

500mA Linear Charger with 150nA Shipping Mode Current

Features

- 3.4V to 5.5V input range for Efficient Linear Charging
- Programmable Charging Current from 10mA to 500mA by 0.1% external resistor
- Low Dropout Fast Charge, up to 1.5A
- Configurable 4V - 4.525V charging voltage. Preset 4.2V with $\pm 0.5\%$ Accuracy
- Fully Integrated Power Path Switches and No External Blocking Diode Required
- Charging/Discharging Current Monitor Output for Fuel Gauging
- Device Status Output and Access Command Input from STACMD pin
- C/20 Charge Termination
- 2.8V Trickle Charge Threshold
- Built-In Battery Disconnection Function for Shipping Mode with 150nA current consumption
- Built-In Robust Protection Including Input Current Limit, System Short-Circuit Protection, Discharge Current Limit, Battery OVP, Thermal Regulation
- Safety Related Certifications:
IEC62368-1 : 2018 CB Certification
- Tiny 0.67mm x 1.02mm 6-pin WLP with 0.35mm pitch

Applications

- Smart Watch/Band
- TWS Earbud
- Bluetooth Portable Device

General Description

YHM2710 is a highly integrated, single-cell Li-ion battery charger with system power path management for space-limited portable applications. The full charger function features Trickle-charge, constant current fast charge and constant voltage regulation, charge termination, and auto recharge.

YHM2710 can deliver up to 500mA charging current, be programmed externally with a single resistor. The charge voltage is default 4.2V and adjustable by Access command. YHM2710 automatically terminates the charge cycle when the charge current drops to 1/20 of the programmed value after the final float voltage is reached. The device can report charging/discharging current for fuel gauging by current monitor output.

Fully Integrated Power Path Switches and no blocking diode is required due to the internal bi-direction MOSFET architecture. Thermal feedback regulates the charge current to limit the die temperature during high power operation or high ambient temperature.

YHM2710 can enter shipping mode by Access command and exit it after input power is present. In shipping mode, battery FET is open and the device only consume 150nA current.

The device status is indicated on STACMD pin output for charging, discharging and charge done. This pin also supports Access command to adjust charging current and charging voltage or enter different mode.

YHM2710 comes in a 6-bump, 0.35mm pitch, 0.67mm x1.02mm wafer-level package (WLP).

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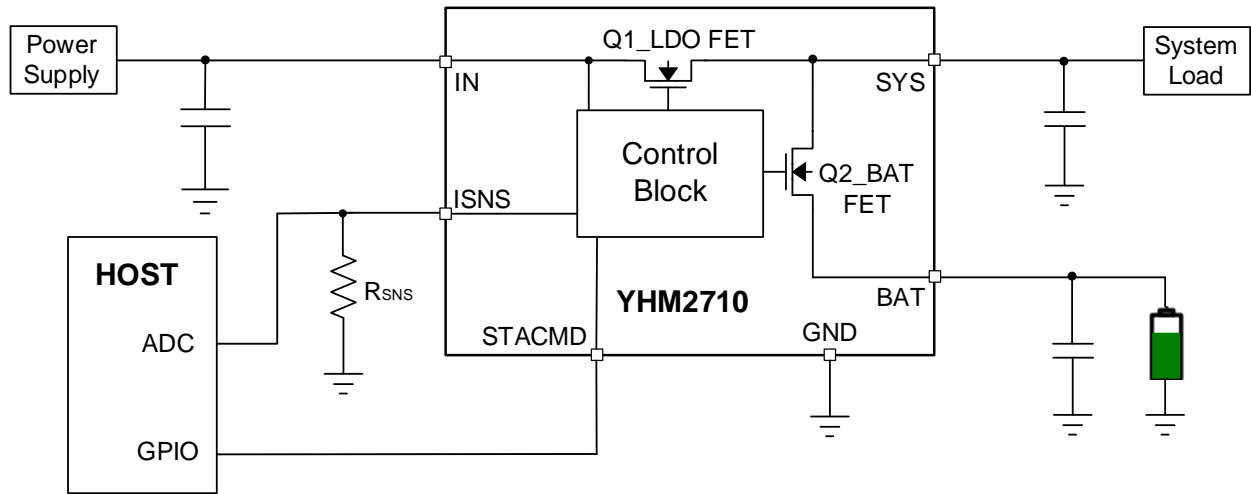


Fig 1. YHM2710 Typical Application

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YHM2710 Pin Configurations

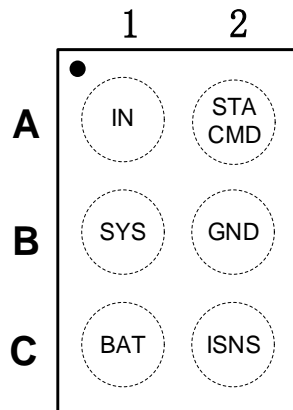


Fig 2. YHM2710 WLP-6 Pin Assignment(Top Through View)

YHM2710 WLP Pin Descriptions

WLP	Name	Description
A1	IN	Input and Power Supply. Bypass this input with a ceramic capacitor to ground.
A2	STACMD	Status Output and Access Command Input. This pin can also be used as push button for hardware reset or exit ship mode, connect push button by 50kohm resistor.
B1	SYS	System power supply. Connect to system load. Place at least 4.7 μ F ceramic capacitor from SYS to GND, and as close to the IC as possible.
B2	GND	Ground.
C1	BAT	Battery Pin. Place at least 2.2 μ F ceramic capacitor from BAT to GND, and as close to the IC as possible.
C2	ISNS	Charge Current Program & Monitor Pin. The charge current is programmed by connecting a 0.1% resistor to GND. The voltage on this pin can be used to measure the current between BAT and SYS. This pin can be used for Q2 fully turn on control when tied to ground.

