2MBI600XHA120-50

IGBT Modules

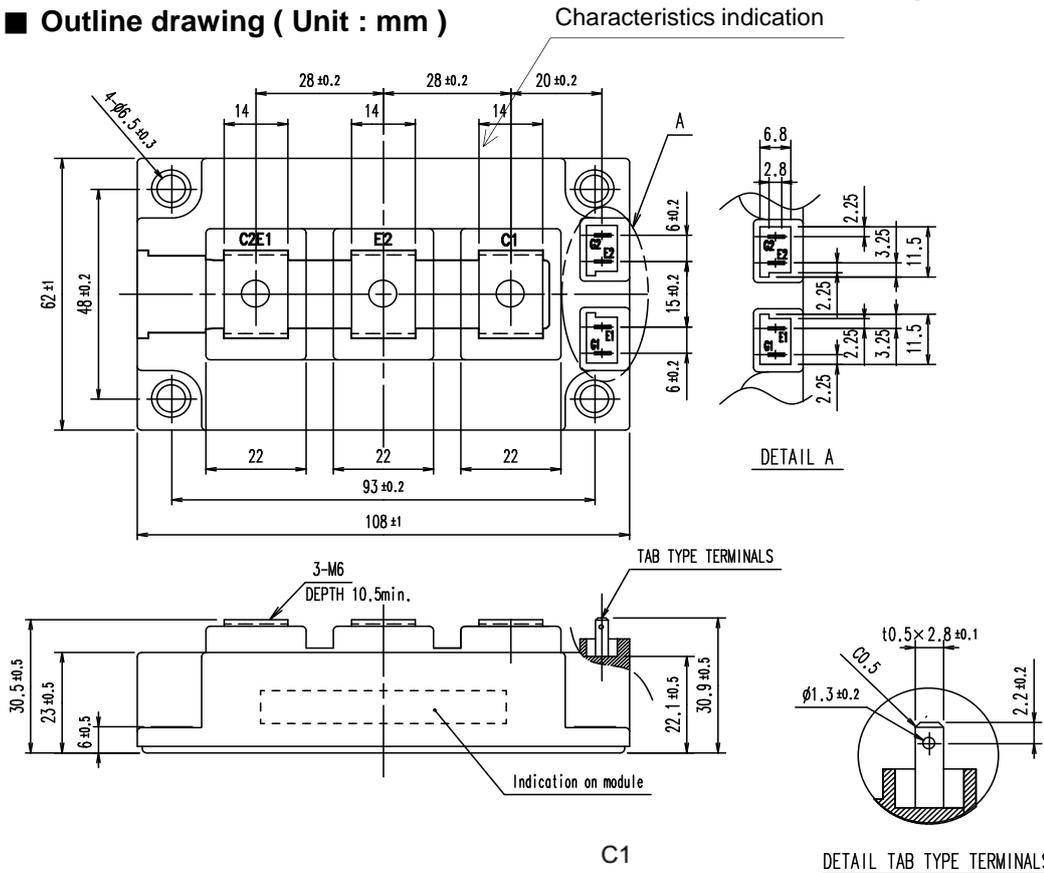## Power Module (X series)
1200V / 600A / 2-in-1 package

■ Features
Low $V_{CE(sat)}$
High speed switching
Low Inductance Module structure

■ Applications
Inverter for Motor Drives, AC and DC Servo Drives
Uniterruptible Power Supply Systems,
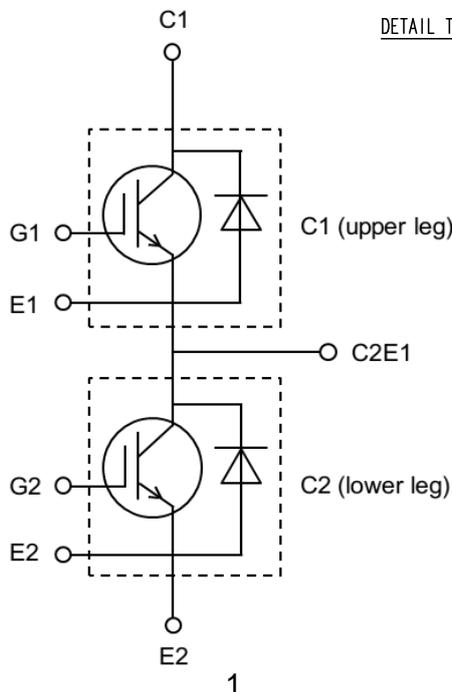Industrial machines,such as Welding machines

■ Outline drawing (Unit : mm)

Characteristics indication

DETAIL A

3-M6 DEPTH 10.5min.

