



Electronic System Group

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Field of study: Circuit Interconnection, Noise Reduction, Signal Integrity

Key words: Planar Transmission Line, Waveguide, SIW, PCB

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I. Subjects and Aims of Research

1. Interconnection circuit design
2. Noise reduction
3. Signal integrity

II. Related Recent Research Topics

1. Noise reduction on differential transmission lines [Journal paper 2]

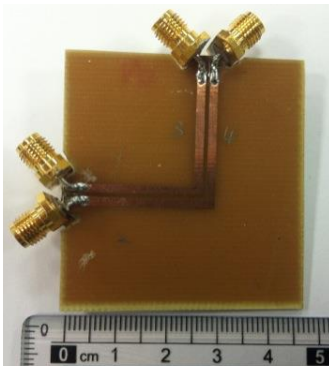


Fig. 1 Differential transmission lines

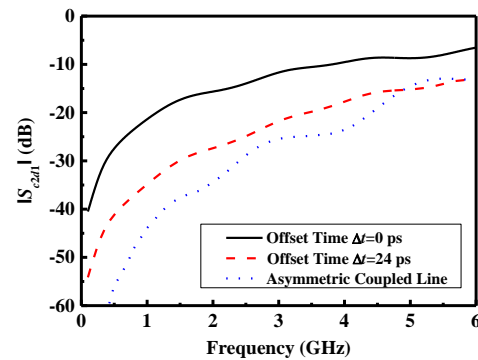


Fig. 2 Mode conversion responses

2. Rectangular waveguide power divider/combiner [Journal paper 4]

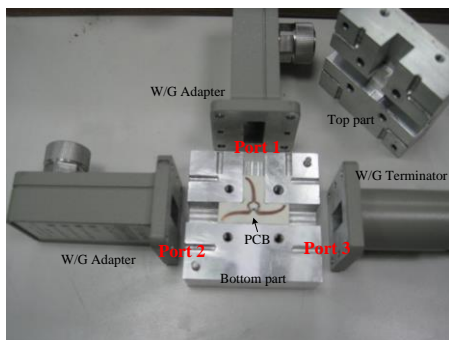


Fig. 3 RWG power combiner

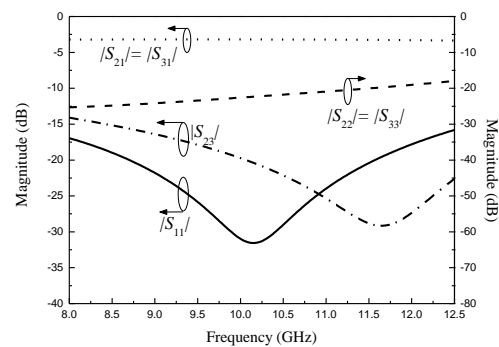


Fig. 4 Transmission, reflection, isolation responses

3. CB-CPW to SIW transition [Journal paper 8]

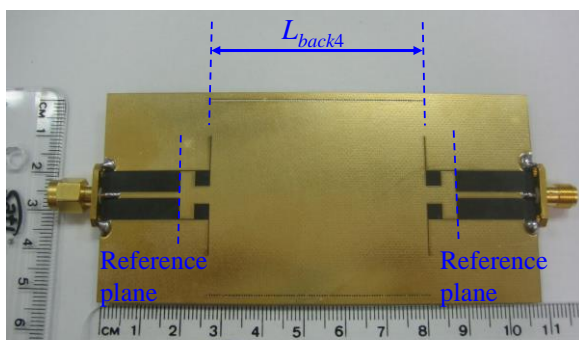


Fig. 5 CB-CPW to SIW transition

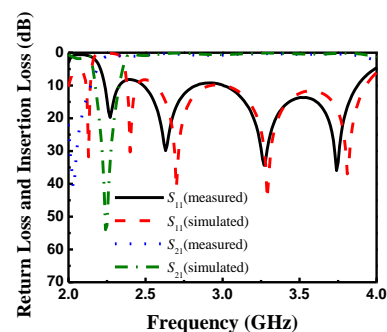


Fig. 6 Transmission, reflection responses

III. Selected Publications and Projects

◆ Selected publications

● Journal papers

1. C.-C. Yeh, K.-C. Chen, and C.-L. Wang, “Common-mode noise suppression of differential serpentine delay line using timing-offset differential signal,” *IEEE Trans. Electromagnetic Compatibility*, vol. 57, no. 6, pp. 1457–1465, Dec. 2015.
2. C.-C. Yeh, B.-R. Huang, K.-C. Chen, R. Y. Fang, and C. L. Wang, “Reduction of common-mode and differential-mode noises using timing-offset differential signal,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 5, no. 12, pp. 1818–1827, Dec. 2015.
3. B.-R. Huang, C.-H. Chang, R.-Y. Fang, and C.-L. Wang, “Common-mode noise reduction using asymmetric coupled line with SMD capacitor,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 4, no. 6, pp. 1082–1089, Jun. 2014.
4. J.-K. Chuang, R.-Y. Fang, and C.-L. Wang, “Compact and broadband rectangular waveguide power divider/combiner using microstrip-fed antisymmetric tapered probe,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 4, no. 1, pp. 109–116, Jan. 2014.
