XC6207 Series

TOREX

High Speed "Green Operation" LDO Voltage Regulators

GENERAL DESCRIPTION

GO-Compatible

The XC6207 series are precise, low noise, high speed, and low dropout regulators with green operation (GO) function. They are fabricated using Torex's CMOS process. Performance features of the series include high ripple rejection and low dropout voltage, and the series include a reference voltage source, an error amplifier, a current limiter, and a phase compensation circuit. Output voltage is selectable in 50mV increments within a range of 1.2V~5.0V, using laser trimming technologies. The series' output stabilization capacitor (C_L) is also compatible with low ESR ceramic capacitors. GO provides high speed operation, low power consumption and high efficiencies by automatically switching between a high speed mode (HS) and a power save mode (PS) depending upon the load current level. The switching point of the GO to the output current is being fixed inside the IC. The IC operates when the GO pin is low-level. When only high-speed operation is required, it can be fixed by inputting a high level signal to the GO pin, thus providing operating conditions with the most suitable level of supply current for the application. The CE function enables the output to be turned off resulting in greatly reduced power consumption. In this state, with the XC6207B series, the IC turns on the internal switch located between the V_{OUT} and V_{SS} pins. This short enables the electric charge at the output capacitor (C_L) to be discharged via the internal auto-discharge resistance, and as a result the V_{OUT} pin quickly returns to the V_{SS} level. The constant current limit circuit and the current limiter's foldback circuit also operate as a short circuit protection for the output current limiter and the output pin.

APPLICATIONS

Cellular phones

Cordless phones,

Wireless communication equipment

Portable games

Cameras, VCRs

Portable AV equipment

PDAs

FEATURES

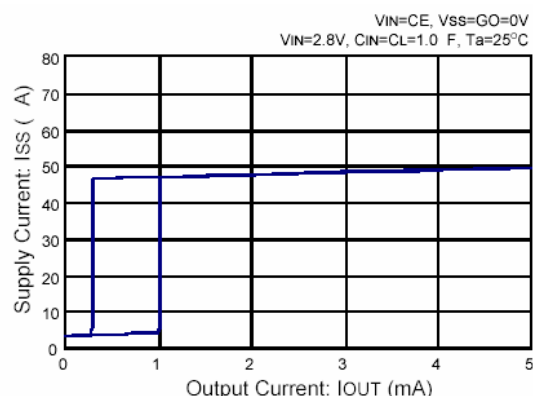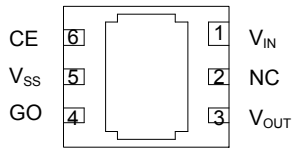|	
Maximum Output Current	: 300mA (Up to 380mA (TYP.))
Dropout Voltage	: 40mV@ I_{OUT}=30mA
	: 120mV@ I_{OUT}=100mA
Operating Voltage Range	: 2.0V ~ 6.0V
Output Voltage Setting Range	: 1.2V ~ 5.0V (50mV increments)
Accuracy	: ±2% (HS Mode: V_{OUT} >1.5V)
	2%, - 3% (PS Mode: V_{OUT} >1.5V)
	±30mV (HS Mode: V_{OUT} 1.5V)
	+30mV, - 45mV (HS Mode: V_{OUT} 1.5V)
Low Power Consumption	: 5.5µA (TYP.) (PS Mode)
	50µA (TYP.) (HS Mode)
Stand-by Current	: Less than 0.1µA
High Ripple Rejection	: 70dB @ 1kHz
Operating Temperature Range	: - 40 ~ 85
Low ESR Capacitor	: Ceramic capacitor compatible
CMOS	
Low Output Noise	
Green Operation (GO) Function	
CL High-Speed Auto-Discharge (XC6207B)	
Packages	: SOT-89-5, SOT-25, USP-6C

TYPICAL APPLICATION CIRCUIT
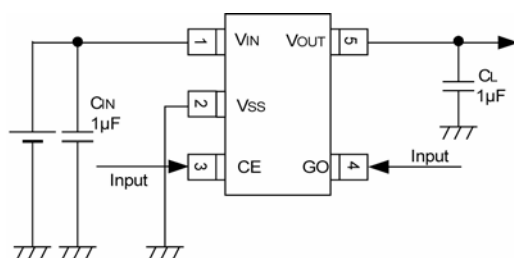
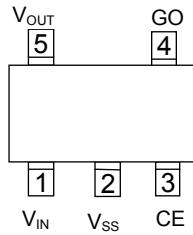## TYPICAL PERFORMANCE CHARACTERISTICS

Supply Current vs. Output Current

XC6207A182xx

PIN CONFIGURATION
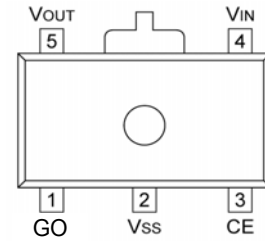
CE $\boxed{6}$ $\boxed{1}$ V_{IN}
V_{SS} $\boxed{5}$ $\boxed{2}$ NC
GO $\boxed{4}$ $\boxed{3}$ V_{OUT}

USP-6C
(BOTTOM VIEW)

V_{OUT} $\boxed{5}$ $\boxed{4}$ GO

$\boxed{1}$ $\boxed{2}$ $\boxed{3}$
V_{IN} V_{SS} CE

SOT-25
(TOP VIEW)

V_{OUT} $\boxed{5}$ $\boxed{4}$ V_{IN}

$\boxed{1}$ $\boxed{2}$ $\boxed{3}$
GO   Vss   CE

SOT-89-5
(TOP VIEW)

*The dissipation pad for the USP-6C 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 (No. 5) pin.

PIN ASSIGNMENT

PIN NUMBER			PIN NAME	FUNCTIONS
USP-6C	SOT-25	SOT-89-5		
1	1	4	V_{IN}	Power Input
2	-	-	NC	No Connection
3	5	5	V_{OUT}	Output
4	4	1	GO	Green Operation Mode Switch
5	2	2	Vss	Ground
6	3	3	CE	ON/OFF Control

FUNCTIONS CHART

CE pin

CE	FUNCTION
H	Operation
L	Stand-by

*For the XC6207B series, the output capacitor (C_L) is discharged via the internal auto-discharge resistance
when the CE is at low level.

GO pin

GO	FUNCTION
H	High Speed Mode
L	Green Operation (HS/PS Mode Automatic Switching) $I_{GO} \leq I_{OUT}$: High Speed Mode $I_{GOR} \geq I_{OUT}$: Power Save Mode

PRODUCT CLASSIFICATION

Ordering Information

XC6207

DESIGNATOR	DESCRIPTION	SYMBOL	DESCRIPTION
	Type of Regulator	A	: CE High Active, no resistor for fixing pin's electrical potential, no C_L discharge resistor
		B	: CE High Active, no resistor for fixing pin's electrical potential, with C_L discharge resistor
	Output Voltage	12 ~ 50	: ex.) $V_{OUT(T)}$ = 3.0V = 3, = 0
	Output Accuracy	2	: Output voltage 100mV increments When HS mode, 1.2V $V_{OUT(T)}$ 1.5V : Accuracy± 30mV 1.5V $V_{OUT(T)}$ 5.0V: Accuracy± 2% When PS mode, 1.2V $V_{OUT(T)}$ 1.5V: Accuracy± 30mV or - 45mV 1.5V $V_{OUT(T)}$ 5.0V: Accuracy± 2% or - 3%
		A	: Output voltage 50mV increments When HS mode, 1.2V $V_{OUT(T)}$ 1.5V : Accuracy± 30mV 1.5V $V_{OUT(T)}$ 5.0V: Accuracy± 2% When PS mode, 1.2V $V_{OUT(T)}$ 1.5V: Accuracy± 30mV or - 45mV 1.5V $V_{OUT(T)}$ 5.0V: Accuracy± 2% or - 3%
	Packages	E	: USP-6C
		M	: SOT-25
		P	: SOT-89-5
	Device Orientation	R	: Embossed tape, standard feed
		L	: Embossed tape, reverse feed

BLOCK DIAGRAMS
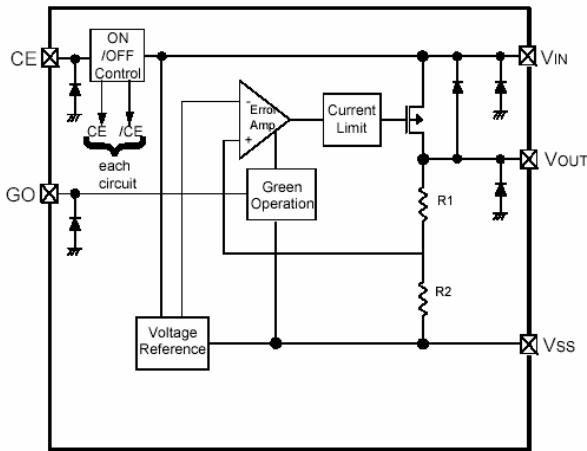
XC6207A Series   XC6207B Series
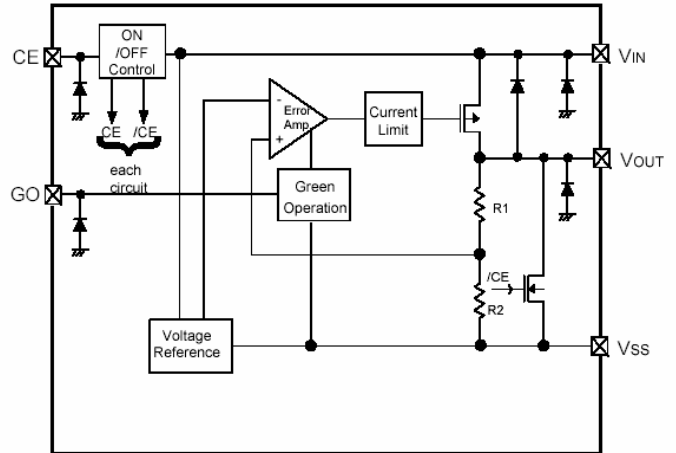
*Diodes inside the circuit are ESD protection diodes and parasitic diodes.

ABSOLUTE MAXIMUM RATINGS

Ta=25

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	- 0.3 ~ 7.0	V
Output Current		I_{OUT}	500*	mA
Output Voltage		V_{OUT}	V_{SS} - 0.3 ~ V_{IN} + 0.3	V
CE Input Voltage		V_{CE}	V_{SS} - 0.3 ~ 7.0	V
GO Input Voltage		V_{GO}	V_{SS} - 0.3 ~ 7.0	V
Power Dissipation	SOT-89-5	Pd	500	mW
	SOT-25		250	
	USP-6C		100	
Operational Temperature Range		Topr	- 40 ~ + 85	
Storage Temperature Range		Tstg	- 55 ~ +125	

* I_{OUT}=Pd / (V_{IN}-V_{OUT})

ELECTRICAL CHARACTERISTICS

XC6207A/B series

Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Output Voltage	$V_{OUT(E)}$ [*3]	$V_{GO}=V_{IN}$, $V_{CE}=V_{IN}$, $I_{OUT}=10mA$: High Speed (HS) mode	[*9]	E-0	[*9]	V	
		$V_{GO}=V_{SS}$, $V_{CE}=V_{IN}$, $I_{OUT}=0.1mA$: Power Save (PS) mode	[*9]	E-1	[*9]		
Maximum Output Current	I_{OUTMAX}	$V_{CE}=V_{IN}$	300	-	-	mA	
Load Regulation	$\triangle V_{OUT}$	$V_{GO}=V_{IN}$ (HS mode), $V_{CE}=V_{IN}$, 1mA $\leq I_{OUT} \leq$ 100mA	-	15	60	mV	
Dropout Voltage [*4]	Vdif1	$V_{GO}=V_{IN}$, (HS mode), $V_{CE}=V_{IN}$, $I_{OUT}=30mA$		E-2		mV	
	Vdif2	$V_{GO}=V_{IN}$ (HS mode), $V_{CE}=V_{IN}$, $I_{OUT}=100mA$		E-3			
Supply Current 1	I_{SS1}	$V_{GO}=V_{IN}$ (HS mode), $V_{IN}=V_{CE}=6.0V$, No load	35	50	80	μA	
Supply Current 2	I_{SS2}	$V_{GO}=V_{SS}$ (PS mode), $V_{IN}=V_{CE}=6.0V$, No load	-	5.5	8.0	μA	
Stand-by Current	I_{STBY}	$V_{IN}=6.0V$, $V_{CE}=V_{SS}$	-	0	0.1	μA	
Line Regulation 1.2V $\leq V_{OUT(T)} \leq$ 4.5V	$\dfrac{\triangle V_{OUT}}{\triangle V_{IN} V_{OUT}}$	$V_{GO}=V_{IN}$ (HS mode), $V_{OUT(T)}+1.0V \leq V_{IN} \leq 6.0V$, $V_{CE}=V_{IN}$, $I_{OUT}=30mA$	-	0.01	0.20	%/V	
Line Regulation 4.5V $\leq V_{OUT(T)} \leq$ 5.0V		$V_{GO}=V_{IN}$ (HS mode), $5.5V \leq V_{IN} \leq 6.0V$, $V_{CE}=V_{IN}$, $I_{OUT}=30mA$					
Input Voltage	V_{IN}	-	2.0	-	6.0	V	
Output Voltage Temperature Characteristics	$\dfrac{\triangle V_{OUT}}{\triangle Ta V_{OUT}}$	$V_{GO}=V_{IN}$ (HS mode), $-40 \leq Ta \leq 85$, $V_{CE}=V_{IN}$, $I_{OUT}=30mA$	-	±100	-	ppm/	
Ripple Rejection Rate 1.2V $\leq V_{OUT(T)} \leq$ 1.25V	PSRR	$V_{GO}=V_{IN}$ (HS mode), $V_{CE}=V_{IN}$, $I_{OUT}=30mA$, $V_{IN}=2.25V_{DC}+0.5Vp-pAC$, f=1kHz	-	70	-	dB	
Ripple Rejection Rate 1.25V $\leq V_{OUT(T)} \leq$ 4.75V		$V_{GO}=V_{IN}$ (HS mode), $V_{CE}=V_{IN}$, $I_{OUT}=30mA$, $V_{IN}=\{V_{OUT(T)}+1.0V\}V_{DC}+0.5Vp-pAC$, f=1kHz					
Ripple Rejection Rate 4.75V $\leq V_{OUT(T)} \leq$ 5.0V		$V_{GO}=V_{IN}$ (HS mode), $V_{CE}=V_{IN}$, $I_{OUT}=30mA$, $V_{IN}=5.75V_{DC}+0.5Vp-pAC$, f=1kHz					
Limit Current	I_{lim}	$V_{GO}=V_{IN}$ (HS mode), $V_{CE}=V_{IN}$	300	380	-	mA	
Short Current	I_{short}	$V_{GO}=V_{IN}$ (HS mode), $V_{CE}=V_{IN}$, V_{OUT} is short-circuited at the V_{SS} level.	-	50	-	mA	
PS Switching Current	I_{GOR}	$V_{CE}=V_{IN}$, $V_{GO}=V_{SS}$, (HS/PS automatic switching) I_{OUT}: heavy to light load	0.3	-	-	mA	
HS Switching Current	I_{GO}	$V_{CE}=V_{IN}$, $V_{GO}=V_{SS}$, (HS/PS automatic switching) I_{OUT}: light to heavy load	-	-	2.0	mA	

ELECTRICAL CHARACTERISTICS (Continued)

XC6207A/B series (Continued)

Ta=25

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Switching Current Hysteresis Range	I_{GOhys}	$I_{GOhys}=I_{GO}-I_{GOR}$	-	1.0	-	mA	
PS Switching Delay Time	T_{DPS}	$V_{CE}=V_{IN}$, $V_{GO}=V_{SS}$, (HS/PS automatic switching) Time until HS mode switches to PS mode by I_{GOR}.	-	-	900	μs	
CE High Level Voltage	V_{CEH}	$V_{GO}=V_{IN}$, no load Voltage to start operation by applying voltage to the CE.	1.6	-	-	V	
CE Low Level Voltage	V_{CEL}	$V_{GO}=V_{IN}$, no load Voltage to become the stand-by mode by applying voltage to the CE.	-	-	0.25	V	
GO High Level Voltage [*7]	V_{GOH}	$V_{CE}=V_{IN}$, no load Voltage to become HS mode by applying voltage to the GO.	1.6	-	-	V	
GO Low Level Voltage [*7]	V_{GOL}	$V_{CE}=V_{IN}$, no load Voltage to become HS/PS automatic switching mode by applying voltage to the GO.	-	-	0.25	V	
CE High Level Current	I_{CEH}	$V_{CE}=V_{IN}$, $V_{GO}=V_{IN}$	- 0.1	-	0.1	μA	
CE Low Level Current	I_{CEL}	$V_{CE}=V_{SS}$, $V_{GO}=V_{IN}$	- 0.1	-	0.1	μA	
GO High Level Current	I_{GOH}	$V_{GO}=V_{IN}$, $V_{CE}=V_{IN}$	- 0.1	-	0.1	μA	
GO Low Level Current	I_{GOL}	$V_{GO}=V_{SS}$, $V_{CE}=V_{IN}$	- 0.1	-	0.1	μA	
CL Auto-Discharge Resistance [*8]	R_{dischg}	$V_{IN}=6.0V$, $V_{OUT}=6.0V$, $V_{CE}=V_{GO}=V_{SS}$	-	470	-		

