

EiceDRIVER™

2ED300E17-S

Dual Evaluation Board for IGBT driver 2ED300C17-S

Technical Documentation



prepared by : M.Hornkamp	date of publication: 01.05.2003
approved by: Mark Münzer	revision: 1.0
SN: 24690	status: evaluation board

*EiceDRIVER*TM 2ED300E17-S

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Correspondence of the contents of this document with the described hardware has been checked. Discrepancies may exist nevertheless; no guaranty is assumed for total congruence. The information contained in this document is subject to regular revision. Any alterations required will be incorporated in the next issue. Suggestions for improvement are welcome.

Changes of the document may occur without prior notice.

Safety notice!

It must be prevented that children and the general public have access to the installed driver or can get into proximity!

The driver/adapter board may only be used for the purposes prescribed by the manufacturer. Inadmissible alterations and use of spare parts and accessories not recommend by the manufacturer of the driver can cause fire, electric shock and injuries.

This document has to be at the disposal of all users, developers and qualified personnel who are to work with the driver.

If measurements and tests on the live device have to be carried out, then the regulations of the Safety Code VBG 4.0 are to be observed, in particular § 8 "Admissible deviations during work on live parts". Suitable electronic devices are to be used.

Prior to installation and commissioning please read this document thoroughly.

- Commissioning is prohibited if there is visible damage by inappropriate handling or transport.
- Contact while uninstalled is permitted only with ESD protection.
- Install only without supply voltage.
- Always keep sufficient safety distance during commissioning without closed protective housing.
- Contact under live condition is strictly prohibited.
- Work after turn-off is not admissible until the absence of supply voltage has been verified.
- During work after turn-off it has to be observed that components heat up during operation. Contact with these can cause burning.
- The drivers are mounted electrically and mechanically into the 2ED300E17-S mother board by soldering. The mechanical strength has to be verified by the user and, if necessary, assured with appropriate tests.
- The evaluation board with the driver 2ED300C17-S are designed for use with eupec IGBT modules type IHM, EconoPACK+, 62mm. In case of ulterior use, safe operation cannot be guaranteed.

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General information for the evaluation board 2ED300E17-S:

The evaluation board 2ED300E17-S is an application add-on for the Dual IGBT driver 2ED300C17-S. In this function the evaluation board supports the application of the 2ED300C17-S. Documented is the minimum required circuitry of the 2ED300C17-S. Special circuits such as "Active Clamping", separate Rgon/ Rgoff or use of the EDFA (see datasheet of the 2ED300C17-S chapter 3.9) are not described in this document, are, however, possible with the 2ED300E17-S.

This technical document is to be used only in conjunction with the datasheet of the 2ED300C17-S.

Commissioning of the evaluation board 2ED300E17-S:

Basis of this datasheet is the datasheet of the 2ED300C17-S. Before commissioning the evaluation boards the datasheet of the 2ED300C17-S has to be read.

- 1) Insert IGBT drivers 2ED300C17-S into the evaluation board and solder. **Page 4.**
- 2) Choose half-bridge or direct mode. **Page 6.**
- 3) For half-bridge mode set interlock delay times. **Page 6.**
- 4) Connect eupec IGBT module(s) with the evaluation board. **Page 7.**
- 5) Apply PWM Signals. **Page 5**
- 6) Apply supply voltage +15V. **Page 5**
- 7) Adapt the 2ED300C17-S to the IGBT module and its application. **Page 6 and 8**

