



# YJ Power Modules Profile

YJ Marketing Department.  
2020.2

2020 Version 1.

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01

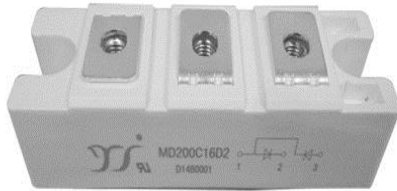
# Product Series

# 1 Rectifier Diode Module D1/D2/D1N Series



Dimensions(mm) :  
93\*21\*30

**D1**



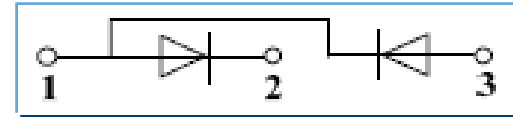
Dimensions(mm) :  
94\*34\*30

**D2**

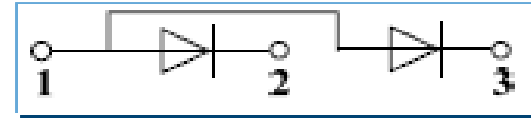


Dimensions(mm) :  
94\*26\*30

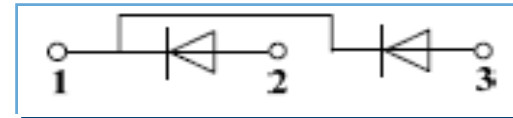
**D1N**



**C: Series Connection**



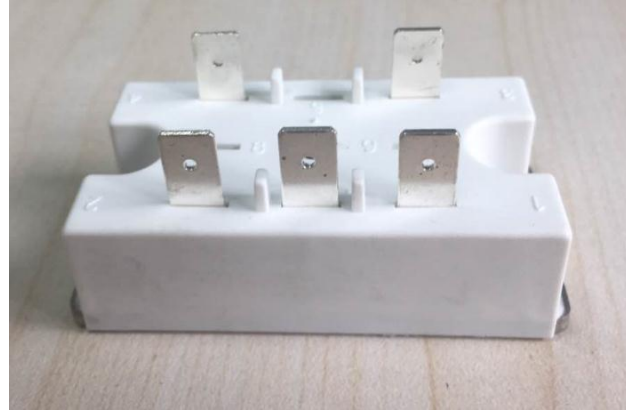
**A: Common Anode**



**K: Common cathode**

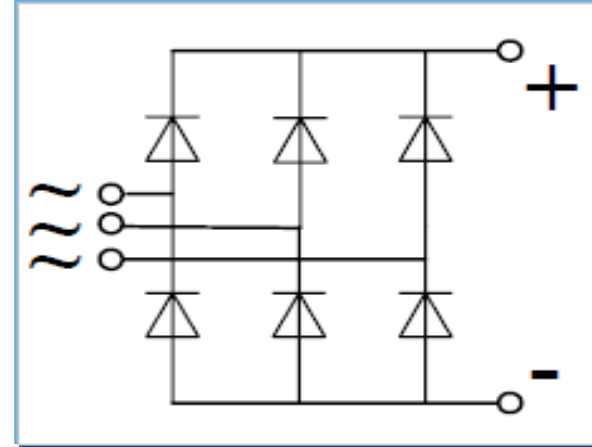
Series	Current	Voltage	Features	Standard
D1	36/60/70/100/120A	800/1200/1600/1800V	STD	UL/ RoHS
D1N	36/60/70/100/120A	800/1200/1600/1800V	STD	RoHS
D2	165/200/240A	800/1200/1600/1800V	STD	UL/RoHS

## 2 Three Phase Rectifier Module M1 Series



**M1**

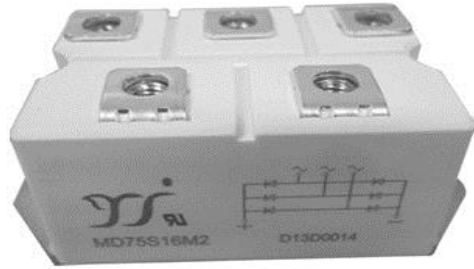
Dimensions(mm) :  
60\*32\*27.3



Series	Current	Voltage	Features	Standard
M1	50/75A	800/1200/1600/1800V	STD	RoHS

**Features** : We optimized the internal layout, compared to the other products in the market ,YJ product is available for 250mil chip and current can reach 75A.

### 3 Three Phase Rectifier Module M2/M3 Series



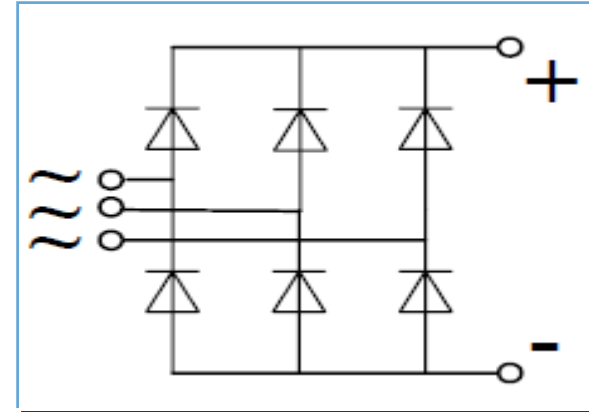
**M2**

Dimensions(mm) :  
72\*42\*30



**M3**

Dimensions(mm) :  
94\*54\*30



Series	Current	Voltage	Features	Standard
M2	60/75/100A	800/1200/1600/1800V	STD	UL/ RoHS
M3	100/130/160/200/250A	800/1200/1600/1800V	STD	UL/RoHS



# 4 Three Phase Rectifier Module NM2/NM3 Series



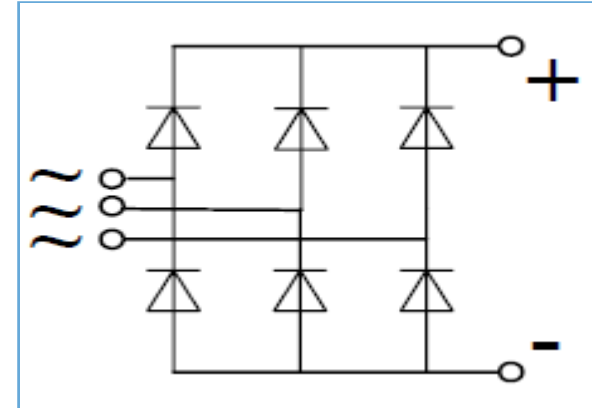
**NM2**

Dimensions(mm) :  
72\*42\*39.7



**NM3**

Dimensions(mm) :  
94\*42\*39.7



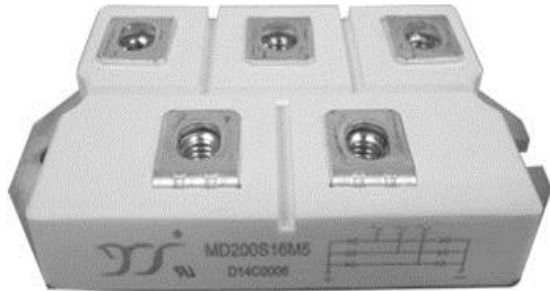
Series	Current	Voltage	Features	Standard
NM2	60/75/100A	800/1200/1600/1800V	STD	RoHS
NM3	100/130/160/200/250A	800/1200/1600/1800V	STD	RoHS

