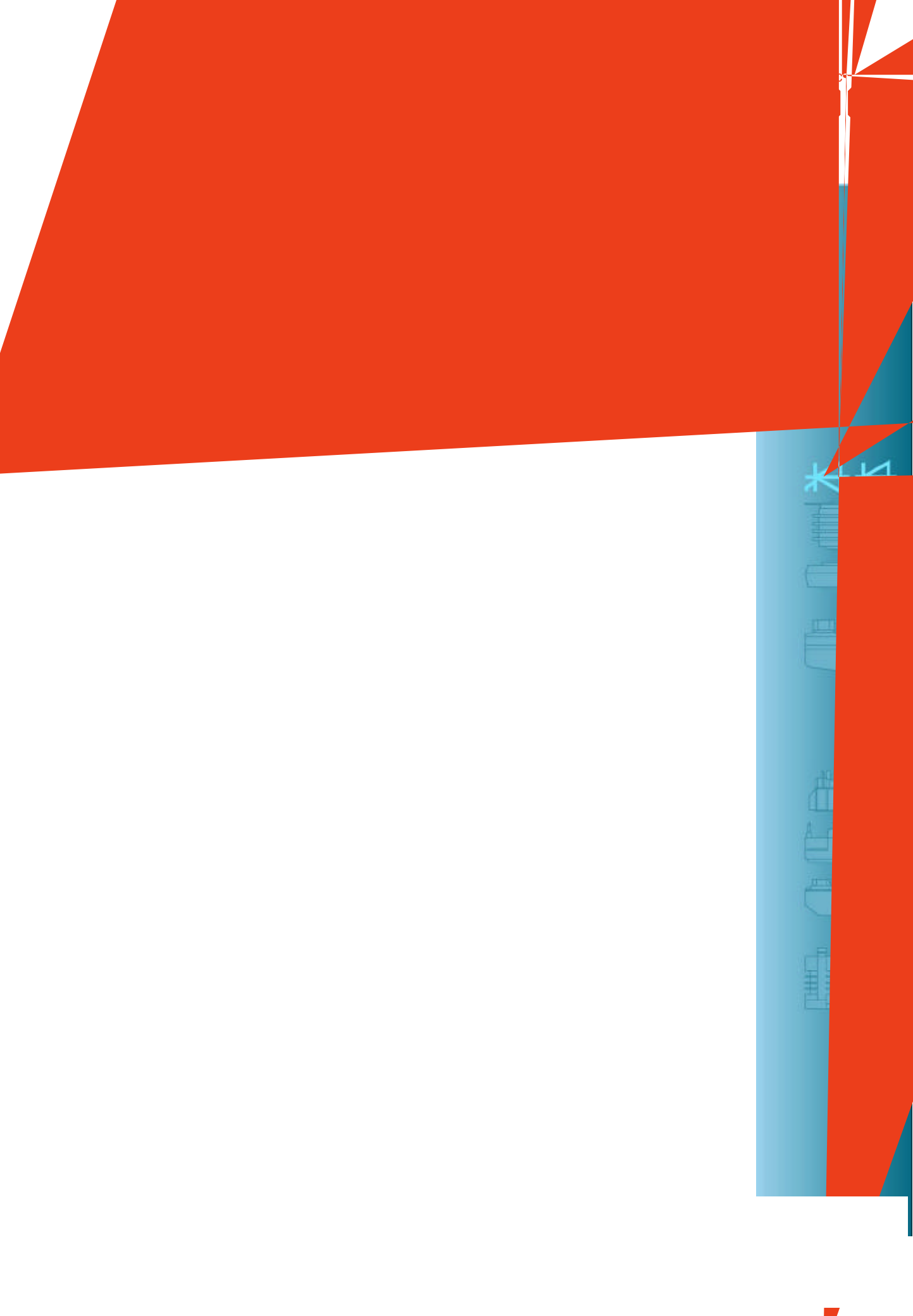

Correspondence of the contents of this document with the described hardware has been checked. Discrepancies may exist nevertheless; no guaranty is assumed for total congruence. The information contained in this document is subject to regular revision. Any alterations required will be incorporated in 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 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 a mother board by soldering. The mechanical strength has to be verified by the user and, if necessary, assured with appropriate tests.
• The drivers are designed for use with eupec IGBT Modules type IHM, EconoPACK+, 62mm. In case of ulterior use, safe operation cannot be guaranteed.

