

---

## 120mA LDO REGULATOR

---

NO.EA-082-111027

### OUTLINE

The R1141Q Series consist of CMOS-based voltage regulator ICs with high output voltage accuracy, low supply current, low ON-resistance, and high ripple rejection. Each of these voltage regulator ICs consists of a voltage reference unit, an error amplifier, resistors for setting Output Voltage, a current limit circuit, and a chip enable circuit.

Output Current Limit circuit is embedded in the R1141Q Series to prevent the break down of the IC caused by excess current.

Chip enable circuit realizes standby mode and makes consumption current extremely small.

These ICs perform with low dropout voltage and a chip enable function. The line transient response and load transient response of the R1141Q Series are excellent, making these ICs very suitable for the power supply for hand-held communication equipment.

Their output voltage is internally fixed with high accuracy. Since the package for these ICs is SC-82AB (Super Mini-mold) package, high density mounting of the ICs on boards is possible.

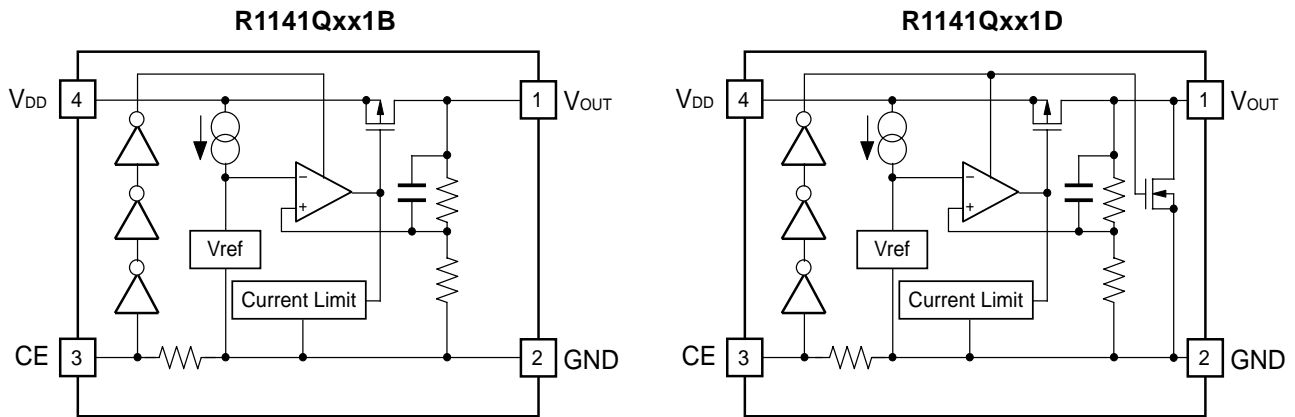
### FEATURES

- Supply Current ..... Typ. 90 $\mu$ A
- Standby Mode ..... Typ. 0.1 $\mu$ A
- Dropout Voltage ..... Typ. 0.15V ( $I_{OUT}=100\text{mA}$ , Output Voltage=3.0V Type)
- Ripple Rejection ..... Typ. 75dB ( $V_{OUT} \leq 2.4\text{V}$ )  
Typ. 70dB ( $V_{OUT} \geq 2.5\text{V}$ ) ( $f=1\text{kHz}$ )
- Temperature-Drift Coefficient of Output Voltage ..... Typ.  $\pm 100\text{ppm}/^\circ\text{C}$
- Line Regulation ..... Typ. 0.02%/V
- Output Voltage Accuracy .....  $\pm 1.5\%$  or  $\pm 30\text{mV}$  ( $V_{OUT} \leq 2.0\text{V}$ )
- Excellent Dynamic Response
- Package ..... SC-82AB (Super Mini-mold)
- Output Voltage Range ..... 1.5V to 4.0V (0.1V steps)  
(For other voltages, please refer to MARK INFORMATIONS.)
- Built-in Chip Enable Circuit (B/D : active high)
- Built-in Fold-back Protection Circuit ..... Typ. 40mA (Short Current)
- Ceramic capacitor can be used for Output pin ..... Recommended value is 2.2 $\mu$ F or more.

### APPLICATIONS

- Power source for cellular phones such as GSM, CDMA and various kinds of PCS.
- Power source for electrical appliances such as cameras, VCRs and camcorders, and hand-held communication equipment.
- Power source for battery-powered equipment.
- Very stable Voltage Reference

## BLOCK DIAGRAMS



## SELECTION GUIDE

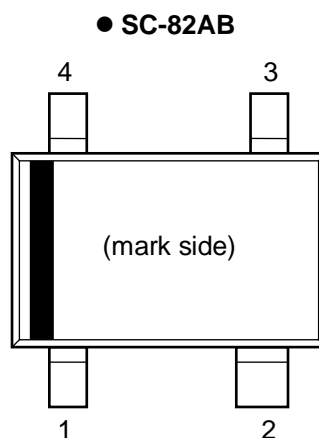
The output voltage, auto discharge function for the ICs can be selected at the user's request.

Product Name	Package	Quantity per Reel	Pb Free	Halogen Free
R1141Qxx1*-TR-FE	SC-82AB	3,000 pcs	Yes	Yes

xx: The output voltage can be designated in the range from 1.5V(15) to 4.0V(40) in 0.1V steps.  
(For other voltages, please refer to MARK INFORMATIONS.)

