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Harris et al.

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(54) **SIMPLIFIED CURVATURE COMPENSATED
BANDGAP USING ONLY RATIOED
COMPONENTS**

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(71) Applicant: **Microchip Technology Incorporated,**
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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 134 days.

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(65) **Prior Publication Data**

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(57) **ABSTRACT**

(51) **Int. Cl.**

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G05F 1/46 (2006.01)

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A curvature compensated bandgap circuit that is capable of
matching best-in-class two (2) parts-per-million perform-
ance without over-temperature trimming. This improves
performance metrics for precision voltage reference prod-
ucts without requiring individual device tuning during pro-
duction thereof. A core bandgap circuit comprises a main
operational amplifier having a second order bowed voltage
response over temperature. A ptat circuit is coupled to the
core bandgap circuit to provide a sigmoidal third order shape
for the bandgap voltage.

(52) **U.S. Cl.**

CPC **G05F 3/225** (2013.01); **G05F 1/461**
(2013.01); **G05F 3/30** (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

13 Claims, 4 Drawing Sheets

