XC6420 Series

150mA Small Dual LDO Regulator with ON/OFF Switch

■GENERAL DESCRIPTION

The XC6420 series is a small dual CMOS LDO regulator with 2-channel 150mA outputs. The series features high speed, high accuracy, high ripple rejection and low dropout voltage. The series is capable of high density board installation by the small package of two low on-resistance regulators. Each output voltage is internally set in a range from 1.2V to 3.6V in increments of 0.05V with ±2% accuracy.

The EN function controls the two regulators on/off independently. In the stand-by mode, the electric charge at the output capacitor CL is discharged via the internal switch and as a result the V_{OUT} pin quickly returns to the VSS level.

The series is also compatible with low ESR ceramic capacitors. The high level of output stability is maintained even during frequent load fluctuations, due to the excellent transient response performance. The two regulators are completely isolated so that a cross talk during load fluctuations is minimized.

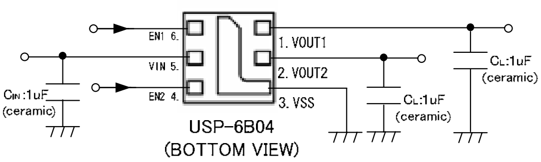
■APPLICATIONS

- Smart phones / Mobile phones
- Portable game consoles
- Digital audio equipments
- Digital still cameras / Camcorders

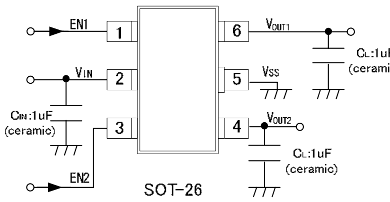
■FEATURES

Maximum Output Current	: 150mA
Operating Voltage Range	: 1.6V～5.5V
Output Voltage	: 1.2V～3.6V (±2%) 0.05V increments
Dropout Voltage	: 190mV @I_{OUT}=150mA (V_{OUT}=3.3V)
Low Power Consumption	: 55μA / ch (TYP.)
Stand-by Current	: 0.1μA
Ripple Rejection	: 75dB@1kHz
EN Function	: Active High C_L High Speed Auto Discharge
Protection Circuit	: Current Limit 250mA (TYP.) Short Circuit 50mA (TYP.)
Output Capacitor	: 1.0μF Ceramic Capacitor
Operating Ambient Temperature	: -40℃~+85℃
Packages	: SOT-26 USPN-6 USP-6B04
Environmentally Friendly	: EU RoHS Compliant, Pb Free

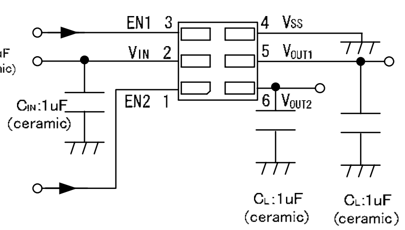
■TYPICAL APPLICATION CIRCUITS



USP-6B04
(BOTTOM VIEW)



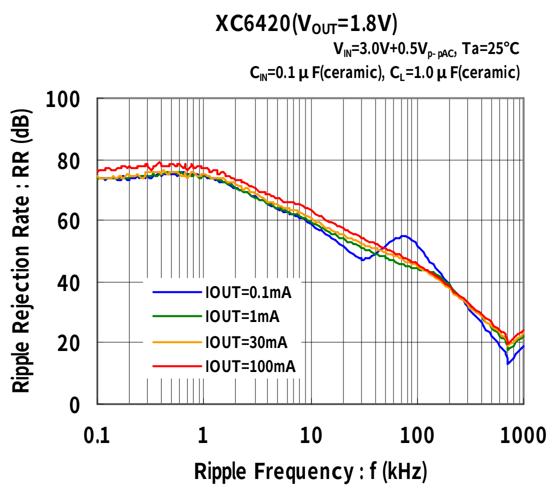
SOT-26
(TOP VIEW)



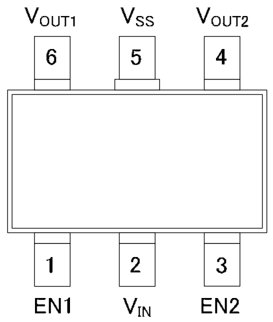
USPN-6
(BOTTOM VIEW)

■TYPICAL PERFORMANCE CHARACTERISTICS

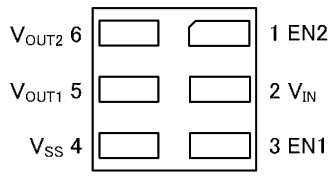
Ripple Rejection



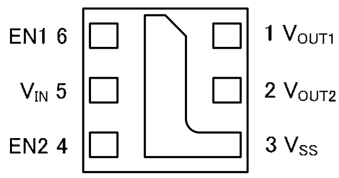
■PIN CONFIGURATION



SOT-26
(TOP VIEW)



USPN-6
(BOTTOM VIEW)



USP-6B04
(BOTTOM VIEW)

■PIN ASSIGNMENT

PIN NUMBER			PIN NAME	FUNCTIONS
SOT-26	USPN-6	USP-6B04		
1	3	6	EN1	ON/OFF Control 1
2	2	5	V_{IN}	Power Input
3	1	4	EN2	ON/OFF Control 2
4	6	2	V_{OUT2}	Output 2
5	4	3	V_{SS}	Ground
6	5	1	V_{OUT1}	Output 1

■ PRODUCT CLASSIFICATION

●Ordering Information

XC6420①②③④⑤⑥-⑦(*1)

DESIGNATOR	ITEM	SYMBOL	DESCRIPTION
①	Basic Function	A	EN1: Active High, EN2: Active High V_{OUT1}: with C_L Auto Discharge, V_{OUT2}: with C_L Auto Discharge
②	Enable Pin	B	EN1: With Pull-down, With EN2: Pull-down
③④	Output Voltage	01～	See the chart below
⑤⑥-⑦ (*1)	Packages (Order Unit)	MR-G	SOT-26 (3,000/Reel)
		7R-G	USPN-6 (5,000/Reel)
		DR-G	USP-6B04 (5,000/ Reel)

(*1) The "-G" suffix denotes Halogen and Antimony free as well as being fully EU RoHS compliant.

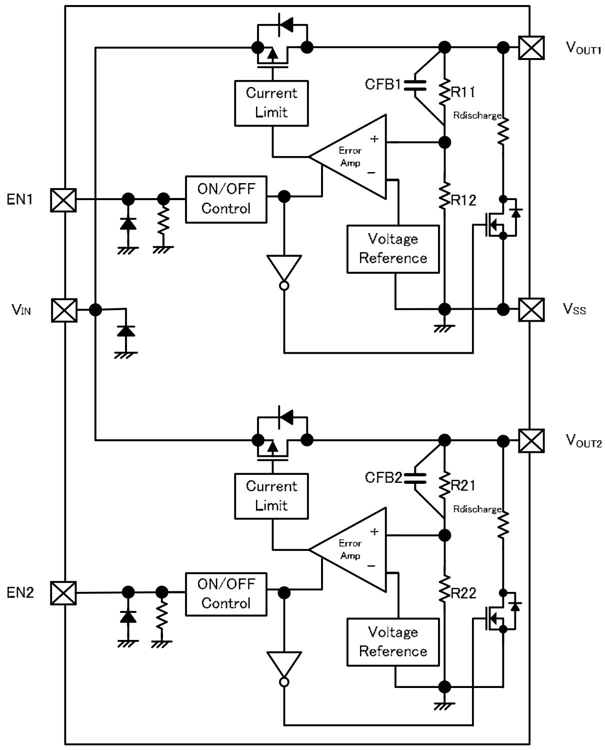
DESIGNATOR ③④

③④	V_{OUT1}(V)	V_{OUT2}(V)	③④	V_{OUT1}(V)	V_{OUT2}(V)
01	1.20	1.20	31	1.50	2.80
02	1.20	1.50	32	1.80	2.80
03	1.20	2.50	33	2.80	2.80
04	1.20	2.85	34	2.80	3.00
05	1.20	3.00	35	2.80	3.30
06	1.20	3.30	36	1.20	3.60
07	1.50	1.50	37	3.60	1.20
08	1.50	1.80	38	1.20	2.80
09	1.50	2.50	39	3.30	2.00
10	1.50	2.85	40	3.00	3.30
11	1.50	3.00	41	3.30	3.30
12	1.50	3.30	42	1.30	1.50
13	1.80	1.80	43	2.60	2.80
14	1.80	2.50	44	3.10	3.30
15	2.85	2.85	45	1.50	2.60
16	1.80	2.85	46	2.60	3.30
17	1.80	3.00	47	3.40	3.40
18	3.00	1.80	48	2.85	2.60
19	1.80	3.30	49	3.30	1.80
20	2.50	2.50	50	1.80	1.20
21	2.50	2.80	51	3.10	3.10
22	2.50	2.85	52	1.50	3.10
23	3.30	1.50	53	3.30	2.80
24	2.50	3.00	54	3.00	2.80
25	2.50	3.30	55	3.30	3.00
26	2.85	3.00			
27	2.85	3.30			
28	3.00	3.00			
29	1.20	1.80			
30	1.30	2.80			

*For other output voltage combinations, please contact your local Torex sales office or representative.

■BLOCK DIAGRAMS

XC6420ABxxxxseries



* Diodes inside the circuits are ESD protection diodes and parasitic diodes.

■ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	Vss-0.3〜+7.0	V
Output Current		$I_{OUT1}+I_{OUT2}$	600 (*1)	mA
Output Voltage 1 / Output Voltage2		V_{OUT1} /V_{OUT2}	V_{SS}-0.3〜V_{IN}+0.3	V
EN1/EN2 Input Voltage		V_{EN1} /V_{EN2}	V_{SS}-0.3〜+7.0	V
Power Dissipation	SOT-26	Pd	250	mW
			600 (PCB mounted) (*2)	
	USPN-6		100	
			600 (PCB mounted) (*2)	
	USP-6B04		600 (PCB mounted)(*2)	
Operating Ambient Temperature		Topr	-40〜+85	℃
Storage Temperature		Tstg	-55〜+125	℃

(*1) Please use within the range of Pd > { (V_{IN}-V_{OUT1})×I_{OUT1} + (V_{IN}-V_{OUT2})×I_{OUT2} }

(*2) This is a reference data taken by using the test board. Please refer to 22〜24 for detail information of test condition.

■ELECTRICAL CHARACTERISTICS

●XC6420 series

Regulator 1, Regulator 2 (*8)

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS	CIRCUITS
Output Voltage	$V_{OUT(E)}$ (*2)	$V_{EN}=V_{IN}$, $I_{OUT}=10mA$	$V_{OUT(T)}$ ×0.98 (*3)	$V_{OUT(T)}$ (*4)	$V_{OUT(T)}$ ×1.02 (*3)	V	①
Maximum Output Current	I_{OUTMAX}	$V_{EN}=V_{IN}$	150	-	-	mA	①
Load Regulation	ΔV_{OUT}	$V_{EN}=V_{IN}$ $0.1mA \leqq I_{OUT} \leqq 150mA$	-	25	45	mV	①
Dropout Voltage (*5)	Vdif	$I_{OUT}=150mA$, $V_{EN}=V_{IN}$	See "OUTPUT VOLTAGE CHART"			mV	①
Supply Current	I_{SS}	$V_{EN}=V_{IN}$ $I_{OUT}=0mA$	-	55	105	μA	②
Stand-by Current	I_{STB}	$V_{EN}=V_{SS}$	-	0.01	0.1	μA	②
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN} \cdot V_{OUT})$	$2.5V \leqq V_{IN} \leqq 5.0V$ $(V_{OUT(T)} \leqq 2.0V)$ $V_{EN}=V_{IN}$, $I_{OUT}=30mA$ $V_{OUT(T)}+0.5V \leqq V_{IN} \leqq 5.5V$ $(V_{OUT(T)} \geqq 2.05V)$ $V_{EN}=V_{IN}$, $I_{OUT}=30mA$	-	0.02	0.1	%/V	①
Input Voltage	V_{IN}	-	1.6	-	5.5	V	①
Output Voltage Temperature Characteristics (R&D Value)	$\Delta V_{OUT}/(\Delta Topr \cdot V_{OUT})$	$V_{EN}=V_{IN}$, $I_{OUT}=10mA$ -40℃≦Ta≦85℃	-	±100	-	ppm/℃	①
Power Supply Rejection Ratio	PSRR	$V_{EN}=V_{IN}$ $V_{IN}\{V_{OUT(T)}+1.0\}+0.5Vp\text{-}pAC$ $I_{OUT}=30mA$, f=1kHz	-	75	-	dB	③
Limit Current	I_{LIM}	$V_{EN}=V_{IN}$	150	250	-	mA	①
Short Current	I_{SHORT}	$V_{EN}=V_{IN}$ $V_{OUT}=V_{SS}$	-	50	-	mA	①
EN"H"Level Voltage	V_{ENH}	-	1.0	-	5.5	V	①
EN"L"Level Voltage	V_{ENL}	-	-	-	0.3	V	①
EN"H"Level Current	I_{ENH}	$V_{EN}=V_{IN}=5.5V$	2.5	6.0	9.1	μA	①
EN"L"Level Current	I_{ENL}	$V_{EN}=V_{SS}$	-0.1	-	0.1	μA	①
C_L Discharge Resistor	R_{DCHG}	$V_{IN}=5.5V$, $V_{EN}=V_{SS}$ $V_{OUT}=2.0V$	-	300	-	Ω	①

