

# Föreläsning 9

## IE1332 Utveckling av elektronikprodukter

### Kapitel 14

- Skärmning

# Behövs skärmning?

## To shield or not to shield

- if predicted differential mode fields will exceed limits, shielding is essential
- if layout requires dispersed interfaces, shielding will probably be essential
- if layout allows concentrated interfaces, a ground plate may be adequate
- consider shielding only critical circuitry

# Elektriskt fält dämpas av skärm

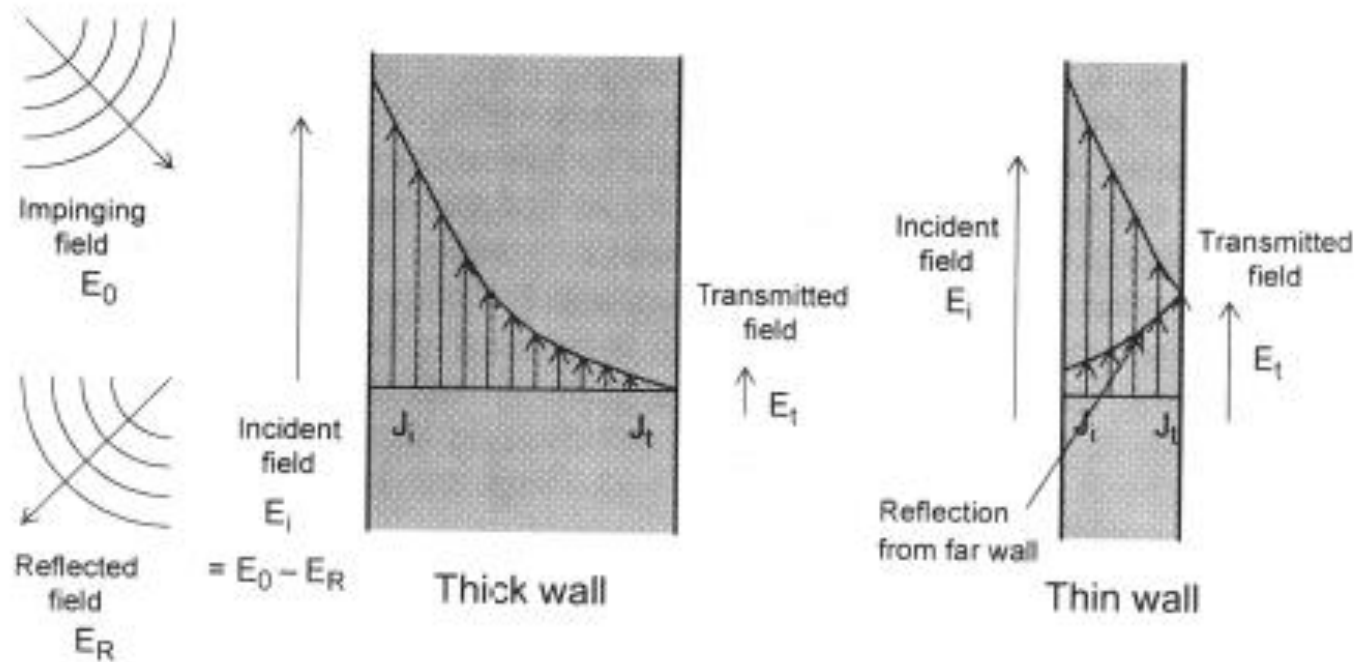


