

2A, 18V, 600KHz Synchronous Step-Down Converter

GENERAL DESCRIPTION

The SY8120B are high efficiency 600KHz synchronous step-down DC-DC converters capable of delivering 2.0A output currents, respectively. SY8120B operate over a wide input voltage range from 4V to 18V and integrate main switch and synchronous switch with very low $R_{DS(ON)}$ To minimize the conduction loss.

Low output voltage ripple and small external inductor and capacitor sizes are achieved with 600KHz switching frequency.

Features

- low $R_{ds(on)}$ for internal switches (top/bottom)
Up to 95% Efficiency
- 600KHz Fixed Switching Frequency
- 4-18V input voltage range
- Internal softstart limits the inrush current
- SOT23-6 Packages
- 2% 0.6V reference

APPLICATIONS

- Dsl Modem
- Portable TV/DVD /DVB/MID/ATSC
- DPF/MP5
- Handheld Computers and PDAs
- Access Point Router
- LVD-TV/LCD-M

TYPICAL APPLICATIONS

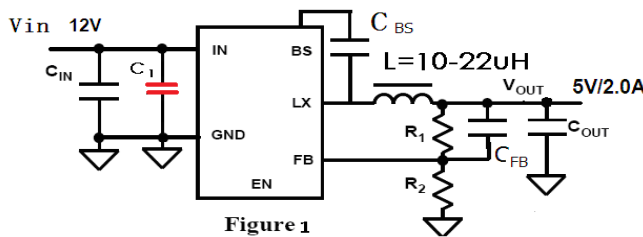
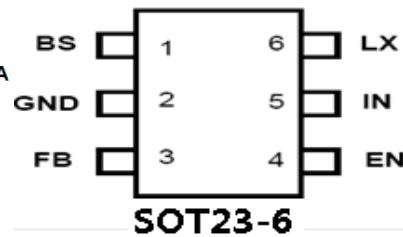


Figure 1

PIN ASSIGNMENT



C1-Bypass ceramic capacitor is must put very closely to the Vin Pin

PIN DESCRIPTION

$$V_{out} = 0.6 * (1 + R1/R2)$$

$$C_{bs} = 10nF$$

| SOT Pin No. | PIN NAMES | DESCRIPTION |
|----------------|--------------|--|
| 1 | BS | Boot-Strap Pin. Supply high side gate driver. Decouple this pin to LX pin with 0.01uF ceramic cap. |
| 2 | GND | Ground |
| 3 | FB | Output Feedback Pin. Connect this pin to the center point of the output resistor divider (as shown in Figure 1) to program the output voltage: $V_{out} = 0.6 * (1 + R1/R2)$ |
| 4 | EN | Enable pin. A high input at EN enables the device and a low input disables the devices. Do not float. |
| 5 | IN | Input pin. |
| 6 | LX | Inductor pin. Connect this pin to the switching node of inductor |

ABSOLUTE MAXIMUM RATINGS (Note 1)

| SYMBOL | ITEMS | VALUE | UNIT |
|-------------------|---|--------------------|------|
| V _{IN} | Input Voltage | 4~18.0 | V |
| V _{SW} | Voltage at SW Pin | -0.5~18 | V |
| V _{IO} | All Other I/O Pins | GND-0.3 to VDD+0.3 | V |
| P _{DMAX} | Power Dissipation | 0.4 | W |
| SS _{R1} | Thermal Resistance, SOT-23-6, Θ_{JA} | 220 | °C/W |
| Tstg | Storage Temperature | -55 to 150 | °C |
| Tsolder | Package Lead Soldering Temperature | 260°C, 10s | |
| HBM | ESD Suscessibility(human body mode) | 2 | kV |
| MM | Machine Mode | 200 | V |

RECOMMENDED OPERATING RANGE (Note 1)

| SYMBOL | ITEMS | VALUE | UNIT |
|------------------|-----------------------|------------|------|
| V _{IN} | VIN Supply Voltage | 4 to 16.0 | V |
| T _{OSS} | Operating Temperature | -40 to +85 | °C |

ELECTRICAL CHARACTERISTICS (Note 4, 5)

The following specifications apply for V_{IN}=V_{EN}=3.6V T_A=25 °C, unless specified otherwise.

