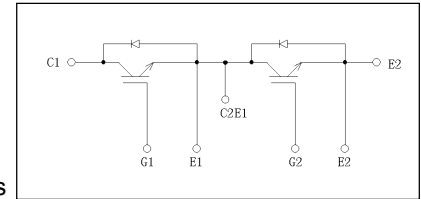


2MBI400U2B-060



IGBT Module U-Series 600V / 400A 2 in one-package

■ Equivalent Circuit Schematic



■ 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)

Item		Symbol	Conditions	Rating	Unit	
Collector-Emitter voltage		V _{CES}		650	V	
Gate-Emitter voltage		V _{GES}		±20	V	
Collector current		I _c	Continuous	400	A	
		I _{cp}	1ms	800		
		-I _c		400		
		-I _c pulse		800		
Collector Power Dissipation		P _c	1 device	1250	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			3.5	

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

*2 : Recommendable value : Mounting 2.5 to 3.5N·m(M5), Terminal 2.5 to 3.5 N·m(M5)

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

Item	Symbols	Conditions		Characteristics			Unit
				Min.	Typ.	Max.	
Zero gate voltage collector current	ICES	VGE=0V, VCE=600V		—	—	2.0	mA
Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V		—	—	400	nA
Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=400mA		6.2	6.7	7.7	V
Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V, IC=400A	TJ=25°C	—	2.25	2.55	V
			TJ=125°C	—	2.50	—	
	VCE(sat) (chip)		TJ=25°C	—	1.85	—	
			TJ=125°C	—	2.10	—	
Input capacitance	Cies	VCE=10V, VGE=0V, f=1MHz		—	29	—	nF
Turn-on time	ton	VCC=300V IC=400A VGE=±15V		—	0.40	1.20	μs
	tr			—	0.22	0.60	
	tr(i)			—	0.16	—	
Turn-off time	toff	RG= 6.8 Ω		—	0.48	1.20	
	tf			—	0.07	0.45	
Forward on voltage	VF (terminal)	VGE=0V IF=400A	TJ=25°C	—	2.00	2.35	V
			TJ=125°C	—	2.05	—	
	VF (chip)		TJ=25°C	—	1.60	—	
			TJ=125°C	—	1.65	—	
Reverse recovery time	trr	IF=400A		—	—	0.35	μs
Lead resistance, terminal-chip*3	R lead			—	0.97	—	mΩ

*3:Biggest internal terminal resistance among arm.

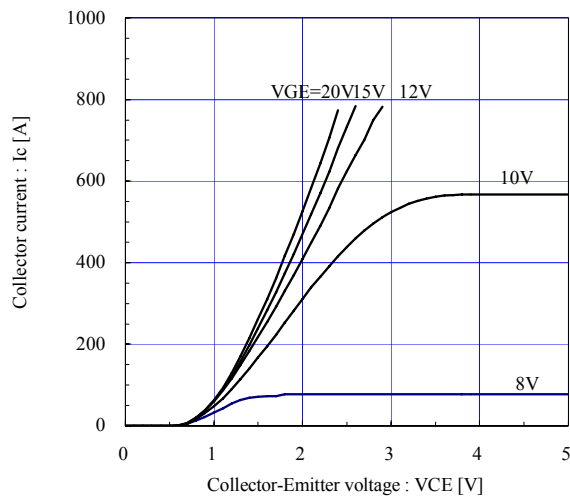
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{th(j-c)}	IGBT	—	—	0.10	°C/W
	R _{th(j-c)}	FWD	—	—	0.16	°C/W
Contact Thermal resistance	R _{th(c-f)} *4	With thermal compound	—	0.025	—	°C/W

