LOW NOISE 150mA LDO REGULATOR

NO.EA-173-080424

OUTLINE

The RP130x Series are CMOS-based positive voltage regulator ICs with high ripple rejection, low dropout voltage, high output voltage accuracy and extremely low supply current. Each of these ICs consists of a voltage reference unit, an error amplifier, a resistor-net for voltage setting, a short current limit circuit and a chip enable circuit.

These ICs have an excellent low supply current performed by CMOS process, moreover they perform with low dropout voltage due to built-in low ON-resistance. A chip enable function prolongs the battery life.

The input transient response, the load transient response and the ripple rejection have been improved in the RP130x Series compared with the conventional products. Besides achieving low supply current (Typ.38µA).

The range of the operation voltage is capable from 1.7V to 6.5V and the range of the output voltage is capable from 1.2V to 5.0V for this product, which is wider range as our conventional product R1114x series.

The output voltage of these ICs is fixed with high accuracy. Since the packages for these ICs are DFN(PLP)1010-4, SOT-23-5 and SC-82AB, therefore high density mounting of the ICs on boards is possible.

FEATURES

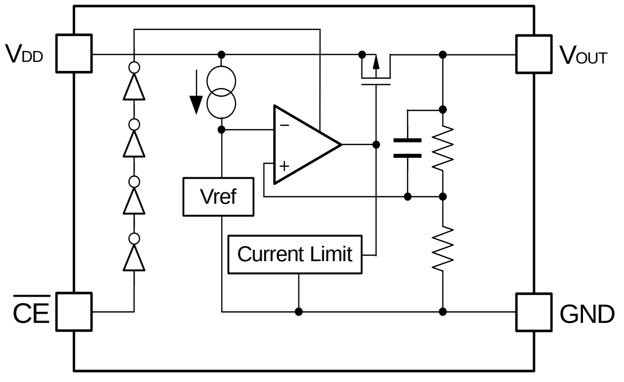
- Supply Current ....Typ. 38µA
- Supply Current (Standby Mode)...................................Typ. 0.1 µA
- Ripple Rejection ....Typ. 80dB (f=1kHz)
- Input Voltage Range...1.7V to 6.5V
- Output Voltage Range...1.2V to 5.0V
- Output Voltage Accuracy..±1.0% (V_{OUT}>2.0V, T_{opt}=25°C)
- Temperature-Drift Coefficient of Output Voltage ....Typ. ±20ppm/°C
- Dropout Voltage..Typ. 0.32V (I_{OUT}=150mA, V_{OUT}=2.8V)
- Line Regulation ....Typ. 0.02%/V
- Packages...DFN(PLP)1010-4, SOT-23-5, SC-82AB
- Built-in Fold Back Protection Circuit.............................Typ. 40mA
- Ceramic capacitors are recommended to be used with this IC .... 0.47µF or more

APPLICATIONS

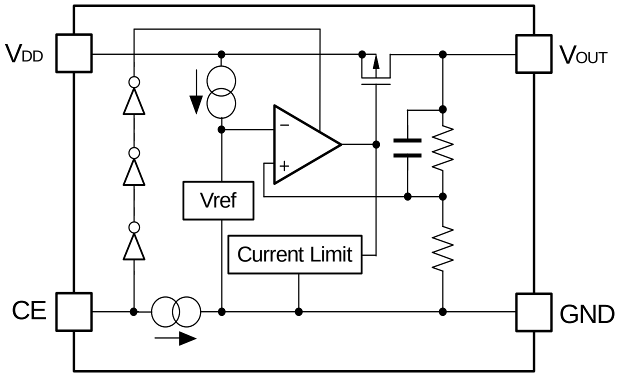
- Power source for battery-powered equipment.
- Power source for portable communication equipment.
- Power source for electrical appliances such as cameras, VCRs and camcorders.
- Power source for high stable reference voltage.

BLOCK DIAGRAMS

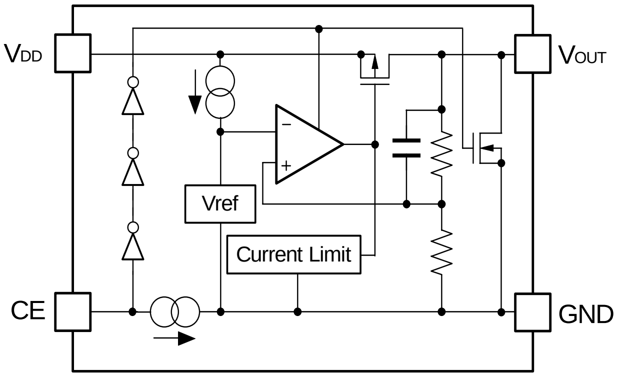
RP130xxx1A



RP130xxx1B



RP130xxx1D



RICOH

SELECTION GUIDE

The output voltage, chip enable polarity, 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;

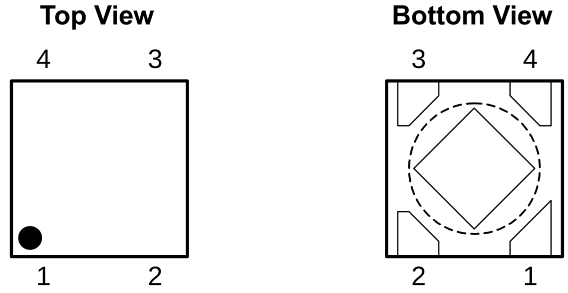
RP130xxx1x-xx-x ←Part Number
↑↑ ↑ ↑ ↑
a b c d e

Code	Contents
a	Designation of Package Type: K: DFN(PLP)1010-4 N: SOT-23-5 Q: SC-82AB
b	Setting Output Voltage (V_{OUT}): Stepwise setting with a step of 0.1V in the range of 1.2V to 5.0V is possible. Exceptions:1.85V=RP130x181x5-xx-x, 2.85V=RP130x281x5-xx-x
c	Designation of Mask Option A: active low, without auto discharge function* at OFF state. 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: Ex. TR (Refer to Taping Specifications; TR type is the standard direction.)
e	Designation of composition of pin plating: -F : Lead free solder plating (SOT-23-5, SC-82AB) None : Au plating (DFN(PLP)1010-4)

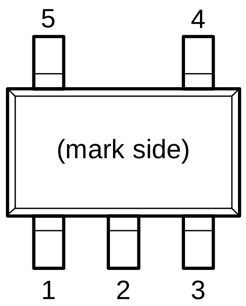
*) When the mode is into standby with CE signal, auto discharge transistor turns on, and it makes the turn-off speed faster than normal type.

PIN CONFIGURATIONS

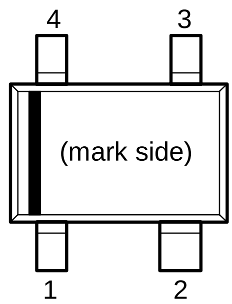
• **DFN(PLP)1010-4***



• **SOT-23-5**



• **SC-82AB**



PIN DESCRIPTIONS

• **DFN(PLP)1010-4***

Pin No.	Symbol	Description
1	V_{OUT}	Output Pin
2	GND	Ground Pin
3	$\overline{CE}$ / CE	Chip Enable Pin
4	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.

• **SOT-23-5**

Pin No.	Symbol	Description
1	V_{DD}	Input Pin
2	GND	Ground Pin
3	$\overline{CE}$ / CE	Chip Enable Pin
4	NC	No Connection
5	V_{OUT}	Output Pin

• **SC-82AB**

Pin No.	Symbol	Description
1	$\overline{CE}$ / CE	Chip Enable Pin
2	GND	Ground Pin
3	V_{OUT}	Output Pin
4	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)	200	mA
P_D	Power Dissipation (DFN(PLP)1010-4)*	400	mW
	Power Dissipation (SOT-23-5)*	420	
	Power Dissipation (SC-82AB)*	380	
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 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 for V_{OUT}>1.5V. V_{IN}=2.5V for V_{OUT} ≦ 1.5V.
I_{OUT}=1mA, C_{IN}=C_{OUT}=0.47µF, unless otherwise noted.
The specification in ☐ is checked and guaranteed by design engineering at −40°C ≦ Topt ≦ 85°C, unless otherwise noted.

- **RP130xxx1A**

Topt=25°C

Symbol	Item	Conditions		Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	Topt=25°C	V_{OUT}>2.0V	×0.99		×1.01	V
			V_{OUT} ≦ 2.0V	−20		20	mV
		−40°C ≦ Topt ≦ 85°C	V_{OUT}>2.0V	×0.985		×1.015	V
			V_{OUT} ≦ 2.0V	−30		30	mV
I_{OUT}	Output Current			150			mA
$\Delta V_{OUT}/\Delta I_{OUT}$	Load Regulation	1mA ≦ I_{OUT} ≦ 150mA			10	30	mV
V_{DIF}	Dropout Voltage	I_{OUT}=150mA	1.2V ≦ V_{OUT}<1.5V		0.67	1.00	V
			1.5V ≦ V_{OUT}<1.7V		0.54	0.81	
			1.7V ≦ V_{OUT}<2.0V		0.46	0.68	
			2.0V ≦ V_{OUT}<2.5V		0.41	0.60	
			2.5V ≦ V_{OUT}<4.0V		0.32	0.51	
			4.0V ≦ V_{OUT}		0.24	0.37	
I_{SS}	Supply Current	I_{OUT}=0mA			38	58	µA
Istandby	Standby Current	V_{CE}=V_{IN}			0.1	1.0	µA
$\Delta V_{OUT}/\Delta V_{IN}$	Line Regulation	Set V_{OUT}+0.5V ≦ V_{IN} ≦ 5.0V			0.02	0.10	%/V
RR	Ripple Rejection	f=1kHz, Ripple 0.2Vp-p V_{IN}=Set V_{OUT}+1.0V, I_{OUT}=30mA (In case that V_{OUT} ≦ 2.0V, V_{IN}=3.0V)			80		dB
V_{IN}	Input Voltage			1.7		6.5	V
$\Delta V_{OUT}/\Delta Topt$	Output Voltage Temperature Coefficient	−40°C ≦ Topt ≦ 85°C			±20		ppm /°C
Ilim	Short Current Limit	V_{OUT}=0V			40		mA
V_{CEH}	$\overline{CE}$ Input Voltage "H"			1.0			V
V_{CEL}	$\overline{CE}$ Input Voltage "L"					0.4	V
en	Output Noise	BW=10Hz to 100kHz, I_{OUT}=30mA			30		µVrms

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 Detector Threshold Temperature Coefficient.

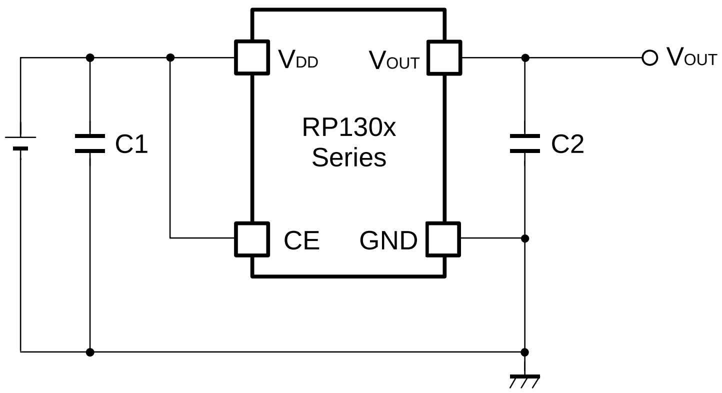
- **RP130xxx1B/D**

Topt=25°C

Symbol	Item	Conditions		Min.	Typ.	Max.	Unit
V_{OUT}	Output Voltage	T_{opt}=25°C	V_{OUT}>2.0V	×0.99		×1.01	V
			V_{OUT} ≦ 2.0V	−20		20	mV
		−40°C ≦ T_{opt} ≦ 85°C	V_{OUT}>2.0V	×0.985		×1.015	V
			V_{OUT} ≦ 2.0V	−30		30	mV
I_{OUT}	Output Current			150			mA
$\Delta V_{OUT}/\Delta I_{OUT}$	Load Regulation	1mA ≦ I_{OUT} ≦ 150mA			10	30	mV
V_{DIF}	Dropout Voltage	I_{OUT}=150mA	1.2V ≦ V_{OUT}<1.5V		0.67	1.00	V
			1.5V ≦ V_{OUT}<1.7V		0.54	0.81	
			1.7V ≦ V_{OUT}<2.0V		0.46	0.68	
			2.0V ≦ V_{OUT}<2.5V		0.41	0.60	
			2.5V ≦ V_{OUT}<4.0V		0.32	0.51	
			4.0V ≦ V_{OUT}		0.24	0.37	
I_{SS}	Supply Current	I_{OUT}=0mA			38	58	µA
$I_{standby}$	Standby Current	V_{CE}=0V			0.1	1.0	µA
$\Delta V_{OUT}/\Delta V_{IN}$	Line Regulation	Set V_{OUT}+0.5V ≦ V_{IN} ≦ 5.0V			0.02	0.10	%/V
RR	Ripple Rejection	f=1kHz, Ripple 0.2Vp-p V_{IN}=Set V_{OUT}+1.0V, I_{OUT}=30mA (In case that V_{OUT} ≦ 2.0V, V_{IN}=3.0V)			80		dB
V_{IN}	Input Voltage			1.7		6.5	V
$\Delta V_{OUT}/\Delta T_{opt}$	Output Voltage Temperature Coefficient	−40°C ≦ T_{opt} ≦ 85°C			±20		ppm /°C
I_{lim}	Short Current Limit	V_{OUT}=0V			40		mA
I_{PD}	CE Pull-down Current				0.4		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}=30mA			30		µVrms
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 ≦ 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 Detector Threshold Temperature Coefficient.