NOTE:
Unless otherwise stated, $V_{IN}=V_{OUT(T)}+1V$, $I_{OUT}=1mA$, $C_{IN}=C_L=1.0\mu F$.
(*1) $V_{OUT(E)}$: Effective output voltage
(*2) Characteristics of the actual $V_{OUT(E)}$ by setting output voltage is shown in the voltage chart.
(*3) $V_{OUT(T)}$: Nominal output voltage
(*4) $Vdif=\{V_{IN1}-V_{OUT1}\}$
V_{IN1}: The input voltage when V_{OUT1} appears as input voltage is gradually decreased.
V_{OUT1}: A voltage equal to 98% of the output voltage whenever an amply stabilized $I_{OUT}\{V_{OUT(T)}+1.0V\}$ is input.
(*5) E-1 : See the dropout voltage chart
(*6) Each channel is measured when the other channel is turned off ($V_{EN}=V_{SS}$).

■OUTPUT VOLTAGE CHART

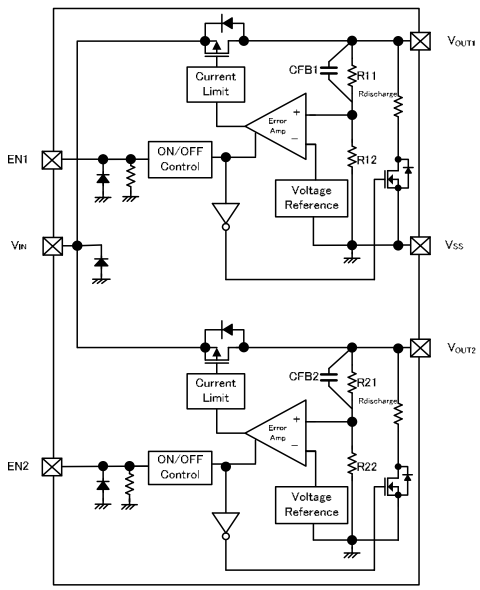
<table>
<tr><th>NOMINAL OUTPUT VOLTAGE (V)</th><th colspan="2">OUTPUT VOLTAGE (V)</th><th colspan="2">DROPOUT VOLTAGE (mV)</th></tr>
<tr><th rowspan="2">$V_{OUT(T)}$</th><th colspan="2">$V_{OUT(E)}$</th><th colspan="2">Vdif</th></tr>
<tr><th>MIN.</th><th>MAX.</th><th>TYP.</th><th>MAX.</th></tr>
<tr><td>1.200</td><td>1.176</td><td>1.224</td><td rowspan="2">560</td><td rowspan="2">710</td></tr>
<tr><td>1.250</td><td>1.225</td><td>1.275</td></tr>
<tr><td>1.300</td><td>1.274</td><td>1.326</td><td rowspan="2">530</td><td rowspan="2">600</td></tr>
<tr><td>1.350</td><td>1.323</td><td>1.377</td></tr>
<tr><td>1.400</td><td>1.372</td><td>1.428</td><td rowspan="4">460</td><td rowspan="4">520</td></tr>
<tr><td>1.450</td><td>1.421</td><td>1.479</td></tr>
<tr><td>1.500</td><td>1.470</td><td>1.530</td></tr>
<tr><td>1.550</td><td>1.519</td><td>1.581</td></tr>
<tr><td>1.600</td><td>1.568</td><td>1.632</td><td rowspan="4">380</td><td rowspan="4">470</td></tr>
<tr><td>1.650</td><td>1.617</td><td>1.683</td></tr>
<tr><td>1.700</td><td>1.666</td><td>1.734</td></tr>
<tr><td>1.750</td><td>1.715</td><td>1.785</td></tr>
<tr><td>1.800</td><td>1.764</td><td>1.836</td><td rowspan="4">300</td><td rowspan="4">450</td></tr>
<tr><td>1.850</td><td>1.813</td><td>1.887</td></tr>
<tr><td>1.900</td><td>1.862</td><td>1.938</td></tr>
<tr><td>1.950</td><td>1.911</td><td>1.989</td></tr>
<tr><td>2.000</td><td>1.960</td><td>2.040</td><td rowspan="9">280</td><td rowspan="9">390</td></tr>
<tr><td>2.050</td><td>2.009</td><td>2.091</td></tr>
<tr><td>2.100</td><td>2.058</td><td>2.142</td></tr>
<tr><td>2.150</td><td>2.107</td><td>2.193</td></tr>
<tr><td>2.200</td><td>2.156</td><td>2.244</td></tr>
<tr><td>2.250</td><td>2.205</td><td>2.295</td></tr>
<tr><td>2.300</td><td>2.254</td><td>2.346</td></tr>
<tr><td>2.350</td><td>2.303</td><td>2.397</td></tr>
<tr><td>2.400</td><td>2.352</td><td>2.448</td></tr>
</table>

<table>
<tr><th>NOMINAL OUTPUT VOLTAGE (V)</th><th colspan="2">OUTPUT VOLTAGE (V)</th><th colspan="2">DROPOUT VOLTAGE (mV)</th></tr>
<tr><th rowspan="2">$V_{OUT(T)}$</th><th colspan="2">$V_{OUT(E)}$</th><th colspan="2">Vdif</th></tr>
<tr><th>MIN.</th><th>MAX.</th><th>TYP.</th><th>MAX.</th></tr>
<tr><td>2.450</td><td>2.401</td><td>2.499</td><td>280</td><td>390</td></tr>
<tr><td>2.500</td><td>2.450</td><td>2.550</td><td rowspan="10">200</td><td rowspan="10">340</td></tr>
<tr><td>2.550</td><td>2.499</td><td>2.601</td></tr>
<tr><td>2.600</td><td>2.548</td><td>2.652</td></tr>
<tr><td>2.650</td><td>2.597</td><td>2.703</td></tr>
<tr><td>2.700</td><td>2.646</td><td>2.754</td></tr>
<tr><td>2.750</td><td>2.695</td><td>2.805</td></tr>
<tr><td>2.800</td><td>2.744</td><td>2.856</td></tr>
<tr><td>2.850</td><td>2.793</td><td>2.907</td></tr>
<tr><td>2.900</td><td>2.842</td><td>2.958</td></tr>
<tr><td>2.950</td><td>2.891</td><td>3.009</td></tr>
<tr><td>3.000</td><td>2.940</td><td>3.060</td><td rowspan="13">190</td><td rowspan="13">270</td></tr>
<tr><td>3.050</td><td>2.989</td><td>3.111</td></tr>
<tr><td>3.100</td><td>3.038</td><td>3.162</td></tr>
<tr><td>3.150</td><td>3.087</td><td>3.213</td></tr>
<tr><td>3.200</td><td>3.136</td><td>3.264</td></tr>
<tr><td>3.250</td><td>3.185</td><td>3.315</td></tr>
<tr><td>3.300</td><td>3.234</td><td>3.366</td></tr>
<tr><td>3.350</td><td>3.283</td><td>3.417</td></tr>
<tr><td>3.400</td><td>3.332</td><td>3.468</td></tr>
<tr><td>3.450</td><td>3.381</td><td>3.519</td></tr>
<tr><td>3.500</td><td>3.430</td><td>3.570</td></tr>
<tr><td>3.550</td><td>3.479</td><td>3.621</td></tr>
<tr><td>3.600</td><td>3.528</td><td>3.672</td></tr>
</table>

■OPERATIONAL EXPLANATION

The voltage divided by resistors Rx1 & Rx2 is compared with the internal reference voltage by the error amplifier. The P-channel MOSFET connected to the V_{OUT} pin is then driven by the subsequent output signal. The output voltage at the V_{OUT} pin is controlled & stabilized by a system of negative feedback. The current limit circuit and short protect circuit operate in relation to the level of output current. Further, the IC's internal circuitry can be shutdown via the EN pin's signal.

XC6420ABxxxxseries



<Low ESR Capacitor>

The XC6420 needs an output capacitor (C_L) for phase compensation. In order to ensure the effectiveness of the phase compensation, we suggest that an output capacitor (C_L) is connected as close as possible to the output pin (V_{OUT}) and the V_{SS} pin. Please use an output capacitor with a capacitance value of at least 1.0μF. Also, please place 1.0μF input capacitor C_L between V_{IN} and V_{SS} pins for stabilizing input supply voltage.

<Current Limiter, Short-Circuit Protection>

The XC6420 includes a combination of a fixed current limiter circuit & a foldback circuit, which aid the operations of the current limiter and circuit protection. When the load current reaches the current limit level, the fixed current limiter circuit operates and output voltage drops. As a result of this drop in output voltage, the foldback circuit operates, output voltage drops further and output current decreases. When the output pin is shorted, a current of about 50mA flows.

<EN Pin>

The IC's internal circuitry can be shutdown via the signal from the EN pin with the XC6420 series. In shutdown mode, the series enables the electric charge at the output capacitor C_L to be discharged via the internal switch between V_{OUT} pin and V_{SS} pin, and as a result the V_{OUT} pin quickly returns to the V_{SS} level.
The EN pin is internally pulled down by a resistor. Please note that input current through a pull-down resistor exists.

<C_L Auto-Discharge Function>

XC6420 series can quickly discharge the electric charge at the output capacitor (C_L), when a low signal to the EN pin, which enables a whole IC circuit put into OFF state, is inputted via the N-channel transistor located between the V_{OUT} pin and the V_{SS} pin (cf. BLOCK DIAGRAM). The C_L discharge resistance is set to 300Ω when V_{IN} is 5.5V (TYP.) and V_{OUT} is 2.0V (TYP.). Moreover, discharge time of the output capacitor (C_L) is set by the C_L auto-discharge resistance and the output capacitor (C_L). By setting time constant of a C_L auto-discharge resistance value [R_{DCHG}] and an output capacitor value (C_L) as τ (τ=C x R), the output voltage after discharge via the N channel transistor is calculated by the following formulas.

$$V = V_{OUT(E)} \times e^{-t/\tau}, \quad \text{or} \quad t = \tau \ln (V_{OUT(E)} / V)$$

V : Output voltage after discharge, $V_{OUT(E)}$: Output voltage, t: Discharge time,
τ : C_L auto-discharge resistance R_{DCHG} × Output capacitor (C_L) value C

■NOTES ON USE

1. For temporary, transitional voltage drop or voltage rising phenomenon, the IC is liable to malfunction should the ratings be exceeded.

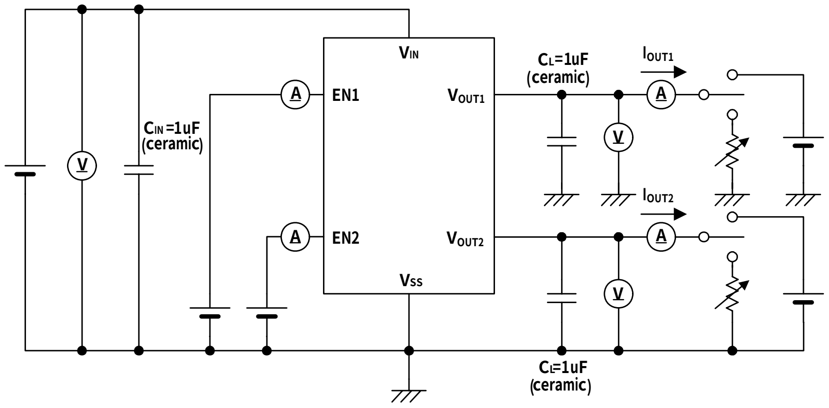
2. Torex places an importance on improving our products and its reliability.
However, by any possibility, we would request user fail-safe design and post-aging treatment on system or equipment.

