flexiBrute™ Current Transformer Board 1.0

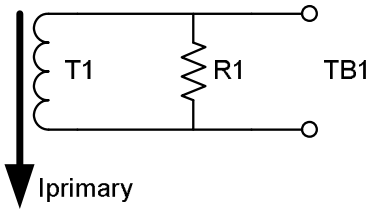
flexiBrute Current Transformer Board 1.0

Introduction

The flexiBrute Current Transformer Board 1.0 features a single 500A wideband current transformer which is perfect for use in small DRSSTCs and SSTCs. It is most commonly used as a feedback current transformer in DRSSTCs or a current monitor in both DRSSTC and high voltage / pulsed power applications. There is an onboard 2 watt resistor, R1, which can be utilized as a burden resistor for current monitoring. A screw terminal block is provided for the output of the current transformer.

Typical Applications:

- DRSSTC Feedback Transformers
- Current Sense Circuits
- Pulse Current Monitor
- Low-to-Mid Power DRSSTCs



Schematic Diagram

Electrical Properties	
Bandwidth	20kHz – 200kHz
Max. Current (peak)	> 500A
Max. Current (RMS)	> 110A
Number Turns	100
Inductance	14mH
R1, Max. Power	2W

Selecting R1, Burden Resistor

Selection of the R1, burden resistor should be done using the following formula:

Volts/Amp = R1 / Number of Turns

For example, if we used a burden resistor of 1 ohm, then our calculated Volts / Amp would be:

Volts/Amp = 1 / 100 = 0.01V/A

So with a DRSSTC that operates with a peak current of 500A, the output of this current transformer would be:

Voutput = (Ipulse x R1) / Number of Turns

= (500A * 1) / 100 = 5V

R1, Burden Resistor Power Dissipation

Power dissipation of the burden resistor, R1, can be approximated with the following equation:

$Pdiss = (Voutput^2 / R1) \times DC$

(where DC = duty cycle of DRSSTC system)

Generally, DRSSTCs operate at very low duty cycles, typically 5-10% maximum duty cycle. So, if we have a DRSSTC that operates with a peak output current of 500A and the maximum operational duty cycle is 5%, the maximum power dissipation of the burden resistor, R1 would be:

$Pdiss = (5V^2 / 1) \times 0.05$

Pdiss = 1.25 watts

The maximum power dissipation of the onboard burden resistor, R1 is 2 watts so this value of burden resistance is acceptable.

flexiBrute™ Current Transformer Board 2.0

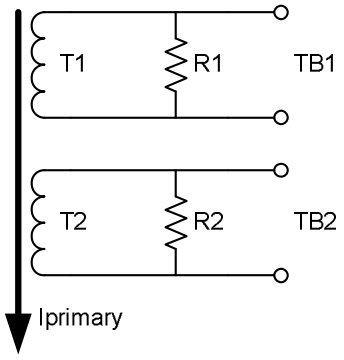
flexiBrute Current Transformer Board 2.0

Introduction

The flexiBrute Current Transformer Board 2.0 features dual 500A wideband current transformers. This is one of our most popular current transformer boards which is perfect for low-to-mid power DRSSTCs. It provides both the current feedback signal as well as current monitoring signal, for current limiting circuits, for DRSSTC systems. There are also two onboard burden resistors, R1 and R2, which can be used if required by the end user. Screw terminal blocks are provided for both current transformer outputs.

Typical Applications:

- DRSSTC Feedback Transformers
- Current Sense Circuits
- Pulse Current Monitor
- Low-to-Mid Power DRSSTCs



Schematic Diagram

Electrical Properties	
Bandwidth	20kHz – 200kHz
Max. Current (peak)	> 500A
Max. Current (RMS)	> 110A
Number Turns	100
Inductance	14mH
R1, Max. Power	2W
R2, Max. Power	2W

Selecting Burden Resistor, R1 and R2

Selection of the R1 or R2, burden resistor should be done using the following formula:

Volts/Amp = R1 / Number of Turns

For example, if we used a burden resistor of 1 ohm, then our calculated Volts / Amp would be:

Volts/Amp = 1 / 100 = 0.01V/A

So with a DRSSTC that operates with a peak current of 500A, the output of this current transformer would be:

Voutput = (Ipulse x R1) / Number of Turns

= (500A * 1) / 100 = 5V

Burden Resistor Power Dissipation

Power dissipation of the burden resistor, R1 or R2, can be approximated with the following equation:

$Pdiss = (Voutput^2 / R1) \times DC$

(where DC = duty cycle of DRSSTC system)