TAB TYPE TERMINALS

Indication on module

DETAIL TAB TYPE TERMINALS

Weight: 370 g(typ.)

■ Equivalent Circuit

C1

G1
E1
C1 (upper leg)

C2E1

G2
E2
C2 (lower leg)

E2

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

Items		Symbols	Conditions		Maximum Ratings	Units
Inverter	Collector-Emitter voltage Gate-Emitter short-circuited	V_{CES}			1200	V
	Gate-Emitter voltage Collector-Emitter short-circuited	V_{GES}			±20	V
	Collector current	I_C	Continuous	T_C=100°C	600	A
	Repetitive peak collector current	I_{CRM}	1ms		1200	
	Forward current	I_F			600	
	Repetitive peak forward current	I_{FRM}	1ms		1200	
Total power dissipation		P_{tot}	1 device		2340	W
Virtual junction temperature		T_{vj}			175	°C
Operating virtual junction temperature		T_{vjop}			175	
Case temperature		T_c			125	
Storage temperature		T_{stg}			-40 ~ 125	
Isolation voltage	between terminal and copper base (*1)	V_{isol}	AC: 1min.		4000	Vrms
Mounting torque of screws to heat sink (*2)		M_s	M5 or M6		6.0	N·m
Mounting torque of screws to terminals (*2)		M_t	M6		5.0	

(*1) All terminals should be connected together during the test.
(*2) Recommendable Value: Mounting   3.0 ~ 6.0 N·m   (M5 or M6)
       Recommendable Value: Terminals   2.5 ~ 5.0 N·m   (M6)

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■ **Electrical characteristics (at T_{vj}= 25°C unless otherwise specified)**

Items		Symbols	Conditions		Characteristics			Units
					min.	typ.	max.	
Inverter	Collector-Emitter cut-off current,Gate-Emitter short-circuited	I_{CES}	$V_{GE} =$ 0V $V_{CE} =$ 1200V		-	-	200	μA
	Gate leakage current, Collector-Emitter short-circuited	I_{GES}	V_{CE}=0V, V_{GE}=±20V		-	-	400	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} =$ 20V $I_C =$ 600mA		6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_C=$ 600A	T_{vj}=25°C	-	1.70	2.15	V
		$V_{CE(sat)}$ (chip)		T_{vj}=25°C	-	1.45	1.90	
				T_{vj}=125°C	-	1.85	-	
				T_{vj}=150°C	-	1.90	-	
				T_{vj}=175°C	-	2.00	-	
	Internal Gate resistance	r_g	-		-	1.63	-	Ω
	Capacitance	C_{ies}	V_{CE}=10V, V_{GE}=0V, f=1MHz		-	63	-	nF
		C_{oes}			-	2.1	-	
		C_{res}			-	0.56	-	
	Gate charge	Q_G	$V_{CC} =$ 600V, $I_C =$ 600A $V_{GE} =$ -15 → +15V		-	4000	-	nC
	Forward voltage	V_F (terminal)	$V_{GE} = 0V$ $I_F=$ 600A	T_{vj}=25°C	-	1.90	2.35	V
		V_F (chip)		T_{vj}=25°C	-	1.65	2.10	
				T_{vj}=125°C	-	1.70	-	
				T_{vj}=150°C	-	1.65	-	
				T_{vj}=175°C	-	1.65	-	
	Switching time (*1)	$t_{d(on)}$	$V_{CC} =$ 600V $I_C, I_F =$ 600A $V_{GE} =$ +15/ -15V $R_G =$ 0.56 Ω $L_S =$ 30 nH	T_{vj}=25°C	-	400	-	ns
				T_{vj}=125°C	-	410	-	
				T_{vj}=150°C	-	415	-	
				T_{vj}=175°C	-	420	-	
		t_r		T_{vj}=25°C	-	95	-	
				T_{vj}=125°C	-	100	-	
				T_{vj}=150°C	-	100	-	
				T_{vj}=175°C	-	105	-	
		$t_{d(off)}$		T_{vj}=25°C	-	370	-	
				T_{vj}=125°C	-	405	-	
				T_{vj}=150°C	-	415	-	
				T_{vj}=175°C	-	420	-	
		t_f		T_{vj}=25°C	-	105	-	
				T_{vj}=125°C	-	170	-	
				T_{vj}=150°C	-	185	-	
				T_{vj}=175°C	-	210	-	
	Reverse recovery time	t_{rr}		T_{vj}=25°C	-	295	-	
				T_{vj}=125°C	-	285	-	
				T_{vj}=150°C	-	590	-	
				T_{vj}=175°C	-	635	-	

(*1) Turn on time (t_{on}) = $t_{d(on)}$+ t_r , Turn off time (t_{off}) = $t_{d(off)}$ + t_f