Figure 14.1 Reflection and absorption in an infinite barrier

# Effektivitet vid olika frekvenser

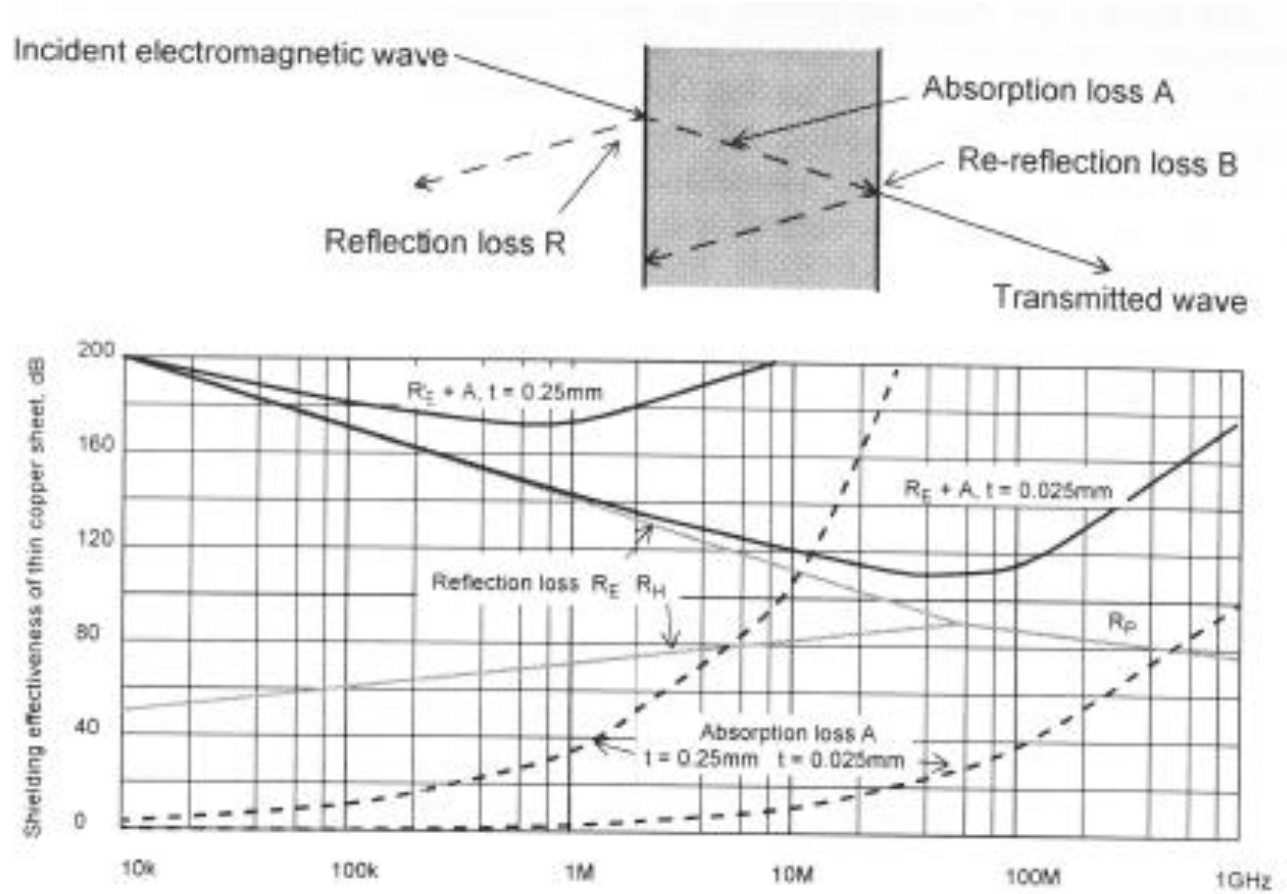
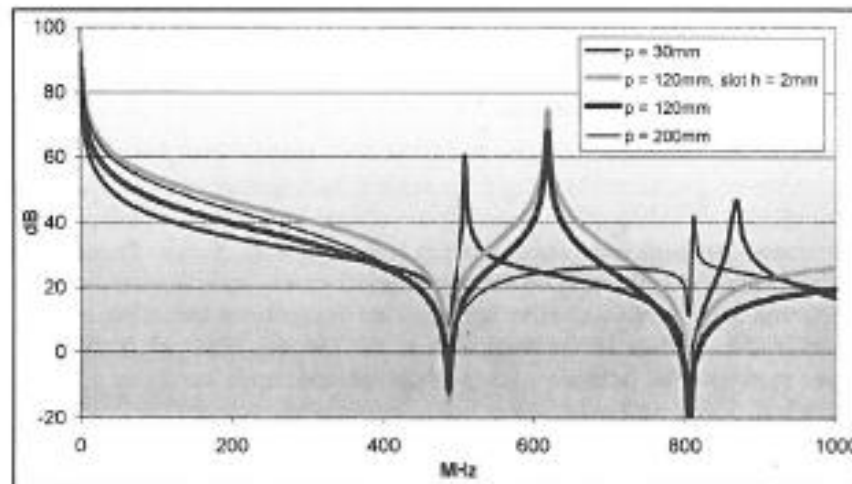
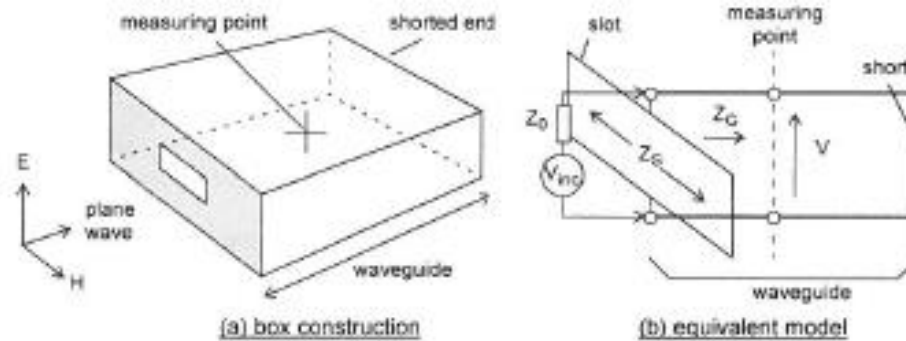


Figure 14.2 Shielding effectiveness versus frequency for a copper sheet of infinite extent

# Fält i skärmad låda



(c) calculated example

Box dimensions: width 400mm, depth 400mm, height 133mm,  
slot width 100mm, slot height 20mm except where stated  
p is distance from face with slot

