



Výrobní tester

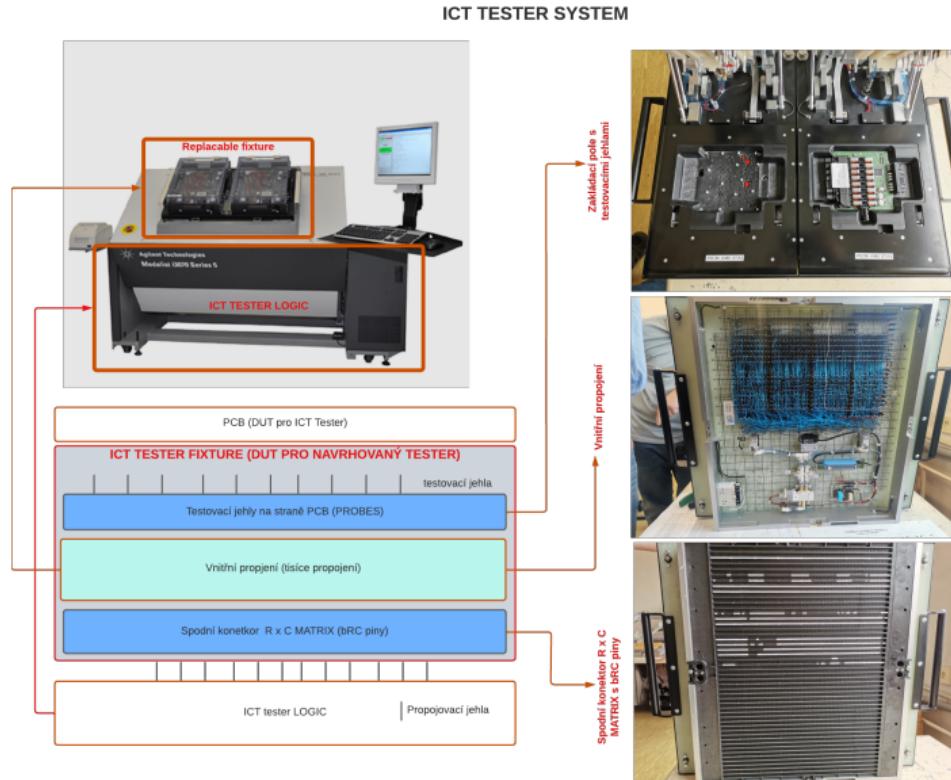
Semestrální práce

Autor práce: Bc. FILIP PAUL

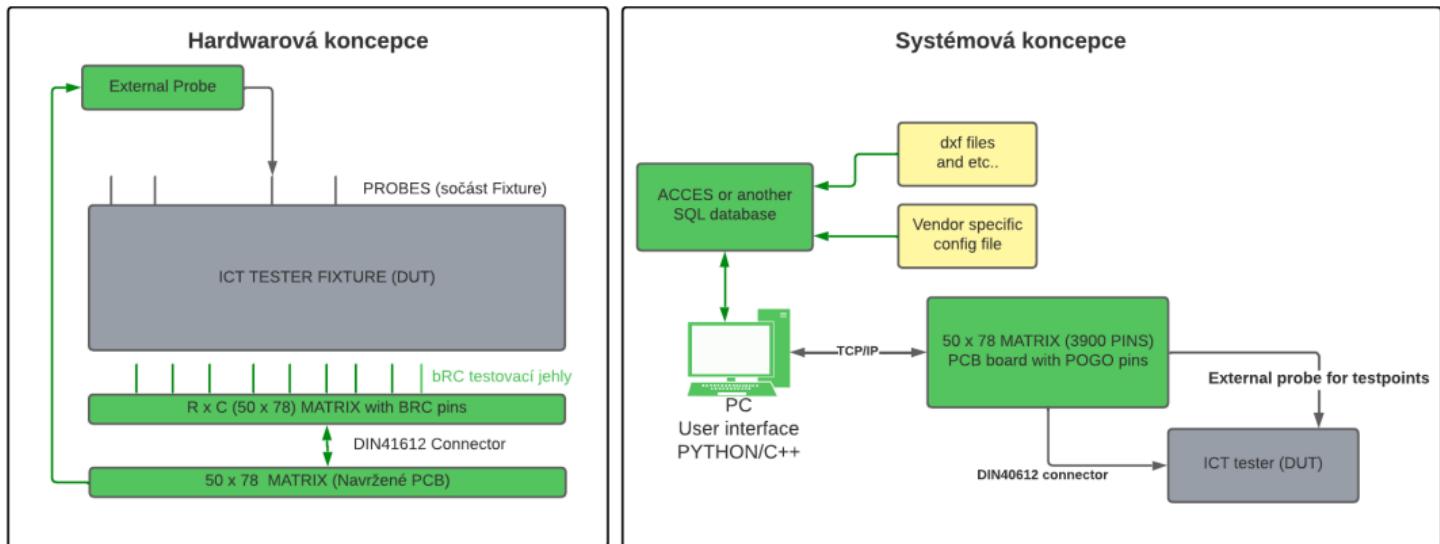
Vedoucí práce: prof. Dr. Ing. ZDENĚK KOLKA