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

## PIN CONFIGURATION



## PIN DESCRIPTION

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

## ABSOLUTE MAXIMUM RATINGS

Symbol	Item	Rating	Unit
$V_{IN}$	Input Voltage	6.5	V
$V_{CE}$	Input Voltage (CE Pin)	6.5	V
$V_{OUT}$	Output Voltage	-0.3 to $V_{IN} + 0.3$	V
$I_{OUT}$	Output Current	140	mA
$P_D$	Power Dissipation (SC-82AB)*	380	mW
$T_{opt}$	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

### • R1141Qxx1B/D

T<sub>opt</sub>=25°C

Symbol	Item	Conditions	Min.	Typ.	Max.	Unit
V <sub>OUT</sub>	Output Voltage	V <sub>IN</sub> = Set V <sub>OUT</sub> +1.0V 1mA ≤ I <sub>OUT</sub> ≤ 30mA(*1)	×0.985 (-30mV)		×1.015 (+30mV)	V
I <sub>OUT</sub>	Output Current	V <sub>IN</sub> -V <sub>OUT</sub> =1.0V	120			mA
ΔV <sub>OUT</sub> /ΔI <sub>OUT</sub>	Load Regulation	V <sub>IN</sub> = Set V <sub>OUT</sub> +1.0V 1mA ≤ I <sub>OUT</sub> ≤ 120mA		12	40	mV
V <sub>DIF</sub>	Dropout Voltage	Refer to the ELECTRICAL CHARACTERISTICS by OUTPUT VOLTAGE				
I <sub>SS</sub>	Supply Current	V <sub>IN</sub> = Set V <sub>OUT</sub> +1.0V		90	160	μA
I <sub>standby</sub>	Supply Current (Standby)	V <sub>IN</sub> =V <sub>CE</sub> = Set V <sub>OUT</sub> +1.0V		0.1	1.0	μA
ΔV <sub>OUT</sub> /ΔV <sub>IN</sub>	Line Regulation	Set V <sub>OUT</sub> +0.5V ≤ V <sub>IN</sub> ≤ 6.0V I <sub>OUT</sub> = 30mA (In case that V <sub>OUT</sub> ≤ 1.6V, 2.2V ≤ V <sub>IN</sub> ≤ 6.0V)		0.02	0.10	%/V
RR	Ripple Rejection	f = 1kHz, Ripple 0.5Vp-p V <sub>IN</sub> = Set V <sub>OUT</sub> +1V, I <sub>OUT</sub> = 30mA (In case that V <sub>OUT</sub> ≤ 1.7V, V <sub>IN</sub> -V <sub>OUT</sub> =1.2V)		75 (70) (*2)		dB
V <sub>IN</sub>	Input Voltage		2.2		6.0	V
ΔV <sub>OUT</sub> /ΔT <sub>opt</sub>	Output Voltage Temperature Coefficient	I <sub>OUT</sub> =30mA -40°C ≤ T <sub>opt</sub> ≤ 85°C		±100		ppm/ °C
I <sub>SC</sub>	Short Current Limit	V <sub>OUT</sub> =0V		40		mA
R <sub>PU</sub>	CE Pull-up resistance		0.7	2.0	8.0	MΩ
V <sub>CEH</sub>	CE Input Voltage "H"		1.5		V <sub>IN</sub>	V
V <sub>CEL</sub>	CE Input Voltage "L"		0.0		0.3	V
en	Output Noise	BW=10Hz to 100kHz		30		μVrms
R <sub>LOW</sub>	Low Output Nch Tr. ON Resistance (of D version)	V <sub>CE</sub> =0V		60		Ω

\*1: ±30mV Tolerance at V<sub>OUT</sub> ≤ 2.0V\*2: 70dB at V<sub>OUT</sub> ≥ 2.5V

#### 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.

## • ELECTRICAL CHARACTERISTICS by OUTPUT VOLTAGE

Output Voltage $V_{OUT}$ (V)	Dropout Voltage $V_{DIF}$ (V)		
	Condition	Typ.	Max.
$V_{OUT} = 1.5$	$I_{OUT} = 120\text{mA}$	0.36	0.70
$V_{OUT} = 1.6$		0.32	0.60
$V_{OUT} = 1.7$		0.30	0.50
$1.8 \leq V_{OUT} \leq 2.0$		0.28	0.40
$2.1 \leq V_{OUT} \leq 2.7$		0.24	0.35
$2.8 \leq V_{OUT} \leq 4.0$		0.18	0.28

## 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, be sure to use a  $2.2\mu\text{F}$  or more capacitor  $C_{OUT}$  with good frequency characteristics and ESR (Equivalent Series Resistance).

(Note: When the additional ceramic capacitors are connected to the Output Pin with Output capacitor for phase compensation, the operation might be unstable. Because of this, test these ICs with as same external components as ones to be used on the PCB.)

### PCB Layout

Make  $V_{DD}$  and GND lines sufficient. When their impedance is high, picking up the noise or unstable operation may result. Connect a capacitor with as much as  $1.0\mu\text{F}$  capacitor between  $V_{DD}$  and GND pin as close as possible.

