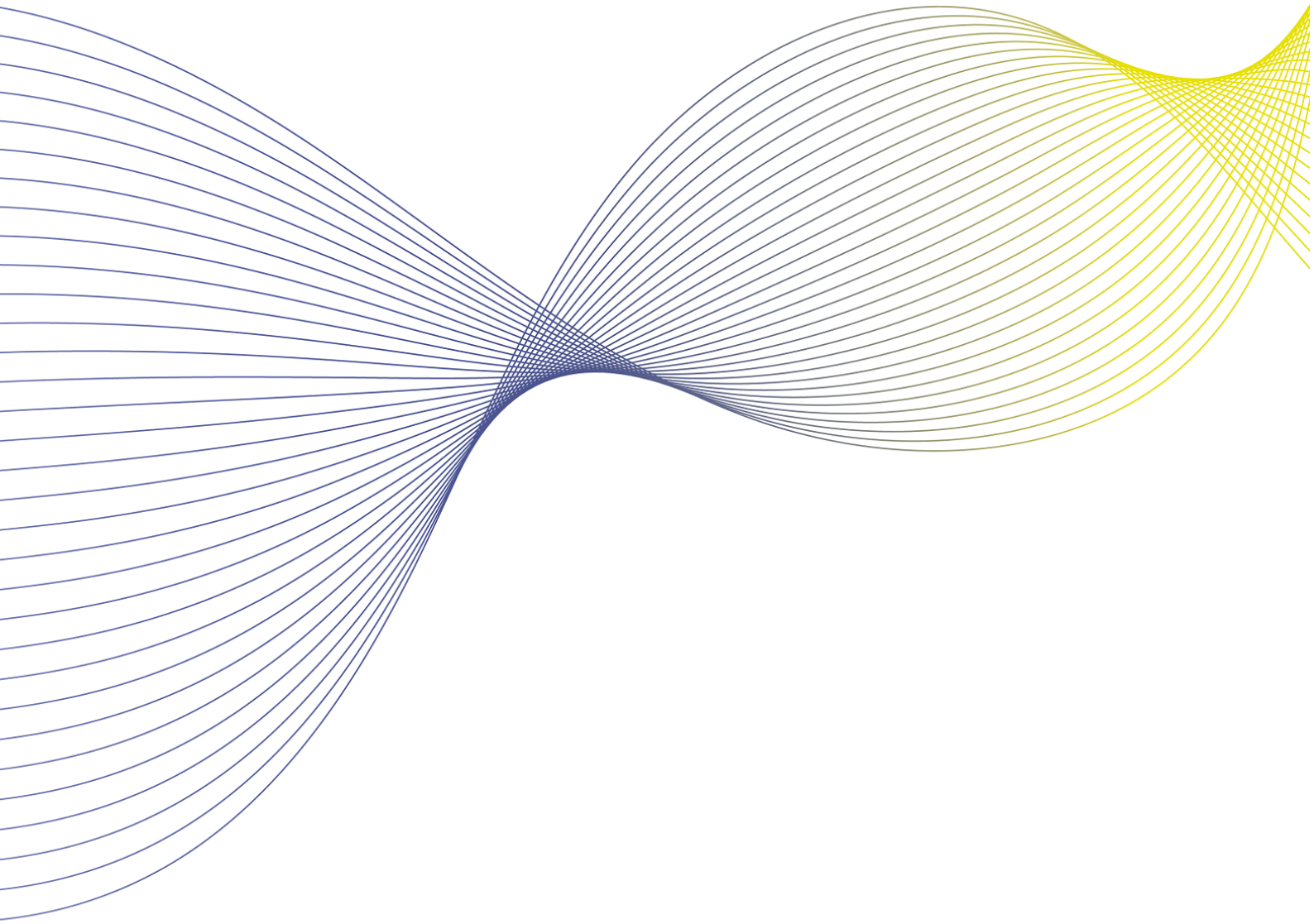
HSTDR, HSNDR, HAM APPLICATION NOTES

INFORMATION IN THIS DOCUMENT SHOULD BE USED AS REFERENCE, THEY ARE NOT GUARANTEED VALUES



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1 HSTDR

1.1 RECOMMENDATIONS FOR USE

1.1.1 STORAGE

The LEM transducers must be stored in a dry location, within the following ambient room conditions (< 40 °C and < 60 % RH). The product should be stored in its closed and original packing. Ensure during storage and transport, the units are not damaged by applying excess weight to the packaging. The transducers mustn't be stored more than 2 years. Ensure during storage and transport, the units are not damaged by applying excess weight to the boxes. Maximal stack-up storage of secondary container (pallet) must not exceed 2.

