XC62FJ Series

10V Input, 200mA Low Consumption Current Regulator

■GENERAL DESCRIPTION

The XC62FJ series is a highly precise, low power consumption, positive voltage regulator manufactured with CMOS and laser trimming technologies.

The series provides large currents with a significantly small dropout voltage.

The XC62FJ consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error amplifier.

The output voltage is selectable in 0.1V steps between 1.7V ~ 6.0V.

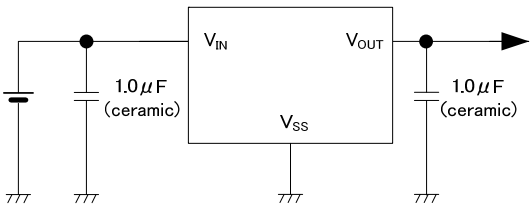
■APPLICATIONS

- Smart meter
- Walky-talky
- Blood pressure manometer
- Applications with 2Li-ion batteries

■FEATURES

Maximum Output Current	:	200mA
Dropout Voltage	:	160mV@I_{OUT}=100mA (V_{OUT}=5.0V)
Operating Voltage Range	:	1.8V～10V
Output Voltage Range	:	1.7V～6.0V (±2.0%) 0.1V increments
Consumption Current	:	2.0μA (TYP.)
External Capacitor	:	Ceramic Capacitor
Operating Ambient Temperature	:	-40℃～+85℃
Package	:	SOT-89
Environmentally Friendly	:	EU RoHS Compliant, Pb Free

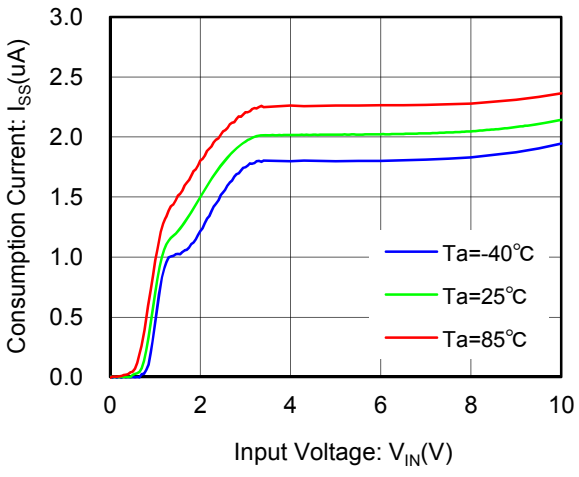
■TYPICAL APPLICATION CIRCUIT



■TYPICAL PERFORMANCE CHARACTERISTICS

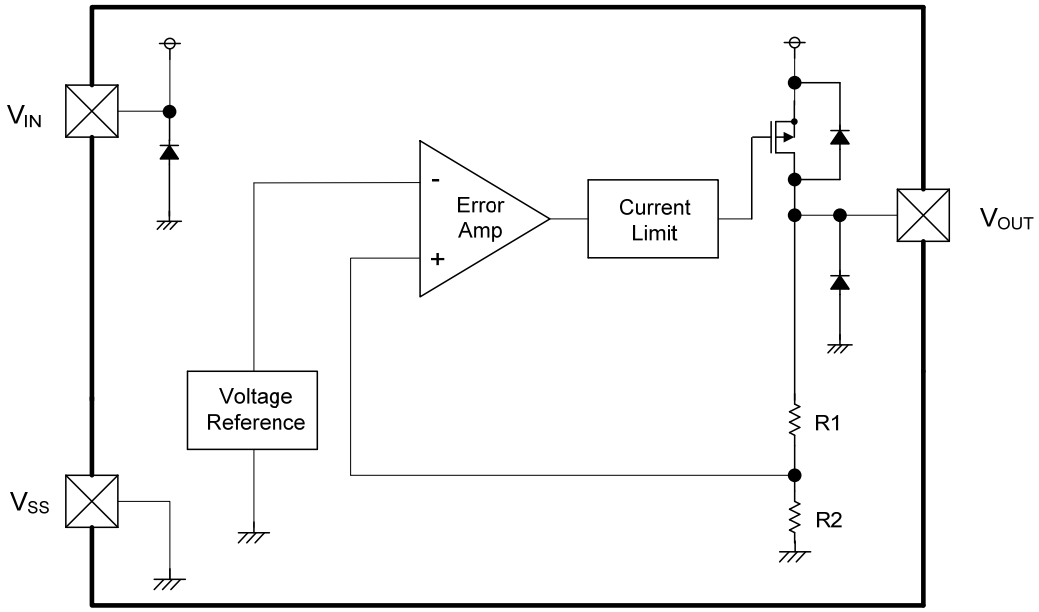
●Consumption Current vs. Input Voltage

XC62FJ3302PR-G



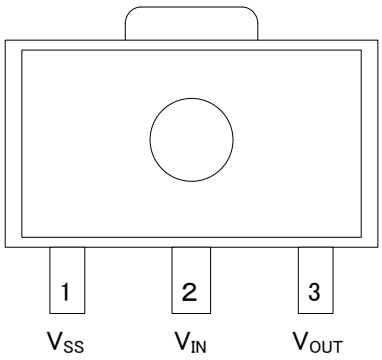
■BLOCK DIAGRAM

XC62FJ Series



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

■PIN CONFIGURATION



SOT-89
(TOP VIEW)