Figure 14.3 Modelling a rectangular box with a slot

# Resonant låda

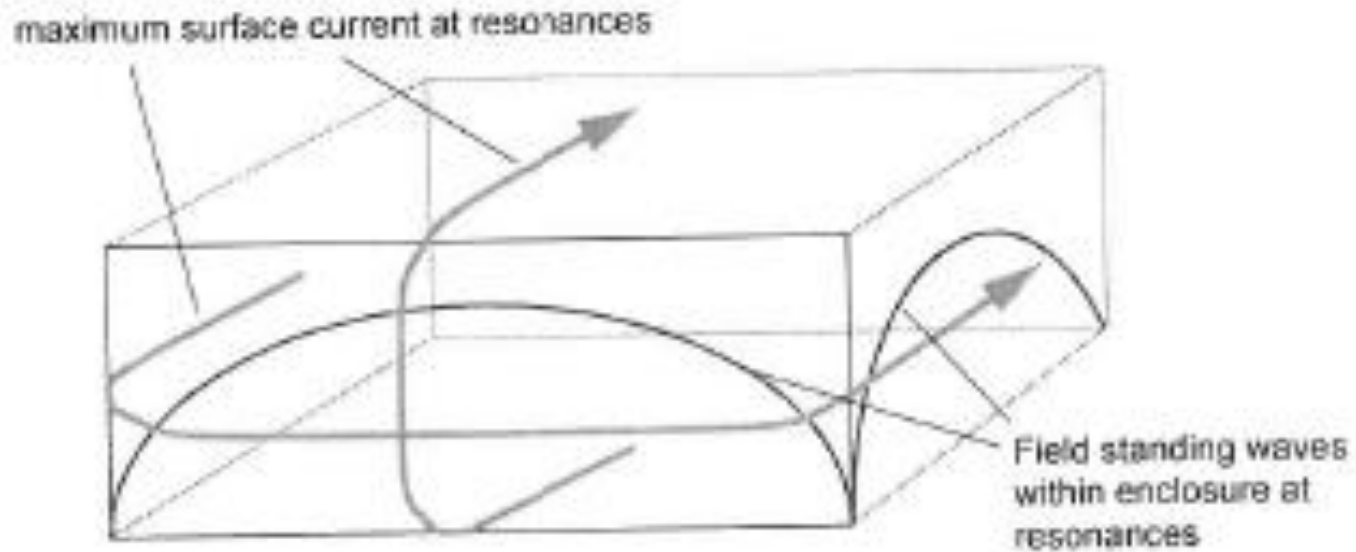


Figure 14.4 Resonances degrade shielding effectiveness

