

## 2FHC0215 Data Sheet

### Abstract

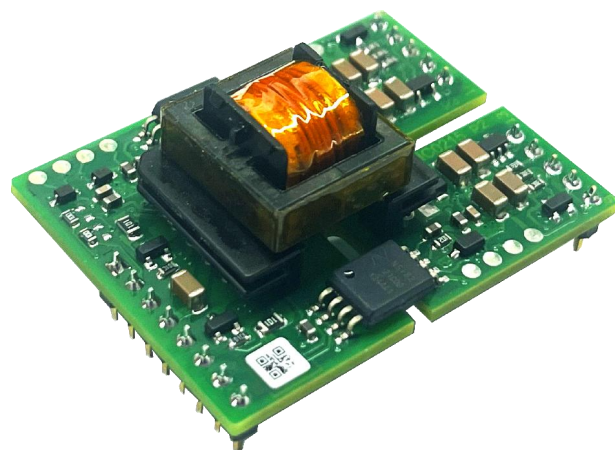
The 2FHC0215 is a high performance, dual-channel driver core developed by Firstack based on intelligent chip technology. It supports IGBT modules up to 1700V. The peripheral application circuit is simple, which means customers can drive the IGBT safely and reliably without investing in debugging the driver core.

### Highlights:

- 2W/15A, support up to 30kHz
- Suitable for up to 1700V module
- Short-circuit protection (soft shut down)
- Support multi-level applications
- Intelligent fault management

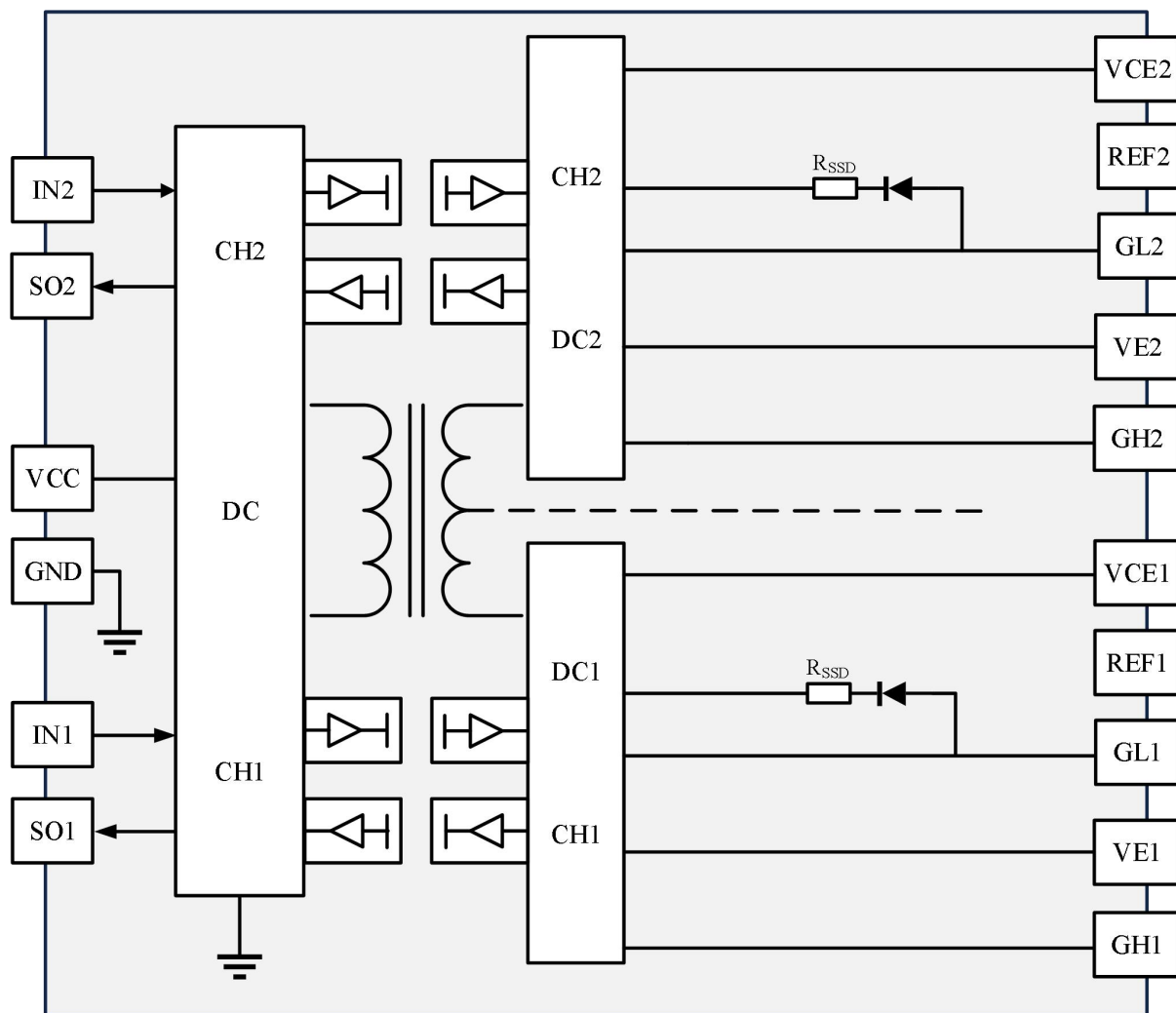
### Applications:

- Motor drives
- ESS



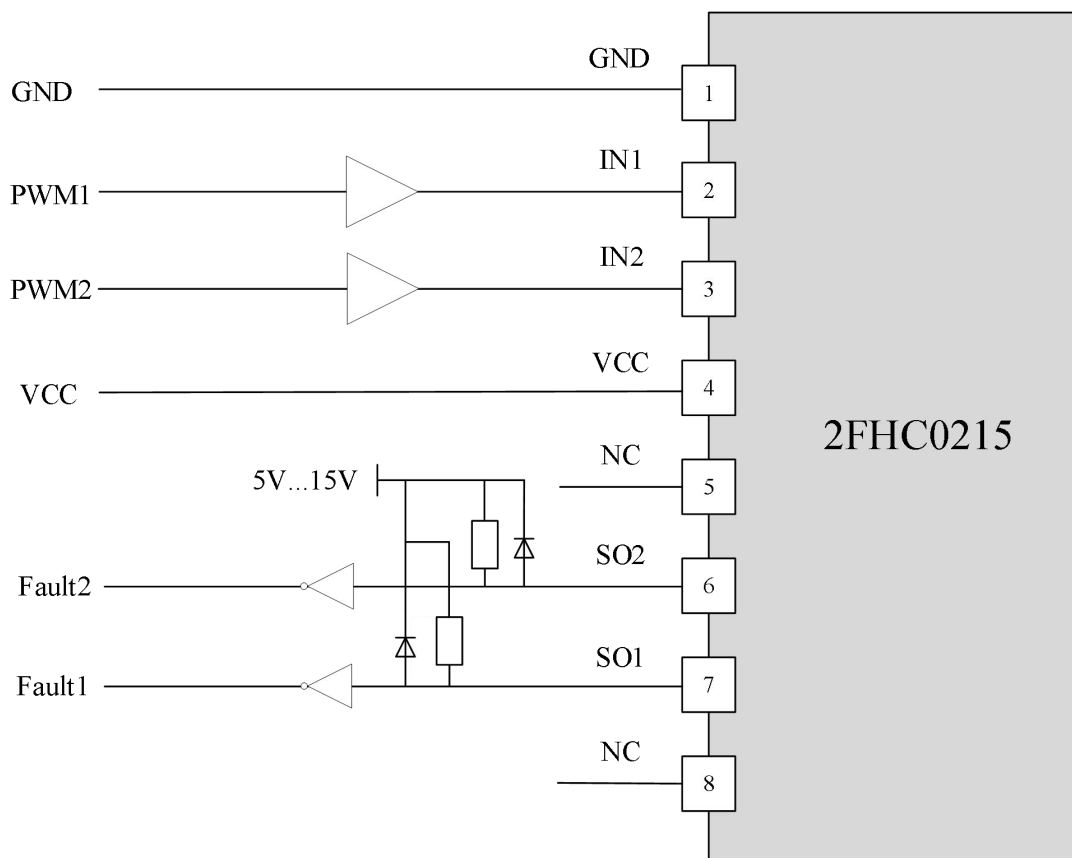
**Fig.1** 2FHC0215

**Functional block diagram**



