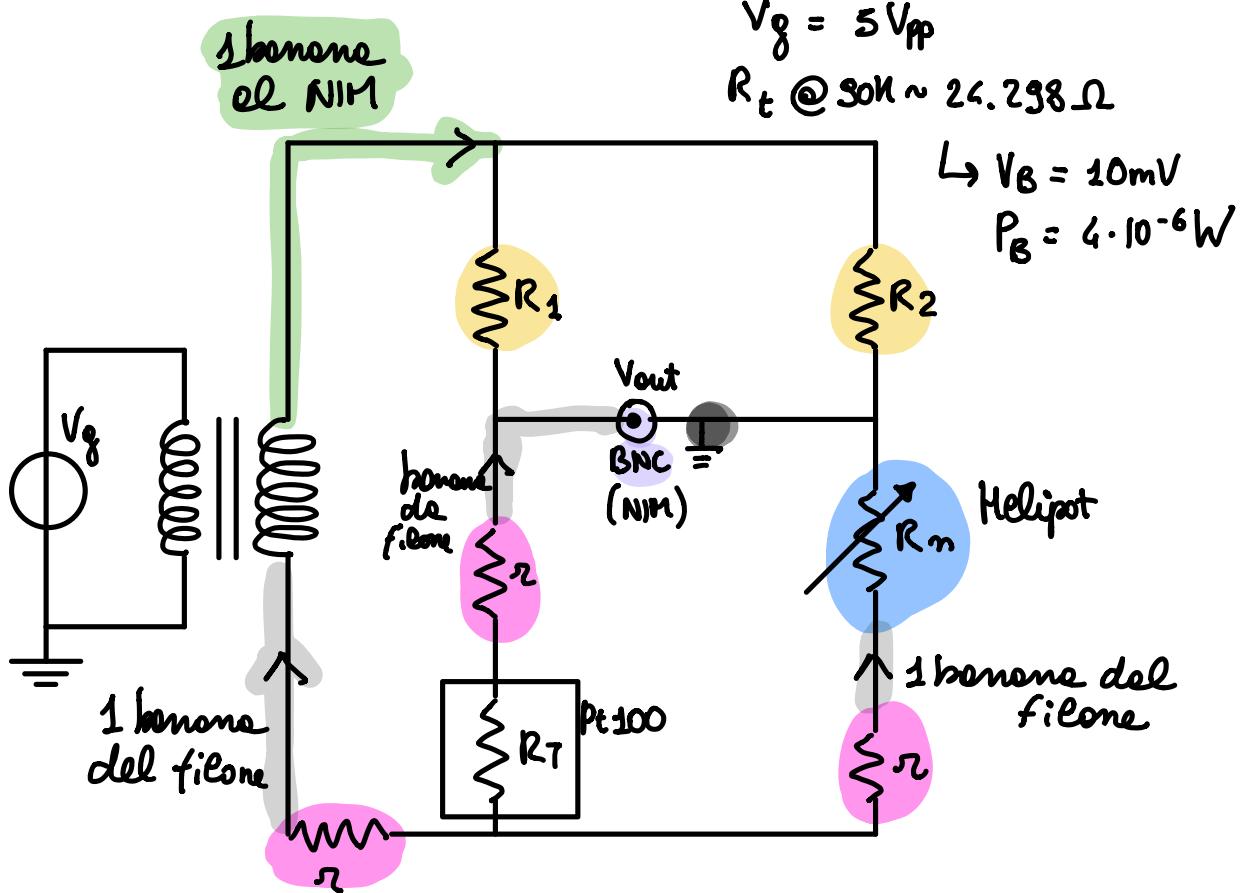