Brno, 6. 1. 2023

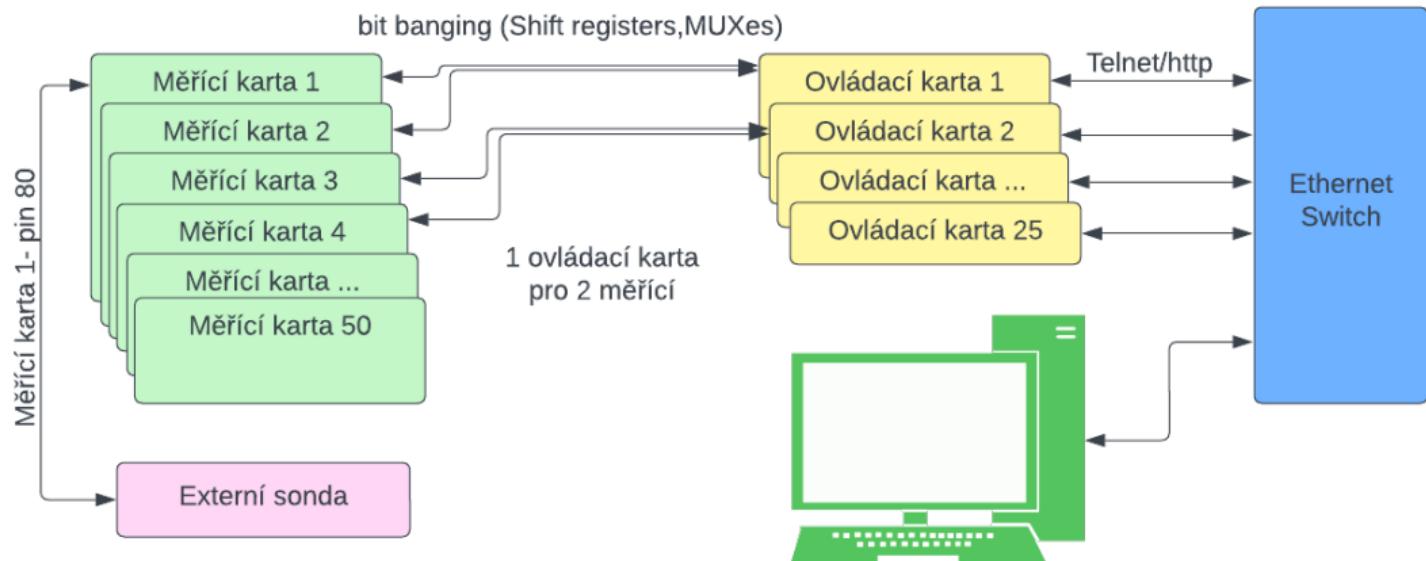
- ICT tester
- Fixture
- Měření odporu
- Testovací jehly
- Probes
- bRC

