MACMIC®

Power for the Better

Power Semiconductors

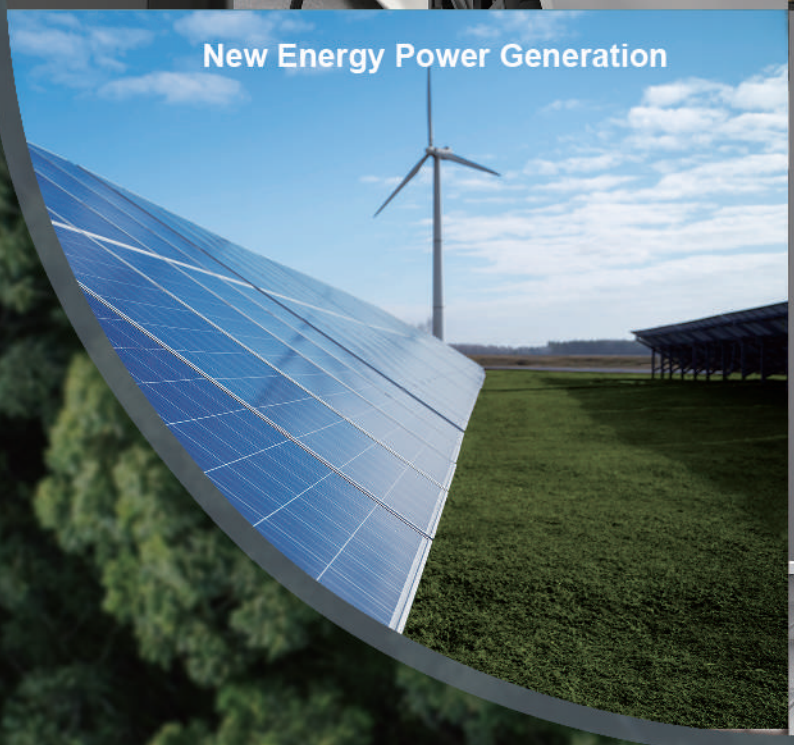
2024-2025 Product Catalogue

MACMIC SCIENCE & TECHNOLOGY CO., LTD.

Power for the Better


Electric Vehicles


Industrial Control


New Energy Power Generation


Household Appliances

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Power for the Better

COMPANY PROFILE

MacMic was founded in 2006. Its main business is the R&D, manufacturing, and sales of power semiconductor devices. The main products of MacMic are IGBT, VDMOS, FRED, SiC chips, discrete devices, and modules. MacMic has advanced IGBT and FRED technologies. MacMic focuses on becoming an expert in providing power semiconductor device solutions. It is one of the leading companies in the power semiconductor industry in China. In 2021, MacMic was successfully listed on the Shanghai Science and Technology Innovation Board with stock ticker 688711.

BUSINESS SCOPES

- Design, development, manufacturing, and marketing of new types of power semiconductor devices, i.e. IGBT, VDMOS, FRED chips and discrete devices, standard and customer specific power modules (CSPM).

QUALITY MANAGEMENT SYSTEMS

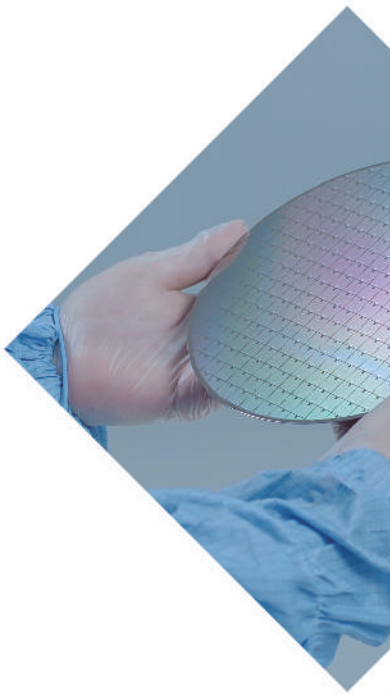
- Insisting on independent innovation, scientific management and continuous improvement, providing better products and services to meet and exceed customers' requirements and expectations.

- The entire production process is controlled by the ISO9001 and IATF16949 quality management systems. Every production step is strictly checked and tested to ensure the quality and stability of the products.

COMPANY GOALS

- Independent innovation, design, development and manufacturing of world-class IGBT, VDMOS, FRD discretes and modules, to provide solutions of power semiconductor devices.

COMPANY STRENGTH



POWER MODULE LINE

Huashan Plant - Factory Area: 6000m^2; Clean Room Area: 1700m^2
Xinzhu Plant - Factory Area: 41000m^2; Clean Room Area: 19300m^2

Equipment: Pick and Place Machines / Vacuum Fumace / Al and Cu Wire Bonders /
X-Ray and C-SAM Scanners

CHARACTERISTIC ANALYSIS LABORATORY

Diode Reverse Recovery Tester
IGBT DC Parameter Tester
IGBT Switching Parameter Tester
IGBT Charge Tester
IGBT Short Circuit Tester
IGBT SCSOA Tester
IGBT RBSOA Tester
HV-D Reverse Recovery Tester
8KV HV Static Parameter Tester
Power Semiconductor UIS Tester
SCR Static & Dynamic Parameter Tester
Surge Current Tester
Thermal Resistance Tester

RELIABILITY LABORATORY

High Temperature Reverse Bias Test
High Temperature Gate Bias Test
HV-H3TRB
Power Cycle Test
High / Low Temperature Cycle Test
High Humidity High Temperature Reverse Bias Test
85 / 85 Temperature / Humidity Test
Thermal Shock Test
Salt Spray Evaluation Test
Vibration Evaluation Test
Highly Accelerated Stress Test (HAST)

Macro Ambitions Achieved Through Micro Steps

FAILURE ANALYSIS LABORATORY

X-Ray Scanning
Cross-Section Analysis
Hot Spotting Analysis
Scanning Electron Microscope (SEM)
Emission Microscope (EMMI)
1000 Times Magnification Microscope

PART 01 IGBT MODULES

IGBT MODULES

Ranges

- 600-1700V / 10-950A

Packages

- GJ, GS, GQ, GD, GK, GQC, GWJ, GCB, GCE, GH, GHD, GW, GWD, GHB, GWB, GHC, GHP, GCF, GB, GC, GV, GVB, GVC, GVD

Circuit Configurations

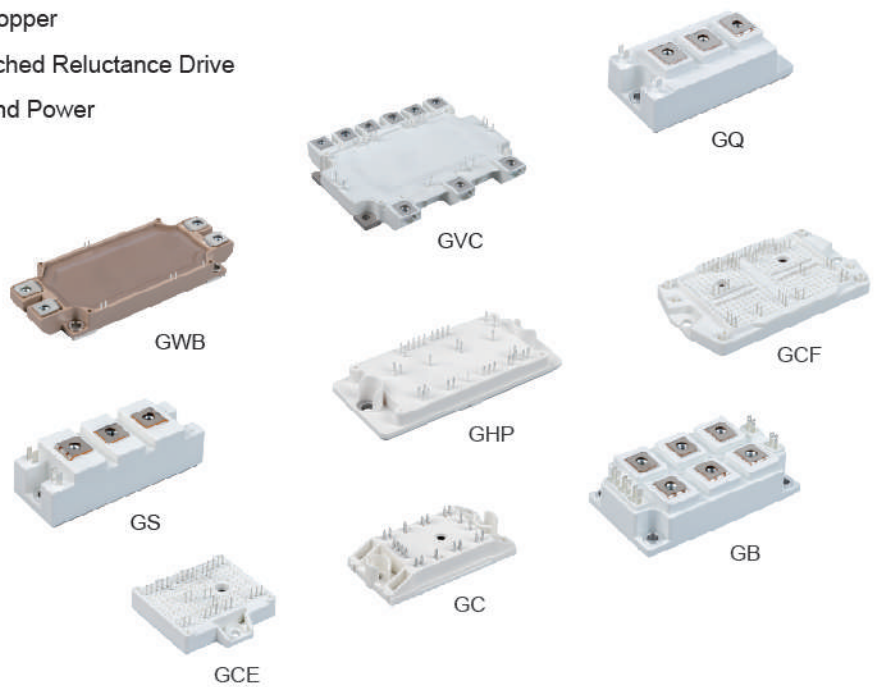
- Single Circuit
- Half-Bridge Circuit, Full-Bridge Circuit, Three Phase Bridge Circuit
- Chopping Circuit, Common-Emitter Circuit
- Three-Level Circuit

Features

- Fast Switching Speed
- Low Conduction Loss
- Soft Turn-Off Characteristic
- High Short Circuit Capability

Applications

- Welding Machine, Cutting Machine
- Plating Power Supply, Induction Heating
- UPS, Inverter, Chopper
- Servo Drive, Switched Reluctance Drive
- Solar Inverter, Wind Power
- Electric Vehicle




GWB

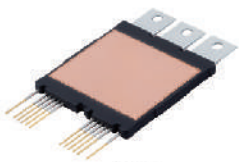

GV


GVB


GVC


GVD

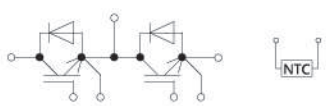
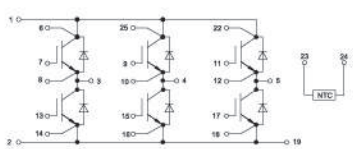
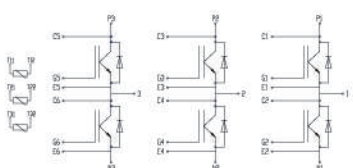
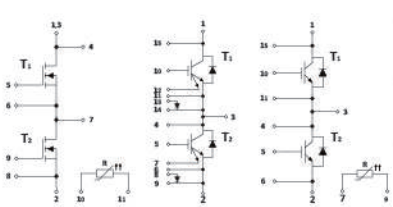

SSC


DSC


SDC

IGBT MODULES FOR ELECTRIC VEHICLE

T_C=25°C unless otherwise noted

Circuit	Part Number	V_{CES} min. (V)	I_C T_C= 65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
 B	MMG450WB120B6TC	1200	450	1.85	2142	40.0	0.07	GWB
	MMG600WB120B6T6	1200	600	1.70	2941	74.5	0.051	GWB
	MMG800WB120B6T6	1200	800	1.80	3750	121.0	0.04	GWB
 X	MMG400VB065X6TC	650	400	1.55	1200	14.6	0.125	GVB
	MMG280VD075X6TC	750	280	1.40	564	20.0	0.266	GVD
	MMG400VD075X6TC	750	400	1.35	1315	24.0	0.114	GVD
	MMG400VC075X6TC	750	400	1.21	1071	22.3	0.14	GVC
 X	MMG600V075X6TC	750	600	1.15	1071	20.0	0.14	GV
	MMG820V075X6TC	750	820	1.35	1070	31.5	0.14	GV
	MMG820V075X6RS	750	820	1.35	1154	25.0	0.13	GV
	MMG950V075X6TC	750	950	1.15	1304	28.2	0.115	GV
	MMG600V120X6RS	1200	600	1.80	1500	51.0	0.10	GV
	CSF080HB075C1T3	750	800	1.35	667	14.03	0.132	DSC
	CSF058HB075C1T1	750	580	1.50	478	79.0	0.23	SSC
 SDC DSC SSC	CCMO02HB120C3B3A1	1200	660	1.41	143	85.1	0.77	SDC


GC


GB


GWB


GCF

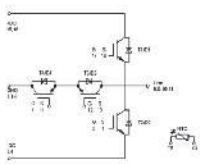
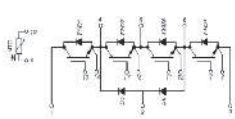
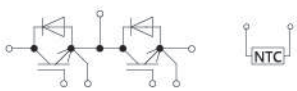
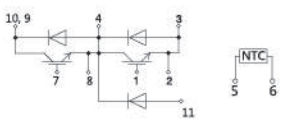
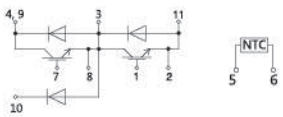

GHP


GCE


GD

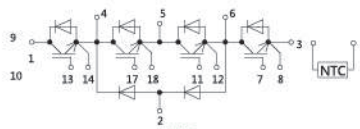
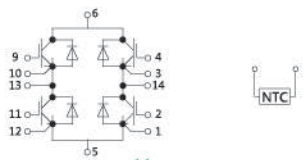
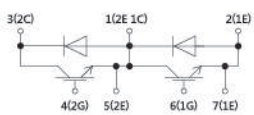
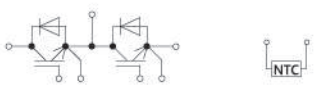
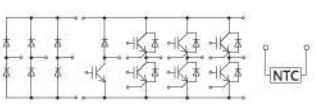
IGBT MODULES FOR PV

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{CES} min. (V)	I_C Tc= 65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
 BF	MMG80C120BF_Y1	1200	80	1.90	300	1.4	0.50	GC
	MMG150B065PD6TC	650	150	1.55	411	5.3	0.34	GB
	MMG450WB120B6TC	1200	450	1.85	2305	48.5	0.065	GWB
 PD	MMG600WB120B6T6	1200	600	1.70	2941	74.5	0.051	GWB
	MMG800WB120B6T6	1200	800	1.80	3750	121.0	0.04	GWB
 B	MMG300WB120TLB6TC	1200	300	1.70	1380	37.0	0.09	GWB
	MMG300WB120TLA6TC	1200	300	1.70	1380	37.0	0.09	GWB
	MMG400CF065PD6T5C	650	400	1.20	1389	2.1	0.11	GCF
 TLB	MMG450HP065PD6T5	650	450	1.50	1071	2.2	0.14	GHP
	MMG150CE065PD6TC	650	150	1.65	335	5.1	0.45	GCE
	MMG150CE065PD6T6	650	150	1.40	335	5.0	0.40	GCE
 TLA	MMG200CE065PD6T5	650	200	1.50	468	5.2	0.32	GCE
	MMG800D120B6T7	1200	800	1.50	3061	132.0	0.049	GD

600-650V IGBT MODULES

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{CES} min. (V)	I_C Tc= 65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
	M3i							
 PD	MMG150B065PD6TC	650	150	1.55	441	4.90	0.34	GB
	MMG200B065PD6TC	650	200	1.55	600	5.70	0.25	GB
	MMG300B065PD6TC	650	300	1.55	882	11.20	0.17	GB
 H	MMG100CE065PD6TC	650	100	1.55	300	2.40	0.45	GCE
	MMG150CE065PD6TC	650	150	1.65	335	5.10	0.45	GCE
	MMG150HB060H6TC	600	150	1.55	441	3.70	0.34	GHB
	MMG200HB060H6TC	600	200	1.55	600	5.70	0.25	GHB
 B	MMG75S060B6TC	600	75	1.55	250	2.15	0.60	GS
	MMG100S060B6TC	600	100	1.55	330	2.15	0.45	GS
	MMG150S060B6TC	600	150	1.65	441	5.00	0.34	GS
	MMG200S060B6TC	600	200	1.55	600	5.70	0.25	GS
 B	MMG300Q060B6TC	600	300	1.55	882	10.70	0.17	GQ
	MMG300D060B6TC	600	300	1.55	882	10.70	0.17	GD
	MMG400D060B6TC	600	400	1.55	1200	12.60	0.125	GD
 XB	MMG450WB065B6TC	650	450	1.55	1250	19.00	0.12	GWB
	MMG600WB065B6TC	650	600	1.55	1760	30.50	0.085	GWB
	MMG50H065XB6TC	650	50	1.70	187	1.00	0.80	GH
	MMG75H065XB6TC	650	75	1.35	250	2.25	0.60	GH


GJ

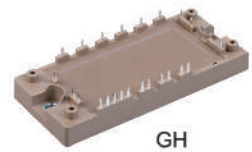

GCB

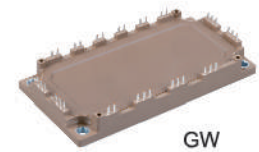

GD


GQC


GQ


GHB


GH


GW

1200V IGBT MODULES

T_C=25°C unless otherwise noted

Circuit	Part Number	V_{CES} min. (V)	I_C T_C= 65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} T_j=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
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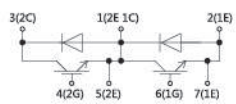
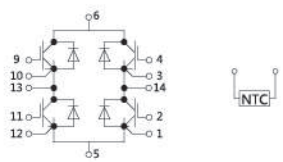
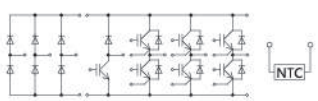
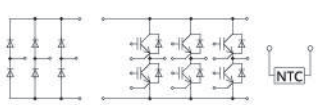
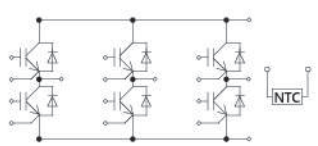
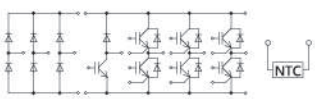
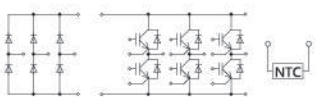
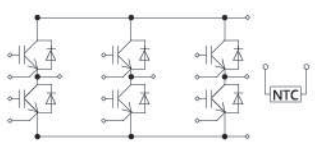
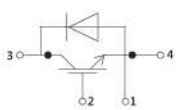
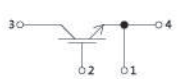
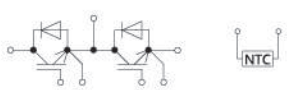
 B	MMG40S120B6UC	1200	40	1.70	300	2.40	0.50	GS
	MMG50S120B6UC	1200	50	1.70	405	3.10	0.37	GS
	MMG75S120B6UC	1200	75	1.70	535	4.10	0.28	GS
	MMG100S120B6UC	1200	100	2.20	555	5.00	0.27	GS
	MMG150S120B6UC	1200	150	2.00	1000	7.30	0.15	GS
 H	MMG100D120B6UC	1200	100	1.70	789	6.70	0.19	GD
	MMG150D120B6UC	1200	150	1.70	937	9.60	0.16	GD
	MMG200D120B6UC	1200	200	1.90	1071	12.30	0.14	GD
	MMG300D120B6UC	1200	300	1.90	1578	23.50	0.095	GD
	MMG400D120B6UC	1200	400	1.90	2083	31.60	0.072	GD
 XB	MMG50QC120H6UC	1200	50	1.70	405	3.10	0.37	GQC
	MMG75QC120H6UC	1200	75	1.70	535	4.10	0.28	GQC
	M3i T							
 XT	MMG10CB120XB6TC	1200	10	1.85	107	0.69	1.25	GCB
	MMG10CB120X6TC	1200	10	1.85	107	0.69	1.25	GCB
	MMG10CB120XT6TC	1200	10	1.85	107	0.69	1.25	GCB
	MMG15CB120XB6TC	1200	15	1.85	130	1.12	1.05	GCB
	MMG15CB120X6TC	1200	15	1.85	130	1.12	1.05	GCB
	MMG15CB120XT6TC	1200	15	1.85	130	1.12	1.05	GCB
	MMG25CB120X6TC	1200	25	1.85	203	2.40	0.74	GCB
 X	MMG25CE120XB6TC	1200	25	1.85	176	2.40	0.75	GCE
	MMG35CE120XB6TC	1200	35	1.85	214	3.30	0.60	GCE
	MMG25HD120XB6TC	1200	25	1.85	166	2.40	0.90	GHD

