MacMic Science & Technology Co., Ltd.

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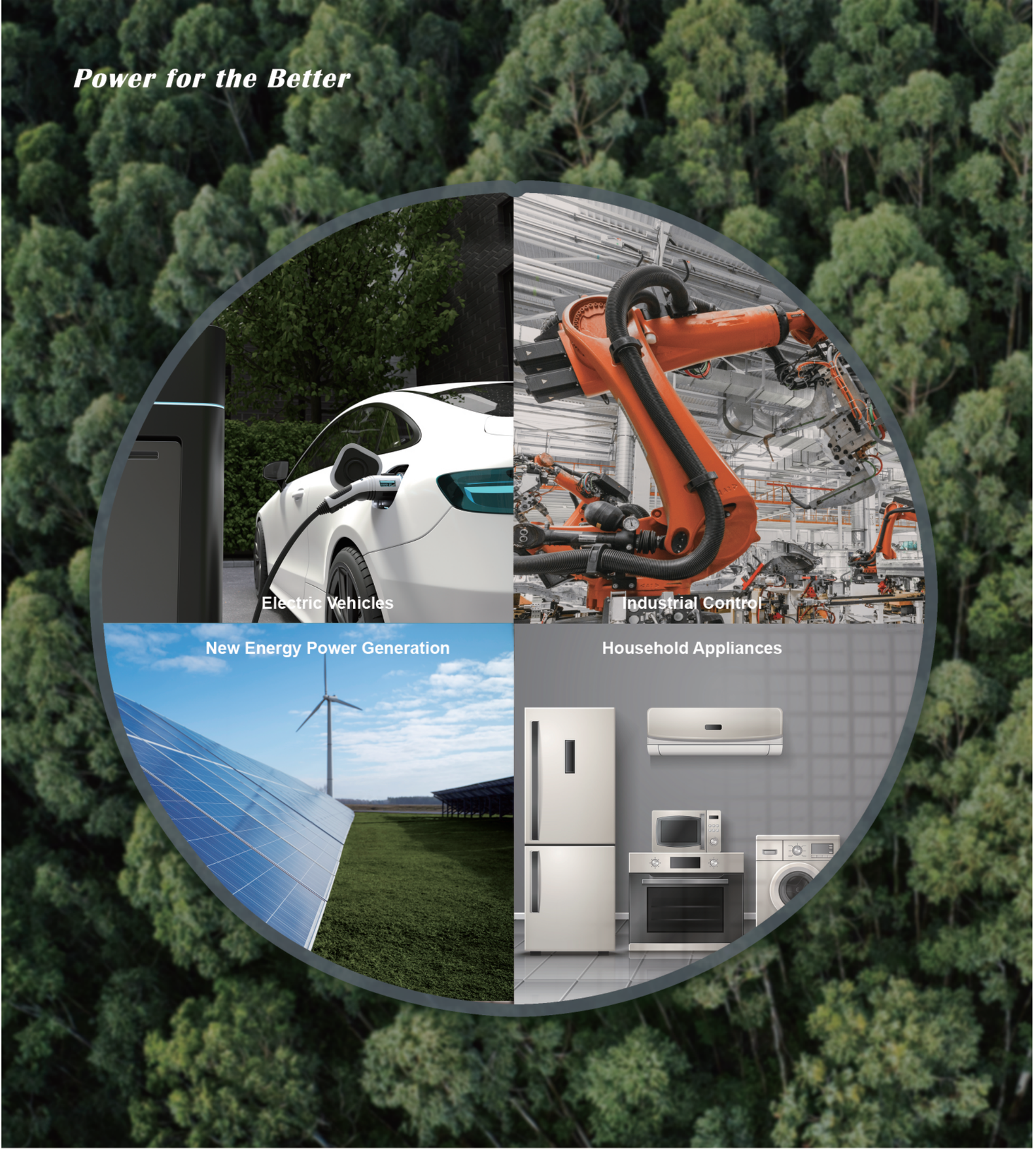
MACMIC®

Power for the Better

Power Semiconductors

2025-2026 Product Catalogue

MacMic Science & Technology Co., Ltd.



CONTENTS

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, MOSFET, 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. The company 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, FRED, SiC 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 managed by the ISO9001 and IATF16949 quality management systems. Every process 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, FRED, SiC chips, discretes and modules, to provide solutions of power semiconductor devices.

COMPANY STRENGTH

POWER MODULE FABRICATION LINES

Fab 1（Huashan Plant）—Plant Area: 6000m^2, Clean Room Area: 1700m^2
Fab 2（Xinzhu Plant）—Plant Area: 11200m^2, Clean Room Area: 5600m^2
Fab 3（Xinzhu Plant）—Plant Area: 12000m^2, Clean Room Area: 7500m^2
Fab 4（Core Energy*）—Plant Area: 14000m^2, Clean Room Area: 12300m^2

* Note：Core Energy is a subsidiary of MacMic.

CHARACTERISTIC ANALYSIS LABORATORY

Diode Reverse Recovery Tester
IGBT Static Parameter Tester
IGBT Switching Parameter Tester
IGBT Charge Tester
IGBT Short Circuit Tester
HV Static Parameter Tester
UIS Tester
Surge Current Tester
Electrostatic Discharge Tester
……

RELIABILITY LABORATORY

High Temperature Reverse Bias Tester
High Temperature Gate Bias Tester
Power Cycle Tester
High / Low Temperature Cycle Tester
85 / 85 Temperature / Humidity Tester
High Humidity High Temperature Reverse Bias Tester
High Temperature Storage Life Tester
Low Temperature Storage Life Tester
Thermal Shock Tester
Salt Spray Evaluation Tester
Vibration Evaluation Test
Mechanical Shock Tester
Highly Accelerated Stress Tester

Macro Ambitions Achieved through Micro Steps

FAILURE ANALYSIS LABORATORY

Digital Microscope
Scanning Acoustic Microscope
Scanning Electron Microscope (SEM)
Thermal EMMI
Laser Decap
Automatic Cutting Machine
Automatic Grinder and Polisher

IGBT MODULES

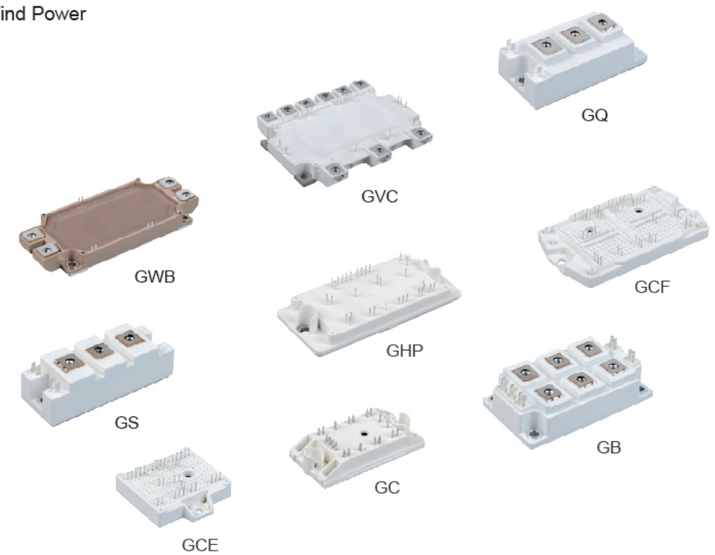
Ranges
- 600-1700V / 10-950A

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, GVE

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

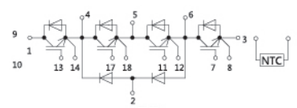
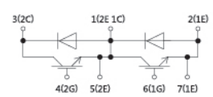
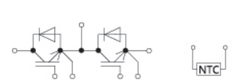
Features
- Fast Switching Speed
- Low Conduction Loss
- Soft Turn-Off Characteristic
- High Short Circuit Capability

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



600-650V IGBT MODULES

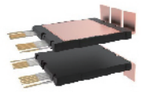
T_C=25°C unless otherwise noted

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
	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
	MMG100CE065PD6TC	650	100	1.55	300	2.40	0.45	GCE
 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
	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
 B	M5i							
	MMG200CE065PD6T5	650	200	1.50	468	6.03	0.32	GCE
	M6i							
	MMG150CE065PD6T6	650	150	1.40	335	5.00	0.40	GCE


GWB

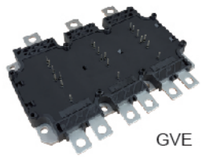

GV

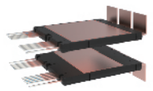

GVB


SSC


GVD

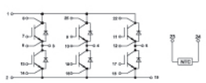
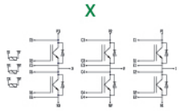
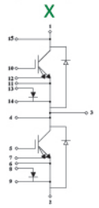
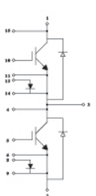

GVC


GVE

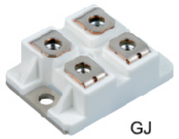

DSC

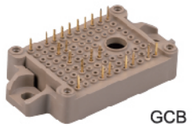
750V IGBT MODULES

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
 X	MMG280VD075X6T7	750	280	1.38	595	15.5	0.252	GVD
	MMG400VD075X6TC-12	750	400	1.40	1027	24.0	0.146	GVD
 X	MMG400VB075X6TC	750	400	1.21	1071	21.7	0.107	GVB
	MMG400VC075X6TC	750	400	1.21	1070	22.3	0.14	GVC
	MMG600V075X6T7	750	600	1.10	937	20.0	0.16	GV
	MMG820V075X6T7	750	820	1.10	1640	31.5	0.12	GV
	MMG820V075X6TC	750	820	1.15	1070	20.0	0.14	GV
	MMG950V075X6T7	750	950	1.15	1800	28.2	0.10	GV
 HB	MMG500VE075X6T7	750	500	1.35	600	15.0	0.23	GVE
	MMG650VE075X6T7	750	650	1.10	950	20.0	0.16	GVE
	MMG880VE075X6T7	750	880	1.00	1300	18.0	0.14	GVE
 HB	CS095HB08C1P1-I7000 *	750	950	1.24	1127	14.03	0.133	DSC
	CS080HB08C1P1-I7000*	750	800	1.22	1136	14.0	0.132	DSC
	CS054HB08C2P1-Z7000*	750	540	1.22	418	16.7	0.358	SSC

* Note: Transfer-Molded IGBT Modules by Core Energy


GJ

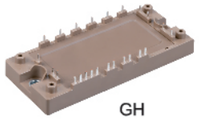

GCB


GD


GQC


GQ

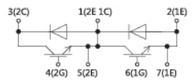
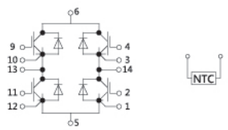
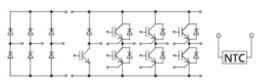
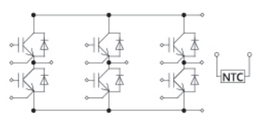

GHB


GH


GW

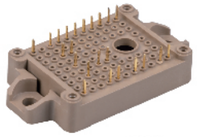
1200V IGBT MODULES

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
	M3i							
 B	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
	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
 H	MMG50QC120H6UC	1200	50	1.70	405	3.10	0.37	GQC
	MMG75QC120H6UC	1200	75	1.70	535	4.10	0.28	GQC
 XB	MMG10CB120XB6TC	1200	10	1.85	107	0.69	1.25	GCB
	MMG10CB120X6TC	1200	10	1.85	107	0.69	1.25	GCB
 X	MMG15CB120XB6TC	1200	15	1.85	130	1.12	1.05	GCB
	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

GQ

GWJ

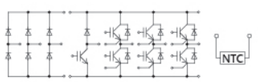
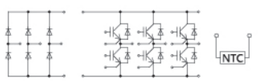
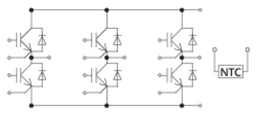
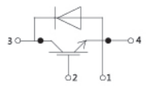
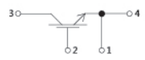


GCB

GHE

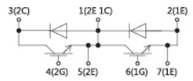
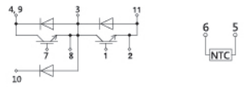
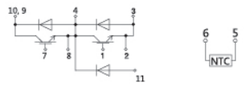
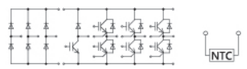
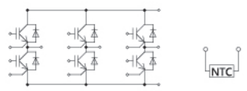
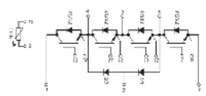
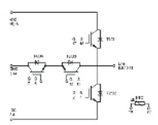
1200V IGBT MODULES

