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An Active Rectifier with Time-Domain Delay Compensation to Enhance the Power Conversion Efficiency

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Abstract : This paper presents an active rectifier with time-domain delay compensation to enhance the efficiency. A delay calibration circuit is designed to convert delay time to voltage and adaptive control on/off delay in variable input voltage. This circuit is designed in 0.18 mm CMOS process. The input voltage range is from 2 V to 3.6 V with the output voltage from 1.8 V to 3.4 V. The efficiency can maintain more than 85% when the load from 50 Ω ~ 1500 Ω for 3.6 V input voltage. The maximum efficiency is 92.4 % at output power to be 38.6 mW for 3.6 V input voltage.

Keywords : wireless power transfer, active diode, delay compensation, time to voltage converter, PCE
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