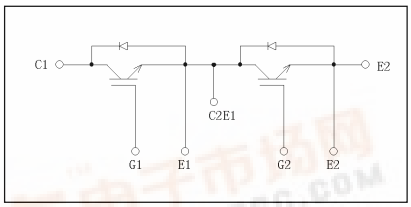
2MBI400U2B-060

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 Tj=25°C unless otherwise specified)

Item	Symbols	Conditions		Characteristics Min.	Typ.	Max.	Unit
Zero gate voltage collector current	I_{CES}	V_{GE}=0V, V_{CE}=600V		–	–	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=400mA		6.2	6.7	7.7	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	V_{GE}=15V, I_C=400A	Tj=25°C	–	2.25	2.55	V
			Tj=125°C	–	2.50	–	
	$V_{CE(sat)}$ (chip)		Tj=25°C	–	1.85	–	
			Tj=125°C	–	2.10	–	
Input capacitance	C_{ies}	V_{CE}=10V, V_{GE}=0V, f=1MHz		–	29	–	nF
Turn-on time	t_{on}	V_{CC}=300V		–	0.40	1.20	µs
	t_r	I_C=400A		–	0.22	0.60	
	$t_{r(i)}$	V_{GE}=±15V		–	0.16	–	
Turn-off time	t_{off}	R_G= 6.8 Ω		–	0.48	1.20	
	t_f			–	0.07	0.45	
Forward on voltage	V_F (terminal)	V_{GE}=0V	Tj=25°C	–	2.00	2.35	V
		I_F=400A	Tj=125°C	–	2.05	–	
	V_F (chip)		Tj=25°C	–	1.60	–	
			Tj=125°C	–	1.65	–	
Reverse recovery time	t_{rr}	I_F=400A		–	–	0.35	µs
Lead resistance, terminal-chip*3	R lead			–	0.97	–	mΩ

*3:Biggest internal terminal resistance among arm.

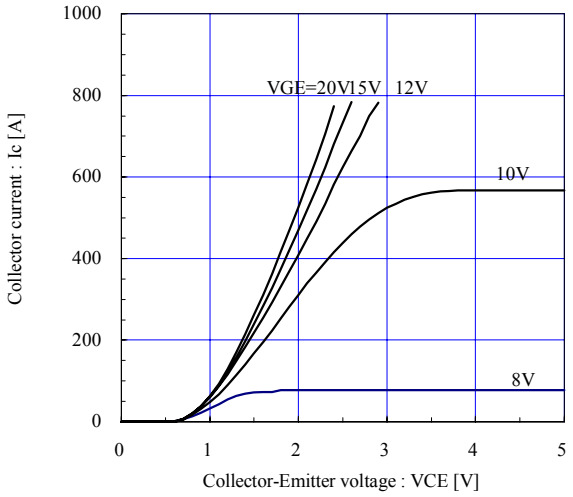
Thermal resistance characteristics

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

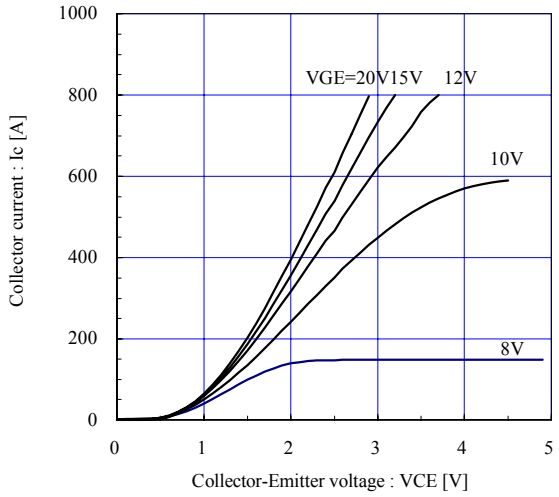
*4 This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