1.1.2 UNPACKING

When unpacking, care must be taken with cutting tools not to damage the transducer.

1.1.3 HANDLING

The LEM transducers must be handled with care and not undergo any shocks or falls (fall=scrap). It is recommended to handle the transducer as long as possible inside its original packing (thermoform tray on customer's assembly station). It is forbidden to handle the transducers by their terminals. To avoid problems of ESD, it is recommended not to touch secondary terminals. Any rework operations are forbidden and will conduct part out of LEM warranty.

1.1.4 INSTALLATION

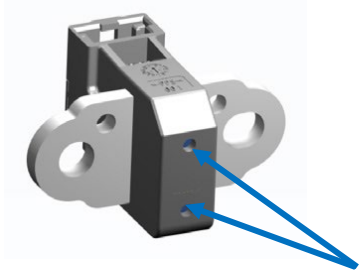
The workshop and the people in contact with the transducers must be ESD protected. Before installing, be sure to check that the transducer corresponds to the required application. Be sure that the air gap between the housing of the transducer and the primary bar is sufficient to avoid damage in case of vibrations.
Do not install (or re-install) a damaged part (broken or crushed element…).
LEM do not recommend customers to make any maintenance on LEM sensors, otherwise it will drive sensors directly out of warranty.

1.1.5 DISASSEMBLY

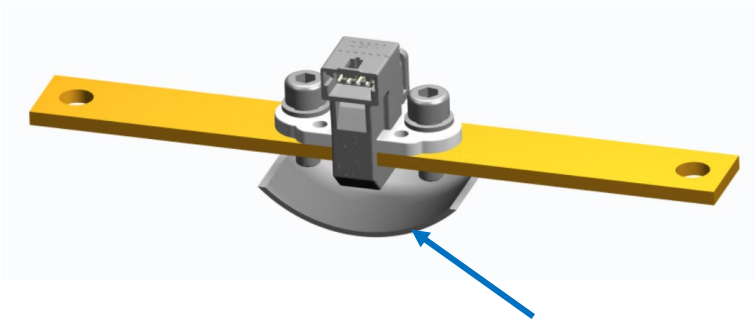
Suppress all electricity power before disassembling the transducer.

1.1.6 MOUNTING

1. Recommend that customer's busbar is mounted under HSTDR, refer to the figure below, to avoid shorten clearance/creepage distance.
2. Recommend use insulation layer under HSTDR if the HSTDR bottom is close to other metal parts, to avoid potential insulation issue (two auxiliary holes of plastic injection on HSTDR bottom).



Auxiliary holes



Insulation layer

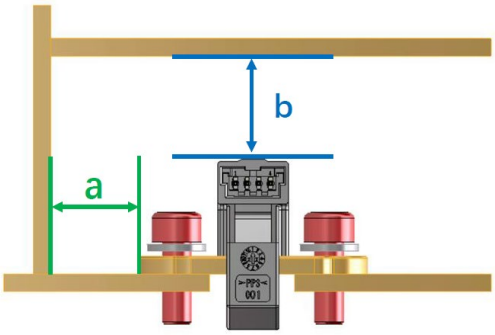
1.2 RETURN BUSBAR DISTURBANCE

1.2.1 PURPOSE

- Purpose is to present return busbar disturbance with busbar shapes, this can be referred during structure design.

