Features

- Output Current: 200mA
- Low Quiescent Current: 0.8μA
- Input Voltage: 3V ～ 5.5V
- Fixed Output Voltage: 2.8V, 3.1V, 3.3V
- Only 1μF Output Capacitor Required for Stability
- Dropout Voltage: 240mV@200mA
- Overload/Over Temperature Protection
- Package: DFN1.2*1.6-4L (lead-free packaging is now available)
- Specified from: -40℃ ～ +85℃

Applications

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

Description

The HX2031 is 200mA low dropout linear regulator 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 HX2031 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.

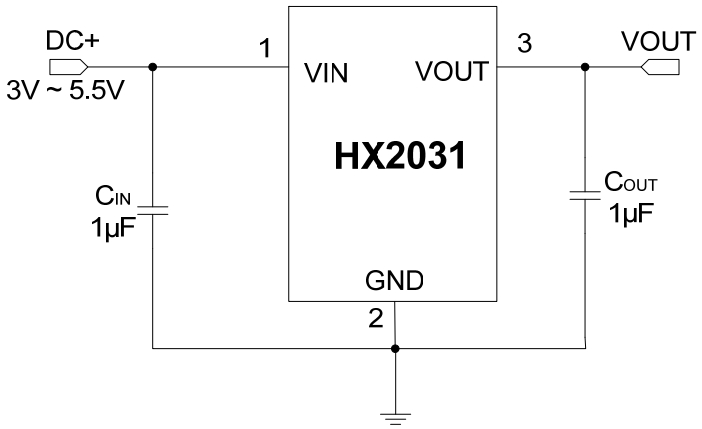
The HX2031 regulators are available in the industry standard DFN1.2*1.6-4L power packages (or upon request).

Order Information

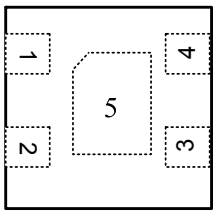
HX2031—① ②:

SYMBOL	DESCRIPTION
①	Denotes Output Voltage: E:2.8V L:3.1V G: 3.3V
②	Denotes Package Type: D: DFN1.2*1.6-4L

Typical Application Circuit



Pin Assignment and Description

TOP VIEW	PIN	NAME	FUNCTION
 DFN1.2*1.6-4L	1	VIN	Power Input
	2	GND	Ground
	3	VOUT	Output Pin
	4,5	NC	No Connect

Absolute Maximum Ratings (Note 1)

- Supply Input Voltage ……-0.3V ～ 6V
- Operating Temperature Range(Note 2)……-40°C ～ +85℃
- Junction Temperature Range ……-40°C ～ +125℃
- Storage Temperature Range ……-65℃ ～ +150℃
- Lead Temperature (Soldering, 10 sec.) ……+265℃

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 HX2031 is guaranteed to meet performance specifications from 0°C to 70°C. Specifications over the –40°C to 85°C operating temperature range are assured by design, characterization and correlation with statistical process controls.

Electrical Characteristics

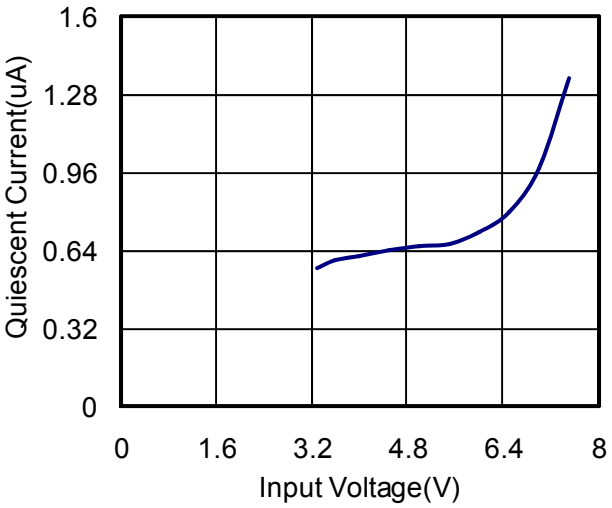
Operating Conditions: TA=25℃, V_{IN} = V_{OUT}+0.5V, C_{IN} = C_{OUT} = 1μF, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Voltage Range		3		5.5	V
ΔV_{OUT}	Output Voltage Accuracy		-2		+2	%
I_Q	Quiescent Current	I_{OUT} = 0mA		0.8		μA
I_{LIM}	Current Limit			300		mA
V_{DROP}	Dropout Voltage(Note 3)	I_{OUT} = 100mA		110		mV
		I_{OUT} = 200mA		240		mV
ΔV_{LINE}	Line Regulation	V_{IN} = (V_{OUT}+0.5V) to 5.5V, I_{OUT} = 1mA		2		mV
ΔV_{LOAD}	Load Regulation	1mA ≤ I_{OUT} ≤ 200mA, V_{IN}=V_{OUT}+0.5V		15		mV

