Application Note

eupec

European Power-
Semiconductor and
Electronics Company

## Current lead capacity of PCB traces

When mounting IGBT modules like EconoPACK or EconoPIM on a **P**rinted **C**ircuit **B**oard, the PCB has to lead the current. In this case, the copper trace in the PCB works like a resistor and turns hot depending on the current; an unpleasant effect. If the PCB temperature goes up to approx. 120C° with standard epoxy material**,** a glaze effect in the core of the PCB starts which will destroy the PCB. Due to the different thermal expansion coefficient of copper and epoxy, the PCB quickly gets old with strong power cycling.

Helpful solutions are:

- If possible, use the surface traces for power transfer.
- Use as much copper area as possible.
- Provide for air cooling of the PCB.
- Do not use heat traps within your layout.
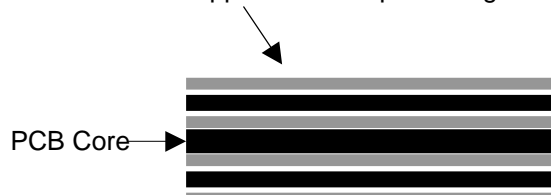
Experience value for PCB design:

Copper 70/105um thick

PCB Core
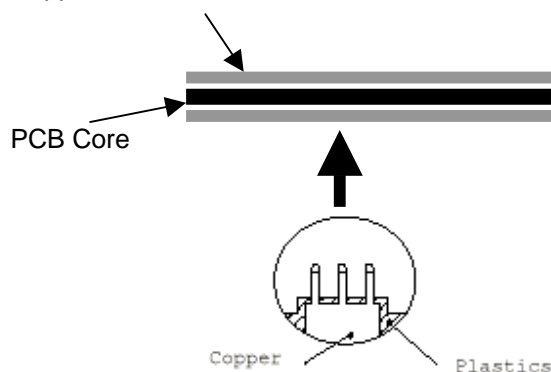
Two Layer PCB   1,4A/mm   70µm
Surface traces   1,6A/mm 105µm
Creepage distance UL508c at $1000V_{DC}$ =5,08mm
Creepage distance to ground potential =12mm

Copper   Plastics

X
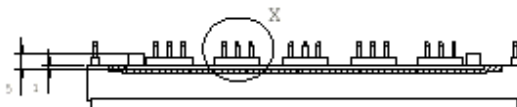
Surface Copper traces 35µm for signal

PCB Core

*__Four layer PCB   0,7A/mm 70/105um__
__Inside traces__
Creepage distance UL508c at $1000V_{DC}$ =0,4mm

*Please check the a.m. values with the PCB manufacturers.