

## 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

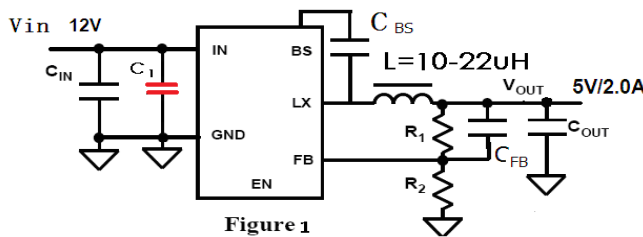
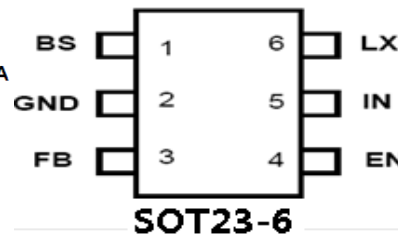


Figure 1

### 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 <sub>IN</sub>	Input Voltage	4~18.0	V
V <sub>SW</sub>	Voltage at SW Pin	-0.5~18	V
V <sub>IO</sub>	All Other I/O Pins	GND-0.3 to VDD+0.3	V
P <sub>DMAX</sub>	Power Dissipation	0.4	W
SS <sub>R1</sub>	Thermal Resistance, SOT-23-6, $\Theta_{JA}$	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 <sub>IN</sub>	VIN Supply Voltage	4 to 16.0	V
T <sub>OSS</sub>	Operating Temperature	-40 to +85	°C

**ELECTRICAL CHARACTERISTICS (Note 4, 5)**

The following specifications apply for V<sub>IN</sub>=V<sub>EN</sub>=3.6V T<sub>A</sub>=25 °C, unless specified otherwise.

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

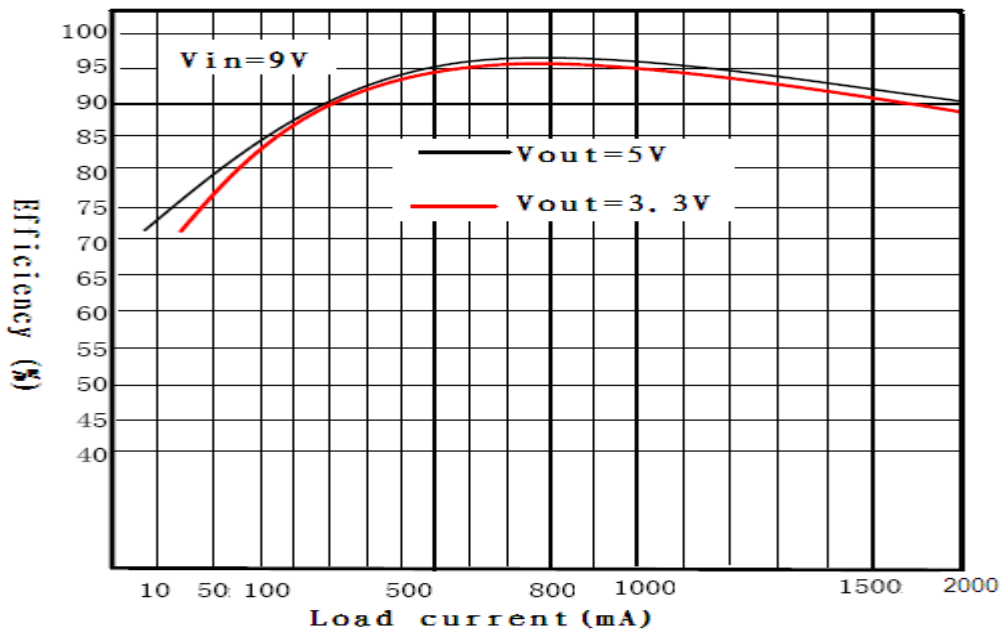
**Note 1:** Typical parameters are measured at 25°C and represent the parametric norm.

