

2MBI450UE-120



IGBT Module U-Series 1200V / 450A 2 in one-package

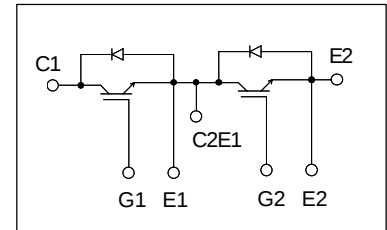
■ Features

- 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

■ Equivalent Circuit Schematic



■ Maximum ratings and characteristics

● Absolute maximum ratings (at Tc=25°C unless otherwise specified)

Item		Symbol	Conditions		Rating	Unit	
Collector-Emitter voltage		V _{CES}			1200	V	
Gate-Emitter voltage		V _{GES}			±20	V	
Collector current		I _c	Continuous	T _c =25°C	675	A	
				T _c =80°C	450		
		I _{cp}	1ms	T _c =25°C	1350		
				T _c =80°C	900		
		-I _c			450		
		-I _c pulse			900		
Collector Power Dissipation		P _c	1 device		2080	W	
Junction temperature		T _j			+150	°C	
Storage temperature		T _{stg}			-40 to +125		
Isolation voltage	between terminal and copper base *1		V _{iso}	AC:1min.		2500	VAC
Screw Torque		Mounting *2				3.5	N·m
		Terminals *2				4.5	

*1 : All terminals should be connected together when isolation test will be done.

*2 : Recommendable value : Mounting 2.5 to 3.5 N·m(M5 or M6), Terminals 3.5 to 4.5N·m(M6)

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

Item	Symbols	Conditions		Characteristics			Unit
				Min.	Typ.	Max.	
Zero gate voltage collector current	I _{CES}	V _{GE} =0V, V _{CE} =1200V		—	—	3.0	mA
Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V		—	—	600	nA
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _C =450mA		4.5	6.5	8.5	V
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} =15V, I _C =450A	T _J =25°C	—	2.00	2.35	V
			T _J =125°C	—	2.25	—	
	V _{CE(sat)} (chip)		T _J =25°C	—	1.75	2.10	
			T _J =125°C	—	2.00	—	
Input capacitance	C _{ies}	V _{CE} =10V, V _{GE} =0V, f=1MHz		—	50	—	nF
Turn-on time	t _{on}	V _{CC} =600V I _C =450A V _{GE} =±15V		—	0.36	1.20	μs
	t _r			—	0.21	0.60	
	t _{r(i)}			—	0.03	—	
Turn-off time	t _{off}	R _G =0.68 Ω		—	0.37	1.00	
	t _f			—	0.07	0.30	
Forward on voltage	V _F (terminal)	V _{GE} =0V I _F =450A	T _J =25°C	—	1.85	2.15	V
			T _J =125°C	—	1.95	—	
	V _F (chip)		T _J =25°C	—	1.60	1.90	
			T _J =125°C	—	1.70	—	
Reverse recovery time	t _{rr}	I _F =450A		—	—	0.35	μs
Lead resistance, terminal-chip*3	R lead			—	0.45	—	mΩ

*3:Biggest internal terminal resistance among arm.

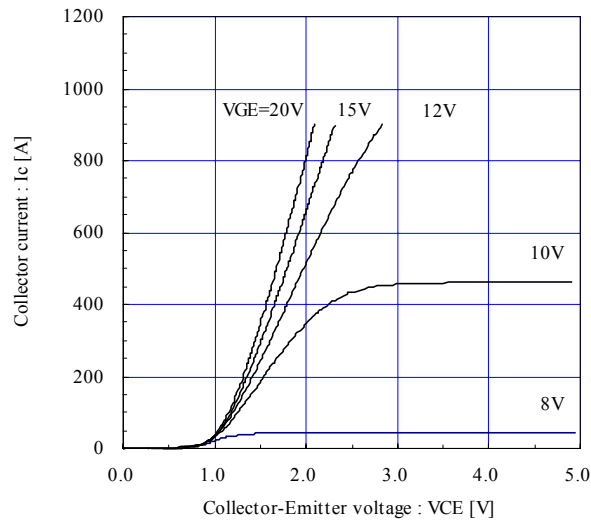
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{th(j-c)}	IGBT	—	—	0.060	°C/W
	R _{th(j-c)}	FWD	—	—	0.08	°C/W
Contact Thermal resistance	R _{th(c-f)} *4	With thermal compound	—	0.0167	—	°C/W

