

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

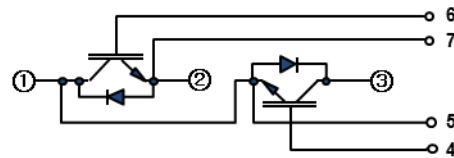
- $BV_{CES} = 1200V$
- Low Conduction Loss : $V_{CE(sat)} = 2.8V$ (typ.)
- Fast & Soft Anti-Parallel FWD
- Short circuit rated : Min. 10us at $T_C = 100^\circ C$
- Isolation Type Package

Applications

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



7DM-1



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	$T_C = 25^\circ C$	100	A
		$T_C = 80^\circ C$	75	A
Pulsed Collector Current ⁽¹⁾	I_{CM}	150	A	
Diode Continuous Forward Current	I_{FM}	$T_C = 80^\circ C$	75	A
Diode Maximum Forward Current		150	A	
Power Dissipation	P_D	500	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	
AC 1minute				
Mounting screw Torque : M6	-	4	N.m	

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

Electrical Characteristics of IGBT @ $T_C = 25^\circ\text{C}$ (unless otherwise specified)

Characteristics	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Static Characteristics							
Collector-Emitter Breakdown Voltage	BV_{CES}	$I_C = 1\text{mA}, V_{GE} = 0\text{V}$	1200	-	-	V	
Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 2\text{mA}$	4.5	-	6.5		
Collector Cut-Off Current	I_{CES}	$V_{CE} = 1200\text{V}, V_{GE} = 0\text{V}$	-	-	1	mA	
Gate Leakage Current	I_{GES}	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}$	-	-	± 250	nA	
Collector-Emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{V}, I_C = 75\text{A}$	$T_C = 25^\circ\text{C}$	-	2.8	3.2	V
			$T_C = 100^\circ\text{C}$	-	3.4	-	V
Dynamic Characteristics							
Total Gate Charge	Q_g	$V_{CC} = 600\text{V}, I_C = 75\text{A}, V_{GE} = \pm 15\text{V}$	-	300	-	nC	
Gate-Emitter Charge	Q_{ge}		-	33	-		
Gate-Collector Charge	Q_{gc}		-	177	-		
Input Capacitance	C_{ies}	$V_{CE} = 30\text{V}, V_{GE} = 0\text{V}, f = 1.0\text{MHz}$	-	4080	-	pF	
Output Capacitance	C_{oes}		-	444	-		
Reverse Transfer Capacitance	C_{res}		-	150	--		
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 600\text{V}, I_C = 75\text{A}, V_{GE} = \pm 15\text{V}, R_G = 12\Omega, \text{Inductive Load}$	-	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}		-	5.5	-		mJ
Turn off Switching Loss	E_{off}		-	3.8	-		mJ
Total Switching Loss	E_{ts}		-	9.3	-		mJ
Short Circuit Withstand Time	T_{sc}	$V_{CC} = 600\text{V}, V_{GE} = \pm 15\text{V}, R_G = 12\Omega @ T_C = 100^\circ\text{C}$	10	-	-	us	

Electrical Characteristics of FRD @ $T_a = 25^\circ\text{C}$ (unless otherwise specified)

Diode Forward Voltage	V_{FM}	$I_F = 75\text{A}$	$T_C = 25^\circ\text{C}$	-	2.9	3.5	V
			$T_C = 100^\circ\text{C}$	-	2.3	-	
Diode Reverse Recovery Time	t_{rr}	$I_F = 75\text{A}, V_R = 600\text{V}, di/dt = -150\text{A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	80	-	ns
			$T_C = 100^\circ\text{C}$	-	200	-	
Diode Peak Reverse Recovery Current	I_{rr}		$T_C = 25^\circ\text{C}$	-	3.5	-	A
			$T_C = 100^\circ\text{C}$	-	11	-	
Diode Reverse Recovery Charge	Q_{rr}		$T_C = 25^\circ\text{C}$	-	140	-	nC
			$T_C = 100^\circ\text{C}$	-	1100	-	

Thermal Characteristics and Weight

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Junction-to-Case(IGBT Part)	$R_{\theta JC}$	-	-	0.25	$^{\circ}C/W$
Junction-to-Case(DIODE Part)	$R_{\theta JC}$	-	-	0.56	$^{\circ}C/W$
Case-to-Sink (Conductive grease applied)	$R_{\theta CS}$	0.05	-	-	$^{\circ}C/W$
Weight of Module	Weight	-	-	200	g

