

## Vorschlag

13.11.2023

FDOR\_3-9485-02 Lagenaufbau:

```
1 -----      Cu-Foil  9+35  :End-Cu 44
                  Imp/Diff.Pair
xxxxxxxxxxxxxxxxx Prepreg  106 R1755 58 :55
xxxxxxxxxxxxxxxxx Prepreg  1080R1755LR 74 :70
2 -----      #PWR/GND
##### Core  200 35/35 :270  FR4
3 -----      Imp/Diff.Pair
xxxxxxxxxxxxxxxxx Prepreg  2116R1755HR 122 :115
xxxxxxxxxxxxxxxxx Prepreg  2116R1755HR 122 :115
4 -----      #PWR/GND
##### Core  200 35/35 :270  FR4
5 -----      #PWR/Power
xxxxxxxxxxxxxxxxx Prepreg  2116R1755HR 122 :115
xxxxxxxxxxxxxxxxx Prepreg  2116R1755HR 122 :115
6 -----      Signale
##### Core  200 35/35 :270  FR4
7 -----      #PWR/Power
xxxxxxxxxxxxxxxxx Prepreg  1080R1755LR 74 :70
xxxxxxxxxxxxxxxxx Prepreg  106 R1755 58 :55
                  Imp/Diff.Pair Single-Ended
8 -----      Cu-Foil  9+35  :End-Cu 44
```

Lagen: 8 Dicke: 1,57 +/- 0,13

Edge-coupled Surface Microstrip

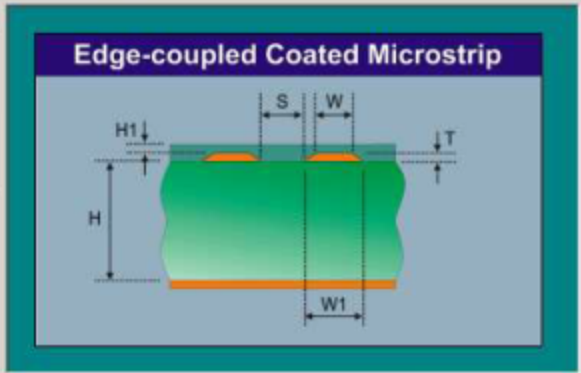
Edge-coupled Coated Microstrip

Edge-coupled Embedded Microstrip

Edge-coupled Symmetrical Stripline

Edge-coupled Offset Stripline

Broadside-coupled Stripline



Height	H	<input type="text" value="130"/>	<input type="button" value="Calculate"/>
Height1	H1	<input type="text" value="10"/>	<input type="button" value="Calculate"/>
Width	W	<input type="text" value="110"/>	<input type="button" value="Calculate"/>
Width1	W1	<input type="text" value="130"/>	<input type="button" value="Calculate"/>
Separation	S	<input type="text" value="130"/>	<input type="button" value="Calculate"/>
Thickness	T	<input type="text" value="42"/>	<input type="button" value="Calculate"/>
Dielectric	Er	<input type="text" value="3.7"/>	<input type="button" value="Calculate"/>
Diff. Impedance	Zo	<input type="text" value="98.38"/>	<input type="button" value="Calculate"/>
			<input data-bbox="1461 502 1567 538" type="button" value="More..."/>

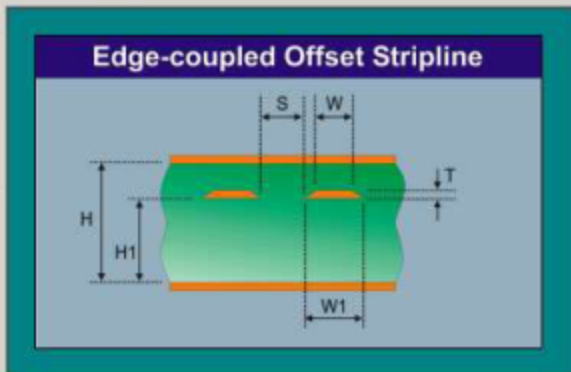
Notes

Units

☐ Mils  
☐ Inches  
☒ Microns  
☐ Millimetres



Design and Test Tools for  
Controlled Impedance  
and Signal Integrity

Edge-coupled Surface  
MicrostripEdge-coupled Coaxial  
MicrostripEdge-coupled  
Embedded MicrostripEdge-coupled  
Symmetrical StriplineEdge-coupled Offset  
StriplineBroadside-coupled  
Stripline