TYPICAL APPLICATION



(External Components)
Ceramic Capacitor C2 0.47μF MURATA GRM155B30J474KE18B

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 0.47μF or more.

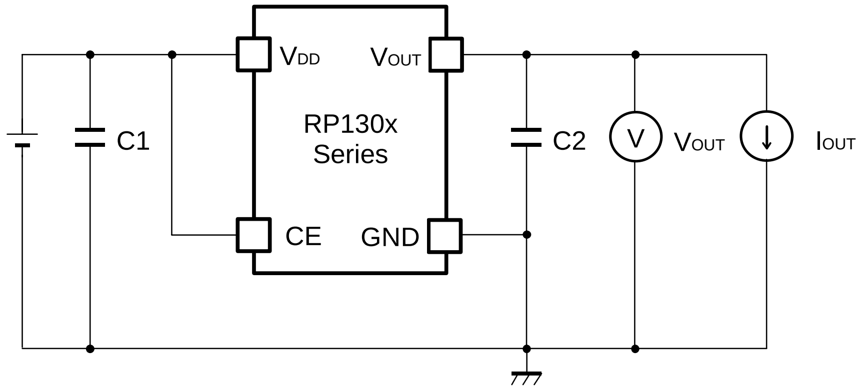
If a tantalum capacitor is used, and its ESR (Equivalent Series Resistance) of C2 is large, the loop oscillation may result. Because of this, select C2 carefully considering its frequency characteristics.

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 with a capacitance value as much as 0.47μF or more between V_{DD} and GND pin, and as close as possible to the pins.

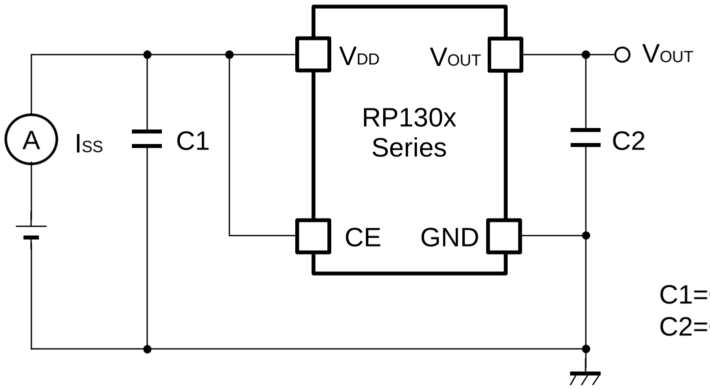
Set external components, especially the output capacitor C2, as close as possible to the ICs, and make wiring as short as possible.

TEST CIRCUITS



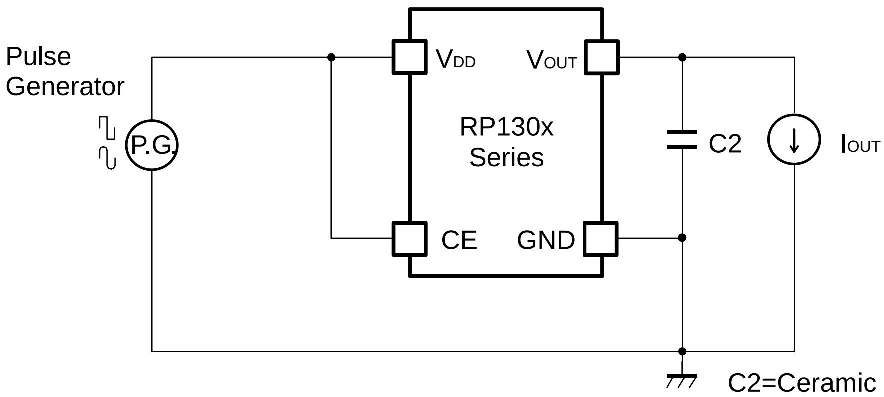
C1=Ceramic 0.47μF
C2=Ceramic 0.47μF

Basic Test Circuit



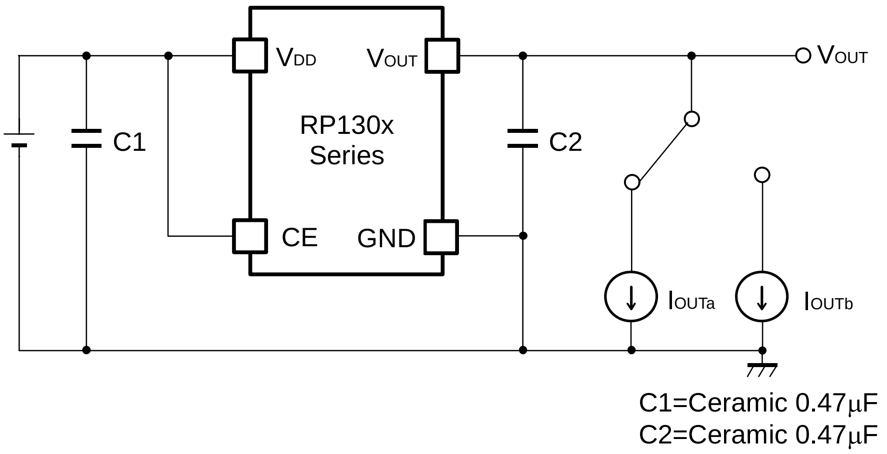
C1=Ceramic 0.47μF
C2=Ceramic 0.47μF

Test Circuit for Supply Current



C2=Ceramic 0.47μF

Test Circuit for Ripple Rejection

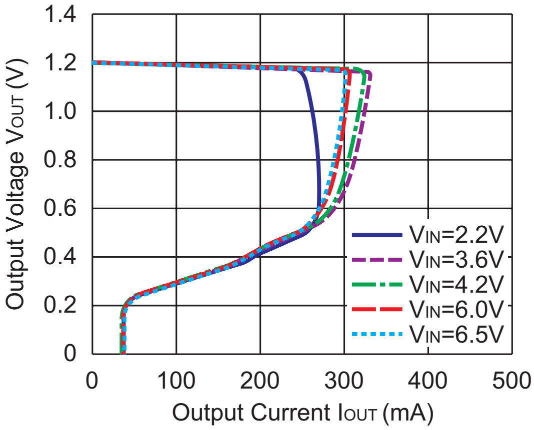


Test Circuit for Load Transient Response

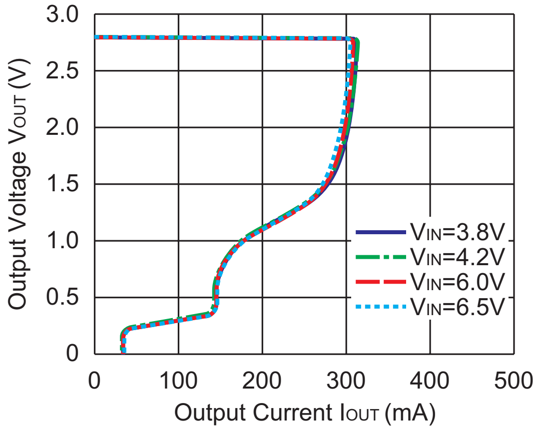
TYPICAL CHARACTERISTICS

1) Output Voltage vs. Output Current (C1=0.47μF, C2=0.47μF, Topt=25°C)

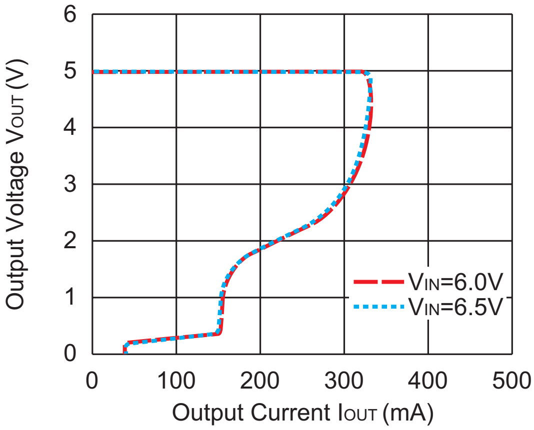
RP130x121x



RP130x281x

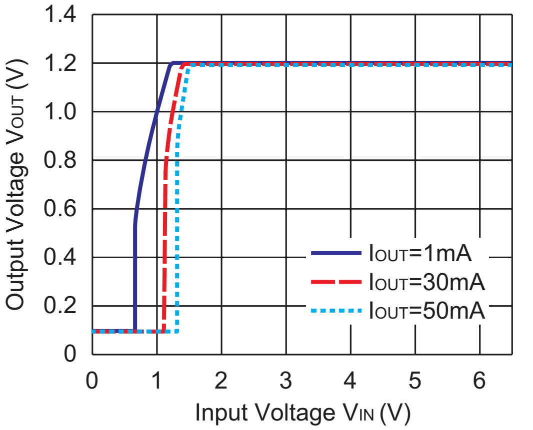


RP130x501x

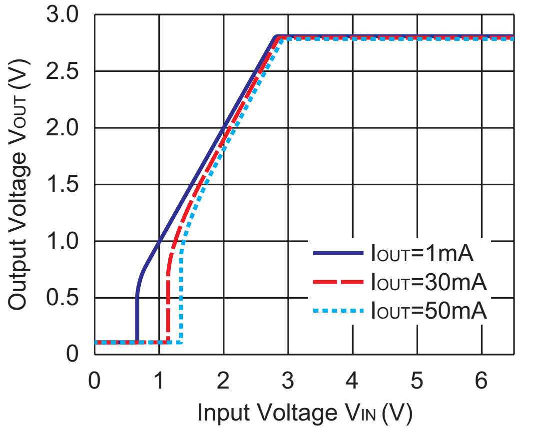


2) Output Voltage vs. Input Voltage (C1=0.47μF, C2=0.47μF, Topt=25°C)

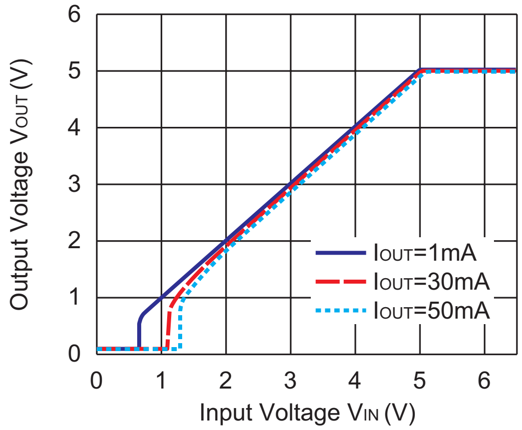
RP130x121x



RP130x281x

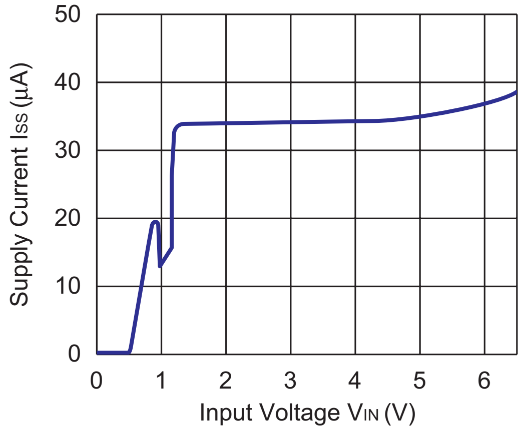


RP130x501x



3) Supply Current vs. Input Voltage (C1=0.47µF, C2=0.47µF, Topt=25°C)

RP130x121x



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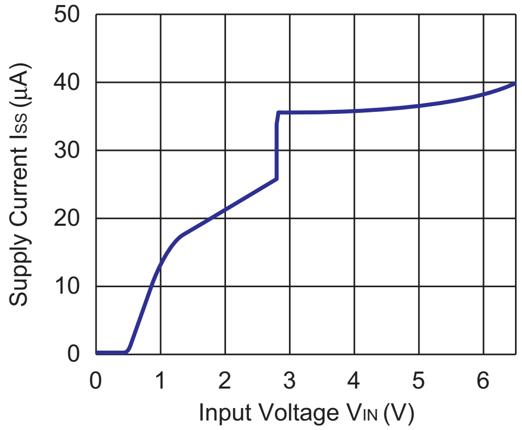

