

General Description

The SY8078B is a high efficiency 3MHz synchronous step down DC/DC regulator IC capable of delivering up to 0.6A output current. It can operate in PFM or CCM mode during light load programmed by MODE pin. It can operate over a wide input voltage range from 1.85V to 5.5V and integrate main switch and synchronous switch with very low $R_{DS(ON)}$ to minimize the conduction loss.

Ordering Information

SY8078

Temperature Code
Package Code
Optional Spec Code

Ordering Number	Package Type	Note
SY8078BDTC	DFN1.45x1-6	--

Features

- 1.85~5.5V input voltage range
- 3MHz switching frequency
- 40uA low quiescent current
- Low $R_{DS(ON)}$ for internal switches (PFET/NFET): 350m Ω /250m Ω
- Fixed 100us soft-start time
- PFM/CCM operation mode during light load programmed by MODE pin
- hic-up mode protection for hard short condition
- RoHS Compliant and Halogen Free
- Compact package: DFN1.45x1-6

Applications

- Portable Audio, Portable Media
- Cell phones
- Digital Cameras

Typical Applications

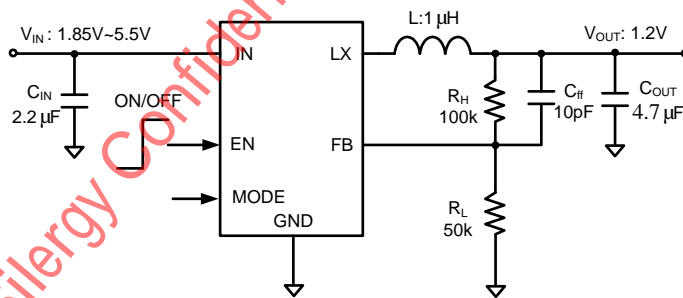


Figure 1. Schematic diagram

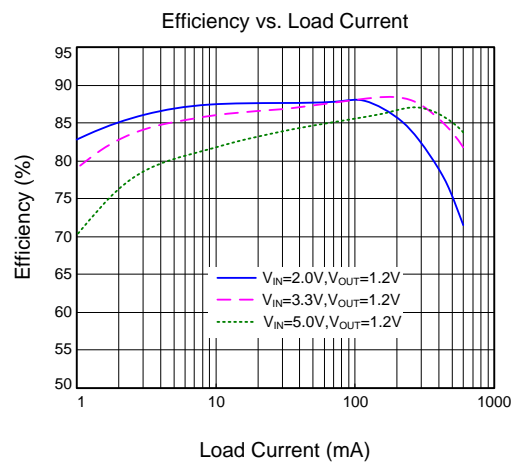
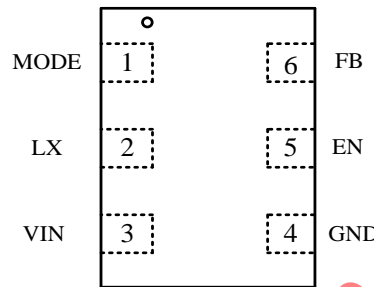


Figure 2. Efficiency vs. Load Current

Pinout (Top View)



(DFN1.45x1-6)

Top Mark: Cxyz for SY8078B (device code: C, x=year code, y=week code, z=lot number code)

Pin Name	Pin Number	Pin Description
1	MODE	Mode control pin. MODE=high, selected Force CCM mode operation during light load. MODE=low, selected PFM mode operation during light load.
2	LX	Inductor pin. Connect this pin to the switching node of inductor.
3	VIN	Input pin. Decouple this pin to GND pin with at least 2.2uF ceramic cap.
4	GND	Ground pin.
5	EN	Enable control. Pull high to turn on. Do not leave it float.
6	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: $V_{OUT}=0.4V*(1+R_H/R_L)$.

