Re: Charging A Lead Acid Battery

Source: http://sci.tech−archive.net/Archive/sci.electronics.basics/2008−02/msg00448.html

- *From*: ehsjr <ehsjr@xxxxxxxxxxxxxxx>
- *Date*: Fri, 15 Feb 2008 17:48:26 GMT

James Beck wrote:

> In article <ddac6f54−dd64−45ac−bd54−3f43655f468d@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>, redbelly98@xxxxxxxxx says...
>
> > On Feb 14, 10:29 am, James Beck <j...@xxxxxxxxxxxxxxxxxxxxxx> wrote:
> >
> > > In article <4b78e703−68e3−4822−b318−a1cd9fb8ff04@e6g2000prf.googlegroups.com>, redbell...@xxxxxxxxx says...
> > >
> > > > On Feb 13, 9:09 am, James Beck <j...@xxxxxxxxxxxxxxxxxxxxxx> wrote:
> > > >
> > > > > In article <6194982a−5fc6−406e−b08d−dd15013ba985@y5g2000hsf.googlegroups.com>, redbell...@xxxxxxxxx says...
> > > > >
> > > > > > Why is your simple charger so complicated? Why not

use a 12 volt DC wall transformer and 13 ohm resistor (5 watt)? You get 540mA when the battery is low at 5 volts, and about 400mA as the battery voltage rises to 7 volts.

−Bill

If you forget to turn off a charger like that, it will seriously overcharge a 6V battery! On

> the other
> hand Ed's
> charger will
> not do
> that

> It won't?
> It should continue to charge
> the battery up to the wall
> wart voltage,
> which is still too high if you
> leave it plugged in too long.
> I would, and do, just use a
> CV source that is set to the
> float voltage
> of the battery. Pick a
> regulator that has over temp
> and current
> limiting and let it float.

> Jim

> What about all the voltage drops between the
> wall wart and battery:

> 1 to 1.5V drop−out voltage of regulator
> 1.2−1.3V between regulator "out" and "adj"
> pins (across 2.5R resistor)
> 0.6−0.7V diode drop across 1N400x

> Mark

Build it and try.
As the current drops I'll bet you don't get the drops you think,
especially across the resistor used for the current sense. You
are also
assuming that the 9V wall wart is regulated. A cheap
unregulated wall
wart that is a "nominal" 9V under X% of load will usually be
quite a bit

> higher than you expect as the load drops. A CV float charger could be
> used with any wall wart that is the V drop of the regulator or higher.

You make good points, I had been thinking simplistically about the voltage drops at 500 mA.

Mark

Mind you, you can have problems with a simple float charger too.
If you rely on the regulator's current and thermal limit to hold the current under a certain level it will get HOT. I also had a National part that the info in the datasheet didn't match real life and we blew out a few wall warts before I caught it.

Jim

I'm amazed at this thread. The "very simple charger"
I diagrammed *stinks* if _used_ as a float charger, which
is what you were de facto discussing when you talked about
forgetting and leaving the batteries on it too long.
If used that way, it *might* prevent damage to the
batteries by the cumulative voltage drop which you and
Mark have discussed, but it is the *wrong* tool for
that job, and the wrong usage of the tool.

I am glad to see that you are taking the discussion to a
float charger. I'm responding below because you mentioned
relying on the chip's thermasl & current limits and that
some wall warts blew.

It would be poor practice to design a float charger that
relied on the regulator's current and thermal limit to
hold the current under a certain level, assuming by
"the regulator's" you mean the IC chip. Those things − the
current and thermal limit − only indirectly hold the
current under a certain level. They are design maximums
for the chip, not for whatever load the chip is feeding.

The circuit design needs to keep the current under the
maximum rating of the chip under worst case conditions.
The designer specifies a heat sink and/or a design that
keeps the chip temperature below the maximum spec. He/she
needs to ensure that any other limitations (eg Vin−Vout
rating) for the chip are adhered to.

A float charger may not need current limiting for normal

conditions, but it does for worst case: a shorted battery.
That's where a float charger without current limiting fails.
Under normal conditions, the battery will limit the current
drawn as the battery voltage increases, and additional
limiting may not be required. Still, you need to consider
the whole circuit. You mentioned that you had some blown wall
warts. If the batteries require more than the wall wart can
deliver, that may be a specification rather than circuit
problem. (ie use a bigger wall wart) If they blew because the
circuit relied on the chip to shut down when it got too hot,
that's a design issue. You indicated an error in the National
datasheet was the cause − do you still have the details? It
could be helpful to know which part and what spec was wrong.

Ed

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