XB1086 Series

ETR0325-005

1.5A Positive Voltage Regulator

■GENERAL DESCRIPTION

The XB1086 is a series of low dropout positive voltage regulators with a high output current capability of 1.5A.
Stable output can be maintained by using 10μF (C_{IN}) and 22μF (C_L) of tantalum capacitors.
The XB1086P series is available in the fixed voltage types of 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V. The XB1086K is also available as a voltage adjustable type which can set the output voltage with only two external resistors. With an over current and thermal protection circuit built-in, the IC is disabled for protection when an output current reaches limit current or junction temperature increases up to limit temperature.
The XB1086 series is available in TO-252 package.

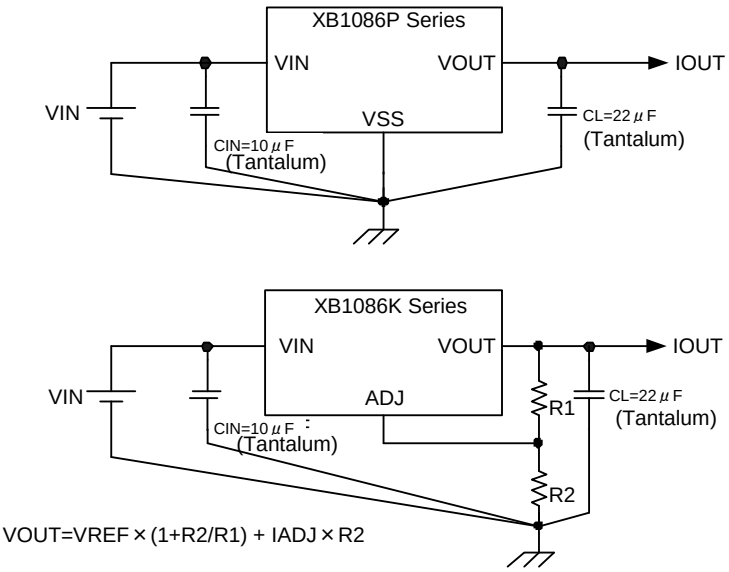
■APPLICATIONS

- High efficiency linear regulators
- Battery chargers
- DVD drives
- Set top boxes
- Various battery drive equipment

■FEATURES

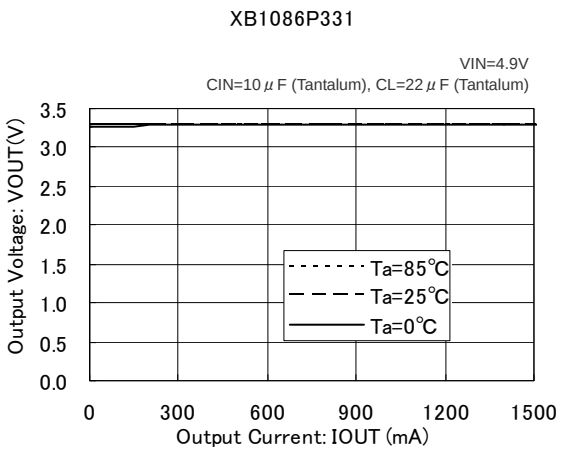
Maximum Output Current	: More than 1.5A (within Pd)
Maximum Operating Voltage	: 15V
Output Voltage	: 1.5V, 1.8V, 2.5V, 3.3V, 5.0V (XB1086P), Externally Set (XB1086K / Reference Voltage 1.25V (TYP.))
Output Voltage Accuracy	: ±1% (Tj =25℃)
Dropout Voltage	: 1.3V @ I_{OUT}=1.5A (TYP.)
Line Regulation	: 0.015% (TYP.) <ADJ>
Load Regulation	: 0.1% (TYP.) <ADJ>
Reference Voltage Pin Current	: Less than 120μA <ADJ>
Overcurrent Protection Circuit Built-In	
Thermal Protection Circuit Built-In	
Package	: TO-252
Environmentally Friendly	: EU RoHS Compliant