3. Where wiring impedance is high, operations may become unstable due to the noise and/or phase lag depending on output current. Please strengthen V_{IN} and V_{SS} wiring in particular.

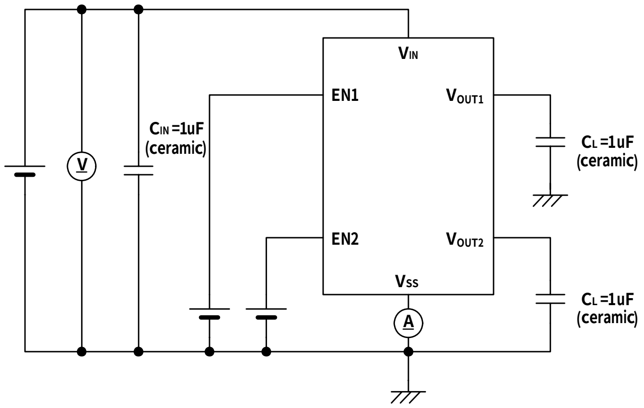
4. Please wire the input capacitor (C_{IN}) and the output capacitor (C_L) as short and close to the IC as possible.

■TEST CIRCUITS

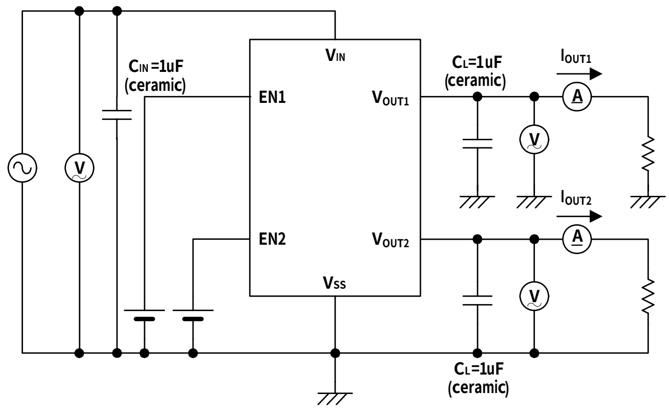
●Circuit ①



●Circuit ②



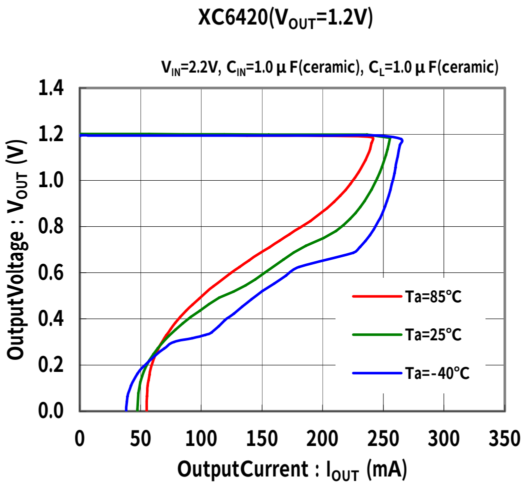
●Circuit ③

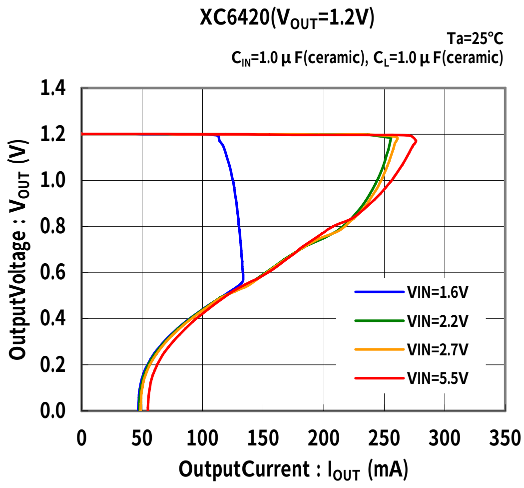


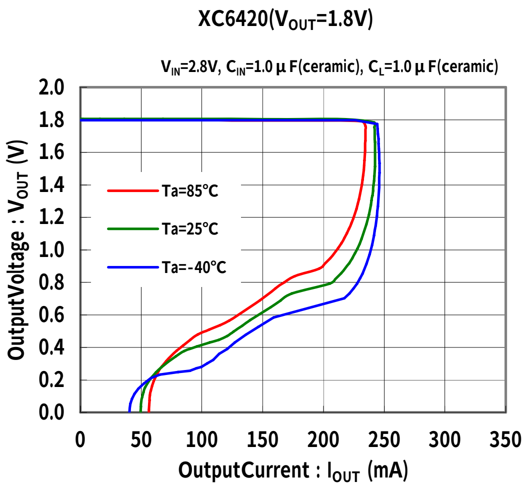
■TYPICAL PERFORMANCE CHARACTERISTICS

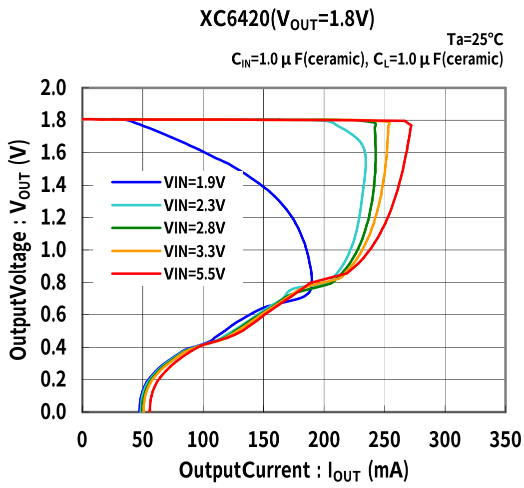
* EN Voltage condition: Unless otherwise stated, $V_{EN}=V_{IN}$.

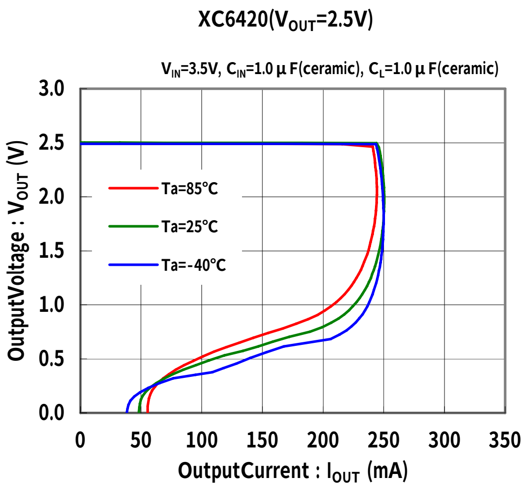
(1) OutputVoltage vs. OutputCurrent

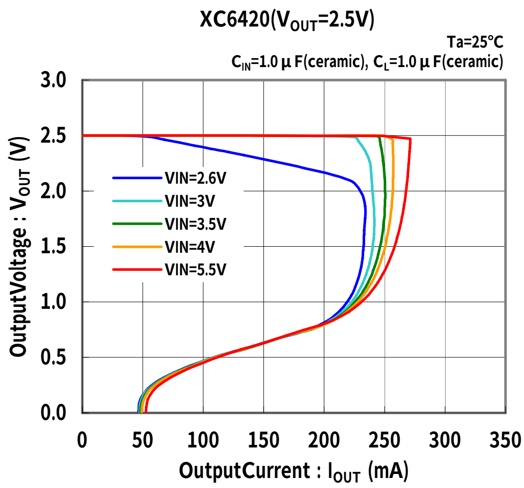










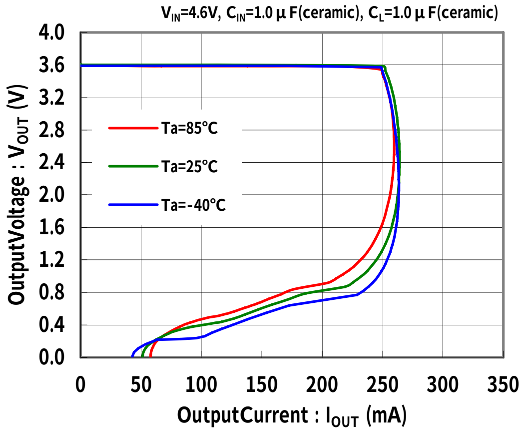


■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(1) OutputVoltage vs. OutputCurrent

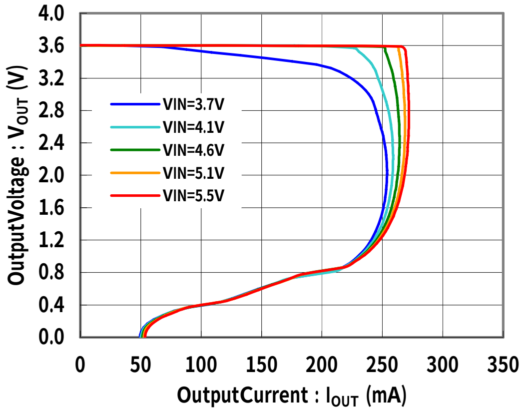
XC6420(V_{OUT}=3.6V)

V_{IN}=4.6V, C_{IN}=1.0μF(ceramic), C_L=1.0μF(ceramic)



XC6420(V_{OUT}=3.6V)

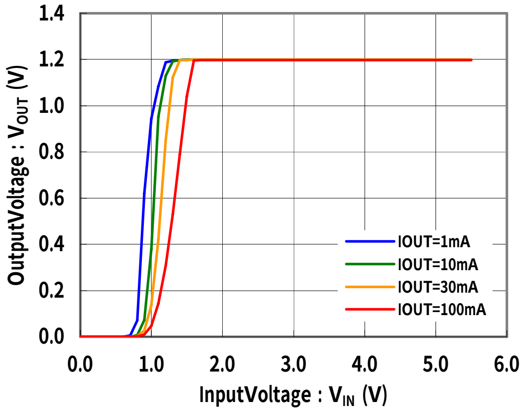
Ta=25°C
C_{IN}=1.0μF(ceramic), C_L=1.0μF(ceramic)



(2) OutputVoltage vs. InputVoltage

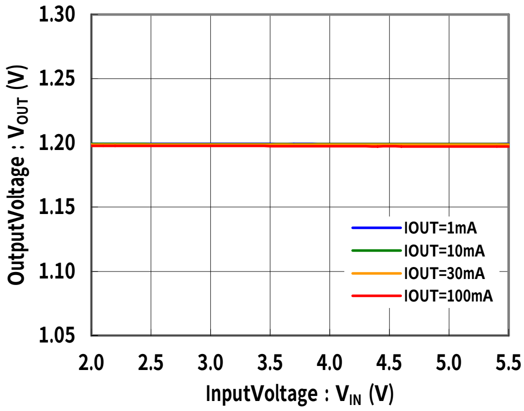
XC6420(V_{OUT}=1.2V)

Ta=25°C
C_{IN}=1.0μF(ceramic), C_L=1.0μF(ceramic)



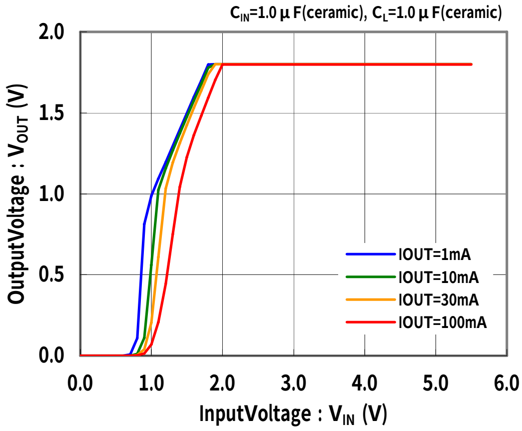
XC6420(V_{OUT}=1.2V)

