

PRELIMINARY
 Notices: This is not a final specification.
 Some parametric limits are subject to change.

M62253FP

LITHIUM ION BATTERY CHARGER CONTROL IC

GENERAL DESCRIPTION

The M62253FP is a charge controller designed for charging lithium ion batteries.

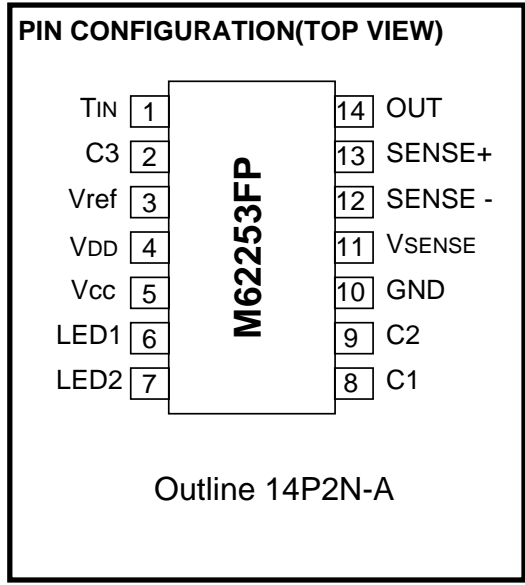
The IC has a current and voltage control circuit allowing the constant current/voltage charging to lithium ion batteries.

A charger system for lithium ion batteries can be easily designed by utilizing the IC's following functions ;

- charge disabling function for an over discharged battery
- charge control function by detecting the battery temperature