1200V IGBT MODULES

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{CES} min. (V)	I_C Tc= 65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
 XB	MMG35HD120XB6TC	1200	35	1.85	208	3.30	0.72	GHD
	MMG35HD120XT6TC	1200	35	1.85	208	3.30	0.72	GHD
	MMG50HD120XB6TC	1200	50	1.80	278	4.20	0.54	GHD
	MMG50HD120XT6TC	1200	50	1.80	278	4.20	0.54	GHD
	MMG25H120XB6TC	1200	25	1.85	166	2.40	0.90	GH
 XT	MMG40H120XB6TC	1200	40	1.95	208	3.35	0.72	GH
	MMG50W120XB6TC	1200	50	1.85	278	4.00	0.54	GW
	MMG75W120XB6TC	1200	75	1.85	385	6.20	0.39	GW
	MMG75WD120XB6TC	1200	75	1.85	385	6.20	0.39	GWD
	MMG100WD120XB6TC	1200	100	1.70	515	9.00	0.29	GWD
 X	MMG35CB120X6TC	1200	35	1.80	214	3.70	0.70	GCB
	MMG75H120X6TC	1200	75	1.85	385	6.20	0.39	GH
	MMG75W120X6TC	1200	75	1.85	385	6.20	0.39	GW
	MMG100W120X6TC	1200	100	1.85	515	5.60	0.29	GW
	MMG150W120X6TC	1200	150	1.85	750	13.00	0.20	GW
 U	MMG75J120UZ6TC	1200	75	1.85	385	6.20	0.39	GJ
	MMG75J120U6TC	1200	75	1.85	385	6.20	0.39	GJ
	MMG100J120UZ6TC	1200	100	1.85	515	9.10	0.29	GJ
 UZ	MMG150J120UZ6TC	1200	150	1.85	750	14.40	0.20	GJ
	MMG75S120B6TC	1200	75	1.85	385	6.20	0.39	GS
	MMG100S120B6TC	1200	100	1.70	515	8.30	0.29	GS
 B	MMG150S120B6TC	1200	150	1.85	750	13.00	0.20	GS
	MMG100D120B6TC	1200	100	1.85	556	5.60	0.27	GD
	MMG150D120B6TC	1200	150	1.70	789	12.10	0.19	GD


GQ

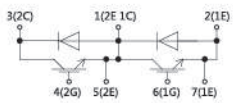
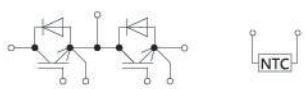
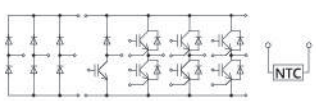
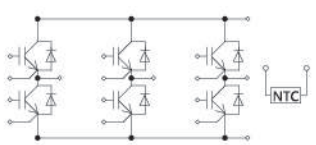

GWB


GCB


GW

1200V IGBT MODULES

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{CES} min. (V)	I_C Tc= 65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
	MMG200Q120B6TC	1200	200	1.70	1071	16.50	0.14	GQ
	MMG200Q120DE6TC	1200	200	1.70	1071	16.50	0.14	GQ
 B	MMG200D120B6TC	1200	200	1.70	1071	16.50	0.14	GD
	MMG300D120B6TC	1200	300	1.85	1500	29.00	0.10	GD
	MMG400D120B6TC	1200	400	1.85	2000	35.00	0.75	GD
	MMG450D120B6TC	1200	450	1.85	2235	52.00	0.07	GD
	MMG300WB120B6TC	1200	300	1.80	1596	26.30	0.094	GWB
 B	MMG450WB120B6TC	1200	450	1.85	2305	45.00	0.065	GWB
	MMG600WB120B6TC	1200	600	1.90	3125	58.00	0.048	GWB
	M6i							
 XB	MMG600WB120B6T6	1200	600	1.70	3750	74.50	0.40	GWB
	MMG800WB120B6T6	1200	800	1.80	3571	87.00	0.042	GWB
	M7i							
	MMG25CB120XB6T7	1200	25	1.60	163	3.18	0.92	GCB
	MMG75HD120XB6T7	1200	75	1.55	312	4.95	0.48	GHD
 X	MMG150WJ120XB6T7	1200	150	1.50	882	12.10	0.17	GW
	MMG200W120X6T7	1200	200	1.55	652	13.60	0.23	GW
	MMG300W120X6T7	1200	300	1.50	882	24.40	0.17	GW
	MMMG800D120B6T7	1200	800	1.50	3061	132.00	0.05	GD


GW

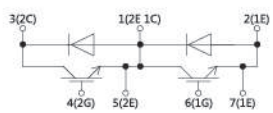
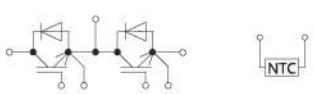
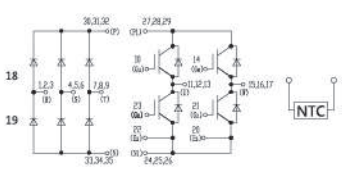

GS


GD


GWB

1700V IGBT MODULES

T_C=25°C unless otherwise noted

Circuit	Part Number	V_{CES} min. (V)	I_C T_C= 65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} T_j=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
	SPT+							
	MMG50S170B	1700	50	2.40	395	9.8	0.38	GS
	MMG75S170B	1700	75	2.40	535	18.5	0.28	GS
 B	MMG100S170B	1700	100	2.30	682	24	0.22	GS
	MMG100D170B	1700	100	2.30	789	25	0.19	GD
	MMG150D170B	1700	150	2.30	1071	41	0.14	GD
	MMG200D170B	1700	200	2.30	1363	56	0.11	GD
	MMG300D170B	1700	300	2.30	1875	93	0.08	GD
	MMG300WB170B	1700	300	2.65	2000	94	0.075	GWB
 B	MMG450WB170B	1700	450	2.70	2700	150	0.055	GWB
	MMG600WB170B	1700	600	2.70	3750	215	0.04	GWB
	M3i							
	MMG75S170B6TC	1700	75	2.15	555	17	0.27	GS
	MMG100S170B6TC	1700	100	2.15	681	22.5	0.22	GS
	MMG100D170B6TC	1700	100	2.05	833	26	0.18	GD
	MMG150D170B6TC	1700	150	2.15	1071	34	0.14	GD
 HX	MMG200D170B6TC	1700	200	2.20	1500	52	0.10	GD
	MMG300D170B6TC	1700	300	2.15	1760	90	0.085	GD
	MMG450WB170B6TC	1700	450	2.05	2500	160	0.06	GWB
	MMG75W170HX6TC	1700	75	2.15	500	17	0.30	GW
	MMG100W170HX6TC	1700	100	2.20	750	25	0.20	GW
	MMG150W170HX6TC	1700	150	2.20	880	36	0.17	GW

PART 02 FRED MODULES

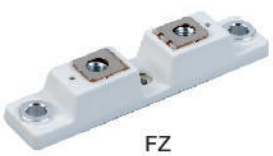
Ranges
- 100-1700V / 60-600A

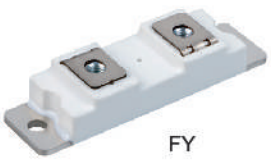
Circuit Configuration
- Non-insulated Common-Cathode Circuit
- Insulated Common-Cathode Circuit
- Insulated Common-Anode Circuit
- Insulated Half Bridge Circuit

Packages
- FZ, FN, FJ, FY, FS, FYB, FD

Features
- Short Recovery Time
- Soft-Recovery Characteristics
- Low Reverse Recovery Charge
- Low Forward Voltage
- High Avalanche Energy
- Stressless Package

Applications
- Welding Machine
- SMPS, UPS
- Inverter, Chopper
- PFC


FZ


FY


FN


FJ


FYB

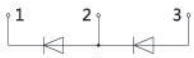
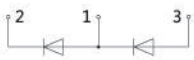
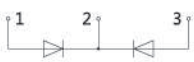
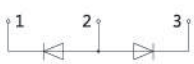

FS


FD

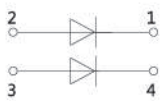
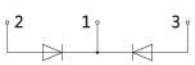
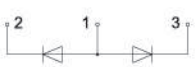
Tc=25°C unless otherwise noted

Circuit	Part Number	V_{RRM} (V)	$I_{F(AV)}$ d=0.5 Tc=110°C (A)	I_{FSM} 10ms T_J=45°C (A)	V_{FM} @ I_{FM} T_J=25°C (V)	(A)	t_{rr} T_J=25°C (ns)	R_{thJC} (K/W)	Package Outline
 DK1 (Non-insulated)	MMF400Z020DK1	200	2×200	1800	0.95	200	90	0.20	FZ
	MMF200ZB040DK1	400	2×100	1250	1.00	100	70	0.20	FZ
	MMF200ZB040DK1C	400	2×100	1000	1.10	100	75	0.22	FZ
	MMF200ZB040DK1D	400	2×100	700	1.25	100	49	0.37	FZ
	MMF200ZB060DK1C	600	2×100	1000	1.20	100	130	0.25	FZ
	MMF800Y020DK1	200	2×400	3000	1.00	400	165	0.08	FY
	MMF200Y040DK1	400	2×100	1250	1.00	100	70	0.10	FY
	MMF300Y040DK1	400	2×150	1900	1.20	150	65	0.10	FY
	MMF300Y040DK1B	400	2×150	1900	1.20	150	65	0.10	FY
	MMF400Y040DK1	400	2×200	2550	1.20	200	75	0.08	FY
	MMF400Y040DK1B	400	2×200	2550	1.20	200	75	0.08	FY
	MMF200Y060DK1	600	2×100	1200	1.20	100	91	0.20	FY
	MMF300Y060DK1	600	2×150	2500	1.20	150	100	0.08	FY
	MMF300Y060DK1B	600	2×150	2650	1.30	150	95	0.075	FY
	MMF300YB050U	500	300	3800	1.20	300	160	0.11	FYB
	MMF300YB070U	700	300	3800	1.38	300	121	0.12	FYB
	MMF600S060U	600	600	4800	1.15	600	175	0.075	FS
 U	MMF300S120U	1200	300	2500	2.75	300	150	0.14	FS
	MMF400S120U	1200	400	3200	3.00	400	180	0.11	FS
 U	MMF600S120U	1200	600	4800	2.80	600	200	0.10	FS
	MMF400S170U	1700	400	4000	1.80	400	1100	0.09	FS
	MMF400D120U	1200	400	3600	2.10	400	190	0.085	FD

T_C=25°C unless otherwise noted

Circuit	Part Number	V_{RRM} (V)	$I_{F(AV)}$ d=0.5 T_C=110°C (A)	I_{FSM} 10ms T_J=45°C (A)	V_{FM} @ I_{FM} T_J=25°C (V)	(A)	t_{rr} T_J=25°C (ns)	R_{thJC} (K/W)	Package Outline
 B	MMF150N060B6B	600	2×150	1400	1.15	150	130	0.34	FN
	MMF100N120B	1200	2×100	1100	1.60	100	135	0.44	FN
 B	MMF150S060B	600	2×150	1500	1.15	150	130	0.22	FS
	MMF200S060B	600	2×200	2000	1.15	200	140	0.18	FS
	MMF300S060B	600	2×300	3000	1.15	300	150	0.14	FS
	MMF150S120B	1200	2×150	1500	1.60	150	145	0.22	FS
	MMF200S120B	1200	2×200	1800	2.30	200	110	0.22	FS
	MMF300S120B	1200	2×300	2700	2.80	300	135	0.14	FS
	MMF100S170B	1700	2×100	1000	1.80	100	500	0.22	FS
	MMF300N060DK6B	600	2×150	1410	1.25	150	95	0.34	FN
 DK	MMF200N120DK6B	1200	2×100	1100	3.25	100	150	0.44	FN
	MMF200N120DK	1200	2×100	1100	1.77	100	150	0.44	FN
	MMF200N070DK	700	2×100	1200	1.20	100	140	0.34	FN
	MMF150S060DK	600	2×150	1500	1.15	150	130	0.22	FS
	MMF200S060DK	600	2×200	2000	1.15	200	140	0.18	FS
	MMF300S060DK	600	2×300	3000	1.15	300	150	0.14	FS
	MMF150S120DK	1200	2×150	1500	1.60	150	145	0.22	FS
	MMF200S120DK	1200	2×200	1800	2.30	200	110	0.22	FS
	MMF300S120DK	1200	2×300	2700	2.80	300	135	0.14	FS
	MMF200N120DA6B	1200	2×100	1100	3.25	100	150	0.44	FN
	MMF200N120DA	1200	2×100	1100	1.77	100	150	0.44	FN
 DA	MMF200N070DA	700	2×100	1200	1.20	100	140	0.34	FN
	MMF150S060DA	600	2×150	1500	1.15	150	130	0.22	FS
	MMF200S060DA	600	2×200	2000	1.15	200	140	0.18	FS
	MMF300S060DA	600	2×300	3000	1.15	300	150	0.14	FS
	MMF150S120DA	1200	2×150	1500	1.60	150	145	0.22	FS
	MMF200S120DA	1200	2×300	1800	2.30	200	110	0.22	FS
	MMF300S120DA	1200	2×300	2700	2.80	300	135	0.14	FS

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{RRM} (V)	$I_{F(AV)}$ d=0.5 Tc=110°C (A)	I_{FSM} 10ms T_J=45°C (A)	V_{FM} @ I_{FM} T_J=25°C (V)	(A)	t_{rr} T_J=25°C (ns)	R_{thJC} (K/W)	Package Outline
 D	MMF2X100J040D	400	2×100	1100	1.20	100	62	0.34	FJ
	MMF2X100J060D	600	2×100	1500	1.35	100	95	0.30	FJ
	MMF2X60J070D	700	2×60	600	1.15	60	150	0.60	FJ
	MMF2X60J120D	1200	2×60	500	1.80	60	135	0.65	FJ
	MMF2X100J120D	1200	2×60	1400	2.15	100	125	0.40	FJ
	MMF2X100J120D6B	1200	2×100	950	3.25	100	150	0.44	FJ
 DK2B	MMF400N020DK2B	200	2×200	2000	0.90	200	135	0.34	FN
	MMF400S040DK2B	400	2×400	2800	1.60	400	110	0.10	FS
	MMF150S060DK2B	600	2×150	1500	1.25	150	95	0.30	FS
	MMF200S060DK2B	600	2×200	2000	1.15	200	140	0.18	FS
	MMF300S060DK2B	600	2×300	3000	1.10	300	165	0.15	FS
	MMF150S120DK2B	1200	2×150	1500	1.60	150	145	0.22	FS
	MMF200S120DK2B	1200	2×200	1800	2.30	200	110	0.22	FS
	MMF300S120DK2B	1200	2×300	2700	2.80	300	135	0.14	FS
 DA2B	MMF150S060DA2B	600	2×150	1500	1.25	150	95	0.30	FS
	MMF200S060DA2B	600	2×200	2000	1.15	200	140	0.18	FS
	MMF300S060DA2B	600	2×300	3000	1.10	300	165	0.15	FS
	MMF200S120DA2B	1200	2×200	1800	2.30	200	110	0.22	FS
	MMF200S170DA2B	1700	2×200	2000	1.80	200	750	0.14	FS
	MMF150S060B2B	600	2×150	1500	1.15	150	130	0.22	FS
	MMF300S060B2B	600	2×300	3000	1.15	300	150	0.14	FS
 B2B	MMF150S120B2B	1200	2×150	1500	1.60	150	145	0.22	FS
	MMF300S120B2B	1200	2×300	2700	2.80	300	135	0.14	FS
	MMF400D120B2B	1200	2×400	3200	3.00	400	180	0.11	FD
	MMF100S170B2B	1700	2×100	1000	1.80	100	500	0.22	FS
	MMF300D170B2B	1700	2×300	3000	2.00	300	500	0.14	FD
	MMF400D170B2B	1700	2×400	3200	1.95	400	2000	0.10	FD

PART 03 RECTIFIER DIODE MODULES

Ranges
- 1600-1800V / 60-400A

Circuit Configurations
- Half Bridge Circuit
- Common-Cathode Circuit
- Single Circuit

Applications
- Inverter
- Switching Mode Power Supply
- Welding Machine
- Medical Power Supply

Packages
- DA, DAB, DS

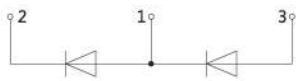
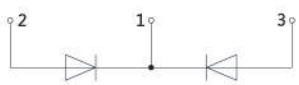
Features
- Compact Structure
- High Current Capability
- High Blocking Voltage
- High Reliability
- High Performance Price Ratio