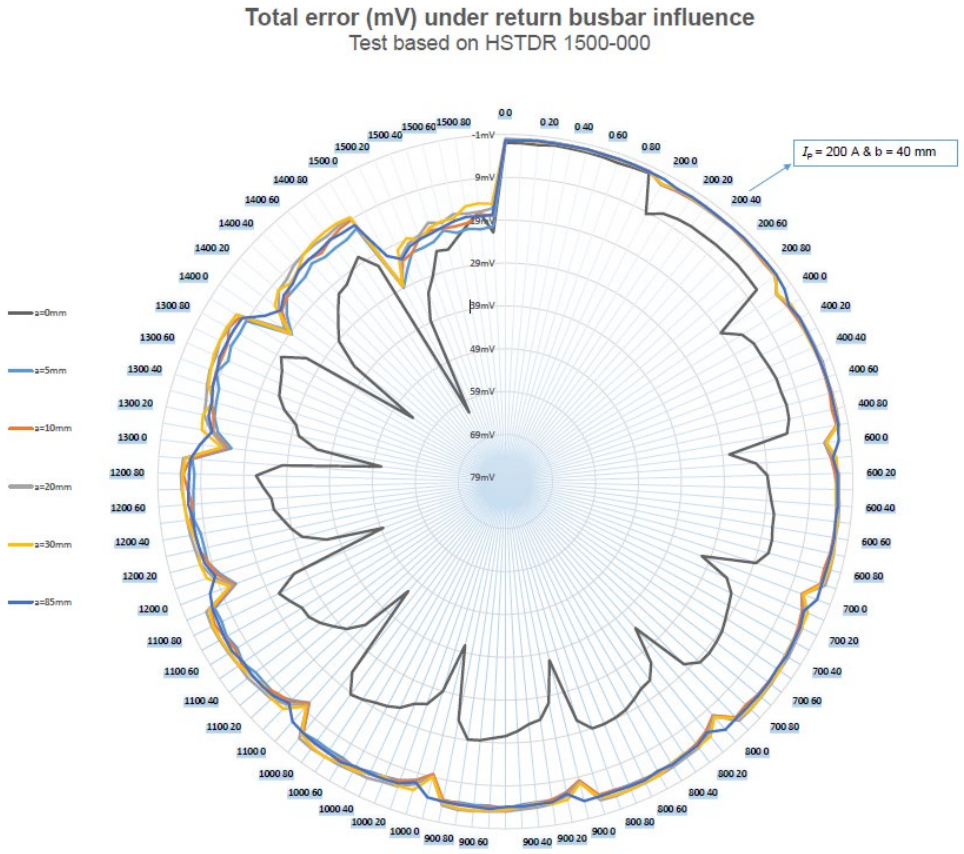
1.2.2 RETURN BUSBAR SETUP

- This shape is the most influential case
- The busbar dimension for test: 22 mm(Width)x4mm(Thickness).
- Environment: 25 ° C.



1.2.3 RETURN BUSBAR INFLUENCE

Difference of the Uout between the return busbar (C-shape) vs reference (straight busbar).



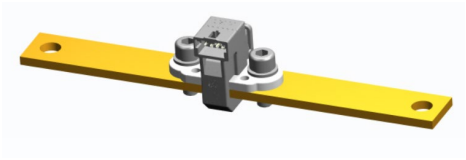
1.2.4 NOTES

- Due to the complexity of practical application, the examples cannot cover all the application conditions.

1.3 HEATING GENERATION ON BUSBAR DUE TO PRIMARY CURRENT

1.3.1 SETUP

Condition
- Inside climate chamber
- 55 °C setting up in chamber
- IP range: 100 A -1500 ADC
- Mounting: refers to picture
- Test points: middle of busbar, inside DUT

