200mA Small Dual LDO Regulator with ON/OFF Switch

Features

- 200mA Output Current
- Low Quiescent Current: 100μA
- Shut-down Current: < 0.1μA
- Input Voltage: 1.8V ～ 5.5V
- Output Voltage: VOUT1: 1.8V
  VOUT2: 2.5V
- 0.47μF ～ 10μF Ceramic Capacitors Ensures the Stability
- Overload/over Temperature Protection
- Package: SOT-23-6L (lead-free packaging is now available)
- Specified from: - 40℃ ～ +85℃

Applications

- MP3/MP4 Players
- Cellular phones, radiophone, digital cameras, and portable electronics
- Portable devices
- Disk driver
- Battery chargers
- Bluetooth and other radio products
- Laptop/notebook/palmtop computers

Description

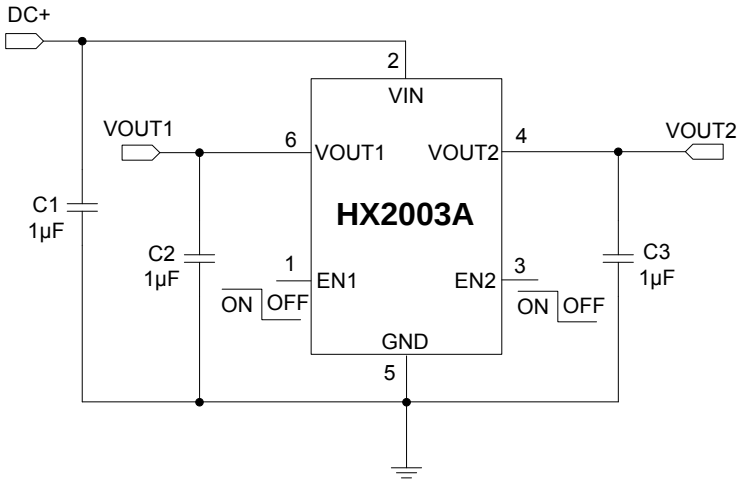
The HX2003A is 200mA small dual LDO regulator with on/off Switch optimized to provide a high performance solution to low power system.

The device offers a new level of cost-effective performance in cellular phones, laptop and notebook computers, and other portable devices. Proprietary design techniques ensure high performance. The EN function controls the two regulators on/off independently.

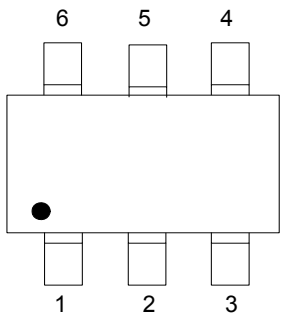
The HX2003A is designed to make use of low cost ceramic capacitors which ensure the stability of the output current, and enhance the efficiency in order to prolong the battery life of those portable devices.

The HX2003A regulators are available in the industry standard SOT-23-6L power packages (or upon request).

Typical Application



Pin Assignment and Description



PIN	NAME	DESCRIPTION
1	EN1	ON/OFF Control for Output1 (High Enable)
2	VIN	Power Input for the IC
3	EN2	ON/OFF Control for Output2 (High Enable)
4	VOUT2	Output Pin for VOUT2 (2.5V)
5	GND	Ground
6	VOUT1	Output Pin for VOUT1 (1.8V)

Absolute Maximum Ratings (Note 1)

- Supply Input Voltage ……6V
- Storage Temperature Range …… -65℃ ～ +150℃
- Lead Temperature (Soldering, 10 sec.) ……+265℃

Recommended Operating Conditions (Note 2)

- Supply Input Voltage …… 1.8V ～ 5.5V
- EN1,2 Input Voltage …… 0V ～ 5.5V
- Junction Temperature Range ……-40℃ ～ +125℃
- Ambient Temperature Range……-40℃ ～ +85℃

Note 1: Stresses listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

Note 2: The device is not guaranteed to function outside its operating conditions.

Electrical Characteristics

Operating Conditions: T_A=25℃, C1 = C2 = C3 =1μF, unless otherwise specified.