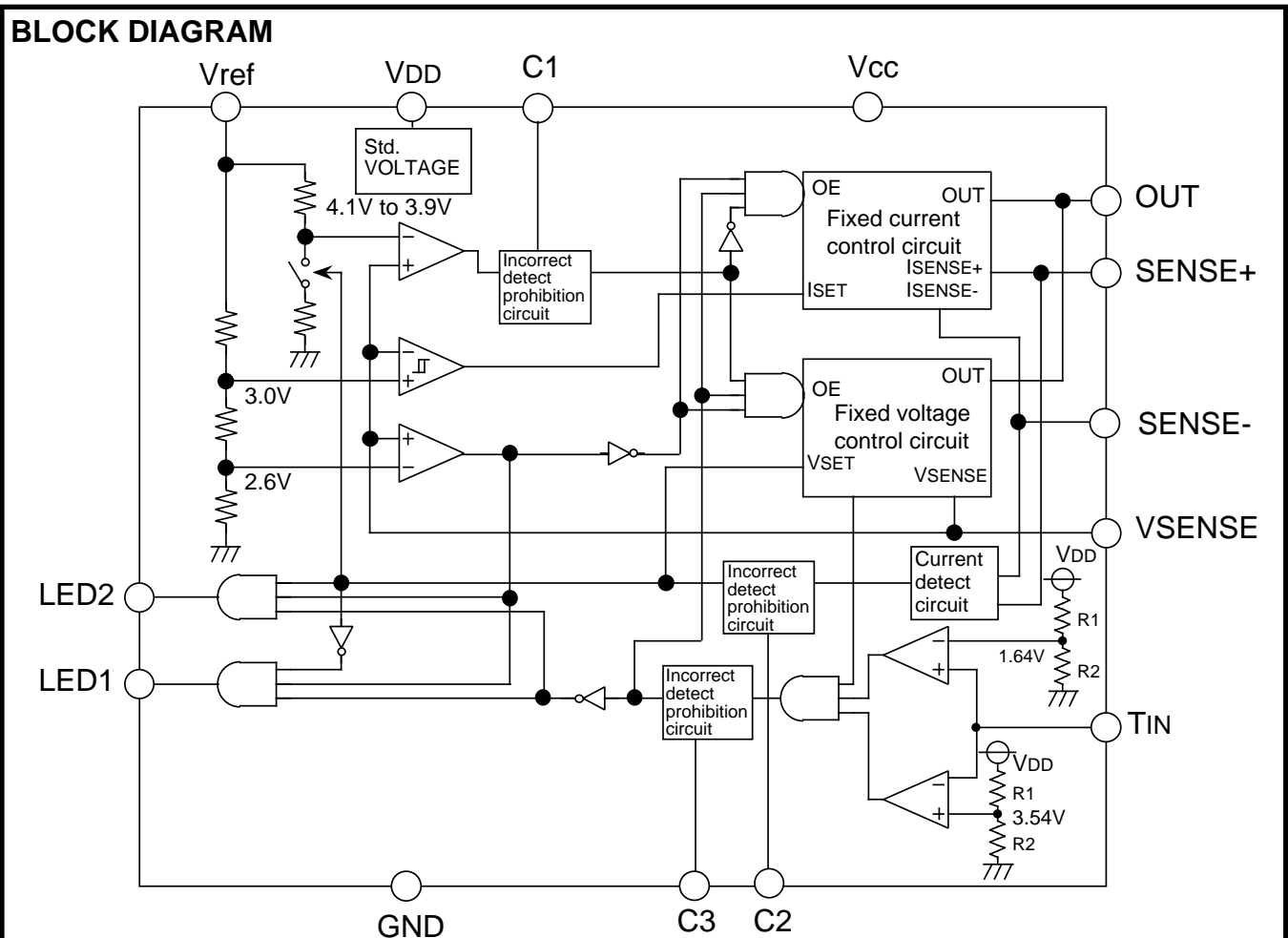
FEATURES

- Constant current and voltage charging
- Charge disabling functions for an over discharged battery and a high/low temperature battery
- Recharging function
- 2 LED driving circuits to Indicate charging conditions
- Delay circuit to prevent chattering



APPLICATION

Lithium ion battery charger for digital equipment



EXPLANATION OF TERMINALS

Pin No.	Symbol	Function
1	TIN	Temperature detection (also using for battery connect detection)
2	C3	Setting delay time of temperature detection (Tpd=50ms at 0.1μF)
3	Vref	Reference voltage of internal circuit.
4	VDD	5.0V reference voltage
5	Vcc	Power supply
6,7	LED1,2	LED connection (LED1 is on during charging, LED2 is on at charge completion.)
8	C1	Setting delay time of voltage detection (Tpd = 1.20sec at 2.2μF)
9	C2	Setting delay time of current detection (Tpd = 1.30sec at 2.2μF)
10	GND	Ground
11	VSENSE	Battery voltage detection
12	SENSE-	Charging current detection
13	SENSE+	Charging current detection
14	OUT	Output (open collector configuration)

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ABSOLUTE MAXIMUM RATING

(Ta=25°C unless otherwise noted)

Symbol	Parameter	Test conditions	Ratings	Unit
Vcc	Supply voltage		16	V
IOUT	OUT pin output current		30	mA
VSENSE	SENSE pin voltage		Vcc	V
TIN	TIN pin voltage		Vcc	V
Pd	Power dissipation	Ta = 25°C	450	mW
Ktheata	Thermal derating	Ta = 25°C	4.5	mW/°C
Topr	Operating temperature		-20 to +85	°C
Tstg	Storage temperature		-40 to +125	°C

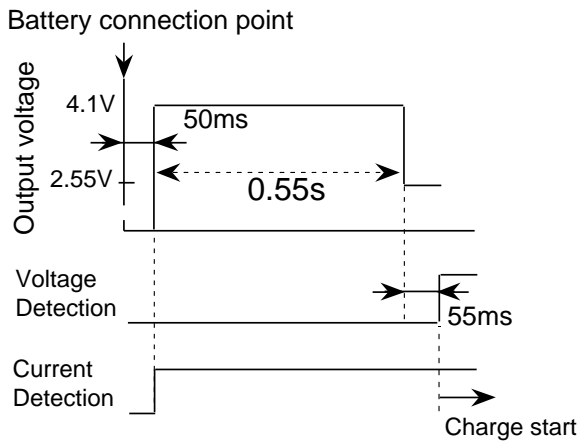
ELECTRICAL CHARACTERISTICS

(Vcc=8.5V, Vref=4.10V, VSENSE=3.6V, Ta=25°C, unless otherwise noted)