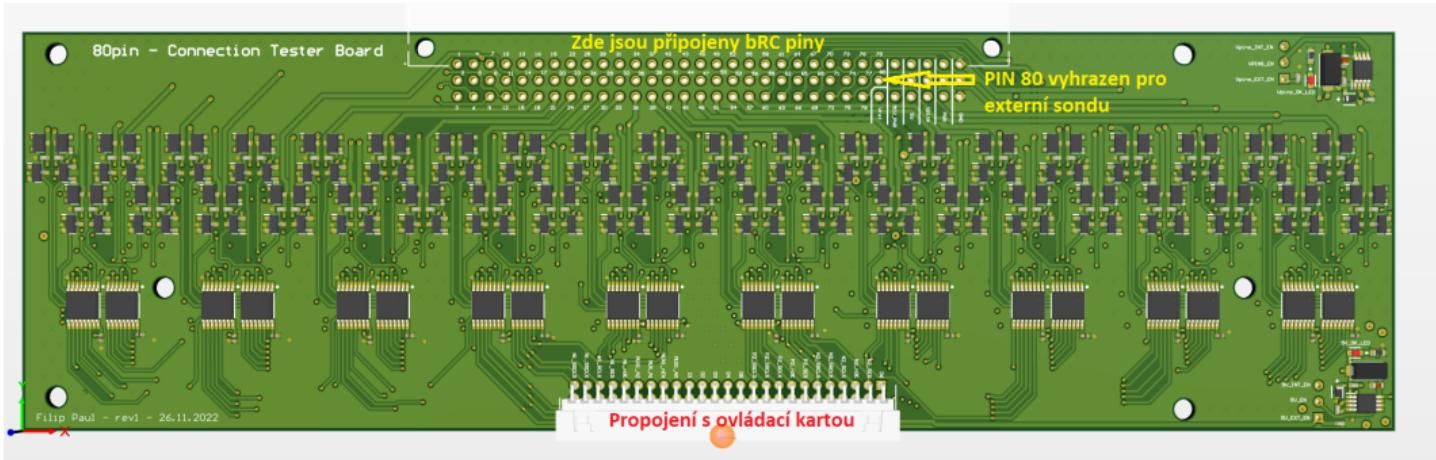


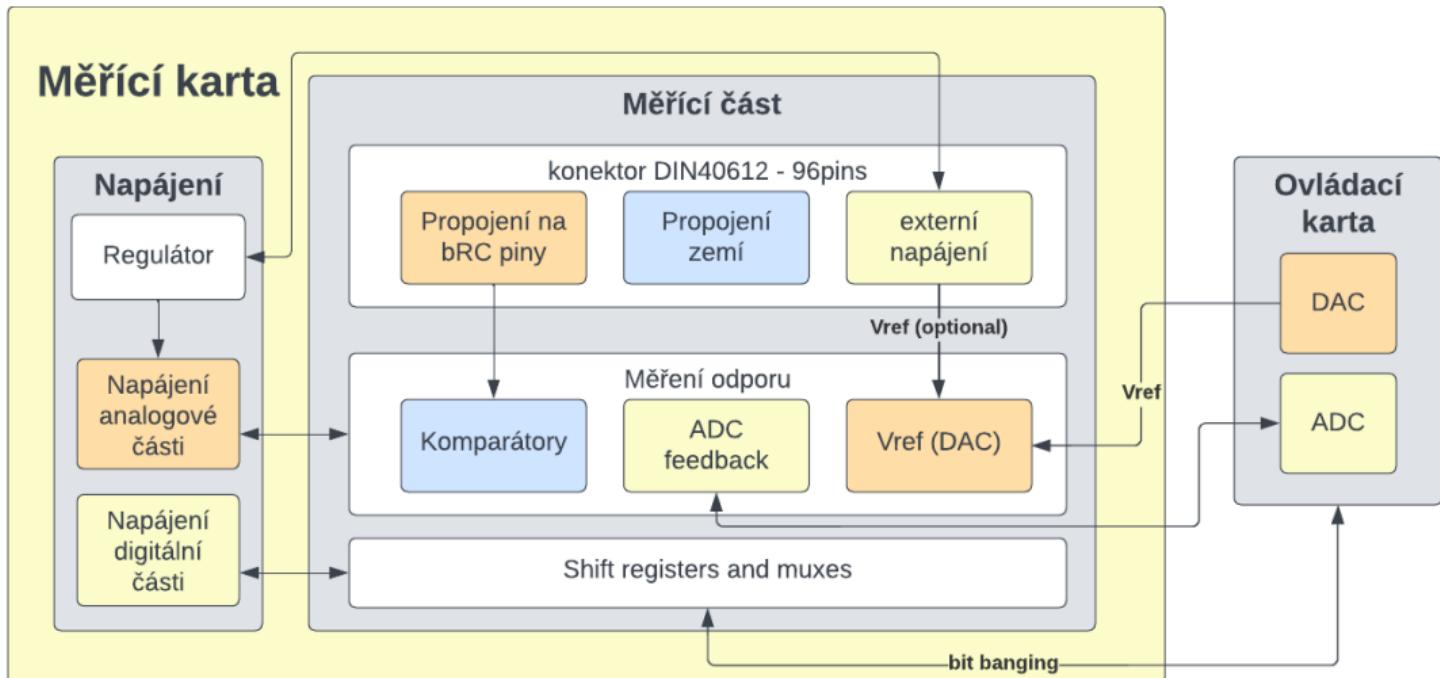
Koncepce testeru 1/2



