Sensory w Aplikacjach Wbudowanych

Urządzenie IoT monitorujące temperaturę i wilgotność w pomieszczeniu serwerowym

-- spotkanie kontrolne --

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Hardware

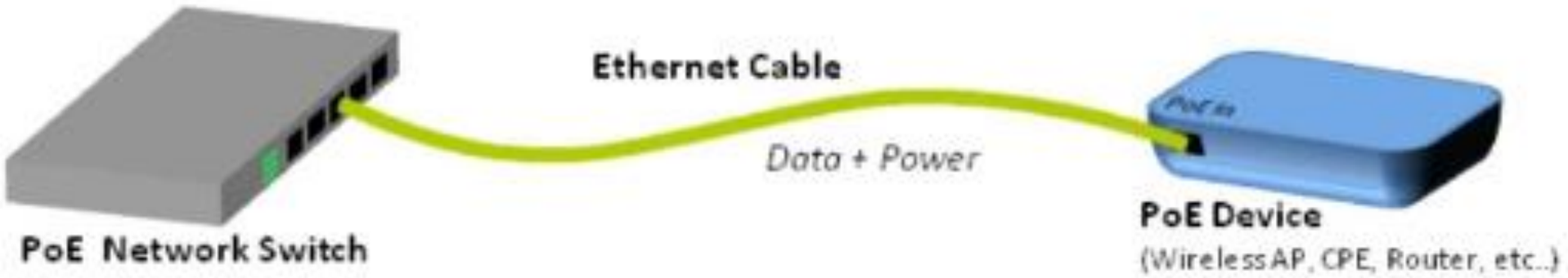
ESP32 + ENS210 + PoE

802.3af (2003)


DLA CIEBIE SZKLANKA
JEST DO POŁOWY
PEŁNA
CZY
PUSTA?

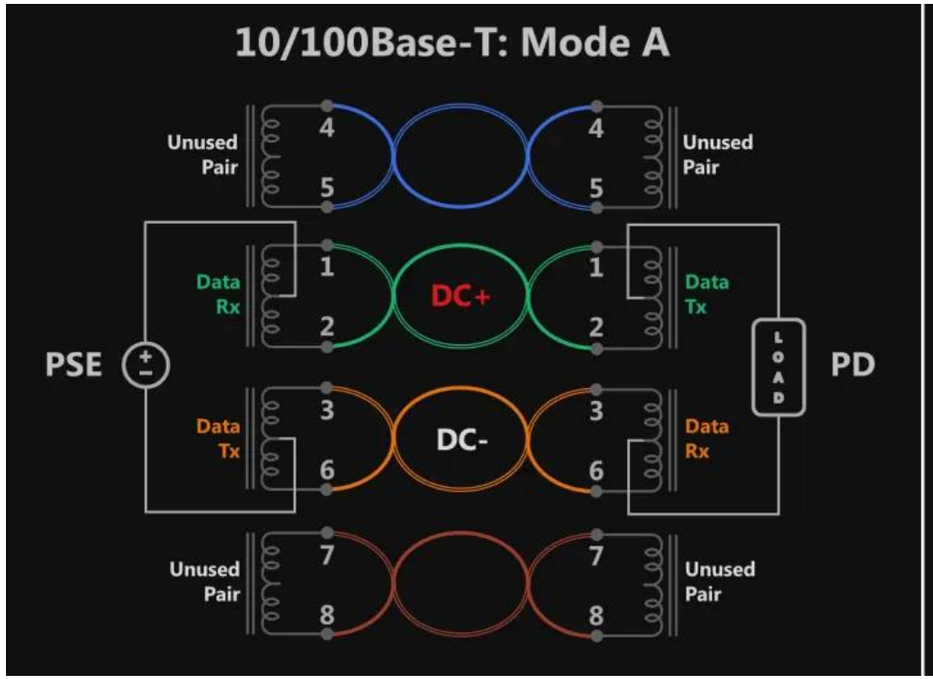

PoE
czy twoje życie ma sens ?

