

Features

- Maximum Output Current : More than 150mA (300mA limit)
- Dropout Voltage : 100mV @100mA
- OUT1 Voltage: 2.8V
- OUT2 Voltage: 1.8V
- Operating Voltage Range : 2.9V ~ 5.5V
- Low Power Consumption :180μA (TYP.)
- Operating Temperature Range : -40°C ~ +85°C
- Low ESR Capacitor Compatible : Ceramic capacitor
- Low Output Noise
- Ultra Small Packages : TSOT23-6L or SOT23-6L

Applications

- Mobile Phones
- Cordless phones and radio communication equipment
- Portable games
- Cameras, Video recorders
- Portable Audio Equipment
- PDAs

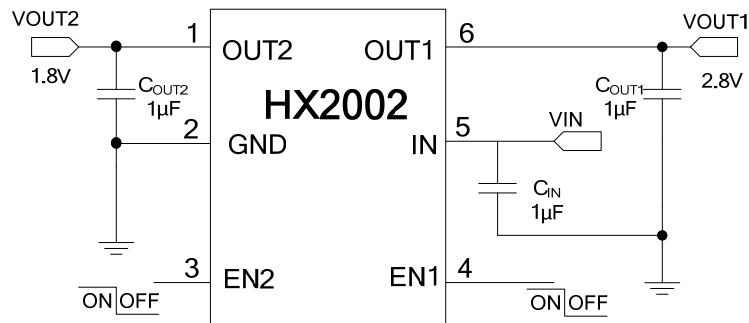
Description

The HX2002 series are highly accurate, Dual low noise, CMOS LDO voltage regulators. Performance features of the series include low output noise, high ripple rejection ratio, low dropout and very fast turn-on times.

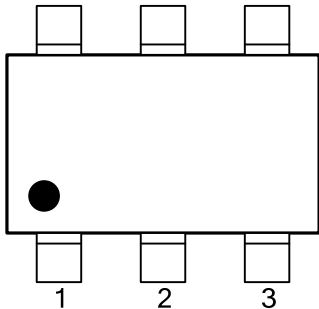
The output voltage for each regulator is set independently by laser trimming. The HX2002 series is also fully compatible with low ESR ceramic capacitors, reducing cost and improving output stability.

This high level of output stability is maintained even during frequent load fluctuations, due to the excellent transient response performance and high PSRR achieved across a broad range of frequencies. The EN function allows the output of each regulator to be turned off independently, resulting in greatly reduced power consumption. The HX2002 series is available in the TSOT23-6L or SOT23-6L packages(or upon request).

Typical Application Circuit



Pin Assignment and Description

TOP VIEW  TSOT/SOT-23-6L		PIN	NAME	DESCRIPTION
		1	OUT2	Output 2
		2	GND	Ground
		3	EN2	ON/OFF Control 2
		4	EN1	ON/OFF Control 1
		5	IN	Input
		6	OUT1	Output 1

Absolute Maximum Ratings (Note 1)

- Supply Input Voltage6V
- Lead Temperature (Soldering, 10 sec.)+265°C
- Storage Temperature Range -65°C ~ +150°C

Recommended Operating Conditions (Note 2)

- Supply Input Voltage 2.9V ~ 5.5V
- EN Input Voltage 0V ~ 5.5V
- Junction Temperature Range.....-40°C ~ +125°C
- Ambient Temperature Range.....-40°C ~ +85°C

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.

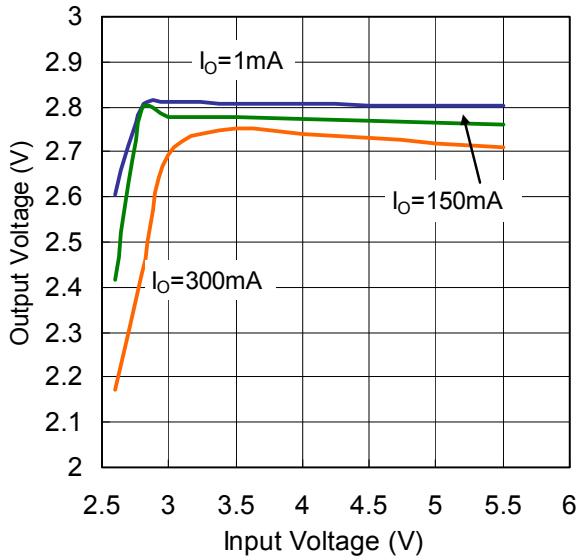
Electrical Characteristics

Operating Conditions: $T_A=25^{\circ}\text{C}$, $V_{IN}=5\text{V}$, $C_{IN}=C_{OUT1}=C_{OUT2}=1\mu\text{F}$, unless otherwise specified.