■TYPICAL APPLICATION CIRCUITS

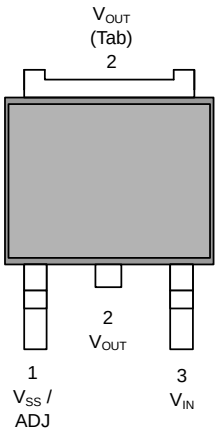


■TYPICAL PERFORMANCE CHARACTERISTICS

●Output Voltage vs. Output Current



■PIN CONFIGURATION



TO-252
(TOP VIEW)

■PIN ASSIGNMENT

PIN NUMBER TO-252	PIN NAME	FUNCITONS
1	V_{SS} / ADJ	Ground / Reference Voltage
2	V_{OUT}	Output
3	V_{IN}	Input

■PRODUCT CLASSIFICATION

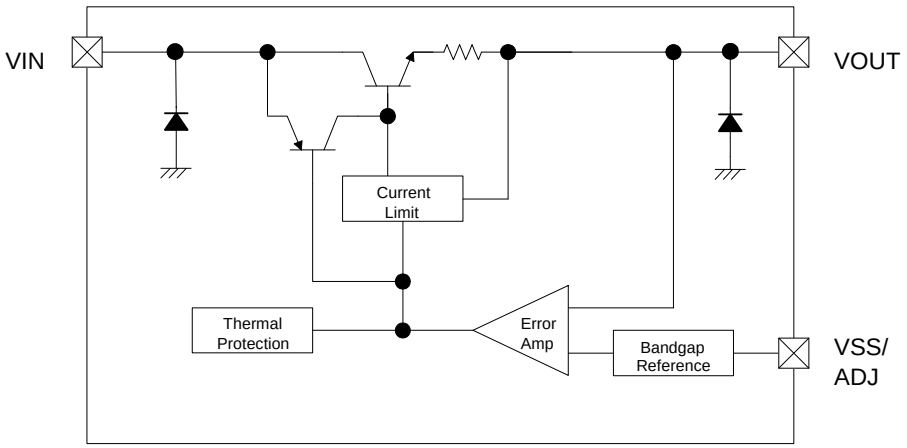
●Ordering Information

XB1086①②③④⑤⑥-⑦(*1)

DESIGNATOR	DESCRIPTION	SYNBOL	DESCRIPTION
①	Type of Regulators	P	Fixed V_{OUT}
		K	Adjustable (Externally Set)
②③④	Output Voltage and Output Voltage Accuracy	151	V_{OUT}=1.5V (±1%)
		181	V_{OUT}=1.8V (±1%)
		251	V_{OUT}=2.5V (±1%)
		331	V_{OUT}=3.3V (±1%)
		501	V_{OUT}=5.1V (±1%)
		12B	V_{REF}=1.25V (±1%)
⑤⑥−⑦	Package (Oder Unit)	JR	TO-252 (2,500/Reel)
		JR-G	TO-252 (2,500/Reel)

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

■BLOCK DIAGRAM



*Diodes inside the circuit are ESD protection diodes.

■ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	18	V
Power Dissipation	Pd	1300 (*2)	mW
Operating Junction Temperature	Tj	125	℃
Storage Temperature Range	T_{stg}	- 55 ~ 125	℃

Note:

*1: Stresses greater than those listed under the above ratings may cause permanent damage to the device.

*2: The rating of the power dissipation is determined when mounted on the PCB.