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

## TYPICAL APPLICATION



(External Components)  
Output Capacitor; Ceramic Type  $C1=1.0\mu\text{F}$   $C2=2.2\mu\text{F}$

TEST CIRCUITS

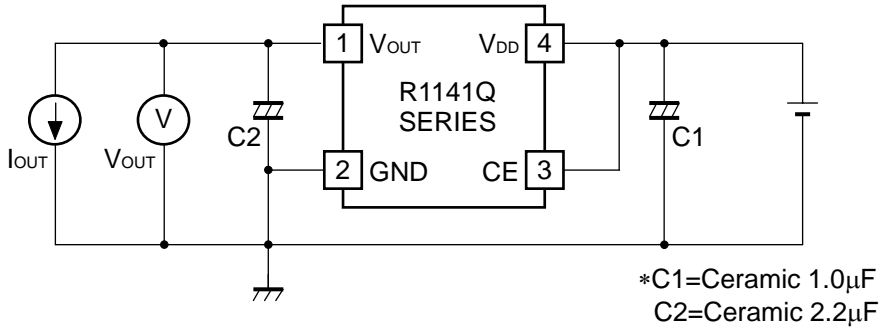


Fig.1 Standard test Circuit

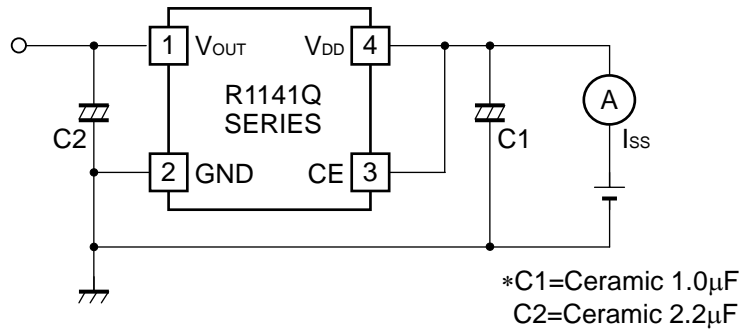


Fig.2 Supply Current Test Circuit

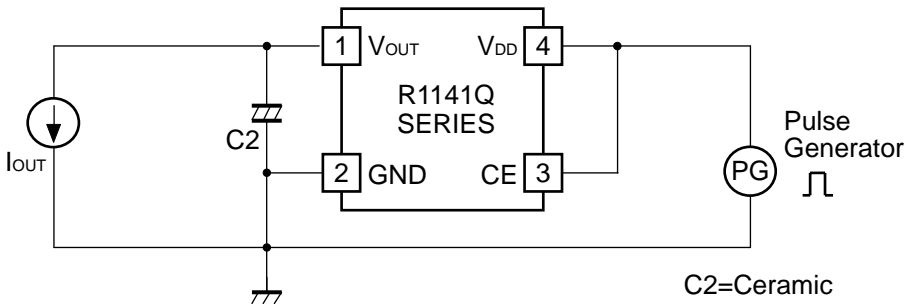


Fig.3 Ripple Rejection, Line Transient Response Test Circuit

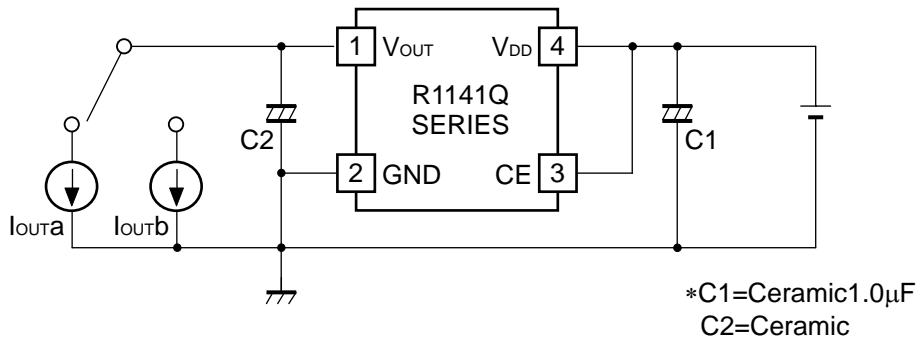
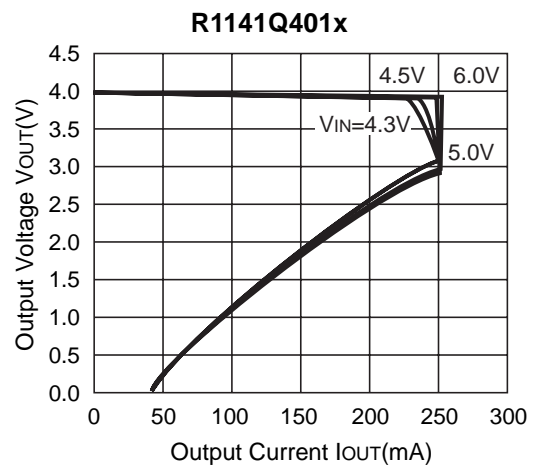
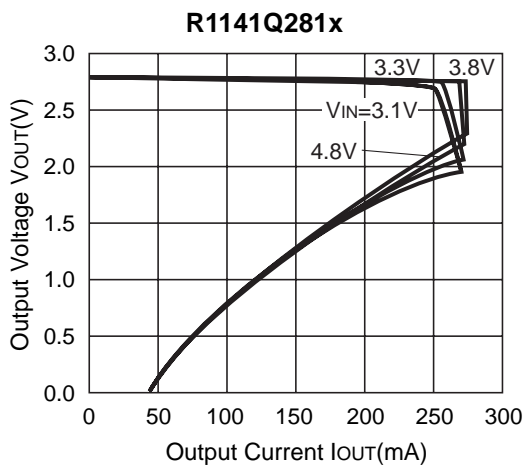
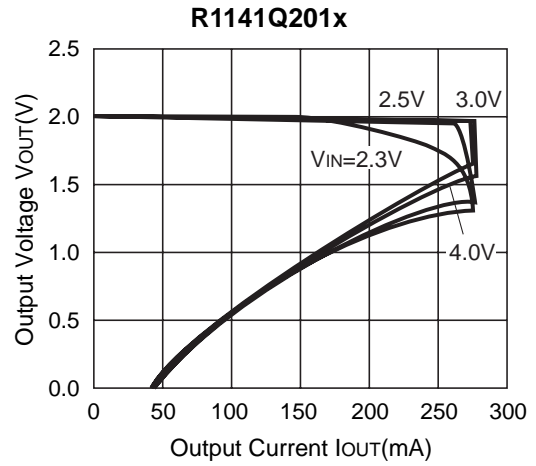
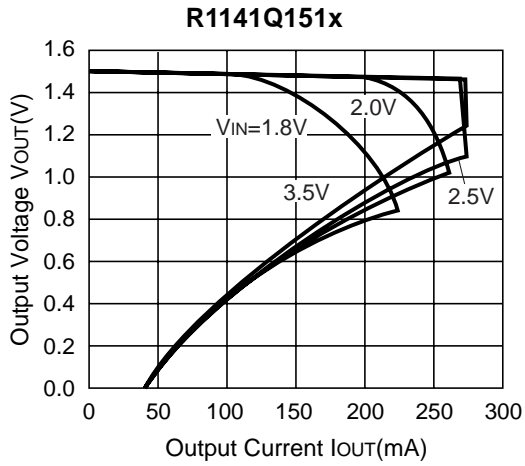


