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XB2121-1.8 SOT23-5
XB2204-3.3 SOT23-5
XB2204-5.0 SOT23-5
XB2204-ADJ SOT23-5
Temperature Range -40 to +85°C

Description

The XB2204 series is a positive voltage regulator IC fabricated by high voltage EPNP process.

The XB2204 has features of wide input voltage range, high accuracy, high ripple rejection, low dropout voltage, low noise, current limit and ultra-low quiescent current which make it ideal for use in various USB and portable devices.

The IC consists of a voltage reference, an error amplifier, a resistor network for setting output voltage, a current limit circuit for current protection, and a chip enable circuit.

The XB2204 has 1.8V 3.3V 5.0V ADJ fixed voltage versions and adjustable voltage version.

Features

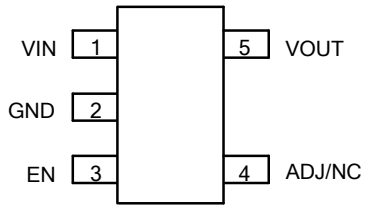
- Wide Input Voltage Range: 2.6V to 24V
- Wide Output Voltage Range: 1.24V to 22V
- Excellent Ripple Rejection: 60dB@ f = 1kHz
- Low Dropout Voltage: V_{DROP} = 100mV@ I_{OUT} = 100μA
- Low Ground Current
- High Output Voltage Accuracy
- Compatible with Low ESR Ceramic Capacitor
- Excellent Line/Load Regulation
- Thermal Shutdown Function
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Applications

- Battery-powered Equipment
- Laptop, Palmtops, Notebook Computers
- Portable Information Appliances

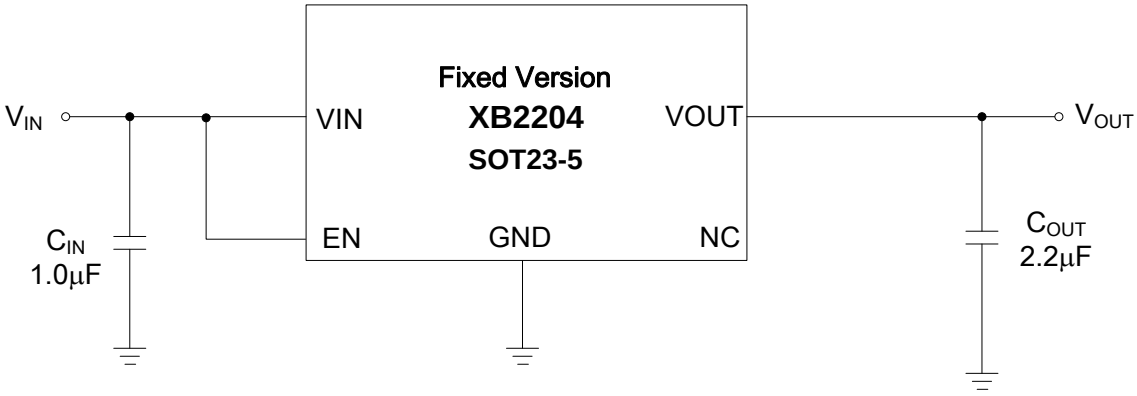
Pin Assignments

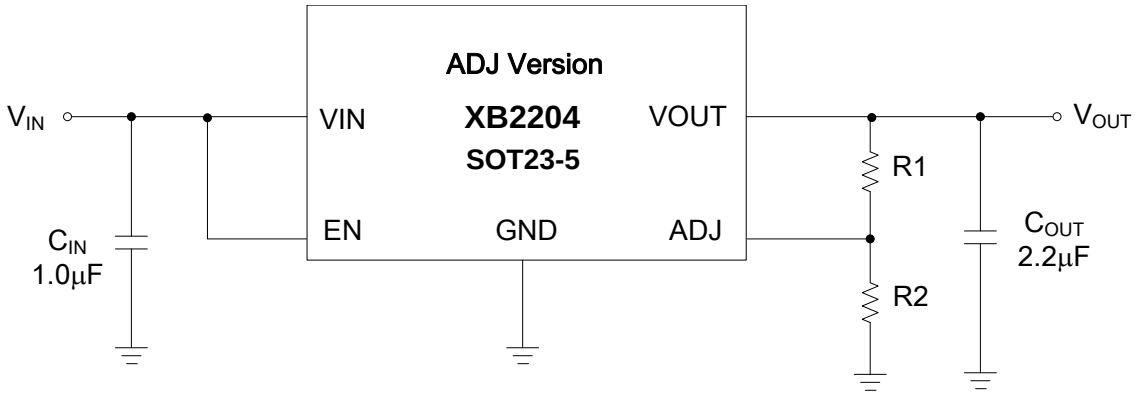
(Top View)