DA


DAB


DS

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{RRM} (V)	$I_{F(AV)}$ Tc=85°C (A)	I_{FSM} t=10ms T_J=45°C (A)	V_{FM} @ I_{FM} T_J=25°C (V)	V_{FM} @ I_{FM} T_J=25°C (A)	R_{thJC} (K/W)	Package Outline
	MMD60A160DK	1600	60	1350	1.50	180	0.63	DA
	MMD110A180B	1800	110	2500	1.60	350	0.30	DA
 B	MMD130A160B	1600	130	3450	1.50	400	0.25	DA
	MMD130A180B	1800	130	3500	1.50	400	0.20	DA
	MMD110AB160B	1600	110	2350	1.40	300	0.30	DAB
	MMD160AB160B	1600	160	5000	1.50	500	0.18	DAB
	MMD130S160B	1600	130	3500	1.50	400	0.20	DS
 DK	MMD160S160B	1600	160	5500	1.50	500	0.18	DS
	MMD160S180B	1800	160	5500	1.50	500	0.18	DS
	MMD180S160B	1600	180	6000	1.50	600	0.18	DS
	MMD180S180B	1800	180	6000	1.50	600	0.18	DS
	MMD200S180B	1800	200	6500	1.50	600	0.16	DS
 U	MMD240S160B	1600	240	7350	1.55	600	0.12	DS
	MMD300S160U	1600	300	9000	1.25	500	0.09	DS
	MMD400S160U	1600	400	12000	1.10	400	0.09	DS

PART 04 THREE-PHASE RECTIFIER BRIDGE MODULES

Ranges

- 1600-2000V / 50-250A

Circuit Configurations

- Three Phase Rectifier Bridge Circuit

Applications

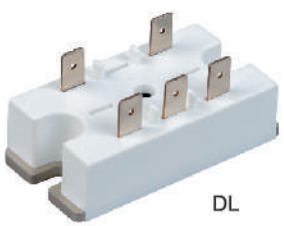
- Inverter
- Switching Mode Power Supply
- Welding Machine
- Medical Power Supply

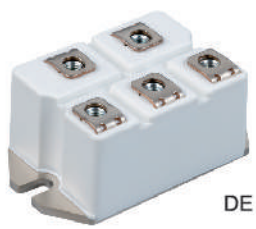
Packages

- DE, DEB, DF, DFB, DL

Features

- Compact Structure
- High Current Capability
- High Blocking Voltage
- High Reliability
- High Performance Price Ratio


DL


DE

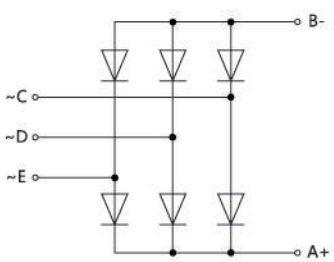

DEB


DFB


DF

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{RRM} (V)	$I_{F(AV)}$ Tc=85°C (A)	I_{FSM} t=10ms T_J=45°C (A)	$V_{F(max)}$ @ I_F T_J=25°C (V)	(A)	R_{thJC} (K/W)	Package Outline
	MMD50L160X	1600	50	500	1.40	50	0.20	DL
	MMD70E160X MMD70E180X MMD70E200X	1600 1800 2000	70	700	1.35	70	0.18	DE
	MMD100E160X MMD100E180X MMD100E200X	1600 1800 2000	100	1000	1.35	100	0.15	DE
	MMD100F200X	2000	100	1000	1.35	100	0.15	DF
	MMD150F160X MMD150F180X	1600 1800	150	1500	1.45	150	0.11	DF
	MMD160F200X	2000	160	1600	1.50	160	0.11	DF
	MMD200F160X MMD200F180X MMD200F200X	1600 1800 2000	200	2000	1.45	200	0.09	DF
	MMD250F160X MMD250F180X	1600 1800	250	2500	1.55	250	0.08	DF
	MMD70EB160X	1600	70	700	1.35	70	0.18	DEB
	MMD75EB160X	1600	75	1000	1.35	75	0.15	DEB
	MMD100EB160X	1600	100	1000	1.35	100	0.15	DEB
	MMD150FB160X	1600	150	1500	1.45	150	0.11	DFB
	MMD200FB160X	1600	200	2000	1.45	200	0.09	DFB
	MMD250FB160X MMD250FB180X	1600 1800	250	2500	1.55	250	0.08	DFB



X

PART 05 DISCRETES

IGBT DISCRETES

Ranges

- 650-1350V / 10-140A

Packages

- TO-247-3L, TO-247-4L, TO-247 Plus-3L, TO-247 Plus-4L

Applications

- Welding Machine, Induction Cooker, Inverter
- Switching Mode Power Supply, UPS
- PV Inverter, Energy Storage

Features

- Fast Switching Speed
- High Short Circuit Capability

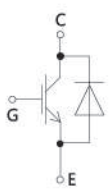
T_C=25°C unless otherwise noted

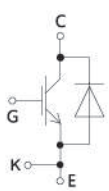
TO-247-3L

TO-247 Plus-3L

TO-247 Plus-4L

TO-247-4L





Circuit	Part Number	V_{CES} min. (V)	I_C Tc= 80-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=150°C (mJ)	R_{thJC} max. (K/W)	Package Outline
	MM40G3U65B	650	40	1.55	230	0.70	0.65	TO-247-3L
	MM50GBU65B	650	50	1.50	375	1.90	0.42	TO-247-3L
	MM60G3U65B	650	60	1.55	300	1.14	0.50	TO-247-3L
	MM75G3T65B	650	75	1.45	535	3.05	0.24	TO-247-3L
	MM75G5T65B	650	75	1.50	385	2.60	0.39	TO-247-3L
	MM75G5U65BX	650	75	1.65	385	1.20	0.39	TO-247-3L
	MM75G5U65BKX	650	75	1.65	385	1.40	0.39	TO-247-4L
	MM100G5T65B	650	100	1.50	517	1.63	0.29	TO-247-3L
	MM120G3T65BM	650	120	1.60	750	5.10	0.20	TO-247 Plus-3L
	MM10G3T120B	1200	10	1.85	125	0.69	1.20	TO-247-3L
	MM15G3T120B	1200	15	1.85	200	1.12	0.75	TO-247-3L
	MM25G3T120B	1200	25	1.80	385	2.55	0.39	TO-247-3L
	MM25G3U120BX	1200	25	2.15	326	1.05	0.46	TO-247-3L
	MM40G3T120B	1200	40	1.90	395	4.70	0.35	TO-247-3L
	MM40G3U120BX	1200	40	1.90	455	2.20	0.33	TO-247-3L
	MM40G5U120BX	1200	40	1.70	395	1.90	0.38	TO-247-3L
	MM50G3T120BM	1200	50	1.80	535	4.30	0.28	TO-247 Plus-3L
	MM50G3U120BMX	1200	50	1.95	535	2.80	0.28	TO-247 Plus-3L
	MM75G5U120BM	1200	75	1.70	535	3.80	0.28	TO-247 Plus-3L
	MM75G5U120BKM	1200	75	1.70	535	3.70	0.28	TO-247 Plus-4L
	MM140G7U120BKM	1200	140	1.60	1111	8.00	0.14	TO-247 Plus-4L
	RC IGBT							
	MM20G3R135B	1350	20	1.60	333	1.40	0.45	TO-247-3L
	MM20G3T135B	1350	20	1.65	268	1.30	0.56	TO-247-3L

* Note: RC IGBT stands for reverse conducting IGBT

MOSFET DISCRETES

Ranges

- 1500V / 3A

Packages

- TO-263, TO-3PF, TO-247

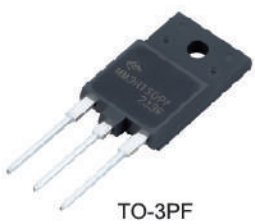
Applications

- High Switching Mode Power Supply

Features

- Low $R_{ds(on)}$
- Fast Switching Speed
- High Avalanche Energy

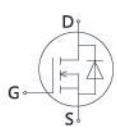
TO-263



TO-3PF

TO-247

T_C=25°C unless otherwise noted

Circuit	Part Number	V_{DSS} min. (V)	I_D (A)	$R_{DS(on)}$ typ. (Ω)	P_D max. (W)	t_f T_j=25℃ (ns)	R_{thJC} max. (K/W)	Package Outline
	MM3N150PF	1500	2.5	9	63	61	2.00	TO-3PF
	MM3N150S	1500	2.5	9	63	61	0.90	TO-263
	MM3N150B	1500	2.5	9	63	61	0.89	TO-247

FRED DISCRETES

Ranges

- 200-1200V / 8-100A

Packages

- TO-220, TO-220F
- TO-247, TO-3P

Applications

- Welding Machine
- SMPS, UPS
- Home Appliances
- Charging Pile

Features

- Short Recovery Time
- Soft-Recovery Characteristics
- Low Reverse Recovery Charge
- Low Leakage Current
- High Avalanche Energy

TO-220(A/B/C)

TO-247-3L

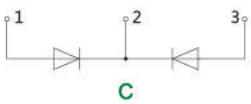
TO-3P-2L(3PN/3PB)

TO-220F

TO-247-2L

TO-3P-3L(3PN/3PB)

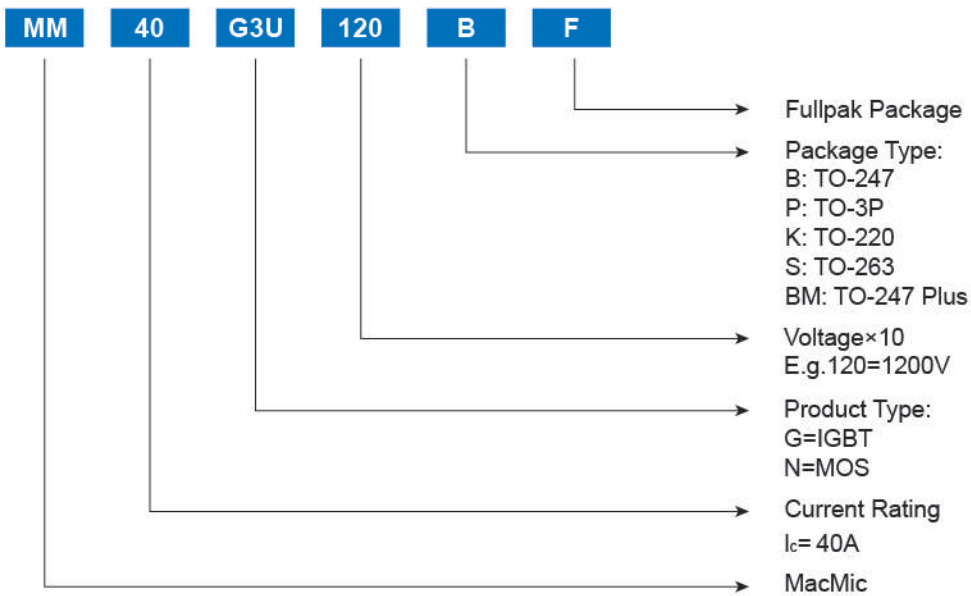
Tc=25°C unless otherwise noted

Circuit	Part Number	V_{RRM} (V)	$I_{F(AV)}$ d=0.5 Tc=110°C (A)	V_F $I_F=I_{F(AV)}$ Tj=125°C (V)	t_{rr} I_F=1A Tj=25℃ (ns)	R_{thJC} max. (K/W)	Package Outline
 C	D92-02	200	10*2	0.90	17	1.50	TO-3PB-3L
	MM100F20B	200	100	1.00	35	0.24	TO-247-2L
	MM60F020PC	200	30*2	0.86	22	0.80	TO-3PB-3L
	MM60FU030PC	300	30*2	1.25	22	0.80	TO-3PB-3L
	MM80FU040PC	400	40*2	1.30	22	0.80	TO-3PB-3L
	MM30F060PC	600	15*2	1.41	21	0.80	TO-3PB-3L
	MM60F060PC	600	30*2	1.50	30	0.80	TO-3PB-3L
	MM60F060B	600	60	1.30	27	0.50	TO-247-2L
	MM30FU60K	600	30	2.00	20	0.80	TO-220C-2L
	MM75F60B	600	75	1.35	31	0.38	TO-247-2L
	MM30F060B	600	30	1.50	30	0.80	TO-247-2L
	MM15F060K	600	15	1.30	30	1.50	TO-220C-2L
	MM60FU060B	600	60	2.00	25	0.50	TO-247-2L
	MM60F060P	600	60	1.30	40	0.50	TO-3PB-2L
	MM30FU060K1	600	30	2.00	20	1.50	TO-220F-2L
	MM60FU60BC	600	30*2	2.00	20	0.80	TO-247-3L
	MM8FU060K	600	8	1.80	17	2.50	TO-220C-2L
	MM30FU60PC	600	15*2	2.00	18	1.30	TO-3PB-3L
	MM30FU060B	600	30	2.00	20	0.80	TO-247-2L
	MM15F060K1	600	15	1.30	30	2.00	TO-220F-2L
	MM15F70K	700	15	1.30	21	1.50	TO-220C-2L
	MM16F70KC	700	8*2	1.30	19	2.50	TO-220C-3L
 U	MM8F70K	700	8	1.30	19	2.50	TO-220C-2L
	MM30FC100B	1000	30	2.50	25	0.80	TO-247-2L
	MM60FC100B	1000	60	2.50	30	0.40	TO-247-2L
	MM15FU120K	1200	15	2.60	25	1.50	TO-220A-2L/ TO-220B-2L
	MM30FU120B	1200	30	2.90	26	0.80	TO-247-2L
	MM8FU120K	1200	8	2.80	20	2.00	TO-220A-2L/ TO-220B-2L
	MM30FU120K	1200	30	2.90	26	0.80	TO-220A-2L/ TO-220B-2L
	MM60F120B	1200	60	2.10	40	0.40	TO-247-2L
	MM60FU120B	1200	60	2.80	30	0.40	TO-247-2L
	MM30FC120B	1200	30	2.80	26	0.80	TO-247-2L
	MM60FC120B	1200	60	2.80	31	0.40	TO-247-2L
	MM60F040B	400	60	1.15	35	0.48	TO-247-2L

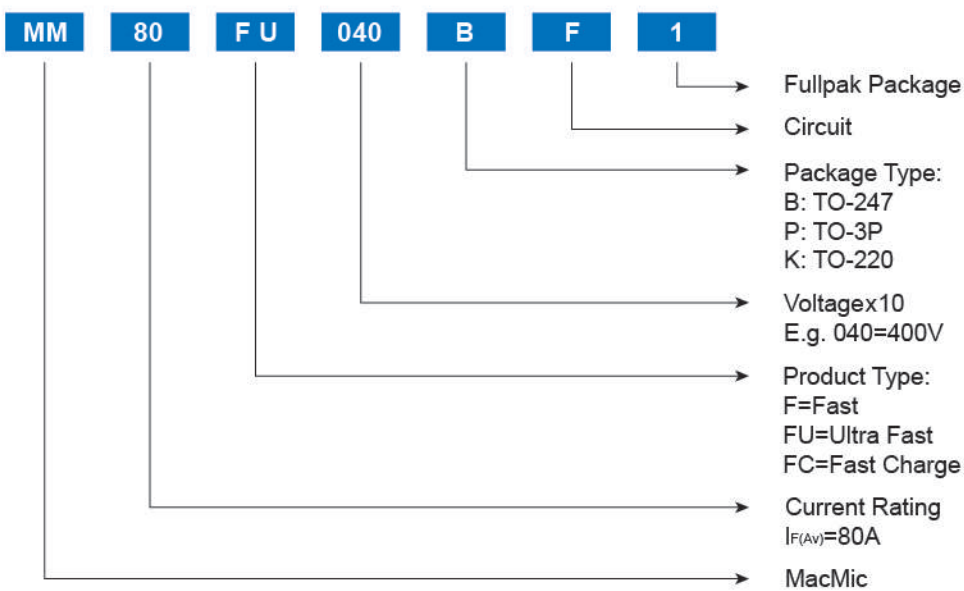
Note: I_F=IA, di_F/dt=-200Nus, V_R=30V.

