

## IGBT DUAL DRIVER MODULES

Two versions are available

either for " DM " DIRECT- Mode or " HB " HALF-BRIDGE MODE

### DDHV2-DM DIRECTMODE

#### Application Note

#### DUAL Drive of TWO fully independent IGBT's - DIRECT -

#### FEATURES

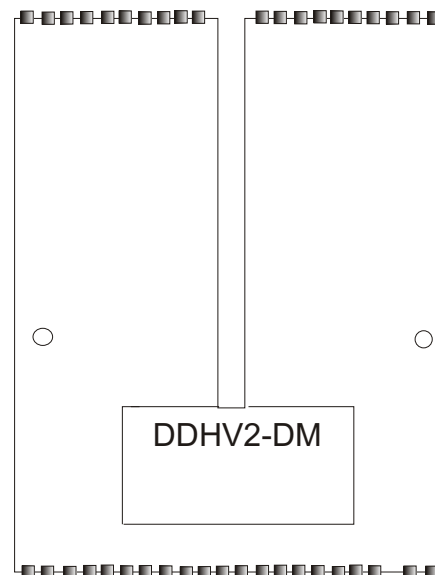
- NPT-SPT & Trench 1200V IGBT's
- CH A & B electr. fully isolated
- Vce SAT monitoring each CH with error flag report
- suitable for existing interface cards
- Gate current +/-16A peak
- Electrical isolation 6 kV
- Partial Discharge free isolation up to 1,7kV rms
- UVLO monitoring both CH
- switching frequency > 100kHz
- input duty cycle 0 to 100%
- built in isolated DC/DC power supply

#### KEY PARAMETERS

- Supply voltage 15V +/-5%
- Drive voltage 15V
- drive power 2 x 3W total 6W
- peak gate drive current +/-16A
- bipolar output stages

#### APPLICATIONS

- industrial drives
- multilevel converters
- power supplies
- inverters



See also [www.floeth-electronic.com/IGBT-drivers](http://www.floeth-electronic.com/IGBT-drivers)

The information presented herein is provided in good faith but it is the users responsibility to determine the performance suitability in actual drive solution applications.

## DDHV2-DD APPLICATION NOTE

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### ABSOLUTE MAXIMUM RATINGS

Stress above those listed below may cause permanent damage to the device!  
 Longer exposure to the limits may affect device reliability as well.

T case +25°C unless stated otherwise.

Symbol	Parameter	Test Condition	Min.	Max.	Unit
V DC	supply voltage	V DC against GND		16	V
I out	Gate peak current	470nF via 1 ohm		16	A
I DC max	max. supply current	@ V in 15V		600	mA
P out	output power	each segment		3	W
Pout tot	output power	both segments		6	W
V in	Input/supply Voltage	15V	-0,3	16	V
V err out	error flag outp voltage			16	V
I out	sink current err flag outp	activated L		50	mA
f oper	operating frequency	depends on load char.		150	kHz
V iso.	Isolation test voltage			5	kV
V iso.	Partial discharge free			1400	VAC
T amb	ambient temp for	/I industrial	-40	+70	°C
		/A automotive	-55	+85	°C
T stg	storage temp range		-55	+95	°C

### ELECTRICAL CHARACTERISTICS -POWER SUPPLY

T amb. 25°C and V in = 15V DC unless otherwise stated

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V in DC	nominal suppl. Voltage	V DC to GND	14,25	15	15,75	V
UVLO	UVLO threshold			12,5		V
I DC	supply current	zero load		0,11		A
P in	total power consump.	Zero load		1,65		W

### DRIVE SIGNAL INPUTS

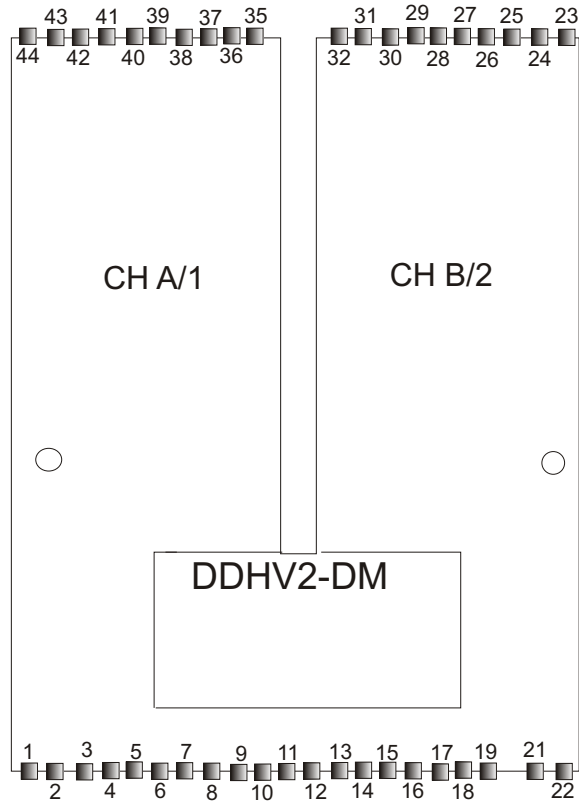
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V IN H	INPUT H-LEVEL voltage	--	3,8	15	18	V
V IN L	INPUT L-LEVEL voltage	--	-0,3	0	0,8	V

### DRIVE SIGNAL OUTPUTS

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
t d on	Turn On delay time	refer to fig.		325		ns
t d off	Turn Off delay time			180		ns
t l r	Outp. Current rise time			100		ns

ELECTRICAL INSULATION		Test conditions	min.	Typ	max.	Unit
Operating voltage	standard	continously			1200	V
	extended	continously			1500	V
isolation test voltage	standard	50Hz/ 5sec. max.			4000	V
	extended	50Hz/ 5sec. Max.			6000	V
partial discharge free isolation	std.	<10pC			1400	V
	ext.	<10pC			1700	V
creepage	Prim/ sec. standard				13	mm
	CH A /CHB standard				13	mm
	Prim/ sec. extended				16	mm
	CHA /CHB extended				16	mm
Insulation dv/dt					100	kV/μs

## DDHV2-DM Pin Configuration



## DDHV2-DM series application note

### Pin Connections

Pin.No.	Description	Note
1	V DC	+15V for small signal section. Decoupling Cap required
2	V DC	+15V for small signal section. Decoupling Cap required
3	ER FLG 1	Error flag output CH A/ 1
4&5	N.C.	
6	INPUT B/2	Drive Input CH B/2 is turned ON when H
7&8	N.C.	
9	ER FLG 2	Error flag output CH B/ 2
10	Input A/1	Drive Input CH A/1 is turned On when H
11 & 12	GND	Small signal GND
13 -17	V DC	+15V for Input supply /DC-DC converter 470µF Cap req.
18-22	GND	Power GND
23	N.C.	
24	V C /DES CH B/2	monitoring input with REF to COM via HV-blocking diode
25	R TH CHB/2	Ref level set by Z-diode
26&27	E CH B/2	Emitter CH B/2
28	+V DC Out CH B/2	100µF/20V decoupling cap
29&30	COM CH B/2	Virtual COM CH B/2
31&32	G CH B/2	Gate CH B/2
33&34	omitted	
35	N.C.	
36	V C/DES CH A/1	
37	R TH CH A/1	REF Level set by Z-diode
38 &39	E CH A/1	Emitter CH A/1
40	+V DC Out CH B/2	100µF/20V decoupling cap
41&42	COM CH A/1	Virtual COM CH A/1
43&44	G CH A/1	Gate CH A/1

## DDHV2-DM Application note

### Introduction

The DIRECT MODE driver offers a complete solution for driving and protecting TWO independant IGBT's - in voltage conversion applications- requiring few periphel components and can be operated to 150kHz.

### Pin DESCRIPTION and requirements

Usually the pin groups for Input +15V pin 1&2; 13 to 17 are interconnected same for Input GND pin 11&12 further 18 to 22

A Input buffer Elco capacitor of 470µF/20V between Input GND and +15V IN is MANDATORY.