# 5 Three Phase Rectifier Module M4/M5 Series



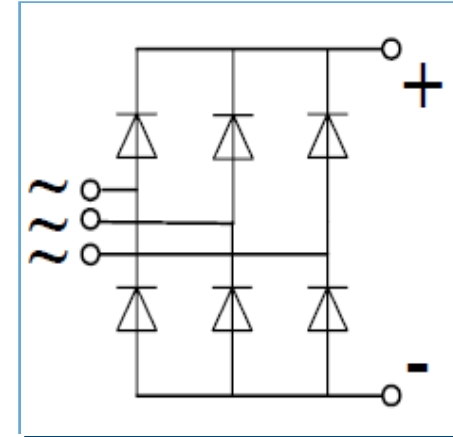
**M4**

Dimensions(mm) :  
82\*42\*22



**M5**

Dimensions(mm) :  
94\*54\*17



Series	Current	Voltage	Features	Standard
M4	50/75/100A	800/1200/1600/1800V	Japanese Standard	RoHS
M5	100/130/160/200/250A	800/1200/1600/1800V	17mm	UL/RoHS

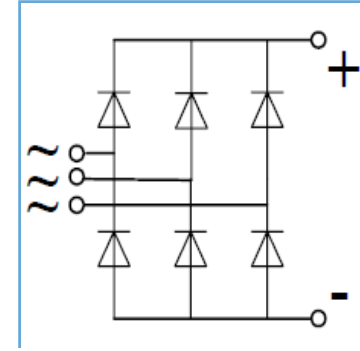


## 6 Three Phase Rectifier Module M7/M8 Series

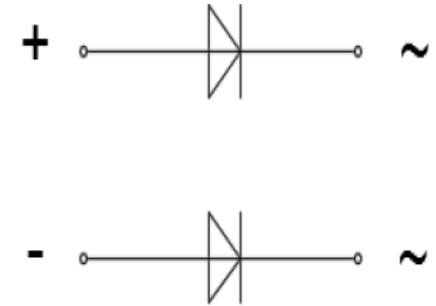


**M7**

Dimensions(mm) :  
70\*40\*34



**S**



**DU** ★

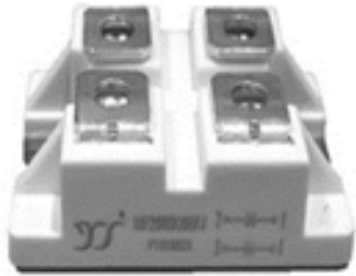


**M8**

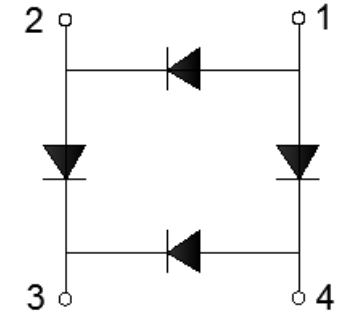
Dimensions(mm) :  
80\*40\*36

Series	Current	Voltage	Standard
M7	40/60A	800/1200/1600/1800V	RoHS
M8	100A	800/1200/1600/1800V	RoHS

## 7 Single Phase Rectifier Module FJ/M2Series



Dimensions(mm) :  
38\*28\*12.8



**FJ**

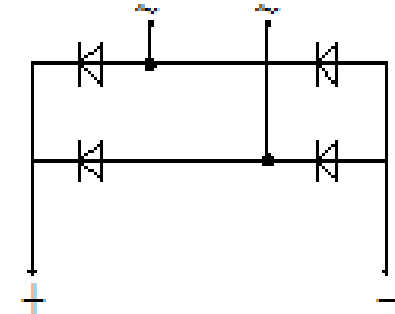


**M2**



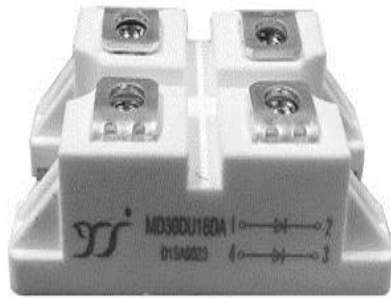
**M4★**

M2Dimensions  
(mm) : 72\*42\*30;  
M4Dimensions  
(mm) : 82\*42\*22



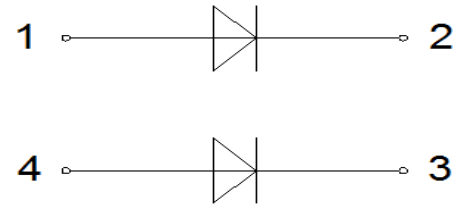
Series	Current	Voltage	Standard
FJ	35/50A	800/1200/1600/1800V	RoHS
M2	50/60A	800/1200/1600/1800V	RoHS

## 8 Rectifier Diode Module DA Series/ FRD Module FJ Series

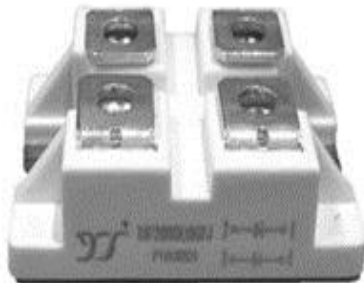


**DA**

Dimensions  
(mm) :  
50\*30\*17

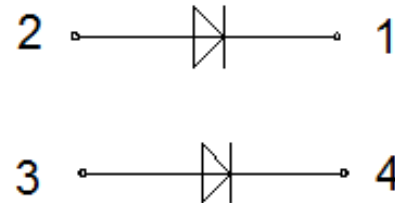


**DU Structure**

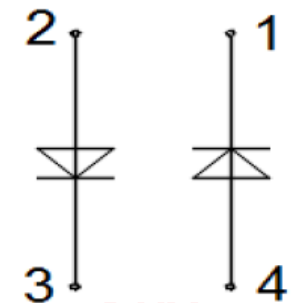


**FJ**

Dimensions(m  
m) :  
38\*28\*12.8



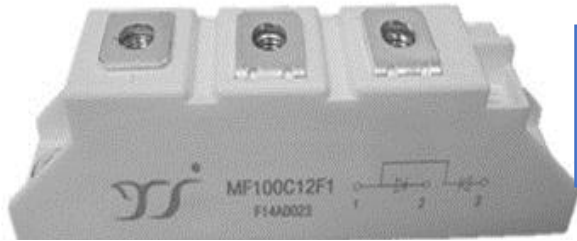
**DU Structure**



**DUV  
Structure ★**

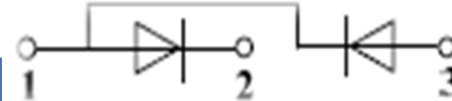
Series	Current	Voltage	Features	Standard
DA	30A	800/1200/1600/1800V	STD	UL/ RoHS
FJ	2×100A	400/600V	STD	RoHS