■ELECTRICAL CHARACTERISTICS

XB1086PxxxJ

Tj= 25℃ unless otherwise specified

PARAMETER	SYMBOL	CONDITIONS		MIN.	TYP.	MAX.	UNIT	CIRCUIT
Output Voltage	V_{OUT} (1.5V)	V_{IN}=3.5V, I_{OUT}=10mA		1.485	1.5	1.515	V	①
			O.T. (*1)	1.47	-	1.53		
	V_{OUT} (1.8V)	V_{IN}=3.8V, I_{OUT}=10mA		1.782	1.8	1.818	V	①
			O.T. (*1)	1.746	-	1.854		
	V_{OUT} (2.5V)	V_{IN}=4.5V, I_{OUT}=10mA		2.475	2.500	2.525	V	①
			O.T. (*1)	2.45	-	2.55		
	V_{OUT} (3.3V)	V_{IN}=5.0V, I_{OUT}=10mA		3.267	3.300	3.333	V	①
			O.T. (*1)	3.235	-	3.366		
	V_{OUT} (5.0V)	V_{IN}=7.0V, I_{OUT}=10mA		4.95	5	5.05	V	①
			O.T. (*1)	4.9	-	5.1		
Line Regulation	ΔV_{OUT1} (1.5V)	1.5V≦V_{IN}-V_{OUT}≦10V I_{OUT}=10mA		-	0.3	6	mV	①
			O.T. (*1)	-	0.6	6		
	ΔV_{OUT1} (1.8V)	1.5V≦V_{IN}-V_{OUT}≦10V I_{OUT}=10mA		-	0.3	6	mV	①
			O.T. (*1)	-	0.6	6		
	ΔV_{OUT1} (2.5V)	1.5V≦V_{IN}-V_{OUT}≦10V I_{OUT}=10mA		-	0.3	6	mV	①
			O.T. (*1)		0.6	6		
	ΔV_{OUT1} (3.3V)	1.5V≦V_{IN}-V_{OUT}≦10V I_{OUT}=10mA		-	0.5	10	mV	①
			O.T. (*1)	-	1	10		
	ΔV_{OUT1} (5.0V)	1.5V≦V_{IN}-V_{OUT}≦10V I_{OUT}=10mA		-	0.5	10	mV	①
			O.T. (*1)	-	1	10		
Load Regulation	ΔV_{OUT2} (1.5V)	V_{IN}-V_{OUT}=2.0V 10mA≦I_{OUT}≦1.5A		-	3	12	mV	①
			O.T. (*1)	-	6	20		
	ΔV_{OUT2} (1.8V)	V_{IN}-V_{OUT}=2.0V 10mA≦I_{OUT}≦1.5A		-	3	12	mV	①
			O.T. (*1)	-	6	20		
	ΔV_{OUT2} (2.5V)	V_{IN}-V_{OUT}=2.0V 10mA≦I_{OUT}≦1.5A		-	3	12	mV	①
			O.T. (*1)	-	6	20		
	ΔV_{OUT2} (3.3V)	V_{IN}-V_{OUT}=2.0V 10mA≦I_{OUT}≦1.5A		-	3	15	mV	①
			O.T. (*1)	-	7	20		
	ΔV_{OUT2} (5.0V)	V_{IN}-V_{OUT}=2.0V 10mA≦I_{OUT}≦1.5A		-	5	20	mV	①
			O.T. (*1)	-	10	35		
Dropout Voltage	V_{dif}	ΔV_{OUT}=1%, I_{OUT}=1.5A		-	1.3	1.5	V	①
Current Limit	I_{LIM}	V_{IN}-V_{OUT}=2.0V		1.5	2.3	-	A	①
Supply Current	I_{DD}	V_{IN}=V_{OUT}+1.3V	O.T. (*1)	-	5	10	mA	②
Temperature Stability I_{OUT}=10mA	Ts O.T. (*1)	V_{IN}-V_{OUT}=1.5V I_{OUT}=10mA	O.T. (*1)	-	0.5	-	%	-

Note:

*1: O.T. denotes the specifications which apply over the range of operating junction temperature (0℃≦Tj≦125°C).
Please be sure that the power consumption does not exceed the power dissipation rating, 1300mW. If the power consumption exceeds the power dissipation rating and the operating junction temperature rises more than the rating, 125°C, the IC enters thermal shutdown state.

