

## PRODUCT FEATURES

- High short circuit capability, self limiting short circuit current
- IGBT CHIP(Highly rugged SPT+ design)
- $V_{CE(sat)}$  with positive temperature coefficient
- Ultra Low Loss, High Ruggedness
- Free wheeling diodes with fast and soft reverse recovery

## APPLICATIONS

- AC motor control
- Motion/servo control
- Inverter and power supplies
- Photovoltaic/Fuel cell



### IGBT-inverter

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter/Test Conditions	Values	Unit
$V_{CES}$	Collector Emitter Voltage	$T_J = 25^\circ\text{C}$	V
$V_{GES}$	Gate Emitter Voltage		
$I_C$	DC Collector Current	$T_C = 25^\circ\text{C}, T_{Jmax} = 175^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}, T_{Jmax} = 175^\circ\text{C}$	
$I_{CM}$	Repetitive Peak Collector Current	$t_p = 1\text{ms}$	
$P_{tot}$	Power Dissipation Per IGBT	$T_{Jmax} = 175^\circ\text{C}$	W

### Diode-inverter

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter/Test Conditions	Values	Unit
$V_{RRM}$	Repetitive Reverse Voltage	$T_J = 25^\circ\text{C}$	V
$I_{F(AV)}$	Average Forward Current		A
$I_{FRM}$	Repetitive Peak Forward Current	$t_p = 1\text{ms}$	
$I^2t$		$T_J = 150^\circ\text{C}, t = 10\text{ms}, V_R = 0\text{V}$	$\text{A}^2\text{S}$

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# MMG150D170B

## IGBT-inverter

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}, I_C=6\text{mA}$	5.4	6.2	7.4	V
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$I_C=150\text{A}, V_{GE}=15\text{V}, T_J=25^\circ\text{C}$		2.5	2.75	
		$I_C=150\text{A}, V_{GE}=15\text{V}, T_J=150^\circ\text{C}$		3.1		
$I_{CES}$	Collector Leakage Current	$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$			1	mA
		$V_{CE}=1700\text{V}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$			10	mA
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}, V_{GE}=\pm 15\text{V}, T_J=25^\circ\text{C}$	-500		500	nA
$Q_g$	Gate Charge	$V_{CE}=900\text{V}, I_C=150\text{A}, V_{GE}=\pm 15\text{V}$		1.22		$\mu\text{C}$
$C_{ies}$	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		10.2		nF
$C_{res}$	Reverse Transfer Capacitance			0.36		nF
$t_{d(on)}$	Turn on Delay Time	$V_{CC}=900\text{V}, I_C=150\text{A}$ $R_G=7.5\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	240		ns
			$T_J=150^\circ\text{C}$	260		ns
$t_r$	Rise Time		$T_J=25^\circ\text{C}$	120		ns
			$T_J=150^\circ\text{C}$	130		ns
$t_{d(off)}$	Turn off Delay Time		$T_J=25^\circ\text{C}$	450		ns
			$T_J=150^\circ\text{C}$	550		ns
$t_f$	Fall Time	$T_J=25^\circ\text{C}$	160		ns	
		$T_J=150^\circ\text{C}$	180		ns	
$E_{on}$	Turn on Energy	$V_{CC}=900\text{V}, I_C=150\text{A}$ $R_G=7.5\Omega,$ $V_{GE}=\pm 15\text{V},$ Inductive Load	$T_J=25^\circ\text{C}$	36		mJ
			$T_J=125^\circ\text{C}$	47		mJ
			$T_J=150^\circ\text{C}$	52		mJ
$E_{off}$	Turn off Energy		$T_J=25^\circ\text{C}$	28		mJ
			$T_J=125^\circ\text{C}$	44		mJ
			$T_J=150^\circ\text{C}$	48		mJ
$I_{SC}$	Short Circuit Current	$t_{psc} \leq 10\mu\text{s}, V_{GE}=15\text{V}$ $T_J=150^\circ\text{C}, V_{CC}=1300\text{V}$		500		A
$R_{thJC}$	Junction to Case Thermal Resistance ( Per IGBT )				0.14	K /W