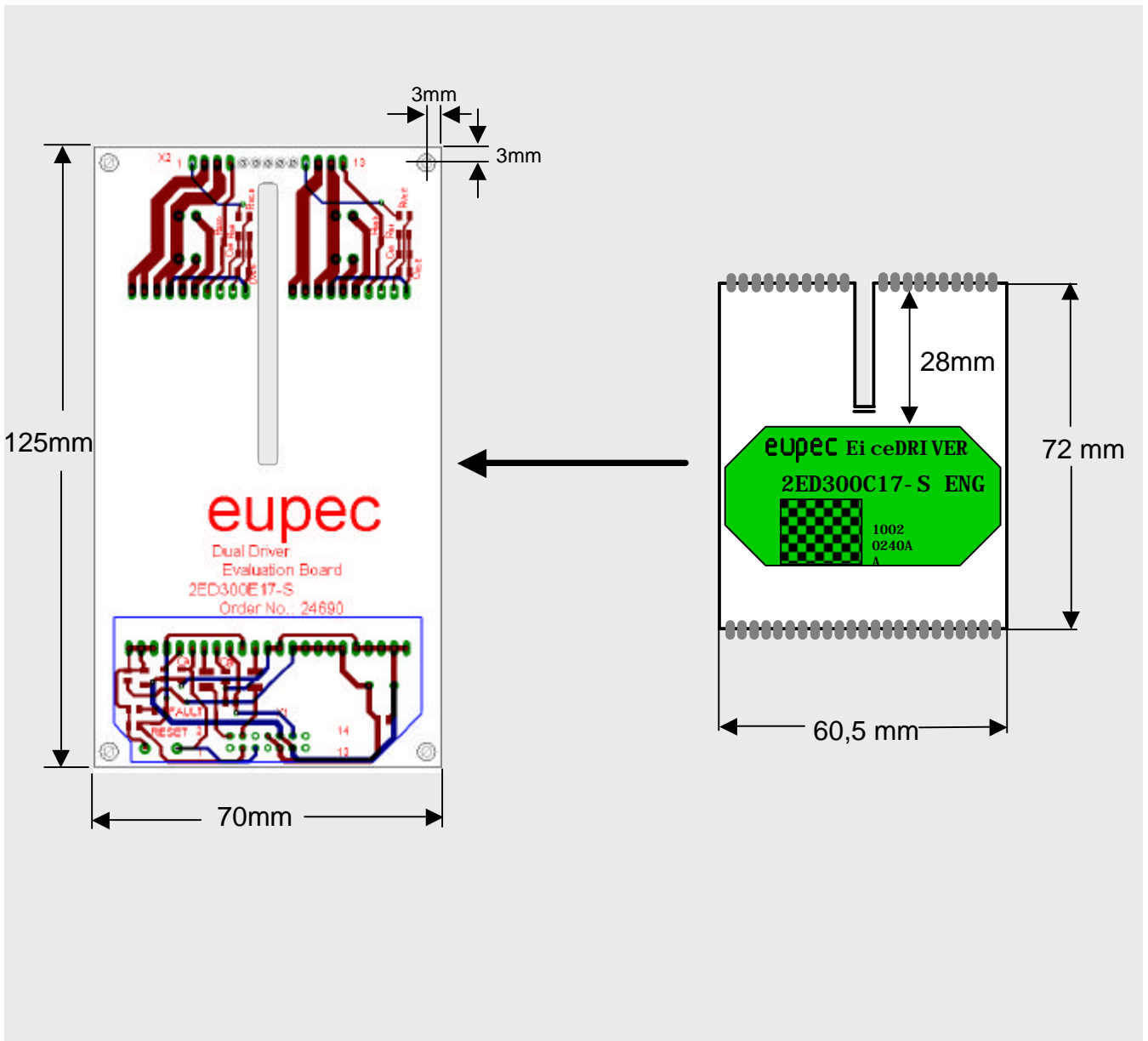


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Mounting and dimensions :