General Information 2ED300C17-S:

This datasheet describes the dual channel IGBT driver 2ED300C17-S for industrial application and the 2ED300C17-ST for traction application. The Drivers are separated in two temperature classes –25°C for the 2ED300C17-S and –40°C for the 2ED300C17ST. The electrical function and the mechanic dimension are in both version similar. Only if there is a different in the types the 2ED300C17-ST is called.
The 2ED300C17-S is one of the *EiceDRIVER*™ driver family. (**e**upec **I**GBT **c**ontrolled **e**fficiency **DRIVER**). The 2ED300C17-S IGBT driver is designed for use with eupec IGBT modules of the 1200V and 1700V series. Functions of the 2ED300C17-S such as the "soft shut down" or the V_{CEsat} reference curves have to be adapted to the individual modules. This is described in the following chapters.

The 2ED300C17-S is designed for applications with high safety and reliability requirements and aims for power ratings of 75kW to 1MW.

To offer high interference suppression, +15V is generally used for control. The entire logic processing is also done with +15V. The integrated transformer is separated into three sections:
Two pulse transformers and a dual channel DC-DC switch mode power supply. These are designed such that they offer lowest coupling capacitances and high isolation stability.
The 2ED300C17-S is additionally equipped with a feed-back "Sense" input. This input can **optionally** be connected with the active clamping or di/dt and dv/dt control.

The clearance and creepage distances comply with VDE0110 and VDE0160 / EN50178 and are designed for pollution degree 3. Materials of the transformer meet requirements of UL94V0. Protection degree IP00.

To protect from undefined switching of IGBTs in case of a gate-emitter short circuit of another IGBT, the supply voltage $V_{A;B+}$; $V_{A;B-}$ is internally monitored in the driver for short circuit currents. In case of a gate-emitter short the secondary circuit is interrupted and thus the primary voltage maintained.

Exclusion clause:

The datasheet is part of the eupec IGBT driver 2ED300C17-S. To guaranty safe and fault free operation it is **necessary** to have read and understood this datasheet.
The eupec IGBT driver 2ED300C17-S is only intended for control of eupec IGBT modules. The company eupec GmbH cannot warrant against damage and/or dysfunction if IGBT modules used not produced by eupec.
In this context, eupec GmbH retains the right to change technical data and product specifications without prior notice to the course of improvement.

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1.2 Features

- Dual channel IGBT driver 2ED300C17-S
- For 1200V / 1700V eupec IGBT modules
- $V_{CE\ sat}$ monitoring
- “Soft Shut Down” for fault conditions
- Save electrical isolation according to EN50178
- Integrated DC-DC SMPS
- High peak output current
- ±15V secondary drive voltage
- Short signal transition time
- Optional “**Sence”** function
- High RFI immunity