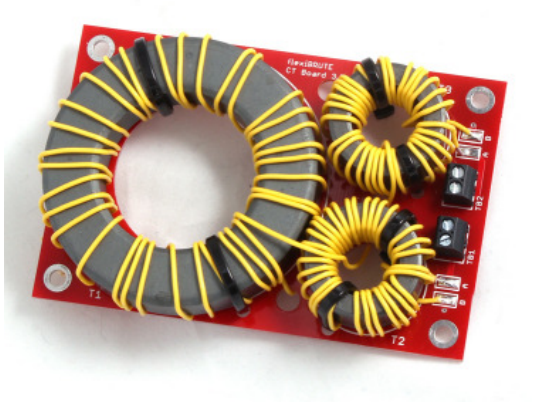
Generally, DRSSTCs operate at very low duty cycles, typically 5-10% maximum duty cycle. So, if we have a DRSSTC that operates with a peak output current of 500A and the maximum operational duty cycle is 5%, the maximum power dissipation of the burden resistor, R1 would be:

$Pdiss = (5V^2 / 1) \times 0.05$

Pdiss = 1.25 watts

The maximum power dissipation of the onboard burden resistor, R1 is 2 watts so this value of burden resistance is acceptable.

flexiBrute™ Current Transformer Board 3.0



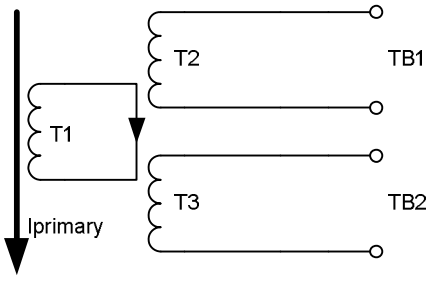
flexiBrute Current Transformer Board 3.0

Introduction

The flexiBrute Current Transformer Board 3.0 features a cascaded current transformer arrangement which is designed for high power DRSSTC systems. It is mostly used for CM300 / CM600 IGBT brick based DRSSTCs. This is our most popular option for large DRSSTCs in that it can support peak currents exceeding 1000A! It provides both the current feedback signal and well as current monitoring signal, for current limiting circuits. Screw terminal blocks are provided for both current transformer outputs.

Typical Applications:

- High power DRSSTC systems
- Current feedback transformer
- Current limit monitoring
- Pulsed power applications



Schematic Diagram

Electrical Properties	
Bandwidth	20kHz – > 300kHz
Max. Current (peak)	> 1000A
Typical Turns per Transformer	33 (typical application)
Effective Turns per Current Sense Circuit, T2	1089
Effective Turns per Current Sense Circuit, T3	1089
Current Divide Ratio	1:1089 (approx. 1:1000)

Selecting Burden Resistor

Burden resistor values should be calculated using the following formula:

Volts/Amp = Rburden / Number of Turns

For example, if we used a burden resistor of 10 ohms, then our calculated Volts / Amp would be:

Volts/Amp = 10 / 1089 = 0.0092V/A

(or rough approx. 0.01V/A)

So with a DRSSTC that operates with a peak current of 1000A, the output of this current transformer would be:

Voutput = (Ipulse x R1) / Number of Turns

= (1000A * 10) / 1089 = 9.18V

Burden Resistor Power Dissipation

Power dissipation of the burden resistor, Rburden, can be approximated with the following equation:

$Pdiss = (Voutput^2 / Rburden) \times DC$

(where DC = duty cycle of DRSSTC system)

Generally, DRSSTCs operate at very low duty cycles, typically 5-10% maximum duty cycle. So, if we have a DRSSTC that operates with a peak output current of 1000A and the maximum operational duty cycle is 5%, the maximum power dissipation of the burden resistor, Rburden would be:

$Pdiss = (9.18V^2 / 10) \times 0.05$

Pdiss = 0.42 watts

flexiBrute™ Current Monitor Board 1.0

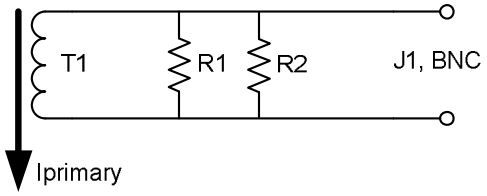
flexiBrute Current Monitor Board 1.0

Introduction

The flexiBrute Current Monitor Board 1.0 is designed for use as a monitoring and troubleshooting tool for DRSSTC and other pulsed power systems. This board features a single 500A wideband current transformer which provides high accuracy measurements. There is both an onboard 0.5 watt and 2 watt resistor, R1 and R2, which can be utilized as a burden resistor. A BNC output connector is provided for easy connection to an oscilloscope or other similar monitoring device.