Between Pin 28 isolated +15V DC Out CH B/2 and 29&30 Virtual COM CH B/2 we suggest to implement a OSCON 100µF/20V

same for the other Channel

between Pin 40 isolated +15V DC Out CH A/1 and 41&42 Virtual COM CHA/1

Pin 24 CH B/2 and Pin 36 CH A/1 are V CE/DES monitoring inputs to detect short or Out of Sturation.

To be connected via suitable blocking diode and attenuation 68R to related Collector.

Pin 25 CH B/2 and Pin 37 CH A/1 RTH =Referenz-Threshold resistor or Z-Diode The protection function becomes active when voltage at PIN 24 or 37 V CE is higher than the set Threshold voltage at Pin 25/37

$V_{TH} = 12,995 \times (R_{TH}/R_{TH} + 56)$  Result in VOLTS ( where RTH in Kohms)

this value can be used use a proper Z-diode against "Virtual COM"

or

calculate to find the right Resistor value in kohms

$R_{TH} = 56 / (12,995/V_{TH} - 1)$  to be connected against "Virtual COM"

Pin 26&27 E CH B/2 and Pin 39&40 E CH A/1 to be connected to the aux E-terminal

Pin 31&32 G CH B/2 and Pin 39&40 G CH A/1

deliver a max- +/-16A peak current and shall be conected via proper Gate resistors to the respective Gate. (Take the internal IGBT gate resistance in account)

Gate overshoots and ringing due to Miller and parasitic inductance Gate shall be protected via 18V Zener or Transils against Emitter in both directions

Emitter terminals never to be connected to any virtual COM!

