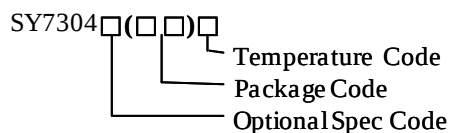


General Description

The SY7304 is a high efficiency, current-mode control Boost regulator. The device integrates a 120mΩ low $R_{DS(ON)}$ N-channel MOSFET for high efficiency. The fixed 1MHz switching frequency and internal compensation reduce external components size and count. The build-in internal soft start circuitry minimizes the inrush current at start-up.

The SY7304 is available in compact DFN3×3-10 package.

Ordering Information



Ordering Number	Package type	Note
SY7304DBC	DFN3×3-10	4A

Features

- Wide input range: 3-33V
- Maximum output voltage: 33V
- 1MHz switching frequency
- Integrated 120 mΩ $R_{DS(ON)}$ switch with 4A peak current capability
- Internal soft-start
- $0.6V \pm 2\%$ reference voltage
- Cycle by cycle peak current limit
- Over temperature protection
- RoHS Compliant and Halogen Free
- Compact package: DFN3×3-10

Applications

- Portable Device
- Battery Powered System
- Networking cards powered from PCI or PCI-express slots

Typical Applications

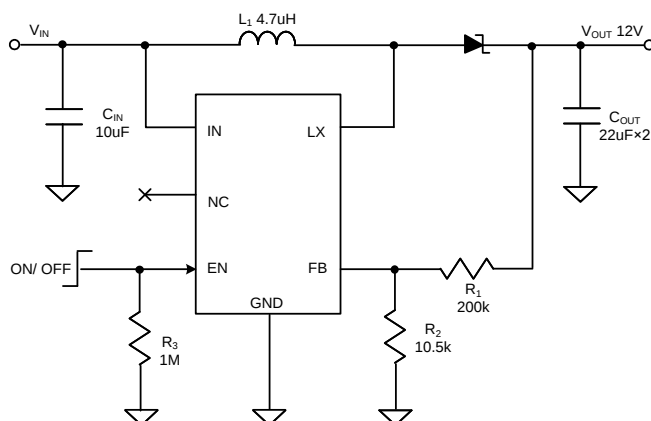


Figure 1. Schematic Diagram

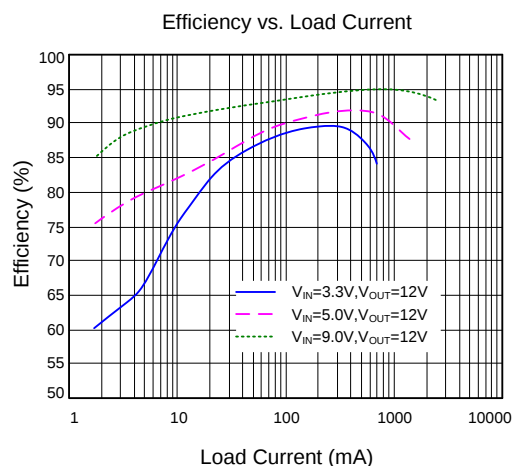
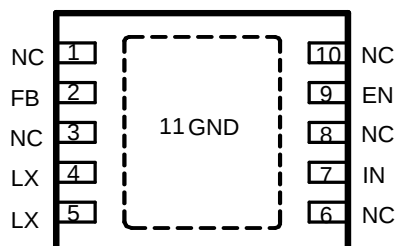


Figure 2. Efficiency vs. Load Current

Pinout (top view)



(DFN3×3-10)

Top Mark: VIxyz (Device code: VI, x=*year code*, y=*week code*, z= *lot number code*)

Pin Name	Pin Number	Pin Description
IN	7	Input pin. Decouple this pin to GND pin with 1uF ceramic cap.
GND	11	Ground pin
LX	4,5	Inductor node. Connect an inductor between IN pin and LX pin.
FB	2	Feedback pin. Connect a resistor R1 between V _{OUT} and FB, and a resistor R2 between FB and GND to program the output voltage: $V_{OUT}=0.6V \cdot (R1/R2+1)$.
EN	9	Enable control. High to turn on the part. Don't leave it floated.
NC	1,3,6,8,10	No connection.