SOT-23-5

Notes: 4. The substrate/exposed pad should be connected to GND.
5. The substrate/exposed pad should be connected to VIN.
6. The exposed pad should be connected to GND for better dissipation.

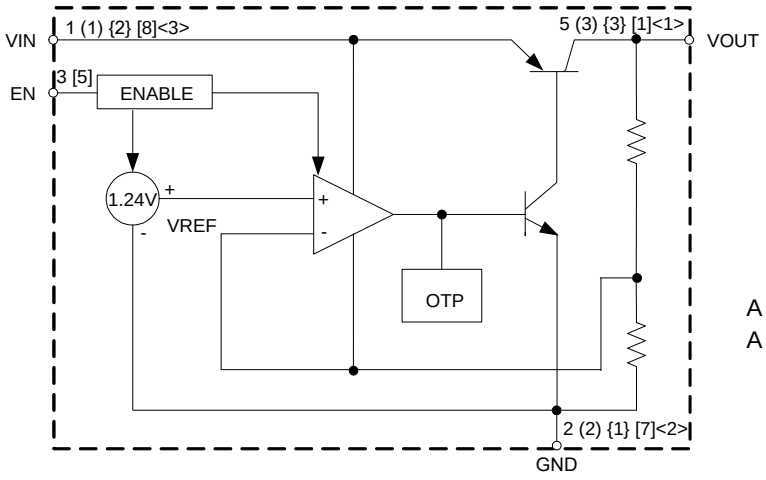




$V_{OUT}=V_{REF}(1+(R1/R2))$

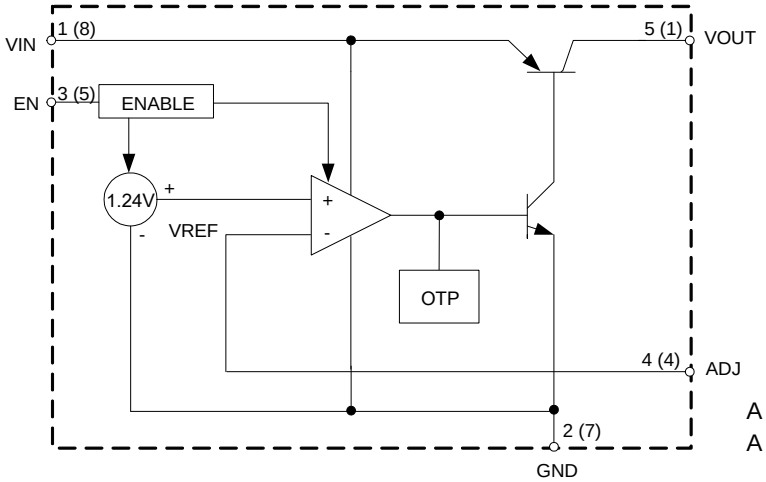
Pin Number		Function
SOT-23-5	Pin Name	
1	VIN	Input voltage
2	GND	Ground
3	EN	Enable input
4	ADJ/NC	Adjust output for ADJ version/Not connected for fixed version
5	VOUT	Regulated output voltage

Functional Block Diagram



A (B) {C} [D] <E>
A for SOT-23-5

Fixed Output Voltage



A (B)
A for SOT-23-5

Adjustable Output Voltage

Symbol	Parameter	Rating		Unit
V_{IN}	Supply Input Voltage	38		V
V_{CE}	Enable Input Voltage	38		V
I_{OUT}	Output Current	250		mA
T_{LEAD}	Lead Temperature (Soldering, 10sec)	+260		°C
T_J	Operating Junction Temperature	+150		°C
θ_{JA}	Thermal Resistance	SOT-23-5	250	°C/W
T_{STG}	Storage Temperature Range	-65 to +150		°C
—	ESD (Machine Model)	275		V
—	ESD (Human Body Model)	2000		V

Notes: 7. Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

8. θ_{JA} is measured with the component mounted on a 2-Layer FR-4 PCB board with 1.5cm*1.5cm thermal sink pad in free air.