5. J.-K. Chuang, R.-Y. Fang, Y.-J. Huang, Y.-C. Lee, C.-L. Wang, and K. Y. Lee, “A broadband-matched load using multiwalled carbon nanotubes,” *IEEE Trans. Nanotechnol.*, vol. 12, no. 6, pp. 1213–1218, Nov. 2013.
6. R.-Y. Fang, and C.-L. Wang, “Miniaturized microstrip-to-waveguide transition using capacitance-compensated broadside-coupled microstrip line,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 9, no. 9, pp. 1588–1596, Sep. 2013.
7. R.-Y. Fang, C.-T. Wang, and C.-L. Wang, “A broadband CPW to rectangular waveguide power divider using a slot,” *International Journal of RF and Microwave Computer-Aided Engineering*, vol. 23, no. 2, pp. 232–237, Mar. 2013.
8. R.-Y. Fang, C.-F. Liu, and C.-L. Wang, “Compact and broadband CB-CPW-to-SIW transition using stepped-impedance resonator with 90°-bent slot,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 3, no. 2, pp. 247–252, Feb. 2013.
9. R.-Y. Fang and C.-L. Wang, “Miniaturized coplanar waveguide to rectangular waveguide transition using inductance-compensated slotline,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 2, no. 10, pp. 1666–1671, Oct. 2012.
10. C.-H. Chang, R.-Y. Fang, and C.-L. Wang, “Bended differential transmission line using compensation inductance for common-mode noise suppression,” *IEEE*

Trans. Components, Packaging, and Manufacturing Technology, vol. 2, no. 9, pp. 1518–1525, Sep. 2012.

11. J.-K. Chuang, R.-Y. Fang, and C.-L. Wang, “Compact and broadband microstrip-to-waveguide transition using antisymmetric tapered probes,” *Electron. Lett.*, vol. 48, no. 6, 15th Mar. 2012.
12. R.-Y. Fang, and C.-L. Wang, “Broadband slotline-to-rectangular waveguide transition using a truncated bow-tie antenna,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 1, no. 8, pp. 1154–1159, Aug. 2011.
13. R.-Y. Fang, C.-T. Wang, and C.-L. Wang, “Coplanar-to-rectangular waveguide transitions using slot antennas,” *IEEE Trans. Components, Packaging, and Manufacturing Technology*, vol. 1, no. 5, pp. 681–688, May 2011.

