

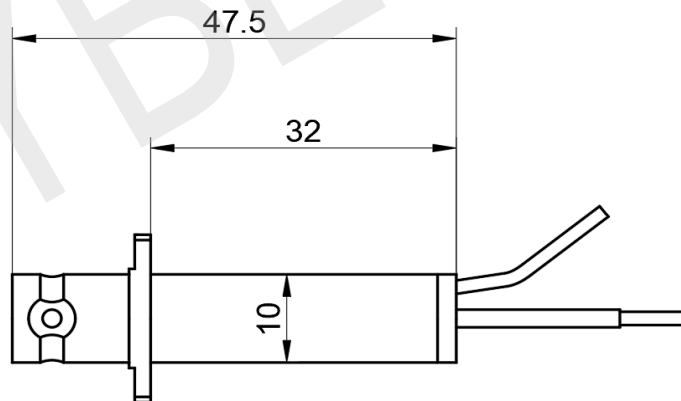
# The measurement application of Coaxial Diverter in SiC and GaN component

## 1. Preface

As the development of modern electronics, more and more people have applied SiC/GaN power component in different specific field. Engineers will always need to measure the power circuit with above hundreds kHz of frequency and tens ampere of current. The traditional HF current probe (such as the TCP series of CP8000 series) containing iron core and shielding layer will suffer large damage and heating under high frequency current (Please refer to the current frequency derating curve from the CP8000 series instruction manual). The loss of expensive probe had become common result of testing these circuits. Coaxial Diverter is pure resistor structure and can remain functional even under high frequency current (DC-120MHz), making it a very good choice for your high frequency current testing.

The disadvantage of coaxial diverter is the absent of insulation function, so the oscilloscope and circuit under test must be common-grounded. It can only be used for the current on low side, rather than high side.

The CSD series coaxial diverter is a type of resistor component of 4 port KELVIN RsNs in coaxial structure, as shown in the diagram below:



BNC port is the signal output port. To improve the high frequency performance, a 50Ω coaxial cable needed to connect to the input port of the oscilloscope. The input impedance should be set as 50Ω

## 2. Double Pulse Circuit Testing

Oscilloscope: DPO3034 with bandwidth of 300MHz

Inductance: 524μH (@50kHz);

SiC MOS: C2M0025120D, 1200V, 90A;

SiC Diode: SCS240KE2, 1200V, 40A;

Resistor compared:

- CYBERTEK CSD01, rated resistance 0.01046Ω
- T&M/SDN-414-01, rated resistance 0.00979Ω

**Conclusion: Waveform in accordance. Deviation of waveforms of 6.5% is caused by the difference of the calibration value on resistors**

