XC6210 Series

High Current, High Speed LDO Regulators

■GENERAL DESCRIPTION

The XC6210 series are precise, low noise, high current, positive voltage low dropout regulators. They are fabricated using Torex's CMOS process.
The series features a voltage reference, an error amplifier, a current limiter, and a phase compensation circuit plus a driver transistor.
With a low ON resistance driver transistor built into, batteries can be used until input-output voltage differential is minimal and can accordingly be used for a longer time.
The series is also compatible with low ESR ceramic capacitors which give added output stability.
The output voltage of the LDO is selectable in 0.05V increments within the range of 0.8V to 5.0V.
The current limiter's foldback circuit also operates as the output current limiter and the output pin protection.
The IC's internal regulator circuit can be placed in stand-by mode via the CE function. In the stand-by mode, power consumption is greatly reduced.

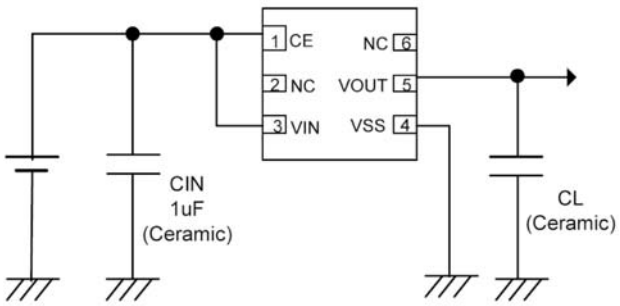
■APPLICATIONS

- CD-ROMs, CD-R / RW drive
- DVD drive
- HDD drive
- Cameras, Video recorders
- Portable AV equipment
- Battery powered equipment

■FEATURES

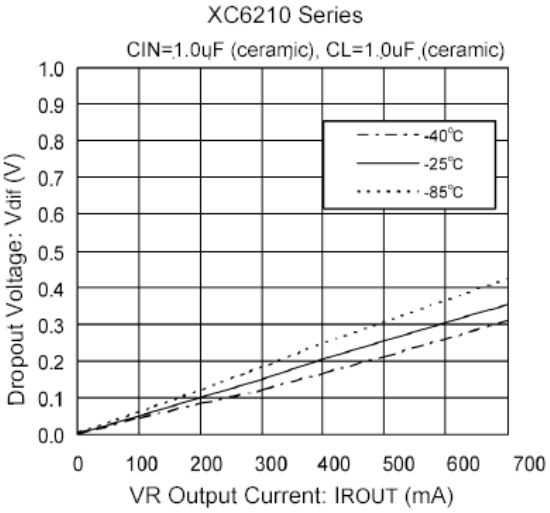
Maximum Output Current : More than 700mA
(800mA limit, TYP.)
(1.6V≦$V_{OUT(T)}$≦5.0V)
Dropout Voltage : 50mV @ 100mA
: 100mV @ 200mA
Operating Voltage Range : 1.5V ~ 6.0V
Output Voltage Range : 0.8V ~ 5.0V (0.05V increments)
Highly Accurate : ±2%(The setting voltage accuracy)
Low Power Consumption : 35μA (TYP.)
High Ripple Rejection : 60dB @1kHz
Operational Ambient Temperature
: - 40℃ ~ 85℃
CMOS
Low ESR Capacitor Compatible
Packages : SOT-25
SOT-89-5
USP-6B
Environmentally Friendly : EU RoHS Compliant, Pb Free

■TYPICAL APPLICATION CIRCUIT

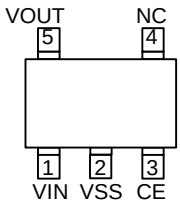


■TYPICAL PERFORMANCE CHARACTERISTICS

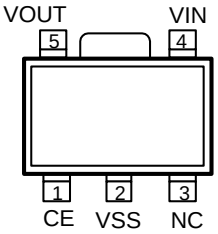
●Dropout Voltage vs. Output Current



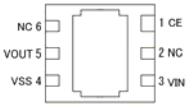
■PIN CONFIGURATION



SOT-25 (TOP VIEW)



SOT-89-5 (TOP VIEW)



USP-6B
(BOTTOM VIEW)

*The dissipation pad for the USP-6B package should be solder-plated in recommended mount pattern and metal masking so as to enhance mounting strength and heat release. If the pad needs to be connected to other pins, it should be connected to the VSS pins.

■PIN ASSIGNMENT

PIN NUMBER			PIN NAME	FUNCTION
SOT-25	SOT-89-5	USP-6B		
3	1	1	CE	ON/OFF Control
1	4	3	VIN	Power Input
2	2	4	VSS	Ground
5	5	5	VOUT	Output
4	3	2, 6	NC	No Connection

■PRODUCT CLASSIFICATION

●Selection Guide

CE Input Logic, Internal Pull-Up / Down Resistor

SERIES	CE INPUT LOGIC
XC6210A	High Active with Pull-Down Resistor
XC6210B	High Active with No Pull-Down Resistor
XC6210C	Low Active with Pull-Up Resistor
XC6210D	Low Active with No Pull-Up Resistor

●Ordering Information

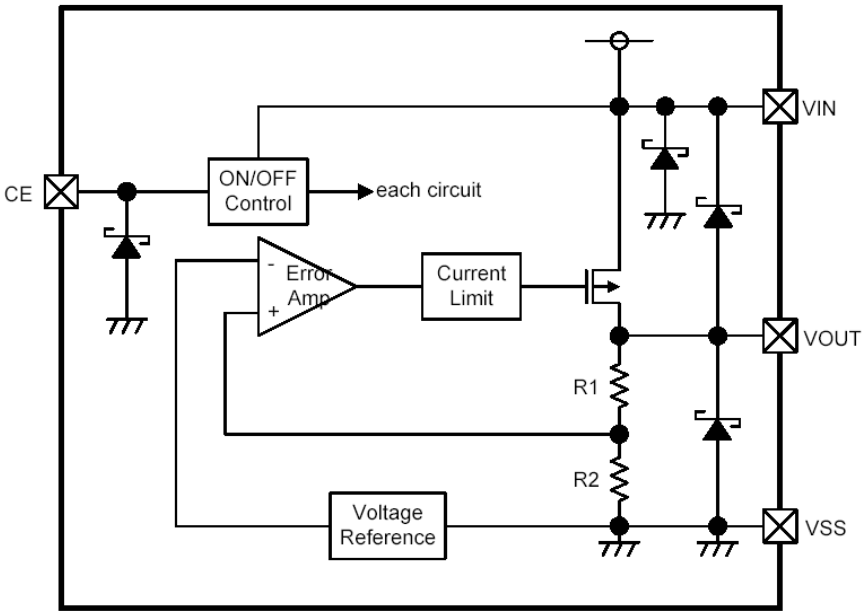
XC6210 ①②③④⑤⑥-⑦(*1)

DESIGNATOR	DESRIPTION	SYMBOL	DESCRIPTION
①	CE Pin Functions	A	High Active with pull-down resistor
		B	High Active with no pull-down resistor
		C	Low Active with pull-up resistor
		D	Low Active with no pull-up resistor
② ③	Output Voltage	08~50	ex.) 3.0V → ②=3, ③=0
④	Output Voltage Accuracy	2	0.1V increments, ±2% (VOUT≦1.5V→less than ±30mV) ex.) 2.80V→②=2, ③=8, ④=2
		A	0.05V increments, ±2% (VOUT≦1.5V→less than ±30mV) ex.) 2.85V→②=2, ③=8, ④=A
⑤⑥-⑦	Packages Taping Type (*2)	MR	SOT-25
		MR-G	SOT-25 (Halogen & Antimony free)
		PR	SOT-89-5
		PR-G	SOT-89-5 (Halogen & Antimony free)
		DR	USP-6B
		DR-G	USP-6B (Halogen & Antimony free)

(*1) The "-G" suffix indicates that the products are Halogen and Antimony free as well as being fully RoHS compliant.

(*2) The device orientation is fixed in its embossed tape pocket. For reverse orientation, please contact your local Torex sales office or representative. (Standard orientation: ⑤R-⑦, Reverse orientation: ⑤L-⑦)

■BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATINGS

Ta=25℃

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	6.5	V
Output Current *		I_{OUT}	900	mA
Output Voltage		V_{OUT}	V_{SS} -0.3 ~ V_{IN} +0.3	V
CE Pin Voltage		V_{CE}	V_{SS} -0.3 ~ 6.5	V
Power Dissipation	SOT-25	Pd	250	mW
	SOT-89-5		500	
	USP-6B		100	
Operating Temperature Range		Topr	- 40 ~ + 85	℃
Storage Temperature Range		Tstg	- 55 ~ + 125	℃

* I_{OUT}=Pd / (V_{IN} – V_{OUT})

■ELECTRICAL CHARACTERISTICS

●XC6210 series

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Output Voltage (*2), (*3)	$V_{OUT(E)}$	V_{IN}=$V_{OUT(T)}$+1.0V, I_{OUT}=30mA V_{CE}=ON (V_{IN} or V_{SS})	x 0.98	$V_{OUT(T)}$	x 1.02	V	①
		$V_{OUT(T)}$≦1.5V, I_{OUT}=30mA V_{CE}=ON (V_{IN} or V_{SS})	(-30mV)	$V_{OUT(T)}$	(+30mV)		
Maximum Output Current [$V_{OUT(E)}$>1.6V]	I_{OUTMAX}	V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=ON (V_{IN} or V_{SS})	700	-	-	mA	①
Maximum Output Current [$V_{OUT(E)}$≦1.5V]	I_{OUTMAX}	V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=ON (V_{IN} or V_{SS})	500	-	-		
Load Regulation	△V_{OUT}	1mA≦I_{OUT}≦100mA, V_{CE}=ON(V_{IN} or V_{SS})	-	15	60	mV	①
Dropout Voltage (*4)	Vdif1	I_{ROUT}=30mA, V_{CE}=ON (V_{IN} or V_{SS})	E-1			mV	①
	Vdif2	I_{ROUT}=100mA, V_{CE}=ON (V_{IN} or V_{SS})	E-2				
Supply Current (A type)	I_{DD}	VIN=V_{CE}=$V_{OUT(T)}$+1.0V	E-3			μA	②
Supply Current (B type)		V_{IN}=V_{CE}=$V_{OUT(T)}$+1.0V	-	35	55		
Supply Current (C type)		V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=V_{SS}	E-3				
Supply Current (D type)		V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=V_{SS}	-	35	55		
Stand-by Current	ISTBY	V_{IN}=6.0V,CE=OFF(V_{IN} or V_{SS})	-0.10	-	0.10	μA	②
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle Topr \cdot V_{OUT}}$	$V_{OUT(T)}$+1.0V≦V_{IN}≦6.0V When $V_{OUT(T)}$≧4.5V, 5.5V≦V_{IN}≦6.0V V_{CE}=ON (V_{IN} or V_{SS}), I_{OUT}=30mA	-	0.01	0.20	% / V	①
Input Voltage	V_{IN}	-	1.5	-	6.0	V	-
Output Voltage Temperature Characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr \cdot \triangle V_{OUT}}$	I_{OUT}=30mA, V_{CE}=ON (V_{IN} or V_{SS}) -40℃≦Topr≦85℃	-	±100	-	ppm/℃	①
Ripple Rejection Rate	PSRR	V_{IN}=[$V_{OUT(T)}$+1.0]V_{DC}+0.5Vp-pAC When $V_{OUT(T)}$≧4.75V → V_{IN}=5.75V_{DC}+0.5V_{p-pAC} V_{CE}=ON (V_{IN} or V_{SS}), I_{OUT}=30mA, f=1kHz	-	60	-	dB	③
Current Limiter [$V_{OUT(E)}$>1.6V]	I_{LIM}	V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=ON(V_{IN} or V_{SS})	700	800	-	mA	①
Current Limiter [$V_{OUT(E)}$≦1.5V]	I_{LIM}	V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=ON(V_{IN} or V_{SS})	-	800	-		
Short-Circuit Current	I_{SHORT}	V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=ON(V_{IN} or V_{SS})	-	50	-	mA	①
CE "High" Level Voltage	V_{CEH}	-	1.3	-	6.0	V	①
CE "Low" Level Voltage	V_{CEL}	-	-	-	0.25		
CE "High" Level Current (A type)	I_{CEH}	V_{IN}=V_{CE}=$V_{OUT(T)}$+1.0V	E-4	-	E-4	μA	①
CE "High" Level Current (B / C / D type)			- 0.10	-	0.10		
CE "Low" Level Current (C type)	I_{CEL}	V_{IN}=$V_{OUT(T)}$+1.0V, V_{CE}=V_{SS}	E-5	-	E-5	μA	①
CE "Low" Level Current (A / B / D type)			- 0.10	-	0.10		

