RoHS Compliant
HALOGEN-FREE

MagnaChip

MPMD150B120RH
NPT & Rugged Type 1200V IGBT Module

General Description

MagnaChip's IGBT Module 7DM-3 package devices are optimized to reduce losses and switching noise in high frequency power conditioning electrical systems. These IGBT Module series are ideally suited for IH, High Power inverters, Motors drives and other applications where switching losses are significant portion of the total losses.

Features

- BV_{CES}= 1200V
- Low Conduction Loss : $V_{CE(sat)}$ = 2.7V (typ.)
- Fast & Soft Anti-Parallel FWD
- Short circuit rated : Min. 10us at T_C=100℃
- Isolation Type Package

Applications

- Induction Heating, Motor Drives, High Power Inverters
- Welding Machine, UPS

7DM-3

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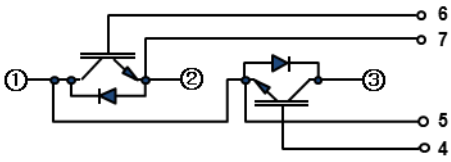


Equivalent Circuit

Absolute Maximum Ratings @Tc = 25°C (Per Leg)

Characteristics		Symbol	Rating	Unit
Collector-Emitter Voltage		V_{CES}	1200	V
Gate- Voltage		V_{GES}	±20	V
Continuous Collector Current	T_C=25°C	I_C	200	A
	T_C=80°C		150	A
Pulsed Collector Current(1)		I_{CM}	300	A
Diode Continuous Forward Current	T_C=80°C	I_F	150	A
Diode Maximum Forward Current		I_{FM}	300	A
Power Dissipation	T_C=25°C	P_D	833	W
Short Circuit Withstand Time		T_{SC}	10	us
Operating Junction Temperature		Tj	-55~150	°C
Storage Temperature Range		T_{stg}	-55~125	°C
Isolation Voltage	AC 1minute	V_{iso}	2500	V
Mounting screw Torque : M6		-	4	N.m

Note : (1) Repetitive rating : Pulse width limited by max. junction temperature

Electrical Characteristics of IGBT @T_C =25°C(unless otherwise specified)

Characteristics	Symbol	Test Condition		Min.	Typ.	Max.	Unit
Static Characteristics							
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C = 1mA, V_{GE} = 0V		1200	-	-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 2mA		4.5	-	7.5	
Collector Cut-Off Current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V		-	-	1	mA
Gate Leakage Current	I_{GES}	V_{GE} = ±20V, V_{CE} = 0V		-	-	±500	nA
Collector-Emitter saturation voltage	$V_{CE(sat)}$	V_{GE} = 15V, I_C=150A	T_C=25℃	-	2.7	3.3	V
			T_C=100℃	-	3.3	-	V
Dynamic Characteristics							
Total Gate Charge	Q_g	V_{CC} = 600V, I_C = 150A, V_{GE} = ±15V		-	580	-	nC
Gate-Emitter Charge	Q_{ge}			-	90	-	
Gate-Collector Charge	Q_{gc}			-	360	-	
Input Capacitance	C_{ies}	V_{CE} = 30V, V_{GE} = 0V, f = 1.0MHz		-	6800	-	pF
Output Capacitance	C_{oes}			-	740	-	
Reverse Transfer Capacitance	C_{res}			-	250	--	
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C =150A, V_{GE} =±15V, R_G = 6.8Ω, Inductive Load		-	135	-	ns
Rise Time	t_r			-	60	-	
Turn-Off Delay Time	$t_{d(off)}$			-	450	-	
Fall Time	t_f			-	70	-	
Turn on Switching Loss	E_{on}			-	8.5	-	mJ
Turn off Switching Loss	E_{off}			-	7.0	-	mJ
Total Switching Loss	E_{ts}			-	15.5	-	mJ
Short Circuit Withstand Time	T_{sc}	V_{cc} = 600V, V_{GE} = ±15V R_G = 6.8Ω @ Tc = 100℃		10	-	-	us

Electrical Characteristics of FRD @Ta =25°C(unless otherwise specified)

Diode Forward Voltage	V_{FM}	I_F=150A	T_C=25℃	-	2.9	3.5	V
			T_C=100℃	-	2.3	-	
Diode Reverse Recovery Time	t_{rr}	I_F =150A, V_R=600V, di/dt = -300A/us	T_C=25℃	-	120	-	ns
			T_C=100℃		240		
Diode Peak Reverse Recovery Current	I_{rr}		T_C=25℃	-	7	-	A
			T_C=100℃	-	17	-	
Diode Reverse Recovery Charge	Q_{rr}		T_C=25℃	-	420	-	nC
			T_C=100℃	-	2040	-	

