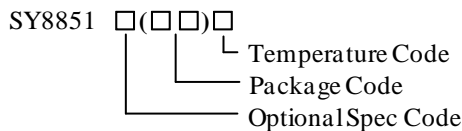


General Description

SY8851 is a 400nA ultra low quiescent current, 1.0MHz synchronous step down DC/DC regulator capable of delivering up to 500mA output current. It can operate over a wide input voltage range from 2.2V to 5.5V and integrate main switch and synchronous switch with very low R_{DS(ON)} to minimize the conduction loss.

Low output voltage ripple, small external inductor and capacitor sizes are achieved with 1.0MHz switching frequency.

Ordering Information



Ordering Number	Package type	Note
SY8851DFC	DFN2×2-8	

Features

- 2.2~5.5V Input Voltage Range
- Ultra Low Quiescent Current Down to 400nA
- Low R_{DS(ON)} for Internal Switches (Top/Bottom) 280mΩ /120mΩ
- Instant PWM Control to Achieve Ultra Fast Load Transient Speed.
- High Switching Frequency 1.0MHz Minimizes the External Components
- Internal Soft-start Limits the Inrush Current
- Power Good Indicator
- Hiccup Mode for Output Short Circuit Protection
- 100% Drop Out Operation
- Output Auto Discharge Function
- RoHS Compliant and Halogen Free
- Compact Package: DFN2x2-8

Applications

- Battery Powered Applications
- Consumer and Portable Medical Products
- Personal Ware Products

Typical Applications

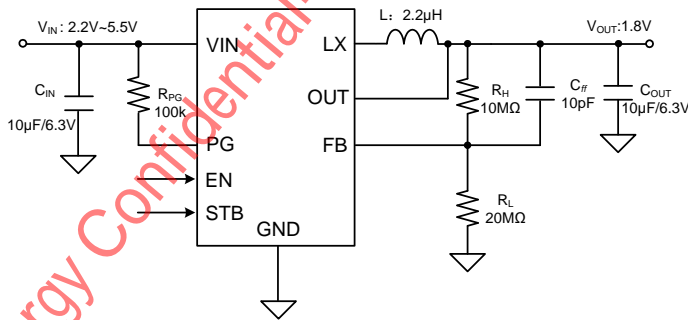


Figure1. Schematic Diagram

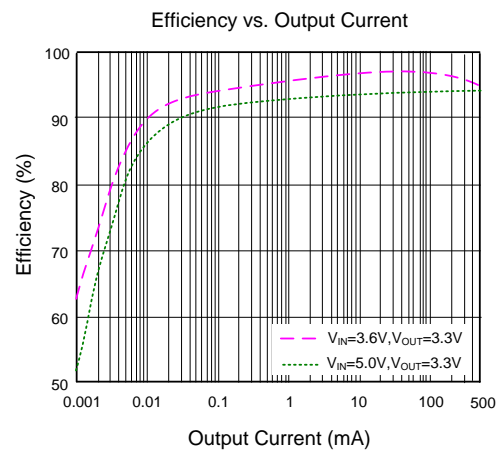
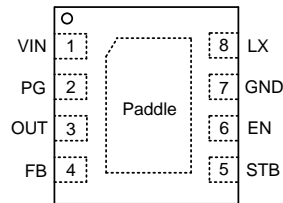


Figure2. Efficiency vs. Output Current

Pinout (Top View)



(DFN2x2-8)

Top Mark: Wtxyz (device code: Wt, x=year code, y=week code, z=lot number code)

Pin Name	Pin Number	Pin Description
VIN	1	Power input pin. Decouple this pin to GND pin with at least a 10 μ F ceramic capacitor.
PG	2	Power good indicator (open drain output). Low if the output < 90% of regulation; high otherwise. Connect a pull-up resistor to the input.
OUT	3	Output voltage feedback pin. Connect this pin to the output side.
FB	4	Connect this pin to the center point of the output resistor divider (as shown in Figure 1) to program the output voltage: $V_{OUT}=1.2V \times (1+R_H/R_L)$.
STB	5	This pin controls the standby mode. With STB = low, deep standby function is activated, $I_Q=400nA$. With STB = high, deep standby function is disabled, $I_Q=15uA$.
EN	6	Enable control. Pull high to turn on. Do not leave it floating.
GND	7	Power Ground pin.
LX	8	Inductor pin. Connect this pin to the switching node of inductor.

