XD6216 Series

ETR03098-001a

28V Low Power Consumption 150mA Voltage Regulators (with Stand-by Function)

☆AEC-Q100 Grade2

■GENERAL DESCRIPTION

XD6216 series are positive voltage regulator ICs with 28V of operation voltage. The series consists of a voltage reference, an error amplifier, a current limiter, a thermal shutdown circuit and a phase compensation circuit plus a driver transistor.

The output voltage is selectable in 0.1V increments within the range of 1.8V to 12V using laser trimming technologies.

The output stabilization capacitor (C_L) is also compatible with low ESR ceramic capacitors.

The over current protection circuit and the thermal shutdown circuit are built-in. These two protection circuits will operate when the output current reaches current limit level or the junction temperature reaches temperature limit level.

The CE function enables the output to be turned off and the IC becomes a stand-by mode resulting in greatly reduced power consumption.
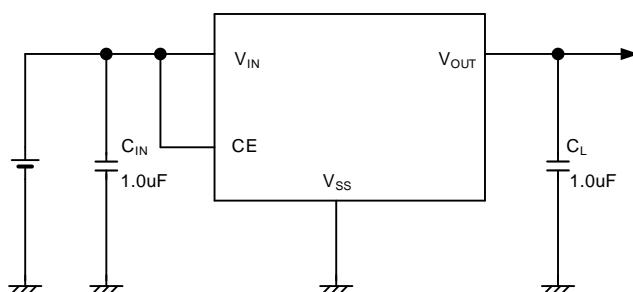
■APPLICATIONS

● Car navigation systems

● Car audios

● Car-mounted camera

● Other automotive accessories
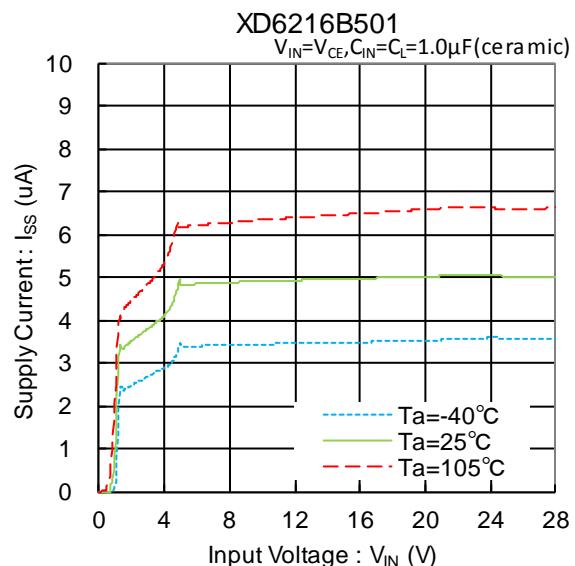
■FEATURES

Max Output Current	: 150mA ($V_{IN}=V_{OUT}+3.0V$)
Low Power Consumption	: 5µA
Stand-by Current	: Less than 0.1µA
Dropout Voltage	: 190mV@I_{OUT}=20mA
	(V_{OUT}=5.0V)
Input Voltage Range	: 2.0V ~ 28.0V
Output Voltage Range	: 1.8V ~ 12.0V (0.1V Step)
Fixed Output Accuracy	: ±1% ($V_{OUT}{\geqq}2.0V$)
	±20mV ($V_{OUT}{\leqq}1.9V$)
High Ripple Rejection	: 30dB@1kHz
Built–in Protection	: Current Limit
	Thermal Shutdown
Output Capacitor	: Ceramic Capacitor Compatible
Operating Ambient Temperature	: -40℃~ +105℃
Packages	: SOT-25
	: SOT-89-5
Environmentally Friendly	: EU RoHS Compliant, Pb Free

■ TYPICAL APPLICATION CIRCUIT
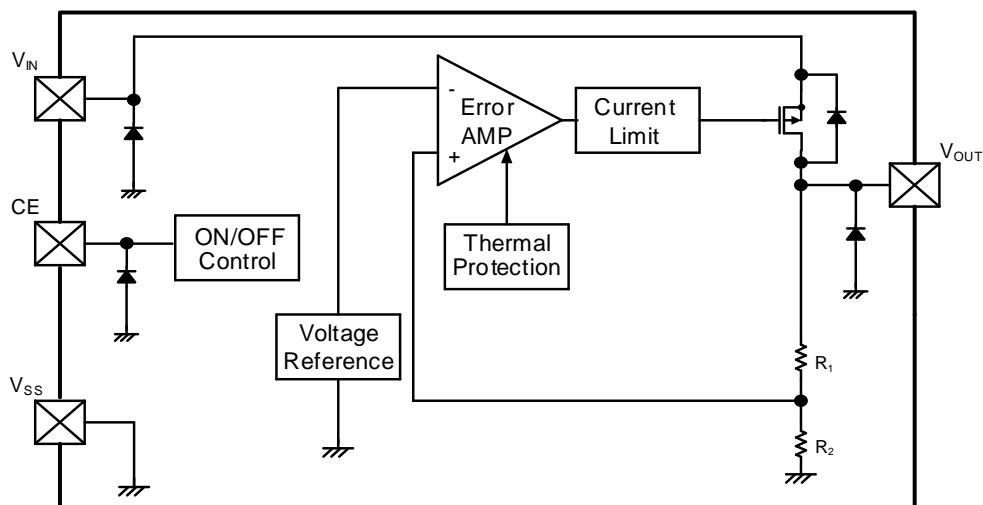
■TYPICAL PERFORMANCE CHARACTERISTICS

XD6216B501
$V_{IN}=V_{CE}, C_{IN}=C_L=1.0µF(ceramic)$

■BLOCK DIAGRAMS

●XD6216 Series

*Diodes inside the circuit are an ESD protection diode and parasitic diodes.

■ PRODUCT CLASSIFICATION

●Ordering Information

XD6216①②③④⑤⑥-⑦[*1]

DESIGNATOR	ITEM	SYMBOL	DESCRIPTION
①	TYPE	B	Refer to Selection Guide
②③	Output Voltage	18~C0	For the voltage within 1.8V~9.9V (0.1V increments); e.g. 2.5V ⇒ 25, 5.0V ⇒ 50 For the voltage within 10.0V~12.0V (0.1V increments); e.g. 10.6V ⇒ A6, 11.2V ⇒ B2, 12.0V ⇒ C0
④	Output Voltage Accuracy	1	±1%
⑤⑥-⑦[*1]	Packages (Order Unit)	MR-Q	SOT-25 (3,000pcs/Reel)
		PR-Q	SOT-89-5 (1,000pcs/Reel)

[*1] The "-Q" suffix denotes "AEC-Q100" and "Halogen and Antimony free" as well as being fully EU RoHS compliant.

●Selection Guide

TYPE	CE function
B	Yes
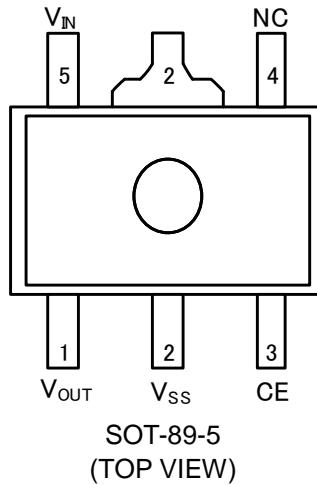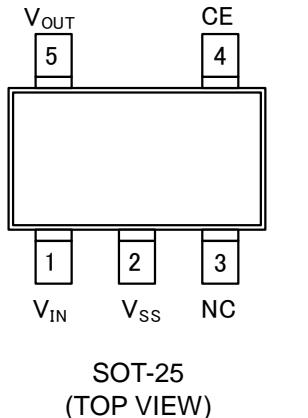
■STANDARD VOLTAGE

●Examples for standard voltage

V_{OUT}	PACKAGES	
	SOT-25	SOT-89-5
3.3V	XD6216B331MR-Q	XD6216B331PR-Q
5.0V	XD6216B501MR-Q	XD6216B501PR-Q
8.0V	XD6216B801MR-Q	XD6216B801PR-Q

Output voltages can be set internally from 1.8V to 12.0V. For other voltages, please contact your local Torex sales office or distribution

■PIN CONFIGURATION

SOT-25
(TOP VIEW)

SOT-89-5
(TOP VIEW)

■PIN ASSIGNMENT

PIN NUMBER		PIN NAME	FUNCTION
SOT-25	SOT-89-5		
1	5	V_{IN}	Power Supply Input
2	2	V_{SS}	Ground
3	4	NC	No Connection
4	3	CE	ON/OFF Control
5	1	V_{OUT}	Output

■FUNCTION

PIN NAME	DESIGNATOR	IC OPERATION
CE	L	Stand-by
	H	Active
	OPEN	Undefined state*

* Please avoid the state of OPEN, and make CE Pin arbitrary fixed potential.