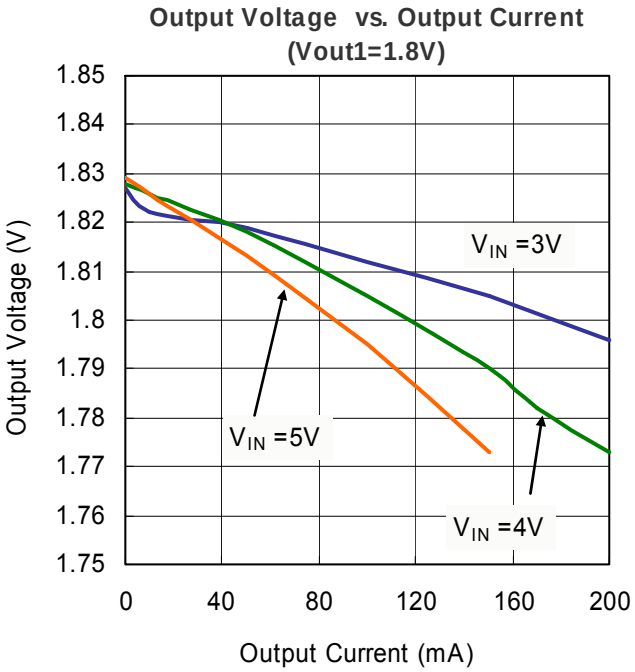
SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
ΔV_{OUT}	Output Voltage Accuracy	$I_{OUT1,2}$ = 1mA		-2		2	%
V_{OUT1}	Output Voltage of VOUT1				1.8		V
V_{OUT2}	Output Voltage of VOUT2				2.5		V
I_Q	Quiescent Current	$I_{OUT1,2}$ = 0mA			100		μA
V_{DROP1}	Dropout Voltage (Note 3)	V_{IN}=3.6V	I_{OUT1} = 100mA		60		mV
			I_{OUT1} = 200mA		100		mV
V_{DROP2}	Dropout Voltage (Note 3)	V_{IN}=3.6V	I_{OUT2} = 100mA		50		mV
			I_{OUT2} = 200mA		80		mV
ΔV_{LINE}	Line Regulation (VOUT1)	V_{IN} = (V_{OUT} + 1V) to 5.5V, I_{OUT1} = 1mA			0.11		%
	Line Regulation (VOUT2)	V_{IN} = (V_{OUT} + 1V) to 5.5V, I_{OUT2} = 1mA			0.04		%
ΔV_{LOAD}	Load Regulation (VOUT1)	1mA < I_{OUT1} < 200mA			2.1		%
	Load Regulation (VOUT2)	1mA < I_{OUT2} < 200mA			2.1		%
V_{EN}	EN1 or EN2 Voltage	V_{IN} = 5V, Shut-down			1.2		V
		V_{IN} = 5V, Start-up			1.3		V

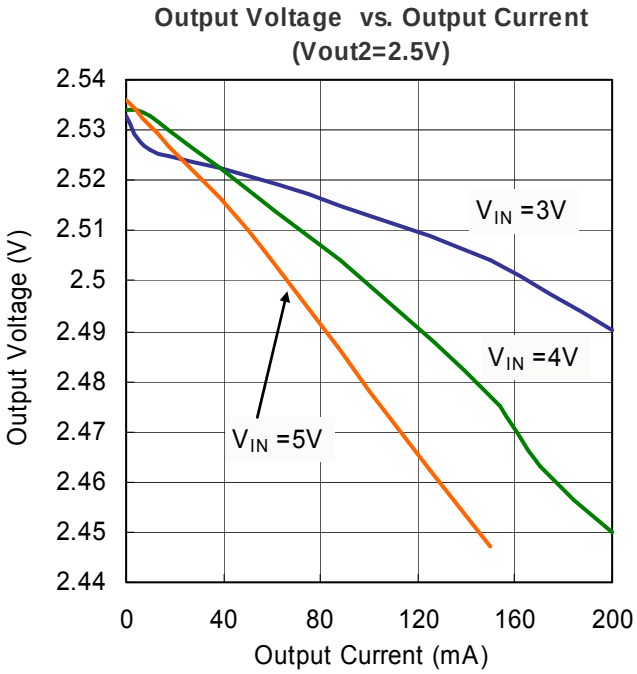
Note 3: The dropout voltage is defined as V_{IN}-V_{OUT}, which is measured when V_{OUT} is $V_{OUT\ (NORMAL)}$ – 100mV.