NOTE:

*1: Unless otherwise stated, V_{IN}=$V_{OUT(T)}$+1.0V

*2: $V_{OUT(T)}$=Specified output voltage

*3: $V_{OUT(E)}$=Effective output voltage

(i.e. the output voltage when " $V_{OUT(T)}$+1.0V" is provided while maintaining a certain I_{OUT} value).

*4: Vdif ={$V_{IN1}^{(*6)}$-$V_{OUT1}^{(*5)}$ }

*5: A voltage equal to 98% of the output voltage whenever a stabilized V_{OUT1}=I_{OUT}{$V_{OUT(T)}$+1.0V} is input.

*6: V_{IN}1= the input voltage when V_{OUT1}, which appears as input voltage is gradually decreased.

*7: $V_{OUT(T)}$≦1.50V MIN. : $V_{OUT(T)}$ - 30mV, MAX. : $V_{OUT(T)}$ +30mV

*8: CE conditions: XC6210A / B type: ON=V_{IN}, OFF=V_{SS}

XC6210C / D type: ON=V_{SS}, OFF=V_{IN}

■VOLTAGE CHART

●Dropout Voltage, Supply Current, CE “H / L” Level Current Chart

Ta=25℃

SETTING OUTPUT VOLTAGE	OUTPUT VOLTAGE (Accuracy: 2%)		E-1		E-2		E-3		E-4		E-5	
			DROPOUT VOLTAGE 1 (I_{OUT}=30mA)		DROPOUT VOLTAGE 2 (I_{OUT}=100mA)		SUPPLY CURRENT		CE “H” LEVEL CURRENT		CE “L” LEVEL CURRENT	
(V)	(V)		(mV)		(mV)		(μA)		(μA)		(μA)	
$V_{OUT(T)}$	V_{OUT}		Vdif1		Vdif2		I_{DD}		I_{CEH}		I_{CEL}	
	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.
0.80	0.770	0.830	100.0	700.0	250.0	800.0	38.0	60.0	1.50	5.00	-5.00	-1.50
0.85	0.820	0.880										
0.90	0.870	0.930		600.0		700.0						
0.95	0.920	0.980										
1.00	0.970	1.030	50.0	500.0	150.0	600.0	38.5	61.5	2.00	6.50	-6.50	-2.00
1.05	1.020	1.080										
1.10	1.070	1.130		400.0		500.0						
1.15	1.120	1.180										
1.20	1.170	1.230	30.0	300.0	100.0	400.0						
1.25	1.220	1.280										
1.30	1.270	1.330		200.0		300.0						
1.35	1.320	1.380										
1.40	1.370	1.430		100.0		250.0						
1.45	1.420	1.480										
1.50	1.470	1.530	27.0	41.0	90.0	135.0	39.0	63.0	2.50	8.00	-8.00	-2.50
1.55	1.519	1.581										
1.60	1.568	1.632										
1.65	1.617	1.683										
1.70	1.666	1.734										
1.75	1.715	1.785										
1.80	1.764	1.836										
1.85	1.813	1.887										
1.90	1.862	1.938										
1.95	1.911	1.989										
2.00	1.960	2.040	25.0	37.0	80.0	120.0	39.5	64.5	3.00	9.50	-9.50	-3.00
2.05	2.009	2.091										
2.10	2.058	2.142										
2.15	2.107	2.193										
2.20	2.156	2.244										
2.25	2.205	2.295										
2.30	2.254	2.346										
2.35	2.303	2.397										
2.40	2.352	2.448										
2.45	2.401	2.499										
2.50	2.450	2.550	18.0	28.0	60.0	90.0	40.0	66.0	3.50	11.00	-11.00	-3.50
2.55	2.499	2.601										
2.60	2.548	2.652										
2.65	2.597	2.703										
2.70	2.646	2.754										
2.75	2.695	2.805										
2.80	2.744	2.856										
2.85	2.793	2.907										
2.90	2.842	2.958										
2.95	2.891	3.009										

■VOLTAGE CHART (Continued)

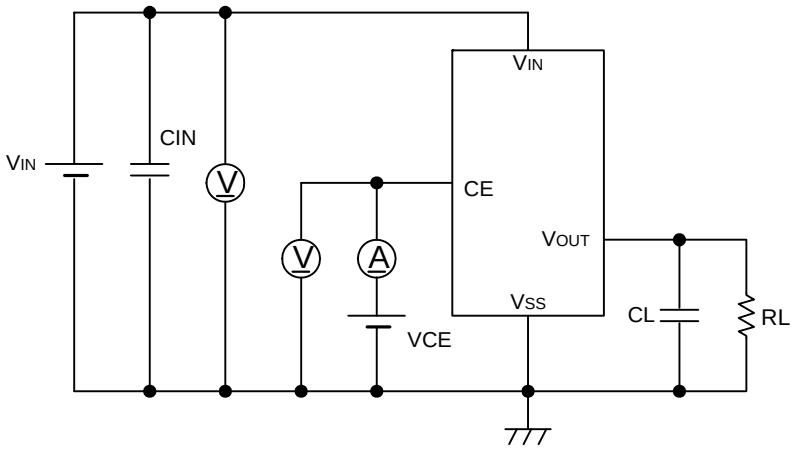
●Dropout Voltage, Supply Current, CE “H / L” Level Current Chart

Ta=25℃

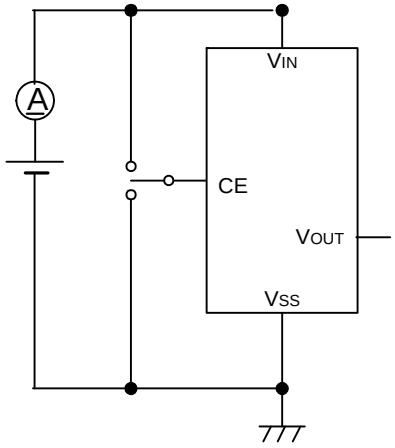
SETTING OUTPUT VOLTAGE	OUTPUT VOLTAGE (Accuracy: 2%)		E-1 DROPOUT VOLTAGE 1 (I_{OUT}=30mA)		E-2 DROPOUT VOLTAGE 2 (I_{OUT}=100mA)		E-3 SUPPLY CURRENT		E-4 CE “H” LEVEL CURRENT		E-5 CE “L” LEVEL CURRENT	
(V)	(V)		(mV)		(mV)		(μA)		(μA)		(μA)	
$V_{OUT(T)}$	V_{OUT}		Vdif1		Vdif2		I_{DD}		I_{CEH}		I_{CEL}	
	MIN.	MAX.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.	MIN.	MAX.	MIN.	MAX.
3.00	2.940	3.060	15.0	23.0	50.0	75.0	40.5	67.5	4.00	12.50	-12.50	-4.00
3.05	2.989	3.111										
3.10	3.038	3.162										
3.15	3.087	3.213										
3.20	3.136	3.264										
3.25	3.185	3.315										
3.30	3.234	3.366										
3.35	3.283	3.417										
3.40	3.332	3.468										
3.45	3.381	3.519										
3.50	3.430	3.570	15	23	50	75	41.0	69.0	4.40	14.00	-14.00	-4.40
3.55	3.479	3.621										
3.60	3.528	3.672										
3.65	3.577	3.723										
3.70	3.626	3.774										
3.75	3.675	3.825										
3.80	3.724	3.876										
3.85	3.773	3.927										
3.90	3.822	3.978										
3.95	3.871	4.029										
4.00	3.920	4.080	15.0	23.0	50.0	75.0	41.5	70.5	4.85	15.50	-15.50	-4.85
4.05	3.969	4.131										
4.10	4.018	4.182										
4.15	4.067	4.233										
4.20	4.116	4.284										
4.25	4.165	4.335										
4.30	4.214	4.386										
4.30	4.214	4.386										
4.40	4.312	4.488										
4.45	4.361	4.539										
4.50	4.410	4.590					42.0	72.0	5.30	17.00	-17.00	-5.30
4.55	4.459	4.641										
4.60	4.508	4.692										
4.65	4.557	4.743										
4.70	4.606	4.794										
4.75	4.655	4.845										
4.80	4.704	4.896										
4.85	4.753	4.947										
4.90	4.802	4.998										
4.95	4.851	5.049										
5.00	4.900	5.100										

■TEST CIRCUITS

●Circuit ①

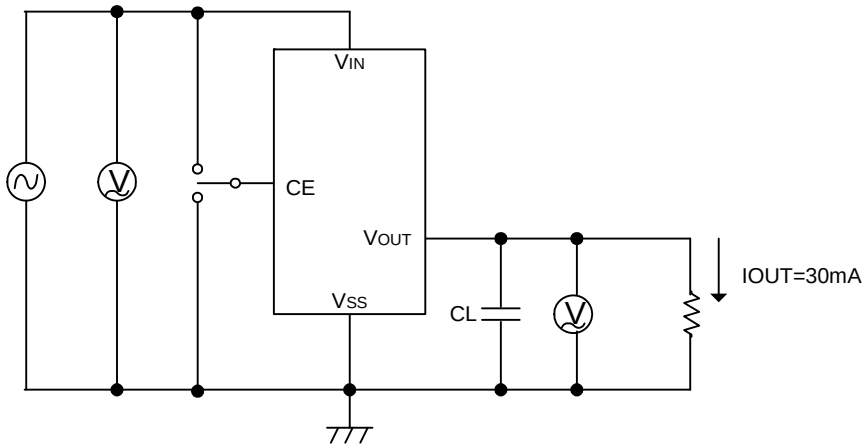


●Circuit ②



●Circuit ③

VIN={VOUT+1.0V}VDC+0.5Vp-pAC
VOUT≧4.75V
VIN=5.75VDC+0.5Vp-pAC



●Output Capacitor Corresponding Chart

VR OUTPUT VOLTAGE	0.8V~1.45V	1.5V ~ 1.75V	1.8V ~ 5.0V
CL	More than 6.8μF	More than 4.7μF	More than 1.0μF

■OPERATIONAL EXPLANATION

<Output Voltage Regulator Control>

The voltage, divided by resistors R1 & R2, which are connected to the VOUT pin is compared with the internal reference voltage by the error amplifier. The P-channel MOSFET, which is connected to the VOUT pin, is then driven by the subsequent output signal. The output voltage at the VOUT pin is controlled & stabilized by negative feedback. The constant current limit circuit and short circuit protection operate in relation to the level of output current.