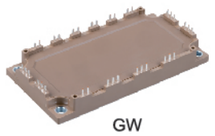
Tc=25°C unless otherwise noted

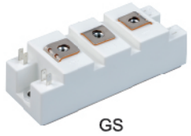
Circuit	Part Number	V_{CES} min. (V)	I_C Tc=65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
 XB	MMG35HD120XB6TC	1200	35	1.85	208	3.30	0.72	GHD
	MMG35HD120XT6TC	1200	35	1.85	208	3.30	0.72	GHD
	MMG50HD120XB6TC	1200	50	1.80	278	4.20	0.54	GHD
	MMG50HD120XT6TC	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	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
 UZ	MMG100J120UZ6TC	1200	100	1.85	515	9.10	0.29	GJ
	MMG150J120UZ6TC	1200	150	1.85	750	14.40	0.20	GJ
	MMG75S120B6TC	1200	75	1.85	385	6.20	0.39	GS
 B	MMG100S120B6TC	1200	100	1.70	515	8.30	0.29	GS
	MMG150S120B6TC	1200	150	1.85	750	13.00	0.20	GS
	MMG150D120B6TC	1200	150	1.70	789	12.10	0.19	GD

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
 B	MMG200Q120B6TC	1200	200	1.70	1071	16.50	0.14	GQ
	MMG200D120B6TC	1200	200	1.70	1071	16.50	0.14	GD
 B	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
 TLA	MMG300WB120B6TC	1200	300	1.80	1596	26.30	0.094	GWB
	MMG450WB120B6TC	1200	450	1.85	2305	45.00	0.065	GWB
 TLB	MMG300WB120TLA6TC	1200	300	1.70	1500	26.50	0.09	GWB
	MMG300WB120TLB6TC	1200	300	1.70	1500	26.50	0.09	GWB
	M6i							
 XB	MMG600WB120B6T6	1200	600	1.70	3750	74.50	0.40	GWB
	M7i							
 X	MMG25CB120XB6T7	1200	25	1.60	163	3.18	0.92	GCB
	MMG75HE120XB6T7_W11	1200	75	1.55	340	11.24	0.44	GHE
 PD	MMG150WJ120XB6T7	1200	150	1.50	882	12.10	0.17	GWJ
	MMG450WQ120PD6T7	1200	450	1.53	1400	13.70	0.107	GWQ
	MMG450WQ120PD6T7H	1200	450	1.53	1400	13.70	0.107	GWQ
 BF	MMG560WQ120BF6T7	1200	560	1.50	1666	18.70	0.09	GWQ
	MMG800D120B6T7	1200	800	1.50	3061	132.00	0.05	GD
	MMG800WB120B6T7	1200	800	1.80	3750	121.0	0.04	GWB


GW


GS

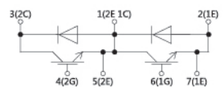

GD


GWB

1700V IGBT MODULES

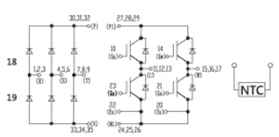
Tc=25°C unless otherwise noted

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
	SPT+							
	MMG75S170B	1700	75	2.40	535	18.5	0.28	GS
	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
	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
	MMG150D170B6TC	1700	150	2.15	1071	34	0.14	GD
	MMG200D170B6TC	1700	200	2.20	1500	52	0.10	GD
	MMG300D170B6TC	1700	300	2.15	1760	90	0.085	GD
	MMG300WB170B6TC	1700	300	2.15	1688	95	0.09	GWB
	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
	M6i							
	MMG600WB170B6T6	1700	600	1.70	3486	223	0.039	GWB



B

B



HX

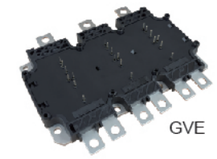

GWB


GV


GVB


GVD


GVC

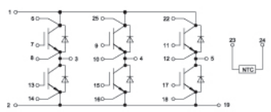

GVE

IGBT MODULES FOR ELECTRIC VEHICLE

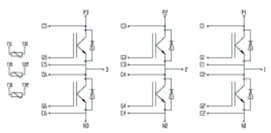
Tc=25°C unless otherwise noted

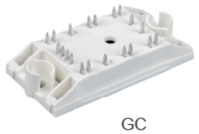
Circuit	Part Number	V_{CES} min. (V)	I_C Tc=65-110°C (A)	$V_{CE(sat)}$ typ. (V)	P_D max. (W)	E_{off} Tj=125°C (mJ)	R_{thJC} max. (K/W)	Package Outline
	MMG450WB120B6TC	1200	450	1.85	2305	45.0	0.065	GWB
	MMG600WB120B6T6	1200	600	1.70	2941	74.5	0.051	GWB
	MMG800WB120B6T7	1200	800	1.80	3750	121.0	0.04	GWB
	MMG280VD075X6T7	750	280	1.38	595	15.5	0.252	GVD
	MMG400VD075X6TC-12	750	400	1.40	1027	24.0	0.146	GVD
	MMG400VB075X6TC	750	400	1.21	1071	21.7	0.107	GVB
	MMG400VC075X6TC	750	400	1.21	1070	22.3	0.14	GVC
	MMG600V075X6T7	750	600	1.10	937	20.0	0.16	GV
	MMG820V075X6T7	750	820	1.10	1640	31.5	0.12	GV
	MMG820V075X6TC	750	820	1.15	1070	20.0	0.14	GV
	MMG950V075X6T7	750	950	1.15	1800	28.2	0.10	GV
	MMG600V120X6RS	1200	600	1.60	1500	51.0	0.10	GV
	MMG500VE075X6T7	750	500	1.35	600	15.0	0.23	GVE
	MMG650VE075X6T7	750	650	1.10	950	20.0	0.16	GVE
	MMG880VE075X6T7	750	880	1.00	1300	18.0	0.14	GVE

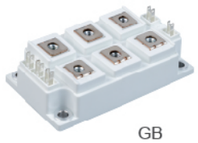
B

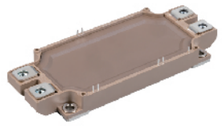


X

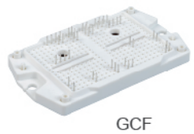

X


GC

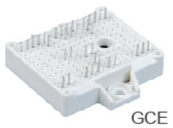

GB


GWB


GWQ


GCF

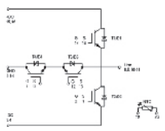
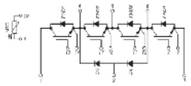
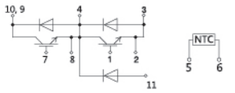
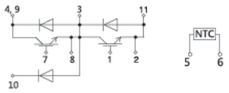

GHP


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	4.9	0.34	GB
	MMG450WB120B6TC	1200	450	1.85	2305	45.0	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
	MMG300WB120TLB6TC	1200	300	1.70	1380	37.0	0.09	GWB
 B	MMG300WB120TLA6TC	1200	300	1.70	1380	37.0	0.09	GWB
	MMG150CE065PD6T6	650	150	1.40	335	5.0	0.40	GCE
 TLB	MMG200CE065PD6T5	650	200	1.50	468	5.2	0.32	GCE
	MMG800D120B6T7	1200	800	1.50	3061	132.0	0.049	GD
 TLA	MMG450WQ120PD6T7	1200	450	1.53	1400	14.1	0.107	GWQ
	MMG560WQ120BF6T7	1200	560	1.50	1666	15.7	0.09	GWQ
	MMG600WQ100PD6T7	1000	600	1.80	1540	11.8	0.097	GWQ

IGBT DISCRETES

Ranges

- 650-1200V / 10-140A

Applications

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

Packages

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

Features

- Fast Switching Speed
- High Short Circuit Capability

Tc=25°C unless otherwise noted

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
 TO-247-3L	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
 TO-247 Plus-3L	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
 TO-247 Plus-4L	MM15G3T120T	1200	15	1.85	300	1.50	0.50	TOLT
	MM25G7T120T	1200	15	1.55	250	2.65	0.60	TOLT
	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
 TO-247 LP-4L	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
	MM40G7U120B	1200	40	1.50	441	1.40	0.34	TO-247-3L
	MM40G7U120BK	1200	40	1.50	441	1.40	0.34	TO-247 LP-4L
	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
 TO-247-4L	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
 TOLT	MM140G7U120BKM	1200	140	1.60	1111	8.00	0.14	TO-247 Plus-4L

SiC MODULES


NV


NCB


SJ / NJ


NS

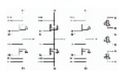
SiC SBD MODULES

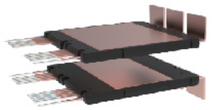
Tc=25°C unless otherwise noted

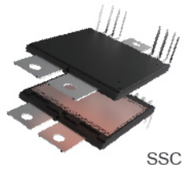
Circuit	Part Number	V_{CES} (V)	I_C (A)	$V_{CE(sat)}$ (V)	R_{thJC} (K/W)	T_{jmax}	Package Outline
	MMS2X60J120D	1200	2x60	1.40	0.11	175°C	SJ
	MMS2X100J065D	1200	2x100	1.36	0.24	175°C	SJ

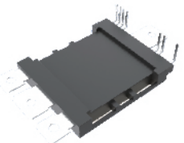
SiC MOSFET MODULES

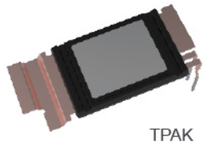
Tc=25°C unless otherwise noted

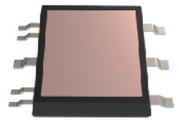
Circuit	Part Number	V_{DSS} (V)	I_D (A)	$R_{DS(on)}$ (mΩ)	R_{thJF} /R_{thJC} (K/W)	T_{jmax}	Package Outline
 BA	MMN7CB120BA6BS	1200	110	7	0.32	150°C	NCB
 X	MMN01V120X6BS	1200	540	1.57	0.105	175°C	NV
	MMN02V120X6BS	1200	439	2.12	0.118	175°C	NV
 U	MMN13J120U6TN	1200	107	13.4	0.565	175°C	NJ
 B	MMN14S120B6TN	1200	140	13.8	0.467	175°C	NS


DSC


SSC

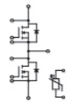
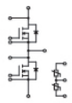
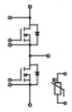
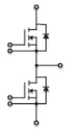

SDC


TPAK


SMPD

TRANSFER-MOLDED SiC MODULES

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{DSS} (V)	I_D (A)	$R_{DS(on)}$ (mΩ)	R_{thJF} /R_{thJC} (K/W)	T_{jmax}	Package Outline
	CC002HB12C1P1-R4000	1200	800	1.6	0.016	175℃	DSC
	CC002HB12C5C1-E3000	1200	400	2.2	0.025	175℃	SSC
	CC002HB12C3P1-L2000	1200	800	1.6	0.088	175℃	SDC
	CC008ST12F1C1-F1000	1200	200	8	0.093	175℃	Tpak
	CC010ST12F1C1-F1000	1200	120	10	0.111	175℃	Tpak
	CC035HB12S1C1-F1000	1200	40	35	0.27	175℃	SMPD
	CC060HB12S1C1-F1000	1200	15	60	0.50	175℃	SMPD
	CC018HB12S1C1-F1000	1200	90	18	0.14	175℃	SMPD

Note: Transfer-Molded SiC Modules by Core Energy

SiC DISCRETES

TO-247-2L

TO-247-4L

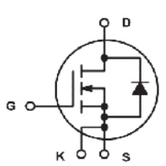
SiC SBD DISCRETES

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{RRM} (V)	$I_{F(AV)}$ (A)	V_F (V)	I_{FSM} (A)	T_{jmax}	Qualification	Package Outline
	MM20S120B	1200	20	1.40	180	175°C	Industrial	TO-247-2L
	MM20SH120B	1200	20	1.45	180	175°C	Industrial	TO-247-2L
	MM40S120B	1200	40	1.40	360	175°C	Industrial	TO-247-2L
	MM40SH120B	1200	40	1.45	360	175°C	Industrial	TO-247-2L

SiC MOSFET DISCRETES

Tc=25°C unless otherwise noted

Circuit	Part Number	V_{DSS} (V)	I_D (A)	$R_{DS(on)}$ (mΩ)	Q_q (nC)	T_{jmax}	Qualification	Package Outline
	MM11NAS075KZ	750	138	11	217	175°C	Industrial	TO-247-4L
	MM25NAS075KZ	750	74	25	112	175°C	Industrial	TO-247-4L
	MM13N120BK	1200	130	13	184	175°C	Industrial	TO-247-4L
	MM15NAS120KZ	1200	126	18	222	175°C	Industrial	TO-247-4L
	MM20NAS120KZ	1200	88	20	175	175°C	Industrial	TO-247-4L
	MM30NAS120KZ	1200	64	30	117	175°C	Industrial	TO-247-4L
	MM39NAS120KZ	1200	50	39	93	175°C	Industrial	TO-247-4L
	MM40N120KZ	1200	50	40	120	175°C	Industrial	TO-247-4L