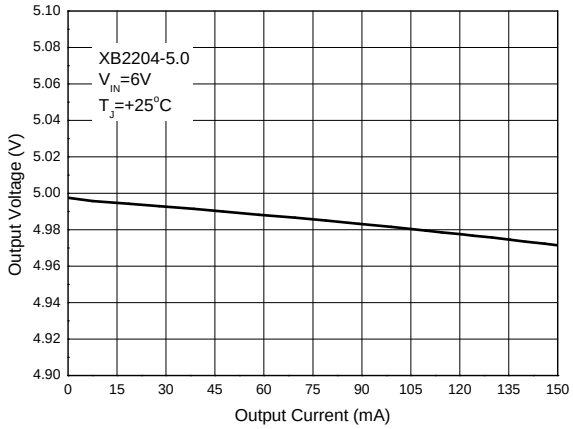
Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Supply Input Voltage	2.6 (Note 9)	24	V
T_J	Operating Junction Temperature	-40	+125	°C

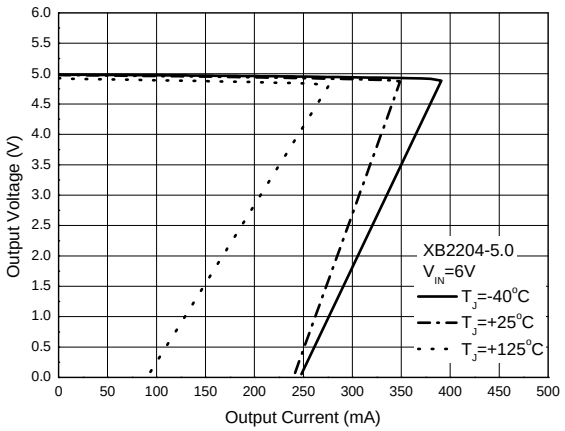
Note: 9. Minimum recommended input voltage is the larger of 2.6V or V_{OUT} + 1V. Below this value the device may enter drop-out conditions and cease to regulate the output voltage correctly.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	Variation from Specified V_{OUT}	V_{OUT} ×98%	—	V_{OUT} ×102%	V
V_{REF}	Reference Voltage	—	1.215	1.24	1.265	V
V_{IN}	Input Voltage	—	—	—	24	V
$I_{OUT(max)}$	Maximum Output Current	V_{IN}-V_{OUT} = 1V, V_{OUT} = 98% × V_{OUT}	150	200	—	mA
$\Delta V_{OUT}/\Delta V_{IN}$	Line Regulation	V_{OUT}+1V ≤ V_{IN} ≤ 24V	—	0.05	—	%
$\Delta V_{OUT}/V_{OUT}$	Load Regulation	1mA ≤ I_{OUT} ≤ 150mA	—	0.5	—	%
V_{DROP}	Dropout Voltage	I_{OUT} = 100μA	—	100	150	mV
		I_{OUT} = 50mA	—	270	350	
		I_{OUT} = 100mA	—	320	460	
		I_{OUT} = 150mA	—	360	500	
I_{GND}	Ground Current	I_{OUT} = 0A	—	20	—	μA
		I_{OUT} = 100μA	—	50	—	
		I_{OUT} = 50mA	—	0.5	—	mA
		I_{OUT} = 100mA	—	1.3	—	
		I_{OUT} = 150mA	—	2.5	—	
I_{STD}	Standby Current	V_{IN} = V_{OUT}+1V V_{EN} in OFF Mode	—	0.01	1.0	μA
PSRR	Power Supply Rejection Ration	Ripple 0.5V_{P-P}, f = 100Hz V_{IN} = V_{OUT}+1V	—	60	—	dB
		Ripple 0.5V_{P-P}, f = 1kHz V_{IN} = V_{OUT}+1V	—	60	—	
$\Delta V_{OUT}/(V_{OUT}\times\Delta T)$	Output Voltage Temperature Coefficient	I_{OUT} = 100μA, -40 °C ≤ T_J ≤ +125°C	—	**±100**	—	ppm/°C
V_{NOI}	RMS Output Noise	T_J = +25°C, 10Hz ≤ f ≤ 100kHz	—	30	—	μV_{rms}
I_{ADJ}	ADJ Pin Current	I_{OUT} = 100μA	—	0.5	—	μA
I_{EN}	EN Pin Current	V_{EN} = V_{OUT}+1V	—	1	—	μA
—	EN “High” Voltage	EN Input Voltage “High”	2.0	—	—	V
—	EN “Low” Voltage	EN Input Voltage “Low”	—	—	0.4	V
θ_{JC}	Thermal Resistance (Junction to Case)	SOT-23-5	—	43	—	°C/W