# Skarvar i skärmen

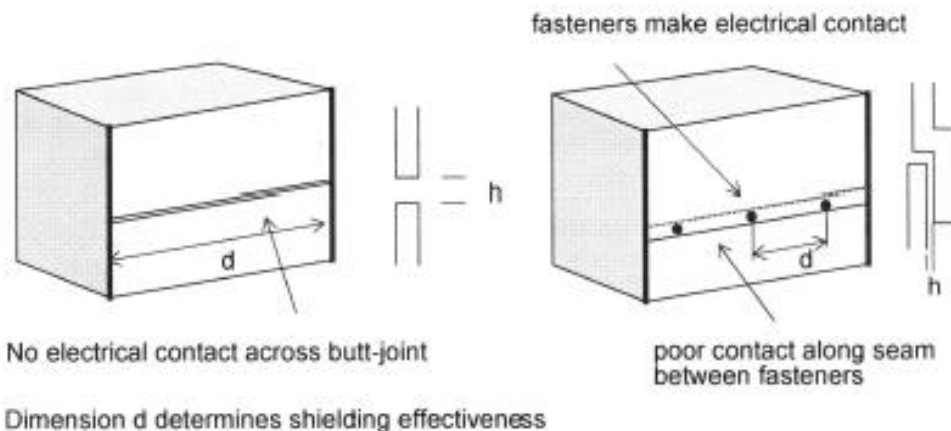


Figure 14.5 Seams between enclosure panels

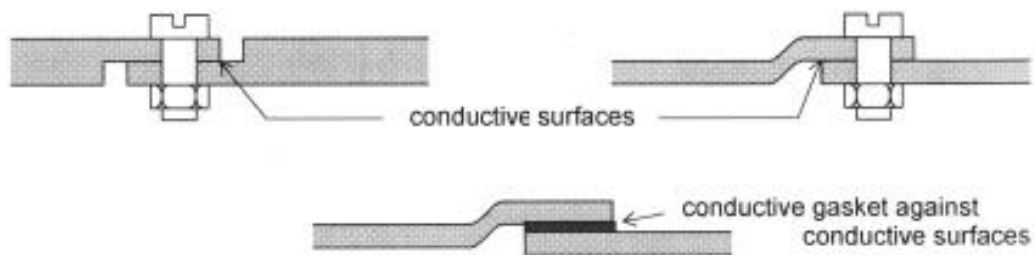


Figure 14.6 Cross-sections of joints for good conductivity