| SYMBOL | ITEMS | CONDITIONS | Min. | Typ. | Max. | UNIT |
|--------------------|------------------------------|--|------|------|------|------|
| V _{IN} | Input Voltage | | 4 | | 16.0 | V |
| V _{FB} | FB Pin Voltage | | 588 | 600 | 612 | mV |
| I _{qc} | Quiescent current | I _{out} =0 V _{fb} =V _{REF} +5% | | 200 | | μA |
| I _{off} | Operating Current (Shutdown) | EN=0V | | 1 | 5 | μA |
| F _{sw} | Switching Frequency | I _{out} -=200mA | | 600 | | KHz |
| D _{max} | Maximum Duty Cycle | V _{FB} =0V | 90 | | | % |
| V _{EN_H} | EN Minimum High Level | | 1.5 | | | V |
| V _{EN_L} | EN Maximum Low Level | | | | 0.4 | V |
| V _{uvlo} | Input UVLO threshold | | | | 3.9 | V |
| R _{ON(1)} | SW On Resistance(TOP FET) | | | 0.11 | | Ω |
| R _{ON(2)} | SW On Resistance(Bottom FET) | | 0.09 | | | Ω |
| T-CL | TOP FET Current Limit | | 2.5 | | | A |

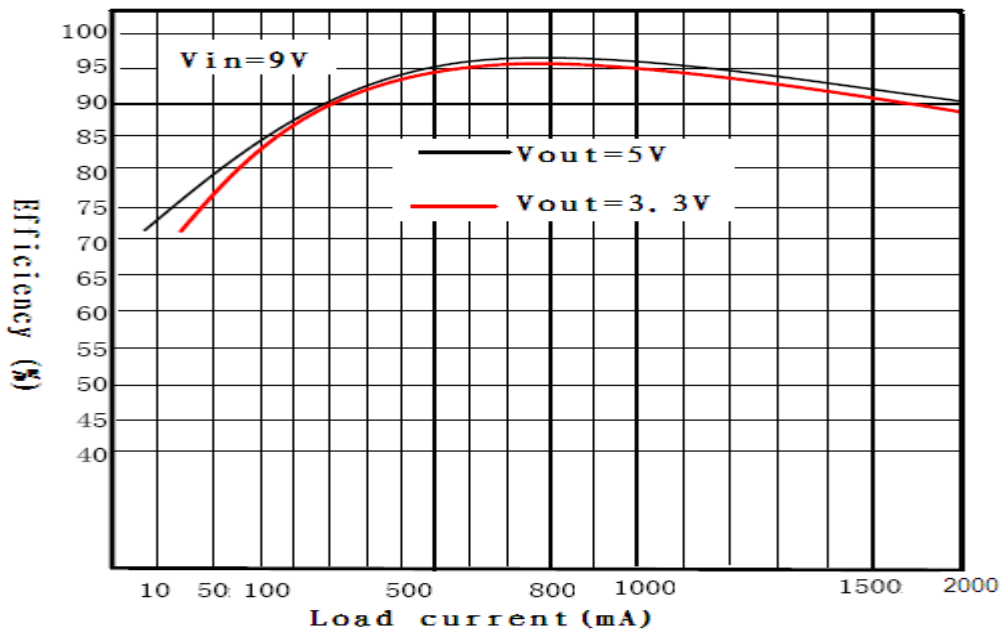
Note 1: Typical parameters are measured at 25°C and represent the parametric norm.

Note 2: Datasheet min/max specification limits are guaranteed by design, test, or statistical analysis.