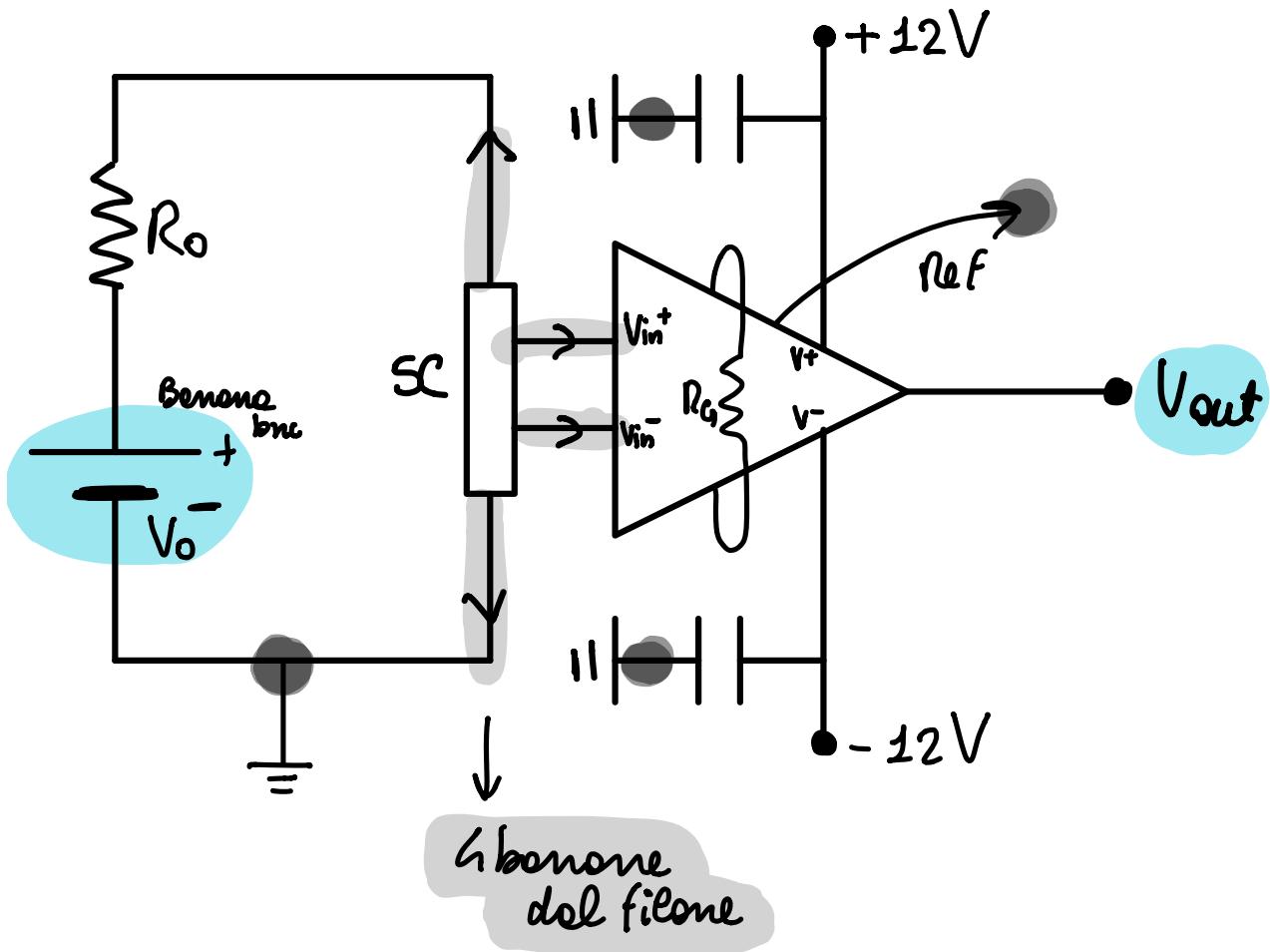