FRED MODULES

Ranges

- 200-1700V/ 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

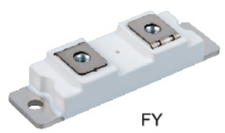
Features

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

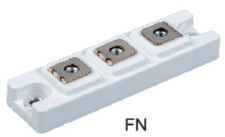
Applications

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

FZ

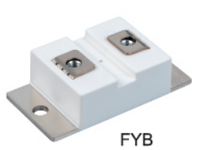


FY



FN

FJ



FYB

FS

FD

FZ

FY

FYB

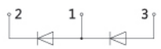
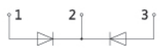
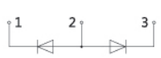
FS

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)	V_{FM} @ I_{FM} T_J=25°C (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
	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
 U	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
	MMF300S120U	1200	300	2500	2.75	300	150	0.14	FS
 U	MMF400S120U	1200	400	3200	3.00	400	180	0.11	FS
	MMF600S120U	1200	600	4800	2.80	600	200	0.10	FS
	MMF400D120U	1200	400	3600	2.10	400	190	0.085	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)	V_{FM} @ I_{FM} T_J=25°C (A)	t_{rr} T_J=25°C (ns)	R_{thJC} (K/W)	Package Outline
 B	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
 DK	MMF300N060DK6B	600	2×150	1410	1.25	150	95	0.34	FN
	MMF200N120DK	1200	2×100	1100	1.77	100	150	0.44	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
 DA	MMF200N120DA	1200	2×100	1100	1.77	100	150	0.44	FN
	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

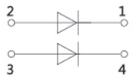
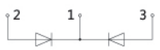

FJ


FN


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 Tj=45°C (A)	V_{FM} @ I_{FM} Tj=25°C (V)	V_{FM} @ I_{FM} Tj=25°C (A)	t_{rr} Tj=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
 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
	MMF200S120DK2B	1200	2×200	1800	2.30	200	110	0.22	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
	MMF300S120DA2B	1200	2×300	2700	2.80	300	135	0.14	FS
	MMF300S060DA2B	600	2×300	3000	1.10	300	165	0.15	FS
 B2B	MMF150S060B2B	600	2×150	1500	1.15	150	130	0.22	FS
	MMF300S060B2B	600	2×300	3000	1.15	300	150	0.14	FS
	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

FRED DISCRETES

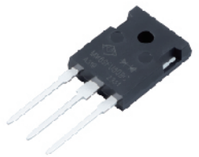
Ranges
- 300-1700V / 8-100A

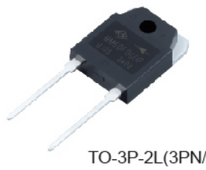
Applications
- Welding Machine
- SMPS, UPS
- Home Appliances
- Charging Pile

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

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

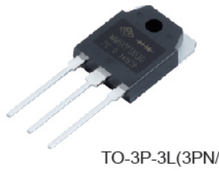

TO-220(A/B/C)


TO-247-3L


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


TO-220F


TO-247-2L


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


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°C (ns)	R_{thJC} max. (K/W)	Package Outline
 C	MM60FU030PC	300	60	1.25	22	0.80	TO-3PB-3L
	MM60F040B	400	60	1.15	35	0.48	TO-247-2L
	MM80FU040PC	400	80	1.30	22	0.80	TO-3PB-3L
	MM30F060PC	600	30	1.41	21	0.80	TO-3PB-3L
	MM60F060PC	600	60	1.50	30	0.80	TO-3PB-3L
	MM60F060P	600	60	1.30	40	0.50	TO-3PB-2L
	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
	MM60FU060B	600	60	2.00	25	0.50	TO-247-2L
	MM30FU060K1	600	30	2.00	20	1.50	TO-220F-2L
	MM60FU60BC	600	60	2.00	20	0.80	TO-247-3L
	MM8FU060K	600	8	1.80	17	2.50	TO-220C-2L
	MM30FU60PC	600	30	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
	MM15F060K	600	15	1.30	30	1.50	TO-220C-2L
	MM15FU60K	600	15	2.00	18	1.30	TO-220
 U	MM100F60B	600	100	1.55	50	0.26	TO-247-2L
	MM15F70K	700	15	1.30	21	1.50	TO-220C-2L
	MM16F70KC	700	16	1.30	19	2.50	TO-220C-3L
	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-220
	MM30FU120B	1200	30	2.90	26	0.80	TO-247-2L
	MM8FU120K	1200	8	2.80	20	2.00	TO-220
	MM30FU120K	1200	30	2.90	26	0.80	TO-220
	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
	MM75F170B	1700	75	2.00	0	0.25	TO-247-2L

RECTIFIER DIODE MODULES

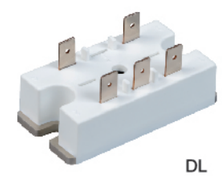
Ranges
- 1600-2000V / 50-300A

Circuit Configurations
- Three Phase Rectifier Bridge Circuit
- Half Bridge Circuit
- Common-Cathode Circuit
- Single Circuit

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

Packages
- DE, DEB, DF, DFB, DL
  DA, DAB, DS

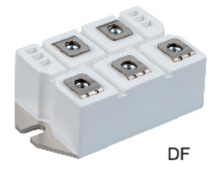
Features
- Compact Structure
- High Current Capability
- High Blocking Voltage
- High Reliability
- High Performance Price Ratio


DL


DE


DEB


DFB


DF


DA

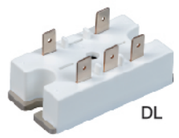

DAB


DS


DA


DAB


DS


DL


DE


DF

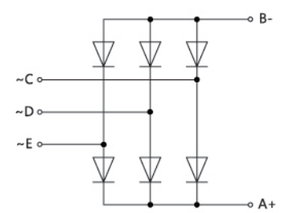

DEB


DFB

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)	(A)	R_{thJC} (K/W)	Package Outline
 B	MMD110A180B	1800	110	2500	1.60	350	0.30	DA
	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
	MMD160S160B	1600	160	5500	1.50	500	0.18	DS
	MMD160S180B	1800	160	5500	1.50	500	0.18	DS
	MMD180S180B	1800	180	6000	1.50	600	0.18	DS
 U	MMD200S180B	1800	200	6500	1.50	600	0.16	DS
	MMD240S160B	1600	240	7350	1.55	600	0.12	DS
	MMD300S160U	1600	300	9000	1.25	500	0.09	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)	$V_{F(max)}$ @ I_F T_j=25°C (V)	(A)	R_{thJC} (K/W)	Package Outline
 X	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
	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

PRODUCT NAMING

IGBT & MOSFET & SiC MOSFET DISCRETES

MM | Q | 50 | G | 7T | 120 | BH | [ ]

MacMic

Q: Automotive Grade
(AEC-Q101 Qualified)
Blank: Industrial Grade

Ic= 50A
$R_{DS(on)}$ =50mohm

Product Type
N: MOSFETs
G:IGBT

Optimization
1S: GEN1 SiC MOSFETs
AS: GEN2 SiC MOSFETs
3T: M3i 5-40kHz
3U: M3i 10-60kHz
3R: M3i RC-IGBT
5T: M5i 5-40kHz
5U: M5i 10-60kHz
7T: M7i 5-40kHz
7U: M7i 10-60kHz

Voltage×10
E.g.120=1200V

Package Type
K : TO-220-3L
K1 : TO-220 Full Package
PF : TO-3P Full Package
S : TO-263 (D^2PAK)
SJ : TO-263-7
B : TO-247-3L
BH : TO-247-H3L (High Creapage)
BM: TO-247Plus-3L
MH: TO-247Plus-H3L (High Creapage)
BK : TO-247-4L (C-E High Creapage)
KA : TO-247LP-4L (Asymmetric)
KZ : TO-247-4L
MK: TO-247Plus-4L (C-E High Creapage)
ZA : TO-247Plus-4L (Collector Protrusion)
T : TOLT / TOLL

Blank for MOSFETs
Diode Type for IGBT
Blank: Ful Rated Diode
G : Half Rated Diode
Q : Full rated SiC SBD
D : Half Rated SiC SBD
N : Single IGBT

FRED & SiC SBD DISCRETES

MM | 80 | F | U | 040 | P | C

MacMic

Current Rating
$I_{F(Av)}$=80A

Product Type:
D: Rectifier Diode
F: Fast Recovery Diode
S: SiC Schottky Diode

Optimization:
Blank: Fast
U : Ultrafast
UF: Hyperfast
C : EV Charger
H : High efficiency

Voltagex10
E.g. 040=400V

Package Type:
K : TO-220-2L / 3L
K1 : TO-220 Full Package
P : TO-3PN / 3PB
PF : TO-3P Full Package
S : TO-263-2L / 3L (D2PAK)
B : TO-247-2L / 3L

Circuit
Blank: Single
H : Half Bridge
T : Dual Package
C : Common Cathode
A : Common Anode

IGBT MODULES & HYBRID SiC MODULES

MM | G | 450 | WQ | 120 | PD | 6T7 | H

MacMic

G: IGBT Modules

Current Rating
I_c=450A

Package Type:
EV Pack (Electric Vehicle Pack Series) :
V, VB, VC, VD, VE, VF
Smart: C, CB, CE, CF
Ofa (Original Fashion Series) : B, S, D, J, K, Q, QC
Sym (Symmetrical Series) : WB
PV (Photovoltaic Series) : HP, WQ
Effi PIM (Efficient PIM Series) :
H, HD, HE, W, WD, WJ

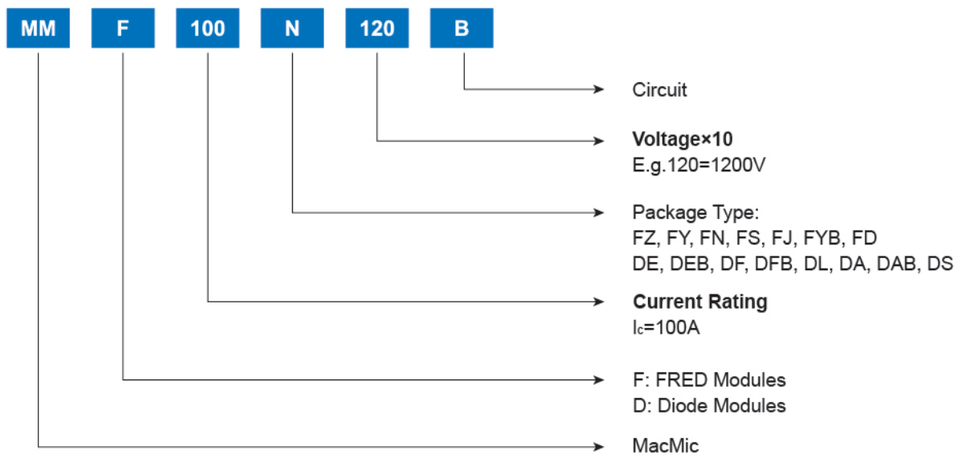
Voltage×10
E.g.120=1200V

H: Hybrid SiC Modules
.....

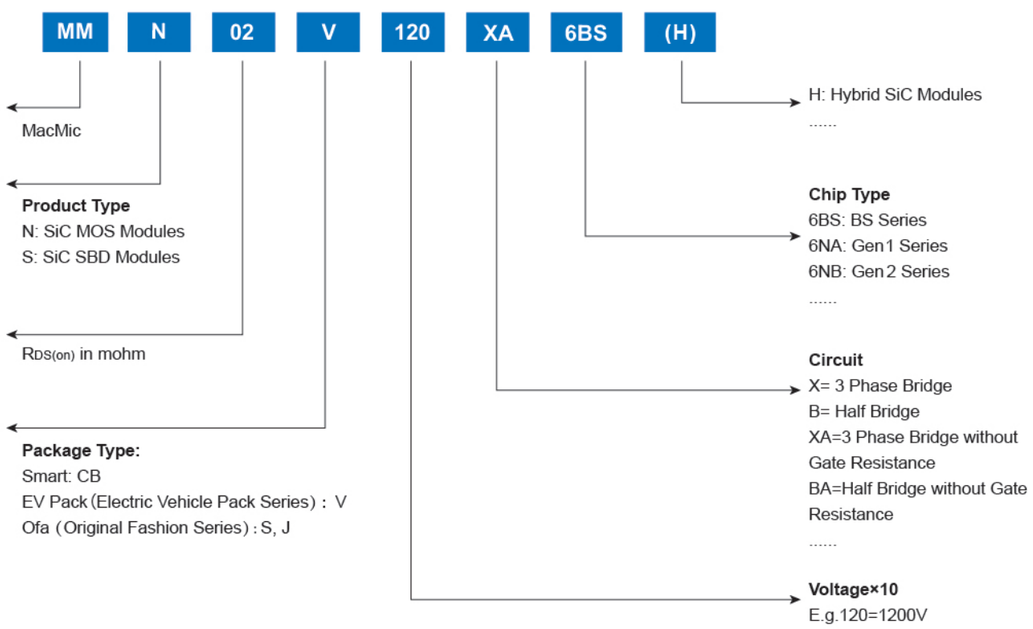
Chip Type
MacMic Chip:
6TC: M3i 6T5: M5i
6T6 : M6i 6T7: M7i
.....