1.3 Key data

°C

1.4 Block 95

1.7 Maximum permissible values

Supply voltage V_{DC}	Maximum primary supply voltage	+16	V
PWM signal input voltage V_{in}	Max. voltage on inputs IN A; IN B	±20	V
Logic signal input voltage V_{iH}	Max. voltage (Mode; Reset)	±20	V
Logic signal output current I_{OC}	Fault output; max. continuous current open collector	20	mA
Peak output current ON $I_{G\ on}$	Max. driver peak output current	+30	A
Peak output current OFF $I_{G\ off}$	Max. driver peak output current	-30	A
Output current summed maximum $\|I_{out}\|_{AV}$	Average value of the summed output current values per channel [1)]	133	mA
Maximum output power $P_{DC/DC}$	$P_{DC/DC}$ channelA + channel B	8	W
Maximum IGBT voltage V_{CES}	Maximum collector-emitter voltage on IGBT	1700	V
Isolation test voltage $V_{isol\ IO}$	Input- Output (RMS, 50Hz, 1s)	5000	V~
Isolation test voltage $V_{isol\ 12}$	Input A- Output B (RMS, 50Hz,1s)	2250	V~
Surge voltage test $V_{isol\ Su}$	Surge test according to EN50178 Input to Output	9600	V
Gate resistor $R_{g\ min}$	Min. gate resistor (module internal + external gate resistor)	1	Ω
Gate capacity $C_{ies\ max}$	Maximum IGBT gate capacity	350	nF
dv/dt	Voltage slew rate secondary to primary site	50*	kV/ µs
T_{op}	Operating temperature 2ED300C17-S	-25.....+85	°C
T_{op}	Operating temperature 2ED300C17-ST	-40 .....+85	°C
$T_{sto.}$	Storage temperature	-40 .....+85	°C
$f_{s\ max}$ switching frequency	Max. switching frequency(T_{op}<65°C $P_{DC/DC}$=8W)	60'000	Hz
Supply current $I_{DC\ max.}$	Maximum continue permissible current draw of the dual driver	533	m A
$t_{TD\ min}$ min. interlock delay time	Factory set delay time in half-bridge mode	1,6	µs
d duty cycle	Maximum duty cycle	100	%

* during test

• 133mA refer to gate input and additive ancillary voltage (see chapter 2.10)
$|I_{out}|_{AV} = |I_G|_{AV} + I_{out}$

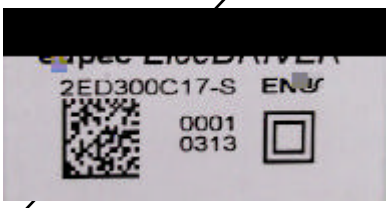
1.8 Characteristic values

All values at +25°C	Min.	Typ.	Max.	Recommend.	
V_{DC} supply voltage primary DC-DC	+14	+15	+16	+15V	V
I_{DC} current draw DC-DC		80			mA
I_{DC} current consumption DC-DC (V_{DC}=+15V $P_{DC/DC}$=8W)			525		
P_{DC-DC} power DC-DC SMPS			8		W
V_{DD} supply voltage electronics	+14	+15	+16	+15V	V
I_{DD} current draw electronics		8			mA
f_S switching frequency	0		60		kHz
$T_{pd\ on}$ signal transition time switch on		670			ns
$T_{pd\ off}$ signal transition time switch off		580			ns
t_{dif} transition time differences		50			ns
t_{md} Minimal puls suppression		400			ns
d duty cycle	0		100		%
Reference voltage for the $V_{CE\ sat}$ – monitoring **V_{CEstat}**	2		9	8[3)]	V
Threshold logic and signal level **(IN A/B; Reset; Mode)** **V_{Level}**		+8		+15	V
Reactivation after fault condition and IN A/B Low[2)] **t_{BK}**	50			60	ms
Interlock delay time in half-bridge mode **t_{TD}**[4)]	1,6				µs
Coupling capacity primary/secondary **C_{ps}**		18			pF
Coupling capacity sec. channel A to B **C_{ss}**		15			pF

1) "Conditions to be defined"
2) See chapter 2.4
3) See chapter 2.7
4) See chapter 2.3
5) See chapter 2.6

Max. switching frequency: $$f_{S\max.} = \frac{I_{outAV}(mA)}{Q_G(\mu C)\cdot 1{,}5}$$

f_{max}= maximum switching frequency
I_{outAV}= average cont. output current per channel
Q_G= maximum IGBT gate charge at 30V
1.5= tolerance factor



Clearance distance and creep page Primary/ Secondary	>15	mm
Clearance distance Secondary/ Secondary	>6	mm
Creep page Secondary/ Secondary	>14	mm