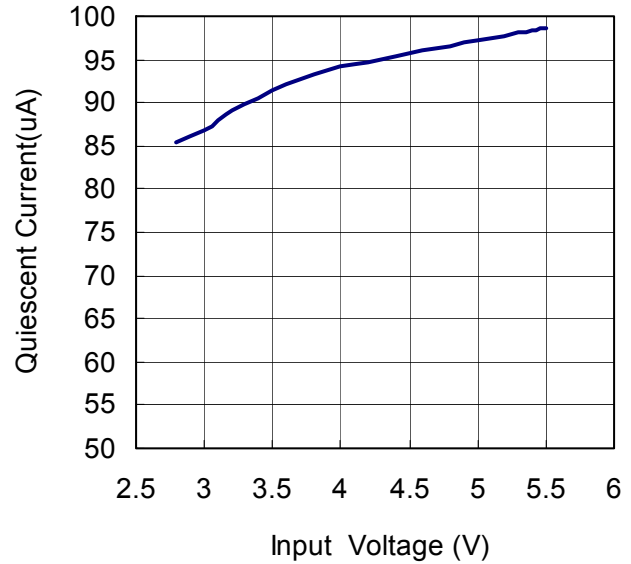
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Operating Voltage Range		2.9		5.5	V
ΔV_{OUT}	Output Voltage Precision	$I_{OUT}=10\text{mA}$	-2		2	%
I_Q	Quiescent Current	$3\text{V} \leq V_{IN} \leq 5.0\text{V}$		180		μA
I_{SHDN}	Shut-down Current	$V_{EN1}=V_{EN2}=\text{GND}$, $V_{IN}=5\text{V}$		0.02	0.1	μA
I_{LIM}	Overload Limited			300		mA
ΔV_{LINE}	Line Regulation	$3\text{V} \leq V_{IN} \leq 5\text{V}$, $I_{OUT}=0\text{mA}$		2		mV
ΔV_{LOAD}	Load Regulation	$0\text{mA} \leq I_{OUT} \leq 100\text{mA}$		30		mV

Typical Performance Characteristics (OUT1)

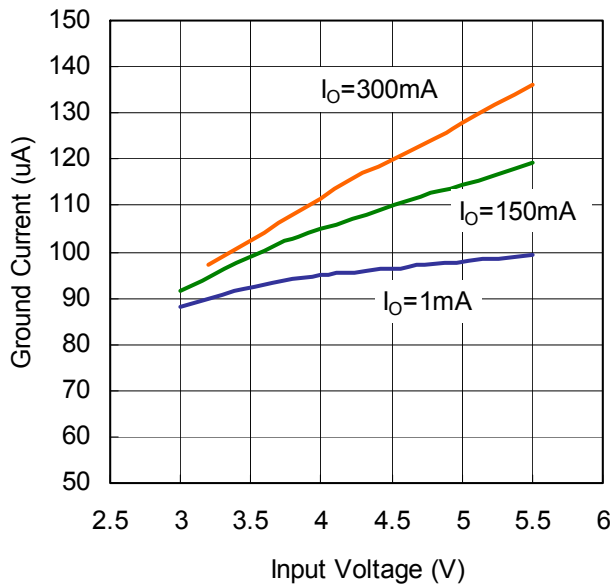
Output Voltage vs. Input Voltage
($V_{out}=2.8V$)