Thermal Characteristics and Weight

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Junction-to-Case(IGBT Part)	$R_{\theta JC}$	-	-	0.15	℃/W
Junction-to-Case(DIODE Part)	$R_{\theta JC}$	-	-	0.3	℃/W
Case-to-Sink (Conductive grease applied)	$R_{\theta CS}$	0.05	-	-	℃/W
Weight of Module	Weight	-	-	360	g

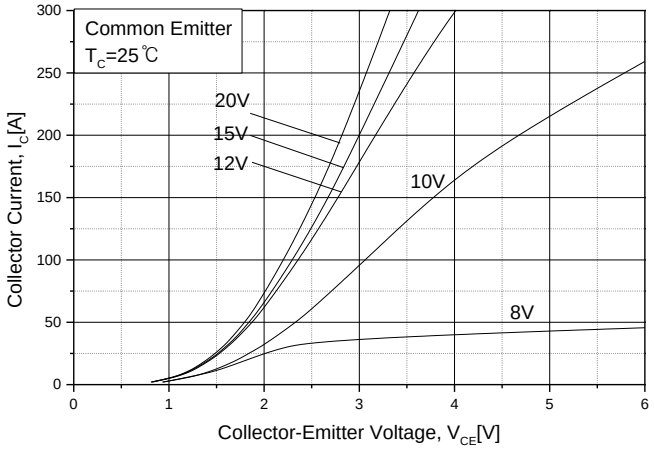


Fig.1 Typical Output Characteristics

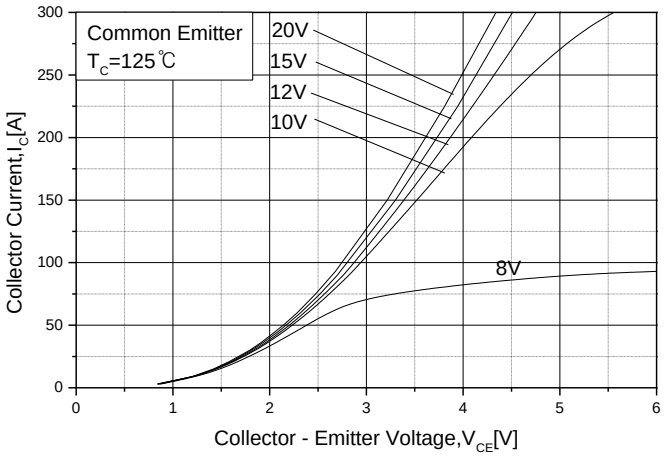


Fig.2 Typical Output Characteristics