■ABSOLUTE MAXIMUM RATINGS

1) XD6216 Series   Ta=25℃

PARAMETER		SYMBOL	RATINGS	UNITS
V_{IN} Pin Voltage		V_{IN}	-0.3 ~ +30.0	V
Output Current		I_{OUT}	300 [*1]	mA
Output Voltage		V_{OUT}	-0.3 ~ V_{IN}+0.3 or +30.0 [*2]	V
CE Input Voltage		V_{CE}	-0.3 ~ +30.0	V
Power Dissipation	SOT-25	Pd	250	mW
			600 (40mm x 40mm Standard board) [*3]	
			760(JESD51-7 board) [*3]	
	SOT-89-5		500	
			1300 (40mm x 40mm Standard board) [*3]	
			1750 (JESD51-7 board) [*3]	
Operating Ambient Temperature		Topr	-40 ~ +105	℃
Storage Temperature		Tstg	-55 ~ +125	℃

All voltages are described based on the V_{SS}.

[*1] Please use within the range of $I_{OUT} \leqq Pd/$ $(V_{IN}-V_{OUT})$

[*2] The maximum rating corresponds to the lowest value between V_{IN}+0.3 or +30.0.

[*3] The power dissipation figure shown is PCB mounted and is for reference only.

The mounting condition is please refer to PACKAGING INFORMATION.

■ELECTRICAL CHARACTERISTICS

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS		MIN.	TYP.	MAX.	UNITS	CIRCUIT
Output Voltage	$V_{OUT(E)}$ [*2]	I_{OUT}=20mA , V_{CE}=V_{IN}			E-0		V	①
		-40℃≦Ta≦105℃ [*4]						
Maximum Output Current	I_{OUTMAX}	V_{IN}= $V_{OUT(T)}$+3.0V [*1] , V_{CE}=V_{IN} ($V_{OUT(T)}$≧3.0V)		150	-	-	mA	①
		V_{IN}=$V_{OUT(T)}$+3.0V [*1] , V_{CE}=V_{IN} ($V_{OUT(T)}$＜3.0V)		100	-	-		
Load Regulation	ΔV_{OUT}	1mA≦I_{OUT}≦50mA, V_{CE}=V_{IN} ($V_{OUT(T)}$≦7.0V)		-	50	90	mV	①
		1mA≦I_{OUT}≦50mA , V_{CE}=V_{IN} (7.0V＜$V_{OUT(T)}$)		-	110	140	mV	①
Dropout Voltage1	Vdif1 [*3]	I_{OUT}=20mA , V_{CE}=V_{IN}		-	E-1		mV	①
Dropout Voltage2	Vdif2 [*3]	I_{OUT}=100mA , V_{CE}=V_{IN}		-	E-2		mV	①
Supply Current	I_{SS}	V_{CE}=V_{IN}		1.0	5.0	9.0	μA	②
		-40℃≦Ta≦105℃ [*4]		0.3	5.0	10.0		
Stand-by Current	I_{STB}	V_{CE}=V_{SS}		-	0.01	0.10	μA	②
		-40℃≦Ta≦105℃ [*4]		-	-	0.30		
Line Regulation1	ΔV_{OUT} / ($\Delta V_{IN} \cdot V_{OUT}$)	$V_{OUT(T)}$+2.0V≦V_{IN}≦28.0V I_{OUT}=5mA , V_{CE}=V_{IN}		-	0.05	0.10	%/V	①
Line Regulation2	ΔV_{OUT} / ($\Delta V_{IN} \cdot V_{OUT}$)	$V_{OUT(T)}$+2.0V≦V_{IN}≦28.0V I_{OUT}=13mA , V_{CE}=V_{IN}		-	0.15	0.30	%/V	①
Input Voltage	V_{IN}		-40℃≦Ta≦105℃ [*4]	2.0	-	28.0	V	-
Output Voltage Temperature Characteristics	ΔV_{OUT} / ($\Delta Topr \cdot V_{OUT}$)	I_{OUT}=20mA , V_{CE}=V_{IN} -40℃≦Topr≦105℃		-	±100	-	ppm/℃	①
Power Supply Rejection Ratio	PSRR	V_{IN}=[$V_{OUT(T)}$+2.0]V+0.5V_{P-PAC} I_{OUT}=20mA , f=1kHz , V_{CE}=V_{IN}		-	30	-	dB	③
Short Current	I_{SHORT}	V_{CE}=V_{IN}, V_{OUT}=V_{SS}		-	30	-	mA	①
CE "H" Level Voltage	V_{CEH}	-	-40℃≦Ta≦105℃ [*4]	1.1	-	28.0	V	④
CE "L" Level Voltage	V_{CEL}	-	-40℃≦Ta≦105℃ [*4]	V_{SS}	-	0.35	V	④
CE "H" Level Current	I_{CEH}	V_{IN}=V_{CE}=28.0V		-0.1	-	0.1	μA	②
			-40℃≦Ta≦105℃ [*4]	-0.1	-	0.2		
CE "L" Level Current	I_{CEL}	V_{IN}=28.0V, V_{CE}=V_{SS}	-40℃≦Ta≦105℃ [*4]	-0.1	-	0.1	μA	②
Thermal Shutdown Detect Temperature	T_{TSD}	V_{CE}=V_{IN} , Junction Temperature		-	150	-	℃	④
Thermal Shutdown Release Temperature	T_{TSR}	V_{CE}=V_{IN} , Junction Temperature		-	125	-	℃	④
Thermal Shutdown Hysteresis Width	T_{TSD}-T_{TSR}	V_{CE}=V_{IN} , Junction Temperature		-	25	-	℃	-

Unless otherwise stated, (V_{IN}=$V_{OUT(T)}$ +2.0V).

NOTE:

[*1]: $V_{OUT(T)}$: Nominal output voltage

[*2]: $V_{OUT(E)}$: Effective output voltage

      (i.e. the output voltage when "$V_{OUT(T)}$ +2.0V" is provided at the V_{IN} pin while maintaining a certain I_{OUT} value.)

[*3]: Vdif= {V_{IN1} - V_{OUT1}}

    V_{OUT1}: $V_{OUT(T)}$＜3.0V, A voltage equal to 98% of the output voltage whenever an amply stabilized I_{OUT} {$V_{OUT(T)}$+3.0V} is input.

      $V_{OUT(T)}$≧3.0V, A voltage equal to 98% of the output voltage whenever an amply stabilized I_{OUT} {$V_{OUT(T)}$+2.0V} is input.

    V_{IN1}: The input voltage when V_{OUT1} appears as input voltage is gradually decreased.

[*4]: The ambient temperature range (-40℃≦Ta≦105℃) is design Value.

■ELECTRICAL CHARACTERISTICS (Continued)

●Voltage Chart1 (XD6216 Series)

PARAMETER	E-0				E-1		E-2	
NOMINAL OUTPUT VOLTAGE(V)	Output Voltage (V)		Output Voltage (V)		DROPOUT VOLTAGE 1 (mV) I_{OUT}=20mA		DROPOUT VOLTAGE 2 (mV) I_{OUT}=100mA	
	Ta=25℃		-40℃≦Ta≦105℃		Ta=25℃		Ta=25℃	
$V_{OUT(T)}$	$V_{OUT(E)}$		$V_{OUT(E)}$		Vdif1		Vdif2	
	MIN	MAX	MIN	MAX	TYP	MAX	TYP	MAX
1.8	1.780	1.820	1.740	1.860	550	710	2200	2700
1.9	1.880	1.920	1.840	1.960				
2.0	1.980	2.020	1.940	2.060	450	600	1900	2600
2.1	2.079	2.121	2.037	2.163				
2.2	2.178	2.222	2.134	2.266	390	520	1700	2200
2.3	2.277	2.323	2.231	2.369				
2.4	2.376	2.424	2.328	2.472				
2.5	2.475	2.525	2.425	2.575	310	450	1500	1900
2.6	2.574	2.626	2.522	2.678				
2.7	2.673	2.727	2.619	2.781				
2.8	2.772	2.828	2.716	2.884				
2.9	2.871	2.929	2.813	2.987				
3.0	2.970	3.030	2.910	3.090	260	360	1300	1700
3.1	3.069	3.131	3.007	3.193				
3.2	3.168	3.232	3.104	3.296				
3.3	3.267	3.333	3.201	3.399				
3.4	3.366	3.434	3.298	3.502				
3.5	3.465	3.535	3.395	3.605				
3.6	3.564	3.636	3.492	3.708				
3.7	3.663	3.737	3.589	3.811				
3.8	3.762	3.838	3.686	3.914				
3.9	3.861	3.939	3.783	4.017				
4.0	3.960	4.040	3.880	4.120	220	320	1100	1500
4.1	4.059	4.141	3.977	4.223				
4.2	4.158	4.242	4.074	4.326				
4.3	4.257	4.343	4.171	4.429				
4.4	4.356	4.444	4.268	4.532				
4.5	4.455	4.545	4.365	4.635				
4.6	4.554	4.646	4.462	4.738				
4.7	4.653	4.747	4.559	4.841				
4.8	4.752	4.848	4.656	4.944				
4.9	4.851	4.949	4.753	5.047				