Circuit
U=Single Switch UZ=Single without FWD
UK=Chopper Diode Low Side
UA=Chopper Diode Up Side
UX=3 Phase Rectifier+Brake
B=Half Bridge H= Full Bridge
HX=3 Phase Rectifier+Full Bridge
X=3 Phase Bridge
XT=3 Phase Rectifier+3 Phase Output
XB=3 Phase Rectifier+Brake+3 Phase Output (PIM)
BT=Boost BF=T-NPC PF=Buck+ Boost
PD=I-NPC PG=I-NPC
.....

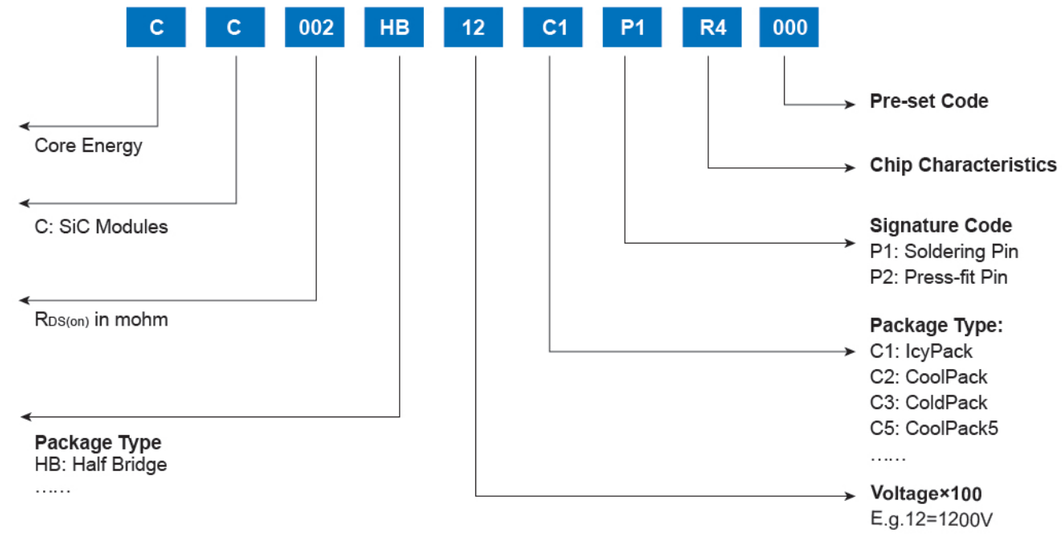
FRED MODULES / RECTIFIER DIODE MODULES / THREE-PHASE RECTIFIER BRIDGE MODULES



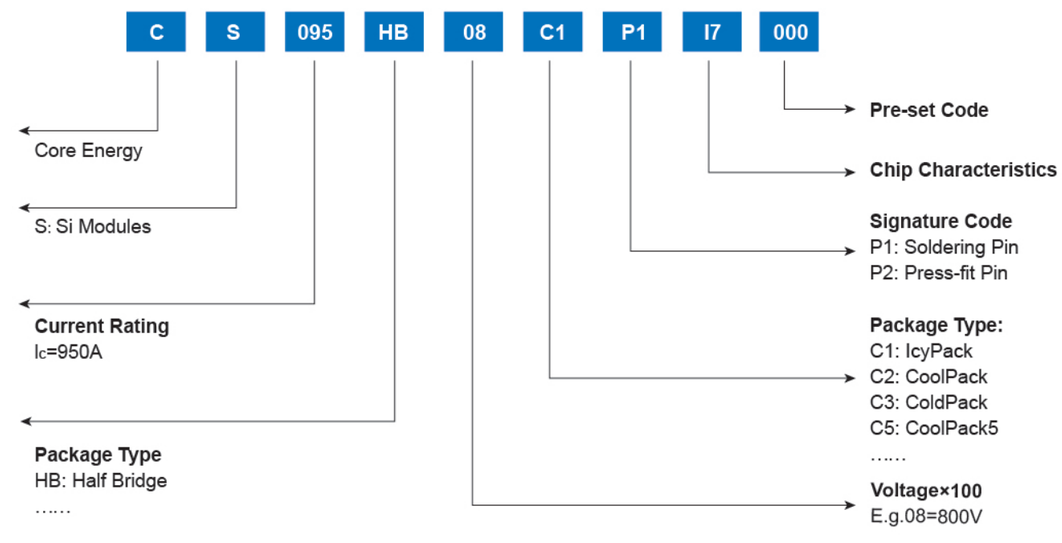
SiC MODULES



TRANSFER-MOLDED SiC MODULES

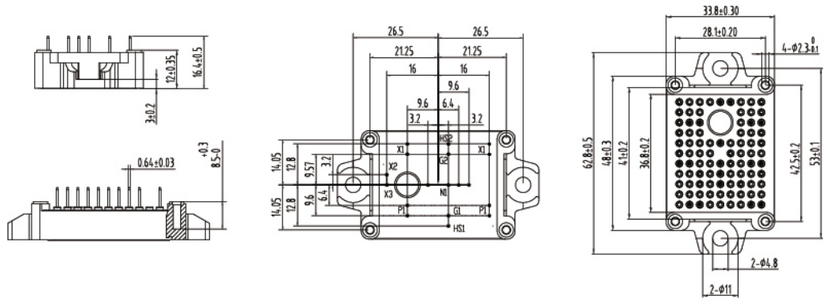


TRANSFER-MOLDED IGBT MODULES

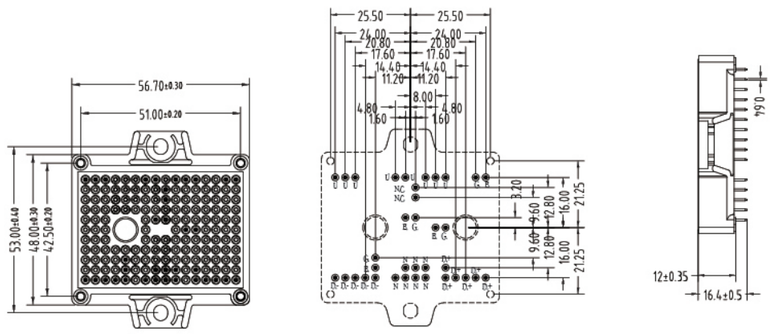


OUTLINE DRAWINGS

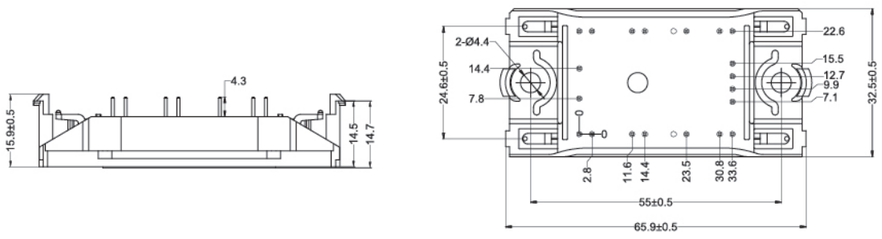
GCB



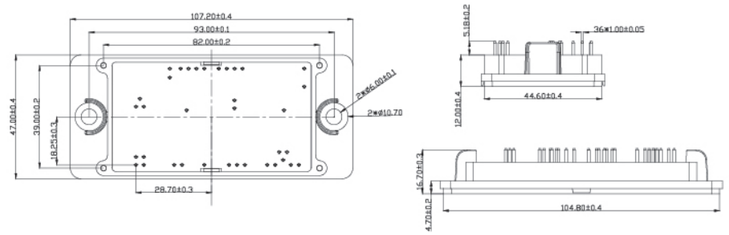
GCE



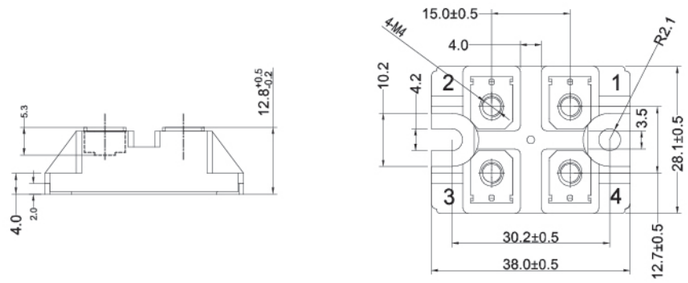
GC



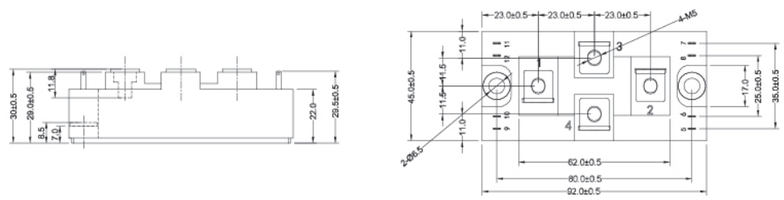
GHP



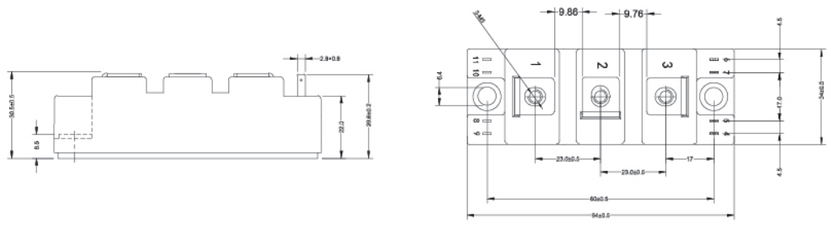
GJ / NJ / SJ