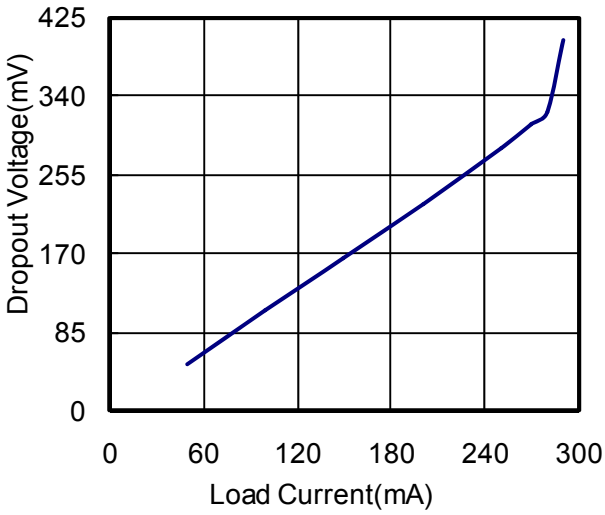
Note 3: The dropout voltage is defined as V_{IN}-V_{OUT}, which is measured when V_{OUT} is $V_{OUT\ (NORMAL)}$ – 100mV.

Typical Performance Characteristics

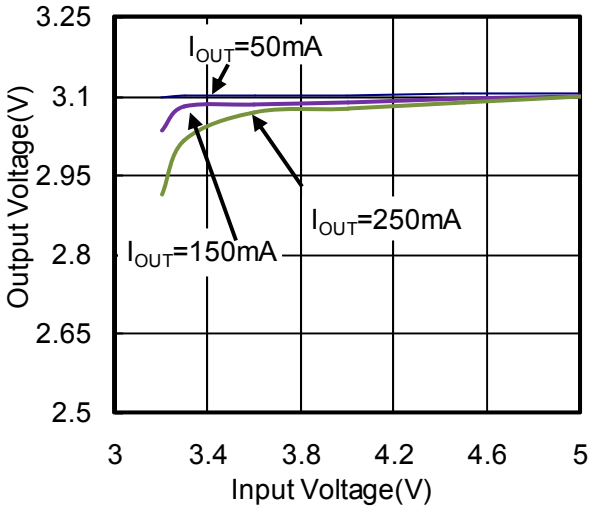
Quiescent Current vs. Input Voltage



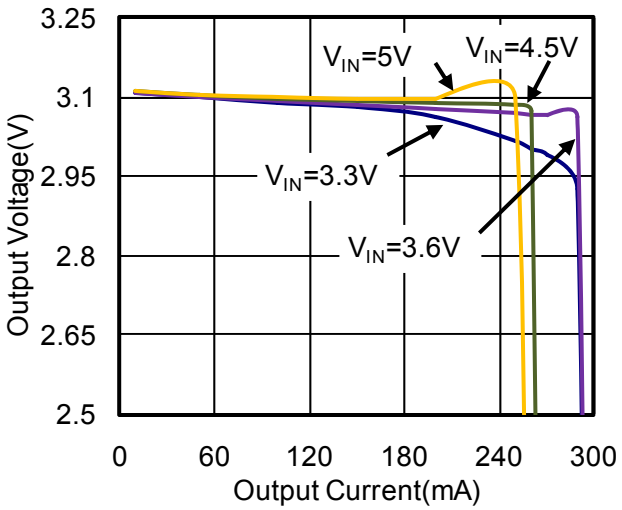
