

MPMB50B120RH

NPT & Rugged Type 1200V IGBT Module

General Description

MagnaChip's IGBT Module 7DM-1 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 : $V_{CE(sat)} = 2.8V$ (typ.)
- Fast & Soft Anti-Parallel FWD
- Short circuit rated : Min. 10us at $T_C = 100^\circ C$
- Isolation Type Package

Applications

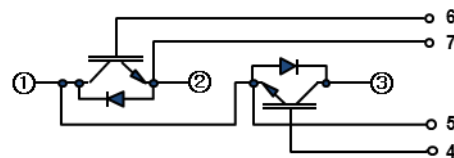
- Induction Heating, Motor Drives, High Power Inverters
- Welding Machine, UPS



7DM-1



E301932



Equivalent Circuit

Absolute Maximum Ratings @ $T_C = 25^\circ C$ (Per Leg)

Characteristics	Symbol	Rating	Unit	
Collector-Emitter Voltage	V_{CES}	1200	V	
Gate- Voltage	V_{GES}	± 20	V	
Continuous Collector Current	I_C	$T_C = 25^\circ C$	75	A
		$T_C = 80^\circ C$	50	A
Pulsed Collector Current ⁽¹⁾	I_{CM}	100	A	
Diode Continuous Forward Current	I_F	50	A	
Diode Maximum Forward Current	I_{FM}	100	A	
Power Dissipation	P_D	416	W	
Short Circuit Withstand Time	T_{SC}	10	us	
Operating Junction Temperature	T_j	-55~150	$^\circ C$	
Storage Temperature Range	T_{stg}	-55~125	$^\circ C$	
Isolation Voltage	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	-	6.5		
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	-	-	±250	nA	
Collector-Emitter saturation voltage	V _{CE(sat)}	V _{GE} = 15V, I _C =50A	T _C =25 °C	-	2.8	3.2	V
			T _C =100 °C	-	3.4	-	V
Dynamic Characteristics							
Total Gate Charge	Q _g	V _{CC} = 600V, I _C = 50A, V _{GE} = ±15V	-	220	-	nC	
Gate-Emitter Charge	Q _{ge}		-	25	-		
Gate-Collector Charge	Q _{gc}		-	130	-		
Input Capacitance	C _{ies}	V _{CE} = 30V, V _{GE} = 0V, f = 1.0MHz	-	3400	-	pF	
Output Capacitance	C _{oes}		-	370	-		
Reverse Transfer Capacitance	C _{res}		-	125	--		
Turn-On Delay Time	t _{d(on)}	V _{CC} = 600V, I _C = 50A, V _{GE} = ±15V, R _G = 15Ω, 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}		-	3.8	-		mJ
Turn off Switching Loss	E _{off}		-	3.0	-		mJ
Total Switching Loss	E _{ts}		-	6.8	-		mJ
Short Circuit Withstand Time	T _{sc}	V _{CC} = 600V, V _{GE} = ±15V R _G =15 Ω @ T _C = 100 °C	10	-	-	us	

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

Diode Forward Voltage	V _{FM}	I _F =50A	T _C =25 °C	-	2.9	3.5	V
			T _C =100 °C	-	2.3	-	
Diode Reverse Recovery Time	t _{rr}	I _F =50A, V _R =600V di/dt = -100A/μS	T _C =25 °C	-	70	-	ns
			T _C =100 °C	-	150	-	
Diode Peak Reverse Recovery Current	I _{rr}		T _C =25 °C	-	3	-	A
			T _C =100 °C	-	10	-	
Diode Reverse Recovery Charge	Q _{rr}		T _C =25 °C	-	105	-	nC
			T _C =100 °C	-	750	-	

Thermal Characteristics and Weight

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Junction-to-Case(IGBT Part)	$R_{\theta JC}$	-	-	0.3	$^{\circ}C/W$
Junction-to-Case(DIODE Part)	$R_{\theta JC}$	-	-	0.6	$^{\circ}C/W$
Case-to-Sink (Conductive grease applied)	$R_{\theta CS}$	0.05	-	-	$^{\circ}C/W$
Weight of Module	Weight	-	-	200	g

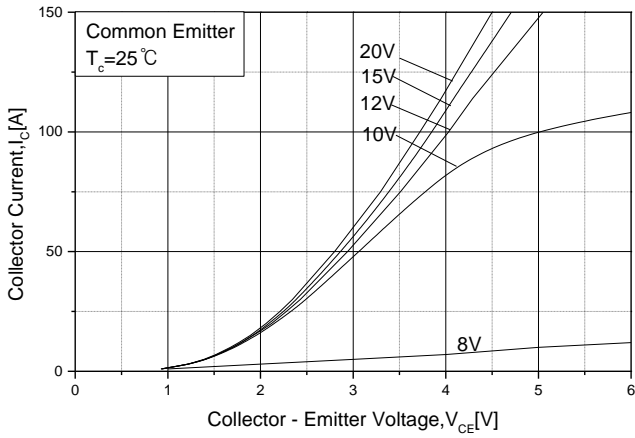


Fig.1 Typical Output Characteristics

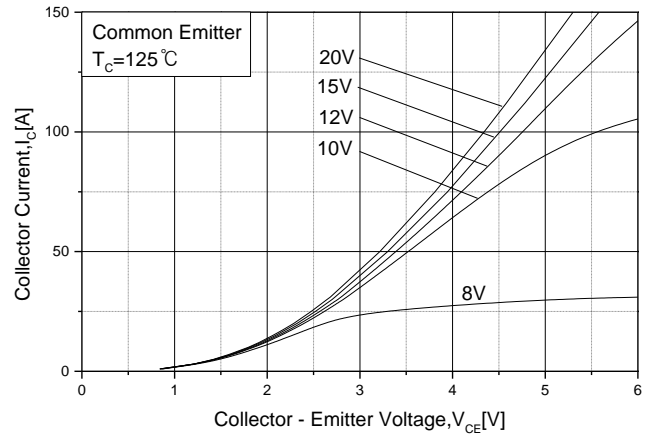


Fig.2 Typical Output Characteristics

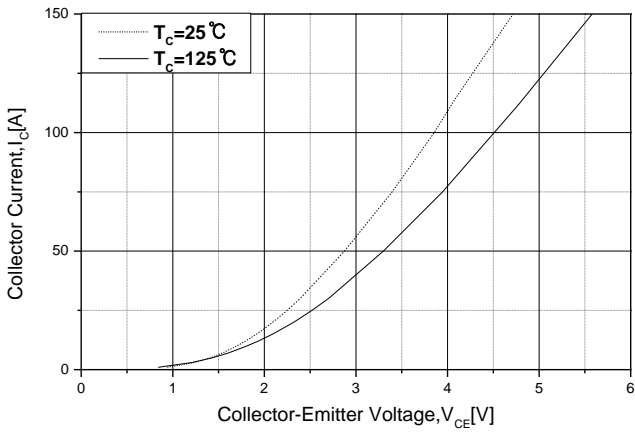


Fig.3 Typical Saturation Voltage Characteristics

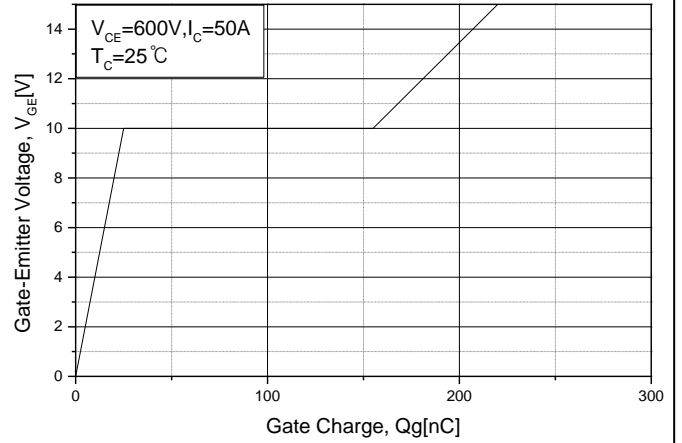


Fig.4 Gate Charge Characteristics

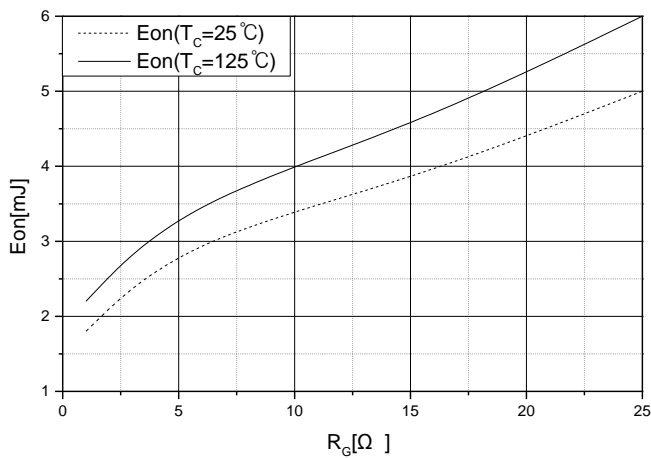


Fig.5 Typical turn-on energy = $f(R_g)$
 $V_{GE} = \pm 15\text{V}, I_C = 50\text{A}, V_{CE} = 600\text{V}$

