4FHP0435E82L2 Data Sheet

Abstract

4FHP0435E82L2 is a solution for EconoDual™ package IGBT two-level 2 parallel connection based on Firstack digital technology.Module center spacing of 82mm, drive peak current ± 35A, single drive power of 4W, with soft shutdown, active clamp and other functions.

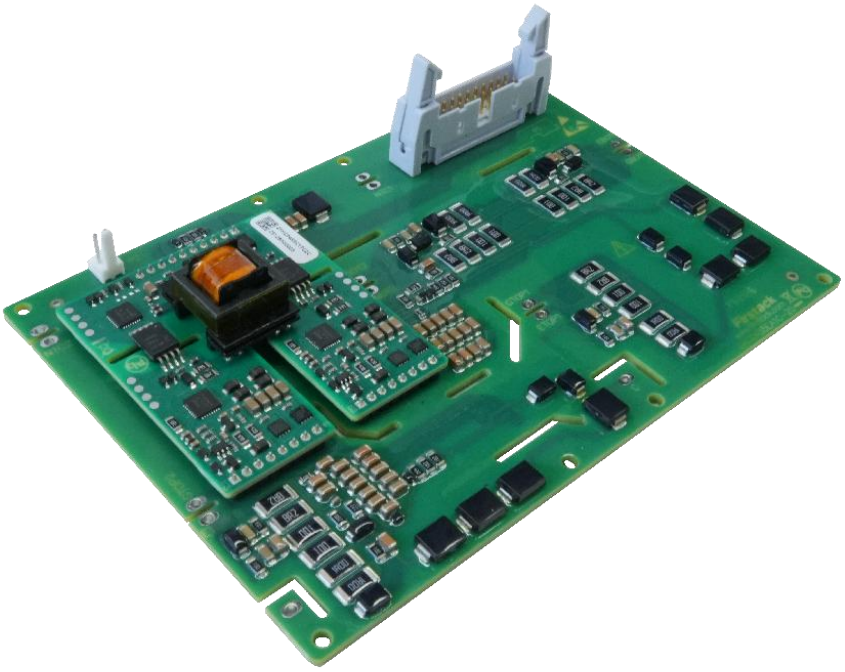


Fig. 1 4FHP0435E82L2

Core Features:

- 4W, ±35A per Channel
- Max. 50kHz
- Short-circuit protection(soft shut down)
- UVLO
- Intelligent fault feedback

Typical Application:

- Power quality
- Specialty Power Supplies
- Switching power supply
- Inverter

Functional Block Diagram

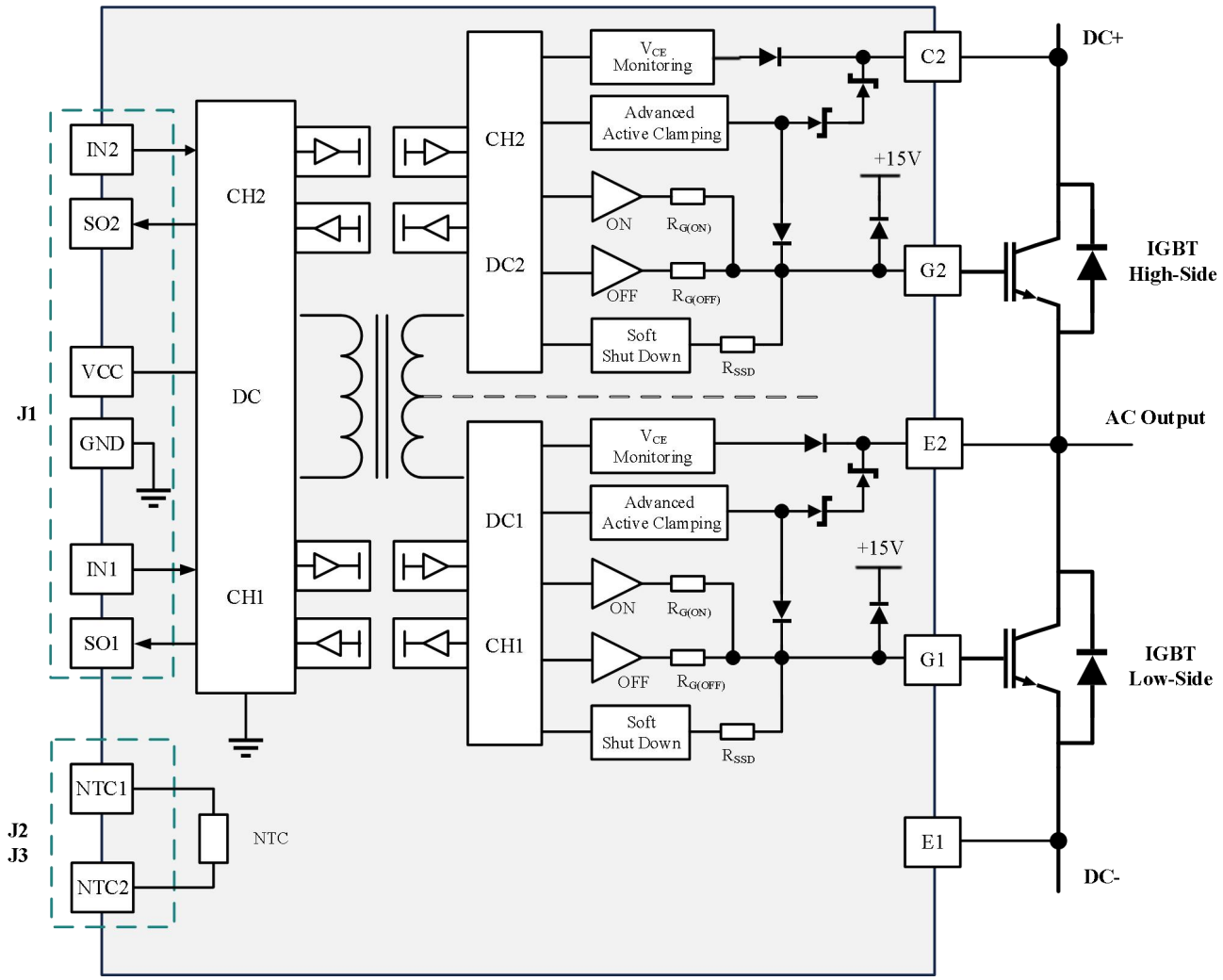
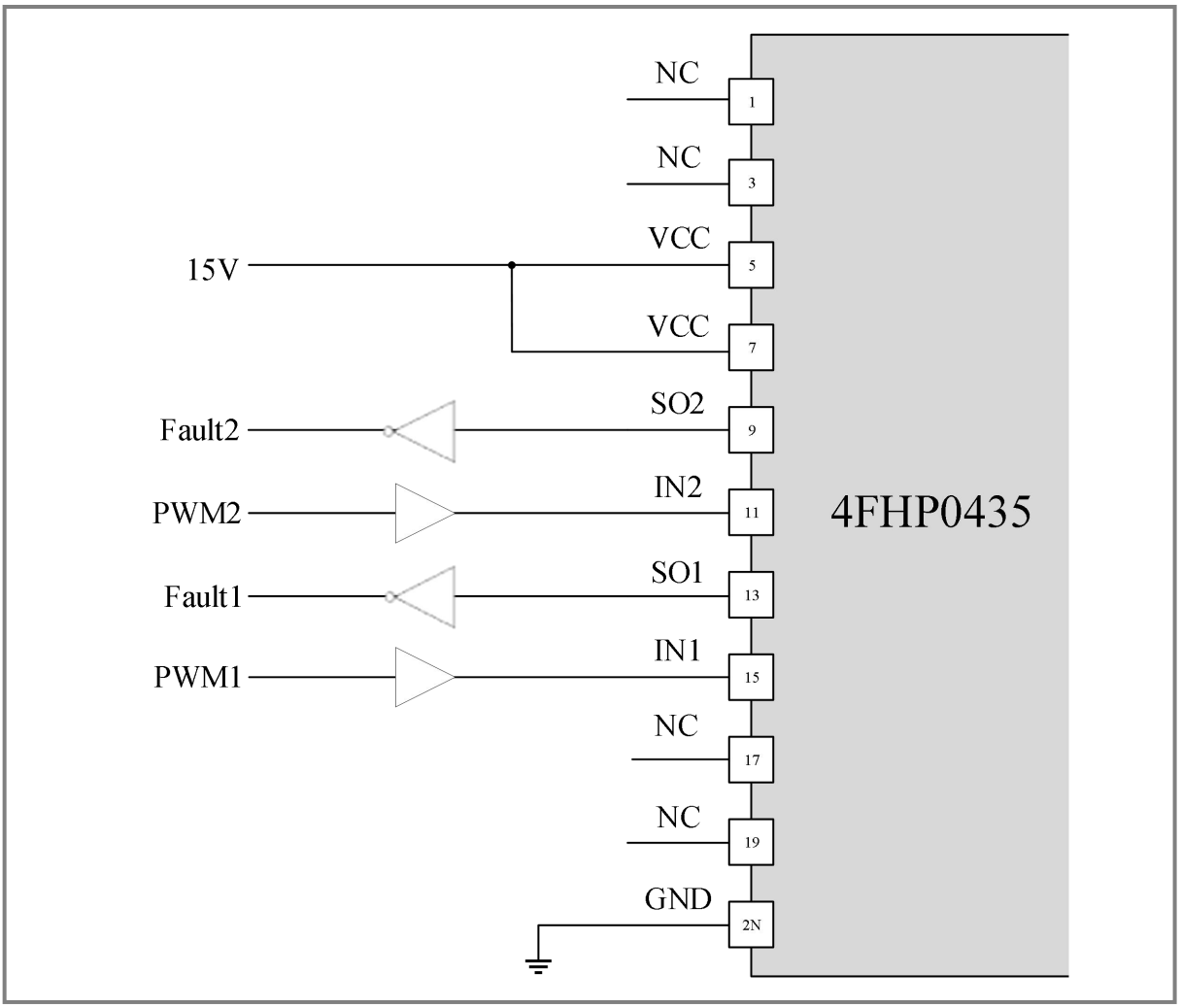


Fig. 2 Functional block diagram

J1 Recommended Interface Circuit



P1 terminal pin designation

Pin	Definition	Function	Pin	Definition	Function
1	NC	Free	2	GND	Primary side ground
3	NC	Free	4	GND	Primary side ground
5	V_{CC}	Power supply input	6	GND	Primary side ground
7	V_{CC}	Power supply input	8	GND	Primary side ground
9	SO1	Status output channel 1	10	GND	Primary side ground
11	IN1	Signal input channel 1	12	GND	Primary side ground
13	SO2	Status output channel 2	14	GND	Primary side ground
15	IN2	Signal input channel 2	16	GND	Primary side ground
17	NC	Free	18	GND	Primary side ground
19	NC	Free	20	GND	Primary side ground

Technical Parameters

Parameter	Remarks	Min	Max	Unit
Supply voltage V_{DC}	V_{DC} to GND	0	15.5	V
Input/Output Voltage	V_{DC} to GND	0	15.5	V
Fault Output Current	Fault	0	10	mA
Output power per channel	@85℃		4	W
Gate peak current	@85℃	35	35	A
Test voltage (50Hz/1min)	Primary to secondary side	5000		V_{RMS}
	Secondary to secondary side	4000		V_{RMS}
DC Bus Voltage			1200	V
Operating temperature		-40	85	℃
Storage temperature		-40	90	℃

Recommended Operating Conditions

Parameter	Remarks	Min	Typ	Max	Unit
Supply voltage V_{DC}	V_{DC} to GND	14.5	15	15.5	V
Supply current I_{DC}	Without load		0.11		A
Coupling capacitor C_{IO}	Primary to secondary side		18		pF
Undervoltage threshold	Supply voltage		12		V

