

2MBI450UE-120



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

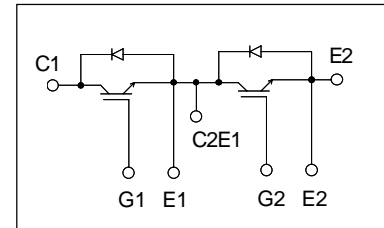
■ Features

- 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	
				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	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 Tj=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	–	0.36	1.20	μs	
	t _r	I _c =450A	–	0.21	0.60		
	t _{r(i)}	V _{GE} =±15V	–	0.03	–		
Turn-off time	t _{off}	R _G =0.68 Ω	–	0.37	1.00	μs	
	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

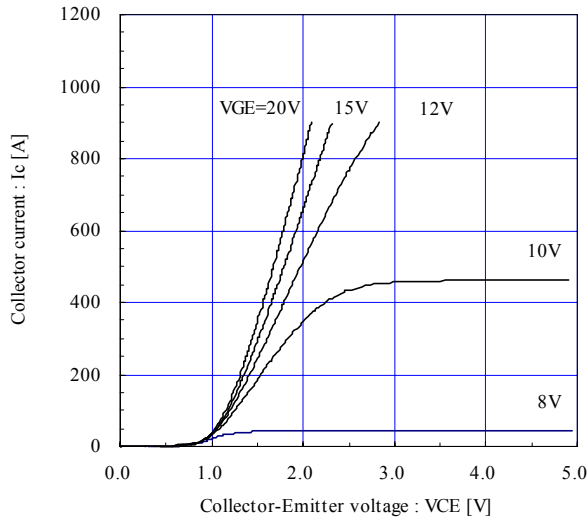
Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{th(j-c)}	IGBT	–	–	0.060	°C/W
	R _{th(j-c)}	FWD	–	–	0.08	°C/W
Contact Thermal resistance	R _{th(c-f)} *4	With thermal compound	–	0.0167	–	°C/W

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

Characteristics (Representative)

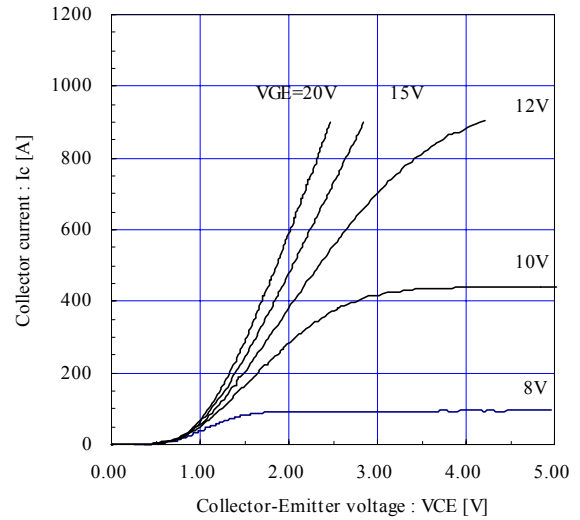
Collector current vs. Collector-Emitter voltage (typ.)

T_j= 25°C / chip



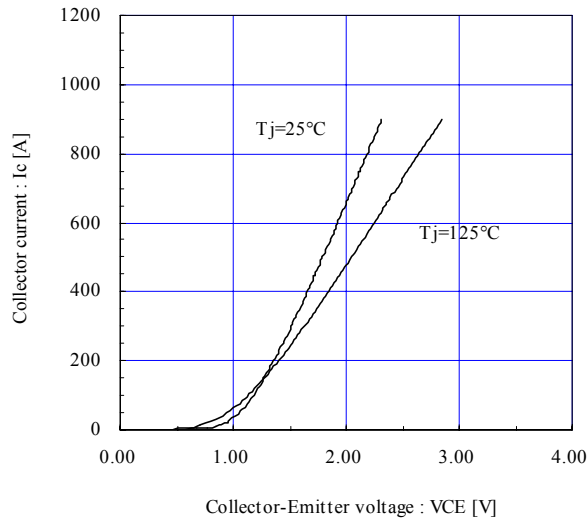
Collector current vs. Collector-Emitter voltage (typ.)