## Ponte Wheatstone



- Bancone del filo della corrente di moto ( $\times 7$ )
- Connettori bancone-BNC ( $\times 2$ )
- Connettori BNC ( $\times 1$ )
- Connettori bancone semplici ( $\times 1$ )  
 (Numeri riferiti al secondo schema)

## Amplificatore



$$R_G = 98.5 \Omega \Rightarrow G = 508.614$$

$$V_o = 2V$$

$$R_o = 995 \Omega$$

$$R_{SC} \sim 0.1 \Omega$$

$$R_{SC} \sim 0.05 \Omega$$

$$V_{SC} = 50mV$$

$$I = \frac{V_o}{R_o} = 2.01mA$$

$$\Rightarrow V_{SC}^{approx} = R_{SC} \frac{V_o}{R_o} G = 102.23mV$$

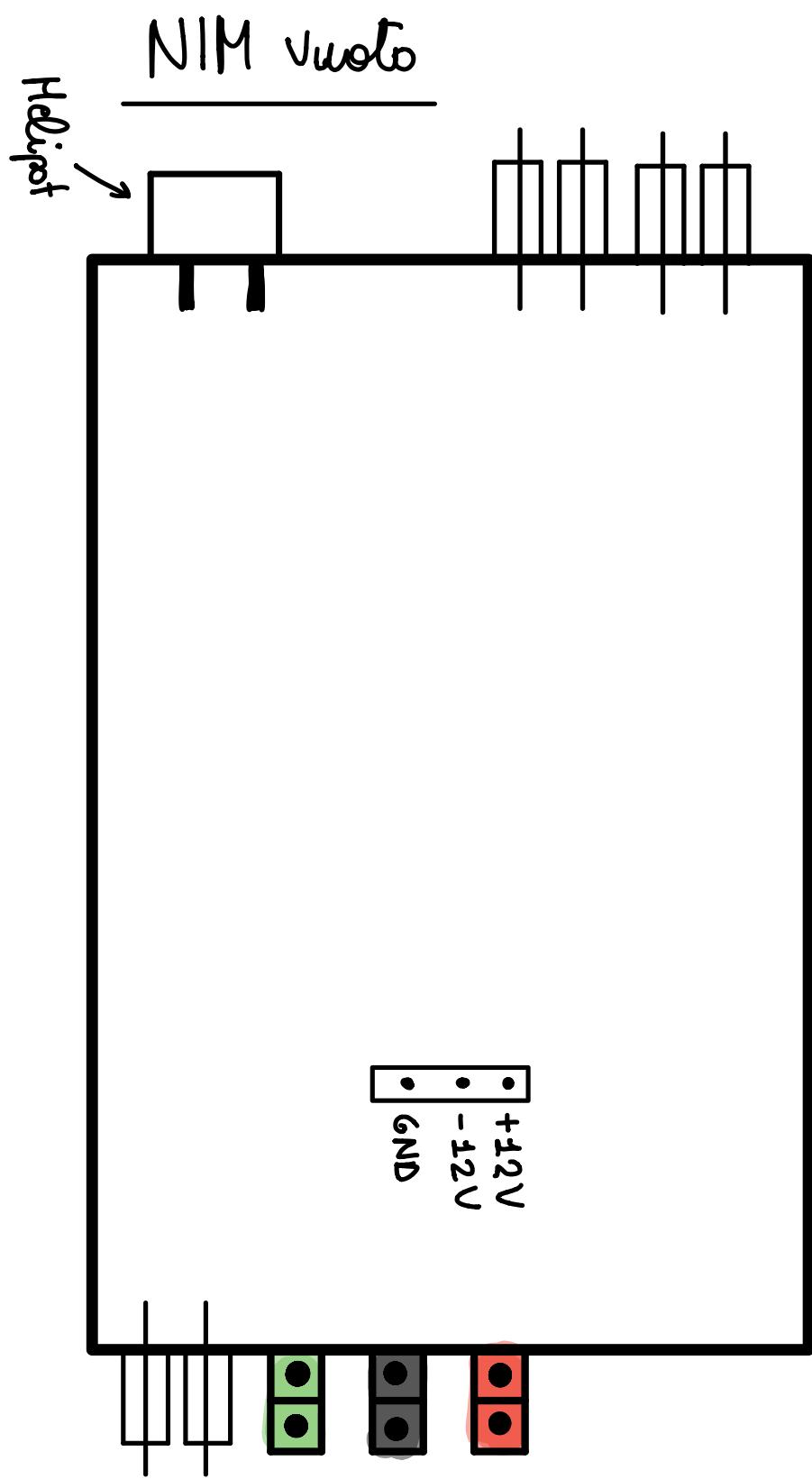
$$V_{SC}^{corr} = V_o \frac{R_{SC}}{R_o + R_{SC}} G = 102.22mV$$