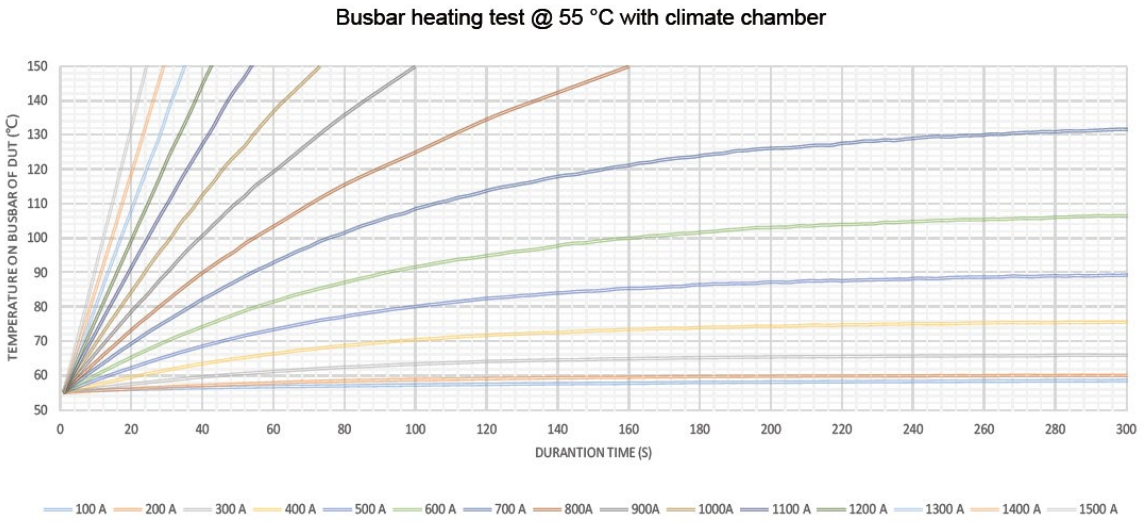


HST series:
- Cu-ETP
- Section: 3 x 16.7 (mm)
- Length: 39 mm
- Resistance: 20 µΩ

Distribution busbar besides:
- Cu-ETP
- Section: 3 x 16.7 (mm)
- Length: 200 mm

* Busbars besides are designed to simulate the application in customer system

1.3.2 HEATING GENERATION CHART ACCORDING TO ABOVE CONDITION



1.3.3 MAX. DURATION TIME TO REACH THE LIMIT 150 °C OF BUSBAR ACCORDING TO ABOVE CONDITION

I_P	≤ 700	800	900	1000	1100	1200	1300	1400	1500
Max duration time (s)	Continue	160	100	73	52	43	34	31	25

- The result is for reference only according to certain condition as above.
- If the profile of primary current is over than the limit, please consider enlarging the section of busbar besides.

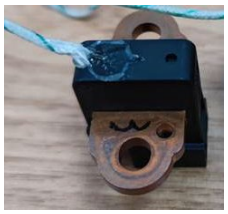
1.4 MAX. CONTINUOUS CURRENT VERSUS AMBIENT TEMPERATURE

1.4.1 PURPOSE

To verify the maximum acceptance continuous IP current value at different ambient temperatures. The typical values of the test can be used by the customer for reference during design.

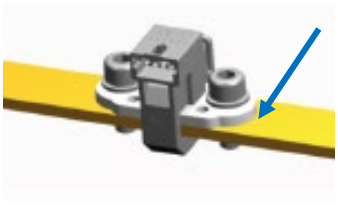
1.4.2 SPECIFIC TEST SETUP AND LIMITS

- Environment: Ambient temperature of sensor inside climate chamber
  25 °C, 45 °C, 65 °C, 85 °C, 105 °C, 125 °C
- Keep ambient temperature stable due to the cooling system of climate chamber.
- IP range: 100A to 1500A
- Test points: refers to picture.
  101<core>：Magnetic core temperature monitor point, limited 150 °C
  102<ASIC>：ASIC temperature monitor point, limited 125 °C
  103<busbar>：Extend Busbar temperature monitor point, limited 150 °C