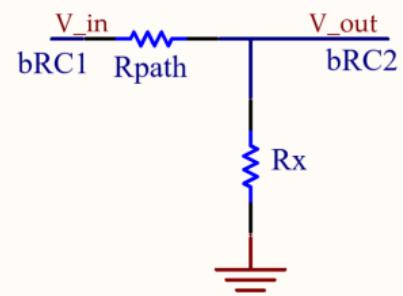
Koncepce testeru 2/2



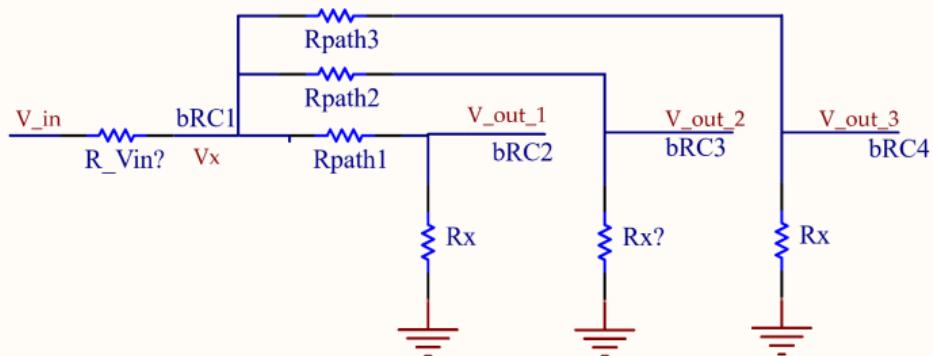


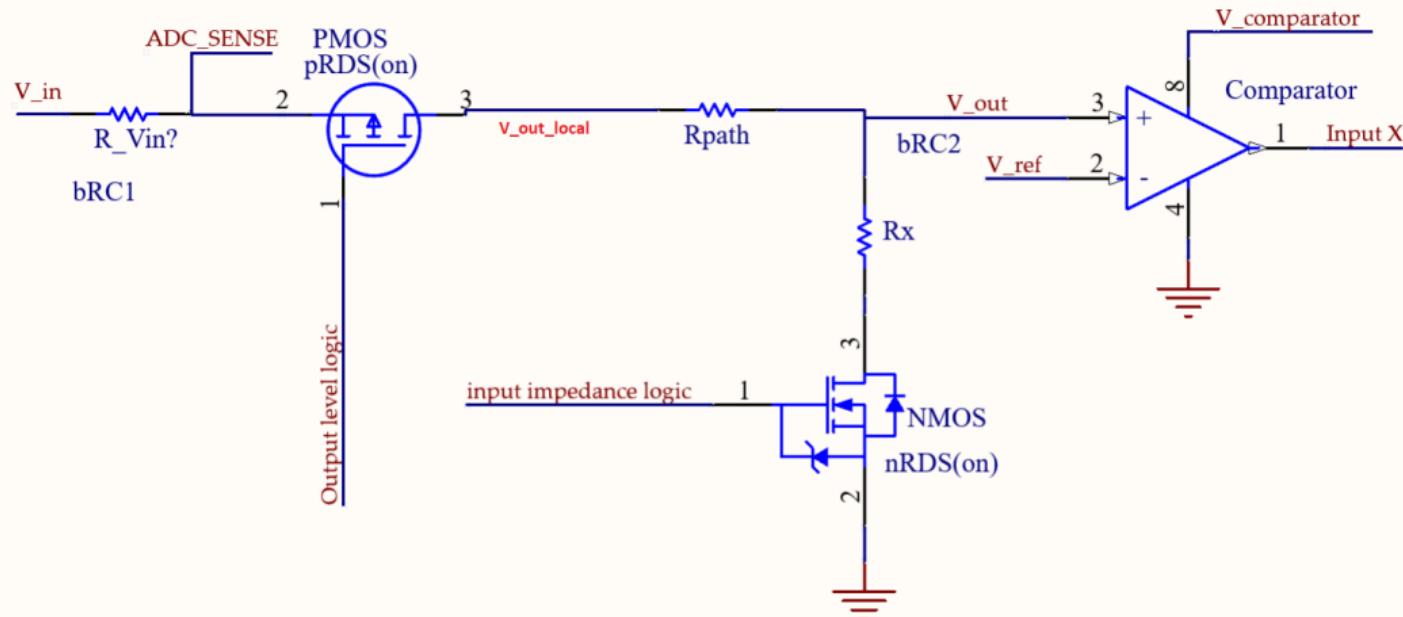