$$P_{SC} = R_{SC} I^2 = 4 \cdot 10^{-7} W$$

$$R_{vsc} = 0.02$$

$V_o$	$V_{out}$
0.5	6 mV
1	11.6 mV
1.5	17.2 mV
2	22.8 mV
0	0.4 mV

$V_o$	$V_{out}$
2	21.8 mV
1.5	16 mV
1	10.5 mV
0.5	5.2 mV
0	-0.6 mV



$$R_1 = 11.99 \text{ k}\Omega$$

$$R_2 = 11.99 \text{ k}\Omega$$

$$V_g = 5 V_{pp}$$

$$R_T @ 30K = 24.238 \text{ }\Omega$$

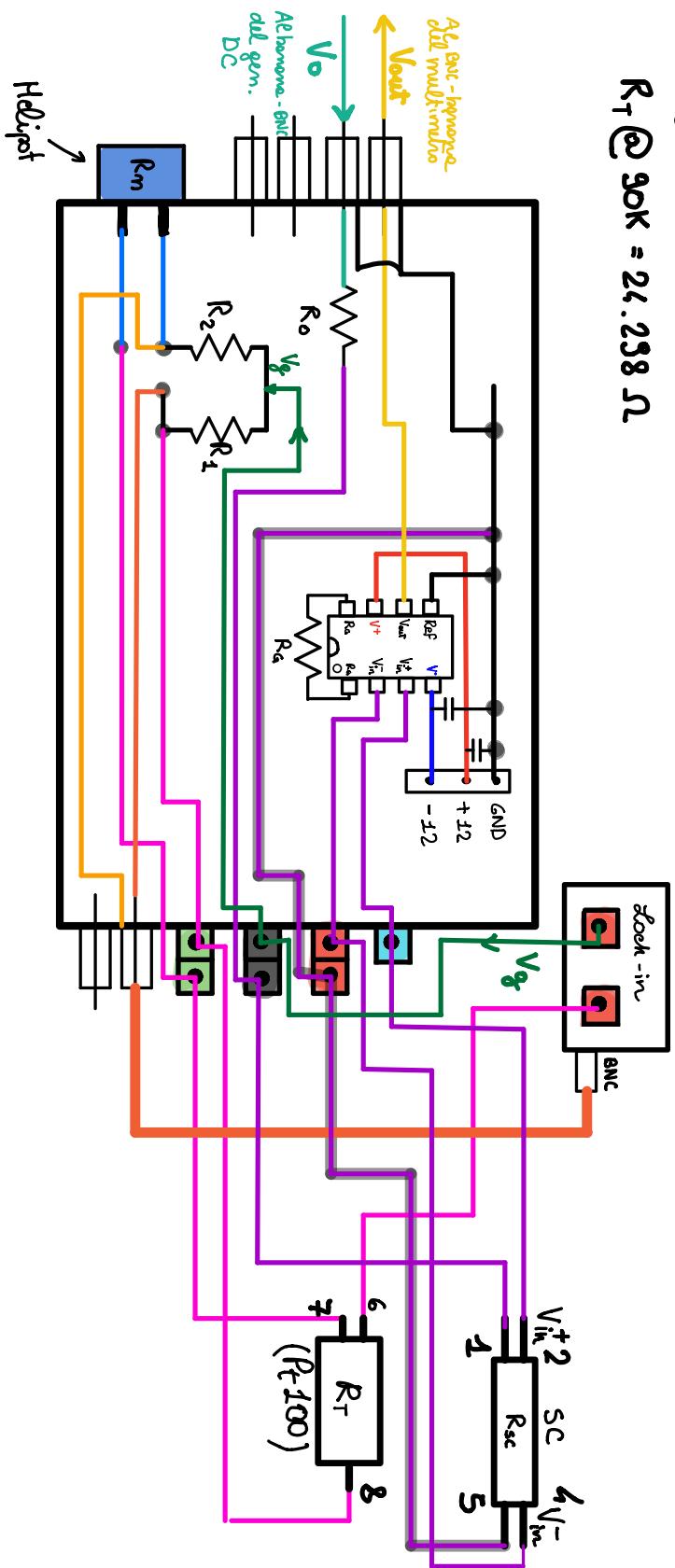
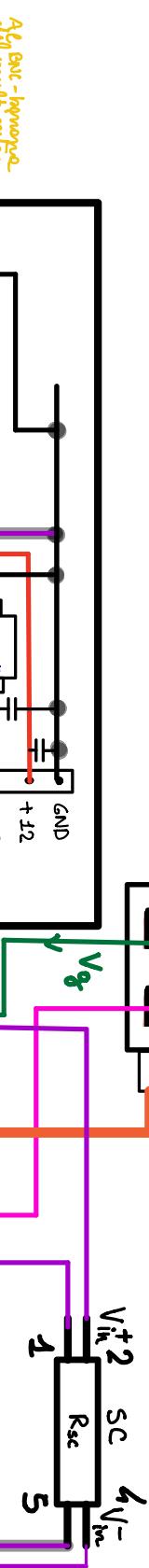
$$R_o = 0.995 \text{ k}\Omega$$