Dropout Voltage vs. Load Current



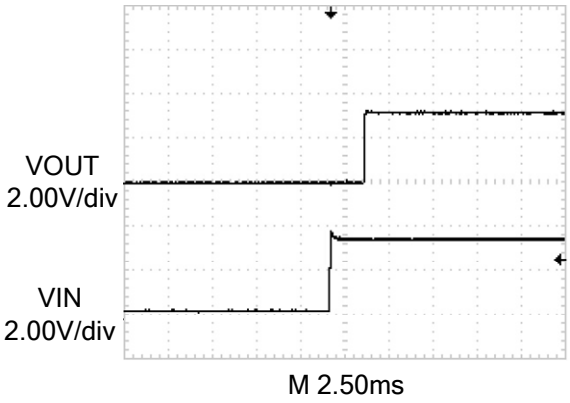
Input and Output Voltage



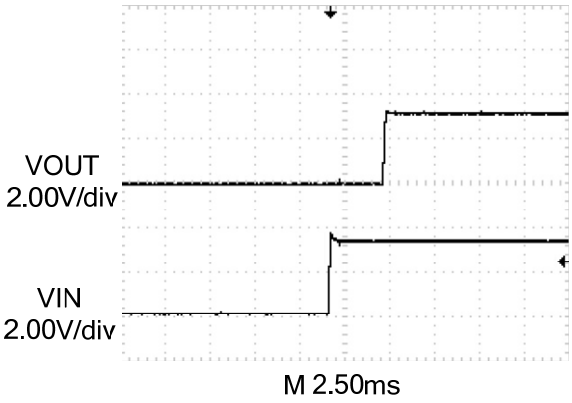
Output Voltage vs.Output Current



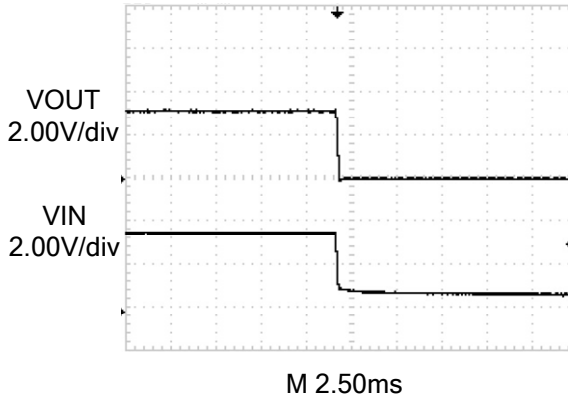
Start Up
(V_{IN} = 3.6V, I_{OUT} = 100mA)



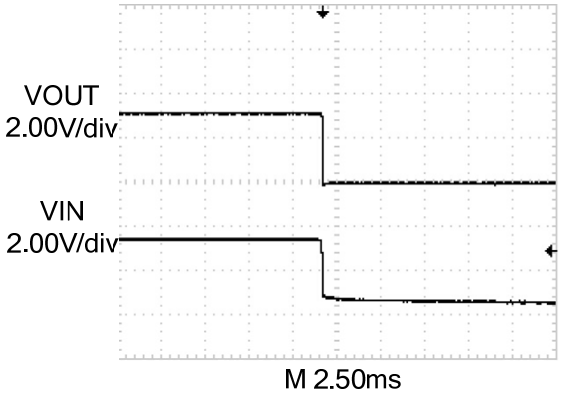
Start Up
(V_{IN} = 3.6V, I_{OUT} = 200mA)



