

# 2BB0535T2Ax-25

## Target Data Sheet

Base Board for 2SC0535T SCALE-2 drivers for 2500V IGBT modules with a combined electrical/fiber-optic interface for 2-level, 3-level and multilevel converter topologies with paralleling capability

### Abstract

The 2BB0535T is a Base Board based on the 2SC0535T SCALE-2 driver core designed to drive almost all available 2500V IGBT modules such as 130mm x 140mm or 190mm x 140mm IGBT modules and others. This Base Board features a combined electrical/fiber-optic interface with a built-in DC/DC power supply to assure maximum flexibility. The user can chose between an electrical or a fiber-optic interface within the same version of the Base Board.

**The turn-on and turn-off gate resistors as well as the auxiliary gate capacitor of both channels are left un-assembled to allow maximum flexibility. They must be assembled by the user before start of operation.** Please refer to "Description & Application Manual for 2BB0535T Base Boards" for more information.

For drivers adapted to various types of high-power and high-voltage IGBT modules, refer to

[www.IGBT-Driver.com/go/plug-and-play](http://www.IGBT-Driver.com/go/plug-and-play)

### Features

- ✓ Easy start of operation of 2SC0535T
- ✓ Shortens application development time
- ✓ Schematics available
- ✓ Production data available (Gerber files)
- ✓ 20-pin flat cable interface
- ✓ Electrical interface available
- ✓ Fiber-optic links available
- ✓ Allows parallel connection of IGBT modules
- ✓ Safe isolation to EN 50178 and EN 50124
- ✓ UL compliant

### Applications

- ✓ 130mm x 140mm dual IGBT modules
- ✓ 130mm x 140mm single IGBT modules
- ✓ 190mm x 140mm single IGBT modules
- ✓ Half-bridge IGBT modules
- ✓ Choppers

## Target Data Sheet

### Safety Notice!

The data contained in this data sheet is intended exclusively for technically trained staff. Handling all high-voltage equipment involves risk to life. Strict compliance with the respective safety regulations is mandatory!

Any handling of electronic devices is subject to the general specifications for protecting electrostatic-sensitive devices according to international standard IEC 60747-1, Chapter IX or European standard EN 100015 (i.e. the workplace, tools, etc. must comply with these standards). Otherwise, this product may be damaged.

### Important Product Documentation

The data sheet of 2SC0535T (see [www.igbt-driver.com/go/2SC0535T](http://www.igbt-driver.com/go/2SC0535T)) applies. **This data sheet contains only information which differs or completes the data contained in the data sheet of driver core 2SC0535T. It is valid for the delivered driver version.**

For a detailed description, must-read application notes and common data that apply to the whole series, please refer to "Description & Application Manual for 2SC0535T drivers" and "Description & Application Manual for 2BB0535T Base Boards" on [www.IGBT-Driver.com/go/2SC0535T](http://www.IGBT-Driver.com/go/2SC0535T) and [www.IGBT-Driver.com/go/2BB0535T](http://www.IGBT-Driver.com/go/2BB0535T).

The turn-on and turn-off gate resistors as well as the auxiliary gate capacitors on this Base Board are left un-assembled in order to assure maximum flexibility. Please refer to "Description & Application Manual for 2BB0535T Base Boards" for more information.

### Mechanical Dimensions

Dimensions: See "Description & Application Manual for 2BB0535T Base Boards"

Mounting principle: Connected to IGBT module over the connectors X101, X102 and X201, X202

### Fiber-Optic Interfaces

Interface	Remarks	Part type #
Drive signal input	Fiber-optic receiver (Notes 8, 9)	HFBR-2522Z
Status output	Fiber-optic transmitter (Notes 8, 10)	HFBR-1522Z

### Electrical Connectors

Interface	Remarks	Part type #
Power supply connector X3	THT connector	FCI/71922-120LF
Output connectors	X101, X102, X201, X202	SAURO/MSB02005

## Target Data Sheet

**Absolute Maximum Ratings**

Parameter	Remarks	Min	Max	Unit
Average supply current $I_{DC}$	Note 1		800	mA
Output power per gate	Ambient temperature <70°C (Note 2)		4.0	W
	Ambient temperature 85°C (Note 2)		3.0	W
DC-link voltage	Switching operation (Note 3)		1700	V
	Off state (Note 11)		2120	V
Operating temperature		-40	+85	°C
Storage temperature		-40	+90	°C

**Recommended Operating Conditions**

Parameter	Remarks	Min	Typ	Max	Unit
Resistance from TB to GND	Blocking time≠0, ext. value	128		∞	kΩ
SO <sub>x</sub> current	Fault condition, 3.3V logic			4	mA

**Electrical Characteristics**

All data refer to +25°C and  $V_{DC} = V_{CC} = 15V$  unless otherwise specified

Power supply	Remarks	Min	Typ	Max	Unit
Supply current $I_{CC}$	F = 0Hz		73		mA
Supply current $I_{CC}$	F = 100kHz		84		mA
Logic Inputs and Outputs	Remarks	Min	Typ	Max	Unit
Input impedance	Electrical interface, $V(INx) > 3V$	3.5	4.1	4.6	kΩ
SO <sub>x</sub> output voltage	Fault condition, $I(SOx) < 8mA$			0.7	V
Short-circuit Protection	Remarks	Min	Typ	Max	Unit
Vce-monitoring threshold	Between auxiliary terminals		62		V
Response time	DC-link voltage = 1700V (Note 4)		7.4		μs
	DC-link voltage = 1500V (Note 4)		7.5		μs
	DC-link voltage = 1300V (Note 4)		7.8		μs
	DC-link voltage = 850V (Note 4)		10.0		μs
	DC-link voltage = 550V (Note 4)		16.8		μs
Blocking time	After fault (Note 5)		90		ms