■ELECTRICAL CHARACTERISTICS (Continued)

XB1086K12BJ

Tj= 25℃ unless otherwise specified

PARAMETER	SYMBOL	CONDITIONS		MIN.	TYP.	MAX.	UNIT	CIRCUIT
Reference Voltage	V_{REF}	V_{IN}-V_{OUT}=2.0V		1.238	1.250	1.262	V	①
		I_{OUT}=10mA	O.T. (*1)	1.225	-	1.270		
Line Regulation	ΔV_{OUT1}	1.5V≦V_{IN}-V_{OUT}≦10V		-	0.015	0.2	%	①
		I_{OUT}=10mA	O.T. (*1)		0.035	0.2		
Load Regulation	ΔV_{OUT2}	V_{IN}-V_{OUT}=2.0V		-	0.1	0.3	%	①
		10mA≦I_{OUT}≦1.5A	O.T. (*1)		0.2	0.4		
Dropout Voltage	Vdif	ΔV_{OUT}=1%, I_{OUT}=1.5A		-	1.3	1.5	V	①
Current Limit	I_{LIM}	V_{IN}-V_{OUT}=2.0V		1.5	2.3	-	A	①
Temperature Stability	T_S	V_{IN}-V_{OUT}=1.5V I_{OUT}=10mA	O.T. (*1)	-	0.5	-	%	-
Minimum Output Current	I_{OUTmin}	1.4V≦V_{IN}-V_{OUT}≦10V	O.T. (*1)	-	2	5	mA	①
Adjust Voltage Pin Current	I_{ADJ}	V_{IN}=V_{OUT}+1.5V I_{OUT}=10mA	O.T. (*1)	-	60	120	μA	①

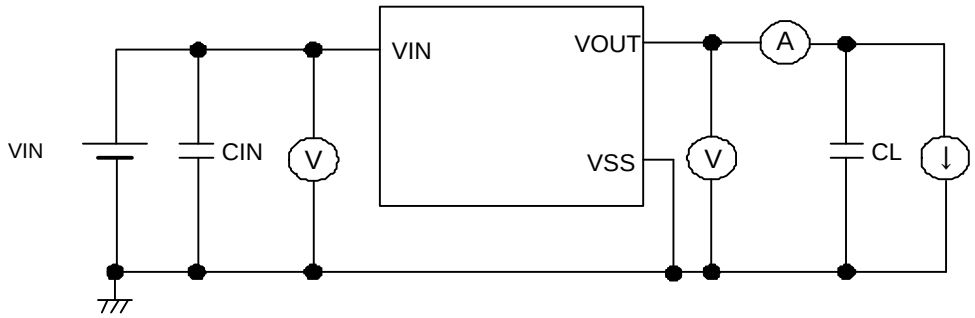
Note:

*1: O.T. denotes the specifications which apply over the range of operating junction temperature (0℃≦Tj≦125°C).
Please be sure that the power consumption does not exceed the power dissipation rating, 1300mW. If the power consumption exceeds the power dissipation rating and the operating junction temperature rises more than the rating, 125°C, the IC enters thermal shutdown state.

■TEST CIRCUITS

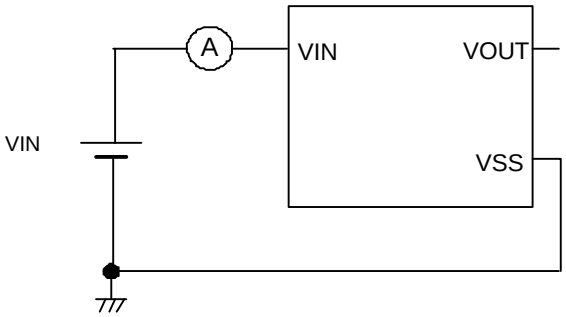
●XB1086PxxxJ

Circuit ①



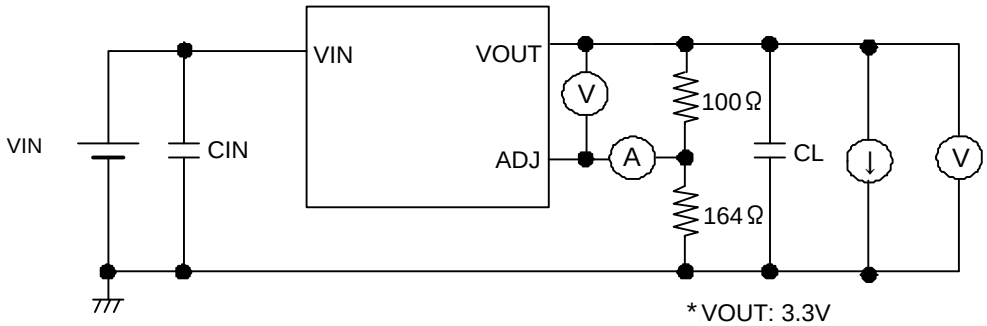
* C_{IN}=10μF (Tantalum), C_L=22μF (Tantalum)

