Monitor and Timing Management for Single-Loop NiMH Battery Charger

Features

- Detects and avoids charging alkaline cells
- Monitors voltage, temperature and time for safety and secondary termination
- Drivers PNP type pass element
- Pre-charge qualification for detecting shorted, damaged, or deeply depleted cells
- Automatic recharge keeps batteries charged
- Optional temperature qualified charging

Applications

- Portable computer, cellular phone and PDA
- Charging docks and cradles
- Portable consumer electronics
- Desktop/standalone charger (AAA/AA)
- Digital still camera
- Music player (MP3)
- Game
- Toy
- Emergency lights

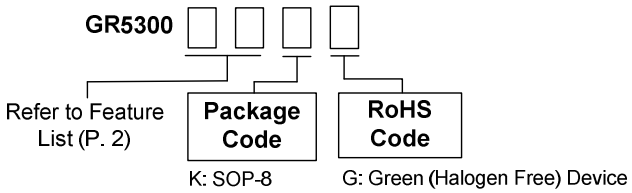
Description

The GR5300 is ideal for standalone charging of 1 to multiple AA or AAA NiMH “loose” cells. NiCd cells can also be charged. Temperature, voltage and charge time are monitored to provide proper fast/slow charging control algorithms for Nickel Metal Hydride (NiMH) batteries. The GR5300 detects the battery chemistry and proceeds with the optimal charging and termination algorithms. This process eliminates undesirable undercharged or overcharged conditions and allows accurate and safe termination of fast/slow charge. Battery tests are included to detect defective or inappropriate cells such as Alkaline primary batteries. The GR5300 supports a parallel charging topology.

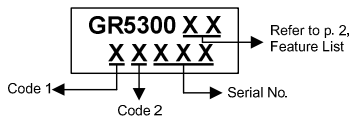
The **GR5300AA** supports one loop single cell charging topology, with monitoring and controls of cell.

The **GR5300DA** supports one loop two parallel cells charging topology, with the same monitoring and controls of two cells.

Ordering and Marking Information



SOP-8



Code 1	8	9	A	B		G	H	I	J
Year	2008	2009	2010	2011	• • •	2016	2017	2018	2019
Code 2	1	2	3	4		9	A	B	C
Month	Jan.	Feb.	Mar.	Apr.		Sep.	Oct.	Nov.	Dec.

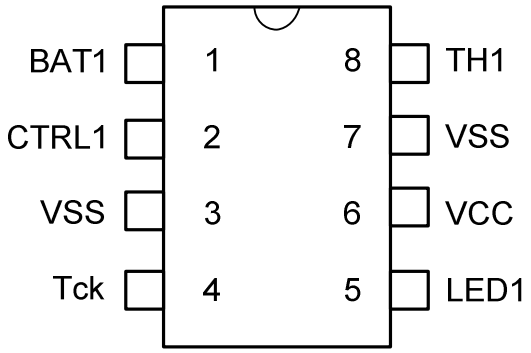
Grenergy OPTO Inc. reserves the right to make changes to improve reliability or manufacture ability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Feature List

	Fixed Timing
Single Cell	GR5300AA
Dual Cell	GR5300DA

Pin Configuration

TOP VIEW



Pin Description

Pin No.	Symbol	Description
1	BAT1	Slot 1, battery voltage input
2	CTRL1	Slot 1, charge switch control
3, 7	VSS	Negative power supply
4	Tck	Tck for test mode and time selection
5	LED1	Slot 1 charge/ Full status LED indicator
6	VCC	Positive power supply
8	TH1	Thermistor input for Slot 1