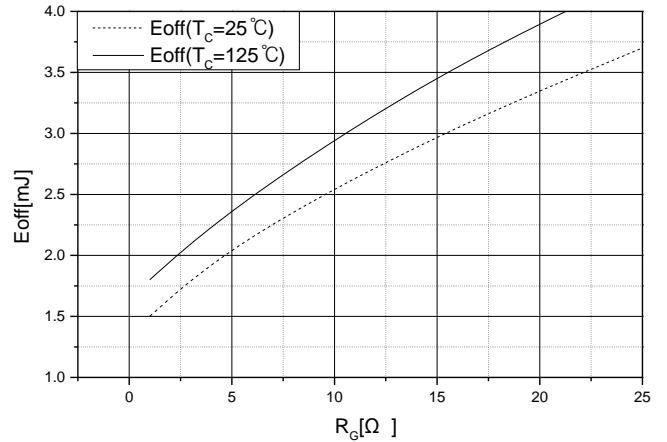


Fig.6 Typical turn-off energy = $f(R_g)$
 $V_{GE} = \pm 15\text{V}, I_C = 50\text{A}, V_{CE} = 600\text{V}$

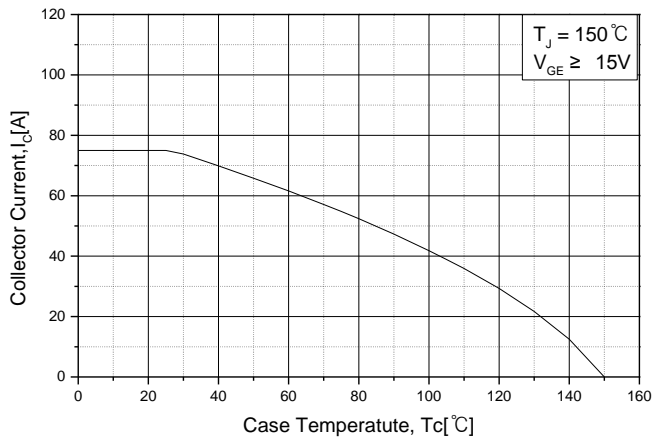


Fig.7 Rated Current vs. Case Temperature

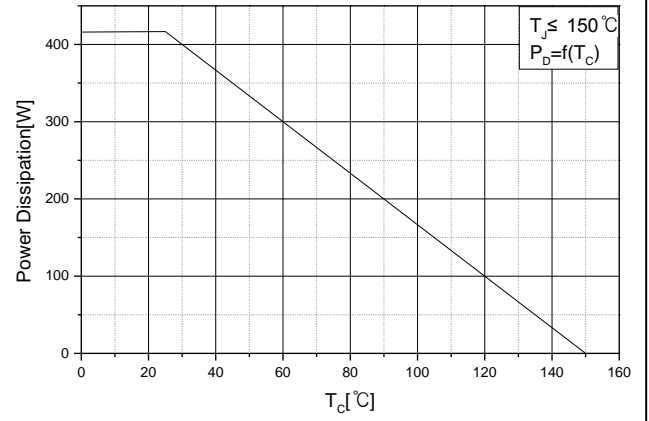


Fig.8 Power Dissipation vs. Case Temperature

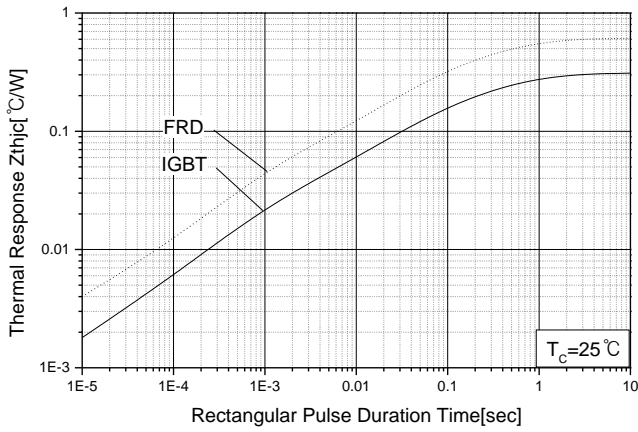


Fig.9 Transient Thermal Impedance

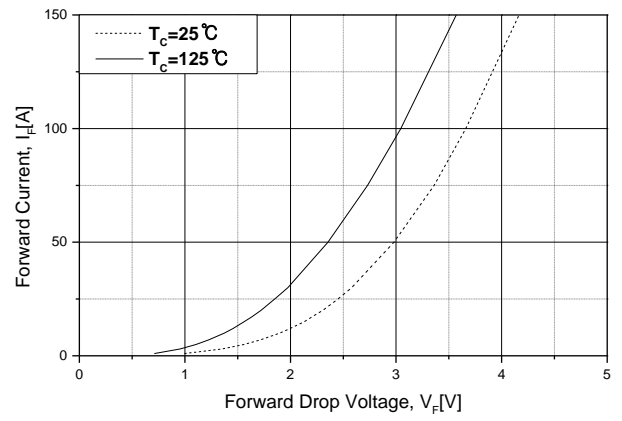


Fig.10 Forward Characteristics

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