

Generate a Bandgap derivative with a smaller area for a UK Design house

Amalia reduced the component area of this circuit by 57.5% while also meeting the requirements for current.

Specification	Requirement			Customer Design	Thalia Solution 1
	Minimum	Typical	Maximum		
Supply Current	-	180 μ A	-	180.29 μ A	157.42 μ A
Bandgap Circuit Current	-	75 μ A	-	75.38 μ A	52.615 μ A
StandBy Current	-	100 nA	-	10.05 nA	5.02 nA
VGB Variation Trimmed	-	1.199 V	1.202 V	1.199 V	1.197 V
VGB Variation Trimmed Minimum	-	1.199 V	1.202 V	1.198 V	1.196 V
VGB Variation Trimmed Maximum	-	1.199 V	1.202 V	1.2 V	1.198 V
VGB Variation Mismatch	0.3 %	-	-0.3 %	+/- 0.3 %	+/- 0.3 %
Bandgap Current Variation Mismatch	10 %	-	-10 %	-16.82% to 11.01%	-9.8% to 12.03%
Vbg Variation over Trim Current at 5 μ s, 7 μ s, 10 μ s, 15 μ s, 25 μ s, 35 μ s, 45 μ s	1.07 V	-	1.42 V	-1.19 V to 1.43 V	1.197 V - 1.203 V
Pmos Currents at 5 μ s, 7 μ s, 10 μ s, 15 μ s, 25 μ s, 35 μ s, 45 μ s	8.35 μ A	10 μ A	12.4 μ A	9.93 μ A - 9.99 μ A	9.98 μ A - 10.05 μ A
Nmos Currents at 5 μ s, 7 μ s, 10 μ s, 15 μ s, 25 μ s, 35 μ s, 45 μ s	4.17 μ A	4.99 μ A	6.16 μ A	4.98 μ A - 5.01 μ A	4.88 μ A - 5.93 μ A
Startup Time	2.13 μ s	2.29 μ s	2.96 μ s	2.311 μ s	2.179 μ s
Pmos Currents Settling Time	3.8 μ s	4.1 μ s	5.5 μ s	4.31 μ s	2.855 μ s
Nmos Currents Settling Time	3.8 μ s	4.1 μ s	5.5 μ s	4.02 μ s	2.992 μ s
PSRR (< 1 KHz)	-	-	-50 db	-65.59 db	-56.9 db
PSRR (< 100 KHz)	-	-	-30 db	-35.9 db	-37.9 db
PSRR (> 100 KHz)	-	-	-20 db	-29.9 db	-27.4 db
PSRR (> 10 MHz)	-	-	-20 db	-32.55 db	-52.8 db
Startup Circuit Phase Margin	89°	92°	95°	91.4°	89.01°
Startup Circuit Gain Margin	37 db	38 db	39 db	37.99 db	35.5 db
Bandgap Loop Phase Margin	73°	75°	77°	77.02°	69.46°
Bandgap Gain Margin	22 db	25 db	31 db	28.19 db	20.3 db
Component Area	-	-	-	22927 μ m ²	9759 μ m ²
Solutions Evaluated*	-	-	-	-	800**

*Average number of simulated solutions required to reach the first optimised solution

**Simulation time for each solution is approximately 1 minute. The total time using four simulators in parallel is 3 hours and 30 minutes

