

2MBI300HJ-120-50

IGBT Modules

Power Module (V series)
1200V / 300A / 2-in-1 package

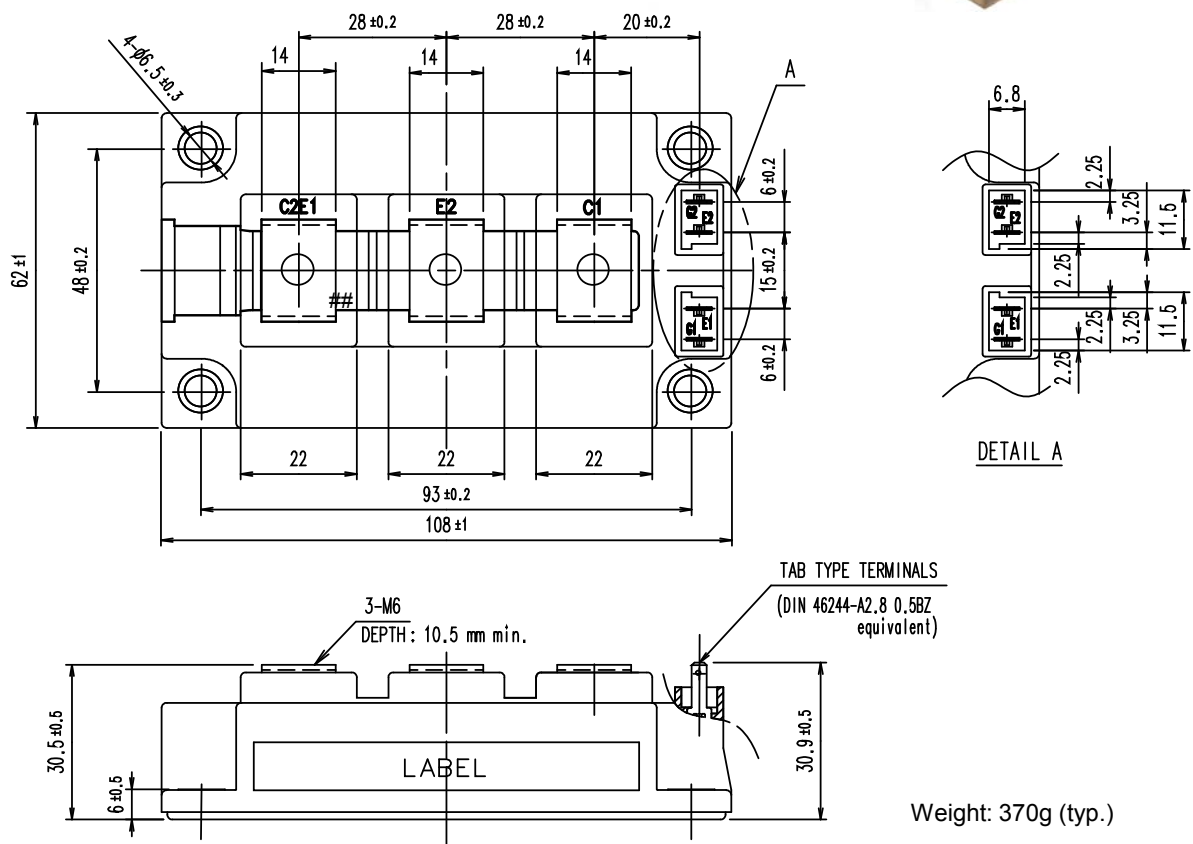
■ Features

- High speed switching
- Voltage drive
- Low Inductance module structure

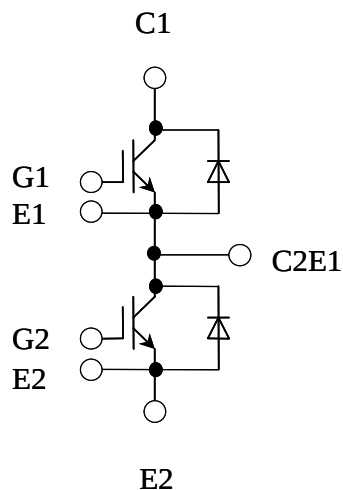
■ Applications

- Soft-switching Application
- Industrial machines, such as Welding machines

■ Outline drawing (Unit : mm)



■ Equivalent Circuit



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■ Absolute Maximum Ratings (at T_c= 25°C unless otherwise specified)

Items		Symbols	Conditions	Maximum Ratings	Units
Collector-Emitter voltage		V_{CES}		1200	V
Gate-Emitter voltage		V_{GES}		±20	V
Collector current		I_C	Continuous	$T_C=60^{\circ}\text{C}$ $T_C=25^{\circ}\text{C}$	300 370
		I_C pulse	1ms		600
		$-I_C$			400
		$-I_C$ pulse	1ms		800
Collector power dissipation		P_C	1 device	1950	W
Junction temperature		T_J		150	°C
Case temperature		T_c		125	
Storage temperature		T_{stg}		-40 ~ 125	
Isolation voltage	between terminal and copper base (*1)	V_{iso}	AC: 1min.	2500	VAC
Screw Torque	Mounting (*2)	-		6.0	N m
	Terminals (*3)	-		5.0	

(*1) All terminals should be connected together during the test.

(*2) Recommendable Value : 3.0-6.0 Nm (M5 or M6)

(*3) Recommendable Value : 2.5-5.0 Nm (M6)

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■ Electrical characteristics (at T_j= 25°C unless otherwise specified)

Items	Symbols	Conditions		Characteristics			Units
				min.	typ.	max.	
Zero gate voltage Collector current	I _{CES}	V _{GE} =0V, V _{CE} =1200V		-	-	4.0	mA
Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V		-	-	800	nA
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _c =300mA		5.7	6.2	6.7	V
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} =15V, I _c =300A	T _j =25°C	-	3.40	3.70	V
			T _j =125°C	-	4.20	-	
	V _{CE(sat)} (chip)	V _{GE} =15V, I _c =300A	T _j =25°C	-	3.20	3.50	
			T _j =125°C	-	4.00	-	
Internal gate	R _{G(int)}	-		-	0.5	-	Ω
Input capacitance	C _{ies}	V _{CE} =10V, V _{GE} =0V, f=1MHz		-	36.0	-	nF
Turn-on time	t _{on}	V _{CC} = 600V I _C = 300A V _{GE} = ±15V R _G = 3.3Ω T _j = 125°C L _s = 30nH		-	250	-	nsec
	t _r			-	180	-	
	t _{r(i)}			-	40	-	
	t _{off}			-	300	-	
Turn-off time	t _f			-	50	-	
Forward on voltage	V _F (terminal)	V _{GE} =0V, I _F =400A	T _j =25°C	-	1.85	2.30	V
			T _j =125°C	-	2.00	-	
	V _F (chip)	V _{GE} =0V, I _F =400A	T _j =25°C	-	1.70	2.15	
			T _j =125°C	-	1.85	-	
Reverse recovery time	t _{rr}	I _F =400A		-	130	-	nsec

5. Thermal resistance characteristics

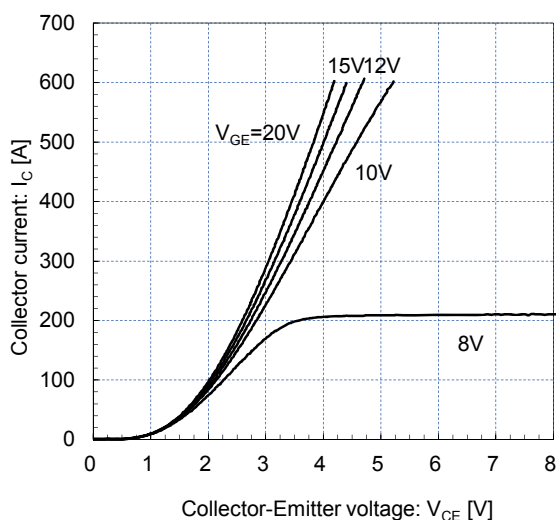
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1dev)	R _{th(j-c)}	IGBT FWD	-	-	0.064	°C/W
Contact thermal resistance	R _{th(c-f)}	with Thermal Compound	-	0.0125	-	

(*1) This is the value which is defined mounting on the additional cooling fin with thermal compound.