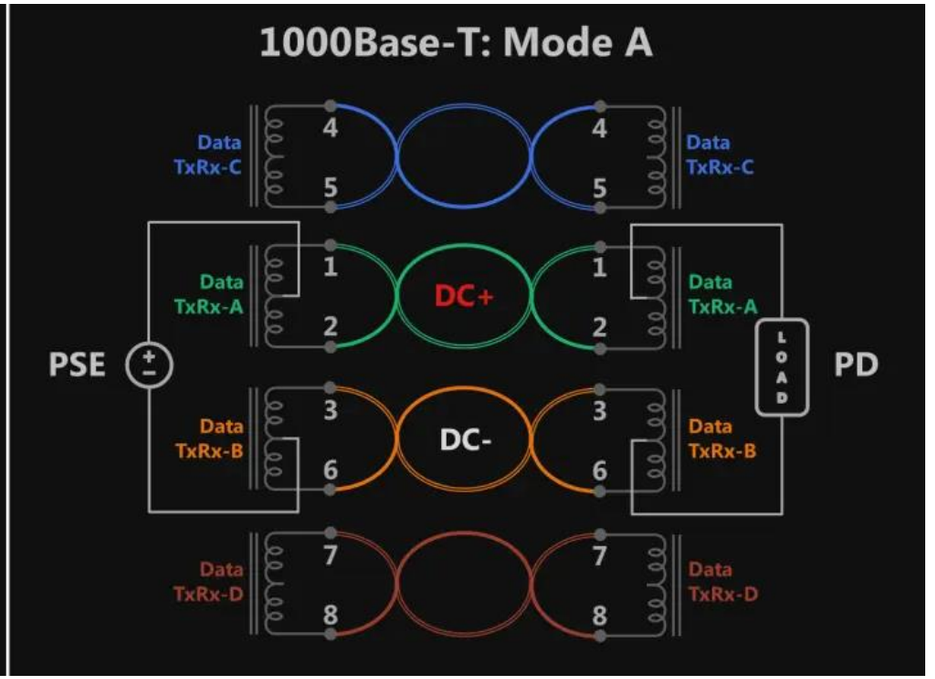
Świat idealny

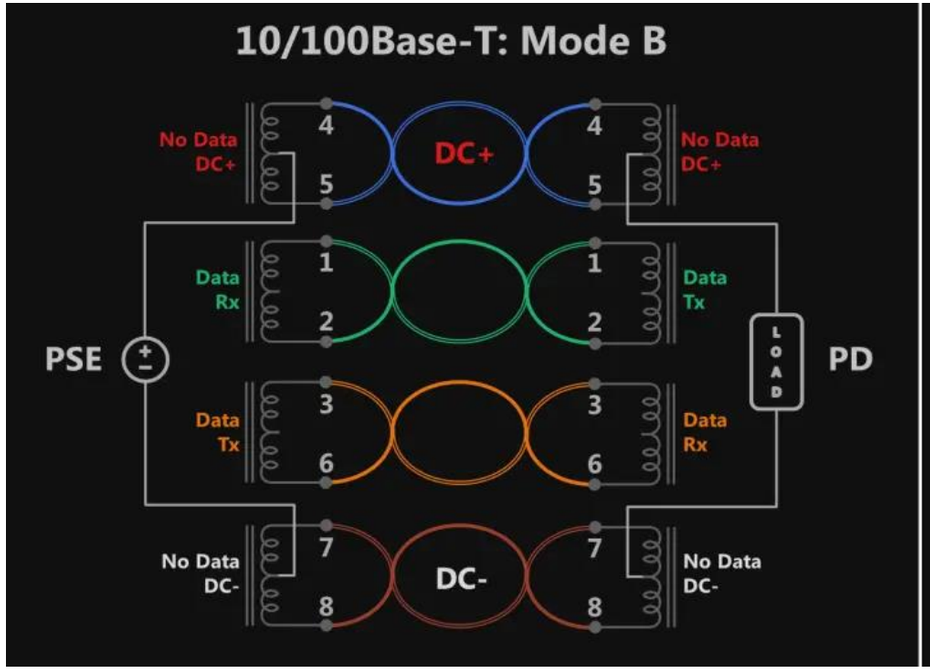


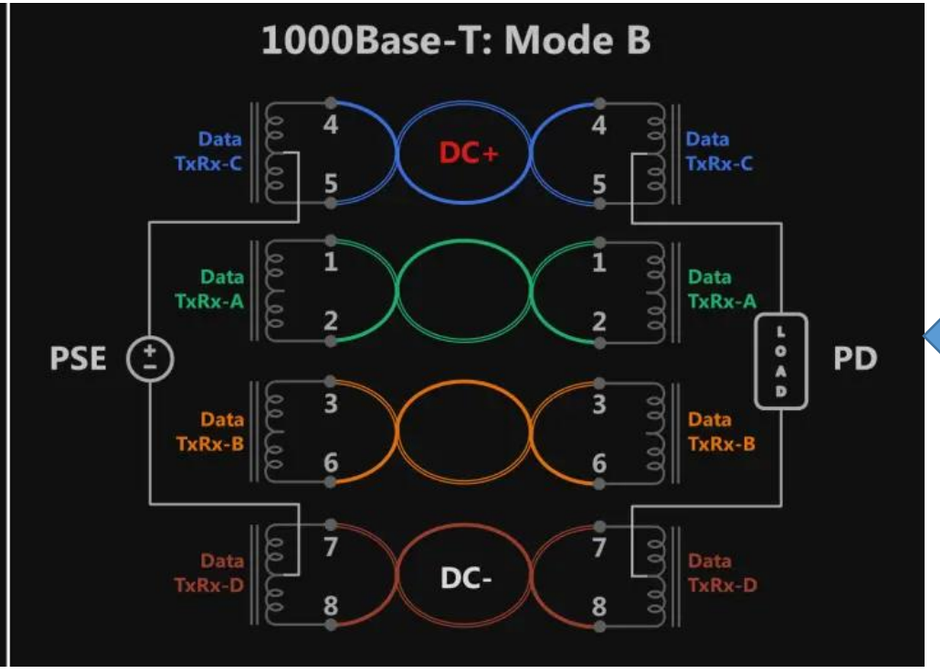
Type	Standard	PD Min. Power Per Port	PSE Max. Power Per Port	Cable Category	Power Over Pairs	Released Time
Type 1	IEEE 802.3af	12.95W	15.4W	Cat5e	2 pairs	2003
Type 2	IEEE 802.3at	25W	30W	Cat5e	2 pairs	2009
Type 3	IEEE 802.3bt	51-60W	60W	Cat5e	2 pairs class0-4, 4 pairs class5-6	2018
Type 4	IEEE 802.3bt	71-90W	100W	Cat5e	4 pairs class7-8	2018

PD - Powered Device,
PSE - Power Sourcing Equipment


10/100Base-T: Mode A
Unused Pair
Unused Pair
Data Rx
DC+
Data Tx
PSE
PD
LOAD
Data Tx
DC-