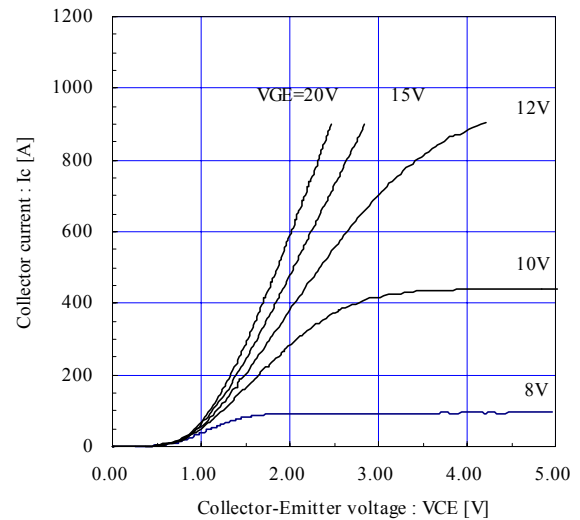
*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

Characteristics (Representative)

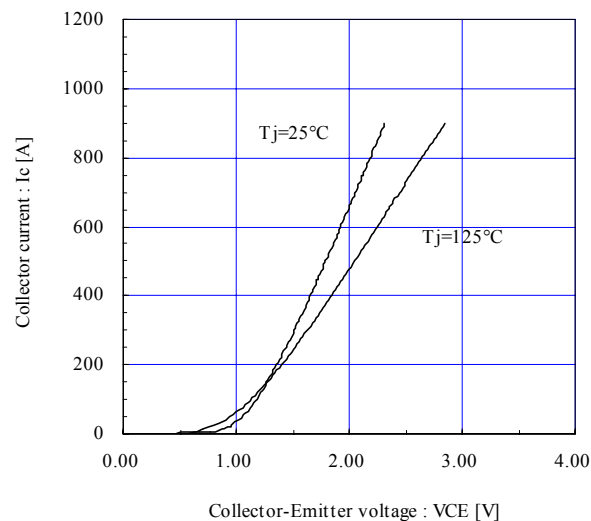
Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C} / \text{chip}$ 

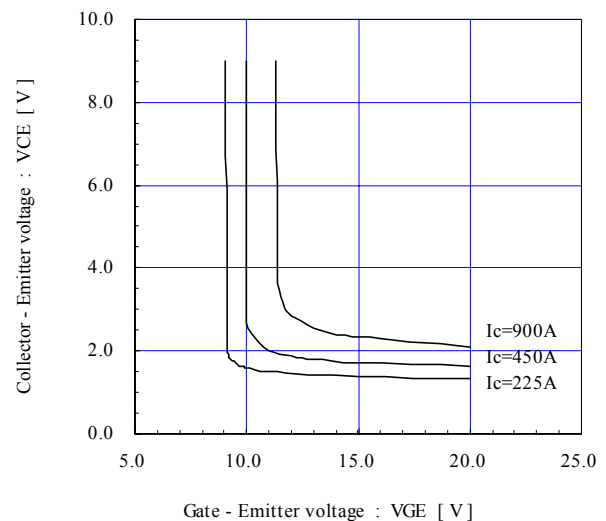
Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 125^\circ\text{C} / \text{chip}$ 

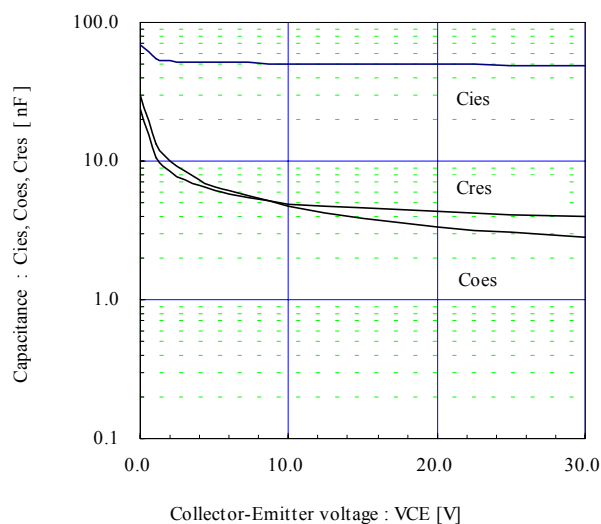
Collector current vs. Collector-Emitter voltage (typ.)