■ELECTRICAL CHARACTERISTICS (Continued)

●Voltage Chart1 (XD6216 Series) (Continued)

PARAMETER	E-0				E-1		E-2	
NOMINAL OUTPUT VOLTAGE(V)	Output Voltage (V)		Output Voltage (V)		DROPOUT VOLTAGE 1 (mV) I_{OUT}=20mA		DROPOUT VOLTAGE 2 (mV) I_{OUT}=100mA	
	Ta=25℃		-40℃≦Ta≦105℃		Ta=25℃		Ta=25℃	
$V_{OUT(T)}$	$V_{OUT(E)}$		$V_{OUT(E)}$		Vdif1		Vdif2	
	MIN	MAX	MIN	MAX	TYP	MAX	TYP	MAX
5.0	4.950	5.050	4.850	5.150	190	280	1000	1300
5.1	5.049	5.151	4.947	5.253				
5.2	5.148	5.252	5.044	5.356				
5.3	5.247	5.353	5.141	5.459				
5.4	5.346	5.454	5.238	5.562				
5.5	5.445	5.555	5.335	5.665				
5.6	5.544	5.656	5.432	5.768				
5.7	5.643	5.757	5.529	5.871				
5.8	5.742	5.858	5.626	5.974				
5.9	5.841	5.959	5.723	6.077				
6.0	5.940	6.060	5.820	6.180				
6.1	6.039	6.161	5.917	6.283				
6.2	6.138	6.262	6.014	6.386				
6.3	6.237	6.363	6.111	6.489				
6.4	6.336	6.464	6.208	6.592				
6.5	6.435	6.565	6.305	6.695	170	230	800	1150
6.6	6.534	6.666	6.402	6.798				
6.7	6.633	6.767	6.499	6.901				
6.8	6.732	6.868	6.596	7.004				
6.9	6.831	6.969	6.693	7.107				
7.0	6.930	7.070	6.790	7.210				
7.1	7.029	7.171	6.887	7.313				
7.2	7.128	7.272	6.984	7.416				
7.3	7.227	7.373	7.081	7.519				
7.4	7.326	7.474	7.178	7.622				
7.5	7.425	7.575	7.275	7.725				
7.6	7.524	7.676	7.372	7.828				
7.7	7.623	7.777	7.469	7.931				
7.8	7.722	7.878	7.566	8.034				
7.9	7.821	7.979	7.663	8.137				
8.0	7.920	8.080	7.760	8.240				
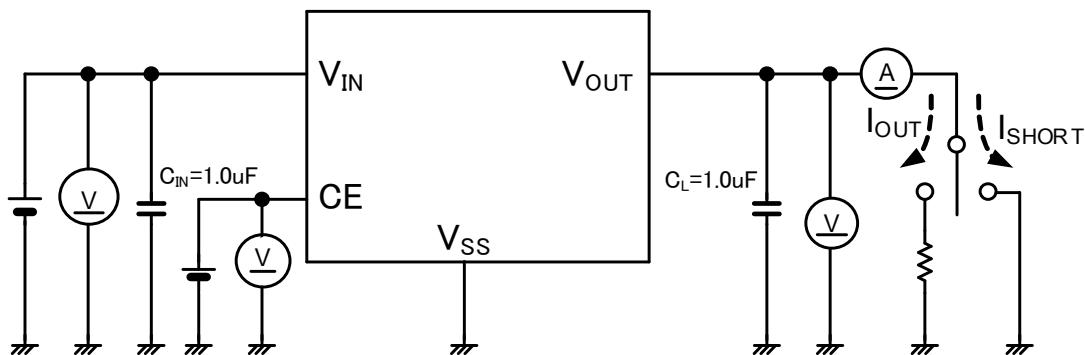
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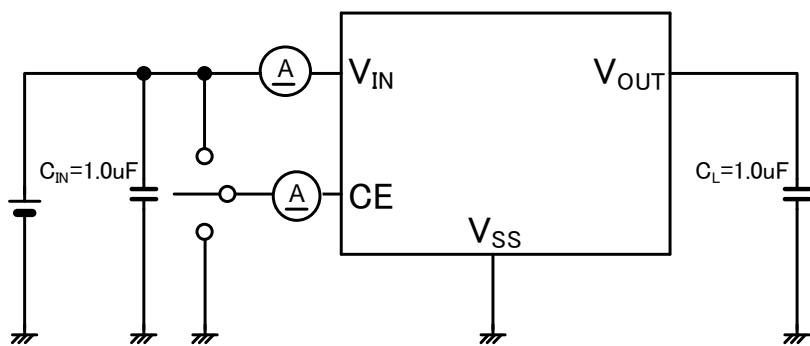
● Voltage Chart1 (XD6216 Series) (Continued)

PARAMETER	E-0				E-1		E-2	
NOMINAL OUTPUT VOLTAGE(V)	Output Voltage (V)		Output Voltage (V)		DROPOUT VOLTAGE 1 (mV) I_{OUT}=20mA		DROPOUT VOLTAGE 2 (mV) I_{OUT}=100mA	
	Ta=25℃		-40℃≦Ta≦105℃		Ta=25℃		Ta=25℃	
$V_{OUT(T)}$	$V_{OUT(E)}$		$V_{OUT(E)}$		Vdif1		Vdif2	
	MIN	MAX	MIN	MAX	TYP	MAX	TYP	MAX
8.1	8.019	8.181	7.857	8.343	130	190	700	950
8.2	8.118	8.282	7.954	8.446				
8.3	8.217	8.383	8.051	8.549				
8.4	8.316	8.484	8.148	8.652				
8.5	8.415	8.585	8.245	8.755				
8.6	8.514	8.686	8.342	8.858				
8.7	8.613	8.787	8.439	8.961				
8.8	8.712	8.888	8.536	9.064				
8.9	8.811	8.989	8.633	9.167				
9.0	8.910	9.090	8.730	9.270				
9.1	9.009	9.191	8.827	9.373				
9.2	9.108	9.292	8.924	9.476				
9.3	9.207	9.393	9.021	9.579				
9.4	9.306	9.494	9.118	9.682				
9.5	9.405	9.595	9.215	9.785				
9.6	9.504	9.696	9.312	9.888				
9.7	9.603	9.797	9.409	9.991				
9.8	9.702	9.898	9.506	10.094				
9.9	9.801	9.999	9.603	10.197				
10.0	9.900	10.100	9.700	10.300				
10.1	9.999	10.201	9.797	10.403	120	160	650	850
10.2	10.098	10.302	9.894	10.506				
10.3	10.197	10.403	9.991	10.609				
10.4	10.296	10.504	10.088	10.712				
10.5	10.395	10.605	10.185	10.815				
10.6	10.494	10.706	10.282	10.918				
10.7	10.593	10.807	10.379	11.021				
10.8	10.692	10.908	10.476	11.124				
10.9	10.791	11.009	10.573	11.227				
11.0	10.890	11.110	10.670	11.330				
11.1	10.989	11.211	10.767	11.433				
11.2	11.088	11.312	10.864	11.536				
11.3	11.187	11.413	10.961	11.639				
11.4	11.286	11.514	11.058	11.742				
11.5	11.385	11.615	11.155	11.845				
11.6	11.484	11.716	11.252	11.948				
11.7	11.583	11.817	11.349	12.051				
11.8	11.682	11.918	11.446	12.154				
11.9	11.781	12.019	11.543	12.257				
12.0	11.880	12.120	11.640	12.360				

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# ■TEST CIRCUITS
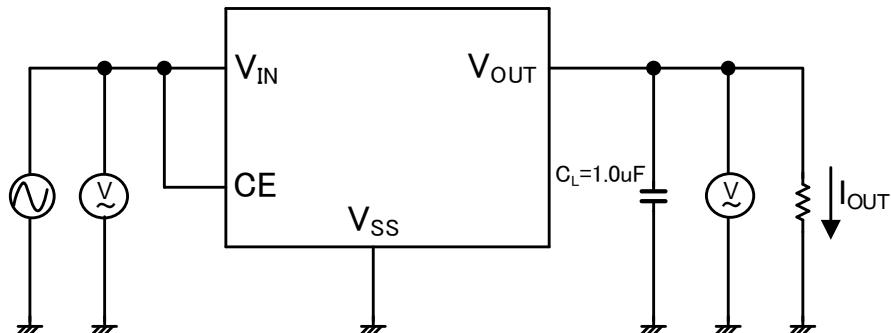
● CIRCUIT①
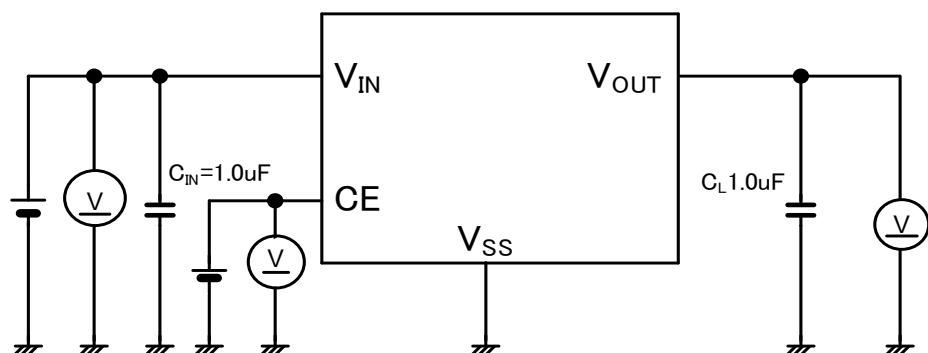
● CIRCUIT②