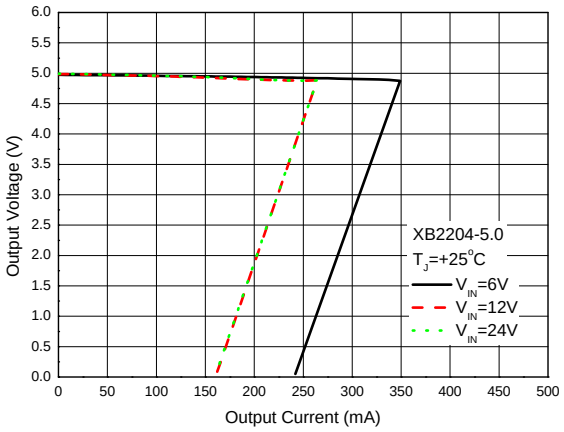
Output Voltage vs. Output Current



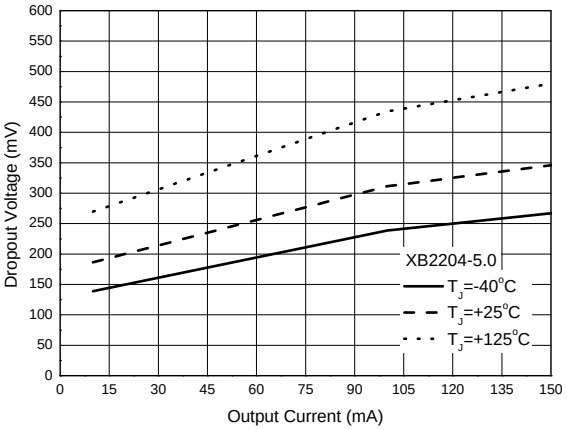
Output Voltage vs. Output Current



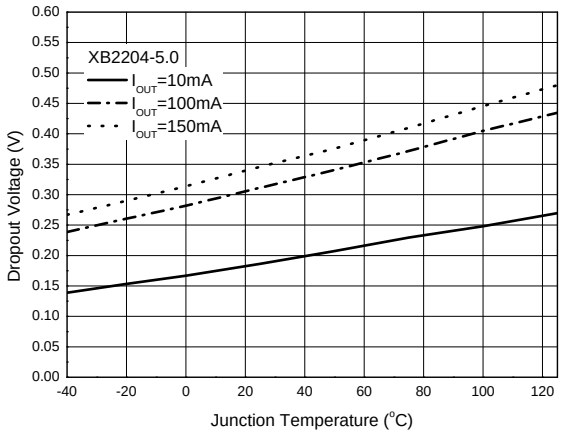
Output Voltage vs. Output Current



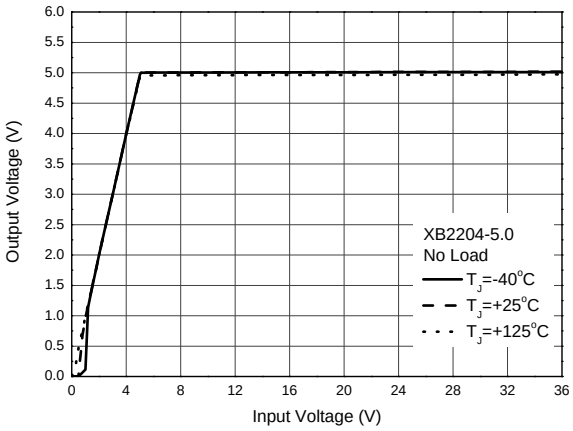
Dropout Voltage vs. Output Current



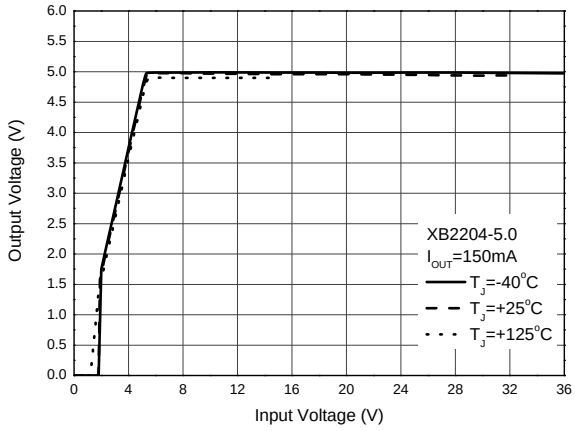
Dropout Voltage vs. Junction Temperature



