

Features

- External parts: Coil, capacitor
- Output voltage: Settable to between 2.1V to 5.5V in 0.1V steps
- Maximum Oscillation
- frequency :350KHz
- Accuracy of $\pm 2\%$
- High efficiency :95%
- Package: SOT23 and TO92

Applications

- Digital cameras
- Electronic notebooks and PDAS
- Portable CD/MD players
- Cameras , video equipment
- Communications equipment
- Power supply for microcomputers

General Description

The HE9116 Series is a Synchronous step-up DC/DC Converter with PFM Control. With the HE Series, a step-up switching DC/DC converter can be configured by using

an external coil, capacitor. The built-in MOSFET is turned off by a protection circuit when the voltage at the LX pin exceeds the limit to prevent it from being damaged.

Selection Table

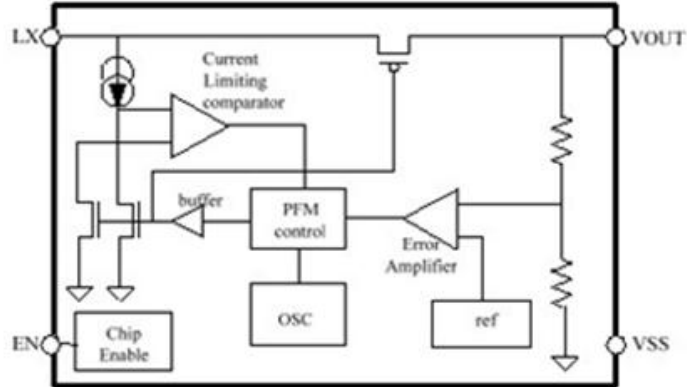
| Part No. | Output Voltage | Package | Marking |
|-----------|----------------|---------|---------|
| HE9116Axx | 2.7V | SOT23 | |
| HE9116Axx | 3.0V | | |
| HE9116Axx | 3.3V | | |
| HE9116Axx | 3.6V | | |
| HE9116Axx | 4.5V | | |
| HE9116Axx | 5.0V | | |

Order Information

HE9116①②③④⑤

| Designator | Symbol | Description |
|------------|---------|--|
| ① | A | Standard |
| ②③ | Integer | Output Voltage (2.7~5.0) e.g:3.0V=②: 3; ③: 0 |
| ④ | N | Package:SOT23 |
| ⑤ | R | RoHS / Pb Free |
| | G | Halogen Free |

Block Diagram



Pin Assignment

SOT23 (Top view)

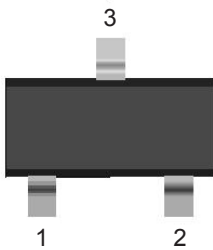


Table1 HE9116 series (SOT23 PKG)

| PIN NO. | PIN NAME | FUNCTION |
|---------|----------|----------------------------------|
| 1 | GND | GND pin |
| 2 | LX | External inductor connection pin |
| 3 | VOUT | Output voltage pin |

Absolute Maximum Ratings

(Unless otherwise specified, Ta=25°C)

| PARAMETER | | SYMBOL | RATINGS | UNITS |
|------------------------------|-------|---------------------|---|-------|
| VOUT Pin Voltage | | V _{OUT} | V _{SS} -0.3~V _{SS} +8 | V |
| LX Pin Voltage | | V _{LX} | V _{SS} -0.3~V _{SS} +8 | V |
| LX Pin Current | | I _{LX} | 500 | mA |
| Power Dissipation | SOT23 | PD | 250 | mW |
| Operating Temperature | | T _{OPR} | -40~+85 | °C |
| Storage Temperature | | T _{STG} | -40~+125 | °C |
| Soldering Temperature & Time | | T _{SOLDER} | 260°C, 10s | |

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

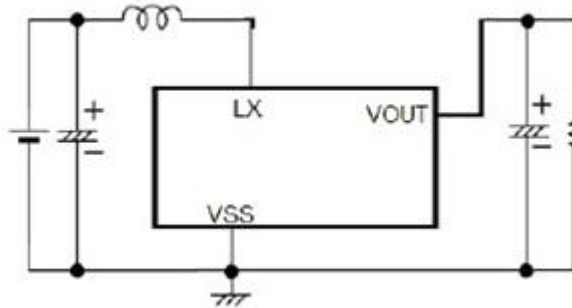
Electrical Characteristics

(Unless otherwise specified, Ta = 25°C)