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 an amply stabilized "$V_{OUT(T)}$ 1.0V" is provided at the V_{IN} pin while maintaining a certain I_{OUT} value.)
   High Speed (HS) mode: The voltage of V_{GOH} or more is input to the GO pin, or the voltage of V_{GOL} or less is input to the GO pin when the output current is I_{GO} or more.
   Power Save (PS) mode: The voltage of V_{GOL} or less is input to the GO pin when the output current is I_{GOR} or less.
* 4: $V_{dif}=\{V_{IN}1^{(*6)}-V_{OUT}1^{(*5)}\}$
* 5: $V_{OUT}1$=A voltage equal to 98% of the output voltage whenever an amply stabilized I_{OUT} {$V_{OUT(T)}$+1.0V} is input in the HS mode.
* 6: $V_{IN}1$=The input voltage when $V_{OUT}1$ appears as Input Voltage is gradually decreased.
* 7: With the GO pin input voltage, the fixed HS mode or Green Operation (GO) is selectable.
* 8: For the XC6207B series only.   The XC6207A series discharges by resistors R1 and R2 only as shown in the block diagrams.
* 9: The rated value of the output voltage when $V_{OUT(T)}$ 1.5V is shown below.
   HS mode : $V_{OUT(T)}$ -30mV $V_{OUT(E)}$ $V_{OUT(T)}$ +30mV
   PS mode : $V_{OUT(T)}$ -45mV $V_{OUT(E)}$ $V_{OUT(T)}$+30mV
*10: Recommended conditions for C_{IN} and CL
   1.2V $V_{OUT(T)}$ 1.8V: C_{IN}=1.0μF, CL=4.7μF (ceramic cap.)
   1.8V $V_{OUT(T)}$ 2.5V: C_{IN}=1.0μF, CL=1.0μF (ceramic cap.)
   2.5V $V_{OUT(T)}$ 5.0V: C_{IN}=2.2μF, CL=1.0μF (ceramic cap.)

ELECTRICAL CHARACTERISTICS (Continued)

DROPOUT VOLTAGE CHART

SETTING OUTPUT VOLTAGE (V)	E-0 OUTPUT VOLTAGE (HS MODE) (V)			E-1 OUTPUT VOLTAGE (PS MODE) (V)			E-2 DROPOUT VOLTAGE 1 IOUT=30mA (mV)		E-3 DROPOUT VOLTAGE 2 IOUT=100mA (mV)	
VOUT(T)	VOUT(E)			VOUT(E)			Vdif1		Vdif2	
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.
1.20	1.170	1.20	1.230	1.1550	1.20	1.230	800	850	810	860
1.25	1.220	1.25	1.280	1.2050	1.25	1.280				
1.30	1.270	1.30	1.330	1.2550	1.30	1.330	700	750	710	760
1.35	1.320	1.35	1.380	1.3050	1.35	1.380				
1.40	1.370	1.40	1.430	1.3550	1.40	1.430	600	650	610	660
1.45	1.420	1.45	1.480	1.4050	1.45	1.480				
1.50	1.470	1.50	1.530	1.4550	1.50	1.530	500	550	510	560
1.55	1.519	1.55	1.581	1.5035	1.55	1.581				
1.60	1.568	1.60	1.632	1.5520	1.60	1.632	400	450	410	460
1.65	1.617	1.65	1.683	1.6005	1.65	1.683				
1.70	1.666	1.70	1.734	1.6490	1.70	1.734	300	350	310	360
1.75	1.715	1.75	1.785	1.6975	1.75	1.785				
1.80	1.764	1.80	1.836	1.7460	1.80	1.836	200	250	210	260
1.85	1.813	1.85	1.887	1.7945	1.85	1.887				
1.90	1.862	1.90	1.938	1.8430	1.90	1.938	100	150	200	250
1.95	1.911	1.95	1.989	1.8915	1.95	1.989				
2.00	1.960	2.00	2.040	1.9400	2.00	2.040	60	90	180	245
2.05	2.009	2.05	2.091	1.9885	2.05	2.091				
2.10	2.058	2.10	2.142	2.0370	2.10	2.142				
2.15	2.107	2.15	2.193	2.0855	2.15	2.193				
2.20	2.156	2.20	2.244	2.1340	2.20	2.244		80		240
2.25	2.205	2.25	2.295	2.1825	2.25	2.295				
2.30	2.254	2.30	2.346	2.2310	2.30	2.346				
2.35	2.303	2.35	2.397	2.2795	2.35	2.397				
2.40	2.352	2.40	2.448	2.3280	2.40	2.448				
2.45	2.401	2.45	2.499	2.3765	2.45	2.499				
2.50	2.450	2.50	2.550	2.4250	2.50	2.550	50	70	150	220
2.55	2.499	2.55	2.601	2.4735	2.55	2.601				
2.60	2.548	2.60	2.652	2.5220	2.60	2.652				
2.65	2.597	2.65	2.703	2.5705	2.65	2.703				
2.70	2.646	2.70	2.754	2.6190	2.70	2.754				
2.75	2.695	2.75	2.805	2.6675	2.75	2.805				
2.80	2.744	2.80	2.856	2.7160	2.80	2.856				
2.85	2.793	2.85	2.907	2.7645	2.85	2.907				
2.90	2.842	2.90	2.958	2.8130	2.90	2.958				
2.95	2.891	2.95	3.009	2.8615	2.95	3.009				
3.00	2.940	3.00	3.060	2.9100	3.00	3.060	40	65	120	190
3.05	2.989	3.05	3.111	2.9585	3.05	3.111				
3.10	3.038	3.10	3.162	3.0070	3.10	3.162				
3.15	3.087	3.15	3.213	3.0555	3.15	3.213				
3.20	3.136	3.20	3.264	3.1040	3.20	3.264				
3.25	3.185	3.25	3.315	3.1525	3.25	3.315				
3.30	3.234	3.30	3.366	3.2010	3.30	3.366				
3.35	3.283	3.35	3.417	3.2495	3.35	3.417				
3.40	3.332	3.40	3.468	3.2980	3.40	3.468				

ELECTRICAL CHARACTERISTICS (Continued)

DROPOUT VOLTAGE CHART (Continued)

SETTING OUTPUT VOLTAGE (V)	E-0 OUTPUT VOLTAGE (HS MODE) (V)			E-1 OUTPUT VOLTAGE (PS MODE) (V)			E-2 DROPOUT VOLTAGE 1 I_{OUT}=30mA (mV)		E-3 DROPOUT VOLTAGE 2 I_{OUT}=100mA (mV)	
$V_{OUT(T)}$	$V_{OUT(E)}$			$V_{OUT(E)}$			Vdif1		Vdif2	
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.
3.45	3.381	3.45	3.519	3.3465	3.45	3.519				
3.50	3.430	3.50	3.570	3.3950	3.50	3.570				
3.55	3.479	3.55	3.621	3.4435	3.55	3.621				
3.60	3.528	3.60	3.672	3.4920	3.60	3.672				
3.65	3.577	3.65	3.723	3.5405	3.65	3.723				
3.70	3.626	3.70	3.774	3.5890	3.70	3.774				
3.75	3.675	3.75	3.825	3.6375	3.75	3.825				
3.80	3.724	3.80	3.876	3.6860	3.80	3.876				
3.85	3.773	3.85	3.927	3.7345	3.85	3.927				
3.90	3.822	3.90	3.978	3.7830	3.90	3.978				
3.95	3.871	3.95	4.029	3.8315	3.95	4.029				
4.00	3.920	4.00	4.080	3.8800	4.00	4.080				
4.05	3.969	4.05	4.131	3.9285	4.05	4.131				
4.10	4.018	4.10	4.182	3.9770	4.10	4.182				
4.15	4.067	4.15	4.233	4.0255	4.15	4.233				
4.20	4.116	4.20	4.284	4.0740	4.20	4.284	40	65	120	190
4.25	4.165	4.25	4.335	4.1225	4.25	4.335				
4.30	4.214	4.30	4.386	4.1710	4.30	4.386				
4.35	4.263	4.35	4.437	4.2195	4.35	4.437				
4.40	4.312	4.40	4.488	4.2680	4.40	4.488				
4.45	4.361	4.45	4.539	4.3165	4.45	4.539				
4.50	4.410	4.50	4.590	4.3650	4.50	4.590				
4.55	4.459	4.55	4.641	4.4135	4.55	4.641				
4.60	4.508	4.60	4.692	4.4620	4.60	4.692				
4.65	4.557	4.65	4.743	4.5105	4.65	4.743				
4.70	4.606	4.70	4.794	4.5590	4.70	4.794				
4.75	4.655	4.75	4.845	4.6075	4.75	4.845				
4.80	4.704	4.80	4.896	4.6560	4.80	4.896				
4.85	4.753	4.85	4.947	4.7045	4.85	4.947				
4.90	4.802	4.90	4.998	4.7530	4.90	4.998				
4.95	4.851	4.95	5.049	4.8015	4.95	5.049				
5.00	4.900	5.00	5.100	4.8500	5.00	5.100				

OPERATIONAL EXPLANATION

<Output Voltage Control>

The voltage divided by resistors R1 & R2 is compared with the internal reference voltage by the error amplifier. The P-channel MOSFET, which is 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. The GO function monitors the output current and switches a supply current to two values according to the level of output current. Further, the IC's internal circuitry can be shutdown via the CE pin's signal.

<Green Operation>
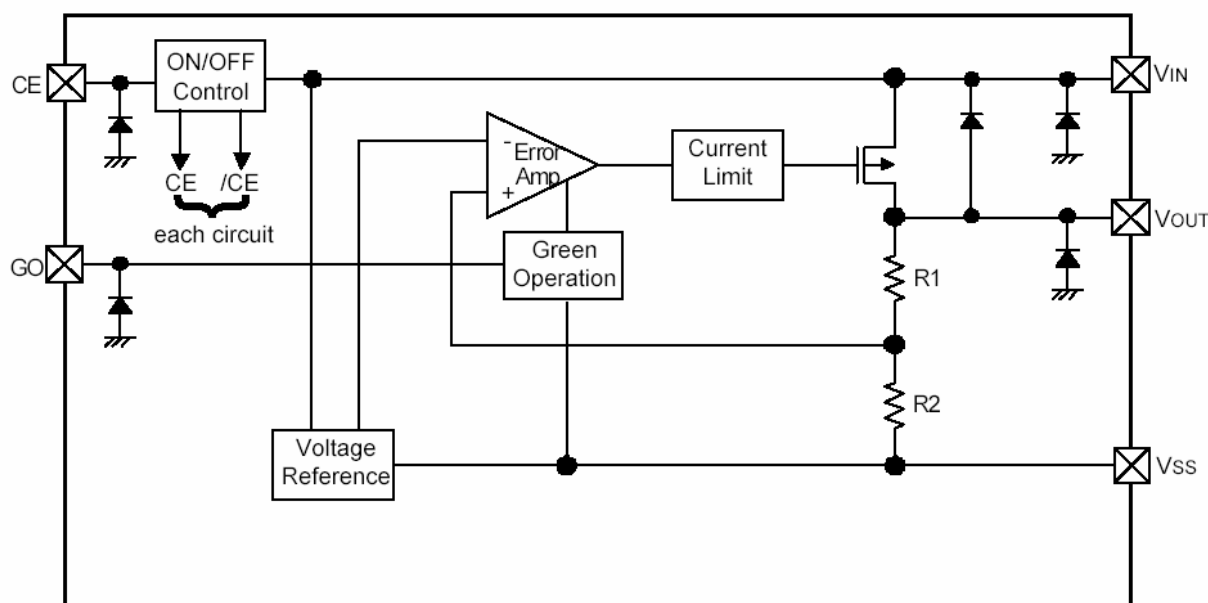
XC6207 series can be set as a fixed high-speed mode or a green operation (GO) mode via a signal to the green operation (GO) pin. Under the condition that the output current becomes I_{GOR} or less, the IC operates in the high speed mode (HS) when the GO pin is at high level and the IC operates in the power save (PS) mode when the GO pin is at low level. The GO mode enables the IC to switch automatically the supply current to the high speed (HS) mode or the power save (PS) mode according to the level of output current. While having both high-speed operation and low supply current state, the XC6207 series can acquire high efficiency. At the HS/PS automatic switching mode (GO mode), the switching point of the HS mode and the PS mode is being fixed inside the IC. When the output current becomes I_{GOR} 0.3mA (TYP.) or below, the mode changes automatically to the PS mode after the delay time of hundreds μs, and it can reduce supply current in light load. For applications, most of portable equipment control the system current, which is the output current to the IC, according to the system condition. Furthermore, the high-speed operation might be required. In such a case, the mode will automatically switch to the HS mode at the automatic switching mode (GO mode), when the output current becomes I_{GO} or more. In the HS mode, the response of the output voltage during the output current fluctuation is better than the PS mode. Automatic switching PS mode to HS mode causes the switching delay time of tens of μs, the output voltage drops more than in the fixed HS mode. If the GO pin voltage is at high level (tens of μs (T) before the output current fluctuation occurs) and the IC is used in the HS mode, the output current fluctuation will be suppressed to as low as the fixed HS mode. (cf. the following item: Load Transient Response by Switching Mode with GO pin.)

The output current at the HS/PS mode should be adjusted to 2.0mA or more / 0.3mA or less respectively when the IC is used in the HS/PS automatic switching mode (GO mode).

It is suggested that you use this IC with either a V_{IN} voltage or a V_{SS} voltage input at the GO pin. If this IC is used with the correct specifications for the GO pin, the IC will operate normally. However, supply current may increase as a result of through current in the IC's internal circuitry when medium voltage is input.
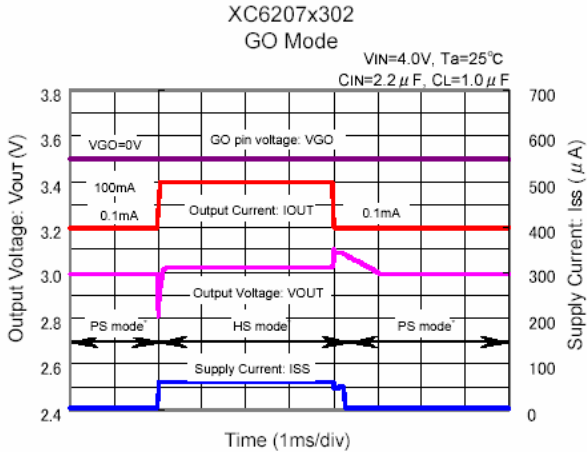
OPERATIONAL EXPLANATION (Continued)

<Green Operation> (Continued)

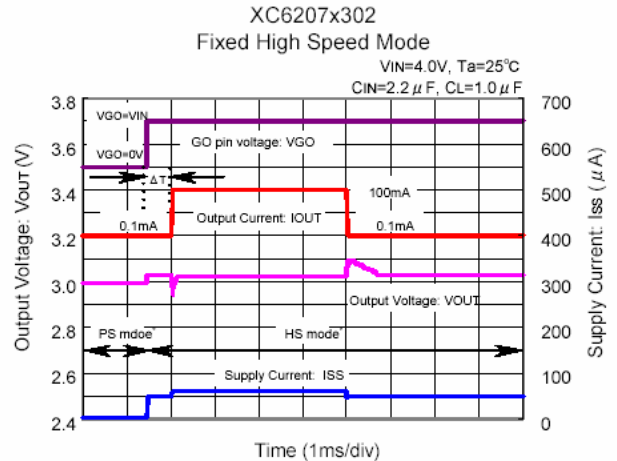Load Transient Response by GO mode

GO mode (GO pin voltage: Low)
Output Current: I_{OUT}=0.1mA 100mA

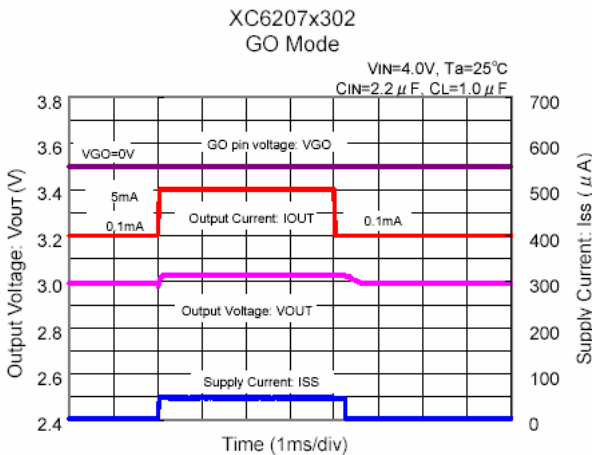Fixed high speed mode via GO pin signal (GO pin voltage: Low to High)
Output Current: I_{OUT}=0.1mA 100mA

XC6207x302
GO Mode

XC6207x302
Fixed High Speed Mode

*Note: Input a "H" level signal to the GO pin before the output current fluctuation (T) occurs.

GO mode (GO pin voltage: Low)
Output Current: I_{OUT}=0.1mA 5mA

Fixed high speed mode via GO pin signal (GO pin voltage: Low to High)
Output Current: I_{OUT}=0.1mA 5mA

XC6207x302
GO Mode

XC6207x302
Fixed High Speed Mode

<Low ESR capacitor>
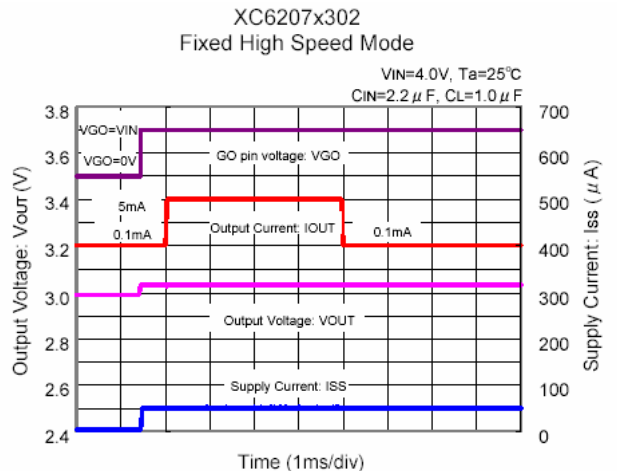
With the XC6207 series, a stable output voltage is achievable even if used with low ESR capacitors, as a phase compensation circuit is built-in. In order to ensure the effectiveness of the phase compensation, we suggest that an output capacitor (C_L) is connected as close as possible to the output pin (V_{OUT}) and the V_{SS} pin. Please use an output capacitor with a capacitance value of at least 1μF when the setting output voltage ($V_{OUT(T)}$) is less than or equal to 1.8V. Also, when the setting output voltage ($V_{OUT(T)}$) is less than or equal to 2.5V, please connect an input capacitor (C_{IN}) of 2.2μF between the V_{IN} pin and the V_{SS} pin in order to ensure a stable power input. The capacitor is possible to decrease depends on bias and temperature. Therefore the phase compensation cannot be ensured effectiveness. Stable phase compensation may not be ensured if the capacitor runs out capacitance when depending on bias and temperature. In case the capacitor depends on the bias and temperature, please make sure the capacitor can ensure the actual capacitance.

<Recommended conditions of C_{IN} and C_L>

SETTING VOLTAGE	C_{IN} (μF)	C_L (μF)
More than 1.2V ~ Under 1.8V	1.0	4.7
More than 1.8V ~ Under 2.5V	1.0	1.0
More than 2.5V ~ Less than 5.0V	2.2	1.0

OPERATIONAL EXPLANATION (Continued)

<CL Auto-Discharge Function>

XC6207B series can quickly discharge the electric charge at the output capacitor (C$_L$), when a low signal to the CE 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).   In this state, the application is protected from a glitch operation caused by the electric charge at the output capacitor (C$_L$).   The C$_L$ auto- discharge resistance at this time depends on the input voltage.   Moreover, discharge time of the output capacitor (C$_L$) is set by the CL auto-discharge resistance (R) and the output capacitor (C$_L$). By setting time constant of a C$_L$ auto-discharge resistance value [R] and an output capacitor value (C$_L$) as (=C x R), the output voltage after discharge via the N channel transistor is calculated by the following formulas.

$$V = V_{OUT} \times e^{-t/}, \quad or \quad t= \quad In\,(V_{OUT} / V)$$

(V : Output voltage after discharge, V$_{OUT(E)}$: Output voltage, t: Discharge time,
  : C$_L$ auto-discharge resistance R× Output capacitor (C$_L$) value C)

Ta=25°C

INPUT VOLTAGE	C$_L$ AUTO-DISCHARGE RESISTANCE	
2.0V	750	(TYP.)
3.0V	550	(TYP.)
4.0V	500	(TYP.)
5.0V	480	(TYP.)
6.0V	470	(TYP.)

(ex.) When input voltage: 4.0V, C$_L$ auto-discharge resistance: 500   (TYP.); output capacitor (C$_L$): 10μ F, V$_{OUT}$:3.0V,
CE voltage=Changing from 4.0V to 0V (The CE pin L level signal)

1   (500μ s) after CE OFF signal is inputted, V$_{OUT(E)}$ becomes: 3.0V× 0.368 = approx. 1.104V
2   (1000μ s) after CE OFF signal is inputted, V$_{OUT(E)}$ becomes: 3.0V× 0.135 = approx. 0.405V
3   (1500μ s) after CE OFF signal is inputted, V$_{OUT(E)}$ becomes: 3.0V× 0.050 = approx. 0.150V
4   (2000μ s) after CE OFF signal is inputted, V$_{OUT(E)}$ becomes: 3.0V× 0.018 = approx. 0.055V

OUTPUT VOLTAGE DISCHARGE CHARACTERISTICS
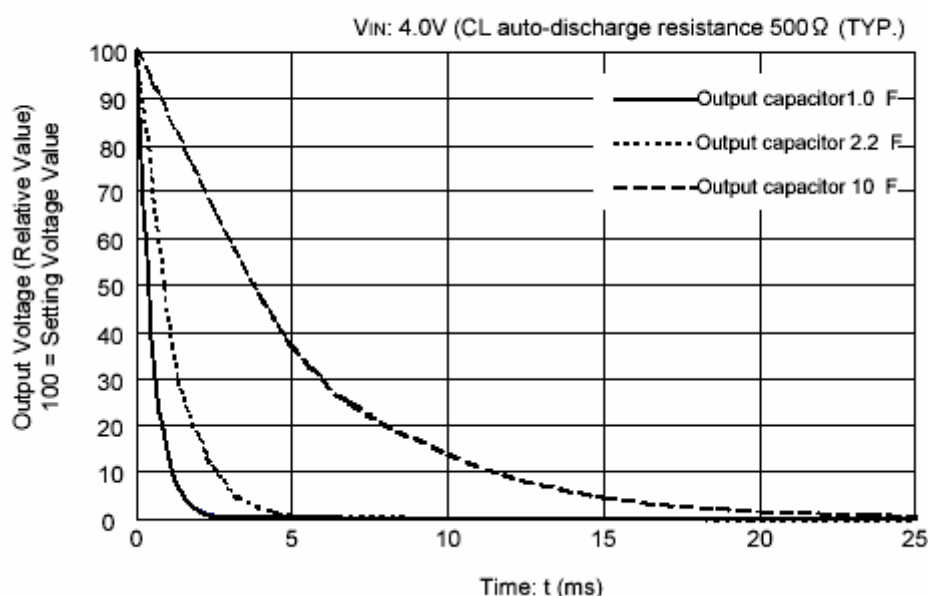
OPERATIONAL EXPLANATION (Continued)

<Current Limiter, Short-Circuit Protection>

The XC6207 series 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 and output voltage drops further and output current decreases.   When the output pin is shorted, a current of about 50mA flows.

<The CE Pin>

The IC's internal circuitry can be shutdown via the signal from the CE pin with the XC6207 series.   In shutdown mode, output at the V_{OUT} pin will be pulled down to the V_{SS} level via R1 & R2.   However, as for the XC6207B series, the C_L auto-discharge resistor is connected in parallel to R1 and R2 while the power supply is applied to the V_{IN} pin. Therefore, time until the V_{OUT} pin reaches the V_{SS} level becomes short.   We suggest that you use this IC with either a V_{IN} voltage or a V_{SS} 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 when medium voltage is input.

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 V_{IN} and V_{SS} wiring in particular.
3. Please wire the input capacitor (C_{IN}) and the output capacitor (C_L) as close to the IC as possible.
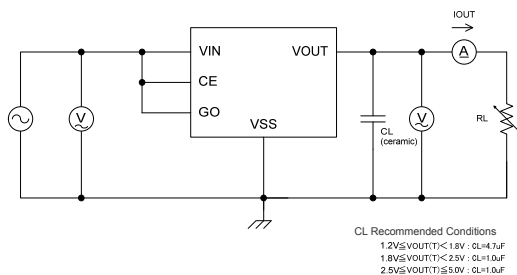
TEST CIRCUITS

Circuit 1 <u>Output Voltage, Input Operating Voltage, Dropout Voltage, Line Regulation, Load Regulation, Limit Current, Short Current</u>
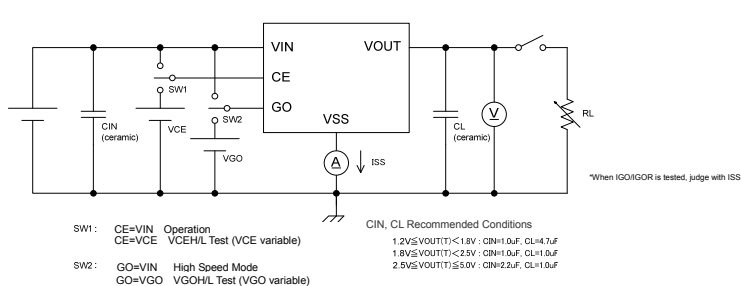

SW1 : GO=VIN ⇒ High Speed Mode
GO=VSS ⇒ High Speed / Power Save Mode

SW2 : RL Connection Test load
VSS Connection Test short circuit

CIN, CL Recommended Conditions
1.2V≦VOUT(T)<1.8V : CIN=1.0uF, CL=4.7uF
1.8V≦VOUT(T)<2.5V : CIN=1.0uF, CL=1.0uF
2.5V≦VOUT(T)≦5.0V : CIN=2.2uF, CL=1.0uF
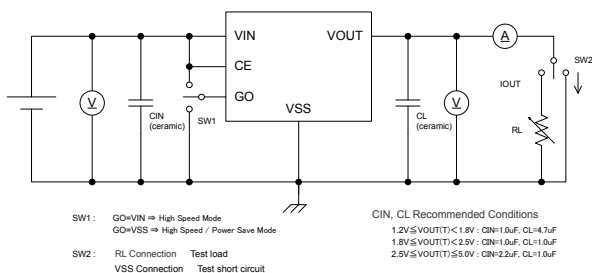
Circuit 2 <u>Supply Current, Standby Current</u>

SW1 : CE=VIN ⇒ Operation
CE=VSS ⇒ Stand-by

SW2 : GO=VIN ⇒ High Speed Mode
GO=VSS ⇒ High Speed / Power Save Mode

※ ISS≒IDD : No load

CIN, CL Recommended Conditions
1.2V≦VOUT(T)<1.8V : CIN=1.0uF, CL=4.7uF
1.8V≦VOUT(T)<2.5V : CIN=1.0uF, CL=1.0uF
2.5V≦VOUT(T)≦5.0V : CIN=2.2uF, CL=1.0uF
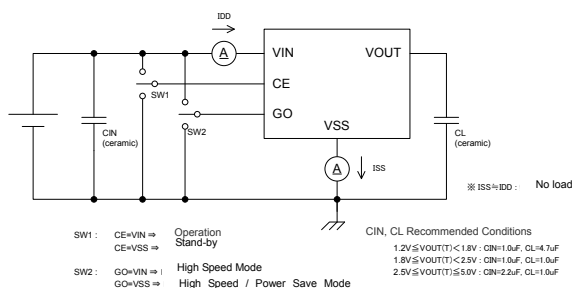
Circuit 3 <u>Ripple Rejection Rate</u>

CL Recommended Conditions
1.2V≦VOUT(T)<1.8V : CL=4.7uF
1.8V≦VOUT(T)<2.5V : CL=1.0uF
2.5V≦VOUT(T)≦5.0V : CL=1.0uF

Circuit 4 <u>CE/GO, High & Low Level Voltage</u>

SW1 : CE=VIN Operation
CE=VCE VCEH/L Test (VCE variable)

SW2 : GO=VIN High Speed Mode
GO=VGO VGOH/L Test (VGO variable)

*When IGO/IGOR is tested, judge with ISS

CIN, CL Recommended Conditions
1.2V≦VOUT(T)<1.8V : CIN=1.0uF, CL=4.7uF
1.8V≦VOUT(T)<2.5V : CIN=1.0uF, CL=1.0uF
2.5V≦VOUT(T)≦5.0V : CIN=2.2uF, CL=1.0uF

Circuit 5 <u>CE/GO, High & Low Level Current</u>

SW1 : CE=VIN ICEH Test
CE=VSS ICEL Test

SW2 : GO=VIN IGOH Test
GO=VSS IGOL Test
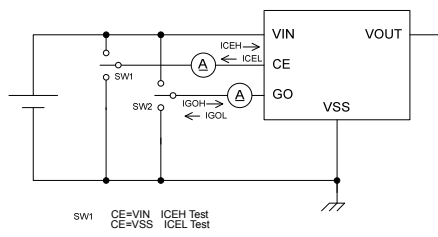
Circuit 6 <u>HS/PS Switching Current, PS Switching Delay Time</u>

IGO : Iout can be changed from light load to heavy load
IGOR : Iout can be changed from heavy load to light load