Ta=25°C
C_{IN}=1.0μF(ceramic), C_L=1.0μF(ceramic)



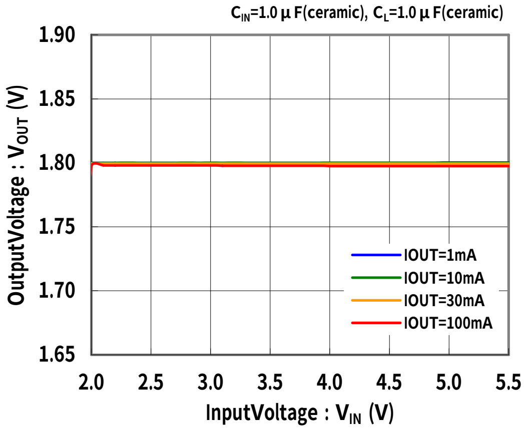
XC6420(V_{OUT}=1.8V)

Ta=25°C
C_{IN}=1.0μF(ceramic), C_L=1.0μF(ceramic)



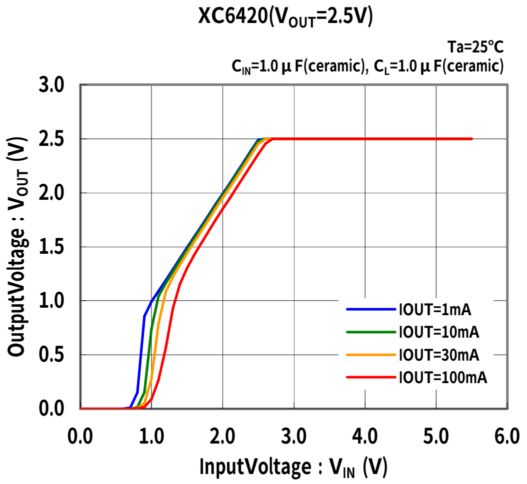
XC6420(V_{OUT}=1.8V)

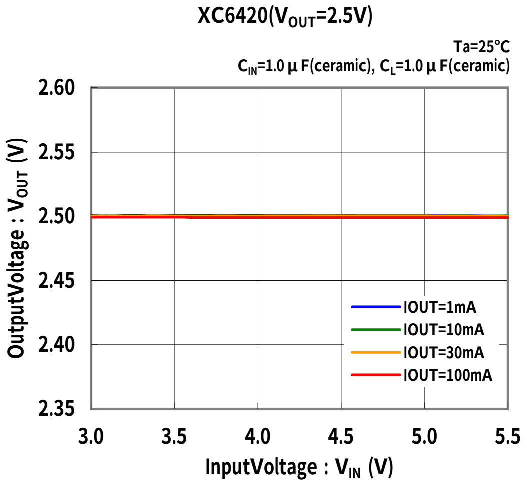
Ta=25°C
C_{IN}=1.0μF(ceramic), C_L=1.0μF(ceramic)

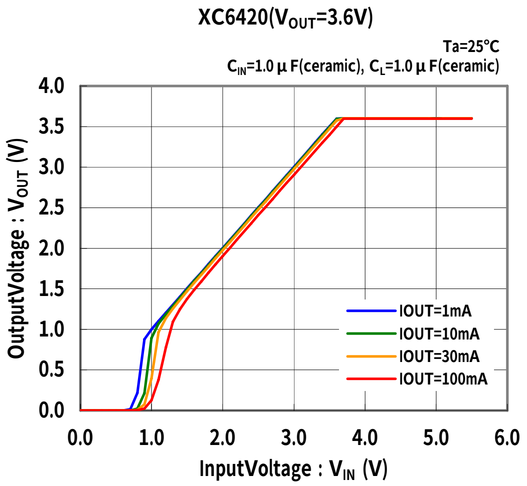


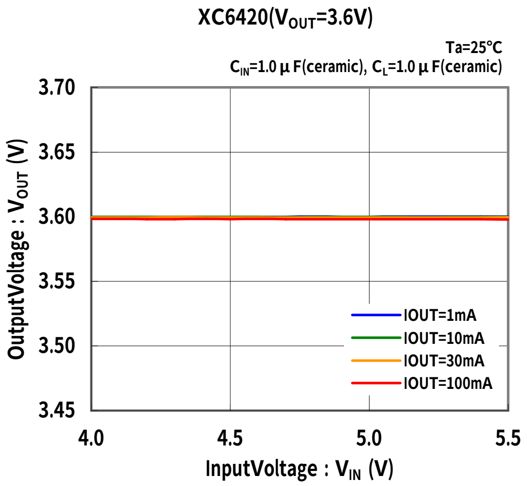
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(2) OutputVoltage vs. InputVoltage

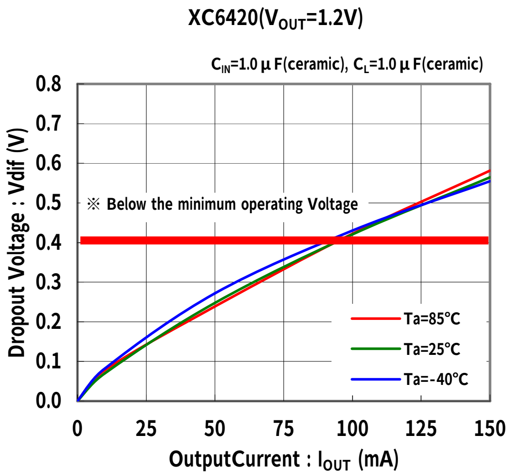


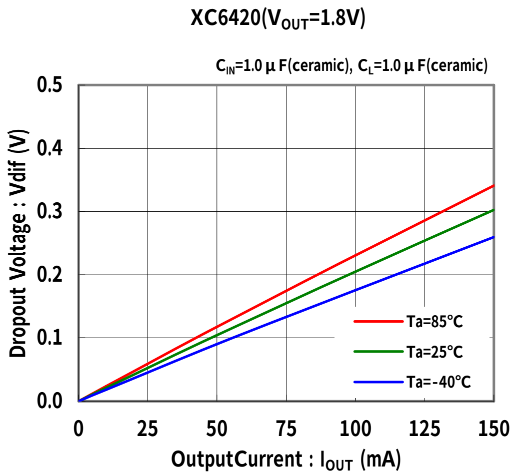






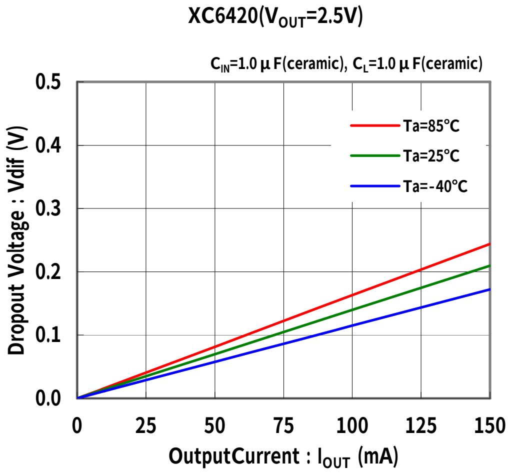
(3) DropoutVoltage vs. OutputCurrent

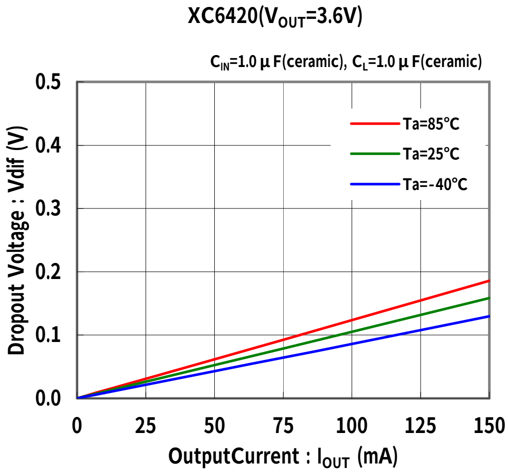




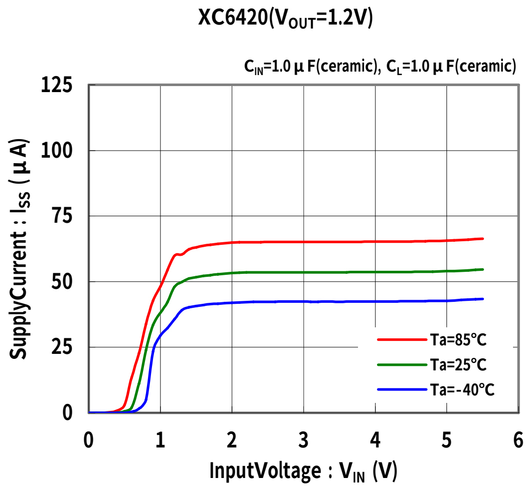
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

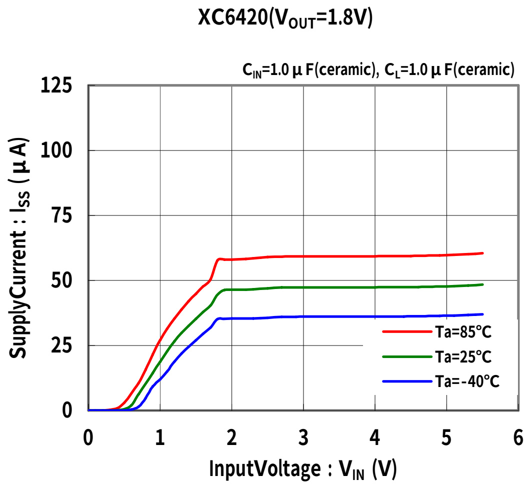
(3) DropoutVoltage vs. OutputCurrent

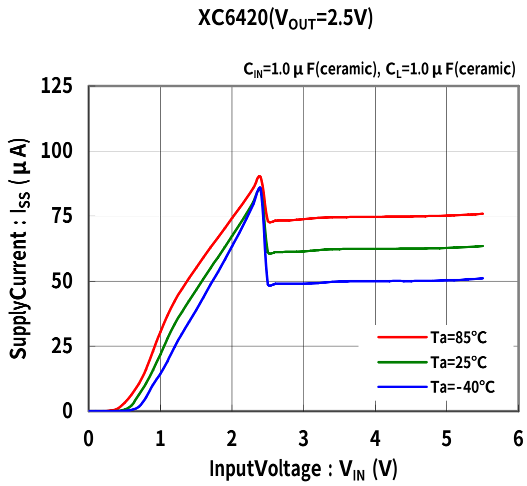


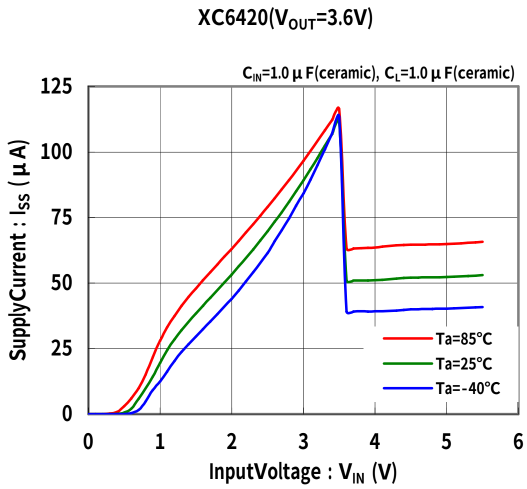


(4) SupplyCurrent vs. InputVoltage





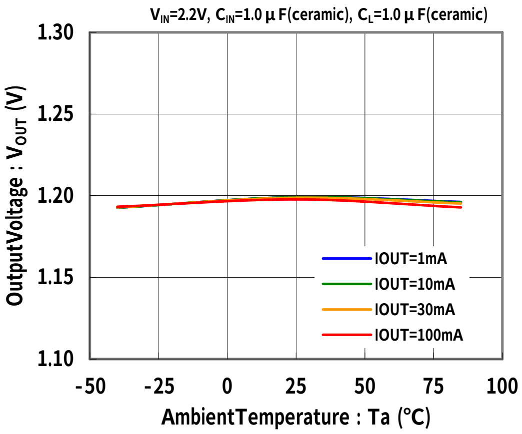




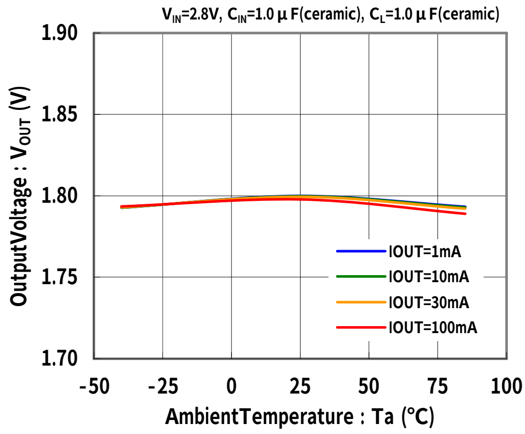
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(5) OutputVoltage vs. AmbientTemperature