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | CONDITION |
|-------------------------------------|------------------|------------------------------|------------------|------------------------------|-------|--|
| Output Voltage | V _{OUT} | V _{OUT(S)} X0.98 | V _{OUT} | V _{OUT(S)} X1.02 | V | - |
| Input Voltage | V _{IN} | - | - | 7.5 | V | - |
| Operation Start Voltage | V _{ST1} | - | - | 0.9 | V | I _{OUT} =1mA |
| Input Current At No Load | I _{SS1} | - | 15 | - | uA | V _{IN} =1.8V, V _{OUT} =3.0V |
| Current Consumption 2 | I _{SS2} | - | 6 | 10 | uA | V _{OUT} =V _{OUT(S)} +0.5V |
| Current Consumption During Shutdown | I _{SSS} | - | - | 1.0 | uA | V _{EN} =0V |
| Maximum Oscillation Frequency | f _{osc} | | 350 | | KHz | V _{OUT} =0.95xV _{OUT(S)} , measure Waveform at LX pin |
| Duty Ratio1 | Duty1 | 70 | 78 | 85 | % | V _{OUT} =0.95xV _{OUT(S)} |
| Efficiency | EFF1 | | 90 | | % | |
| Shutdown Pin Input Voltage | V _{SH} | 0.75 | - | - | V | V _{OUT} =0.95xV _{OUT(S)} , judge Oscillation at LX pin |
| | V _{SL} | - | - | 0.3 | V | V _{OUT} =0.95xV _{OUT(S)} , judge stop at LX pin |
| Shutdown Pin input Current | I _{SH} | -0.1 | - | 0.1 | uA | V _{EN} =6V |
| | I _{SL} | -0.1 | - | 0.1 | uA | V _{EN} =0V |

Remark: V_{OUT(S)} specified above is the set output voltage value, and V_{OUT} is the typical value of the actual output voltage

Application Circuits

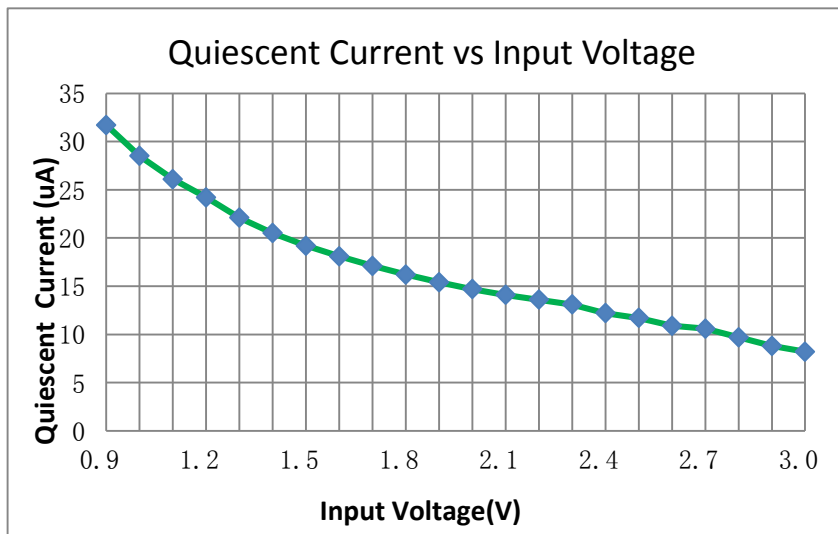
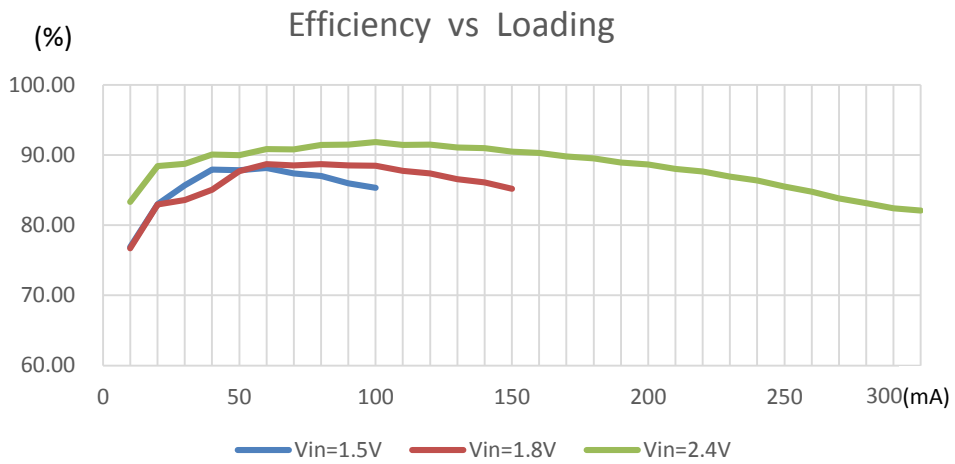
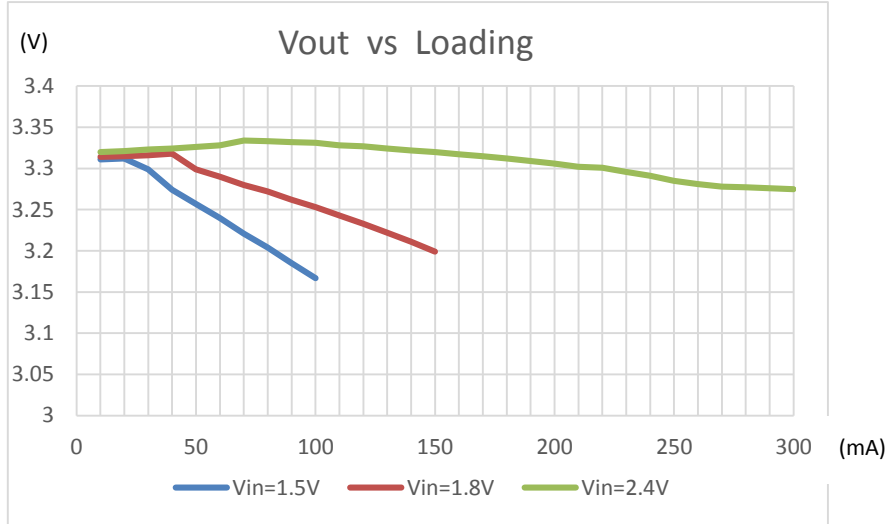