● Conference papers

1. C.-Y. Lin, B.-R. Huang, Z.-S. Yan, and C.-L. Wang, “Differential-mode noise suppression using *L*-shaped pad,” *2015 Asia-Pacific International Symposium on Electromagnetic Compatibility, May 2015*.
2. B.-R. Huang, C.-H. Chang, R.-Y. Fang, and C.-L. Wang, “Bended differential transmission line using compensation inductance and capacitance,” *19th IEEE Workshop on Signal and Power Integrity, May 2015*.
3. C.-Y. Lin, B.-R. Huang, K.-C. Chen, and C.-L. Wang, “Common-mode noise suppression using decoupling capacitor,” *IEEE 4th International Symposium on Next-Generation Electronics, May 2015*.
4. Y.-C. Lee and C.-L. Wang, “Compact and UWB microstrip-fed monopoles antenna,” *IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, 2014*, pp. 1827–1828.
5. C.-C. Yeh, B.-R. Huang, R.-Y. Fang, and C.-L. Wang, “Differential transmission line using timing-offset differential signal,” *37th International Spring Seminar on Electronics Technology (ISSE) 2014*.
6. R.-Y. Fang, C.-F. Liu, C.-Y. Liao, and C.-L. Wang, “High-low impedance transformer using transmission line method,” *IEEE International Symposium for Design and Technology in Electronic Packaging (SIITME) 2013*, pp. 185–189.
7. C.-Y. Lin, B.-R. Huang, and C.-L. Wang, “Common-mode noise suppression using SMD capacitor with grounded via,” *IEEE International Symposium for Design and Technology in Electronic Packaging (SIITME) 2013*.
8. C.-Y. Lin, Y.-C. Lee, C.-Y. Liao, and C.-L. Wang, “Reflection noise elimination using bondwire-free balanced CPW,” *Asia-Pacific Radio Science Conference 2013*, E1b-1.
9. C.-H. Chang, R.-Y. Fang, and C.-L. Wang, “Bended differential transmission line using balanced model for common-mode noise suppression,” *IEEE*

Electrical Design of Advanced Packaging and Systems Symposium 2012, pp. 37–40.

10. R.-Y. Fang, J.-K. Chuang, and C.-L. Wang, “Coplanar waveguide-to-rectangular waveguide transition using meander slotline,” *Asia-Pacific Microwave Conference 2011*, pp. 399–402.
11. R.-Y. Fang, C.-F. Liu, and C.-L. Wang, “Compact stepped-impedance resonator transformer,” *IEEE 20th Conference on Electrical Performance of Electronic Packaging and Systems 2011*, pp. 303–306.
12. C.-H. Chang, R.-Y. Fang, and C.-L. Wang, “Bended differential transmission line using short-circuited coupled line for common-node noise suppression,” *IEEE 20th Conference on Electrical Performance of Electronic Packaging and Systems 2011*, pp. 291–294.
13. J.-K. Chuang, C.-J. Hsiao, R.-Y. Fang, C.-L. Wang, and K.-Y. Lee, “Broadband patch absorber using multi-walled carbon nanotubes,” *24th International Microprocesses and Nanotechnology Conference 2011*, pp. 27P-11-30.

◆ Projects

Project title	Responsibility	Project duration	Funding institution	Process	Budget
Bended differential transmission using compensation inductance for common-mode suppression (NSC 100-2221-E-011-147)	Leader	2011.08.01~ 2012.07.31	National Science Council	Completed	607,000
Compact and broadband planar transmission line to rectangular waveguide transitions (NSC 101-2221-E-011-084)	Leader	2012.08.01~ 2013.07.31	National Science Council	Completed	739,000
Compact and broadband antenna, transition, and power divider using antisymmetric probe (NSC 102-2221-E-011-014)	Leader	2013.08.01~ 2014.07.31	National Science Council	Completed	702,000
Reduction of common-mode noise and differential-mode reflection using asymmetric coupled line with SMD capacitor (MOST 103-2221-E-011-016)	Leader	2014.08.01~ 2015.07.31	National Science Council	Completed	612,000

Reduction of common-mode and differential-mode noises using timing-offset differential signal (MOST 104-2221-E-011-028)	Leader	2015.08.01~ 2016.07.31	National Science Council	Proceeding	739,000
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