Zapojení 2 pinů



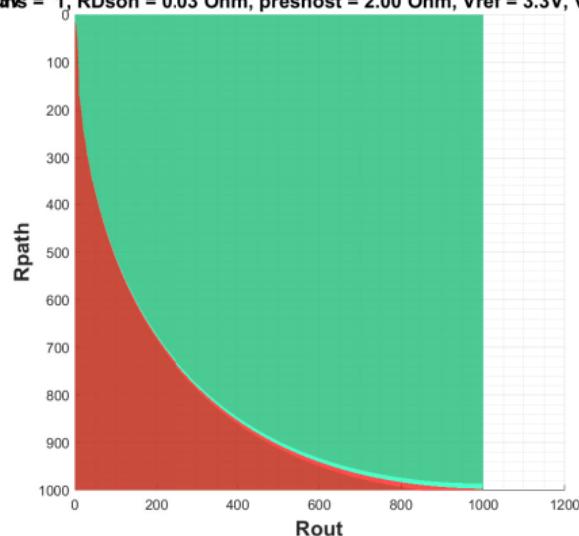
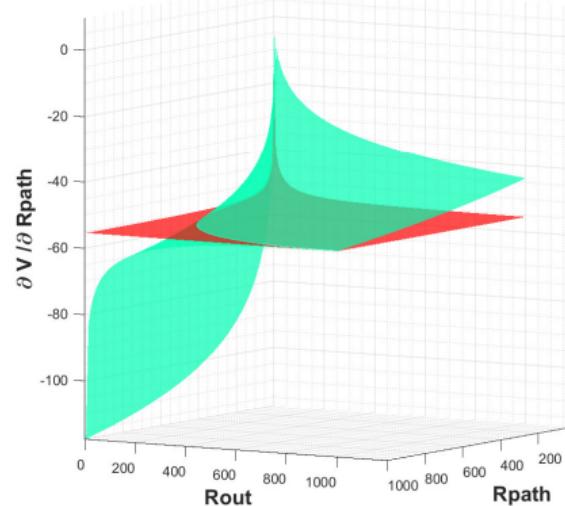
Zapojení 4 pinů