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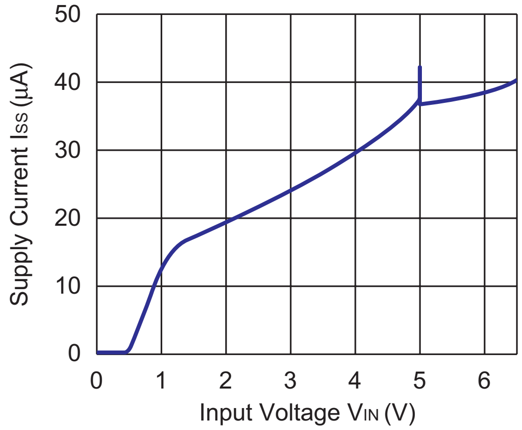
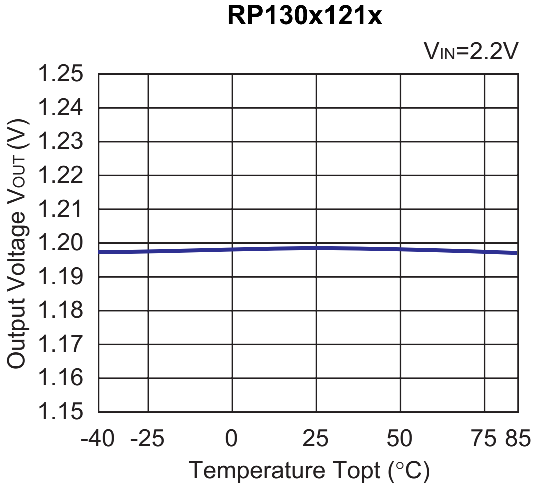
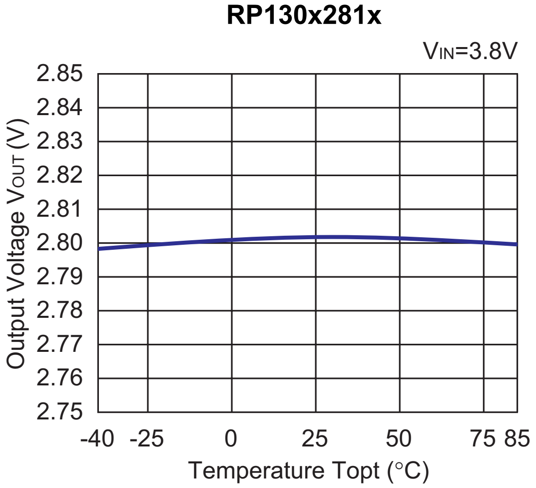
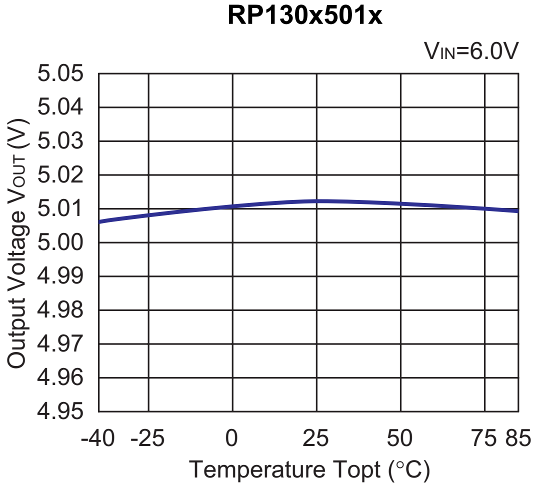


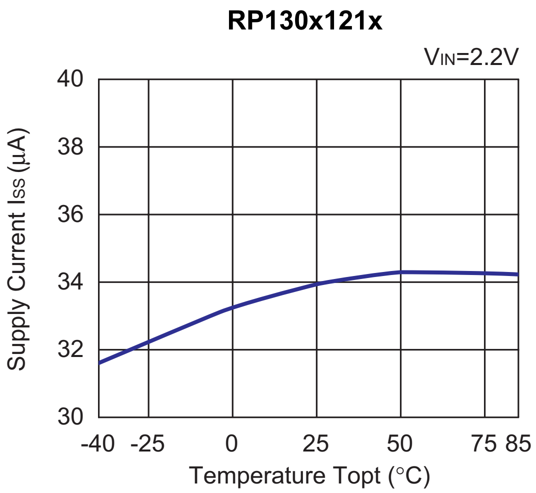
4) Output Voltage vs. Temperature (I_{OUT}=1mA, C1=0.47µF, C2=0.47µF)

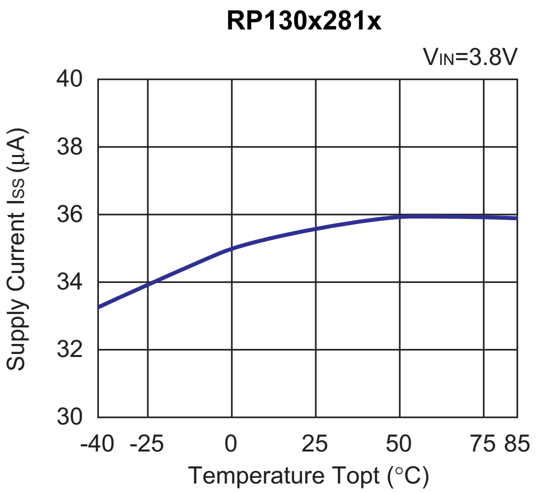






5) Supply Current vs. Temperature (I_{OUT}=0mA, C1=0.47µF, C2=0.47µF)





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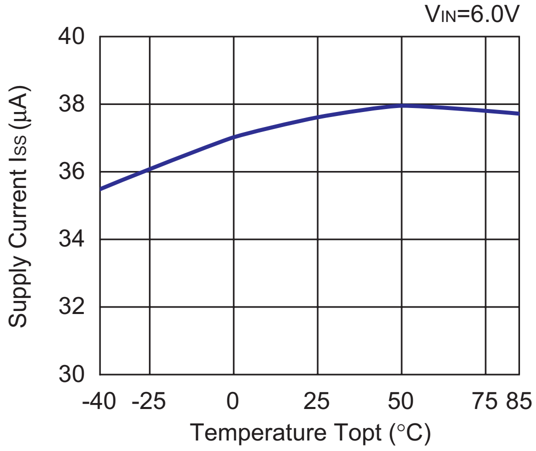
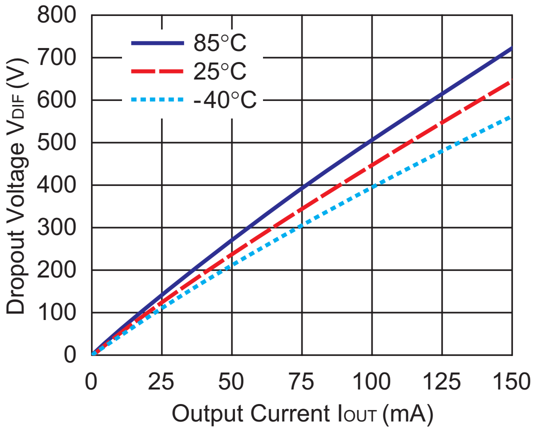
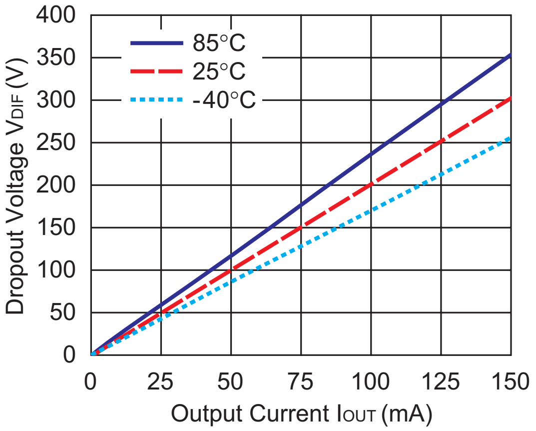


6) Dropout Voltage vs. Output Current (C1=0.47μF, C2=0.47μF)

RP130x121x



RP130x281x



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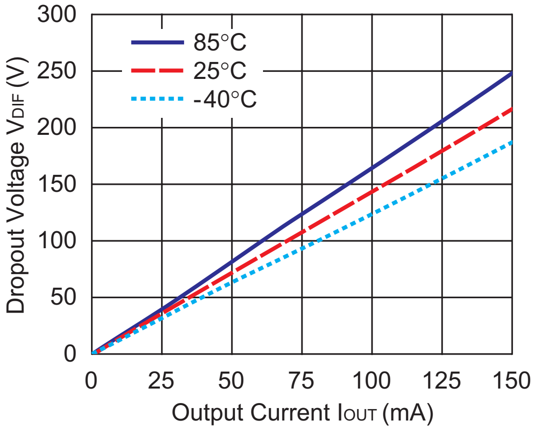
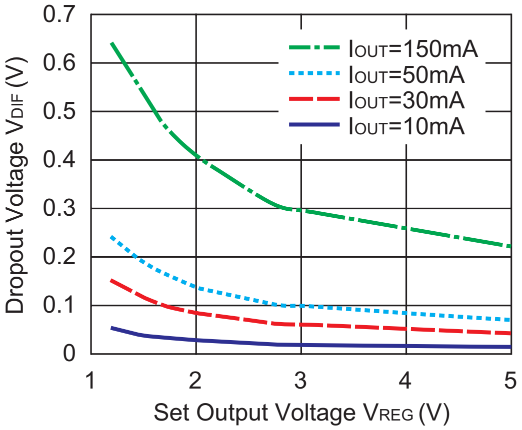
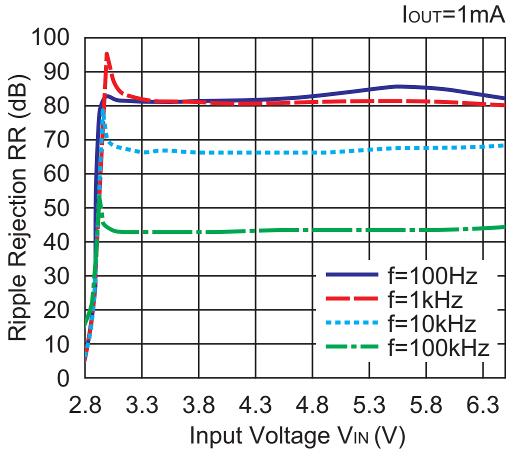


7) Dropout Voltage vs. Set Output Voltage (C1=0.47µF, C2=0.47µF)

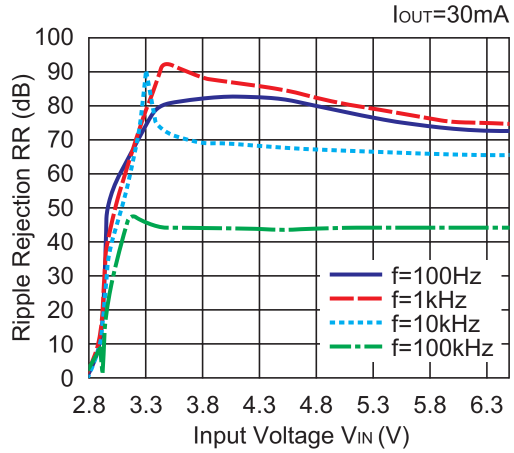


8) Ripple Rejection vs. Input Bias Voltage (C1=none, C2=0.47µF, Ripple=0.2Vp-p, Topt=25°C)