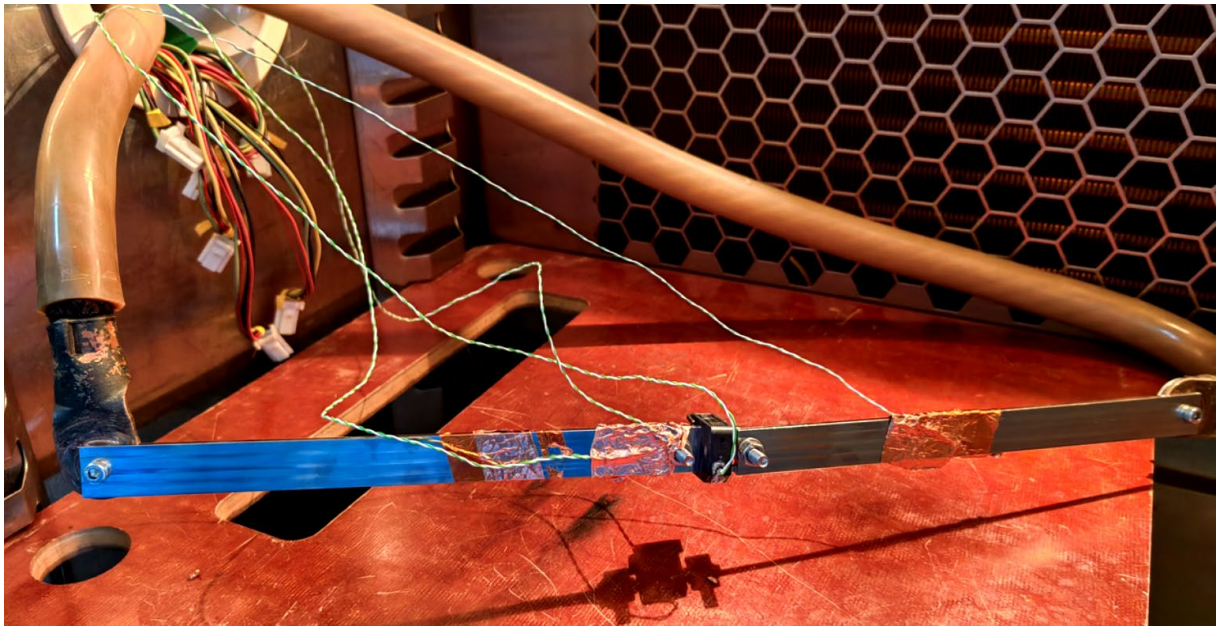
101<core>

102<ASIC>

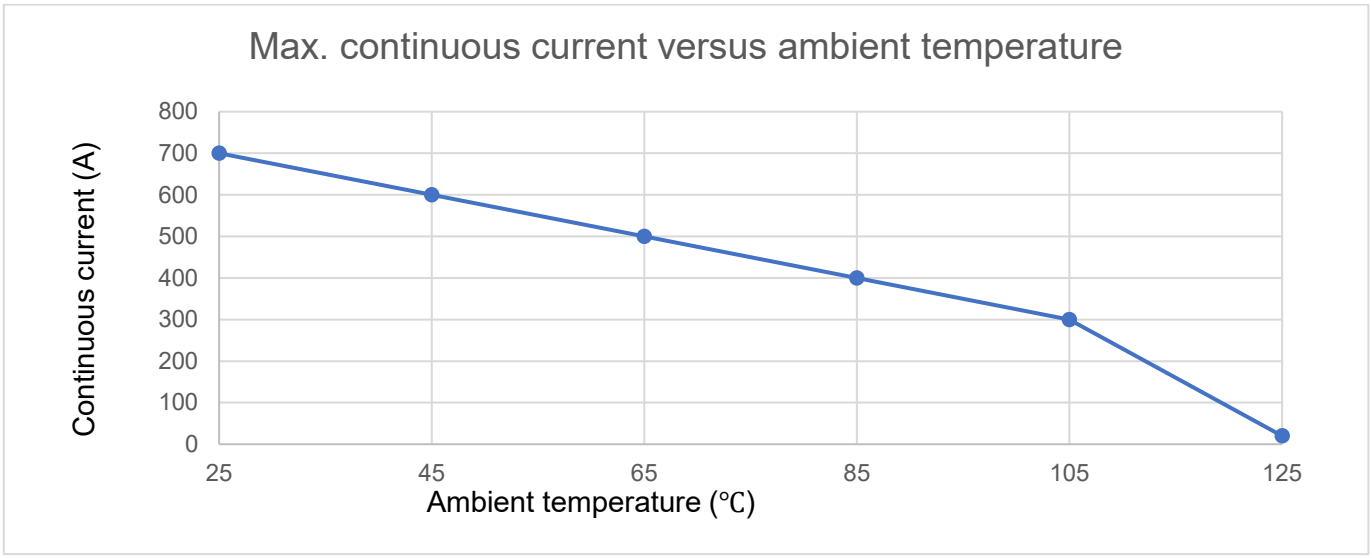


103<busbar>

- Overall setup

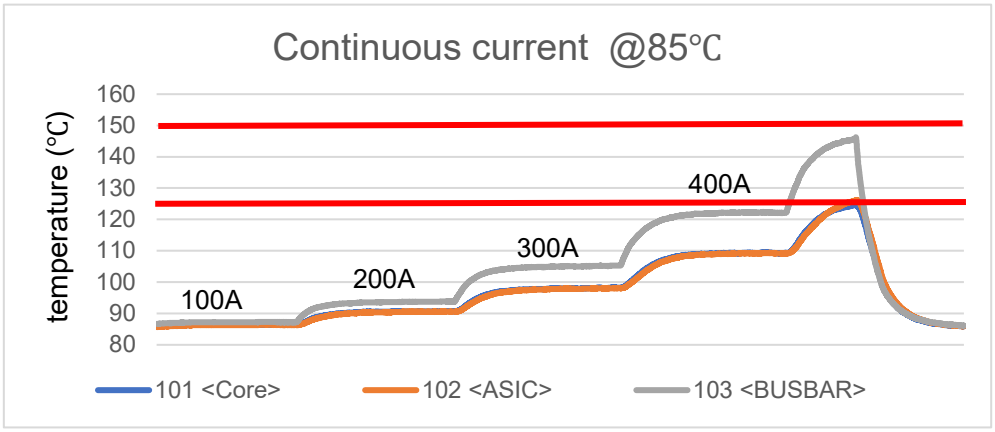


