

Lithium-ion Battery Charger Controller IC with Timer

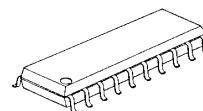
■GENERAL DESCRIPTION

The **NJW4100** is a Lithium-ion Battery Charger Controller IC with over charger timer.

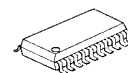
Charger current and voltage can individually be set by the external resistors. Therefore, it can be used for a wide range of battery cells for both 1-cell and 2-cell applications.

It includes a lot of safety features for safety conscious design: Over voltage, Over discharge, temperature monitor and over charge timers.

■PACKAGE OUTLINE



NJW4100M



NJW4100V

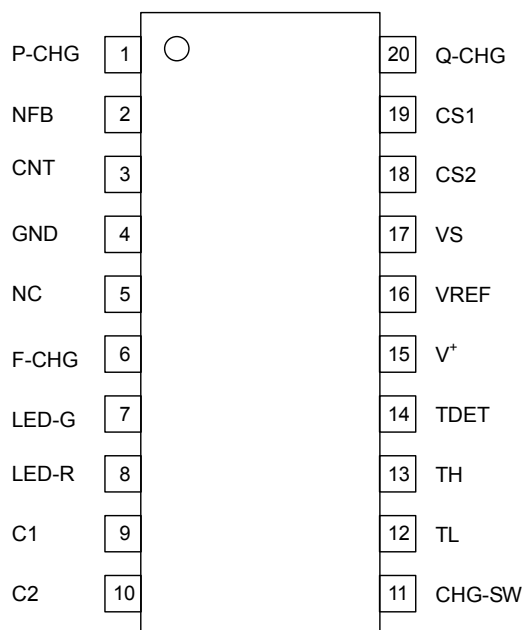
■FEATURES

- Adjustable Charge Voltage
- Adjustable Pre-Charge and Full Charge Current
- Temperature Monitor
- Over Charge Timer
- Internal Re-Charge function
- Delay timers and Hysteresis inputs for high noise immunity
- Over Discharge Battery Detect
- Over Voltage Protection
- Bi-CMOS Technology
- Package Outline

NJW4100M : DMP20

NJW4100V : SSOP20

■PIN CONFIGURATION



NJW4100M

NJW4100V

NJW4100

■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Operating Voltage	V^+	+15	V
C1 Pin Voltage	V_{C1}	+5	V
C2 Pin Voltage	V_{C2}	+5	V
TDET Pin Voltage	V_{TDET}	+5	V
CNT Pin Output Current	$I_{SINK-CNT}$	50	mA
LED-G Pin Output Current	I_{SINK-G}	20	mA
LED-R Pin Output Current	I_{SINK-R}	20	mA
Power Dissipation	P_D	DMP20 :300 SSOP20 :300	mW
Operating Temperature Range	T_{OPR}	-20 ~ +85	°C
Storage Temperature Range	T_{STG}	-40 ~ +125	°C

■ELECTRICAL CHARACTERISTICS ($V^+=5V$, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
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General Characteristics

Operating Voltage	V_{OP}		–	–	14	V
Operating Current	I_{CC}	CHG-SW: OPEN	–	2	3	mA

Under Voltage Lockout Block

ON Threshold Voltage	V_{T-ON}		2.2	2.4	2.6	V
OFF Threshold Voltage	V_{T-OFF}		2.0	2.2	2.4	V
Hysteresis Voltage	V_{HYS}		100	200	300	mV

Reference Voltage Block

Reference Voltage	V_{REF}	$I_{REF}=0mA$	1.228	1.24	1.253	V
Load Regulation	ΔV_{REF}	$I_{REF}=0mA \sim 1mA$	–	–	10	mV

Voltage Detection Block

Quick Charge Detection Voltage	V_{Q-CHG}	VS: L→H	$V_{BAT} \times 0.71$	$V_{BAT} \times 0.73$	$V_{BAT} \times 0.75$	V
Re-Charge Detection Voltage	V_{R-CHG}	VS: H→L	$V_{BAT} \times 0.94$	$V_{BAT} \times 0.95$	$V_{BAT} \times 0.96$	V
Over Voltage Detection Voltage	V_{OV}	VS: L→H	$V_{BAT} \times 1.015$	$V_{BAT} \times 1.025$	$V_{BAT} \times 1.035$	V
Charge Control Block Reference Voltage	V_{REF-CV}	VS Pin	4.17	4.2	4.23	V
VS Pin Input Bias Current	I_{VS}	VS=4.2V	–	50	500	nA
Battery Connected Detection Voltage	V_{T-TDET}	TDET Pin	–	1.15	–	V

Low Voltage Detection (2mA Charge) Block

Charge Current	I_{CHG1}	VS=1V	1	2	3	mA
Low Voltage Detection Voltage	V_{LV}	VS: L→H	$V_{BAT} \times 0.455$	$V_{BAT} \times 0.475$	$V_{BAT} \times 0.495$	V

■ELECTRICAL CHARACTERISTICS ($V^+=5V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
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Current Detection Block

Pre-Charge /Quick Charge Block Voltage Gain	A_{V1}	CS1=3.8V, CS2=3.6V	11.5	12	12.5	dB
Full Charge Block Voltage Gain	A_{V2}	CS2=VS=4.2V, $V_{F-CHG}=96mV$	15.5	18	21	dB
F-CHG Pin Input Voltage Range	V_{F-CHG}	CS2=VS=4.2V	48	—	—	mV
CS1 Pin Input Bias Current	I_{CS1}	CS1=4.2V	—	10	500	nA
CS2 Pin Input Bias Current	I_{CS2}	CS2=4.2V	—	10	500	nA

Output Block

CNT Pin Saturation Voltage	V_{OL-CNT}	$I_{SINK}=20mA$	—	0.2	0.5	V
CNT Pin Leak Current	$I_{LEAK-CNT}$	$V^+=14V$	—	—	1	μA

LED Out Block

LED-G Pin Saturation Voltage	V_{OL-G}	$I_{SINK}=10mA$	—	0.2	0.5	V
LED-G Pin Leak Current	I_{LEAK-G}	$V^+=14V$	—	—	1	μA
LED-R Pin Saturation Voltage	V_{OL-R}	$I_{SINK}=10mA$	—	0.2	0.5	V
LED-R Pin Leak Current	I_{LEAK-R}	$V^+=14V$	—	—	1	μA

Timer Block

OSC1 Timer Error Time	$\Delta T1$	C1=C2=0.01 μF external	-10	—	+10	%
OSC2 Timer Error Time	$\Delta T2$	Not including external deviation	-10	—	+10	%

CHG-SW Block

ON Threshold Voltage	V_{SW-ON}		—	—	0.25	V
OFF Threshold Voltage	V_{SW-OFF}		1	—	—	V
Pull-up Resistance	$R_{PULL-UP}$		300	500	700	k Ω