$$R_G = 98.5 \text{ }\Omega \Rightarrow G = 508.614$$

$$V_o = 2 \text{ V}$$

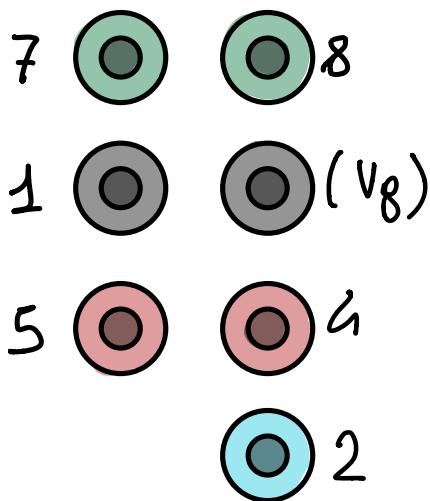
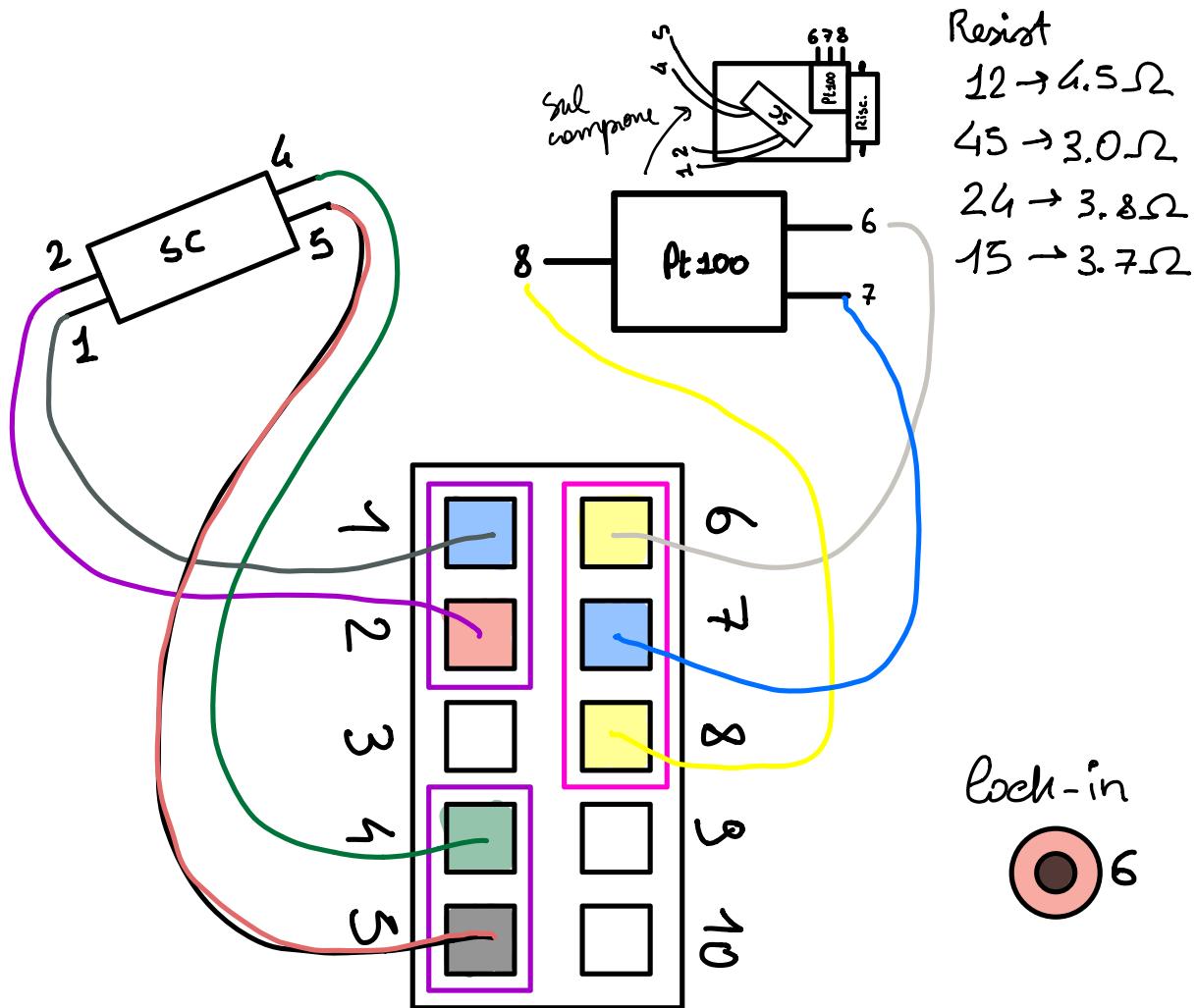
Lock-in

BNC



→ lettura out con multimetro  
usando BNC - komme

→ Pro di questo schema: nè la Vo del generatore che la Vout da leggere sono mai davanti



$V_o = 2.5V$	Tdito	Tcamp	Vout
	51K	82K	400 mV
	47K	75K	406 mV
	46.5K	74K	409 mV
	43.6K	72K	410 mV
	42.5K	71K	410 mV
	42.7K	68.5K	403.4 mV
	45.5K	67.3K	425 mV



OH non  
andava ...