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EiceDRIVER™ 2ED300C17-S

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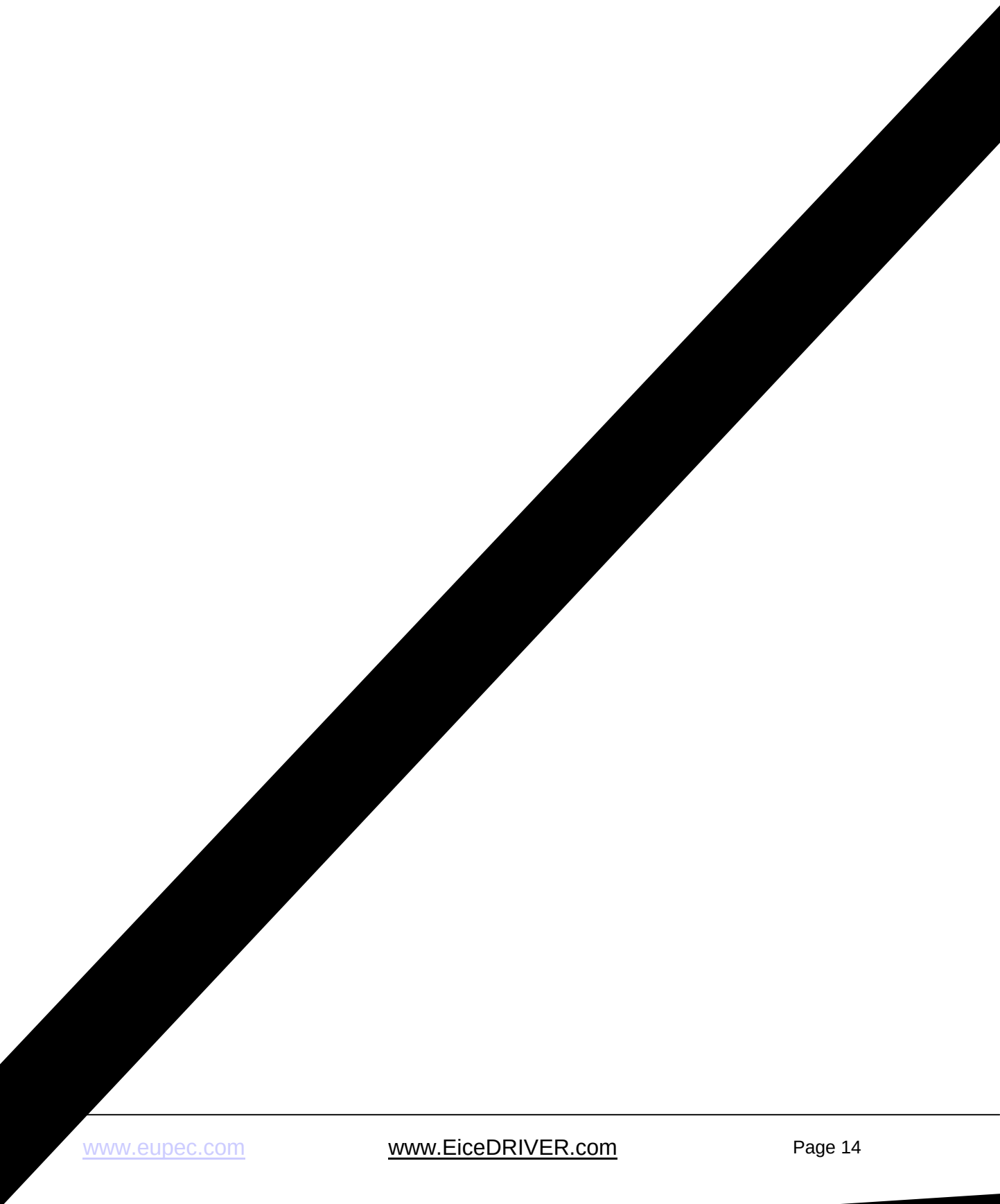