● CIRCUIT③
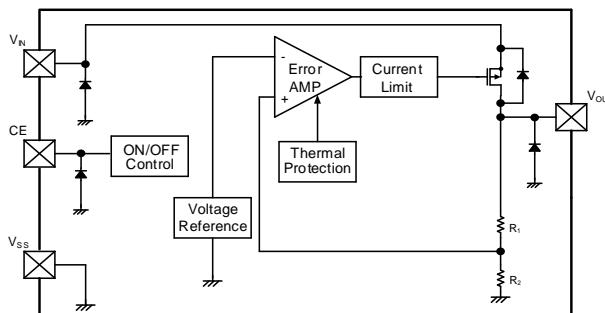
● CIRCUIT④

■OPERATIONAL EXPLANATION

The voltage divided by resistors R_1 & R_2 is compared with the internal voltage reference by the error amplifier. The P-channel MOSFET which is connected to the V_{OUT} pin is then driven by the subsequent controlled signal. The output voltage at the V_{OUT} pin is controlled and stabilized by a system of negative feedback. The current limit circuit and short protect circuit operate in relation to the level of output current and heat dissipation. Further, the IC's internal circuitry can be shutdown via the CE pin's signal.

* Diodes shown in the above circuit are ESD protection diodes and parasitic diodes

<Low ESR Capacitors>

The XD6216 series needs an output capacitor (C_L) for phase compensation. In order to ensure the stable phase compensation, please place an output capacitor (C_L) of 1.0μF or bigger at the V_{OUT} pin and V_{SS} pin as close as possible. For a stable power input, please connect an input capacitor (C_{IN}) of 1.0μF between the input pin (V_{IN}) and the ground pin (V_{SS}).
Since Input capacitor (C_{IN}), the output capacitor (C_L) are bias dependence of the capacitor the influence of the missing capacity due to temperature characteristics, also there is a risk that cannot be stable phase compensation. Please pay attention to the selection of the capacitor to be used.

<Current limit Protection>

The XD6216 series includes a current fold-back circuit as a current limit protection. When the load current reaches the current limit level, the current fold-back circuit operates and output voltage drops. The output voltage drops further and output current decreases. When the output pin is shorted, a current of about 30mA flows.

<CE Pin>

The IC's internal circuitry can be stand-by via the signal from the CE pin. In stand-by mode, output at the V_{OUT} pin will be pulled down by R_1 and R_2 to the V_{SS} level. Note that as the XD6216 series has no pull down resistor so that it will become unstable with the CE pin open. 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 operational logic is fixed and the IC will operate normally. However, supply current may increase as a result of through current in the IC's internal circuitry if a medium voltage is applied.

<Overheating Protection (Thermal Protection)>

The XD6216 series incorporates a thermal shutdown circuit for overheating protection. When the junction temperature of the built-in driver transistor reaches the temperature limit, the thermal shutdown circuit operates and the driver transistor will be set to OFF.   The IC resumes its operation when the thermal shutdown function is released and the IC's operation is automatically restored because the junction temperature drops to the level of the thermal shutdown release temperature.

### <Minimum Operating Voltage>
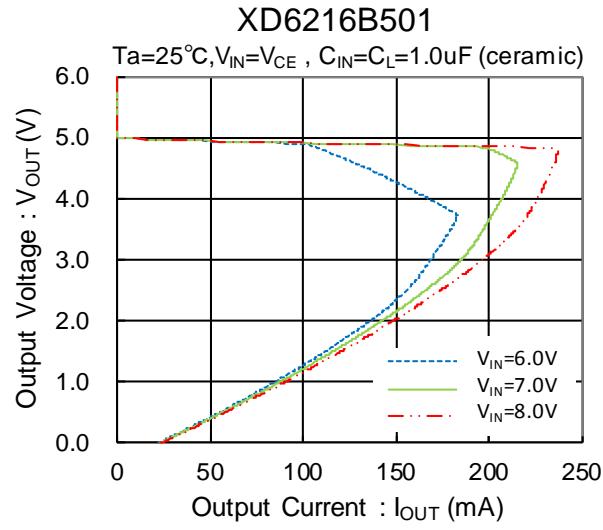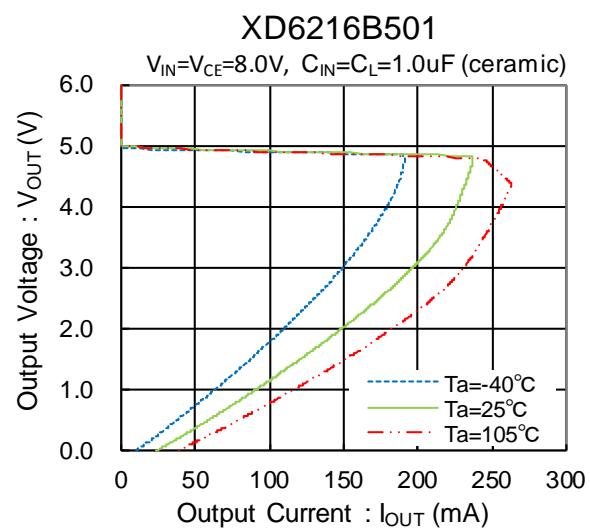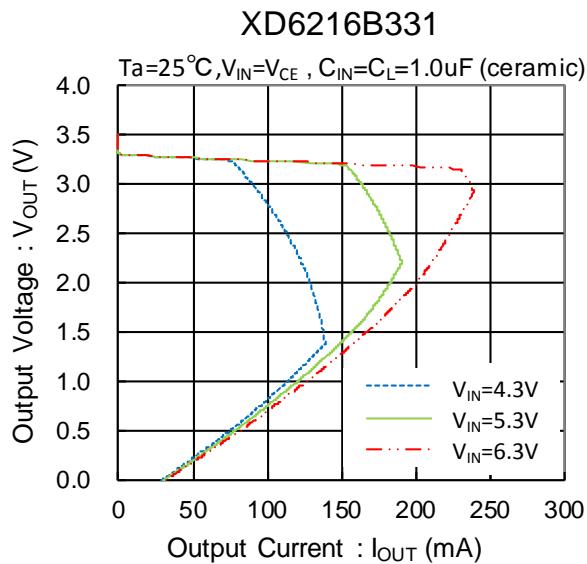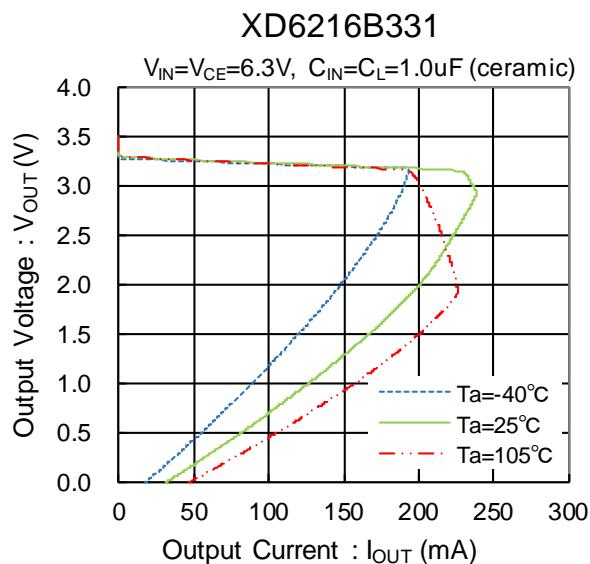
For the stable operation of the IC, over 2.0V of input voltage is necessary. The output voltage may not be generated normally if the input voltage is less than 2.0V.