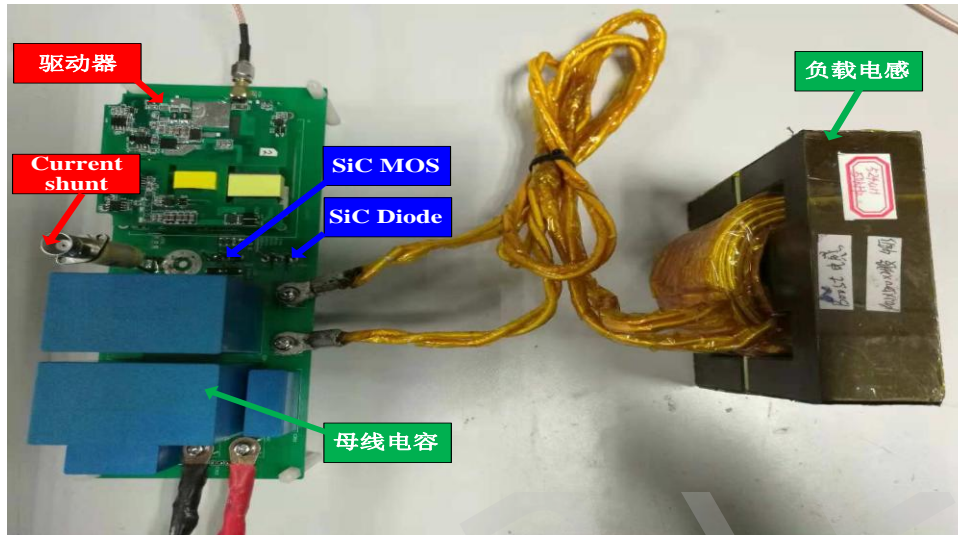
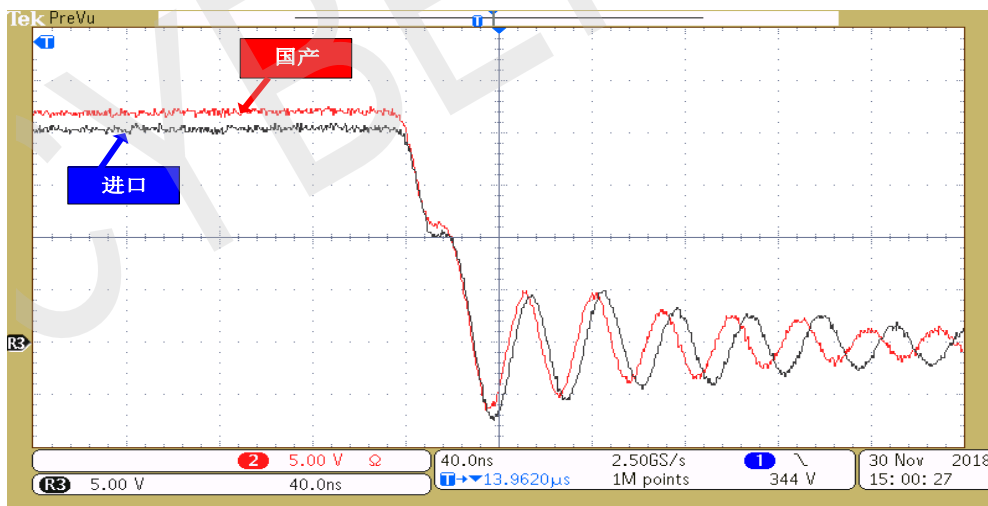
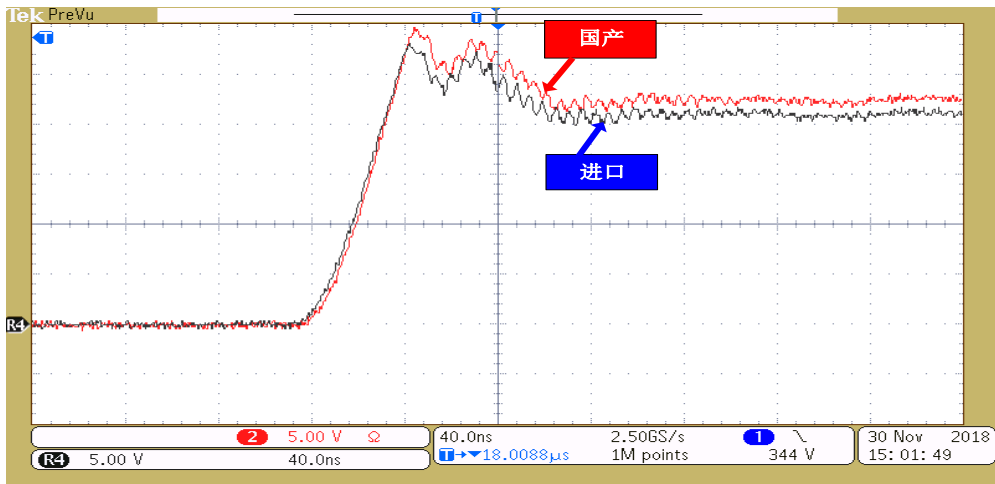