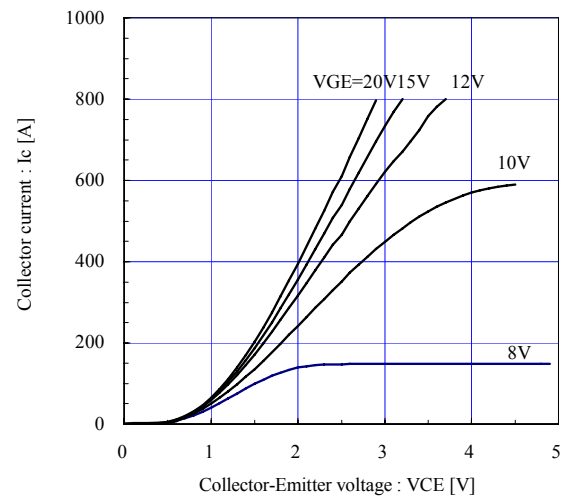
*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

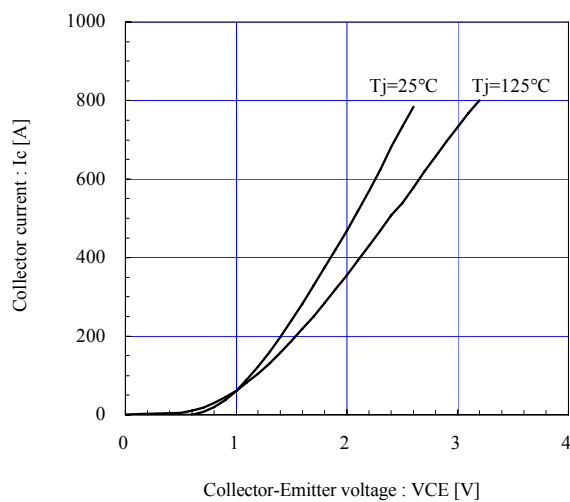
Collector current vs. Collector-Emitter voltage (typ.)

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

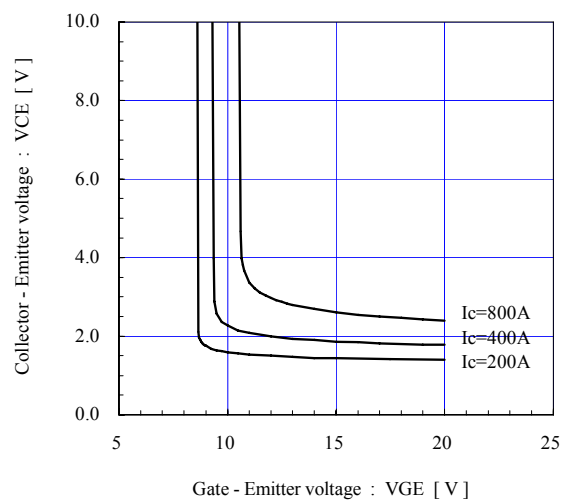
Collector current vs. Collector-Emitter voltage (typ.)

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

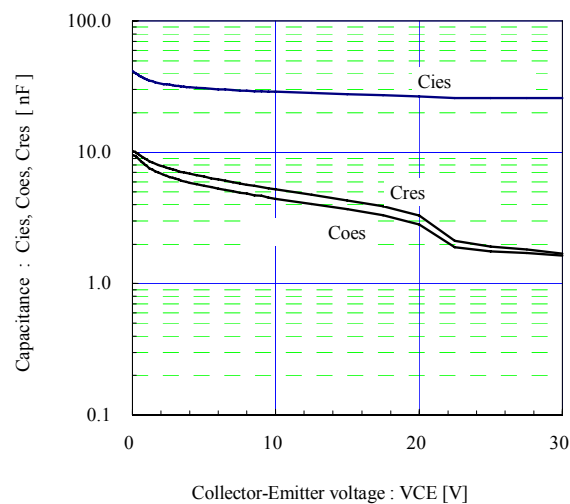
Collector current vs. Collector-Emitter voltage (typ.)