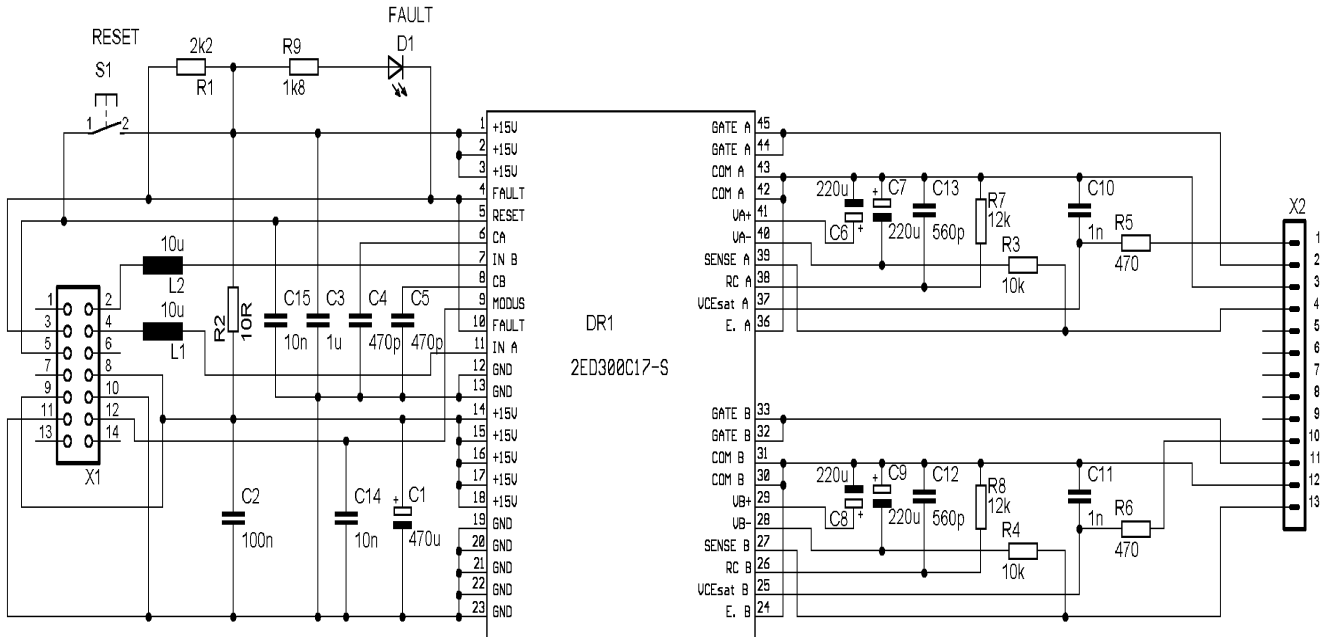
The half-bridge driver 2ED300C17-S is inserted onto the component side of the 2ED300E17-S and soldered cleanly from the back. Make sure not to cause shorts between the pins of the driver. It is important that the driver is inserted as far as possible into the evaluation board.

When mounting the adapter board, make sure that appropriate safety distances are kept between the back of the board and other potentials, as DC-bus voltage is present on the back of the adapter PCB.



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Circuit diagram of the evaluation board 2ED300E17-S:



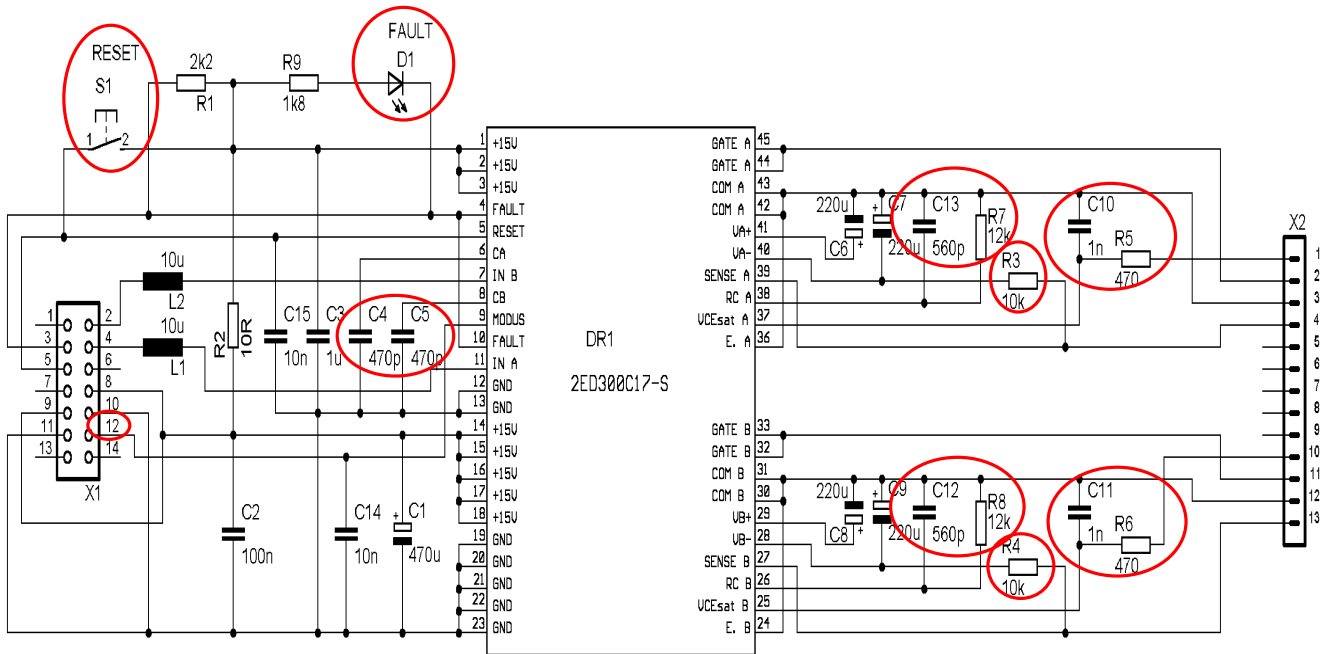
Inputs and Outputs of the 2ED300E17-S

X1		
Pin1	n.c.	
Pin2	IN B;	PWM signal inputs for channel B
Pin3	Fault	The fault output indicates a fault.
Pin4	IN A;	PWM signal inputs for channel A
Pin5	Reset	
Pin6	n.c.	
Pin7	n.c.	
Pin8	+15V±5%	V _{DC} and V _{DD} supply
Pin9	+15V±5%	V _{DC} and V _{DD} supply
Pin10	GND	GND for +15V supply
Pin11	GND	
Pin12	Modus	Input for selection of operational mode. Direct mode GND ; Half-bridge mode +15V
Pin13	n.c.	
Pin14	n.c.	

X2		
Pin1	V _{CE sat} A;	Input saturation voltage monitoring
Pin2	Gate A	Driver output to the gate of the IGBT module via an external gate resistor
Pin3	COM A	Auxiliary emitter
Pin4	Sense A	Control input "soft shut down or for "Active Clamping"
Pin5	n.c.	
Pin6	n.c.	
Pin7	n.c.	
Pin8	n.c.	
Pin9	n.c.	
Pin10	V _{CE sat} B	Input saturation voltage monitoring
Pin11	Gate B	Driver output to the gate of the IGBT module via an external gate resistor
Pin12	COM B	Auxiliary emitter
Pin13	Sense B	Control input "soft shut down or for "Active Clamping"

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Using and adapting:



Reset: Switch S1 and X1/Pin5

By the use of a Reset switch S1 or with a positive edge greater than 10V on X1/5 the driver is reset in case of a fault.

Fault output: LED D1 and x1/Pin3

In case of a fault the red LED is turned on and the the output and corresponding output X1/3 goes to Low (negative logic)

Modus: X1/12

Two modes may be chosen: the half-bridge mode and the direct mode.

The half-bridge mode is activated as X1/12 is connected to +15V

The direct mode is activated as X1/12 is connected to GND.

See also the datasheet of the 2ED300C17-S chapter 3.2

Interlock times : CA and CB

Interlock delay times in the half-bridge mode are set with capacitors C4 and C5. Preset is approx. 4.5µs. See also the datasheet of the 2ED300C17S chapter 3.3

Soft Shut Down: R_{SSD}

The R_{SSD} R4/R3 is preset to 10kOhm. The performance of the SSD depends on the R_{SSD} and has to be adapted. See also the datasheet of the 2ED300C17-S chapter 3.8.

$V_{CE sat}$ Reference curve : C_{SX} and R_{SX}

The $V_{CE sat}$ reference curve for phase U can be set with the components C12,C13 and R7,R8. See also the datasheet of the 2ED300C17-S chapter 3.7