Absolute Maximum Ratings (Note 1)

VIN, LX	6.0V
Enable, MODE, FB Voltage	VIN + 0.6V
Power Dissipation, Pd @ TA = 25 °C, DFN1.45x1-6	450mW
Package Thermal Resistance (Note 2)	
θJA	200 °C/W
θJC	130 °C/W
Junction Temperature Range	150 °C
Lead Temperature (Soldering, 10 sec.)	260 °C
Storage Temperature Range	-65 °C to 150 °C

Recommended Operating Conditions (Note 3)

Supply Input Voltage	1.85V to 5.5V
Junction Temperature Range	-40 °C to 125 °C
Ambient Temperature Range	-40 °C to 85 °C



Electrical Characteristics

($V_{IN} = 5V$, $V_{OUT} = 1.2V$, $L = 1\mu H$, $C_{OUT} = 4.7\mu F$, $T_A = 25\text{ }^\circ C$, unless otherwise specified)

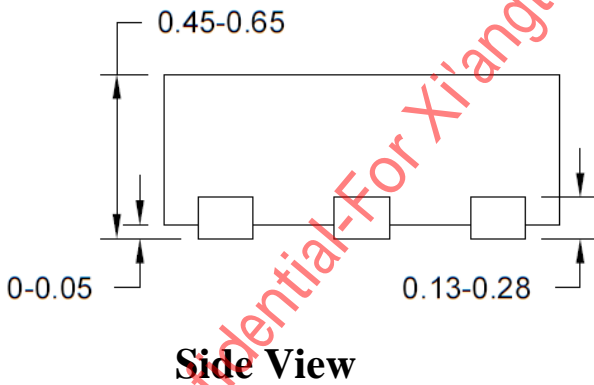
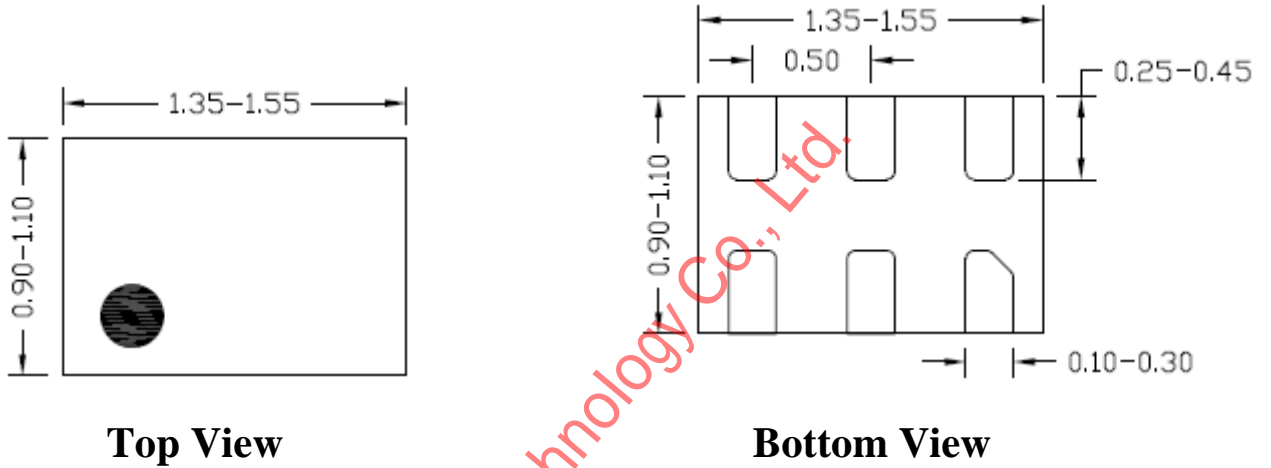
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		1.85		5.5	V
Quiescent Current	I_Q	$I_{OUT}=0, V_{FB}=V_{REF} \times 105\%$		40		μA
Shutdown Current	I_{SHDN}	$EN=0$		0.1	1	μA
Feedback Reference Voltage	V_{REF}		0.392	0.4	0.408	V
Input UVLO threshold	V_{UVLO}				1.85	V
UVLO hysteresis	V_{HYS}			0.1		V
PFET RON	$R_{DS(ON),P}$			350		$m\Omega$
NFET RON	$R_{DS(ON),N}$			250		$m\Omega$
PFET Current Limit	I_{LIM}		1			A
EN rising threshold	V_{ENH}		1.2			V
EN falling threshold	V_{ENL}				0.4	V
Oscillator Frequency	F_{OSC}			3		MHz
Min ON Time				50		ns
Soft Start Time	T_{SS}			100		us
Short Circuit Protection Threshold	V_{SCP}			0.17		V
Thermal Shutdown Temperature	T_{SD}			150		$^\circ C$
Thermal Shutdown Hysteresis	T_{HYS}			20		$^\circ C$

