

2MBI50N-120

IGBT Module

1200V / 50A 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 $T_c=25^{\circ}\text{C}$ unless otherwise specified)

Item	Symbol	Rating	Unit
Collector-Emitter voltage	V_{CES}	1200	V
Gate-Emitter voltage	V_{GES}	± 20	V
Collector current	Continuous	I_c	50 A
	1ms	I_c pulse	100 A
	Continuous	$-I_c$	50 A
	1ms	$-I_c$ pulse	100 A
Max. power dissipation	P_c	400	W
Operating temperature	T_j	$+150$	$^{\circ}\text{C}$
Storage temperature	T_{stg}	-40 to $+125$	$^{\circ}\text{C}$
Isolation voltage	V_{is}	AC 2500 (1min.)	V
Screw torque	Mounting *1	3.5	N·m
	Terminals *1	3.5	N·m

*1 : Recommendable value : 2.5 to 3.5 N·m(M5)

- Electrical characteristics (at $T_j=25^{\circ}\text{C}$ unless otherwise specified)

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	I_{CES}	—	—	1.0	$V_{GE}=0\text{V}$, $V_{CE}=1200\text{V}$	mA
Gate-Emitter leakage current	I_{GES}	—	—	15	$V_{CE}=0\text{V}$, $V_{GE}=\pm 20\text{V}$	μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	4.5	—	7.5	$V_{CE}=20\text{V}$, $I_c=50\text{mA}$	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	—	—	3.3	$V_{GE}=15\text{V}$, $I_c=50\text{A}$	V
Input capacitance	C_{ies}	—	8000	—	$V_{GE}=0\text{V}$	pF
Output capacitance	C_{oes}	—	2900	—	$V_{CE}=10\text{V}$	
Reverse transfer capacitance	C_{res}	—	2580	—	$f=1\text{MHz}$	
Turn-on time	t_{on}	—	0.65	1.2	$V_{CC}=600\text{V}$	μs
	t_r	—	0.25	0.6	$I_c=50\text{A}$	
Turn-off time	t_{off}	—	0.85	1.5	$V_{GE}=\pm 15\text{V}$	
	t_f	—	0.35	0.5	$R_G=24\text{ ohm}$	
Diode forward on voltage	V_F	—	—	3.0	$I_F=50\text{A}$, $V_{GE}=0\text{V}$	V
Reverse recovery time	t_{rr}	—	—	0.35	$I_F=50\text{A}$	μs

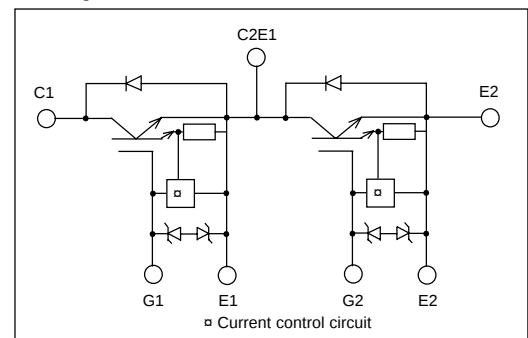
- Thermal resistance characteristics

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	$R_{th(j-c)}$	—	—	0.31	IGBT	$^{\circ}\text{C/W}$
	$R_{th(j-c)}$	—	—	0.85	Diode	$^{\circ}\text{C/W}$
	$R_{th(c-f)*2}$	—	0.05	—	the base to cooling fin	$^{\circ}\text{C/W}$