Data Rx
Unused Pair
Unused Pair
4
5
1
2
3
6
7
8

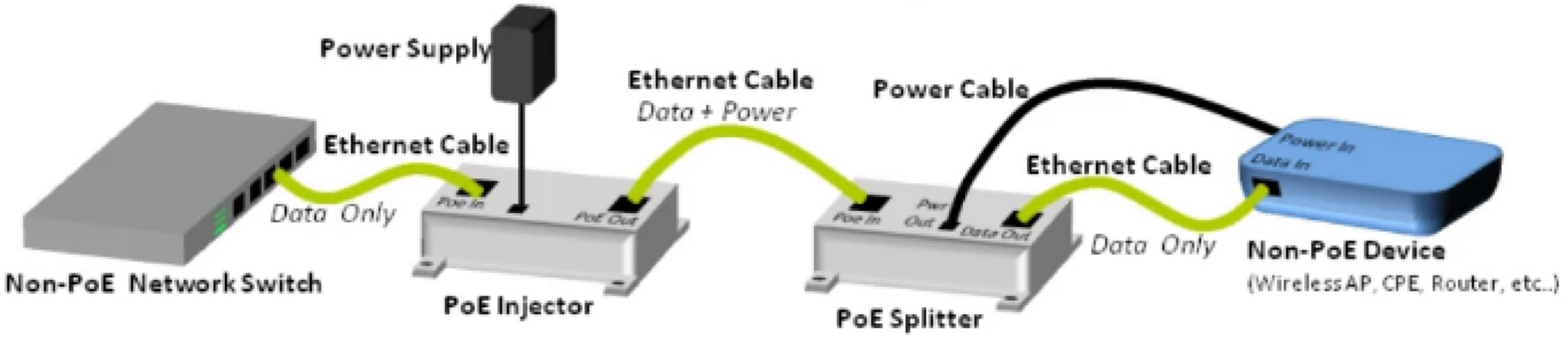

1000Base-T: Mode A
Data TxRx-C
Data TxRx-C
Data TxRx-A
DC+
Data TxRx-A
PSE
PD
LOAD
Data TxRx-B
DC-
Data TxRx-B
Data TxRx-D
Data TxRx-D
4
5
1
2
3
6
7
8


10/100Base-T: Mode B
No Data DC+
DC+
No Data DC+
Data Rx
Data Tx
PSE
PD
LOAD
Data Tx
Data Rx
No Data DC-
DC-
No Data DC-
4
5
1
2
3
6
7
8


1000Base-T: Mode B
Data TxRx-C
DC+
Data TxRx-C
Data TxRx-A
Data TxRx-A
PSE
PD
LOAD
Data TxRx-B
Data TxRx-B
Data TxRx-D
DC-
Data TxRx-D
4
5
1
2
3
6
7
8

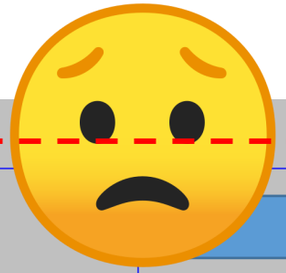
Bo jak nie wiadomo o co chodzi, to chodzi o...

