Bay Linear

Inspire the Linear Power

Precision Micro power Voltage Reference

B4041

Description

The B4041 is a two-terminal, temperature compensated, band-gap voltage reference, which provides a fixed 1.25V output for input currents between 500 µA to 5mA. The bandgap voltage (1.225V) is independently laser trimmed from the output voltage to achieve a very low tempco, then the output voltage is laser trimmed to 1.225 volts. This trimming technique and the low tempco (A grade 50 ppm/ °C) thin film resistor process gives a very stable device over the full temperature range. The B4041 is available in the sub-miniature (3mm × 1.3mm) SOT-23, SO-8 surface mount package, or TO-92 package. The operating temperature is -40°C to 85°C.

The Bay Linear B4041 advanced design eliminates the need for an external stabilized capacitor while insuring stability with any capacitive load, making them easy to use.

Features

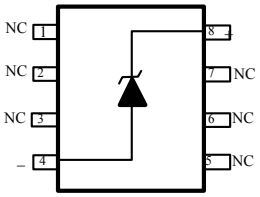
- **Low Temp. Coefficient 50 ppm/◦C**
- **Operating Current Range of 100µA to 15mA**
- **Low power 250mW @I_{IN}=100mA**
- **Small package: SOT-23, TO-92, SO-8**
- **Output Voltage Tolerance of ±0.5%**
- **Similar Replacement for LM4041**

Applications

- **Constant Current Source**
- **Digital Voltmeter**
- **Power Supply Monitor**
- **Battery Powered Equipment**
- **Data Acquisition Systems**
- **Energy Management**

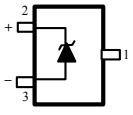
Pin Connection

8-Pin Surface Mount



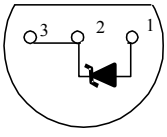
Top View

SOT-23



Front View

TO-92
Plastic Package



Bottom View

Ordering Information

Devices	Package	Temp.
B4041YZ-X	TO-92	-40°C to +85°C
B4041YM-X	SO-8	-40°C to +85°C
B4041YK-X	SOT-23	-40°C to +85°C

Y=	A=100ppm/°C B=150ppm/°C	X=	1=0.5% 2=1% 3=2%

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ABSOLUTE MAXIMUM RATINGS

Reverse Current 20mA
Forward Current 10mA
Storage Temperature..... -65°C to +150°C
Lead Temperature
K Package .....+215°C
Z Package .....+260°C

Power Dissipation at 25°C
K Package……300mW
Z Package…….550mW
Temperature Range…-40°C ≤ T_A ≤ +85°C

ELECTRICAL CHARACTERISTICS

Electrical Characteristics at I_{IN} = 1000µA, and T_A = +25°C unless otherwise noted. . **Boldface limits apply over temperature.**

Parameter	Condition	B4041A-1 Min	B4041A-1 Type	B4041A-1 Max	B4041B-1 Min	B4041B-1 Type	B4041B-1 Max	B4041C-1 Min	B4041C-1 Type	B4041C-1 Max	Unites
Rev; Brek. Voltage	I_R=500 µA		1.25			1.25			1.25		V
Rev. Brek tolerance	I_R=500 µA			±12 **±29**			±12 **±29**			±12 **±29**	mV mV
Output Impedance			0.60 0.3	2 0.9		0.60 0.3	2 1.1		0.60 0.3	2 1.1	Ω
Noise Voltage	0.1kHz≤f ≤10Hz		15			15			15		µV p-p
Tempco	Note 1			100			150			150	ppm/°C
Turn-on Setting	0.1% of V_{OUT}		30			30			30		µSec
Operating Current	Note 2	0.1		5 15	0.1		5 15	0.1		5 15	mA
Temp. Range		-40		85	-40		85	-40		85	°C