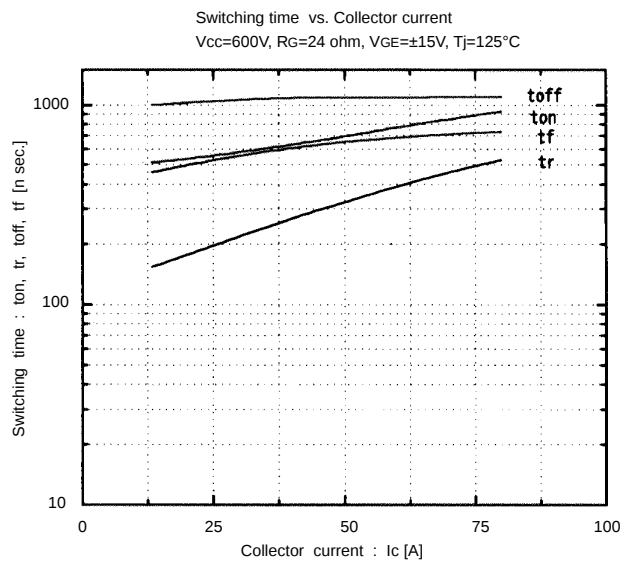
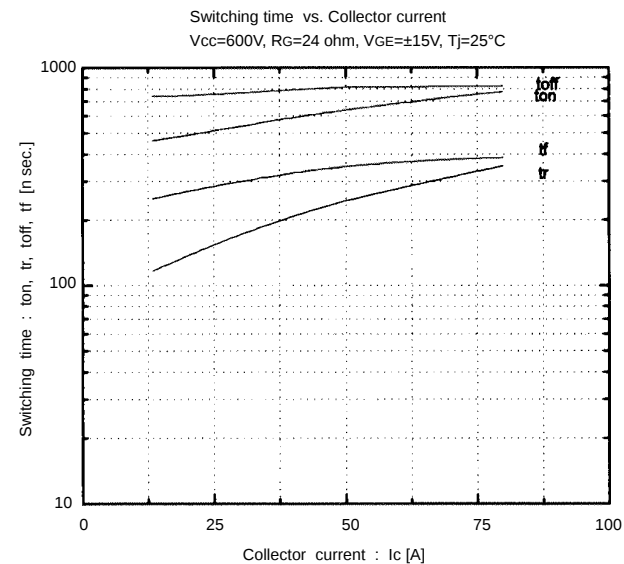
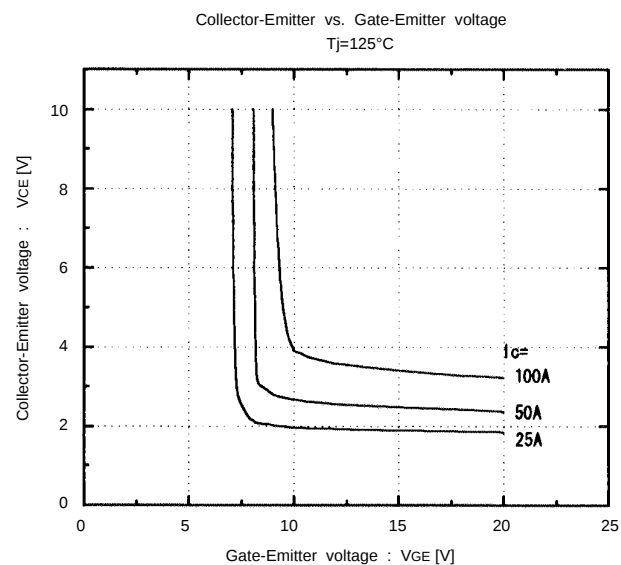
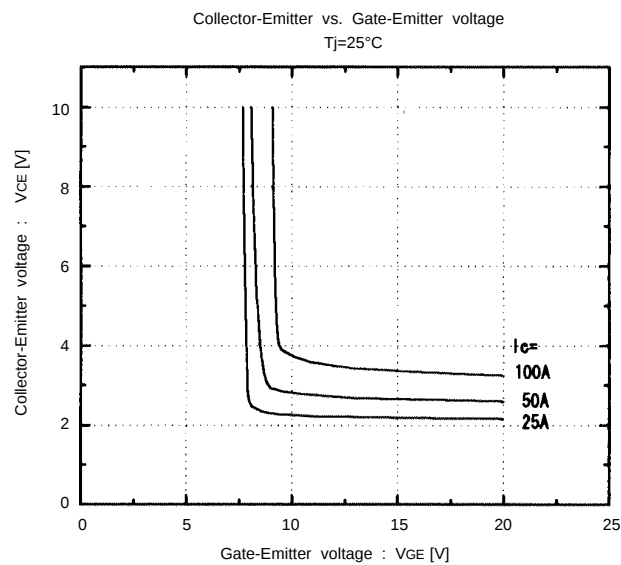