<Low ESR Capacitor>

With the XC6210 series regulator, a stable output voltage is achievable even if low ESR capacitors are used, as a phase compensation circuit is built into the regulator. In order to ensure the effectiveness of the phase compensation, we suggest that an output capacitor (CL) be connected as close as possible, between the output pin (VOUT) and the VSS pin. Please use an output capacitor (CL) with a capacitance, based on the chart below. We also suggest an input capacitor (CIN) of 1μF: this should be connected between VIN and VSS in order to stabilize input power source.

Output Capacitor Corresponding Chart

VOUT	0.8V ~ 1.45V	1.5V ~ 1.75V	1.8V ~ 5.0V
CL	More than 6.8μF	More than 4.7μF	More than 1.0μF

<Current Limiter, Short-Circuit Protection>

The XC6210 series regulator offers a combination of current limit and short circuit protection by means of a built-in fixed current limiter circuit and a foldback circuit. 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, the output voltage drops further and output current decreases. When the output pin is shorted, a current of about 50mA flows.

<CE Pin>

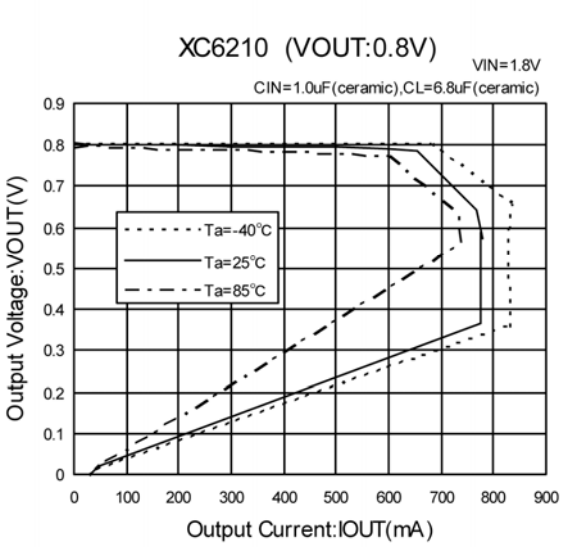
The IC's internal regulator circuitry can be shut down via the signal from the CE pin with the XC6210 series. In shutdown mode, output at the VOUT pin will be pulled down to the VSS level via R1 & R2. Options are available for the CE pin logic (See the product classification). Note that as the XC6210B types are 'High Active / No Pull-Down', operations will become unstable with the CE pin open. Although the CE pin is equal to an inverter input with CMOS hysteresis, with either the pull-up or pull-down options, the CE pin input current will increase when the IC is in operation. We suggest that you use this IC with either a VIN voltage or a VSS voltage input at the CE pin. If this IC is used with the correct specifications for the CE pin, the IC will operate normally. However, supply current may increase as a result of through current in the IC's internal circuitry if a voltage other than VIN or VSS is applied.

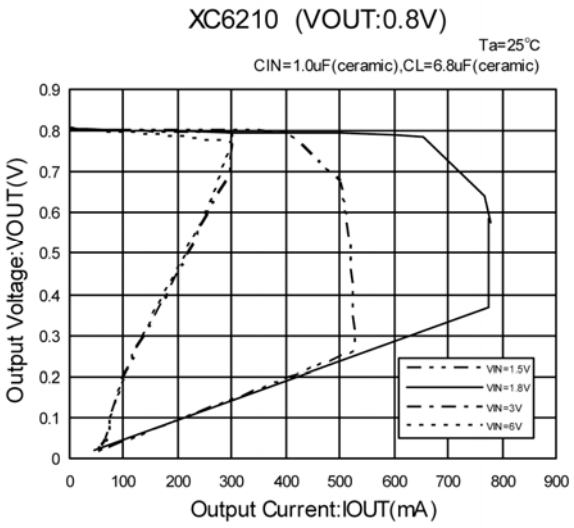
■NOTES ON USE

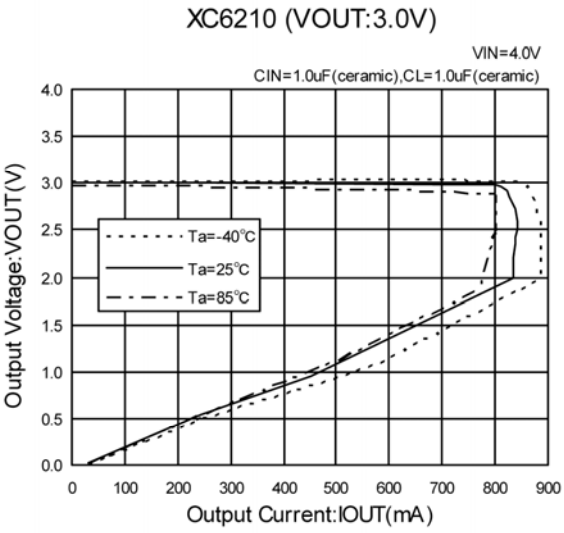
1. Please use this IC within the stated absolute maximum ratings. The IC is liable to malfunction should the ratings be exceeded.
2. Where wiring impedance is high, operations may become unstable due to noise and/or phase lag depending on output current. Please strengthen VIN and VSS wiring in particular.
3. Please wire the input capacitor (CIN) and the output capacitor (CL) as close to the IC as possible. Should rapid input fluctuation or load fluctuation occur, please increase the capacitor value such as CIN or CL to stabilize the operation.