# 9 FRD Module F1/F2 Series



**F1**

Dimensions(mm) :  
93\*21\*30

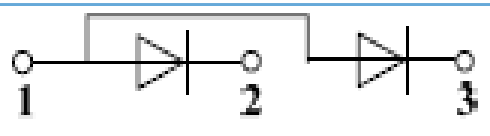


**C: Series Connection**

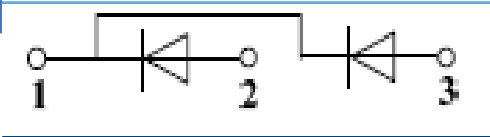


**F2**

Dimensions(mm) :  
94\*34\*30



**A: Common Anode**



**K: Common cathode**

Series	Current	Voltage	Features	Standard
F1	75/100A	600/1200V	STD	RoHS
F2	150/200/300A	600/1200V	STD	RoHS

# 10 FRD Module F1N/F2N Series



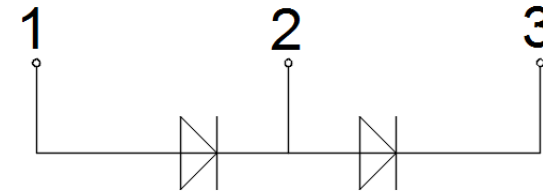
**F1N**

Dimensions(mm) :  
93\*21\*30

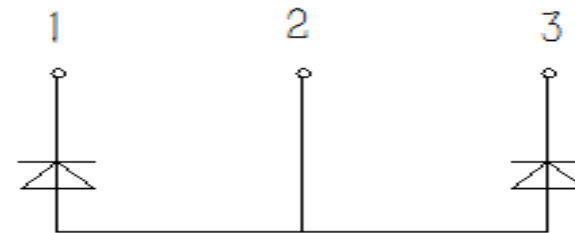


**F2N**

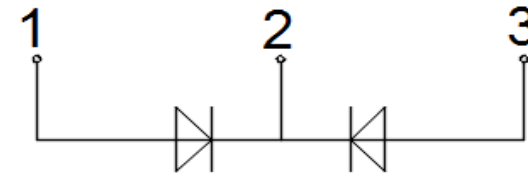
Dimensions(mm) :  
94\*34\*30



**C : Series Connection**



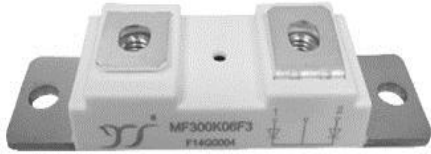
**A : Common Anode**



**K : Common Cathode**

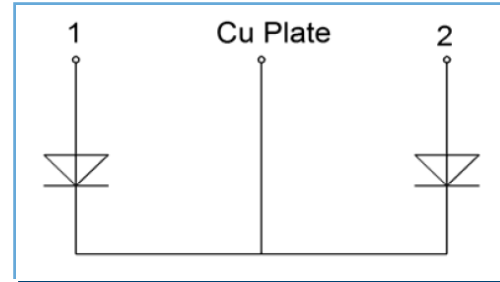
Series	Current	Voltage	Features	Standard
F1N	75/100A	600/1200V	STD	RoHS
F2N	150/200/300A	600/1200V	STD	RoHS

# 11 FRD Module F3/F4 Series



**F3**

Dimensions(mm) :  
92\*27\*17



**K: common cathode**



**F4N**

Dimensions(mm) :  
92\*20\*17

Series	Current	Voltage	Features	Standard
F3	200/300/400A	400/600V	STD	RoHS
F4	200A	400/600V	STD	RoHS

# 12 FRD Module F5/F6 Series



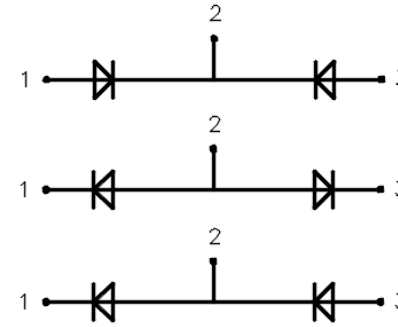
Dimensions(mm) :  
94\*26\*20

**F5**



Dimensions(mm) :  
80\*42\*23

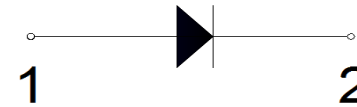
**F6**



**K : common cathode**

**A : Common Anode**

**C : Series Connection**

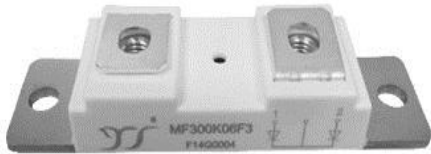


**U : Single Diode**

Series	Current	Voltage	Features	Standard
F5	200/300A	600/1200V	STD	RoHS
F6	300A	500/700V	STD	RoHS



# 13 SBD module F3/F4 series



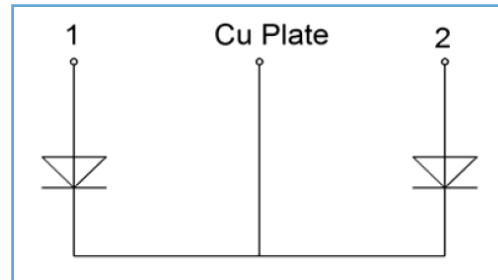
**F3**

Dimensions(mm) :  
92\*27\*17



**F4N**

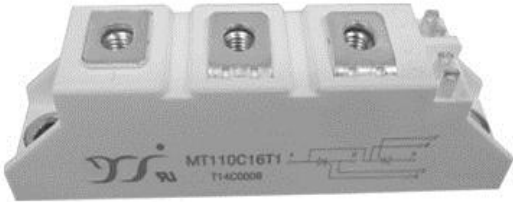
Dimensions(m  
m) : 92\*20\*17



**K :  
common  
cathode**

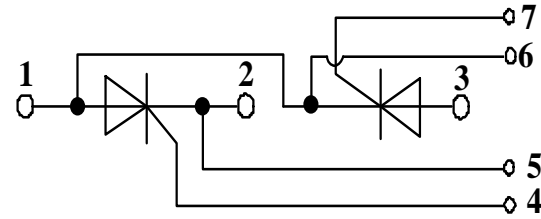
Series	Current	Voltage	Features	Standard
F3	400A/600A/800A	60/100/200V	STD	RoHS
F4	200A/400A	60/100/200V	STD	RoHS

# 14 Thyristor Module T1/T2 Series

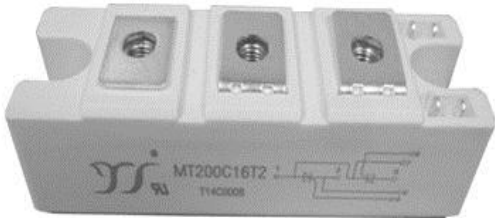


Dimensions(mm) :  
93\*21\*30

**T1**

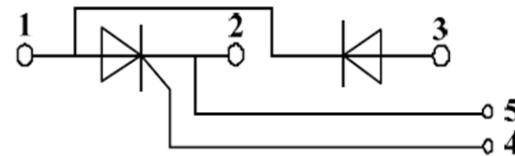


**C: Series Connection**



Dimensions(mm) :  
94\*34\*30

**T2**



**CB: Hybrid**

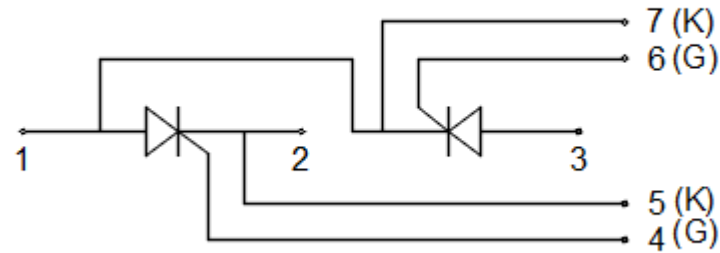
Series	Current	Voltage	Features	Standard
T1	25/40/60/90/110A	800/1200/1600V	STD	UL/RoHS
T2	130/160/200A	800/1200/1600V	STD	UL/RoHS