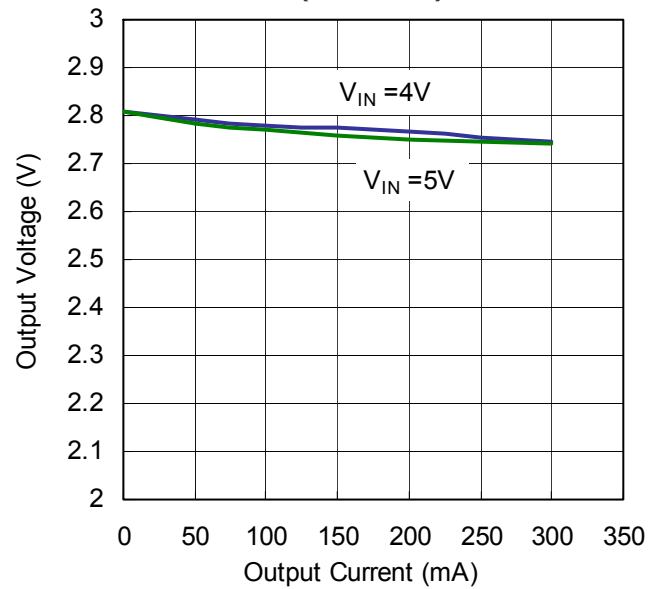
Quiescent Current vs. Input Voltage
($V_{out}=2.8V$ $I_o=0A$)



Ground Current vs. Input Voltage
($V_{out}=2.8V$)

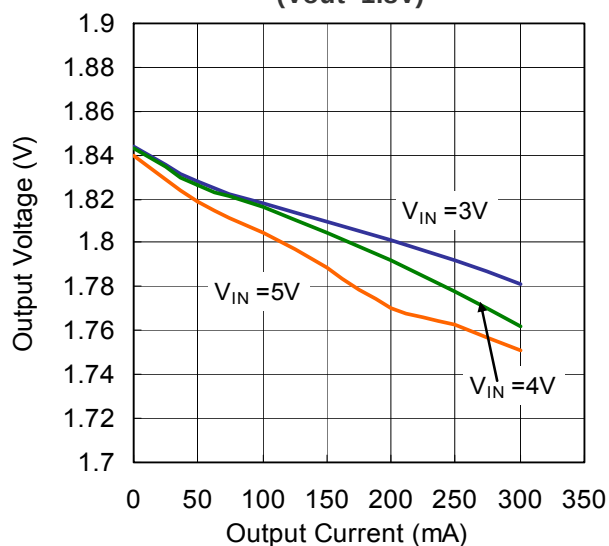


Output Voltage vs. Output Current
($V_{out}=2.8V$)

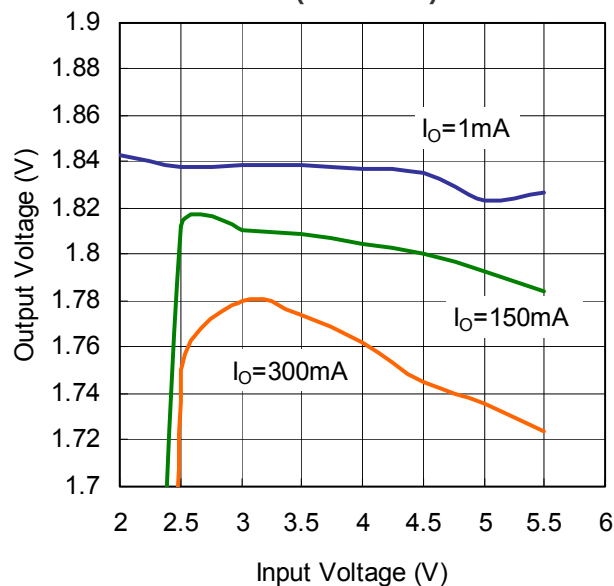


Typical Performance Characteristics (OUT2)

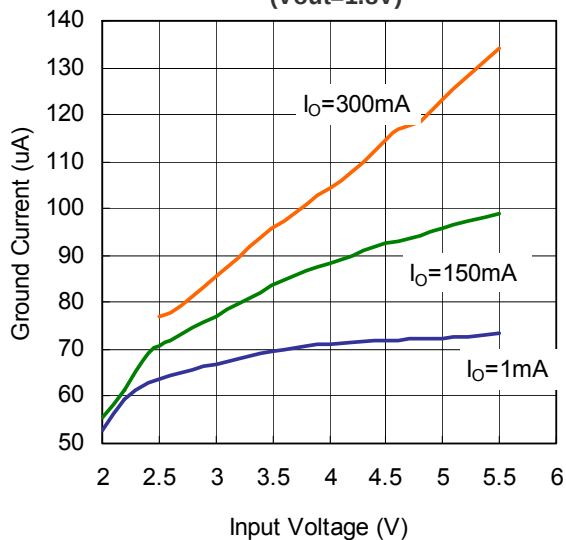
Output Voltage vs. Output Current
($V_{out}=1.8V$)