■PIN ASSIGNMENT

PIN NUMBER	PIN NAME	FUNCTION
SOT-89		
1	V_{SS}	Ground
2	V_{IN}	Power Supply Input
3	V_{OUT}	Output

■PRODUCT CLASSIFICATION

●Ordering Information

XC62FJ①②③④⑤⑥−⑦

DESIGNATOR	DESCRIPTION	SYMBOL	DESCRIPTION
①②	Output Voltage	17～60	e.g. 30: 3.0V, 50: 5.0V
③④	Output Voltage Accuracy	02	±2.0%
⑤⑥−⑦(*1)	Package (Order Unit)	PR-G	SOT-89 (1,000/Reel)

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

■ABSOLUTE MAXIMUM RATINGS

Ta=25℃

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	- 0.3 ～ + 12.0	V
Output Current		I_{OUT}	500 (*1)	mA
Output Voltage		V_{OUT}	- 0.3 ～ V_{IN} + 0.3 or +12.0 (*2)	V
Power Dissipation (*1)	SOT-89	Pd	1000 (PCB mounted) (*3)	mW
Operating Ambient Temperature		Topr	-40～+85	℃
Storage Temperature		Tstg	-55～+125	℃

All voltages are described based on V_{SS}.

(*1) $I_{OUT} \leqq Pd/ (V_{IN}-V_{OUT})$

(*2) The maximum value should be either V_{IN}+0.3 or +12.0 in the lowest

(*3) The power dissipation figure shown is PCB mounted. Please refer to page 14 for details.

■ELECTRICAL CHARACTERISTICS

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	CIRCUIT
Output Voltage	$V_{OUT(E)}$ (*2)	$V_{IN}=V_{OUT(T)}$(*1)+1.0V、I_{OUT}={C1(*6)}mA	E-1 (*5)	$V_{OUT(T)}$	E-1 (*5)	V	②
Maximum Output Current	I_{OUTMAX}	$V_{IN}=V_{OUT(T)}$+1.0V $V_{OUT(E)}\geqq V_{OUT(T)}\times 0.9$	E-2 (*5)	-	-	mA	②
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT(T)}$+1.0V 1mA≦I_{OUT}≦{C2 (*6)}mA	-	E-3 (*5)		mV	②
Dropout Voltage1	Vdif1 (*3)	I_{OUT}={C3 (*6)}mA	-	E-4 (*5)		mV	②
Dropout Voltage2	Vdif2 (*3)	I_{OUT}={C4 (*6)}mA	-	E-5 (*5)		mV	②
Consumption current	I_{SS}	$V_{IN}=V_{OUT(T)}$+1.0V	-	2.0	E-6 (*5)	μA	①
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$V_{OUT(T)}$+1.0V≦V_{IN}≦10.0V I_{OUT}={C5 (*6)}mA	-	0.2	0.3	%/V	②
Input Voltage(*6)	V_{IN}	-	1.8	-	10	V	-
Output Voltage Temperature Characteristics	$\Delta V_{OUT}/(\Delta Topr\cdot V_{OUT})$	I_{OUT}={C1 (*6)}mA -40℃≦Topr≦85℃	-	±100	-	ppm/℃	②

(*1) $V_{OUT(T)}$ is Nominal output voltage
(*2) $V_{OUT(E)}$ is Effective output voltage
(i.e. the output voltage when "($V_{OUT(T)}$ + 1.0V)" is provided at the V_{IN} pin while maintaining a certain I_{OUT} value.)
(*3) Vdif={$V_{IN1}-V_{OUT1}$}
V_{IN1} is the input voltage when V_{OUT1} appears at the V_{OUT} pin while input voltage is gradually decreased.
V_{OUT1} is the voltage equal to 98% of the normal output voltage when amply stabilized $V_{OUT(T)}$ +1.0V is input at the V_{IN} pin.
(*4) Over 1.8V input voltage (Minimum operation voltage) is required when the V_{OUT} is lower than 1.8V.
(*5) Refer to the VOLTAGE CHART
(*6) Refer to the VOLTAGE CONDITIONS CHART