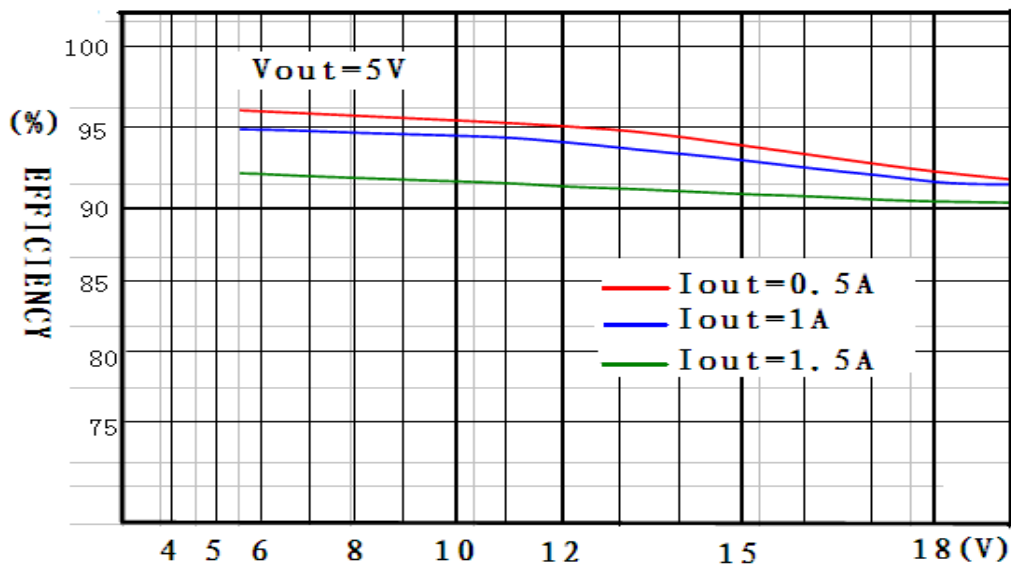
ORDERING INFORMATION

| PACKAGE | TEMPERATURE RANGE | ORDERING PART NUMBER | TRANSPORT MEDIA |
|---------|-------------------|----------------------|-----------------------------|
| SOT23-6 | -40 °C to 85 °C | SY8120B | Tape and Reel 3000 units |