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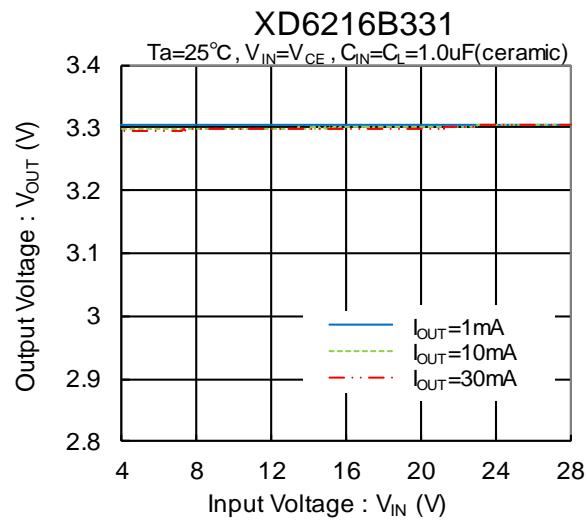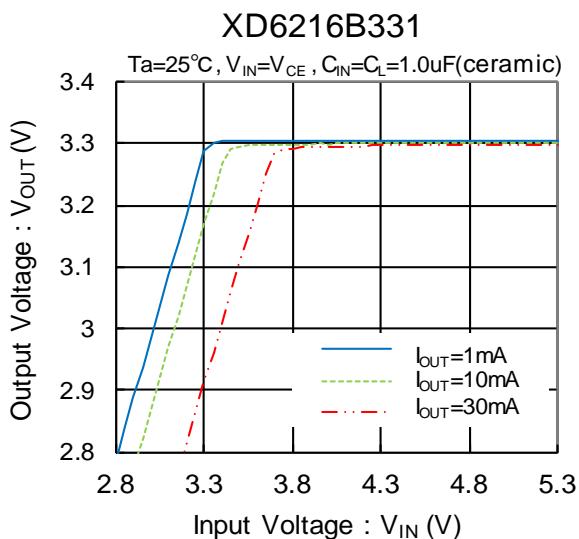
1. For temporary, transitional voltage drop or voltage rising phenomenon, the IC is liable to malfunction should the ratings be exceeded.

2. 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.   The input capacitor (C_{IN}) and the output capacitor (C_L) should be placed to the IC as close as possible with a shorter wiring.

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

■TYPICAL PERFORMANCE CHARACTERISTICS

(1) Output Voltage vs. Output Current

XD6216B331
$V_{IN}=V_{CE}=6.3V$, $C_{IN}=C_L=1.0uF$ (ceramic)

XD6216B331
Ta=25℃, $V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$ (ceramic)

XD6216B501
$V_{IN}=V_{CE}=8.0V$, $C_{IN}=C_L=1.0uF$ (ceramic)

XD6216B501
Ta=25℃, $V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$ (ceramic)

(2) Output Voltage vs. Input Voltage

XD6216B331
Ta=25℃, $V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$ (ceramic)
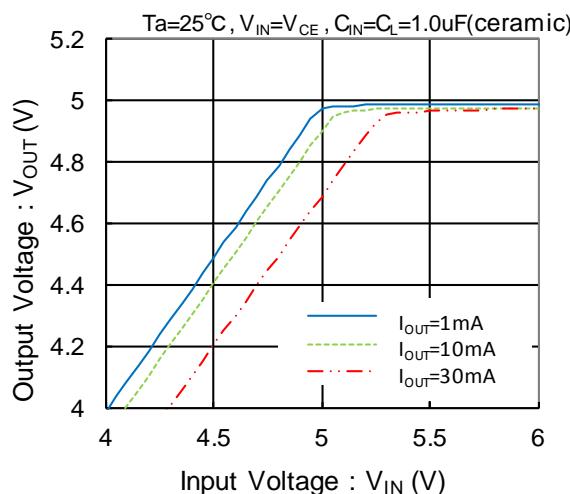
XD6216B331
Ta=25℃, $V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$ (ceramic)
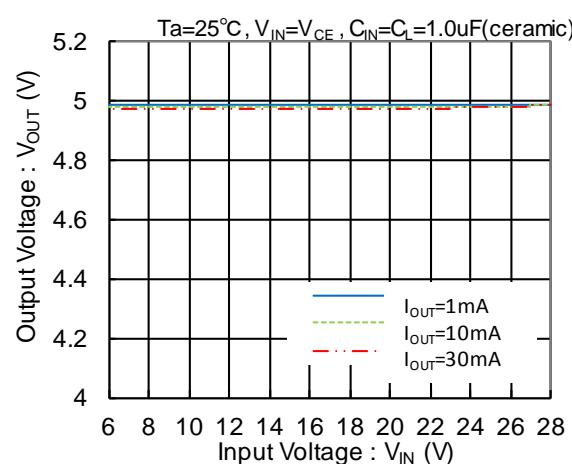
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(2) Output Voltage vs. Input Voltage (Continued)

XD6216B501

Ta=25℃, $V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$(ceramic)


XD6216B501

Ta=25℃, $V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$(ceramic)
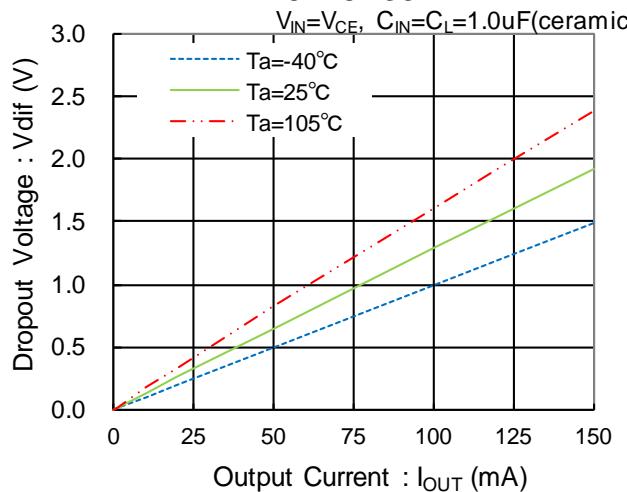
(3) Dropout Voltage vs. Output Current

XD6216B331

$V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$(ceramic)

XD6216B501

$V_{IN}=V_{CE}$, $C_{IN}=C_L=1.0uF$(ceramic)
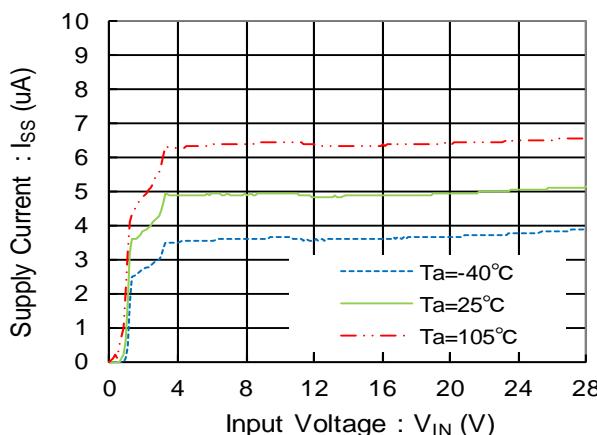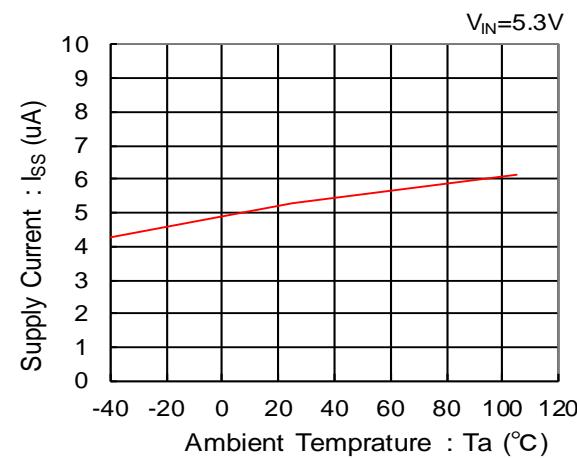
(4) Supply Current vs. Input Voltage