# Öppningar som skär strömbanor

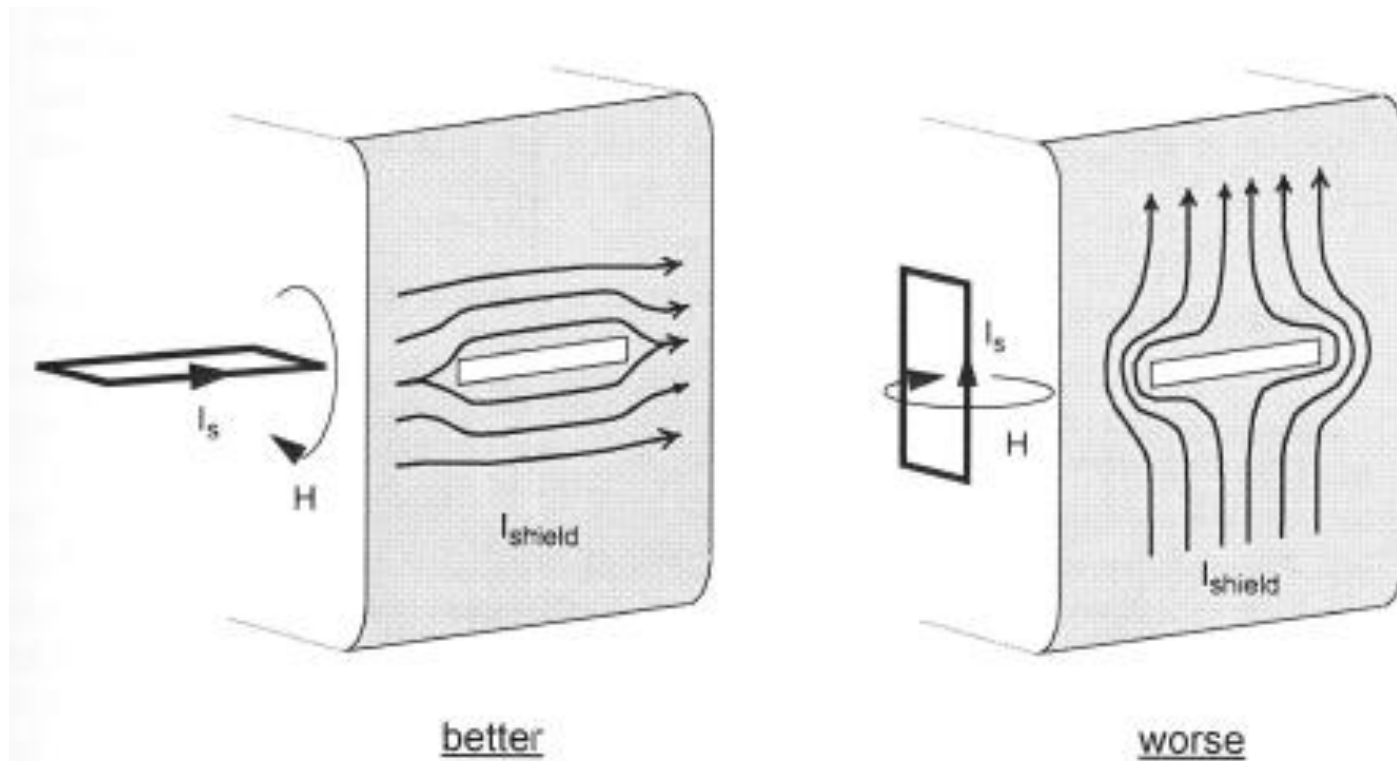


Figure 14.7 Current loop versus aperture orientation



# Jordning av skärm

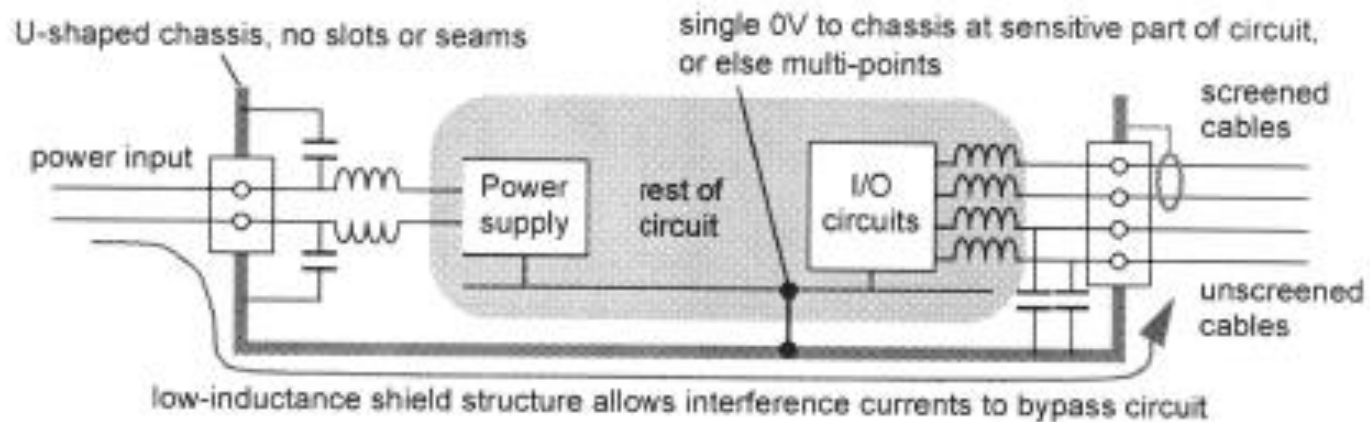