Świat realny



DOPÓKI WALCZYSZ,

JESTEŚ ZWYCIĘZCĄ



V1
48
D4
1N914
D5
1N914
D6
1N914
D7
1N914
V2
0
R1
25k
D1
UDZV11B
R2
101.2k
Q1
2N3904
Q2
2N3904
R3
2k
Q3
2N3904
LM385-ADJ_TRANS
NC_0
K
FB
A
NC_4
NC_3
NC_2
NC_1
U1
R4
130
Q4
2N3904
R5
101.2k
D2
EDZV15B
R6
248.5k
R7
52k
D3
KDZ27B
C1
100µ
IRF9640
M1
LM2576HV_TRANS
OUT
VIN
ON_OFF_N
FB
GND
U3
D9
1N5822
L1
100µ
C2
1000µ
R9
17k
R8
10k
R10
100

Identyfikacja urządzenia PD

- I_{PSE} = 120 uA dla V_{PSE} = 4 V
- I_{PSE} = 278 uA dla V_{PSE} = 8 V

- $\Delta V_{PSE} / \Delta I_{PSE}$ = 25,3 kΩ -> z przedziału (19 kΩ - 26.5 kΩ)

Klasyfikacja urządzenia

U_{PSE} = 20 V
I_{PSE} = 10.6 mA

Klasa 1 -> max 3.84 W dla urządzenia

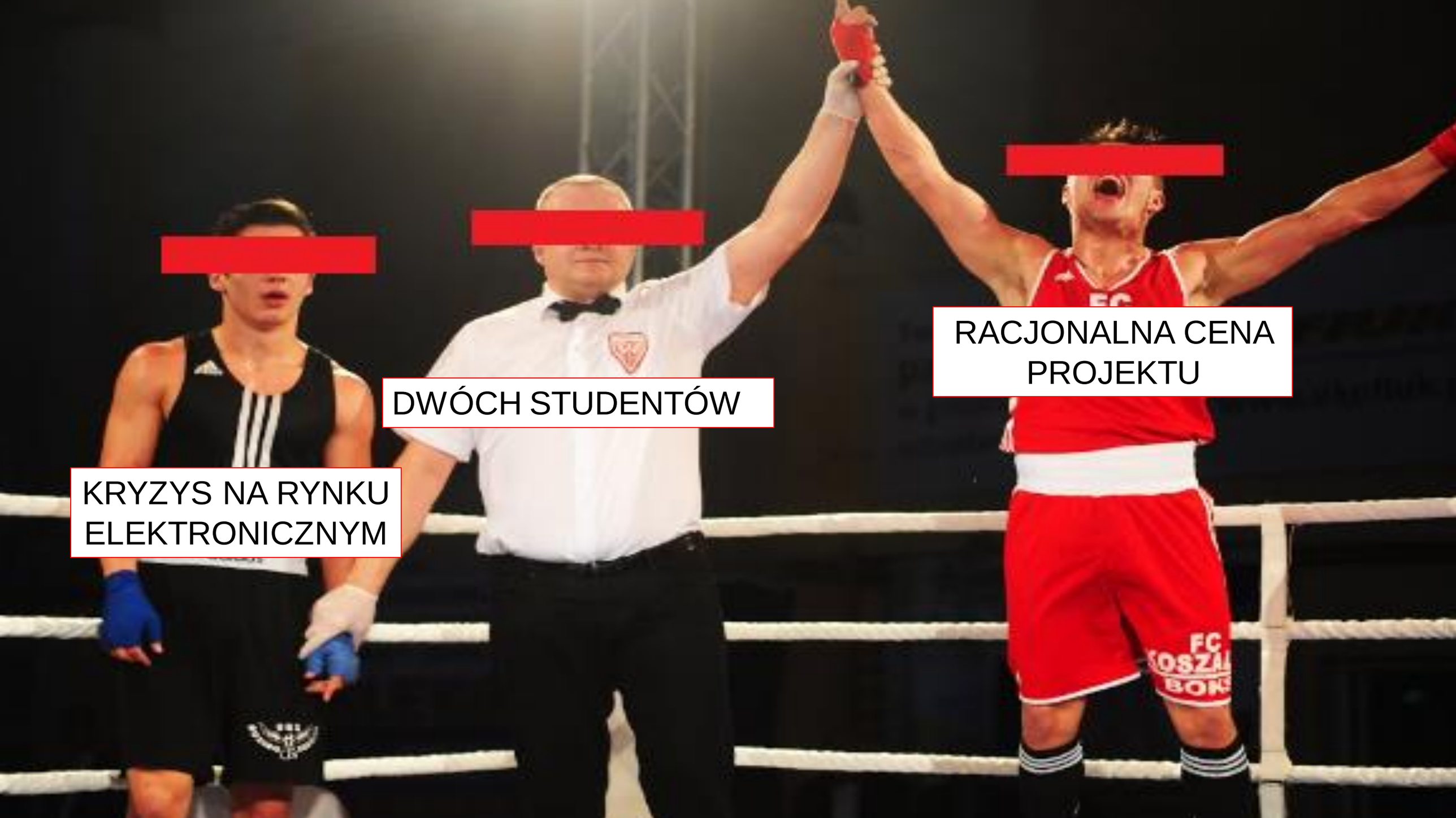
Measured classification current	Classification
0mA to 5mA	Class 0
>5mA and <8mA	Class 0 or 1
8mA to 13mA	Class 1
>13mA and <16mA	Class 0, 1 or 2
16mA to 21mA	Class 2
>21mA and <25mA	Class 0, 2 or 3
25mA to 31mA	Class 3
>31mA and <35mA	Class 0, 2 or 3
35mA to 45mA	Class 4
>45mA and <51mA	Class 0 or 4
≥ 51mA	Class 0