■ELECTRICAL CHARACTERISTICS

VOLTAGE CHART

SYMBOL	E-1		E-2	E-3		E-4		E-5		E-6
NOMINAL OUTPUT VOLTAGE	OUTPUT VOLTAGE (V)		MAXIMUM OUTPUT CURRENT (mA)	LOAD REGULATION (mV)		DROPOUT VOLTAGE1 (mV)		DROPOUT VOLTAGE2 (mV)		CONSUMPTION CURRENT (μA)
$V_{OUT(T)}$	$V_{OUT(E)}$		I_{OUTMAX}	ΔV_{OUT}		Vdif1		Vdif2		I_{SS}
	MIN.	MAX.	MIN.	TYP.	MAX.	TYP.	MAX.	TYP.	MAX.	MAX.
1.7	1.666	1.734	80	10	30	200	370	450	710	5.0
1.8	1.764	1.836	80	10	30	200	370	450	710	5.0
1.9	1.862	1.938	80	10	30	200	370	450	710	5.0
2.0	1.960	2.040	100	15	40	200	370	450	710	5.0
2.1	2.058	2.142	100	15	40	200	370	450	710	5.0
2.2	2.156	2.244	100	15	40	200	370	450	710	5.0
2.3	2.254	2.346	100	15	40	200	370	450	710	5.0
2.4	2.352	2.448	100	15	40	200	370	450	710	5.0
2.5	2.450	2.550	100	15	40	200	370	450	710	5.0
2.6	2.548	2.652	100	15	40	200	370	450	710	5.0
2.7	2.646	2.754	100	15	40	200	370	450	710	5.0
2.8	2.744	2.856	100	15	40	200	370	450	710	5.0
2.9	2.842	2.958	100	15	40	200	370	450	710	5.0
3.0	2.940	3.060	150	20	50	200	360	450	700	5.0
3.1	3.038	3.162	150	20	50	200	360	450	700	5.0
3.2	3.136	3.264	150	20	50	200	360	450	700	5.0
3.3	3.234	3.366	150	20	50	200	360	450	700	5.0
3.4	3.332	3.468	150	20	50	200	360	450	700	5.0
3.5	3.430	3.570	150	20	50	200	360	450	700	5.0
3.6	3.528	3.672	150	20	50	200	360	450	700	5.0
3.7	3.626	3.774	150	20	50	200	360	450	700	5.0
3.8	3.724	3.876	150	20	50	200	360	450	700	5.0
3.9	3.822	3.978	150	20	50	200	360	450	700	5.0
4.0	3.920	4.080	180	25	60	180	350	420	630	6.0
4.1	4.018	4.182	180	25	60	180	350	420	630	6.0
4.2	4.116	4.284	180	25	60	180	350	420	630	6.0
4.3	4.214	4.386	180	25	60	180	350	420	630	6.0
4.4	4.312	4.488	180	25	60	180	350	420	630	6.0
4.5	4.410	4.590	180	25	60	180	350	420	630	6.0
4.6	4.508	4.692	180	25	60	180	350	420	630	6.0
4.7	4.606	4.794	180	25	60	180	350	420	630	6.0
4.8	4.704	4.896	180	25	60	180	350	420	630	6.0
4.9	4.802	4.998	180	25	60	180	350	420	630	6.0
5.0	4.900	5.100	200	30	70	160	340	400	600	6.0
5.1	4.998	5.202	200	30	70	160	340	400	600	6.0
5.2	5.096	5.304	200	30	70	160	340	400	600	6.0
5.3	5.194	5.406	200	30	70	160	340	400	600	6.0
5.4	5.292	5.508	200	30	70	160	340	400	600	6.0
5.5	5.390	5.610	200	30	70	160	340	400	600	6.0
5.6	5.488	5.712	200	30	70	160	340	400	600	6.0
5.7	5.586	5.814	200	30	70	160	340	400	600	6.0
5.8	5.684	5.916	200	30	70	160	340	400	600	6.0
5.9	5.782	6.018	200	30	70	160	340	400	600	6.0
6.0	5.880	6.120	200	30	70	150	330	400	600	6.0

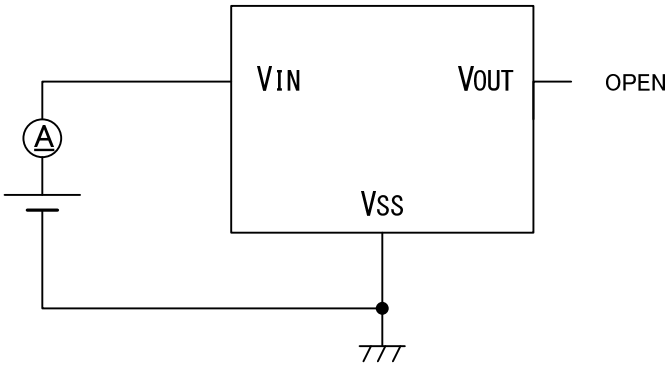
■ELECTRICAL CHARACTERISTICS (Continued)

VOLTAGE CONDITIONS CHART

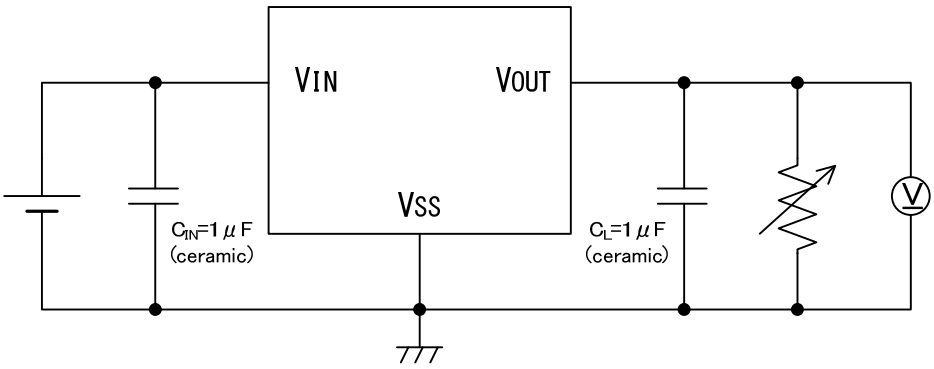
NOMINAL OUTPUT VOLTAGE	C1	C2	C3	C4	C5
	OUTPUT VOLTAGE	LOAD REGULATION	DROPOUT VOLTAGE1	DROPOUT VOLTAGE2	LINE REGULATION
$V_{OUT(T)}$	I_{OUT} (mA)	I_{OUT} (mA)	I_{OUT} (mA)	I_{OUT} (mA)	I_{OUT} (mA)
1.7	40	40	40	80	40
1.8	40	40	40	80	40
1.9	40	40	40	80	40
2.0	40	60	60	120	40
2.1	40	60	60	120	40
2.2	40	60	60	120	40
2.3	40	60	60	120	40
2.4	40	60	60	120	40
2.5	40	60	60	120	40
2.6	40	60	60	120	40
2.7	40	60	60	120	40
2.8	40	60	60	120	40
2.9	40	60	60	120	40
3.0	40	80	80	160	40
3.1	40	80	80	160	40
3.2	40	80	80	160	40
3.3	40	80	80	160	40
3.4	40	80	80	160	40
3.5	40	80	80	160	40
3.6	40	80	80	160	40
3.7	40	80	80	160	40
3.8	40	80	80	160	40
3.9	40	80	80	160	40
4.0	40	100	100	200	40
4.1	40	100	100	200	40
4.2	40	100	100	200	40
4.3	40	100	100	200	40
4.4	40	100	100	200	40
4.5	40	100	100	200	40
4.6	40	100	100	200	40
4.7	40	100	100	200	40
4.8	40	100	100	200	40
4.9	40	100	100	200	40
5.0	40	100	100	200	40
5.1	40	100	100	200	40
5.2	40	100	100	200	40
5.3	40	100	100	200	40
5.4	40	100	100	200	40
5.5	40	100	100	200	40
5.6	40	100	100	200	40
5.7	40	100	100	200	40
5.8	40	100	100	200	40
5.9	40	100	100	200	40
6.0	40	100	100	200	40