1.4.3 RECOMMENDATION OF MAX. CONTINUOUS CURRENTS

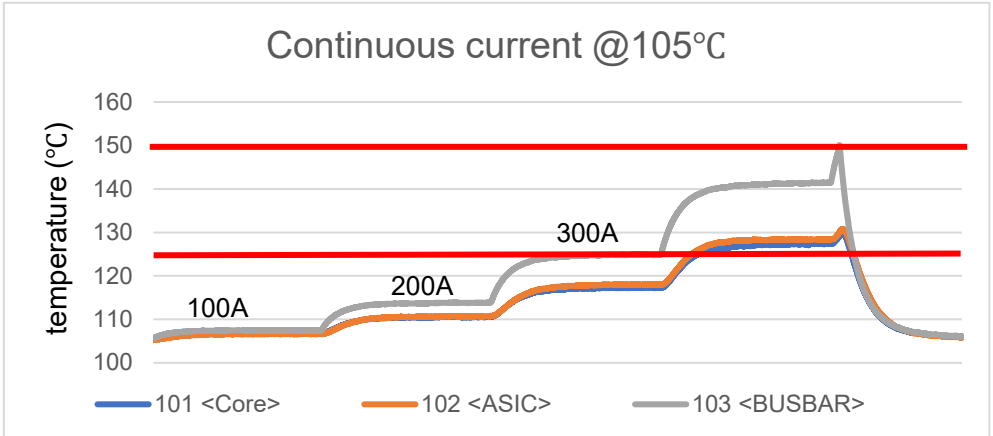


1.4.4 EXAMPLE OF TEST CASES

- Max. continuous current at 85°C is 400A.



- Max. continuous current at 105°C is 300A.