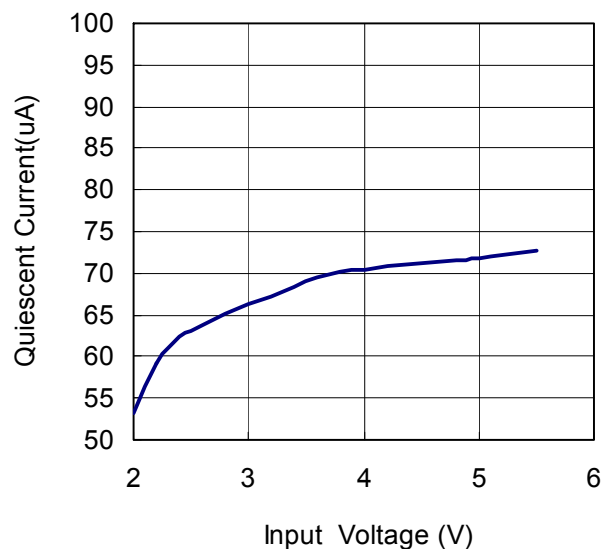
Output Voltage vs. Input Voltage
($V_{out}=1.8V$)



Ground Current vs. Input Voltage
($V_{out}=1.8V$)



Quiescent Current vs. Input Voltage
($V_{out}=1.8V$ $I_o=0A$)



Application Information

Like any low dropout regulator, the external capacitors used with the HX2002 must be carefully selected for regulator stability and performance. Using a capacitor whose value is $> 1\mu\text{F}$ on the HX2002 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 HX2002 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 $1\mu\text{F}$ with ESR is $> 25\text{m}\Omega$ on the HX2002 output ensures stability. The HX2002 still works well with output capacitor of other types due to the wide stable ESR range.