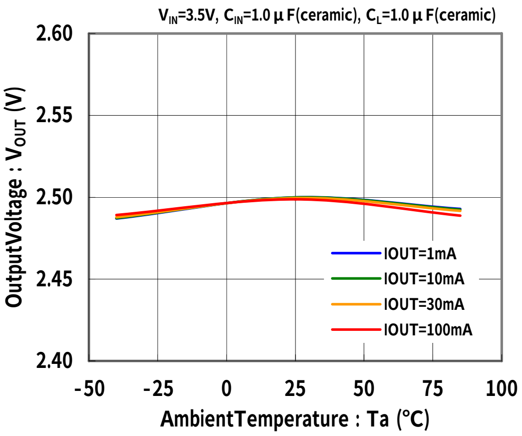
XC6420(V_{OUT}=1.2V)



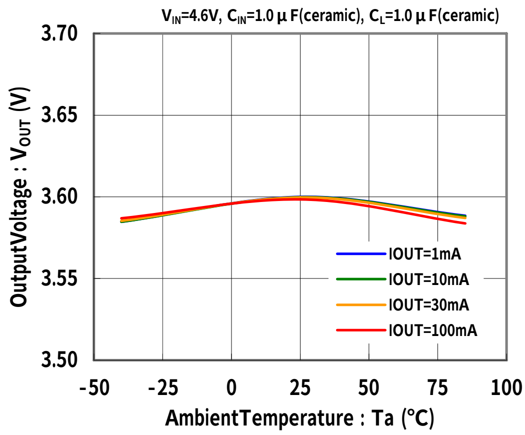
XC6420(V_{OUT}=1.8V)



XC6420(V_{OUT}=2.5V)

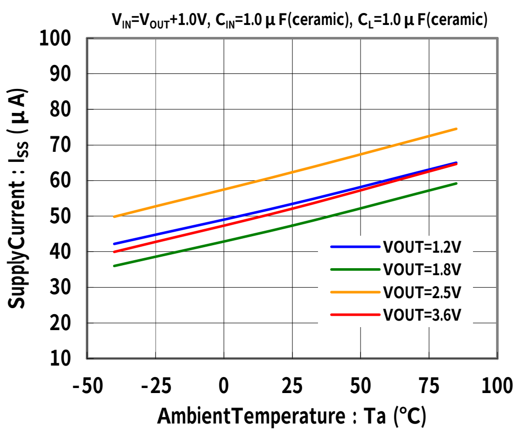


XC6420(V_{OUT}=3.6V)



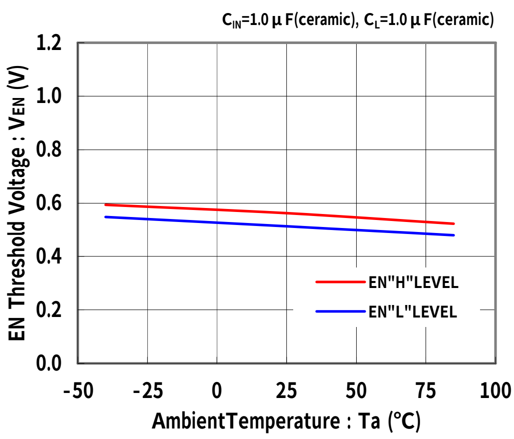
(6) SupplyCurrent vs. AmbientTemperature

XC6420



(7) EN Threshold Voltage vs. AmbientTemperature

XC6420

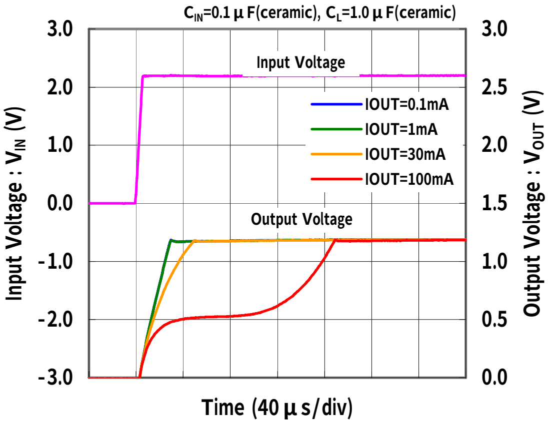


■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Rising Response Time

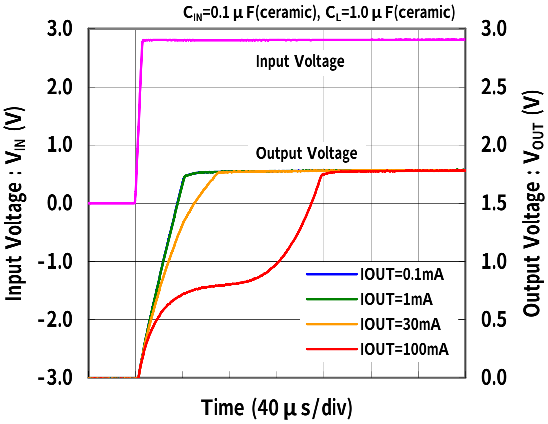
XC6420(V_{OUT}=1.2V)

V_{IN}=0V→2.2V, tr=5 μS, Ta=25°C
C_{IN}=0.1 μF(ceramic), C_L=1.0 μF(ceramic)



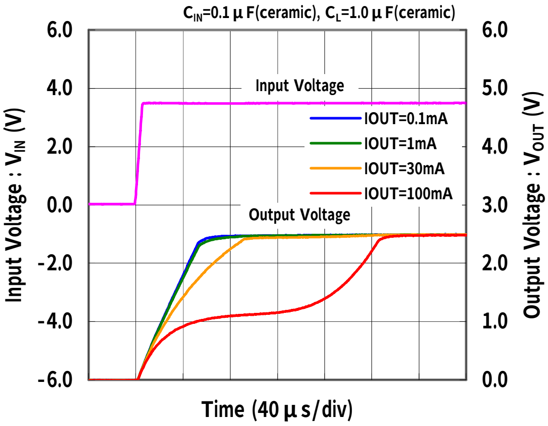
XC6420(V_{OUT}=1.8V)

V_{IN}=0V→2.8V, tr=5 μS, Ta=25°C
C_{IN}=0.1 μF(ceramic), C_L=1.0 μF(ceramic)



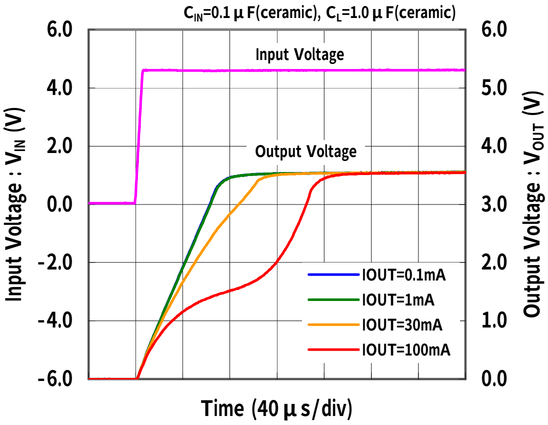
XC6420(V_{OUT}=2.5V)

V_{IN}=0V→3.5V, tr=5 μS, Ta=25°C
C_{IN}=0.1 μF(ceramic), C_L=1.0 μF(ceramic)



XC6420(V_{OUT}=3.6V)

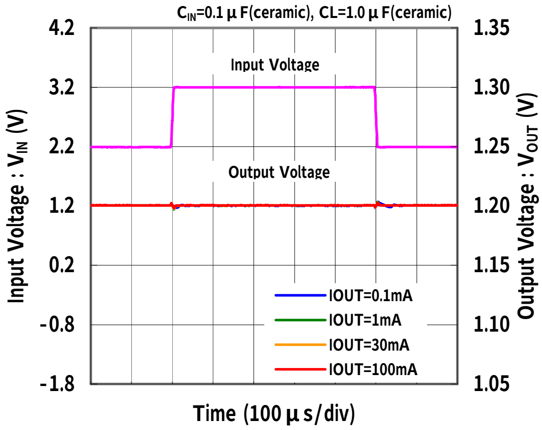
V_{IN}=0V→4.6V, tr=5 μS, Ta=25°C
C_{IN}=0.1 μF(ceramic), C_L=1.0 μF(ceramic)



(9) Input Transient Response

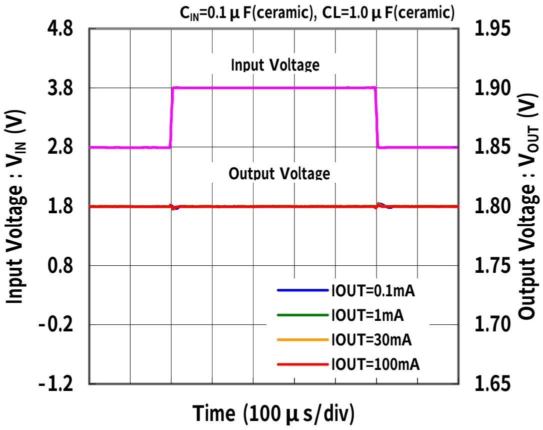
XC6420(V_{OUT}=1.2V)

V_{IN}=2.2V⇔3.2V, tr=tf=5 μS, Ta=25°C
C_{IN}=0.1 μF(ceramic), CL=1.0 μF(ceramic)



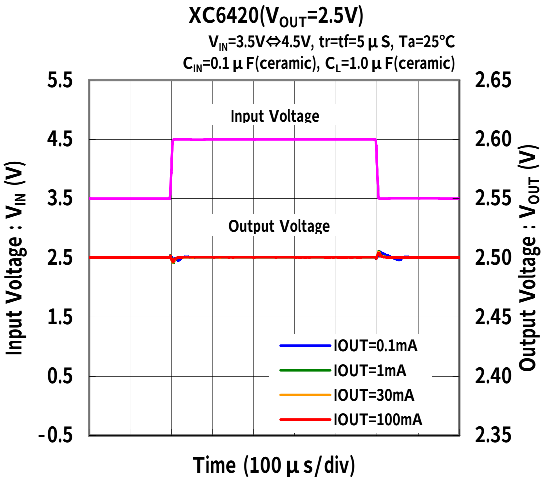
XC6420(V_{OUT}=1.8V)

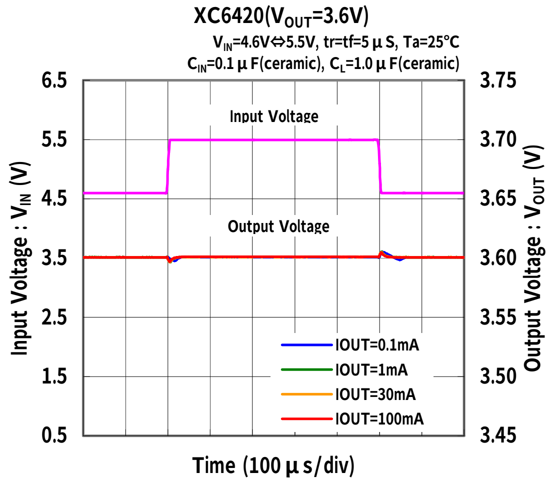
V_{IN}=2.8V⇔3.8V, tr=tf=5 μS, Ta=25°C
C_{IN}=0.1 μF(ceramic), CL=1.0 μF(ceramic)