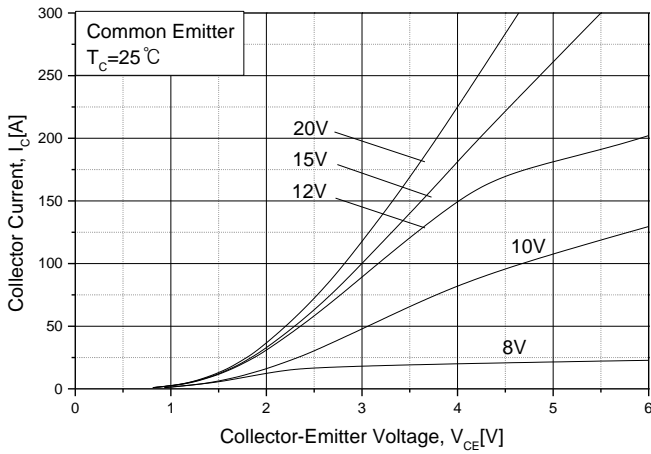


Fig.1 Typical Output Characteristics

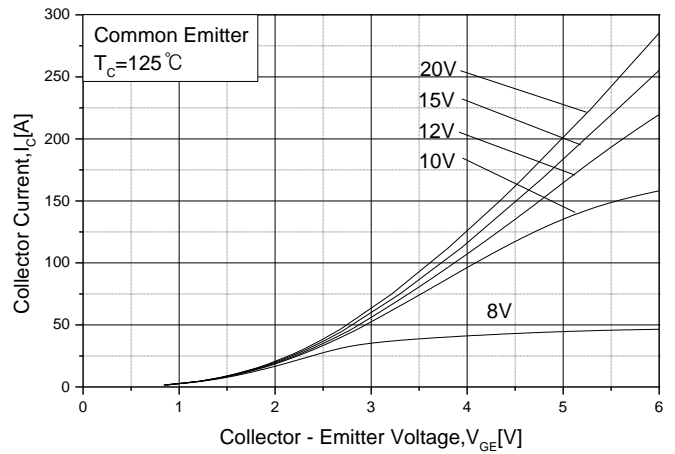


Fig.2 Typical Output Characteristics

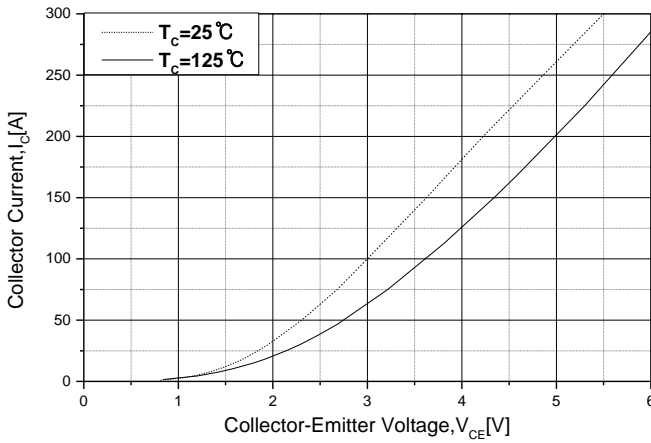


Fig.3 Typical Saturation Voltage Characteristics

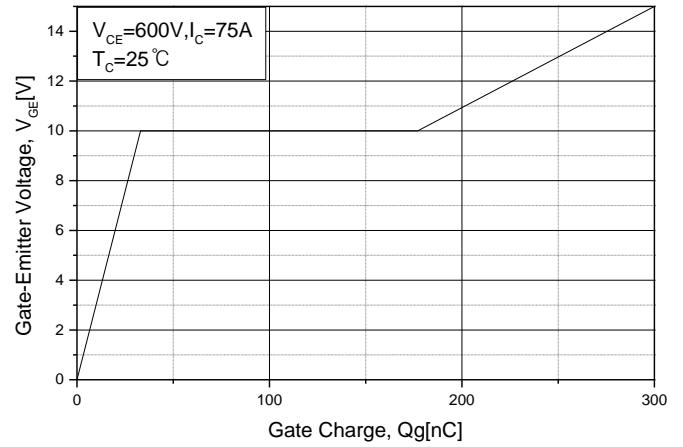


Fig.4 Gate Charge Characteristics

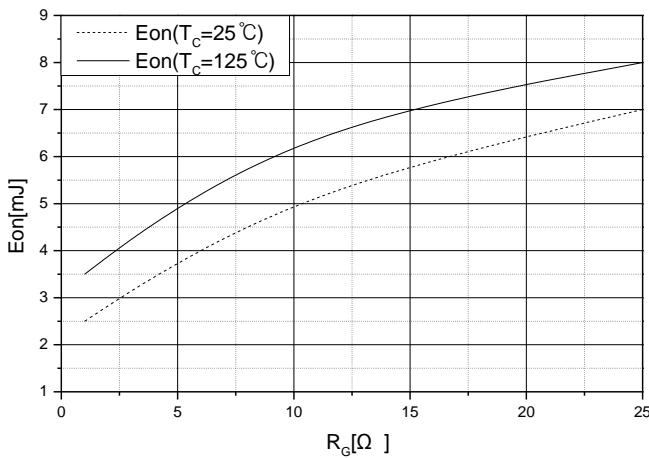


Fig.5 Typical turn-on energy = $f(R_g)$
 $V_{GE} = \pm 15\text{V}, I_C = 75\text{A}, V_{CE} = 600\text{V}$

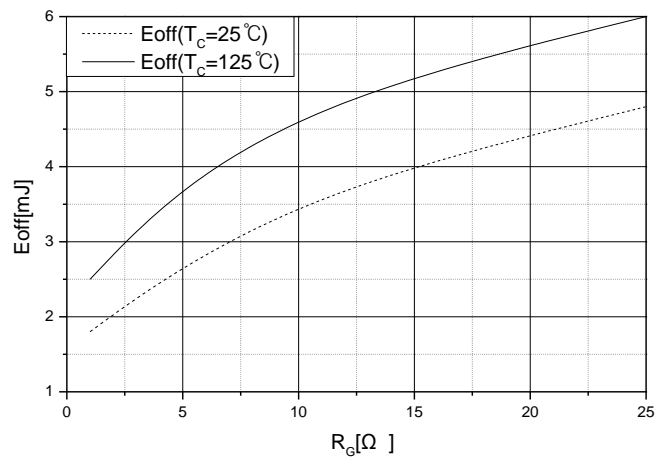


Fig.6 Typical turn-off energy = $f(R_g)$
 $V_{GE} = \pm 15\text{V}, I_C = 75\text{A}, V_{CE} = 600\text{V}$