 $V_{GE} = 15\text{V} / \text{chip}$ 

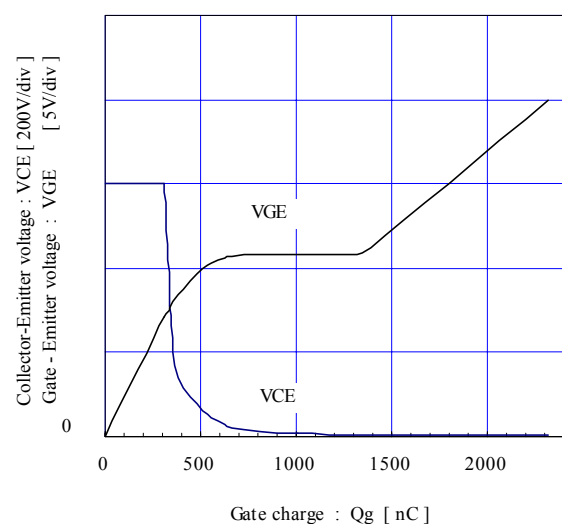
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C} / \text{chip}$ 

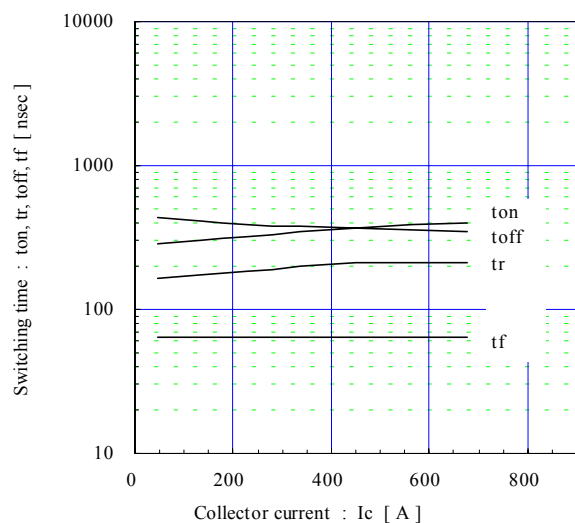
Capacitance vs. Collector-Emitter voltage (typ.)

 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$ 

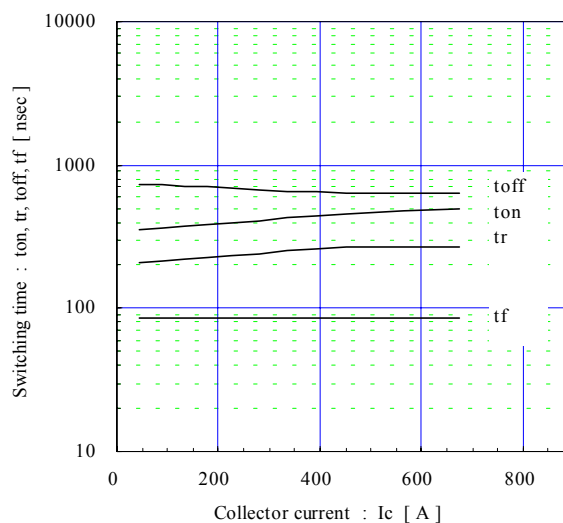
Dynamic Gate charge (typ.)