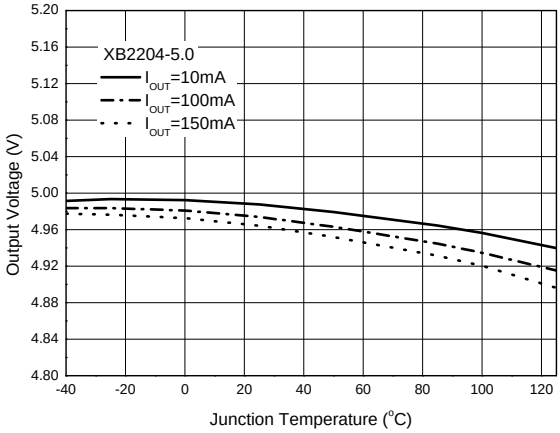
Output Voltage vs. Input Voltage



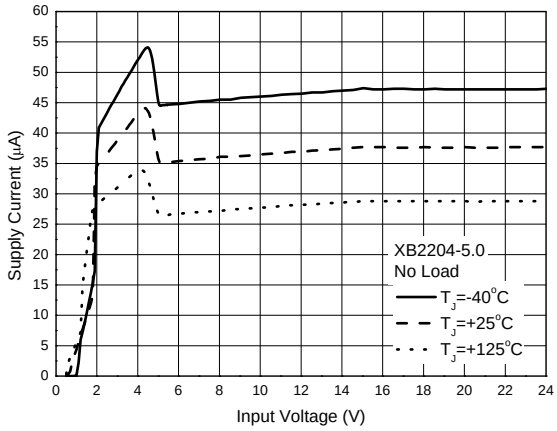
Output Voltage vs. Input Voltage



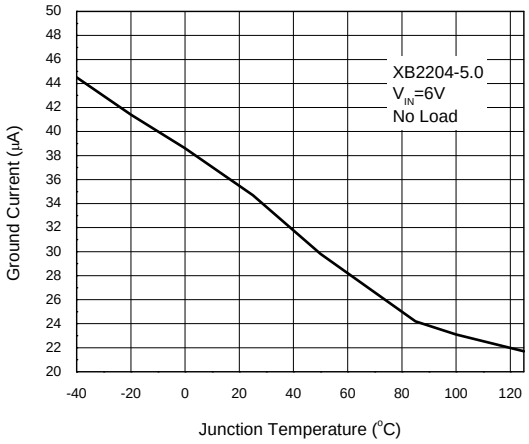
Output Voltage vs. Junction Temperature



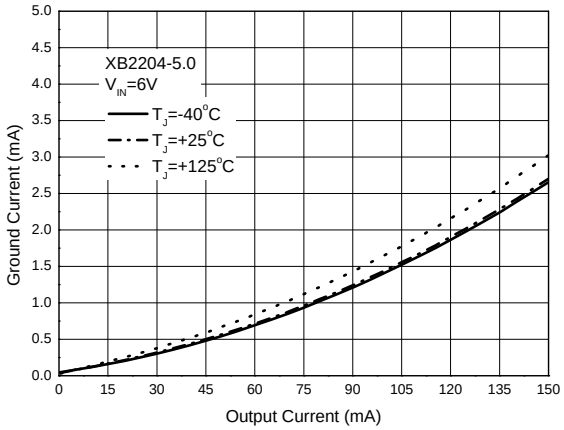
Supply Current vs. Input Voltage



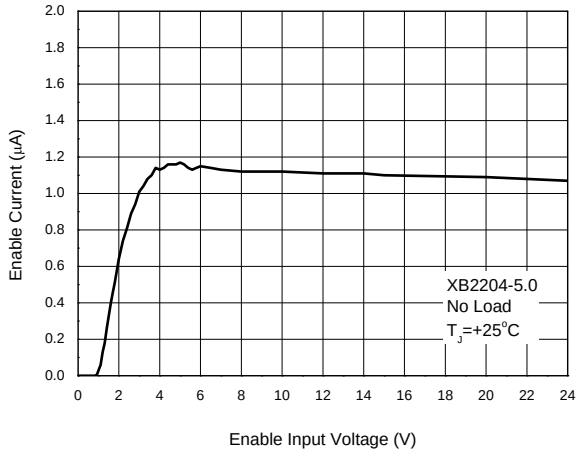