Parameter	Condition	B4041A-2 Min	B4041A-2 Type	B4041A-2 Max	B4041B-2 Min	B4041B-2 Type	B4041B-2 Max	B4041C-2 Min	B4041C-2 Type	B4041C-2 Max	Unites
Rev; Brek. Voltage	I_R=500 µA		1.25			1.25			1.25		V
Rev. Brek tolerance	I_R=500 µA			±25 **±49**			±25 **±49**			±25 **±49**	mV mV
Output Impedance			0.60	2		0.60	2		0.60	2	Ω
Noise Voltage	0.1kHz≤f ≤10Hz		15			15			15		µV p-p
Tempco	Note 1			50			100			150	ppm/°C
Turn-on Setting	0.1% of V_{OUT}		30			30			30		µSec
Operating Current	Note 2	0.5		5 15	0.5		5 15	0.5		5 15	mA
Temp. Range		-40		85	-40		85	-40		85	°C

Electrical Characteristics

Parameter	Condition	B4041A-3 Min	B4041A-3 Type	B4041A-3 Max	B4041B-3 Min	B4041B-3 Type	B4041B-3 Max	B4041C-3 Min	B4041C-3 Type	B4041C-3 Max	Unites
Rev; Brek. Voltage	I_R=500 µA		1.25			1.25			1.25		V
Rev. Brek tolerance	I_R=500 µA			±50 **±74**			±50 **±74**			±50 **±74**	mV mV
Output Impedance			0.60	2		0.60	2		0.60	2	Ω
Noise Voltage	0.1kHz≤f ≤10Hz		15			15			15		µV p-p
Tempco	Note 1			50			100			150	ppm/°C
Turn-on Setting	0.1% of VOUT		30			30			30		µSec
Operating Current	Note 2	0.1		5 15	0.1		5 15	0.1		5 15	mA
Temp. Range		-40		85	-40		85	-40		85	°C

Note: 1) Three-point measurement guarantees the error band over the specified temperature range.
2) Optimum performance is obtained at currents below 1000 µA.
3) Limits are 100% production tested at 25°C. Limits over temperature are guaranteed through correlation using

B4041 Applications Hints

This device is designed for stable operation and has no need of an external capacitor between pin 4 and 8. The reference remains stable if a bypass capacitor is used.

SOT-23

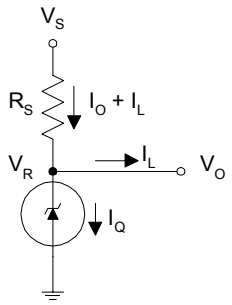
The B4041 in the SOT-23 package has a parasitic Schottky diode between pin 3 and pin 1. Pin 1 of SOT-23 must float or be connected to pin 3.

Conventional Shunt Regulator

In a conventional shunt regulator application (see Figure 1), an external series resister (R_S) is connected between the supply voltage and the B4041. R_S determines the current that flows through the load (I_L) and the reference(I_Q). Since load current and supply voltage may vary, R_S should be small enough to supply at least the minimum acceptable I_Q to the reference even when the supply voltage is at its minimum and the load current is at its maximum value. When the supply voltage is at its maximum and I_L is at its minimum, R_S should be large enough so that the current flowing through the B4041-x.x is less than 15mA

R_S is determined by the supply voltage (V_S), the load and operating current (I_L and I_Q), reference's reverse breakdown voltage (V_R).

$$R_S = (V_S - V_R)/(I_L+I_Q)$$



Advance Information- These data sheets contain descriptions of products that are in development. The specifications are based on the engineering calculations, computer simulations and/ or initial prototype evaluation.

Preliminary Information- These data sheets contain minimum and maximum specifications that are based on the initial device characterizations. These limits are subject to change upon the completion of the full characterization over the specified temperature and supply voltage ranges.

The application circuit examples are only to explain the representative applications of the devices and are not intended to guarantee any circuit design or permit any industrial property right to other rights to execute. Bay Linear takes no responsibility for any problems related to any industrial property right resulting from the use of the contents shown in the data book. Typical parameters can and do vary in different applications. Customer's technical experts must validate all operating parameters including " Typical" for each customer application.

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