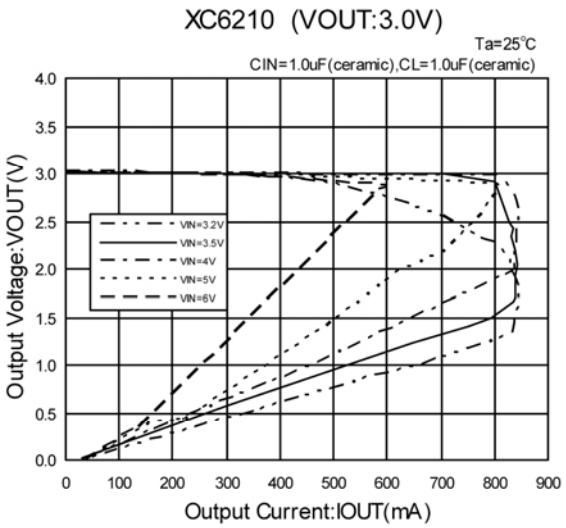
■TYPICAL PERFORMANCE CHARACTERISTICS

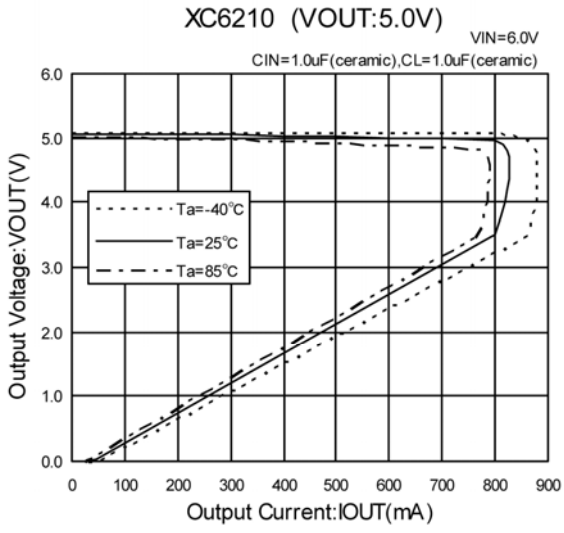
(1) Output Voltage vs. Output Current

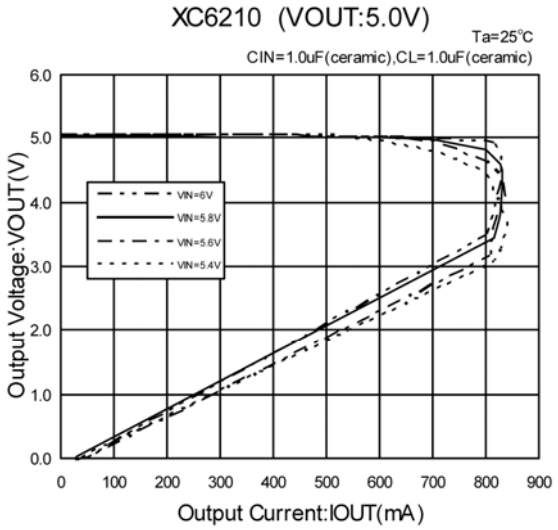






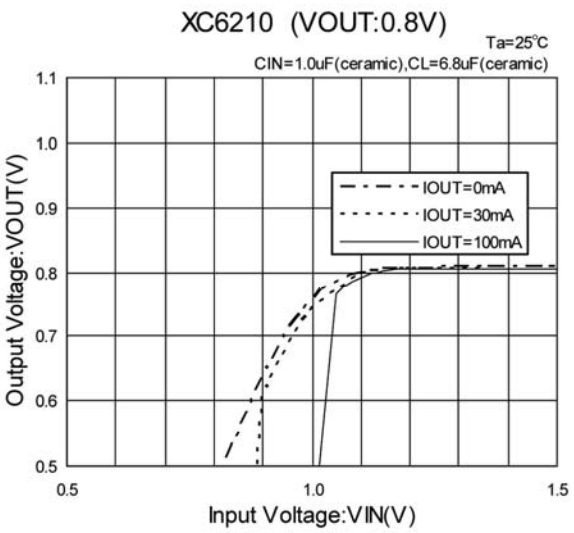


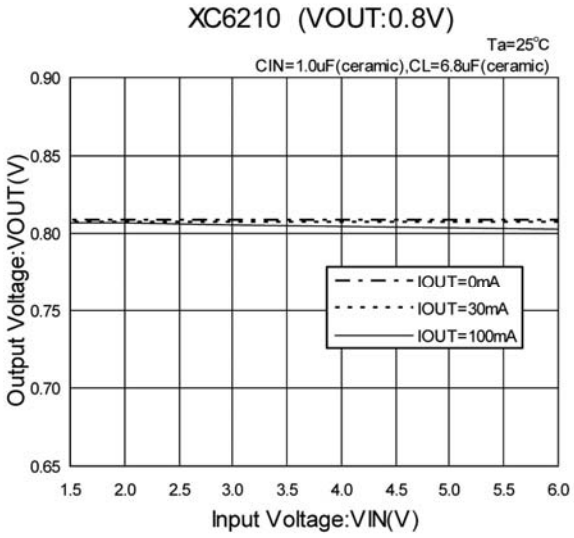


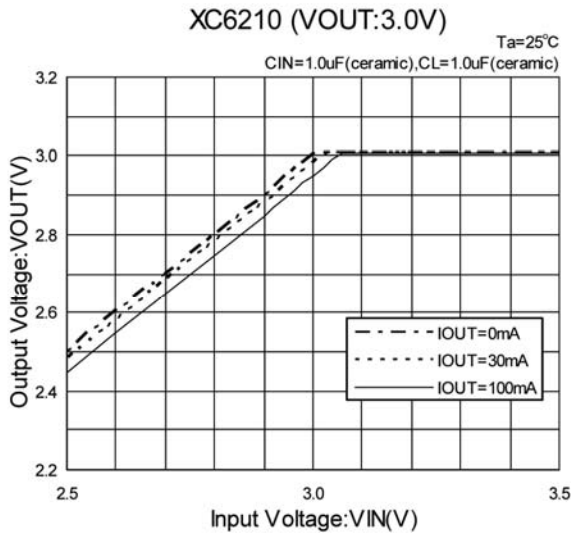


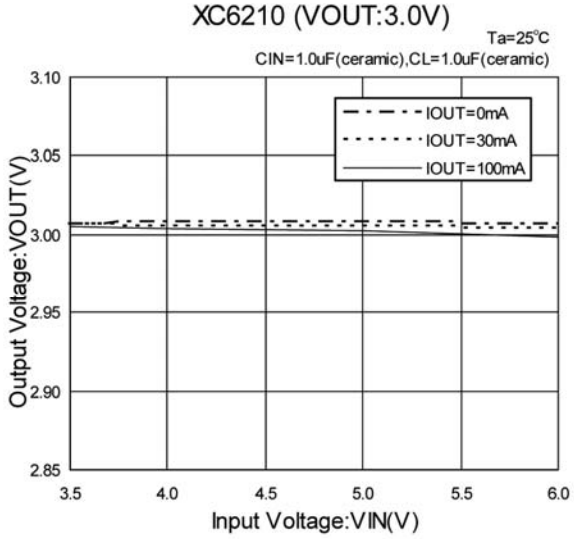
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

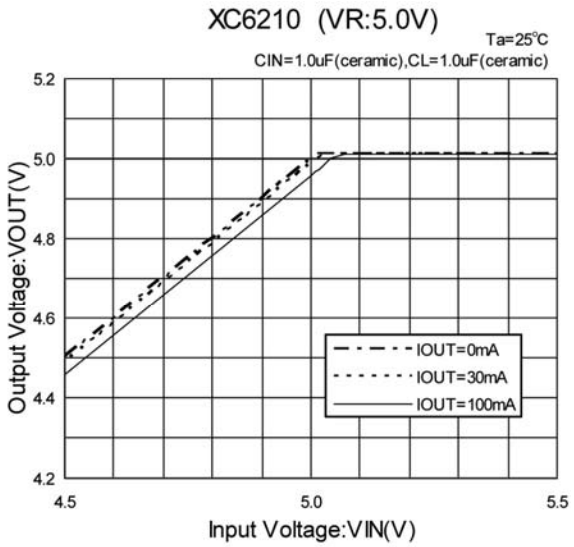
(2) Output Voltage vs. Input Voltage

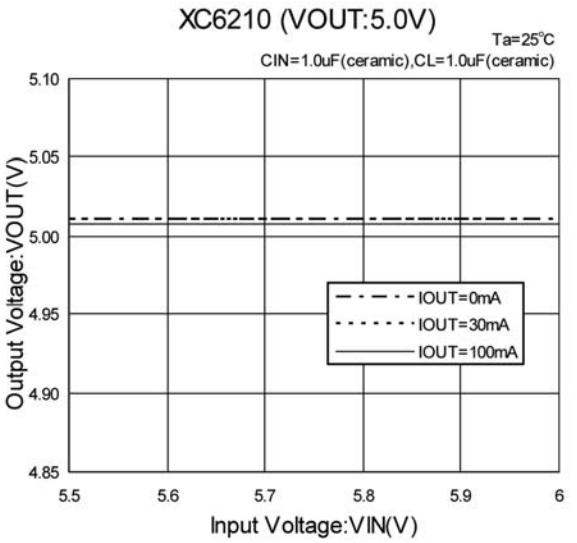








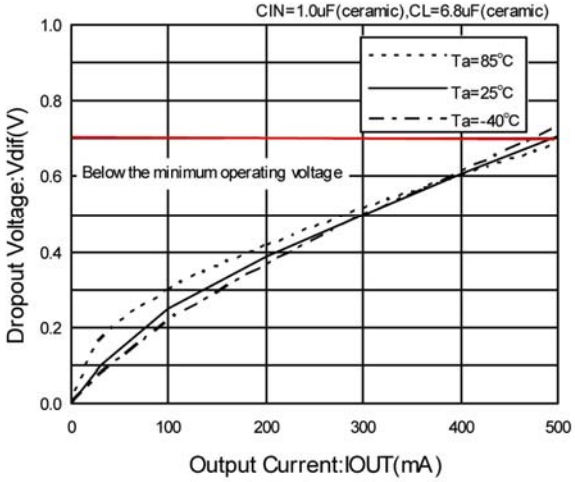




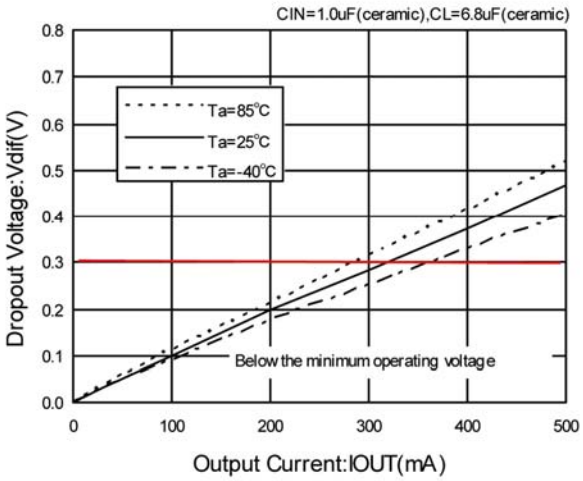
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(3) Dropout Voltage vs. Output Current

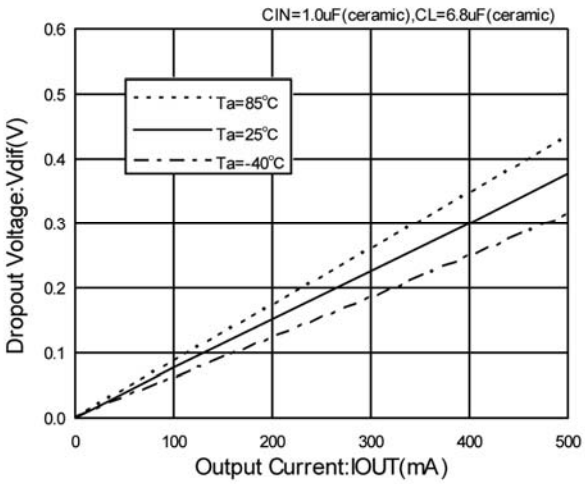
XC6210 (VOUT:0.8V)



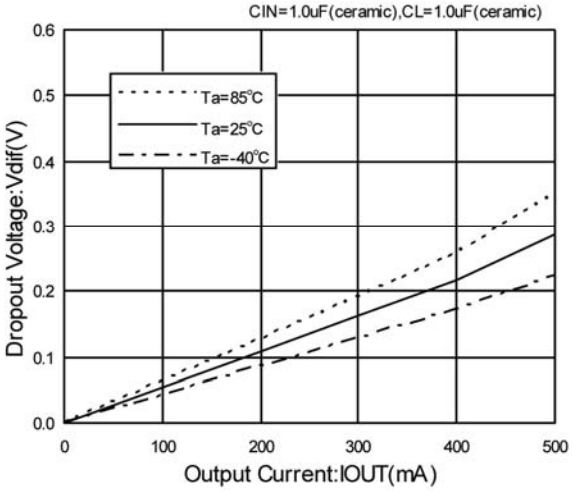
XC6210 (VOUT:1.2V)



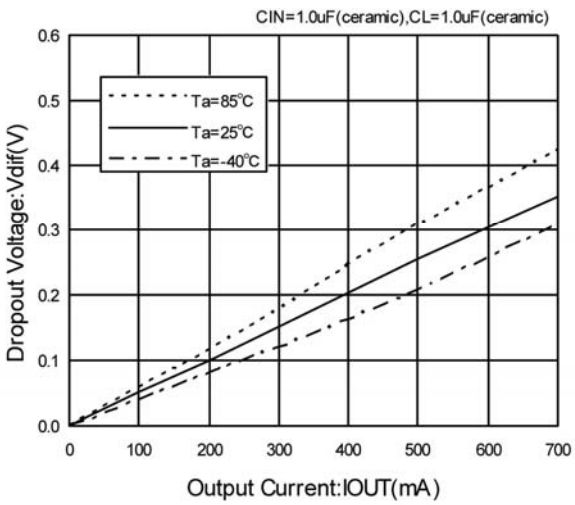
XC6210 (VOUT:1.5V)



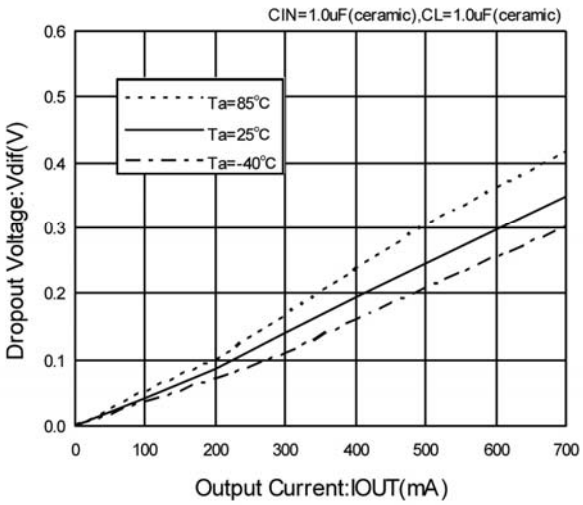
XC6210 (VOUT:2.5V)



XC6210 (VOUT:3.0V)