Table 2.3: PD classification

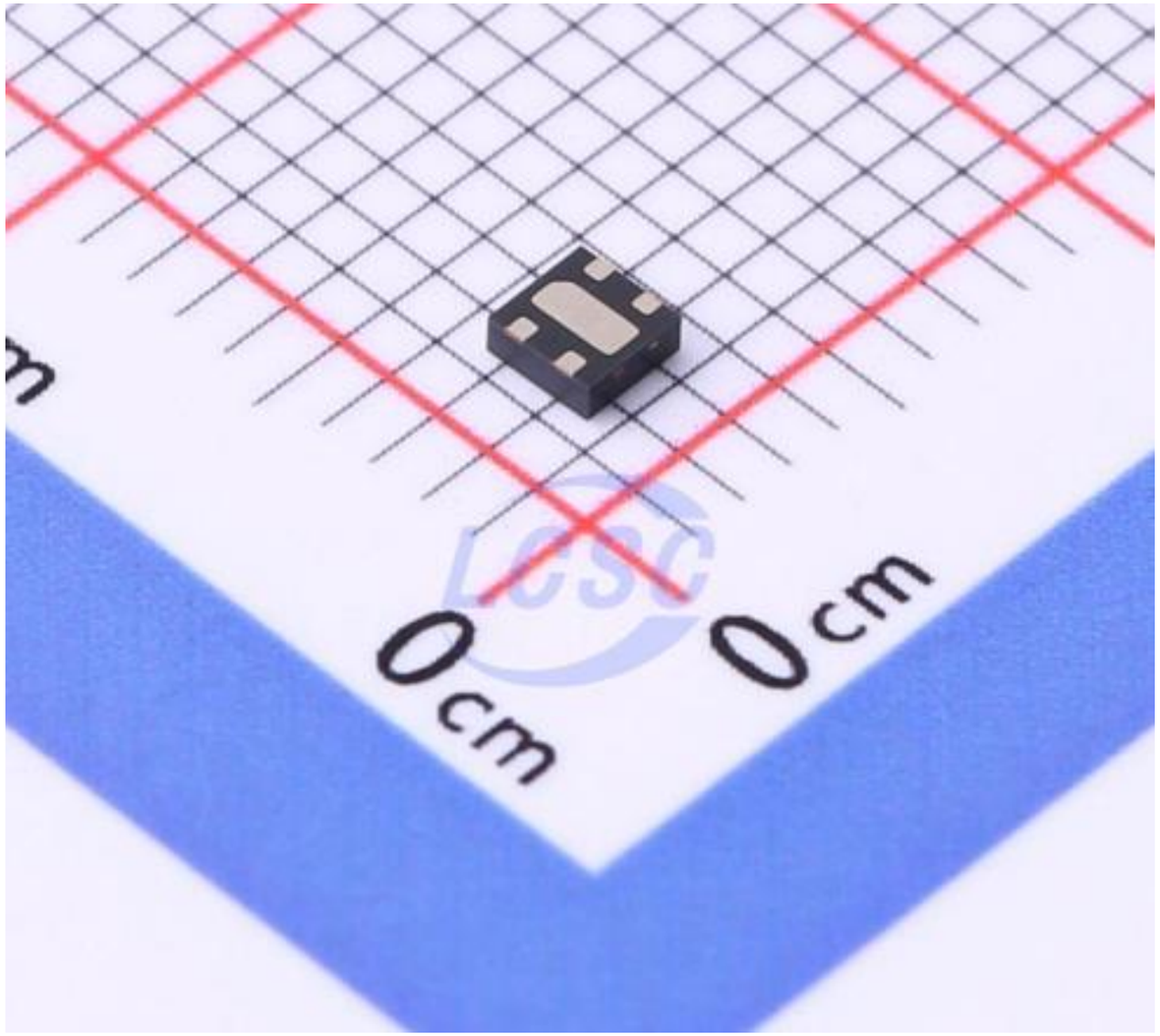
Class	Purpose	Power at the PD input
0	15.4 W	0.44 to 12.95 W
1	4.0 W	0.44 to 3.84 W
2	7.0 W	3.84 to 6.49 W
3	15.4 W	6.49 to 12.95 W
4	Like class 0	Reserved for future applications