Gate Driver Parameters

Output voltage	Remarks	Min	Typ	Max	Unit
Gate positive voltage V_{GSon}	Turn on (ON)	14.5	15	15.5	V
Gate negative voltage V_{GSoff}	Turn off (OFF)	-6	-7	-8	V

Logic Inputs & Outputs

Parameter	Remarks	Min	Typ	Max	Unit
Input signal INx	INx to GND	4.5	15	15.5	V
Input impedance			4.7		KΩ
Turn-on threshold	V(INx)	3.2			V
Turn-off threshold	V(INx)			1.1	V
Fault output SOx	Protection state @Io<10mA			5	V

Short-circuit protection

Parameter	Remarks	Min	Typ	Max	Unit
V_{DS} monitoring threshold	Short-circuit protection monitoring@ Rthx=68kΩ		10.1		V
Response time	CH1, Note 1		6.6		μs
	CH2, Note 1		6.6		μs
Soft shut down time	Soft shut down action time		6.24		μs

Timing Characteristics

Parameter	Remarks	Min	Typ	Max	Unit
Turn-on delay	Note 2		650		ns
Turn-off delay	Note 3		800		ns
Rise time	Note 4		10		ns
Fall time	Note 5		20		ns
Fault blocking time			80		ms
Fault return time	Note 6		10		ms

Electrical Isolation

Parameter	Remarks	Min	Typ	Max	Unit
Creepage distance	Primary to secondary side, Note 7	8			mm
	Secondary to secondary side, Note 7	8			mm
Clearance distance	Primary to secondary side	8			mm
	Secondary to secondary side	6.5			mm

Unless otherwise specified, all data are based on tests at +25℃ ambient temperature and V_{DC}=15V.

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 the rising edge of the PWM signal input from the primary side to the rising edge of the secondary side of the gate driver;
3. Turn-off delay: the time required to transmit the falling edge of the PWM signal input from the primary side 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 (-7V) to 90% of the gate turn-on voltage (+15V);
5. Fall time: the amount of time from 90% of the gate turn-on voltage (+15V) to 10% of the gate turn-off voltage (-7V);
6. Fault return time: short-circuit 10ms, secondary side undervoltage 20ms, primary side undervoltage 40ms;
7. Creepage distance: refer to IEC61800-5-1-2007, and meet the basic isolation requirements of below 2km altitude and pollution level 2; this value is the creepage distance of the isolation device.