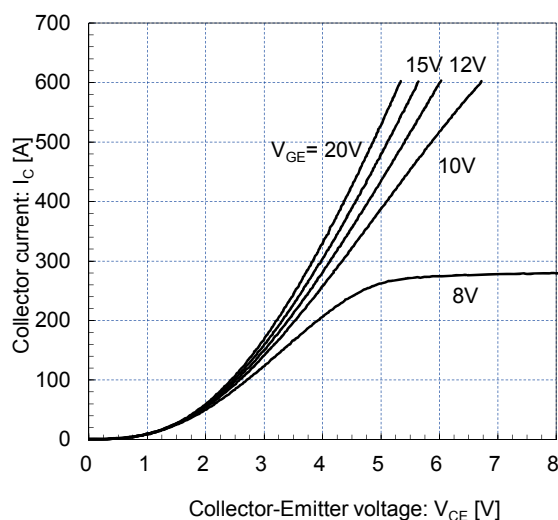
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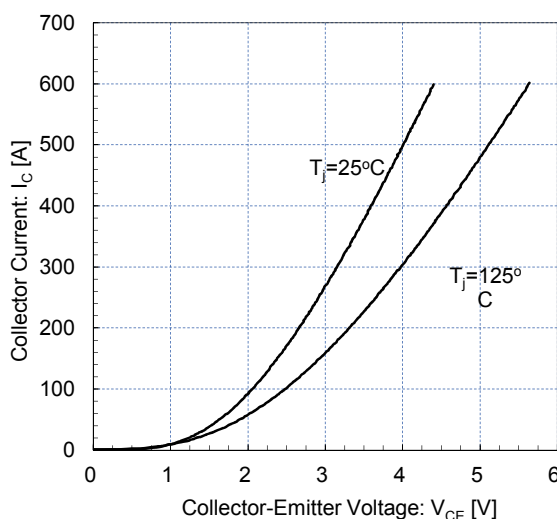
Collector current vs. Collector-Emitter voltage
 $T_j = 25^\circ\text{C}$ / chip



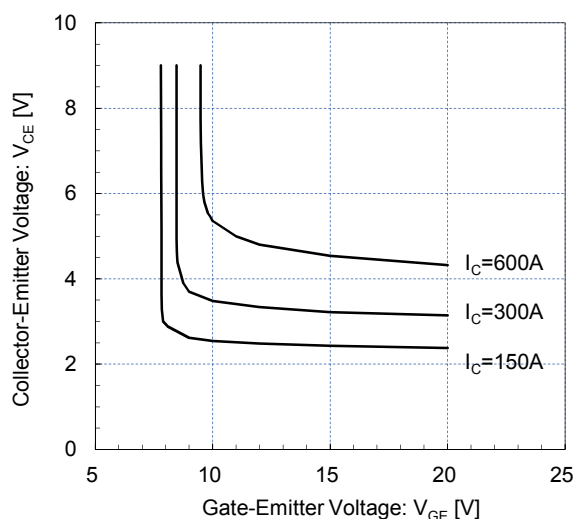
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 125^\circ\text{C}$ / chip



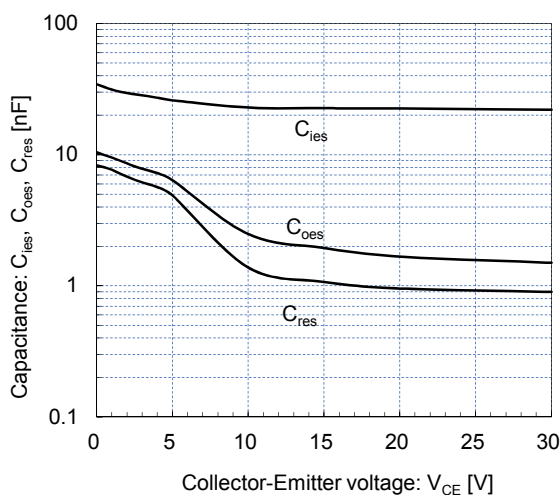
Collector current vs. Collector-Emitter voltage
 $V_{GE} = 15\text{V}$ / chip