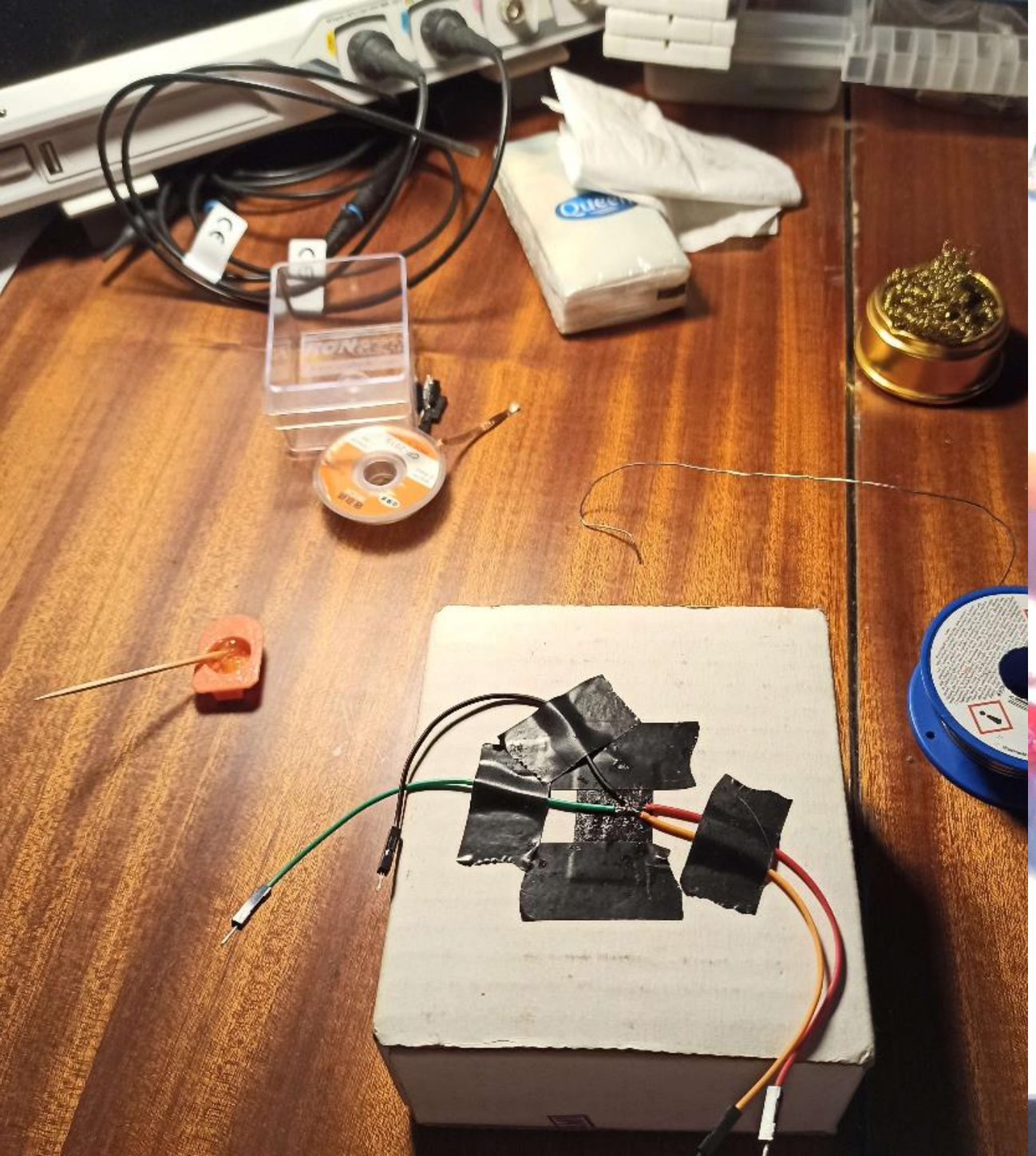
Table 2.4: PD power classes

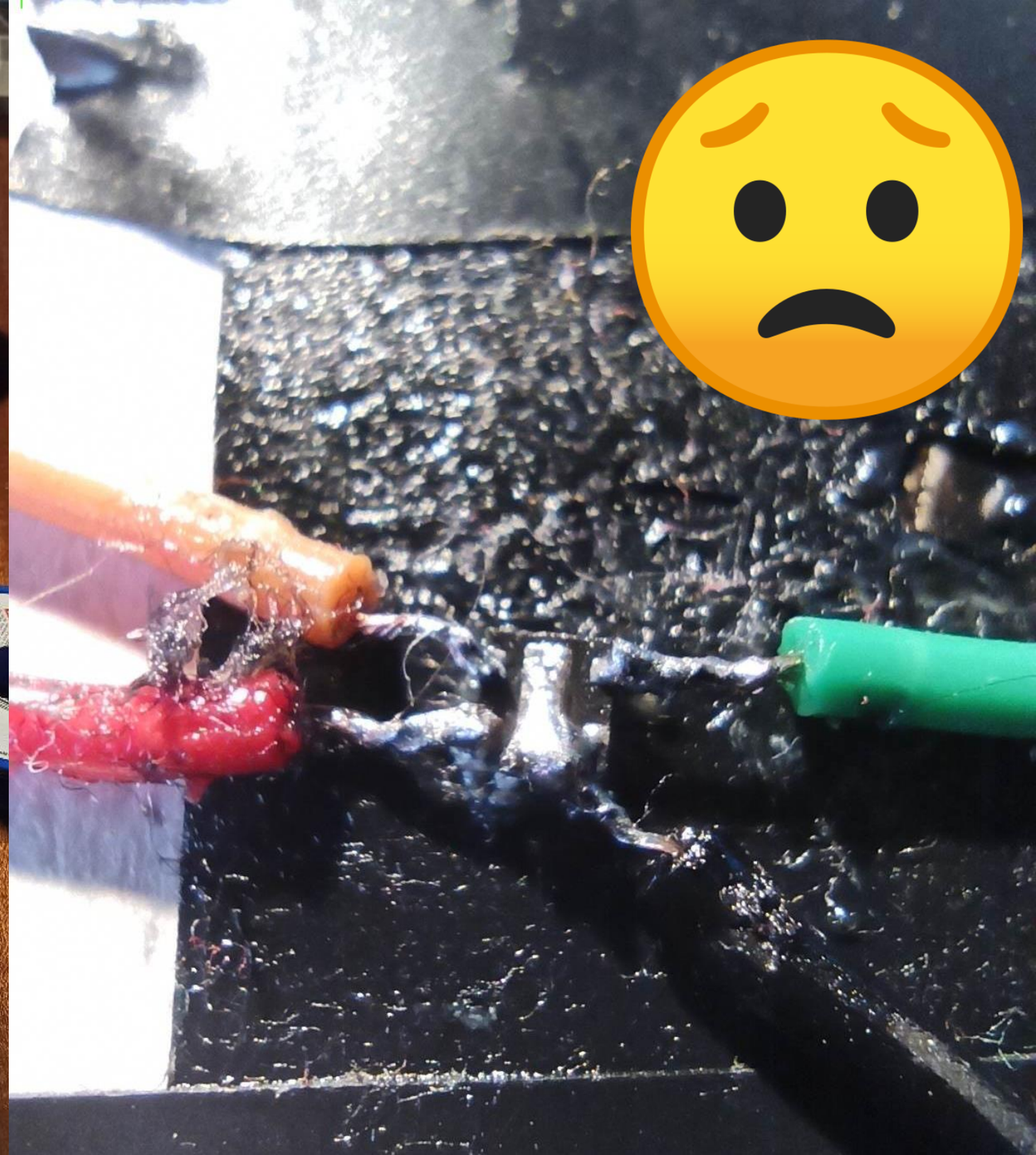

200 Pieces
70 K
5,1 K
1
SCHOTTKY
1N5822
ZENER
4,5V
ZENER
11,6V
2 K
25 K
ZENER
27V


KRYZYS NA RYNKU ELEKTRONICZNYM
DWÓCH STUDENTÓW
RACJONALNA CENA PROJEKTU

ENS210

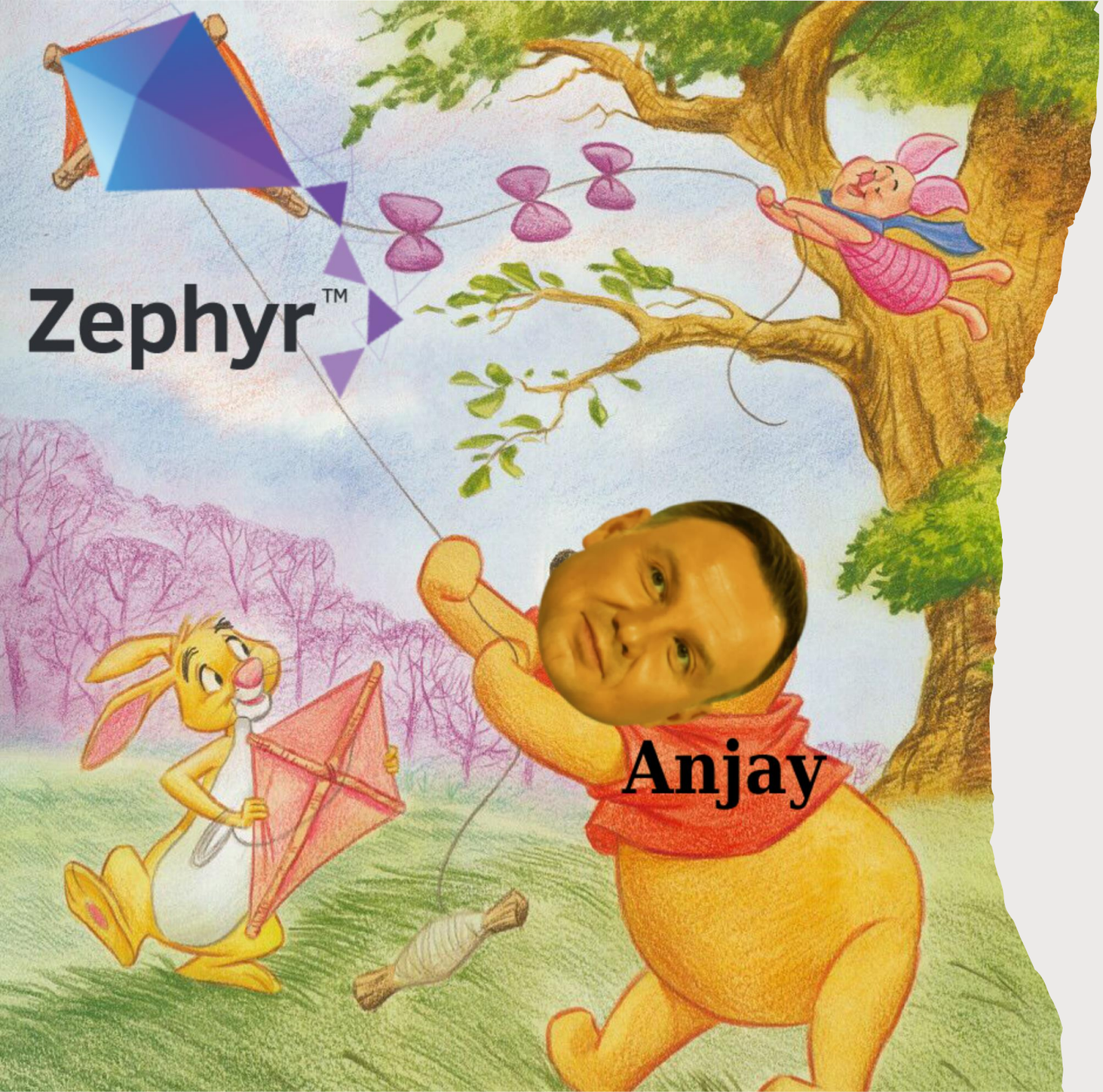






```
Temperature: 24.678125 C; Humidity: 47.038005%
Temperature: 24.693750 C; Humidity: 47.073159%
Temperature: 24.678125 C; Humidity: 47.055582%
Temperature: 24.662500 C; Humidity: 47.055582%
Temperature: 24.678125 C; Humidity: 47.055582%
Temperature: 24.646875 C; Humidity: 47.034099%
Temperature: 24.662500 C; Humidity: 47.055582%
Temperature: 25.146875 C; Humidity: 47.038005%
Temperature: 27.037500 C; Humidity: 47.211822%
Temperature: 28.693750 C; Humidity: 47.348532%
Temperature: 29.162500 C; Humidity: 47.473524%
Temperature: 28.646875 C; Humidity: 47.362203%
Temperature: 28.271875 C; Humidity: 47.342673%
```

Sukces!



Software

REPOZYTORIUM

- Anjay LwM2M Client
- Zephyr OS
- CoioteDM

POKAZ NA ŻYWO