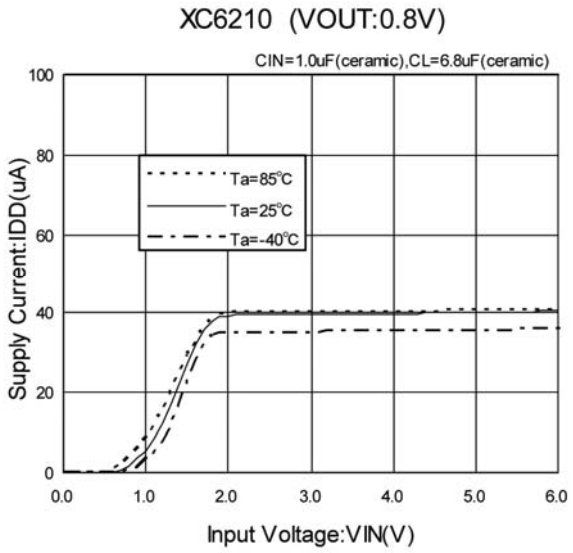


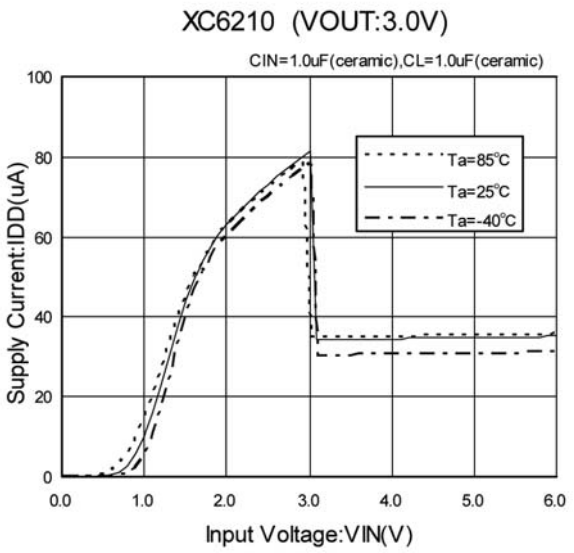
XC6210 (VOUT:5.0V)



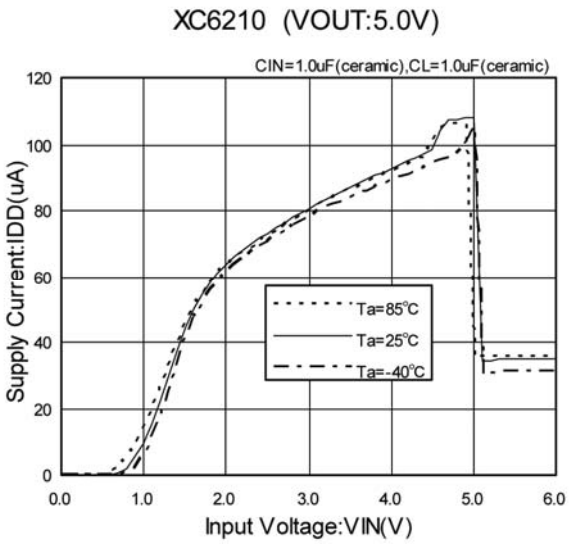
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

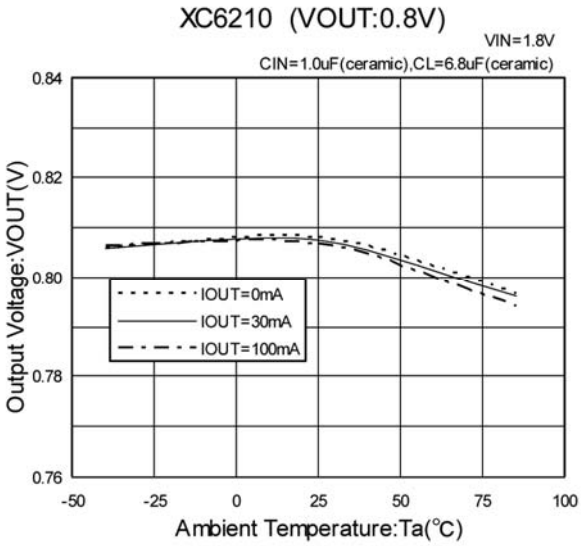
(4) Supply Current vs. Input Voltage

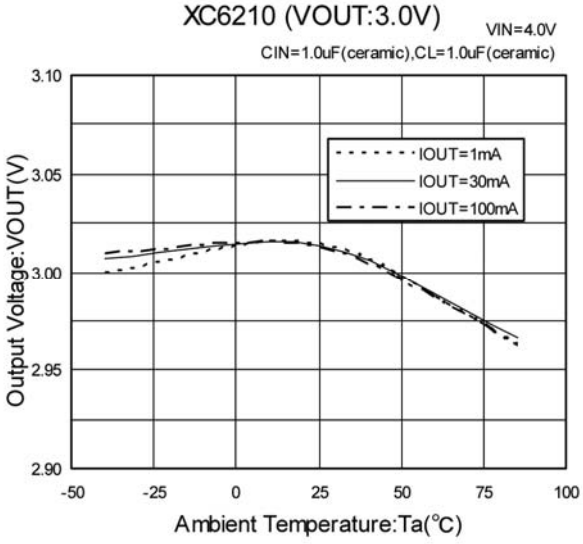


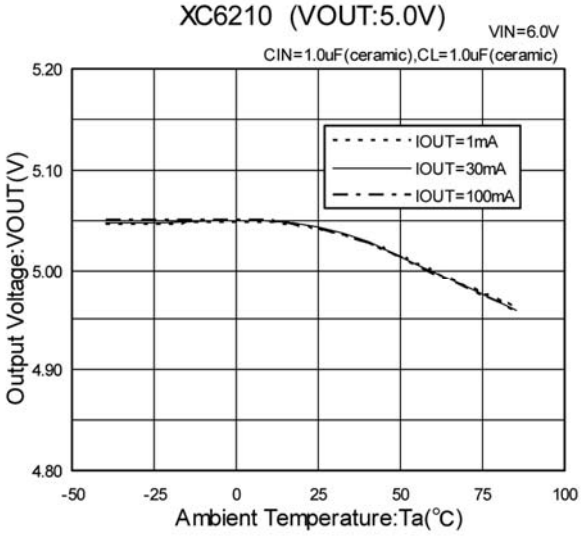


(5) Output Voltage vs. Ambient Temperature



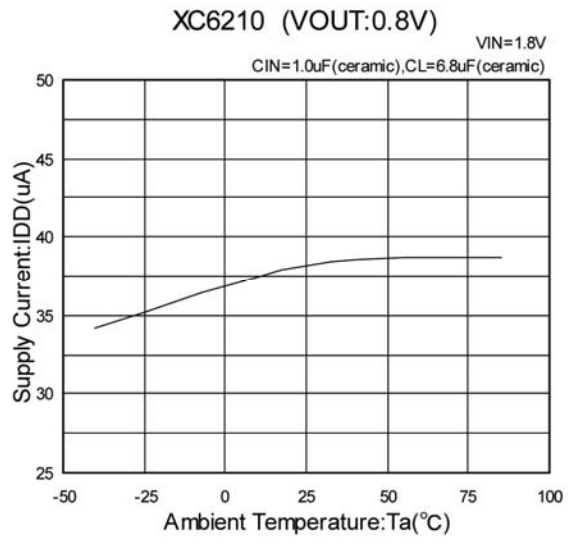


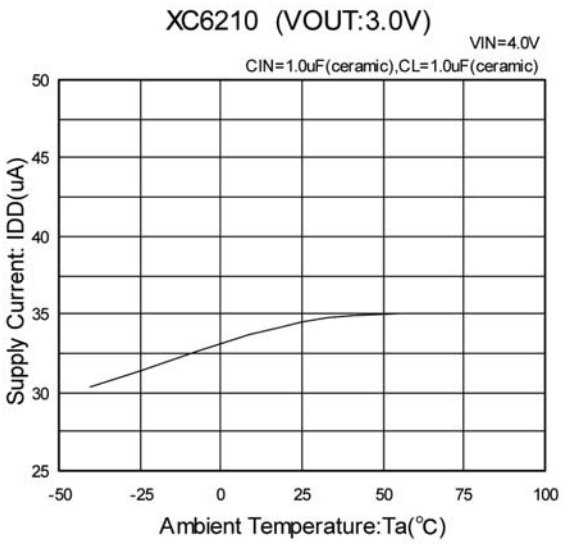


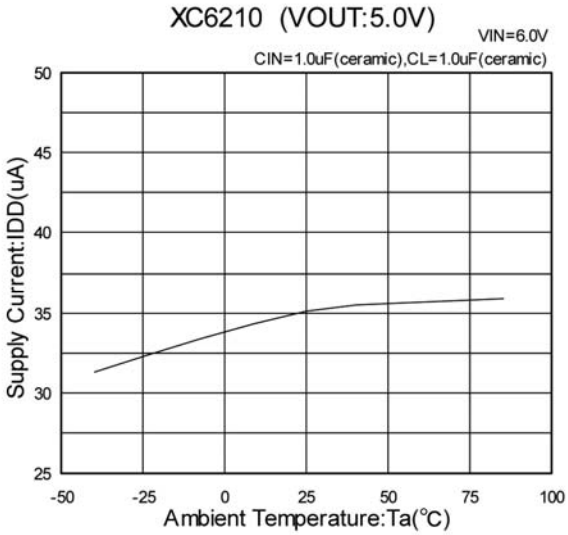


■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

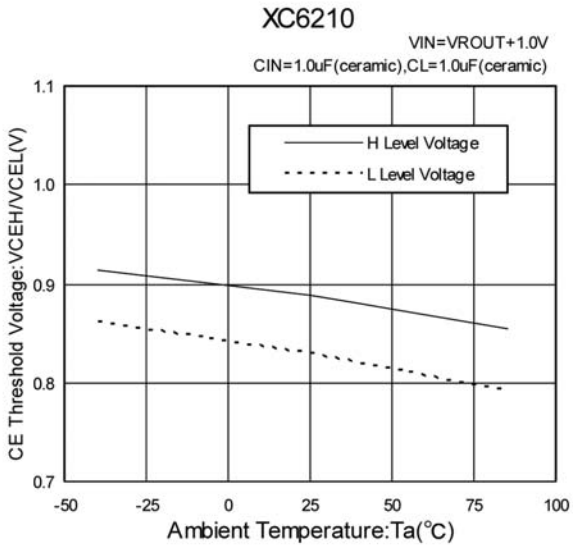
(6) Supply Current vs. Ambient Temperature