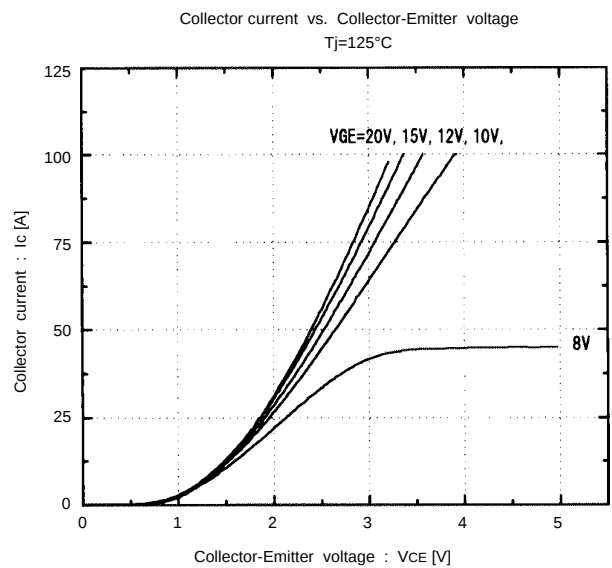
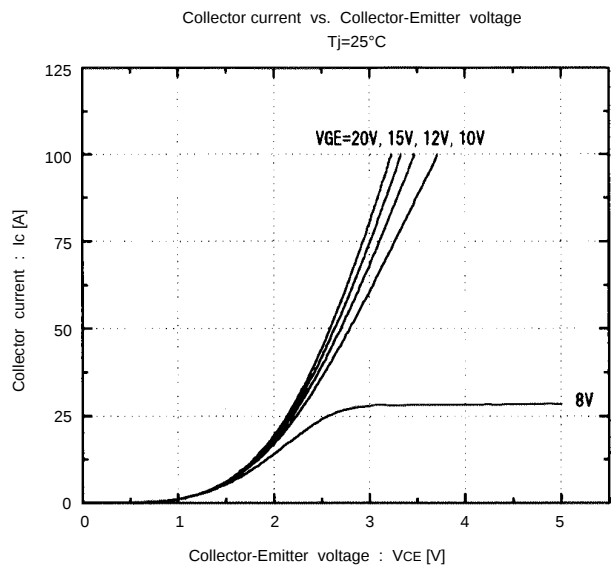
*2 : This is the value which is defined mounting on the additional cooling fin with thermal compound