Ground Current vs. Junction Temperature



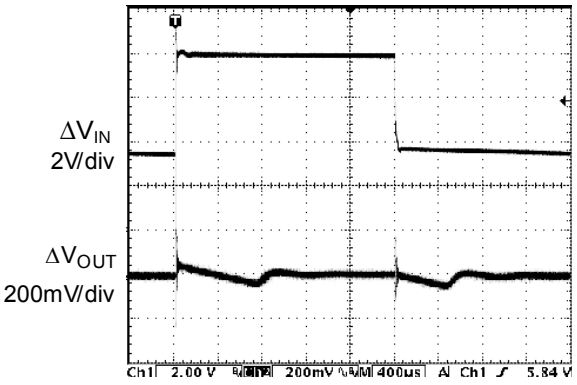
Ground Current vs. Output Current



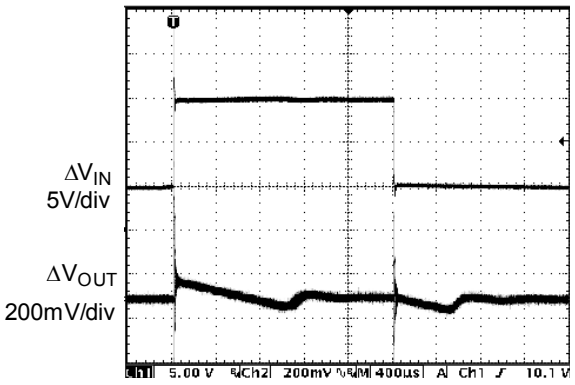
Enable Current vs. Enable Input Voltage



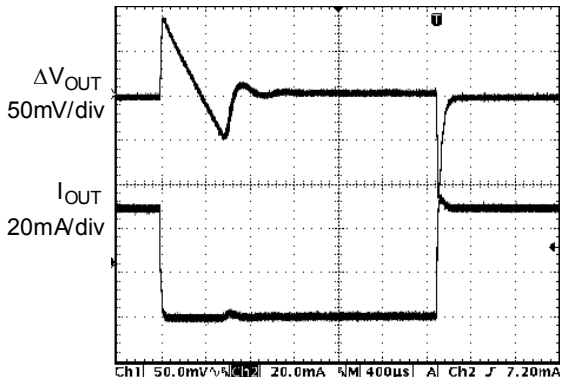
Line Transient
(Conditions: V_{IN}=V_{EN}=3.5V to 8V, C_{IN}=1.0μF, C_{OUT}=2.2μF, I_{OUT}=1mA)