Absolute Maximum Ratings

Input voltage between VCC and VSS ---------- VSS -0.3 ~ VSS +5.5V

Battery voltage input ---------- VSS -0.3 ~ VSS +5V

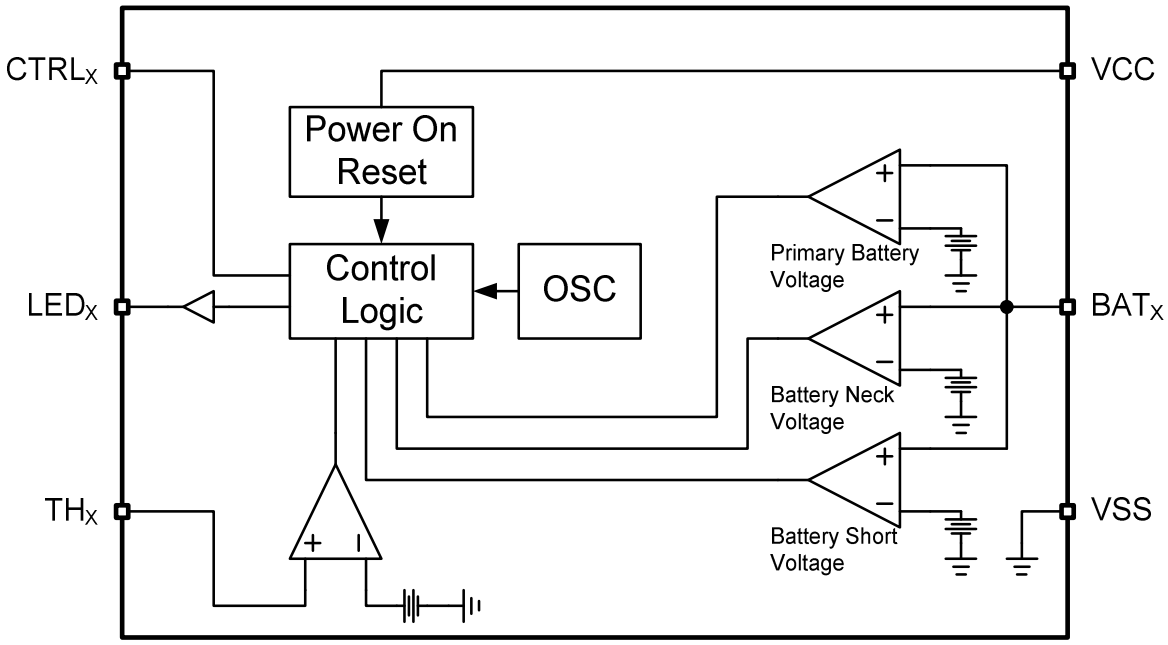
LED sink current ---------- 4mA

LED driver current ---------- 4mA

Operating temperature range ---------- 0 to +85 ^{O}C

Storage temperature range ---------- -40 to +125 ^{O}C

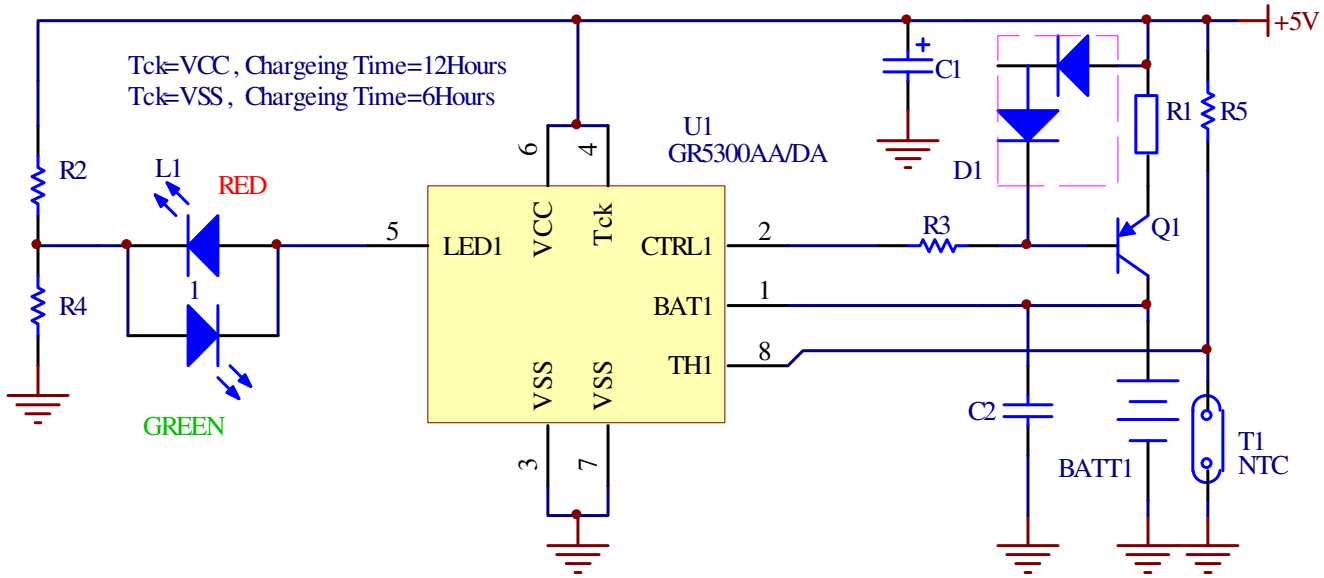
Block Diagram



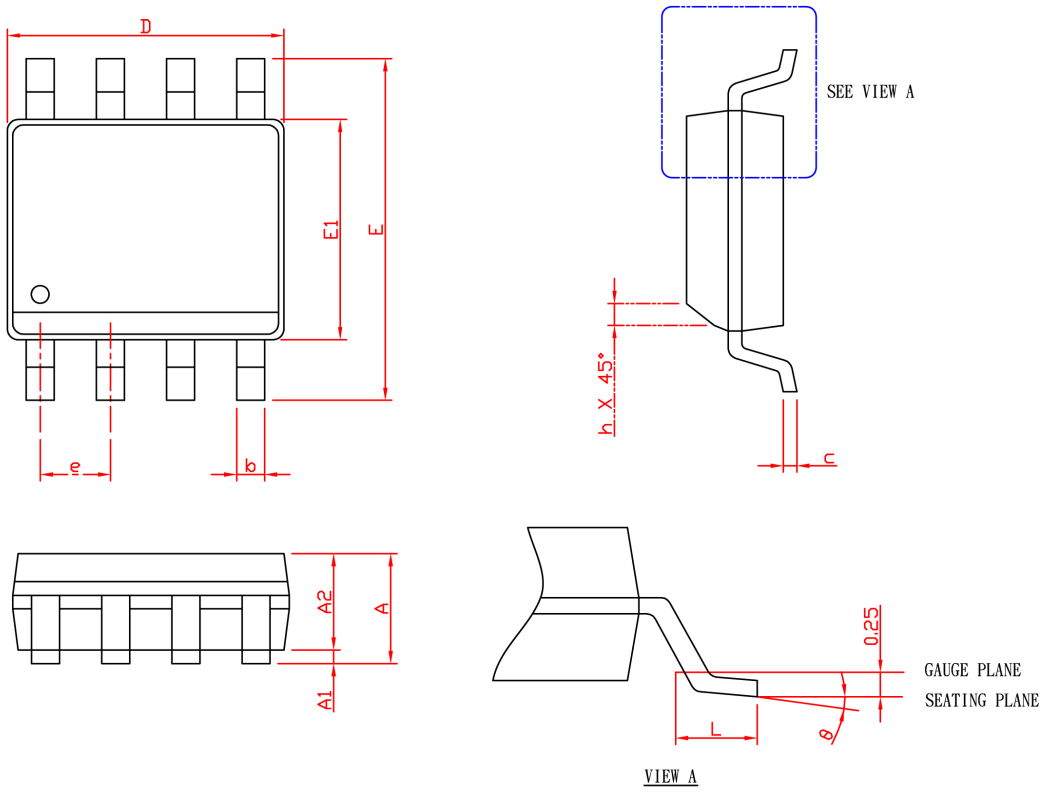
Electrical Characteristics (T_A = 25°C)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
POWER SUPPLY						
Operating voltage		V_{CC}	4.5	5.0	5.5	V
Supply current	V_{CC} = 5V	I_{CC}	0.4	0.5	0.6	mA
Battery voltage input	GR5300AA	V_{BAT}	0.5		2	V
	GR5300DA	V_{BAT}	0.5		4	V
LED sink current	V_{CC} = 5V	$I_{LED-SINK}$	2.5	3	3.5	mA
LED driver current	V_{CC} = 5V	$I_{LED-Driver}$	2.5	3	3.5	mA
Thermistor input		V_{TH}	1.07	1.12	1.17	V
PROTECTION VOLTAGE						
Battery short voltage		Vshort	0.45	0.5	0.55	V
Primary battery voltage	GR5300AA	Vprimary	1.575	1.6	1.625	V
	GR5300DA	Vprimary	3.15	3.2	3.25	V
Battery neck voltage	GR5300AA	Vneck	1.395	1.42	1.445	V
	GR5300DA	Vneck	2.79	2.84	2.89	V
SAFE TIMER						
Safe charge timer	TCK = HI	Timer	11.5	12	12.5	hour
Safe charge timer	TCK = LO	Timer	5.5	6	6.5	hour