*When IGO/IGOR is tested, judge with ISS

CIN, CL Recommended Conditions
1.2V≦VOUT(T)<1.8V : CIN=1.0uF, CL=4.7uF
1.8V≦VOUT(T)<2.5V : CIN=1.0uF, CL=1.0uF
2.5V≦VOUT(T)≦5.0V : CIN=2.2uF, CL=1.0uF
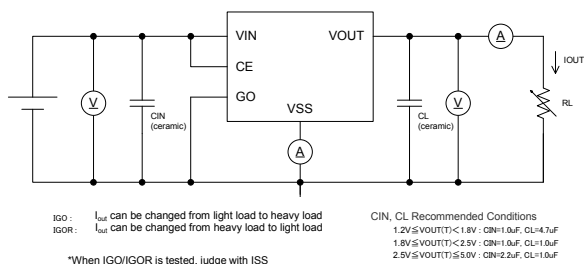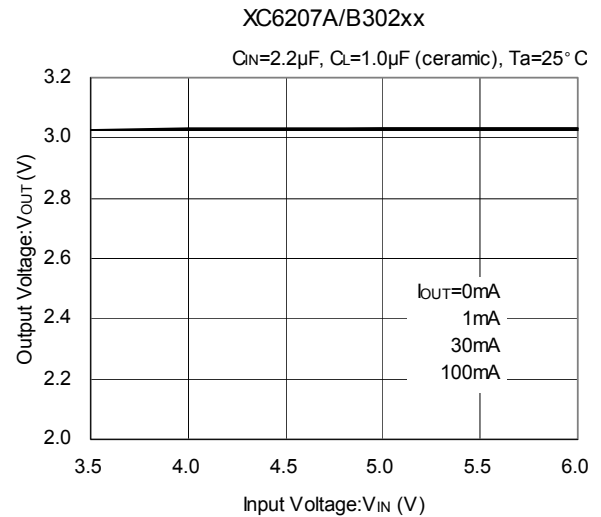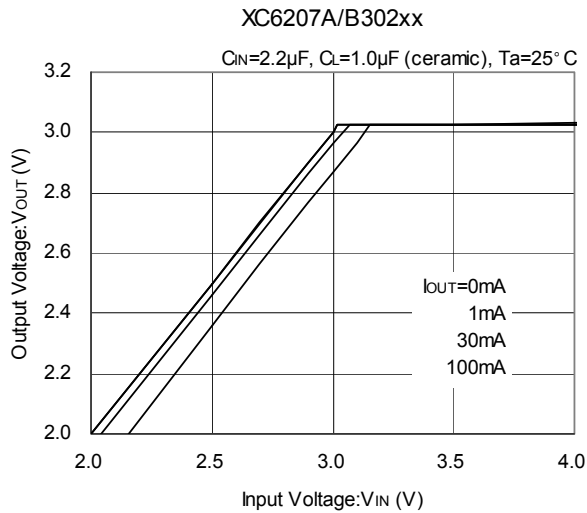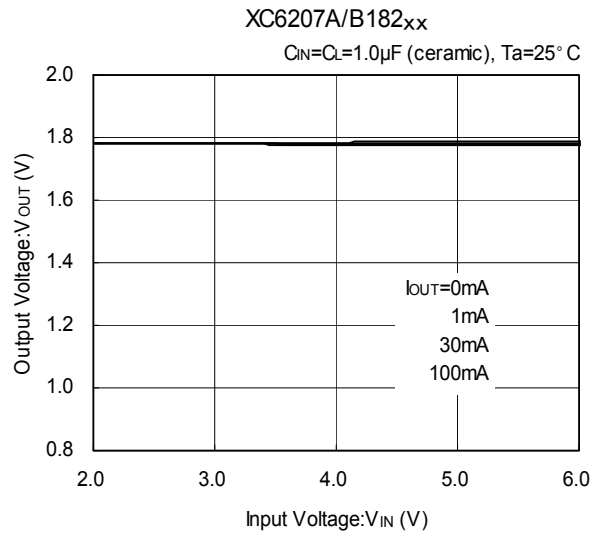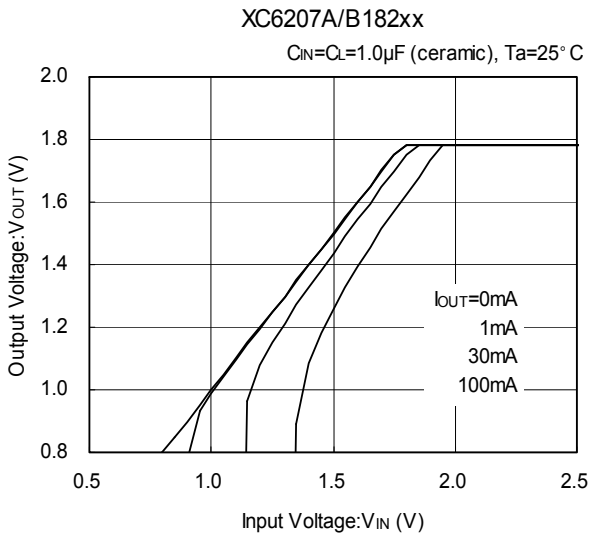
Circuit 7 <u>CL Auto-Discharge Resistance Current</u>

※ Rdischg=VOUT/IOUT
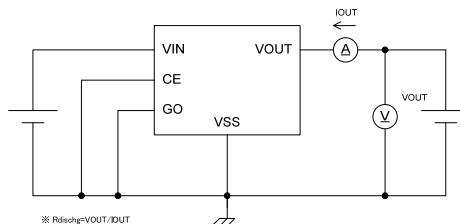
Note: For the capacity of the CIN and the CL, the recommended capacity depending on the setting voltage should be used.
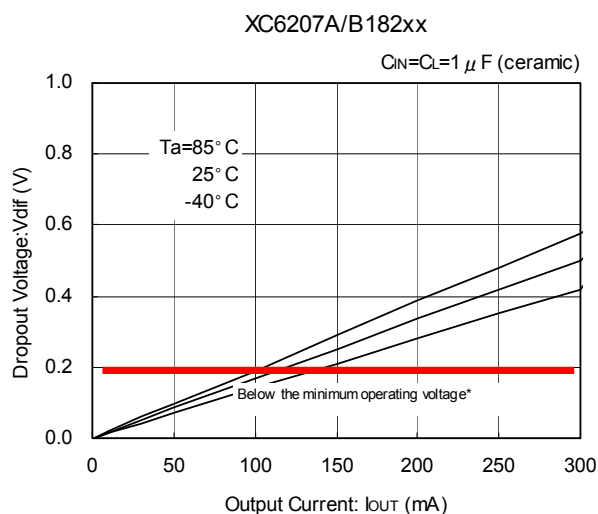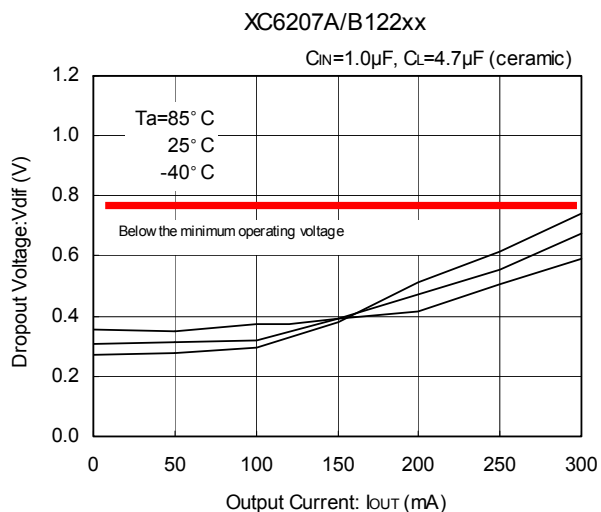
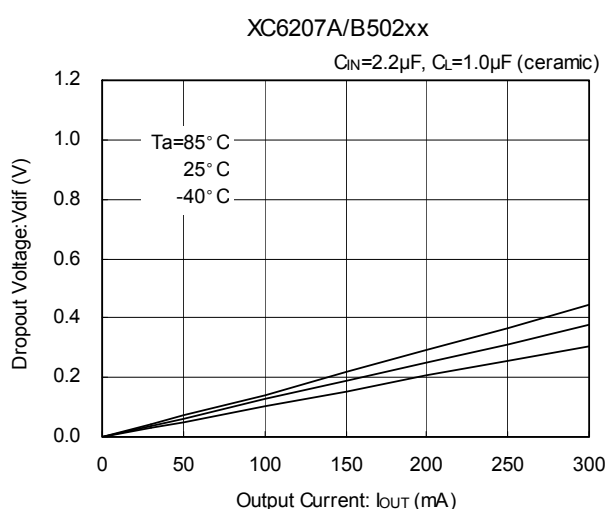## TYPICAL PERFORMANCE CHARACTERISTICS

(1) Output Voltage vs. Input Voltage

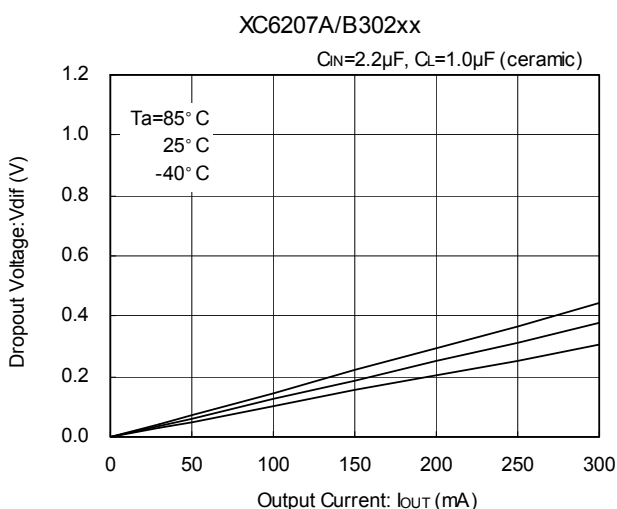### XC6207A/B182xx

$C_{IN}=C_L=1.0\mu F$ (ceramic), Ta=25°C

XC6207A/B182xx

$C_{IN}=C_L=1.0\mu F$ (ceramic), Ta=25°C

XC6207A/B302xx

$C_{IN}=2.2\mu F$, $C_L=1.0\mu F$ (ceramic), Ta=25°C

XC6207A/B302xx

$C_{IN}=2.2\mu F$, $C_L=1.0\mu F$ (ceramic), Ta=25°C

XC6207A/B502xx

$C_{IN}=2.2\mu F$, $C_L=1.0\mu F$ (ceramic), Ta=25°C

XC6207A/B502xx

$C_{IN}=2.2\mu F$, $C_L=1.0\mu F$ (ceramic), Ta=25°C
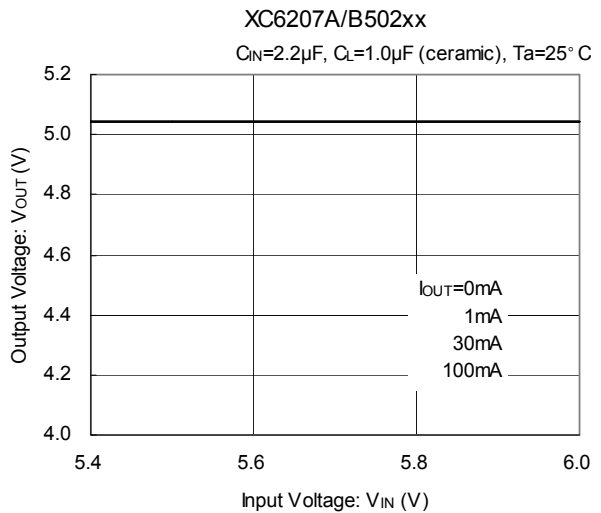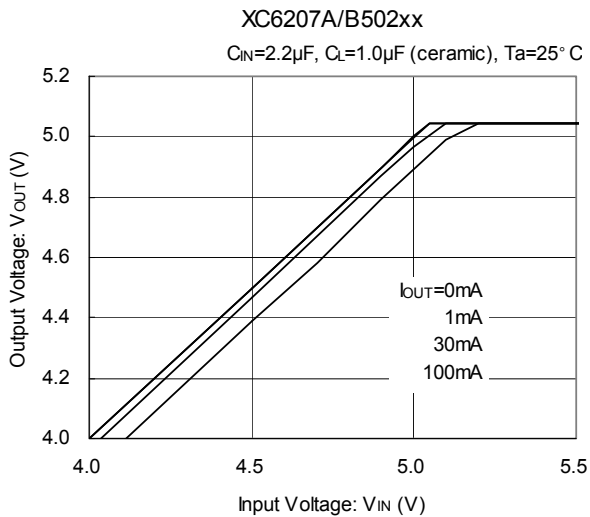
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(2) Dropout Voltage vs. Output Current

XC6207A/B122xx

C_{IN}=1.0μF, C_L=4.7μF (ceramic)

XC6207A/B182xx

C_{IN}=C_L=1μF (ceramic)

*The characteristic when Vdif is lower than 0.2V is the reference characteristic below the minimum operating voltage.

XC6207A/B302xx

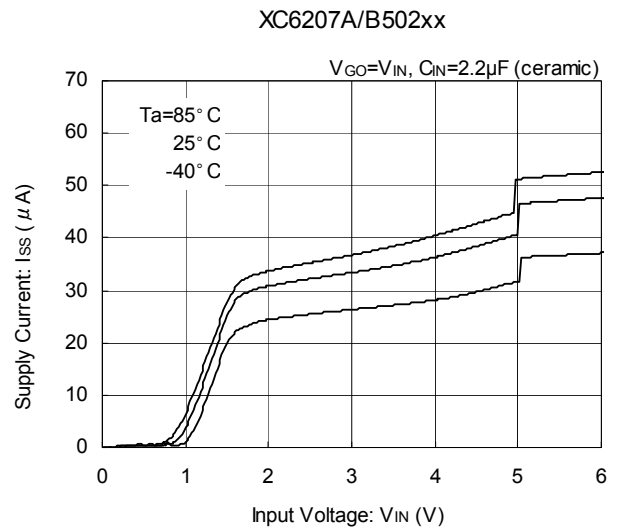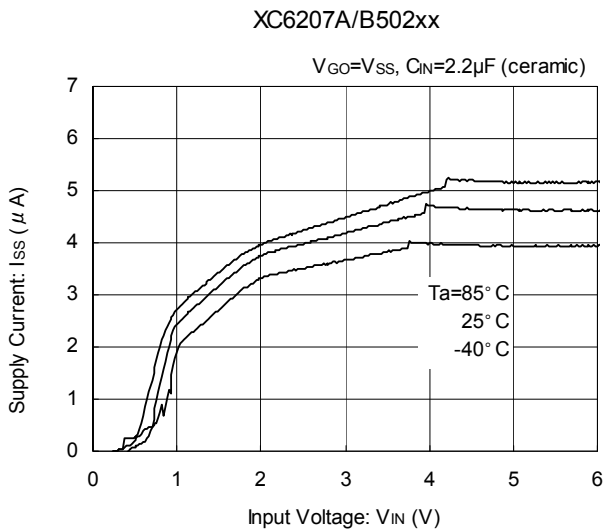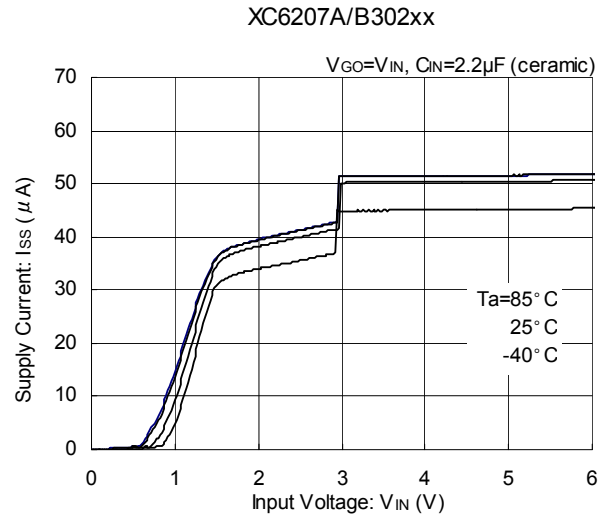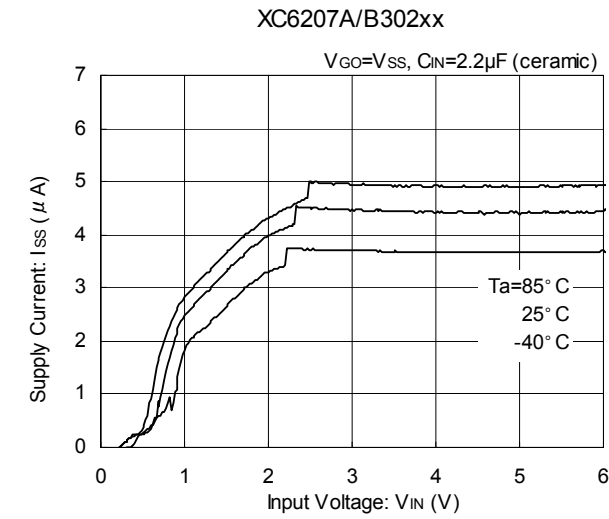C_{IN}=2.2μF, C_L=1.0μF (ceramic)

XC6207A/B502xx

C_{IN}=2.2μF, C_L=1.0μF (ceramic)

(3) Supply Current vs. Input Voltage

XC6207A/B182xx

V_{GO}=V_{SS}, C_{IN}=1.0μF (ceramic)

XC6207A/B182xx

V_{GO}=V_{IN}, C_{IN}=1.0μF (ceramic)
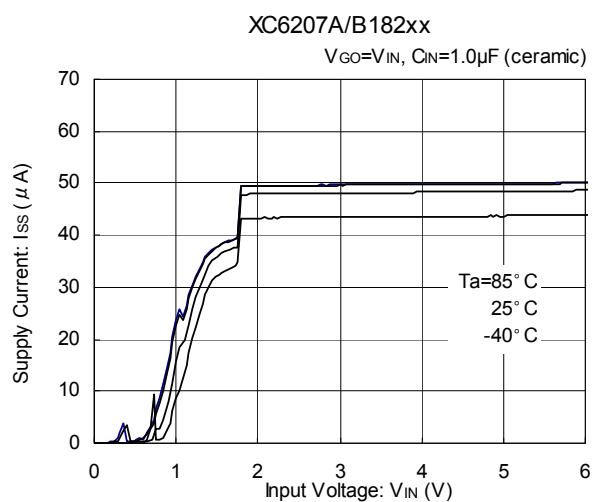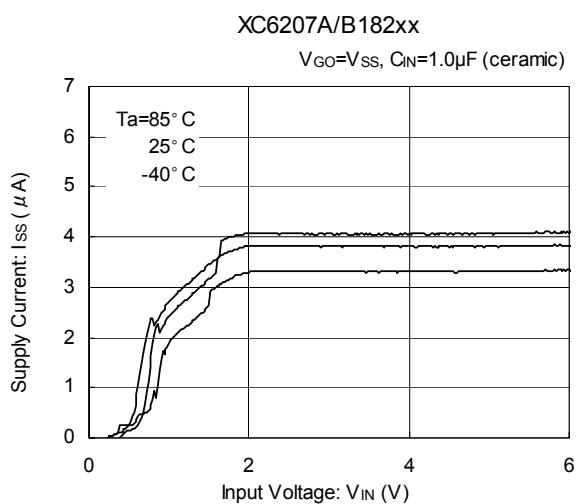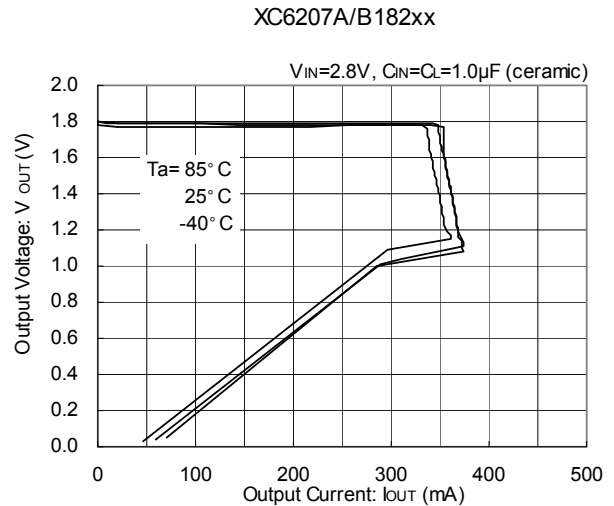
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(3) Supply Current vs. Input Voltage (Continued)

XC6207A/B302xx

$V_{GO}=V_{SS}$, $C_{IN}=2.2\mu F$ (ceramic)

XC6207A/B302xx

$V_{GO}=V_{IN}$, $C_{IN}=2.2\mu F$ (ceramic)

XC6207A/B502xx

$V_{GO}=V_{SS}$, $C_{IN}=2.2\mu F$ (ceramic)

XC6207A/B502xx

$V_{GO}=V_{IN}$, $C_{IN}=2.2\mu F$ (ceramic)

(4) Current Limit

XC6207A/B122xx

$V_{IN}=2.0V$, $C_{IN}=1.0\mu F$, $C_L=4.7\mu F$ (ceramic)

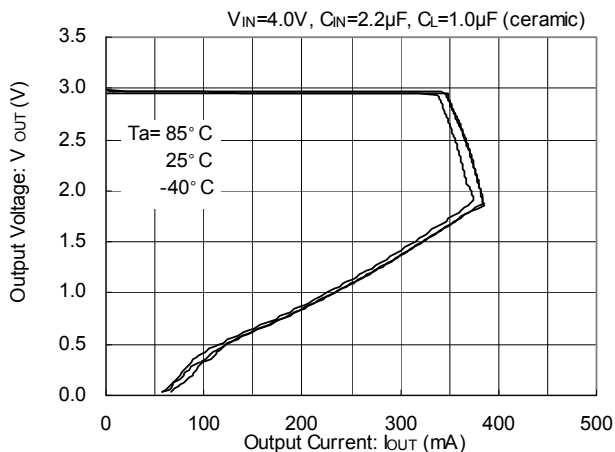### XC6207A/B182xx

$V_{IN}=2.8V$, $C_{IN}=C_L=1.0\mu F$ (ceramic)

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(4) Current Limit (Continued)

XC6207A/B302xx

V_{IN}=4.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

Ta= 85°C
25°C
-40°C

XC6207A/B502xx

V_{IN}=6.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

Ta= 85°C
25°C
-40°C
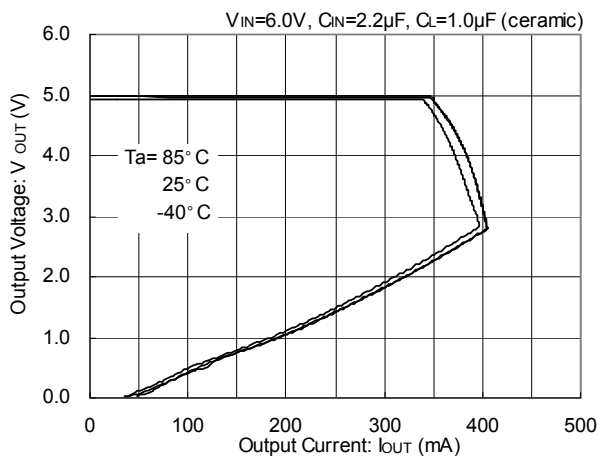
(5) High speed / Power Save Switching Current

XC6207A/B122xx

V_{IN}=$V_{OUT(T)}$+1.0V
C_{IN}=1.0μF, C_L=4.7μF (ceramic)

— HS Switching Current
···· PS Switching Current

XC6207A/B122xx

Ta=25°C
C_{IN}=1.0μF, C_L=4.7μF (ceramic)

— HS Switching Current
···· PS Switching Current
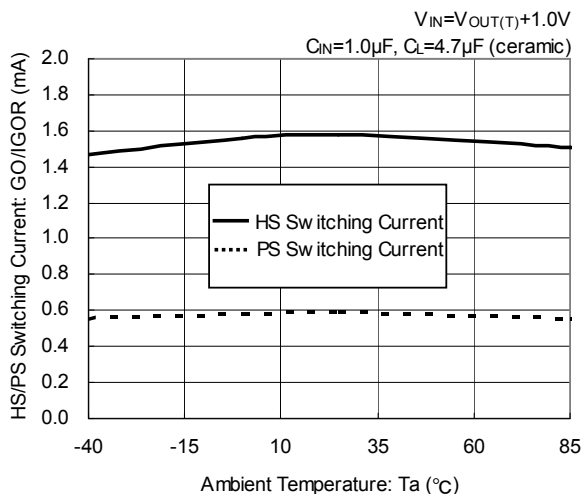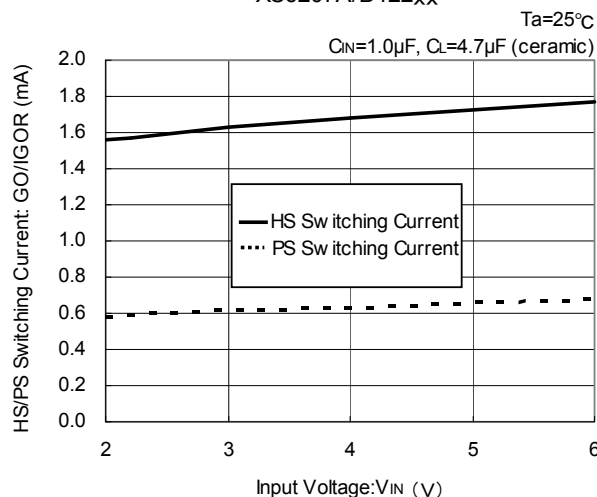
(6) Power Save Switching Delay Time

XC6207A/B122xx

C_{IN}=1.0μF, C_L=4.7μF (ceramic)

V_{IN}=2.0V
3.0V
4.0V
5.0V
6.0V
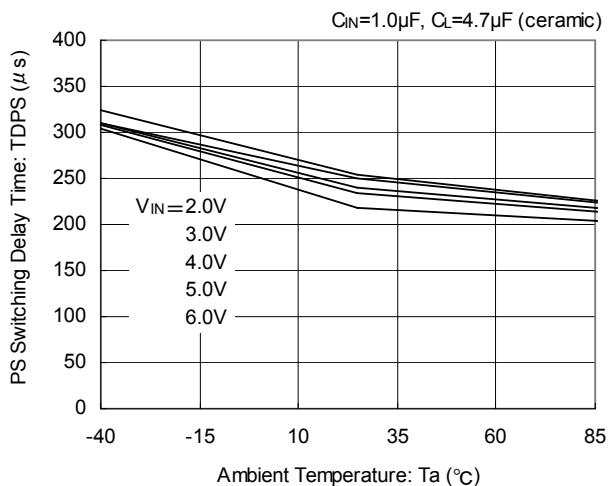
(7) CL Discharge Resistance

XC6207B122xx

V_{CE}=V_{SS}, V_{GO}=V_{OUT}=V_{IN}

Ta=85°C
25°C
-40°C
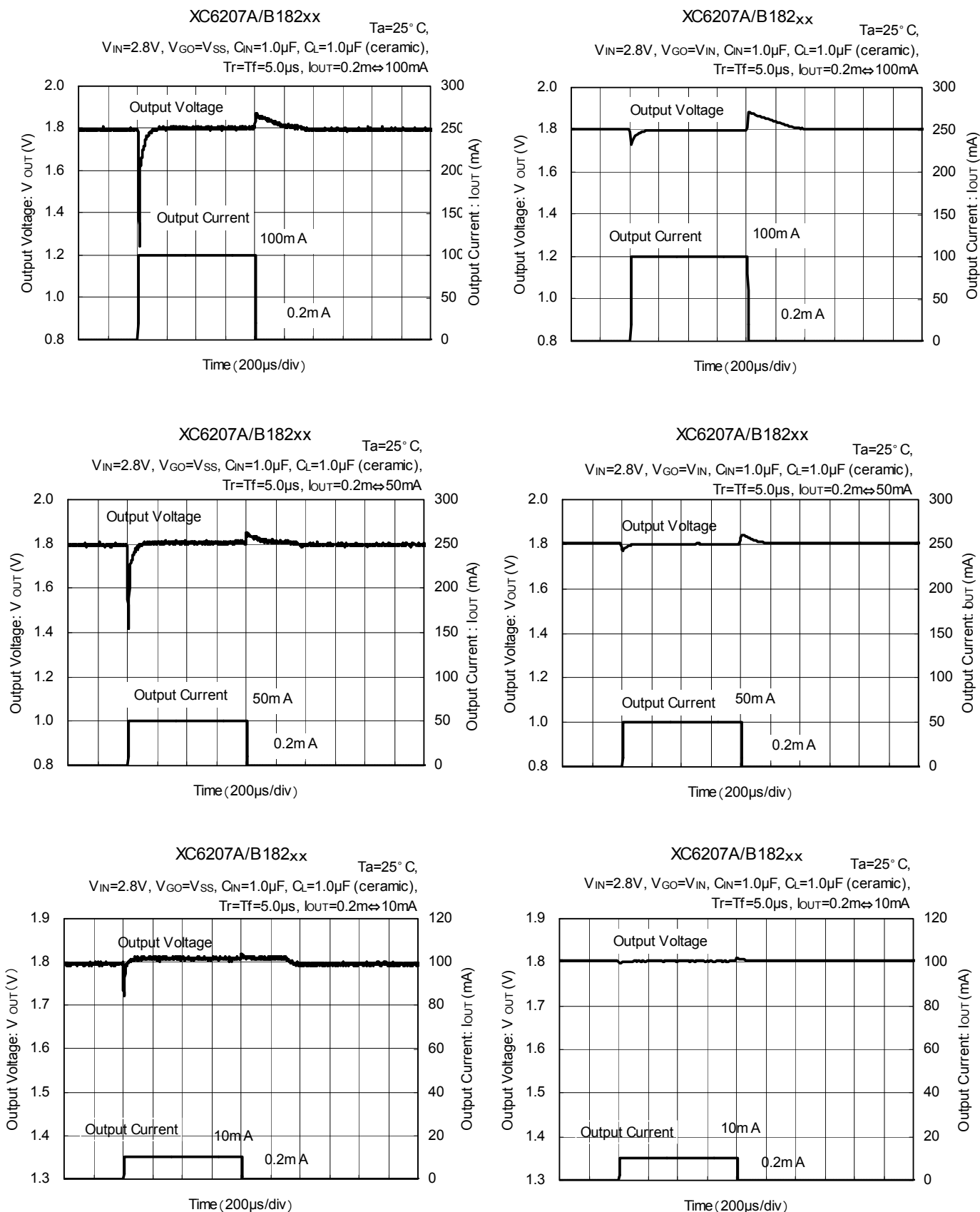
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Load Transient Response

XC6207A/B122xx

Ta=25°C,
V_{IN}=2.2V, V_{GO}=V_{SS}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔100mA

XC6207A/B122xx

Ta=25°C,
V_{IN}=2.2V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔100mA

XC6207A/B122xx

Ta=25°C,
V_{IN}=2.2V, V_{GO}=V_{SS}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔50mA

XC6207A/B122xx

Ta=25°C,
V_{IN}=2.2V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔50mA

XC6207A/B122xx

Ta=25°C,
V_{IN}=2.2V, V_{GO}=V_{SS}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔10mA

XC6207A/B122xx

Ta=25°C,
V_{IN}=2.2V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
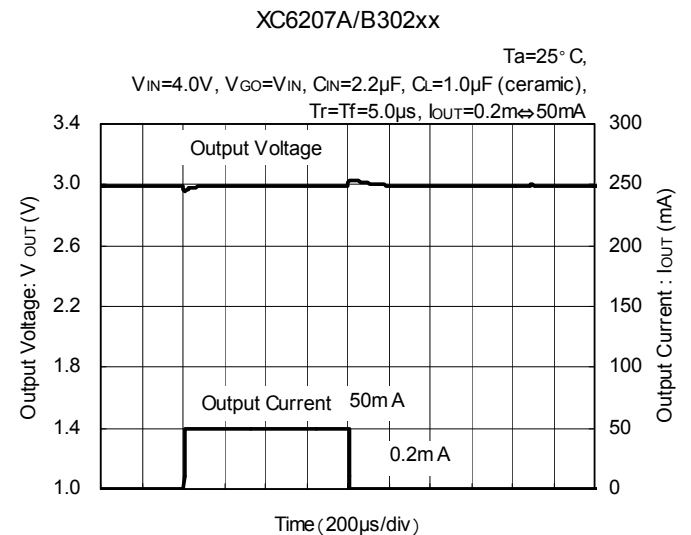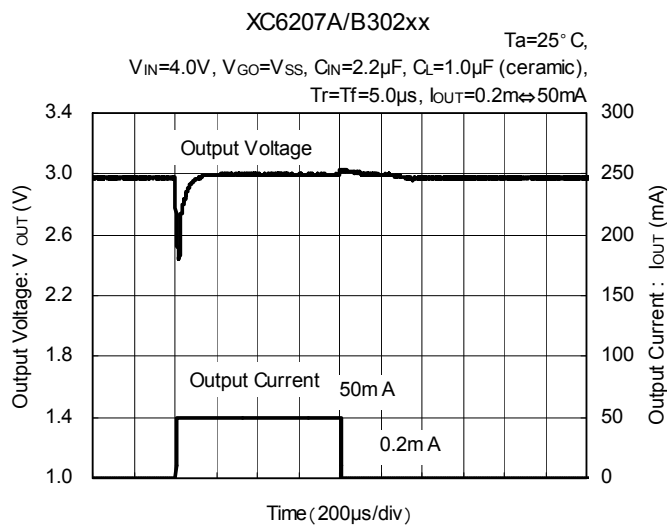Tr=Tf=5.0μs, I_{OUT}=0.2m⇔10mA

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Load Transient Response (Continued)

XC6207A/B182xx

Ta=25°C,
V_{IN}=2.8V, V_{GO}=V_{SS}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔100mA

XC6207A/B182xx

Ta=25°C,
V_{IN}=2.8V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔100mA

XC6207A/B182xx

Ta=25°C,
V_{IN}=2.8V, V_{GO}=V_{SS}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔50mA

XC6207A/B182xx

Ta=25°C,
V_{IN}=2.8V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔50mA

XC6207A/B182xx

Ta=25°C,
V_{IN}=2.8V, V_{GO}=V_{SS}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔10mA

