND, but leaving it open is also acceptable.

Mark Specification (DFN(PLP)1612-4)

- ①② : Product Code ... **Please refer to the RP101Kxx1x Series Mark Specification Table.**
- ③④ : Lot Number ... Alphanumeric Serial Number



RP101Kxx1x Series Mark Specification Table

PKG: DFN(PLP)1612-4

RP101Kxx1B

Part Number	①②	Vset
RP101K121B	3A	1.2V
RP101K131B	3B	1.3V
RP101K151B	3C	1.5V
RP101K181B	3D	1.8V
RP101K181B5	3E	1.85V
RP101K191B	3F	1.9V
RP101K201B	3G	2.0V
RP101K251B	3H	2.5V
RP101K261B	3J	2.6V
RP101K271B	3K	2.7V
RP101K281B	3L	2.8V
RP101K281B5	3M	2.85V
RP101K291B	3N	2.9V
RP101K301B	3P	3.0V
RP101K311B	3Q	3.1V
RP101K331B	3R	3.3V
RP101K211B	3S	2.1V
RP101K231B	3T	2.3V
RP101K241B	3U	2.4V
RP101K321B	3V	3.2V
RP101K221B	3W	2.2V

RP101Kxx1D

Part Number	①②	Vset
RP101K121D	4A	1.2V
RP101K131D	4B	1.3V
RP101K151D	4C	1.5V
RP101K181D	4D	1.8V
RP101K181D5	4E	1.85V
RP101K191D	4F	1.9V
RP101K201D	4G	2.0V
RP101K251D	4H	2.5V
RP101K261D	4J	2.6V
RP101K271D	4K	2.7V
RP101K281D	4L	2.8V
RP101K281D5	4M	2.85V
RP101K291D	4N	2.9V
RP101K301D	4P	3.0V
RP101K311D	4Q	3.1V
RP101K331D	4R	3.3V
RP101K211D	4S	2.1V
RP101K231D	4T	2.3V
RP101K241D	4U	2.4V
RP101K321D	4V	3.2V
RP101K221D	4W	2.2V

Power Dissipation (DFN(PLP)1612-4B)

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 0.54mm * 24pcs

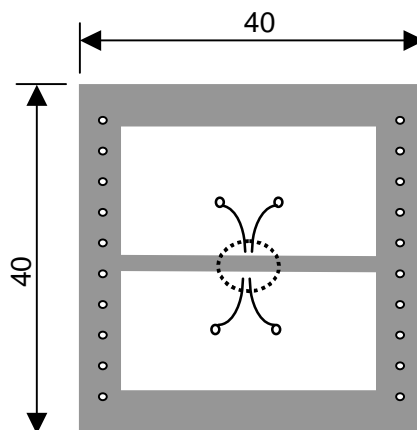
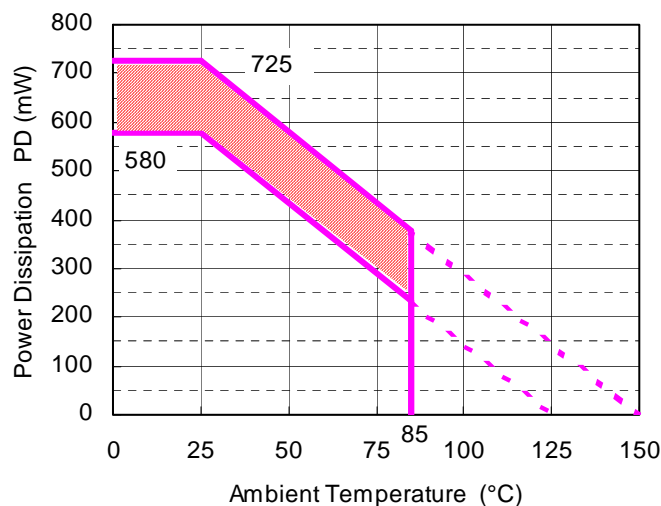
Measurement Result

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

	Standard Test Land Pattern
Power Dissipation	580mW ($T_{jmax}=125^\circ\text{C}$) 725mW ($T_{jmax}=150^\circ\text{C}$)
Thermal Resistance	$\theta_{ja} = (125-25 \text{ }^\circ\text{C}) / 0.58\text{W} = 172 \text{ }^\circ\text{C/W}$ $\theta_{jc} = 51 \text{ }^\circ\text{C/W}$