■TEST CIRCUITS

CIRCUIT①



CIRCUIT②



■OPERATIONAL EXPLANATION

<External Capacitor>

The XC62FJ series needs an output capacitor C_L for phase compensation. In order to ensure the stable phase compensation, please place an output capacitor 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}).

■NOTES ON USE

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

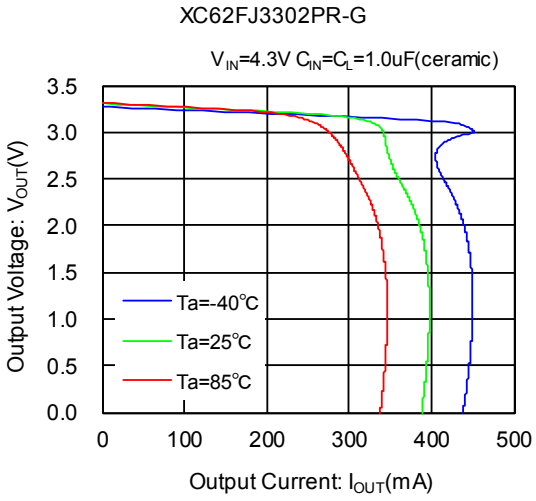
2. Where wiring impedance is high, operations may become unstable due to noise and/or phase lag depending on output current.

3. An oscillation may occur by the impedance between a power supply and the input of the IC. Where the impedance is 10Ωor more, please use an input capacitor (C_{IN}) of at least 1μF. In case of high output current, operation can be stabilized by increasing the input capacitor value. Also an oscillation may occur if the input capacitor value is smaller than the input impedance when the output capacitance (C_L) is large. In such cases, operations can be stabilized by either increasing the input capacitor value or reducing the output capacitor value.

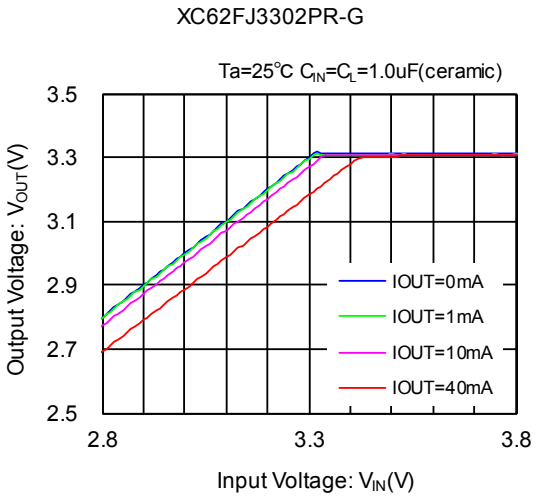
4. Torex places an importance on improving our products and their reliability.
   We request that users incorporate fail-safe designs and post-aging prevention treatment when using Torex products in their systems.