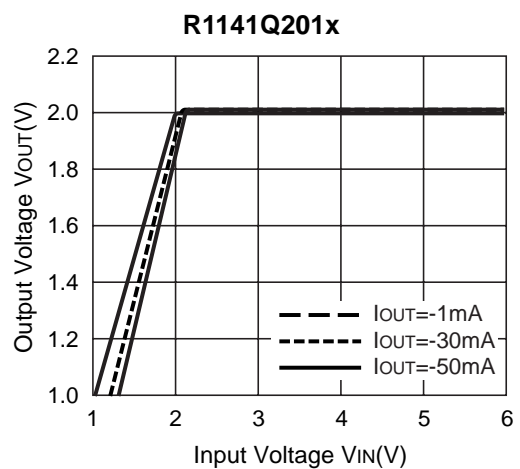
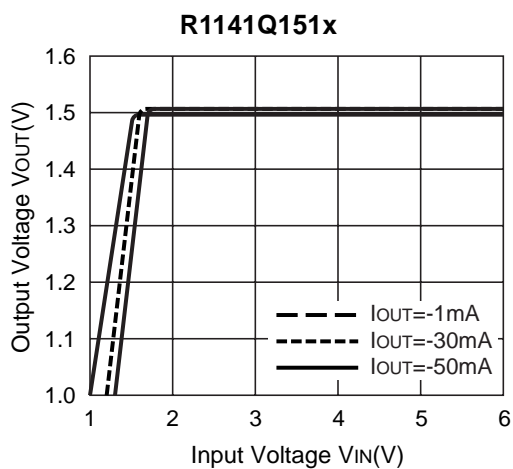
Fig.4 Load Transient Response Test Circuit

## TYPICAL CHARACTERISTICS

### 1) Output Voltage vs. Output Current

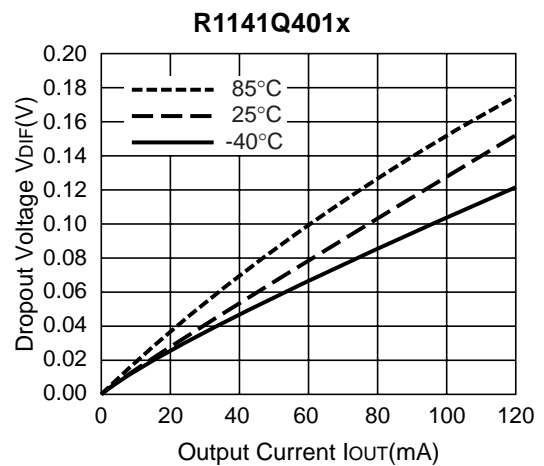
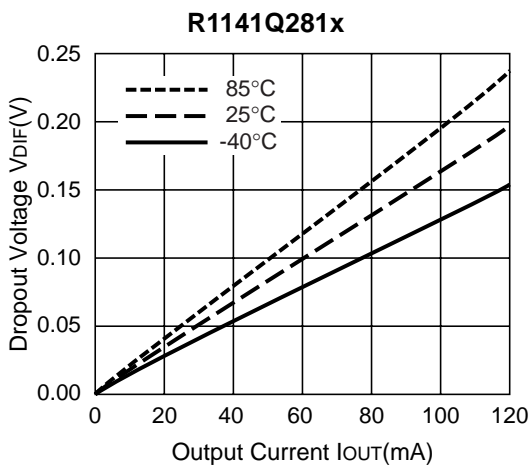
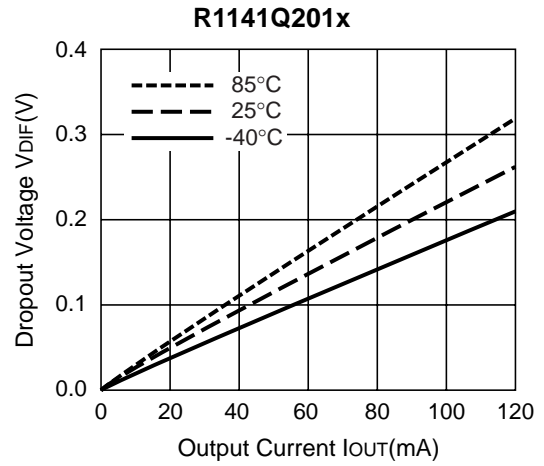
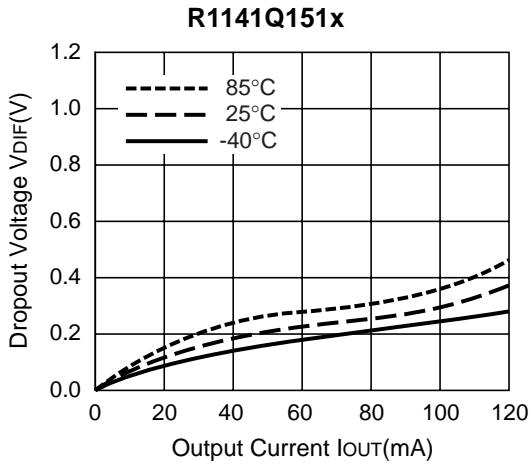