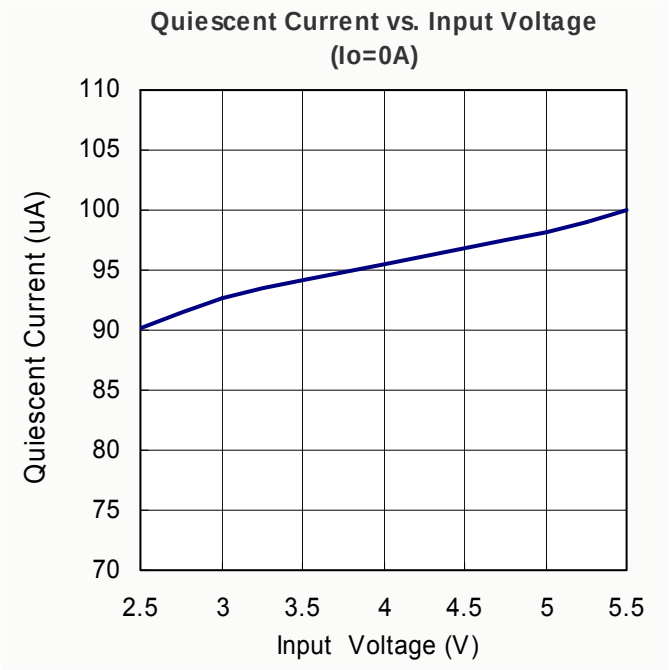
Typical Performance Characteristics

Operating Conditions: T_A=25℃, C1 = C2 = C3 =1μF, unless otherwise specified.

VOUT1 and VOUT2:

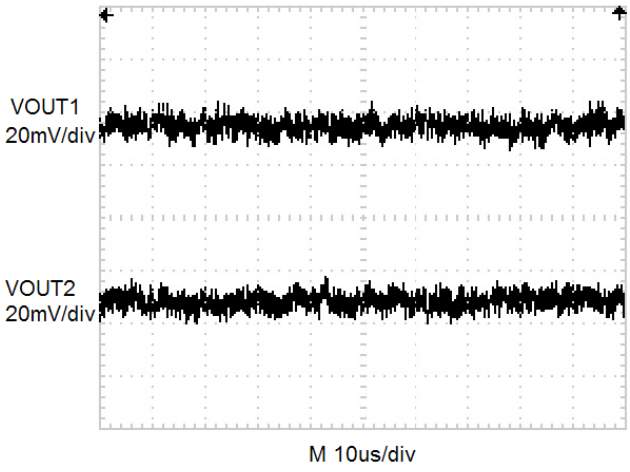






VOUT1 and VOUT2 Noise

（VIN=5V, IOUT1=IOUT2=100mA）



Pin Functions

EN1 (Pin 1): EN Control Input (High Enable). EN = High: Normal free running operation. EN = Low: Shutdown. Do not leave EN floating.

VIN (Pin 2): Power Input Voltage. Must be locally bypassed.