Hyp

$2.5V \rightarrow 420mV$  fino a evento 4400

$2V \rightarrow 336mV$

$1.5V \rightarrow 252mV$

$1V \rightarrow 168mV$

↗ fem indotte

→ Potenziale di contatto causa  
drift lineare delle Vout

## Prova 1

Arduino  $\Rightarrow R_{cav} = 6.5 \Omega$

@  $T_{room} \Rightarrow V_{out} = 30 \text{ mV}$

$$V_o = 3 \text{ V}$$

$$P_{diss} = 10^{-7} \text{ W}$$

$T_{dito}$	$T_{temp}$	$V_{out}$	$V_o^{\text{off}}$	No fondo
248 K	246 K	151.4 mV		30 mV
240 K	239 K	170.9 mV		30 mV
234 K	232 K	184.7 mV		30 mV
228 K	227 K	194.5 mV	= 30 mV	30 mV
225 K	224 K	203.5 mV		30 mV
222 K	221 K	209.0 mV		30 mV
217 K	216 K	217.5 mV		30 mV
212 K	212 K	230.5 mV		30 mV
209 K	209 K	236.5 mV		30 mV
202 K	202 K	250.8 mV	225 mV	
194 K	195 K	264.5 mV	240 mV	
185 K	183 K	282.5 mV	260 mV	
175 K	173 K	298.5 mV	275.3 mV	

166K	170K	303.5mV	287.5mV	
154K	158K	327.5mV	306.2mV	
143K	151K	342.7mV	322.5mV	
135K	142K	353.4mV	333.8mV	
127K	139K	361.5mV	342.5mV	
116K	130K	371.5mV	353.6mV	
107K	125K	380.5mV	263.4mV	
102K	120K	386.2mV	363.5mV	
DA QUI $V_o = 4V$				
91K	112K	395 mV	380mV	
84K	107K	382.5mV	384.3mV	
73K	98K	391mV	392mV	
62K	80K	410mV	410mV	

RISCALDAMENTO

70K	88K	422.8mV	422.8mV
80K	90K	431.5mV	431.5mV
86K	91K	433.0mV	433.0mV
90K	93K	432.7mV	432.7mV
93K	96K	431mV	431mV
95K	96K	431mV	431mV
97K	97.5K	428mV	428mV
99K	98K	428mV	428mV
102K	101K	425.8mV	425.8mV
103.5K	102K	423mV	423mV
105K	104K	421.5mV	421.5mV
107K	105K	419mV	413mV
108K	106K	417.5mV	417.5mV
109K	107K	416mV	416mV
110K	108K	415mV	416mV
111K	109K	417mV	413mV
112K	108K	421mV	411mV

113K	110K	422mV	410mV	
114K	112K	423.5mV	407.5mV	
117K	116K	423mV	403mV	
119K	116K	421mV	400mV	

@  $V_o = 6V$

RAFFREDDAMENTO				
115K	117K	430mV	395mV	
110K	117K	428mV	395mV	
100K	116K	428mV	396mV	
95K	116K	430mV	398mV	
92K	115K	431mV	400mV	
91K	116K	431mV	401mV	
89K	113K	431mV	403mV	
86K	112K	428.5mV	404mV	
84K	111K	427mV	405.5mV	
81K	110K	423mV	406mV	
80K	32.7 Ω	416mV	406mV	

79H	32.Ω	416mV	407mV
78H	32.8Ω	412mV	408mV
77K	31.7Ω	411mV	408mV
76H	31.5Ω	410mV	410mV
75H	106K	411mV	411mV
74H	105H	412mV	412mV
77K	30Ω	415mV	415mV
95K	30.3Ω	421mV	421mV
100K	30.5Ω	421.6mV	421.6mV
103K	31Ω	421.9mV	421.9mV
103H	31.3Ω	421.9mV	421.9mV
104.5H	31.5Ω	422 mV	421mV
105H	31.7Ω	422.7mV	421.5mV
107H	32Ω	424.3mV	420.8mV
108H	32.2Ω	427.8mV	420.4mV
109H	32.5Ω	431.5mV	419.8mV

110K	33Ω	637 mV	619 mV	
112K	33.5Ω	640.5 mV	616 mV	
114K	34.5Ω	642 mV	615 mV	