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

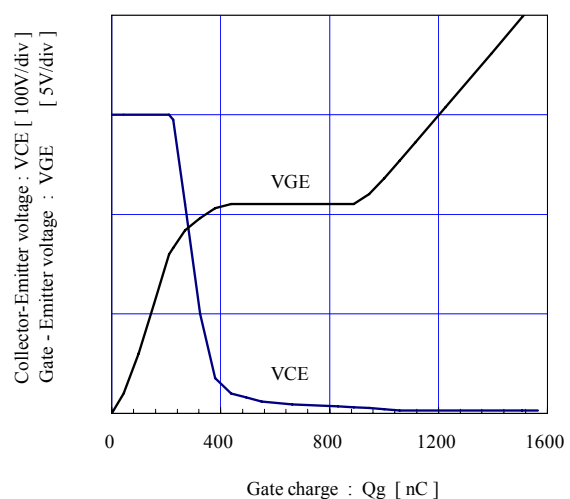
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

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

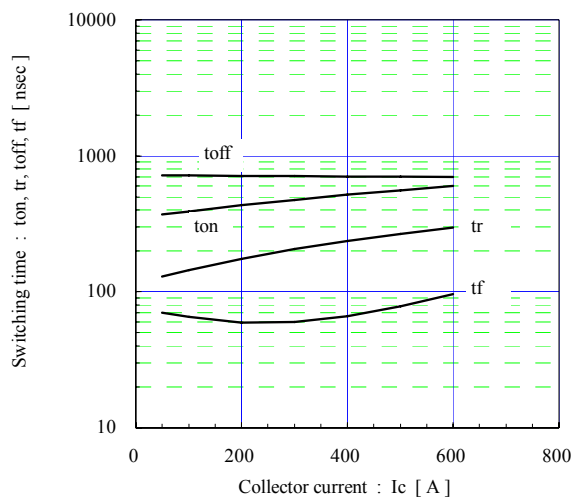
Capacitance vs. Collector-Emitter voltage (typ.)



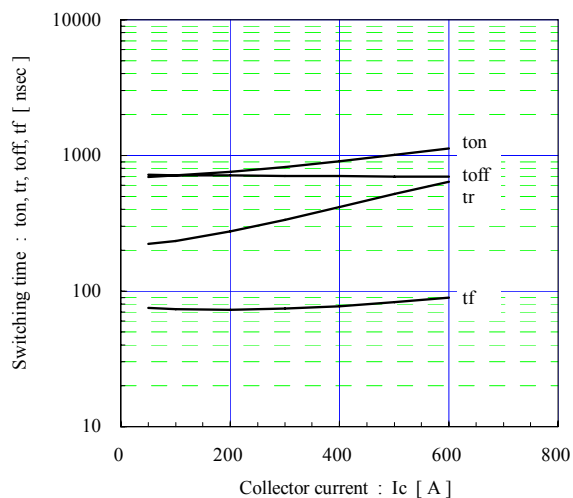
Dynamic Gate charge (typ.)

 $V_{cc} = 300\text{V}$, $I_c = 400\text{A}$, $T_j = 25^\circ\text{C}$ 

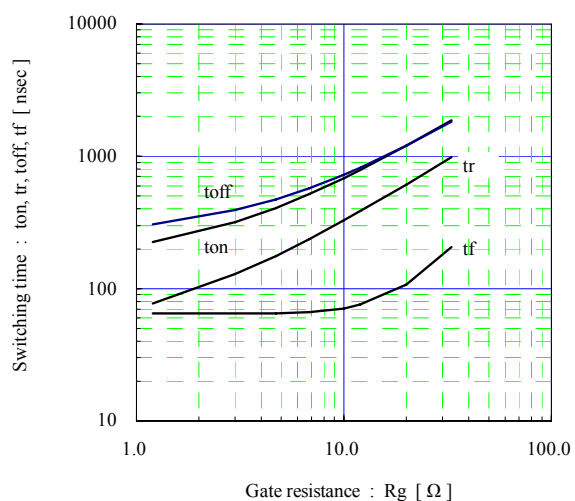
Switching time vs. Collector current (typ.)
 $V_{cc}=300V$, $V_{GE}=\pm 15V$, $R_g=6.8\Omega$, $T_j=25^\circ C$