Notes

desy 100 inner

Units

- ☐ Mils  
☐ Inches  
☒ Microns  
☐ Millimetres

Height	H	460	Calculate
Height1	H1	200	Calculate
Width	W	110	Calculate
Width1	W1	120	Calculate
Separation	S	140	Calculate
Thickness	T	33	Calculate
Dielectric	Er	3.7	Calculate
Diff. Impedance	Zo	96.77	Calculate
More...			

Design and Test Tools for  
Controlled Impedance  
and Signal Integrity

[Embedded Resistors](#)
[PPM Calculator](#)
[Crosstalk Calculator](#)
[Wavelength Calculator](#)
[Er Effective](#)
[Ohm's Law](#)
[Reactance](#)

[Conductor Spacing](#)
[Conductor Impedance](#)
[Conversion Data](#)
[Planar Inductors](#)
[Plane Calculator](#)
[Thermal](#)
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[Via Properties](#)
[Conductor Properties](#)
[Bandwidth & Max Conductor Length](#)
[Differential Pairs](#)
[Padstack Calculator](#)
[Mechanical Information](#)

### Differential Pairs

Conductor Width (W)

**0,13 mm**

Target Zdiff

**120 Ohms**

Formula Restrictions:

0.1 < W/H < 3.0  
0.1 < S/H < 3.0

Conductor Spacing (S)

**0,30 mm**

Conductor Height (H)

**0,130 mm**

**W/H = 1.000**

**S/H = 2.308**

Zdifferential

**120.992 Ohms**

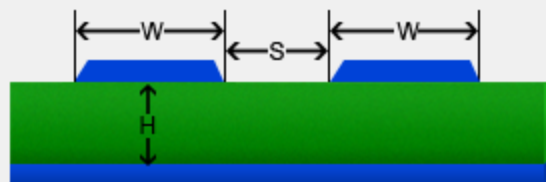
Zo

**63.839 Ohms**

+/- Tolerance = 10%

**133.091 Ohms**

**108.892 Ohms**



### Options

Base Copper Weight

- ☒ 9um
- ☐ 18um
- ☐ 35um
- ☐ 53um
- ☐ 70um
- ☐ 88um
- ☐ 106um
- ☐ 142um
- ☐ 178um

Units

- ☐ Imperial
- ☒ Metric

Substrate Options

Material Selection

**Custom**

Er

**3,7**

Tg (°C)

**130**

Temp Rise (°C)

**20**

Temp in (°F) = 36.0

Ambient Temp (°C)

**22**

Temp in (°F) = 71.6

Plating Thickness

- ☐ Bare PCB
- ☐ 18um
- ☒ 35um
- ☐ 53um
- ☐ 70um
- ☐ 88um
- ☐ 106um

Differential Layer

- ☒ Edge Cpld Ext
- ☐ Edge Cpld Int Sym
- ☐ Edge Cpld Int Asym
- ☐ Edge Cpld Embed
- ☐ Broad Cpld Shld
- ☐ Broad Cpld NShld

Print

Solve!

Information

Total Copper Thickness  
44 um

Via Thermal Resistance  
N/A

Via Count: **10**

Conductor Temperature

Temp in (°C) = N/A

Temp in (°F) = N/A

N/A

Via Voltage Drop

N/A

Conductor Spacing    Conductor Impedance    Conversion Data    Planar Inductors    Plane Calculator    Thermal    Fusing Current  
 Embedded Resistors    PPM Calculator    Crosstalk Calculator    Wavelength Calculator    Er Effective    Ohm's Law    Reactance  
 Via Properties    Conductor Properties    Bandwidth & Max Conductor Length    Differential Pairs    Padstack Calculator    Mechanical Information

## Differential Pairs

Conductor Width (W)

