

# Lenovo X230 Thinkpad Dead - No Power up and Not Charging Debug and fix

## Introduction:

In other words, I know 90% sure what is the problem and it is not the mod but rather a problem that X220 and X230 share .

The problem is something called the ThinkEngine. That IC does the power management and sometimes it just dies .

It did die on my x230 about 2 years ago, way before I even made this mod . The IC itself is cheap but requires a hot air station to change it .

I stand by my work in terms of electronics and by mods as I test every single one of them in my own laptops before sending the mods out. Damage in shipping can be a cause but it is very very slim in such products.

## Context :

In terms of what my mod does , it helps to pull the 20V from the charger and also adds ESD protection to the charger input.

The X230 charges at 20V and the PD standard is limited by specification to a max of 20V on output also ( the only exception can be a charger fault but I am not going to point fingers in any direction) so there is no way in which the laptop could have been affected by the mod by assuming the mod would have delivered a higher voltage. In terms of lower voltage, under 18.5~19V on the input, the input mosfets on the X230's PCB will not open and the voltage will only be read by the **ThinkEngine IC TB62D515FG** while keeping the mosfets closed as the voltage will be considered too low.

The normal output from my mod when used with a PD charger that will output 20V is 19.5~20.1 ( assuming drops on the wires and compensation from the charger) .

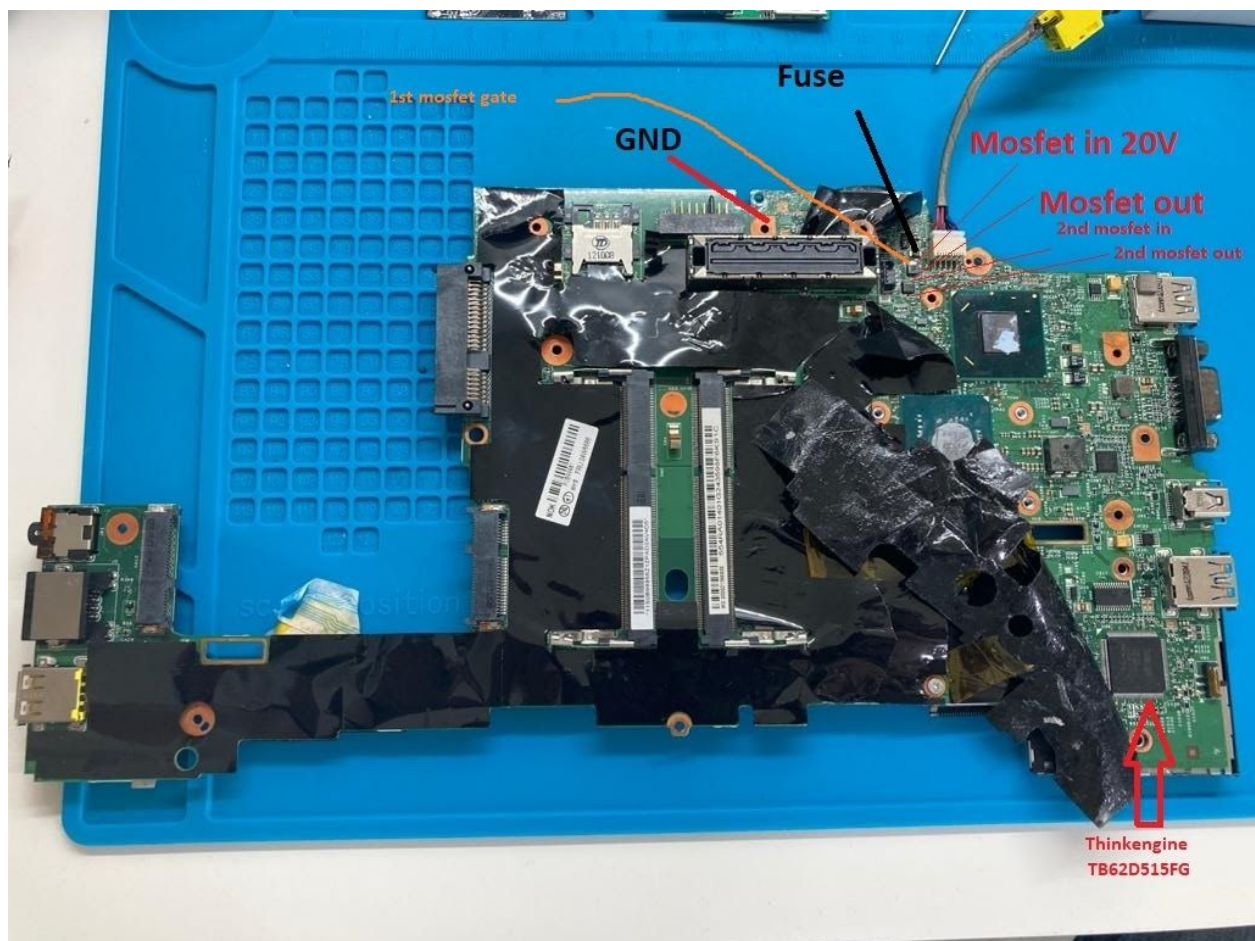
Getting to the PCB itself, there are too many issues that can be counted here as for example a low level on the bios battery can also cause the laptop to not power on. For example my Bios battery has a voltage of 3.1V and works fine but lower that to 2.6~2.8V and it will struggle to power on. Bios can be another issue that would prevent it to power on . But in your case I assume 95% to be the Thinkengine fault.