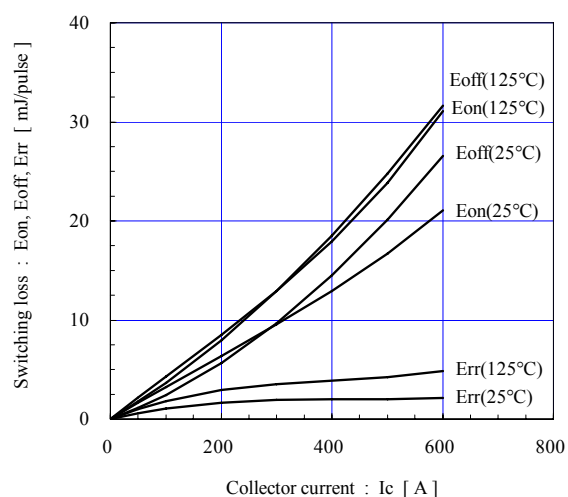
Switching time vs. Collector current (typ.)
 $V_{cc}=300V$, $V_{GE}=\pm 15V$, $R_g=6.8\Omega$, $T_j=125^\circ C$



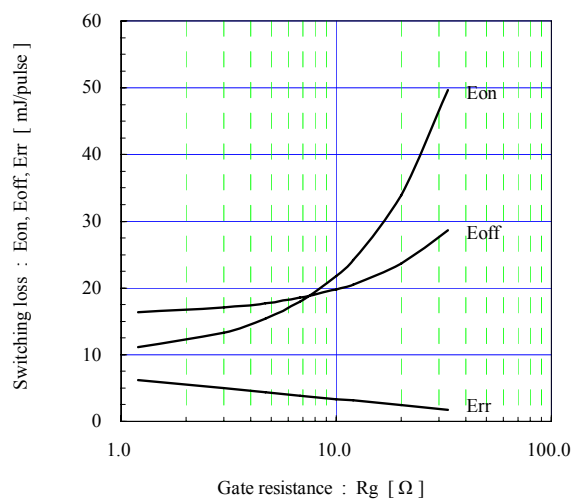
Switching time vs. Gate resistance (typ.)
 $V_{cc}=300V$, $I_c=400A$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$



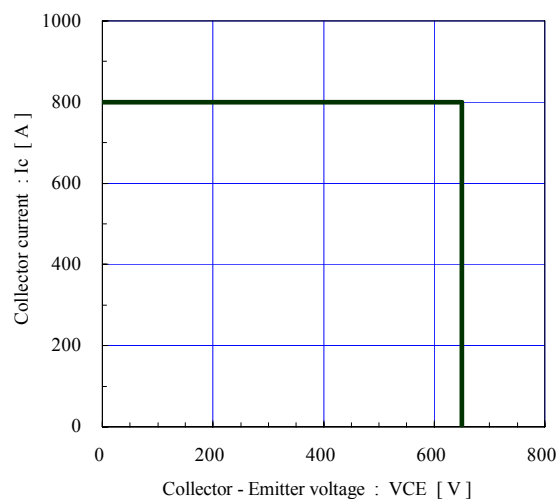
Switching loss vs. Collector current (typ.)
 $V_{cc}=300V$, $V_{GE}=\pm 15V$, $R_g=6.8\Omega$