Power Dissipation

Measurent Board Pattern



 IC Mount Area Unit : mm

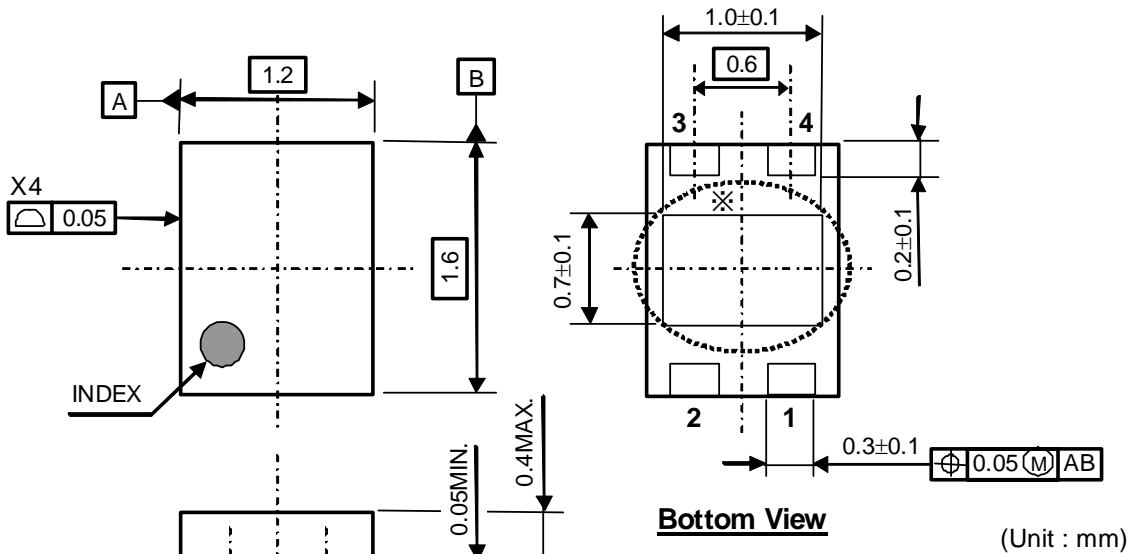
*The above graph shows the Power Dissipation of the package based on $T_{jmax}=125^\circ\text{C}$ and $T_{jmax}=150^\circ\text{C}$. Operating the IC in the shaded area in the graph might have an influence it's lifetime. Operating time must be within the time limit described in the table below, in case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

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

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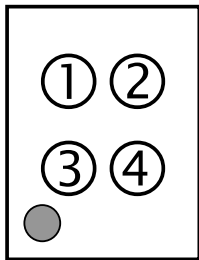
Package Dimensions (DFN(PLP)1612-4B)



※) 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 Specification (DFN(PLP)1612-4B)

- ①② : Product Code ... **Please refer to the RP101Kxx2x Series Mark Specification Table.**
- ③④ : Lot Number ... Alphanumeric Serial Number



RP101Kxx2x Series Mark Specification Table

PKG: DFN(PLP)1612-4B

RP101Kxx2B		
Part Number	①②	Vset
RP101K122B	5A	1.2V
RP101K132B	5B	1.3V
RP101K152B	5C	1.5V
RP101K182B	5D	1.8V
RP101K182B5	5E	1.85V
RP101K192B	5F	1.9V
RP101K202B	5G	2.0V
RP101K252B	5H	2.5V
RP101K262B	5J	2.6V
RP101K272B	5K	2.7V
RP101K282B	5L	2.8V
RP101K282B5	5M	2.85V
RP101K292B	5N	2.9V
RP101K302B	5P	3.0V
RP101K312B	5Q	3.1V
RP101K332B	5R	3.3V
RP101K212B	5S	2.1V
RP101K232B	5T	2.3V
RP101K242B	5U	2.4V
RP101K322B	5V	3.2V
RP101K222B	5W	2.2V