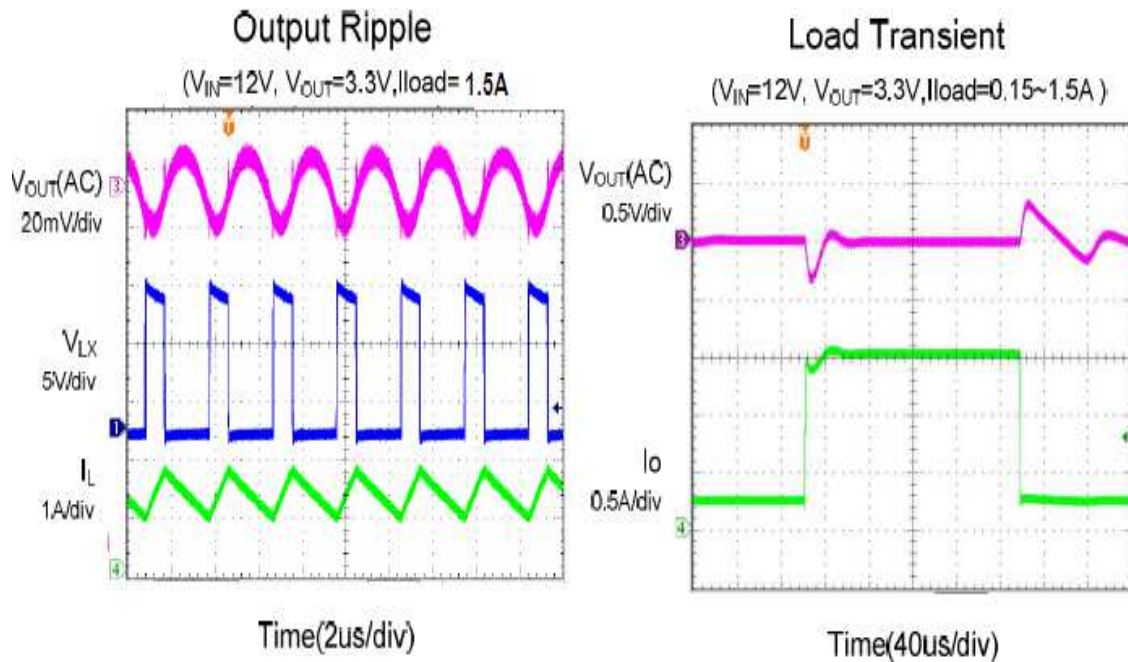
TYPICAL PERFORMANCE CHARACTERISTICS



SY8120B Efficiency VS Load current



SY8120B Efficiency VS Input Voltage



TYPICAL APPLICATION

- SY8120B,Adjustable Output Voltage Type. For example, Output Voltage=5.0V

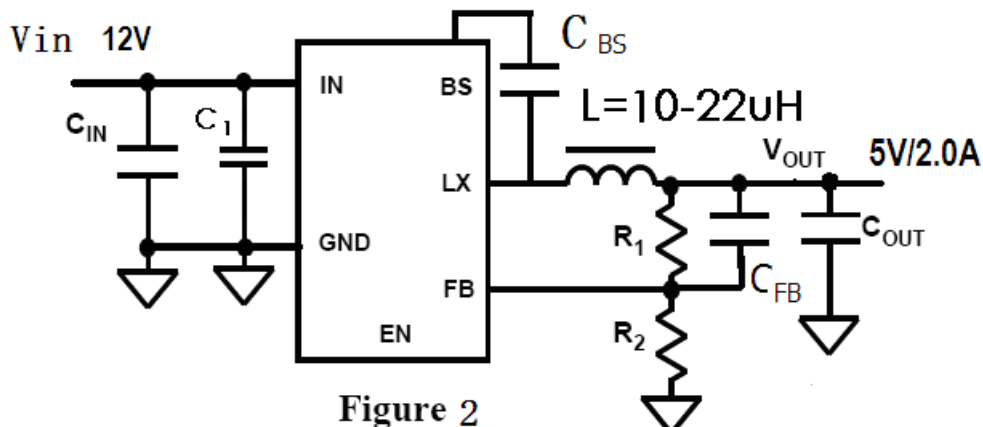
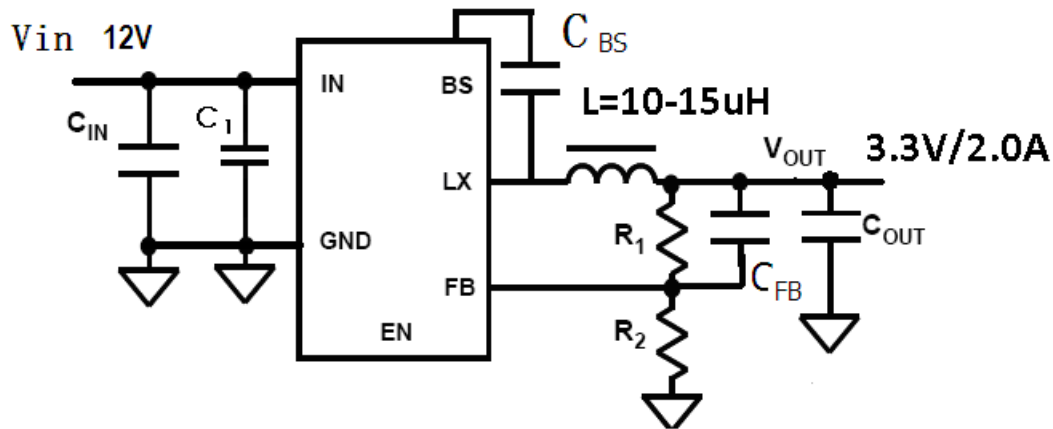


Figure 2

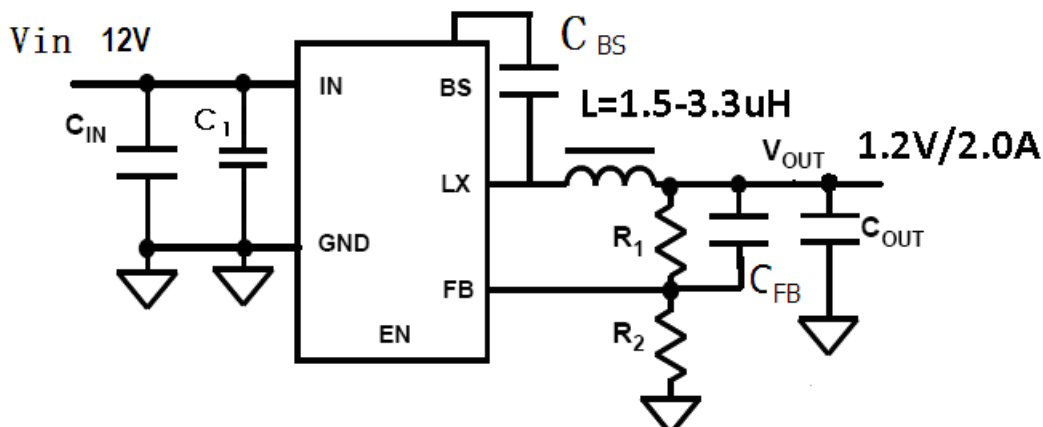
L: CR75-MC (Sumida, 10 μ H) C_{IN} : 22 μ F, Ceramic Type, C_1 =0.1 μ F Ceramic Type, C_{OUT} : 22 μ F, Ceramic Type, C_{BS} : 0.01 μ F, Ceramic Type, C_{FB} : NC , R_1 : 374K Ω (1%) R_2 : 51K Ω (1%)