Figure 14.8 Shield metalwork as ground reference

# Spegling i plan

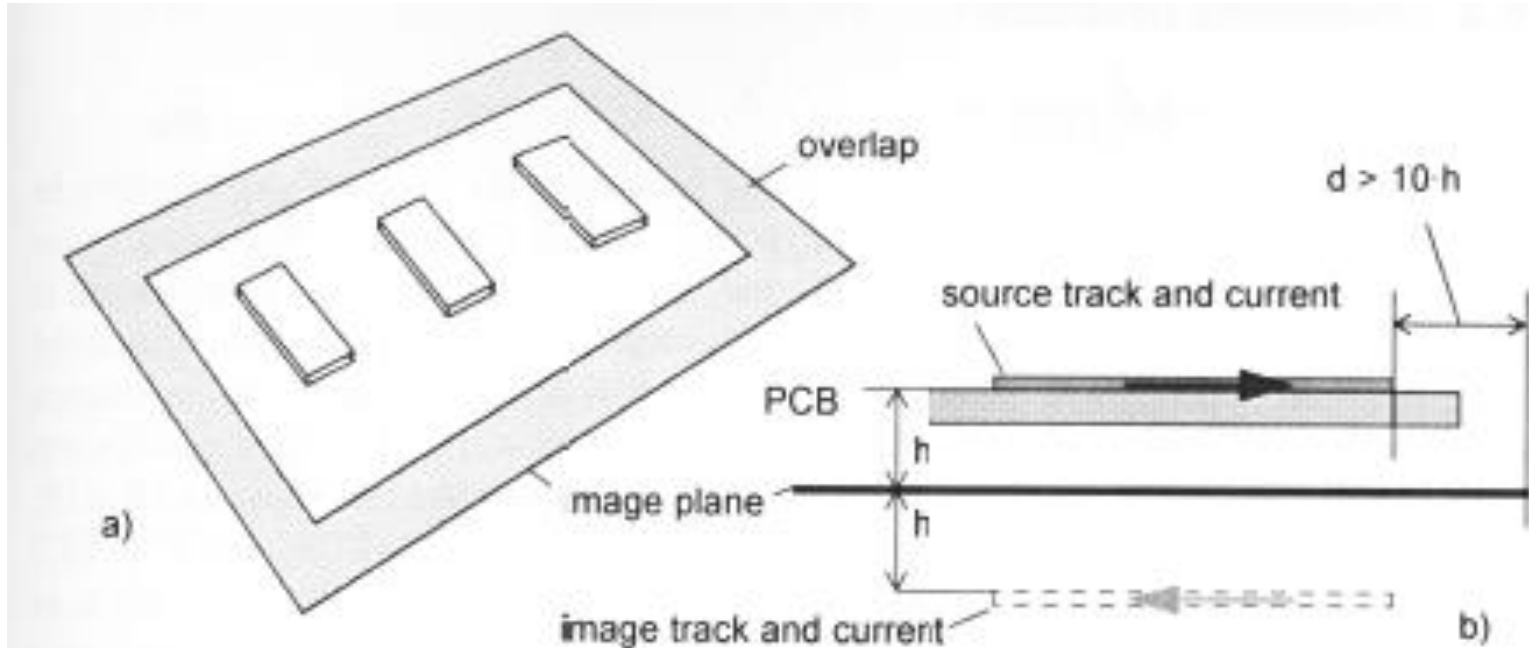
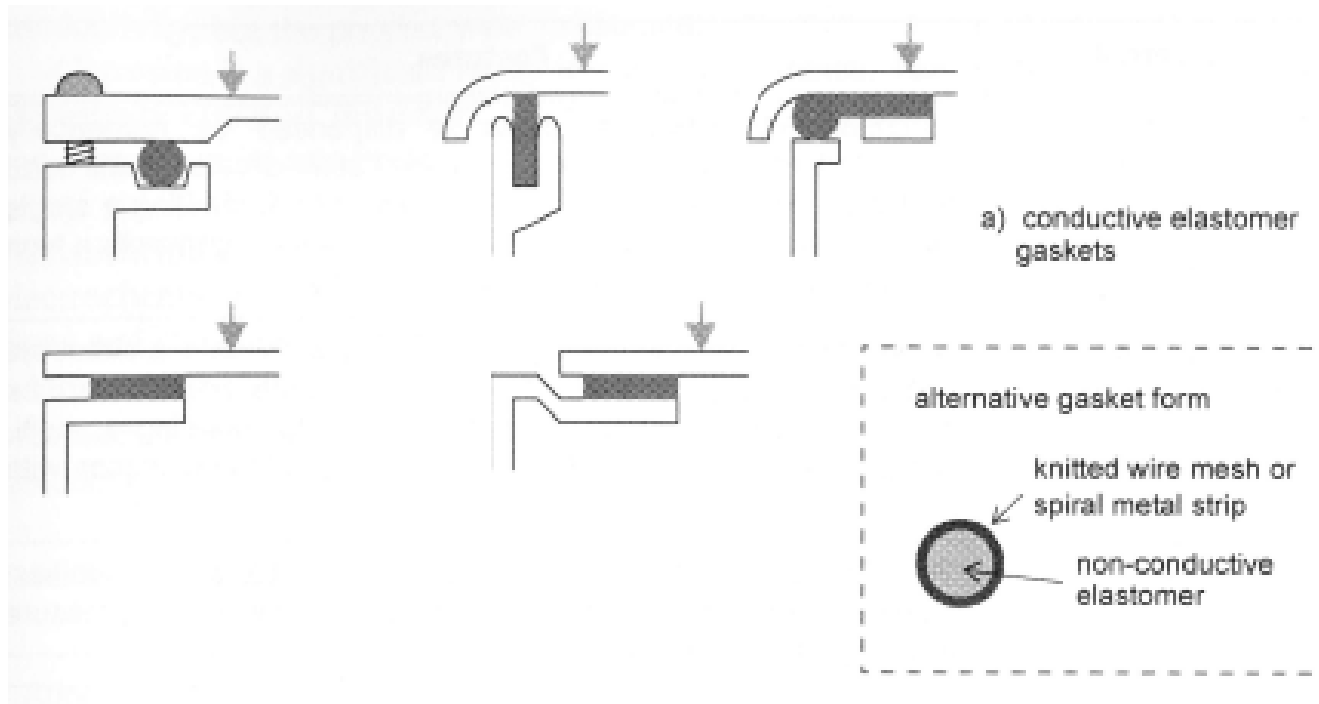
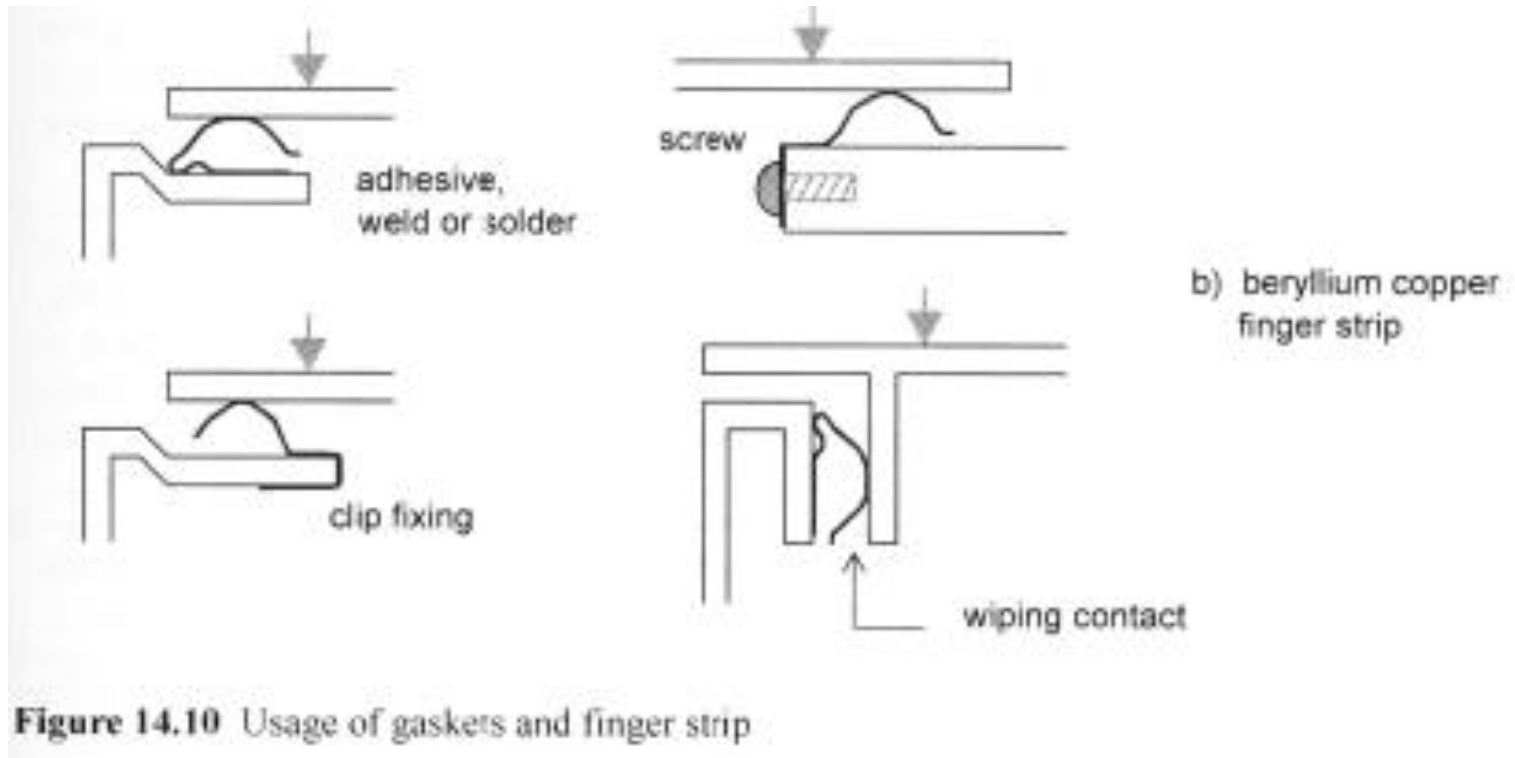