T_j= 125°C / chip



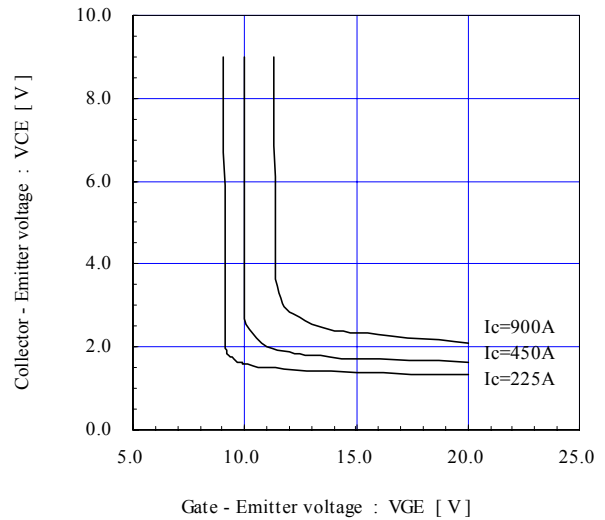
Collector current vs. Collector-Emitter voltage (typ.)

VGE=15V / chip



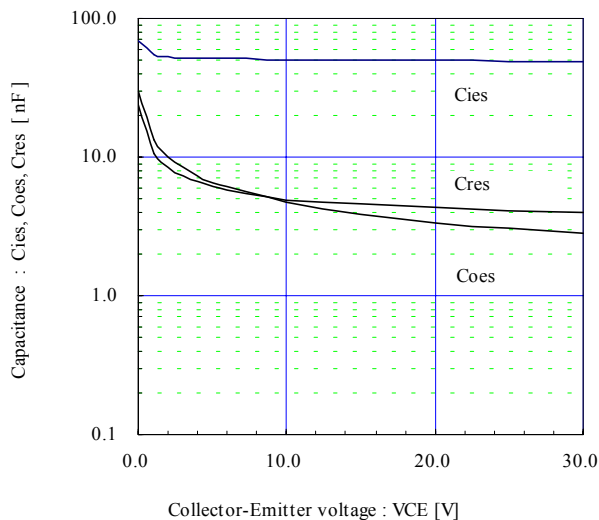
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

T_j=25°C / chip



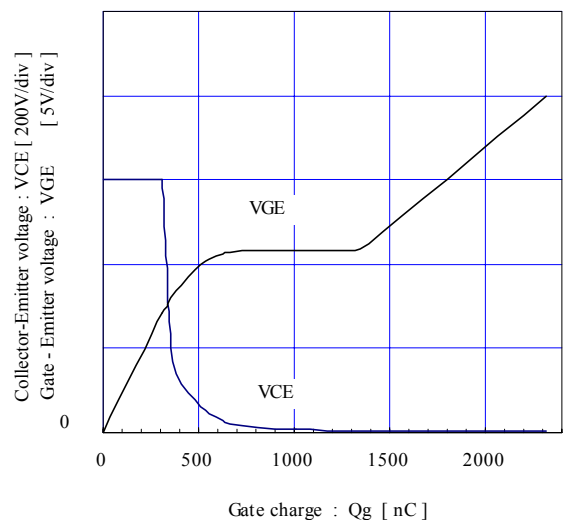
Capacitance vs. Collector-Emitter voltage (typ.)

VGE=0V, f= 1MHz, T_j= 25°C

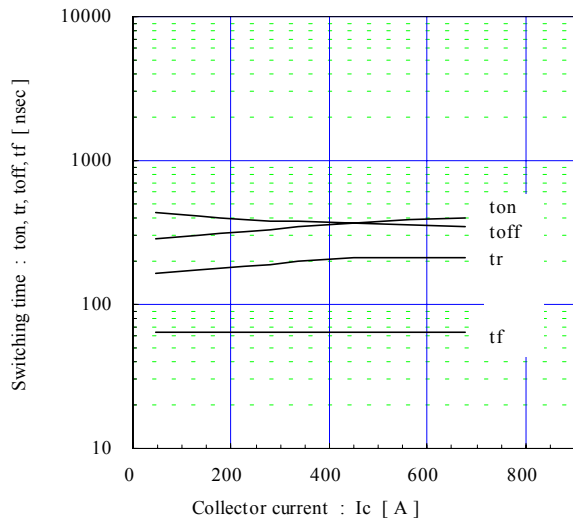


Dynamic Gate charge (typ.)