Gate Resistance/Capacitance Position

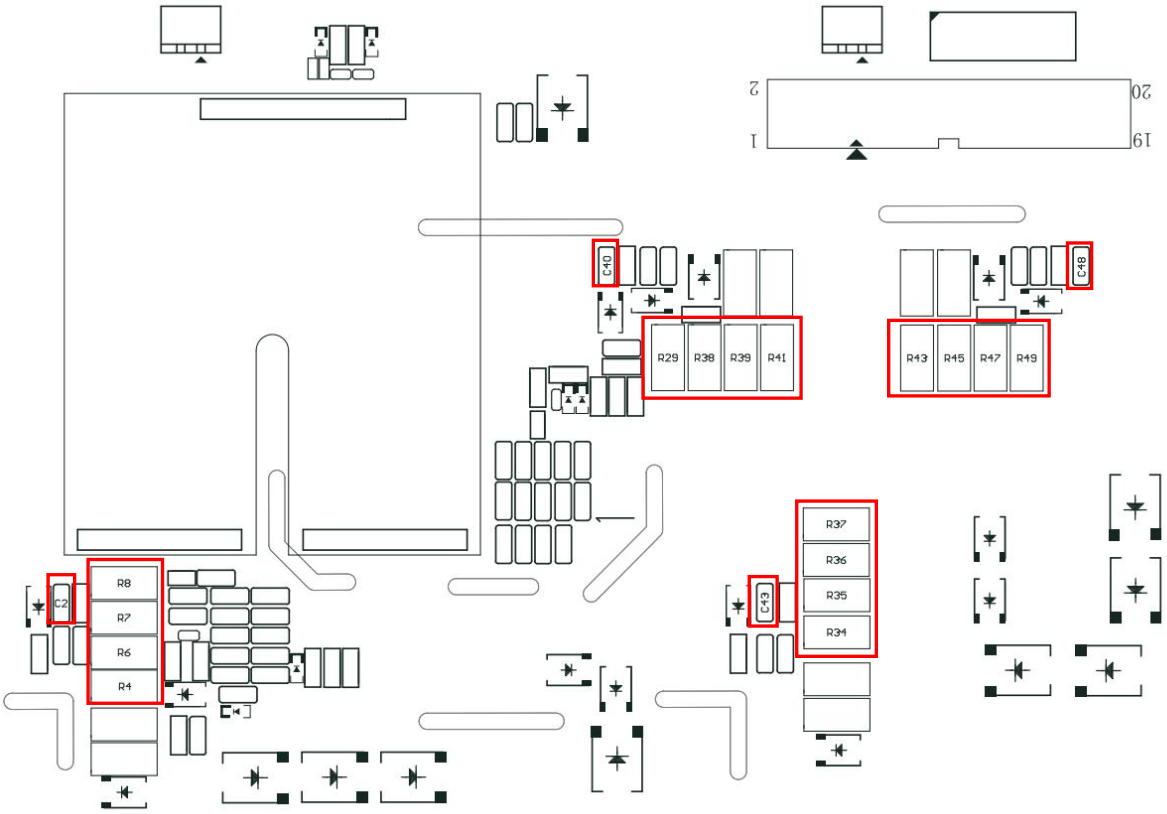


Fig.3 Gate R/C Position

Channel	R_{GON}	R_{GOFF}	C_{GE}
CH1	R7//R8;R36//R37	R4//R6;R34//R35	C2;C43
CH2	R29//R38;R47//R49	R39//R41;R43//R45	C40;C48

Recommended Resistance

No.	Power	Vendor	Housing	Power/Resistance	Size
1	<1W	YAGEO	2512 SMT	1W	L*W：3.2mm x 1.6mm

Resistance-IGBT Table

IGBT	R_{GON} （Ω）	R_{GOFF}（Ω）	C_{GE}（nF）
FF450R17ME4	3.75	5	NC
2MBI450VN-170-50	3.75	5	NC
DIM450M1HS17-PA500	3.75	5	NC
FF600R17ME4	3.75	5	NC
2MBI600VN-170-50	3.75	5	NC
DIM600M1HS17-PA500	3.75	5	NC
TG600HF17M1-S300	3.75	5	NC