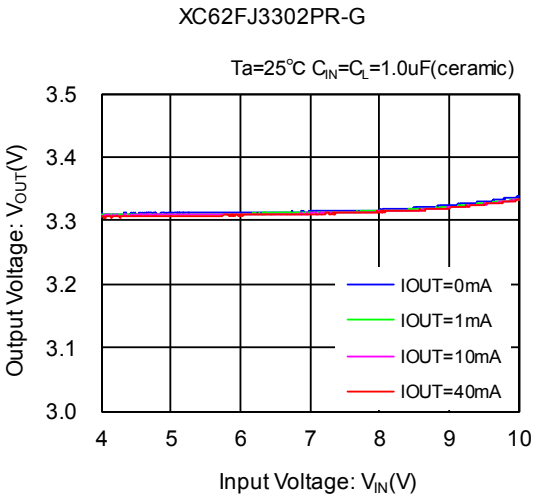
■TYPICAL PERFORMANCE CHARACTERISTICS

(1)Output Voltage vs. Output Current

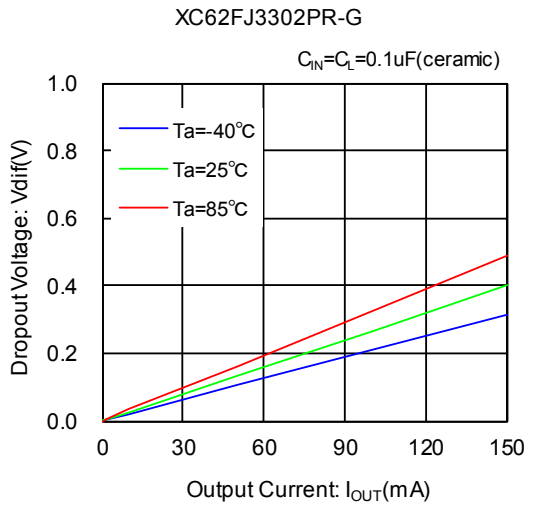


(2) Output Voltage vs. Input Voltage

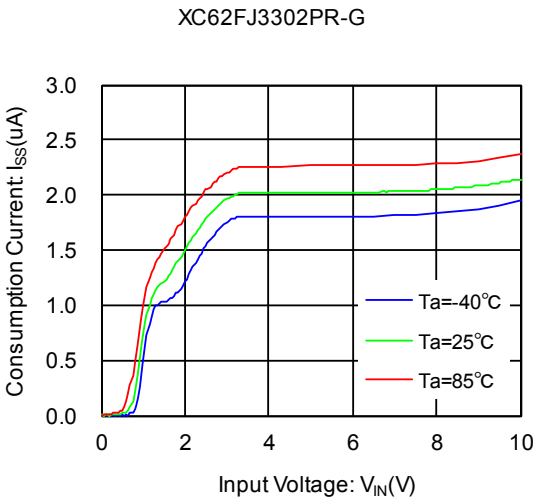




(3)Dropout Voltage vs. Output Current

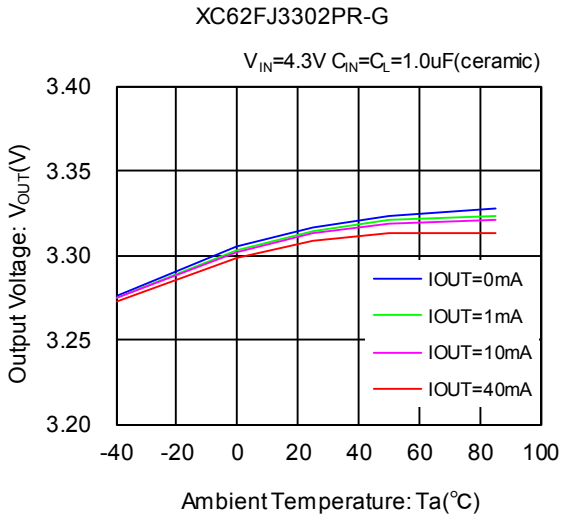


(4)Consumption Current vs. Input Voltage

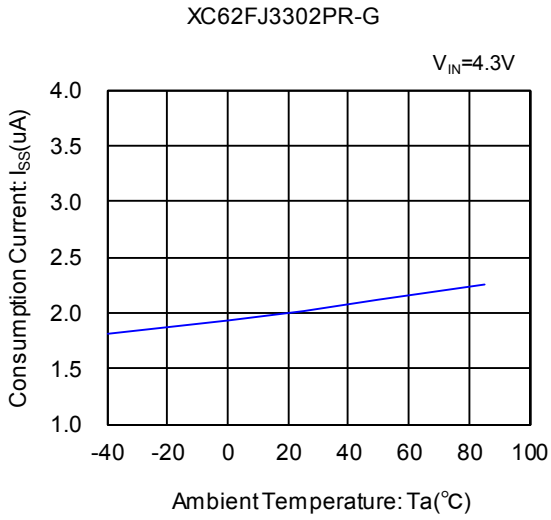


■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(5)Output Voltage vs. Ambient Temperature



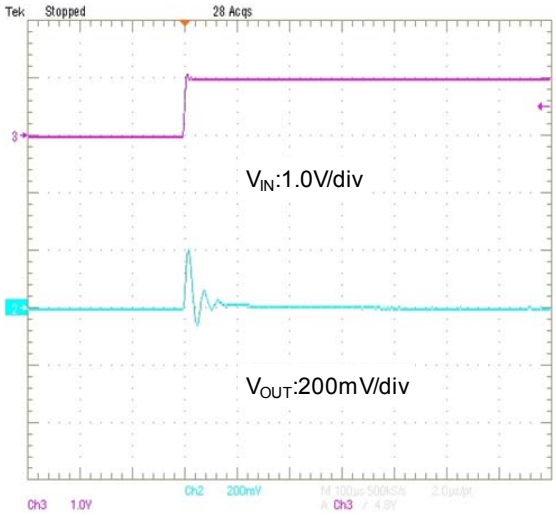
(6)Consumption Current vs. Ambient Temperature