Circuit ②



●XB1086K12BJ

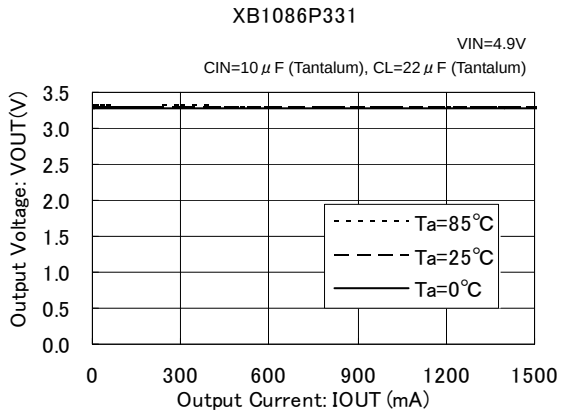
Circuit ①



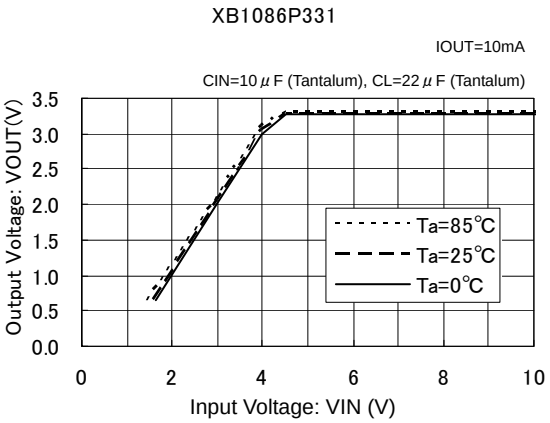
* C_{IN}=10μF (Tantalum), C_L=22μF (Tantalum)