Function Table

STACMD PIN	Status
Low	Charging
High	Other Status except Charging

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1 Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Disclaimer: YHMICROS reserves the right to make any change in circuit design, specification or other related things if needed without notice at any time.

Symbol	Parameters	Min.	Max.	Unit
V_{IN}	IN to GND	-0.3	6	V
V_{SYS}	SYS to GND	-0.3	$V_{IN} + 0.3$	V
V_{OTHER}	Other Pin to GND	-0.3	6	V
I_{IN}	Input Current	0	1500	mA
T_{STG}	Storage Junction Temperature	-65	+150	°C
T_J	Operating Junction Temperature		+150	°C
T_L	Lead Temperature (Soldering, 10 Seconds)		+260	°C
θ_{JA}	Thermal Resistance, Junction-to-Ambient (100mm ² pad of 1 oz. copper)		TBD	°C/W
All Pins	Electrostatic Discharge Capability	Human Body Model, EIA/JESD22-A114	2	KV
		Charged Device Model, JESD22-C101	1	

Note 1. Refer to JEDEC JESD51-7, use a 4-layerboard

2 Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance.

Parameters	Min.	Max.	Unit
V_{IN}	3.4	5.5	V
I_{IN}	0	550	mA
I_{DISCHG}	0	1500*	mA
I_{CHG}	10	500	mA
V_{OTHER}	0	5.5	V
C_{IN}	0.1		μF
C_{SYS} (at least 3μF of ceramic capacitance with DC bias de-rating)	4.7		μF
C_{BAT}	2.2		μF
Ambient Operating Temperature, T_A	-40	85	°C
Operating Junction Temperature, T_J	-40	150	°C

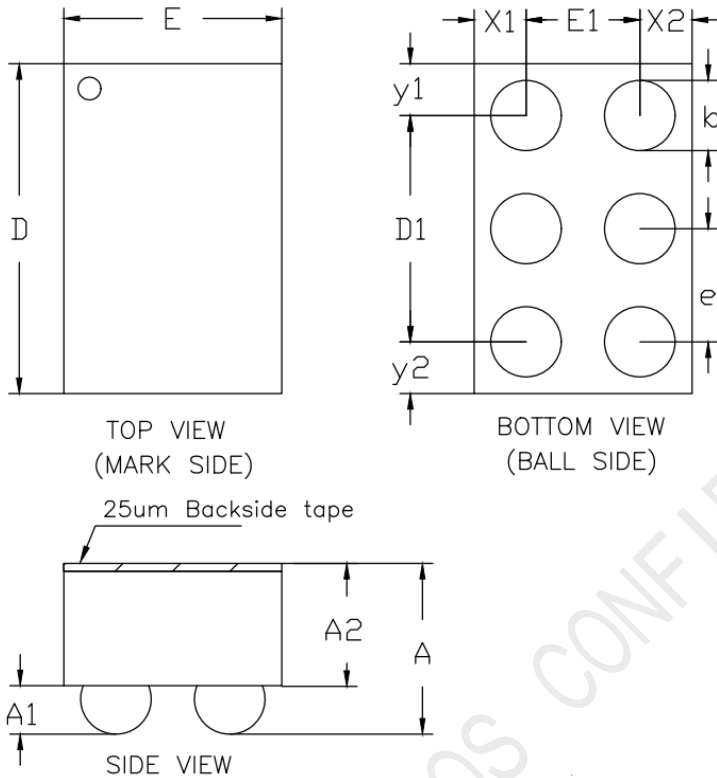
*1.5A continuous discharge current in 85°C. Peak 2.5A 10ms.

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Package Dimensions

WLCSP-6 0.67x1.02



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.483	0.528	0.573
A1	0.130	0.150	0.170
A2	0.353	0.378	0.403
D	1.000	1.020	1.040
D1	0.700BSC		
E	0.650	0.670	0.690
E1	0.350BSC		
b	0.200	0.220	0.240
e	0.350BSC		
x1	0.160 REF		
x2	0.160 REF		
y1	0.160 REF		
y2	0.160 REF		

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Ordering Information

Part Number	Temp Range	Pin Package	Top Mark	MOQ
YHM2710W6T	-40°C to 85°C	6 WLCSP	YW L0	3000

T = Tape and reel.

YW: Date Code. Y = year, W = week.

L: The last number of LOTID.

0: YHM2710

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