

	Memristor	PCM	MRAM	DRAM	Flash	HD
Chip area per bit (F <sup>2</sup> )	4	8-16	14-64	6-8	4-8	
Energy per bit (pJ) <sup>2</sup>	0.1-3	2-100	0.1-1	2-4	$10^1 - 10^3$	$10^6 - 10^7$
Read time (ns)	<10	20-70	10-30	10-50	25,000	$5-8 \times 10^{15}$
Write time (ns)	20-30	50-500	13-95	10-50	200,000	$5-8 \times 10^{15}$
Retention	<10 years	<10 years	Weeks		~10 years	~10 years
Endurance (cycles)	$10^{12}$	$10^7 - 10^8$	$10^{15}$	$10^{17}$	$10^3 - 10^6$	$10^{15}$
3D capability	Yes	No	No	No	Yes	