XD6216B331

XC6216B331

$V_{IN}=5.3V$
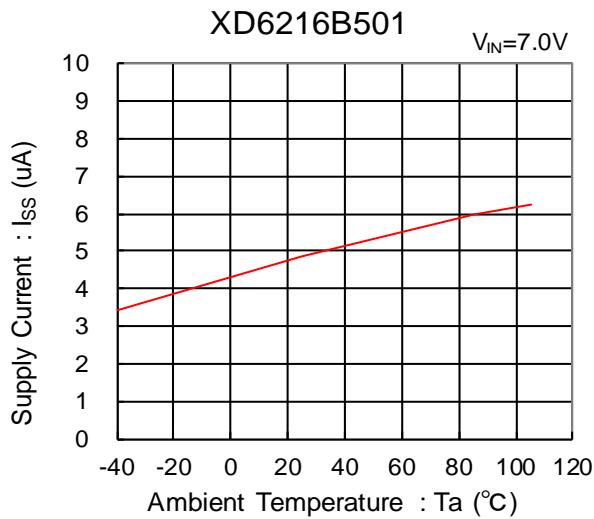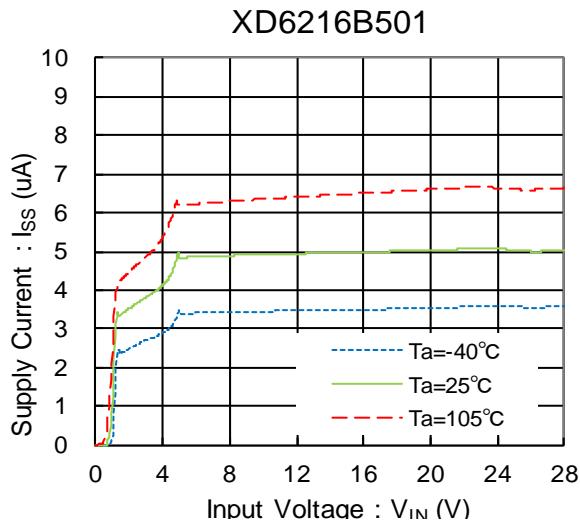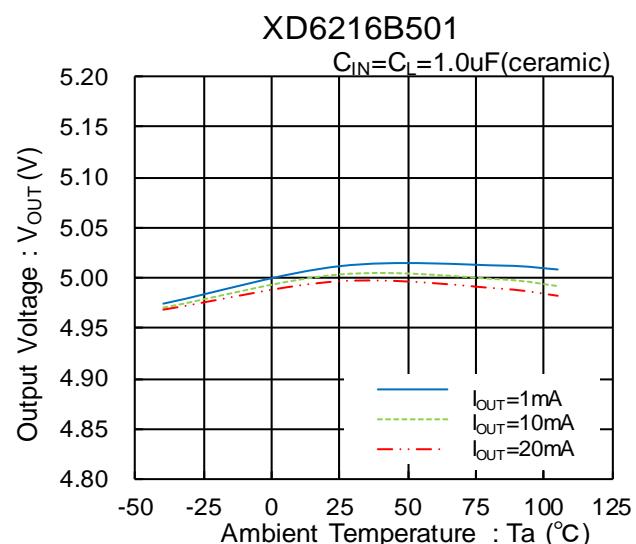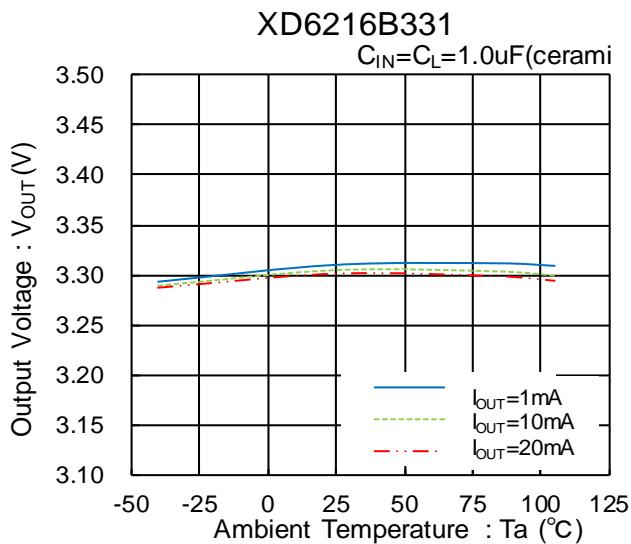
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

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

XD6216B501

XD6216B501

V_{IN}=7.0V
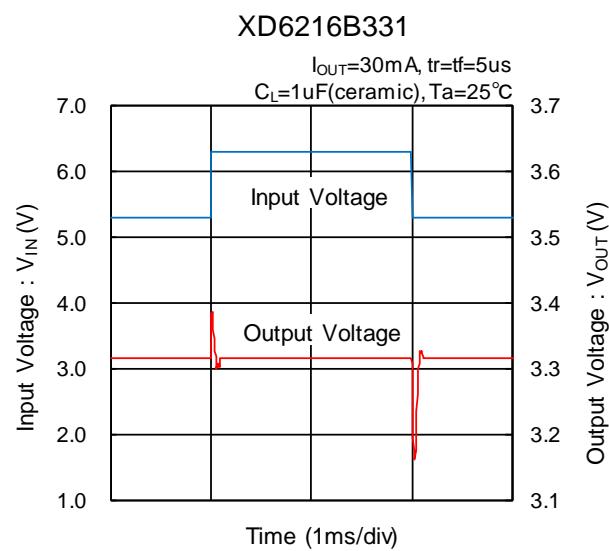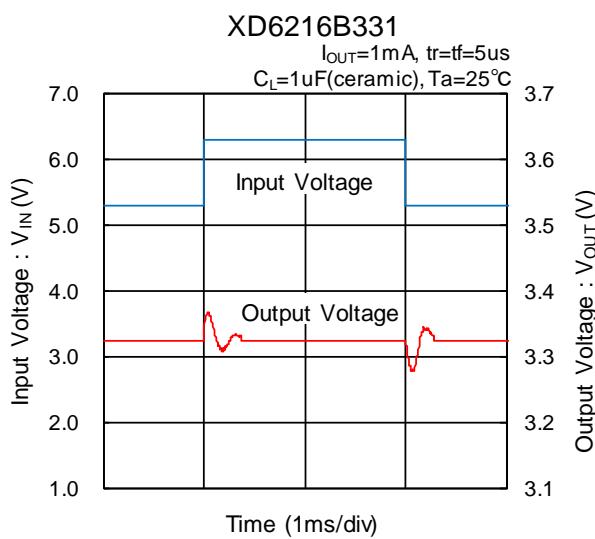
(5) Output Voltage vs. Ambient Temperature

XD6216B331

C_{IN}=C_L=1.0uF(cerami

XD6216B501

C_{IN}=C_L=1.0uF(ceramic)