RP130x281x

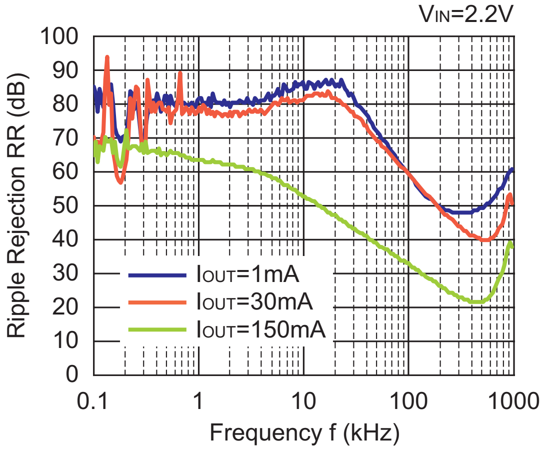


RP130x281x

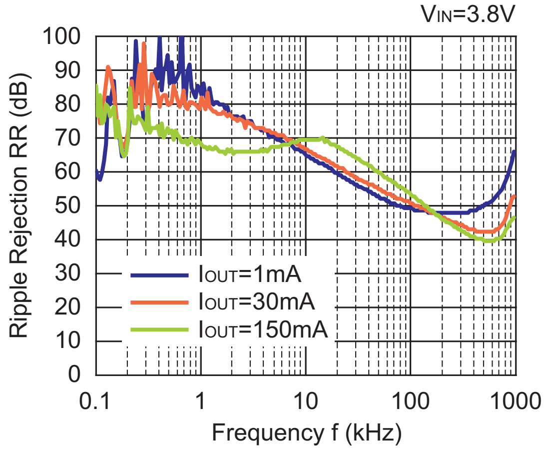


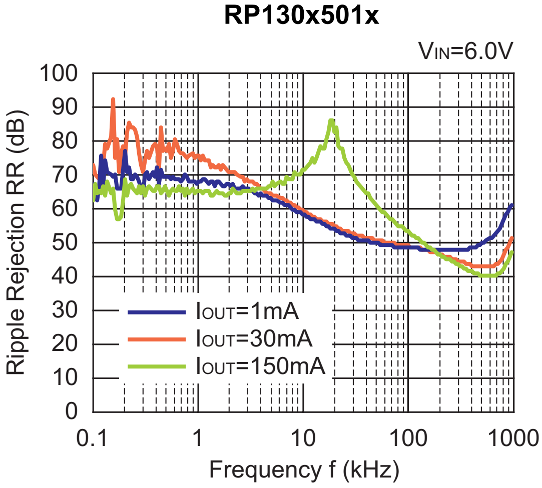
9) Ripple Rejection vs. Frequency (C1=none, C2=0.47µF, Ripple=0.2Vp-p, Topt=25°C)

RP130x121x

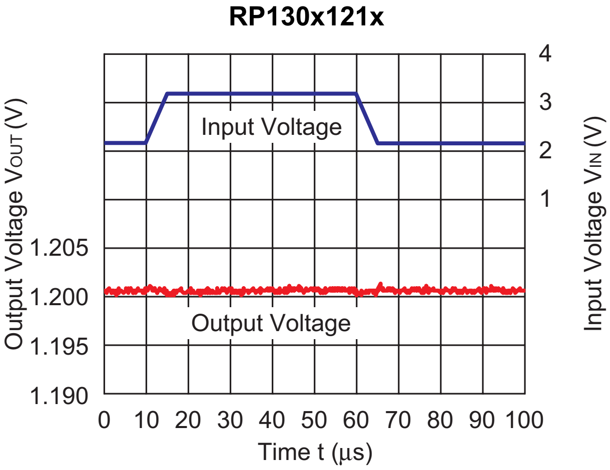


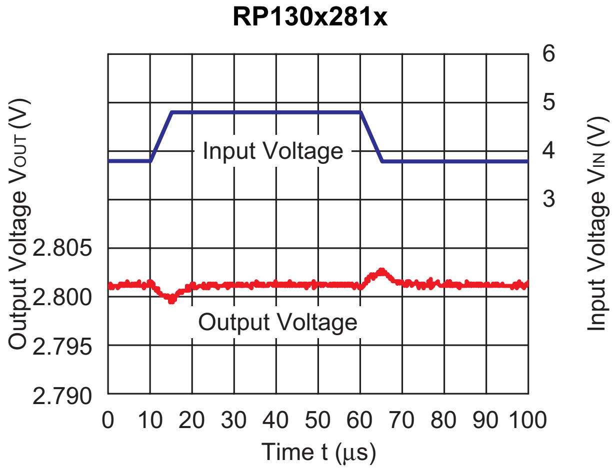
RP130x281x

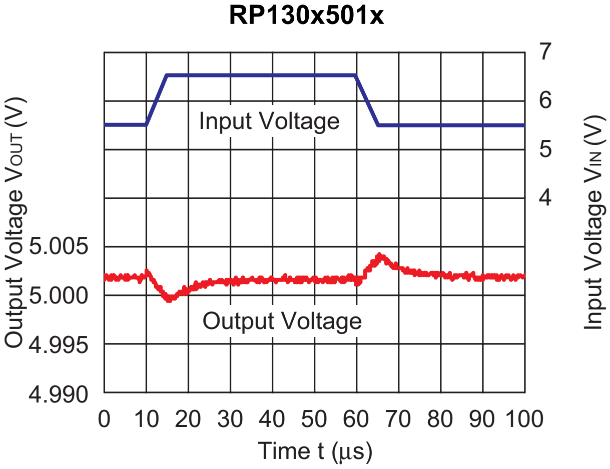




10) Input Transient Response (IOUT=30mA, tr=tf=5μs, C1=none, C2=0.47μF, Topt=25°C)

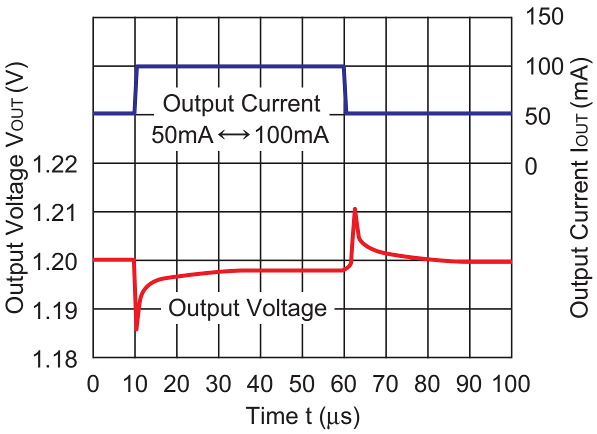




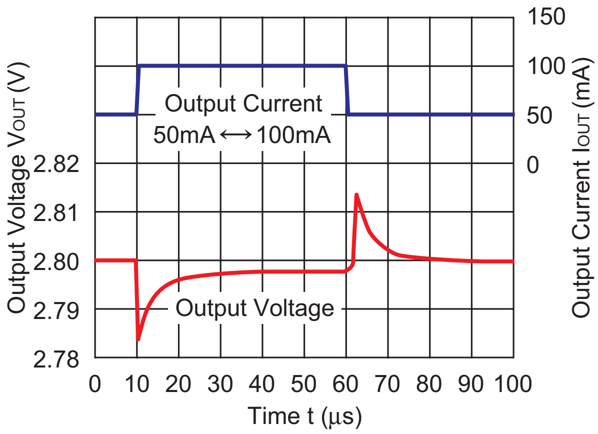


11) Load Transient Response (tr=tf=0.5µs, C1=0.47µF, C2=0.47µF, I_{OUT}=50mA⇔100mA, Topt=25°C)

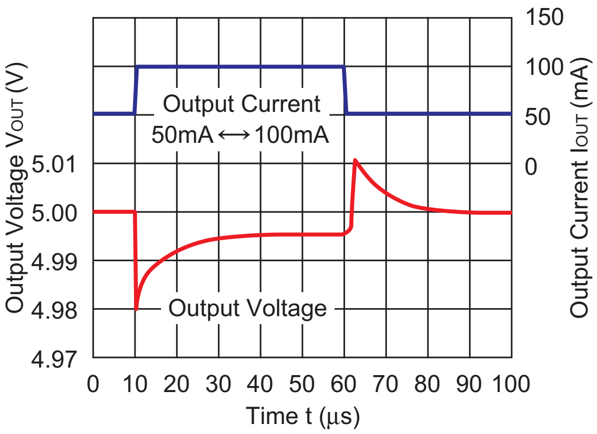
RP130x121x



RP130x281x

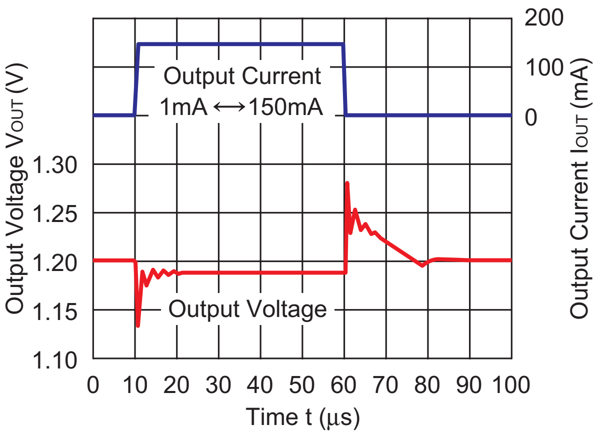


RP130x501x

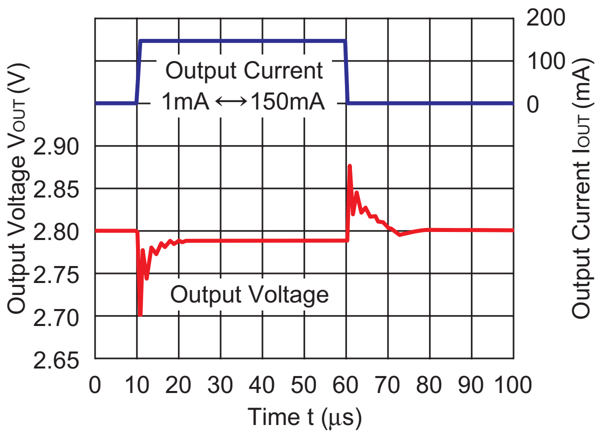


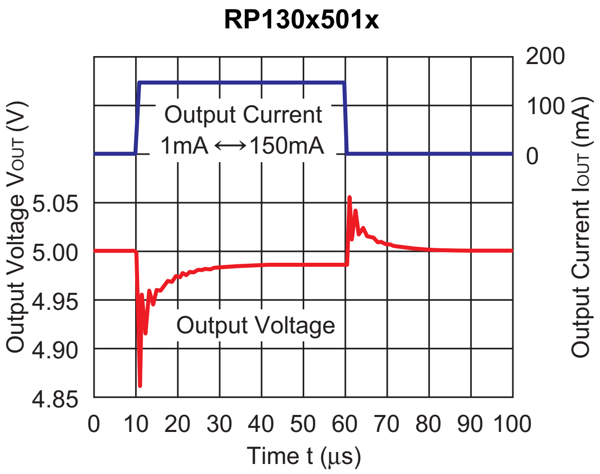
12) Load Transient Response (tr=tf=0.5µs, C1=0.47µF, C2=0.47µF, I_{OUT}=1mA⇔150mA, Topt=25°C)

RP130x121x

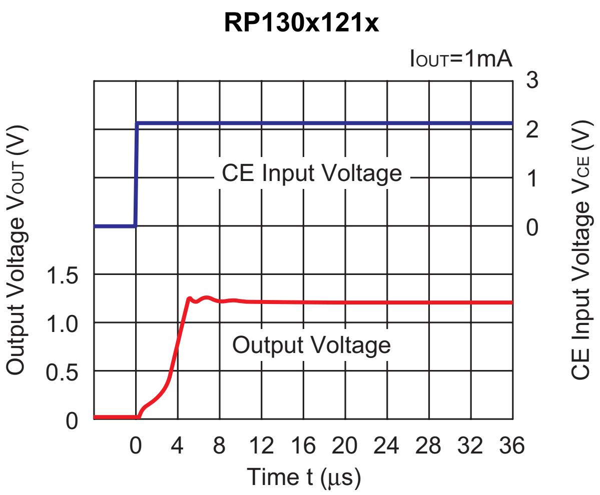


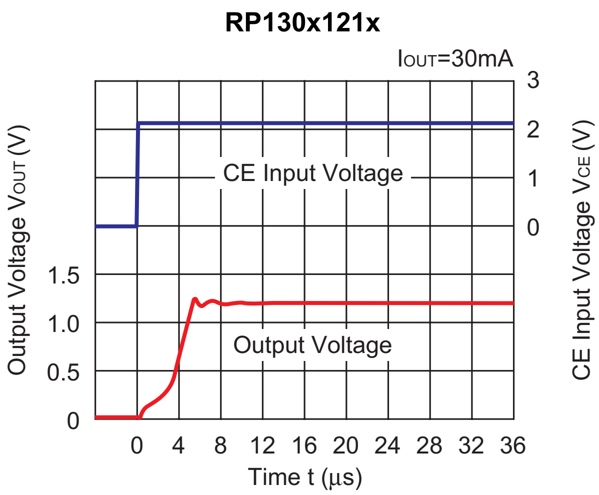
RP130x281x

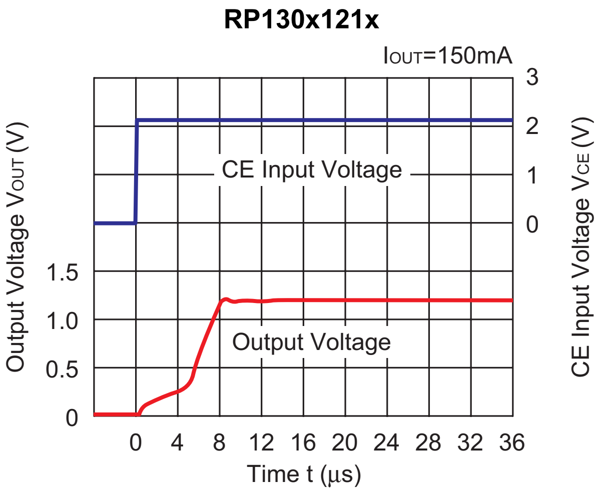


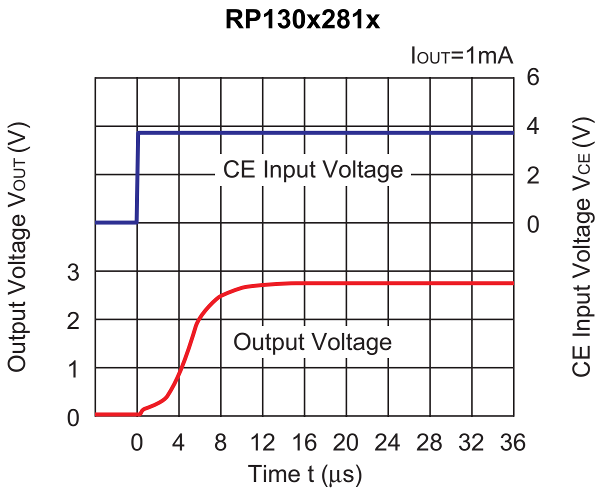


13) Turn On Speed with CE pin (C1=0.47μF, C2=0.47μF, Topt=25°C)