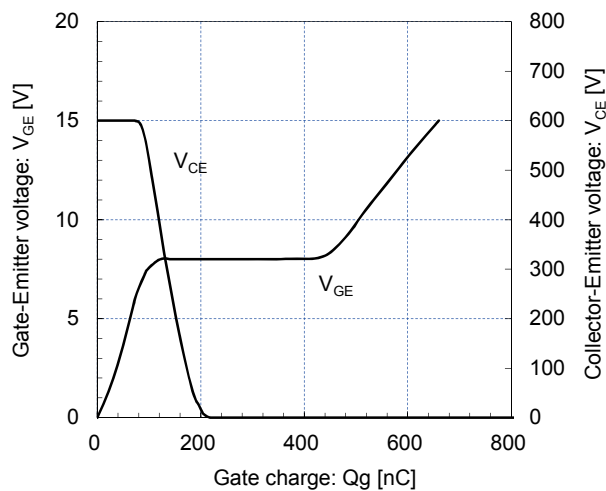
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_j = 25^\circ\text{C}$ / chip



Capacitance vs. Collector-Emitter Voltage
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$



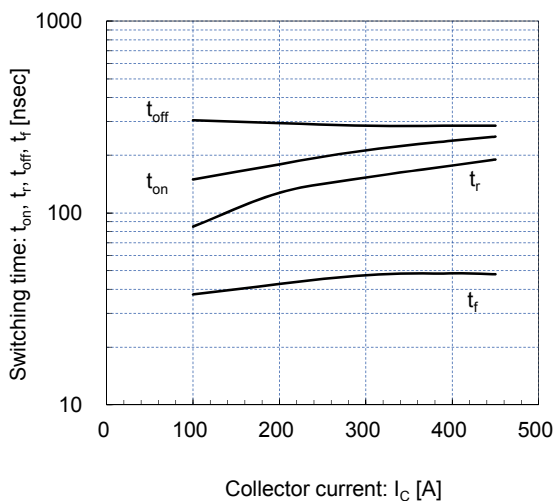
Dynamic Gate Charge (typ.)
 $V_{CC} = 600\text{V}$, $I_C = 300\text{A}$, $T_j = 25^\circ\text{C}$



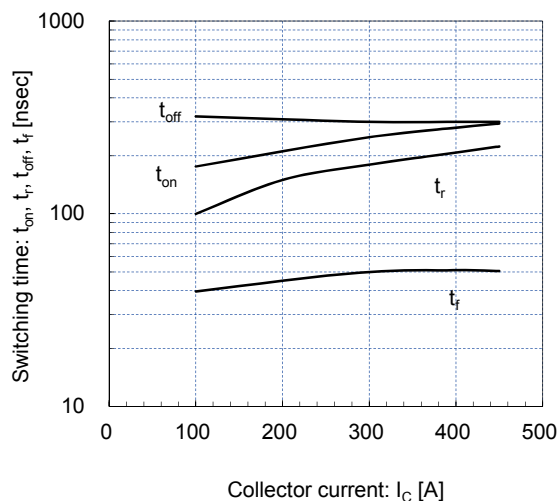
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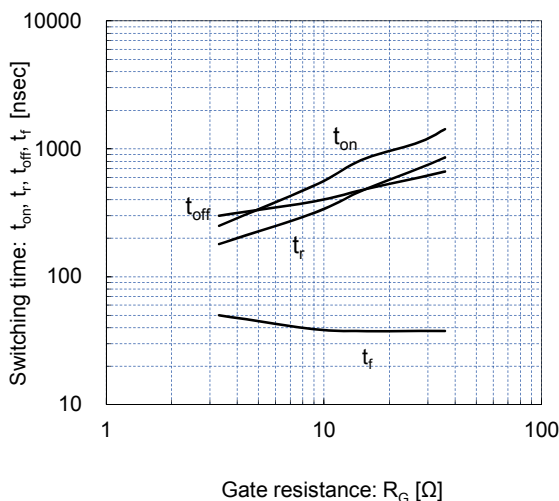
Switching time vs. Collector current (typ.)
V_{cc}=600V, V_{GE}=±15V, R_g=3.3Ω, T_j=25°C