Absolute Maximum Ratings (Note 1)

LX, IN, EN ----- -0.3V to 36V

FB ----- -0.3V to 4V

Power Dissipation, P_D @ T_A = 25°C DFN3×3-10-----2.6W

Package Thermal Resistance (Note 2)

θ_{JA} -----38°C/W

θ_{JC} ----- 8°C/W

Junction Temperature Range ----- -40 to 150°C

Lead Temperature (Soldering, 10 sec.) ----- 260°C

Storage Temperature Range ----- -65°C to 150°C

Dynamic LX voltage in 50ns duration ----- IN+3V to GND-4V

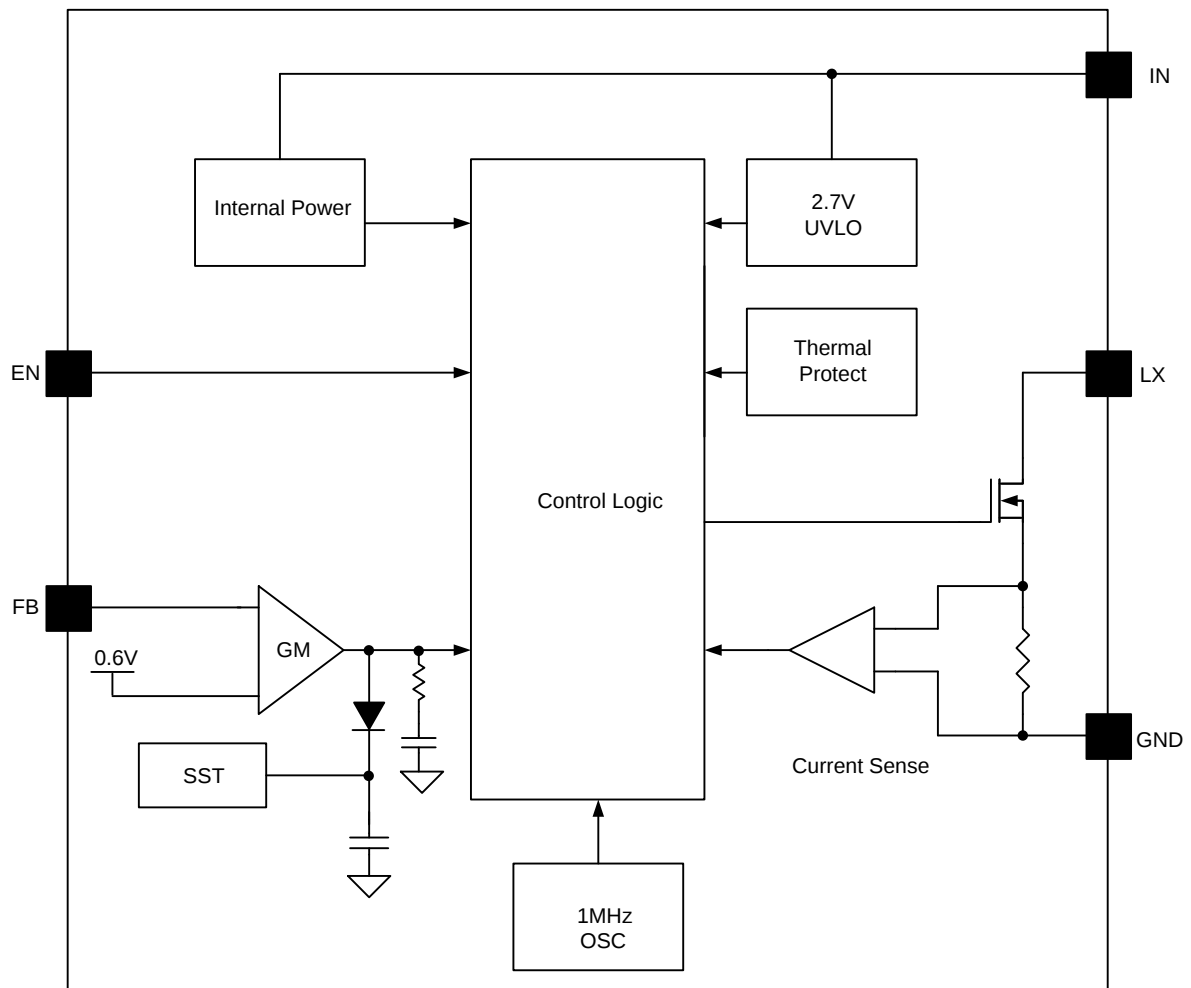
Recommended Operating Conditions (Note 3)