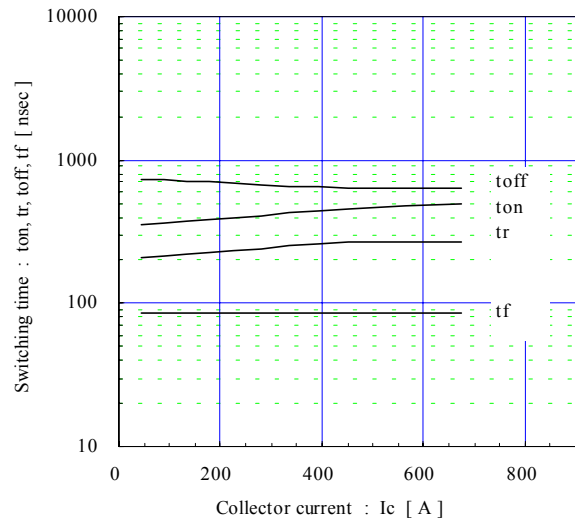
V_{cc}=600, Ic=450A, T_j= 25°C



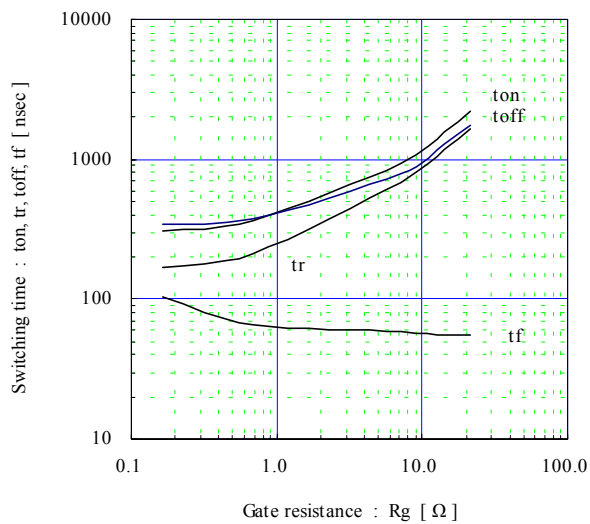
Switching time vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=0.68\Omega, T_j=25^\circ C$



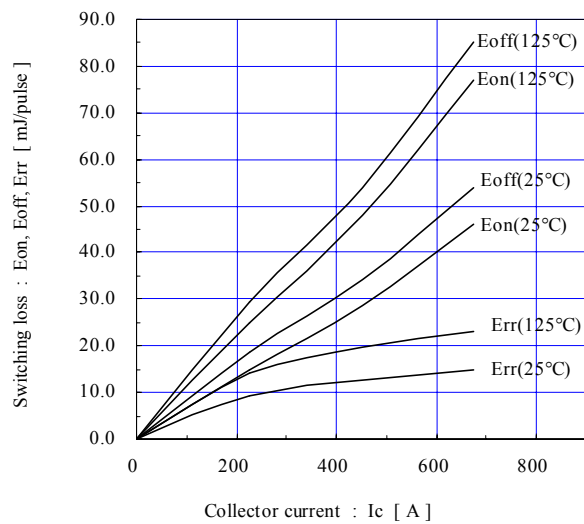
Switching time vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=0.68\Omega, T_j=125^\circ C$



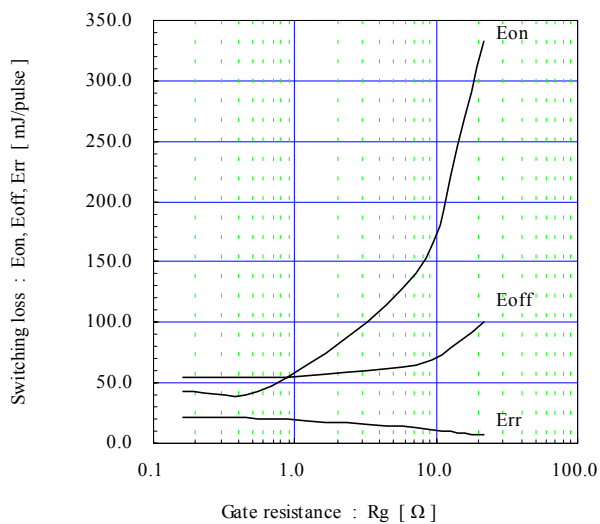
Switching time vs. Gate resistance (typ.)
 $V_{cc}=600V, I_c=450A, V_{GE}=\pm 15V, T_j=25^\circ C$



