

## A1EDB2V Data Sheet

### Abstract

The A1EDB2V is a high-performance, dual-channel SiC gate driver adaptor board based on intelligent chip technology by Firstack. It supports SiC modules up to 1700V. The A1EDB2V need to be used with 2FHD0620, which can flexibly match 1~3 SiC modules. The A1EDB2V integrates driver protection, intelligent fault management, distributed NTC sampling and other functions, and is suitable for EconoDual. The A1EDB2V is mainly used in ESS, motor drives, rail and other high reliability fields.

### Highlights:

- Support max. 4 in parallel
- Support up to 1700V SiC module
- Distributed NTC sampling
- Short-circuit protection(soft shut down)
- Miller clamping
- Configurable drive voltage
- Intelligent fault feedback
- UVLO

### Applications:

- ESS
- Motor drives
- Rail

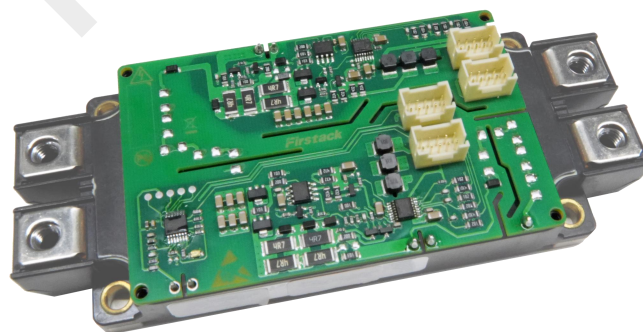


Fig.1 A1EDB2V-S0101

Functional Block Diagram

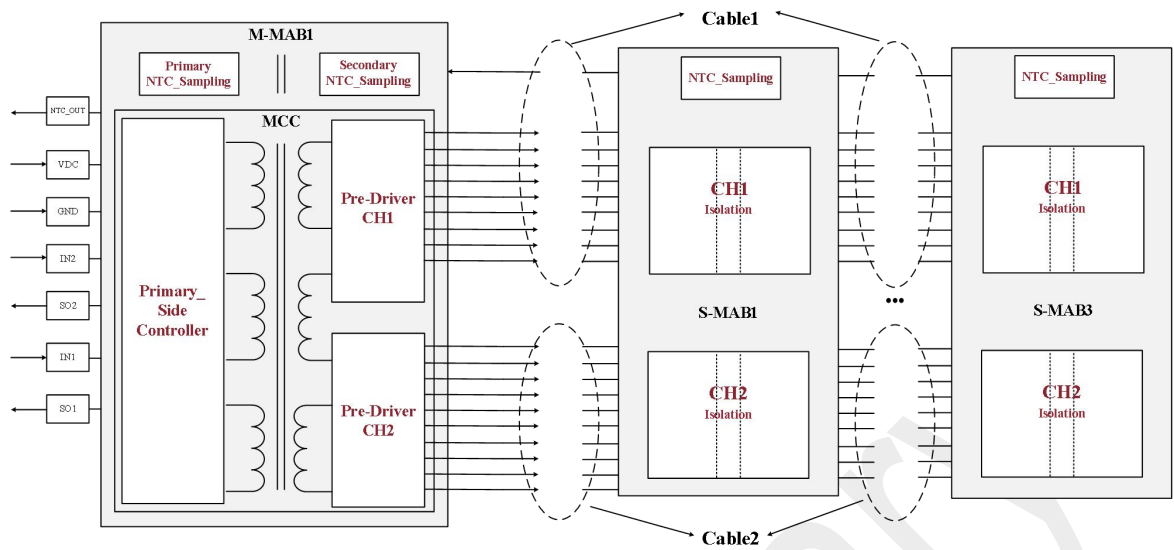


Fig.2 Functional block diagram

Connector Interface Designation

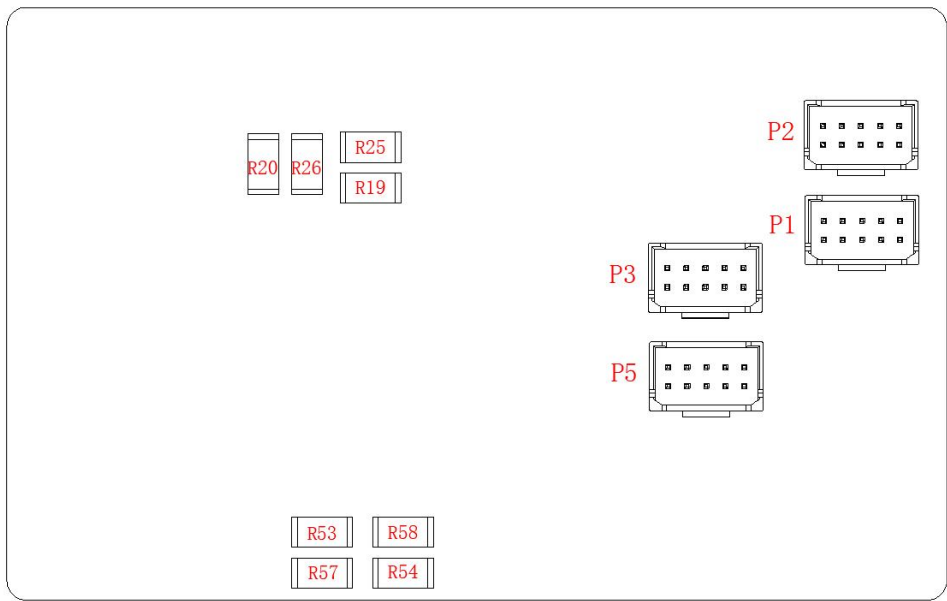
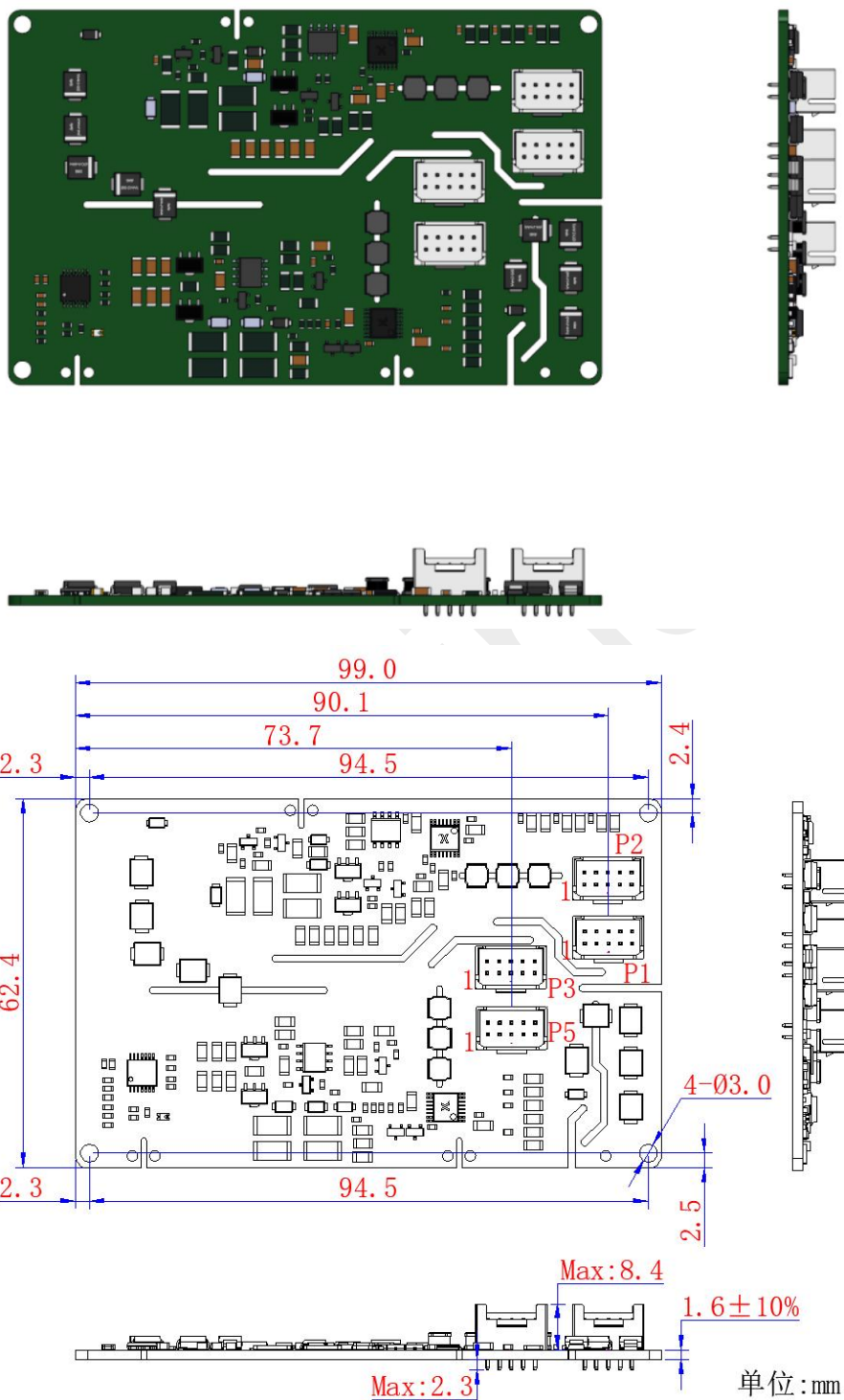


Fig.3 Connector interface location

Gate Resistor Change Instructions

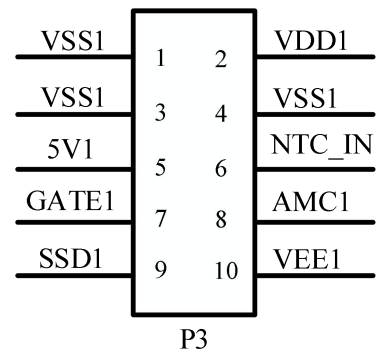
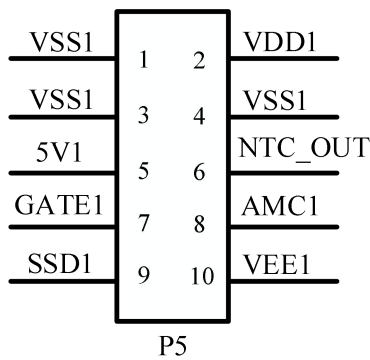
Resistor	Definition
R20,R26 & R54,R58	Turn-on resistor
R19,R25 & R53,R57	Turn-off resistor

## 3D and Mechanical Dimensions

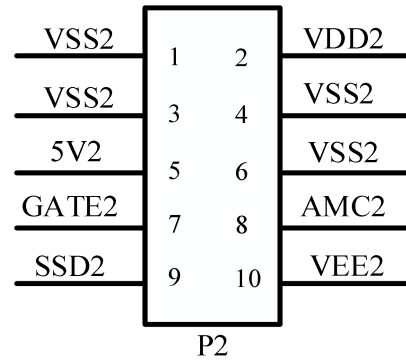
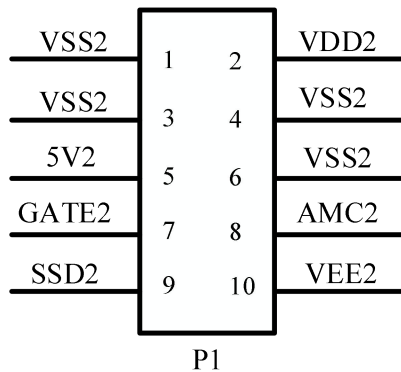


Note: 1. The thickness tolerance of the board is  $\pm 10\%$ ;

2. Other dimensional tolerances refer to GB/T1804-m.

**P3,P5 terminals pin designation(2FHD0620 channel 1)**

P5	Definition	Function	P3	Definition	Function
1	VSS1	Secondary side negative supply channel 1	1	VSS1	Secondary side negative supply channel 1
2	VDD1	Secondary side positive supply channel 1	2	VDD1	Secondary side positive supply channel 1
3	VSS1	Secondary side negative supply channel 1	3	VSS1	Secondary side negative supply channel 1
4	VSS1	Secondary side negative supply channel 1	4	VSS1	Secondary side negative supply channel 1
5	5V1	Secondary side 5V supply channel 1	5	5V1	Secondary side 5V supply channel 1
6	NTC_OUT	NTC sampling output signal channel 1	6	NTC_IN	NTC sampling input signal channel 1
7	GATE1	Gate drive signal channel 1	7	GATE1	Gate drive signal channel 1
8	AMC1	Miller clamping signal channel 1	8	AMC1	Miller clamping signal channel 1
9	SSD1	Soft shut down signal channel 1	9	SSD1	Soft shut down signal channel 1
10	VEE1	Secondary side ground channel 1	10	VEE1	Secondary side ground channel 1

**P1,P2 terminals pin designation(2FHD0620 channel 2)**

P1	Definition	Function	P2	Definition	Function
1	VSS2	Secondary side negative supply channel 2	1	VSS2	Secondary side negative supply channel 2
2	VDD2	Secondary side positive supply channel 2	2	VDD2	Secondary side positive supply channel 2
3	VSS2	Secondary side negative supply channel 2	3	VSS2	Secondary side negative supply channel 2
4	VSS2	Secondary side negative supply channel 2	4	VSS2	Secondary side negative supply channel 2
5	5V2	Secondary side 5V supply channel 2	5	5V2	Secondary side 5V supply channel 2
6	VSS2	Secondary side negative supply channel 2	6	VSS2	Secondary side negative supply channel 2
7	GATE2	Gate drive signal channel 2	7	GATE2	Gate drive signal channel 2
8	AMC2	Miller clamping signal channel 2	8	AMC2	Miller clamping signal channel 2
9	SSD2	Soft shut down signal channel 2	9	SSD2	Soft shut down signal channel 2
10	VEE2	Secondary side ground channel 2	10	VEE2	Secondary side ground channel 2

## Technical Parameters

### Recommended Operating Conditions

Parameter	Remarks	Min	Typ	Max	Unit
Static loss per channel	Without load		0.5		W
Output power per channel	Full load		1		W
Peak current per channel		-15		20	A
Operating temperature		-40		85	°C
Storage temperature		-40		85	°C

### Gate Parameters

Output voltage	Remarks	Min	Typ	Max	Unit
Total gate voltage	$V_{GSon}-V_{GSoff}$	19.5	22	24.5	V
Gate positive voltage $V_{GSon}$	Turn on (ON)	14.5	18	19.5	V
Gate negative voltage $V_{GSoff}$	Turn off (OFF)	-9.5	-4	-0.5	V

### Short-Circuit Protection

Parameter	Remarks	Min	Typ	Max	Unit
$V_{DS}$ monitoring threshold	Short-circuit protection threshold	Configurable	11	Configurable	V
Response time	Note 1	Configurable	1.2	Configurable	μs
Soft shut down time		Configurable	6.24	Configurable	μs

### Miller Clamping

Parameter	Remarks	Min	Typ	Max	Unit
Time from drive signal turn-off to clamp turn-on		Configurable	1.04	Configurable	ns
Time from clamp turn-off to drive signal turn-on			500		ns
Clamp voltage			VSS (negative voltage)		

**Timing Characteristics**

Parameter	Remarks	Min	Typ	Max	Unit
Turn-on delay	Note 2		1.2		μs
Turn-off delay	Note 3		1.3		μs
Rise time	Note 4		12		ns
Fall time	Note 5		12		ns

**Electrical Isolation**

Parameter	Remarks	Min	Typ	Max	Unit
Creepage distance	Secondary to secondary side, Note 6		12		mm
Clearance distance	Secondary to secondary side		6		mm

**NTC Sampling**

Parameter	Remarks	Duty cycle for temperature output		Unit
Temperature output	Fixed frequency 4K, variable duty cycle, output the highest temperature	Note 7		μs

Note:

1. Response time: the time from the occurrence of the fault to the start of soft shut down;
2. Turn-on delay: the time required to transmit from the rising edge of the PWM signal from the primary input to the rising edge of the secondary of the gate driver;
3. Turn-off delay: the time required to transmit from the falling edge of the PWM signal from the primary input to the falling edge of the secondary side of the gate driver;
4. Rise time: the amount of time from 10% of the gate turn-off voltage (-4V) to 90% of the gate turn-on voltage (+18V);
5. Fall time: the amount of time from 90% of the gate turn-on voltage (+18V) to 10% of the gate turn-off voltage (-4V);

6. Creepage distance: refer to IEC61800-5-1-2007, meet the basic isolation requirements for altitudes below 2km and pollution level 2; this value takes the creepage distance of the isolation device.
7. Driver information transfer is an internal protocol, please refer to the 2FHD0620 datasheet for the specific NTC output method.

Preliminary



## Updates

Date	Description	Version
2025.08.11	Official version	V1.0
2025.11.21	Update the product picture and ordering information	V1.1

## Ordering Information

The A1EDB2V have a variety of derivatives, If you have a purchase request, please add the module part number after the gate driver part number, and we can provide the gate driver that best meets your requirements.

Gate driver part number	Voltage level	$R_{GON}(\Omega)$	$R_{GOFF}(\Omega)$	$R_{SSD}(\Omega)$
A1EDB2V-S0101	1700V	4.7/2	4.7/2	15

## Technical Support

Firstack's professional team will provide you with business consultation and technical support. Please contact the Firstack technical sales team if you require the application manual for further information of the technical application.

## Legal Disclaimer

This manual gives a detailed introduction about the product, but cannot promise to provide specific parameters. No warranty or guarantee, express or implied, is given herein as to the delivery, performance or applicability of the product.

Firstack reserves the right to modify technical data and product specifications at any time without prior notice. Firstack's general payment terms and conditions apply.

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Preliminary