 $V_{cc} = 600\text{V}$, $I_c = 450\text{A}$, $T_j = 25^\circ\text{C}$ 

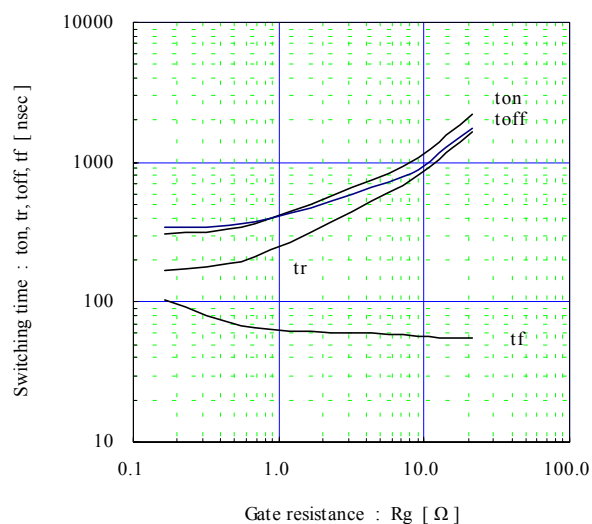
Switching time vs. Collector current (typ.)

 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=0.68\Omega, T_j=25^\circ C$ 

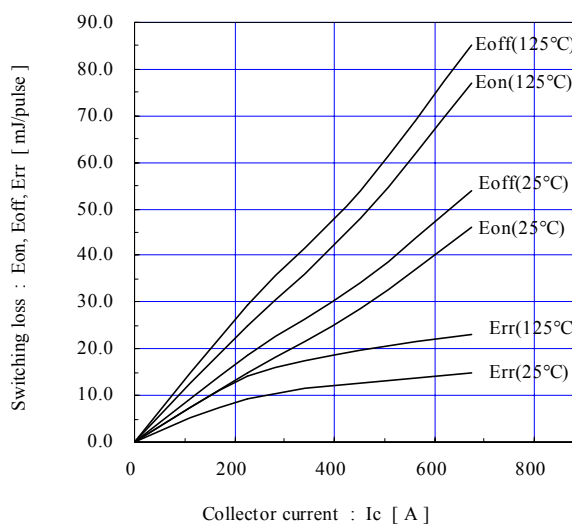
Switching time vs. Collector current (typ.)

 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=0.68\Omega, T_j=125^\circ C$ 

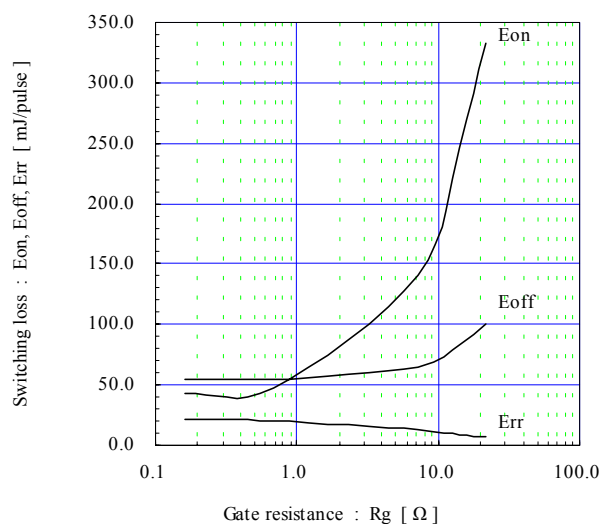
Switching time vs. Gate resistance (typ.)

 $V_{cc}=600V, I_c=450A, V_{GE}=\pm 15V, T_j=25^\circ C$ 

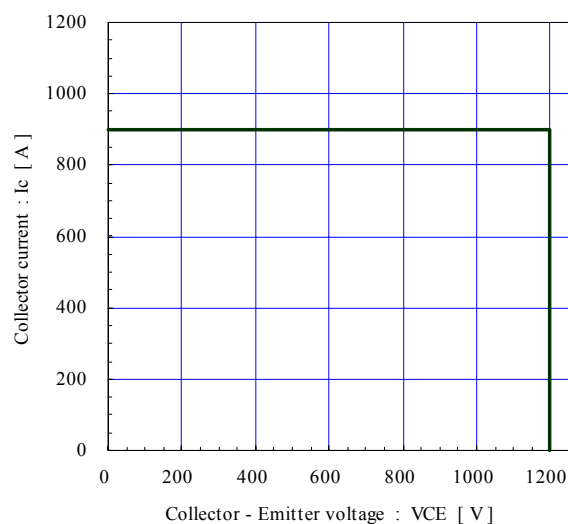
Switching loss vs. Collector current (typ.)