### 2) Output Voltage vs. Input Voltage



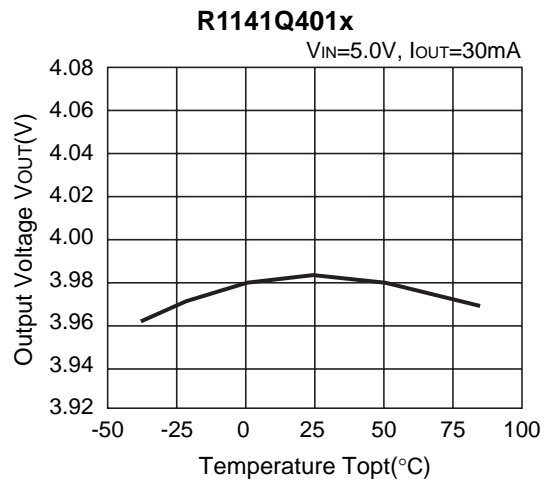
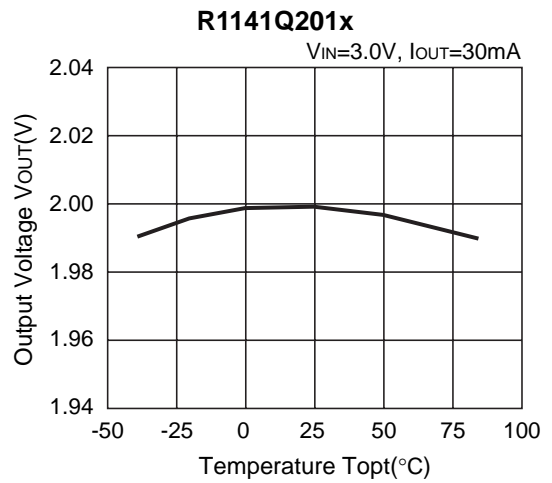
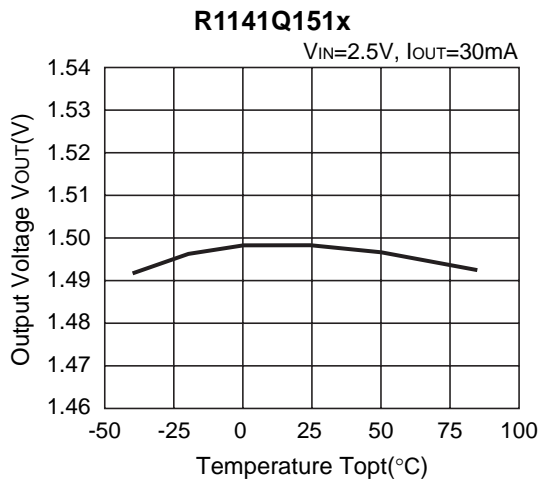