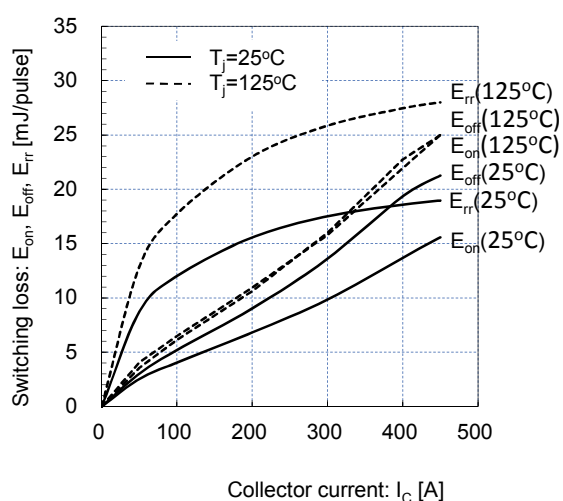
Switching time vs. Collector current (typ.)
V_{cc}=600V, V_{GE}=±15V, R_g=3.3Ω, T_j=125°C



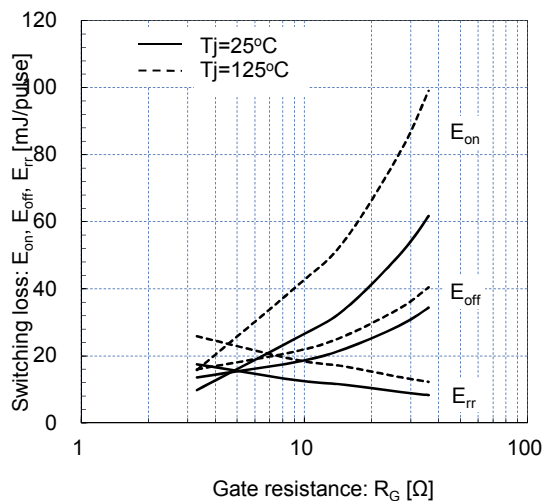
Switching time vs. Gate resistance (typ.)
V_{cc}=600V, I_c=300A, V_{GE}=±15V, T_j=125°C



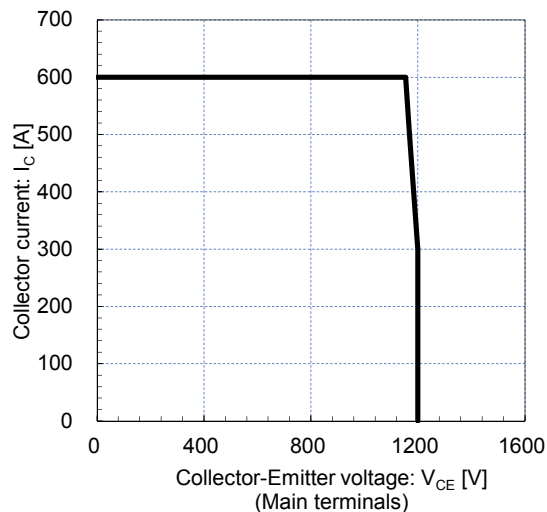
Switching loss vs. Collector current (typ.)
V_{cc}=600V, V_{GE}=±15V, R_g=3.3Ω, T_j=25, 125°C



Switching loss vs. Gate resistance (typ.)
V_{cc}=600V, I_c=300A, V_{GE}=±15V, T_j=25, 125°C