$V_{CE sat}$ Trigger suppression : C_{VCE} and R_{VCE}

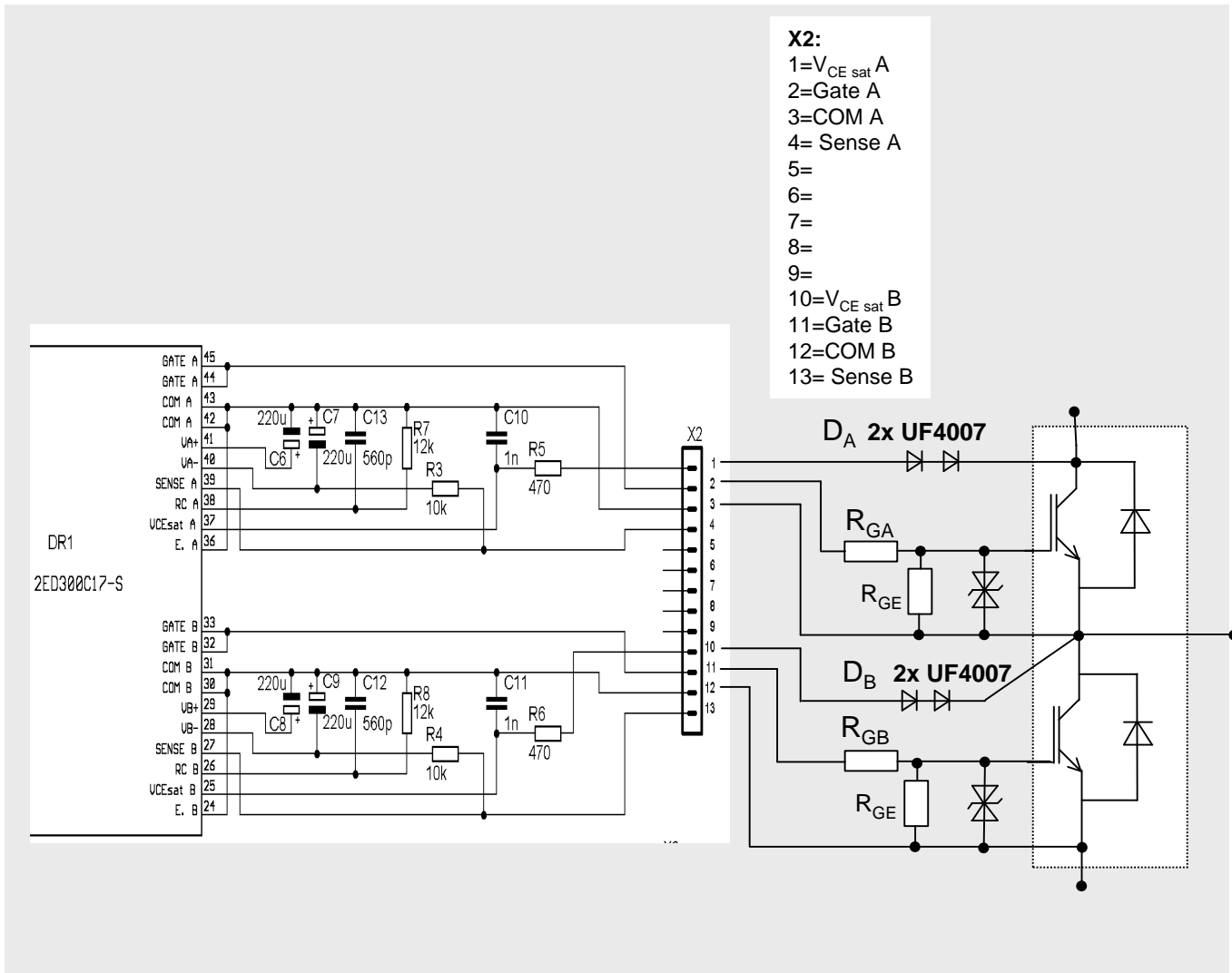
By changing the values of C10, C11 and R5,R6 the trigger level of the $V_{CE sat}$ monitoring can be set.

See also the datasheet of the 2ED300C17-S chapter 3.7.

NOTE ! The PWM inputs have a trigger level of +10V.

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IGBT connection :



Gate resistors as well as gate-emitter clamping should be placed in closest vicinity to the IGBT module.