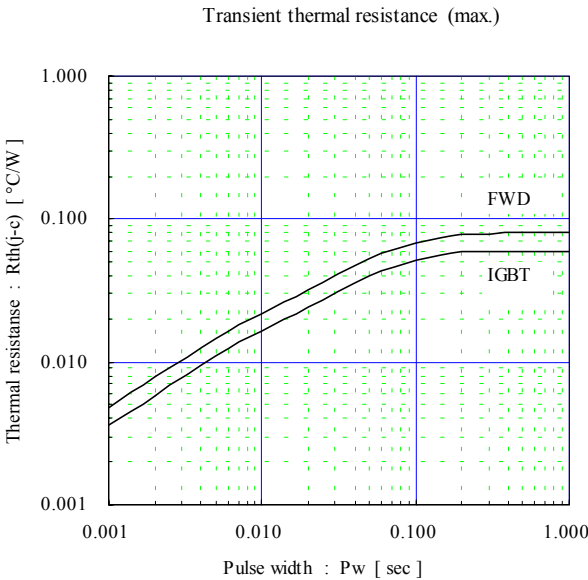
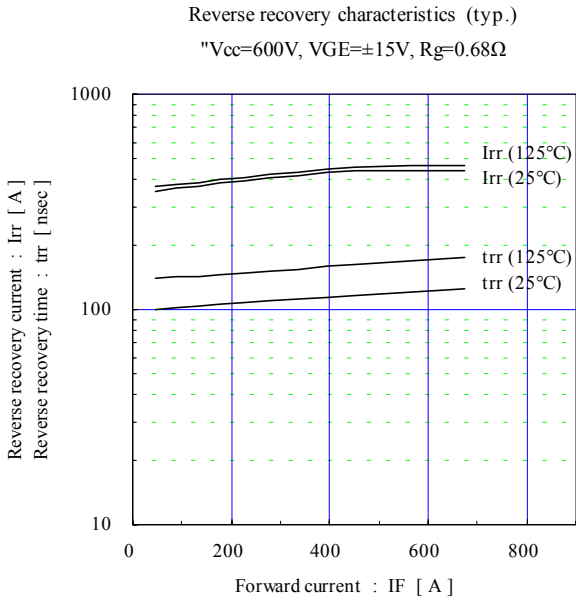
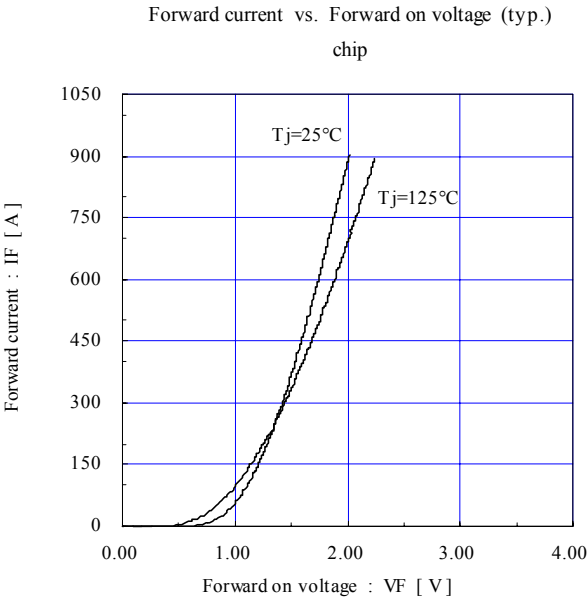
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=0.68\Omega$ 

Switching loss vs. Gate resistance (typ.)

 $V_{cc}=600V, I_c=450A, V_{GE}=\pm 15V, T_j=125^\circ C$ 

Reverse bias safe operating area (max.)

 $+V_{GE}=15V, -V_{GE} \leq 15V, R_g \geq 0.68\Omega, T_j \leq 125^\circ C$ 



■ Outline Drawings, mm