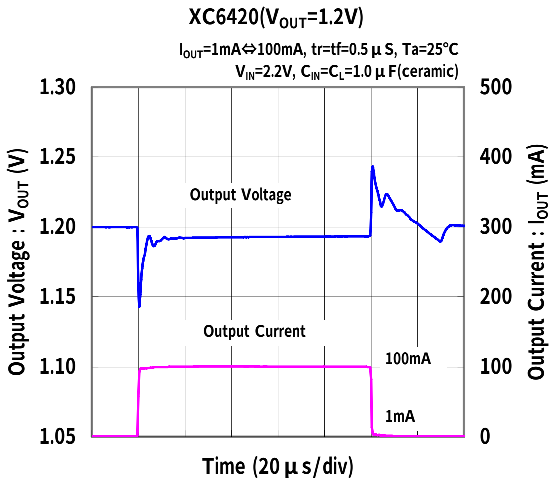
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

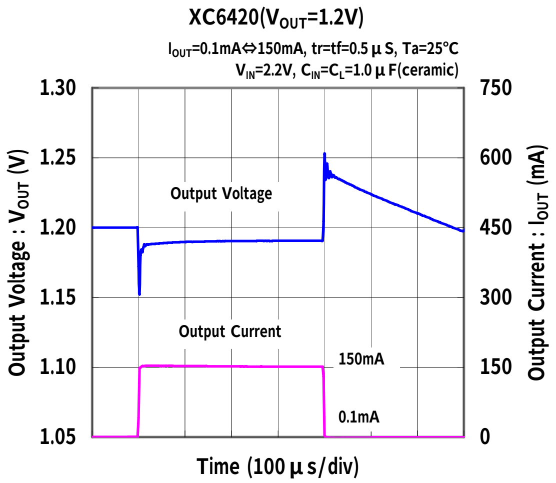
(9) Input Transient Response

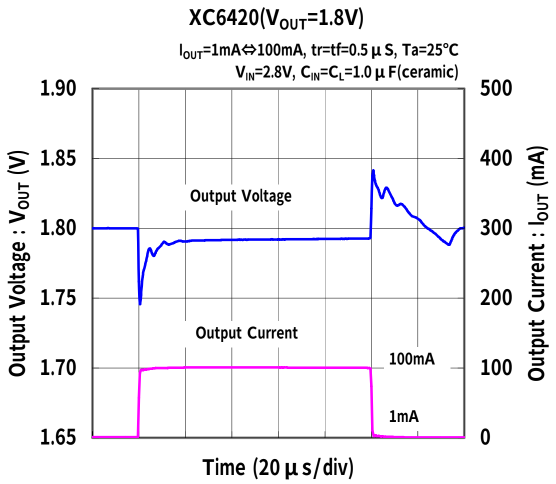


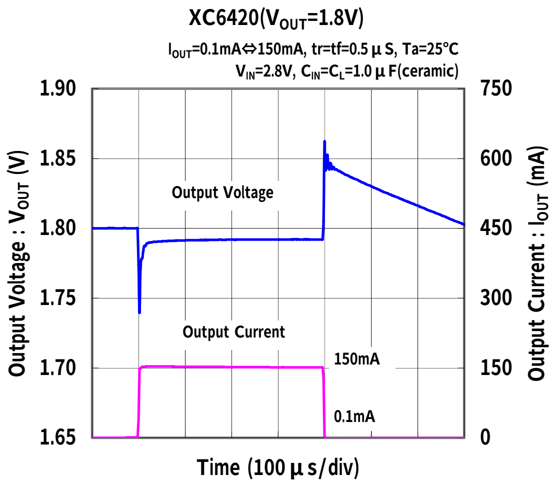


(10) Load Transient Response



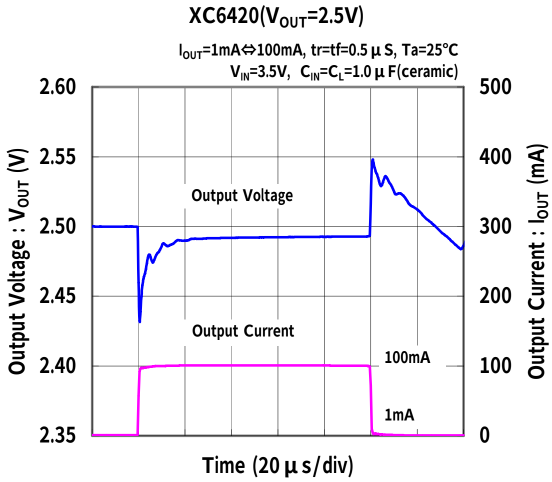


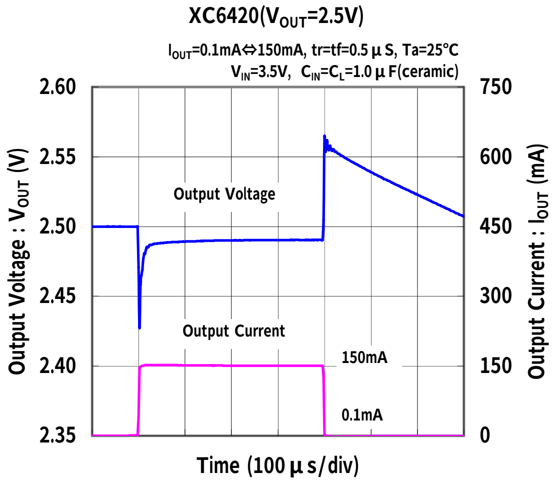


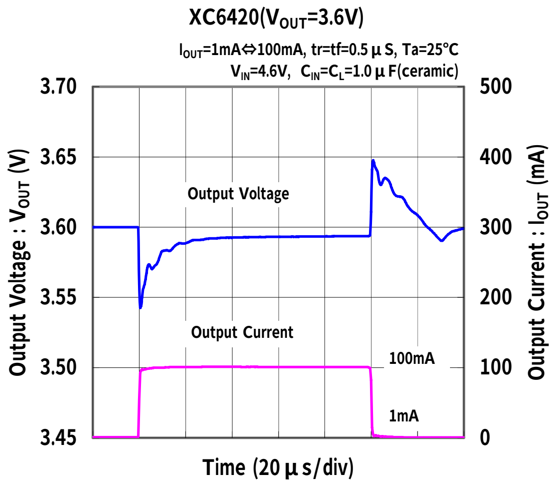


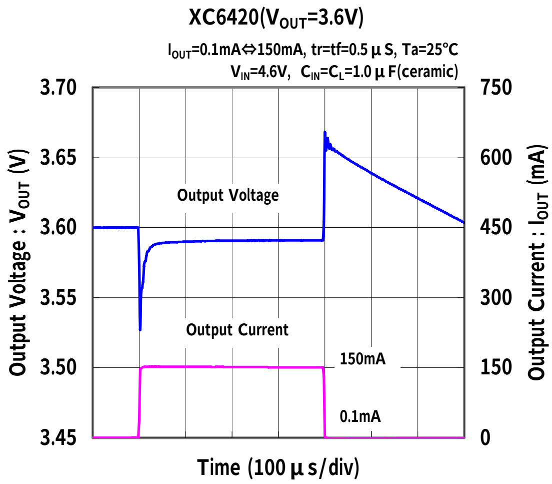
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(10) Load Transient Response

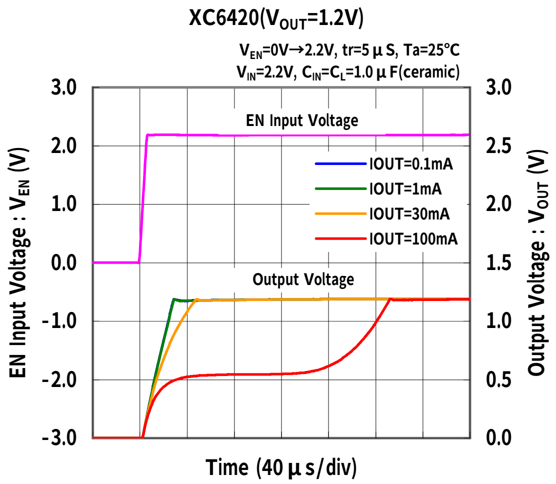


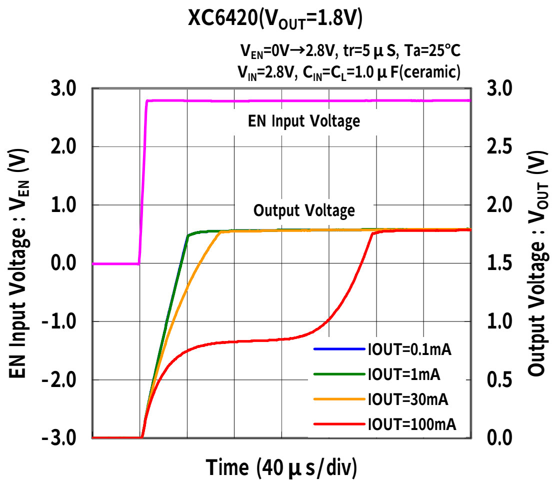






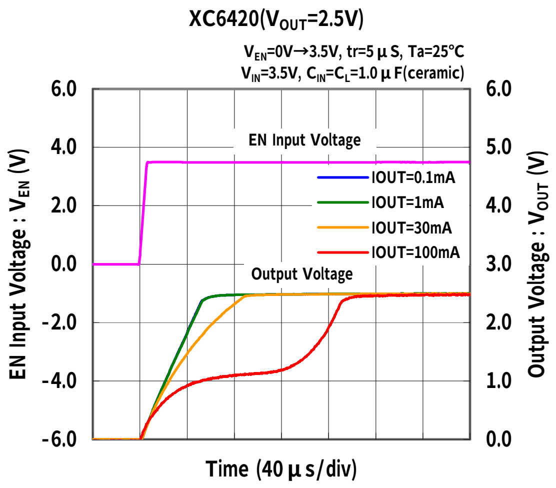
(11) EN Rising Respose Time

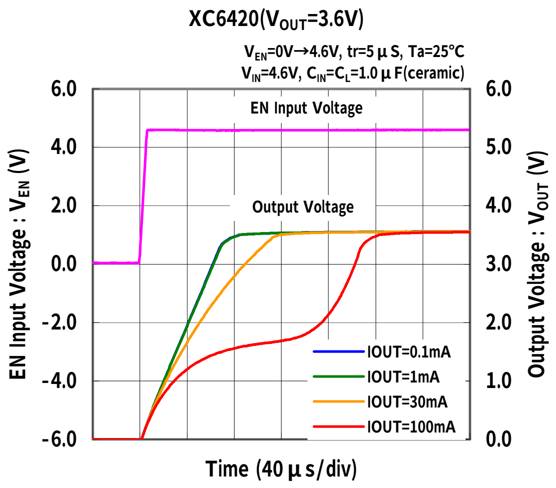




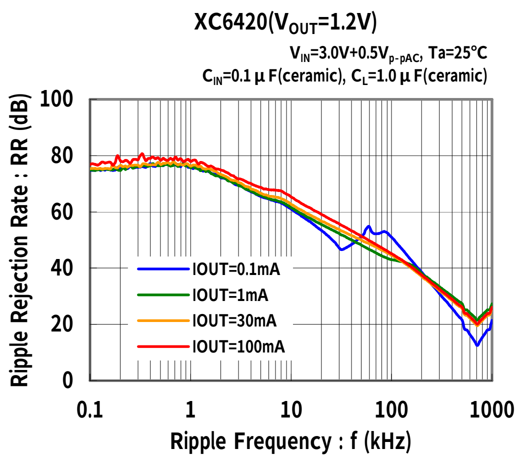
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