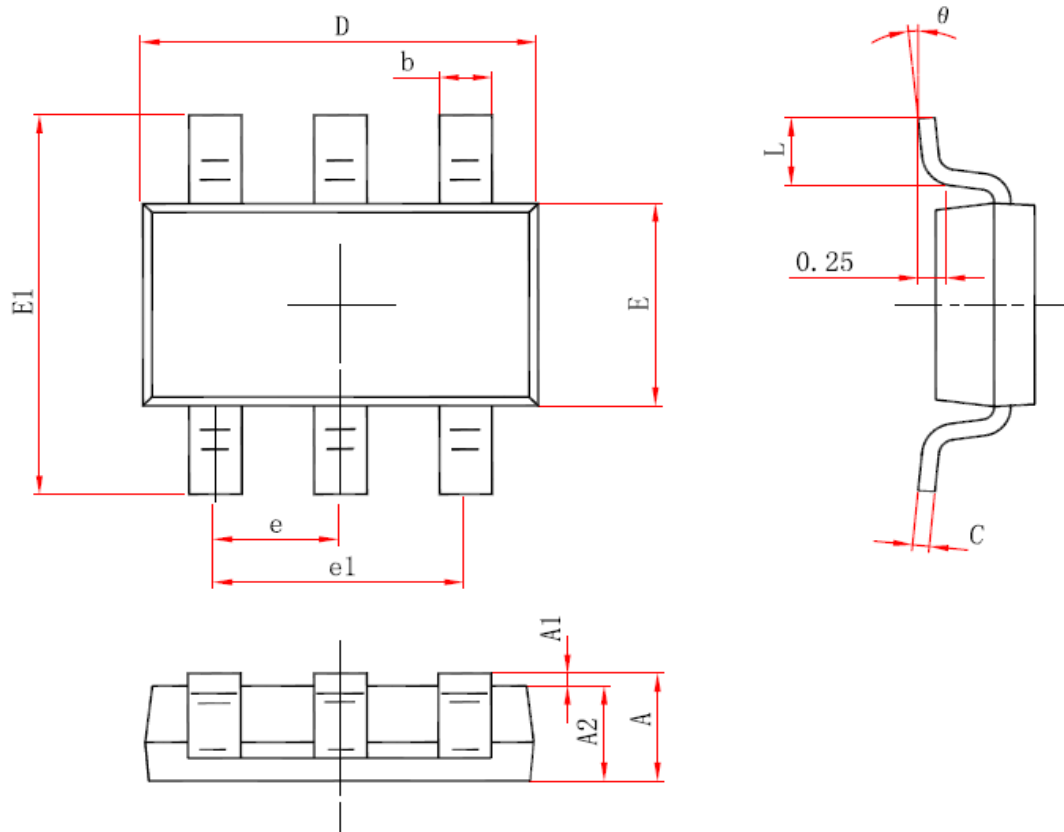
Enable Function

The HX2002 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 1volts.

For to protecting the system, the HX2002 have a quick-discharge function. If the enable function is not needed in a specific application, it may be tied to VIN to keep the LDO regulator in a continuously on state.

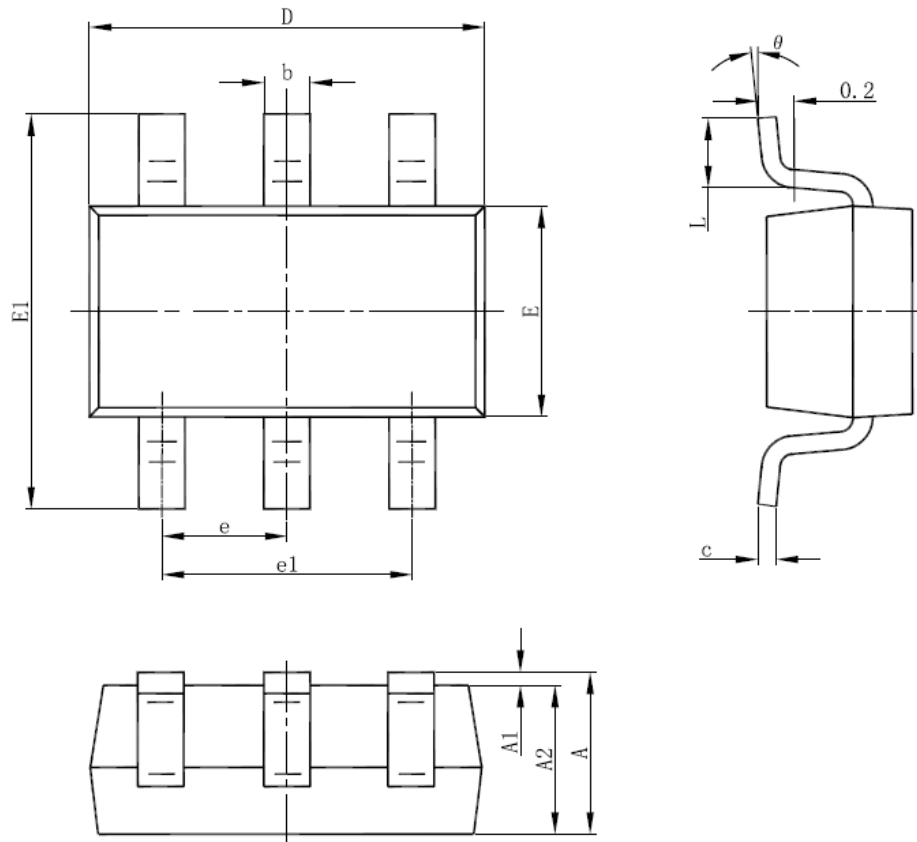
Packaging Information

TSOT-23-6L Package Outline Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b	0.350	0.500	0.014	0.020
c	0.080	0.200	0.003	0.008
D	2.820	3.020	0.111	0.119
E	1.600	1.700	0.063	0.067
E1	2.650	2.950	0.104	0.116
e	0.95 (BSC)		0.037 (BSC)	
e1	1.90 (BSC)		0.075 (BSC)	
L	0.300	0.600	0.012	0.024
θ	0 °	8 °	0 °	8 °

SOT-23-6L Package Outline Dimension



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.