IN ----- 3V to 33V

Junction Temperature Range ----- -40°C to 125°C

Ambient Temperature Range ----- -40°C to 85°C

Block Diagram



Electrical Characteristics

($V_{IN} = 5V$, $V_{OUT} = 12V$, $I_{OUT} = 100mA$, $T_A = 25^\circ C$ unless otherwise specified)

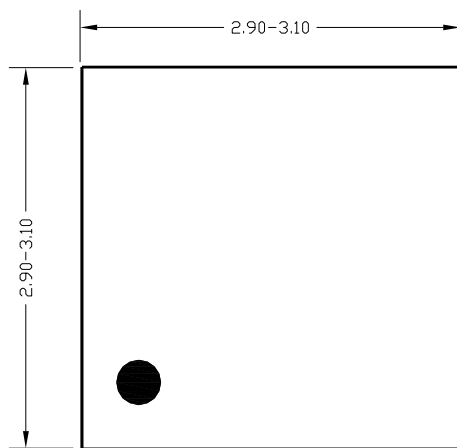
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		3		33	V
Quiescent Current	I_Q	$V_{FB} = 0.66V$		100		μA
Shutdown Current	I_{SHDN}	EN=0			15	μA
Low Side Main FET R_{ON}	$R_{DS(ON)}$			120		$m\Omega$
Main FET Current Limit	I_{LIM}	Duty cycle=80%	4		6	A
Switching Frequency	F_{SW}		0.8	1	1.2	MHz
Feedback Reference Voltage	V_{REF}		0.588	0.6	0.612	V
FB Pin Input Current	I_{FB}		-50		50	nA
IN UVLO Rising Threshold	$V_{IN,UVLO}$				2.7	V
UVLO Hysteresis	$U_{VLO,HYS}$			0.1		V
EN Rising Threshold	V_{ENH}		2			V
EN Falling Threshold	V_{ENL}				0.4	V
Max Duty Cycle	D_{max}			90		%
Thermal Shutdown Temperature	T_{SD}			150		$^\circ C$
Thermal Recovery Hysteresis	T_{HYS}			15		$^\circ C$

Note 1: Stresses listed as the above “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

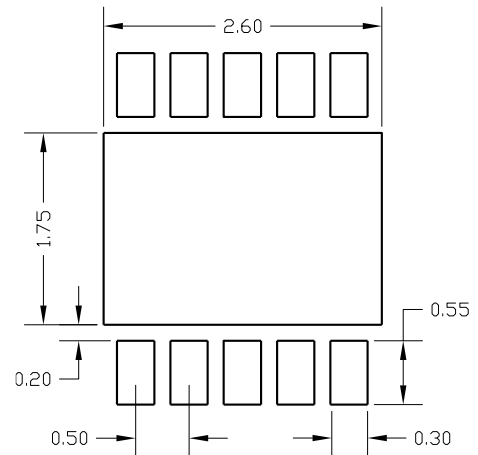
Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^\circ C$ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Test condition: Device mounted on 2” x 2” FR-4 substrate PCB, 2oz copper, with minimum recommended pad on top layer and thermal vias to bottom layer ground plane.