- SY8120B, Adjustable Output Voltage Type. For example, Output Voltage=3.3V

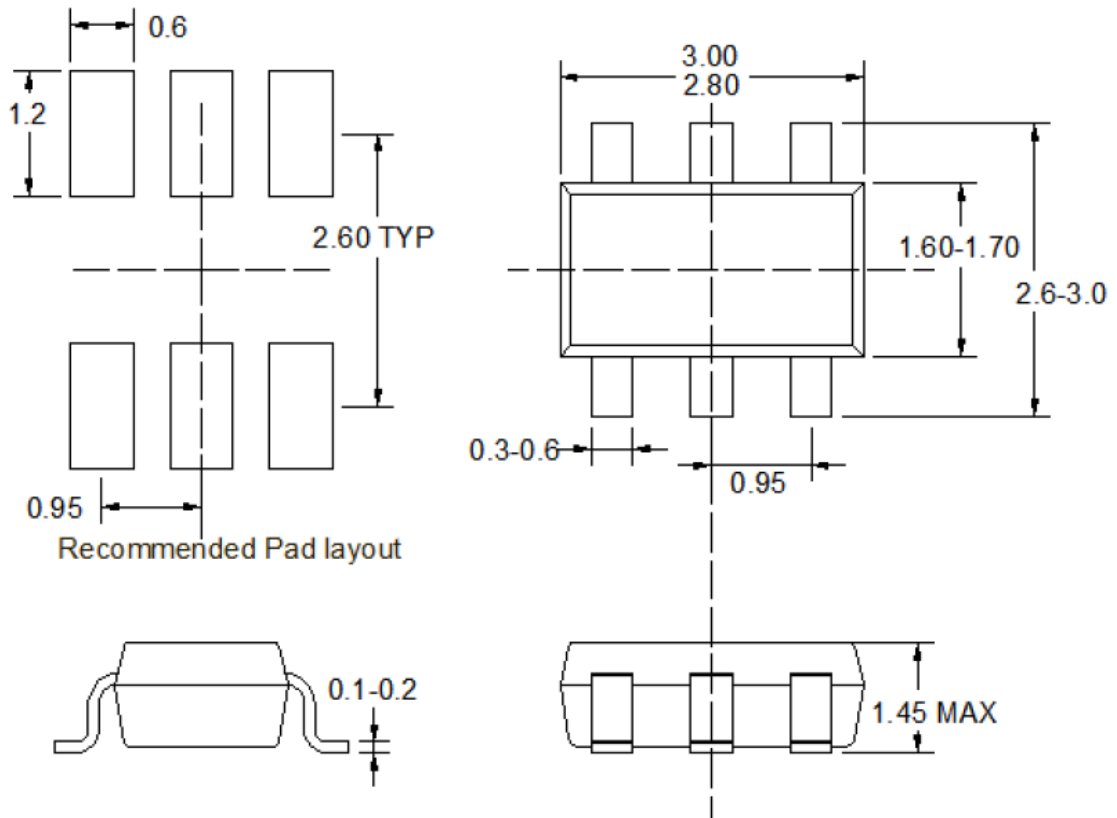


L: CR75-MC (Sumida, 10 μ H) C_{IN} : 22 μ F, Ceramic Type, C_1 =0.1 μ F Ceramic Type, C_{OUT} : 22 μ F, Ceramic Type, C_{BS} : 0.01 μ F, Ceramic Type, C_{FB} : NC, R_1 : 229.5K Ω (1%) R_2 : 51K Ω (1%)

- SY8120B, Adjustable Output Voltage Type. For example, Output Voltage=1.2V



L: CR75-MC (Sumida, 2.2H) C_{IN} : 22 μ F, Ceramic Type, C_1 =0.1 μ F Ceramic Type, C_{OUT} : 22 μ F, Ceramic Type, C_{BS} : 0.01 μ F, Ceramic Type, C_{FB} : NC, R_1 : 51K Ω (1%) R_2 : 51K Ω (1%)

PACKAGE INFORMATION**SOT23-6**

Notes: All dimensions are in millimeters.
All dimensions don't include mold flash & metal burr.

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