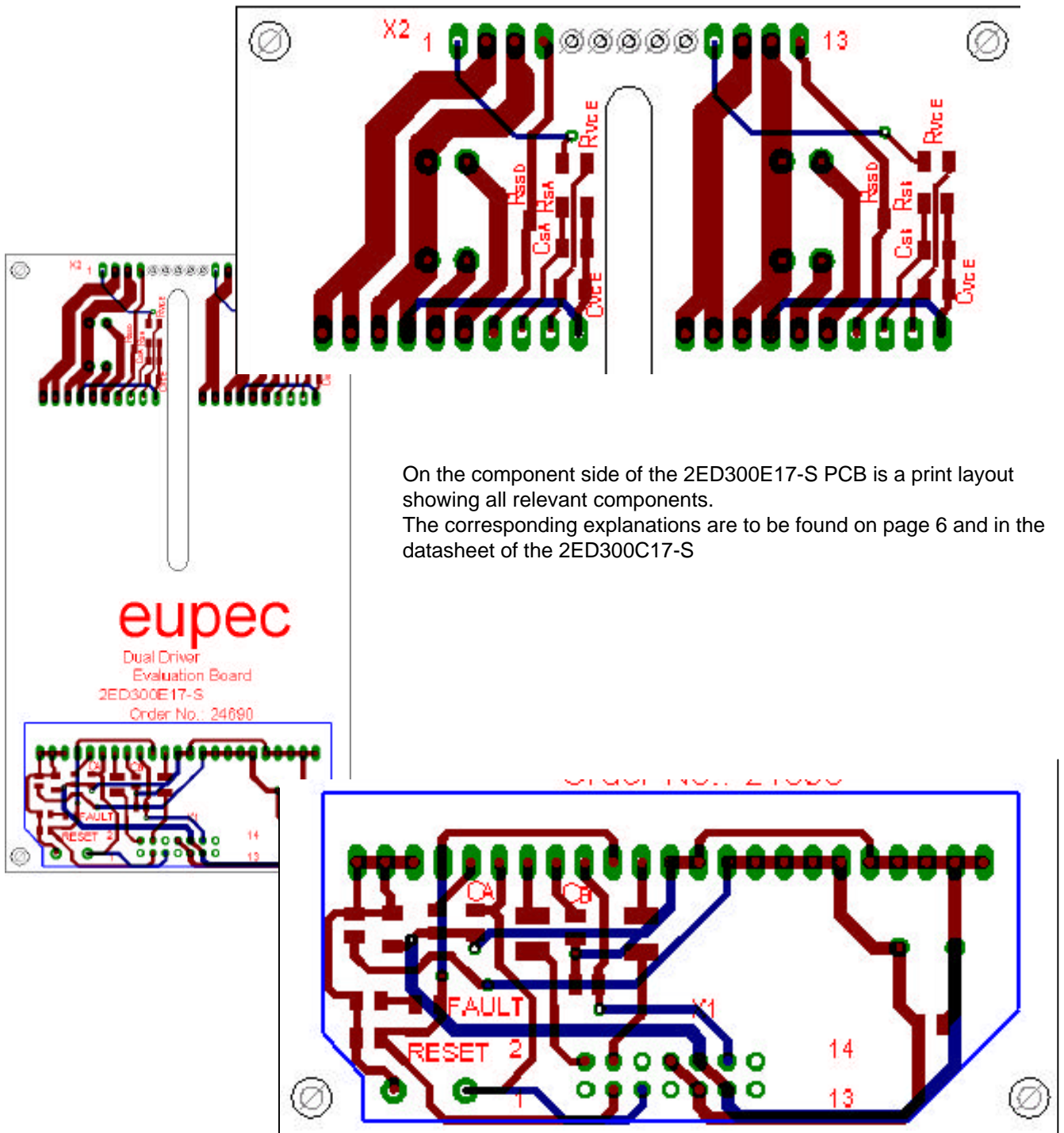
It is equally important to place the collector diodes appropriately. Make sure to be aware of the possible high voltages.

Should an "Active Clamping" as in the datasheet of the 2ED300C17-S chapter 3.10 be used, the sense input is to be utilised.

The plug used for X2 is a "Molex"- type

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Layout and component print :



*EiceDRIVER*TM 2ED300E17-S

Type designation :

*EiceDRIVER*TM eupec IGBT controlled efficiency DRIVER

For example: **2ED300C17-ST**

Insulation class:

F = Base insulated
S = Safe separation
ST = Safe separation / traction

Voltage class:

06 = 600V
12 = 1200V
17 = 1700V and 1200V
33 = 3300V
65 = 6500V

Driver type:

C = Driver core with DC/DC
E = Evaluation board
I = Driver IC (Coreless transformer)
L = Driver IC (Level shifter)

Maximum output current :

e.g.:
004 = 0.4 A
020 = 2.0 A
300 = 30.0 A

eupec IGBT driver

Driver channels

1 = single driver
2 = half-bridge driver
6 = SixPACK driver