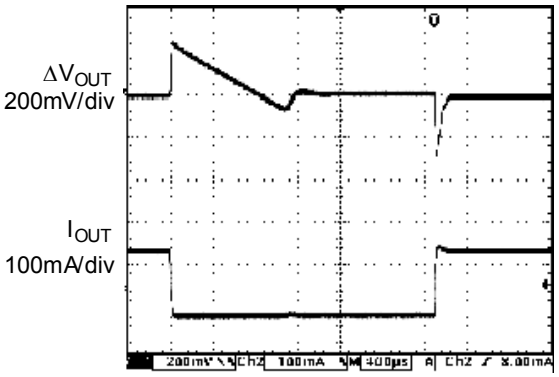
Line Transient
(Conditions: V_{IN}=V_{EN}=5V to 15V, C_{IN}=1.0μF, C_{OUT}=2.2μF, I_{OUT}=1mA)



Load Transient
(Conditions: V_{IN}=5V, C_{IN}=1.0μF, C_{OUT}=2.2μF, I_{OUT}=1mA to 50mA)

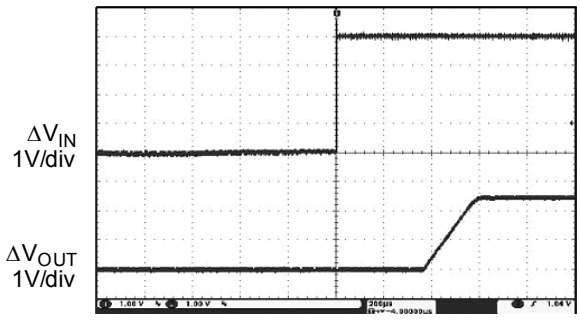


Load Transient
(Conditions: V_{IN}=5V, C_{IN}=1.0μF, C_{OUT}=2.2μF, I_{OUT}=1mA to 150mA)

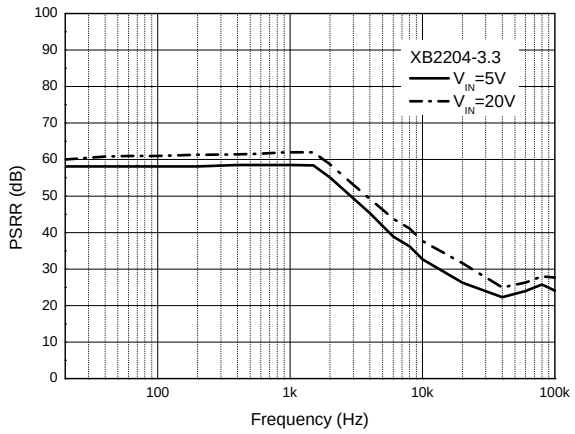


Enable Input Response

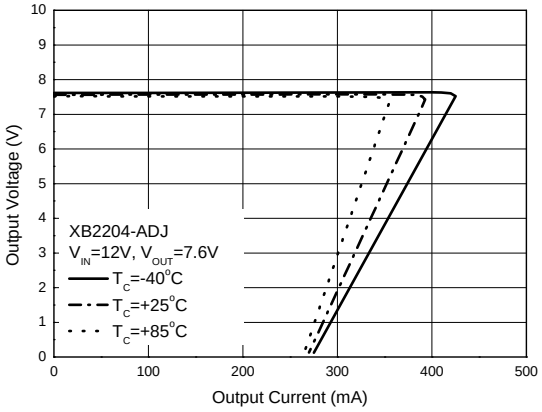
Start-up Response



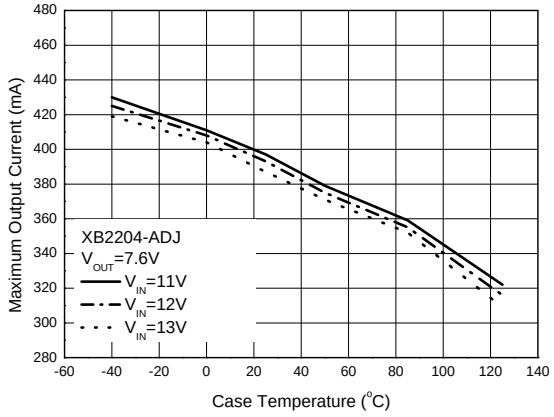
PSRR vs. Frequency
(Conditions: V_{PP}=2V, I_{OUT}=10mA)