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

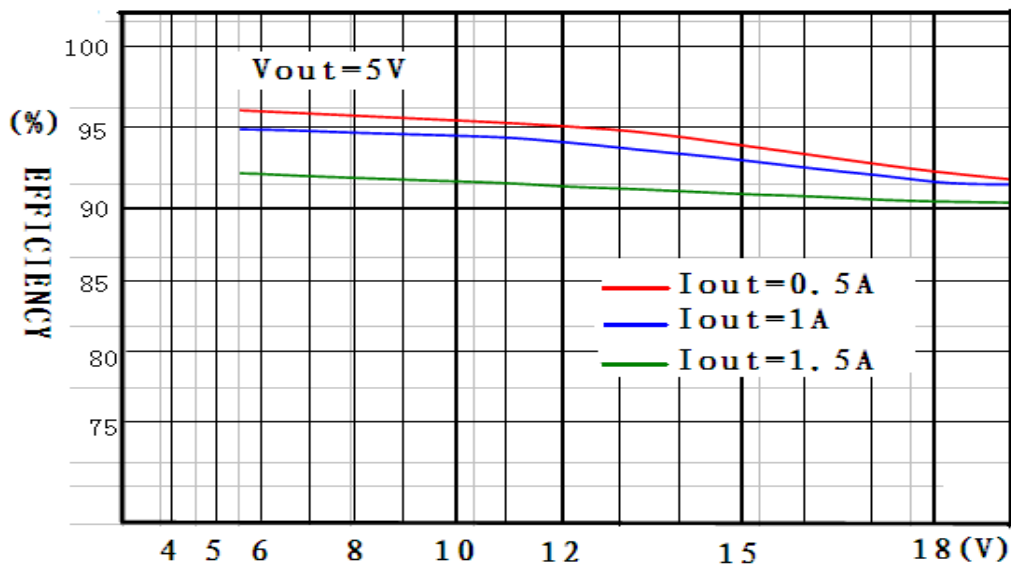
**ORDERING INFORMATION**

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

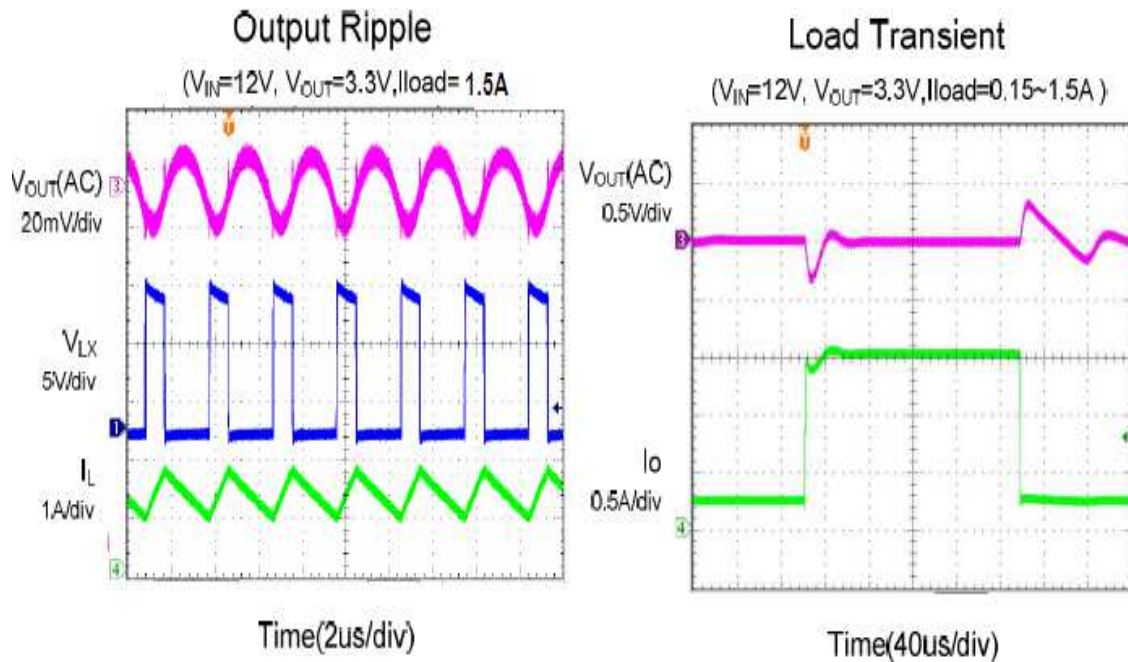
**TYPICAL PERFORMANCE CHARACTERISTICS**



SY8120B Efficiency VS Load current

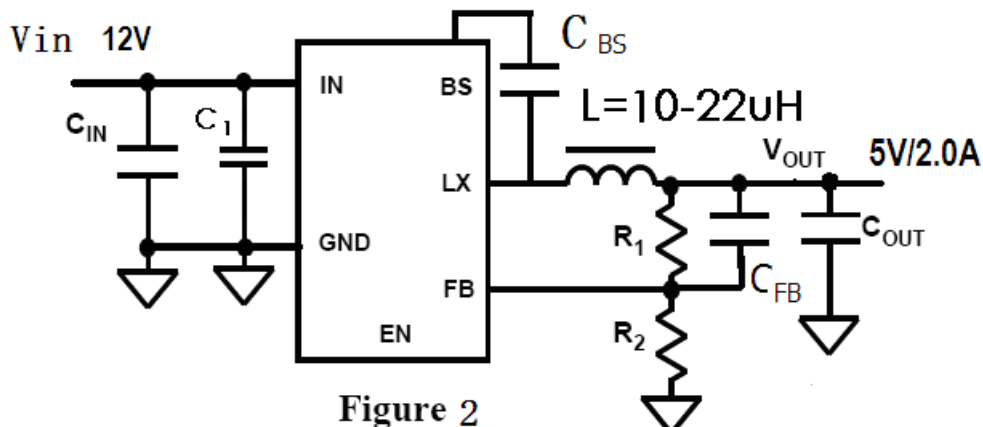


SY8120B Efficiency VS Input Voltage



