High Efficiency, 500kHz, 3A, 16V Input Synchronous Step Down Regulator
Preliminary Specification

General Description

The SY8113 is a high efficiency 500 kHz synchronous step-down DC-DC converter capable of delivering 3A current. The SY8113 operates over a wide input voltage range from 4.5V to 16V and integrates 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 500 kHz switching frequency. It adopts the instant PWM architecture to achieve fast transient responses for high step down applications

Ordering Information

SY8113 □(□□)□
  Temperature Code
  Package Code
  Optional Spec Code
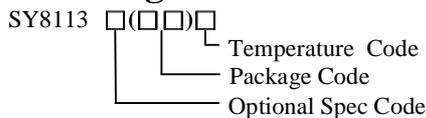
Temperature Range: -40°C to 85°C

Ordering Number	Package type	Note
SY8113ADC	TSOT23-6	--

Features

- low $R_{DS(ON)}$ for internal switches (top/botto 80mΩ/40mΩ
- 4.5-16V input voltage range
- 3A output current capability
- 500 kHz switching frequency
- Instant PWM architecture to achieve fast transient responses.
- Internal softstart limits the inrush current
- ±1.5% 0.6V reference
- TSOT23-6 package

Applications

- Set Top Box
- Portable TV
- Access Point Router
- DSL Modem
- LCD TV

Typical Applications
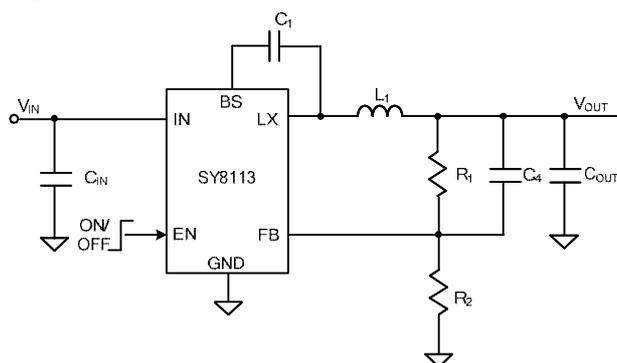
Figure 1. Schematic Diagram

Pinout (top view)

```
      ┌──────⌣──────┐
BS ──┤             ├── LX
      │             │
GND ──┤             ├── IN
      │             │
FB ──┤             ├── EN
      └─────────────┘
```

TSOT23-6(FC)
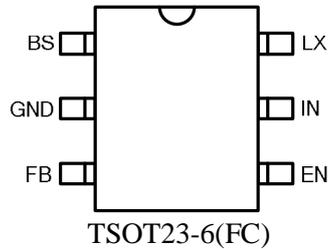
Top Mark: **ML**xyz, (Device code: ML, *x=year code, y=week code, z= lot number code*

Pin Name	Pin Number	Pin Description
BS	1	Boot-Strap Pin. Supply high side gate driver. Decouple this pin to LX pin with 0.1uF ceramic cap.
GND	2	Ground pin
FB	3	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: Vout=0.6*(1+R1/R2)
EN	4	Enable control. Pull high to turn on. Do not float.
IN	5	Input pin. Decouple this pin to GND pin with at least 1uF ceramic cap
LX	6	Inductor pin. Connect this pin to the switching node of inductor

Absolute Maximum Ratings (Note 1)

Supply Input Voltage --- 18V
Enable Voltage-- VIN + 0.3V
FB Voltage -- 4V
Power Dissipation, PD @ TA = 25°C, TSOT23-6（FC）-- TBD
Package Thermal Resistance (Note 2)
θJA -- TBD
θJC -- TBD
Junction Temperature Range --- 125°C
Lead Temperature (Soldering, 10 sec.) --- 260°C
Storage Temperature Range -- -65°C to 150°C

Recommended Operating Conditions (Note 3)

Supply Input Voltage --- 4.5V to 16V
Junction Temperature Range -- -40°C to 125°C
Ambient Temperature Range --- -40°C to 85°C