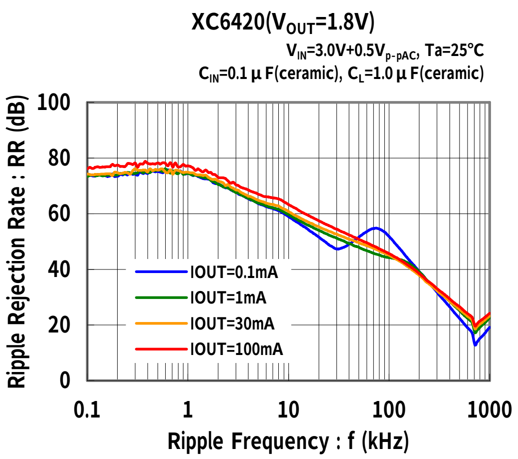
(11) EN Rising Respose Time

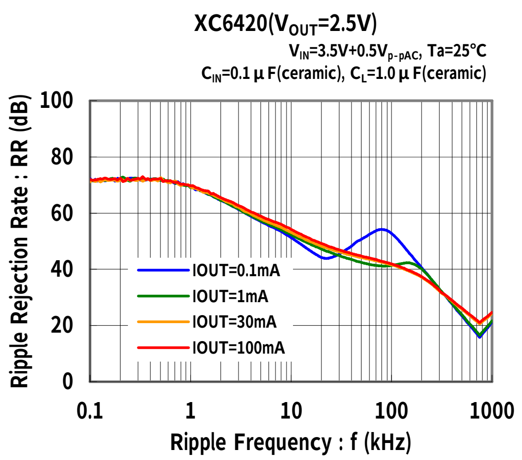


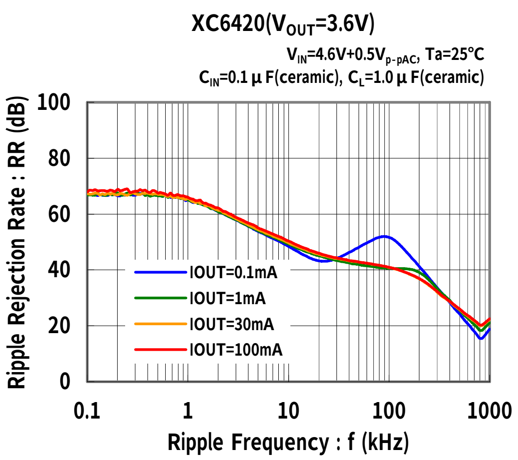


(12) Ripple Rejection





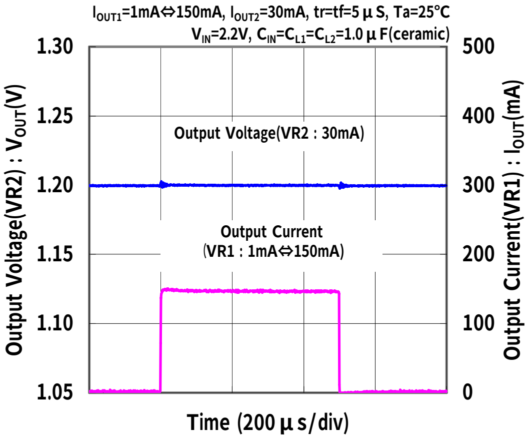




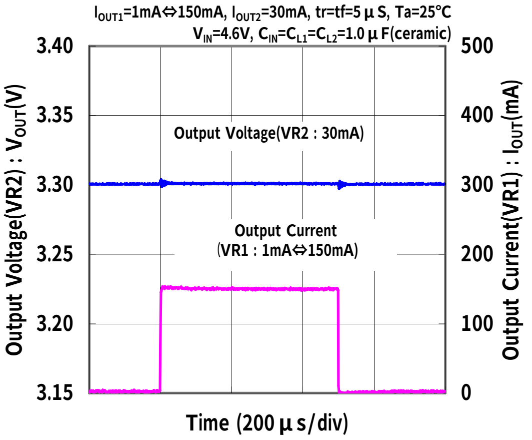
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(13) Cross Talk

XC6420(V_{OUT1}=1.2V, V_{OUT2}=1.2V)

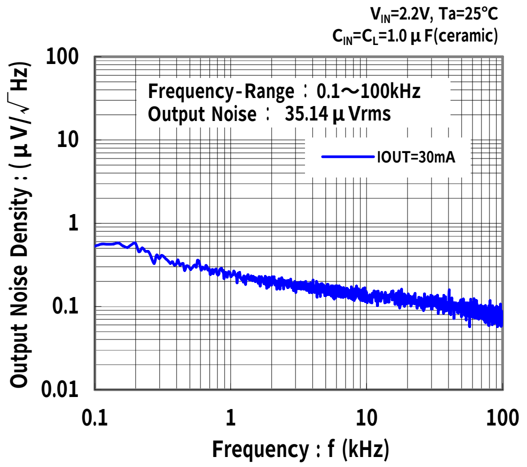


XC6420(V_{OUT1}=3.3V, V_{OUT2}=3.3V)

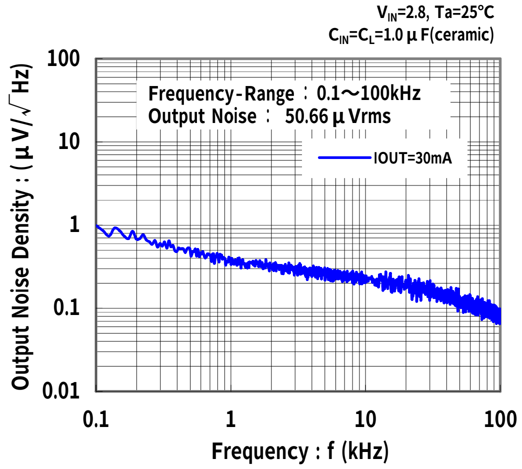


(14) Output Noise Density

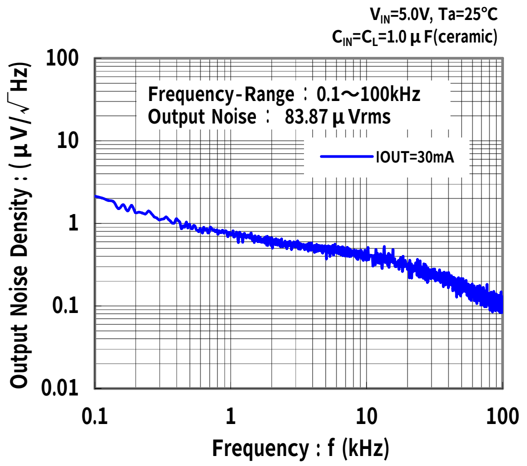
XC6420(V_{OUT}=1.2V)



XC6420(V_{OUT}=1.8V)



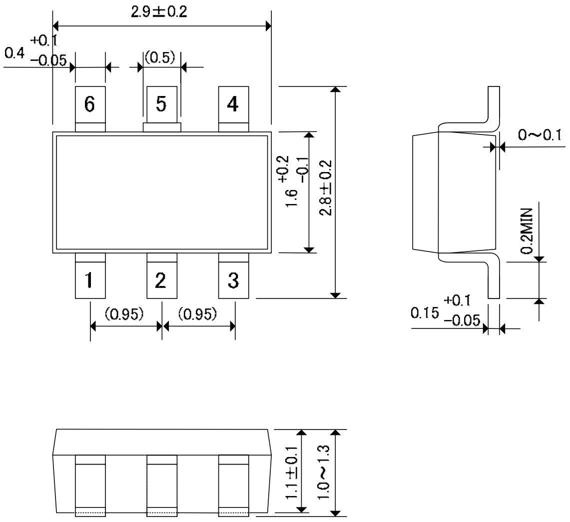
XC6420(V_{OUT}=3.3V)



■PACKAGING INFORMATION

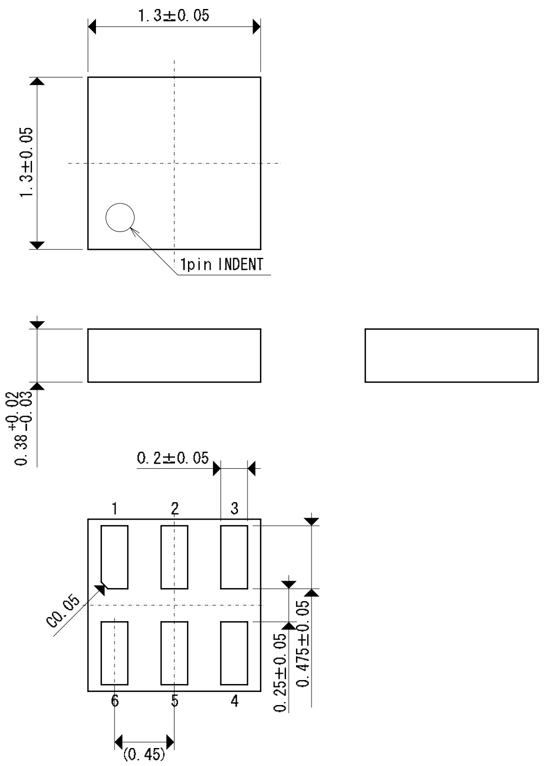
●SOT-26

(unit : mm)

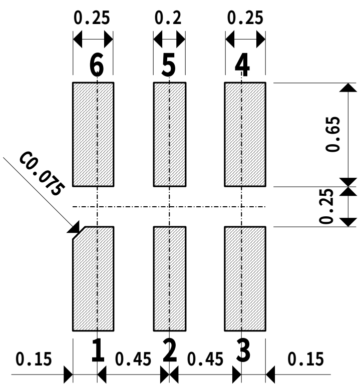


●USPN-6

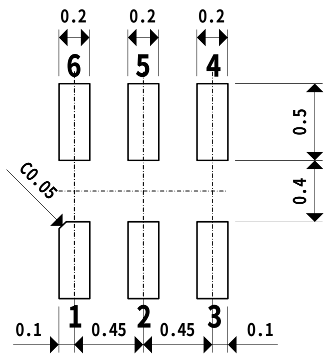
(unit : mm)



●USPN-6 Reference Pattern Layout

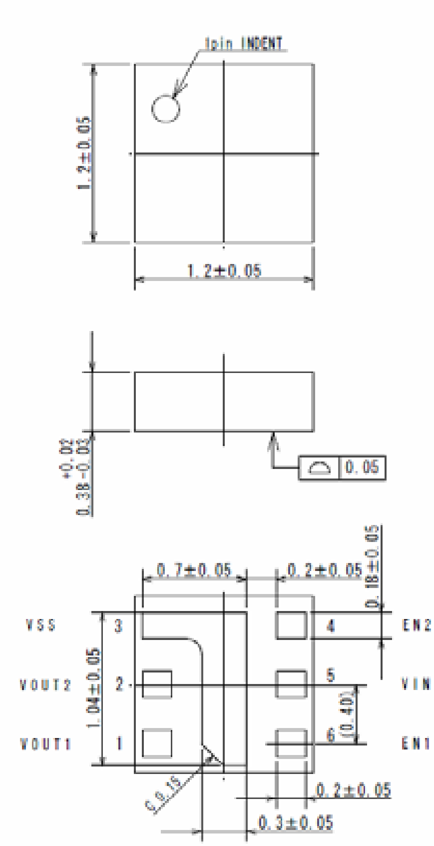


●USPN-6 Reference Metal Mask Design

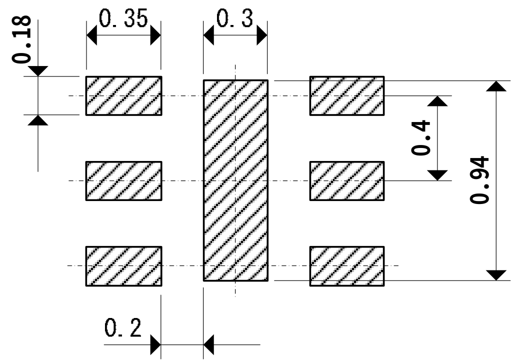


■PACKAGING INFORMATION (Continued)

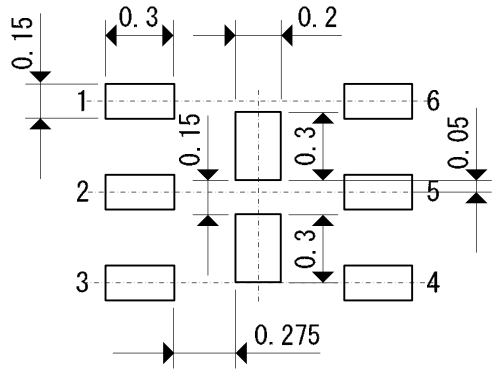
●USP-6B04



●USP-6B04 Reference Pattern Layout



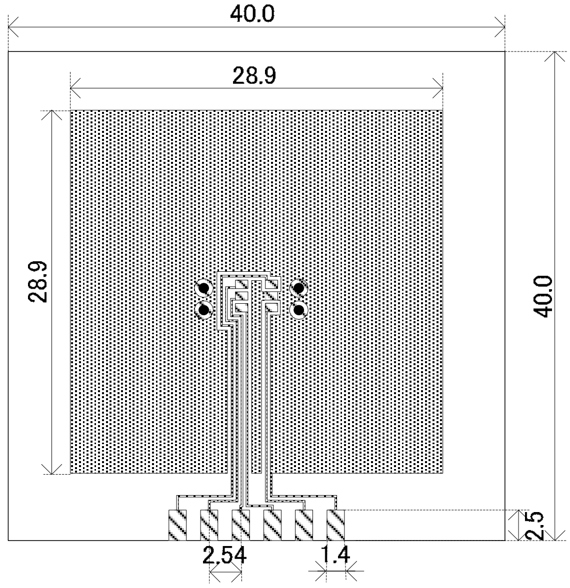
●USP-6B04 Reference Metal Mask Design



■PACKAGING INFORMATION (Continued)

● SOT-26 Power Dissipation

Power dissipation data for the SOT-26 is shown in this page.
The value of power dissipation varies with the mount board conditions.
Please use this data as the reference data taken in the following condition.