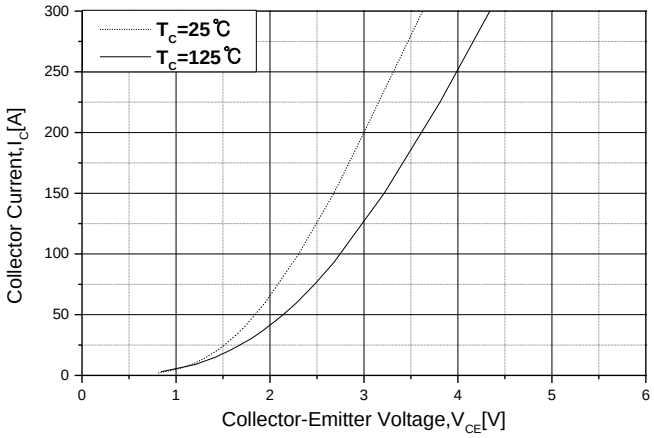


Fig.3 Typical Saturation Voltage Characteristics

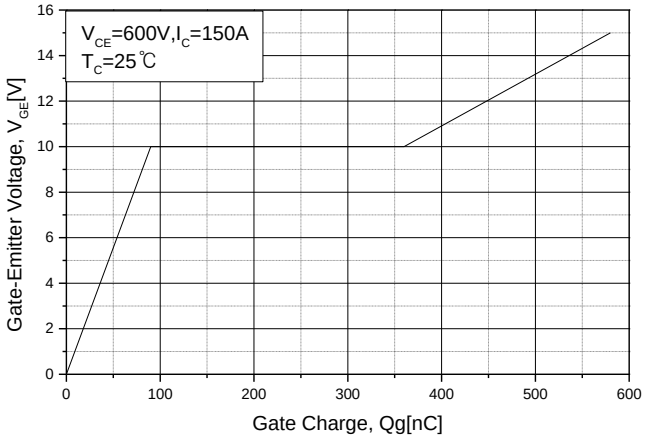


Fig.4 Gate Charge Characteristics

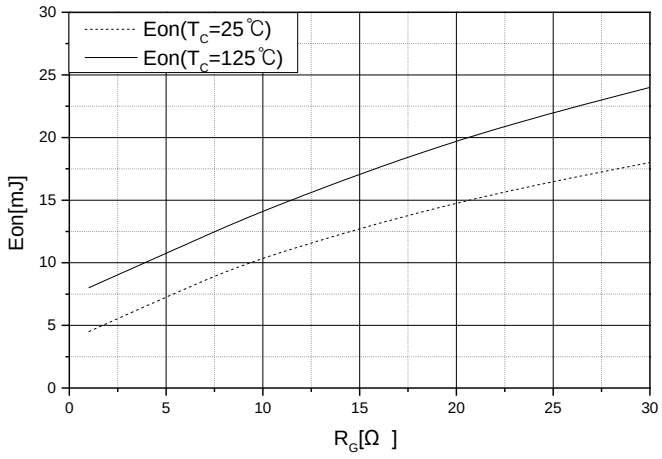


Fig.5 Typical turn-on energy = f(R_G)
V_{GE} = ±15V, IC = 150A, V_{CE} = 600V

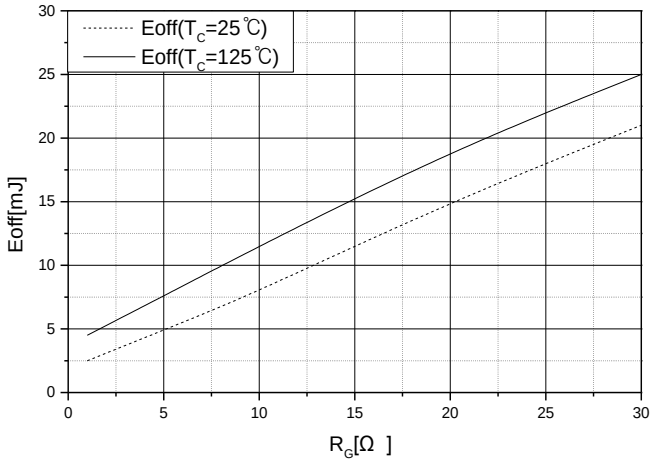


Fig.6 Typical turn-off energy = f(R_G)
V_{GE} = ±15V, IC = 150A, V_{CE} = 600V

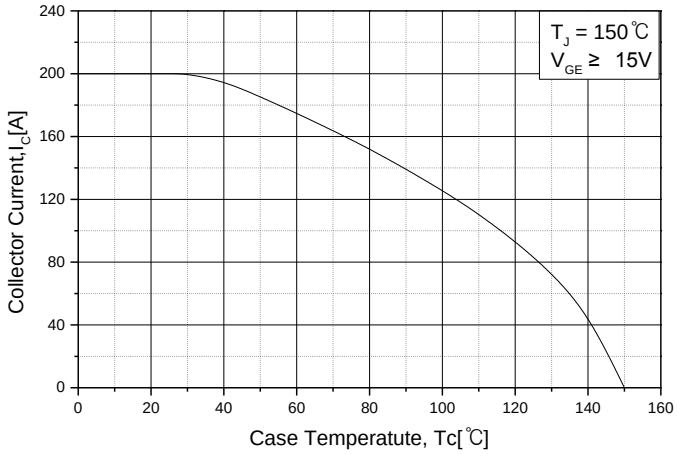