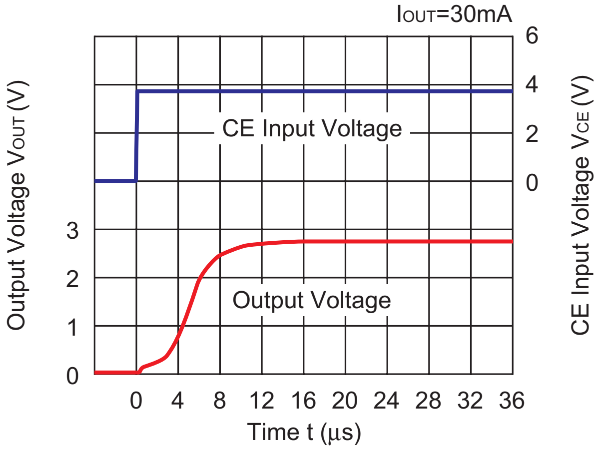




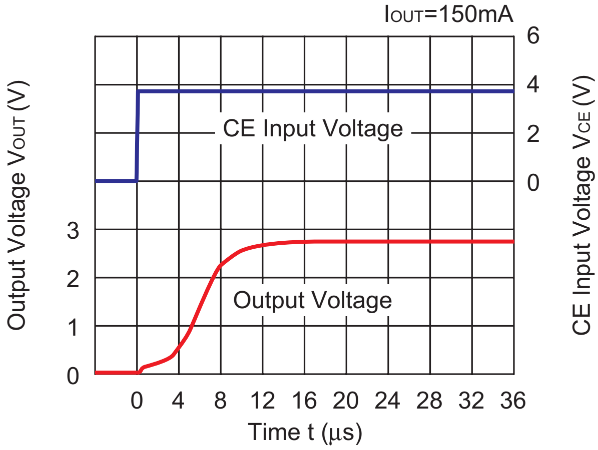


RICOH

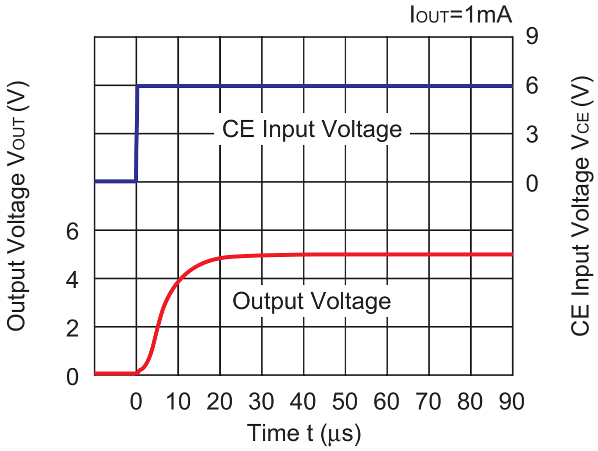
RP130x281x



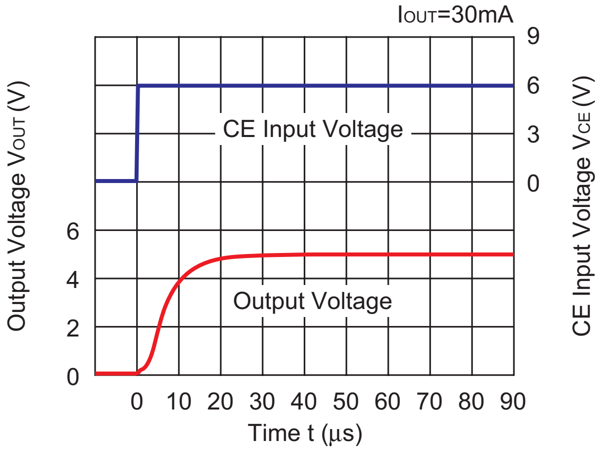
RP130x281x



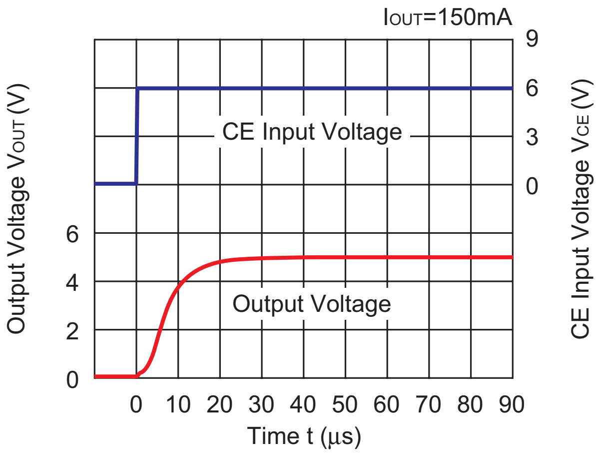
RP130x501x



RP130x501x

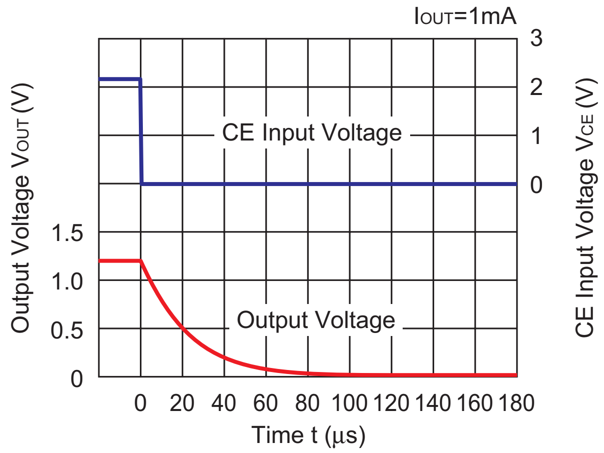


RP130x501x

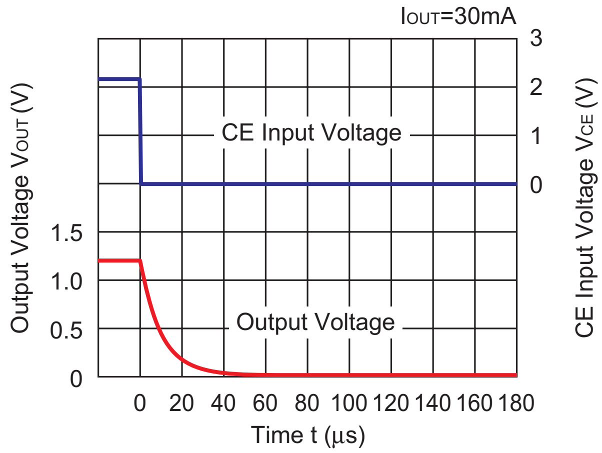


14) Turn Off Speed with CE pin (D Version) (C1=0.47μF, C2=0.47μF, Topt=25°C)

