

2MBI300VD-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 300A / 2 in one package

■ Features

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

■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial machines, such as Welding machines

■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at Tc=25°C unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units
Collector-Emitter voltage	V _{CE}		1200	V
Gate-Emitter voltage	V _{GE}		±20	V
Inverter	Collector current	Continuous	Tc=80°C	300
			Tc=25°C	360
		1ms		600
				300
				600
Collector power dissipation	P _c	1 device	2205	W
Junction temperature	T _j		175	°C
Operating junction temperature (under switching conditions)	T _{jop}		150	
Case temperature	T _c		125	
Storage temperature	T _{stg}		-40 ~ +125	
Isolation voltage	between terminal and copper base (*1)		2500	VAC
Screw torque	Mounting (*2)		6.0	N m
	Terminals (*3)		5.0	

Note *1: All terminals should be connected together during the test.

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

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

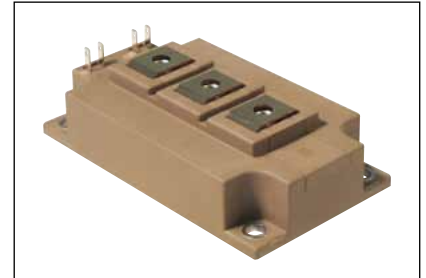
● Electrical characteristics (at Tj= 25°C unless otherwise specified)

Items		Symbols	Conditions		Characteristics			Units
					min.	typ.	max.	
Inverter	Zero gate voltage collector current	I _{CE}	V _{GE} = 0V, V _{CE} = 1200V		-	-	2.0	mA
	Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V		-	-	400	nA
	Gate-Emitter threshold voltage	V _{GE (th)}	V _{CE} = 20V, I _C = 300mA		6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	V _{CE (sat)} (terminal)	V _{GE} = 15V I _C = 300A	T _J =25°C	-	2.00	2.45	V
				T _J =125°C	-	2.35	-	
				T _J =150°C	-	2.40	-	
		V _{CE (sat)} (chip)		T _J =25°C	-	1.85	2.10	
				T _J =125°C	-	2.15	-	
			T _J =150°C	-	2.00	-		
	Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz		-	24.0	-	nF
	Turn-on time	t _{on}	V _{CC} = 600V		-	0.60	-	μs
		t _r	I _C = 300A		-	0.20	-	
		t _{r (i)}	V _{GE} = ±15V		-	0.05	-	
	Turn-off time	t _{off}	R _G = 1.8Ω		-	0.80	-	μs
t _f		T _J = 150°C		-	0.08	-		
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 300A	T _J =25°C	-	1.85	2.25	V	
			T _J =125°C	-	2.00	-		
			T _J =150°C	-	1.95	-		
	V _F (chip)		T _J =25°C	-	1.70	1.95		
			T _J =125°C	-	1.85	-		
		T _J =150°C	-	1.80	-			
Reverse recovery time	t _{rr}	I _F = 300A		-	0.15	-	us	

● Thermal resistance characteristics

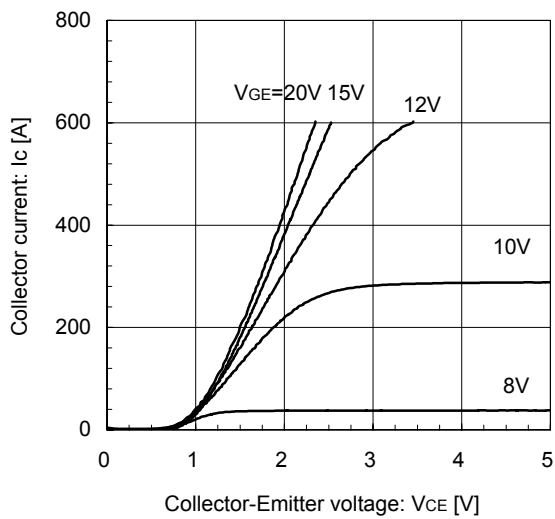
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT FWD	-	-	0.068	°C/W
Contact thermal resistance (1device) (*4)	R _{th(c-f)}	with Thermal Compound	-	0.013	-	

Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

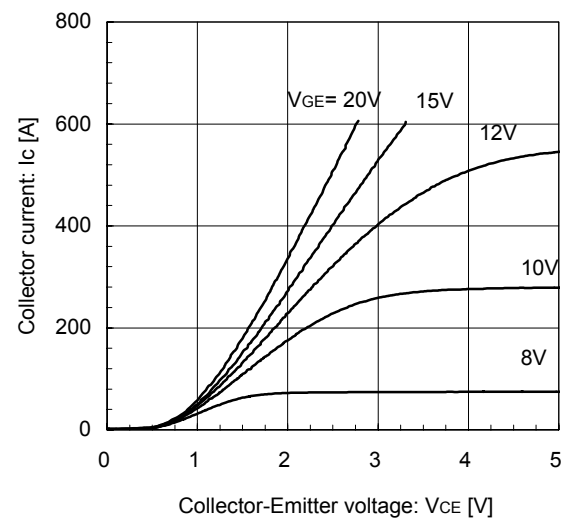


■ Characteristics (Representative)

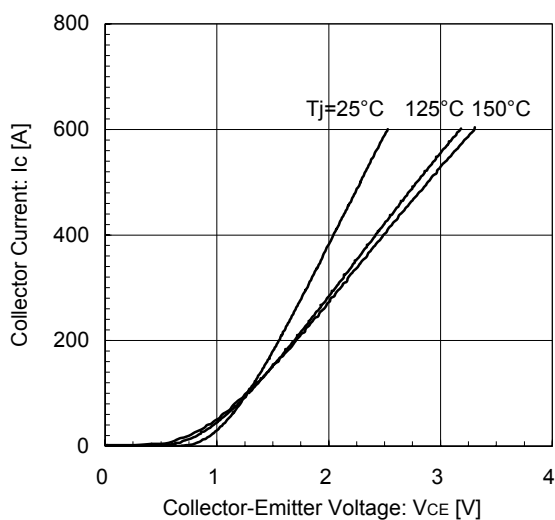
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 25°C / chip



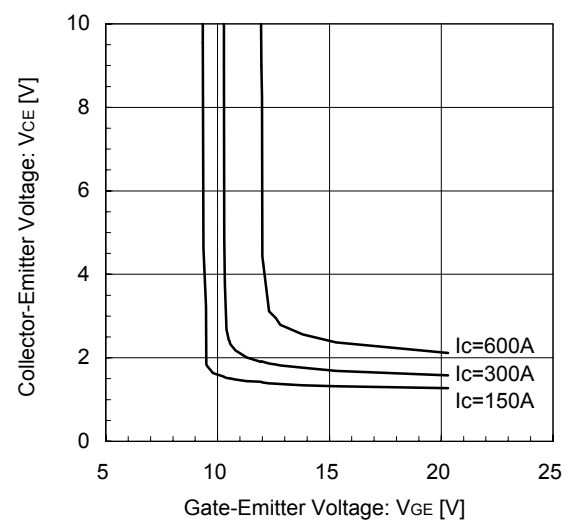
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 150°C / chip



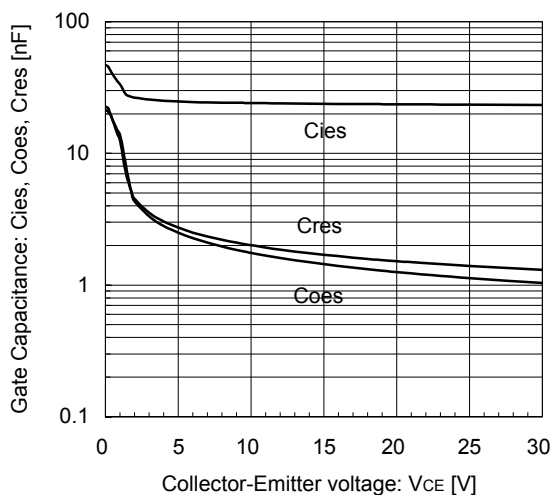
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE} = 15V / chip



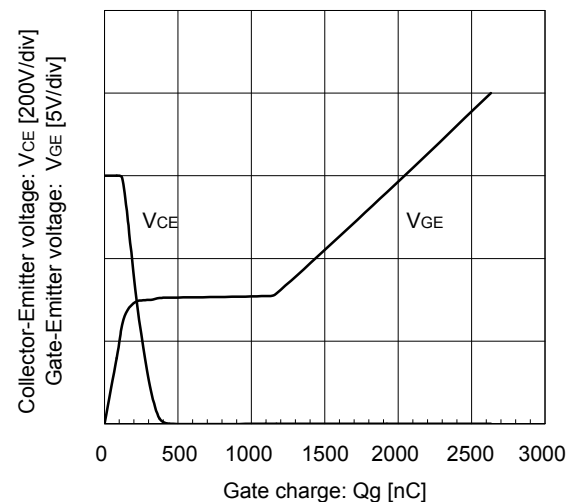
Collector-Emitter voltage vs. Gate-Emitter voltage
T_j = 25°C / chip