PRODUCT NAMING

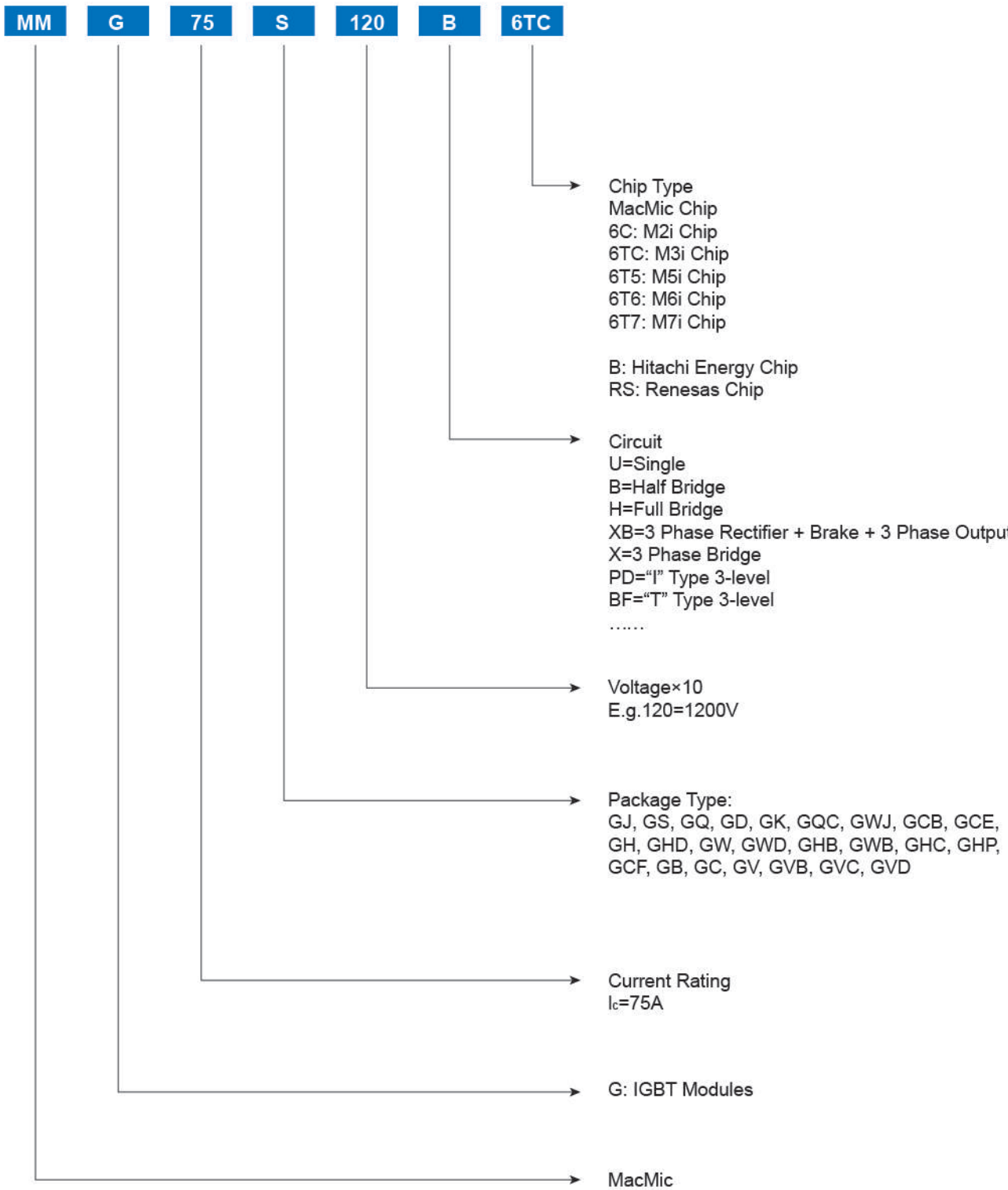
IGBT & MOSFET DISCRETES



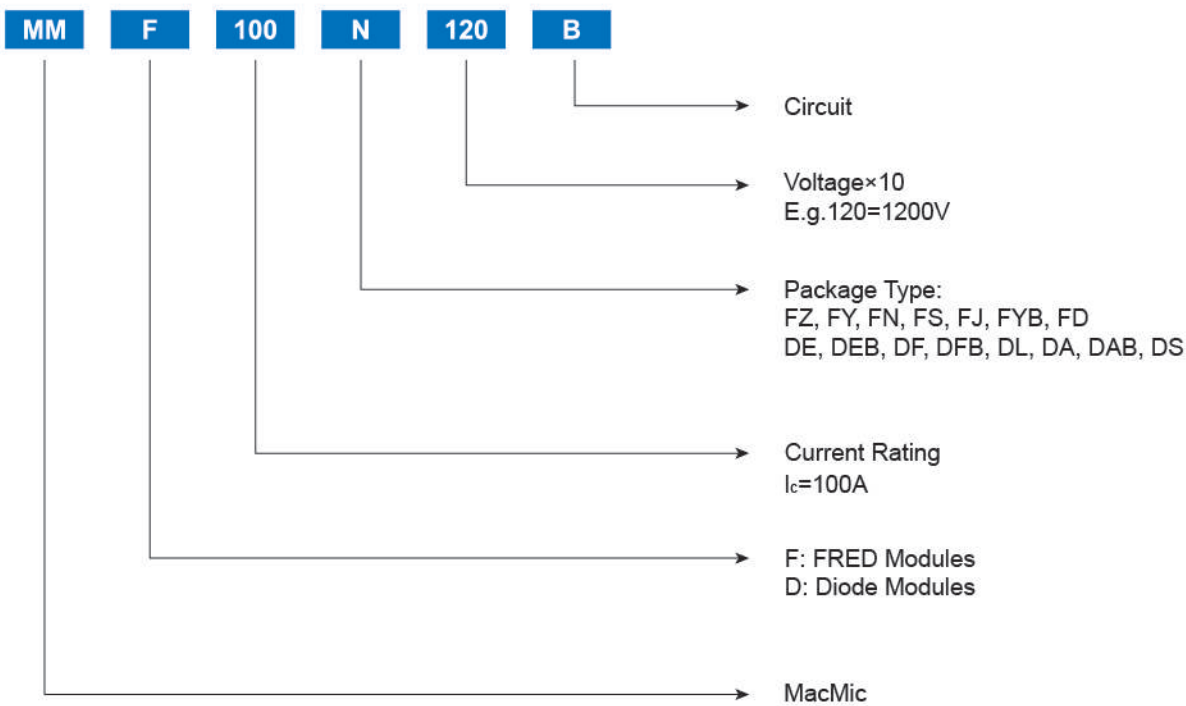
FRED DISCRETES



IGBT MODULES

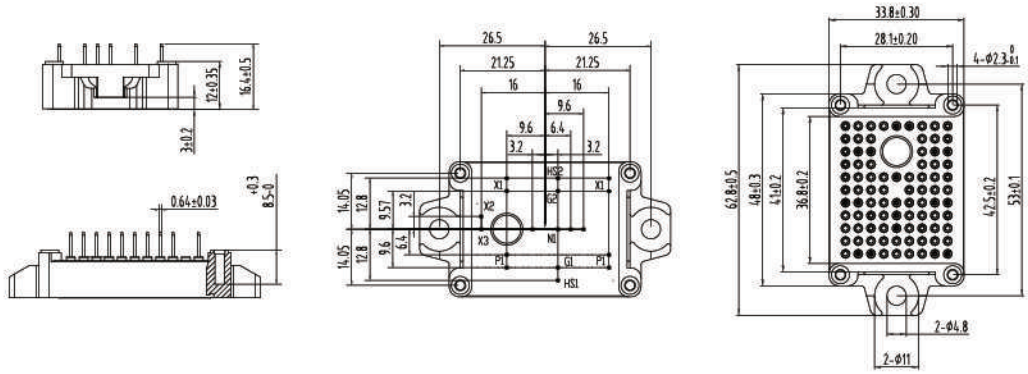


FRED MODULES / RECTIFIER DIODE MODULES / THREE-PHASE RECTIFIER BRIDGE MODULES



OUTLINE DRAWINGS

GCB



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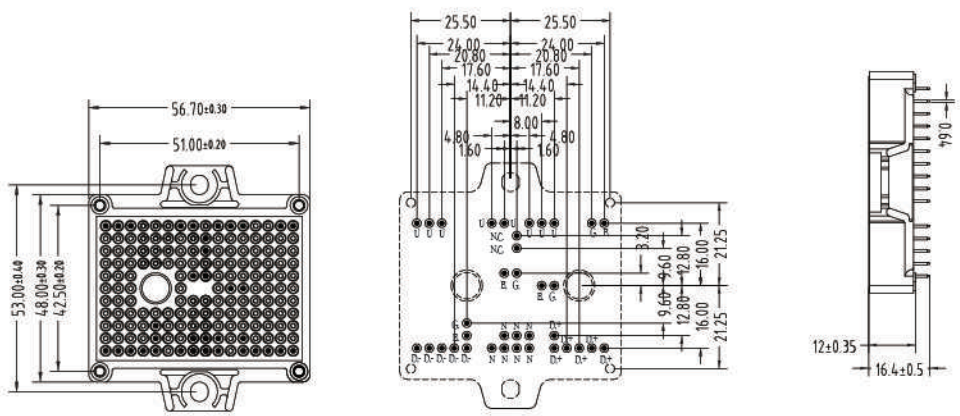

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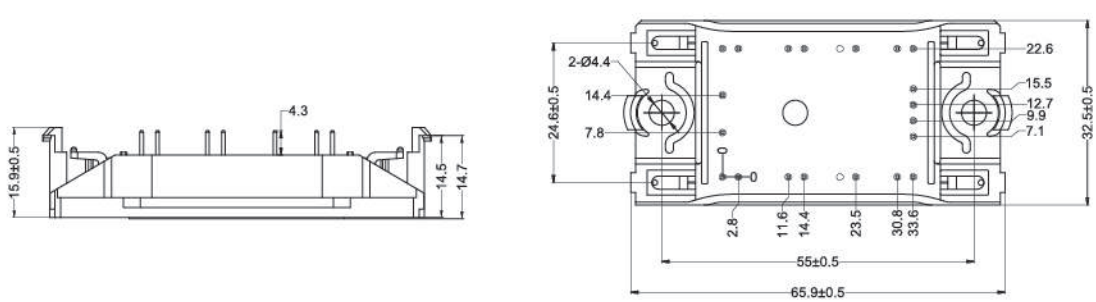
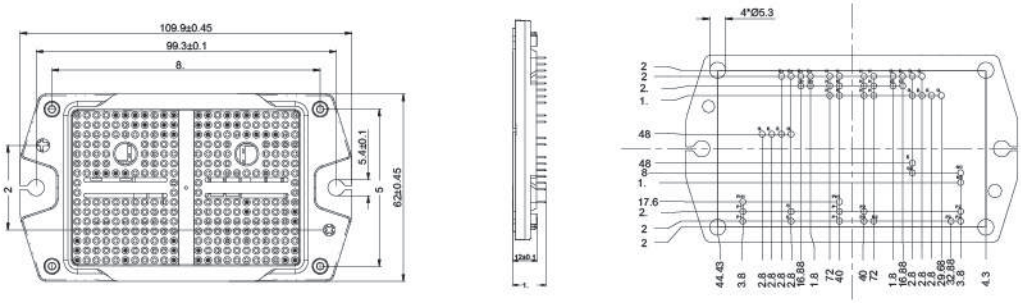


Unit:mm

GCF



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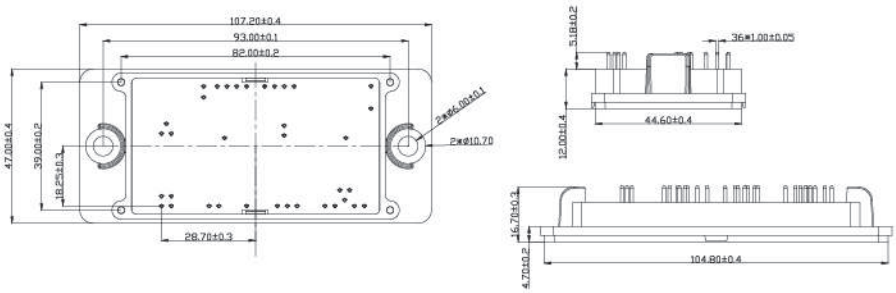

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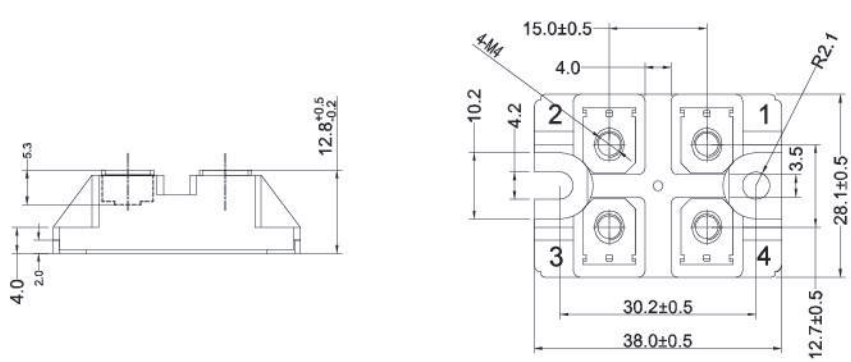

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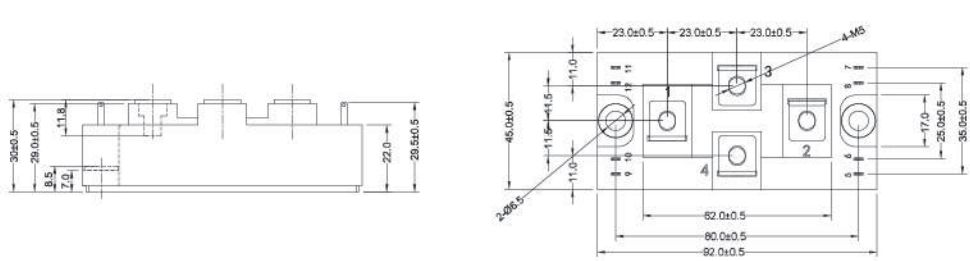

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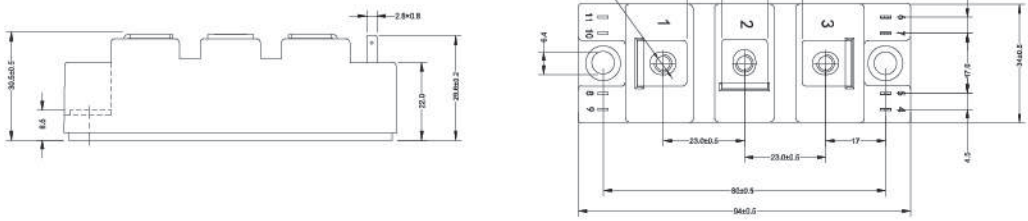

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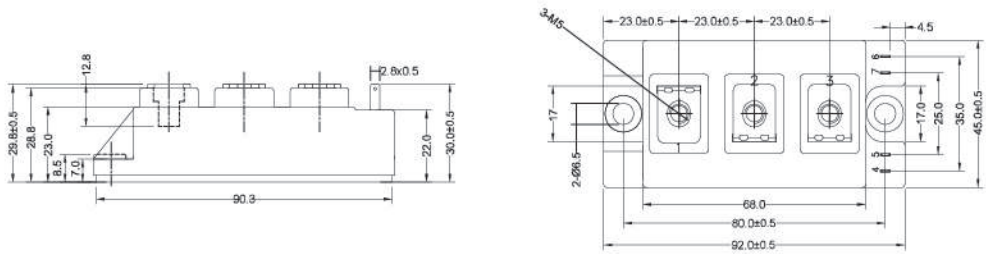

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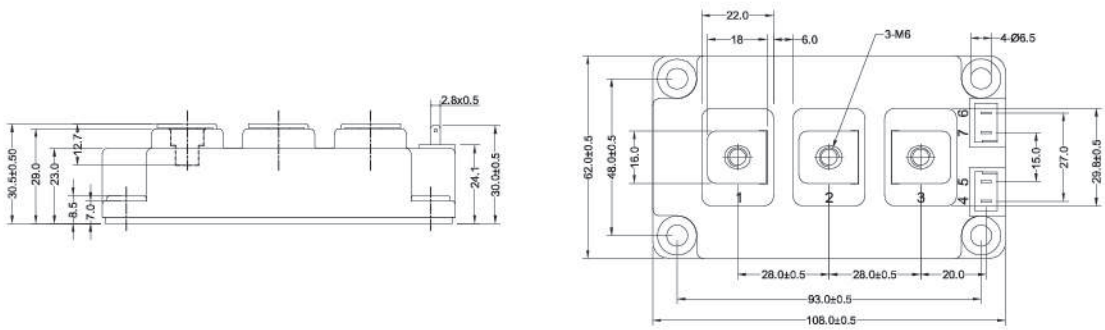

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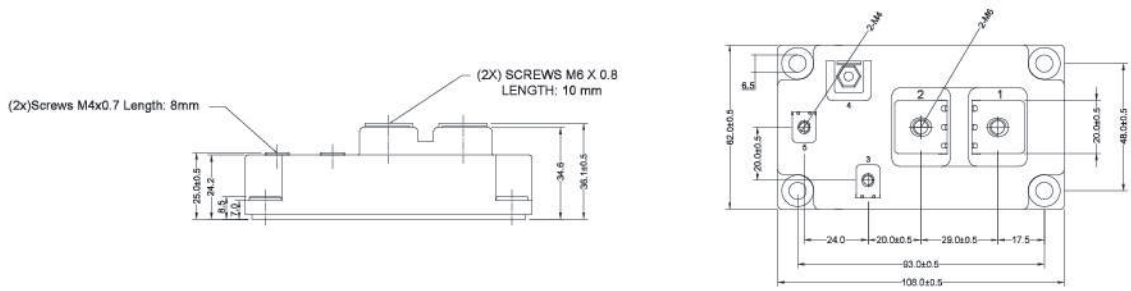
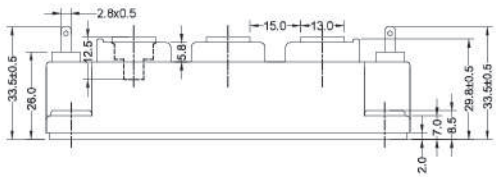
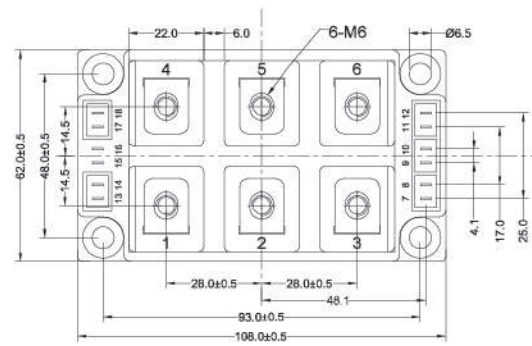