■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

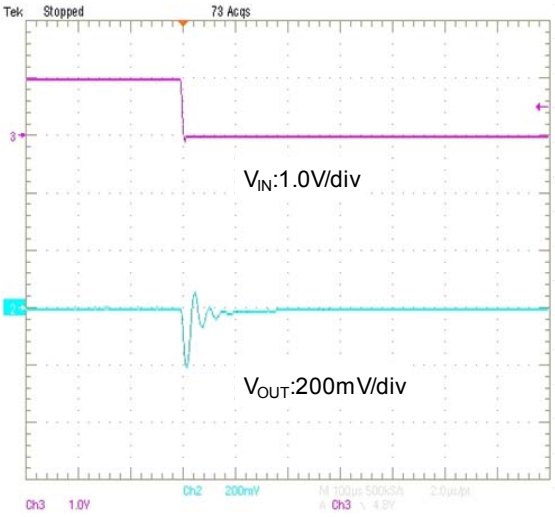
(7) Input Transient Response

XC62FJ3302PR-G
tr=tf=5us V_{IN}=4.3V⇒5.3V I_{OUT}=40mA
C_{IN}=1.0uF(ceramic) C_L=1.0uF(ceramic) Ta=25℃



Time(100 μs/div)

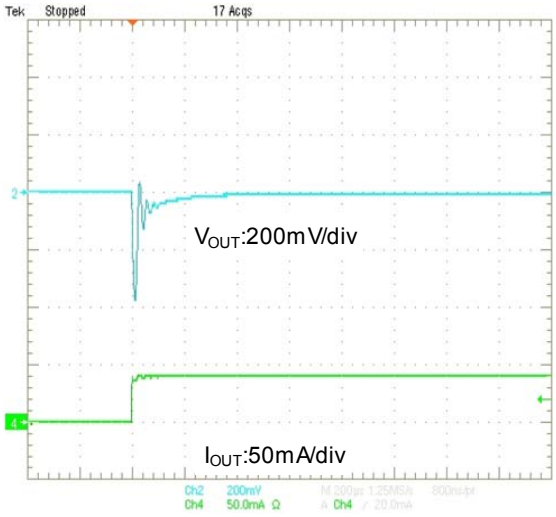
XC62FJ3302PR-G
tr=tf=5us V_{IN}=5.3V⇒4.3V I_{OUT}=40mA
C_{IN}=1.0uF(ceramic) C_L=1.0uF(ceramic) Ta=25℃



Time(100 μs/div)

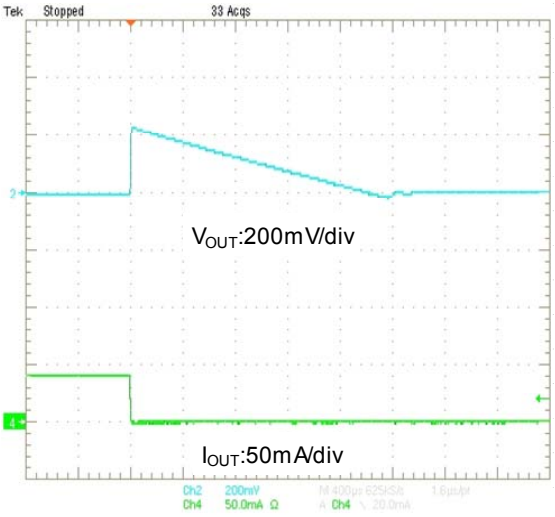
(8) Load Transient Response

XC62FJ3302PR-G
tr=tf=5us V_{IN}=4.3V I_{OUT}=0.1mA⇒40mA
C_{IN}=1.0uF(ceramic) C_L=1.0uF(ceramic) Ta=25℃



Time(200 μs/div)

XC62FJ3302PR-G
tr=tf=5us V_{IN}=4.3V I_{OUT}=40mA⇒0.1mA
C_{IN}=1.0uF(ceramic) C_L=1.0uF(ceramic) Ta=25℃

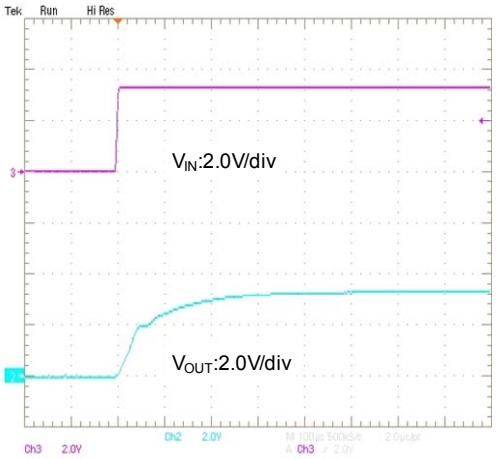


Time(400 μs/div)

■TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

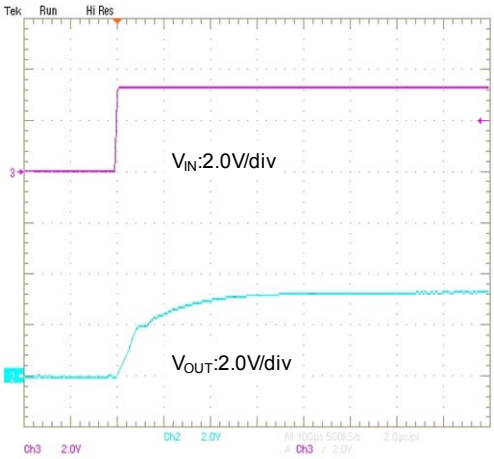
(9) Rising Response Time

XC62FJ3302PR-G
tr=5us V_{IN}=0V⇒4.3V I_{OUT}=1mA
C_L=1.0uF(ceramic) Ta=25℃



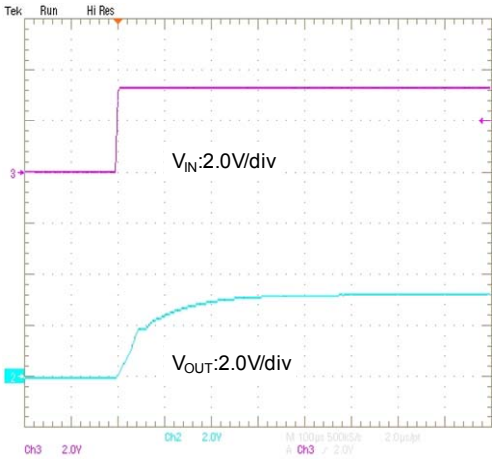
Time(100us/div)