3) Dropout Voltage vs. Output Current

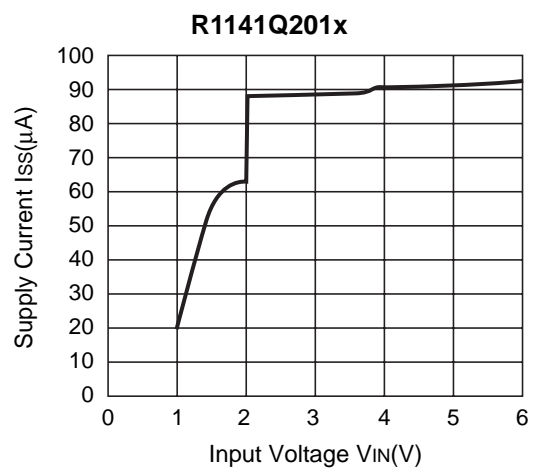




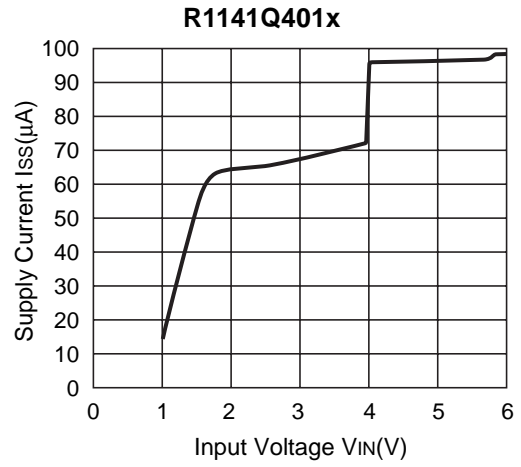
4) Output Voltage vs. Temperature



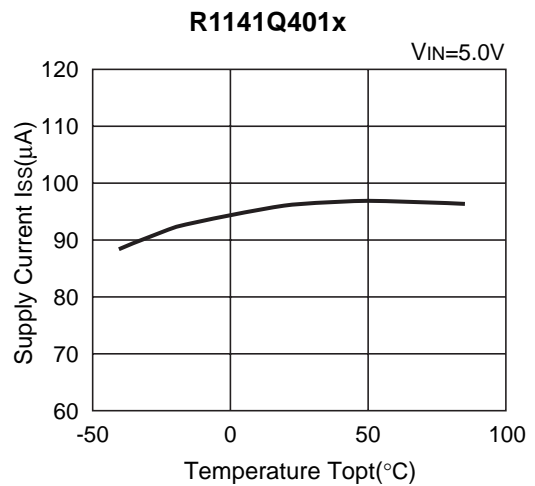
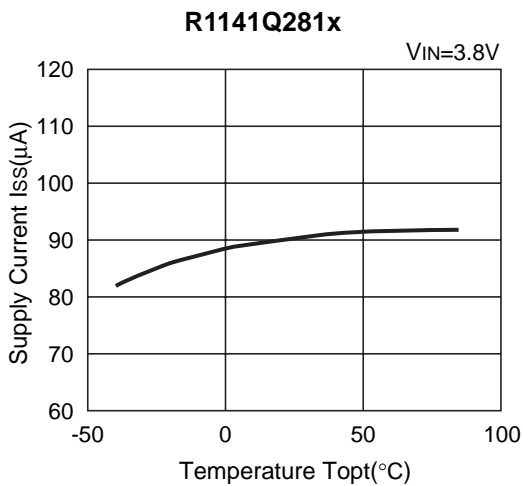
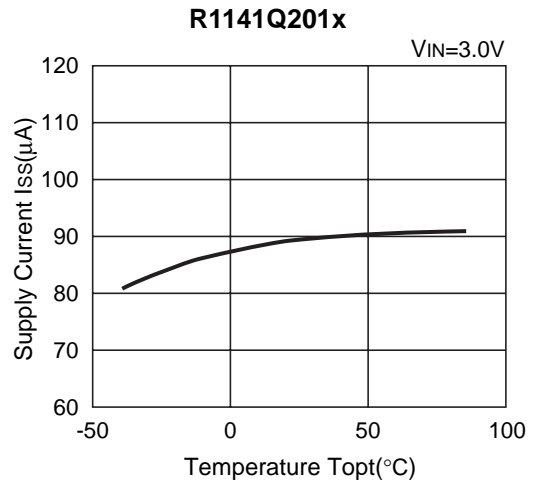
5) Supply Current vs. Input Voltage (T<sub>opt</sub>=25°C)



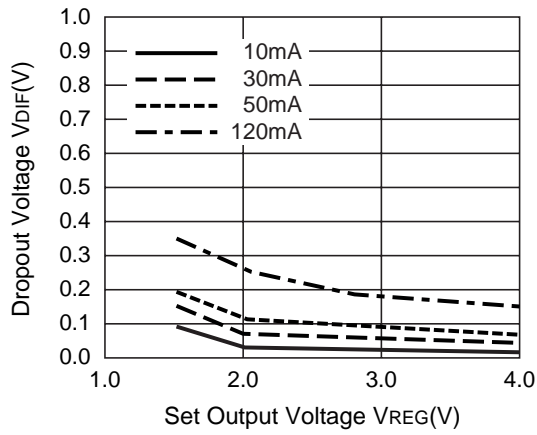
# R1141Q



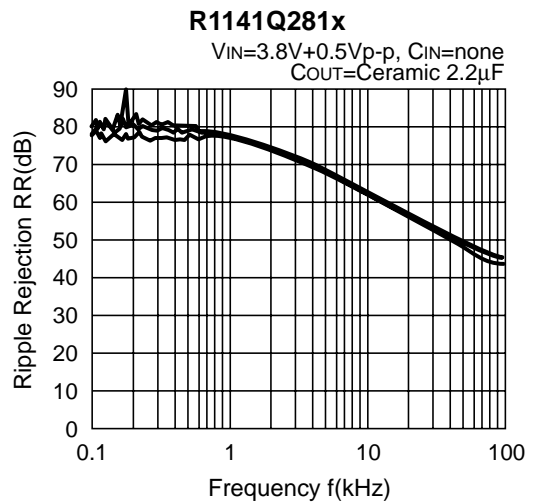
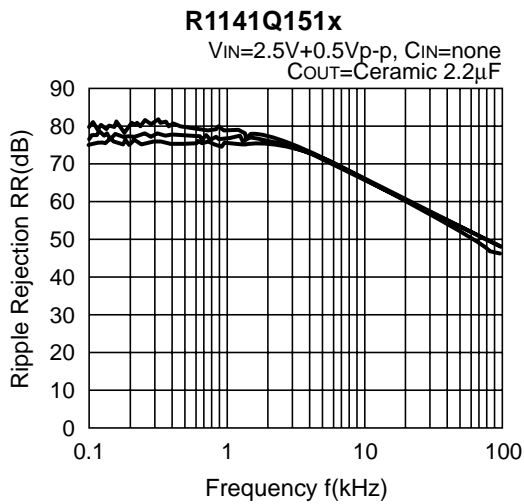
## 6) Supply Current vs. Temperature