Unit:mm

GB





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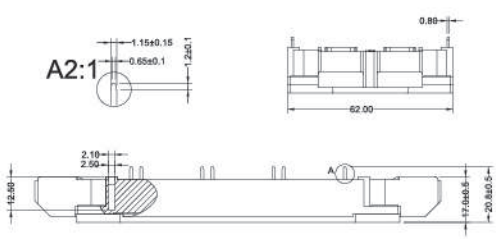
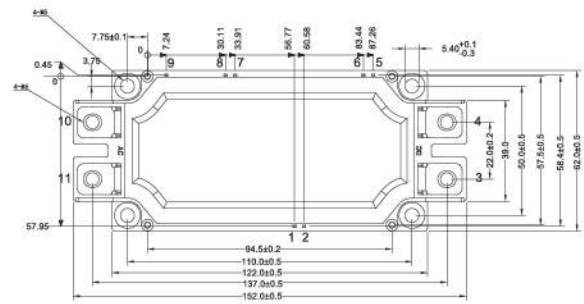
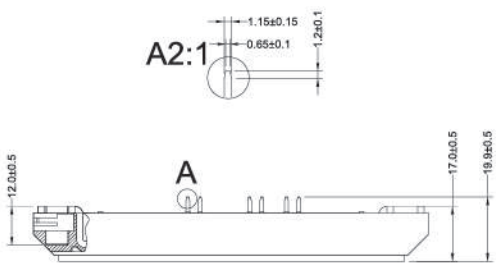
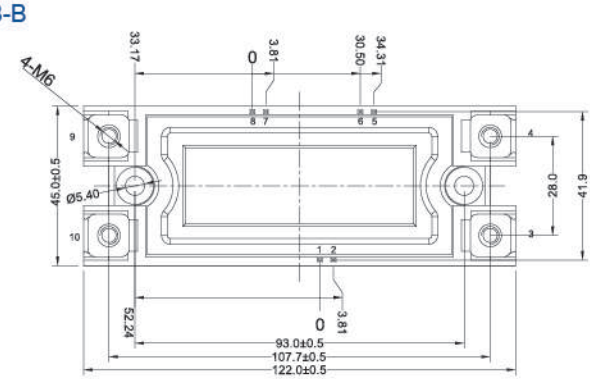


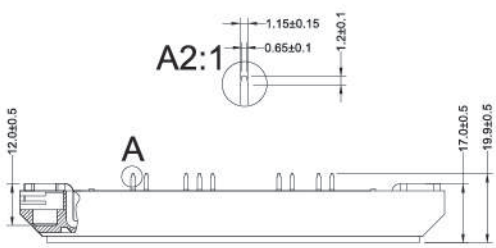


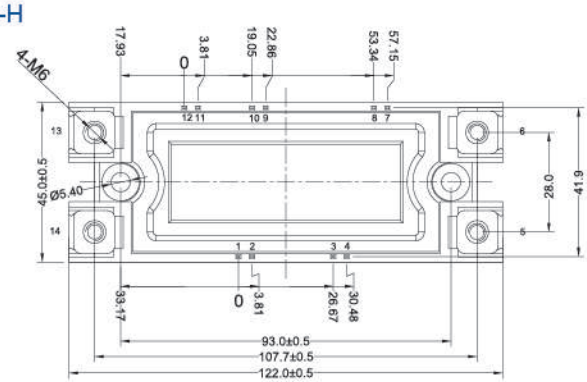
GHB-B



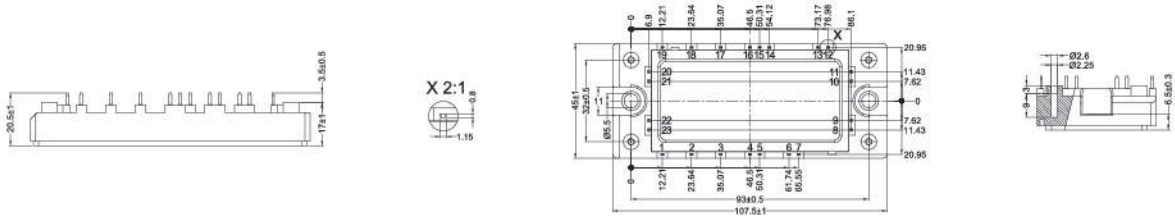


GHB-H

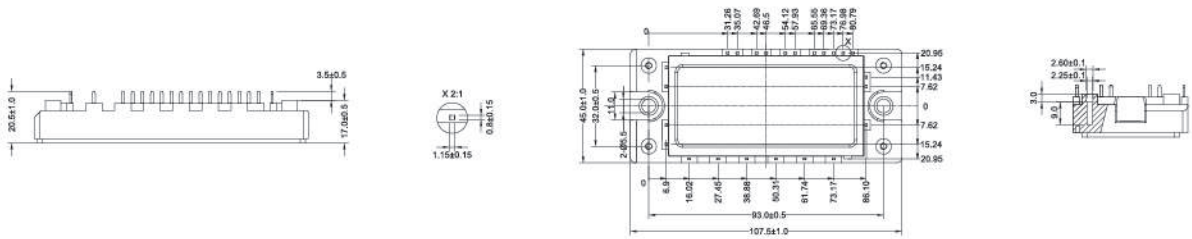




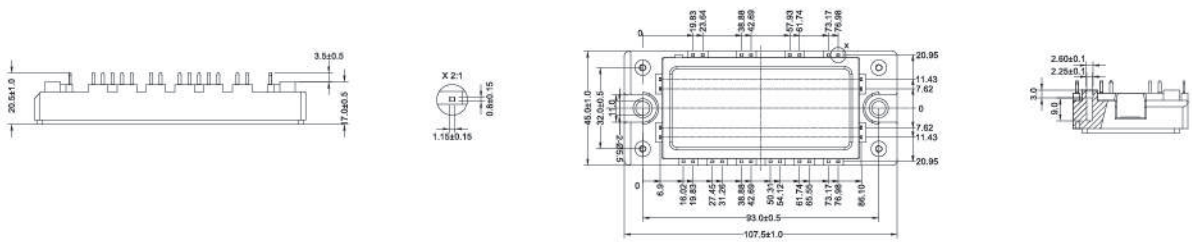
GHD-XB



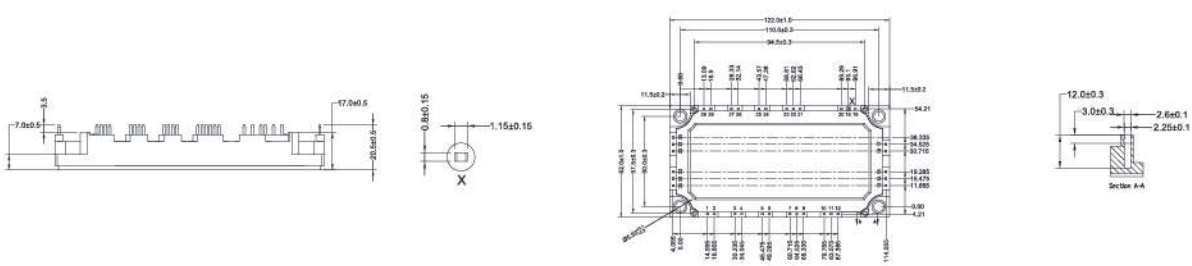
GH-XB



GH-X

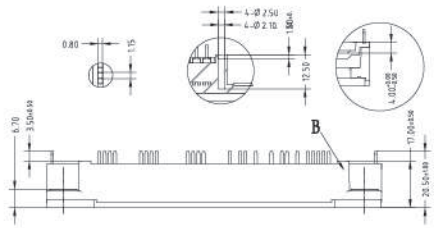


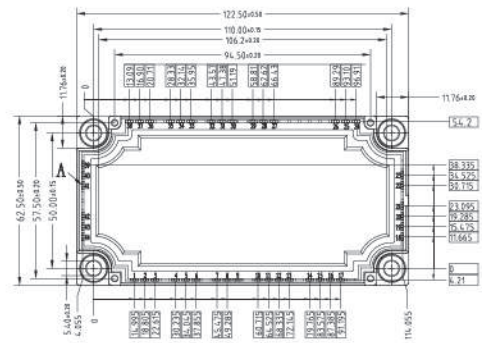
GWD-XB



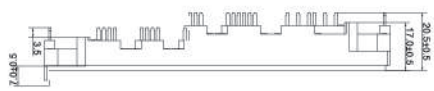
Unit:mm

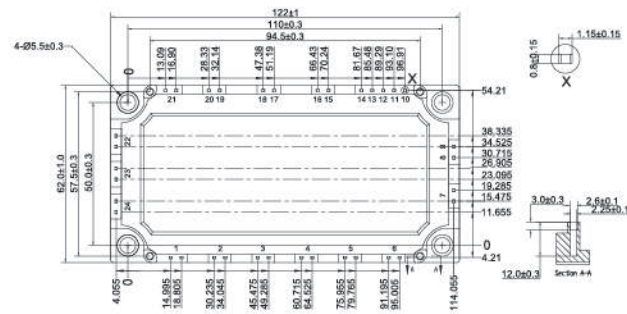
GWJ



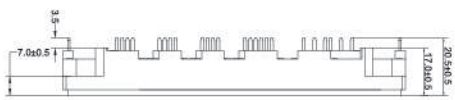


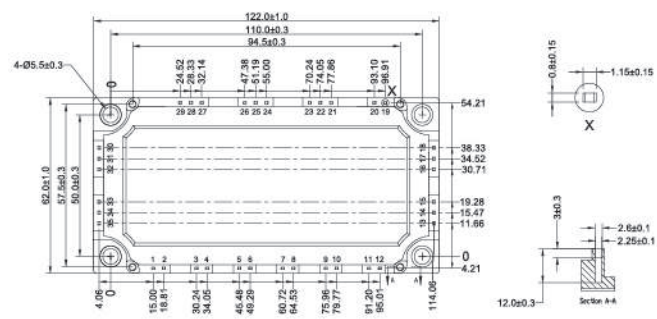
GW-XB



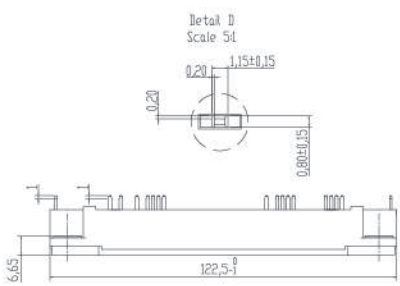


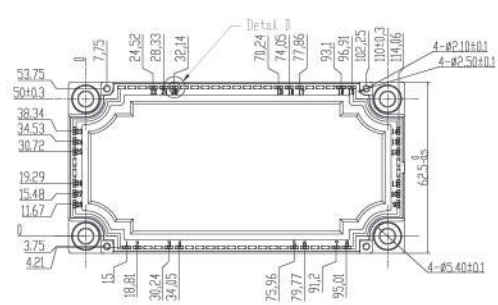
GW-X



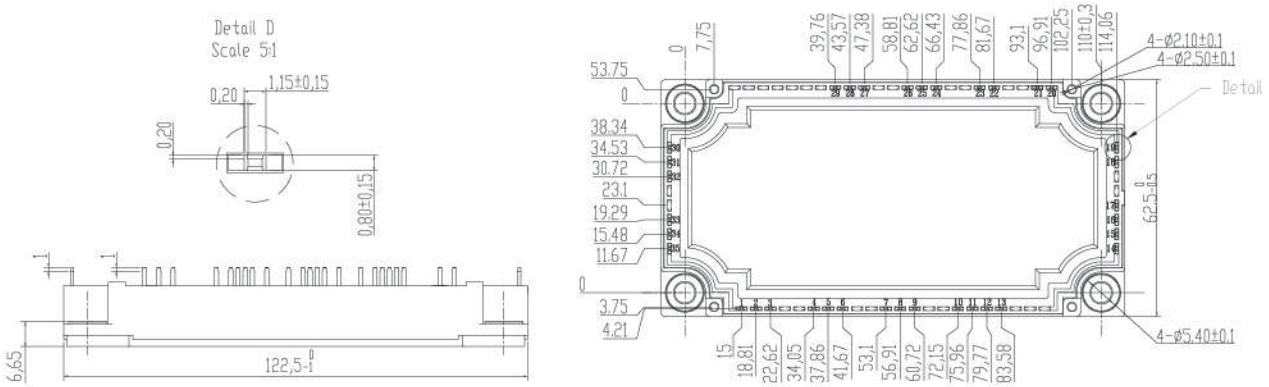


GW-H

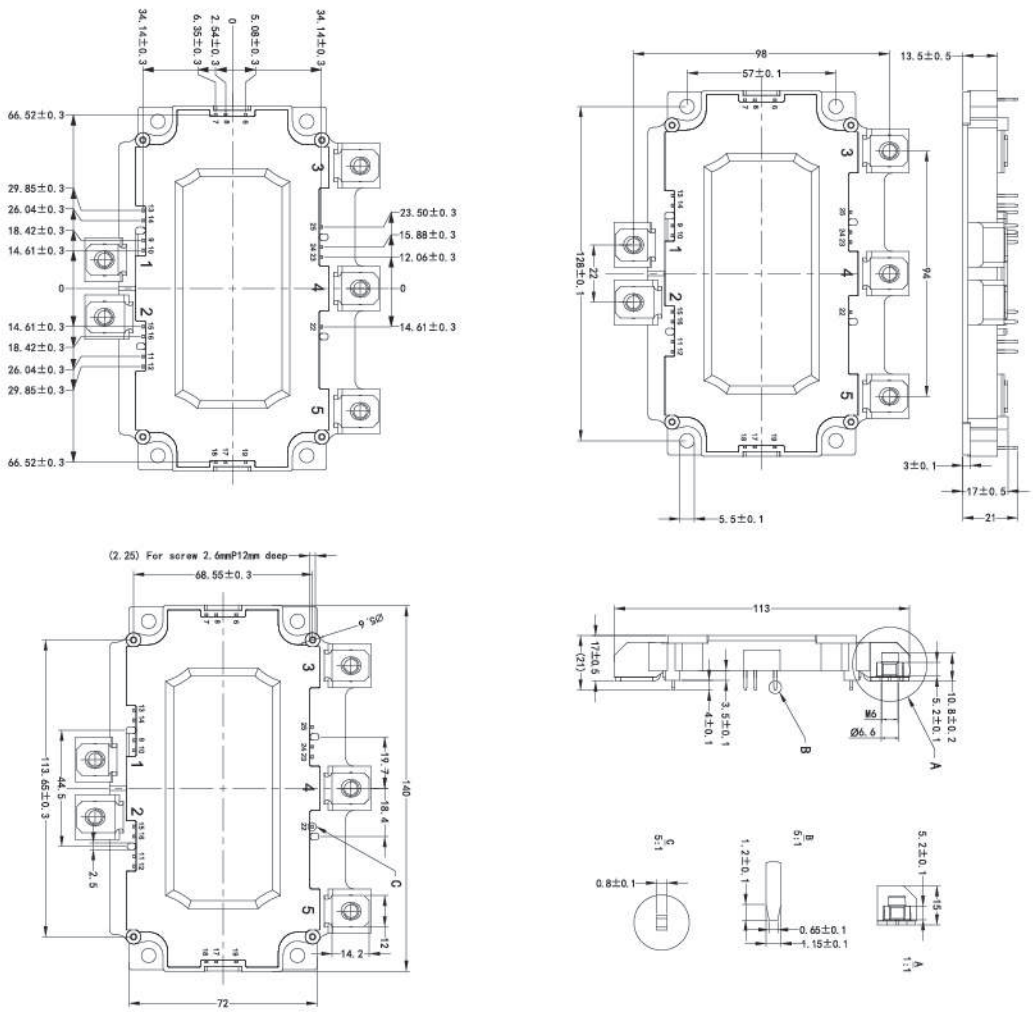




GW-XH

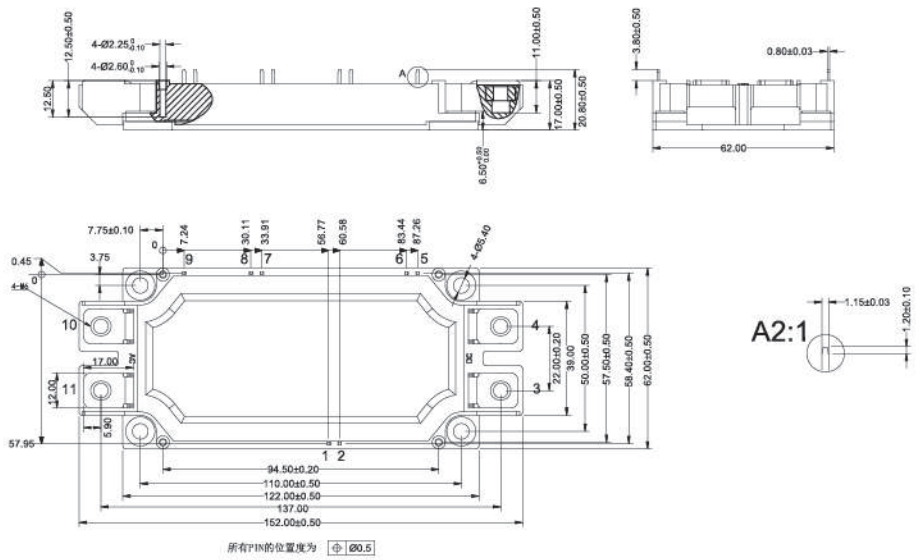


GVB

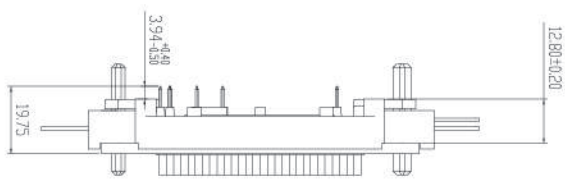


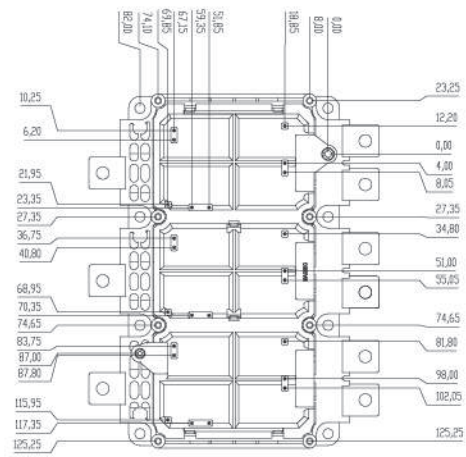
Unit:mm

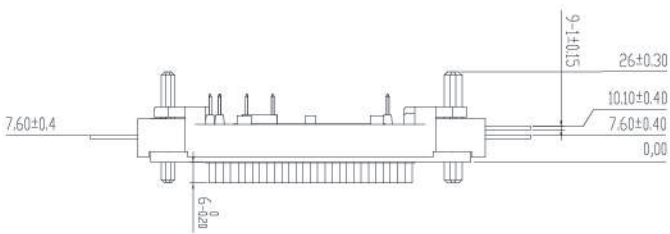
GWB

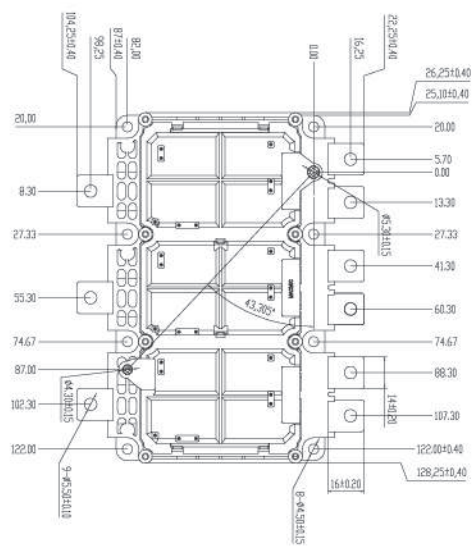

4-Ø2.25
4-Ø2.60
12.50±0.50
12.50
11.00±0.50
17.00±0.50
20.80±0.50
6.50
3.80±0.50
0.80±0.03
62.00
7.75±0.10
7.24
30.11
33.91
56.77
60.58
83.44
87.26
4-Ø5.40
0.45
3.75
17.00
12.00
5.90
57.95
22.00±0.20
39.00
50.00±0.50
57.50±0.50
58.40±0.50
62.00±0.50
94.50±0.20
110.00±0.50
122.00±0.50
137.00
152.00±0.50
所有PIN的位置度为 Ø0.5
A2:1
1.15±0.03
1.20±0.10