**Fig.2** Functional block diagram

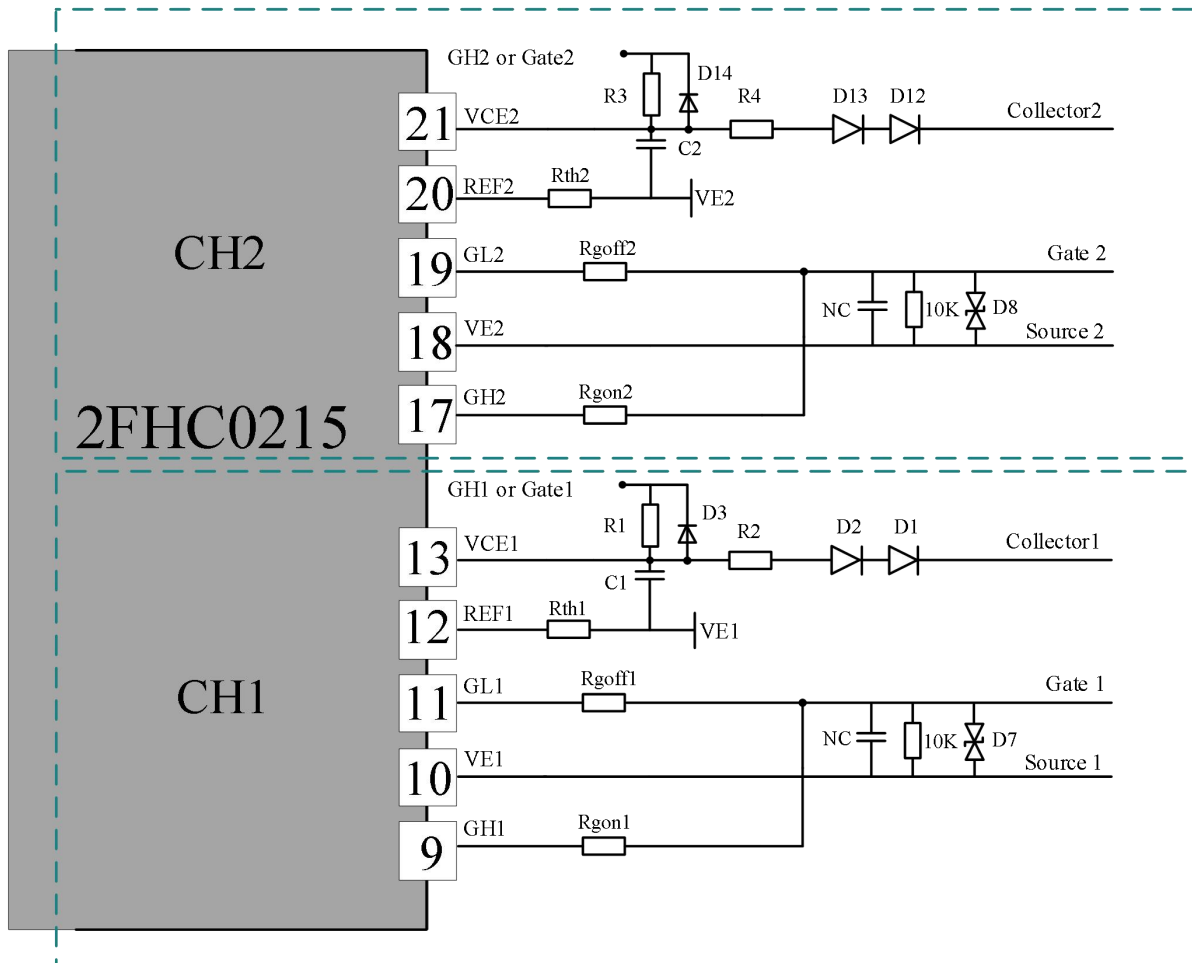
### Primary side recommended interface circuit