7) Dropout Voltage vs. Set Output Voltage



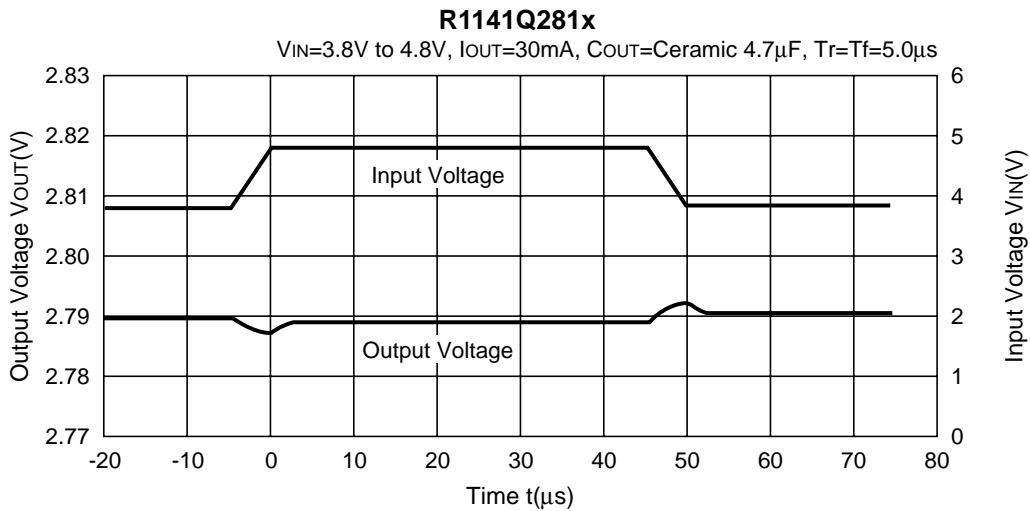
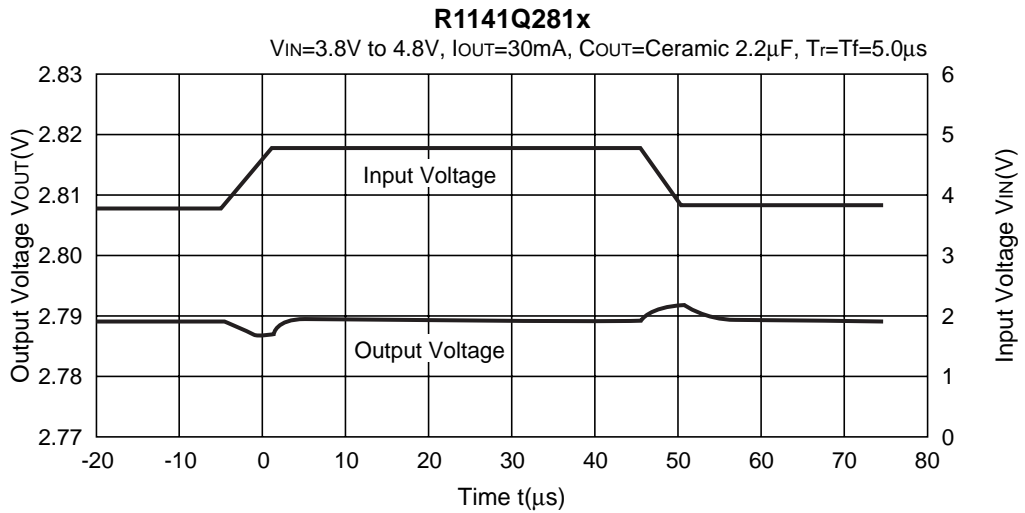
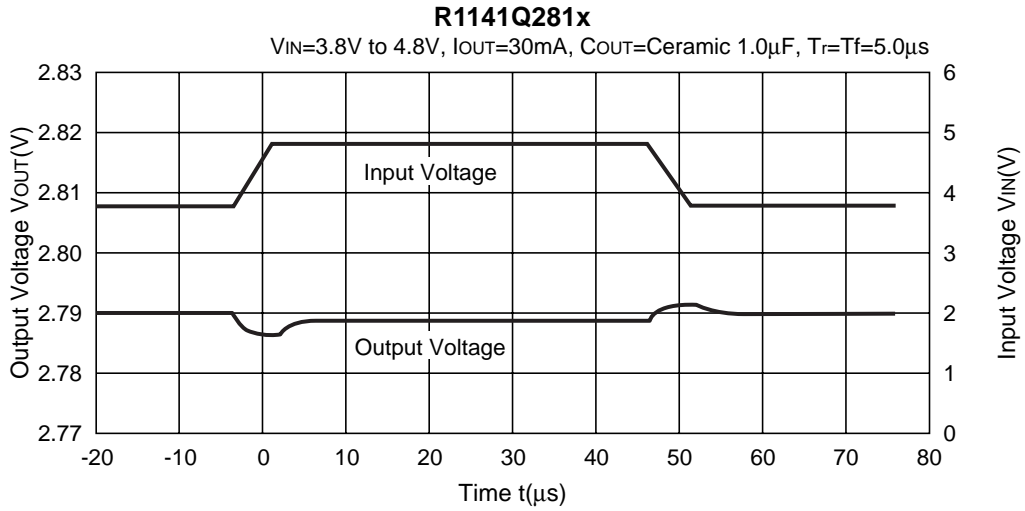
8) Ripple Rejection vs. Frequency