# 15 Thyristor Module T1D/T1AD Series



**T1D**

**T1AD**



**C: Series Connection**

Series	Current	Voltage	Features	Standard
T1D	60/90/110A	800/1200/1600V	STD	UL/RoHS
T1AD	60/90/110A	800/1200/1600V	STD	UL/RoHS

# 16 Thyristor Module L1/L2 Series



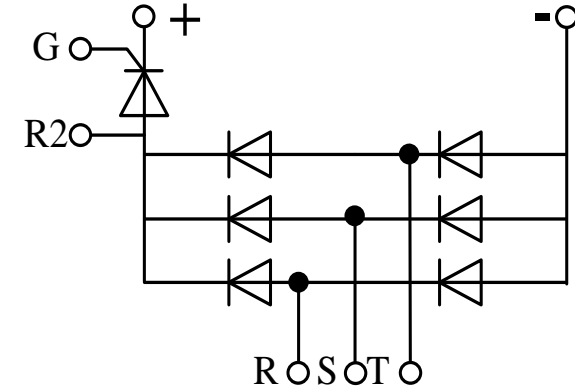
**L1**

Dimensions(m  
m) : 94\*50\*22



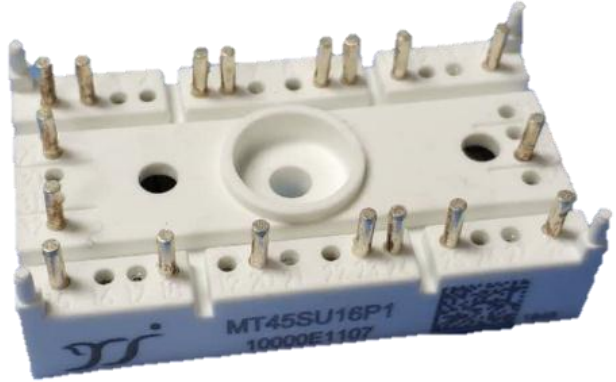
**L2**

Dimensions(m  
m) : 108\*62\*27

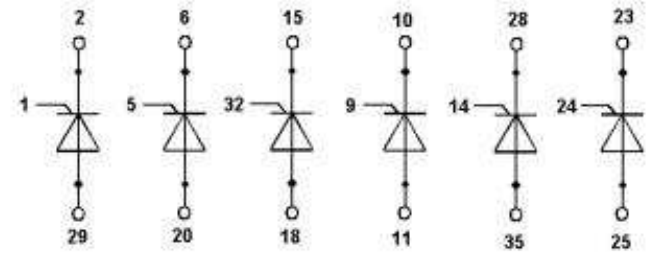


Series	Current	Voltage	Features	Standard
L1	75/100A	800/1200/1600V	STD	UL/RoHS
L2	150/200A	800/1200/1600V	STD	UL/RoHS

# 17 Thyristor Module low Thermal Resistance P1 Series



Dimensions(mm) :  
55\*31\*15.5

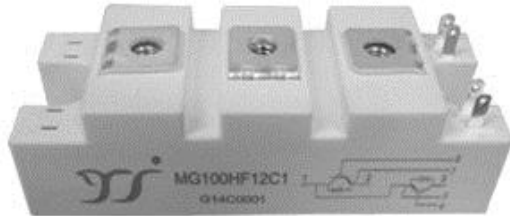


**P1** ★

**SU**

Series	Current	Voltage	Features	Standard
P1	45A	800/1200/1600V/1800V	STD	UL/RoHS

# 18 IGBT Module C1/C2 Series



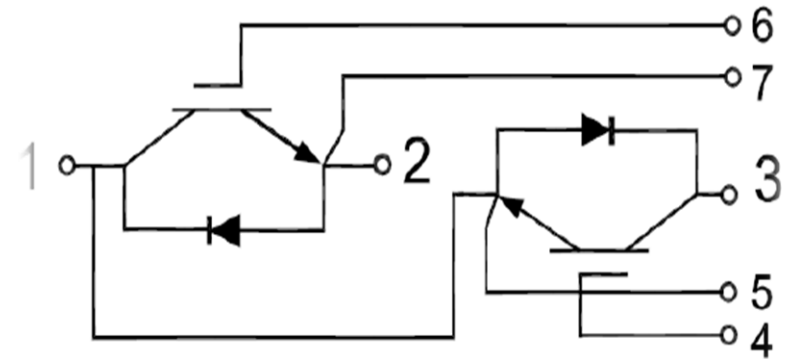
**C1**

Dimensions(m  
m) :  
94\*34\*30.5



**C2**

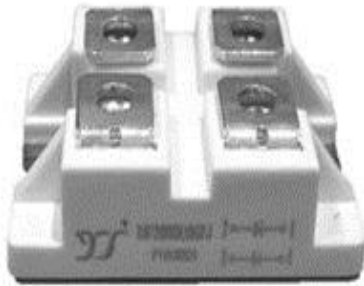
Dimensions(m  
m) :  
108\*62\*30.5



**HF : Half-bridge**

Series	Current (0-20KHz)	Current (20-40KHz)	Voltage	Features	Standard
C1	50/75/100A	50/75/100A	600/1200V	STD	UL/RoHS
C2	100/150/200/300/400A	200/300A	600/1200V	STD	UL/RoHS

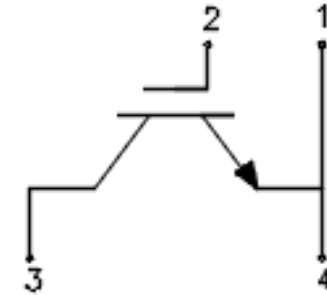
# 19 IGBT Module GJ Series



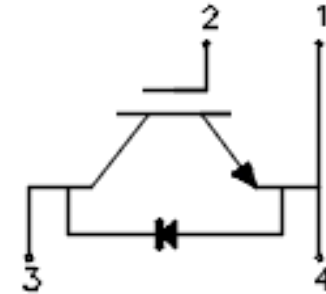
**GJ**

Dimensions(mm) :  
38\*28\*12.8

**UZ**



**U**



Series	Current	Voltage	Features	Standard
GJ-UZ	50/75/100A	600/1200V	STD	RoHS
GJ-U	50/75A	600/1200V	STD	RoHS