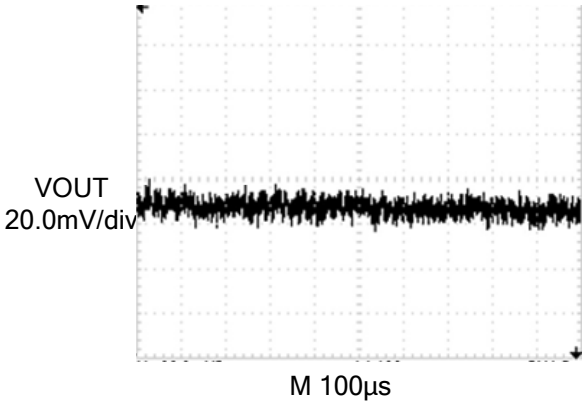
Shutdown
(V_{IN} = 3.6V, I_{OUT} = 100mA)



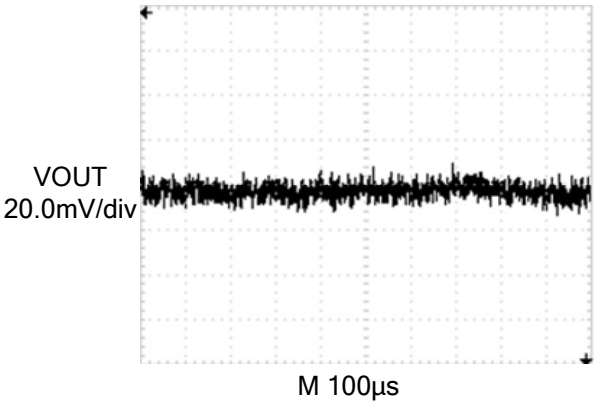
Shutdown
(V_{IN} = 3.6V, I_{OUT} = 200mA)



Noise Waveform
(V_{IN} = 3.6V, I_{OUT} = 100mA)



Noise Waveform
(V_{IN} = 3.6V, I_{OUT} = 200mA)



Pin Functions

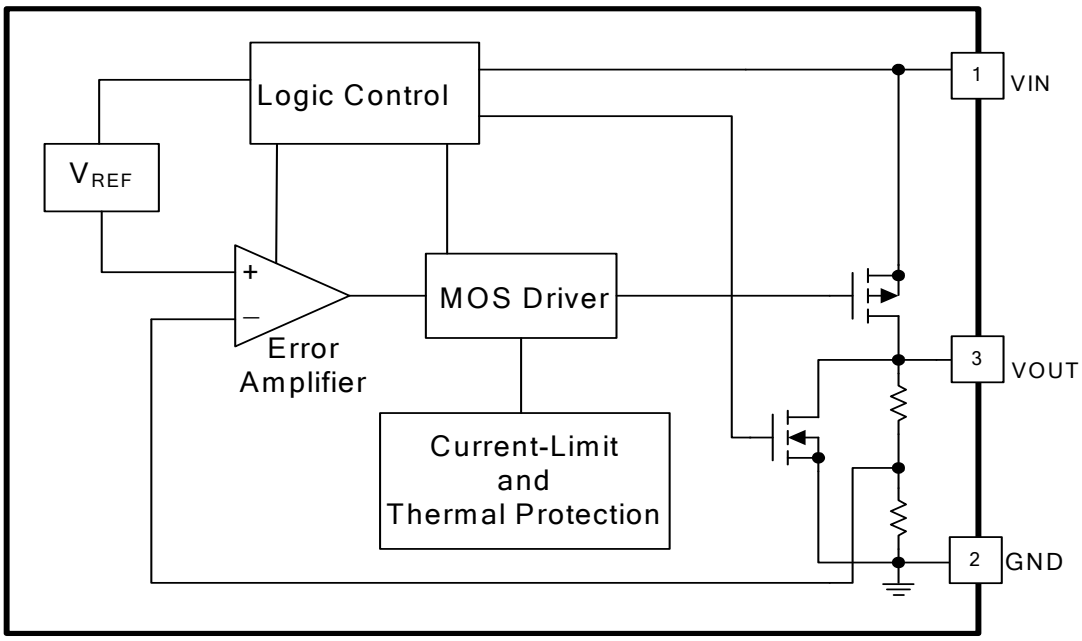
VIN (Pin 1): Power Input Voltage. Must be locally bypassed.