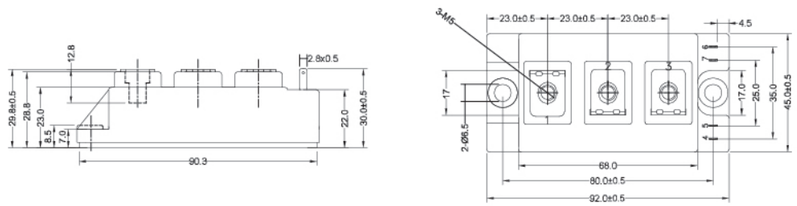
GQC



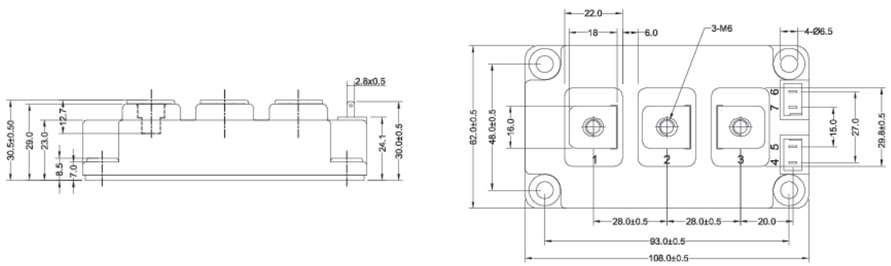
GS / NS



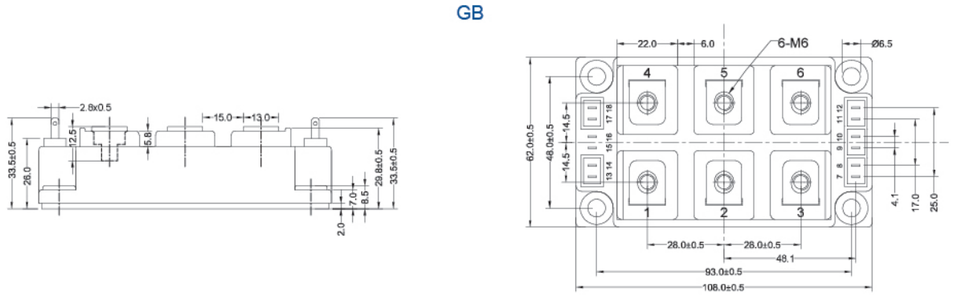
GQ



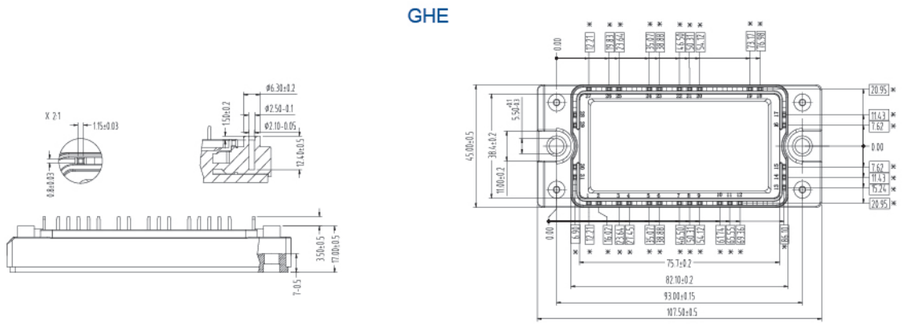
GD



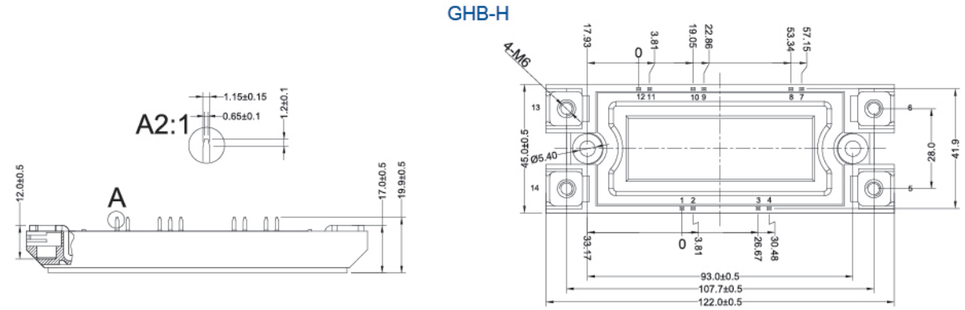
GB



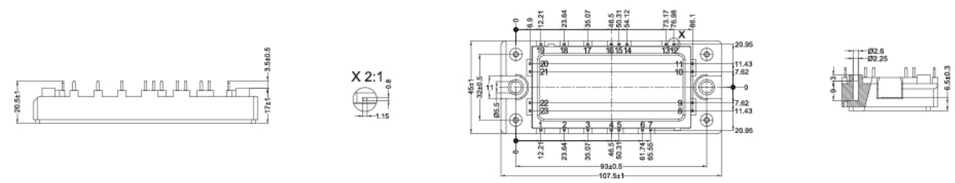
GHE



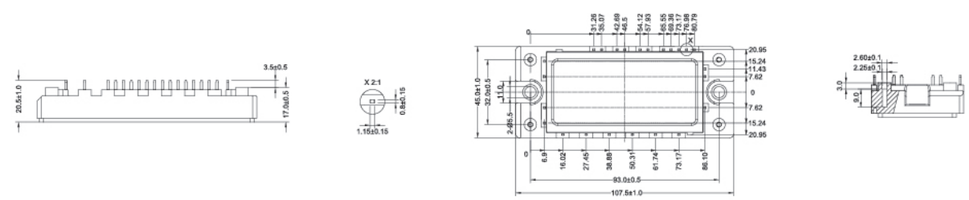
GHB-H



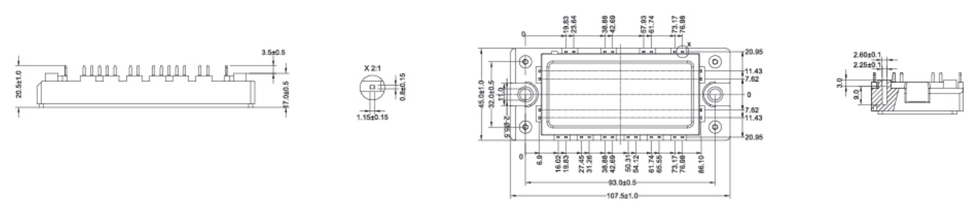
GHD-XB



GH-XB

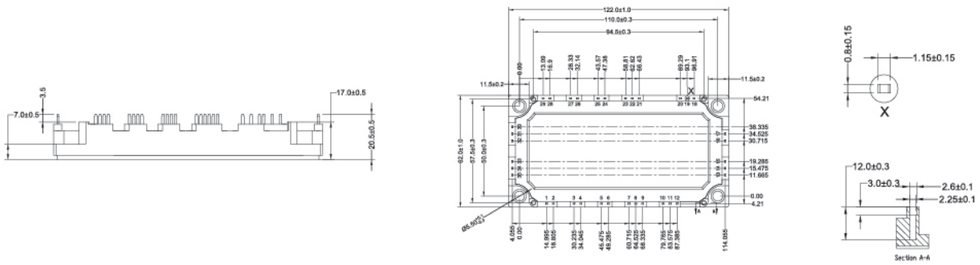


GH-X

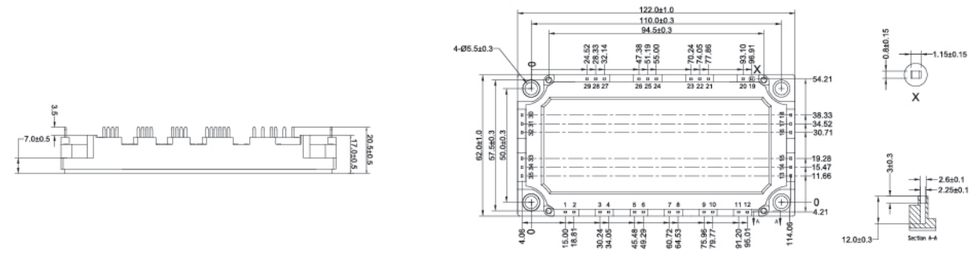


Unit:mm

GWD-XB



GW-X



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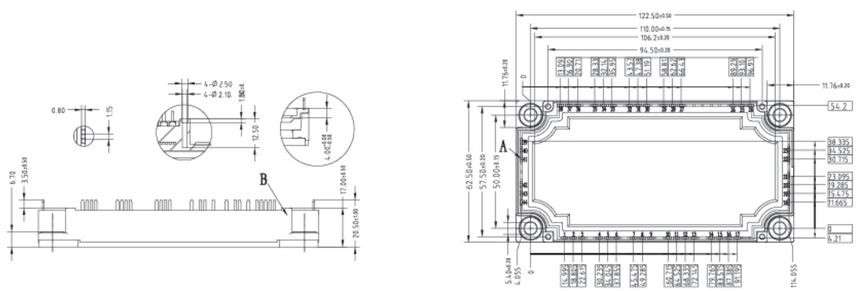

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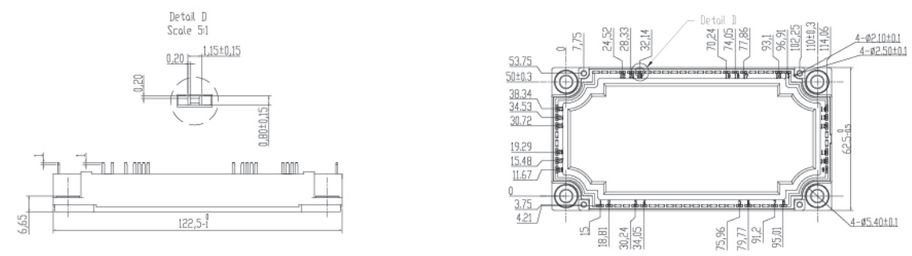
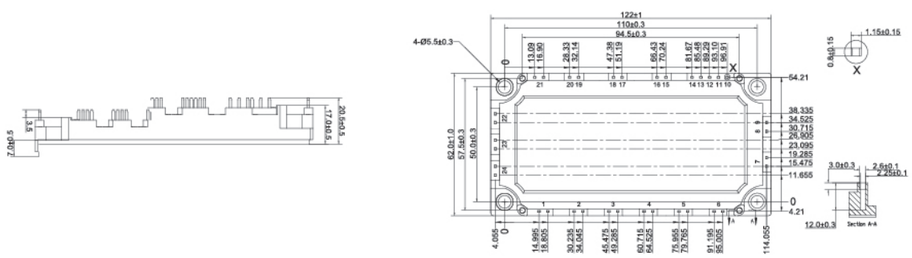
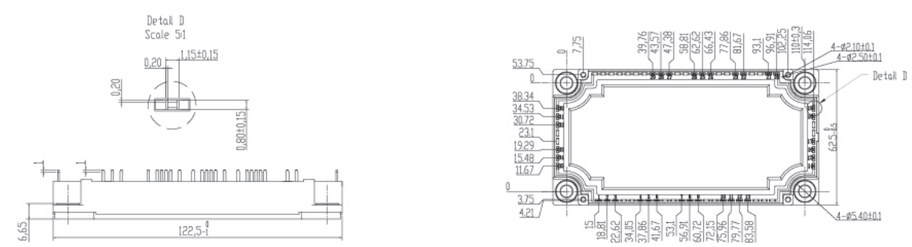


GW-XB

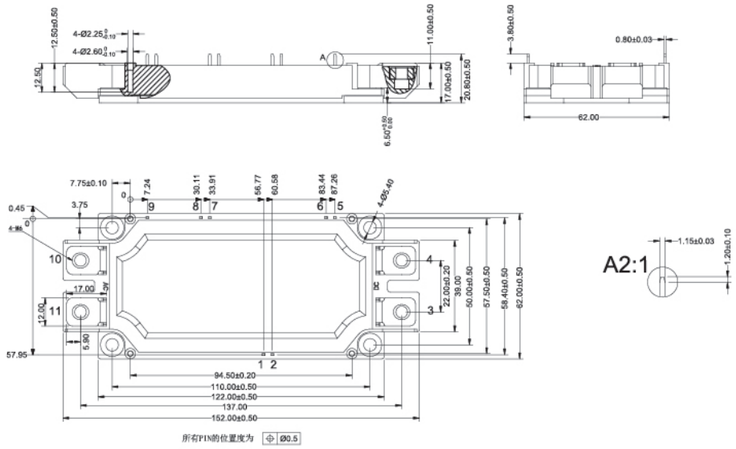


GW-HX



Unit:mm

GWB



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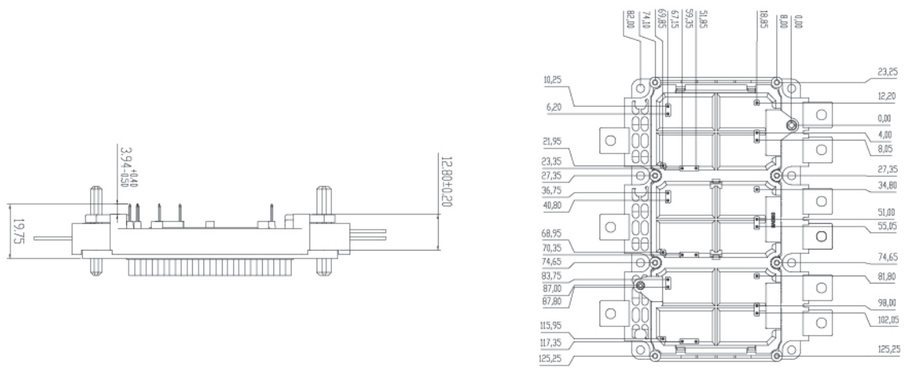