Fig 1 Double Pulse Testing Sample

## ✧ 800V 20A Testing Result



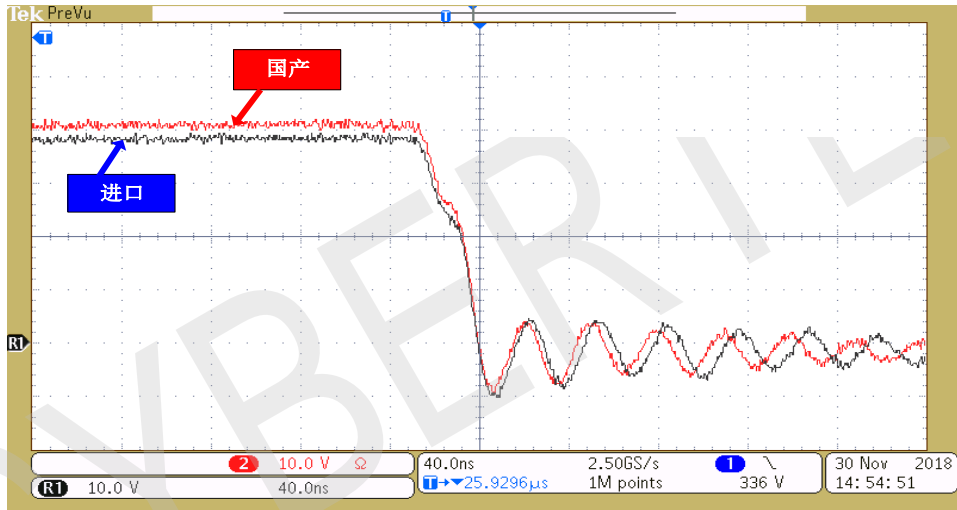
(a) Comparison of cutoff current



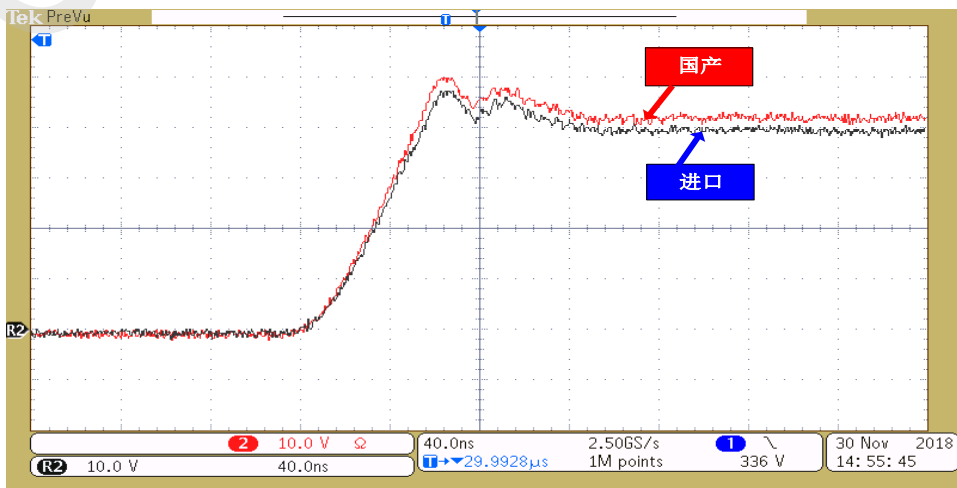
(b) Comparison of turning on current

Fig 2 Waveform Comparison

## ✧ 800V 40A Test Result



(a) Comparison of cutoff current



(b) Comparison of turning on current

Fig 3 Waveform comparison

## 3. Comparison of CSD01 and CT-1 current probe

Device: 150MHz signal source HP8110A

LECROY WAVERUNNER 204XI; Oscilloscope LECROY WAVERUNNER204XI

CT-1 current probe

CYBERTEK CSD01 coaxial diverter

**Conclusion: Waveform in accordance with CT1, with rising time 2.8ns with no overshoot**