9) Ripple Rejection vs. Input Bias



10) Input Transient Response



11) Load Transient Response



## ESR vs. Output Current

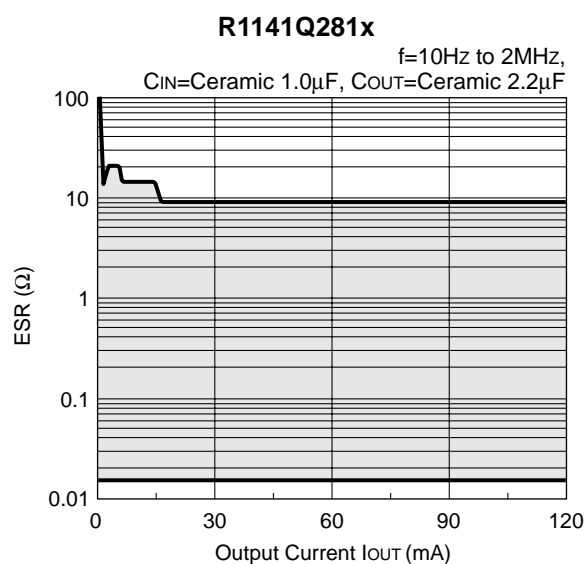
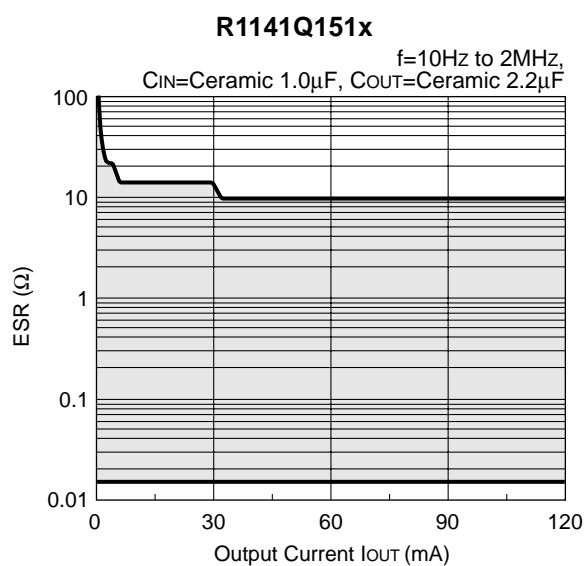
When using these ICs, consider the following points:

In these ICs, phase compensation is made for securing stable operation even if the load current is varied. For this purpose, be sure to use a capacitor  $C_{OUT}$  with good frequency characteristics and ESR (Equivalent Series Resistance) of which is in the range described as follows:

The relations between  $I_{OUT}$  (Output Current) and ESR of 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.

<Test conditions>

- (1)  $V_{IN}=V_{SET}+1\text{V}$
- (2) Frequency band: 10Hz to 30MHz
- (3) Temperature:  $25^{\circ}\text{C}$





1. The products and the product specifications described in this document are subject to change or discontinuation of production without notice for reasons such as improvement. Therefore, before deciding to use the products, please refer to Ricoh sales representatives for the latest information thereon.
2. The materials in this document may not be copied or otherwise reproduced in whole or in part without prior written consent of Ricoh.
3. Please be sure to take any necessary formalities under relevant laws or regulations before exporting or otherwise taking out of your country the products or the technical information described herein.
4. The technical information described in this document shows typical characteristics of and example application circuits for the products. The release of such information is not to be construed as a warranty of or a grant of license under Ricoh's or any third party's intellectual property rights or any other rights.
5. The products listed in this document are intended and designed for use as general electronic components in standard applications (office equipment, telecommunication equipment, measuring instruments, consumer electronic products, amusement equipment etc.). Those customers intending to use a product in an application requiring extreme quality and reliability, for example, in a highly specific application where the failure or misoperation of the product could result in human injury or death (aircraft, spacevehicle, nuclear reactor control system, traffic control system, automotive and transportation equipment, combustion equipment, safety devices, life support system etc.) should first contact us.
6. We are making our continuous effort to improve the quality and reliability of our products, but semiconductor products are likely to fail with certain probability. In order to prevent any injury to persons or damages to property resulting from such failure, customers should be careful enough to incorporate safety measures in their design, such as redundancy feature, fire containment feature and fail-safe feature. We do not assume any liability or responsibility for any loss or damage arising from misuse or inappropriate use of the products.
7. Anti-radiation design is not implemented in the products described in this document.
8. 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.

**RICOH** RICOH ELECTRONIC DEVICES CO., LTD.

<http://www.e-devices.ricoh.co.jp/en/>

#### Sales & Support Offices

##### **RICOH ELECTRONIC DEVICES CO., LTD.**

**Higashi-Shinagawa Office (International Sales)**  
3-32-3, Higashi-Shinagawa, Shinagawa-ku, Tokyo 140-8655, Japan  
Phone: +81-3-5479-2857 Fax: +81-3-5479-0502

##### **RICOH EUROPE (NETHERLANDS) B.V.**

**Semiconductor Support Centre**  
Prof. W.H. Keesomlaan 1, 1183 DJ Amstelveen, The Netherlands  
Phone: +31-20-5474-309

##### **RICOH ELECTRONIC DEVICES KOREA CO., LTD.**

3F, Haesung Bldg. 504, Teheran-ro, Gangnam-gu, Seoul, 135-725, Korea  
Phone: +82-2-2135-5700 Fax: +82-2-2051-5713

##### **RICOH ELECTRONIC DEVICES SHANGHAI CO., LTD.**

Room 403, No.2 Building, No.690 Bilbo Road, Pu Dong New District, Shanghai 201203,  
People's Republic of China  
Phone: +86-21-5027-3200 Fax: +86-21-5027-3299

##### **RICOH ELECTRONIC DEVICES CO., LTD.**

**Taipei office**  
Room 109, 10F-1, No.51, Hengyang Rd., Taipei City, Taiwan (R.O.C.)  
Phone: +886-2-2313-1621/1622 Fax: +886-2-2313-1623



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## Ricoh Electronics:

[R1141Q271D-TR-FE](#) [R1141Q301D-TR-FE](#) [R1141Q301B-TR-FE](#) [R1141Q281B-TR-FE](#) [R1141Q311D-TR-FE](#)  
[R1141Q281D-TR-FE](#) [R1141Q331D-TR-FE](#)

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А