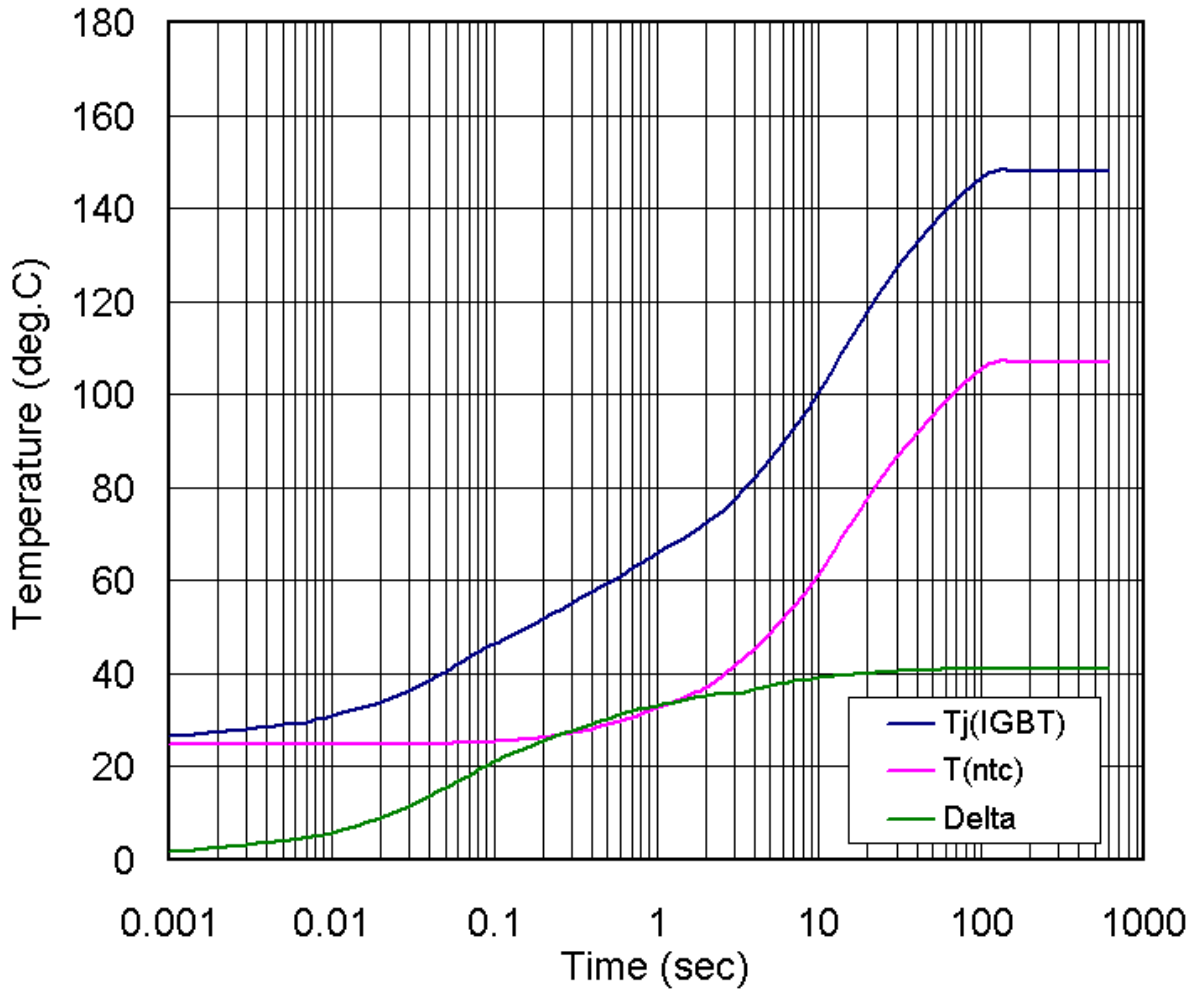
− Fuji IGBT Module −

Junction temperature Tj and time response of thermistor temperature T_ntc

Typename: 2MBI300VJ-120-50



Transient thermal behavior of NTC thermister and IGBT Junction Temperature

In many of Fuji IGBT module, an integrated NTC thermistor is provided mainly to report value to detect rough IGBT case temperature in thermally equilibrium operation, such as steady-state.

The above figure shows an example of the IGBT junction temperature and the time response of the thermistor temperature in 2MBI300VJ-120-50. However, the time response changes depending on the usage environment (thermal design, driving conditions of IGBT module, etc.).

As shown, there is a difference in starting time of temperature rise between the IGBT chip and the thermistor time response. In the time domain 100msec or less, only the chip temperature rises while the thermistor keeps stable. Therefore, as shown by the fact that the temperature difference becomes big between the IGBT chip temperature and the thermistor temperature, it is hard to know the junction temperature from the thermistor response in such a short period.

In addition, , in a short-circuit mode, in which high current flows while voltage is applied, the guaranteed time is about 10micro seconds (the guaranteed short-circuit time differs depending on product generation, voltage classes and operating conditions), and so the thermistor temperature does not rise in this short-circuit period. Namely, the temperature detection by thermistor cannot be used for short-circuit protection. Therefore, other protection functions such as over current detection with current sensors and/or monitoring the saturation voltage of IGBT Vce (sat).

Technical data: MT5F19496

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