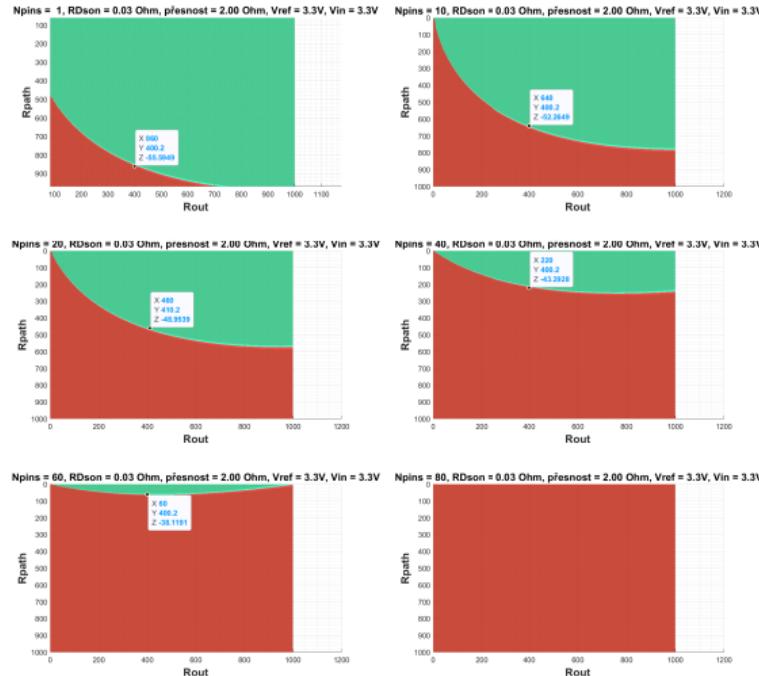


$$\frac{V_{ref}}{2^{12}} + \frac{V_{in} \cdot R_{DSon}^P}{R_{out}/N_{pins} + R_{DSon}^P} < \left| \frac{\partial V_{out}}{\partial R_{path}} \cdot \Delta R_{path} \right|$$

Npins = 1, RDson = 0.03 Ohm, přesnost = 2.00 Ohm, Vref = 3.3V, Vin = 3.3V



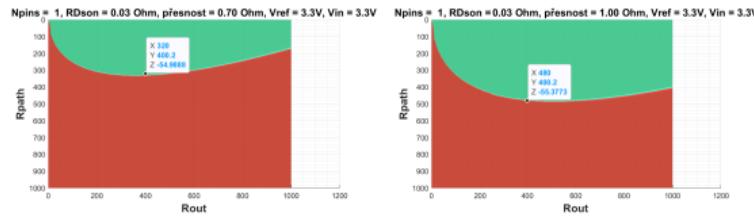
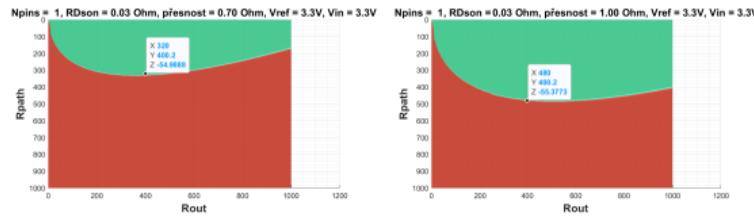
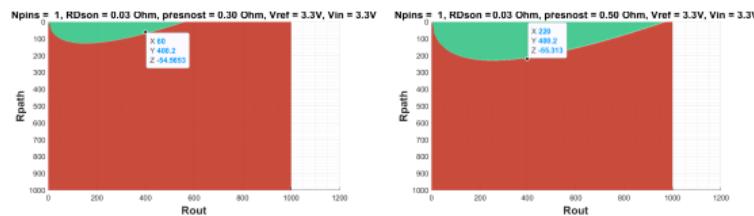
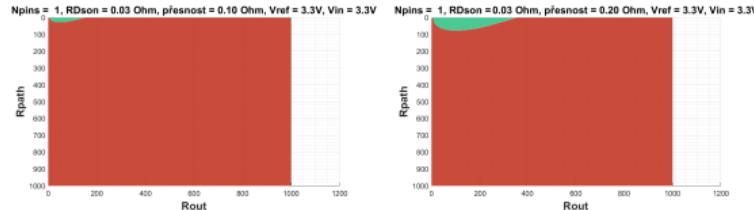
Volba Rx: vliv paralelních cest



- 1 až 80 pinů
- přesnost 2Ω

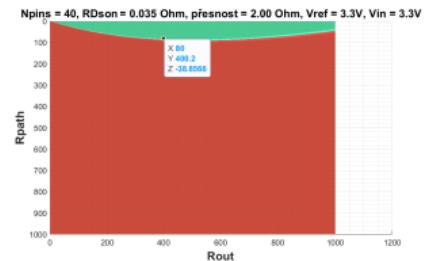
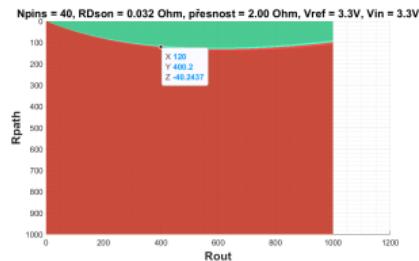
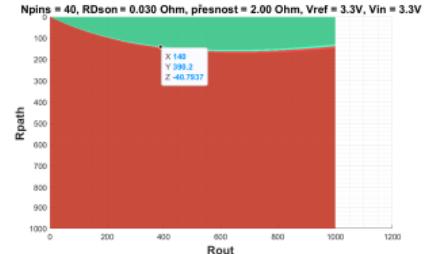
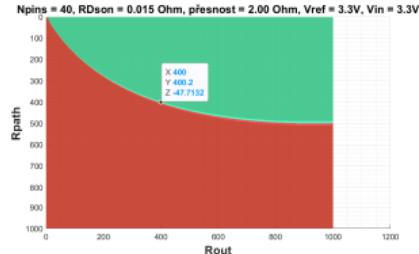
Volba Rx: Maximální přesnost