XC6207A/B182xx

Ta=25°C,
V_{IN}=2.8V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
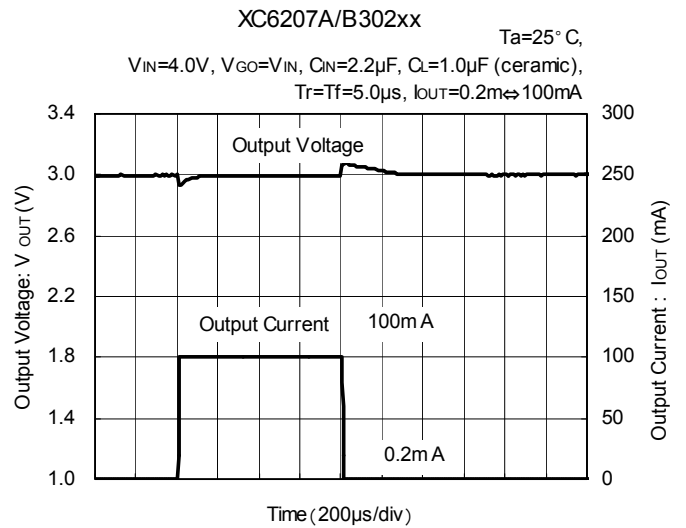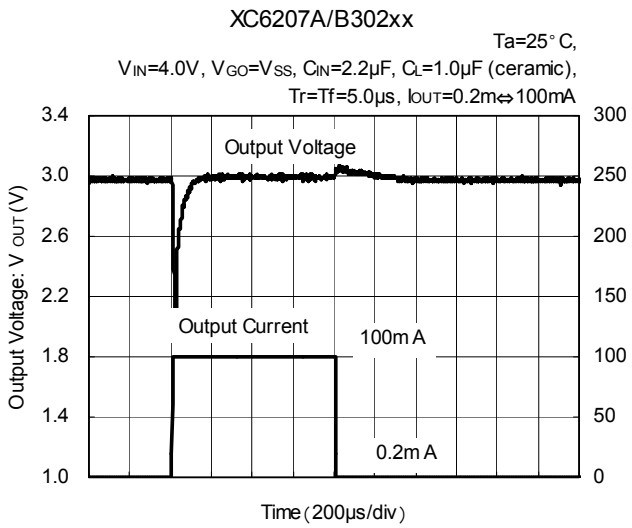Tr=Tf=5.0μs, I_{OUT}=0.2m⇔10mA

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Load Transient Response (Continued)

XC6207A/B302xx

Ta=25°C,
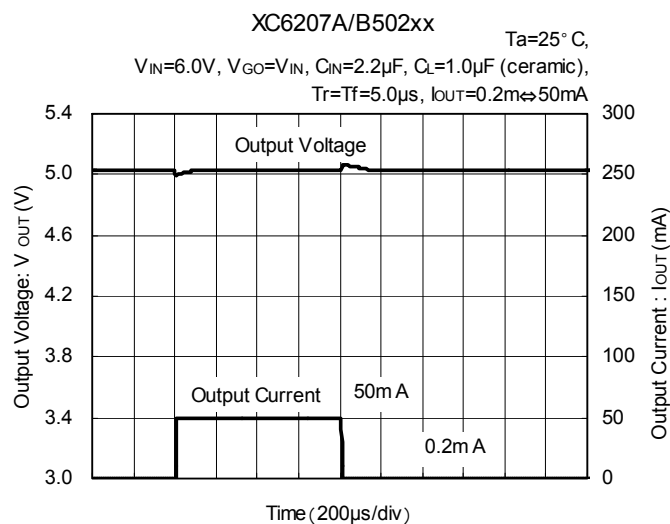V$_{IN}$=4.0V, V$_{GO}$=V$_{SS}$, C$_{IN}$=2.2μF, C$_L$=1.0μF (ceramic),
Tr=Tf=5.0μs, I$_{OUT}$=0.2m⇔100mA

XC6207A/B302xx

Ta=25°C,
V$_{IN}$=4.0V, V$_{GO}$=V$_{IN}$, C$_{IN}$=2.2μF, C$_L$=1.0μF (ceramic),
Tr=Tf=5.0μs, I$_{OUT}$=0.2m⇔100mA

XC6207A/B302xx

Ta=25°C,
V$_{IN}$=4.0V, V$_{GO}$=V$_{SS}$, C$_{IN}$=2.2μF, C$_L$=1.0μF (ceramic),
Tr=Tf=5.0μs, I$_{OUT}$=0.2m⇔50mA

XC6207A/B302xx

Ta=25°C,
V$_{IN}$=4.0V, V$_{GO}$=V$_{IN}$, C$_{IN}$=2.2μF, C$_L$=1.0μF (ceramic),
Tr=Tf=5.0μs, I$_{OUT}$=0.2m⇔50mA

XC6207A/B302xx

Ta=25°C,
V$_{IN}$=4.0V, V$_{GO}$=V$_{SS}$, C$_{IN}$=2.2μF, C$_L$=1.0μF (ceramic),
Tr=Tf=5.0μs, I$_{OUT}$=0.2m⇔10mA

XC6207A/B302xx

Ta=25°C,
V$_{IN}$=4.0V, V$_{GO}$=V$_{IN}$, C$_{IN}$=2.2μF, C$_L$=1.0μF (ceramic),
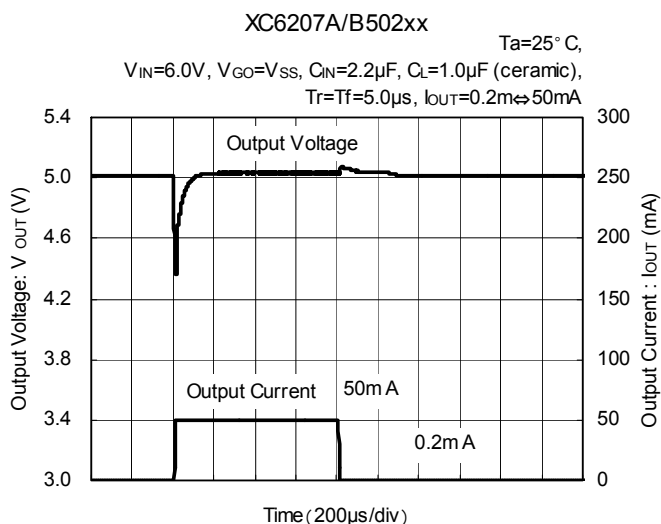Tr=Tf=5.0μs, I$_{OUT}$=0.2m⇔10mA
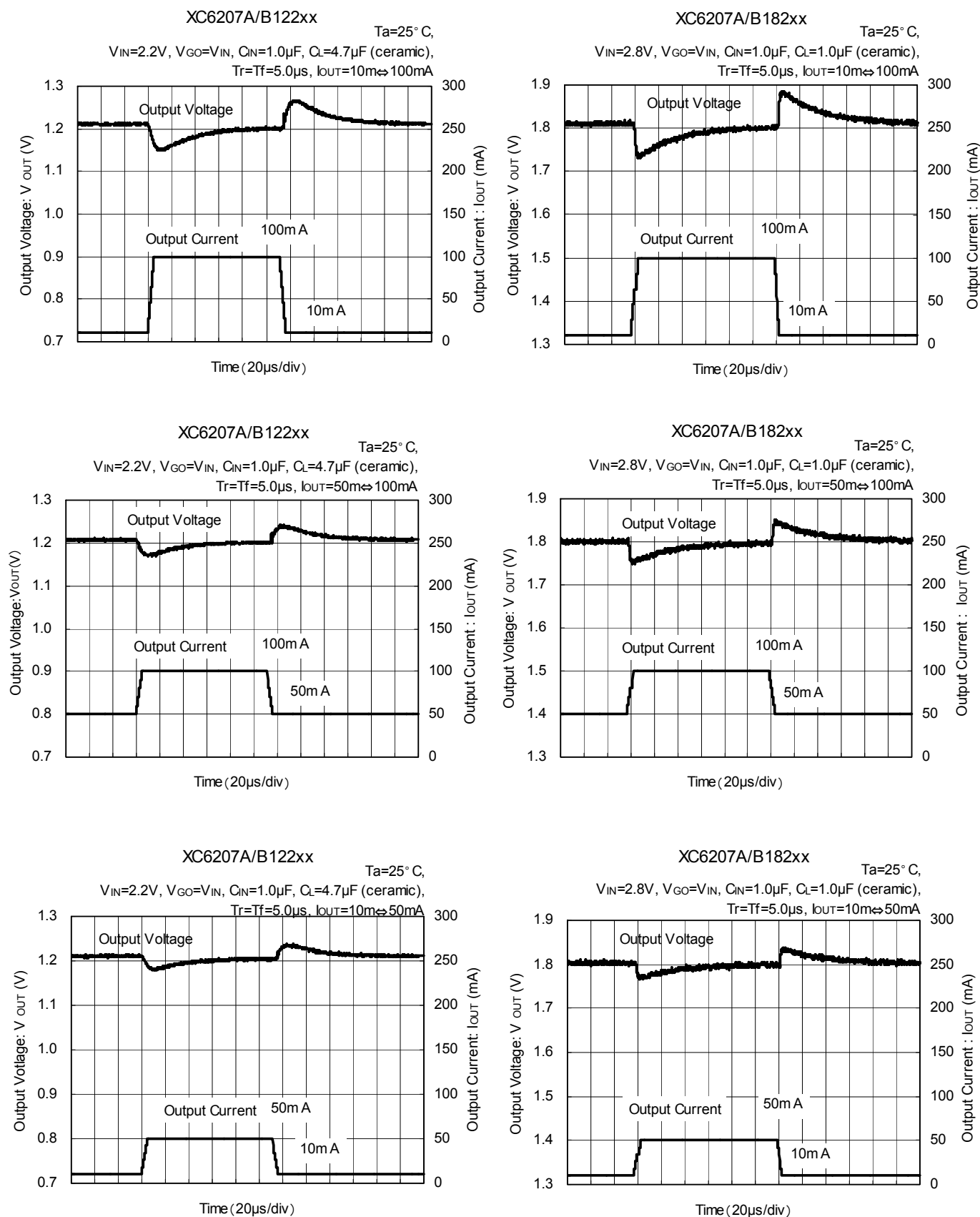
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Load Transient Response (Continued)

XC6207A/B502xx

Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{SS}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔100mA

Output Voltage
Output Current   100mA
0.2mA
Time (200μs/div)

XC6207A/B502xx

Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔100mA

Output Voltage
Output Current   100mA
0.2mA
Time (200μs/div)

XC6207A/B502xx

Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{SS}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔50mA

Output Voltage
Output Current   50mA
0.2mA
Time (200μs/div)

XC6207A/B502xx

Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔50mA

Output Voltage
Output Current   50mA
0.2mA
Time (200μs/div)

XC6207A/B502xx

Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{SS}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔10mA

Output Voltage
Output Current   10mA
0.2mA
Time (200μs/div)

XC6207A/B502xx

Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=0.2m⇔10mA
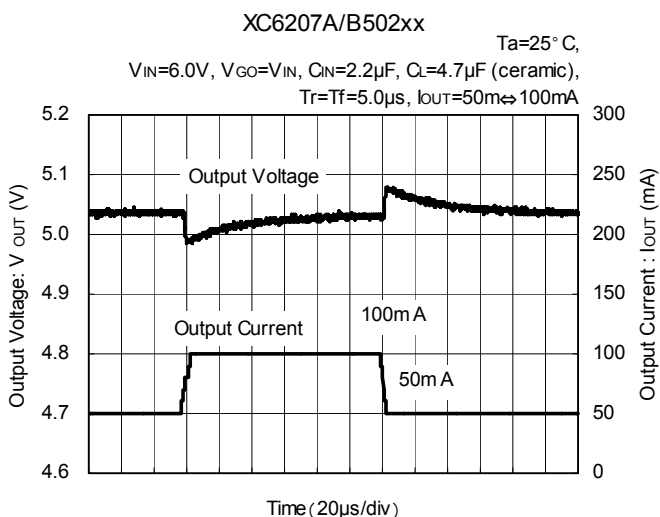
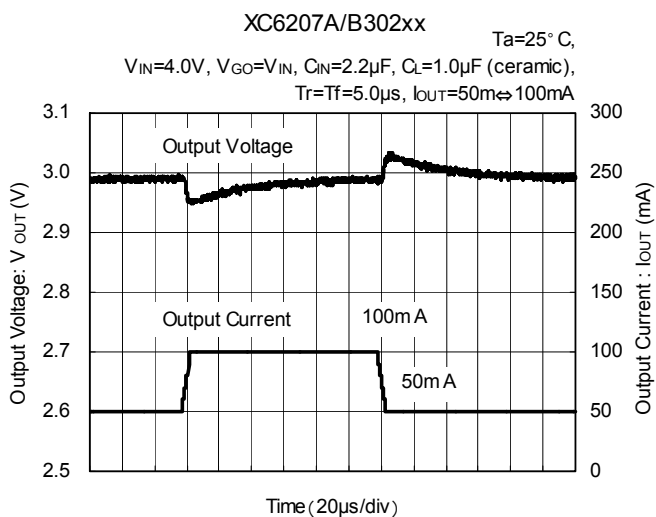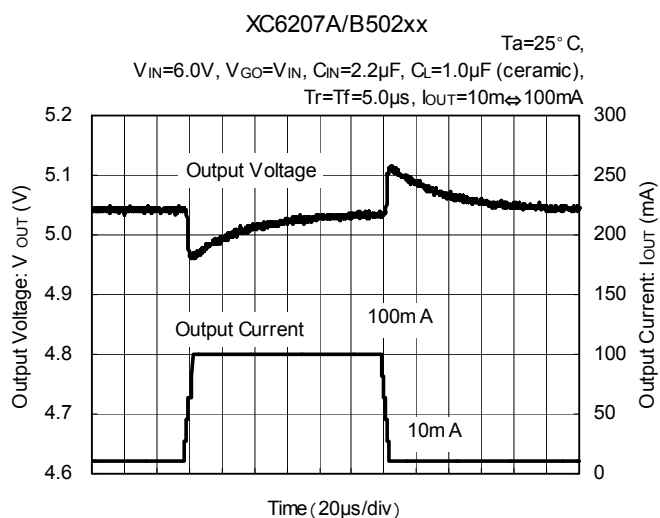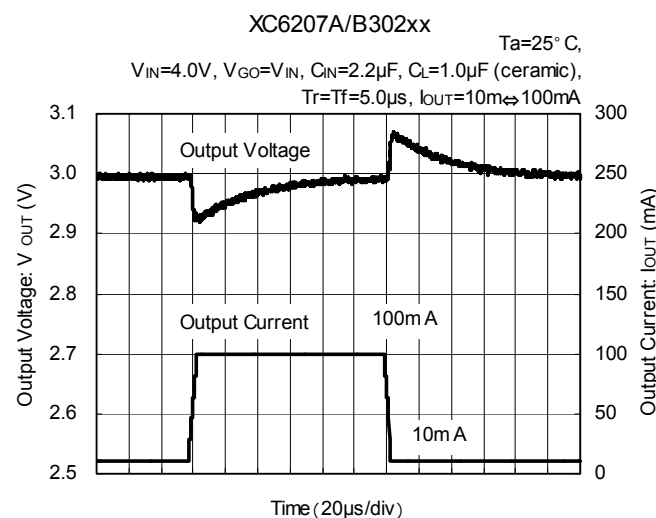Output Voltage
Output Current   10mA
0.2mA
Time (200μs/div)

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Load Transient Response (Continued)

XC6207A/B122xx

Ta=25° C,
V_{IN}=2.2V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=10m⇔100mA

XC6207A/B182xx

Ta=25° C,
V_{IN}=2.8V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=10m⇔100mA

XC6207A/B122xx

Ta=25° C,
V_{IN}=2.2V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=50m⇔100mA

XC6207A/B182xx

Ta=25° C,
V_{IN}=2.8V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=50m⇔100mA

XC6207A/B122xx

Ta=25° C,
V_{IN}=2.2V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=10m⇔50mA

XC6207A/B182xx

Ta=25° C,
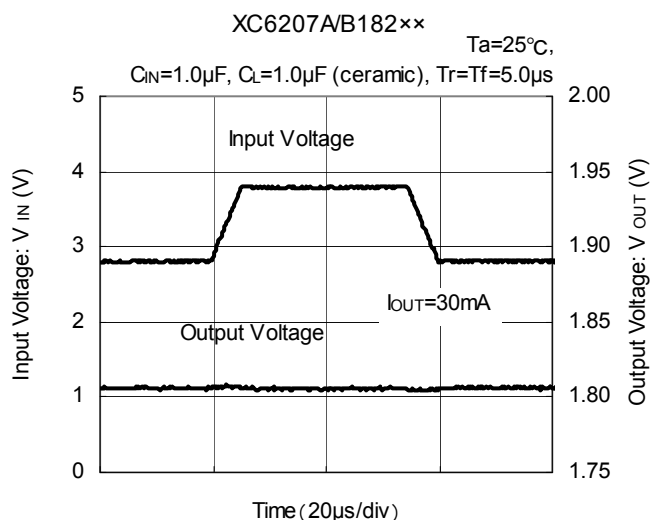V_{IN}=2.8V, V_{GO}=V_{IN}, C_{IN}=1.0μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=10m⇔50mA