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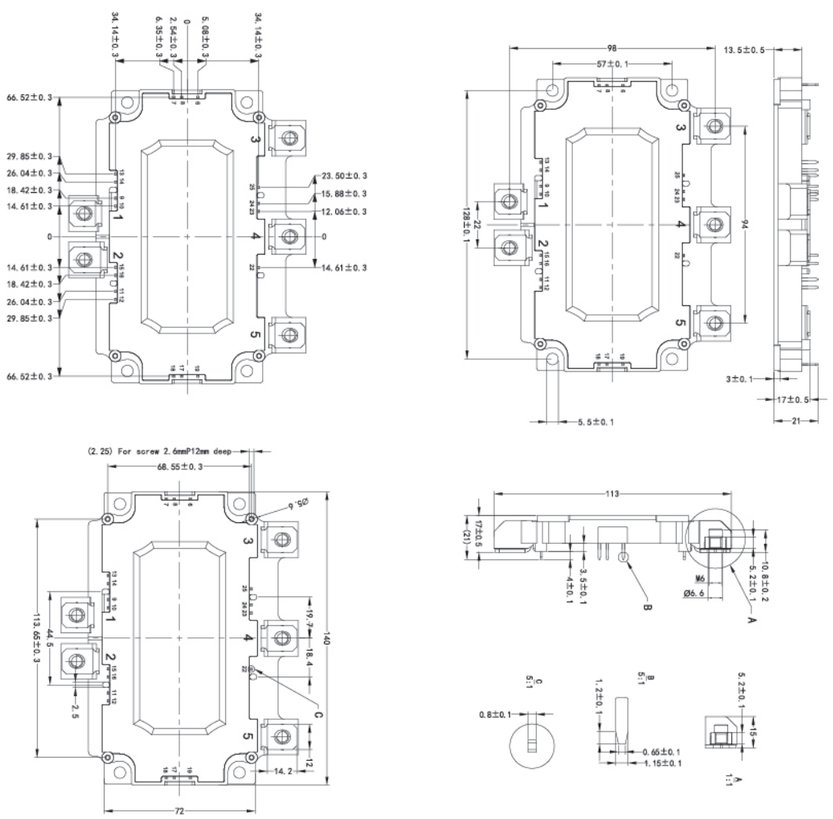

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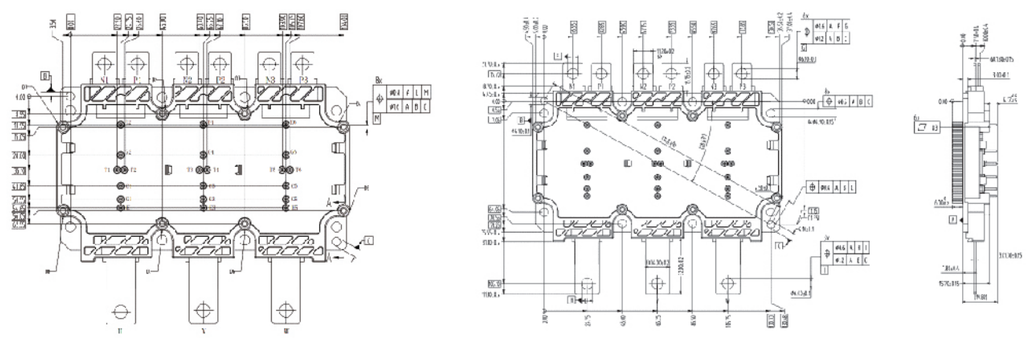
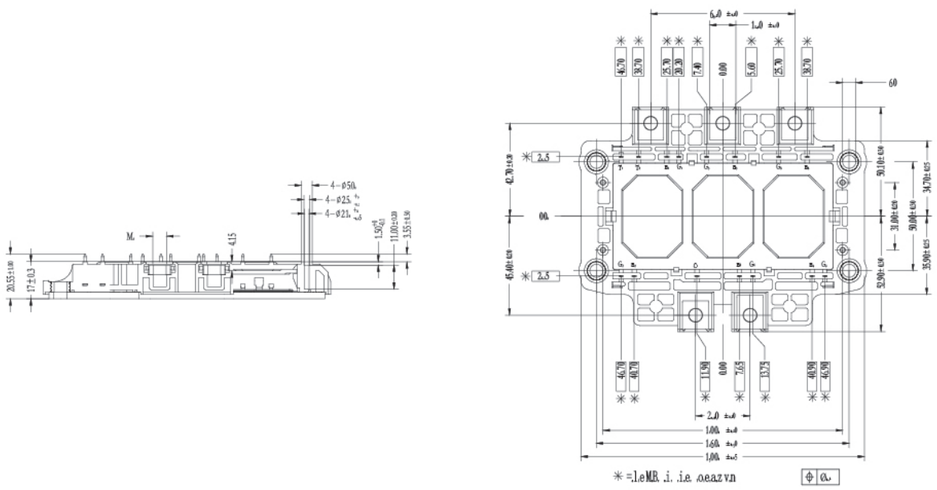


Unit:mm

GVD



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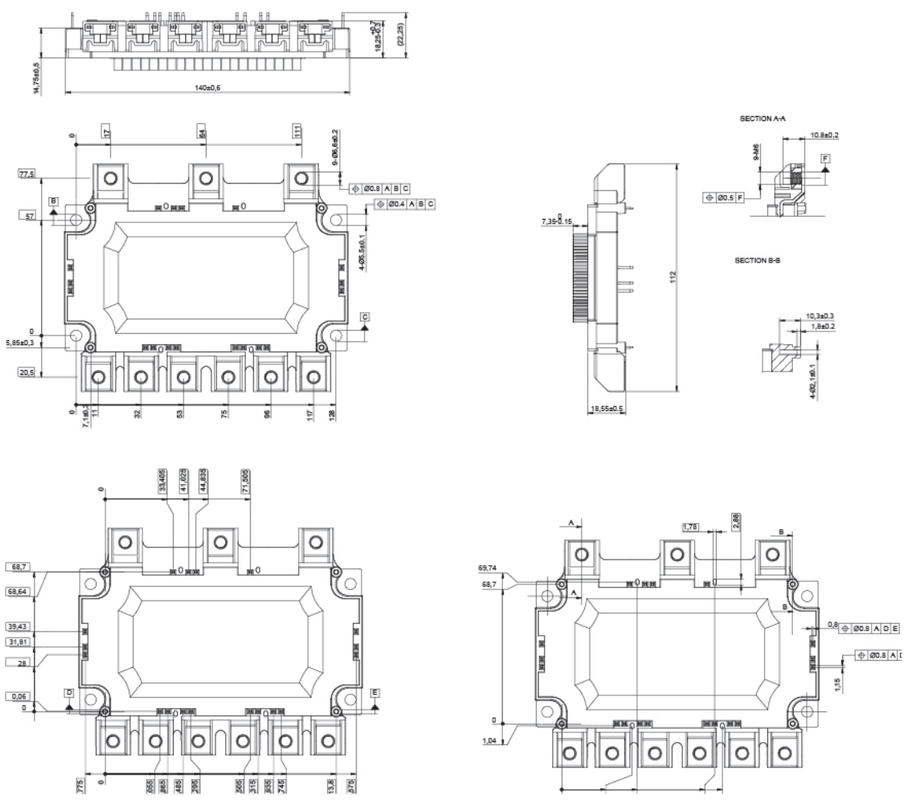

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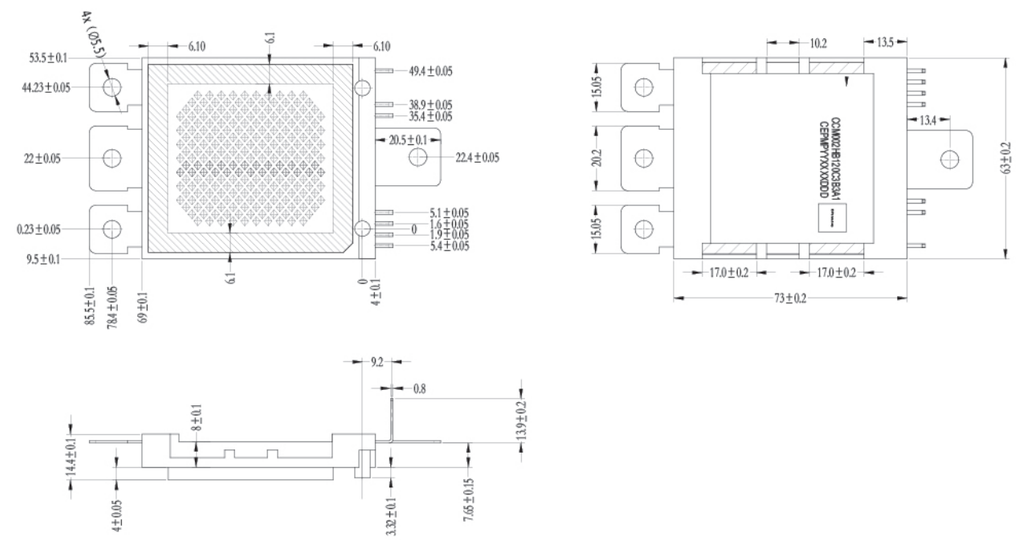

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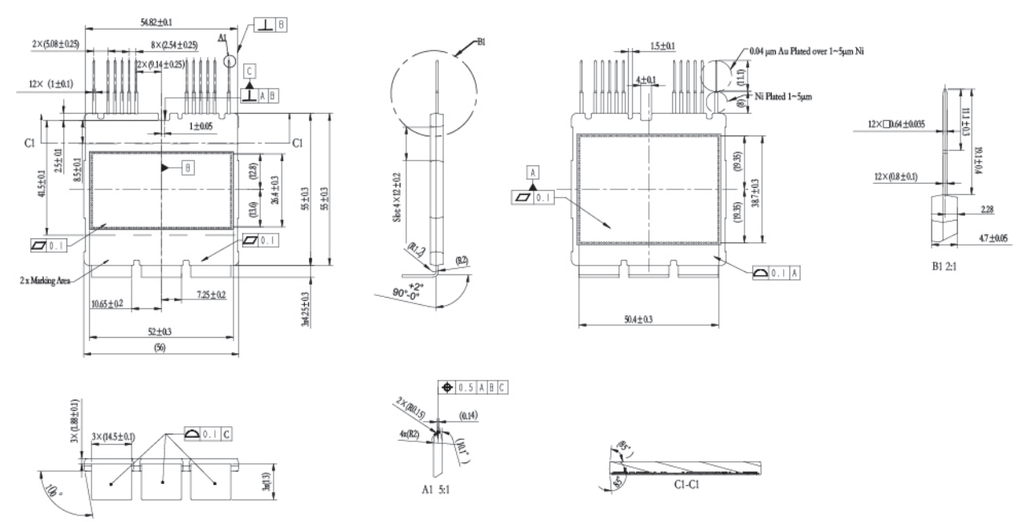

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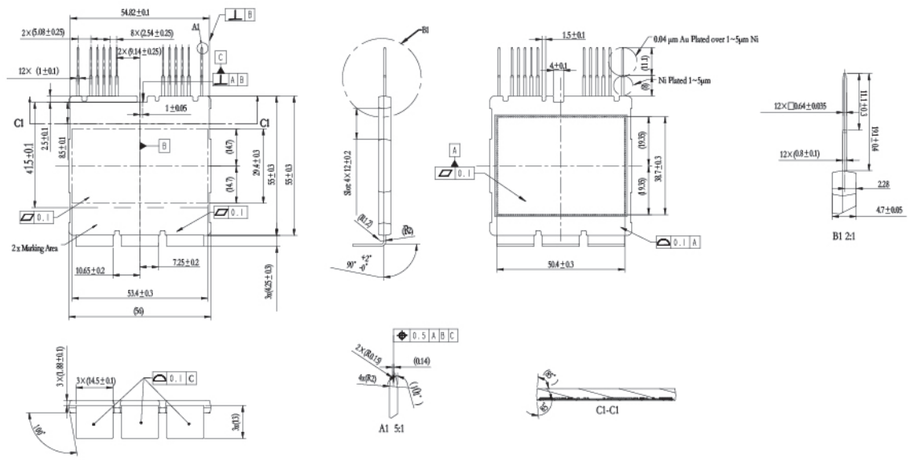
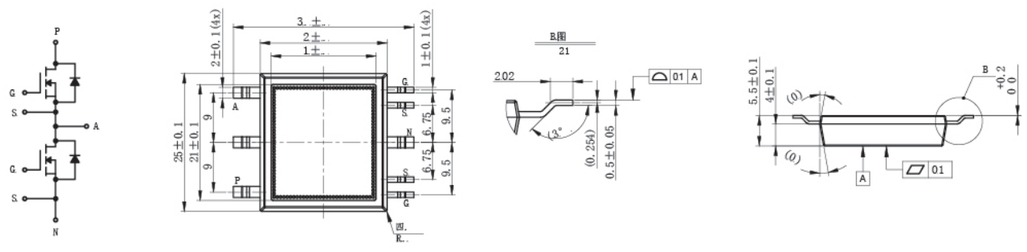
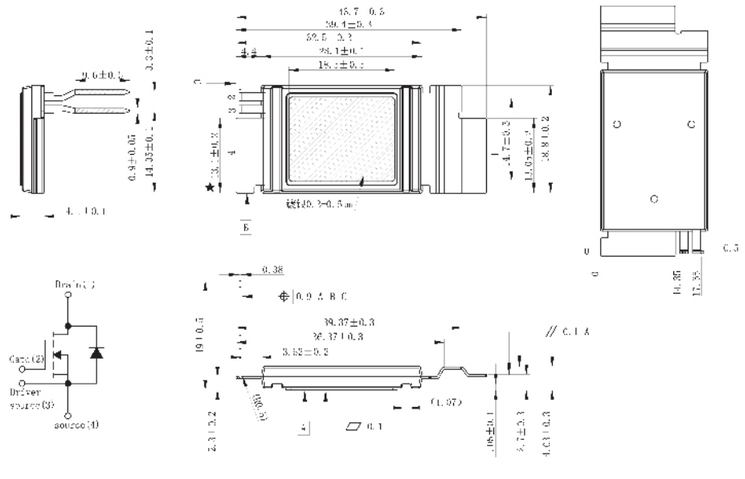