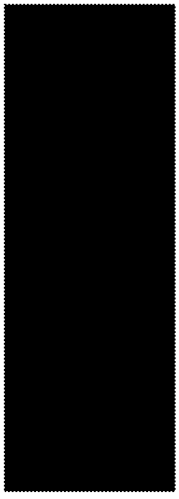

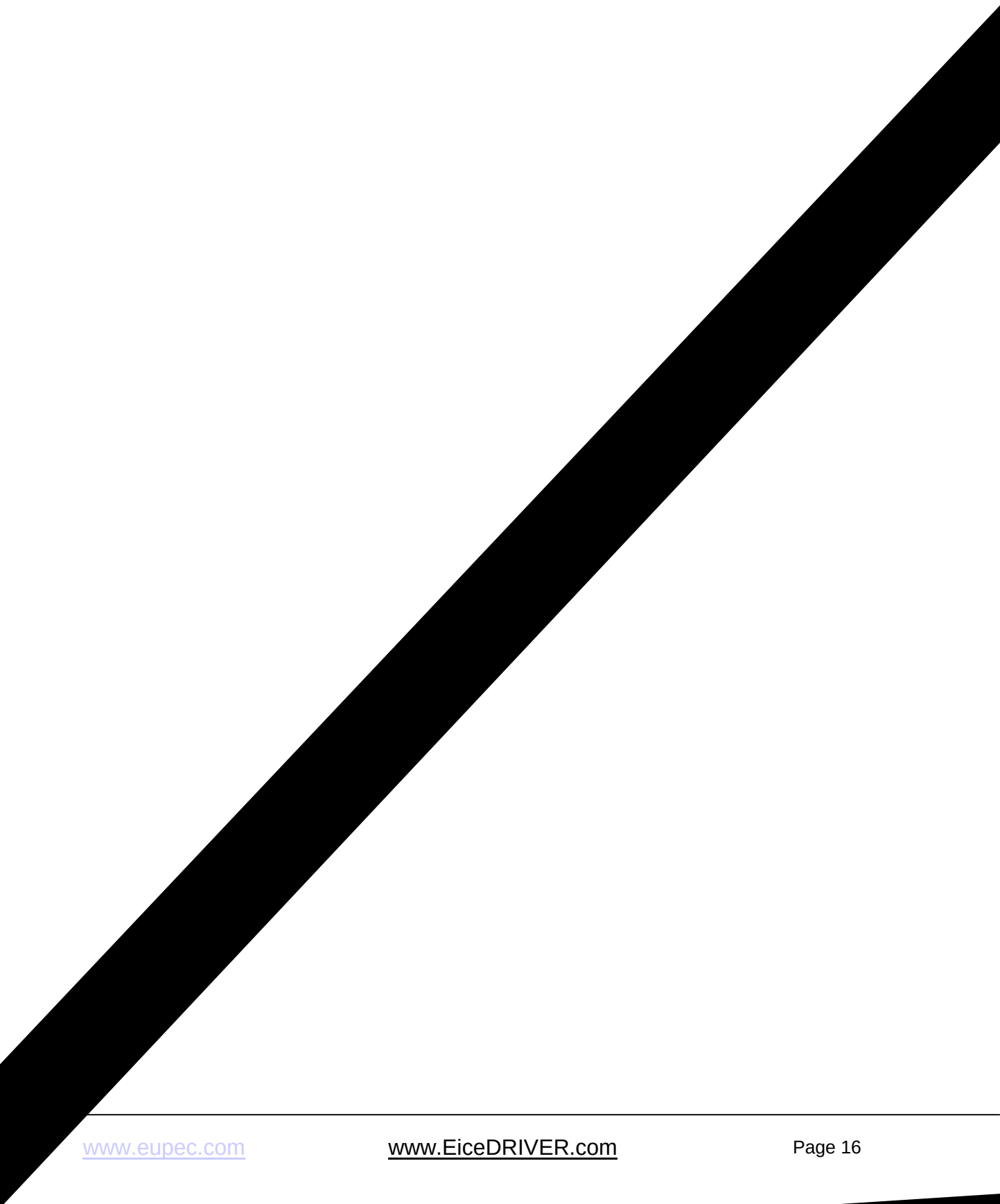

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