XC62FJ3302PR-G
tr=5us V_{IN}=0V⇒4.3V I_{OUT}=10mA
C_L=1.0uF(ceramic) Ta=25℃



Time(100us/div)

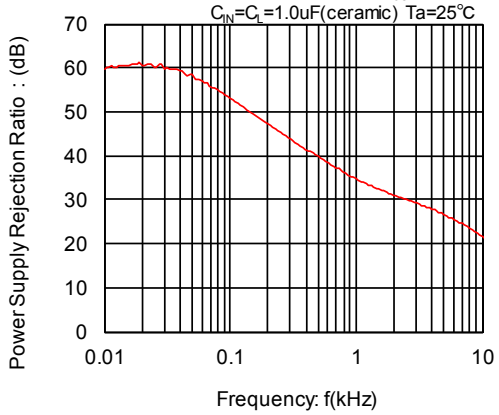
XC62FJ3302PR-G
tr=5us V_{IN}=0V⇒4.3V I_{OUT}=40mA
C_L=1.0uF(ceramic) Ta=25℃



Time(100us/div)

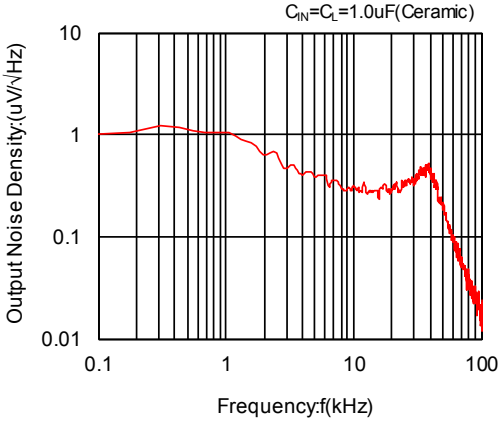
(10) Power Supply Rejection Ratio

XC62FJ3302PR-G
V_{IN}=4.3V+1.0V_{P-P}AC I_{OUT}=40mA
C_{IN}=C_L=1.0uF(ceramic) Ta=25℃



(11) Output Noise Density

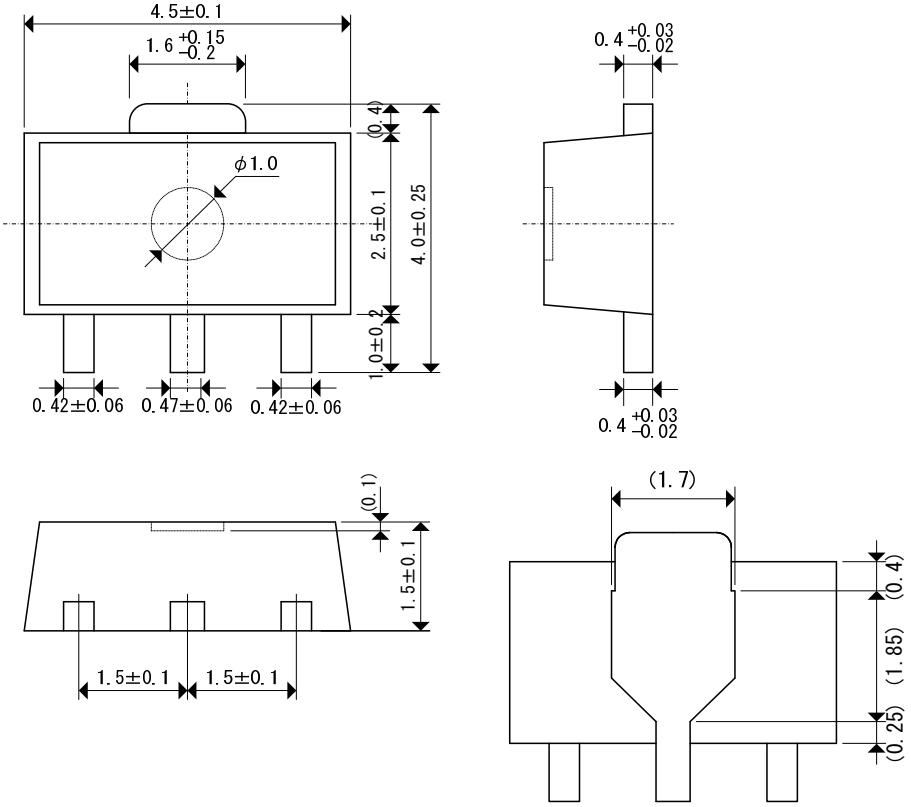
XC62FJ3302PR-G
V_{IN}=4.3V I_{OUT}=40mA Ta=25℃
C_{IN}=C_L=1.0uF(Ceramic)