## How to fix it :

You will first want to measure and conclude that this is the problem and for that you will need :

- A digital Multimeter
- A screwdriver to open the laptop
- A tweezer to open the cable latches easier
- An IC TB62D515FG purchased from ebay or other sources ( picture o f the ic below)
- Hot air station and supplies

Steps to follow :









In the above picture with the PCB , I have the PCB pulled out from the laptop, flipped 180 degrees on the Vertical axis so I am looking at it like the laptop would be with the keyboard facing down and the RAM slots facing up .

1. Measure the fuse has continuity without connecting power to the board
2. Then connect power to the board
3. measure the input of the first mosfet ( should be around 20V)
4. measure the output of the first mosfet ( should be same as the input, if not then your think engine is not opening the mosfet. If the mosfet is closed measure the 1st mosfet gate that should be ~6.5V to open the mosfet if the value is way different, say 19V then the thinkengine is faulty).
5. measure the 2nd mosfet input and output, both should be identical to 1st mosfet input and output
6. If you've got here with no fault from above then the problems likely to be are the bios/cmos battery too low or the BIOS IC needing a reflash .

## Rework:

Now the process of desoldering the the old IC and resoldering the new one is straight forward :

1. General good practice is to disconnect all the accessories from the PCB including bios battery, ram stick, **fan and heatsink** and any other bits.
- 1a. Use some IPA or 95% alcohol and put a few drops under the IC and leave it there for 5-10 minutes. Maybe do this a few times. Some genius in the production line decided to stick the IC with double sided tape before it was reflowed ( on my unit at least) and that will give you the fake impression that the IC is not fully free ( step 6) while it is just stuck with some tape.
2. slowly peel off the isolation black tape off the pcb
3. seal the area with some kapton tape , apply flux paste and when you think it is enough, just squeeze a bit more on top ;-)
4. Preheat the pcb , do a 200 celsius for 1 minute and then raise the temp to 360 celsius
5. Look at the solder on the pins of the IC and when it is melted then slowly and very very carefully try to raise the IC.
6. Take your time as you don't want to break any pads off the pcb .
7. clean with a solder wick all the old solder and apply leaded solder on the pads,
8. Apply flux and place the IC on top in the correct position .
9. start preheating and then heating
10. Finish the solder job.
11. let the board cool down as it will be burning HOT .
12. Clean the excess flux.
13. remove the kapton tape.
14. plug the charger module in the pcb
15. Plug the bios/cmos battery back
16. redo the measurements for voltage and now all of them should be correct.

I hope this guide will be helpful to any of you who have encountered this problem.

MikeP