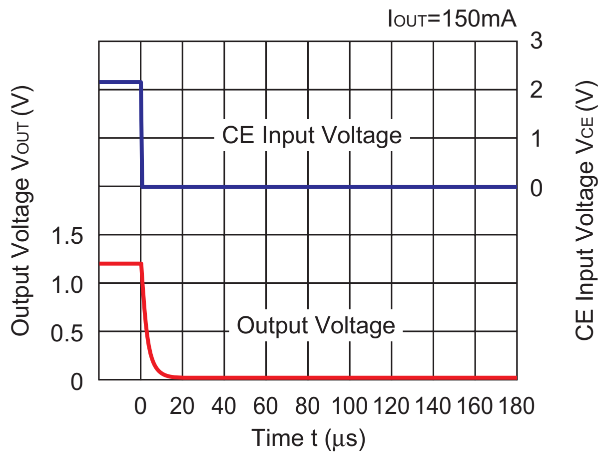
RP130x121D



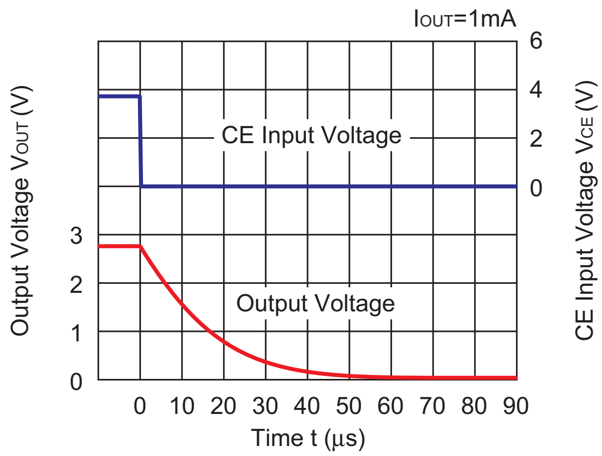
RP130x121D



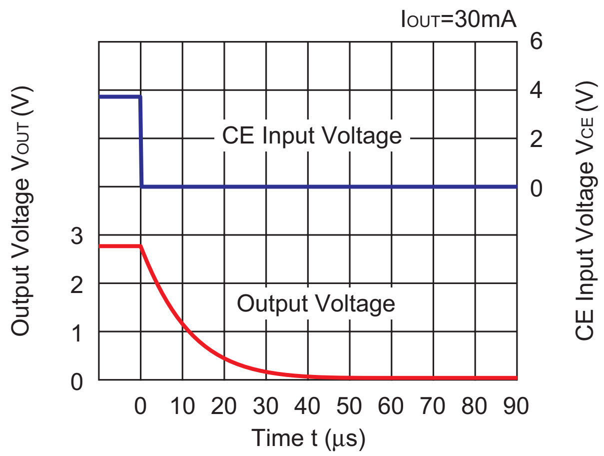
RP130x121D



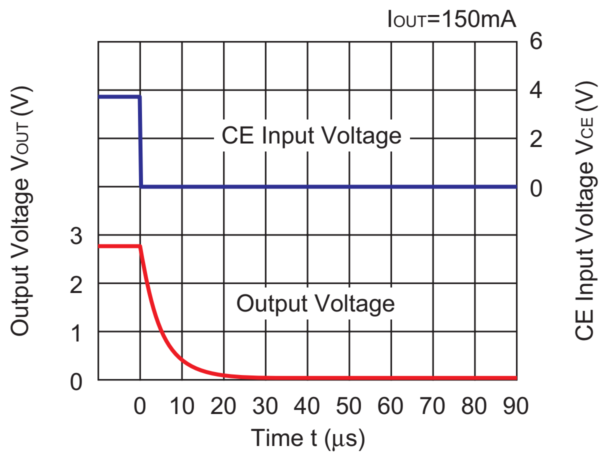
RP130x281D

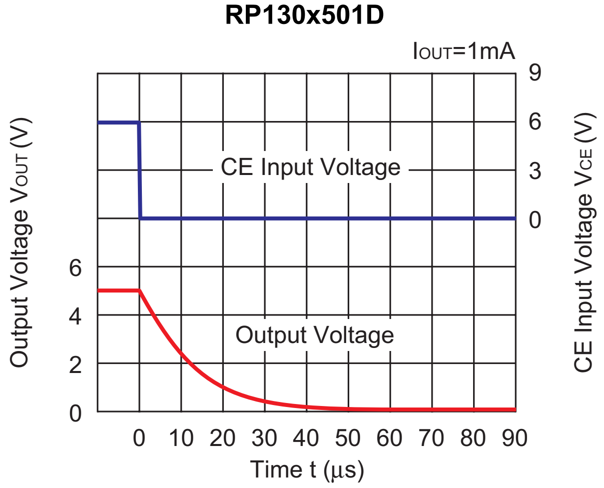


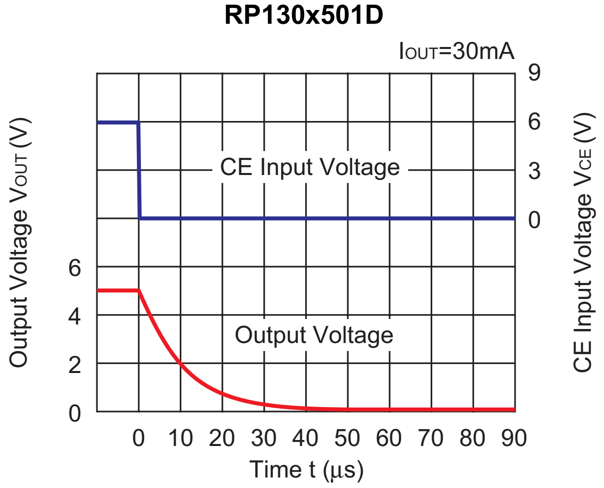
RP130x281D

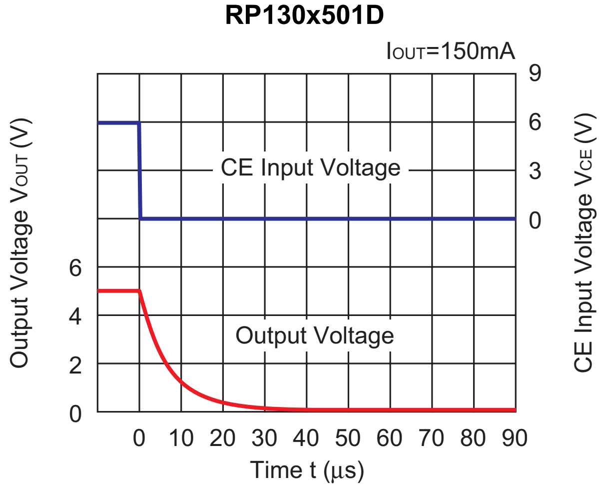


RP130x281D

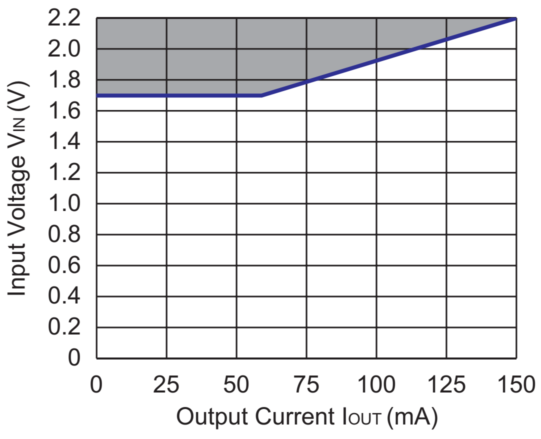








15) Minimum Operating Voltage (C1=0.47μF, C2=0.47μF)



Hatched area is available for 1.2V output.

ESR vs. Output Current

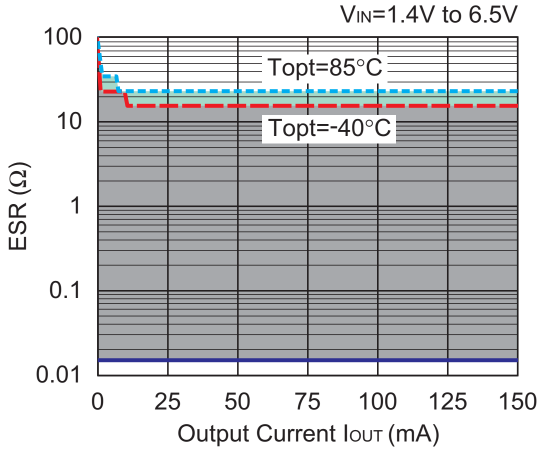
When using these ICs, consider the following points:

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.

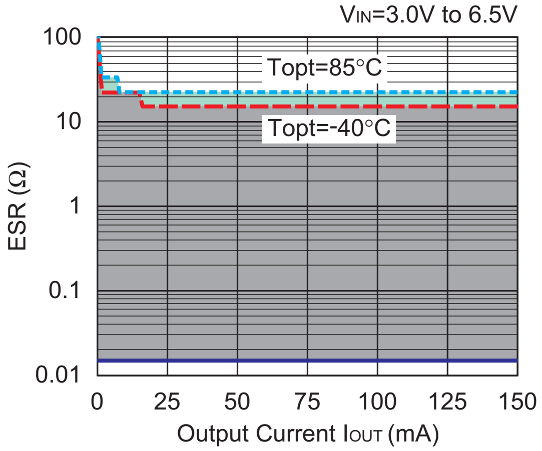
Measurement conditions

Frequency Band : 10Hz to 3MHz
Temperature : –40°C to 85°C
C1, C2 : 0.47µF

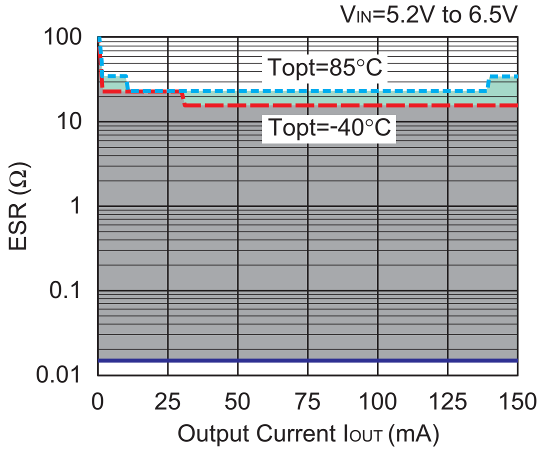
RP130x121x



RP130x281x



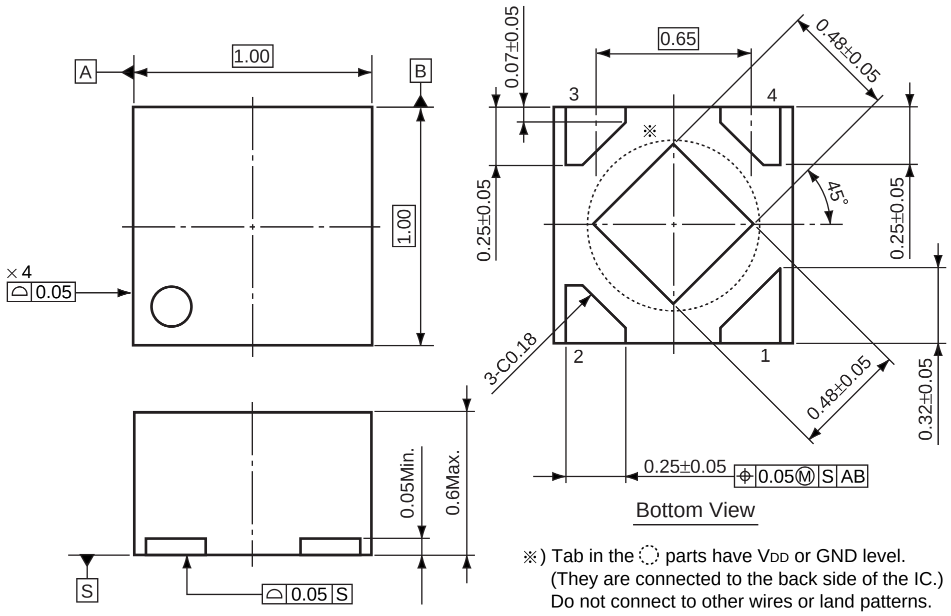
RP130x501x



- **DFN(PLP)1010-4**

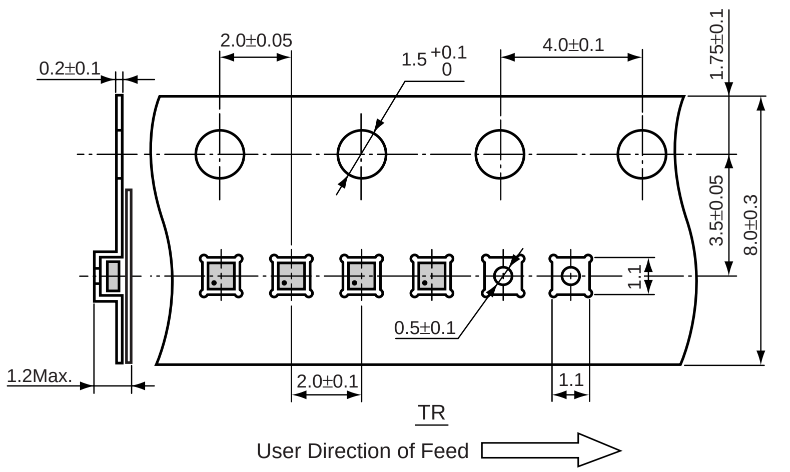
Unit: mm

PACKAGE DIMENSIONS



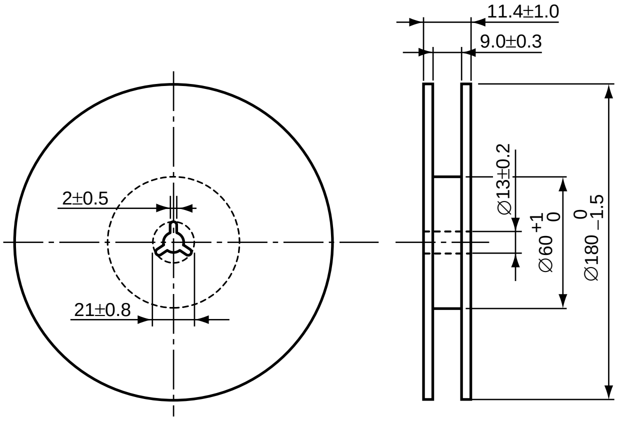
※) Tab in the ◌ parts have V_{DD} or GND level.
(They are connected to the back side of the IC.)
Do not connect to other wires or land patterns.

TAPING SPECIFICATION



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

(1reel=10000pcs)



POWER DISSIPATION (DFN(PLP)1010-4)

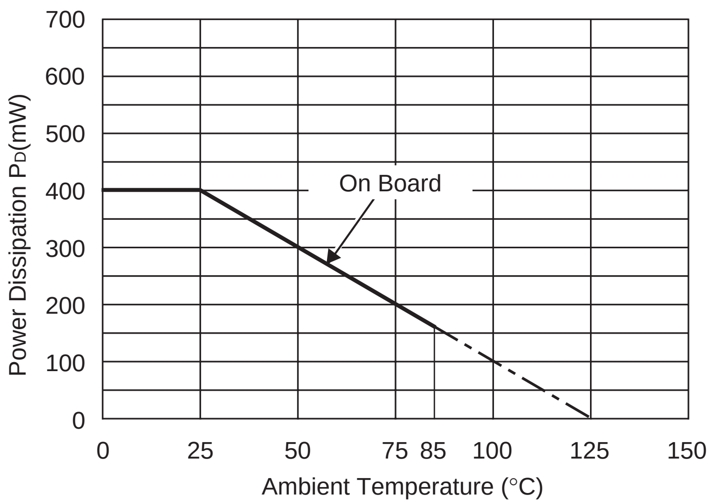
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:

Measurement Conditions

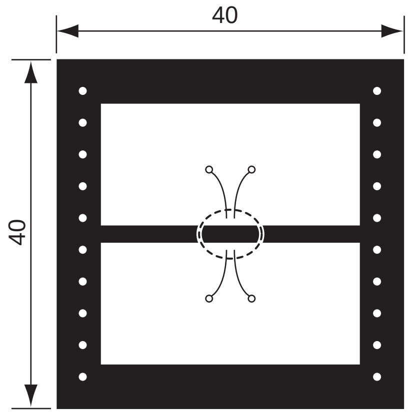
	Standard Land Pattern
Environment	Mounting on Board (Wind velocity=0m/s)
Board Material	Glass cloth epoxy plastic (Double sided)
Board Dimensions	40mm × 40mm × 1.6mm
Copper Ratio	Top side : Approx. 50% , Back side : Approx. 50%
Through-hole	ϕ0.54mm × 24pcs

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

	Standard Land Pattern
Power Dissipation	400mW
Thermal Resistance	θja=(125−25°C)/0.4W=250°C/W
Thermal Resistance	θjc=67°C/W