Typical Application Circuit



Package Information



SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.75		0.069
A1	0.10	0.25	0.004	0.010
A2	1.25		0.049	
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0^o	8^o	0^o	8^o

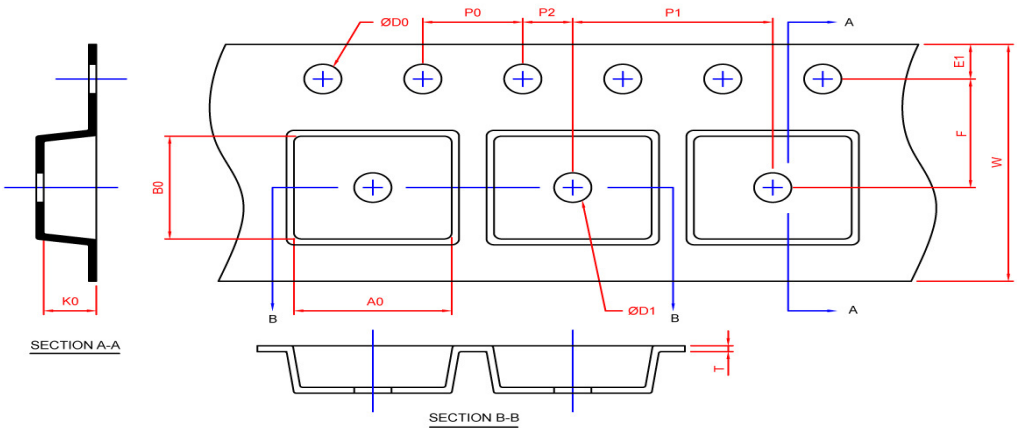
Note: 1. Followed from JEDEC MS-012 AA.

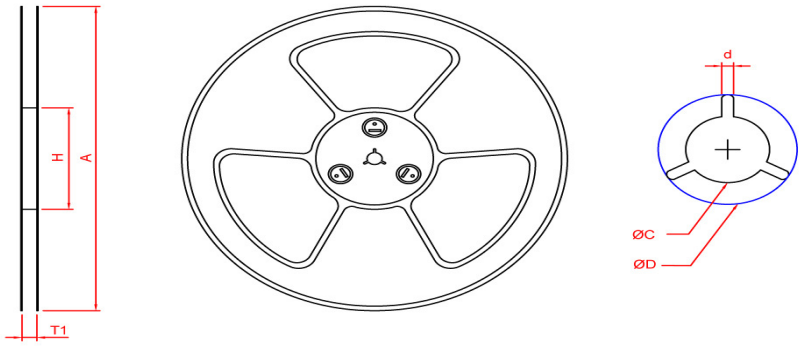
2. Dimension “D” does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.

3. Dimension “E1” does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

Carrier Tape & Reel Dimensions

SOP- 8





Application	A	H	T1	C	d	D	W	E1	F
SOP-8	330.0±2.0	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0±0.30	1.75±0.10	5.5±0.05
	P0	**P1**	**P2**	**D0**	**D1**	**T**	**A0**	**B0**	**K0**
	4.0±0.10	8.0±0.10	2.0±0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40±0.20	5.20±0.20	2.10±0.20

(mm)

Devices Per Unit

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOP- 8	12	-	2500