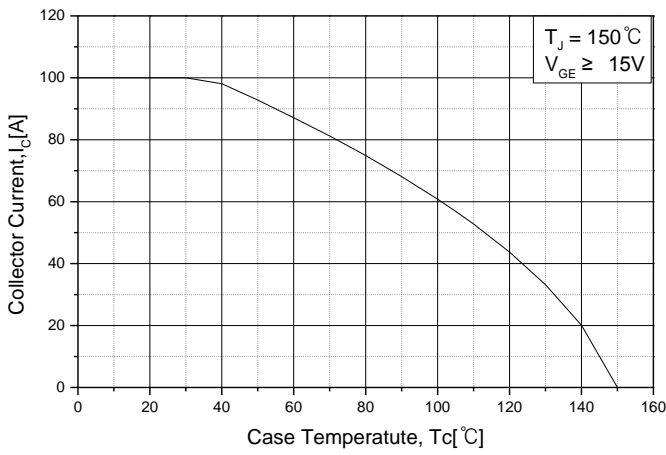


Fig.7 Rated Current vs. Case Temperature

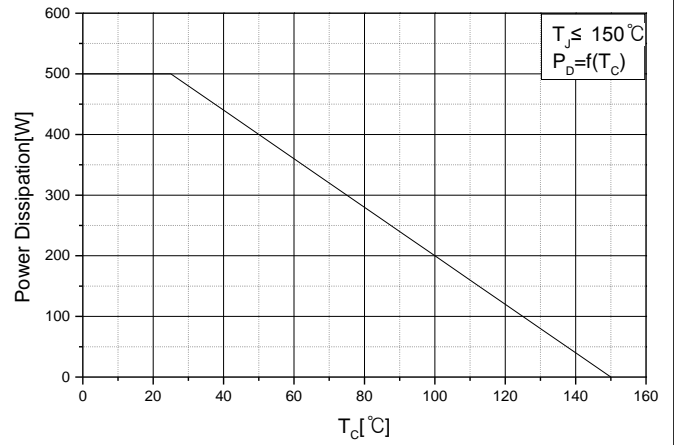


Fig.8 Power Dissipation vs. Case Temperature

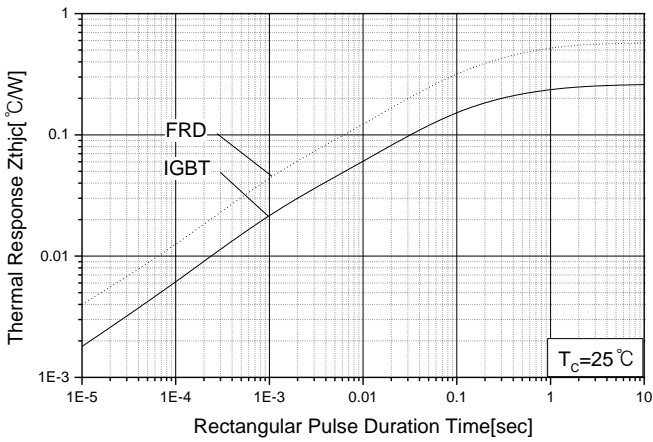


Fig.9 Transient Thermal Impedance

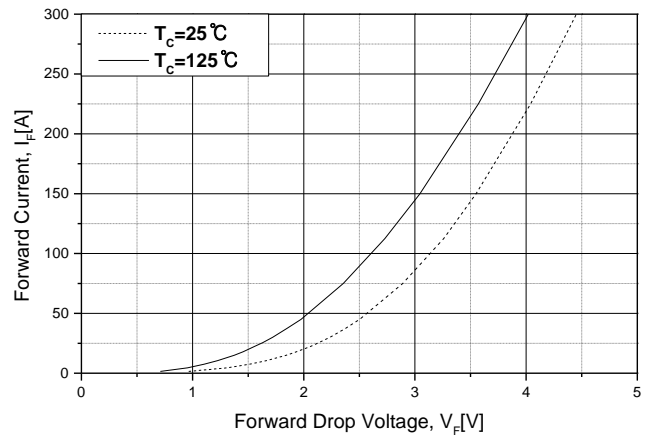
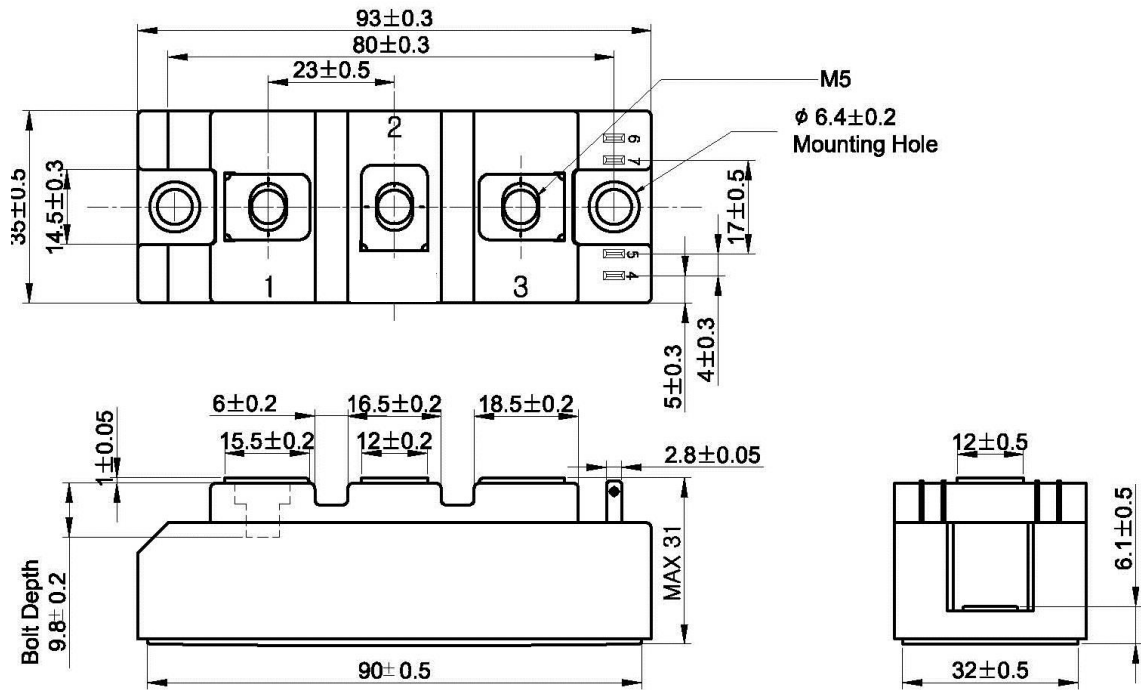


Fig.10 Forward Characteristics

Package Dimension

7DM-1

Dimensions are in millimeters, unless otherwise specified



DISCLAIMER:

The Products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any Product can reasonably be expected to result in a personal injury. Seller's customers using or selling Seller's products for use in such applications do so at their own risk and agree to fully defend and indemnify Seller.

MagnaChip reserves the right to change the specifications and circuitry without notice at any time. MagnaChip does not consider responsibility for use of any circuitry other than circuitry entirely included in a MagnaChip product. [MagnaChip](#) is a registered trademark of MagnaChip Semiconductor Ltd.