Figure 14.9 Image plane under a PCB

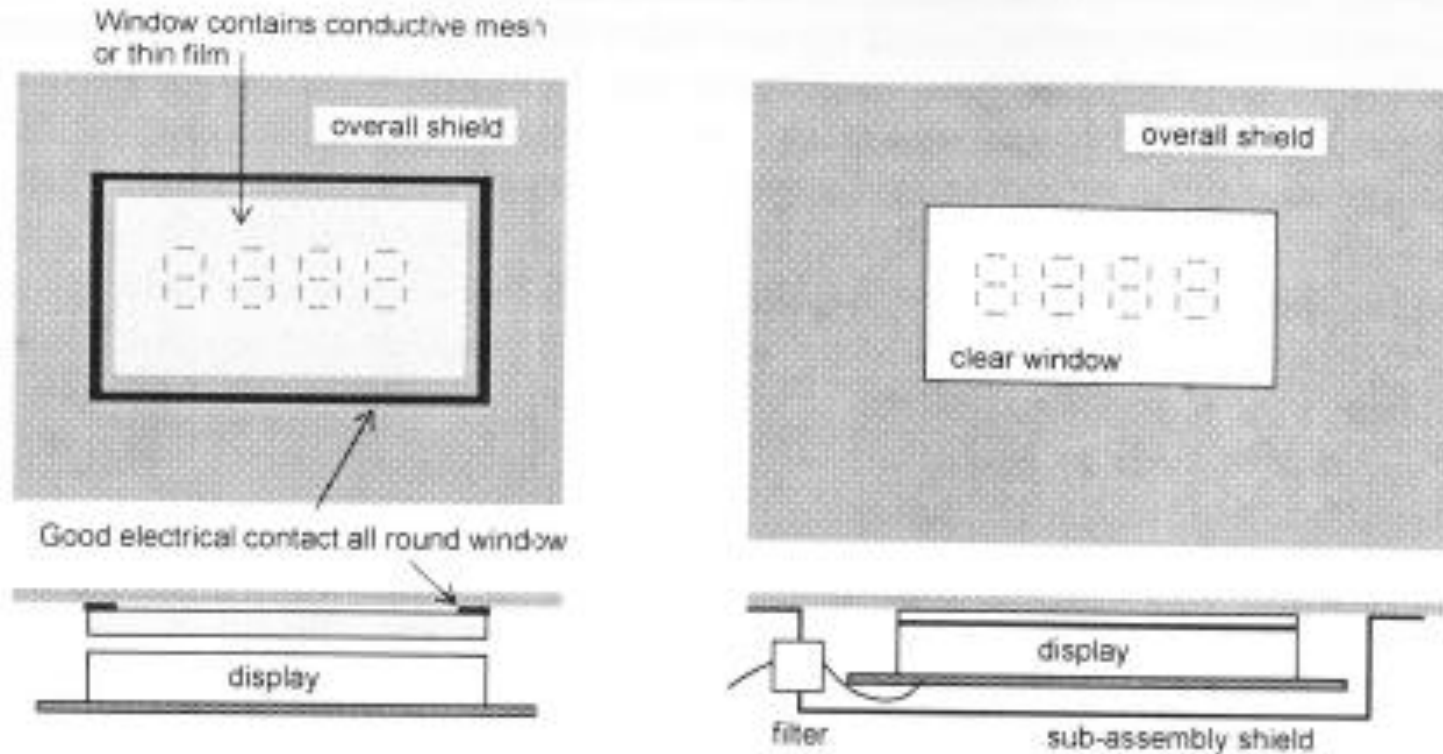
# Packningar (gasket)



