

Digi-Key Resistors at Nitrogen Temperatures and Operating Voltages

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Resistors:

470 k Ω , ¼ watt, 1206 SMD, P/N: RHM470KAICT-ND620 k Ω , ¼ watt, 1206 SMD, P/N: RHM620KAICT-ND

When the resistors were submerged in liquid nitrogen, their resistances increased roughly 3-5% compared to their values at room temperature. Relative to each other, the resistances increased about 1.5%, a change small enough that the resistors can be used in a dynode structure. See Table 1 and Table 2 for results.

Resistor #	Resistance (k Ω)			% Change
	Claimed	Room Temperature	Liquid Nitrogen	
1	470	471.2	491.4	4.29%
2	470	470.1	491.1	4.47%
3	620	620.3	636.8	2.98%
4	620	619.9	637.0	2.76%

Table 1: Resistances at room temperature and in liquid nitrogen.

Resistor #	Current (mA)				Measured Voltage (V)				Calculated Resistance (k Ω)			
	0	0.3	0.6	0.8	0	139.7	279.3	372.5	--	465.7	465.5	465.6
1	0	0.3	0.6	0.8	0	144.3	285.0	377.2	--	481.0	475.0	471.5
					0	139.0	278.5	370.9	--	463.3	464.2	463.6
2	0	0.3	0.6	0.8	0	143.4	283.9	375.9	--	478.0	473.2	469.9
					0	183.4	376.8	458	--	611.3	628.0	627.4
3	0	0.3	0.6	0.73	0	124.8	246.0	366.6	--	624.0	615.0	611.0
					0	122.5	244.7	368.5	--	612.5	611.8	614.2
4	0	0.2	0.4	0.6	0	124.7	247.5	366.6	--	623.5	618.8	611.0
					0	122.5	244.7	368.5	--	612.5	611.8	614.2

Table 2: Measured voltages and calculated resistances for corresponding currents. Highlighted rows show results for resistors in liquid nitrogen.