(6) Line Transient Response

XD6216B331

I_{OUT}=1mA, tr=tf=5us
C_L=1uF(ceramic),Ta=25℃


XD6216B331

I_{OUT}=30mA, tr=tf=5us
C_L=1uF(ceramic),Ta=25℃
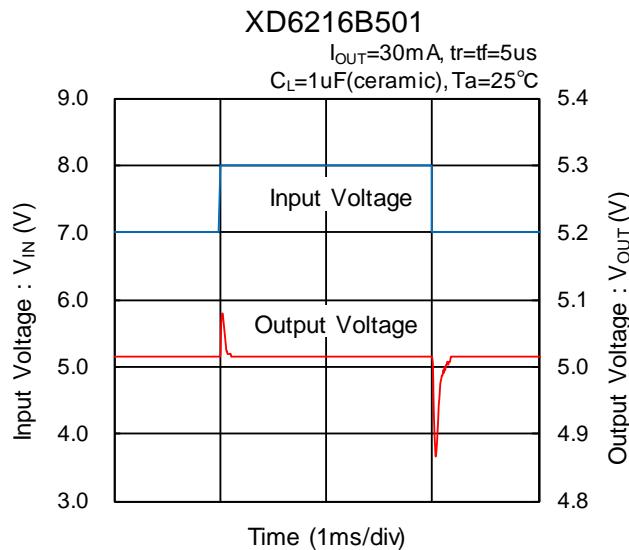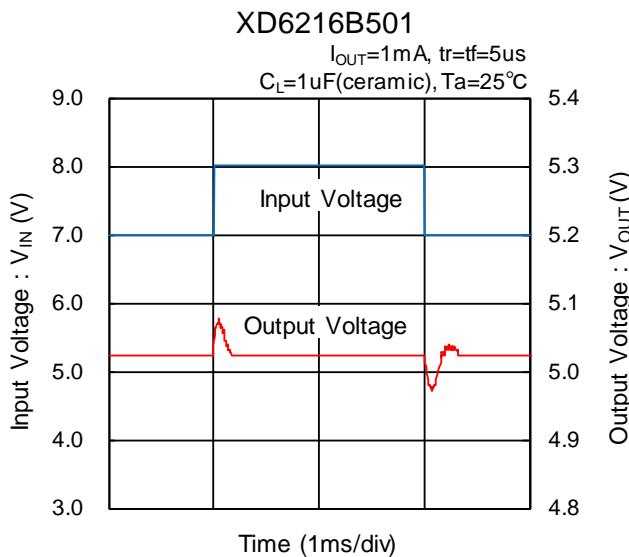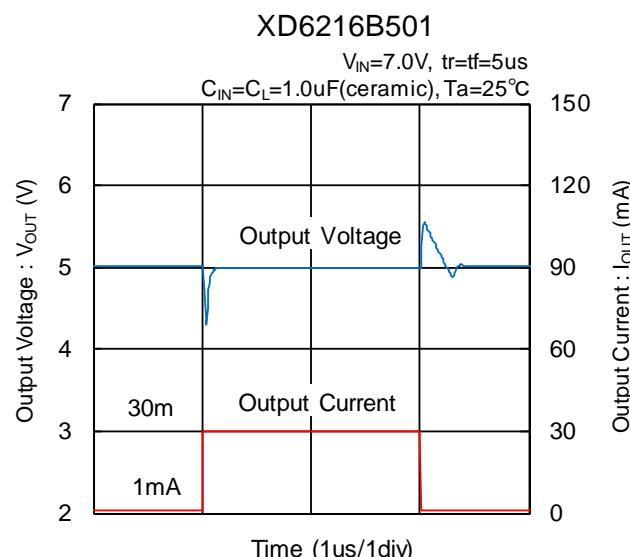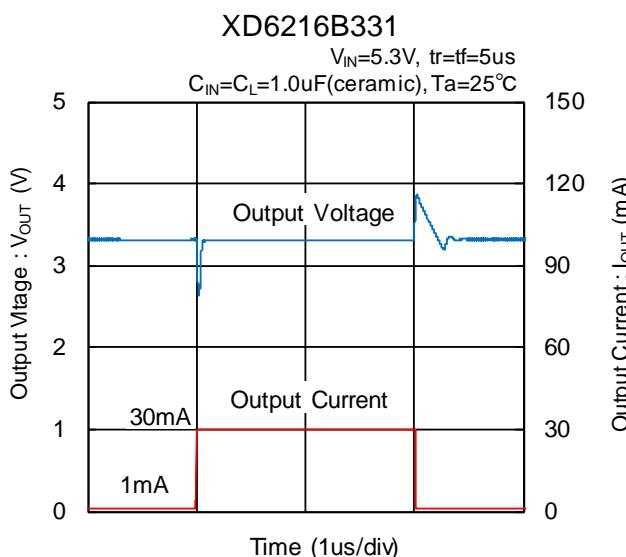
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)
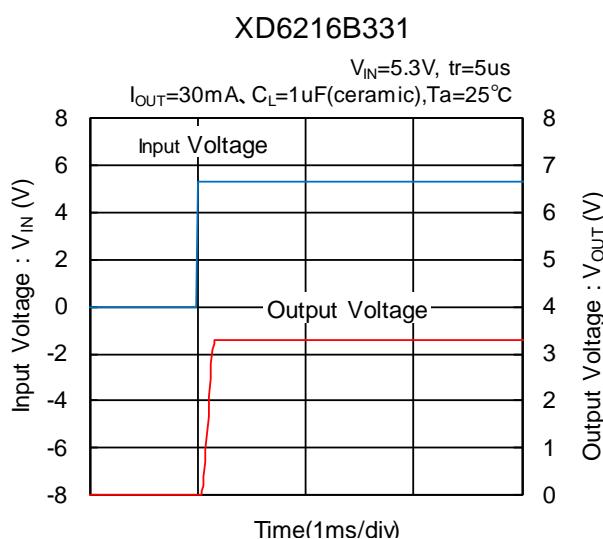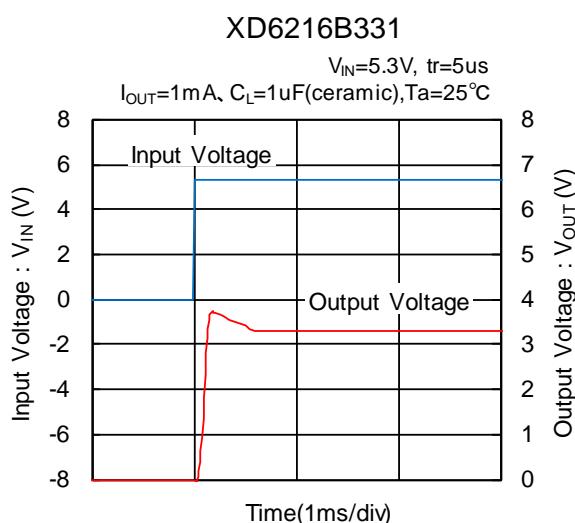
(6) Line Transient Response (Continued)

XD6216B501
I_{OUT}=1mA, tr=tf=5us
C_L=1uF(ceramic), Ta=25℃

XD6216B501
I_{OUT}=30mA, tr=tf=5us
C_L=1uF(ceramic), Ta=25℃

(7) Load Transient Response

XD6216B331
V_{IN}=5.3V, tr=tf=5us
C_{IN}=C_L=1.0uF(ceramic), Ta=25℃

XD6216B501
V_{IN}=7.0V, tr=tf=5us
C_{IN}=C_L=1.0uF(ceramic), Ta=25℃

(8) Input Rise Time

XD6216B331
V_{IN}=5.3V, tr=5us
I_{OUT}=1mA、C_L=1uF(ceramic),Ta=25℃

XD6216B331
V_{IN}=5.3V, tr=5us
I_{OUT}=30mA、C_L=1uF(ceramic),Ta=25℃
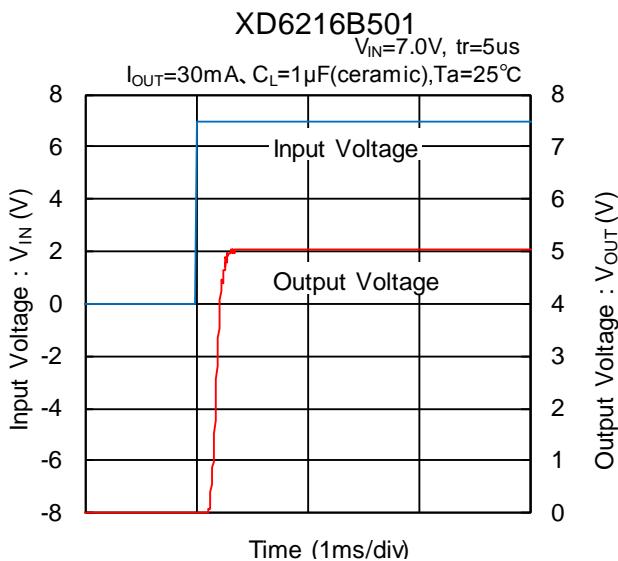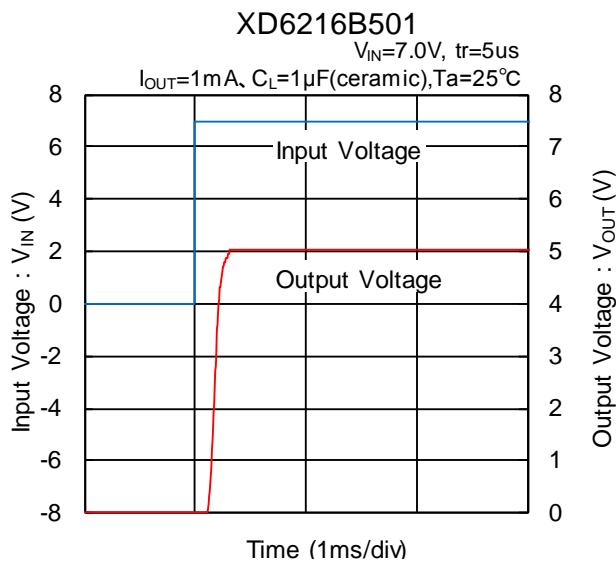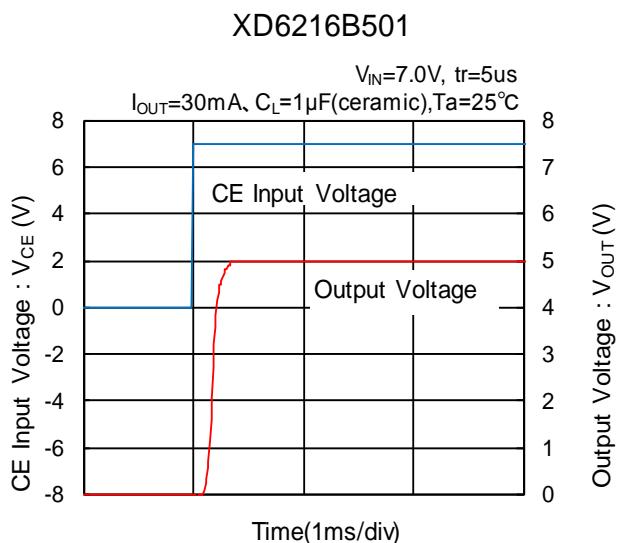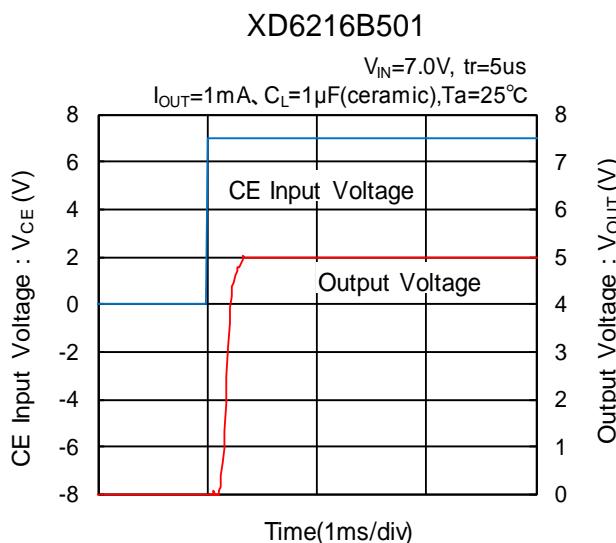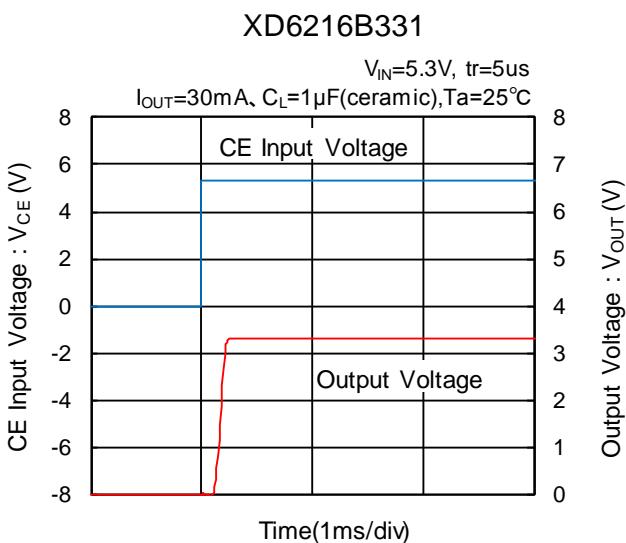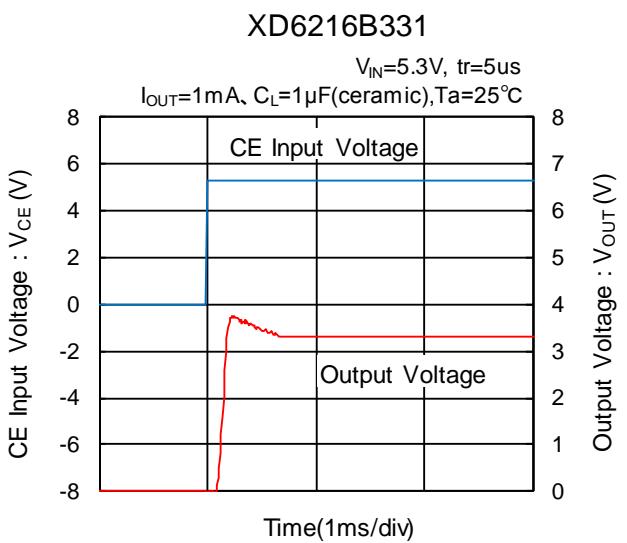
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(8) Input Rise Time (Continued)