Electrical Characteristics

(V_{IN} = 12V, V_{OUT} = 1.2V, L = 2.2uH, C_{OUT} = 47uF, T_A = 25°C, I_{OUT} = 1A unless otherwise specified)

| Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		4.5		16	V
Quiescent Current	I_Q	I_{OUT}=0, V_{FB}=V_{REF}*105%		100		μA
Shutdown Current	I_{SHDN}	EN=0		5	10	μA
Feedback Reference Voltage	V_{REF}		0.591	0.6	0.609	V
FB Input Current	I_{FB}	V_{FB}=3.3V	-50		50	nA
Top FET RON	$R_{DS(ON)1}$			80		mΩ
Bottom FET RON	$R_{DS(ON)2}$			40		mΩ
Bottom FET Valley Current Limit	I_{LIM}		3			A
EN Rising Threshold	V_{ENH}		1.5			V
EN Falling Threshold	V_{ENL}				0.4	V
Input UVLO Threshold	V_{UVLO}				4.5	V
UVLO Hysteresis	V_{HYS}			0.3		V
Min ON Time				80		ns
Min OFF Time				100		ns
Switching Frequency				500		kHz
Thermal Shutdown Temperature	T_{SD}			150		°C
Thermal Shutdown Hysteresis	T_{HYS}			15		°C

Note 1: Stresses beyond the "Absolute Maximum Ratings ma   anent damage to the device. These are stress ratings only. Functional operation of the device at these o   onditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 2: θJA is measured in the natural convection at T_A = 25°C on a low effective 4-layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Pin2 of TSOT23-6 packages is the case position for θJC measurement.

Note 3: The device is not guaranteed to function outside its operating conditions

TSOT23-6L (FC)Package outline & PCB layout

1.90

2.40

0.95

1.00

0.60

2.80 - 3.10

2.70 - 3.00

1.50 - 1.70

0.30 - 0.50

Recommended Pad Layout

0.1 - 0.20

0.25 REF

0.3 - 0.6

1.00 (max)

0.01 - 0.1

0.95 TYP

1.90 TYP
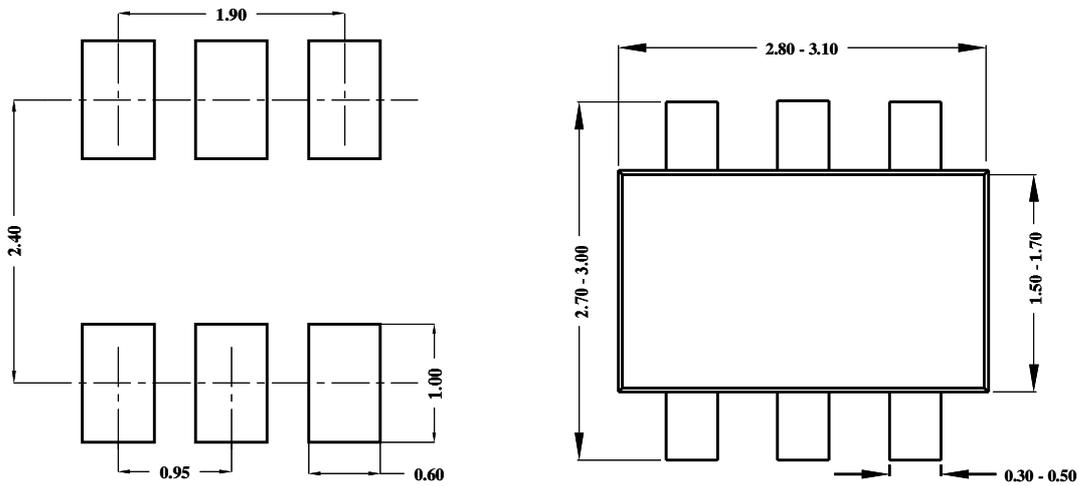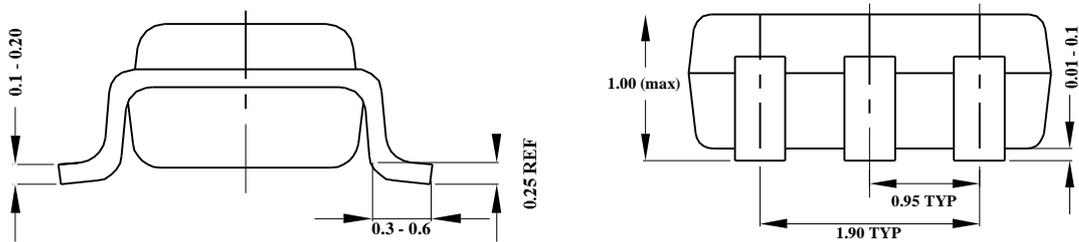
Notes: **All dimension in MM**
All dimension don't not include mold flash & metal burr