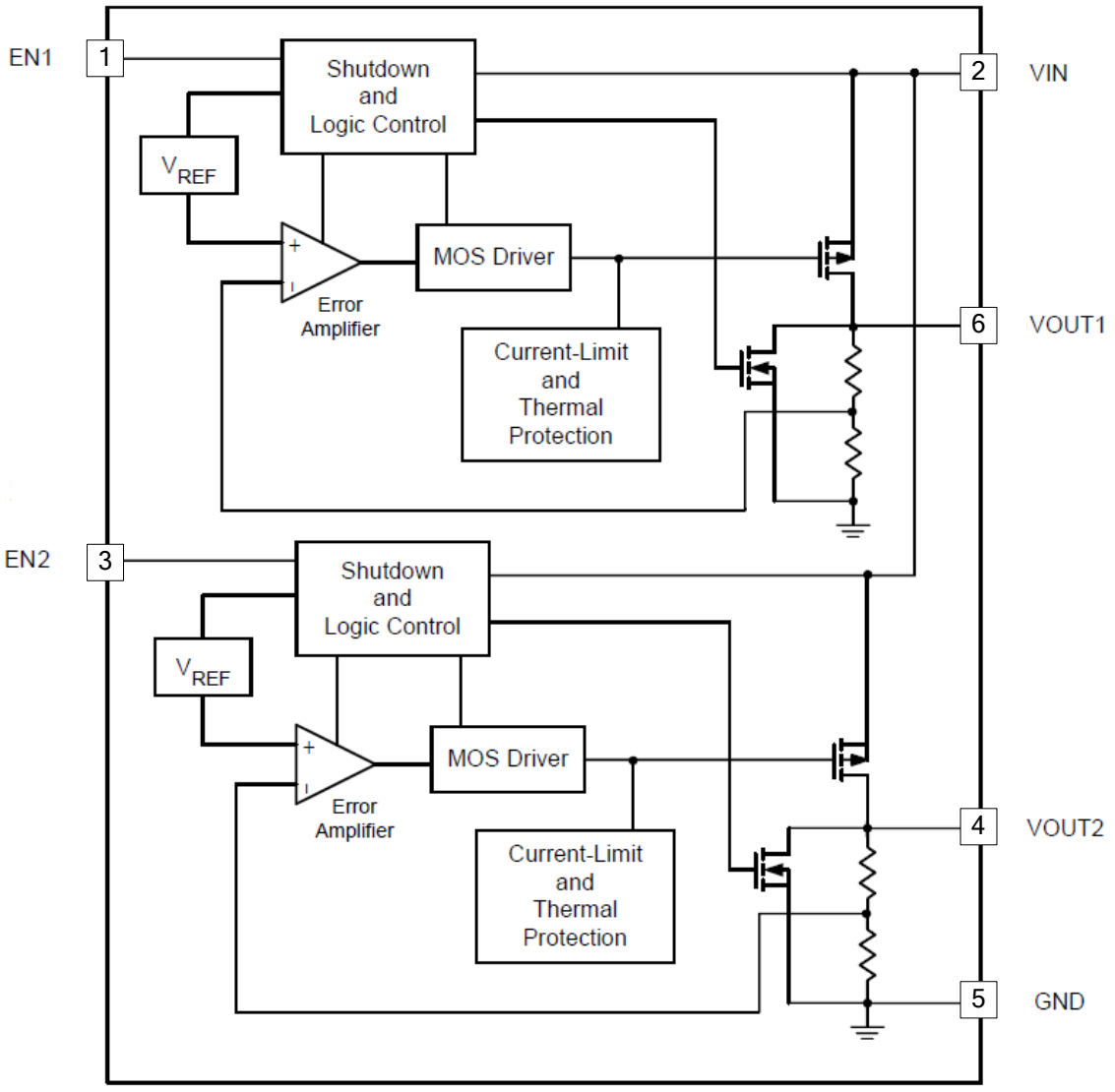
EN2 (Pin 3): EN Control Input (High Enable). EN = High: Normal free running operation. EN = Low: Shutdown. Do not leave EN floating.

VOUT2 (Pin 4): Output Voltage. It is a fixed output voltage (2.5V) for the Micropower LDO Regulator.

GND (Pin 5): Signal and Power Ground. Provide a short direct PCB path between GND and the (–) side of the output capacitor(s).

VOUT1 (Pin 6): Output Voltage. It is a fixed output voltage (1.8V) for the Micropower LDO Regulator.