**0,13 mm**

Target Zdiff

**150 Ohms**Formula Restrictions:
 $0.1 < W/H < 3.0$   
 $0.1 < S/H < 3.0$ 

Conductor Spacing (S)

**0,23 mm**

Conductor Height (H)

**0,360 mm****W/H = 0.361****S/H = 0.639**

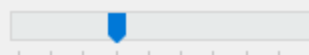
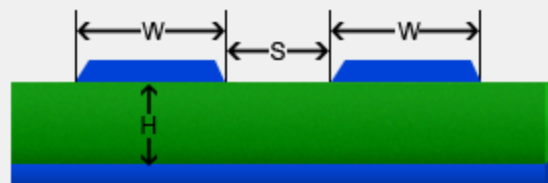
Zdifferential

**152.512 Ohms**

Zo

**103.040 Ohms**

+/- Tolerance = 10%

**167.763 Ohms****137.261 Ohms**

## Options

Base Copper Weight

- ☒ 9um  
☐ 18um  
☐ 35um  
☐ 53um  
☐ 70um  
☐ 88um  
☐ 106um  
☐ 142um  
☐ 178um

Units

- ☐ Imperial  
☒ Metric

Substrate Options

Material Selection

**FR-4 STD**

Er

**3,7**

Tg (°C)

**130**

Temp Rise (°C)

**20**

Temp in (°F) = 36.0

Ambient Temp (°C)

**22**

Temp in (°F) = 71.6

Plating Thickness

- ☐ Bare PCB  
☐ 18um  
☒ 35um  
☐ 53um  
☐ 70um  
☐ 88um  
☐ 106um

Differential Layer

- ☒ Edge Cpld Ext  
☐ Edge Cpld Int Sym  
☐ Edge Cpld Int Asym  
☐ Edge Cpld Embed  
☐ Broad Cpld Shld  
☐ Broad Cpld NShld

Print

Solve!

## Information

Total Copper Thickness  
44 umVia Thermal Resistance  
N/AVia Count: **10**

Conductor Temperature

Temp in (°C) = N/A

Temp in (°F) = N/A

N/A

Via Voltage Drop

N/A

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Conductor Impedance

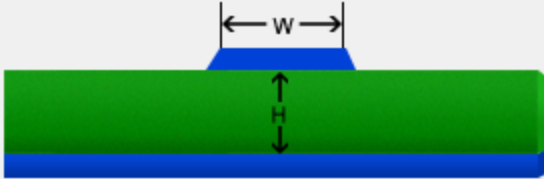
Conductor Width (W)  
0,26mm

Conductor Height (H)  
0,130mm

Frequency (MHz)  
500

Note:  
This calculator uses a complex formula, not the simplified formula. Results track the Sonnet 3D solver.

Er Effective = 2.7263



Zo  
49.9258 Ohms

Lo  
2.7504 nH/cm

Co  
1.1034 pF/cm

Tpd  
55.0895 ps/cm

Options

Base Copper Weight  
☒ 9um  
☐ 18um  
☐ 35um  
☐ 53um  
☐ 70um  
☐ 88um  
☐ 106um  
☐ 142um  
☐ 178um

Plating Thickness  
☐ Bare PCB  
☐ 18um  
☒ 35um  
☐ 53um  
☐ 70um  
☐ 88um  
☐ 106um

Passive Circuits  
☒ Microstrip  
☐ Microstrip Embed  
☐ Stripline  
☐ Stripline Asym  
☐ Dual Stripline  
☐ Coplanar Wave

Information  
Total Copper Thickness  
44 um  
Conductor Temperature  
Temp in (°C) = N/A  
Temp in (°F) = N/A

Units  
☐ Imperial  
☒ Metric


Substrate Options  
Material Selection  
FR-4 STD  
Er  
3,7  
Tg (°C)  
130

Temp Rise (°C)  
20  
Temp in (°F) = 36.0

Ambient Temp (°C)  
22  
Temp in (°F) = 71.6

PrintSolve!

Via Thermal Resistance  
N/A  
Via Count: 10  
Via Voltage Drop  
N/A

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