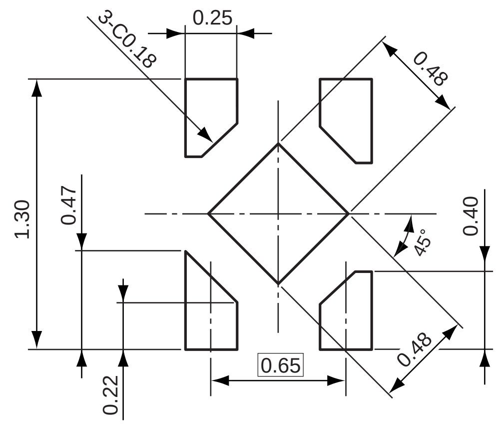
Power Dissipation



Measurement Board Pattern

IC Mount Area (Unit : mm)

RECOMMENDED LAND PATTERN

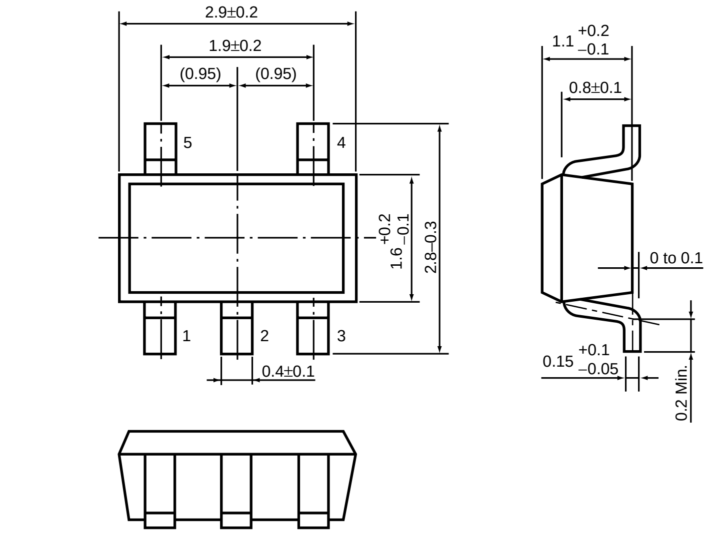


(Unit: mm)

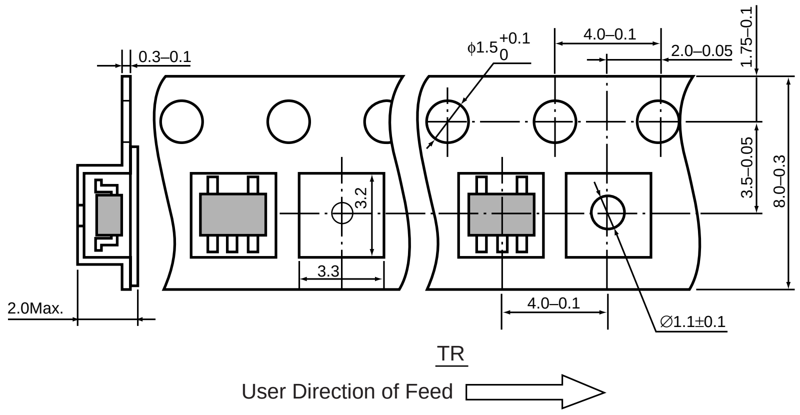
- **SOT-23-5 (SC-74A)**

Unit: mm

PACKAGE DIMENSIONS

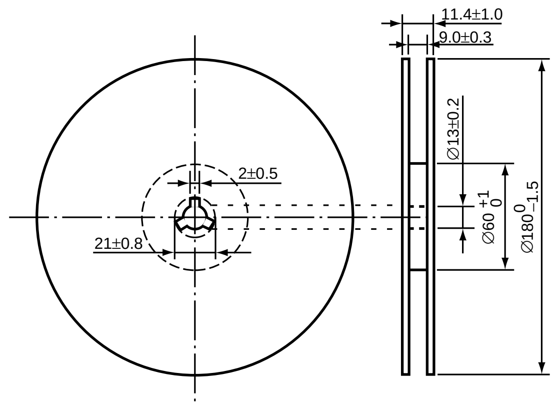


TAPING SPECIFICATION



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

(1reel=3000pcs)



POWER DISSIPATION (SOT-23-5)

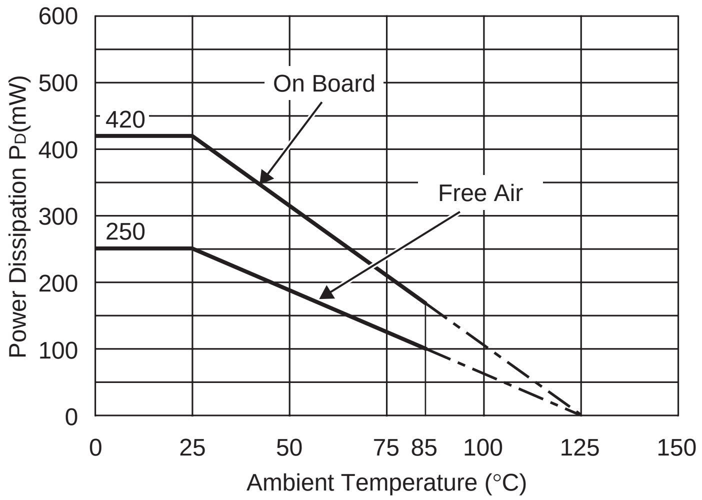
This specification is at mounted on board. Power Dissipation (P_D) depends on conditions of mounting on board. This specification is based on the measurement at the condition below:
(Power Dissipation (SOT-23-5) is substitution of SOT-23-6.)

Measurement Conditions

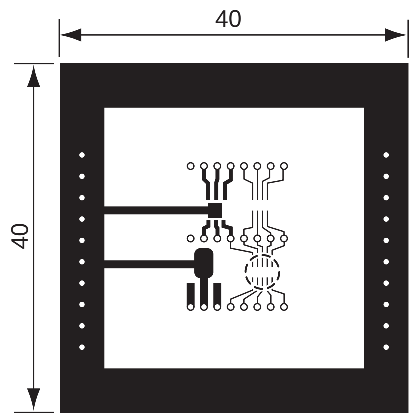
	Standard Land Pattern
Environment	Mounting on Board (Wind velocity=0m/s)
Board Material	Glass cloth epoxy plastic (Double sided)
Board Dimensions	40mm × 40mm × 1.6mm
Copper Ratio	Top side : Approx. 50% , Back side : Approx. 50%
Through-hole	φ0.5mm × 44pcs

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

	Standard Land Pattern	Free Air
Power Dissipation	420mW	250mW
Thermal Resistance	θja=(125−25°C)/0.42W=238°C/W	400°C/W



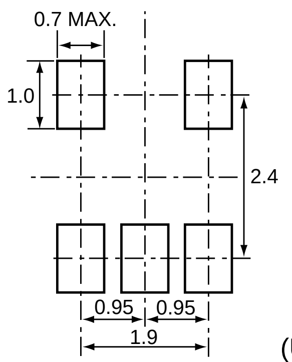
Power Dissipation



Measurement Board Pattern

IC Mount Area Unit : mm

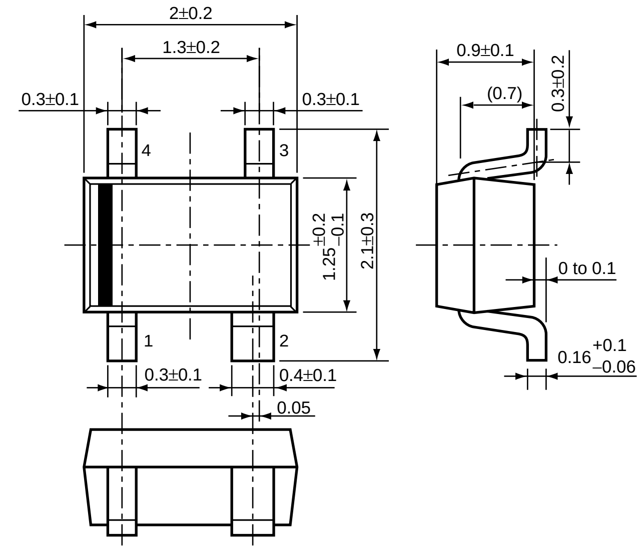
RECOMMENDED LAND PATTERN



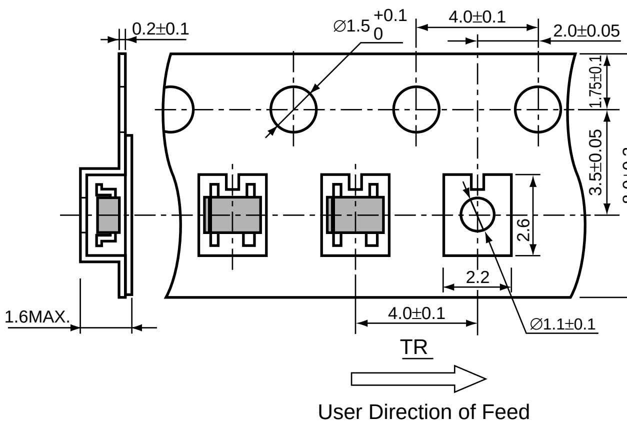
(Unit: mm)

- **SC-82AB** Unit: mm

PACKAGE DIMENSIONS

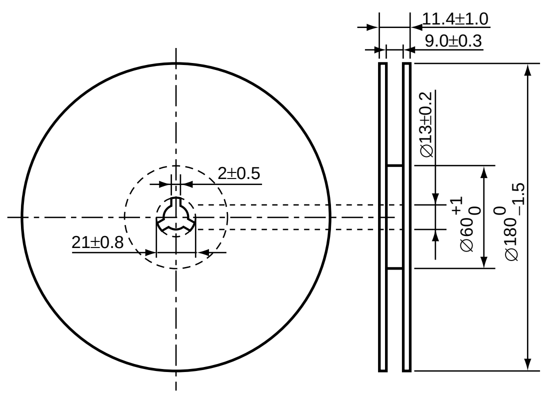


TAPING SPECIFICATION



TAPING REEL DIMENSIONS

(1reel=3000pcs)



POWER DISSIPATION (SC-82AB)

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:

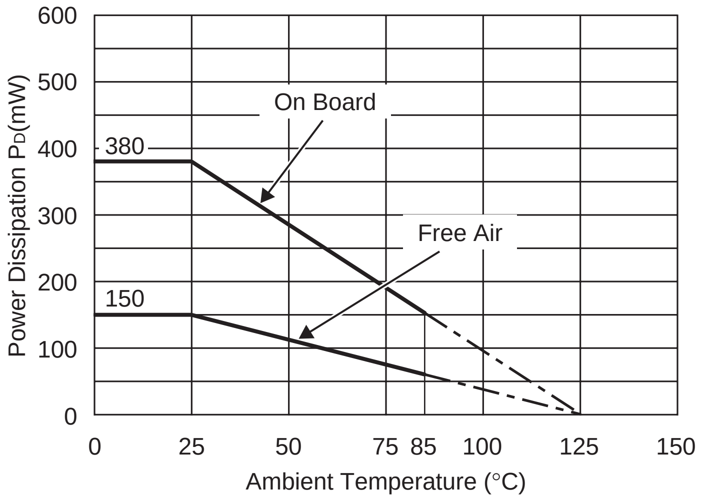
Measurement Conditions

	Standard Land Pattern
Environment	Mounting on Board (Wind velocity=0m/s)
Board Material	Glass cloth epoxy plactic (Double sided)
Board Dimensions	40mm × 40mm × 1.6mm
Copper Ratio	Top side : Approx. 50% , Back side : Approx. 50%
Through-hole	φ0.5mm × 44pcs

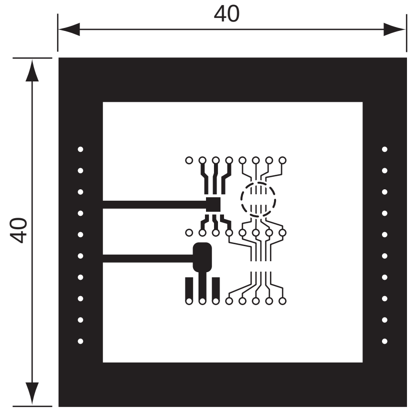
Measurement Result

(Topt=25°C,Tjmax=125°C)

	Standard Land Pattern	Free Air
Power Dissipation	380mW	150mW
Thermal Resistance	θja=(125−25°C)/0.38W=263°C/W	667°C/W



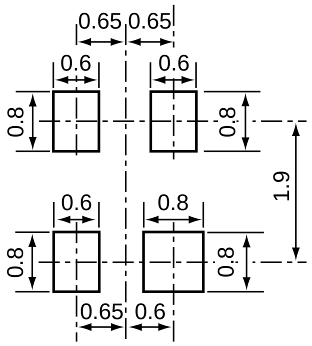
Power Dissipation



Measurement Board Pattern

IC Mount Area (Unit : mm)

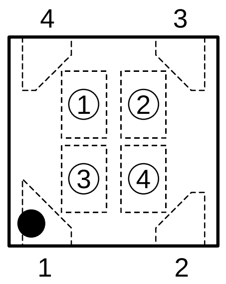
RECOMMENDED LAND PATTERN



(Unit: mm)