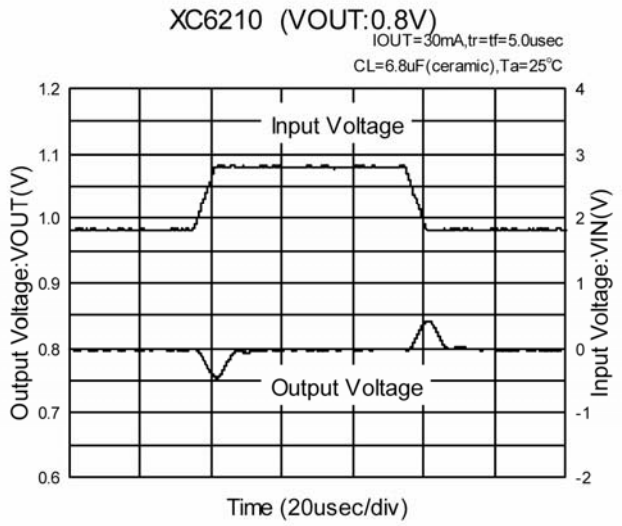


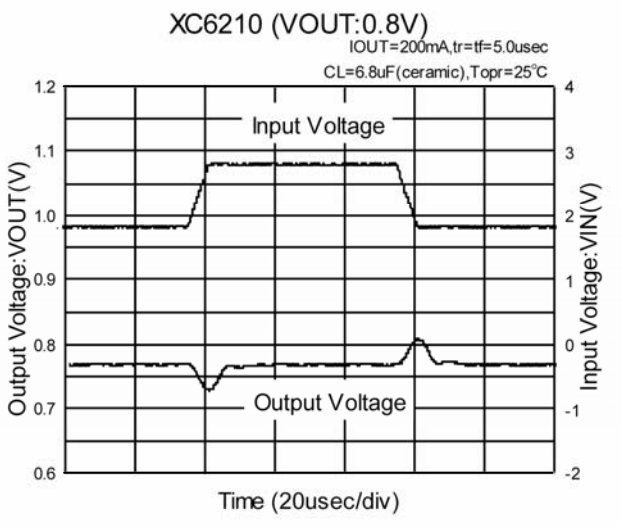
(7) CE Pin Threshold Voltage vs. Ambient Temperature

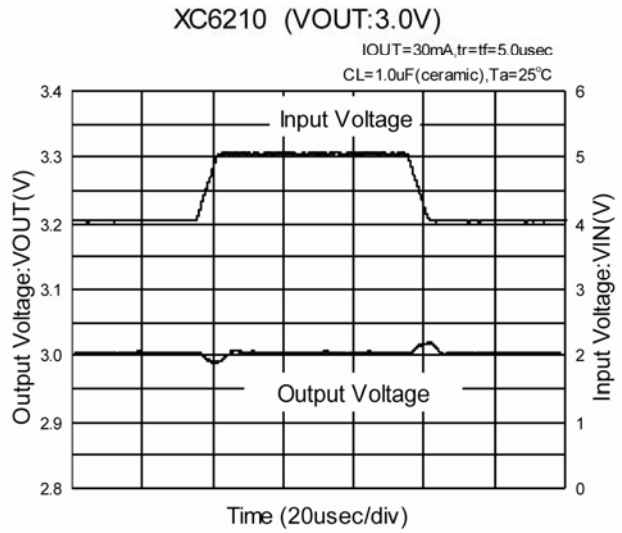


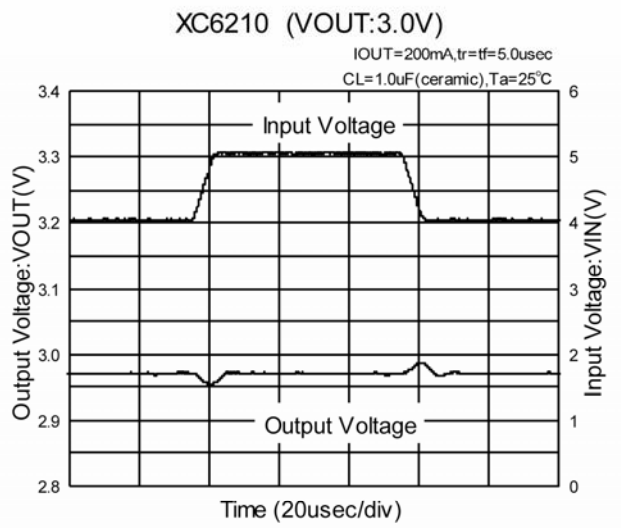
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

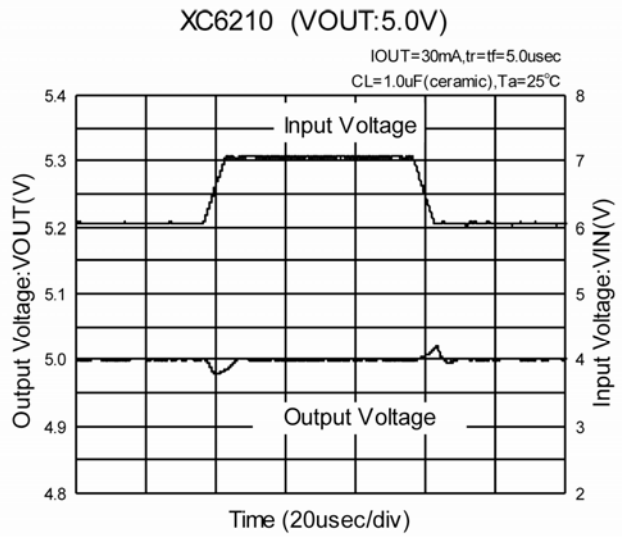
(8) Input Transient Response 1

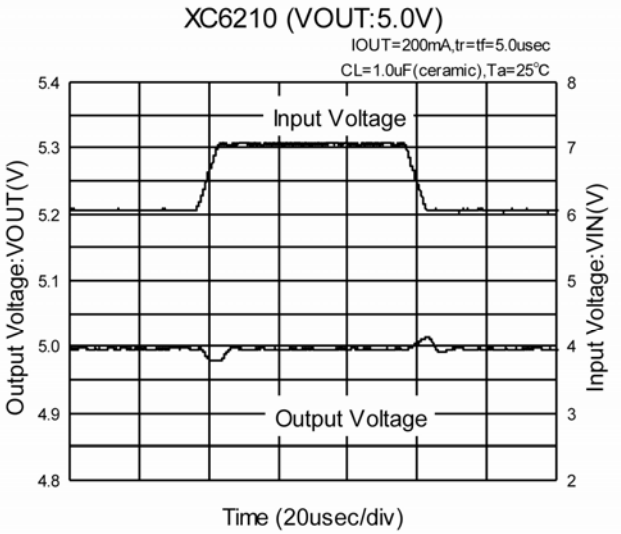






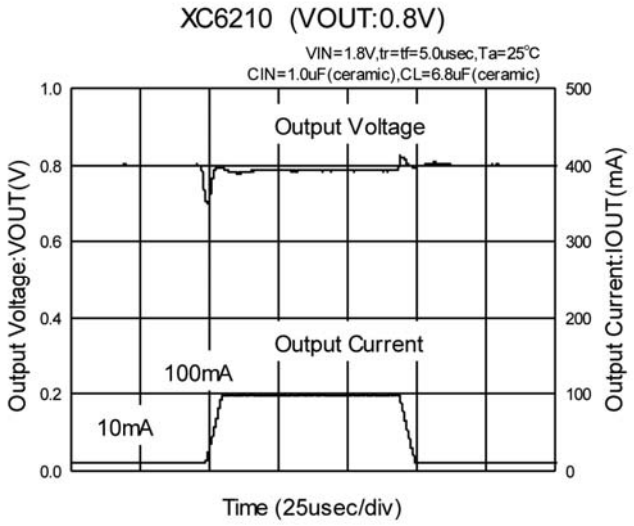


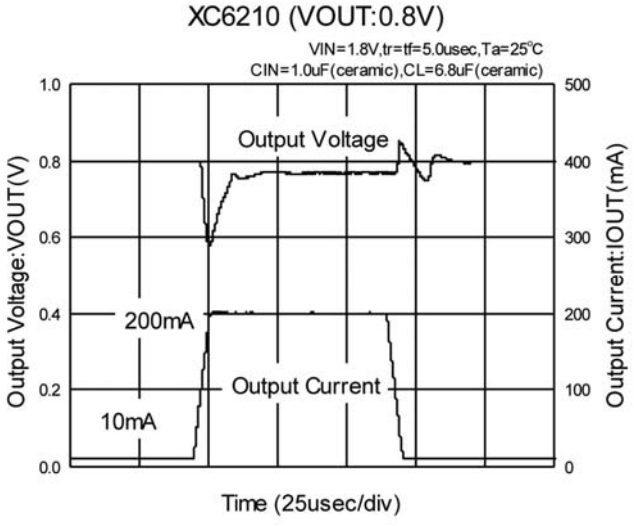


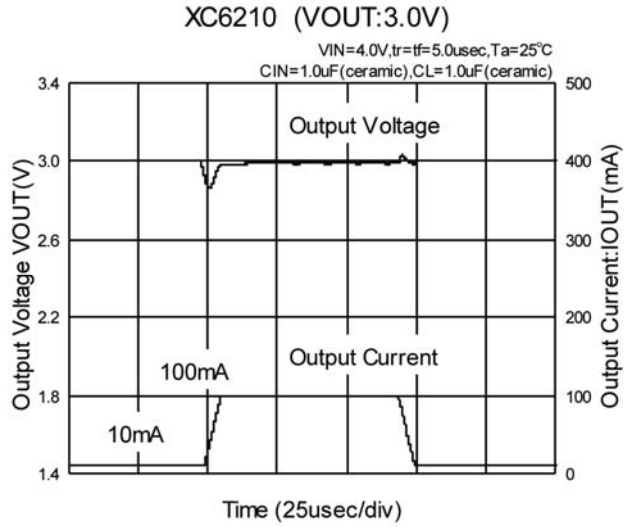


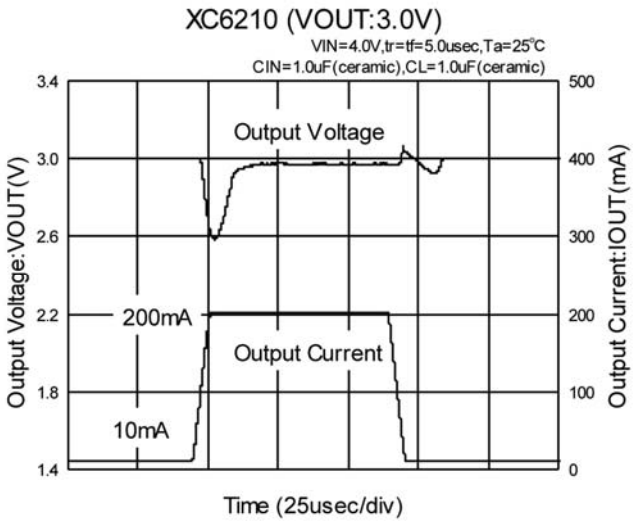
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