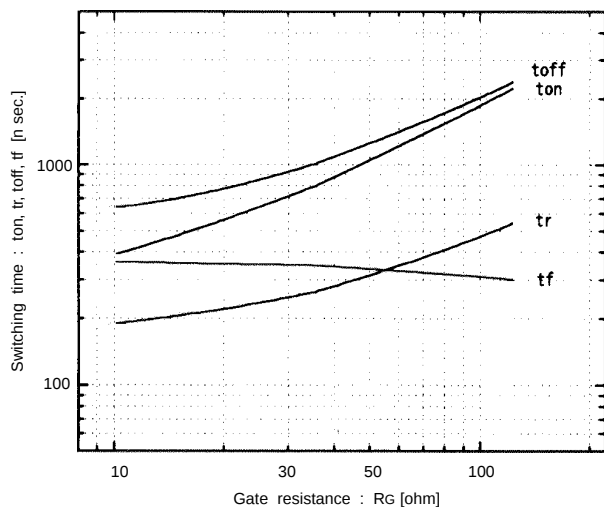
■ Equivalent Circuit Schematic



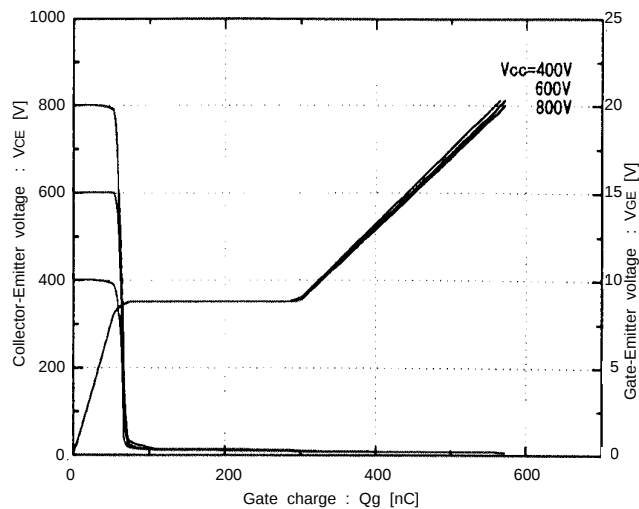
Characteristics (Representative)



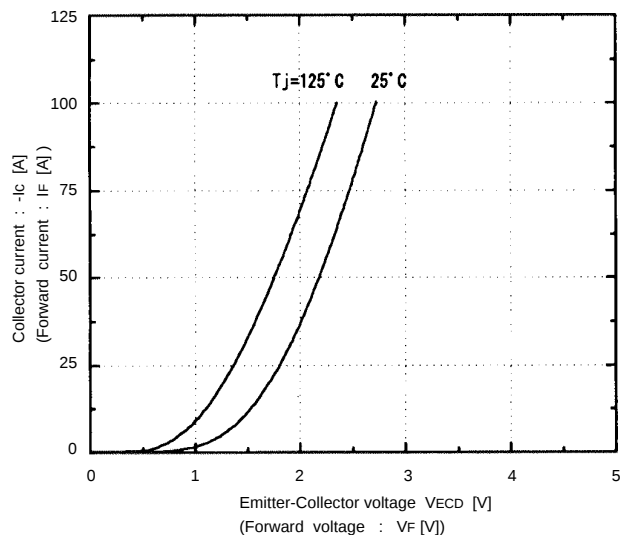
Switching time vs. R_G
 $V_{CC}=600V$, $I_C=50A$, $V_{GE}=\pm 15V$, $T_J=25^\circ C$



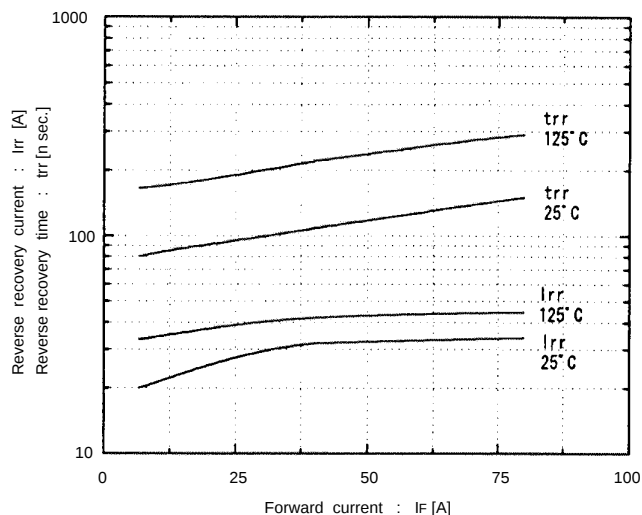
Dynamic input characteristics
 $T_J=25^\circ C$



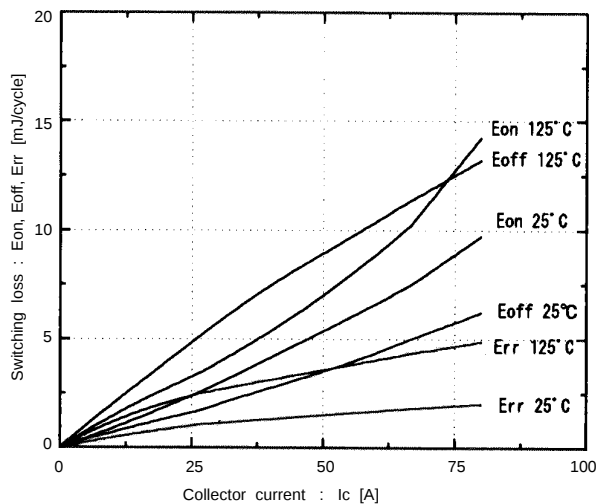
Forward current vs. Forward voltage
 $V_{GE}=0V$