XD6216B501

V_{IN}=7.0V, tr=5us
I_{OUT}=1mA、C_L=1μF(ceramic),Ta=25℃

Input Voltage
Output Voltage

Time (1ms/div)

XD6216B501

V_{IN}=7.0V, tr=5us
I_{OUT}=30mA、C_L=1μF(ceramic),Ta=25℃

Input Voltage
Output Voltage

Time (1ms/div)

(9) CE Rise Time

XD6216B331

V_{IN}=5.3V, tr=5us
I_{OUT}=1mA、C_L=1μF(ceramic),Ta=25℃

CE Input Voltage
Output Voltage

Time(1ms/div)

XD6216B331

V_{IN}=5.3V, tr=5us
I_{OUT}=30mA、C_L=1μF(ceramic),Ta=25℃

CE Input Voltage
Output Voltage

Time(1ms/div)

XD6216B501

V_{IN}=7.0V, tr=5us
I_{OUT}=1mA、C_L=1μF(ceramic),Ta=25℃

CE Input Voltage
Output Voltage

Time(1ms/div)

XD6216B501

V_{IN}=7.0V, tr=5us
I_{OUT}=30mA、C_L=1μF(ceramic),Ta=25℃

CE Input Voltage
Output Voltage

Time(1ms/div)

■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(10) Ripple Rejection Rate

XD6216B331
V_{IN}=5.3.V+0.5V_{P-PAC}, I_{OUT}=1mA
C_L=1μF(ceramic),Ta=25℃

XD6216B331
V_{IN}=5.3.V+0.5V_{P-PAC}, I_{OUT}=30mA
C_L=1μF(ceramic),Ta=25℃

XD6216B501
V_{IN}=7.0.V+0.5V_{P-PAC}, I_{OUT}=1mA
C_L=1μF(ceramic),Ta=25℃

XD6216B501
V_{IN}=7.0V+0.5V_{P-PAC}, I_{OUT}=30mA
C_L=1μF(ceramic),Ta=25℃
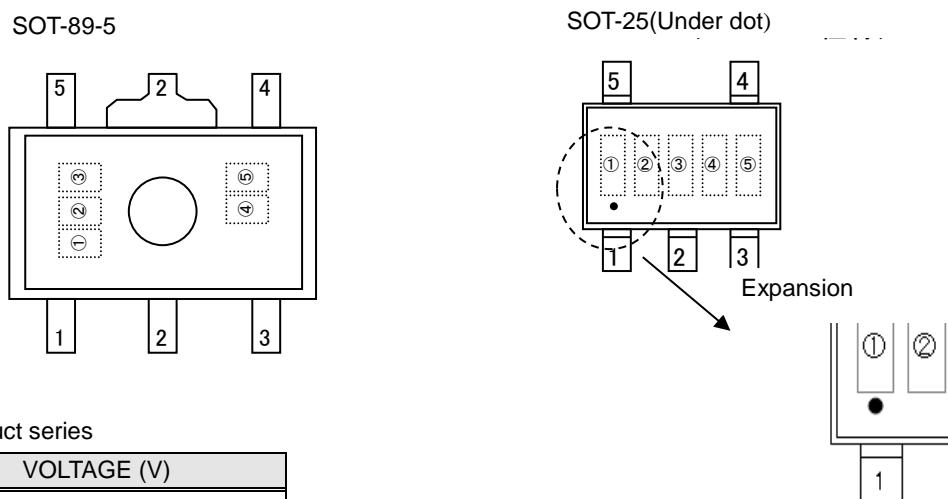
■PACKAGING INFORMATION

For the latest package information go to, www.torexsemi.com/technical-support/packages

PACKAGE	OUTLINE / LAND PATTERN	THERMAL CHARACTERISTICS	
SOT-25	SOT-25 PKG	Standard Board	SOT-25 Power Dissipation
		JESD51-7 Board	
SOT-89-5	SOT-89-5 PKG	Standard Board	SOT-89-5 Power Dissipation
		JESD51-7 Board	

■MARKING RULE

● SOT-25 / SOT-89-5

SOT-89-5

SOT-25(Under dot)

Expansion

① represents the product series

MARK	VOLTAGE (V)
K	XD6216****M*-Q
M	XD6216****P*-Q

∗MARK "K" is to be Under dot.

②represents the output voltage range

MARK	Type	VOLTAGE (V)	PRODUCT SERIES
0	with CE function	1.8~3.0	XD6216B*****-Q
1		3.1~6.0	
2		6.1~9.0	
3		9.1~12.0	

③ represents the output voltage

MARK	VOLTAGE(V)				MARK	VOLTAGE(V)			
0	-	3.1	6.1	9.1	F	-	4.6	7.6	10.6
1	-	3.2	6.2	9.2	H	-	4.7	7.7	10.7
2	-	3.3	6.3	9.3	K	1.8	4.8	7.8	10.8
3	-	3.4	6.4	9.4	L	1.9	4.9	7.9	10.9
4	-	3.5	6.5	9.5	M	2.0	5.0	8.0	11.0
5	-	3.6	6.6	9.6	N	2.1	5.1	8.1	11.1
6	-	3.7	6.7	9.7	P	2.2	5.2	8.2	11.2
7	-	3.8	6.8	9.8	R	2.3	5.3	8.3	11.3
8	-	3.9	6.9	9.9	S	2.4	5.4	8.4	11.4
9	-	4.0	7.0	10.0	T	2.5	5.5	8.5	11.5
A	-	4.1	7.1	10.1	U	2.6	5.6	8.6	11.6
B	-	4.2	7.2	10.2	V	2.7	5.7	8.7	11.7
C	-	4.3	7.3	10.3	X	2.8	5.8	8.8	11.8
D	-	4.4	7.4	10.4	Y	2.9	5.9	8.9	11.9
E	-	4.5	7.5	10.5	Z	3.0	6.0	9.0	12.0

④,⑤ represents assembly lot number
01 to 09, 0A to 0Z, 11 to 9Z, A1 to A9, AA to AZ, B1 to ZZ repeated (G, I, J, O, Q, W excluded)
Note: No character inversion used.

1. The product and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date.

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5. Although we make continuous efforts to improve the quality and reliability of our products; nevertheless Semiconductors are likely to fail with a certain probability. So in order to prevent personal injury and/or property damage resulting from such failure, customers are required to incorporate adequate safety measures in their designs, such as system fail safes, redundancy and fire prevention features.

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