■TYPICAL PERFORMANCE CHARACTERISTICS

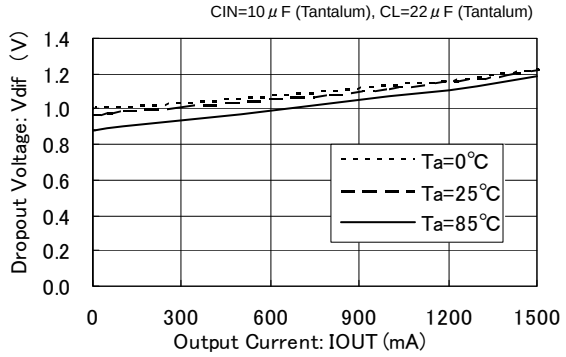
(1) Output Voltage vs. Output Current



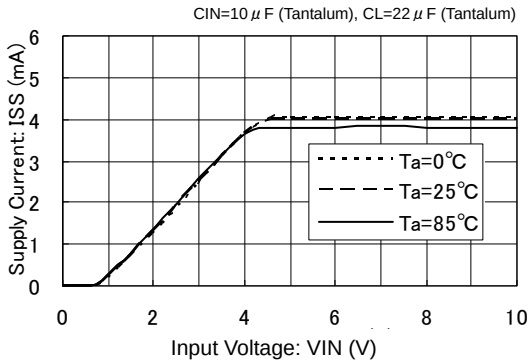
(2) Output Voltage vs. Input Voltage



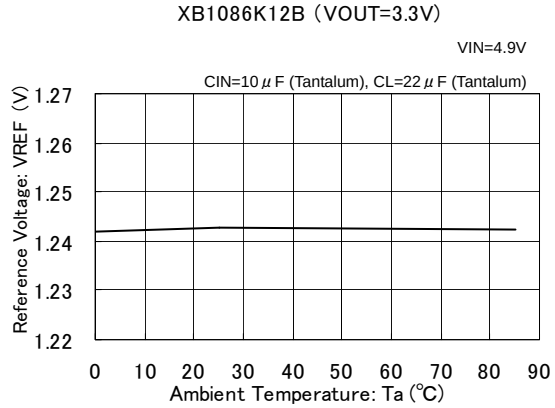
(3) Dropout Voltage vs. Output Current



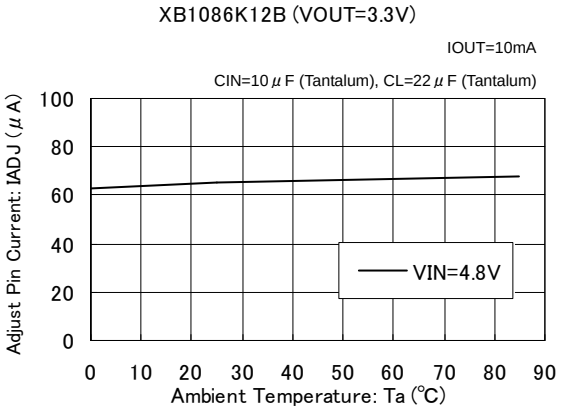
(4) Supply Current vs. Input Voltage



(5) Reference Voltage vs. Ambient Temperature



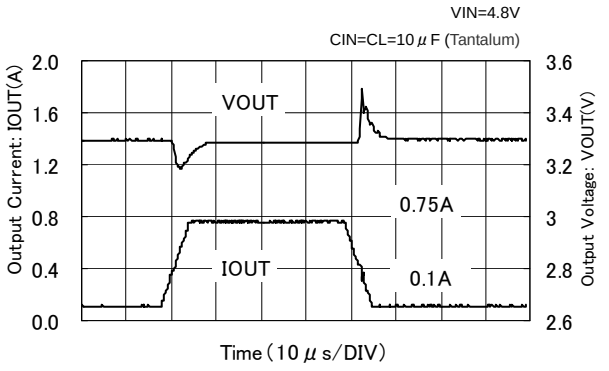
(6) Adjust Pin Current vs. Ambient Temperature



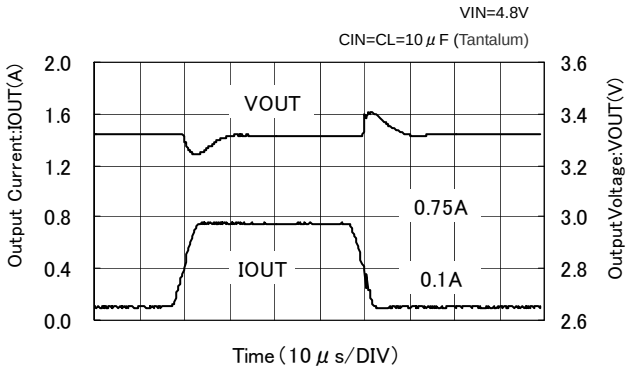
■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(7) Load Transient Response

XB1086P331

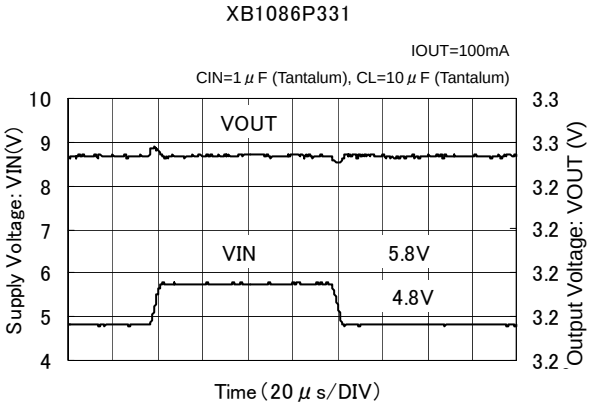


XB1086K12B (VOUT=3.3V)