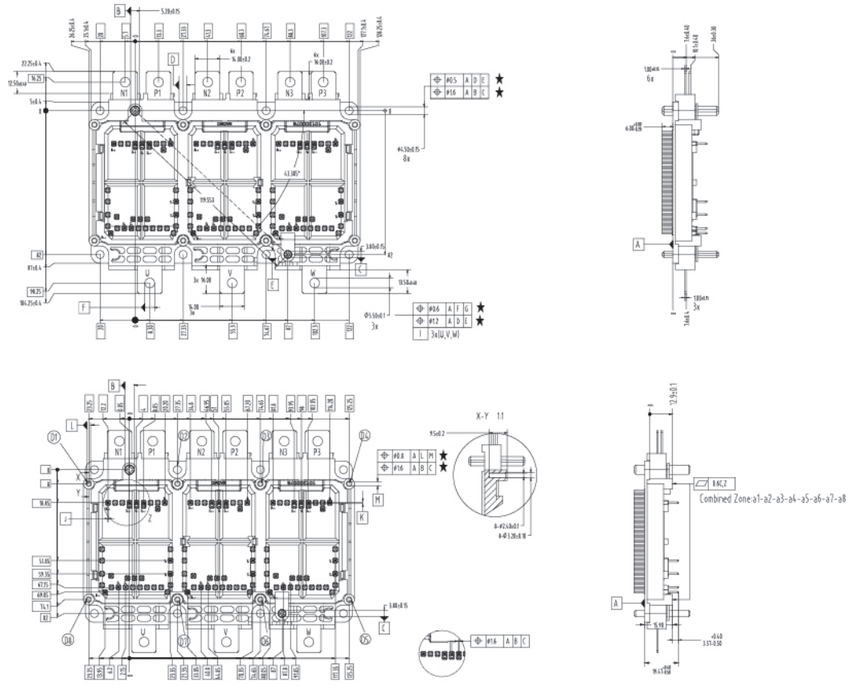
SMIT



TPAK



NV



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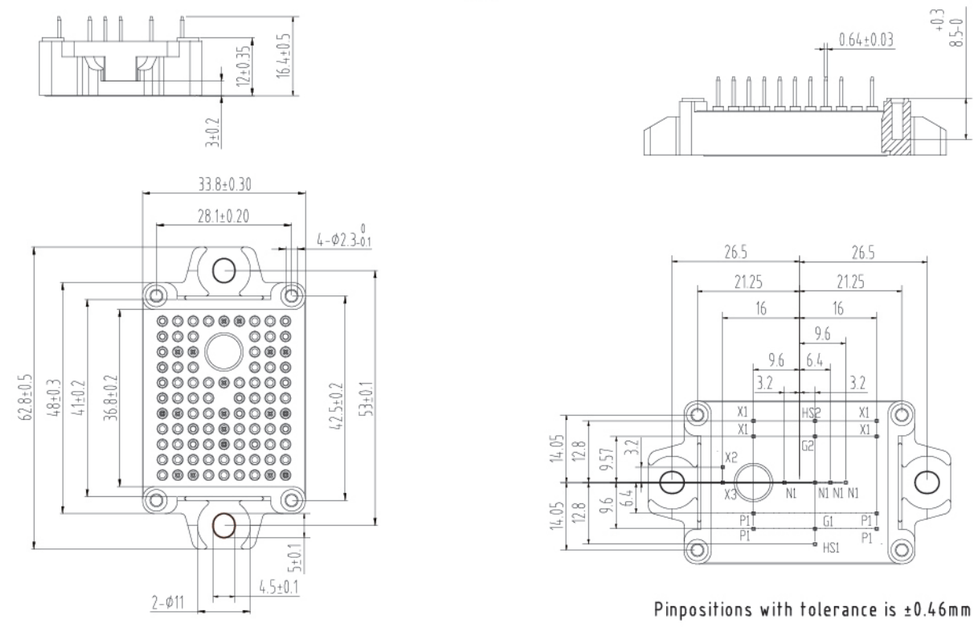
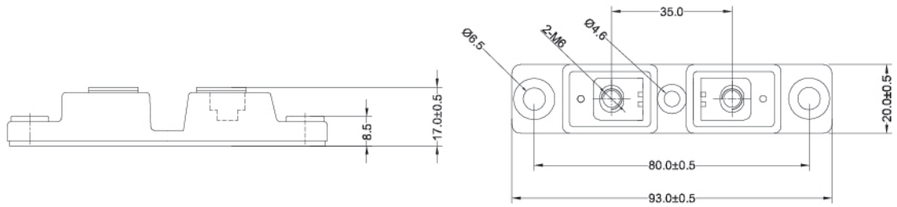


Pinpositions with tolerance is ±0.46mm

Unit:mm

FZ



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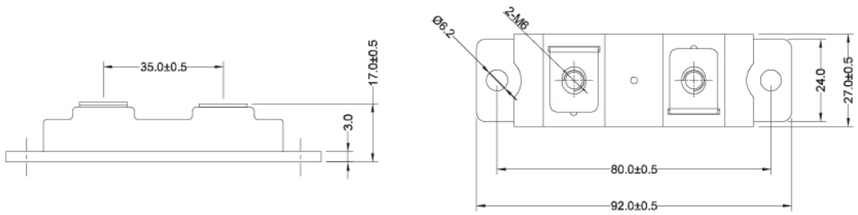

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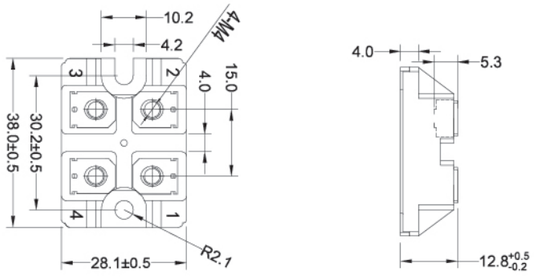

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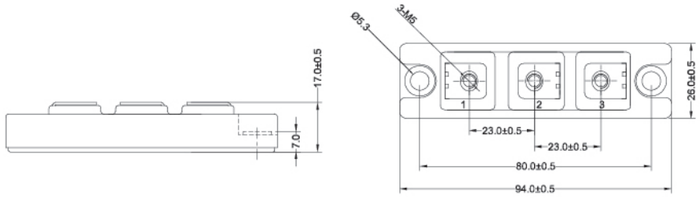
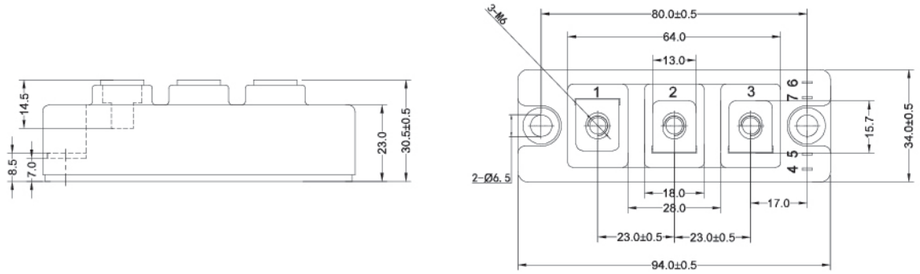
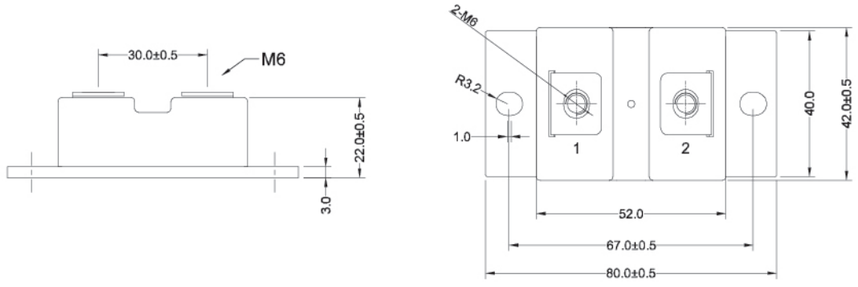


FS



FYB



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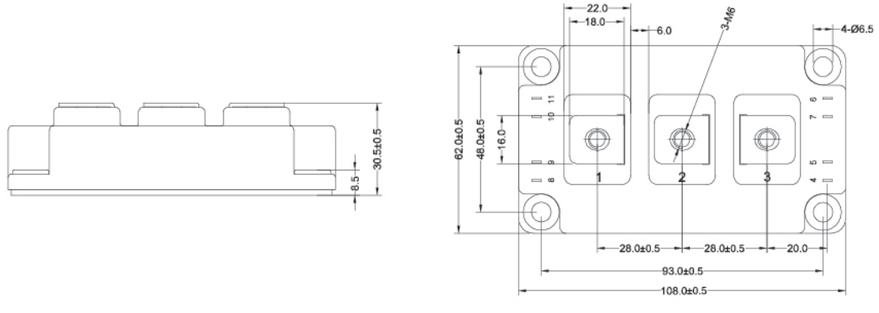
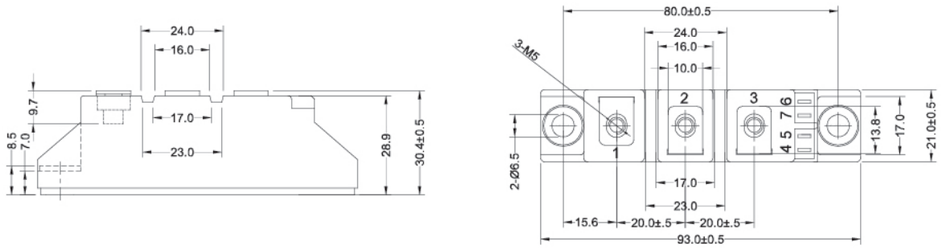
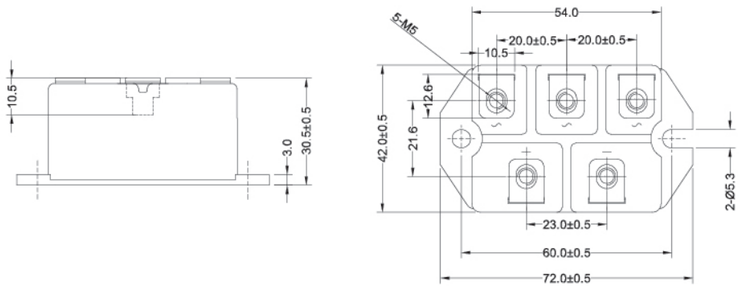