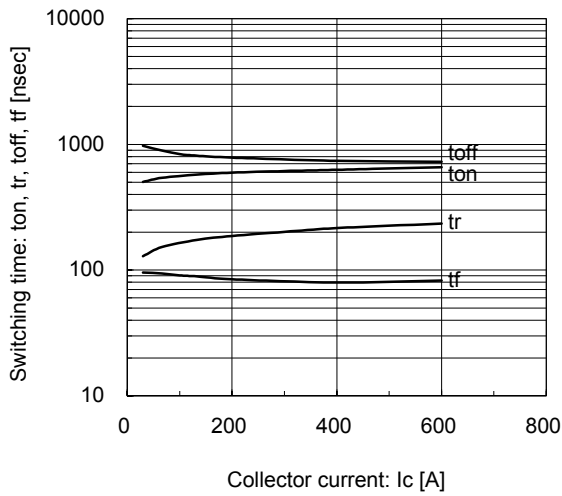
Gate Capacitance vs. Collector-Emitter Voltage
V_{GE} = 0V, f = 1MHz, T_j = 25°C



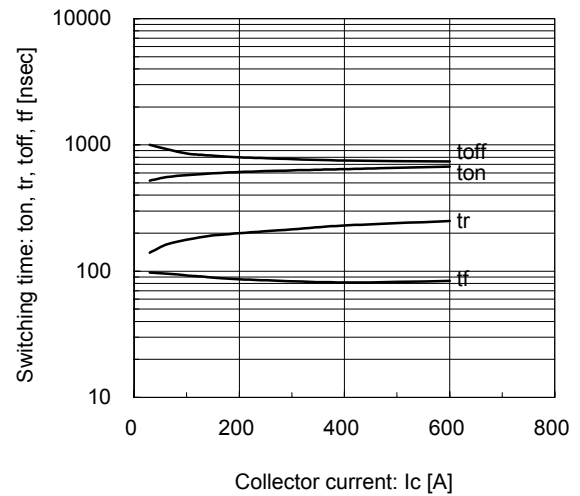
Dynamic Gate Charge (typ.)
V_{CC} = 600V, I_C = 300A, T_j = 25°C



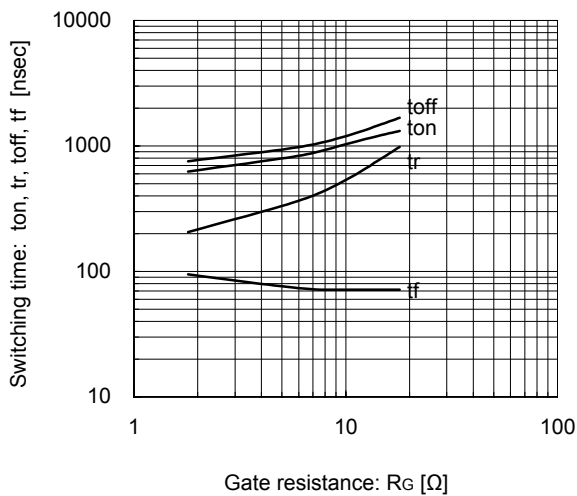
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=125^\circ C$



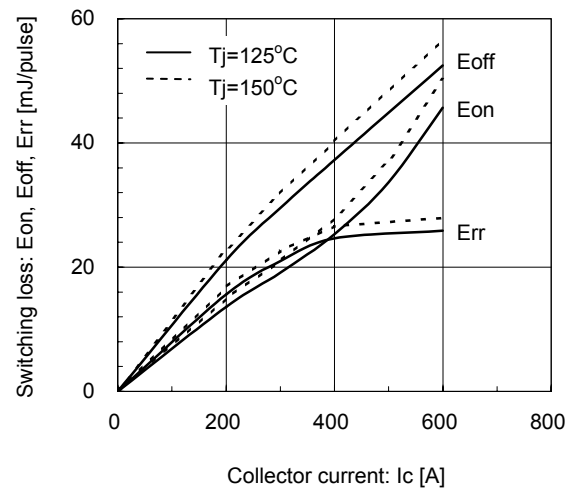
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=150^\circ C$



