

#644 Sampyeong-dong, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea 463-400 T. 82-2-570-5273, F. 82-2-570-5269

## IP 등록 확인서

■ 발급번호 : 제 2015-01호

■ 수 신 : 전북대학교 총장

■ 참 조 : 정용채 교수 / 전북대학교 전자공학부

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## - 아 래 -

## 가. 등록개요

No	. IP Code	IP Name	등록일
1	KU247H0623	CMOS Negative Group Delay Circuit Using Source Series Feedback Circuit and Shunt Resonating Resistance	2015-02-09
2	KU247H0619	RF Energy Harvesting Rectifier Using Parasitic Capacitance Compens ation Technique and Low-pass Filter	2015-02-06

나. 발급목적 : 연구실적 확인

다. 신청인: 박준식 연구원(전북대학교 전자공학부)

라. 확인인 : 최수연 주임 (한국반도체산업협회)

2015년 02월 10일 한국반도체산업협회장 2015. 2. 23. KIPEX

## KU247H0623 / Register: 전북대학교 ( 정용채 )

IP Code : KU247H0623 | IP 등록일 : 2015-02-07 | 승인일 : 2015-02-09 09:51:16

수정하기

IP Version 1.0  Category Analog & Mixed Signal > RF Circuit > Others  Electromagnetic wave propagation in any medium obeys fundamental physical laws describing electromagnetic phenomena which can be formulated by Maxwell's equations. Generally, all media exhibit a normal wave propagation. However, certain media exhibit alnormal luwave propagation characteristics within certain limited frequency bands, where time harm onic components can propagate superfuminal that the group velocity is faster than speed of light, c, and consequently negative group delay [1]. The abnormal electromagnetic wave propagation in characterized by the negative group velocity and negative group delay (NGD) can be described as considering simple one-dimensional wave propagation in slab of ma terial characterized by phase index n(ω) and matched to surrounding media [1]. Therefore, the group velocity in slab [1] can be expressed as below.  Feature Operating frequency: 1.95 GHz Alacthomy and matched to surrounding media [1]. Therefore, the group velocity in slab [1] can be expressed as below.  Foundry Dongbu HITek  Technology 90nm ≤ ~ < 0.13um  IP Type Hard IP  Format GDSII  Silicon Verification Status 7  Alegative group delay circuit (NGDC) has basically large insertion loss (IL) characteristics in a narrow frequency band.  Asel(1) Chippl Application - FM radio system - TM radio system	IP Name	CMOS Negative Group Delay Circuit Using Source Series Feedback Circuit and Shunt Resonating Resistance		
Electromagnetic wave propagation in any medium obeys fundamental physical laws describing electromagnetic phenomena which can be formulated by Maxwell's equations. Gener ally, all media exhibit a normal wave propagation. However, certain media exhibit abnormal I wave propagation characteristics within certain limited frequency bands, where time harm onic components can propagate superluminal that the group velocity is faster than speed of light, c, and consequently negative group delay [1]. The abnormal electromagnetic wave propagation characterized by the negative group velocity and negative group delay (NGD can be described as considering simple one-dimensional wave propagation in slab of ma terial characterized by phase index n(ω) and matched to surrounding media [1]. Therefore, the group velocity in slab [1] can be expressed as below.  - Operating frequency: 1.95 GHz - Matching network realized using bonding-wire - Gain with NGD - Matched with 50 ohm network NGD: 1 ns at center frequency.  Foundry  Dongbu HiTek  Technology  90nm ≤ ~ < 0.13um  IP Type  Hard IP  Format  GDSII  Silicon Verification Status  Negative group delay circuit (NGDC) has basically large insertion loss (IL) characteristics in a narrow frequency band.  - Mobile application - FM radio system - TV transmission - TV transmission - TV transmission - TV transmission system  - TV transmission - TV transmission system  Deliverable  Data Sheet, GDS  Function Diagram  * ÖMIN 2- Berjan, Providerol ÷ 0U/NDA 세결 후 전달하겠음) * ÖMIN 3- ME TV 1- Berjan 1- Providerol ÷ 0U/NDA 세결 후 전달하겠음) * ÖMIN 3- ME TV 1- Berjan 1- Berjan 1- Providerol ÷ 0U/NDA MI 3- PRESTIGON EARLY ID (Berjan 1- Providerol ÷ 0U/NDA MI 3- PRESTIGON EARLY ID (Berjan 1- Providerol ÷ 0U/NDA MI 3- PRESTIGON EARLY ID (Berjan 1- Providerol ÷ 0U/NDA MI 3- PRESTIGON EARLY ID (Berjan 1- Providerol ÷ 0U/NDA MI 3- PRESTIGON EARLY ID (Berjan 1- Providerol ÷ 0U/NDA MI 3- PRESTIGON EARLY ID (Berjan 1- Providerol ÷ 0U/NDA MI 3- PRESTIGON EARLY ID (Berjan 1- Providerol † 0U/NDA MI 3- PRESTIGON EARLY	IP Version	1.0		