Fig.7 Rated Current vs. Case Temperature

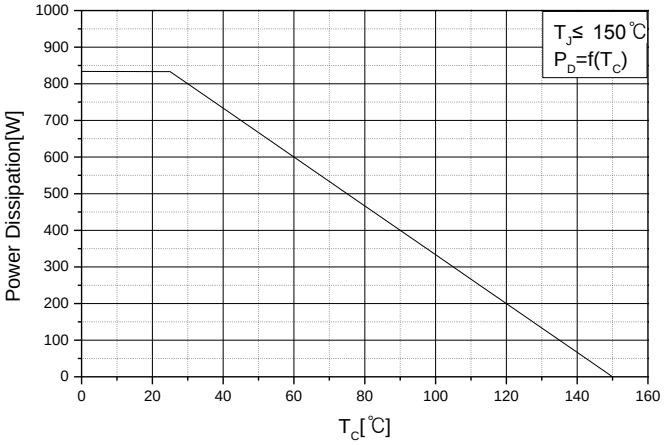


Fig.8 Power Dissipation vs. Case Temperature

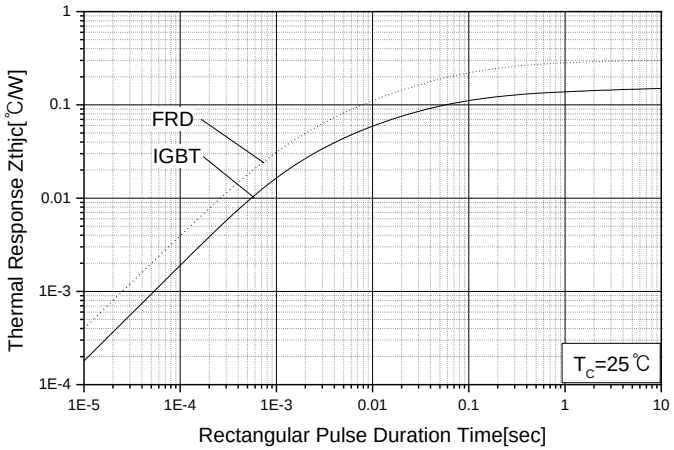


Fig.9 Transient Thermal Impedance

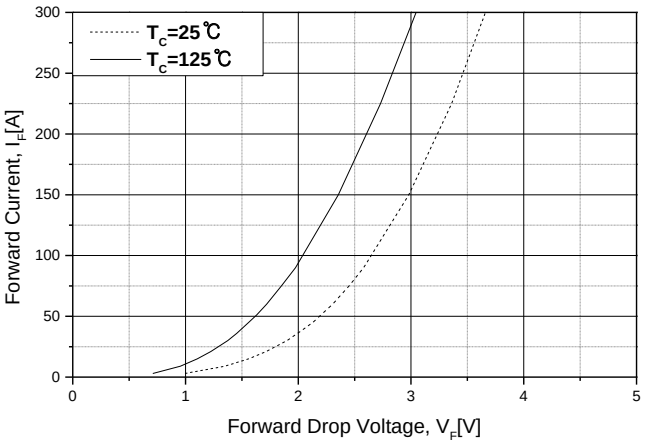
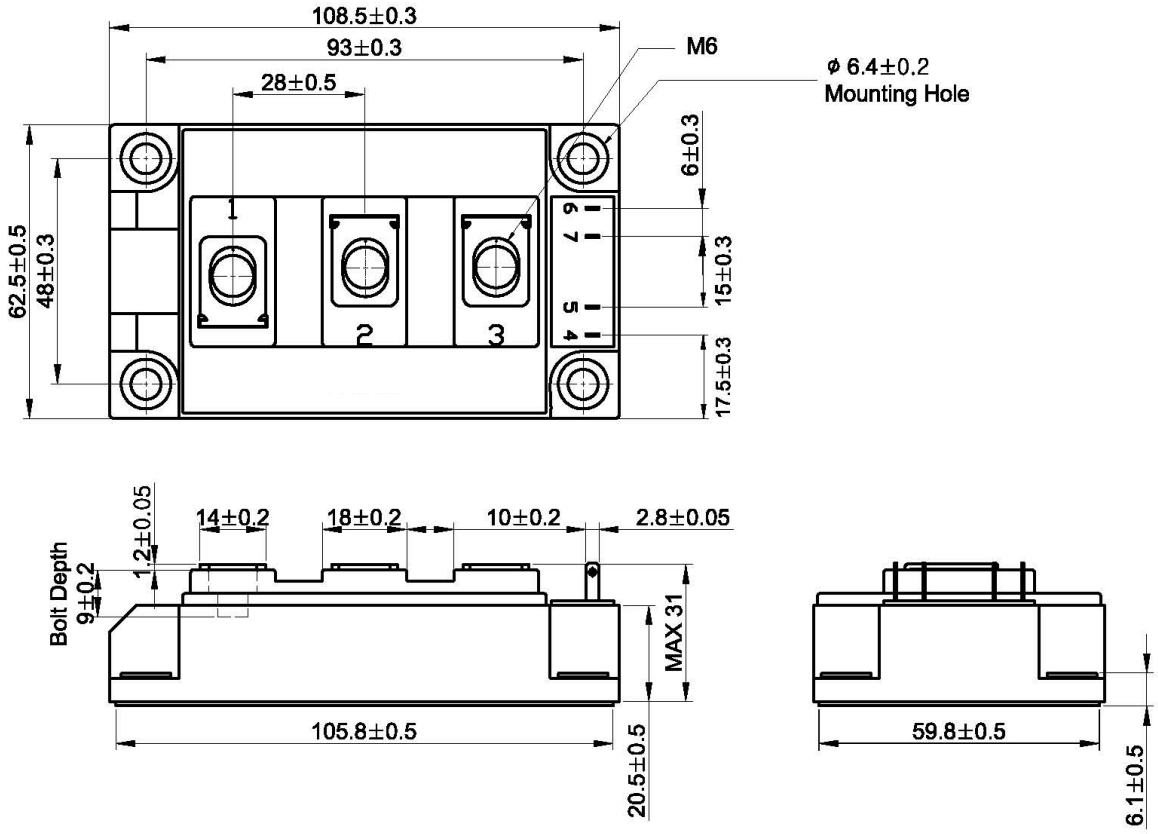


Fig.10 Forward Characteristics

Package Dimension

7DM-3

Dimensions are in millimeters, unless otherwise specified



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