

Re: High Vce(on) with an IGBT – 100kHz smps

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2005-07/msg00849.html>

- *From:* Pooh Bear <rabbitsfriendsandrelations@xxxxxxxxxxxxx>
 - *Date:* Thu, 07 Jul 2005 03:12:56 +0100
-

Terry Given wrote:

> Fritz Schlunder wrote:
>> "Pooh Bear" <rabbitsfriendsandrelations@xxxxxxxxxxxxx> wrote in message
>> news:42CC6F0F.8BE9DEDA@xxxxxxxxxxxxx
>>
>>> I'm currently using a pair of IGBTs in my prototype smps (UC3525
>>> controller – half bridge configuration with IR2110 driver).
>>>
>>> It's up and running nicely now after the kind help here.
>>>
>>> I've been testing it with some dummy loads to check device dissipation
>>> and current waveforms (just a large R across the bridge directly or
>>> coupled by a 1:1 TX).
>>>
>>> At a load of ~ 600W I was surprised by the temp rise in the IGBTs. Makes
>>> no difference if the load is transformer coupled or not btw.
>>>
>
> drop the switching frequency down to, say, 1kHz where you can completely
> ignore the switching losses (Lmag may need to be cranked up, or Vdc
> reduced to compensate).

No problem there. Excellent idea. I can hang the load directly across the bridge anyway since the tranformer ratio is 1:1 anyway.

>>> Looking at the Vce of the lower device whilst on, I saw about 8V.
>>> According to the datasheet (it's an Infineon SGW30N60 btw) with the 4A
>>> or so it's carrying, Vce should be < 1.5V. High side device appears to
>>> dissipate the same. Temp rise seems to correlate with the heatsink
>>> thermal resistance (3C/W) and the calculated dissipation.
>
>
> that's a seriously crap Vce.

Indeed !

Re: High Vce(on) with an IGBT – 100kHz smps

- > there cant be too many reasons:
- >
- > – measurement is wrong

I've been musing over that. And how – why.

- > – Vge is way too low

14V seems ok to me.

- > forget 1kHz, do it at DC – turn the bottom IGBT on, and slam some
- > serious current thru it. Easy to measure Vce then, esp. when Vdc is low.

I can do that too I guess.

- >> Are you saying the thermal dissipation isn't outrageously high, but the
- >> Vce(on) appears very high even so?
- >>
- >> Make sure your oscilloscope isn't lying to you. When off the IGBT blocks a
- >> huge amount of voltage, but when on the voltage becomes very small. On the
- >> small scale needed to measure Vce(on) the oscilloscope may not work properly
- >> due to the extreme high voltage at other times.
- >
- > good point – scope thermal tails due to overdrive.....

Hadn't explicitly considered scope issues but had a nagging feeling. Interesting one. I can see the sense in that.

- >> Try measuring Vce(on) through say a resistor and a low voltage zener diode
- >> to clamp the maximum peak voltage to something small like 10V. Keep in mind
- >> the resistor plus zener and probe capacitance make a low pass filter which
- >> will degrade measurement bandwidth.

I'll check the probe C. A 10:1 probe should be fairly ok. I could even use a 100:1 probe. That's about 4pF IIRC.

- >
- > i've built compensated dividers clamped with 4148s for this job.

Ahhh – ok I got it. Clamp the voltage you're measuring to something that's not over deflecting the scope basically.

Cheers guys, Graham

.

- **Follow-Ups:**

- ◆ **Re: High Vce(on) with an IGBT – 100kHz smps**
◇ From: Terry Given

- **References:**

- ◆ **High Vce(on) with an IGBT – 100kHz smps**
◇ From: Pooh Bear
- ◆ **Re: High Vce(on) with an IGBT – 100kHz smps**
◇ From: Fritz Schlunder
- ◆ **Re: High Vce(on) with an IGBT – 100kHz smps**
◇ From: Terry Given

- Prev by Date: **Re: PROBLEM! misc.busines...**

- Next by Date: **Re: Weight sensors.**

- Previous by thread: **Re: High Vce(on) with an IGBT – 100kHz smps**

- Next by thread: **Re: High Vce(on) with an IGBT – 100kHz smps**

- Index(es):

- ◆ **Date**

- ◆ **Thread**