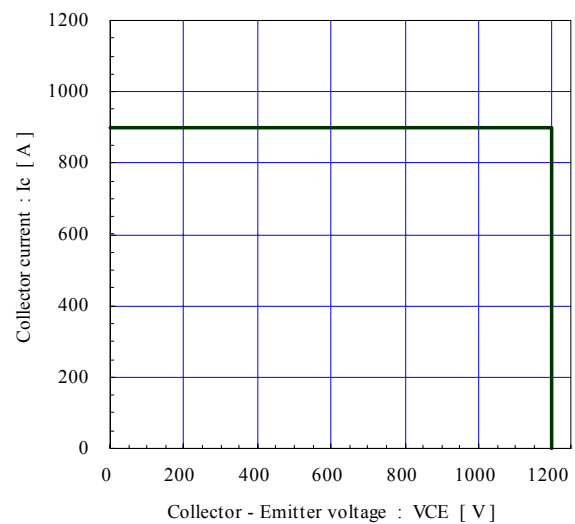
Switching loss vs. Collector current (typ.)
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=0.68\Omega$



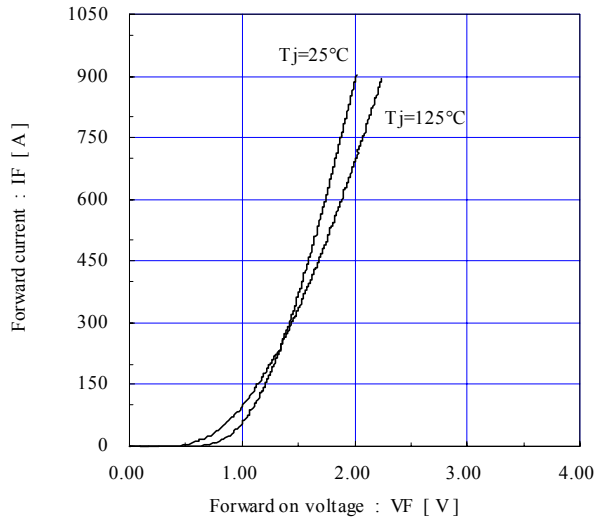
Switching loss vs. Gate resistance (typ.)
 $V_{cc}=600V, I_c=450A, V_{GE}=\pm 15V, T_j=125^\circ C$



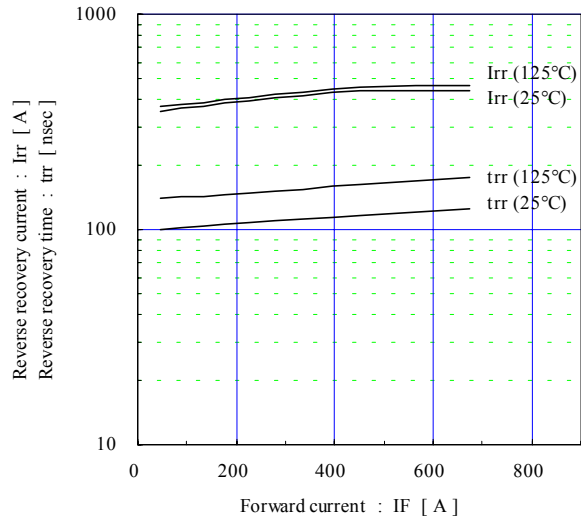
Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \le 15V, R_g \ge 0.68\Omega, T_j \le 125^\circ C$



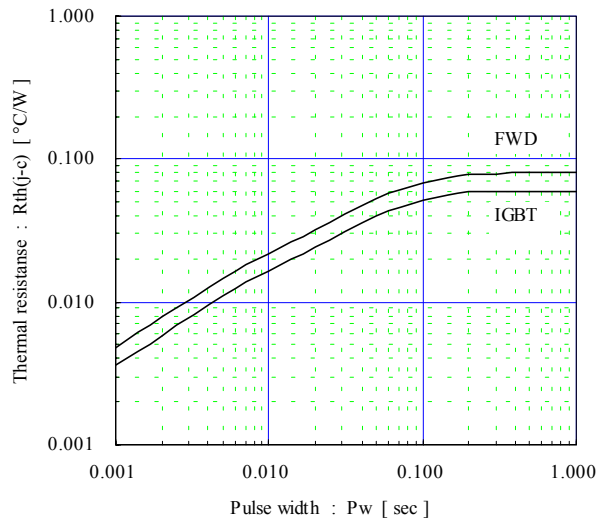
Forward current vs. Forward on voltage (typ.)
chip



Reverse recovery characteristics (typ.)
"Vcc=600V, VGE=±15V, Rg=0.68Ω



Transient thermal resistance (max.)



■ Outline Drawings, mm