GV

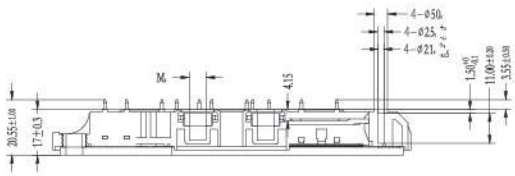

3.94
12.80±0.20
19.75

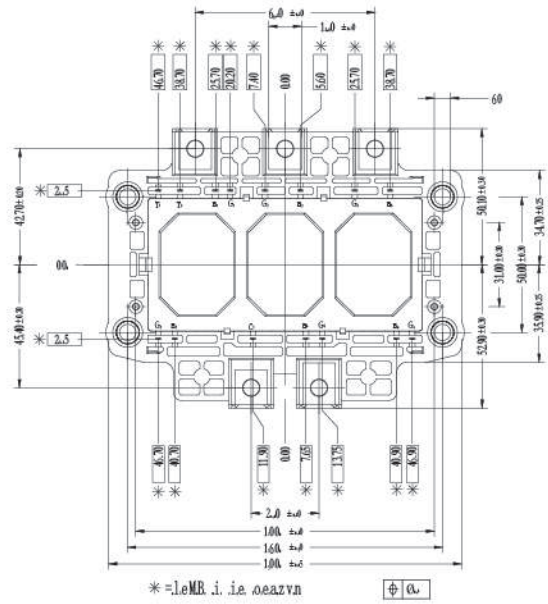

82.00
74.10
69.85
67.15
59.35
54.85
18.85
8.00
0.00
10,25
6,20
21,95
23,35
27,35
36,75
40,80
68,95
70,35
74,65
83,75
87,00
97,80
115,95
117,35
125,25
23,25
12,20
0,00
4,00
8,05
27,35
34,80
51,00
55,85
74,65
81,80
98,00
102,05
125,25


9-1±0.15
26±0.30
10.10±0.40
7.60±0.40
0,00
7.60±0.4
6-Ø2.0

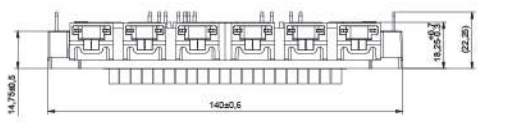

104.25±0.40
98.25
87±0.40
82.00
0.00
16.25
22.25±0.40
26.25±0.40
25.10±0.40
20.00
8.30
27.33
55.30
74.67
87.00
102.30
122.00
5.70
0.00
13.30
41.30
60.30
88.30
107.30
122.00±0.40
128.25±0.40
43.305°
Ø4.30±0.15
9-Ø5.50±0.10
8-Ø4.50±0.15
14±0.20
16±0.20

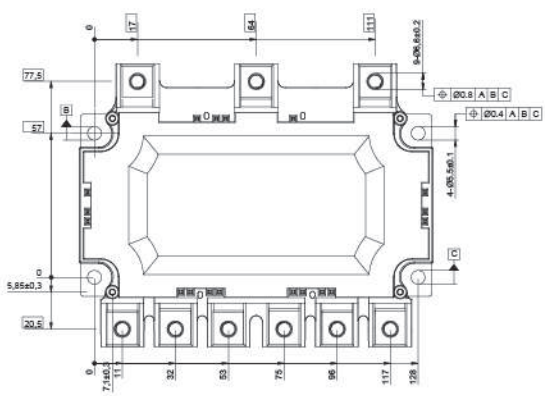
GVD

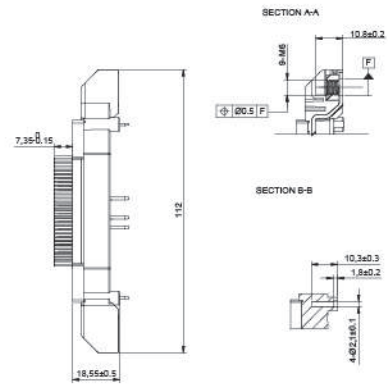


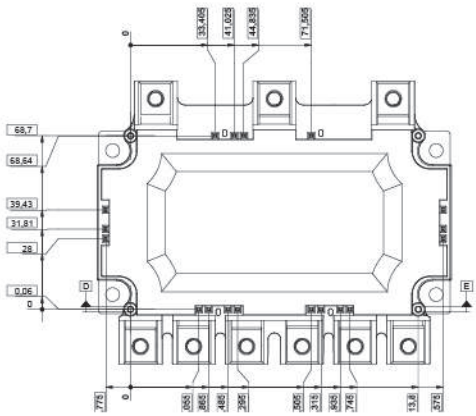


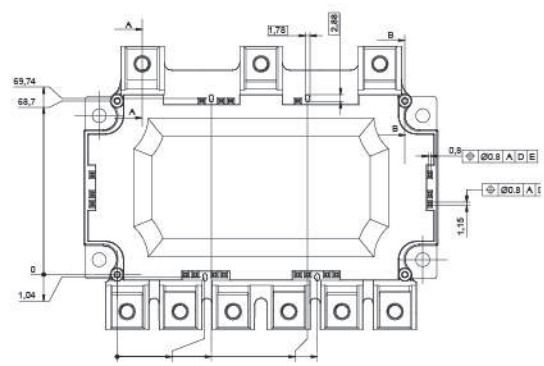
GVC





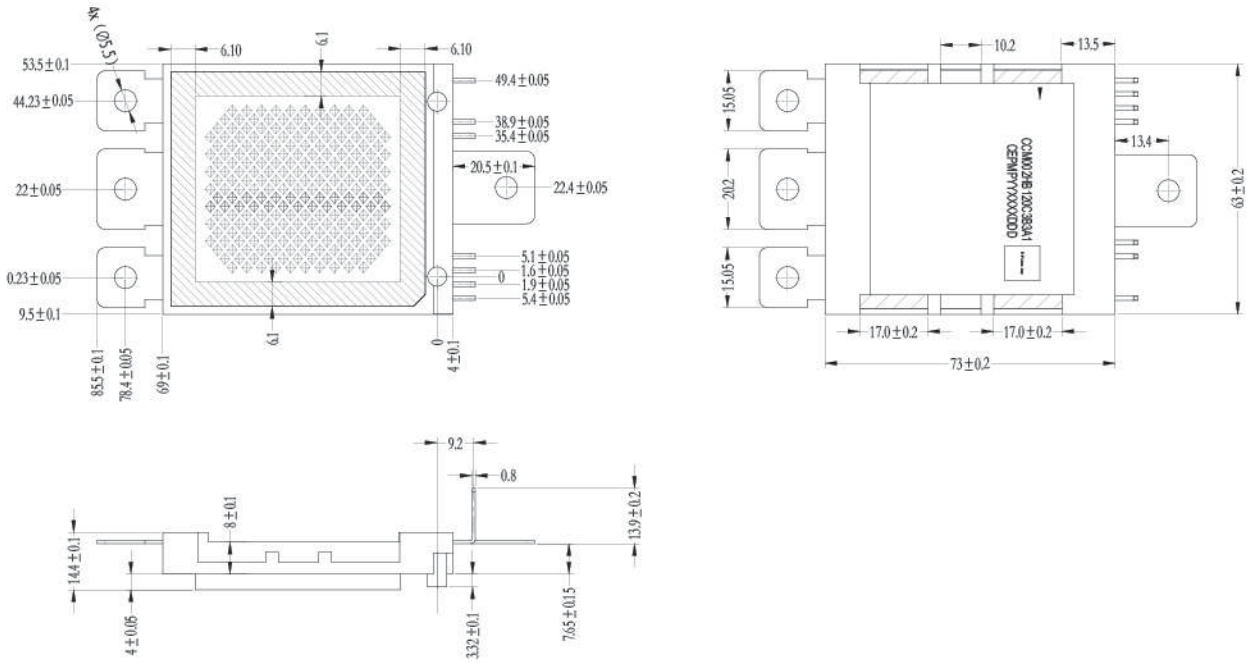




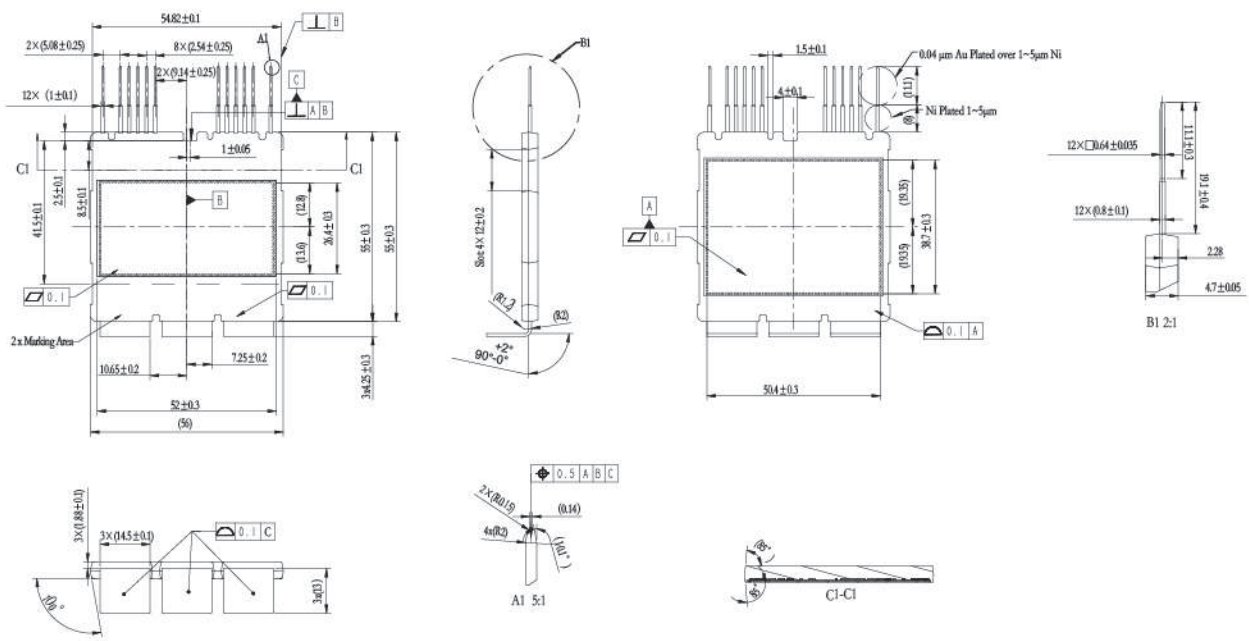


Unit:mm

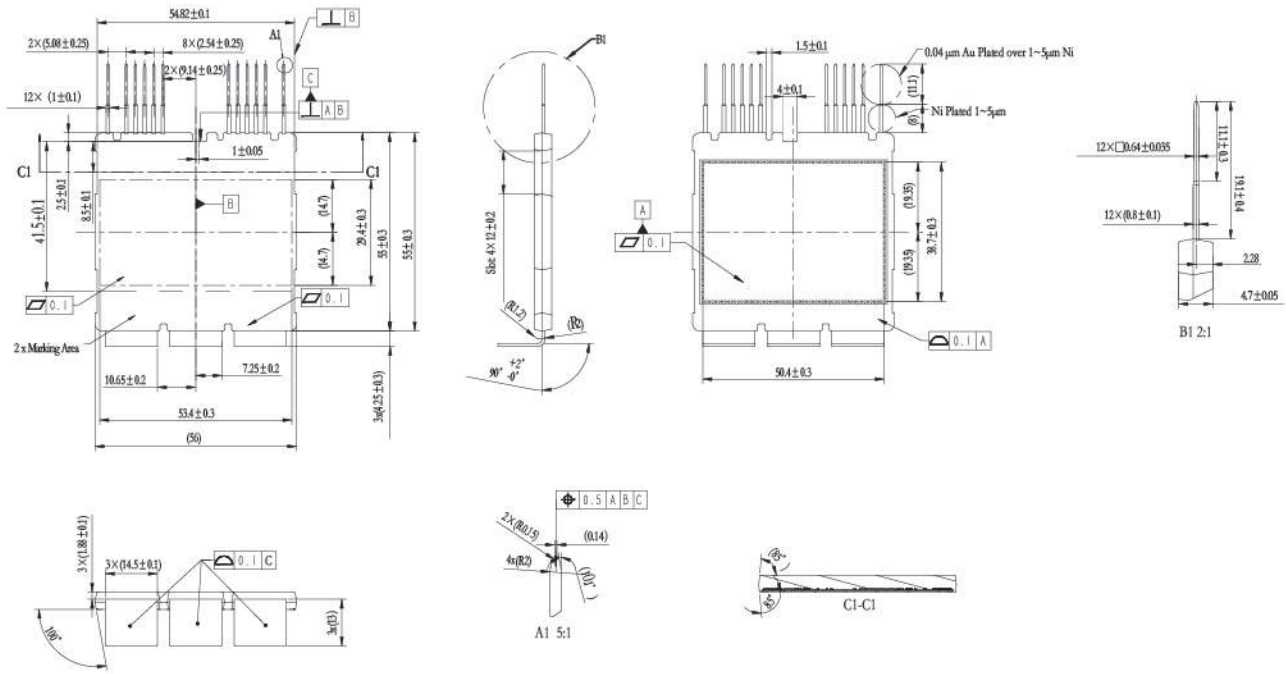
SDC


4x (Ø5.5)
6.10
6.1
6.10
53.5±0.1
44.23±0.05
22±0.05
0.23±0.05
9.5±0.1
49.4±0.05
38.9±0.05
35.4±0.05
20.5±0.1
22.4±0.05
5.1±0.05
1.6±0.05
1.9±0.05
5.4±0.05
0
8.55±0.1
78.4±0.05
69±0.1
4±0.1
10.2
13.5
15.05
20.2
15.05
13.4
63±0.2
17.0±0.2
17.0±0.2
73±0.2
9.2
0.8
8±0.1
14.4±0.1
13.9±0.2
4±0.05
3.32±0.1
7.65±0.15

DSC

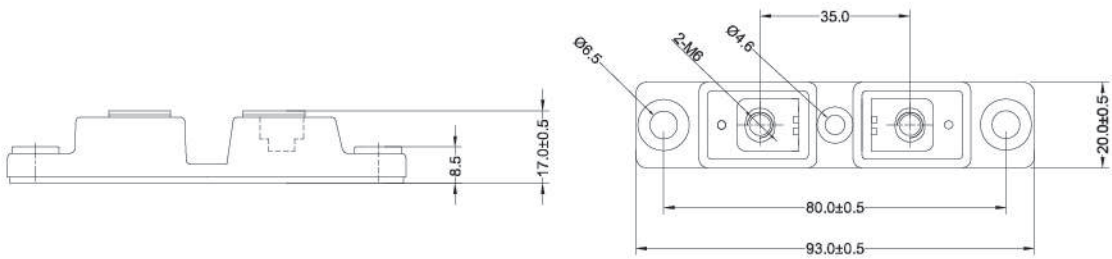

54.82±0.1
2×(5.08±0.25)
8×(2.54±0.25)
2×(9.14±0.25)
12×(1±0.1)
1±0.05
C1
C1
2.5±0.1
8.5±0.1
41.5±0.1
(12.8)
(13.6)
26.4±0.3
55±0.3
55±0.3
2x Marking Area
10.65±0.2
7.25±0.2
3x4.25±0.3
52±0.3
(56)
B1
Slot 4X 12±0.2
(R1.2)
(R2)
90°+2°-0°
1.5±0.1
0.04 μm Au Plated over 1~5μm Ni
4±0.1
(1.11)
Ni Plated 1~5μm
(Ø)
(19.35)
(10.35)
30.7±0.3
50.4±0.3
12×□0.64±0.0035
11±0.3
12×(0.8±0.1)
19.1±0.4
2.28
4.7±0.05
B1 2:1
3×(0.88±0.1)
3×(14.5±0.1)
3x(2)
2×(R0.15)
(0.14)
4x(R2)
(10°)
A1 5:1
(45°)
C1-C1