### Primary side interface definition

Pin	Definition	Function	Pin	Definition	Function
1	GND	Power supply ground potential	2	IN1	PWM signal input channel 1
3	IN2	PWM signal input channel 2	4	VCC	Input power supply
5	NC	Free	6	SO2	Fault status output channel 2
7	SO1	Fault status output channel 1	8	NC	Free

**Secondary side recommended interface circuit**



**Secondary side interface definition 1**

Pin	Definition	Function	Pin	Definition	Function
9	GH1	Gate high channel 1	17	GH2	Gate high channel 2
10	VE1	Ground channel 1	18	VE2	Ground channel 2
11	GL1	Gate low channel 1	19	GL2	Gate low channel 2
12	REF1	Set $V_{CE}$ detection threshold channel 1	20	REF2	Set $V_{CE}$ detection threshold channel 2
13	VCE1	$V_{CE}$ sense channel 1	21	VCE2	$V_{CE}$ sense channel 2

## Technical Parameters

### Absolute Maximum Ratings

Parameter	Remarks	Min	Max	Unit
Power supply $V_{DC}$	$V_{DC}$ to GND	0	15.5	V
Logic input and output voltages	Primary side, GND	0	$V_{DC}+0.5V$	V
Output power per channel	@85°C		2.0	W
Gate peak current	@85°C	-15	15	A
Test voltage(50Hz/1min)	Primary to secondary side	5000		$V_{RMS}$
Maximum DC bus voltage	2FHC0215		1500	V
Operating temperature		-40	85	°C
Storage temperature		-40	90	°C

### Recommended Operating Conditions

Parameter	Remarks	Min	Typ	Max	Unit
Power supply $V_{DC}$	$V_{DC}$ to GND	14.5	15	15.5	V
Supply current $I_{DC}$	Without load		0.08		A
Coupling capacitance $C_{IO}$	Primary to secondary side		10		pF
Supply undervoltage threshold $V_{DC}$	Primary side		12		V

### Gate Driver Parameters

Output level	Remarks	Min	Typ	Max	Unit
Gate voltage $V_{GE}$	Turn on (ON)	14.5	15	15.5	V
Gate voltage $V_{GE}$	Turn off (OFF)	-9.5	-8.5	-7.5	V

## Logic Input & Output Voltages

Parameter	Remarks	Min	Typ	Max	Unit
Input signal INx	INx to GND	4.5	15	15.5	V
Input impedance			240		kΩ
Turn-on threshold	V(INx)	3.2			V
Turn-off threshold	V(INx)			1.1	V
Fault output SOx	Protection state @Io<10mA			0.35	V
MOD mode	Direct mode	Set via software, no configuration required			
	Half-bridge mode	Set via software, no configuration required			

## Short-circuit Protection

Parameter	Remarks	Min	Typ	Max	Unit
V <sub>CE</sub> monitoring threshold	Short-circuit monitoring threshold @R <sub>thx</sub> =68KΩ		10.1		V
Response time	CH1, Note 1		4.0		us
	CH2, Note 1		4.0		us
Soft shut down time	Soft shut down action time		4.16		us