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

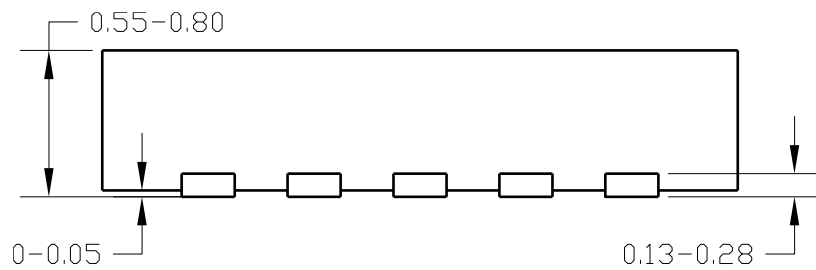
DFN3x3-10 Package outline



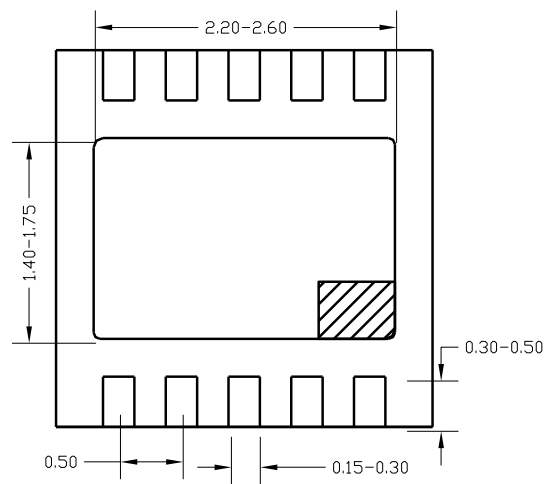
Top View



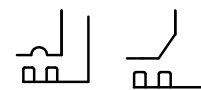
PCB layout (recommended)



Side View



Bottom View

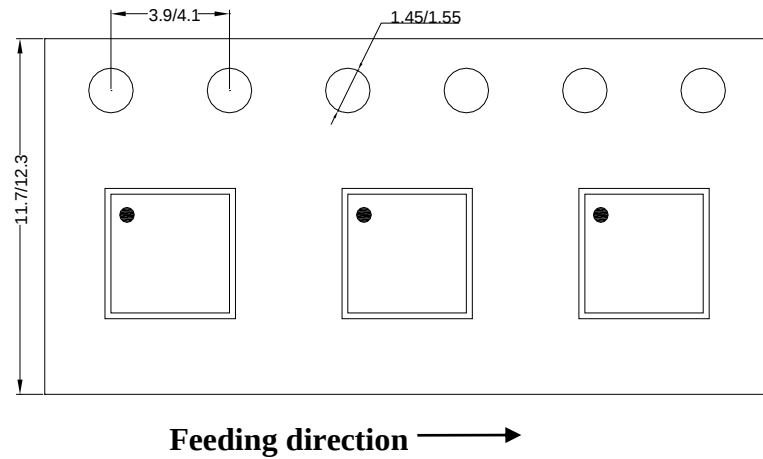


Detail A
Pin1 identifier: two options

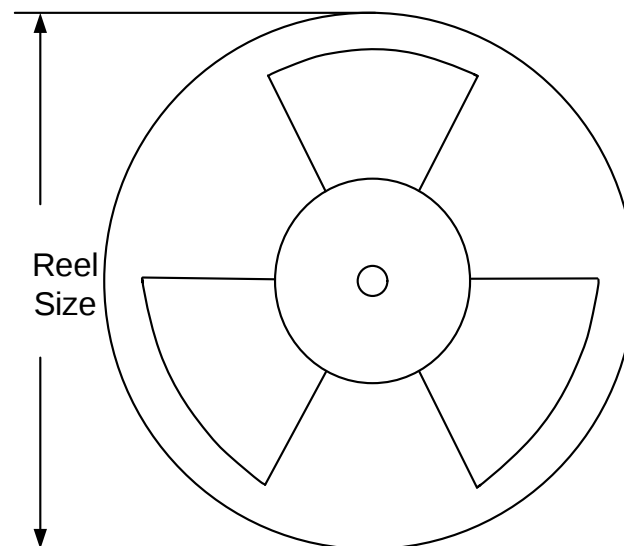
Notes: All dimensions are in millimeters and exclude mold flash & metal burr.

Taping & Reel Specification

1. DFN3x3-10 tapping 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
DFN3x3	10	8	13"	400	400	5000

3. Others: NA