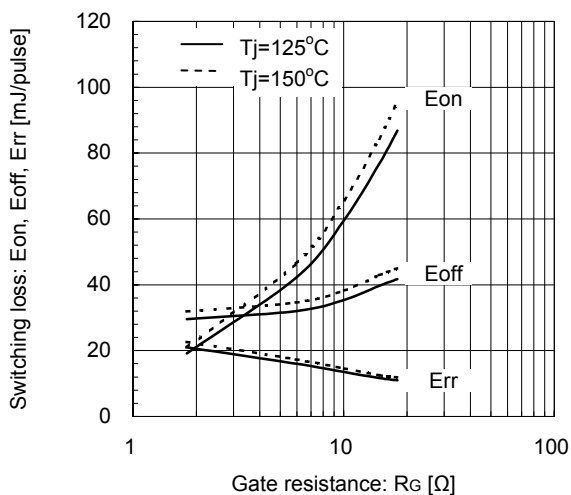
Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$



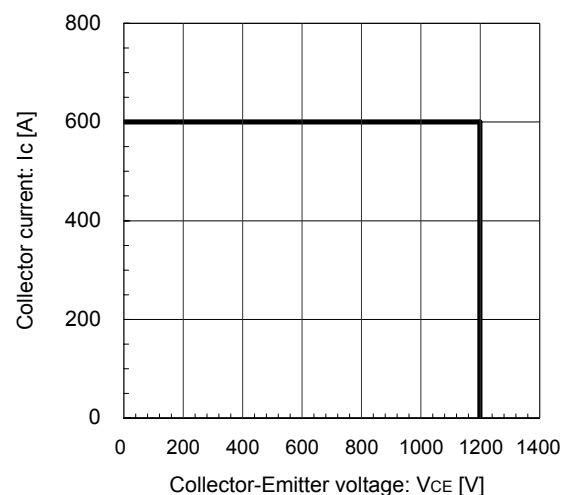
Switching loss vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=125, 150^\circ C$



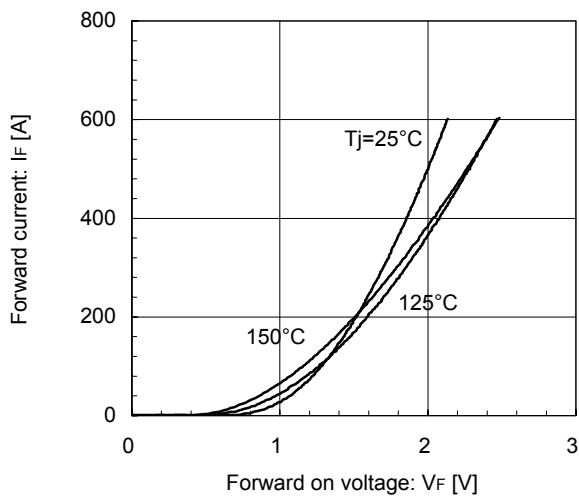
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125, 150^\circ C$



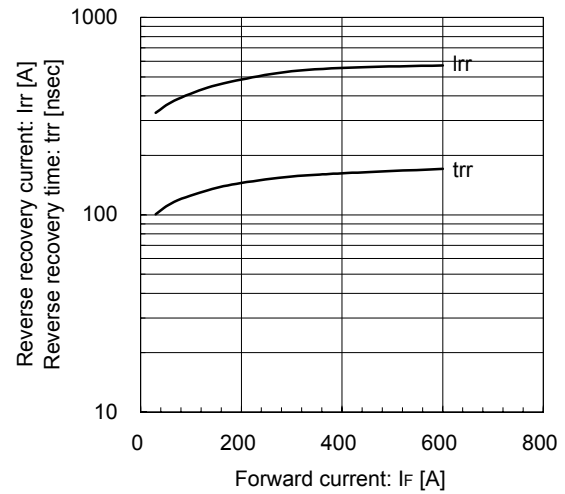
Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_G=1.8\Omega$, $T_J=150^\circ C$



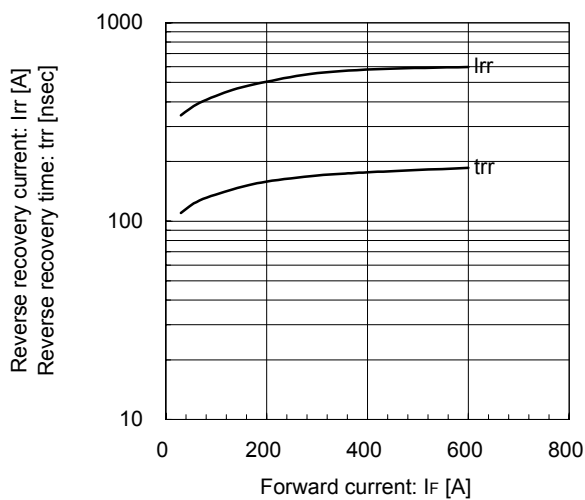
Forward Current vs. Forward Voltage (typ.)
chip