3D and Mechanical Dimensions

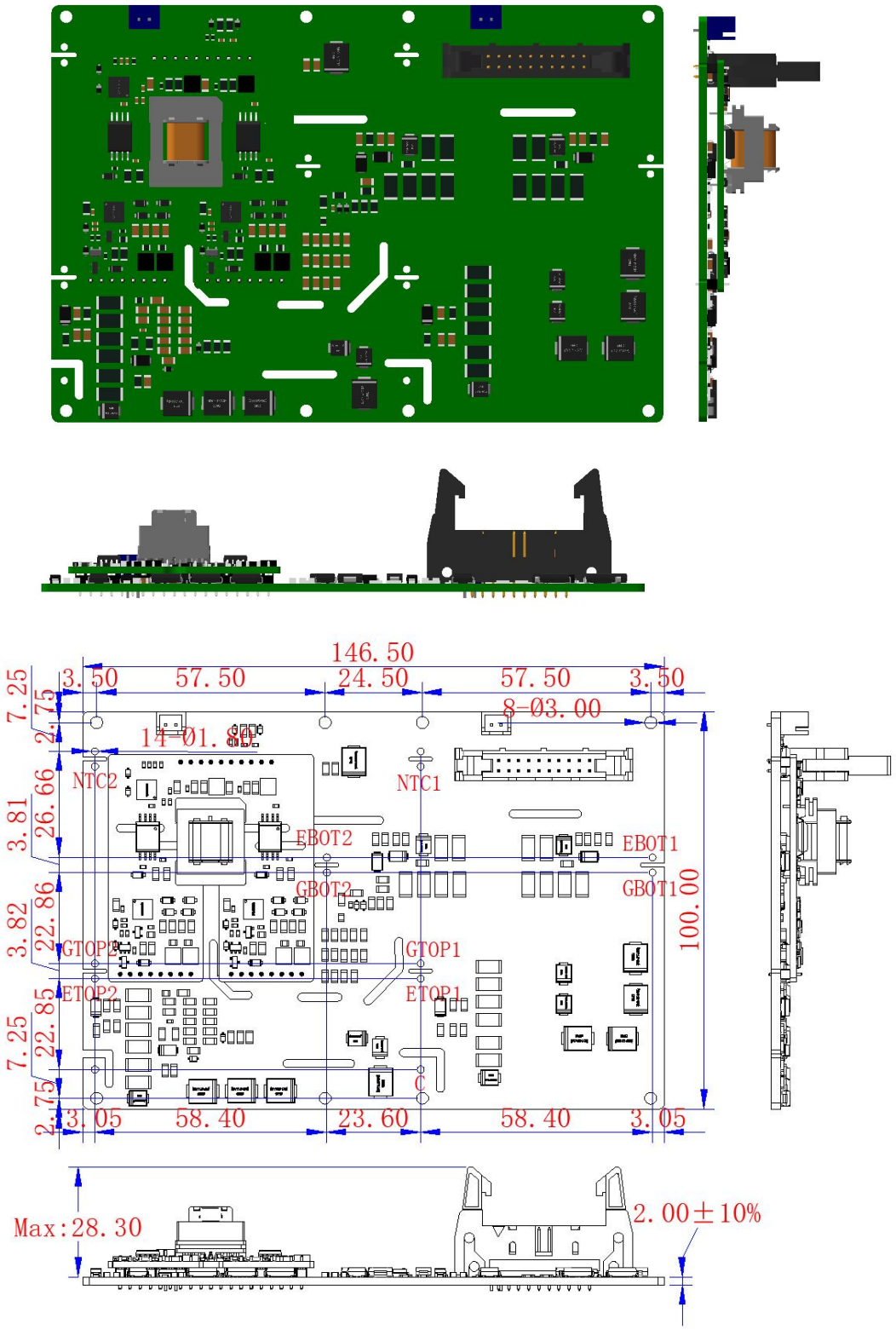


Fig. 4 Mechanical Dimensions(unit: mm)

Note: 1. The thickness tolerance of the board is ±10%;

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

Updates

Date	Description	Version
2025.04.23	Official version	V1.0

Order Information

The 4FHP0435E82L2 can support different models of EconoDual™ package modules from multiple manufacturers.If the products in the selection list do not meet your needs, you can contact Firstack's sales department for customization.

Part Number	Mode	Sox
4FHP0435E82L2-Y0100	Direct Mode	15V
4FHP0435E82L2-Y0200	Half Bridge	15V

Technical Support

Firstack's professional team will provide you with business consultation, technical support, product selection, price, lead time and other related information, and guarantee to answer your questions within 48 hours.

Legal Disclaimer

The instruction manual provides a detailed description of the product but does not commit to providing specific parameters regarding the delivery, performance, or applicability of the product. This document does not offer any express or implied warranties or guarantees.

Firstack reserves the right to modify technical data and product specifications at any time without prior notice. The general delivery terms and conditions of Firstack apply.

Contact Information

Tel: +86-571 8817 2737

Fax: +86-571 8817 3973

Website: www.firstack.com

Email: fsales@firstack.com

Address: 4-5/F, Building/5, Xizi Wisdom Industrial Park, No.1279 Tongxie Road, Hangzhou, China