Note: External Component Recommendation:

- 1) L=47uH(Sumida)
- 2) C=22uF/16V(Tantalum)

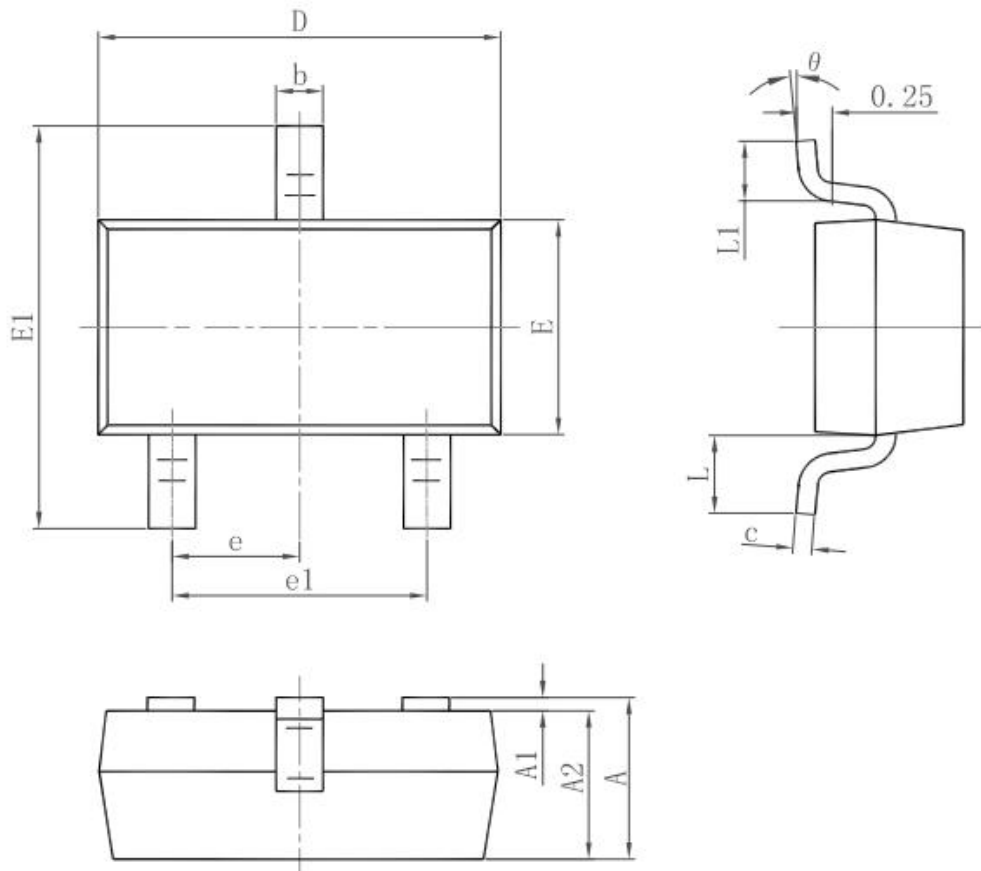
TYPICAL PERFORMANCE CHARACTERISTICS

(Cin=Cout=22uF,L=47uH)



Package Information

3-pin SOT23 Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |