

01

绝缘栅双极型晶体管
IGBTs

主要产品：电压等级为 650V~ 6500V 的包括单开关、半桥等各种电路结构的IGBT模块

Main products: IGBT modules rated 650V~6500V, including all kinds of circuit configuration like single switch, half bridge, etc

产品特点 Features

压接式IGBT模块

双面散热	Double-side Cooling
失效短路	Short-circuit Failure Mode
高热循环能力	High Thermal Cycling Capability
低杂散电感	Low Stray Inductance

高压IGBT模块

高直流稳定性	High DC Stability
高短路能力	High Short Circuit Capability
低饱和电压	Low Vce(sat)
正温度系数电压	Vce(sat) With Positive Temperature Coefficient
低杂散电感	Low Inductance Module Structure
高功率循环与热循环能力	High Power And Thermal Cycling Capability

中低压IGBT模块

铜基板	Cu Baseplate
增强型氧化铝衬板	Enhanced Al ₂ O ₃ Substrate
高热循环能力	High Thermal Cycling Capability
10μs短路承受能力	10μs Short Circuit Withstand

主要应用领域 Main Applications

压接式IGBT模块

柔直换流阀	MMC-HVDC Valve
直流断路器	DC Breaker
海上风电	Off-shore Wind Power
大型工业传动	Large-scale Industrial Drive

高压IGBT模块

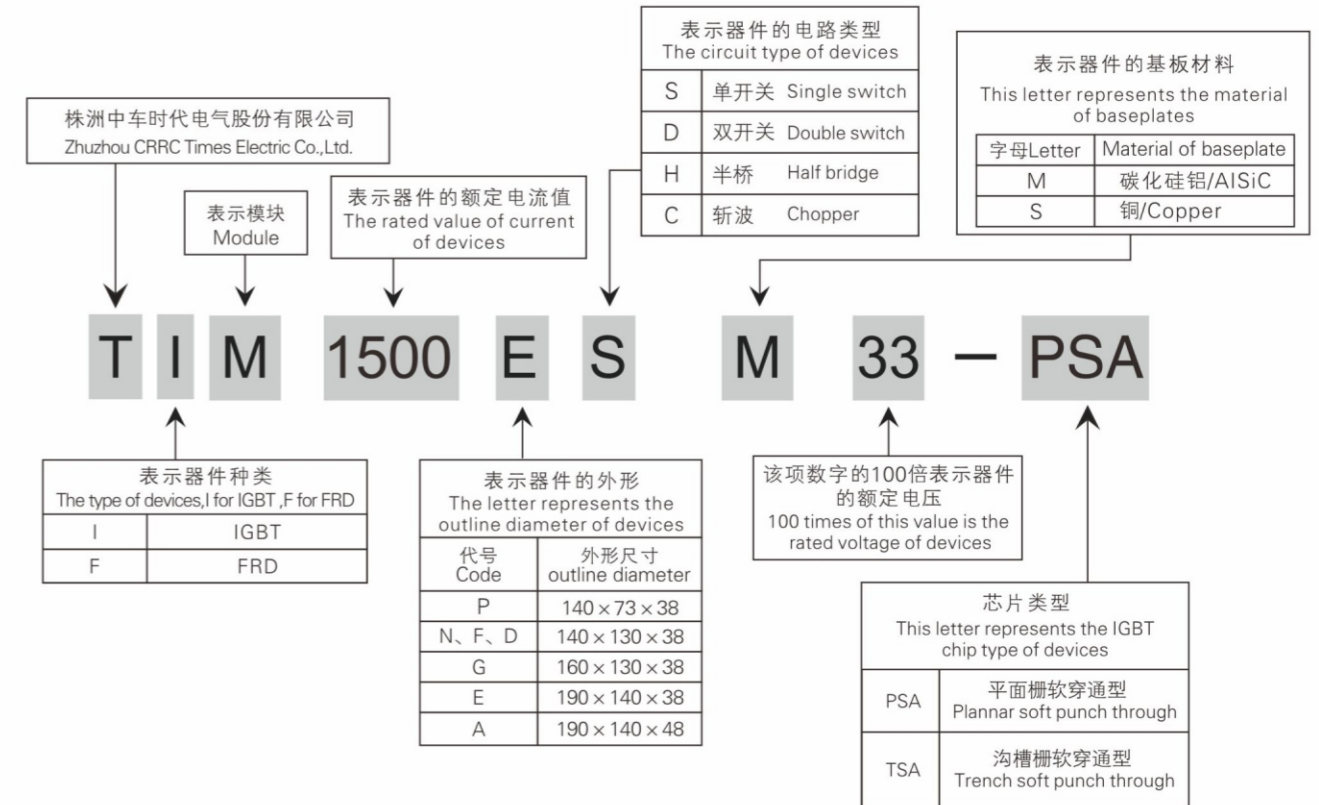
电力牵引	Electric Traction
柔性输电	Flexible Power Transmission
风力发电	Wind Power
电力补偿	Power Compensator
电机驱动	Motor Drive

中低压IGBT模块

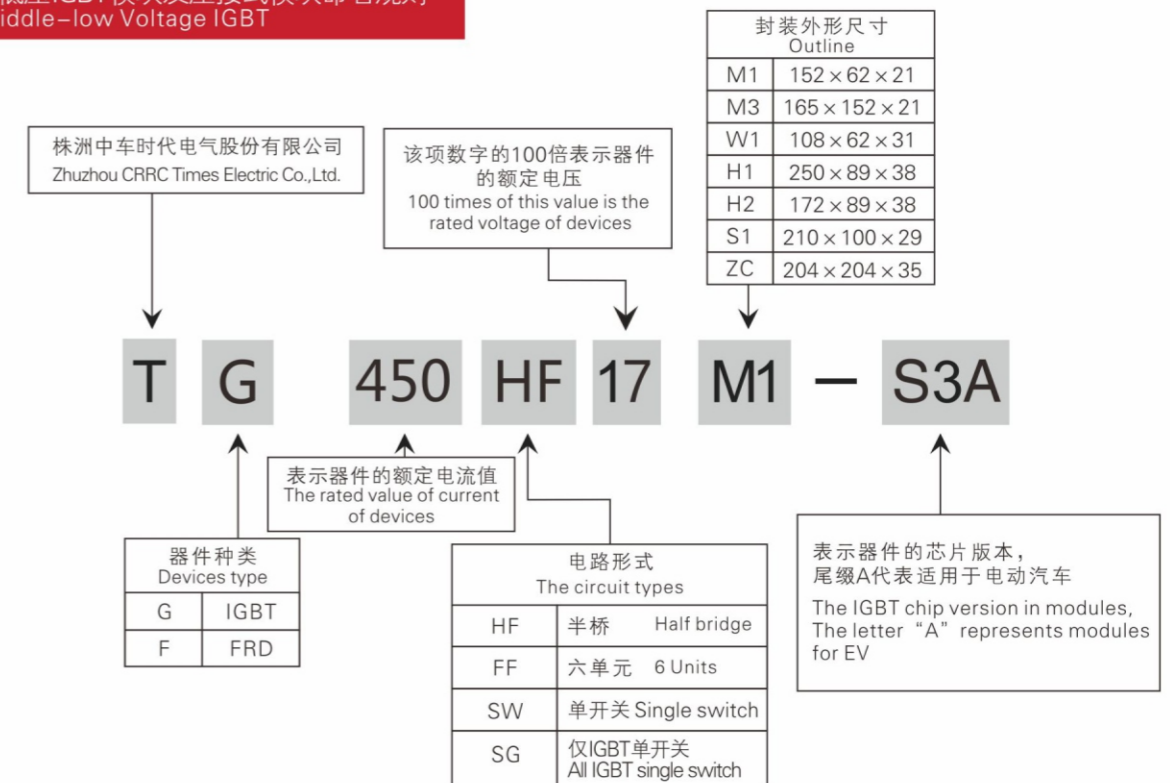
电动汽车	EV/HEV
马达驱动	Motor Drive
充电装置	Power Charging Equipment
无功补偿	Reactive Compensation
高可靠性逆变器	High Reliability Inverter

型号 Type	I_C		V_{CES}	I_{CRM}	V_{CEISAT} @ I_C & $T_C=25^\circ C$	E_{SW} @ T_{VJM}	T_{VJM}	$R_{thJC IGBT}$	封装外形 Assembly Outline		
	A	@ T_C (S模块为T _C) °C							V	A	V
电压至: 750V											
TG600HF08M1-S3A	600	65	750	1200	1.5	76	175	0.09	M1	152×62×21	Cu
TG800FF08S1-S3A	550	65	750	1600	1.45	50	175	0.109	S1	216×100×29	Cu
TG600FF08S3-S3A	600	80	750	1200	1.35	41.5	175	0.134	S3	155×127×27	Cu
电压至: 1200V											
TG600HF12M1-S3A	600	85	1200	1200	1.7	139	150	0.049	M1	152×62×21	Cu
TG450HF12M1-S3A	450	95	1200	900	1.65	78	150	0.052	M1	152×62×21	Cu
电压至: 1700V											
TIM800DDM17-PSA	800	80	1700	1600	2.3	520	125	0.018	DD	140×130×38	AlSiC
TIM800DCM17-PSA	800	80	1700	1600	2.3	520	125	0.018	DC	140×130×38	AlSiC
TIM1600FSM17-PSA	1600	80	1700	3200	2.3	1210	125	0.009	FS	140×130×38	AlSiC
TIM2400NSM17-TSA	2400	85	1700	4800	2.1	2220	150	0.01	ES	140×130×38	AlSiC
TG1000HF17H1-S3	1000	100	1700	2000	1.85	745	150	0.02	H1	250×89×38	Cu
TG650HF17H2-S3	650	100	1700	1300	1.85	580	150	0.03	H2	172×89×38	Cu
TG450HF17M1-S3	450	85	1700	900	1.8	276	150	0.055	M1	152×62×21	Cu
电压至: 3300V											
TIM250PHM33-PSA	250	100	3300	500	2.5	965	150	0.048	PH	140×73×38	AlSiC
TIM500GDM33-PSA	500	95	3300	1000	2.1	2430	150	0.024	GD	160×130×38	AlSiC
TIM1000NSM33-PSA	1000	95	3300	2000	2.1	4650	150	0.012	NS	140×130×38	AlSiC
TIM1000ECM33-PSA	1000	95	3300	2000	2.1	4650	150	0.012	EC	190×140×38	AlSiC
TIM1500ESM33-PSA	1500	95	3300	3000	2.0	6600	150	0.008	ES	190×140×38	AlSiC
电压至: 4500V											
TIM1200ASM45-PSA	1200	85	4500	3000	2.3	10810	125	0.008	AS	190×140×48	AlSiC
TIM1200ESM45-PSA	1200	85	4500	2400	2.3	10810	125	0.008	ES	190×140×38	AlSiC
TG3000SW45ZC-P2	3000	90	4500	6000	2.65	34000	125	0.003	ZC	204×204×35	Cu
TG4000SW45ZC-P2	4000	90	4500	8000	2.65	45300	125	0.0023	ZC	204×204×35	Cu
TG4500SG45ZC-P2	4500	90	4500	9000	2.65	51100	125	0.002	ZC	204×204×35	Cu
TG2000SW45ZC-P2	2000	90	4500	4000	2.65	22900	125	0.0043	ZC	204×204×35	Cu
电压至: 6500V											
TIM750ASM65-PSA	750	80	6500	1500	3.0	10200	125	0.009	AS	190×140×48	AlSiC

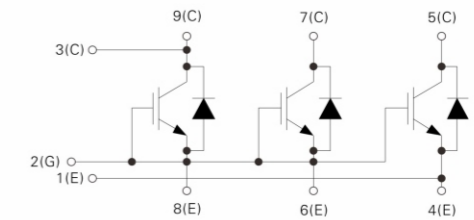
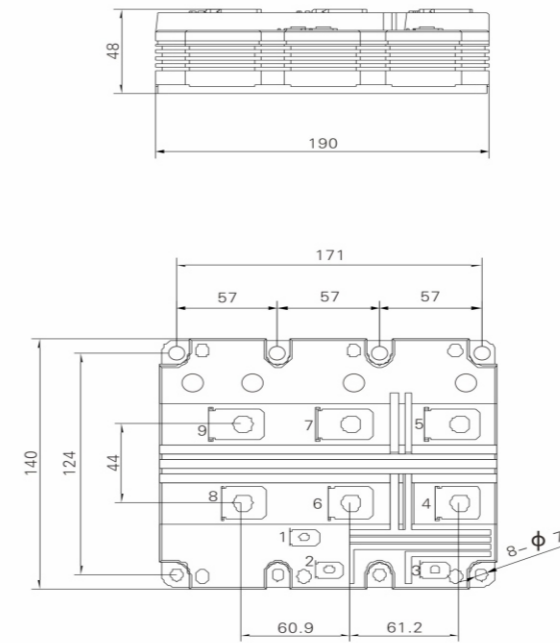
高压IGBT模块产品命名规则 High Voltage IGBT



中低压IGBT模块及压接式模块命名规则 Middle-low Voltage IGBT

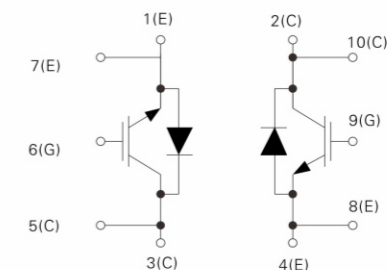
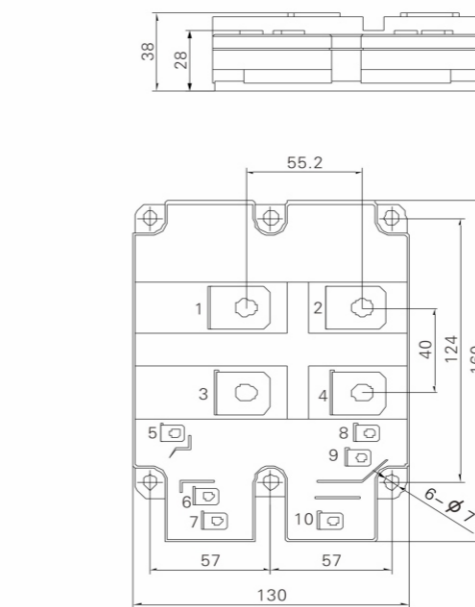


符号 Symbols	参数名称	Characteristics
V_{CES}	集电极-发射极电压	Collector-emitter voltage
V_{GES}	栅极-发射极电压	Gate-emitter voltage
I_C	集电极直流电流	DC collector current
I_{CRM}	集电极重复峰值电流	Peak collector current
P_{tot}	总耗散功率	Total power dissipation.
V_{isol}	绝缘电压	Isolation voltage
Q_{PD}	局部放电	Partial discharge
$R_{thJC IGBT}$	IGBT结壳热阻	IGBT thermal resistance junction to case
$R_{thJC Diode}$	二极管结壳热阻	Diode thermal resistance junction to case
R_{thCH}	接触热阻	IGBT thermal resistance case to heatsink
T_{VJM}	最高(等效)结温	Max. (Virtual) junction temperature
T_{stg}	存储温度	Storage temperature
M	安装力矩	Mounting torque
I_{CES}	集电极截止电流	Collector cut-off current
I_{GES}	栅极漏电流	Gate leakage current
$V_{GE(TH)}$	栅极-发射极阈值电压	Gate-Emitter threshold voltage
$V_{CE(sat)}$	集电极-发射极饱和电压	Collector-Emitter saturation voltage
I_F	二极管正向直流电流	Diode DC forward current
I_{FRM}	二极管正向重复峰值电流	Diode Peak forward current
V_F	二极管正向电压	Diode Forward voltage
C_{ies}	输入电容	Input capacitance
Q_g	栅极电荷	Gate charge
C_{res}	反向传输电容	Reverse transfer capacitance
I_{SC}	短路电流	Short circuit current
$t_{d(off)}$	关断延迟时间	Turn-off delay time
t_f	下降时间	Fall time
E_{OFF}	关断损耗	Turn-off switching energy
$t_{d(on)}$	开通延迟时间	Turn-on delay time.
t_r	上升时间	Rise time
E_{ON}	开通损耗	Turn-on switching energy
Q_{rr}	二极管反向恢复电荷	Diode Reverse recovery charge
I_{rr}	二极管反向恢复电流	Diode Reverse recovery current
E_{rec}	二极管反向恢复损耗	Diode Reverse recovery energy
E_{SW}	IGBT总开关损耗	IGBT total switching energy ($E_{on}+E_{off}$)



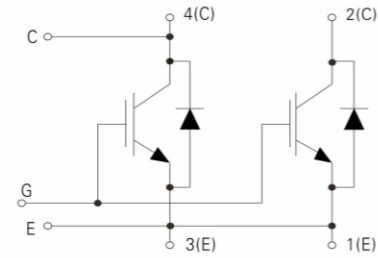
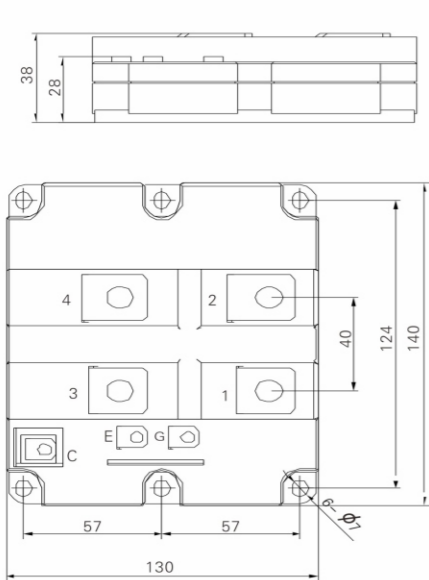
- 1-辅助发射极
 - 2-栅极
 - 3-辅助集电极
 - 4,6,8-发射极
 - 5,7,9-集电极
- 1-Aux Emitter
 - 2-Gate
 - 3-Aux Collector
 - 4,6,8-Emitter
 - 5,7,9-Collector

重量: 1700g Nominal weight: 1700g
封装类型AS: Package type: AS



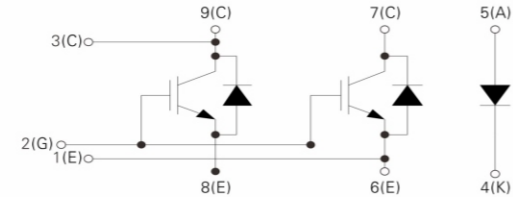
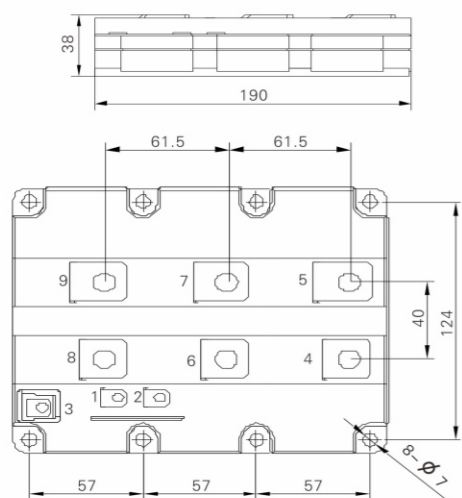
- 1,4-发射极
 - 2,3-集电极
 - 5,10-辅助发射极
 - 6,9-栅极
 - 7,8-辅助发射极
- 1,4-Emitter
 - 2,3-Collector
 - 5,10-Aux emitter
 - 6,9-Gate
 - 7,8-Aux emitter

重量: 1000g Nominal weight: 1000g
封装类型: GD Package type: GD



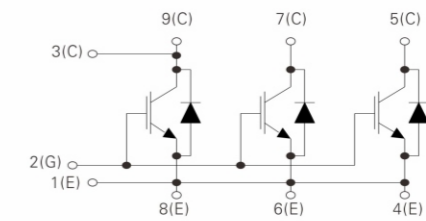
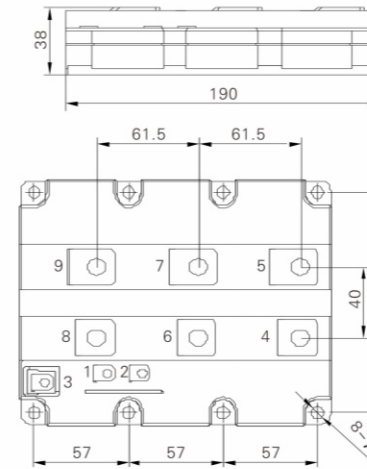
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|---------|-----------------|
| 1,3-发射极 | 1,3-Emitter |
| 2,4-发射极 | 2,4-Collector |
| C-辅助集电极 | C-Aux collector |
| E-辅助发射极 | E-Aux emitter |
| G-栅极 | G-Gate |

重量: 1050g Nominal weight: 1050g
 封装类型: NS Package type: NS



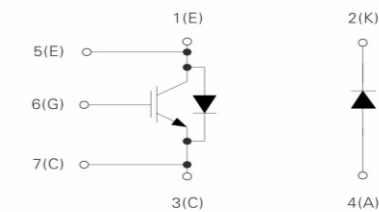
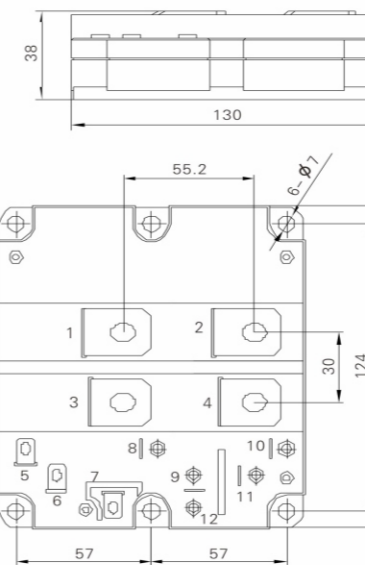
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|-----------|-------------------|
| 1 - 辅助发射极 | 1 - Aux emitter |
| 2 - 栅极 | 2 - Gate |
| 3 - 辅助集电极 | 3 - Aux collector |
| 4 - 二极管正极 | 4 - Diode anode |
| 5 - 二极管负极 | 5 - Diode cathode |
| 6,8 - 发射极 | 6,8 - Emitter |
| 7,9 - 集电极 | 7,9 - Collector |

重量: 1400g Nominal weight: 1400g
 封装类型: EC Package type: EC



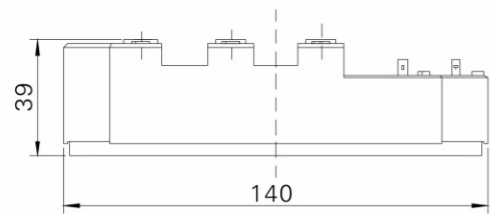
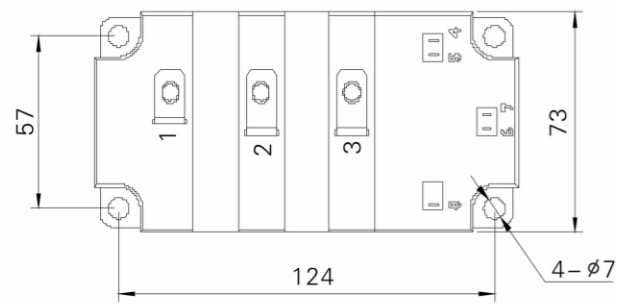
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|-------------|-------------------|
| 1 - 辅助发射极 | 1 - Aux emitter |
| 2 - 栅极 | 2 - Gate |
| 3 - 辅助集电极 | 3 - Aux collector |
| 4,6,8 - 发射极 | 4,6,8 - Emitter |
| 5,7,9 - 集电极 | 5,7,9 - Collector |

重量: 1400g Nominal weight: 1400g
 封装类型: ES Package type: ES

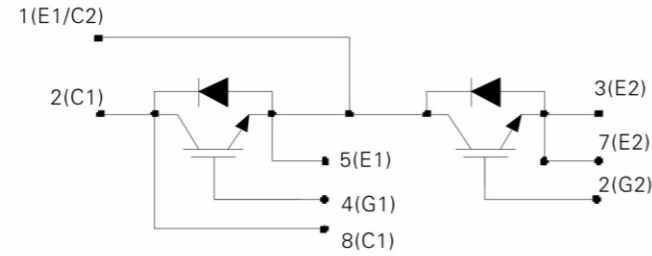


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|-----------|-------------------|
| 1 - 发射极 | 1 - Emitter |
| 2 - 二极管负极 | 2 - Diode cathode |
| 3 - 集电极 | 3 - Collector |
| 4 - 二极管正极 | 4 - Diode anode |
| 5 - 辅助发射极 | 5 - Aux emitter |
| 6 - 栅极 | 6 - Gate |
| 7 - 辅助集电极 | 7 - Aux collector |

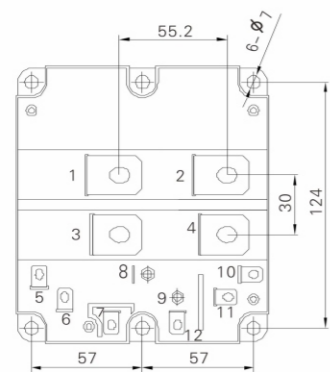
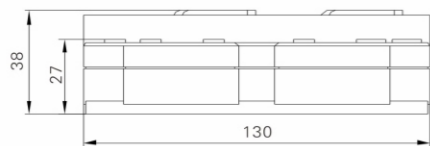
重量: 900g Nominal weight: 900g
 封装类型: DC Package type: DC



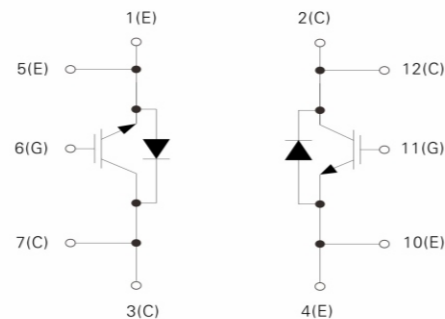
重量: 750g Nominal weight: 750g
封装类型: PH Package type: PH



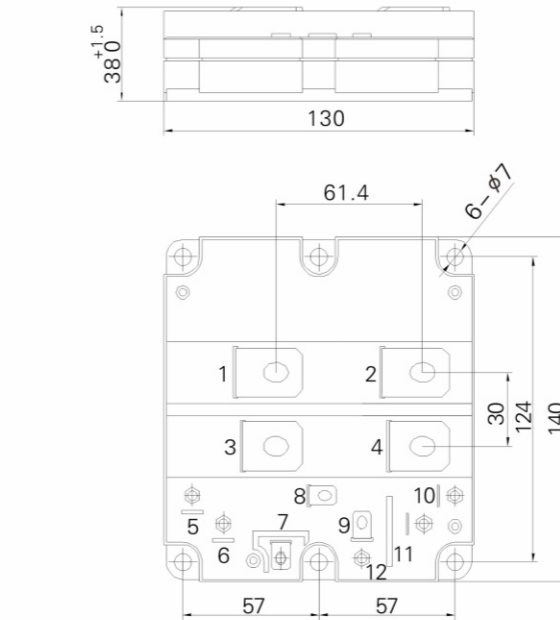
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|------------|---------------------|
| 1-发射极/集电极 | 1-Emitter/Collector |
| 2-集电极 | 2-Collector |
| 3-发射极 | 3-Emitter |
| 4, 6-栅极 | 4, 6-Gate |
| 5, 7-辅助发射极 | 5, 7-Aux Emitter |
| 8-辅助集电极 | 8-Aux Collector |



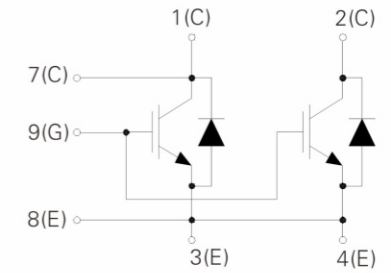
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封装类型: DD Package type: DD



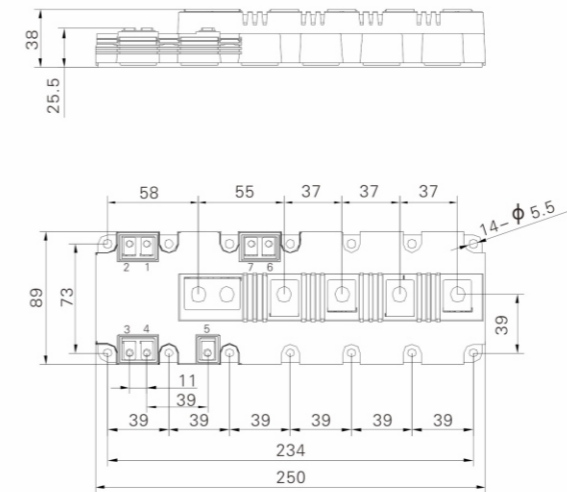
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| 1,4-集电极 | 1,4 - Collector |
| 2,3-发射极 | 2,3 - Emitter |
| 5,10-辅助发射极 | 5,10 - Aux emitter |
| 6,11-栅极 | 6,11 - Gate |
| 7,12-辅助集电极 | 7,12 - Aux collector |



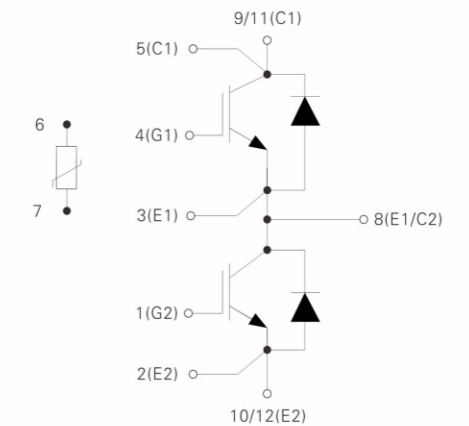
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封装类型: FS Package type: FS



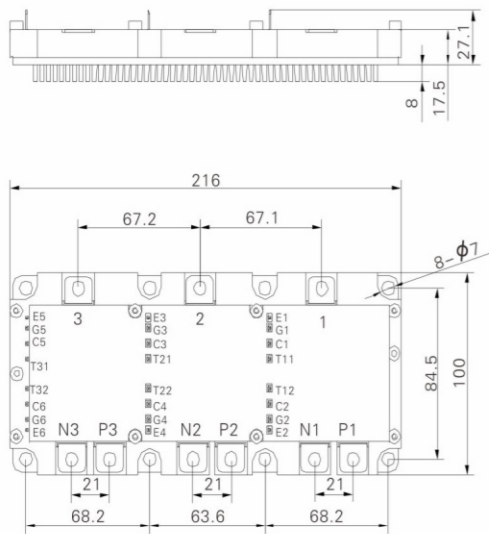
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|---------|-------------------|
| 1,2-集电极 | 1,2 - Collector |
| 3,4-发射极 | 3,4 - Emitter |
| 7-辅助集电极 | 7 - Aux Collector |
| 8-辅助发射极 | 8 - Aux Emitter |
| 9-栅极 | 9 - Gate |



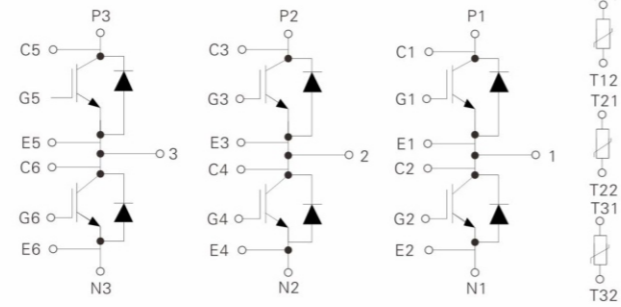
重量: 1200g Nominal weight: 1200g
封装类型: H1 Package type: H1



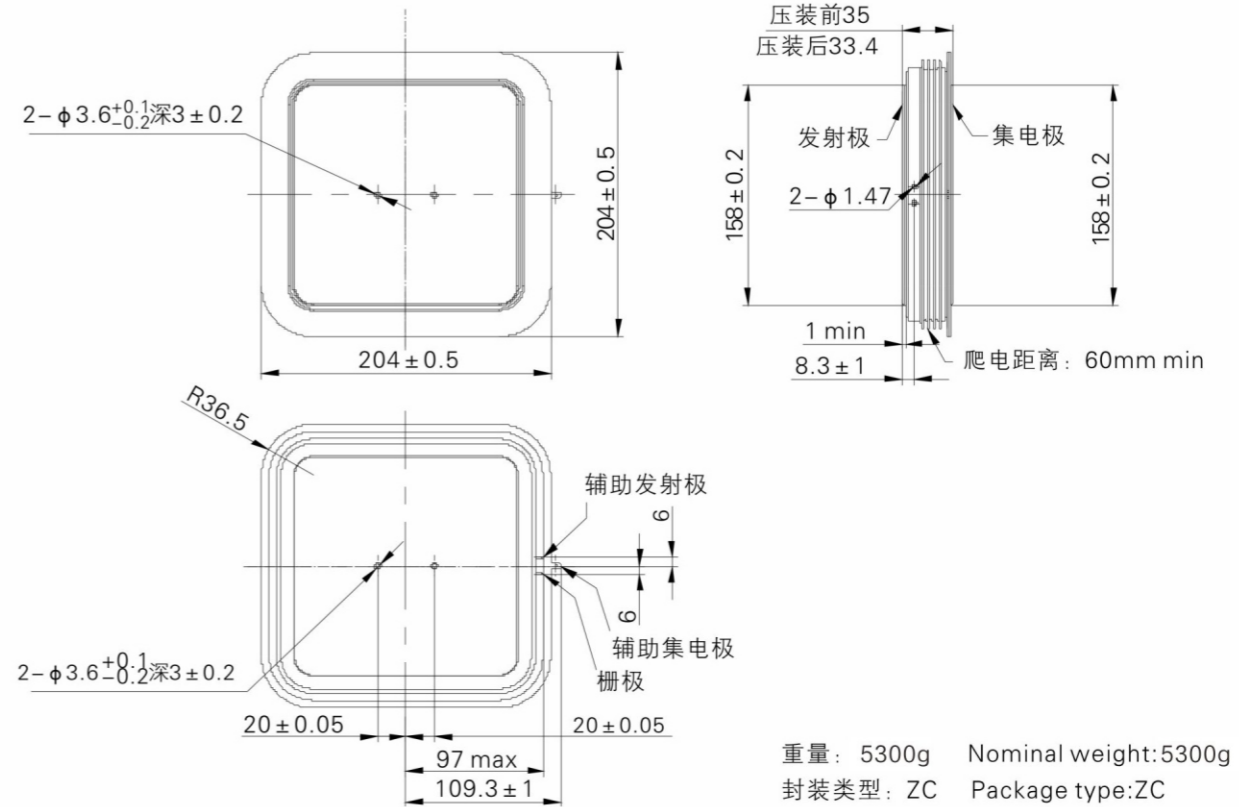
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|-------------|---------------------|
| 1,4 - 栅极 | 1,4-Gate |
| 2,3 - 辅助发射极 | 2,3-Aux emitter |
| 5 - 辅助集电极 | 5- Aux collector |
| 6,7 - 热敏电阻 | 6,7-NTC thermistor |
| 8 - 发射极/集电极 | 8-Emitter/Collector |
| 9,11 - 集电极 | 9,11-Collector |
| 10,12 - 发射极 | 10,12-Emitter |