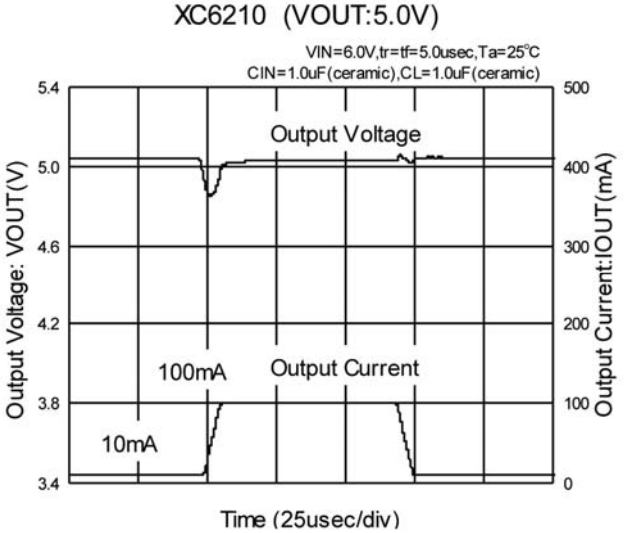
(9) Load Transient Response

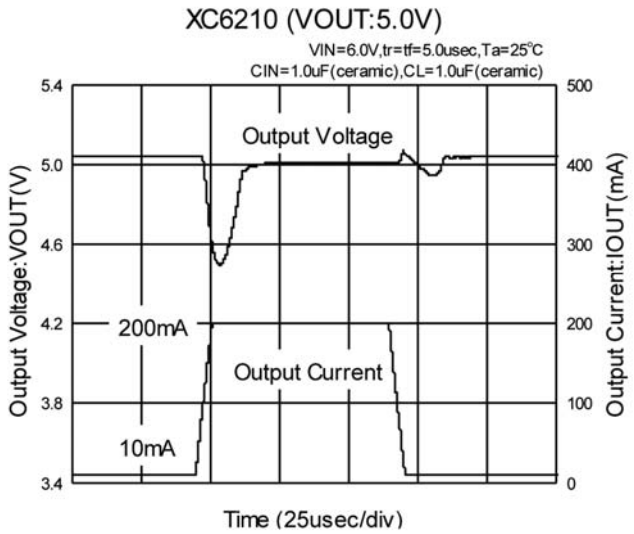






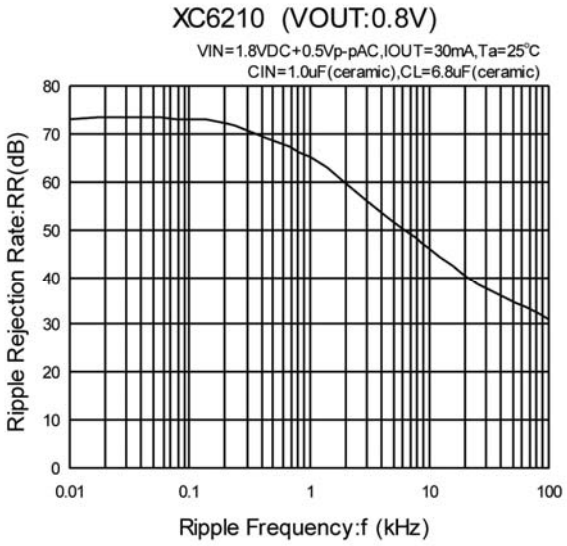


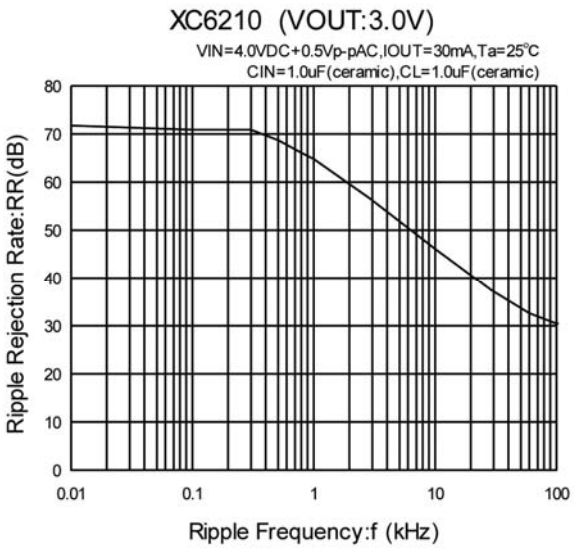


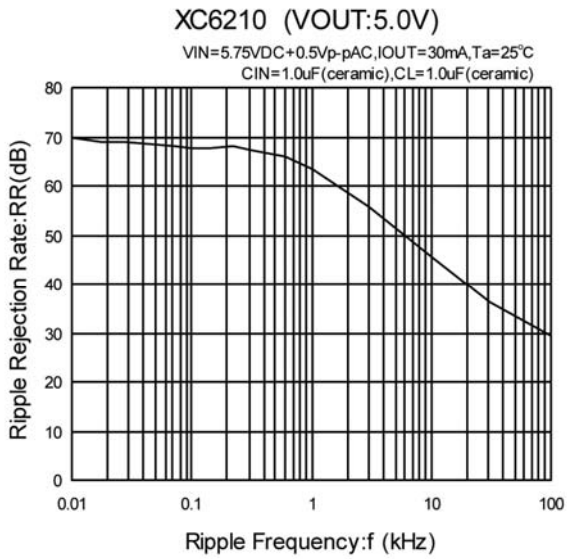


■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(10) Ripple Rejection Rate

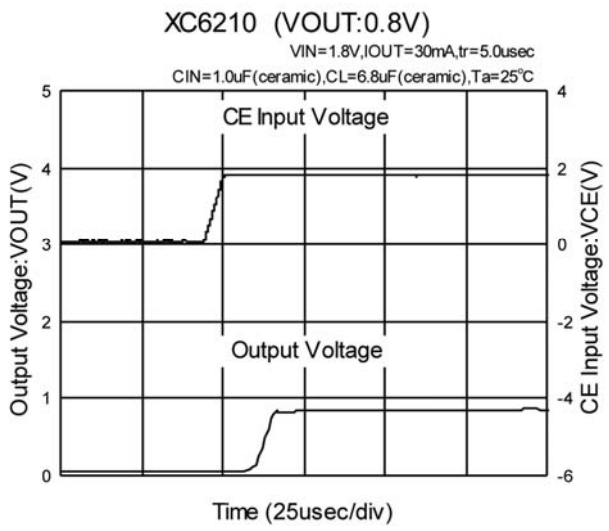


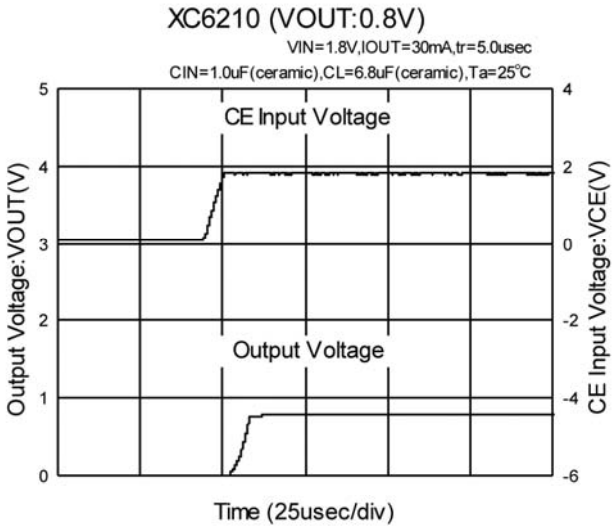


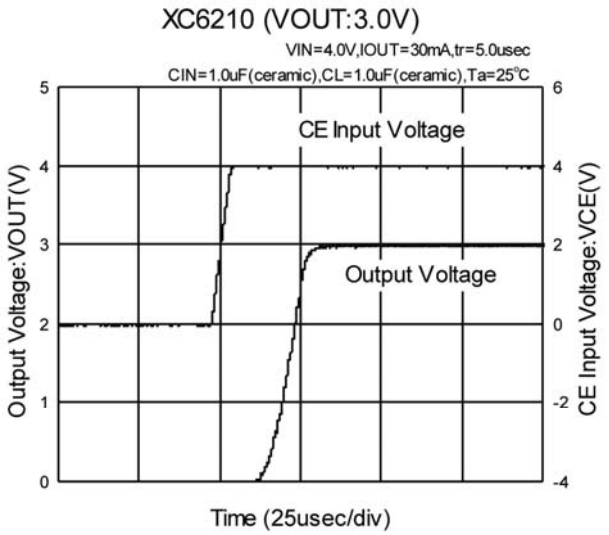


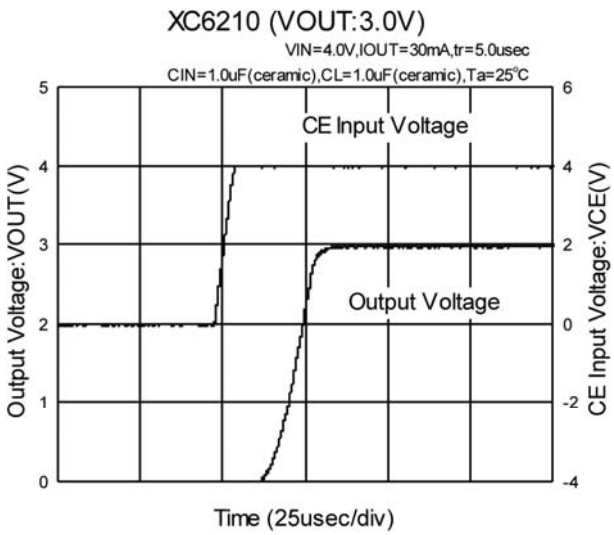
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