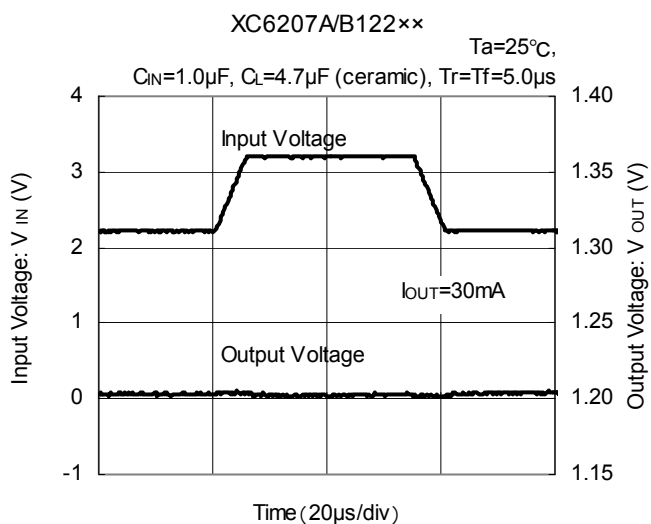# TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Load Transient Response (Continued)

XC6207A/B302xx
Ta=25°C,
V_{IN}=4.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=10m⇔100mA

XC6207A/B502xx
Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=10m⇔100mA

XC6207A/B302xx
Ta=25°C,
V_{IN}=4.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=50m⇔100mA

XC6207A/B502xx
Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=4.7μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=50m⇔100mA

XC6207A/B302xx
Ta=25°C,
V_{IN}=4.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
Tr=Tf=5.0μs, I_{OUT}=10m⇔50mA

XC6207A/B502xx
Ta=25°C,
V_{IN}=6.0V, V_{GO}=V_{IN}, C_{IN}=2.2μF, C_L=1.0μF (ceramic),
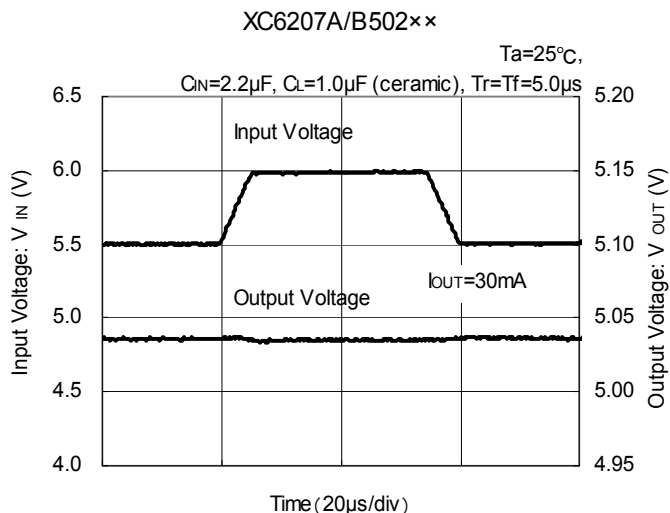Tr=Tf=5.0μs, I_{OUT}=10m⇔50mA

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)
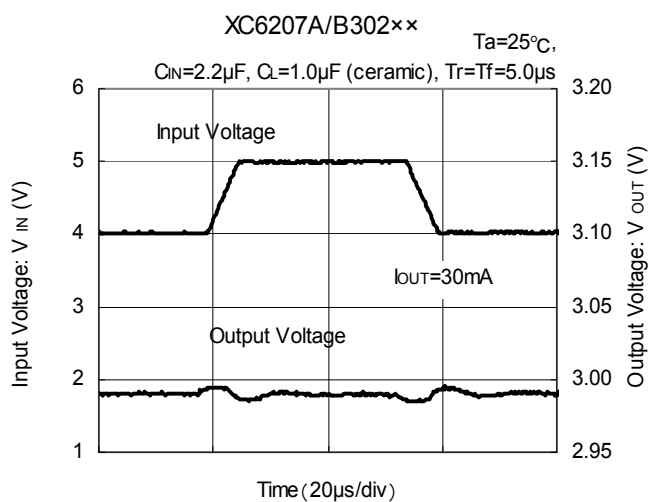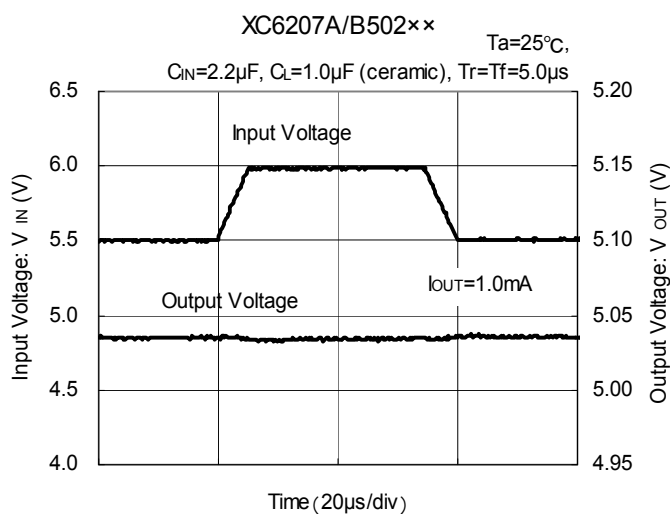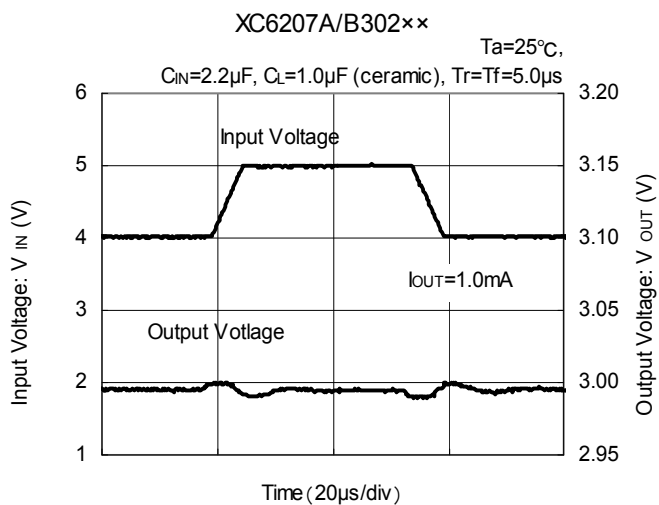
(9) Input Transient Response

XC6207A/B122××

Ta=25℃,
C$_{IN}$=1.0μF, C$_L$=4.7μF (ceramic), Tr=Tf=5.0μs

Input Voltage

Output Voltage

I$_{OUT}$=1.0mA

Time（20μs/div）

XC6207A/B182××

Ta=25℃,
C$_{IN}$=1.0μF, C$_L$=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

Output Voltage

I$_{OUT}$=1.0mA

Time（20μs/div）

XC6207A/B122××

Ta=25℃,
C$_{IN}$=1.0μF, C$_L$=4.7μF (ceramic), Tr=Tf=5.0μs

Input Voltage

Output Voltage

I$_{OUT}$=30mA

Time（20μs/div）

XC6207A/B182××

Ta=25℃,
C$_{IN}$=1.0μF, C$_L$=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

Output Voltage

I$_{OUT}$=30mA

Time（20μs/div）

XC6207A/B122××

Ta=25℃,
C$_{IN}$=1.0μF, C$_L$=4.7μF (ceramic), Tr=Tf=5.0μs

Input Voltage

Output Voltage

I$_{OUT}$=100mA

Time（20μs/div）

XC6207A/B182××

Ta=25℃,
C$_{IN}$=1.0μF, C$_L$=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

Output Voltage

I$_{OUT}$=100mA

Time（20μs/div）

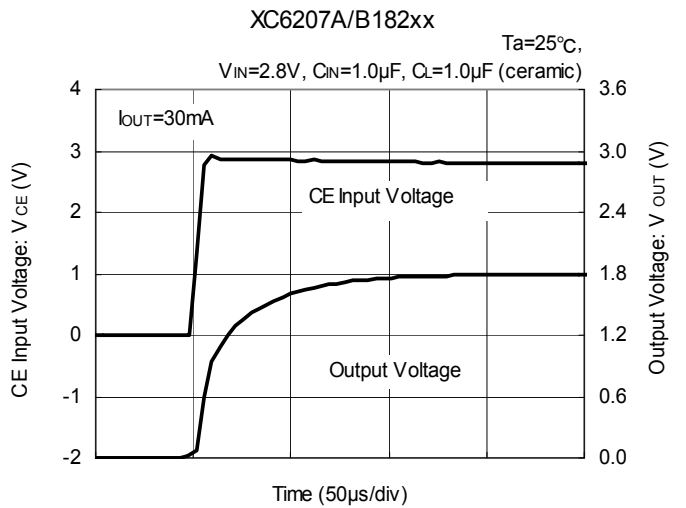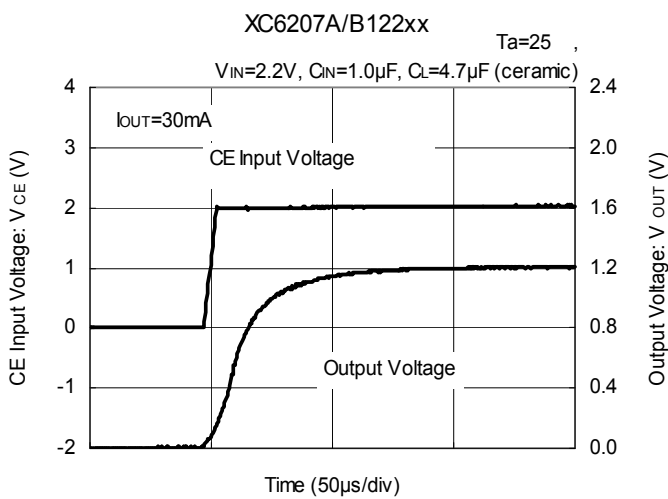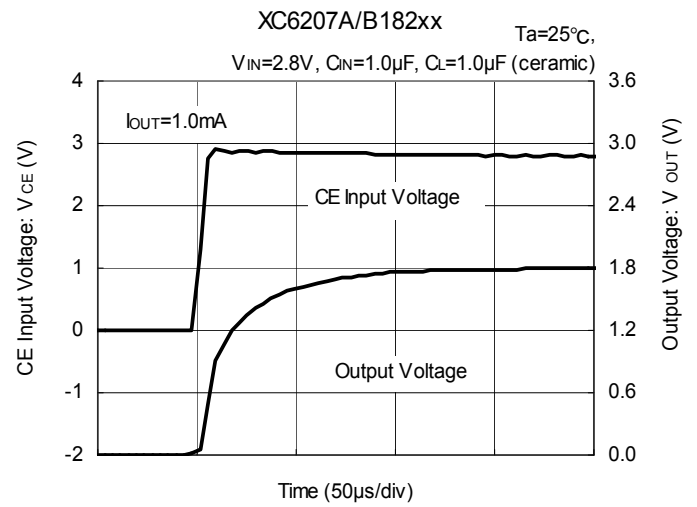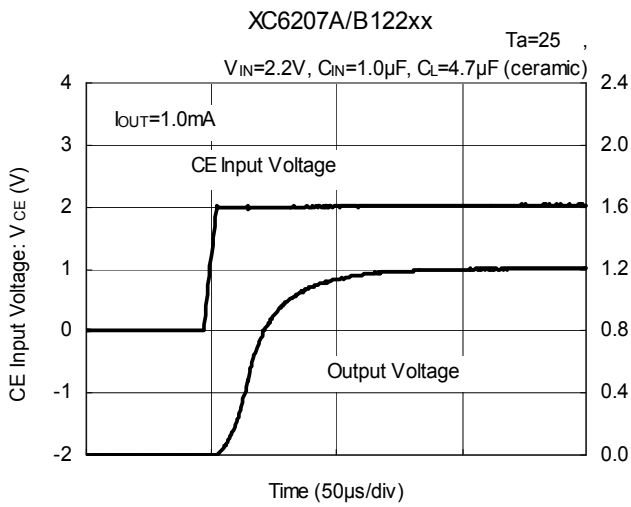# TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(9) Input Transient Response (Continued)

XC6207A/B302××
Ta=25℃,
CIN=2.2μF, CL=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

IOUT=1.0mA

Output Votlage

Time（20μs/div）

XC6207A/B502××
Ta=25℃,
CIN=2.2μF, CL=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

IOUT=1.0mA

Output Voltage

Time（20μs/div）

XC6207A/B302××
Ta=25℃,
CIN=2.2μF, CL=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

IOUT=30mA

Output Voltage

Time（20μs/div）

XC6207A/B502××
Ta=25℃,
CIN=2.2μF, CL=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

IOUT=30mA

Output Voltage

Time（20μs/div）

XC6207A/B302××
Ta=25℃,
CIN=2.2μF, CL=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

IOUT=100mA

Output Voltage

Time（20μs/div）

XC6207A/B502××
Ta=25℃,
CIN=2.2μF, CL=1.0μF (ceramic), Tr=Tf=5.0μs

Input Voltage

IOUT=100mA

Output Voltage

Time（20μs/div）

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)
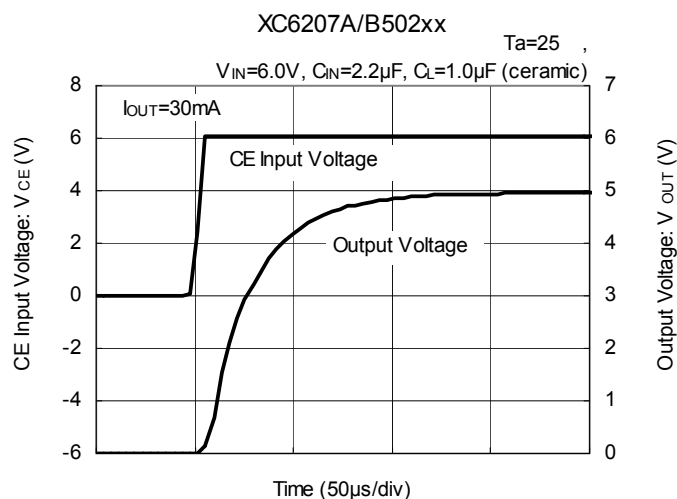
(10) Enable Response Time

XC6207A/B122xx
Ta=25 ,
V_{IN}=2.2V, C_{IN}=1.0μF, C_L=4.7μF (ceramic)

XC6207A/B182xx
Ta=25℃,
V_{IN}=2.8V, C_{IN}=1.0μF, C_L=1.0μF (ceramic)

XC6207A/B122xx
Ta=25 ,
V_{IN}=2.2V, C_{IN}=1.0μF, C_L=4.7μF (ceramic)

XC6207A/B182xx
Ta=25℃,
V_{IN}=2.8V, C_{IN}=1.0μF, C_L=1.0μF (ceramic)

XC6207A/B122xx
Ta=25 ,
V_{IN}=2.2V, C_{IN}=1.0μF, C_L=4.7μF (ceramic)