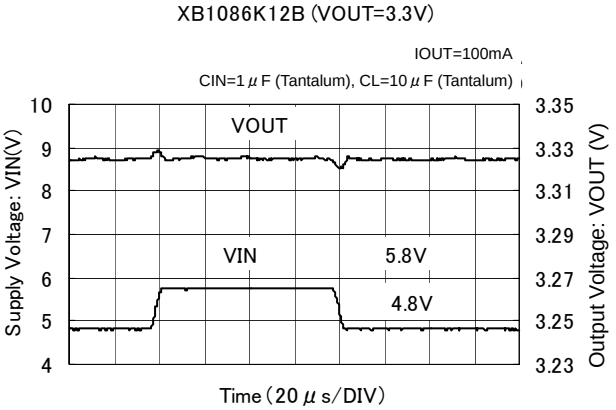


(8) Input Transient Response

XB1086P331

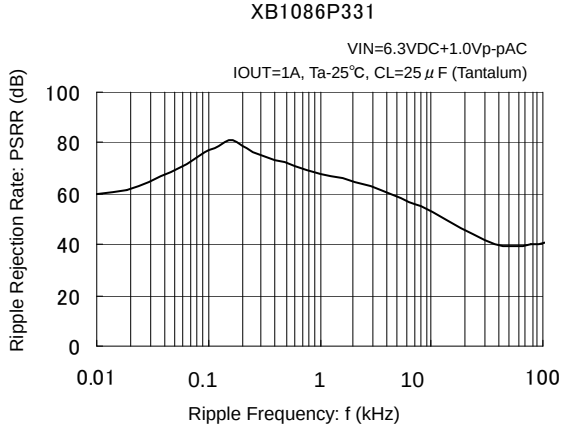


XB1086K12B (VOUT=3.3V)