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Feature       - Matching network realized using bonding-wire - Gain with NGD - Matched with 50 ohm network NGD: 1 ns at center frequency.         Foundry       Dongbu HiTek         Technology       90nm ≤ ~ < 0.13um	Description	bing electromagnetic phenomena which can be formulated by Maxwell's equations. Gener ally, all media exhibit a normal wave propagation. However, certain media exhibit abnorma I wave propagation characteristics within certain limited frequency bands, where time harm onic components can propagate superluminal that the group velocity is faster than speed of light, c, and consequently negative group delay [1]. The abnormal electromagnetic wave propagation characterized by the negative group velocity and negative group delay (NGD ) can be described as considering simple one-dimensional wave propagation in slab of ma terial characterized by phase index $n(\omega)$ and matched to surrounding media [1]. Therefore,		
Technology 90nm ≤ ~ < 0.13um  IP Type Hard IP  Format GDSⅡ  Silicon Verification 강납법도 개발검증  작용된(될) Chip의 Negative group delay circuit (NGDC) has basically large insertion loss (IL) characteristics in a narrow frequency band.  적용된(될) Chip의 - Mobile application - FM radio system - TV transmission - Wireless power transmission system  Biz 범위 • 수정/가공 판매가능함 • 기술지원 가능함  Deliverable Data Sheet , GDS  Function Diagram * 현재파일 : diagram.jpg  Data Sheet  있음(File을 등록하고, Provider의 승인/NDA 체결 후 전달하겠음) * 현재파일 : ip.docx  Silicon Proven Report 업음(자체 보유한 Silicon Proven Report가 없음) 현재 등록된 파일이 없습니다.	Feature	<ul> <li>Matching network realized using bonding-wire</li> <li>Gain with NGD</li> <li>Matched with 50 ohm network.</li> </ul>		
Format GDS II  Silicon Verification Status 개발검증  작용된(될) Chip의 Negative group delay circuit (NGDC) has basically large insertion loss (IL) characteristics in a narrow frequency band.  작용된(될) Chip의 - Mobile application - FM radio system - TV transmission - Wireless power transmission system  Biz 범위	Foundry	Dongbu HiTek		
Format GDSII  Silicon Verification 개발검증  재발검증  지명된(될) Chip의 Negative group delay circuit (NGDC) has basically large insertion loss (IL) characteristics in a narrow frequency band.  - Mobile application - FM radio system - TV transmission - Wireless power transmission system  Biz 범위 • 수정/가공 판매가능함 - 기술지원 가능함  기술지원 가능함  기술지원 가능함  Deliverable Data Sheet , GDS  Function Diagram * 현재파일 : diagram.jpg  Data Sheet 있음(File을 등록하고, Provider의 승인/NDA 체결 후 전달하겠음) * 현재파일 : ip.docx  Silicon Proven Report 없음(자체 보유한 Silicon Proven Report가 없음) 현재 등록된 파일이 없습니다.	Technology	90nm ≤ ~ < 0.13um		
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Status  적용된(될) Chip의 Function  - Mobile application - FM radio system - TV transmission - Wireless power transmission system  Biz 범위  - Pod/가공 판매가능함 - 기술지원 가능함  Deliverable Data Sheet , GDS  Function Diagram * 현재파일 : diagram.jpg  Data Sheet 있음(File을 등록하고, Provider의 승인/NDA 체결 후 전달하겠음) * 현재파일 : ip.docx  Silicon Proven Report 없음(자체 보유한 Silicon Proven Report가 없음) 현재 등록된 파일이 없습니다.	Format	GDSII		
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• 기술지원 가능함  Deliverable Data Sheet , GDS  Function Diagram * 현재파일 : diagram.jpg  Data Sheet 있음(File을 등록하고, Provider의 승인/NDA 체결 후 전달하겠음) * 현재파일 : ip.docx  Silicon Proven Report 없음(자체 보유한 Silicon Proven Report가 없음) 현재 등록된 파일이 없습니다.		- FM radio system - TV transmission		
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