2 HSNDR

2.1 CONTINUOUS CURRENT VS VARIOUS AMBIENT TEMPERATURE

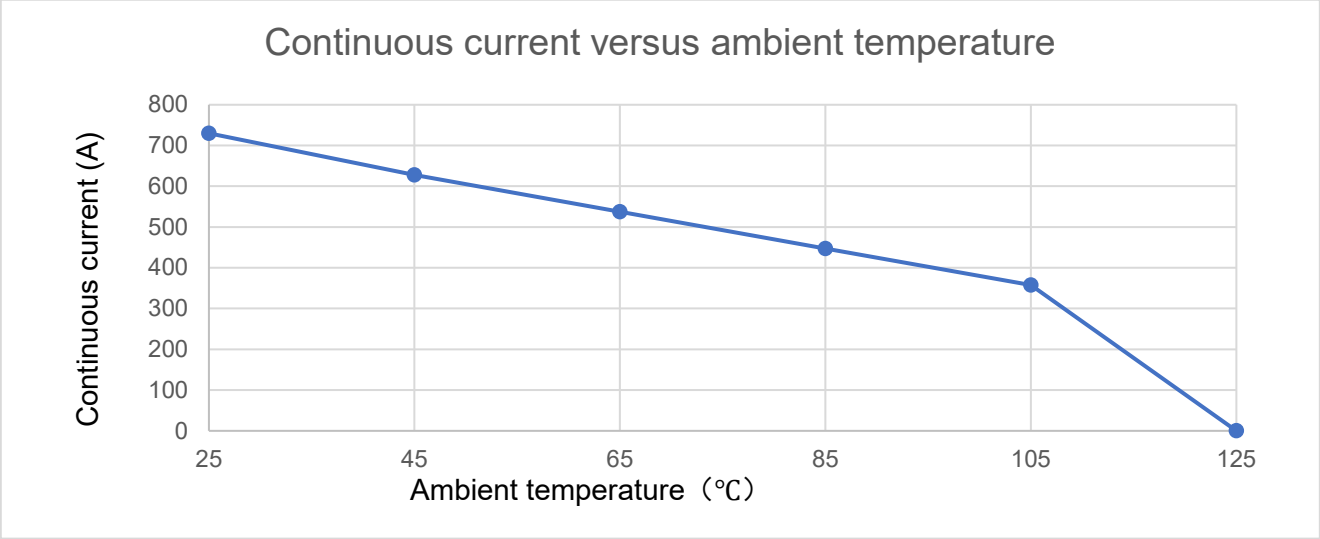
2.1.1 PURPOSE

To verify the maximum acceptance continuous IP current value at different ambient temperatures.
The typical values of the test can be used by the customer for reference during design.

2.1.2 SPECIFIC SETUP AND LIMITS

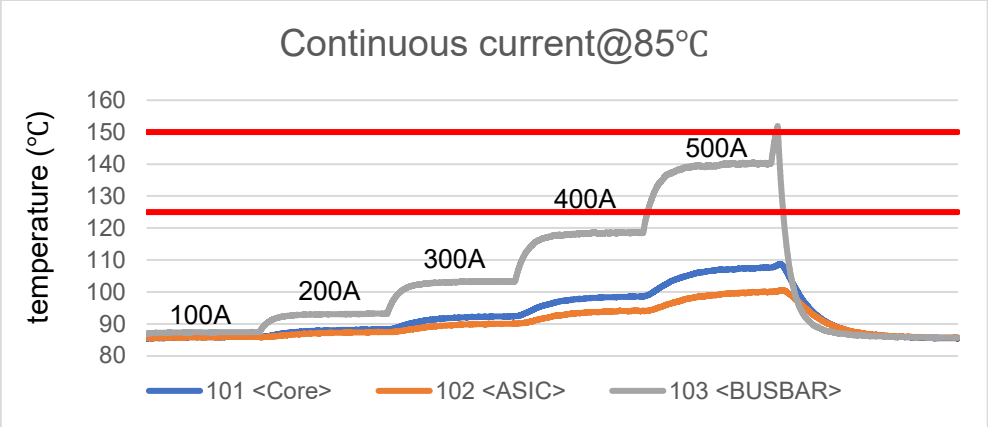
Similar setup and procedure as HST family, for details, see §1.4.2.

2.1.3 RECOMMENDATION OF MAX. CONTINUOUS CURRENTS

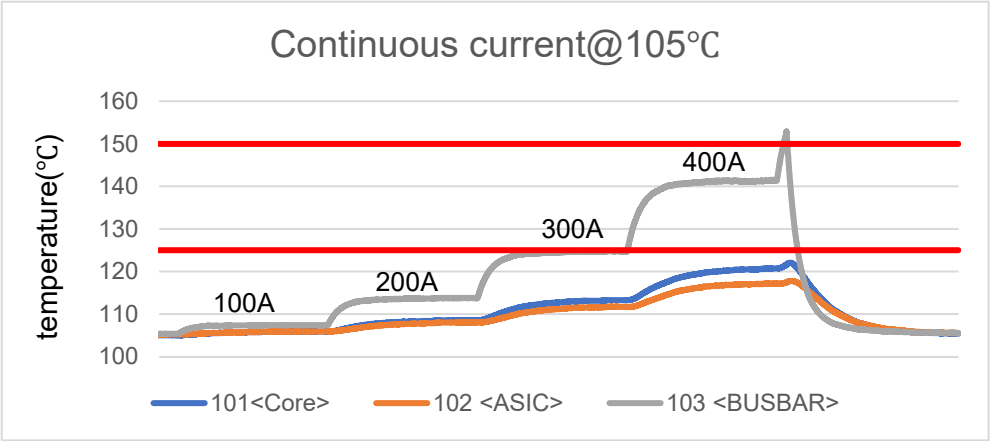


2.1.4 EXAMPLE OF TEST CASES

- Max. continuous current at 85°C is 500A.



- Max. continuous current at 105°C is 400A.