## Timing Characteristics

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

## Electrical Isolation

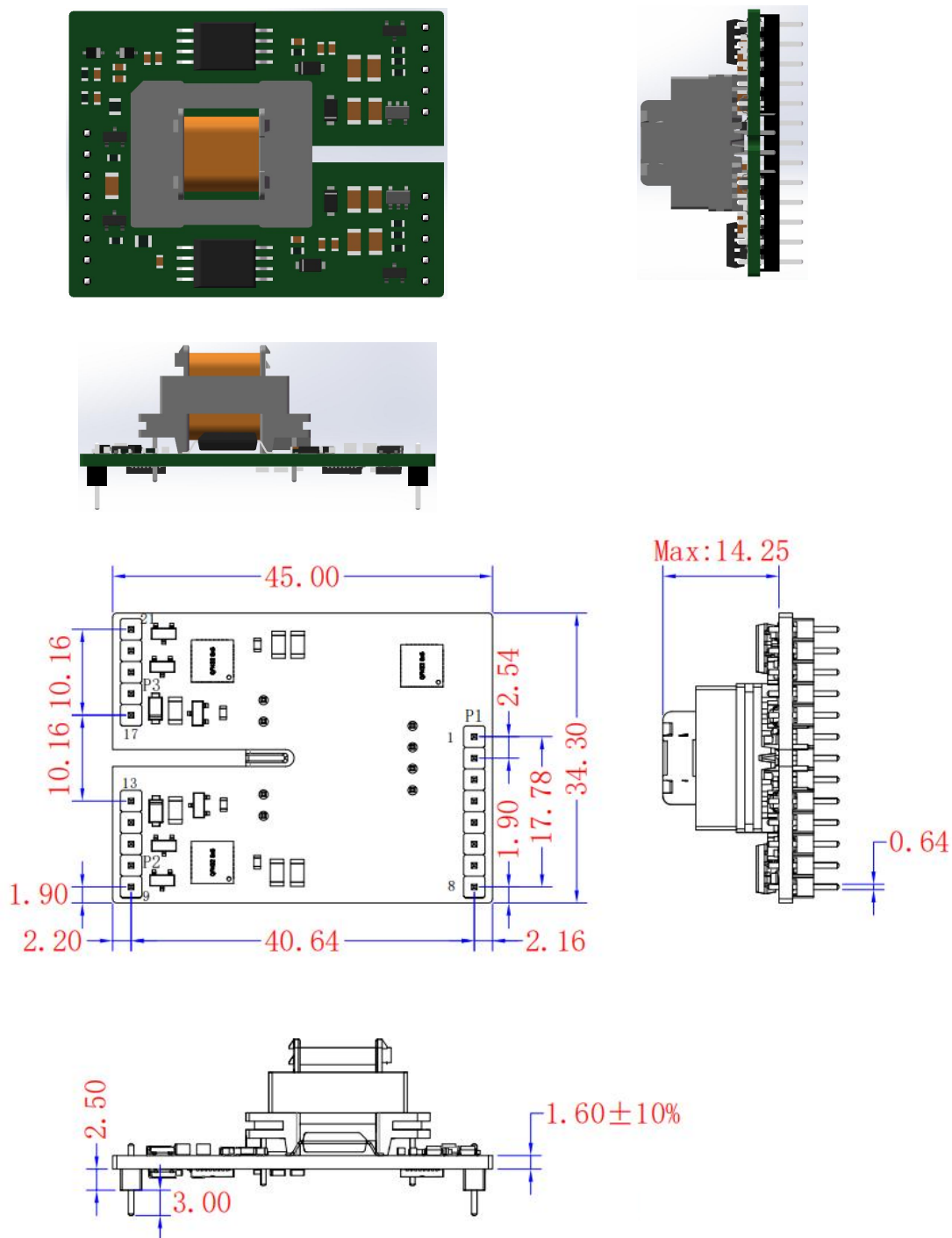
Parameter	Remarks	Min	Typ	Max	Unit
Creepage distance	Primary to secondary side, Note 6	8			mm
	Secondary to secondary side, Note 6	6.5			mm
Clearance distance	Primary to secondary side	8			mm
	Secondary to secondary side	5.5			mm

Unless otherwise specified, all data are based on tests at +25°C 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, the response time can be increased by peripheral circuit filtering;
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 (-8.5V) 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 (-8.5V);
6. Creepage distance: refer to IEC61800-5-1-2007, meet the basic isolation requirements for altitudes below 2km and pollution level 2.

### 3D and Mechanical Dimensions



**Fig.3** 3D and mechanical dimensions(unit: mm)

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

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

#### Recommended dimensions

Serial number	Recommended pin pad size	Recommended through-hole size
1	$\Phi=2\text{mm}$	$\Phi=1.02\text{mm}$



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## Ordering Information

The 2FHC0215 is the general gate driver core and supports different part numbers of modules from multiple manufacturers. If you have a purchase request, please contact us, and we can provide the gate driver that best meets your requirements.

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<b>Part number</b>	<b>Operating mode</b>	<b>INx</b>	<b>SOx</b>	<b>Note</b>
2FHC0215C17A1	Direct mode	5-15V	OD	Lead free, no coating
2FHC0215C17B1	Half bridge mode	5-15V	OD	Lead free, no coating

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## 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.

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