**TYPICAL APPLICATION**

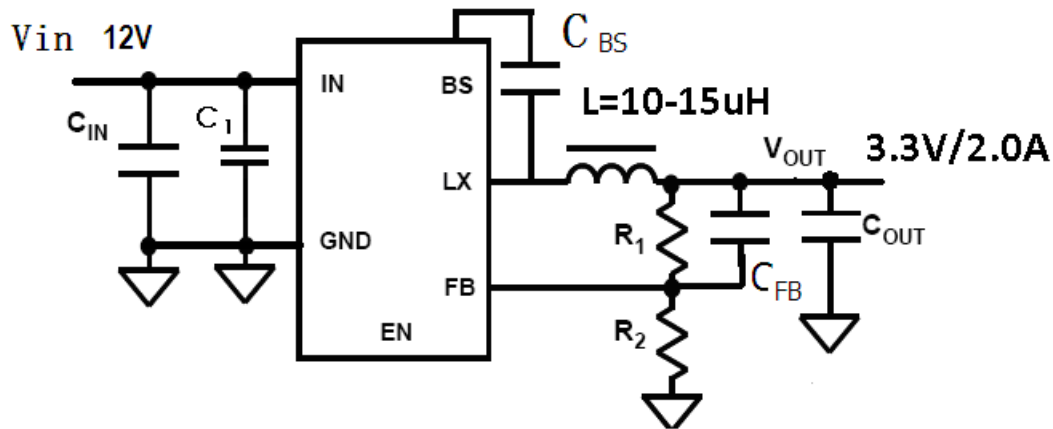
- SY8120B,Adjustable Output Voltage Type. For example, Output Voltage=5.0V



**Figure 2**

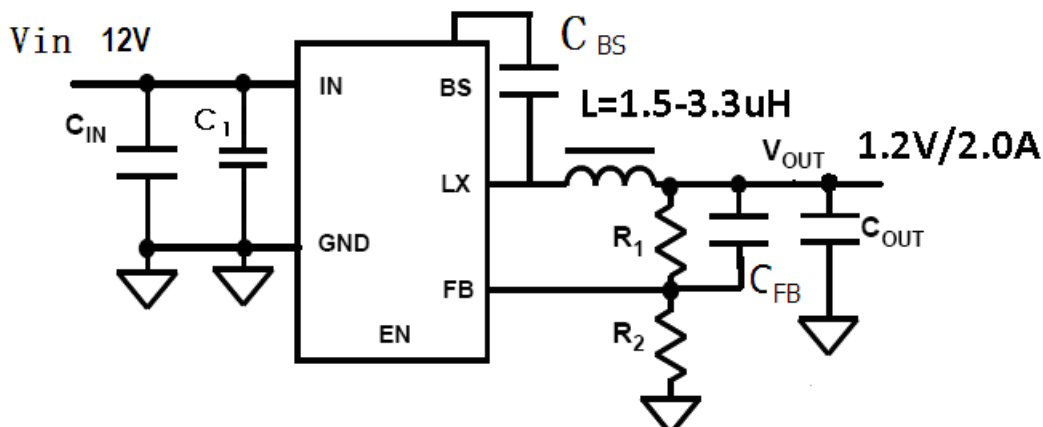
L: CR75-MC (Sumida, 10μH) CIN: 22μF, Ceramic Type, C1=0.1μF Ceramic Type, C OUT: 22μF, Ceramic Type, CBS: 0.01μF, Ceramic Type, CFB : NC , R1: 374KΩ (1%) R2: 51KΩ(1%)