# 20 IGBT Full Bridge Module P1 Series

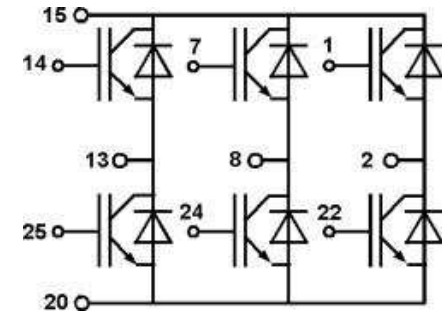
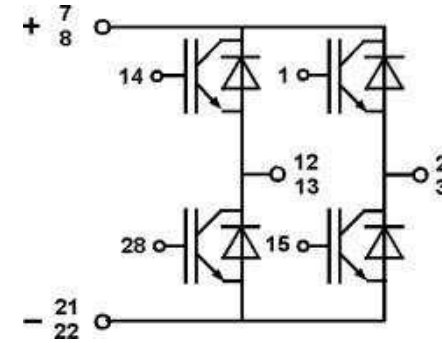


**P1** ★

**FF : Full Bridge** ★

Dimensions(mm) :  
55\*31\*15.5

**TF : Three Phase** ★

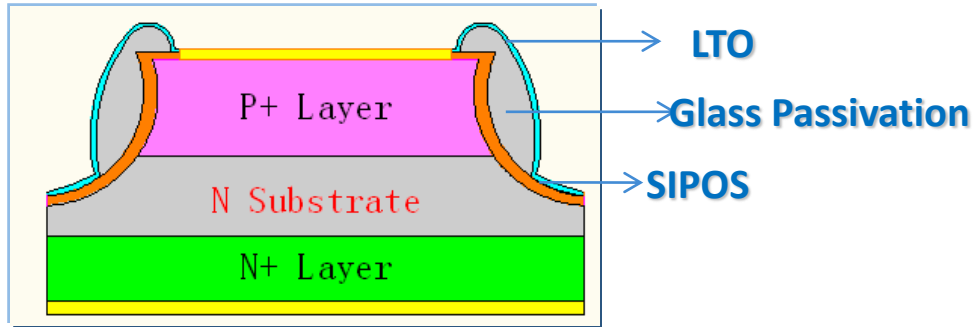


Series	Current	Voltage	Features	Standard
P1-FF	45A	600V	STD	RoHS
P1-TF	25A/45A	600V	STD	RoHS

# 02

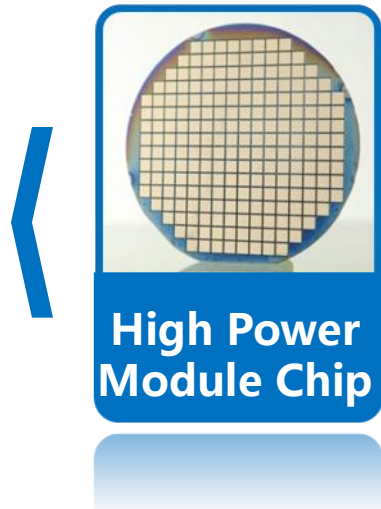
## Technology and Equipment

# 1 Chip Advantage



- ◆ **Worlds' Largest 4" wafer Fab**
- **Advanced American technology**
- **High power module GPP chip**
- **Quality, capacity and delivery assurance**
- **Glass passivation technology ,three levels protection**
- **10K clean room**

Rectifier Series



Current : 36 ~ 240A

Dimensions :

250MIL/280MIL/350MIL/395MIL/480MIL/620MIL/710MIL/820MIL/950MIL

Voltage : 1400V/1600V /1800V/2000V/2400V

# 1 Chip Advantage



- ◆ Advanced 6" wafer fab
- Four major product platforms (PSBD, TSBD, FRED, PSBR);
- All series product standard , support customer standard;
- 0.35um line width , planar trench technology;
- Advanced equipment and technology , high reliability ;
- Clean class 10 ( photo etching area )

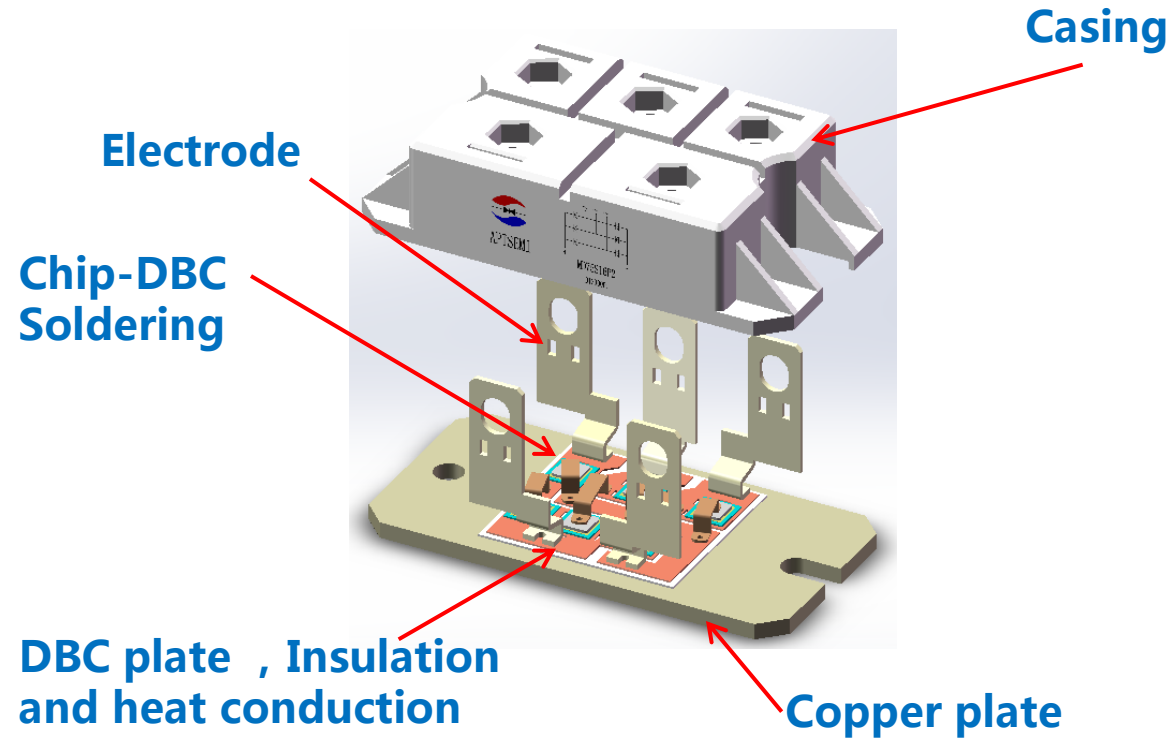
**FRED platform Roadmap**

4500V								225mm <sup>2</sup>				
3300V									180mm <sup>2</sup>	180mm <sup>2</sup>		
1700V								64mm <sup>2</sup>	90mm <sup>2</sup>	115mm <sup>2</sup>		
1200V			9.1mm <sup>2</sup>	15mm <sup>2</sup>	21mm <sup>2</sup>		36mm <sup>2</sup>	60mm <sup>2</sup>	75mm <sup>2</sup>	75mm <sup>2</sup>	100mm <sup>2</sup>	
800V								50mm <sup>2</sup>			140mm <sup>2</sup>	
600V	1.9mm <sup>2</sup>	4.6mm <sup>2</sup>	6.8mm <sup>2</sup>		17mm <sup>2</sup>		31mm <sup>2</sup>	44mm <sup>2</sup>				144mm <sup>2</sup>
400V	1.9mm <sup>2</sup>	4mm <sup>2</sup>			17mm <sup>2</sup>		31mm <sup>2</sup>			75mm <sup>2</sup>		120mm <sup>2</sup>
300V				11mm <sup>2</sup>								
200V	2.1mm <sup>2</sup>	3.2mm <sup>2</sup>	6.3mm <sup>2</sup>	6.7mm <sup>2</sup>								
100V									44mm <sup>2</sup>			
	5A	8A	10A	20A	30A	40A	60A	75A	100A	125A	150A	200A

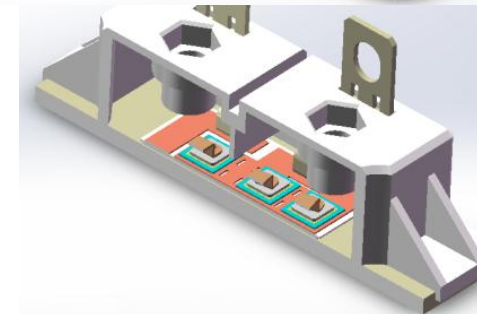
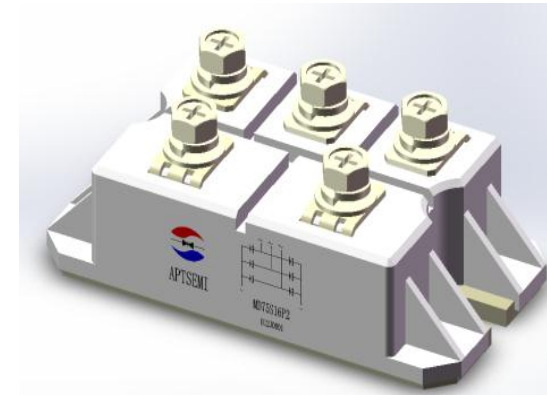
## 2 Technology Advantage

# Module—Structure Design

### ➤ Rectifier Diode Module —Soldering technology



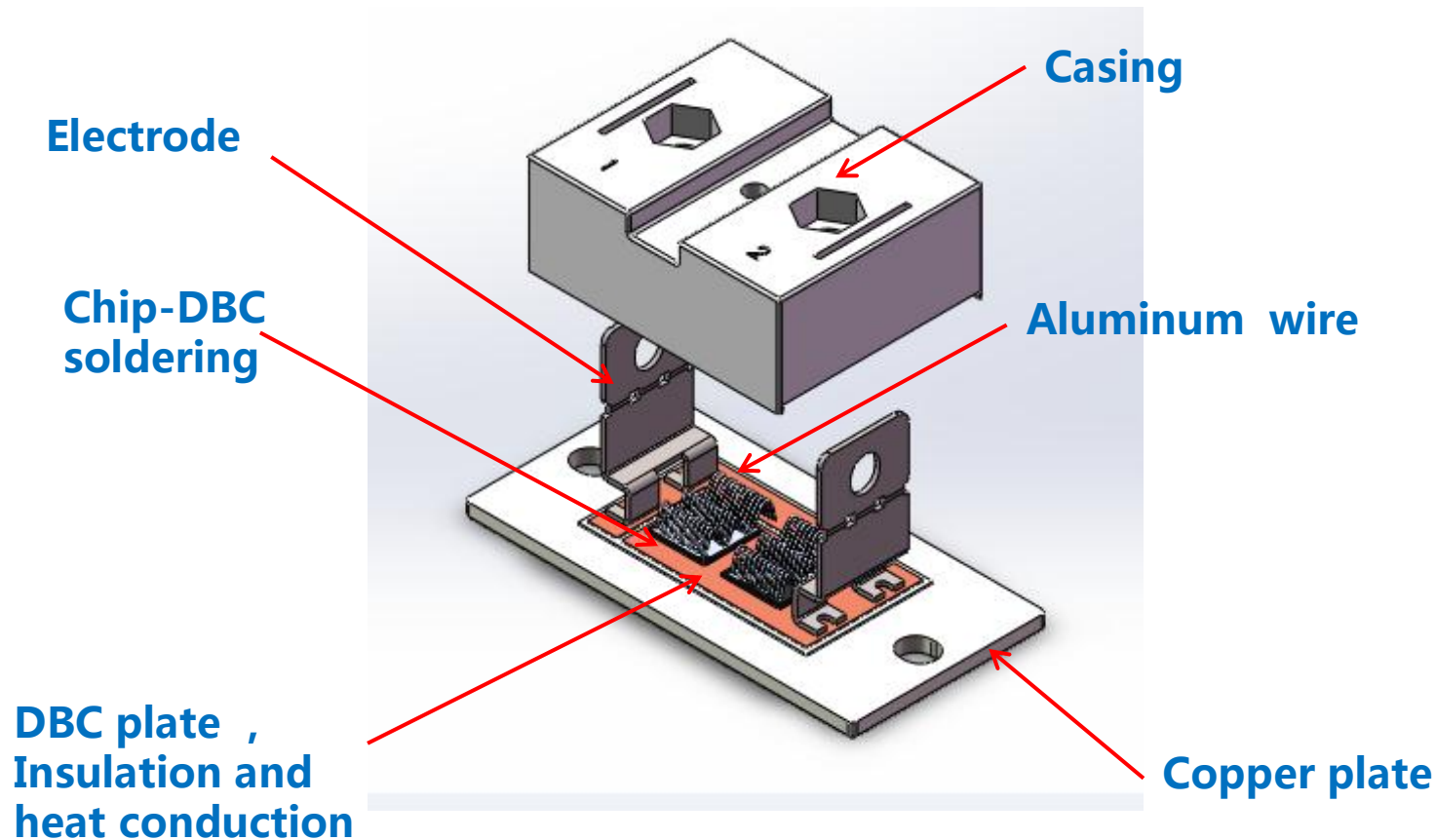
- Vacuum Soldering Technology Single Voidage <math>< 0.5\%</math>
- Special designing for low stress
- Soldering with DBC for low thermal resistance



## 2 Technology Advantage

### Module—Structure Design

#### ➤ FRD Module—Wire-bonding technology



- Vacuum Soldering Technology
- Single Voidage < 0.5%
- Special designing for low stress
- Soldering with DBC for low thermal resistance