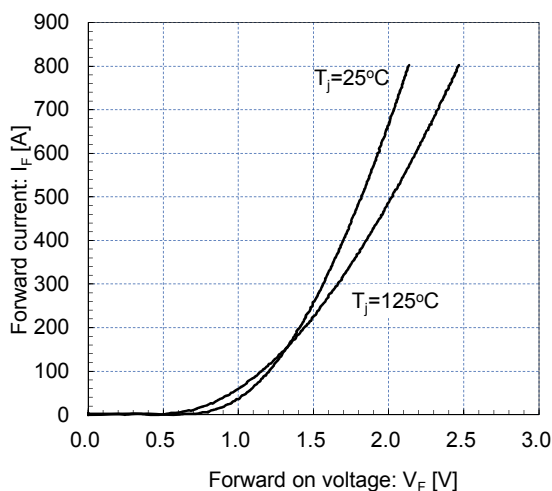
Reverse bias safe operating area (max.)
+V_{GE}=15V, -V_{GE}=15V, R_g=3.3Ω, T_j=125°C



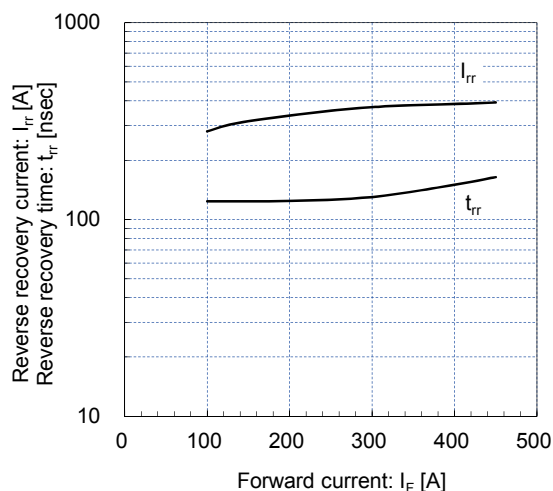
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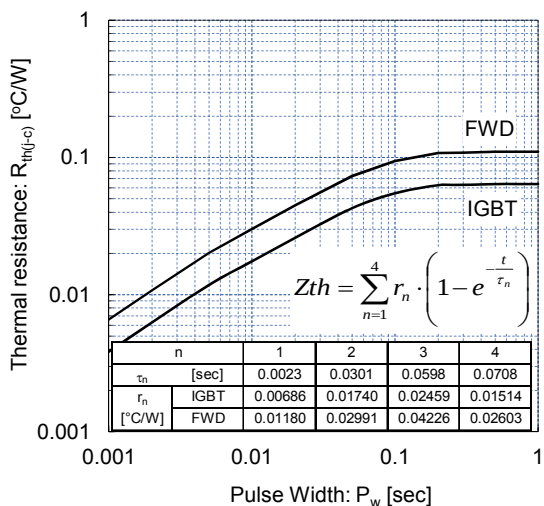
Forward current vs. Forward voltage (typ.)
chip



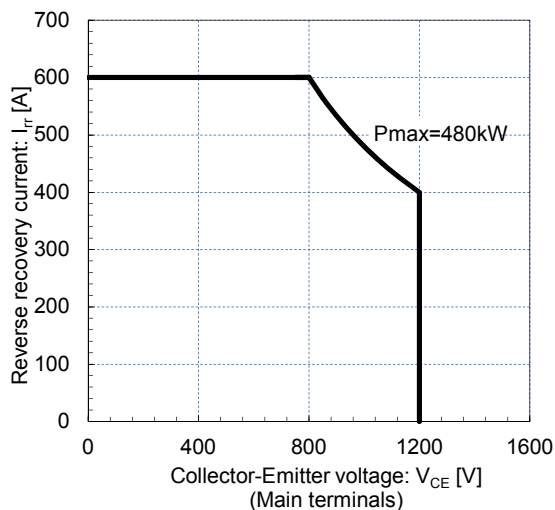
Reverse recovery characteristics (typ.)
V_{CC}=600V, V_{GE}=±15V, R_g=3.3Ω, T_J=125°C



Transient thermal resistance (max.)



FWD safe operating area (max.)
T_J = 125°C



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