Block Diagram



Application Information

Like any low dropout regulator, the external capacitors used with the HX2003A must be carefully selected for regulator stability and performance. Using a capacitor whose value is >1μF on the HX2003A input and the amount of capacitance can be increased without limit. The input capacitor must be located a distance of not more than 0.5 inch from the input pin of the IC and returned to a clean analog ground. Any good quality ceramic or tantalum can be used for this capacitor. The capacitor with larger value and lower ESR (equivalent series resistance) provides better PSRR and line-transient response. The output capacitor must meet both requirements for minimum amount of capacitance and ESR in all LDOs application.

The HX2003A is designed specifically to work with low ESR ceramic output capacitor in space-saving and performance consideration. Using a ceramic capacitor whose value is at least 1μF with ESR is > 25mΩ on the HX2003A output ensures stability. The HX2003A still works well with output capacitor of other types due to the wide stable ESR range.

Output capacitor of larger capacitance can reduce noise and improve load transient response, stability, and PSRR. The output capacitor should be located not more than 0.5 inch from the VOUT pin of the HX2003A and returned to a clean analog ground.

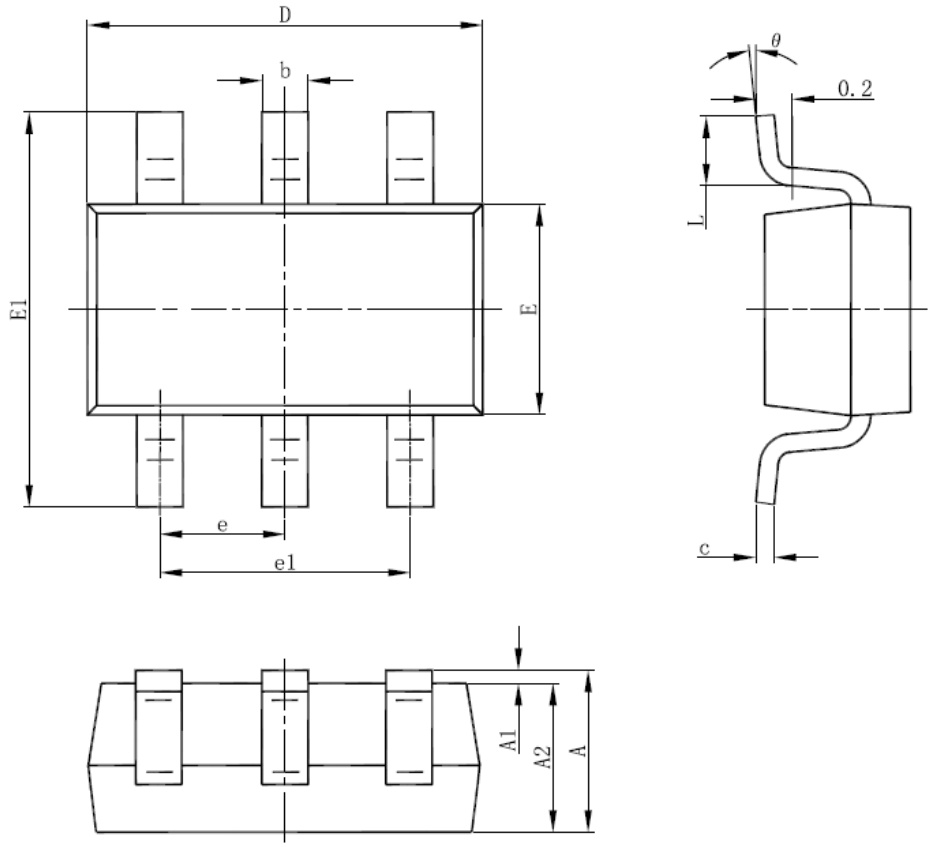
Enable Function

The HX2003A features an LDO regulator enable/disable function. To assure the LDO regulator will switch on, the EN1 and EN2 turn on control level must be greater than 1.3 volts.

For to protecting the system, the HX2003A have a quick-discharge function. If the enable function is not needed in a specific application, they may be tied to VIN to keep the LDO regulator in a continuously on state.

Packaging Information

SOT-23-6L Surface Mount Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Subject changes without notice.

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