3 HAM

3.1 CONTINUOUS CURRENT VS VARIOUS AMBIENT TEMPERATURE

3.1.1 PURPOSE

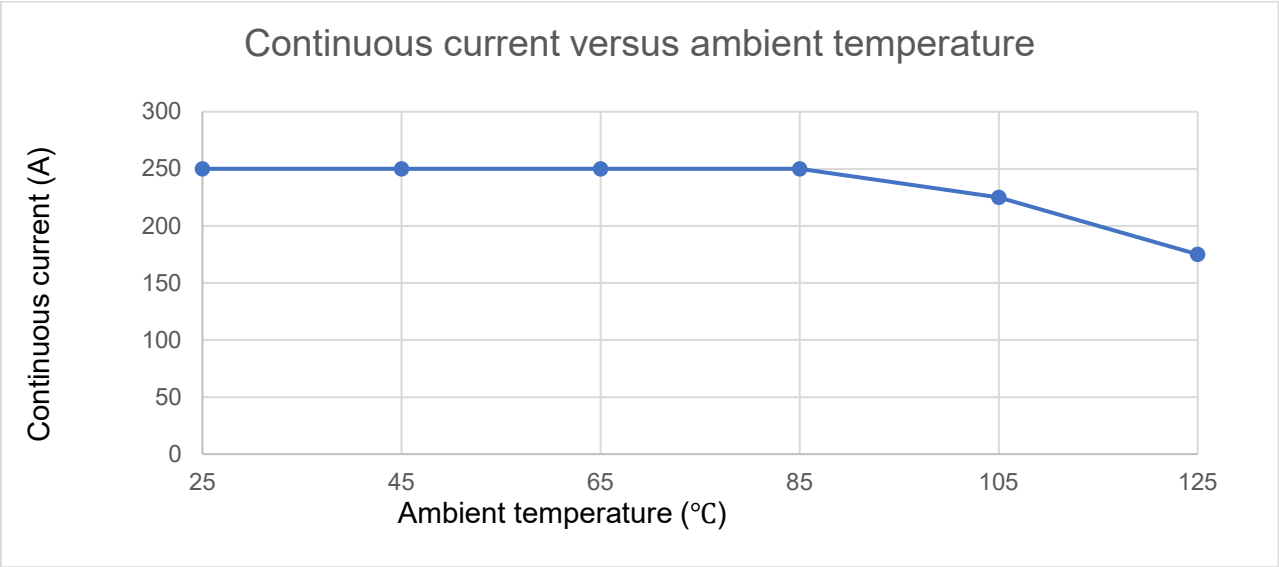
To verify the maximum acceptance continuous IP current value at different ambient temperatures.
The typical values of the test can be used by the customer for reference during design.

3.1.2 SPECIFIC SETUP AND LIMITS

Similar setup and procedure as HST family, for details, see §1.4.2.

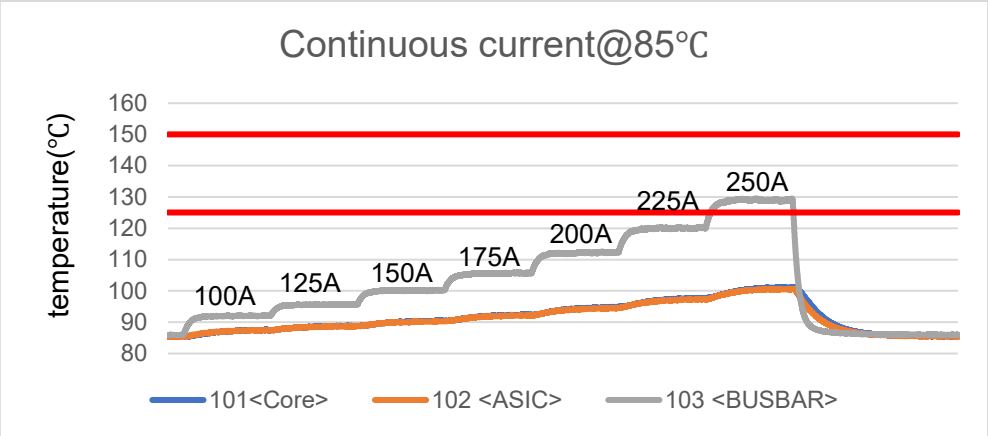
The limit of 250A is defined by the measuring range (not because of thermal limitation).

3.1.3 RECOMMENDATION OF MAX. CONTINUOUS CURRENTS



3.1.4 EXAMPLE OF TEST CASE

- Max. continuous current at 85°C is 250A.



- Max. continuous current at 105°C is 225A.