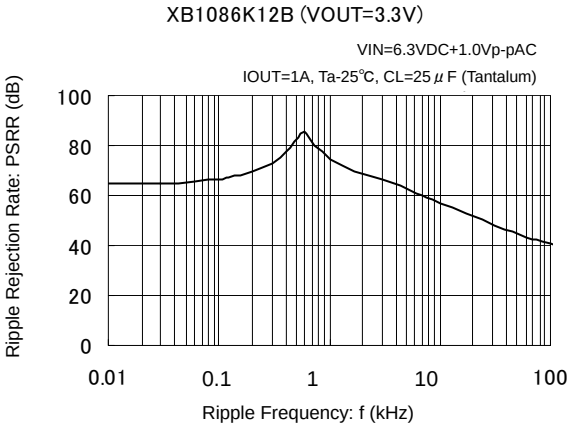


(9) Ripple Rejection Rate

XB1086P331

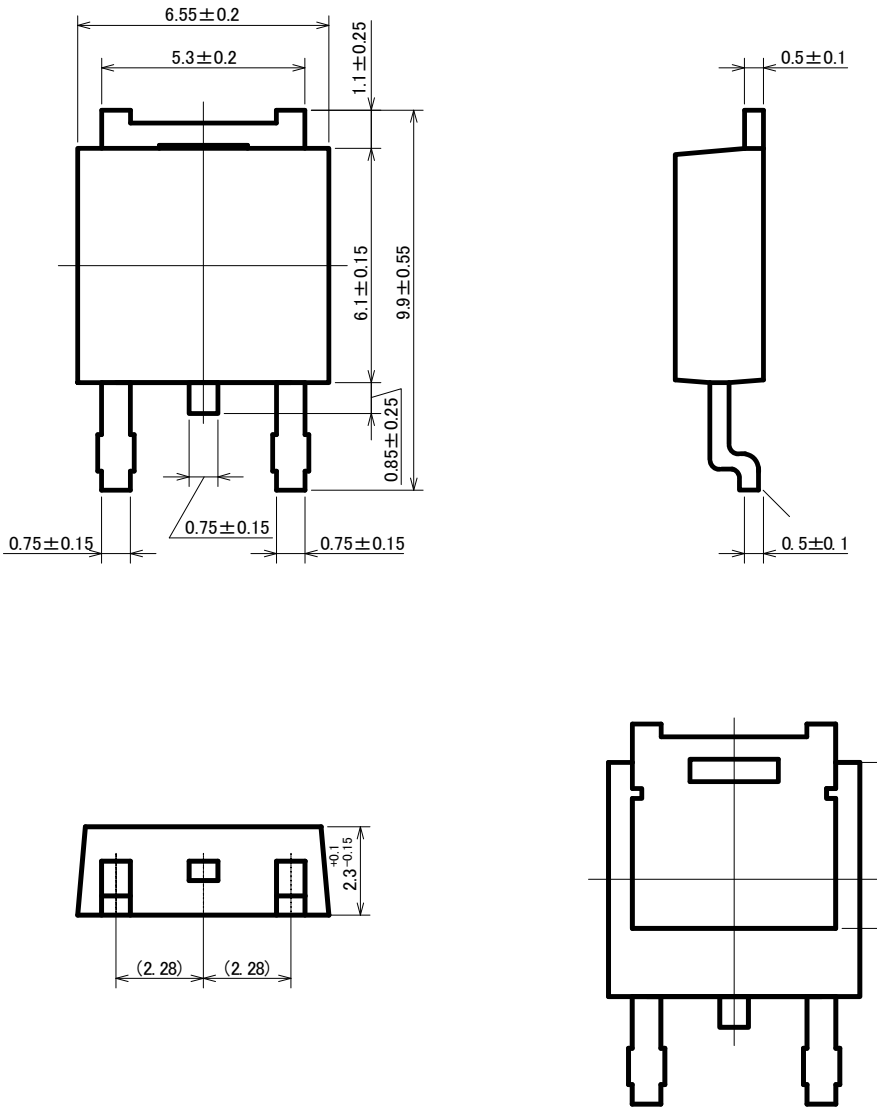


XB1086K12B (VOUT=3.3V)



■ PACKAGING INFORMATION

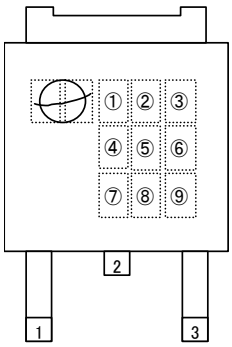
●TO-252



UNIT : mm

■MARKING RULE

●TO-252



TO-252
(TOP VIEW)

TO252

①② represents product series

MARK		PRODUCT SERIES
①	②	
8	5	XB1086****J*

③ represent the type of regulator

MARK	PRODUCT SERIES
P	XB1086P***J*
K	XB1086K***J*

④⑤ represents output voltage

MARK		OUTPUT VOTLAGE PRODUCT SERIES	
④	⑤		
1	5	1.5V	XB1086P151J*
1	8	1.8V	XB1086P181J*
2	5	2.5V	XB1086P251J*
3	3	3.3V	XB1086P331J*
5	0	5.0V	XB1086P501J*
1	2	ADJ	XB1086K12BJ*

⑥ represents output voltage accuracy and output type

MARK	OUTPUT VOLTAGE ACCURACY (OUTPUT TYPE)	PRODUCT SERIES
1	1%	XB1086P**1J*
B	ADJ	XB1086K12BJ*

⑦ represents the last digit of production year

ex.)

MARK	PRODUCTION YEAR
7	2007
8	2008

⑧ represents production lot number
0 to 9, A to Z repeated.
(G, I, J, O, Q, W excepted. '0' of the first digit does not mark.)
*No character inversion used.

ex.)

MARK		PRODUCTION LOT NUMBER
⑧	⑨	
Blank	3	03
1	A	1A

1. The products 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.
2. We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.
3. Please ensure suitable shipping controls (including fail-safe designs and aging protection) are in force for equipment employing products listed in this datasheet.
4. The products in this datasheet are not developed, designed, or approved for use with such equipment whose failure of malfunction can be reasonably expected to directly endanger the life of, or cause significant injury to, the user.
   (e.g. Atomic energy; aerospace; transport; combustion and associated safety equipment thereof.)
5. Please use the products listed in this datasheet within the specified ranges.
   Should you wish to use the products under conditions exceeding the specifications, please consult us or our representatives.
6. We assume no responsibility for damage or loss due to abnormal use.
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