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(54) **DIAMOND SHAPED MAGNETIC RANDOM ACCESS MEMORY**

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(57) **ABSTRACT**

MRAM device structures and techniques for fabrication thereof with improved dielectric gapfill and individually configurable bottom and top encapsulation layers are provided. In one aspect, an MRAM device includes: memory cell pillars having a diamond shaped profile; and an interlayer dielectric fully filling gaps between the memory cell pillars. For instance, each of the memory cell pillars can include a reference layer, a free layer, a tunnel barrier between the reference layer and the free layer, a first encapsulation layer alongside the reference layer, and a second encapsulation layer alongside the free layer; and an interlayer dielectric fully filling gaps between the memory cell pillars. Optionally, the first encapsulation layer can include an oxide dielectric material, and the second encapsulation layer can include a nitride dielectric material. A method of fabricating the present MRAM devices is also provided.