SSC

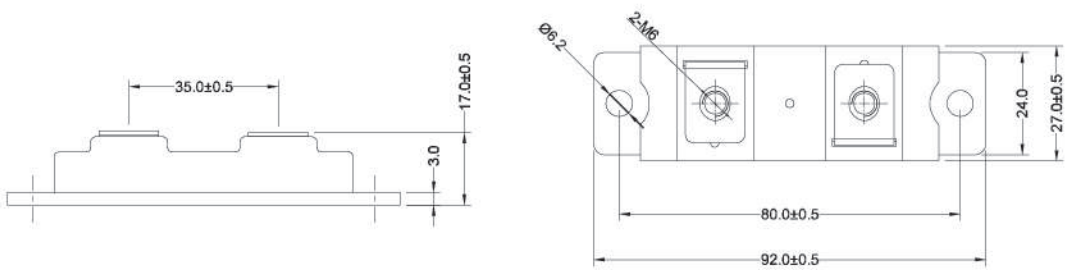

54.82±0.1
2×(5.08±0.25)
8×(2.54±0.25)
2×(9.14±0.25)
12× (1±0.1)
A1
C1
C1
1±0.05
41.5±0.1
2.5±0.1
8.5±0.1
(14.7)
(14.7)
29.4±0.3
35±0.3
35±0.3
2 x Marking Area
10.65±0.2
7.25±0.2
53.4±0.3
(56)
3x(4.25±0.3)
B1
Slot 4×12±0.2
(R1.2)
(R2)
90° +2° -0°
1.5±0.1
0.04 μm Au Plated over 1~5μm Ni
4±0.1
Ni Plated 1~5μm
(19.35)
(19.3)
38.7±0.3
50.4±0.3
12×□0.64±0.035
11.1±0.3
19.1±0.4
12×(0.8±0.1)
2.28
4.7±0.05
B1 2:1
3×(1.88±0.1)
3×(14.5±0.1)
100°
3x(13)
2×(R0.15)
(0.14)
4x(R2)
(10)
A1 5:1
(R5°)
45°
C1-C1

Unit:mm

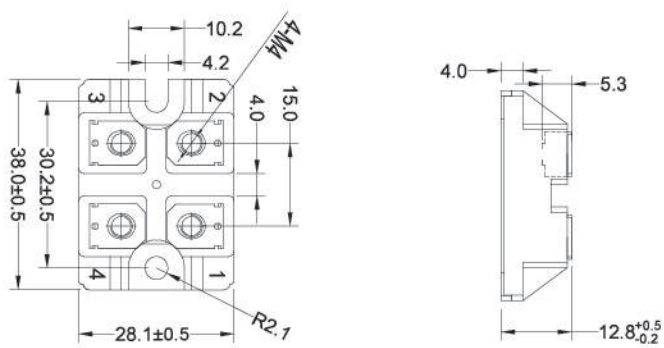
FZ


35.0
Ø6.5
2-M6
Ø4.6
8.5
17.0±0.5
20.0±0.5
80.0±0.5
93.0±0.5

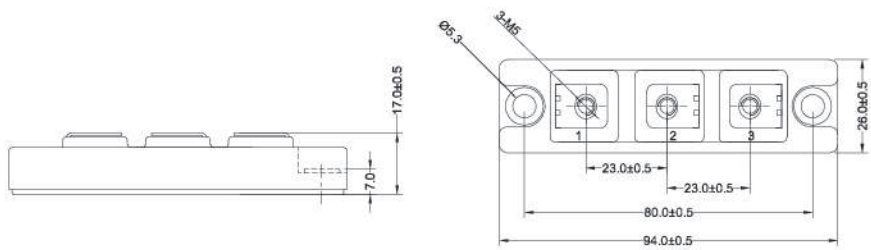
FY


35.0±0.5
17.0±0.5
3.0
Ø6.2
2-M6
24.0
27.0±0.5
80.0±0.5
92.0±0.5

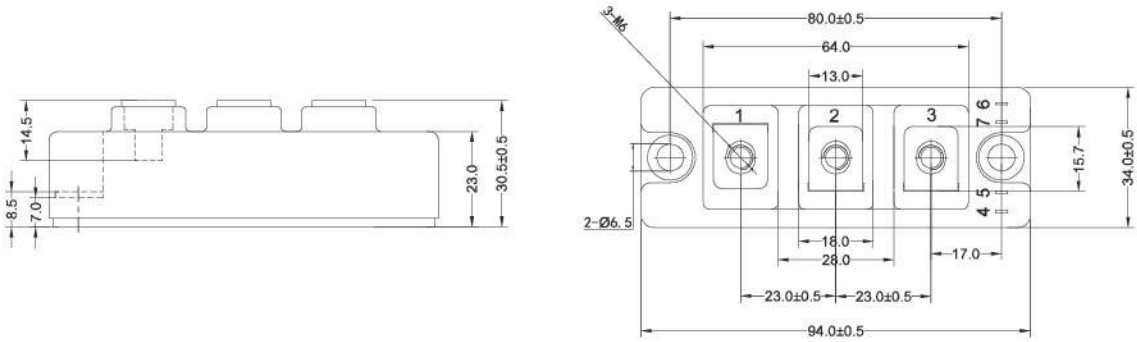
FJ


10.2
4.2
4-M4
3
2
4
1
15.0
4.0
38.0±0.5
30.2±0.5
28.1±0.5
R2.7
4.0
5.3
12.8+0.5 -0.2

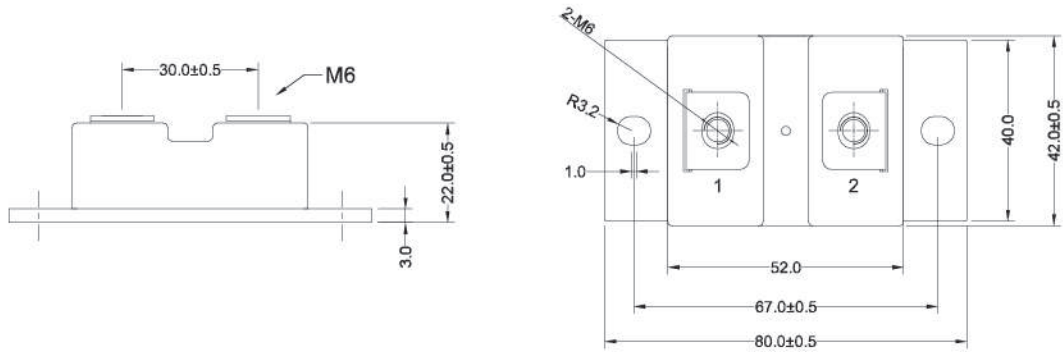
FN


Ø5.3
3-M5
17.0±0.5
7.0
1
2
3
26.0±0.5
23.0±0.5
23.0±0.5
80.0±0.5
94.0±0.5

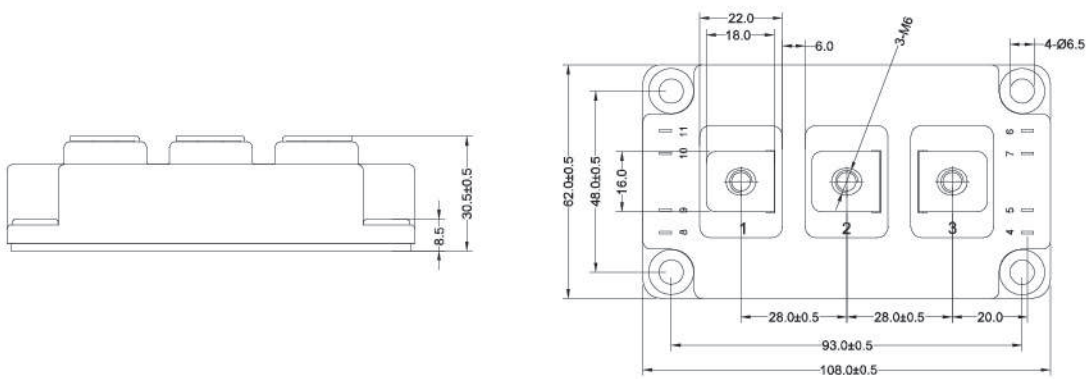
FS



FYB

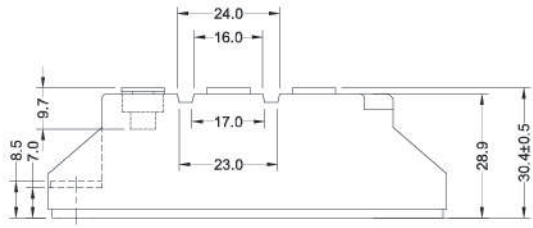


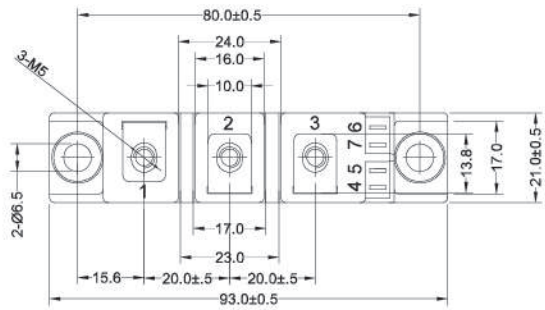
FD



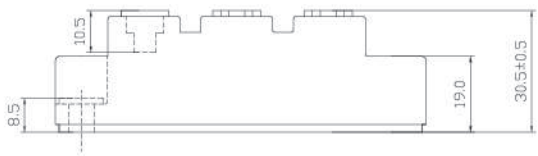
Unit:mm

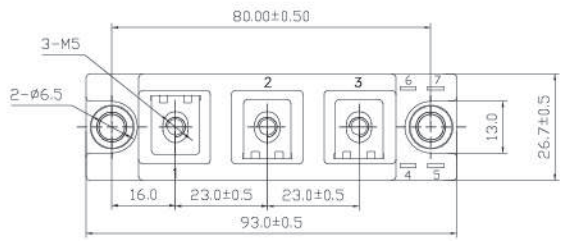
DA


24.0
16.0
17.0
23.0
9.7
8.5
7.0
28.9
30.4±0.5

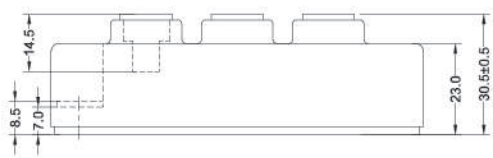

80.0±0.5
24.0
16.0
10.0
3-M5
2-Ø6.5
17.0
23.0
15.6
20.0±.5
20.0±.5
93.0±0.5
13.8
17.0
21.0±0.5

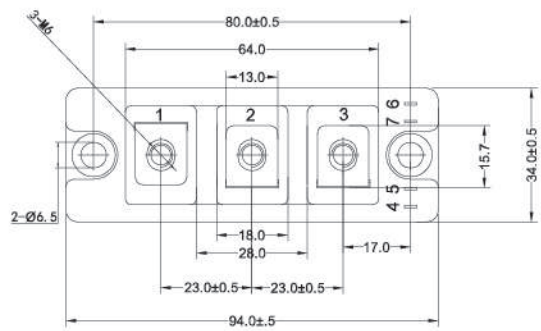
DAB


10.5
8.5
19.0
30.5±0.5

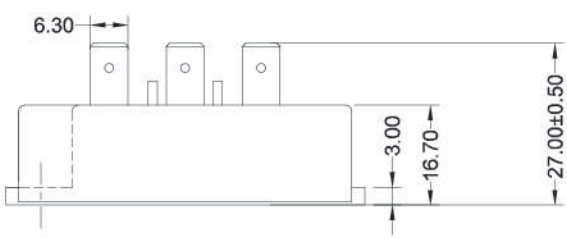

80.00±0.50
3-M5
2-Ø6.5
16.0
23.0±0.5
23.0±0.5
93.0±0.5
13.0
26.7±0.5

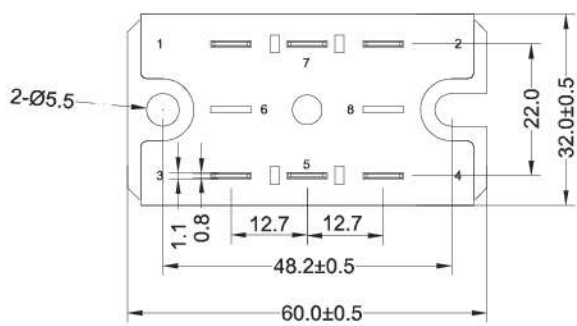
DS


14.5
8.5
7.0
23.0
30.5±0.5

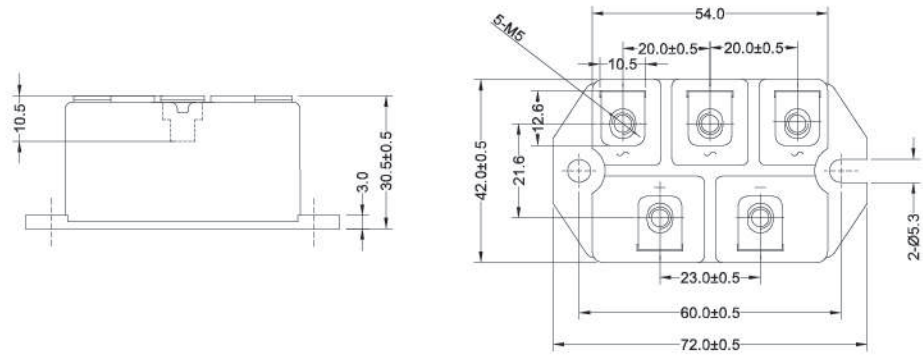

3-M6
80.0±0.5
64.0
13.0
2-Ø6.5
18.0
28.0
17.0
23.0±0.5
23.0±0.5
94.0±.5
15.7
34.0±0.5

DL

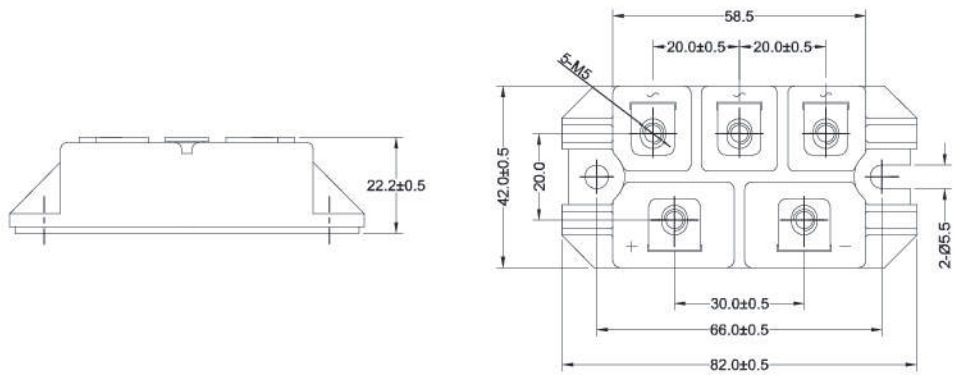

6.30
3.00
16.70
27.00±0.50


2-Ø5.5
1.1
0.8
12.7
12.7
48.2±0.5
60.0±0.5
22.0
32.0±0.5

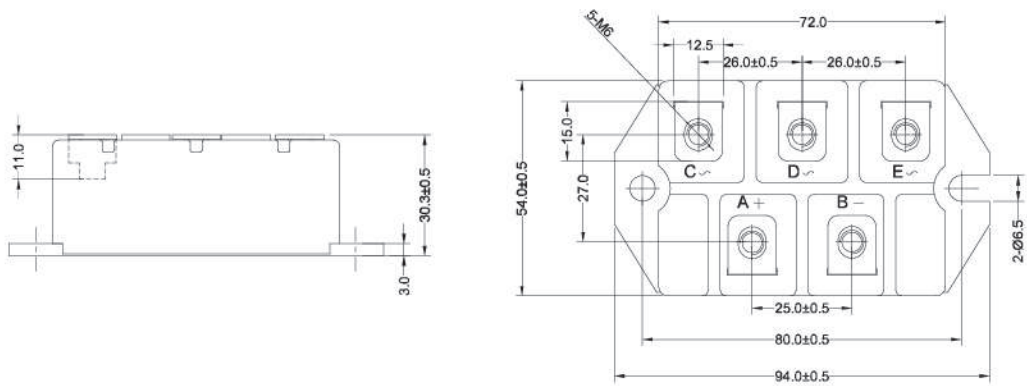
DE



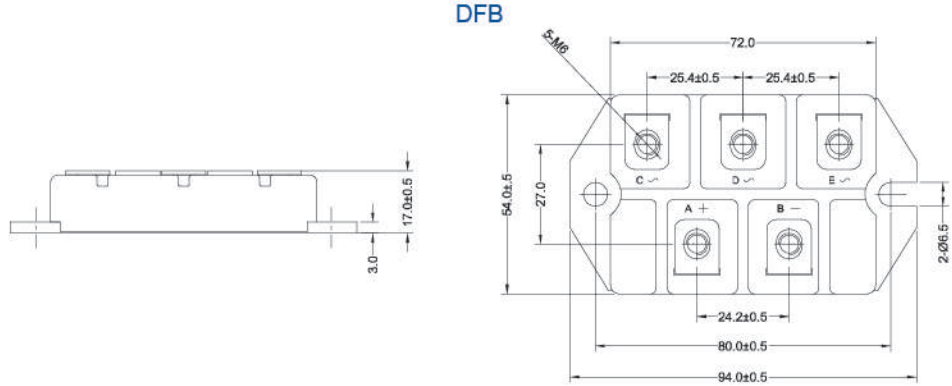
DEB



DF

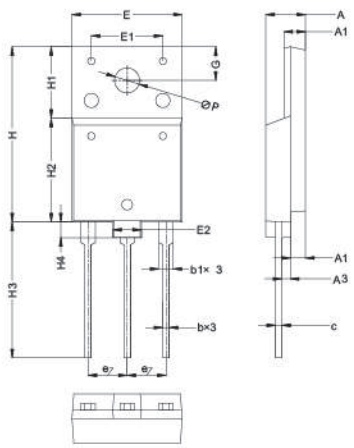


DFB



Unit:mm

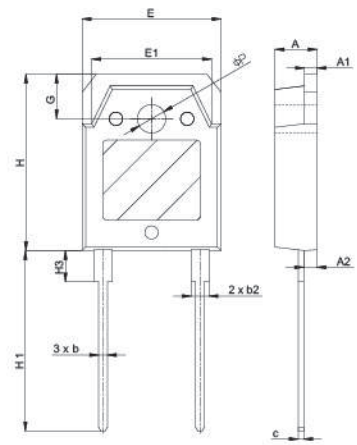
TO-3PF



Symbol	Min	Nom	Max
A	5.35	5.55	5.75
A1	2.80	3.00	3.20
A2	1.90	2.10	2.30
A3	1.00	1.20	1.40
b	0.78	0.90	1.00
b1	1.80	2.00	2.20
e		5.45BSC	
c	0.70	0.90	1.10
E	15.20	15.40	15.60
E1	9.80	10.00	10.20
E2	3.80	4.00	4.20
H	24.30	24.50	24.70
H1	9.80	10.00	10.20
H2	14.30	14.50	14.70
H3	18.50	19.00	19.50
H4	2.00	2.20	2.40
G	4.50	4.70	4.90
ΦP	3.30	3.50	3.70

