

一种 3D NAND 闪存负温度系数的读电压基准发生器

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摘要: 由于阈值电压(threshold voltage, V_{TH})的偏移, 3D NAND 闪存可靠性很容易受到温度变化的影响, 这将进一步恶化读取裕度.为了解决这一问题, 本文提出了一种具有负温度系数的读电压基准发生器来补偿阈值电压随温度的变化.本文所提出的具有负温度系数的电压电路通过分别调整负温度系数(complementary to absolute temperature, CTAT)电流和零温度系数(zero to absolute temperature, ZTAT)电流, 可输出具有相同负温度系数的不同大小的读电压, 并通过调制器(regulator)来提高其输出电压的范围.结果表明, 所提出的方法可以提供一个可配置的读电压范围为 1.5 ~ 4.5 V.

关键词: 阈值电压; 3D NAND 闪存; 读电压发生器; 负温度系数电流; 零温度系数电流; 调制器

A read reference generator with negative temperature coefficient for 3D NAND flash memory

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Abstract: 3D NAND flash reliability is vulnerable to temperature variation due to the threshold voltages (V_{TH}) shift, which will further deteriorate the read margin. To solve this issue, a read reference generator with negative temperature coefficient was proposed to compensate the V_{TH} shift under the changes of temperature. The proposed generator outputs different level voltages with the same negative temperature coefficient by adjusting the CTAT (complementary to absolute temperature) current and ZTAT (zero to absolute temperature) current, respectively. And the regulator was used to enhance the range of output voltage. The results showed the proposed method could provide a configurable range of read voltage of 1.5 ~ 4.5 V.

Key words: threshold voltage; 3D NAND flash memory; read reference generator; CTAT current; ZTAT current; regulator

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