# Fingrar



# Skärma displayfönster



**Figure 14.12** Alternative ways to shield a display window

# Ventilationshål

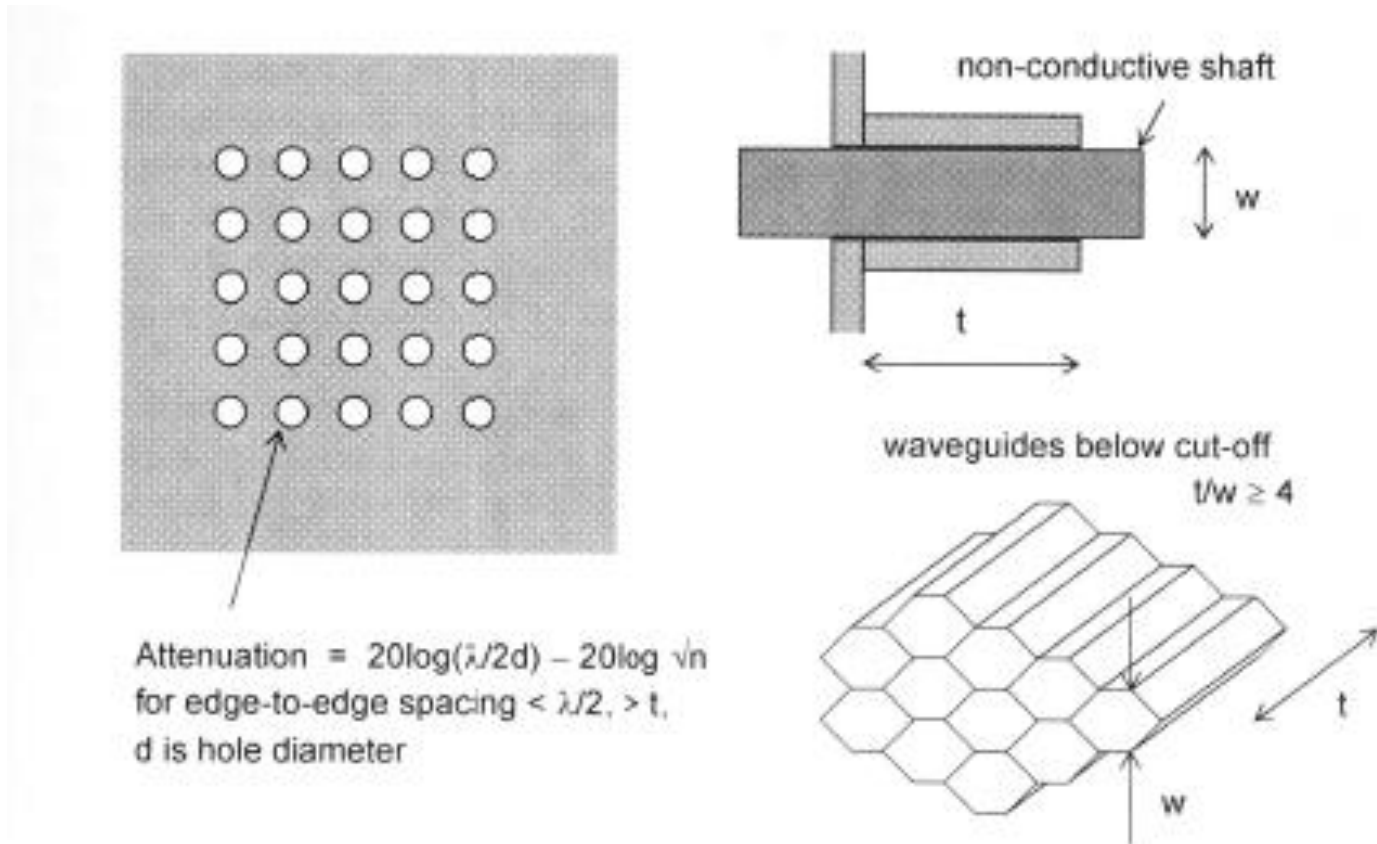


Figure 14.14 Mesh panels and the waveguide below cut-off

# Skärma del av PCB

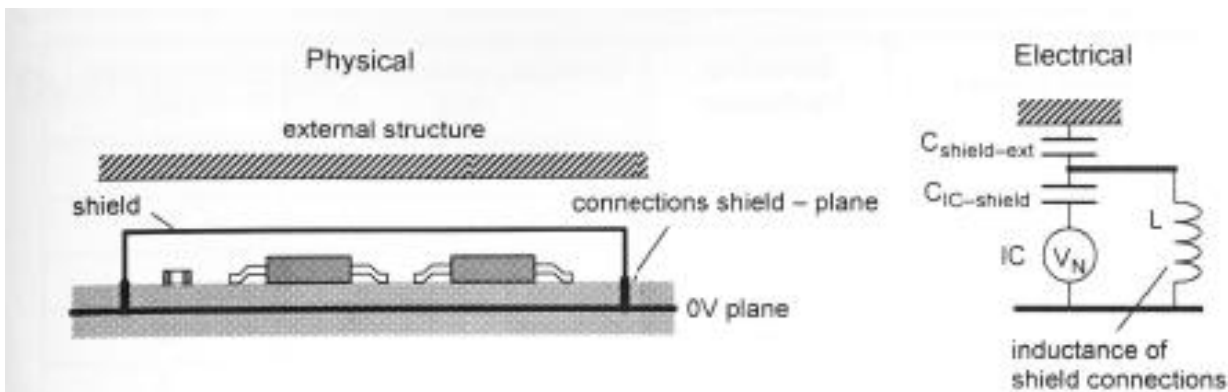


Figure 14.15 Equivalent circuit for E-field shield on a PCB

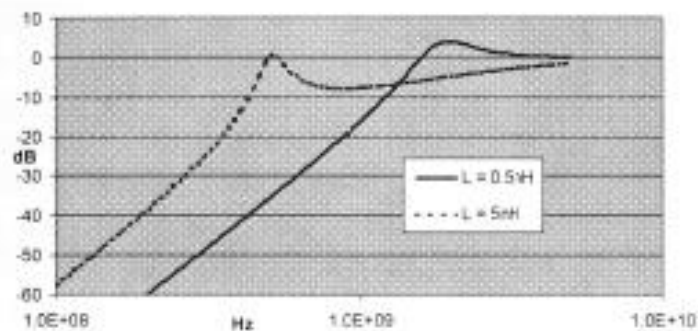


Figure 14.16 Attenuation through  $\epsilon$  shield with mounting inductance  $L$ .