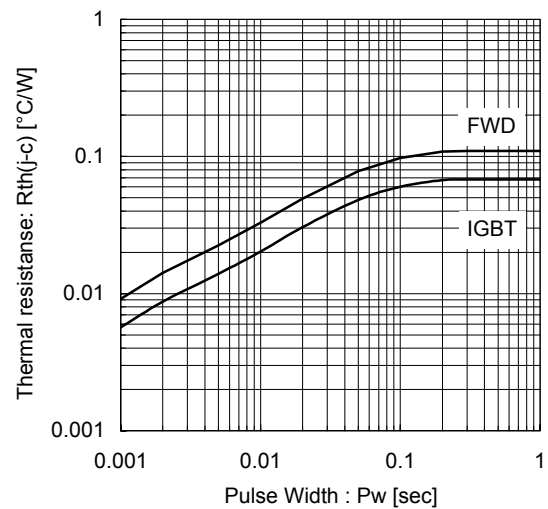
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=125^\circ C$



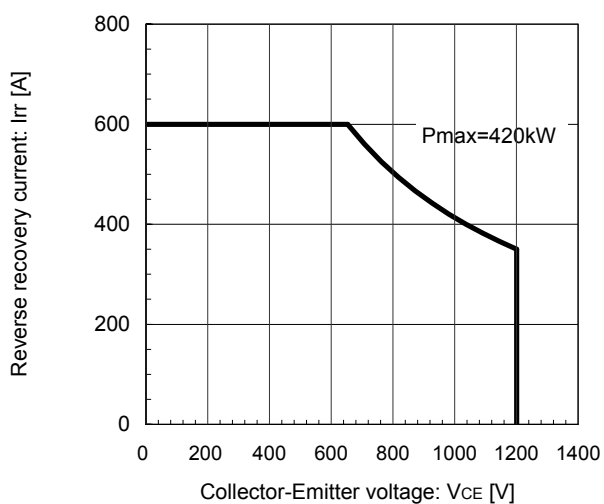
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=150^\circ C$



Transient Thermal Resistance (max.)



FWD safe operating area (max.)
 $T_J=150^\circ C$



Technical drawing of the 3200-1000-000 terminal block, showing top and side views with dimensions.

Top View Dimensions:

- Overall width: 108 ± 1
- Overall height: 62 ± 1
- Distance between terminal centers: 25 ± 0.2
- Terminal width: 14
- Terminal height: 23.5 ± 0.2
- Distance from top edge to terminal center: 48 ± 0.2
- Distance from bottom edge to terminal center: 62 ± 1
- Distance from left edge to terminal center: 22
- Distance from right edge to terminal center: 22
- Distance between terminal blocks: 93 ± 0.2
- Terminal hole diameter: $4-\phi 6.5 \pm 0.3$
- Terminal hole position: 6 ± 0.2
- Terminal hole diameter: 15 ± 0.2
- Terminal hole position: 6 ± 0.2

Side View Dimensions:

- Overall height: 30.5 ± 0.5
- Distance from top edge to terminal center: 23.4
- Terminal height: 6 ± 0.5
- Terminal width: 22.4
- Terminal hole diameter: $3-M6$
- Terminal hole depth: 10.5 min.
- Terminal hole position: 22.4
- Terminal hole diameter: 30.9 ± 0.5

Labels and Notes:

- Labels: C2E1, E2, C1
- Label: LABEL
- Note: TAB TYPE TERMINALS (DIN 46244-A2.8 0.5BZ equivalent)

The diagram shows a two-stage CMOS differential amplifier. The top stage consists of a PMOS load and an NMOS input transistor with inputs G1 and E1. Its output is C2E1. The bottom stage consists of a PMOS load and an NMOS input transistor with inputs G2 and E2. Its output is E2. The common-emitter nodes of both stages are connected to each other.

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			• Industrial robots etc.
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• Traffic-signal control equipment	• Gas leakage detectors with an auto-shut-off feature
• Emergency equipment for responding to disasters and anti-burglary devices	• Safety devices
• Medical equipment	
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• Submarine repeater equipment		
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