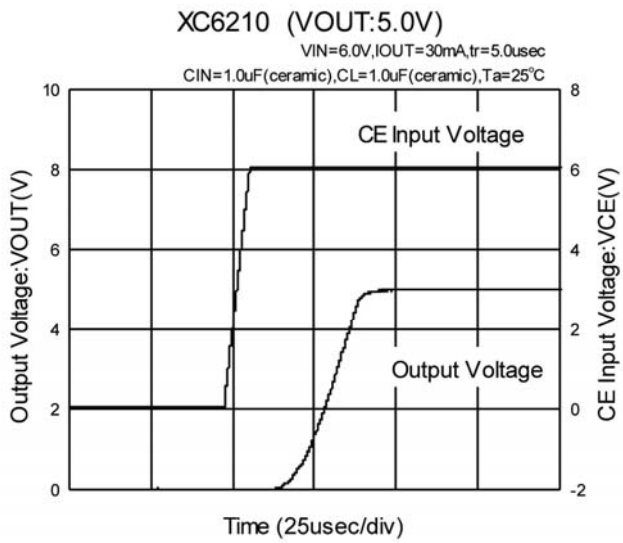
(11) Input Transient Response 2

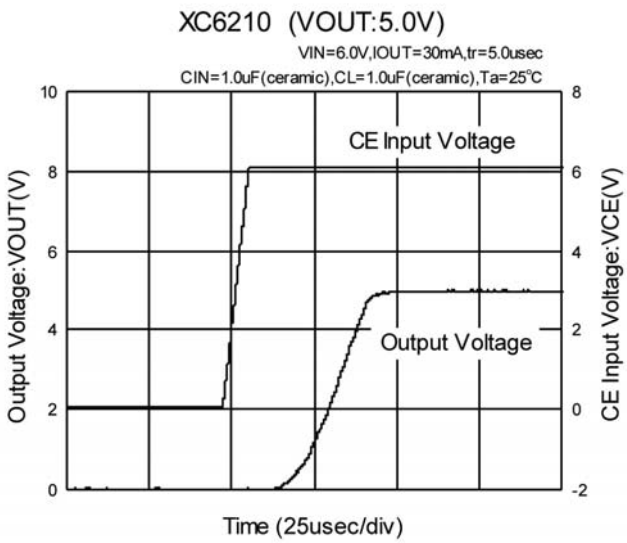






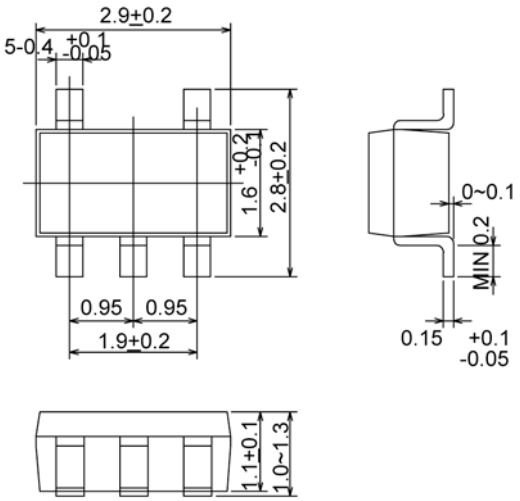




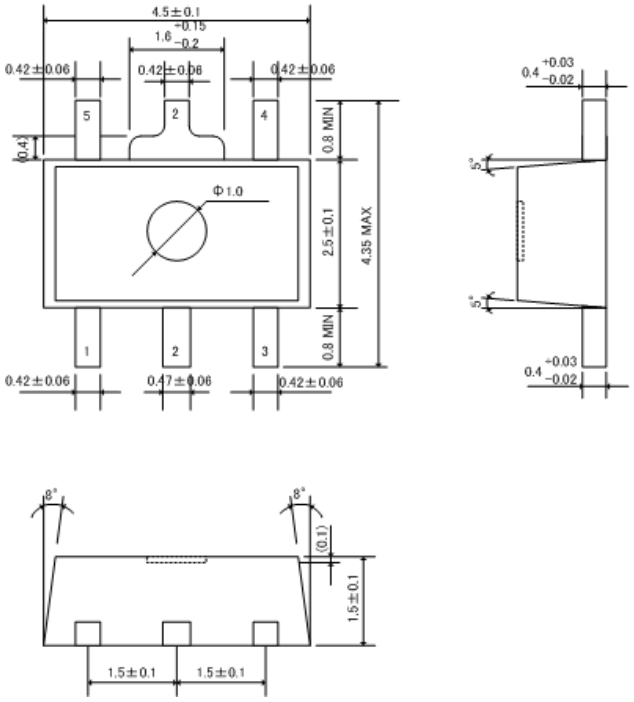


■PACKAGING INFORMATION

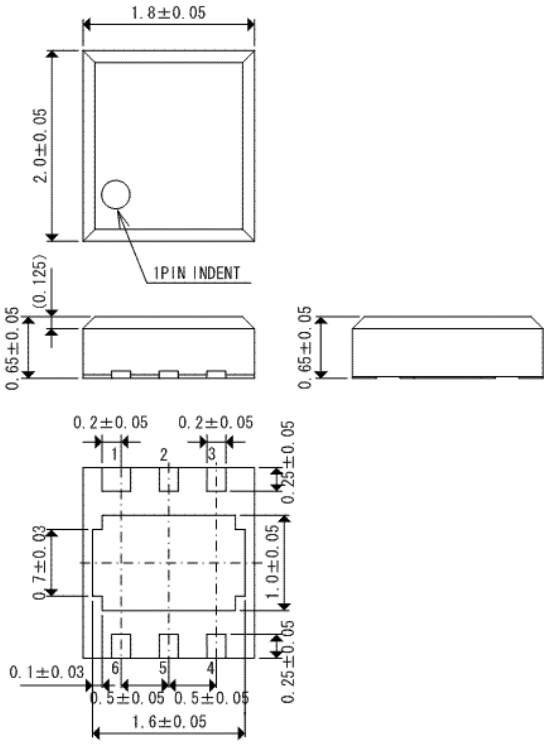
●SOT-25 (SOT-23-5)



●SOT-89-5

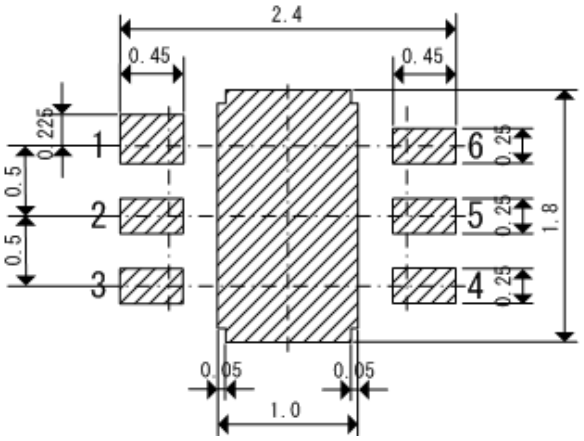


●USP-6B

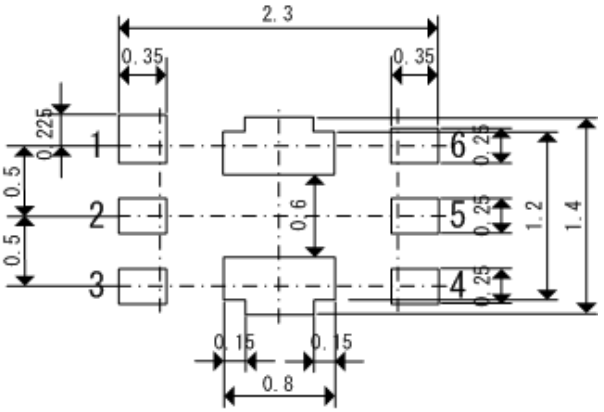


■PACKAGING INFORMATION (Continued)

●USP-6B Reference Pattern Layout

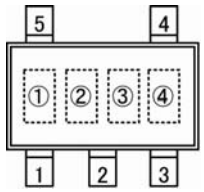


●USP-6B Reference Metal Mask Design



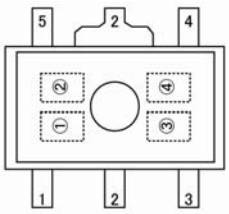
■MARKING RULE

●SOT-25



SOT-25
(TOP VIEW)

●SOT-89-5



SOT-89-5
(TOP VIEW)

① represents product series

MARK	PRODUCT SERIES
0	XC6210xxxxxx

② represents CE function

MARK				PRODUCT SERIES
VOLTAGE= 0.1~3.0V	VOLTAGE= 3.1~6.0V	VOLTAGE= 0.15~3.05V	VOLTAGE= 3.15~6.05V	
V	A	E	L	XC6210Axxxxx
X	B	F	M	XC6210Bxxxxx
Y	C	H	N	XC6210Cxxxxx
Z	D	K	P	XC6210Dxxxxx

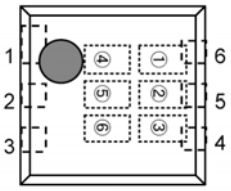
③ represents output voltage

MARK	OUTPUT VOLTAGE (V)				MARK	OUTPUT VOLTAGE (V)			
0	-	3.1	-	3.15	F	1.6	4.6	1.65	4.65
1	-	3.2	-	3.25	H	1.7	4.7	1.75	4.75
2	-	3.3	-	3.35	K	1.8	4.8	1.85	4.85
3	-	3.4	-	3.45	L	1.9	4.9	1.95	4.95
4	-	3.5	-	3.55	M	2.0	5.0	2.05	-
5	-	3.6	-	3.65	N	2.1	-	2.15	-
6	-	3.7	-	3.75	P	2.2	-	2.25	-
7	0.8	3.8	0.85	3.85	R	2.3	-	2.35	-
8	0.9	3.9	0.95	3.95	S	2.4	-	2.45	-
9	1.0	4.0	1.05	4.05	T	2.5	-	2.55	-
A	1.1	4.1	1.15	4.15	U	2.6	-	2.65	-
B	1.2	4.2	1.25	4.25	V	2.7	-	2.75	-
C	1.3	4.3	1.35	4.35	X	2.8	-	2.85	-
D	1.4	4.4	1.45	4.45	Y	2.9	-	2.95	-
E	1.5	4.5	1.55	4.55	Z	3.0	-	3.05	-

④ represents production lot number
0 to 9, A to Z reverse character 0 to 9, A to Z repeated (G, I, J, O, Q, W excluded)

■MARKING RULE (Continued)

●USP-6B



USP-6B
(TOP VIEW)

①② represents product series

MARK		PRODUCT SERIES
①	②	
1	0	XC6210xxxxxx

③ represents CE Function

MARK	TYPE	PRODUCT SERIES
A	High Active With Pull-Down Resistor	XC6210AxxxDx
B	High Active With No Pull-Down Resistor	XC6210AxxxDx
C	Low Active With Pull-Up Resistor	XC6210AxxxDx
D	Low Active With No Pull-Up Resistor	XC6210AxxxDx
S	Custom	XC6210AxxxDx

④ represents the integer number of output voltage

MARK	VOLTAGE (V)	PRODUCT SERIES
3	3.3	XC6210x3xxDx
5	5.0	XC6210x5xxDx

⑤ represents the decimal point of output voltage

MARK	VOLTAGE (V)	PRODUCT SERIES	MARK	VOLTAGE (V)	PRODUCT SERIES
0	x.0	XC6210xx02Dx	A	x.05	XC6210xx0ADx
1	x.1	XC6210xx12Dx	B	x.15	XC6210xx1ADx
2	x.2	XC6210xx22Dx	C	x.25	XC6210xx2ADx
3	x.3	XC6210xx32Dx	D	x.35	XC6210xx3ADx
4	x.4	XC6210xx42Dx	E	x.45	XC6210xx4ADx
5	x.5	XC6210xx52Dx	F	x.55	XC6210xx5ADx
6	x.6	XC6210xx62Dx	H	x.65	XC6210xx6ADx
7	x.7	XC6210xx72Dx	K	x.75	XC6210xx7ADx
8	x.8	XC6210xx82Dx	L	x.85	XC6210xx8ADx
9	x.9	XC6210xx92Dx	M	x.95	XC6210xx9ADx

⑥ represents production lot number
0 to 9, A to Z repeated (G, I, J, O, Q, W, excluded)
Note: No character inversion used.

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