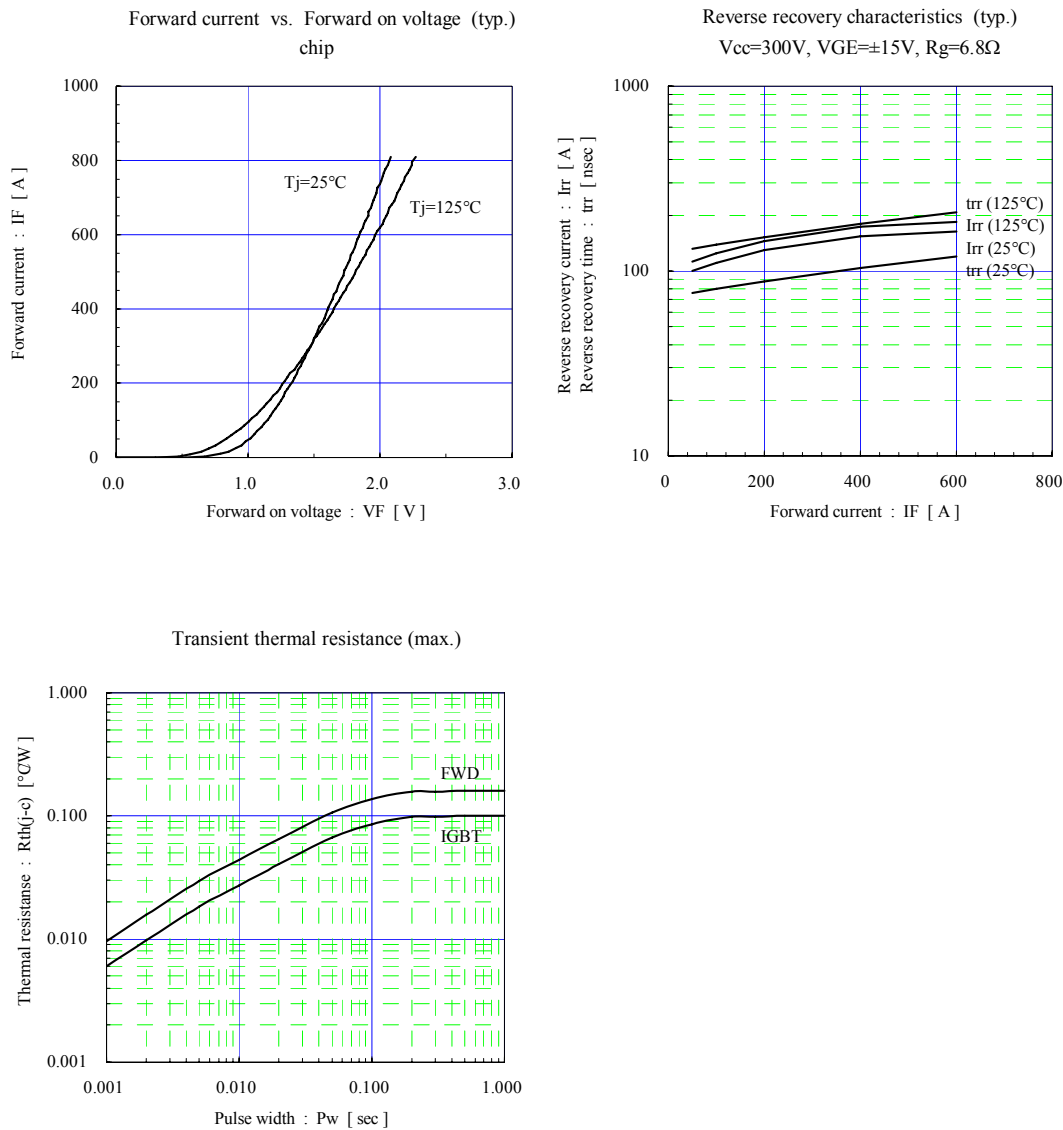


Switching loss vs. Gate resistance (typ.)
 $V_{cc}=300V$, $I_c=400A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$



Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \leq 15V, R_g \geq 6.8\Omega, T_j \leq 125^\circ C$





■ Outline Drawings, mm

M233