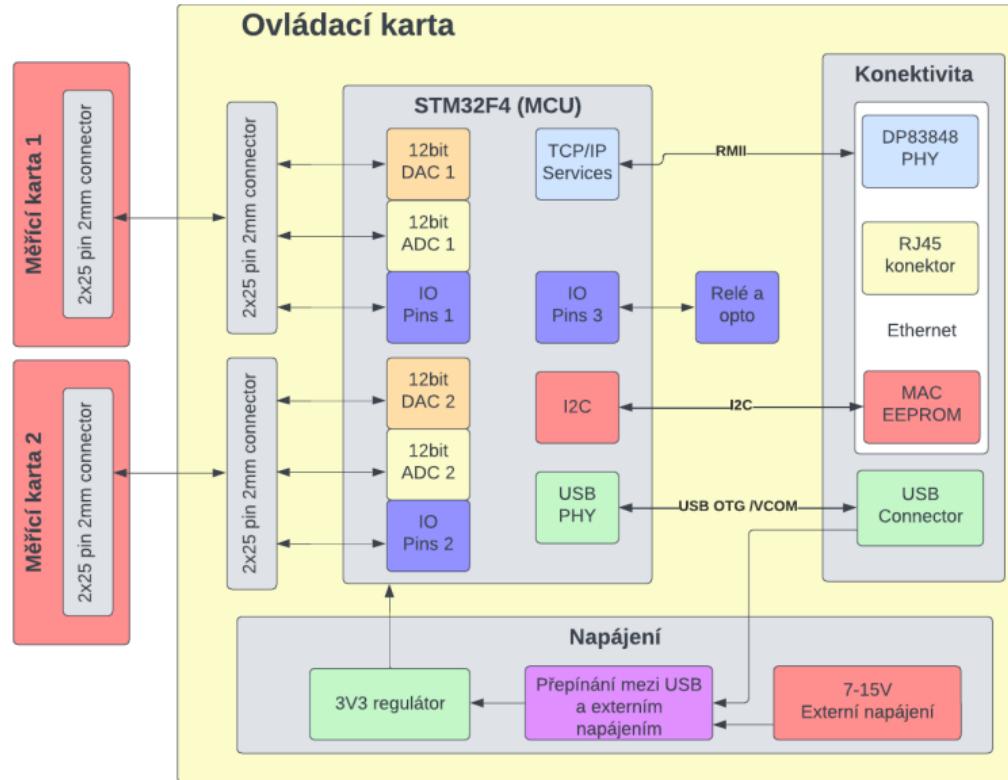
- pouze 1 pin
- přesnost 0.03 - 1Ω



Volba Rx: Vliv RDSOn

- 40 pinů
- přesnost 2Ω
- RDSOn $15-35\text{ m}\Omega$





PC aplikace 1/2

ICT tester of tester

Routing Probe Test Auto Test

Net viewer

ID	B	R	C	X	Y	Type	Spring	Testpoint	Node	Testpoint
457	2,0	13,88	69,0	64102,0	21496,0	Pin			1%SIGN452	
458	2,0	13,0	72,0	72672,0	5779,0	Pin				
459	2,0	13,0	75,0	61342,0	5779,0	Pin				
460	2,0	13,89	77,0	59624,0	22394,0	Pin			1%GND	
461	2,0	12,93	74,0	65052,0	4403,0	Pin				
462	2,0	12,89	73,0	68862,0	3996,0	Pin				
463	2,0	12,91	71,0	70482,0	4242,0	Pin				
464	2,0	12,91	5,0	327942,0	4227,0	Pin			1%GND	
465	2,0	12,63	76,0	57432,0	-826,0	Offset				
466	2,0	17,07	1,8	340078,0	-78196,0	100 mil	1 N	2%tp212,1	2%T201	
467	2,0	17,49	1,8	340078,0	-85595,0	100 mil	1 N	2%tp111,1	2%KL30V	
468	2,0	17,5	3,8	332577,0	-85644,0	100 mil	1 N	2%tp109,1	2%GND	
469	2,0	17,08	5,0	327978,0	-78346,0	100 mil	1 N	2%tp222,1	2%SGN449	
470	2,0	17,42	5,0	327978,0	-84970,0	100 mil	1 N	2%tp205,1	2%SGN449	
471	2,0	17,12	6,1	323926,0	-79019,0	100 mil	1 N	2%tp230,1	2%PSL_PWM11	
472	2,0	17,24	6,1	323827,0	-81244,0	100 mil	1 N	2%tp202,1	2%PSL_PWM13	
473	2,0	17,05	6,9	320528,0	-77846,0	100 mil	1 N	2%tp303,1	2%PL_PWM14	
474	2,0	17,15	7,7	317678,0	-79544,0	100 mil	1 N	2%tp207,1	2%SGN449	
475	2,0	17,38	7,8	317378,0	-83596,0	100 mil	1 N	2%tp198,1	2%T203	
476	2,0	17,4	9,7	310078,0	-83995,0	100 mil	1 N	2%tp112,1	2%GND	
477	2,0	17,07	10,9	305582,0	-78196,0	100 mil	1 N	2%tp217,1	2%T203	

pin viewer

ID	length	Gauge	Color	type_from	c_from	c_to	type_to	c_to	lode_name	OnDevice
23	30,0	28,0	Black	PIN	13,89	77,0	PROBE	13,76	74,8	1%GND

graphic data viewer