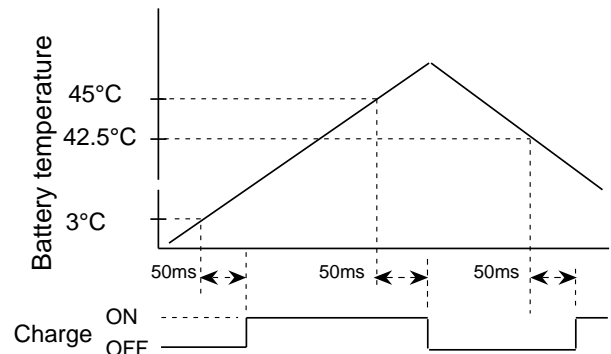
Block	Symbol	Parameter	Test condition	Limit			Unit
				MIN	TYP	MAX	
	Vcc	Supply voltage range		6.0	—	15	V
	Icc	circuit current	LED OFF		7		mA
VDD	VDD	VDD pin output voltage		4.75	5.00	5.25	V
Voltage detect part	VTHchg on	Charge start voltage		2.5	2.6	2.7	V
	VTHqchg on	Fast charge start voltage		2.9	3.0	3.1	V
	VTHqchg off	Const current charge stop voltage		4.06	4.09	4.12	V
	Vochg1	Output voltage set1	Charge time	4.07	4.10	4.13	V
	Vochg2	Output voltage set2	Charge complete time	2.45	2.55	2.65	V
	VTHrchg on	Recharge start voltage	Charge complete time	3.8	3.9	4.0	V
Current detect part	ISET1	Charge current set voltage 1	2.6V battery voltage 3.0V	15	25	35	mV
	ISET2	Charge current set voltage 2	3.0V battery voltage 4.1V	235	250	265	mV
	ITHchg off	Charge complete detect voltage	Const voltage charge time	15	25	35	mV
	IINSENSE+	SENSE+ pin input current	Charge time	—	60	85	μA
	IINSENSE-	SENSE- pin input current	Charge time	—	60	85	μA
LED	IoutLED1	LED1 pin output current		8	10	12	mA
	IoutLED2	LED2 pin output current		8	10	12	mA
	VOHLED1	LED1 pin output "H" voltage				2.5	V
	VOHLED2	LED2 pin output "H" voltage				2.5	V
TIN	VTHINTH1	TIN pin up side threshold voltage 1	Resistance ratio(R1/R2) *in the block diagram	0.398	0.410	0.422	
	VTHINTL1	TIN pin low side threshold voltage 1		1.989	2.050	2.112	
	IinTIN	TIN pin input current		-1.0			μA
	VTHINTH2	TIN pin up side threshold voltage 2	Resistance ratio(R1/R2) *in the block diagram	0.388	0.400	0.412	
	VTHINTL2	TIN pin low side threshold voltage 2		1.804	1.860	1.916	
OUT	VOHOUT	OUT pin saturation voltage	IOUT=20mA		1.0	2.0	V
	ILOUT	OUT pin leak current	VC=15V			1.0	μA
C1	tdC1	Voltage detect delay time	Recharge time @C1= 2.2μ F	0.88	1.20	1.52	s
C2	tdBDET1	Connect detect time 1	4.1V output time C2= 2.2μ F	0.95	1.30	1.63	s
	tdBDET2	Connect detect time 2	2.55V output time C2= 2.2μ F	88	120	152	ms
	tdIDET	Current detect delay time	C2= 2.2μ F	0.95	1.30	1.65	s
	tdILED	LED switching delay time	C2= 2.2μ F	1.8	2.5	3.2	s
	tdchg	Discharge time	C2= 2.2μ F (After current detect)	30	90	—	ms
C3	tdC3	Temperature detect delay time	C3= 0.1μ F	36	50	64	ms

4. Timing chart (a case of application's constants)

(1) Timing of battery connecting detection



(2) Timing of temperature detection



(3) Timing of charging