UNIT: mm

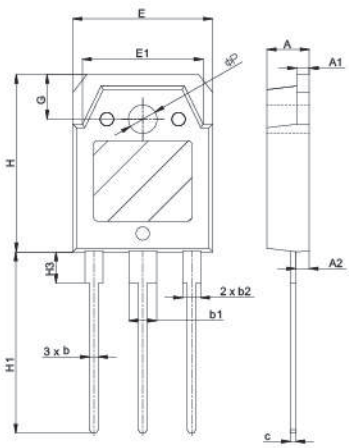
TO-3PB-2L



Symbol	Min	Nom	Max
A	4.60	4.75	4.85
A1	1.30	1.50	1.70
A2	2.20	2.40	2.60
b	0.80	1.00	1.20
b1	2.90	3.10	3.30
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
e		10.9BSC	
E	15.20	15.60	16.00
E1	13.20	13.45	13.70
H	19.80	20.00	20.20
H1	19.40	19.80	20.00
H3	2.90	3.10	3.30
G	4.80	5.00	5.20
ΦP	3.00	3.20	3.40

UNIT: mm

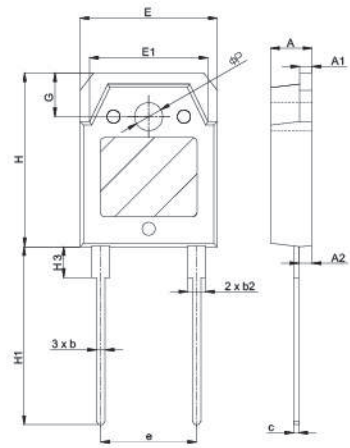
TO-3PB-3L



Symbol	Min	Nom	Max
A	4.60	4.75	4.85
A1	1.30	1.50	1.70
A2	2.20	2.40	2.60
b	0.80	1.00	1.20
b1	2.90	3.10	3.30
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
e		5.45BSC	
E	15.20	15.60	16.00
E1	13.20	13.45	13.70
H	19.80	20.00	20.20
H1	19.40	19.80	20.00
H3	2.90	3.10	3.30
G	4.80	5.00	5.20
ΦP	3.00	3.20	3.40

UNIT: mm

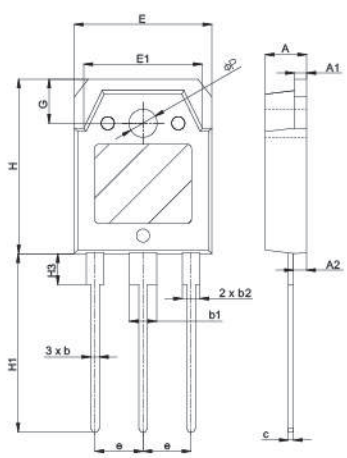
TO-3PN-2L



Symbol	Min	Nom	Max
A	4.60	4.75	4.85
A1	1.30	1.50	1.70
A2	1.20	1.40	1.60
b	0.80	1.00	1.20
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
e		10.90BSC	
E	15.20	15.60	16.00
E1	13.20	13.45	13.70
H	19.20	19.70	20.20
H1	20.00	20.25	20.50
H3	3.20	3.50	3.80
G	4.80	5.00	5.20
ΦP	3.00	3.20	3.40

UNIT: mm

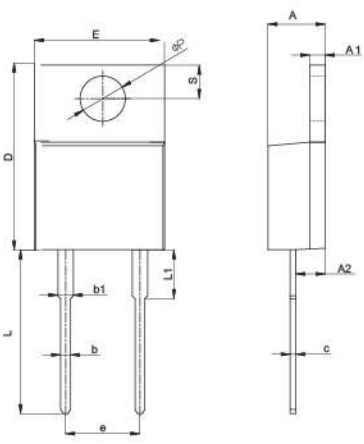
TO-3PN-3L



Symbol	Min	Nom	Max
A	4.60	4.75	4.85
A1	1.30	1.50	1.70
A2	1.20	1.40	1.60
b	0.80	1.00	1.20
b1	2.90	3.10	3.30
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
e		5.45BSC	
E	15.20	15.60	16.00
E1	13.20	13.45	13.70
H	19.20	19.70	20.20
H1	20.00	20.25	20.50
H3	3.20	3.50	3.80
G	4.80	5.00	5.20
ΦP	3.00	3.20	3.40

UNIT: mm

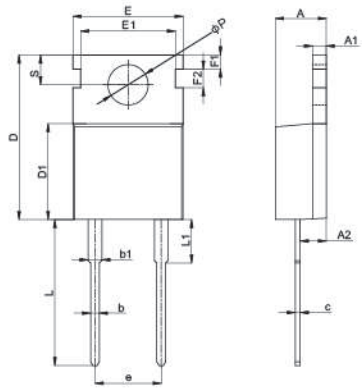
TO-220A-2L



Symbol	Min	Nom	Max
A	4.37	4.60	4.90
A1	1.07	1.27	1.47
A2	2.49	2.69	2.89
b	0.61	0.81	1.01
b1	1.17	1.37	1.57
c	0.30	0.48	0.66
e		5.08BSC	
E	9.86	10.01	10.40
D	14.64	15.02	15.40
L	13.00	13.54	14.08
L1	3.40	3.95	4.90
ΦP	3.64	3.84	4.04
S	2.54	2.74	2.94

UNIT: mm

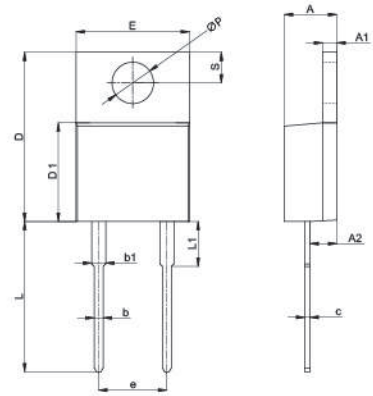
TO-220B-2L



Symbol	Min	Nom	Max
A	4.35	4.50	4.65
A1	1.25	1.30	1.35
A2	2.30	2.40	2.50
b	0.70	0.80	0.90
b1	1.17	1.27	1.37
c	0.45	0.50	0.55
e	5.08BSC		
E	9.80	9.90	10.20
E1	8.60	8.70	8.80
D	15.50	15.70	15.90
D1	9.00	9.20	9.40
L	12.80	13.10	13.40
L1	2.80	3.00	3.20
ΦP	3.50	3.60	3.70
S	2.70	2.80	2.90
F1	1.10	1.30	1.50
F2	1.50	1.70	1.90

UNIT: mm

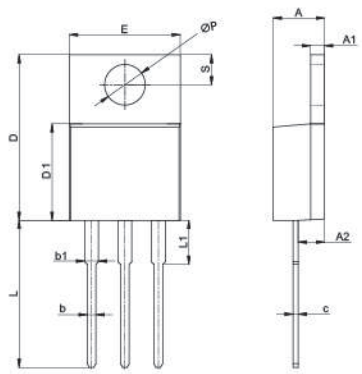
TO-220C-2L



Symbol	Min	Nom	Max
A	4.30	4.50	4.70
A1	1.20	1.30	1.40
A2	2.30	2.40	2.50
b	0.60	0.80	1.00
b1	1.10	1.30	1.50
c	0.40	0.50	0.60
e	5.08BSC		
E	9.80	10.00	10.20
D	15.50	15.70	15.90
D1	9.00	9.20	9.40
L	12.50	13.00	13.50
L1	2.80	3.00	3.20
ΦP	3.40	3.60	3.80
S	2.60	2.80	3.00

UNIT: mm

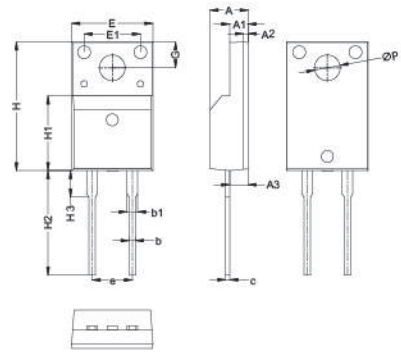
TO-220C-3L



Symbol	Min	Nom	Max
A	4.30	4.50	4.70
A1	1.20	1.30	1.40
A2	2.30	2.40	2.50
b	0.60	0.80	1.00
b1	1.10	1.30	1.50
c	0.40	0.50	0.60
e	2.54BSC		
E	9.80	10.00	10.20
D	15.50	15.70	15.90
D1	9.00	9.20	9.40
L	12.50	13.00	13.50
L1	2.80	3.00	3.20
ΦP	3.40	3.60	3.80
S	2.60	2.80	3.00

UNIT: mm

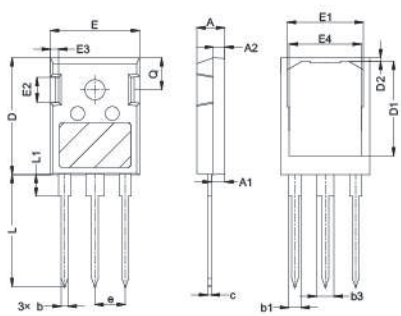
TO-220F



Symbol	Min	Nom	Max
A	4.55	4.75	4.95
A1	2.40	2.60	2.80
A2	0.40	0.60	0.80
A3	2.10	2.30	2.50
b	0.60	0.80	1.00
b1	1.10	1.30	1.50
e	5.00BSC		
c	0.42	0.50	0.58
E	9.90	10.10	10.30
E1	0.68	0.70	0.72
H	15.80	16.00	16.20
H1	9.10	9.30	9.50
H2	12.50	13.00	13.50
H3	3.10	3.30	3.50
G	3.00	3.20	3.40
øP	3.00	3.20	3.40

UNIT: mm

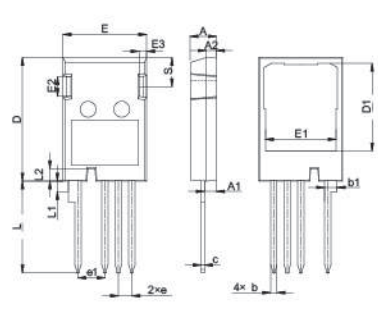
TO-247 Plus-3L



Symbol	Min	Nom	Max
A	4.83	5.02	5.21
A1	2.29	2.42	2.54
A2	1.91	2.04	2.16
b	1.07	1.20	1.33
b1	1.91	2.16	2.41
b3	2.87	3.13	3.38
c	0.55	0.62	0.68
e	5.44BSC		
D	20.80	20.95	21.10
D1	16.25	16.95	17.65
D2	0.50	0.65	0.80
E	15.75	15.94	16.13
E1	13.10	13.63	14.15
E2	3.68	4.39	5.10
E3	1.00	1.45	1.90
E4	12.38	12.91	13.43
L	19.81	20.07	20.32
L1	3.70	3.85	4.00
Q	5.49	5.75	6.00

UNIT: mm

TO-247 Plus-4L

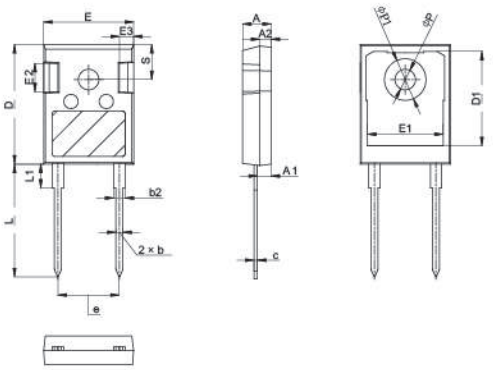


Symbol	Min	Nom	Max
A	4.83	5.02	5.21
A1	2.29	2.42	2.54
A2	1.91	2.04	2.16
b	1.07	1.20	1.33
b1	2.39	2.54	2.69
c	0.55	0.62	0.68
e	2.54BSC		
e1	5.08BSC		
E	15.75	15.94	16.13
E1	12.38	12.91	13.43
E2	3.68	4.39	5.10
E3	1.00	1.14	1.90
D	23.30	23.45	23.60
D1	16.25	17.10	17.65
L	17.31	17.57	17.82
*L1	3.97	4.17	4.37
L2	2.35	2.50	2.65
S	5.49	5.75	6.00

UNIT: mm

Unit:mm

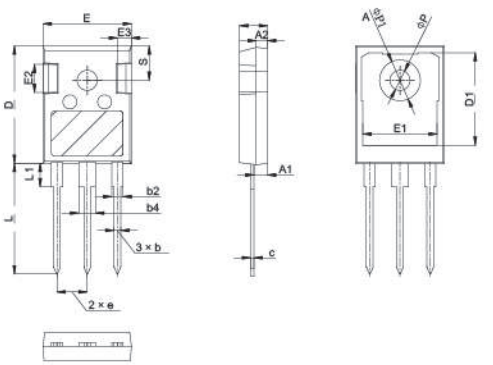
TO-247-2L



Symbol	Min	Nom	Max
A	4.80	5.00	5.21
A1	2.21	2.41	2.61
A2	1.85	2.00	2.16
b	1.07	1.23	1.36
b2	1.90	2.05	2.41
c	0.50	0.60	0.75
e	10.88BSC		
E	15.50	15.80	16.13
E1	12.38	13.30	13.60
E2	3.68	-	5.20
E3	1.00	-	2.70
D	20.70	21.00	21.30
D1	16.25	-	17.65
L	19.60	19.91	20.32
L1	-	-	4.40
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

UNIT: mm

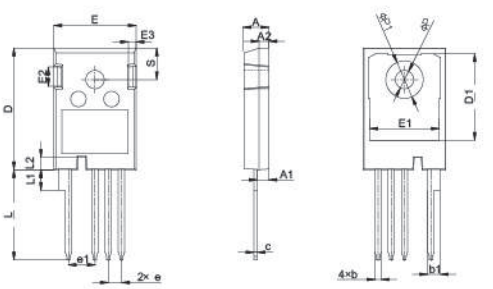
TO-247-3L



Symbol	Min	Nom	Max
A	4.80	5.00	5.21
A1	2.21	2.41	2.61
A2	1.85	2.00	2.16
b	1.07	1.23	1.36
b2	1.90	2.05	2.41
b4	2.87	3.05	3.38
c	0.50	0.60	0.75
e	5.44BSC		
E	15.50	15.80	16.13
E1	12.38	13.30	13.60
E2	3.68	-	5.20
E3	1.00	-	2.70
D	20.70	21.00	21.30
D1	16.25	-	17.65
L	19.60	19.91	20.32
L1	-	-	4.40
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

UNIT: mm

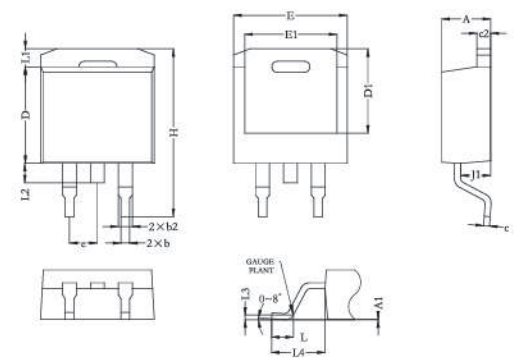
TO-247-4L



Symbol	Min	Nom	Max
A	4.83	5.02	5.21
A1	2.29	2.42	2.54
A2	1.91	2.04	2.16
b	1.07	1.34	1.60
b1	2.39	2.67	2.94
c	0.55	0.62	0.68
e	2.54BSC		
e1	5.08BSC		
E	15.75	15.94	16.13
E1	12.38	12.91	13.43
E2	3.68	4.39	5.10
E3	1.00	1.14	1.90
D	23.30	23.45	23.60
D1	16.25	17.10	17.65
L	17.31	17.57	17.82
L1	3.97	4.17	4.37
L2	2.35	2.50	2.65
ΦP	3.51	3.58	3.65
ΦP1	-	-	7.18
S	6.04	6.17	6.30

UNIT: mm

TO-263



Symbol	Min	Nom	Max
A	4.36	4.46	4.56
A1	-	-	0.25
b	0.70	0.80	0.90
b2	1.17	1.27	1.37
c	0.38	0.54	0.69
c2	1.19	1.27	1.34
D	8.60	8.80	9.00
D1	6.90	7.20	7.50
E	10.15	10.35	10.55
E1	8.10	8.40	8.70
e	8.54BSC		
H	15.00	15.30	15.60
L	1.90	2.20	2.50
L1	-	-	1.65
L2	-	-	1.78
L3	0.25TYP		
L4	4.78	5.03	5.28
J1	2.56	2.76	2.96

UNIT: mm

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