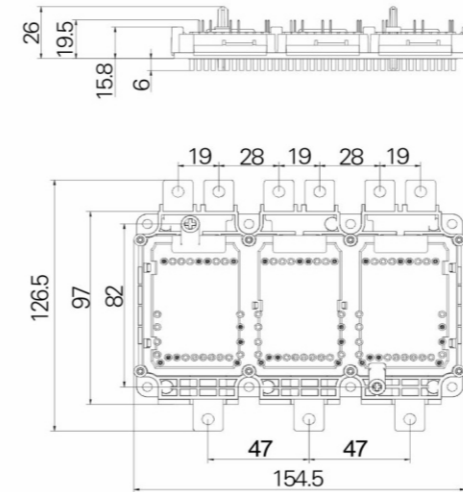
重量: 1250g Nominal weight: 1250g
封装类型: S1 Package type: S1



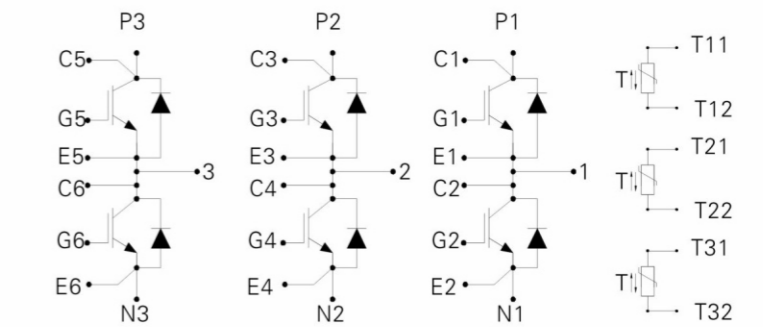
P1,P2,P3-集电极 P1,P2,P3-AC collector
N1,N2,N3-发射极 N1,N2,N3-DC emitter
1,2,3-发射极/集电极 1,2,3-Emitter/Collector
G1,G2,G3,G4,G5,G6-栅极 G1,G2,G3,G4,G5,G6-Gate
E1,E2,E3,E4,E5,E6-辅助发射极 E1,E2,E3,E4,E5,E6-Aux emitter
C1,C2,C3,C4,C5,C6-辅助集电极 C1,C2,C3,C4,C5,C6-Aux collector
T11/T12,T21/T22,T31/T32-热敏电阻 T11/T12,T21/T22,T31/T32-NTC thermistor



重量: 5300g Nominal weight: 5300g
封装类型: ZC Package type: ZC



重量: 800g Nominal weight: 800g
封装类型: S3 Package type: S3



G1,G2,G3,G4,G5,G6-栅极 G1,G2,G3,G4,G5,G6-Gate
E1,E2,E3,E4,E5,E6-辅助发射极 E1,E2,E3,E4,E5,E6-Aux Emitter
C1,C2,C3,C4,C5,C6-辅助集电极 C1,C2,C3,C4,C5,C6-Aux Collector
T11/T12,T21/T22,T31/T32-热敏电阻 T11/T12,T21/T22,T31/T32-NTC Thermistor
1,2,3-发射极/集电极 1,2,3-Emitter/Collector
P1,P2,P3-AC集电极 P1,P2,P3-AC Collector
N1,N2,N3-DC发射极 N1,N2,N3-DC Emitter