## Target Data Sheet

Timing Characteristics	Remarks	Min	Typ	Max	Unit
Jitter of turn-on delay	Electrical interface, Note 6		2.5		ns
Jitter of turn-off delay	Electrical interface, Note 6		1.5		ns
Dead time between outputs	Electrical interface, Half-bridge mode		4.2		μs
Jitter of dead time	Electrical interface, Half-bridge mode		t.b.d.		ns
Propagation delay turn-on	Fiber-optic interface		815		ns
Propagation delay turn-off	Fiber-optic interface		480		ns
Outputs	Remarks	Min	Typ	Max	Unit
Turn-on gate resistor $R_{g(on)}$	Note 7		Not assembled		Ω
Turn-off gate resistor $R_{g(off)}$	Note 7		Not assembled		Ω
Auxiliary gate capacitor $C_{ge}$	Note 7		Not assembled		nF
Gate resistance to COMx			4.7		kΩ
Electrical Isolation	Remarks	Min	Typ	Max	Unit
Creepage distance	Primary to secondary side	44.0			mm
	Secondary to secondary side	22.0			mm
Clearance distance	Primary to secondary side	44.0			mm
	Secondary to secondary side	14.0			mm

### Footnotes to the Key Data

- 1) If the specified value is exceeded, this indicates a Base Board overload. It should be noted that the Base Board is not protected against overload.
- 2) Including the auxiliary gate capacitance  $C_{ge}$ . If the specified value is exceeded, this indicates a Base Board overload. It should be noted that the Base Board is not protected against overload. From 70°C to 85°C, the maximum permissible output power can be linearly interpolated from the given data. Note that the maximum gate power generated by the auxiliary gate capacitance must be limited to 1.5W (<70°C) or 1W (85°C) respectively.
- 3) This limit is due to active clamping under switching conditions. Refer to the "2BB0535T Description & Application Manual".
- 4) Resulting pulse width of the direct output of the gate drive unit for short-circuit type I (excluding the delay of the gate resistors)
- 5) Factory set value. The blocking time can be reduced with an external resistor. Refer to the "2BB0535T Description & Application Manual".
- 6) Jitter measurements are performed with input signals INx switching between 0V and 15V referred to GND, with a corresponding rise time and fall time of 8ns.
- 7) The gate resistors and the auxiliary gate capacitors are not assembled on this Base Board. They must be assembled by the user. Please refer to "2BB0535T Description & Application Manual".
- 8) The transceivers required on the host controller side are not supplied with the gate driver. It is recommended to use the same types as those used in the gate driver. For product information refer to [www.IGBT-Driver.com/go/fiberoptics](http://www.IGBT-Driver.com/go/fiberoptics)
- 9) The recommended transmitter current at the host controller is 20mA. A higher current may increase jitter or delay at turn-off.
- 10) The typical transmitter current at the gate driver is 18mA. In case of supply undervoltage, the minimum transmitter current at the gate driver is 12mA: this is suitable for adequate plastic optical fibers with a length of more than 10 meters.

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## Target Data Sheet

- 11) Due to the Dynamic Active Advanced Clamping Function (DA<sup>2</sup>C) implemented on the Base Board, the DC-link voltage can be increased in the off-state condition (e.g. after emergency shut-down). This value is only valid when the IGBTs are in the off state (not switching). The time during which the voltage can be applied should be limited to short periods (< 60 seconds). Refer to the "2BB0535T Description & Application Manual".

### **Legal Disclaimer**

This data sheet specifies devices but cannot promise to deliver any specific characteristics. No warranty or guarantee is given – either expressly or implicitly – regarding delivery, performance or suitability.

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 Target Data Sheet

**Ordering Information**

The general terms and conditions of delivery of CT-Concept Technologie AG apply.

**CONCEPT Base Board Type #**
**Related IGBTs**

2BB0535T2A0-25

2500V IGBT modules

Note that the 2BB0535T2A0-25 Base Boards are delivered without a 2SC0535T driver and without gate resistors and auxiliary gate capacitors. For orders of 1000 pieces or more (per delivery) the Base Board can be assembled with the 2SC0535T driver, the required gate resistors and gate capacitances.

Product home page: [www.IGBT-Driver.com/go/2BB0535T](http://www.IGBT-Driver.com/go/2BB0535T)

Refer to [www.IGBT-Driver.com/go/nomenclature](http://www.IGBT-Driver.com/go/nomenclature) for information on driver nomenclature

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**Information about Other Products**
**For drivers adapted to high-voltage or high-power IGBT modules**

Direct link: [www.IGBT-Driver.com/go/plug-and-play](http://www.IGBT-Driver.com/go/plug-and-play)

**For other drivers, evaluation systems product documentation and application support**

Please click onto: [www.IGBT-Driver.com](http://www.IGBT-Driver.com)

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