Ordering number :ENN5285

Monolithic linear IC

LA5615M

Lead Battery Charger IC with Battery Voltage Detection Function

Overview

The LA5615M is an IC that integrates a battery voltage detection and lead battery charger on a single chip that supports compact sets.

Functions and Features

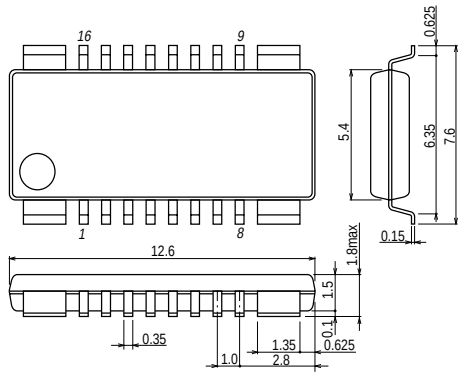
- Charge voltage can be switched between cycle charge and trickle charge (4.9 V typ. → 4.6 V typ.).
- Charge current limit can be set with an external resistor (125 mA typ.).
- Built-in charge current detection circuit
- Built-in battery voltage detection circuit

Package Dimensions

unit: mm

3097-MFP16FS

[LA5615M]



SANYO: MFP16FS

Specifications

Maximum Rating at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC} max		15	V
Battery pin voltage	V_{Batt} max		6	V
Allowable power dissipation	Pd max		0.7	mW
Operating temperature	Topr		–20 to +80	°C
Storage temperature	Tstg		–30 to +125	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		6.15 to 14.5	V
Battery pin voltage	$V_{Batt\ IN}$		0 to 5.5	V
CHARGE LED sink current	$I_{CHG\text{-}LED}$		0 to 40	mA
DET LED sink current	$I_{DET\text{-}LED}$		0 to 40	mA
V_{Batt} sink current	$I_{Batt\text{-}LED}$		0 to 40	mA

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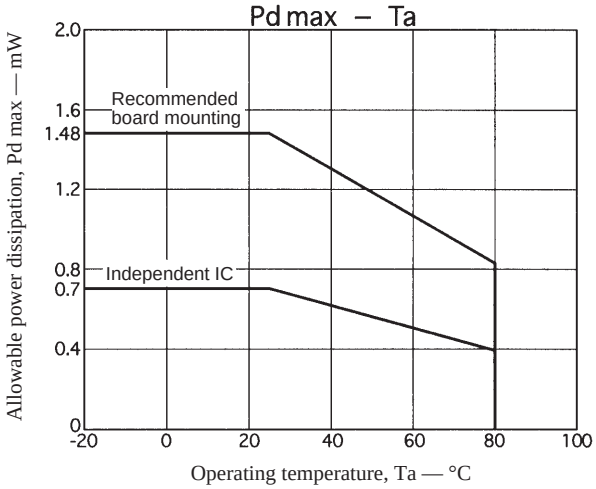
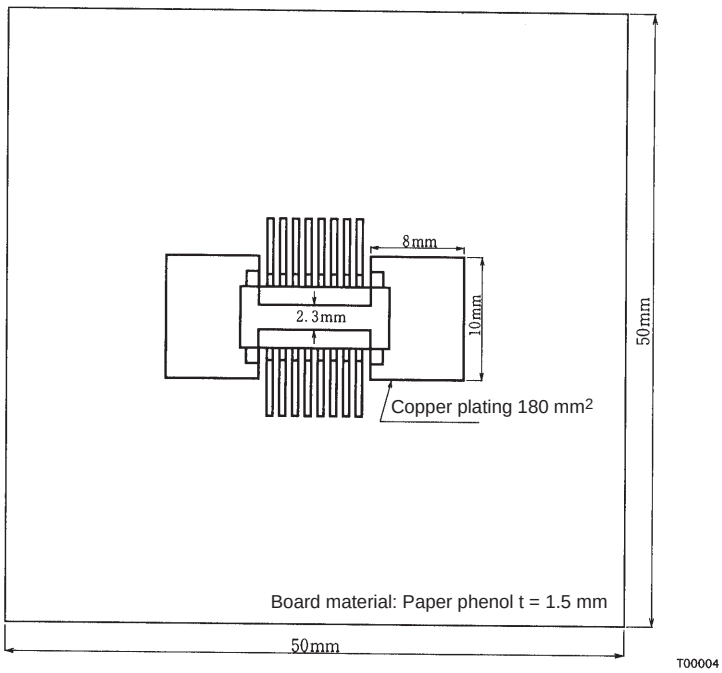
Electrical Characteristics at Ta = 25°C, V_{CC} = 9 V = $V_{Batt\ IN}$ = 4 V

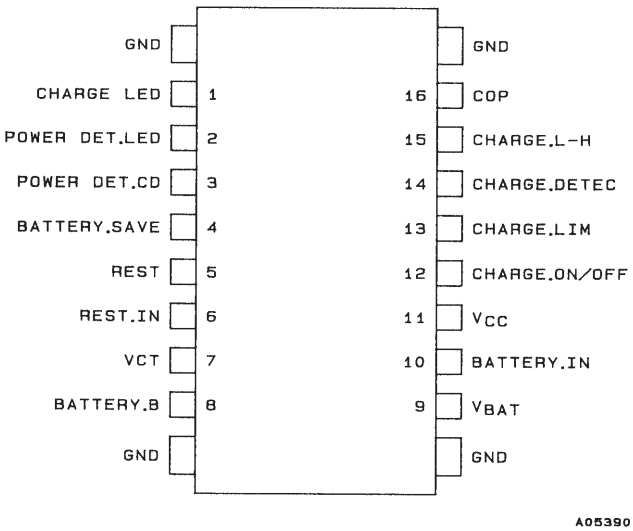
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[Charge System]						
Charge voltage (when trickle is selected)	V_O1	I_O = 10 mA	4.45	4.6	4.75	V
Charge voltage (when cycle is selected)	V_O2	I_O = 50 mA	4.75	4.9	5.05	V
Differential voltage of V_O2 and V_O1	ΔV_O	$\Delta V_O = V_O2 - V_O1$	0.2	0.3	0.4	V
Cycle trickle switching current	I_{CT}		34	40	46	mA
Output peak current	I_{OP}	R_L = 33 Ω	112.5	125	137.5	mA
Line regulation (when trickle is selected)	$V_{OLN}1$	V_{CC} = 8 to 14.5 V, I_O = 10 mA		50	100	mV
Line regulation (when cycle is selected)	$V_{OLN}2$	V_{CC} = 8 to 14.5 V, I_O = 50 mA		100	150	mV
Load regulation (when trickle is selected)	$V_{OLD}1$	I_O = 0.5 to 30 mA		50	100	mV
Load regulation (when cycle is selected)	$V_{OLD}2$	I_O = 50 to 60 mA		100	150	mV
Current drain	I_Q1	I_O = 0 mA		6	10	mV
	I_Q2	I_O = 50 mA		13	21	mA
CHARGE LED residual voltage	$V_{CHG\text{-}LED}$	I_{IN} = 40 mA		1.1	1.3	V
CHARGE LED leak current	$I_{CHG\text{-}LED}$	V_{IN} = 9 V			200	nA
CHARGE detection current	$I_{CHARGED}$		0.8	1	1.2	mA
DET LED residual voltage	V_{DET}	I_{IN} = 40 mA		1.1	1.3	V
DET LED leak current	I_{DET}	V_{IN} = 9 V			200	nA
POWER DET detection voltage	$V_{DET\text{-}IN}$		5.85	6.05	6.15	V
POWER DET hysteresis width	$V_{DET\text{-}HYS}$		0.1	0.2	0.3	V
[Battery Detection System]						
Battery detection voltage	V_{Batt}		3.17	3.3	3.43	V
V_{BAT} pin residual voltage	V_{BAT}	I_{IN} = 40 mA		0.3	0.5	V
V_{BAT} pin leak current	I_{BAT}	V_{IN} = 5 V			200	nA
Current drain when detection circuit is OFF	I_{OFF}	V_{Batt} = 2.5 V		5	6	µA
Current drain when detection circuit is ON	I_{ON}	No load		350	500	µA
Current drain during Battery SAVE	I_{SAVE}	V_{Batt}. SAVE = 4 V		20	30	µA
Battery B residual voltage	V_{BAT}.B	I_{IN} = 40 mA		1.1	1.3	V
[Internal transistors for reset]						
REST residual voltage	V_{REST}	REST.IN = 2 µA, I_{IN} = 50 µA		0.3	0.5	V
REST leak current	I_{REST}	V_{IN} = 5 V			200	nA
[Internal transistors for reset]						
Threshold voltage	V_{SAVE}.TH.		1.1	1.27	1.5	V
SAVE pin input current	$I_{SAVE.}$.IN	V_{IN} = 4 V		17	24	µA



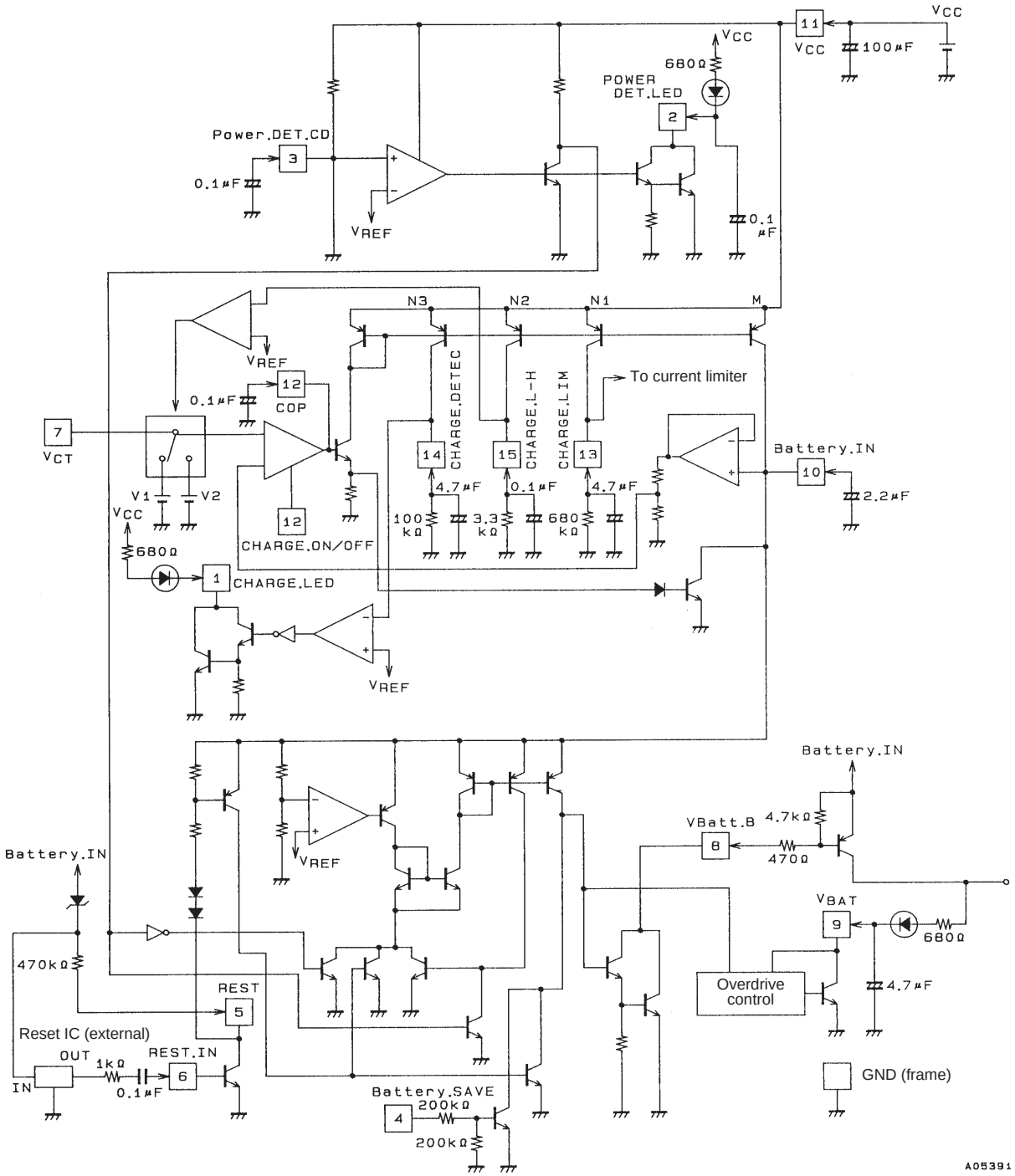
Recommended Board



Pin Assignment

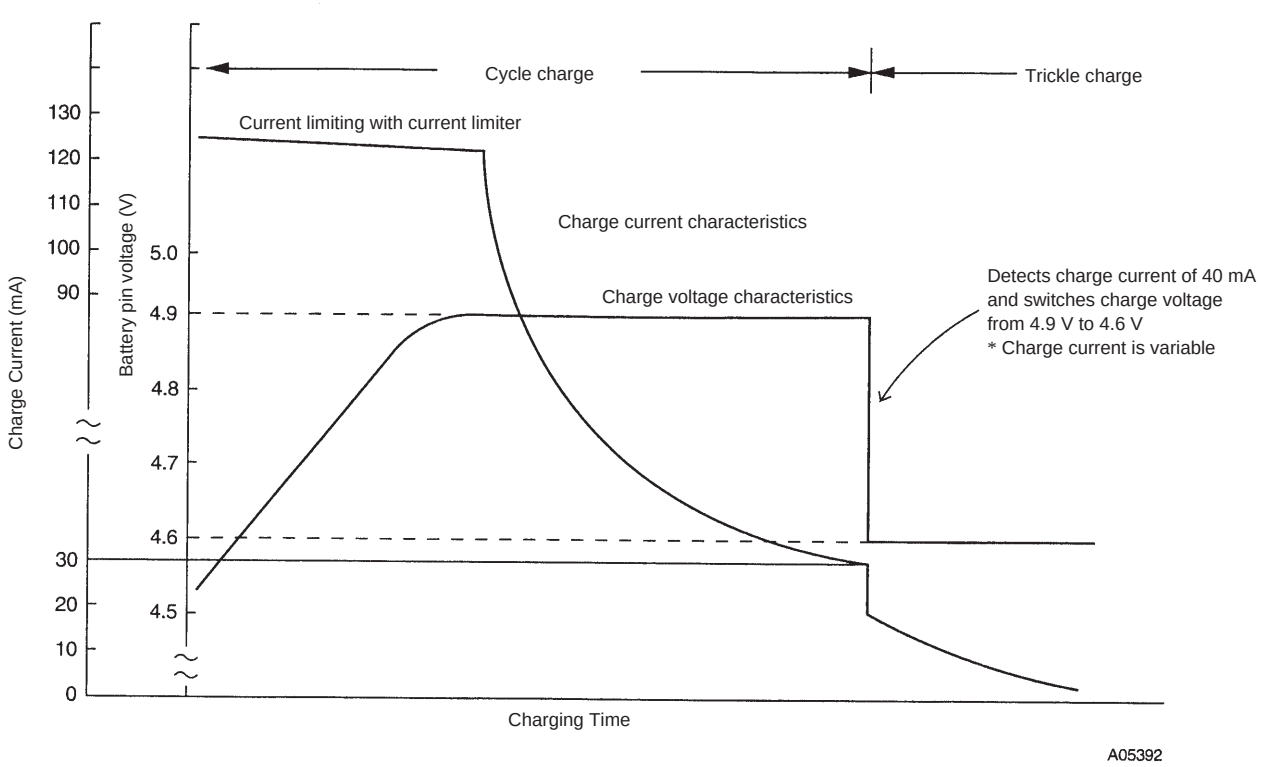


Sample Application Circuit

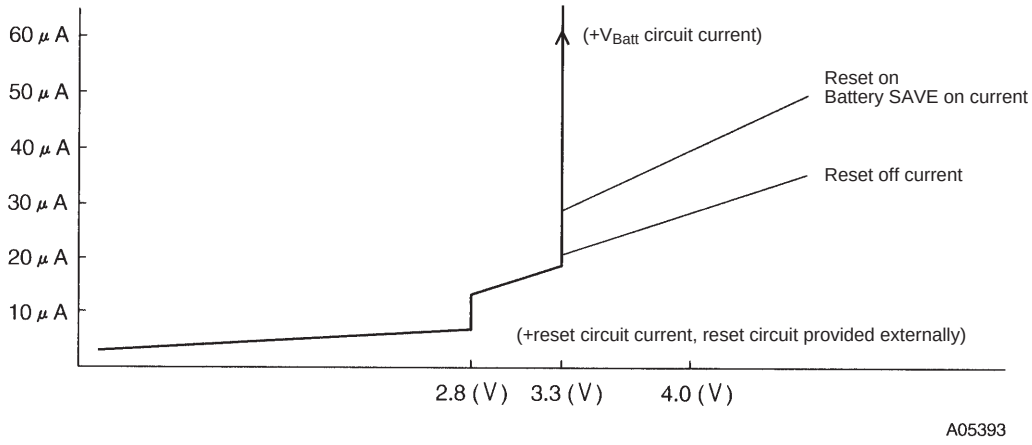


Notes: 1. Use capacitors with little temperature-related capacitance fluctuation (Sanyo capacitors, etc.).
2. The reset IC must be provided externally.

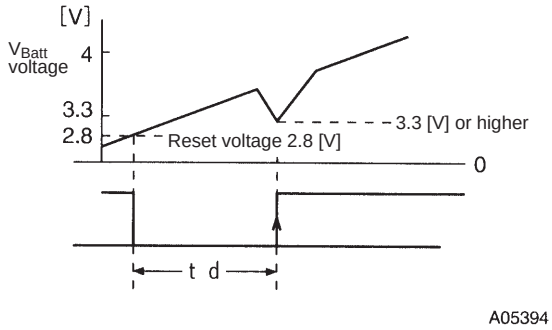
Battery Charger Charging Characteristics



Current Drain Characteristics



Relationship between Reset and V_{Batt} Circuit



The V_{Batt} circuit operates at the edge where the reset voltage becomes Hi. (At this time, the output transistors are set on and the load put on; If this voltage is 3.3 [V] or higher, the V_{Batt} circuit operates, and if it is lower than 3.3 [V], it does not start up.)

Timing Charts