Note 1: Stresses beyond the “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions 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: θ_{JA} is measured in the natural convection at $T_A = 25\text{ }^\circ C$ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

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

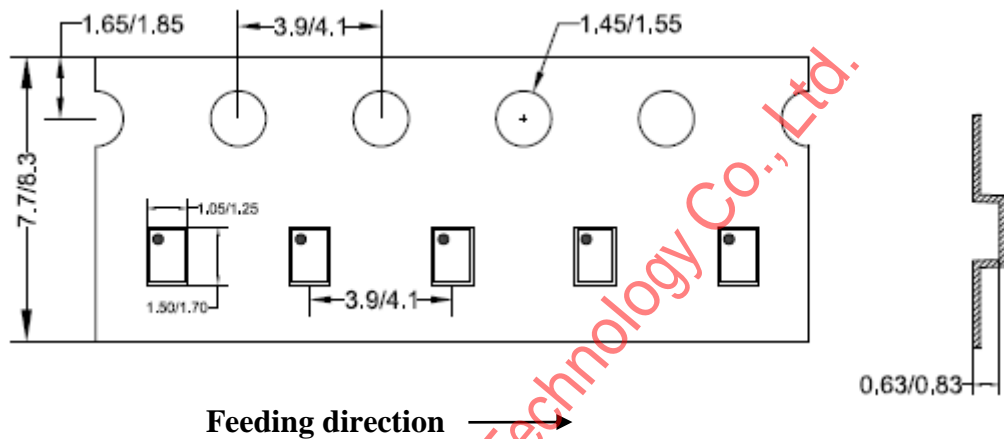
DFN1.45×1-6 Package Outline Drawing



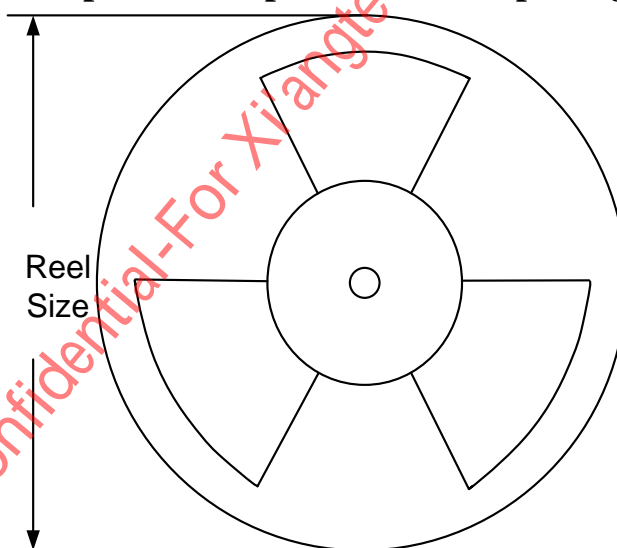
Notes: All dimension in millimeter and exclude mold flash & metal burr.

Taping & Reel Specification

1. Taping orientation



2. Carrier Tape & Reel specification for packages



Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Trailer length(mm)	Leader length (mm)	Qty per reel
DFN1.45x1	8	4	7"	400	160	3000

3. Others: NA