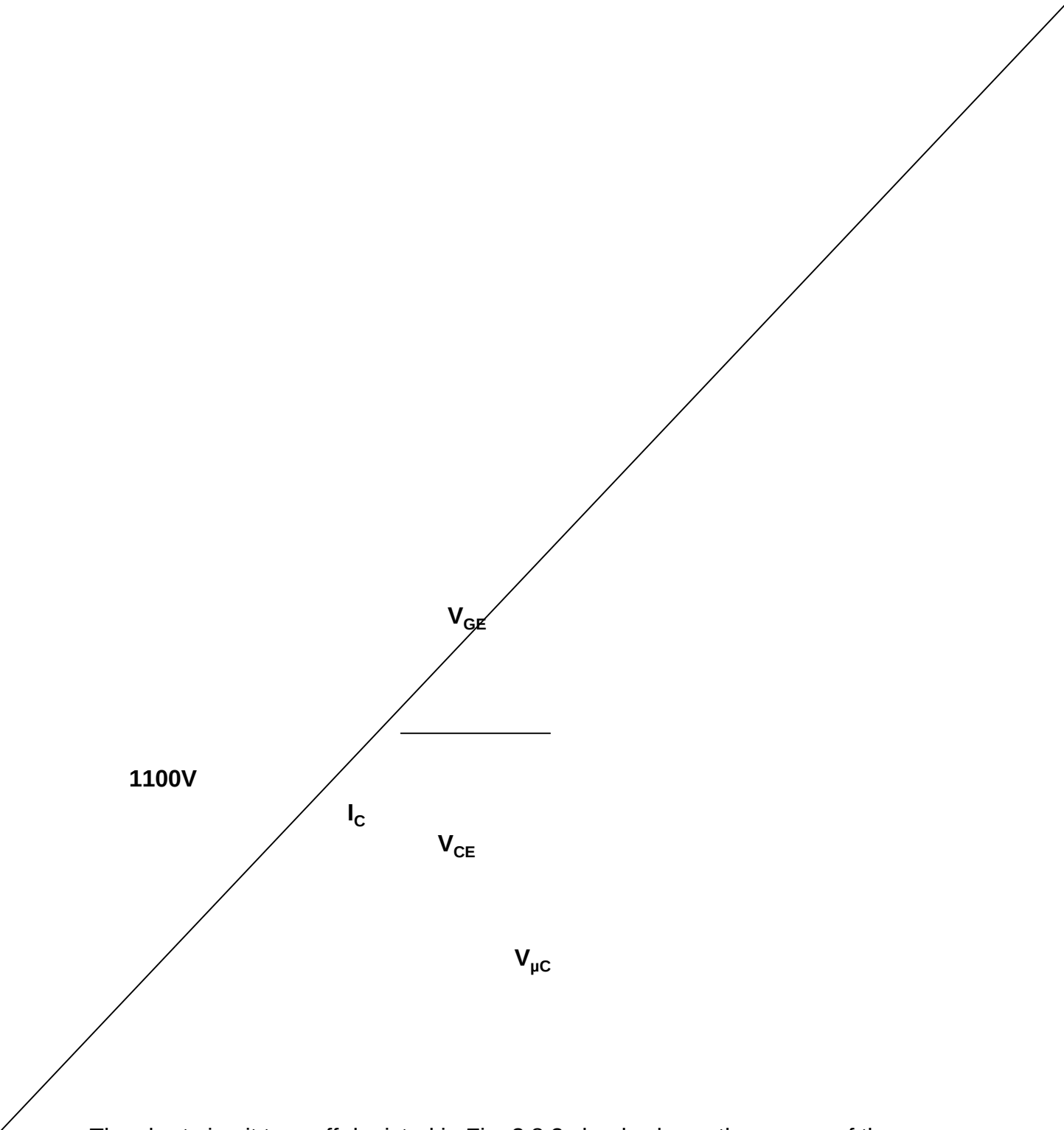
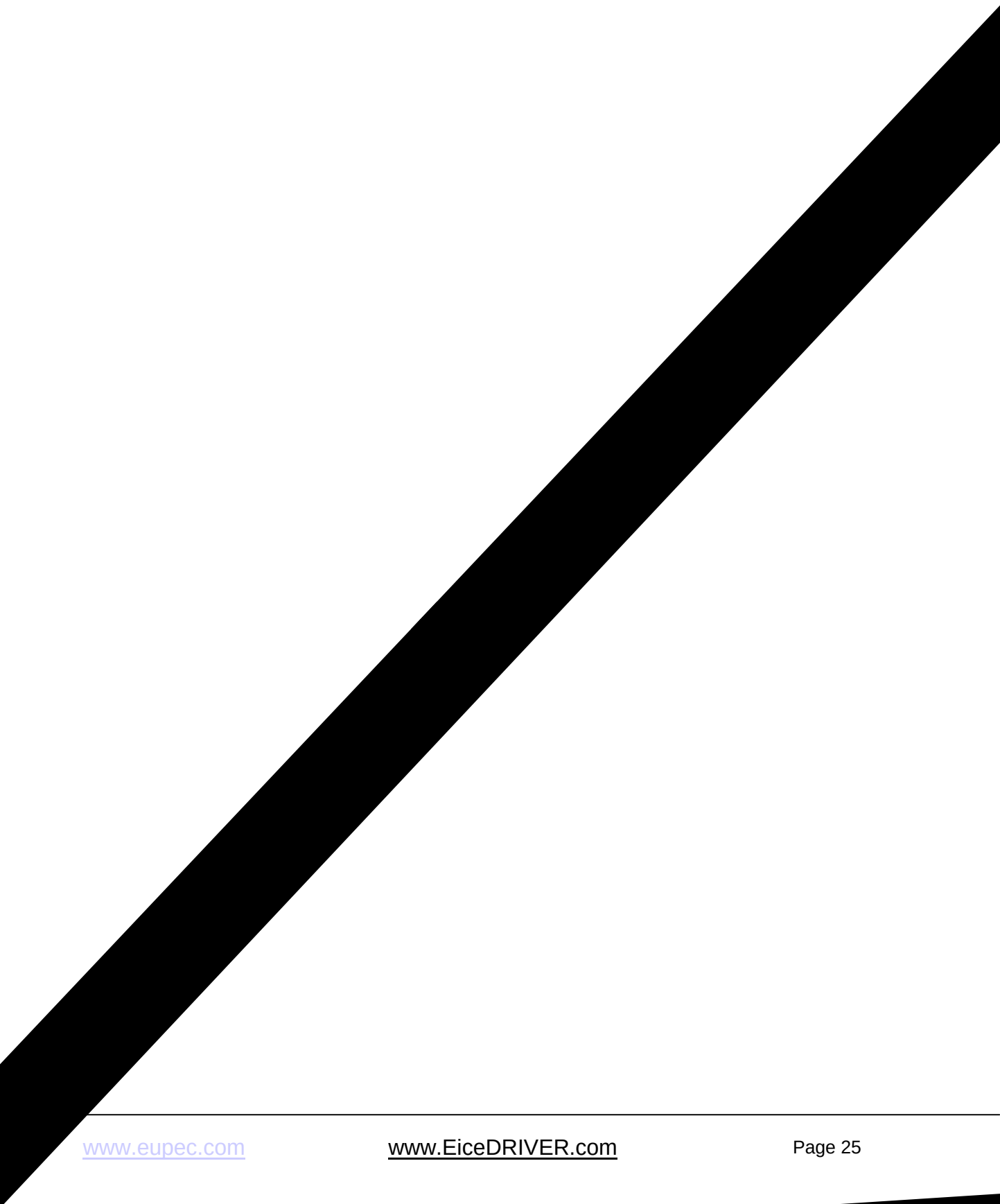


The short circuit turn-off depicted in Fig. 3.8.2 clearly shows the course of the Gate-Emitter voltage with SSD.

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