Typical Applications:

- DRSSTC and SSTC systems
- Current Sense Circuits
- Pulse Current Monitor
- Low-to-Mid Power DRSSTCs



Schematic Diagram

Electrical Properties	
Bandwidth	20kHz – 200kHz
Max. Current (peak)	> 500A
Max. Current (RMS)	> 110A
Number Turns	100
Inductance	14mH
R1, Max. Power	0.5W
R2, Max. Power	2W

Selecting R1 and R2, Burden Resistor

Selection of the R1or R2, burden resistor should be done using the following formula:

Volts/Amp = R1 / Number of Turns

For example, if we used a burden resistor of 1 ohm, then our calculated Volts / Amp would be:

Volts/Amp = 1 / 100 = 0.01V/A

So with a DRSSTC that operates with a peak current of 500A, the output of this current transformer would be:

Voutput = (Ipulse x R1) / Number of Turns

= (500A * 1) / 100 = 5V

Burden Resistor Power Dissipation

Power dissipation of the burden resistor, R1 or R2, can be approximated with the following equation:

$Pdiss = (Voutput^2 / R1) \times DC$

(where DC = duty cycle of DRSSTC system)

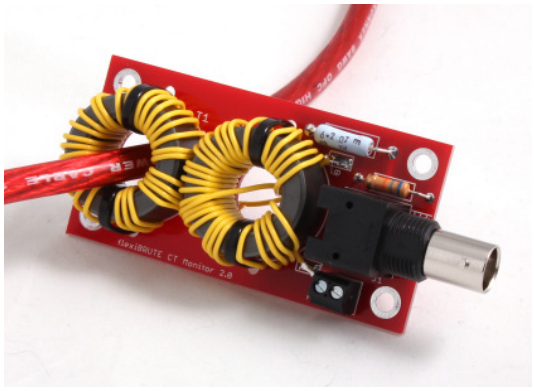
Generally, DRSSTCs operate at very low duty cycles, typically 5-10% maximum duty cycle. So, if we have a DRSSTC that operates with a peak output current of 500A and the maximum operational duty cycle is 5%, the maximum power dissipation of the burden resistor, R1 would be:

$Pdiss = (5V^2 / 1) \times 0.05$

Pdiss = 1.25 watts

The maximum power dissipation of the onboard burden resistor, R1 is 2 watts so this value of burden resistance is acceptable.

flexiBrute™ Current Monitor Board 2.0



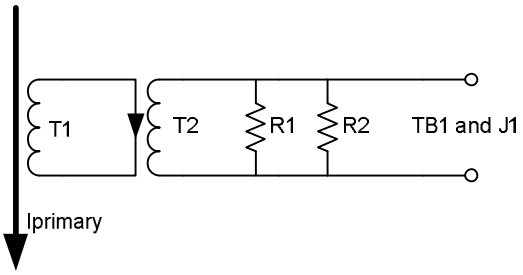
flexiBrute Current Monitor Board 2.0

Introduction

The flexiBrute Current Monitor Board 2.0 features a cascaded current transformer arrangement which is designed for high power DRSSTC and other pulsed power systems. It is designed to be used for monitoring and troubleshooting, as well as tuning, in high power DRSSTC systems. It features both a 0.5W and 2W onboard burden resistors as well as a both a screw terminal block and BNC output connector which allows easy connection to an oscilloscope or other similar monitoring device.

Typical Applications:

- High power DRSSTC systems
- Current feedback transformer
- Current limit monitoring
- Pulsed power applications
- Tuning of DRSSTC systems



Schematic Diagram

Electrical Properties	
Bandwidth	20kHz – > 300kHz
Max. Current (peak)	> 1000A
Typical Turns per Transformer	33 (typical application)
Effective Turns per Current Sense Circuit, T2	1089
Current Divide Ratio	1:1089 (approx. 1:1000)
R1, Max. Power	0.5W
R2, Max. Power	2W

Selecting Burden Resistor

Burden resistor values should be calculated using the following formula:

Volts/Amp = R2 / Number of Turns

For example, if we used a burden resistor of 10 ohms, then our calculated Volts / Amp would be:

Volts/Amp = 10 / 1089 = 0.0092V/A

(or rough approx. 0.01V/A)

So with a DRSSTC that operates with a peak current of 1000A, the output of this current transformer would be:

Voutput = (Ipulse x R2) / Number of Turns

= (1000A * 10) / 1089 = 9.18V

Burden Resistor Power Dissipation

Power dissipation of the burden resistor, R2, can be approximated with the following equation:

$Pdiss = (Voutput^2 / R2) \times DC$

(where DC = duty cycle of DRSSTC system)

Generally, DRSSTCs operate at very low duty cycles, typically 5-10% maximum duty cycle. So, if we have a DRSSTC that operates with a peak output current of 1000A and the maximum operational duty cycle is 5%, the maximum power dissipation of the burden resistor, R2 would be:

$Pdiss = (9.18V^2 / 10) \times 0.05$

Pdiss = 0.42 watts