RP101Kxx2D		
Part Number	①②	Vset
RP101K122D	6A	1.2V
RP101K132D	6B	1.3V
RP101K152D	6C	1.5V
RP101K182D	6D	1.8V
RP101K182D5	6E	1.85V
RP101K1921D	6F	1.9V
RP101K202D	6G	2.0V
RP101K252D	6H	2.5V
RP101K262D	6J	2.6V
RP101K272D	6K	2.7V
RP101K282D	6L	2.8V
RP101K282D5	6M	2.85V
RP101K292D	6N	2.9V
RP101K302D	6P	3.0V
RP101K312D	6Q	3.1V
RP101K332D	6R	3.3V
RP101K212D	6S	2.1V
RP101K232D	6T	2.3V
RP101K242D	6U	2.4V
RP101K322D	6V	3.2V
RP101K222D	6W	2.2V

RP101x

NO.EA-167-160425

Power Dissipation (SOT-23-5)

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

(Power Dissipation (SOT-23-5) is substitution of SOT-23-6.)

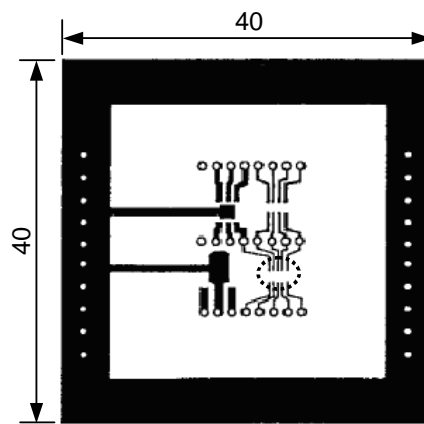
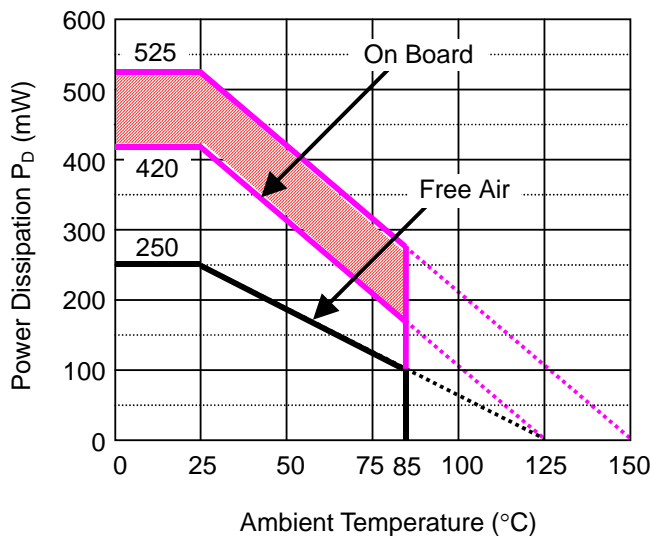
Measurement Conditions

	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 * 44pcs

Measurement Result

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

	Standard Test Land Pattern	Free Air
Power Dissipation	420mW($T_{jmax}=125^\circ\text{C}$) 525mW($T_{jmax}=150^\circ\text{C}$)	250mW($T_{jmax}=125^\circ\text{C}$)
Thermal Resistance	$\theta_{ja} = (125-25^\circ\text{C})/0.42\text{W} = 238^\circ\text{C/W}$	400 $^\circ\text{C/W}$



Measurement Board Pattern

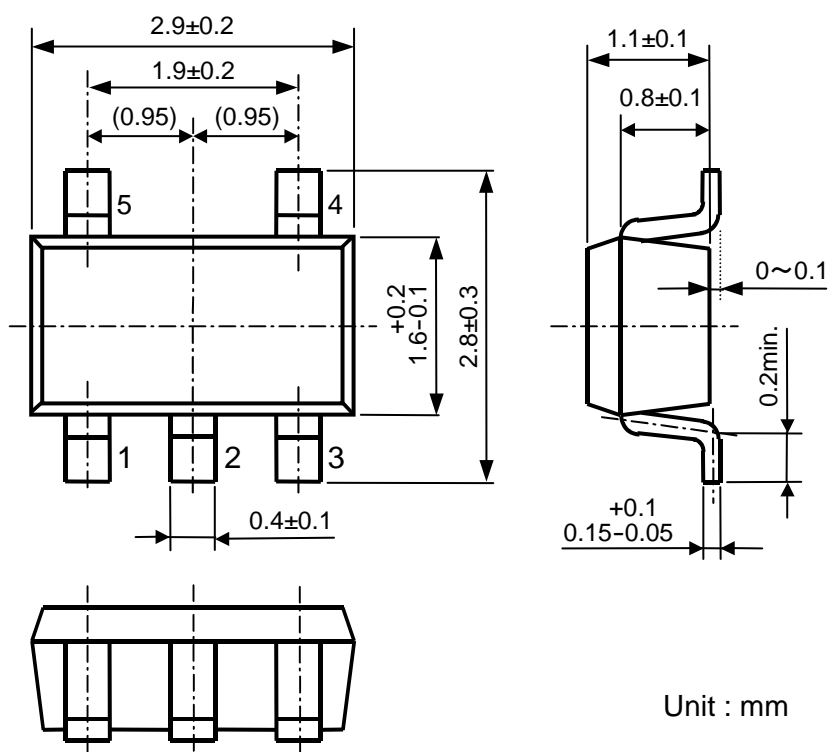
IC Mount Area (Unit: mm)