GND (Pin 2): Signal and Power Ground. Provide a short direct PCB path between GND and the (–) side of the output capacitor(s).

VOUT (Pin 3): Output Voltage. It is a fixed output voltage for the Micropower LDO Regulator.

NC (Pin 4, 5): NO Connect.

Block Diagram



Application Information

Input and Output Capacitor

Like any low dropout regulator, the external capacitors used with the HX2031 must be carefully selected for regulator stability and performance. Using a capacitor whose value is >1μF on the HX2031 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 HX2031 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 HX2031 output ensures stability. The HX2031 still works well with output capacitor of other types due to the wide stable ESR range.

Current Limit

The HX2031 contains an independent current limiter, which monitors and controls the pass transistor's gate voltage, limiting the output current. It protects the part even directly short the output to GND.

Thermal Consideration

Thermal protection limits power dissipation in the HX2031. When the operating junction temperature exceeds 135℃, the OTP circuit starts the thermal shutdown function and turns the pass element off. The pass element turns on again after the junction temperature cools by 10℃.

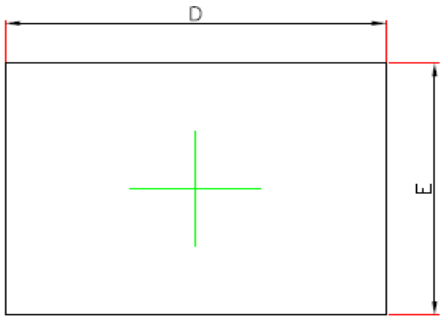
For continuous operation, do not exceed absolute maximum operation junction temperature 125℃. The power dissipation definition in device is:

$$P_D = (V_{IN} - V_{OUT}) \times I_{OUT} + V_{IN} \times I_Q$$

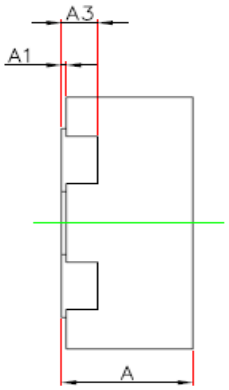
The maximum power dissipation depends on the thermal resistance of IC package, PCB layout, the rate of surroundings airflow and temperature difference between junction to ambient.

Packaging Information

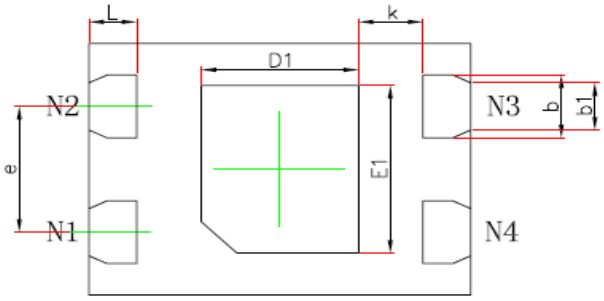
DFN1.2*1.6-4L Package Outline Dimension



TOP VIEW



SIDE VIEW



BOTTOM VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN.	MAX.	MIN.	MAX.
A	0.500	0.600	0.020	0.024
A1	0.000	0.050	0.000	0.002
A3	0.152REF.		0.006REF.	
D	1.500	1.700	0.059	0.067
E	1.100	1.300	0.043	0.051
D1	0.560	0.760	0.022	0.030
E1	0.700	0.900	0.028	0.035
b	0.250	0.350	0.010	0.014
b1	0.175	0.275	0.007	0.011
e	0.600TYP.		0.024TYP.	
L	0.150	0.250	0.006	0.010
k	0.200MIN.		0.008TYP.	

Subject changes without notice