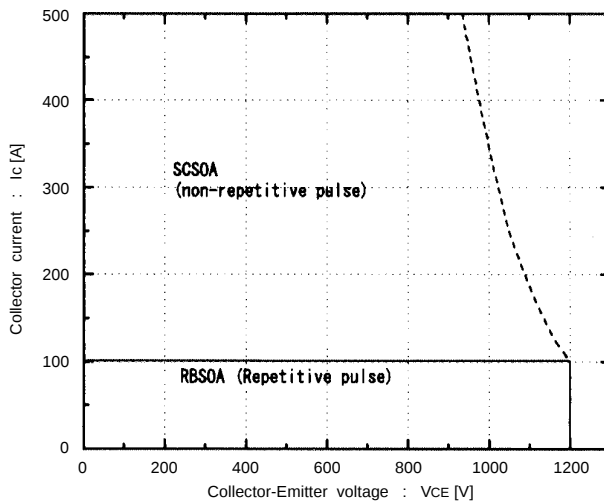
Reverse recovery characteristics
 t_{rr} , I_{rr} , vs. I_F

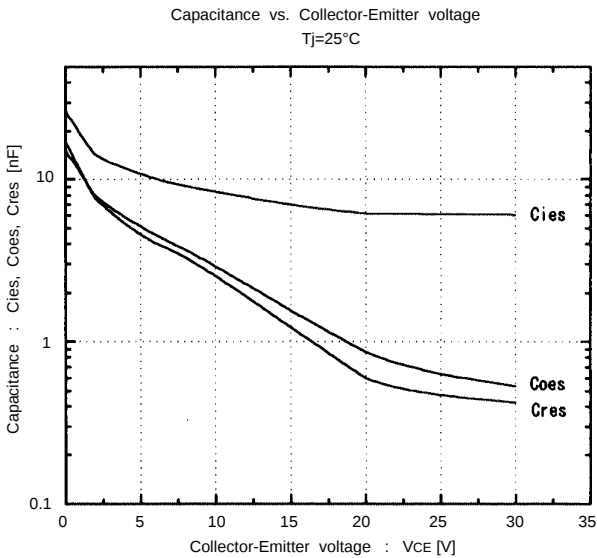
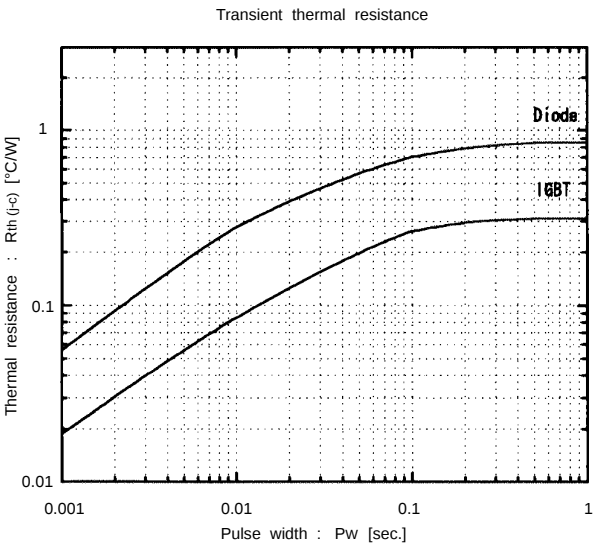


Switching loss vs. Collector current
 $V_{CC}=600V$, $R_G=24\text{ ohm}$, $V_{GE}=\pm 15V$



Reversed biased safe operating area
 $+V_{GE}=15V$, $-V_{GE} \leq 15V$, $T_J \leq 125^\circ C$, $R_G \geq 24\text{ ohm}$





■ Outline Drawings, mm