Unit:mm

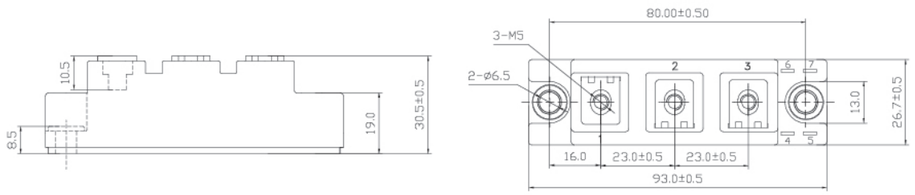
DA



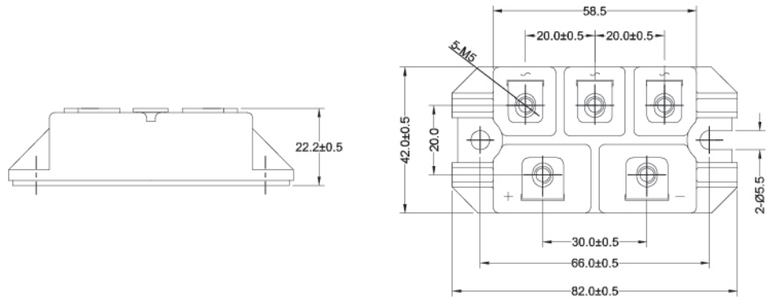
DE



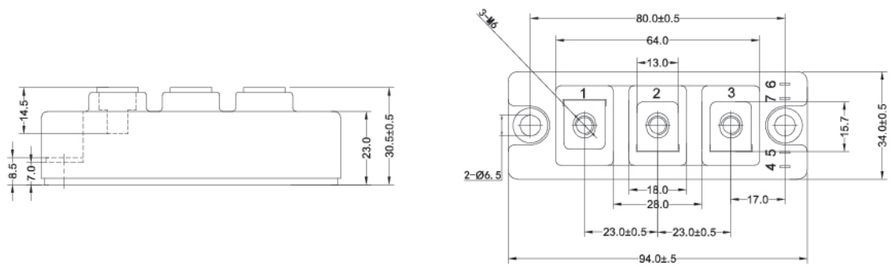
DAB



DEB



DS



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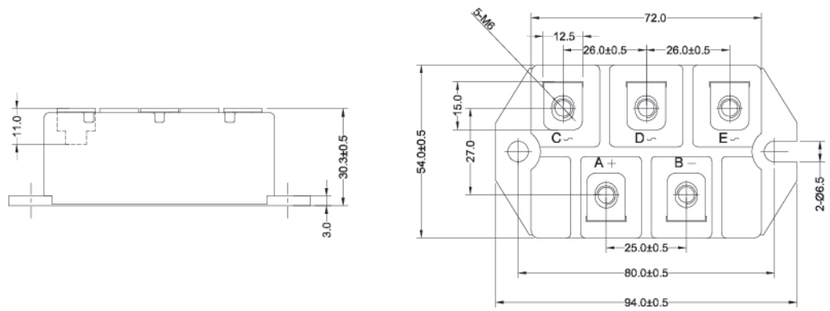
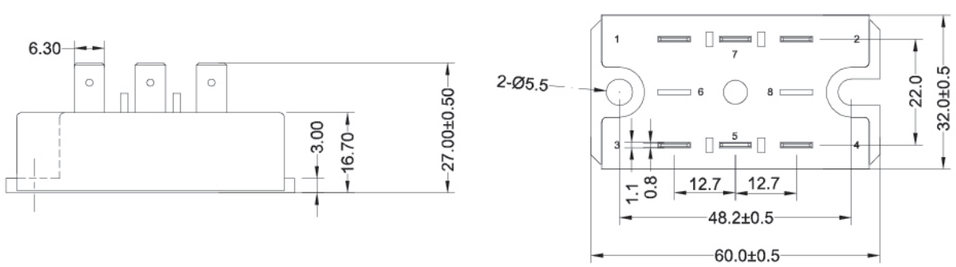
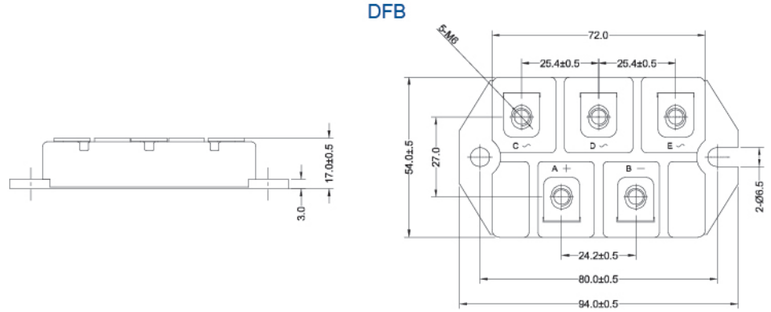


DL

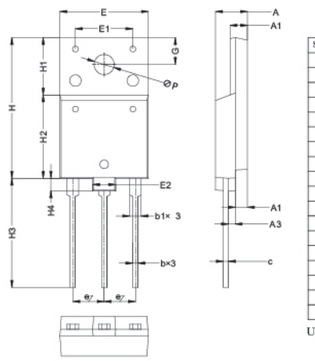


DFB



Unit:mm

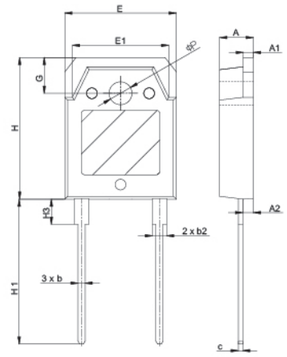
TO-3PF



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
ØP	3.30	3.50	3.70

UNIT: mm

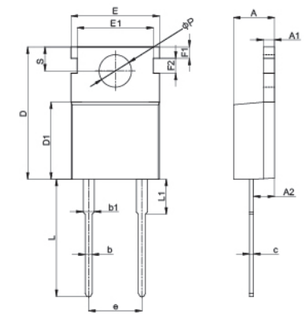
TO-3PB-2L



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
ØP	3.00	3.20	3.40

UNIT: mm

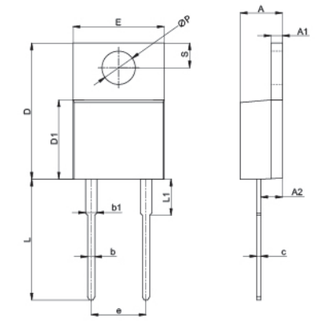
TO-220B-2L



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
ØP	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

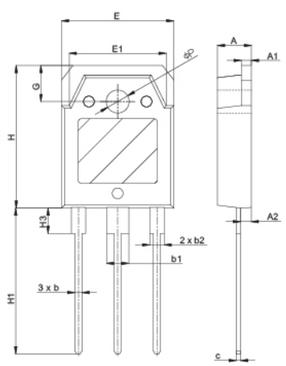
TO-220C-2L



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
ØP	3.40	3.60	3.80
S	2.60	2.80	3.00

UNIT: mm

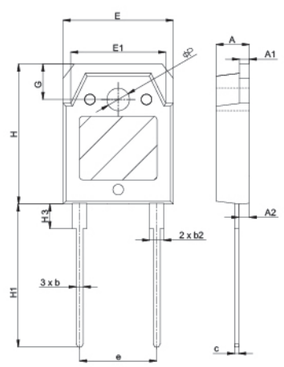
TO-3PB-3L



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
ØP	3.00	3.20	3.40

UNIT: mm

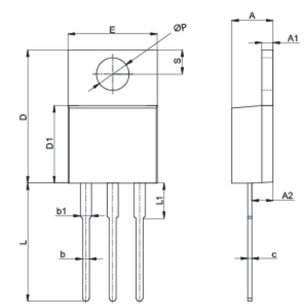
TO-3PN-2L



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
ØP	3.00	3.20	3.40

UNIT: mm

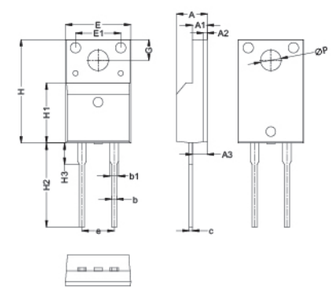
TO-220C-3L



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
ØP	3.40	3.60	3.80
S	2.60	2.80	3.00

UNIT: mm

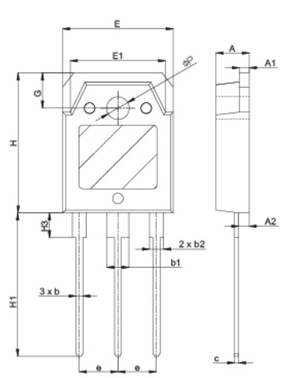
TO-220F



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

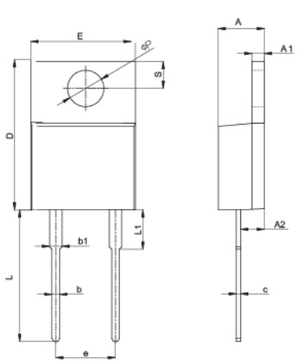
TO-3PN-3L



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
ØP	3.00	3.20	3.40

UNIT: mm

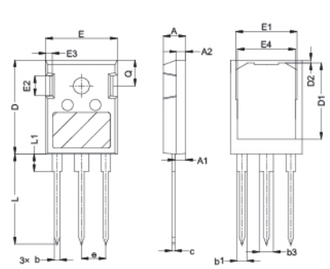
TO-220A-2L



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
ØP	3.64	3.84	4.04
S	2.54	2.74	2.94

UNIT: mm

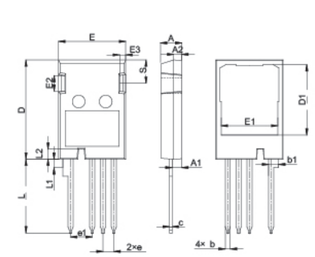
TO-247 Plus-3L



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

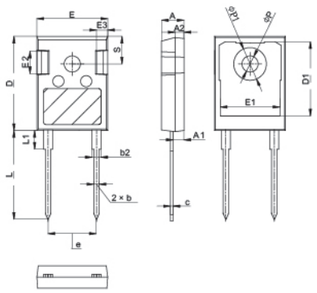
TO-247 Plus-4L



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

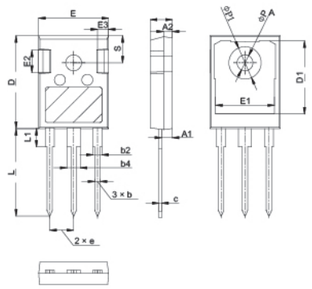
TO-247-2L



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

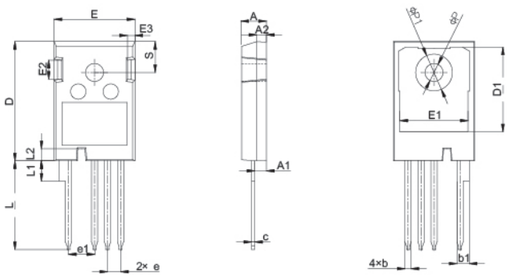
TO-247-3L



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

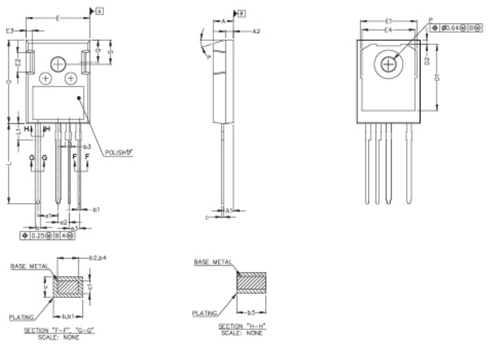
TO-247-4L



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

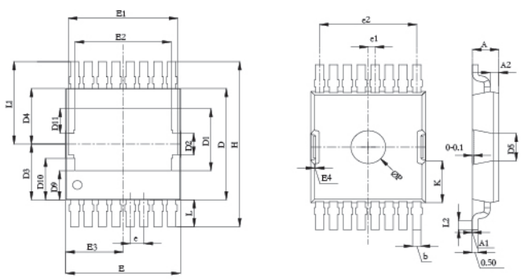
TO-247 LP-4L



SYM	MILLIMETERS	
	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b	1.10	1.30
b1	0.65	0.79
b2	1.10	1.25
b3	1.34	1.44
b4	0.65	0.74
c	0.55	0.68
c1	0.55	0.65
D	20.80	21.10
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13
E1	13.10	14.15
E2	4.32	5.10
E3	1.00	1.90
E4	12.38	13.43
e1	5.08 BSC	
e2	2.79 BSC	
e3	2.54 BSC	
L	19.72	20.32
L1	3.97	4.37
øP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF.	

UNIT: mm

TOLT



Symbol	Min	Max
A	2.20	2.35
A1	0.01	0.11
A2	0.56	0.96
b	0.60	0.85
b1	0.60	0.80
c	0.45	0.65
c1	0.45	0.60
D	10.00	10.30
D1	5.47	5.87
D2	1.80	2.20
D3	4.85	5.25
D4	5.00	5.13
D5	2.08	2.48
D9	2.42	2.82
D10	3.85	4.25
D11	2.04	2.44

Symbol	Min	Max
E	9.70	10.10
E1	9.26	9.66
E2	8.10	8.50
E3	4.75	5.15
E4	0.20	0.60
e	1.20BSC	
e1	0.60BSC	
e2	8.40BSC	
H	14.80	15.20
K	3.71	4.11
L	2.25	2.65
L1	7.30	7.70
L2	1.30	1.70
R	0.07	-
P	2.90	3.10
θ	4°	10°

UNIT: mm