■PACKAGING INFORMATION

●SOT-89

Unit : mm

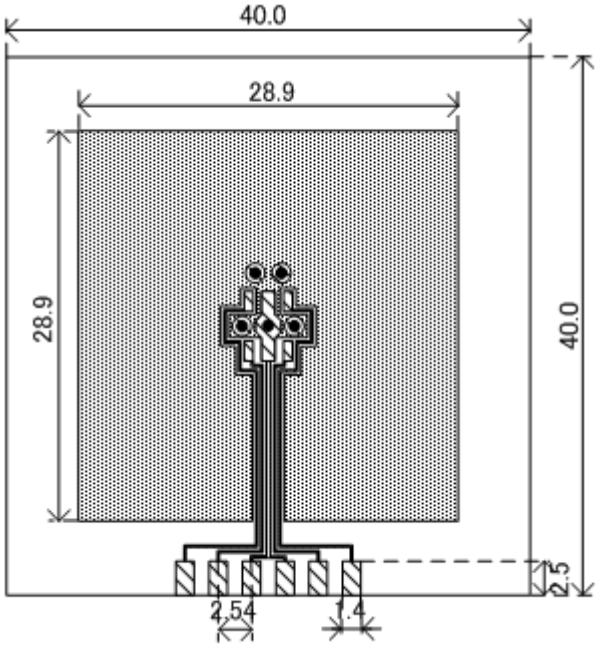


●SOT-89 Power Dissipation

Power dissipation data for the SOT-89 is shown in this page.
The value of power dissipation varies with the mount board conditions.
Please use this data as the reference data taken in the following condition.

1. Measurement Condition

Condition: Mount on a board
Ambient: Natural convection
Soldering: Lead (Pb) free
Board: Dimensions 40 x 40 mm (1600mm^2 in one side)
Copper (Cu) traces occupy 50% of the board area in top and back faces
package heat-sink is tied to the copper traces
Material: Glass Epoxy (FR-4)
Thickness: 1.6mm
Through-hole: 5 x 0.8 Diameter

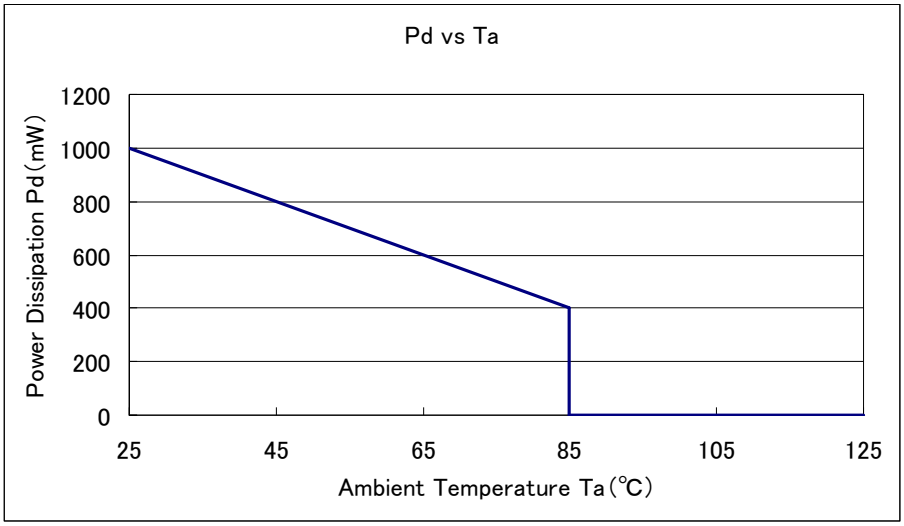


Evaluation Board (Unit: mm)

2. Power Dissipation vs. Ambient Temperature

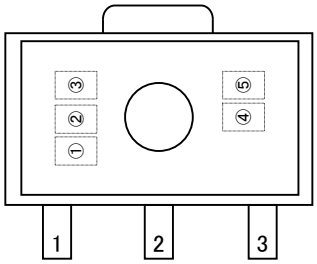
Board Mount (Tjmax=125℃)

Ambient Temperature (℃)	Power Dissipation Pd (mW)	Thermal Resistance (℃/W)
25	1000	100.00
85	400	



■MARKING RULE

●SOT-89



SOT-89
(TOP VIEW)

①represents product series

MARK	PRODUCT SERIES
7	XC62FJ******-G

②represents output voltage range

MARK	OUTPUT VOLTAGE RANGE (V)	PRODUCT SERIES
0	1.7～3.0	XC62FJ******-G
1	3.1～6.0	

③represents output voltage range

MARK	OUTPUT VOLTAGE(V)		MARK	OUTPUT VOLTAGE(V)	
0	―	3.1	F	―	4.6
1	―	3.2	H	1.7	4.7
2	―	3.3	K	1.8	4.8
3	―	3.4	L	1.9	4.9
4	―	3.5	M	2.0	5.0
5	―	3.6	N	2.1	5.1
6	―	3.7	P	2.2	5.2
7	―	3.8	R	2.3	5.3
8	―	3.9	S	2.4	5.4
9	―	4.0	T	2.5	5.5
A	―	4.1	U	2.6	5.6
B	―	4.2	V	2.7	5.7
C	―	4.3	X	2.8	5.8
D	―	4.4	Y	2.9	5.9
E	―	4.5	Z	3.0	6.0

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

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