Absolute Maximum Ratings (Note 1)

Supply Input Voltage	-----	-0.3V to 6.0V
PG, OUT, STB, EN	-----	-0.3V to $V_{IN} + 0.6V$
LX Voltage	-----	-0.3V ^(*1) to 6V ^(*2)
Power Dissipation, P_D @ $T_A = 25^\circ C$, DFN2x2-8	-----	1.1W
Package Thermal Resistance (Note 2)		
θ_{JA}	-----	85 $^\circ C/W$
θ_{JC}	-----	45 $^\circ C/W$
Junction Temperature Range	-----	-40 $^\circ C$ to 150 $^\circ C$
Lead Temperature (Soldering, 10 sec.)	-----	260 $^\circ C$
Storage Temperature Range	-----	-65 $^\circ C$ to 150 $^\circ C$
(*1) LX Voltage Tested Down to -3V<40ns		
(*2) LX Voltage Tested Up to +7V<40ns		

Recommended Operating Conditions (Note 3)

Supply Input Voltage	-----	2.2V to 5.5V
Junction Temperature Range	-----	-40 $^\circ C$ to 125 $^\circ C$
Ambient Temperature Range	-----	-40 $^\circ C$ to 85 $^\circ C$

Electrical Characteristics

($V_{IN} = 5.0V$, $V_{OUT} = 1.8V$, $L = 2.2\mu H$, $C_{OUT} = 10\mu F$, $T_A = 25^\circ C$, unless otherwise specified)

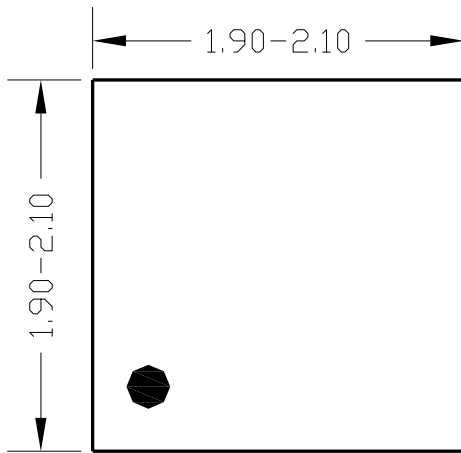
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		2.2		5.5	V
Input UVLO Threshold	V_{UVLO}				2.2	V
Input UVLO Hysteresis	V_{HYS}			0.15		V
Quiescent Current	I_Q	$V_{FB}=V_{REF}\times 115\%$, $STB=0$		400	600	nA
		$V_{FB}=V_{REF}\times 115\%$, $STB=1$		15		μA
Shutdown Current	I_{SHDN}	$V_{EN}=0V$		10	100	nA
Feedback Reference Voltage	V_{REF}		1.182	1.2	1.218	V
LX Node Discharge Resistance	R_{DIS}			10		Ω
Top FET R_{ON}	$R_{DS(ON)1}$			280		m Ω
Bottom FET R_{ON}	$R_{DS(ON)2}$			120		m Ω
EN Input Voltage High	$V_{EN,H}$		1.1			V
EN Input Voltage Low	$V_{EN,L}$				0.4	V
Power Good Threshold	V_{PG}	V_{FB} rising (good)		90		% V_{REF}
Power Good Delay	$t_{PG,F}$	High to low		20		μs
Min ON Time	$t_{ON,MIN}$			80		ns
Maximum Duty Cycle	D_{MAX}		100			%
Turn On Delay	$t_{ON,DLY}$	from EN high to LX start switching		400		μs
Switching Frequency	f_{SW}	$V_{OUT}=1.2V$, $I_{OUT}=500mA$		1		MHz
Top FET Current Limit	$I_{LMT, TOP}$		0.9		1.5	A
Bottom FET Current Limit	$I_{LMT, BOT}$		0.5			A
Output Under Voltage Protection Threshold	$V_{UVP, OUT}$	V_{OUT} threshold		1		V
Output UVP Delay	$t_{UVP, DLY}$			20		μs
UVP Hiccup ON Time	$t_{UVP, ON}$			0.25		ms
UVP Hiccup OFF Time	$t_{UVP, OFF}$			0.25		ms
Thermal Shutdown Temperature	T_{SD}			150		$^\circ C$
Thermal Shutdown Hysteresis	T_{HYS}			15		$^\circ C$

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.

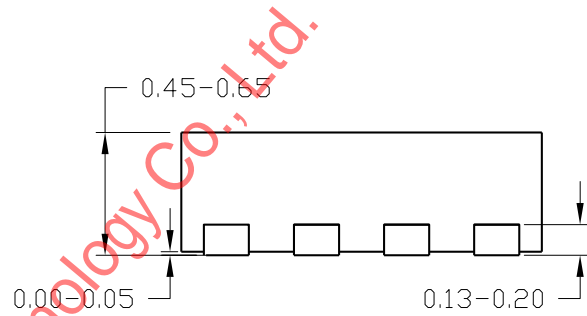
Note 2: θ_{JA} of SY8851DFC is measured in the natural convection at $T_A = 25^\circ C$ on 20Z two-layer Silergy evaluation board of JEDEC 51-3 thermal measurement standard. Paddle of DFN2x2-8 package is the case position for SY8851DFC θ_{JC} measurement.