## Diode-inverter

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$V_F$	Forward Voltage	$I_F=150\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.8	2.25	V
		$I_F=150\text{A}, V_{GE}=0\text{V}, T_J=150^\circ\text{C}$		1.9		
$t_{rr}$	Reverse Recovery Time	$I_F=150\text{A}, V_R=900\text{V}$		900		ns
$I_{RRM}$	Max. Reverse Recovery Current	$di_F/dt=-1400\text{A}/\mu\text{s}$		160		A
$Q_{RR}$	Reverse Recovery Charge	$T_J=150^\circ\text{C}$		76		$\mu\text{C}$
$E_{rec}$	Reverse Recovery Energy			49		mJ
$R_{thJCD}$	Junction to Case Thermal Resistance ( Per Diode )				0.24	K /W

# MMG150D170B

MODULE CHARACTERISTICS ( $T_c=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter/Test Conditions	Values	Unit	
$T_{Jmax}$	Max. Junction Temperature	175	°C	
$T_{Jop}$	Operating Temperature	-40~150		
$T_{stg}$	Storage Temperature	-40~125		
$V_{isol}$	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	4000	V
CTI	Comparative Tracking Index		> 225	
Torque	to heatsink	Recommended (M6)	3~5	Nm
	to terminal	Recommended (M6)	2.5~5	Nm
Weight			300	g

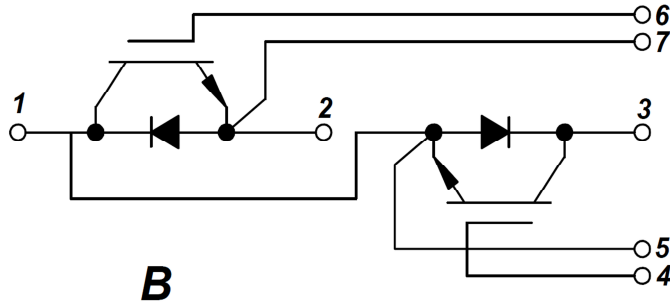


Figure 1. Circuit Diagram

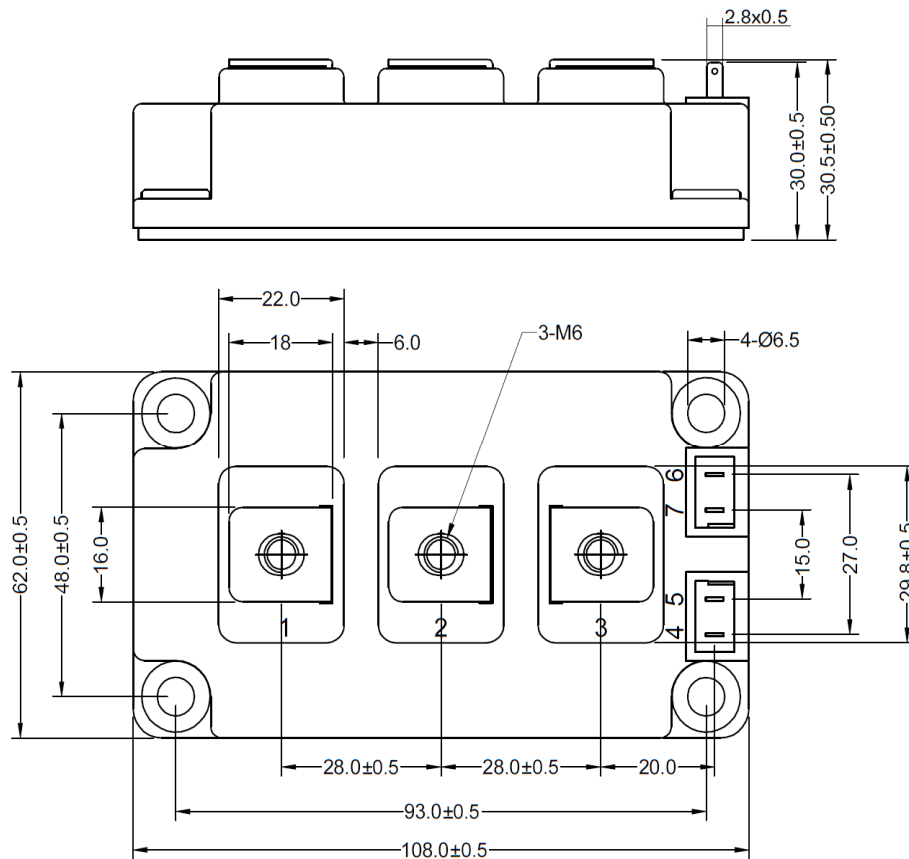


Figure 2. Package Outline