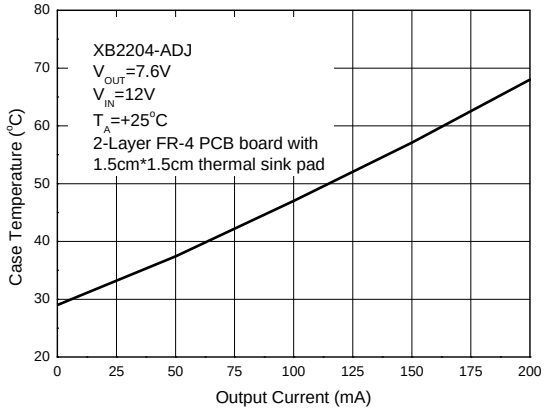
Output Voltage vs. Output Current



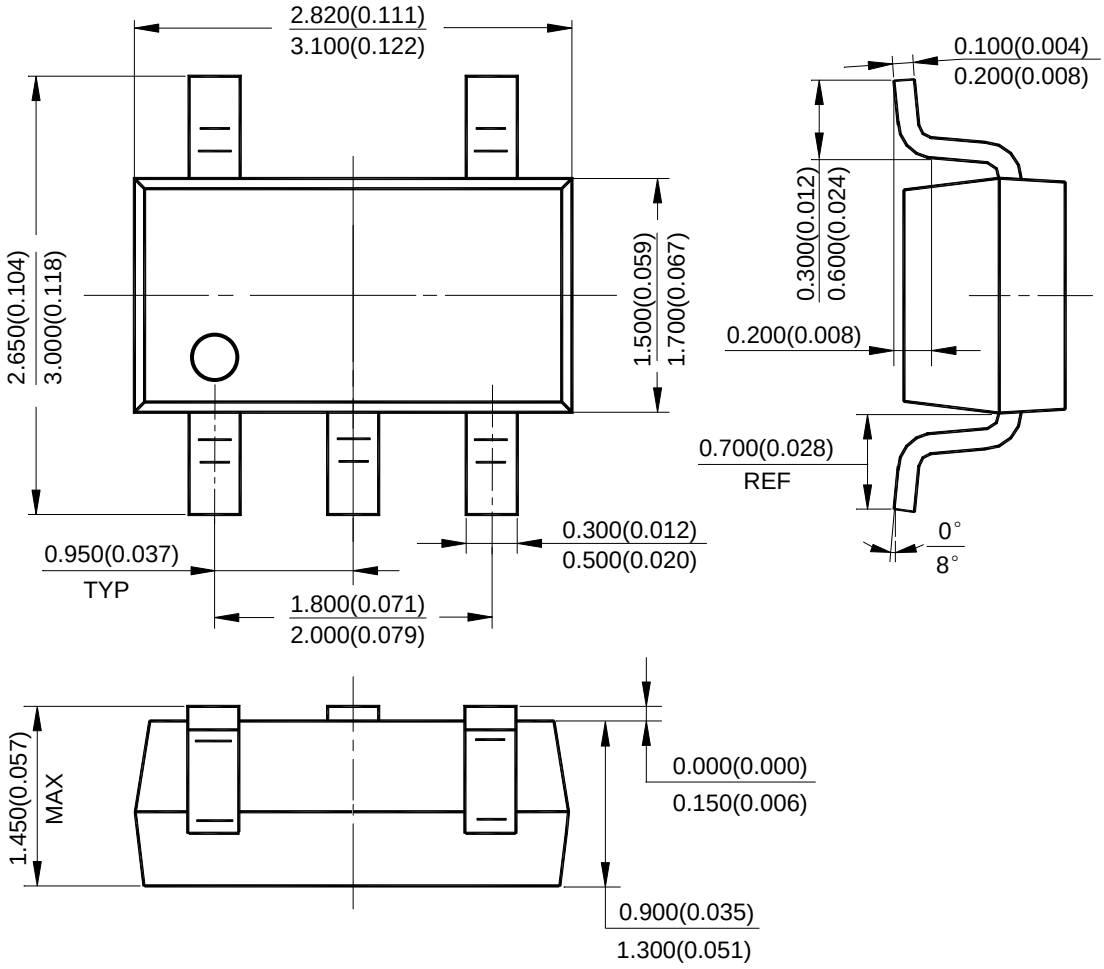
Maximum Output Current vs. Case Temperature



Case Temperature vs. Output Current



(1) Package Type: SOT-23-5



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