Zoom To Fit

PC aplikace 2/2

Routing Probe Test Auto Test

Všechny průvody a testpointy

Filtrvat

ID	B	R	C	X	Y	type	Spring	testpoint	Node	Testpoint
454	2,0	13,92	11,0	305082,0	22062,0	Pin				.._SIGN443
455	2,0	13,0	49,0	160302,0	5779,0	Pin				2%GND
456	2,0	13,0	50,0	156492,0	5779,0	Pin				2%GND
457	2,0	13,88	69,0	84102,0	21496,0	Pin				.._SIGN452
458	2,0	13,0	72,0	72672,0	5779,0	Pin				
459	2,0	13,0	75,0	61342,0	5779,0	Pin				
460	2,0	13,89	77,0	53622,0	22368,0	Pin				1%GND
461	2,0	12,93	74,0	63052,0	4488,0	Pin				
462	2,0	12,89	73,0	68882,0	3896,0	Pin				
463	2,0	12,91	71,0	75482,0	4242,0	Pin				
464	2,0	12,91	5,0	327942,0	4227,0	Pin				1%GND
465	2,0	12,63	76,0	57432,0	-826,0	Offset				
466	2,0	17,07	1,8	340078,0	-78196,0	100 mil	1 N	2%tp212,1	2%tp201	
467	2,0	17,49	1,8	340078,0	-85595,0	100 mil	1 N	2%tp211,1	2%KL30V	
468	2,0	17,5	3,8	332577,0	-85844,0	100 mil	1 N	2%tp109,1	2%GND	
469	2,0	17,08	5,0	327978,0	-78346,0	100 mil	1 N	2%tp222,1	.._SIGN430	
470	2,0	17,42	5,0	327978,0	-84397,0	100 mil	1 N	2%tp205,1	.._SIGN409	
471	2,0	17,12	6,1	323926,0	-79019,0	100 mil	1 N	2%tp220,1	.._PWM11	
472	2,0	17,24	6,1	323827,0	-81244,0	100 mil	1 N	2%tp202,1	.._PWM13	
473	2,0	17,08	6,0	323020,0	-77546,0	100 mil	1 N	2%tp203,1	.._PULSE1	

Všechna propojení vybraného testpointu:

ID	length	Gauge	Color	type_from	r_from	c_from	type_to	r_to	c_to	ode_name	OnDevice
23	30,0	28,0	Black	PIN	13,93	77,0	PROBE	13,76	74,8	1%GND	.._tp413,1

Zoom To Fit

- Osazení měřící karty a odladění firmwaru
- Dokončení návrhu a výroba ovládací karty
- Bezpečnostní prvky (RACK)
- Rozšíření PC aplikace
- Mechanická konstrukce testeru
- Ověření funkčnosti a parametrů

Děkuji za pozornost!