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

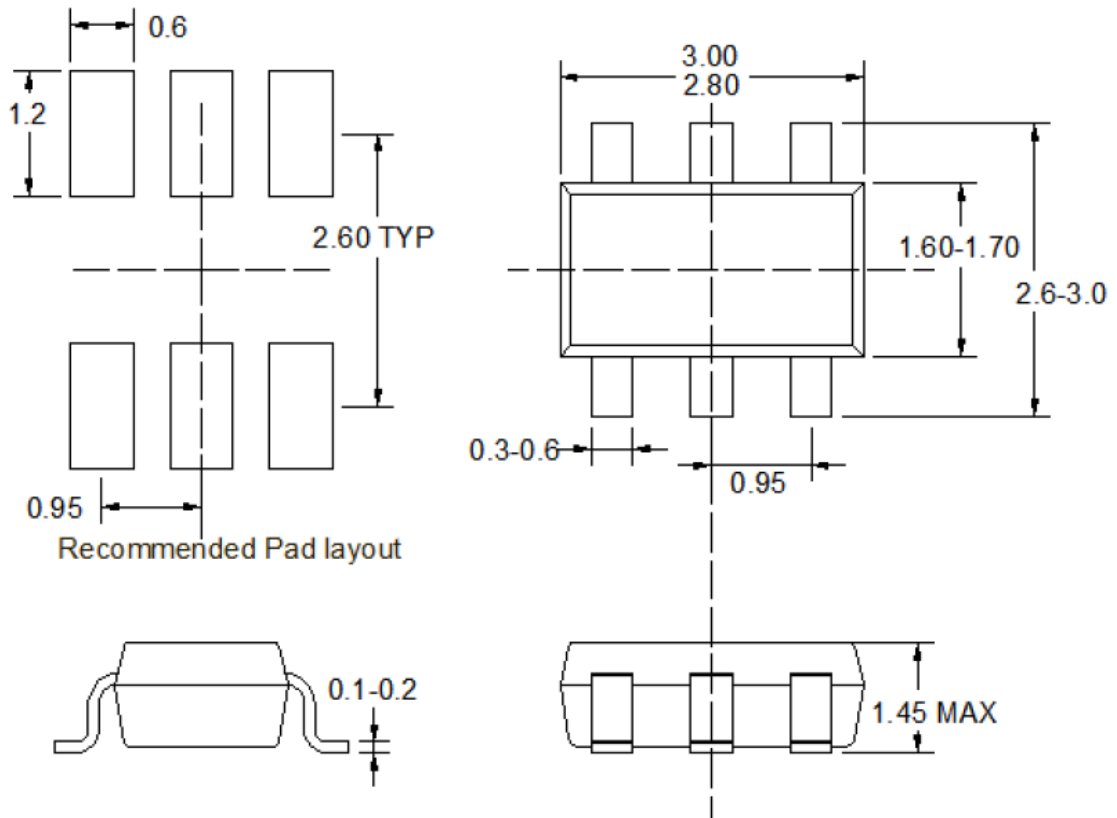


L: CR75-MC (Sumida, 10 $\mu$ H)  $C_{IN}$ : 22 $\mu$ F, Ceramic Type,  $C_1$ =0.1 $\mu$ F Ceramic Type,  $C_{OUT}$ : 22 $\mu$ F, Ceramic Type,  $C_{BS}$ : 0.01 $\mu$ F, Ceramic Type,  $C_{FB}$ : NC,  $R_1$ : 229.5K $\Omega$  (1%)  $R_2$ : 51K $\Omega$ (1%)

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



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

**PACKAGE INFORMATION****SOT23-6**

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