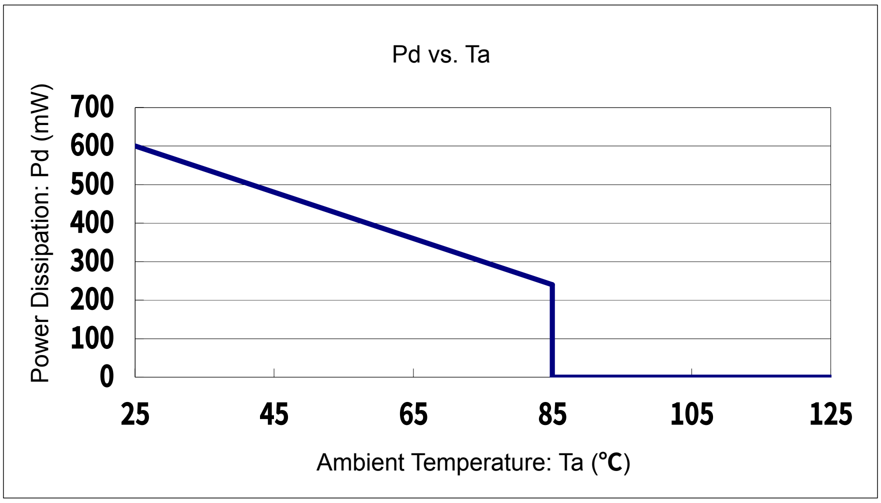
Evaluation Board (Unit: mm)

1. Measurement Condition
   - Condition: Mount on a board
   - Ambient: Natural convection
   - Soldering: Lead (Pb) free
   - Board: Dimensions 40 x 40 mm (1600 mm^2 in one side)
     Copper (Cu) traces occupy 50% of the board area
     In top and back faces
     Package heat-sink is tied to the copper traces
   - Material: Glass Epoxy (FR-4)
   - Thickness: 1.6 mm
   - Through-hole: 4 x 0.8 Diameter

2. Power Dissipation vs. Ambient Temperature

Board Mount (Tj max = 125℃)

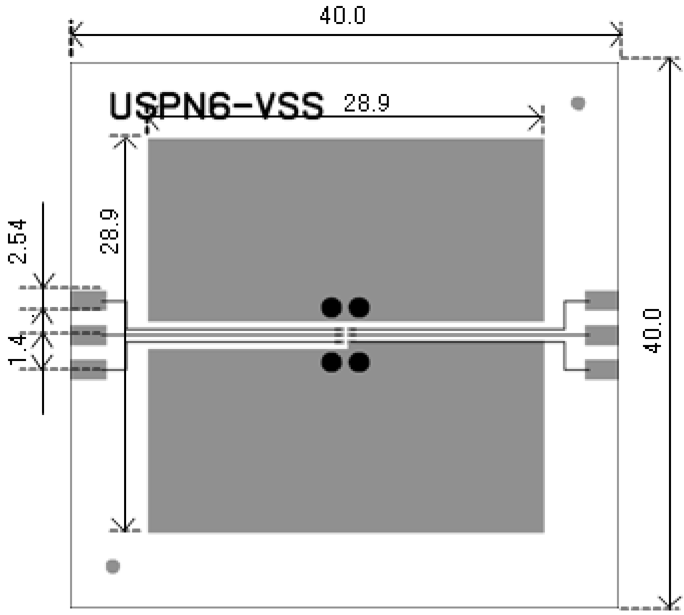
Ambient Temperature (℃)	Power Dissipation Pd (mW)	Thermal Resistance (℃/W)
25	600	166.67
85	240	



■PACKAGING INFORMATION (Continued)

● USPN-6 Power Dissipation

Power dissipation data for the USPN-6 is shown in this page.
The value of power dissipation varies with the mount board conditions.
Please use this data as the reference data taken in the following condition..



Evaluation Board (Unit: mm)

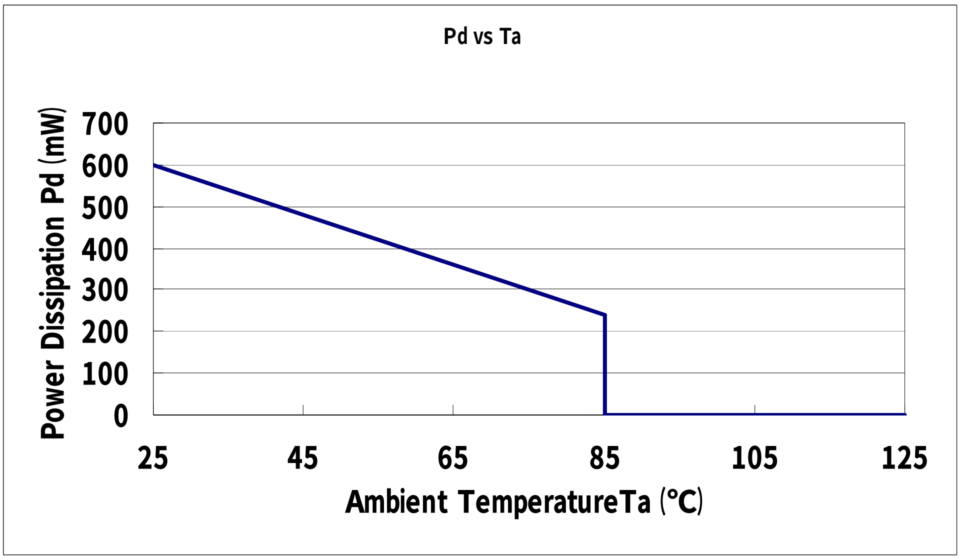
1. Measurement Condition

Condition: Mount on a board
Ambient: Natural convection
Soldering: Lead (Pb) free
Board: 40 x 40 mm (1600 mm^2)
4 Copper Layers
Each layer is connected to the package heat-sink and terminal pin No.1.
Each layer has approximately 800mm2 copper area.
Material: Glass Epoxy (FR-4)
Thickness: 1.6 mm
Through-hole: 4 x 0.8 Diameter

2. Power Dissipation vs. Ambient Temperature

Board Mount (Tj max = 125℃)

Ambient Temperature (℃)	Power Dissipation Pd (mW)	Thermal Resistance (℃/W)
25	600	166.67
85	240	



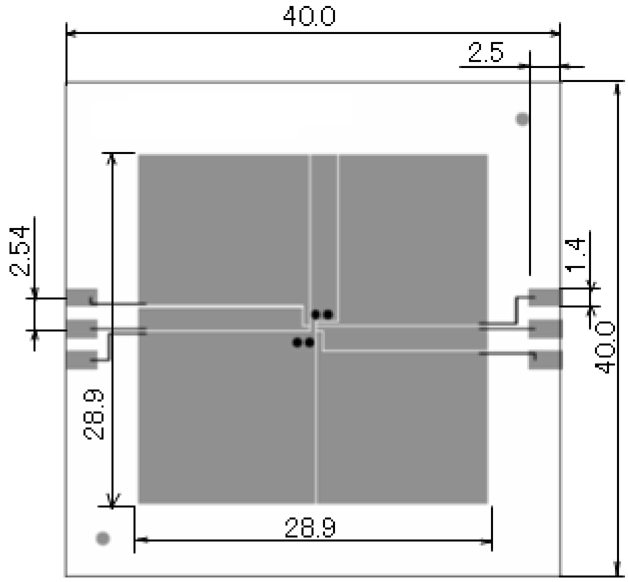
■PACKAGING INFORMATION (Continued)

● USP-6B04 Power Dissipation

Power dissipation data for the USP-6B04 is shown in this page.
The value of power dissipation varies with the mount board conditions.
Please use this data as the reference data taken in the following condition.

1. Measurement Condition

Condition: Mount on a board
Ambient: Natural convection
Soldering: Lead (Pb) free
Board Dimensions: 40mm×40mm (1600mm^2 in one side)
1st Inner Metal Layer about 50%
2nd Inner Metal Layer about 50%
3rd Inner Metal Layer about 50%
4th Inner Metal Layer about 50%
Each heat sink back metal is connected to the Inner layers respectively.
Material: Glass Epoxy (FR-4)
Thickness: 1.0 mm
Through-hole: 4 x 0.4 Diameter

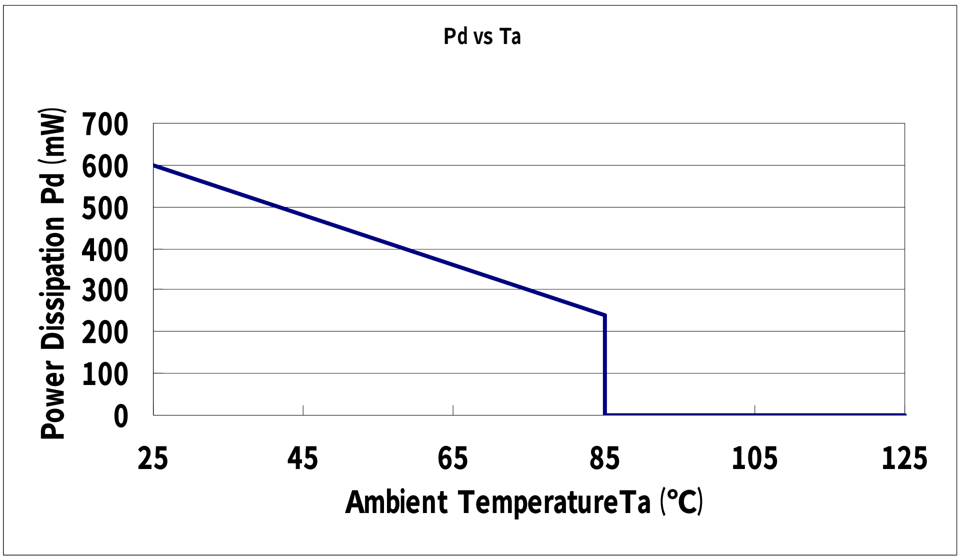


Evaluation Board (Unit: mm)

2. Power Dissipation vs. Ambient Temperature

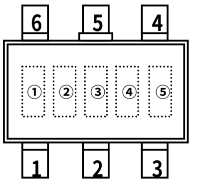
Board Mount (Tj max = 125℃)

Ambient Temperature (℃)	Power Dissipation Pd (mW)	Thermal Resistance (℃/W)
25	600	166.67
85	240	



MARKING RULE

● SOT-26



SOT-26
(TOP VIEW)

① represents product series

MARK	PRODUCT SERIES
2	XC6420******-G

②③ represents output voltage

ex.)

MARK		PRODUCT SERIES
②	③	
0	1	XC6420**01**-G

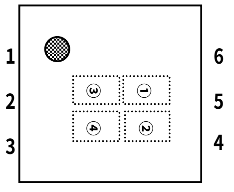
④⑤ represents production lot number.

01 to 09, 0A to 0Z, 11 to 9Z, A1 to A9, AA to Z9, ZA to ZZ in order.

(G, I, J, O, Q, W excepted)

*No character inversion used.

● USPN-6/USP-6B04



USPN-6/USP-6B04
(TOP VIEW)

①② represents internal sequential number

③④ represents production lot number.

01 to 09, 0A to 0Z, 11 to 9Z, A1 to A9, AA to Z9, ZA to ZZ in order.

(G, I, J, O, Q, W excepted)

*No character inversion used.