XC6207A/B182xx
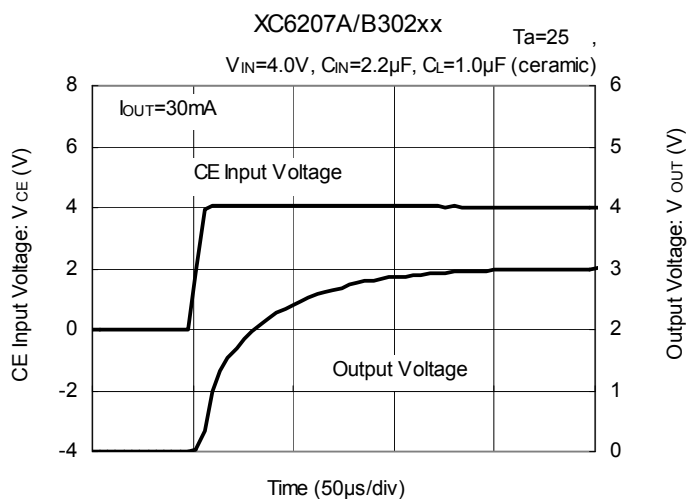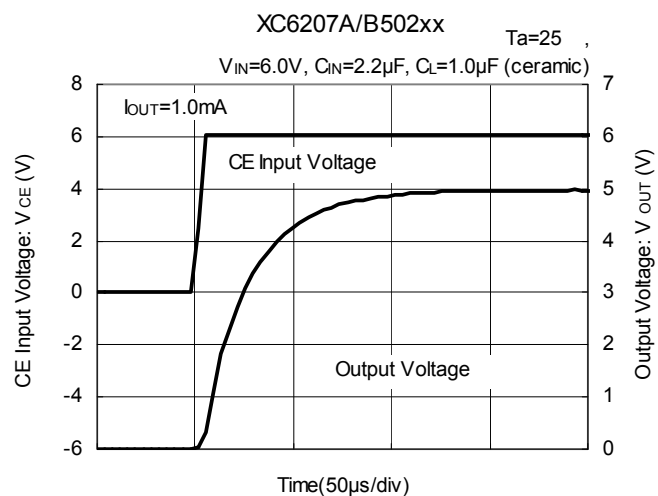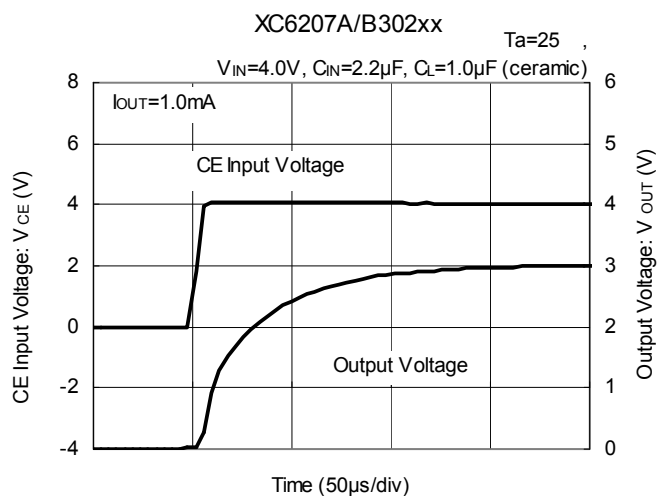Ta=25℃,
V_{IN}=2.8V, C_{IN}=1.0μF, C_L=1.0μF (ceramic)

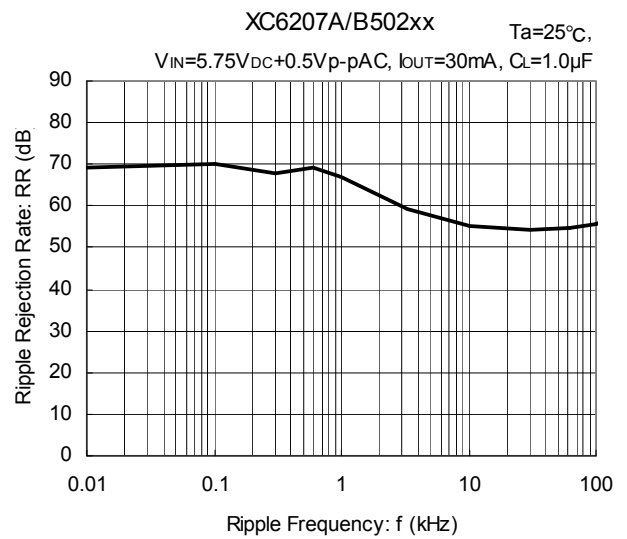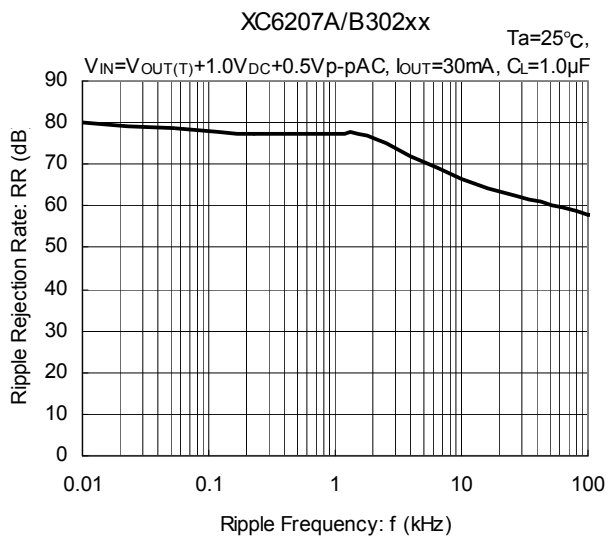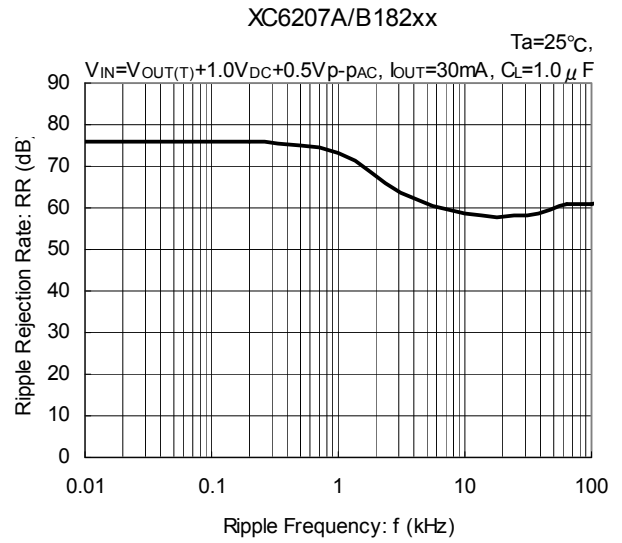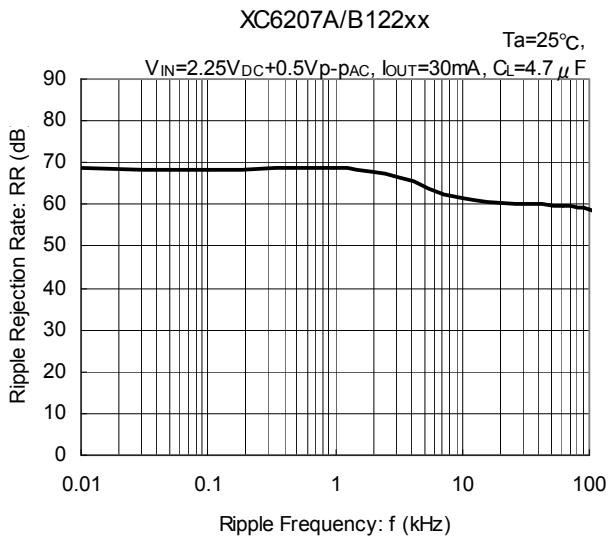# TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(10) Enable Response Time (Continued)

XC6207A/B302xx
Ta=25 ,
V_{IN}=4.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

I_{OUT}=1.0mA

CE Input Voltage

Output Voltage

Time (50μs/div)

XC6207A/B502xx
Ta=25 ,
V_{IN}=6.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

I_{OUT}=1.0mA

CE Input Voltage

Output Voltage

Time(50μs/div)

XC6207A/B302xx
Ta=25 ,
V_{IN}=4.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

I_{OUT}=30mA

CE Input Voltage

Output Voltage

Time (50μs/div)

XC6207A/B502xx
Ta=25 ,
V_{IN}=6.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

I_{OUT}=30mA

CE Input Voltage

Output Voltage

Time (50μs/div)

XC6207A/B302xx
Ta=25 ,
V_{IN}=4.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

I_{OUT}=100mA

CE Input Voltage

Output Voltage

Time (50μs/div)

XC6207A/B502xx
Ta=25 ,
V_{IN}=6.0V, C_{IN}=2.2μF, C_L=1.0μF (ceramic)

I_{OUT}=100mA

CE Input Voltage

Output Voltage

Time (50μs/div)

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(11) Ripple Rejection Rate

XC6207A/B122xx

Ta=25℃,
V_{IN}=2.25V_{DC}+0.5Vp-p$_{AC}$, I_{OUT}=30mA, C_L=4.7μF

XC6207A/B182xx

Ta=25℃,
V_{IN}=$V_{OUT(T)}$+1.0V_{DC}+0.5Vp-p$_{AC}$, I_{OUT}=30mA, C_L=1.0μF

XC6207A/B302xx

Ta=25℃,
V_{IN}=$V_{OUT(T)}$+1.0V_{DC}+0.5Vp-p$_{AC}$, I_{OUT}=30mA, C_L=1.0μF

XC6207A/B502xx

Ta=25℃,
V_{IN}=5.75V_{DC}+0.5Vp-p$_{AC}$, I_{OUT}=30mA, C_L=1.0μF
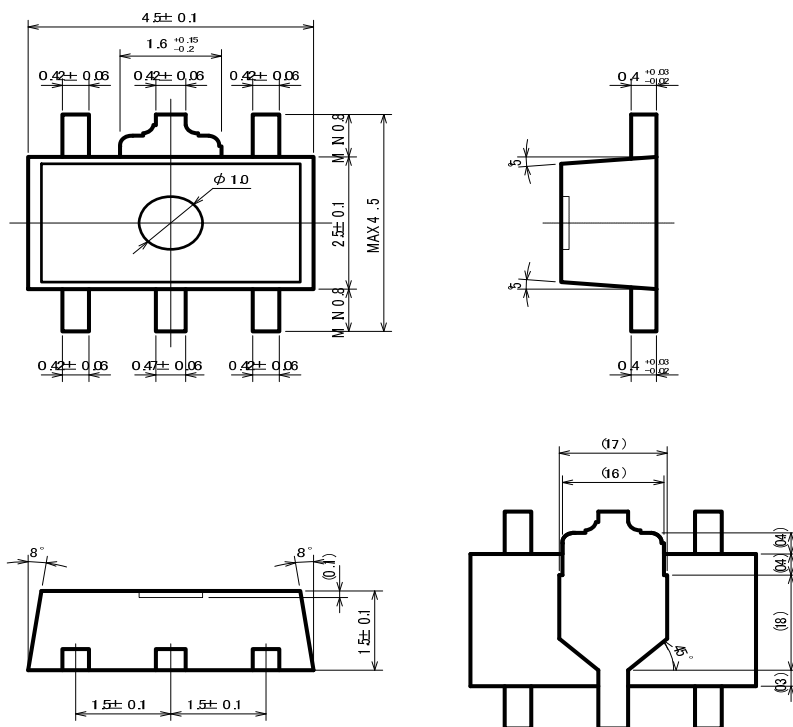
PACKAGING INFORMATION

SOT-25

(unit : mm)
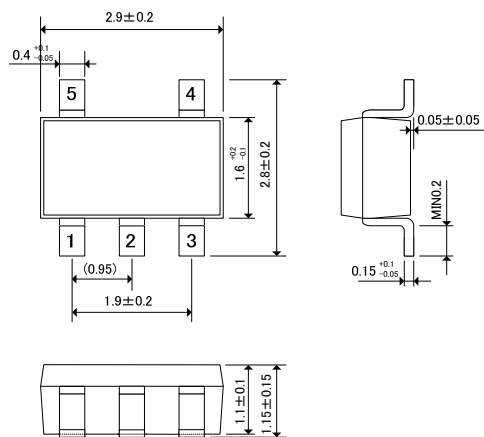
SOT-89-5

PACKAGING INFORMATION (Continued)

USP-6C

（unit：mm）

Note: The side of pins is not gilded, but nickel is used.
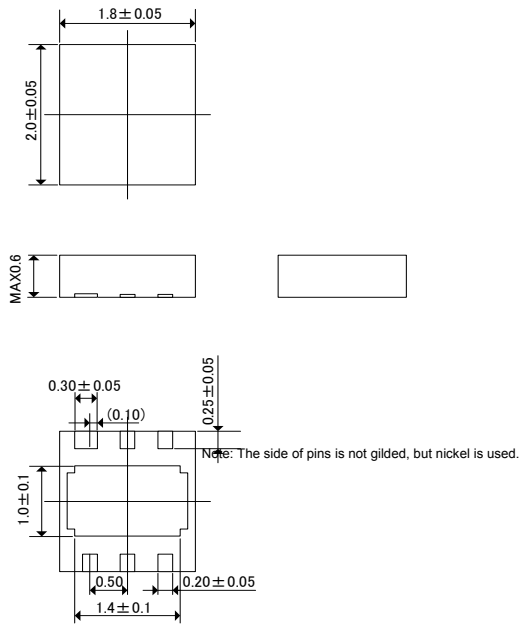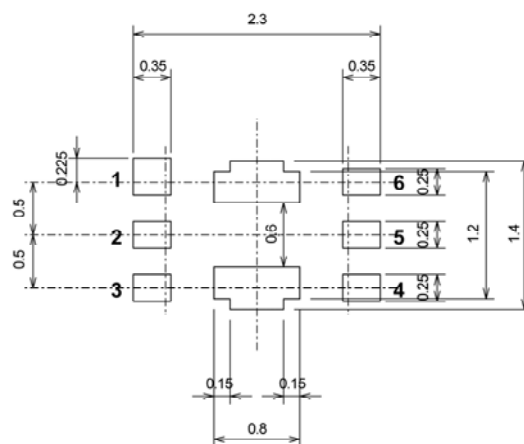
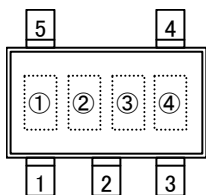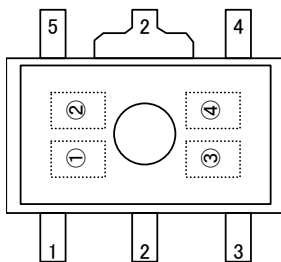USP-6C Recommended Pattern Layout
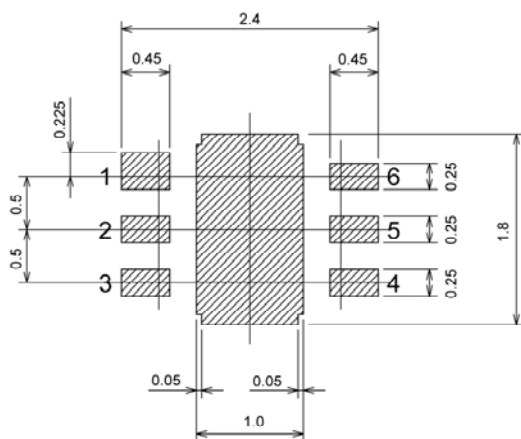
USP-6C Recommended Metal Mask Design

MARKING RULE

SOT-25, SOT-89-5

SOT-25
(TOP VIEW)

SOT-89-5
(TOP VIEW)

Represents product series

MARK	PRODUCT SERIES
7	XC6207******

Represents type of regulator

MARK		PRODUCT SERIES
OUTPUT VOLTAGE 100mV INCREMENTS	OUTPUT VOLTAGE 50mV INCREMENTS	
A	N	XC6207A*****
B	P	XC6207B*****

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	-

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 excepted)

MARKING RULE (Continued)

USP-6C
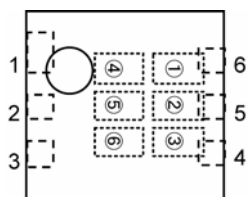
USP-6C
(TOP VIEW)

Represents product series

MARK		PRODUCT SERIES
①	②	
0	7	XC6207******

Represents type of regulator

MARK	TYPE	PRODUCT SERIES
A	High Active with No Pull-Down Resistor, No C$_L$ Discharge Resistor	XC6207A***D*
B	High Active with No Pull-Down Resistor, with C$_L$ Discharge Resistor	XC6207B***D*

Represents integer of the output voltage (ex.)

MARK	VOLTAGE (V)	PRODUCT SERIES
3	3.X	XC6207*3**D*
5	5.X	XC6207*5**D*

Represents decimal number of the output voltage

MARK	VOLTAGE (V)	PRODUCT SERIES	MARK	VOLTAGE (V)	PRODUCT SERIES
0	X.0	XC6207**02/1D*	A	X.05	XC6207**0A/BD*
1	X.1	XC6207**12/1D*	B	X.15	XC6207**1A/BD*
2	X.2	XC6207**22/1D*	C	X.25	XC6207**2A/BD*
3	X.3	XC6207**32/1D*	D	X.35	XC6207**3A/BD*
4	X.4	XC6207**42/1D*	E	X.45	XC6207**4A/BD*
5	X.5	XC6207**52/1D*	F	X.55	XC6207**5A/BD*
6	X.6	XC6207**62/1D*	H	X.65	XC6207**6A/BD*
7	X.7	XC6207**72/1D*	K	X.75	XC6207**7A/BD*
8	X.8	XC6207**82/1D*	L	X.85	XC6207**8A/BD*
9	X.9	XC6207**92/1Dx	M	X.95	XC6207**9A/BD*

Represents production lot number
0 to 9, A to Z repeated (G, I, J, O, Q, W excepted)
*No character inversion used.

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