RP130K SERIES MARK SPECIFICATION

- **DFN(PLP)1010-4**



①, ② : Product Code (refer to Part Number vs. Product Code)

③, ④ : Lot Number

- **Part Number vs. Product Code**

RP130Kxx1A Series

Part Number	Product Code	
	①	②
RP130K121A	R	A
RP130K131A	R	B
RP130K141A	R	C
RP130K151A	R	D
RP130K161A	R	E
RP130K171A	R	F
RP130K181A	R	G
RP130K181A5	R	H
RP130K191A	R	J
RP130K201A	R	K
RP130K211A	R	L
RP130K221A	R	M
RP130K231A	R	N
RP130K241A	R	P
RP130K251A	R	Q
RP130K261A	R	R
RP130K271A	R	S
RP130K281A	R	T
RP130K281A5	R	U
RP130K291A	R	V
RP130K301A	R	W
RP130K311A	R	X
RP130K321A	R	Y
RP130K331A	R	Z
RP130K341A	S	A
RP130K351A	S	B
RP130K361A	S	C
RP130K371A	S	D
RP130K381A	S	E
RP130K391A	S	F
RP130K401A	S	G
RP130K411A	S	H
RP130K421A	S	J
RP130K431A	S	K
RP130K441A	S	L
RP130K451A	S	M
RP130K461A	S	N
RP130K471A	S	P
RP130K481A	S	Q
RP130K491A	S	R
RP130K501A	S	S

RP130Kxx1B Series

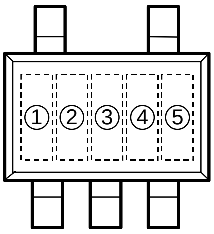
Part Number	Product Code	
	①	②
RP130K121B	T	A
RP130K131B	T	B
RP130K141B	T	C
RP130K151B	T	D
RP130K161B	T	E
RP130K171B	T	F
RP130K181B	T	G
RP130K181B5	T	H
RP130K191B	T	J
RP130K201B	T	K
RP130K211B	T	L
RP130K221B	T	M
RP130K231B	T	N
RP130K241B	T	P
RP130K251B	T	Q
RP130K261B	T	R
RP130K271B	T	S
RP130K281B	T	T
RP130K281B5	T	U
RP130K291B	T	V
RP130K301B	T	W
RP130K311B	T	X
RP130K321B	T	Y
RP130K331B	T	Z
RP130K341B	U	A
RP130K351B	U	B
RP130K361B	U	C
RP130K371B	U	D
RP130K381B	U	E
RP130K391B	U	F
RP130K401B	U	G
RP130K411B	U	H
RP130K421B	U	J
RP130K431B	U	K
RP130K441B	U	L
RP130K451B	U	M
RP130K461B	U	N
RP130K471B	U	P
RP130K481B	U	Q
RP130K491B	U	R
RP130K501B	U	S

RP130Kxx1D Series

Part Number	Product Code	
	①	②
RP130K121D	V	A
RP130K131D	V	B
RP130K141D	V	C
RP130K151D	V	D
RP130K161D	V	E
RP130K171D	V	F
RP130K181D	V	G
RP130K181D5	V	H
RP130K191D	V	J
RP130K201D	V	K
RP130K211D	V	L
RP130K221D	V	M
RP130K231D	V	N
RP130K241D	V	P
RP130K251D	V	Q
RP130K261D	V	R
RP130K271D	V	S
RP130K281D	V	T
RP130K281D5	V	U
RP130K291D	V	V
RP130K301D	V	W
RP130K311D	V	X
RP130K321D	V	Y
RP130K331D	V	Z
RP130K341D	W	A
RP130K351D	W	B
RP130K361D	W	C
RP130K371D	W	D
RP130K381D	W	E
RP130K391D	W	F
RP130K401D	W	G
RP130K411D	W	H
RP130K421D	W	J
RP130K431D	W	K
RP130K441D	W	L
RP130K451D	W	M
RP130K461D	W	N
RP130K471D	W	P
RP130K481D	W	Q
RP130K491D	W	R
RP130K501D	W	S

RP130N SERIES MARK SPECIFICATION

- **SOT-23-5 (SC-74A)**



① to ③ : Product Code (refer to Part Number vs. Product Code)

④, ⑤ : Lot Number

- **Part Number vs. Product Code**

RP130Nxx1A Series

Part Number	Product Code		
	①	②	③
RP130N121A	H	0	A
RP130N131A	H	0	B
RP130N141A	H	0	C
RP130N151A	H	0	D
RP130N161A	H	0	E
RP130N171A	H	0	F
RP130N181A	H	0	G
RP130N181A5	H	0	H
RP130N191A	H	0	J
RP130N201A	H	0	K
RP130N211A	H	0	L
RP130N221A	H	0	M
RP130N231A	H	0	N
RP130N241A	H	0	P
RP130N251A	H	0	Q
RP130N261A	H	0	R
RP130N271A	H	0	S
RP130N281A	H	0	T
RP130N281A5	H	0	U
RP130N291A	H	0	V
RP130N301A	H	0	W
RP130N311A	H	0	X
RP130N321A	H	0	Y
RP130N331A	H	0	Z
RP130N341A	J	0	A
RP130N351A	J	0	B
RP130N361A	J	0	C
RP130N371A	J	0	D
RP130N381A	J	0	E
RP130N391A	J	0	F
RP130N401A	J	0	G
RP130N411A	J	0	H
RP130N421A	J	0	J
RP130N431A	J	0	K
RP130N441A	J	0	L
RP130N451A	J	0	M
RP130N461A	J	0	N
RP130N471A	J	0	P
RP130N481A	J	0	Q
RP130N491A	J	0	R
RP130N501A	J	0	S

RP130Nxx1B Series

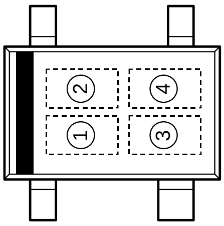
Part Number	Product Code		
	①	②	③
RP130N121B	H	1	A
RP130N131B	H	1	B
RP130N141B	H	1	C
RP130N151B	H	1	D
RP130N161B	H	1	E
RP130N171B	H	1	F
RP130N181B	H	1	G
RP130N181B5	H	1	H
RP130N191B	H	1	J
RP130N201B	H	1	K
RP130N211B	H	1	L
RP130N221B	H	1	M
RP130N231B	H	1	N
RP130N241B	H	1	P
RP130N251B	H	1	Q
RP130N261B	H	1	R
RP130N271B	H	1	S
RP130N281B	H	1	T
RP130N281B5	H	1	U
RP130N291B	H	1	V
RP130N301B	H	1	W
RP130N311B	H	1	X
RP130N321B	H	1	Y
RP130N331B	H	1	Z
RP130N341B	J	1	A
RP130N351B	J	1	B
RP130N361B	J	1	C
RP130N371B	J	1	D
RP130N381B	J	1	E
RP130N391B	J	1	F
RP130N401B	J	1	G
RP130N411B	J	1	H
RP130N421B	J	1	J
RP130N431B	J	1	K
RP130N441B	J	1	L
RP130N451B	J	1	M
RP130N461B	J	1	N
RP130N471B	J	1	P
RP130N481B	J	1	Q
RP130N491B	J	1	R
RP130N501B	J	1	S

RP130Nxx1D Series

Part Number	Product Code		
	①	②	③
RP130N121D	H	2	A
RP130N131D	H	2	B
RP130N141D	H	2	C
RP130N151D	H	2	D
RP130N161D	H	2	E
RP130N171D	H	2	F
RP130N181D	H	2	G
RP130N181D5	H	2	H
RP130N191D	H	2	J
RP130N201D	H	2	K
RP130N211D	H	2	L
RP130N221D	H	2	M
RP130N231D	H	2	N
RP130N241D	H	2	P
RP130N251D	H	2	Q
RP130N261D	H	2	R
RP130N271D	H	2	S
RP130N281D	H	2	T
RP130N281D5	H	2	U
RP130N291D	H	2	V
RP130N301D	H	2	W
RP130N311D	H	2	X
RP130N321D	H	2	Y
RP130N331D	H	2	Z
RP130N341D	J	2	A
RP130N351D	J	2	B
RP130N361D	J	2	C
RP130N371D	J	2	D
RP130N381D	J	2	E
RP130N391D	J	2	F
RP130N401D	J	2	G
RP130N411D	J	2	H
RP130N421D	J	2	J
RP130N431D	J	2	K
RP130N441D	J	2	L
RP130N451D	J	2	M
RP130N461D	J	2	N
RP130N471D	J	2	P
RP130N481D	J	2	Q
RP130N491D	J	2	R
RP130N501D	J	2	S

RP130Q SERIES MARK SPECIFICATION

- **SC-82AB**



①, ② : Product Code (refer to Part Number vs. Product Code)

③, ④ : Lot Number

- **Part Number vs. Product Code**

RP130Qxx1A Series

Part Number	Product Code	
	①	②
RP130Q121A	A	A
RP130Q131A	A	B
RP130Q141A	A	C
RP130Q151A	A	D
RP130Q161A	A	E
RP130Q171A	A	F
RP130Q181A	A	G
RP130Q181A5	A	H
RP130Q191A	A	J
RP130Q201A	A	K
RP130Q211A	B	A
RP130Q221A	B	B
RP130Q231A	B	C
RP130Q241A	B	D
RP130Q251A	B	E
RP130Q261A	B	F
RP130Q271A	B	G
RP130Q281A	B	H
RP130Q281A5	B	J
RP130Q291A	B	K
RP130Q301A	C	A
RP130Q311A	C	B
RP130Q321A	C	C
RP130Q331A	C	D
RP130Q341A	C	E
RP130Q351A	C	F
RP130Q361A	C	G
RP130Q371A	C	H
RP130Q381A	C	J
RP130Q391A	C	K
RP130Q401A	D	A
RP130Q411A	D	B
RP130Q421A	D	C
RP130Q431A	D	D
RP130Q441A	D	E
RP130Q451A	D	F
RP130Q461A	D	G
RP130Q471A	D	H
RP130Q481A	D	J
RP130Q491A	D	K
RP130Q501A	E	A

RP130Qxx1B Series

Part Number	Product Code	
	①	②
RP130Q121B	F	A
RP130Q131B	F	B
RP130Q141B	F	C
RP130Q151B	F	D
RP130Q161B	F	E
RP130Q171B	F	F
RP130Q181B	F	G
RP130Q181B5	F	H
RP130Q191B	F	J
RP130Q201B	F	K
RP130Q211B	G	A
RP130Q221B	G	B
RP130Q231B	G	C
RP130Q241B	G	D
RP130Q251B	G	E
RP130Q261B	G	F
RP130Q271B	G	G
RP130Q281B	G	H
RP130Q281B5	G	J
RP130Q291B	G	K
RP130Q301B	H	A
RP130Q311B	H	B
RP130Q321B	H	C
RP130Q331B	H	D
RP130Q341B	H	E
RP130Q351B	H	F
RP130Q361B	H	G
RP130Q371B	H	H
RP130Q381B	H	J
RP130Q391B	H	K
RP130Q401B	J	A
RP130Q411B	J	B
RP130Q421B	J	C
RP130Q431B	J	D
RP130Q441B	J	E
RP130Q451B	J	F
RP130Q461B	J	G
RP130Q471B	J	H
RP130Q481B	J	J
RP130Q491B	J	K
RP130Q501B	K	A

RP130Qxx1D Series

Part Number	Product Code	
	①	②
RP130Q121D	L	A
RP130Q131D	L	B
RP130Q141D	L	C
RP130Q151D	L	D
RP130Q161D	L	E
RP130Q171D	L	F
RP130Q181D	L	G
RP130Q181D5	L	H
RP130Q191D	L	J
RP130Q201D	L	K
RP130Q211D	M	A
RP130Q221D	M	B
RP130Q231D	M	C
RP130Q241D	M	D
RP130Q251D	M	E
RP130Q261D	M	F
RP130Q271D	M	G
RP130Q281D	M	H
RP130Q281D5	M	J
RP130Q291D	M	K
RP130Q301D	N	A
RP130Q311D	N	B
RP130Q321D	N	C
RP130Q331D	N	D
RP130Q341D	N	E
RP130Q351D	N	F
RP130Q361D	N	G
RP130Q371D	N	H
RP130Q381D	N	J
RP130Q391D	N	K
RP130Q401D	P	A
RP130Q411D	P	B
RP130Q421D	P	C
RP130Q431D	P	D
RP130Q441D	P	E
RP130Q451D	P	F
RP130Q461D	P	G
RP130Q471D	P	H
RP130Q481D	P	J
RP130Q491D	P	K
RP130Q501D	Q	A