Pin 6 Logic Input CH B/2

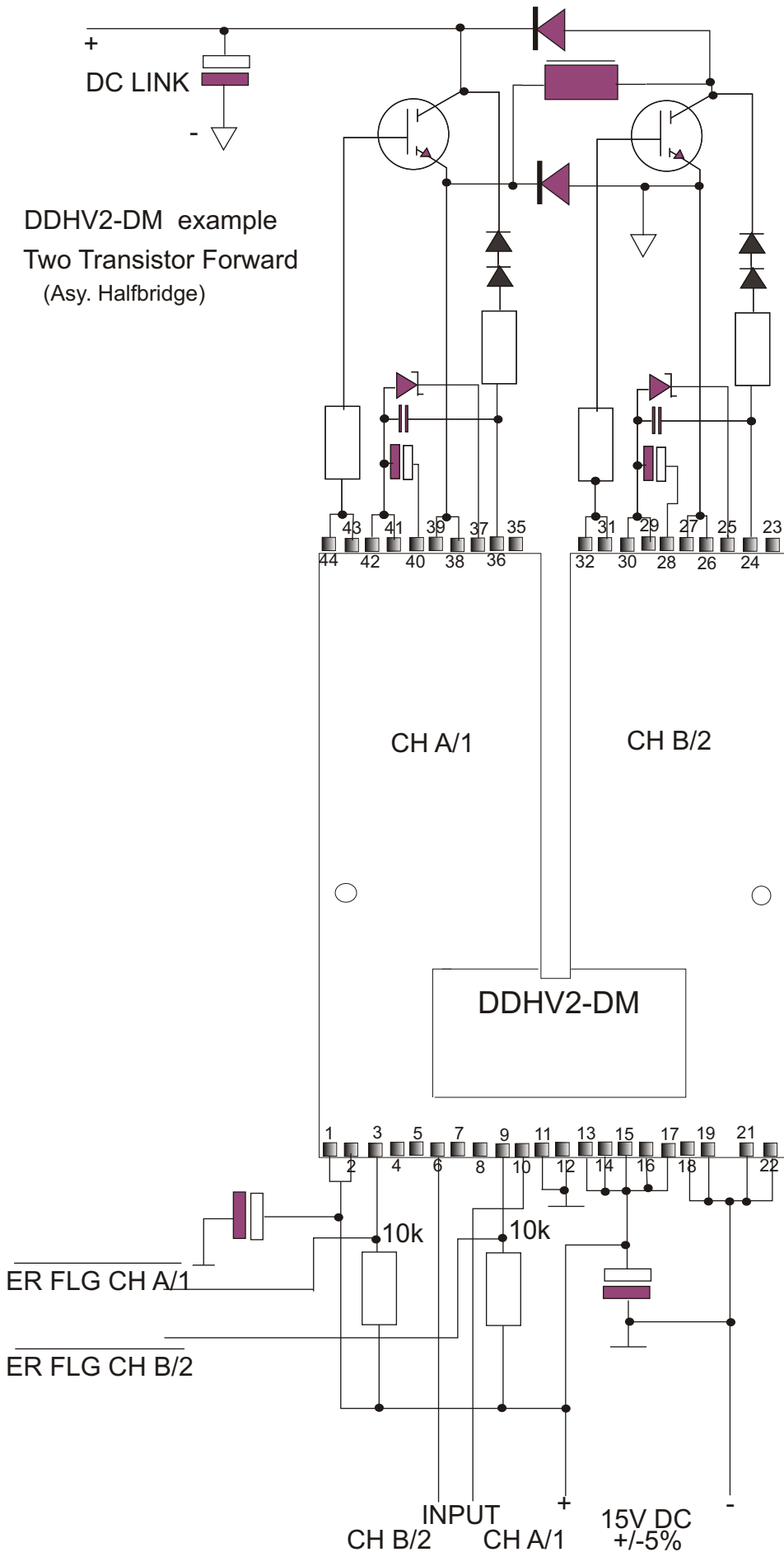
Truth table	L	OFF
	H	ON

Pin 10 Logic Input CH A/1

L	OFF
H	ON

Pin 3 ER FLG CH A/1 and Pin 9 ER FLG CH B/2

to be connected via 10k pull up R to +15V in normal operation H in error mode L for 2,5µs

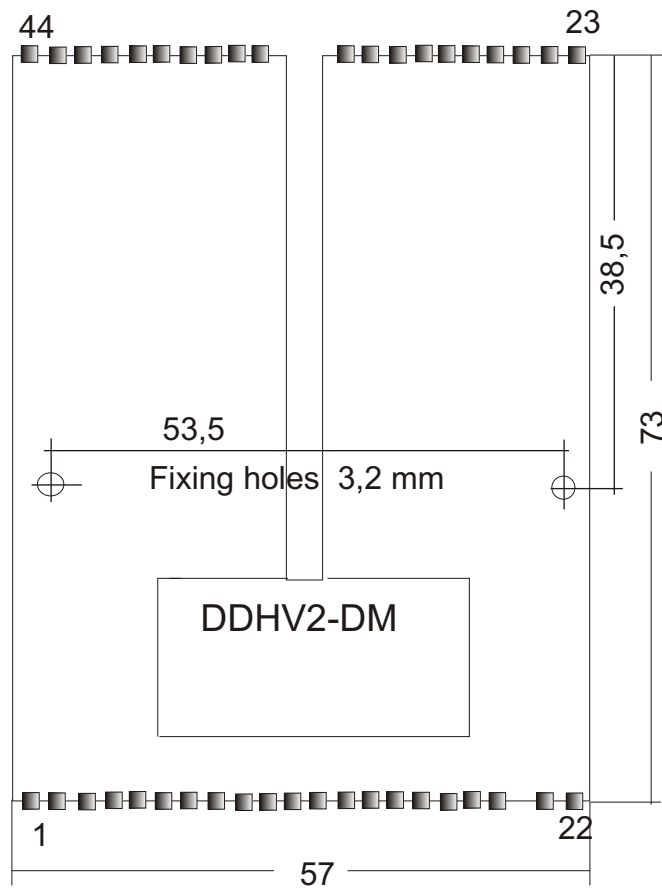


## DDHV2-DM Application note

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### MECHANICAL DIMENSIONS

Pin grid 2,54 mm



PCB material FR 4

All materials acc. UL safety regulations