### 3 Key Technology

#### √Soldering Technology

@Solder sheet soldering, free cleaning

@N<sub>2</sub> environment , vacuum deforming

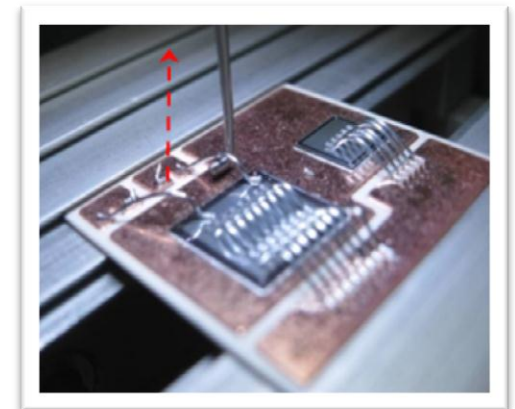
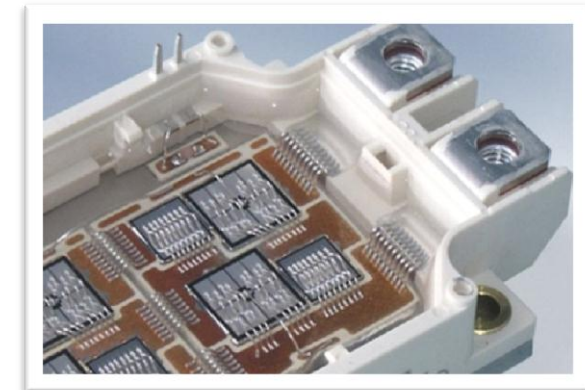
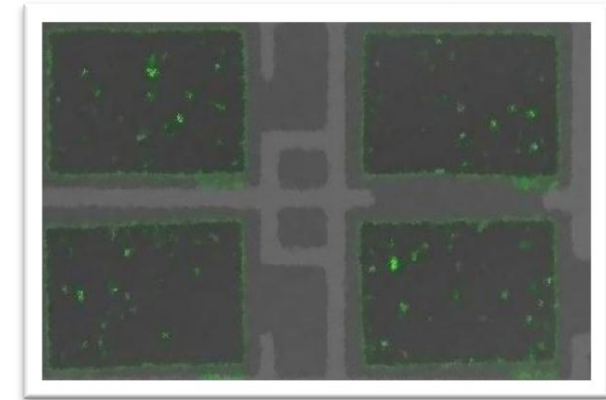
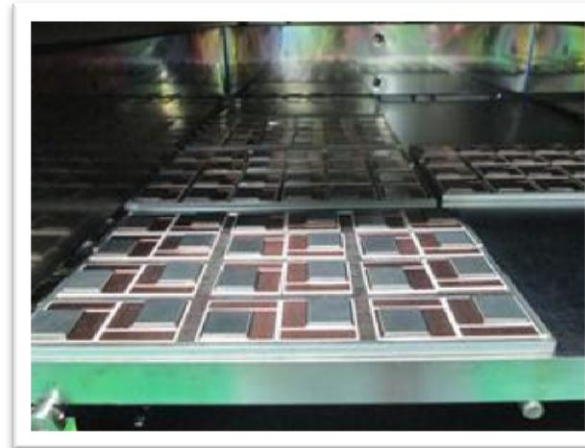
@HCOOH Auxiliary soldering

(  $\text{HCOOH} \rightarrow \text{CO} + \text{H}_2\text{O}$  )

( Single Voidage  $< 0.5\% \leq 2\%$  )

@100% Voidage testing

@Both Chip soldering and plate soldering test

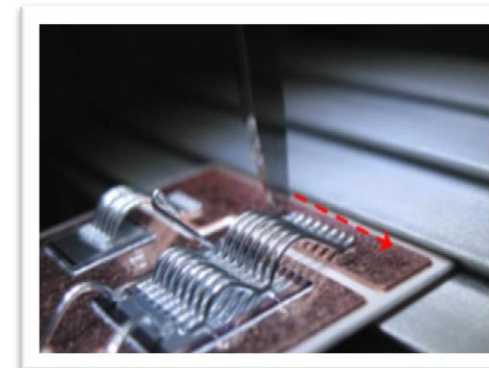


#### √Wire-bonding Technology

@Low stress soldering

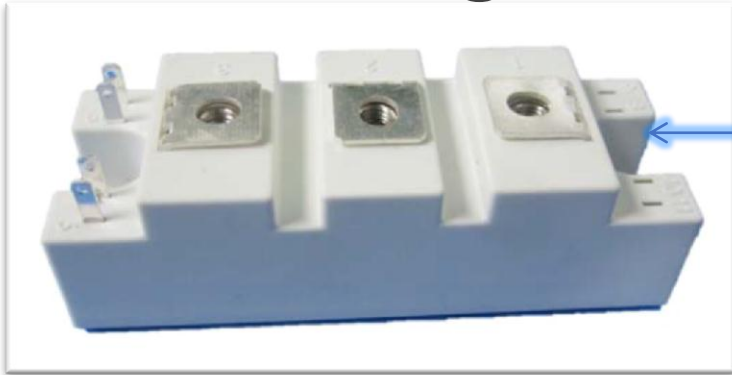
@Pull and cut force control

( Pull  $> 450\text{gf}$ , Cut force  $> 1000\text{gf}$  )



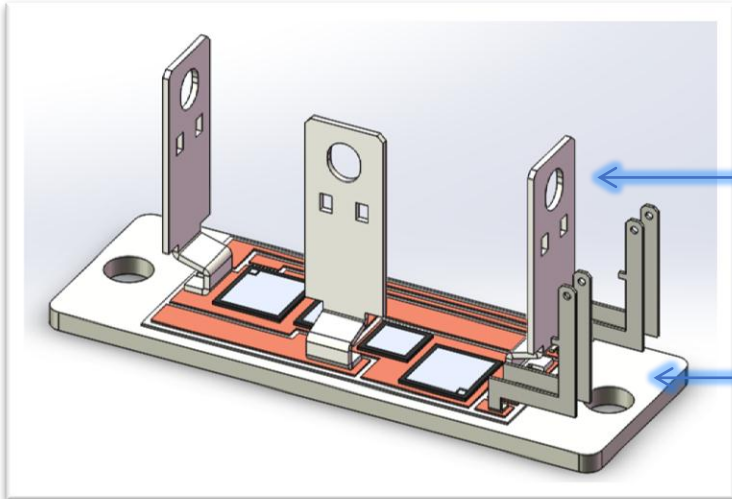
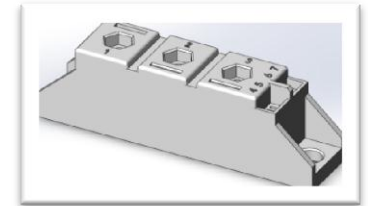


## 4 Product Design



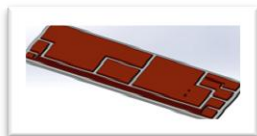
### Case

- @PBT material , UL Certificate
- @Flame Rating of V0
- @Good antiknock performance



### Electrode、 Base Plate

- @>99.96%Oxygen free copper , Good heat conduction
- @flexible design plate , good for close fitting with the radiator
- @Adopt radian design electrode welding to reduce mechanical stress



### DBC

- @CTE (  $6.8 \times 10^{-6}/K$  ) is similar as Si , Low Stress
- @High thermal conductivity (  $24W/m \cdot k$  (  $20^{\circ}C$  ) ) , good heat dissipation
- @Good insulation performance (  $20KV/mm$  )

