

Additional Information

Estimation of pump efficiency

Purpose of this document is to provide guidelines on estimating the pump efficiency with gases and liquids. The maximum fluidic power is generated by a pump when operating it at half of the maximum flow rate and half of the maximum back pressure. Therefore these operating conditions will be considered in the following:

Operating the mp6 micro pump with water at its maximum fluidic power, this equals a flow rate Q of 3,5 ml/min and a pressure p of 300 mbar. Multiplying flow rate and pressure yields a fluidic power of 1,76 mW.

Assuming a total capacitance of 16 nF for the pump piezos, a maximum driving voltage of 250 V and a driving frequency of 100 Hz the electrical power consumption of the pump is 50 mW.

This equals a pump efficiency of about 3,5 %.

As the pump driving electronics also has a certain efficiency, the total power uptake is between 150 mW and 200 mW using the mp6-OEM driver. In this case the overall efficiency is between 0,9 % and 1,17 %.

Operating the mp6 micro pump with air at its maximum fluidic power this equals a flow rate Q of 9 ml/min and a pressure p of 50 mbar. Multiplying flow rate and pressure yields a fluidic power of 0,75 mW.

Assuming a total capacitance of 16 nF for the pump piezos, a maximum driving voltage of 250 V and a driving frequency of 300 Hz the electrical power consumption of the pump is 150 mW. This equals a pump efficiency of about 0,5 %.

As the mp6-OEM has a maximum power uptake of 150 - 200 mW, the overall efficiency will be in the same range as the pump efficiency.



micropump mp6 and pump driver
mp6-OEM



The mp6-OEM has a wide performance range and is not optimized for a single working point. Therefore the overall efficiency can be increased by an optimization of the mp6-OEM module or by developing a customized driving electronics for a specific set of requirements.

All values are approximate and no guarantee of specific technical properties.

Changes in the course of technical progress are possible without notice.



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