Power Dissipation

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

Operating Time	Estimated years (Operating four hours/day)
9,000 hours	6years

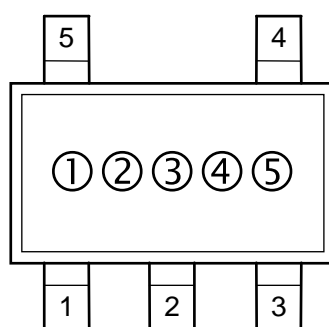
Package Dimensions (SOT-23-5)



Unit : mm

Mark Specification (SOT-23-5)

- ①②③ : Product Code ... **Please refer to the RP101N Series Mark Specification Table.**
- ④⑤ : Lot Number ... Alphanumeric Serial Number



RP101N Series Mark Specification Table

PKG: SOT-23-5

RP101NxxxB

Part Number	①②③	Vset
RP101N121B	70A	1.2V
RP101N131B	70B	1.3V
RP101N151B	70C	1.5V
RP101N181B	70D	1.8V
RP101N181B5	70E	1.85V
RP101N191B	70F	1.9V
RP101N201B	70G	2.0V
RP101N251B	70H	2.5V
RP101N261B	70J	2.6V
RP101N271B	70K	2.7V
RP101N281B	70L	2.8V
RP101N281B5	70M	2.85V
RP101N291B	70N	2.9V
RP101N301B	70P	3.0V
RP101N311B	70Q	3.1V
RP101N331B	70R	3.3V
RP101N211B	70S	2.1V
RP101N231B	70T	2.3V
RP101N241B	70U	2.4V
RP101N321B	70V	3.2V
RP101N221B	70W	2.2V

RP101NxxxD

Part Number	①②③	Vset
RP101N121D	71A	1.2V
RP101N131D	71B	1.3V
RP101N151D	71C	1.5V
RP101N181D	71D	1.8V
RP101N181D5	71E	1.85V
RP101N191D	71F	1.9V
RP101N201D	71G	2.0V
RP101N251D	71H	2.5V
RP101N261D	71J	2.6V
RP101N271D	71K	2.7V
RP101N281D	71L	2.8V
RP101N281D5	71M	2.85V
RP101N291D	71N	2.9V
RP101N301D	71P	3.0V
RP101N311D	71Q	3.1V
RP101N331D	71R	3.3V
RP101N211D	71S	2.1V
RP101N231D	71T	2.3V
RP101N241D	71U	2.4V
RP101N321D	71V	3.2V
RP101N221D	71W	2.2V



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8. The X-ray exposure can influence functions and characteristics of the products. Confirm the product functions and characteristics in the evaluation stage.
9. WLCSP products should be used in light shielded environments. The light exposure can influence functions and characteristics of the products under operation or storage.
10. There can be variation in the marking when different AOI (Automated Optical Inspection) equipment is used. In the case of recognizing the marking characteristic with AOI, please contact Ricoh sales or our distributor before attempting to use AOI.
11. Please contact Ricoh sales representatives should you have any questions or comments concerning the products or the technical information.



Ricoh is committed to reducing the environmental loading materials in electrical devices with a view to contributing to the protection of human health and the environment.

Ricoh has been providing RoHS compliant products since April 1, 2006 and Halogen-free products since April 1, 2012.

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