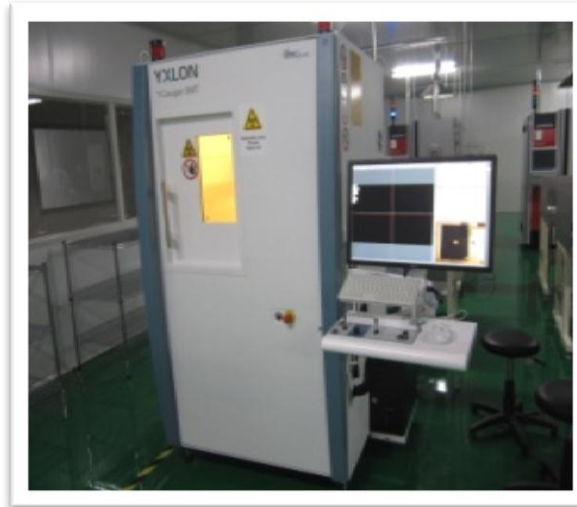
### Silicone Gel

- @stress on chip
- @-65 ~  $200^{\circ}C$  wide range application
- @Moisture proof , hock proof , weather aging resistance, No corrosion

## 5 Production Equipment



**Vacuum Soldering**



**X-Ray**



**Wire-bond Machine**

- **Core Equipment**
- ✓ **HCOOH Auxiliary welding, Ensure low single voidage <math><0.5</math>,**
- ✓ **Ultrasonic bonding technology , Ensure low stress**

## 6 Testing Equipment



Static Tester



Surge Tester

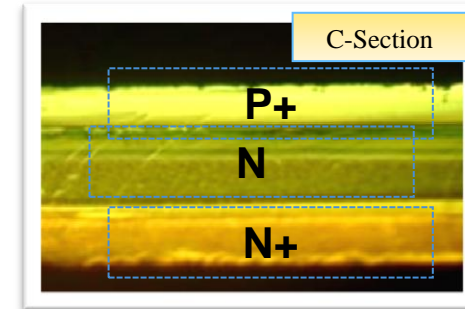
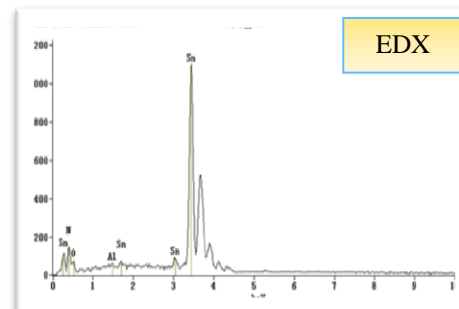
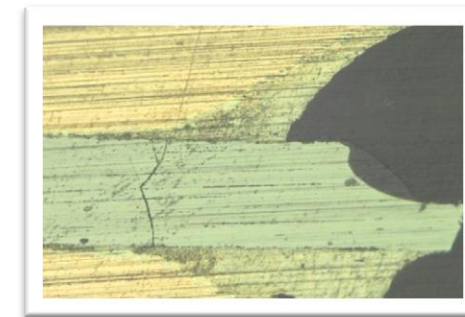
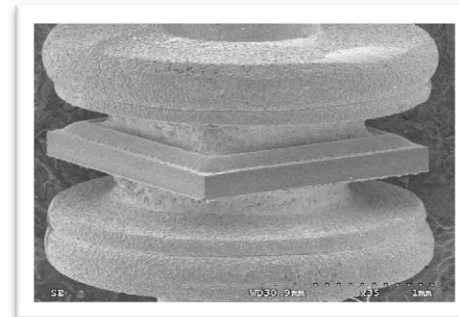
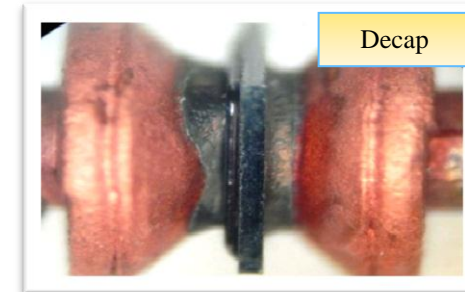
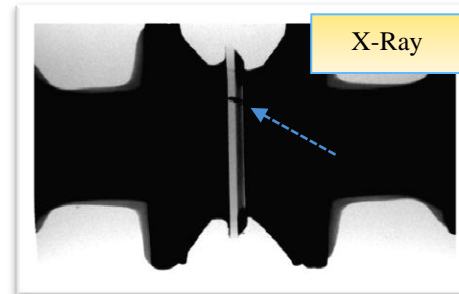


Avalanche Tester

### ➤ Testing Equipment

- ✓ @Italian static tester , Testable all static parameters
- ✓ @Static tester range 2800V、 1000A , Current precision achieves nA level
- ✓ @Surge Tester range 10000A , Can be set fixed interval continuous pulse
- ✓ @Avalanche Tester can test impact resistance of product , improve the reliability in application

# 7 Failure Analysis





# 8 Reliability Test



Test Description	Test Conditions
High Temperature Storage Life (HTSL)	$T_a = 150^{\circ}\text{C}$ , $t=1000\text{h}$ , No bias
High Temperature Reverse Bias (HTRB)	$T_j=150^{\circ}\text{C}$ , $V_R=80\%V_{RRM}$ , $t=1000\text{h}$
Temperature Cycling Test (TC)	HOT $T_a=150^{\circ}\text{C}$ $t=30\text{mins}$ , COLD $T_a = - 55^{\circ}\text{C}$ $t=30\text{mins}$ , TRANSFERRING $\leq 10\text{secs}$ , Cycles=100
Power Cycle (PC)	$T_c$ is constant, $\Delta T_j \geq 100^{\circ}\text{C}$ , Cycles=1000
Constant temperature & humidity ( HTHH )	$T_a = 85^{\circ}\text{C}$ , humidity $\phi=85\%$ , $t=1000\text{h}$
Thermal Resistance Test (Rth)	Junction to Case

# 03

## Product Application

# 1 Product Application

## Main Application

### Electric Vehicle



### Inverter



### Welding Machine

### Intellective power grid



### Solar Energy



### MU trains



### Aerospace



### Wind Power

## 2 Business Customer





## 3 Product Recommendation

### Low power Product

1. Bridge Rectifier Series : DBS, D3K, GBP, GBU, GBJ, TSB-5, MT (1A~50A)
2. Rectifier Diode Series : Axial&SMD(1A~8A)
3. Fast Diode Series : Axial&SMD ( 1A~8A )
4. SKY Diode Series : Axial&SMD(1A~5A)
5. TVS Diode Series : Axial&SMD ( 400W,600W, 1500W )
6. Zener Diode Series

### High power Product

1. Rectifier Module Series : M2,M3,M7,M8 Package
2. FRD Module Series : F3, F4N, FJ, F5,F6 Package 200A,300A,400A/400V, 600V
3. Thyristor Module Series : T1, T2, L1, L2 Package 40A,60A,75A,110A, 150A,200A/800V,1200V, 1600V
4. IGBT Module Series : GJ, GJXPackage 50A,75A,100A/ 600V, 1200V



Compared to our competitors in industrial field, YJ has more wide range of product series for your solution , and has its own wafer fab to meet customer special requirement.



**Thank you !**