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

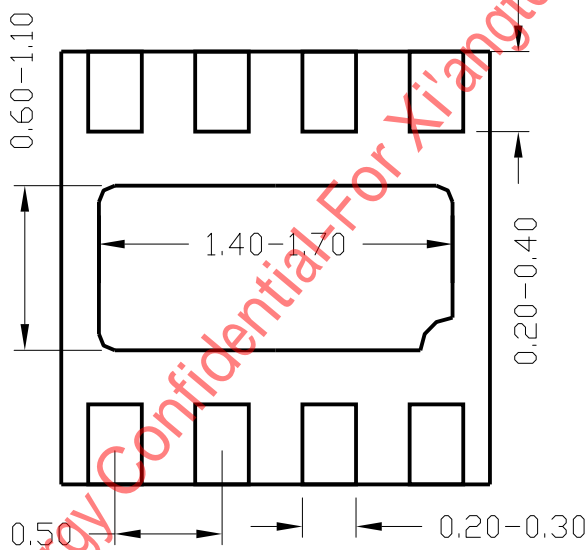
DFN2×2-8 Package Outline



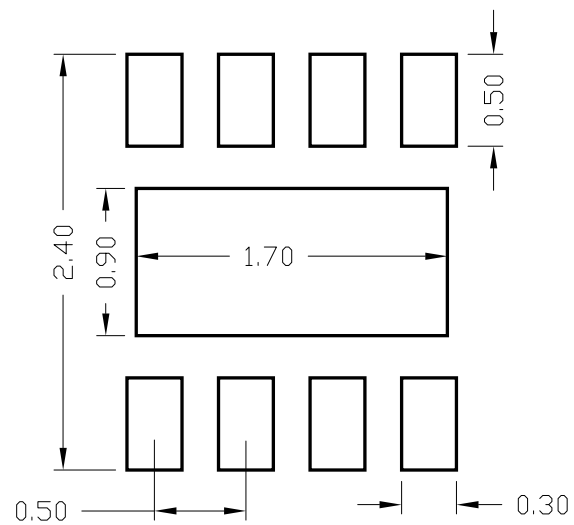
Top View



Side View



Bottom View

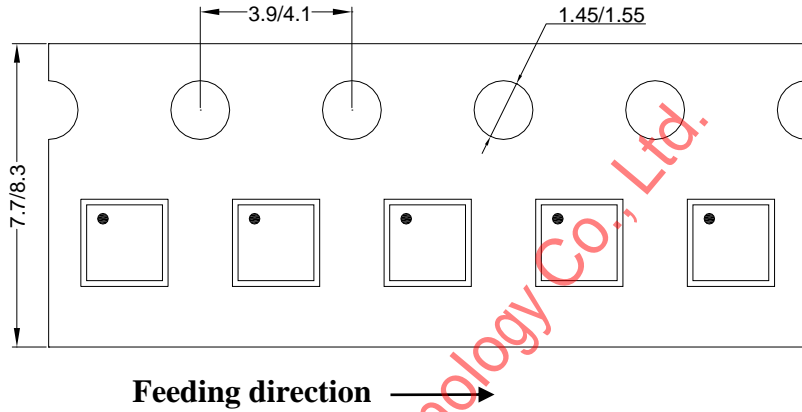


**PCB Layout
(Reference Only)**

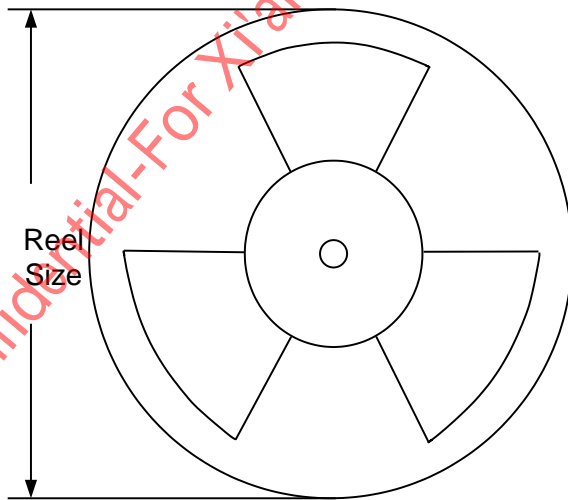
Notes: **All dimension in millimeters.**
 All dimensions don't include mold flash & metal burr.

Taping & Reel Specification

1. DFN2x2



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
DFN2x2	8	4	7"	400	160	3000

3. Others: NA