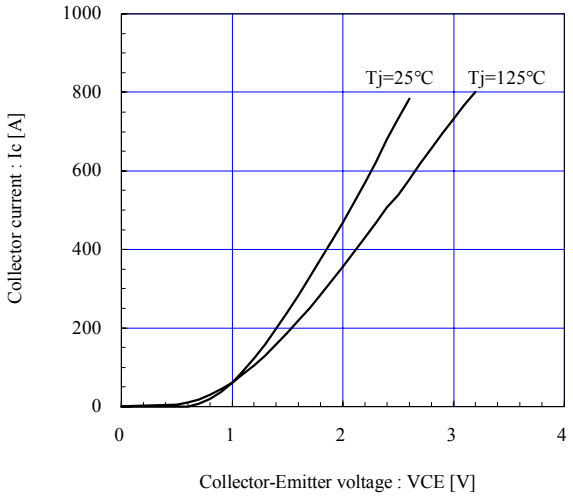
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 25°C / chip



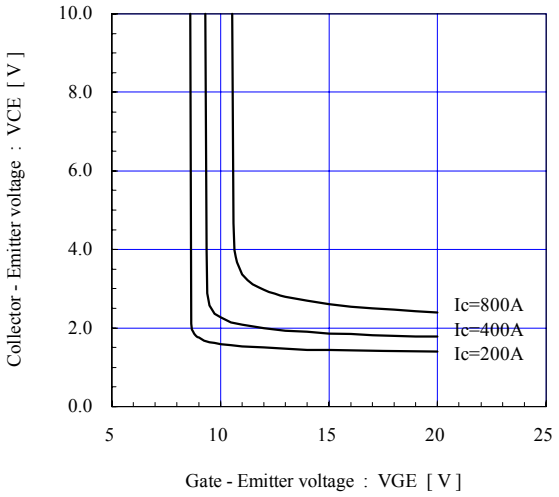
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 125°C / chip



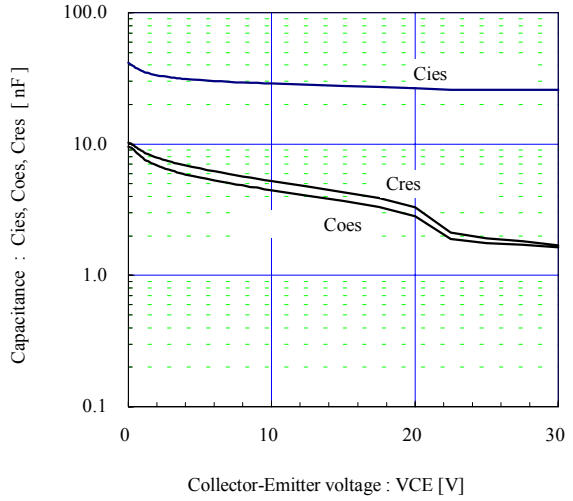
Collector current vs. Collector-Emitter voltage (typ.)
VGE=15V / chip



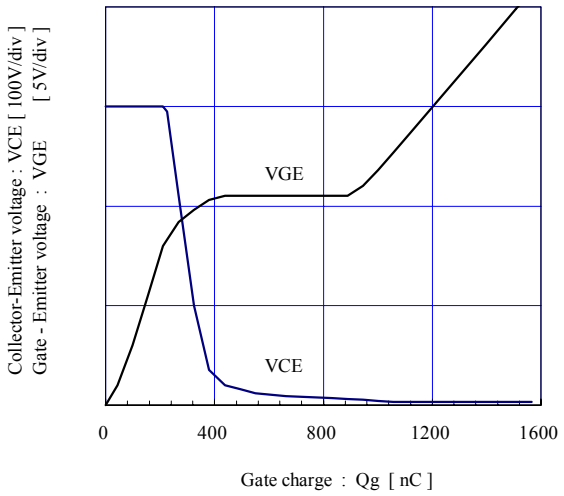
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C / chip



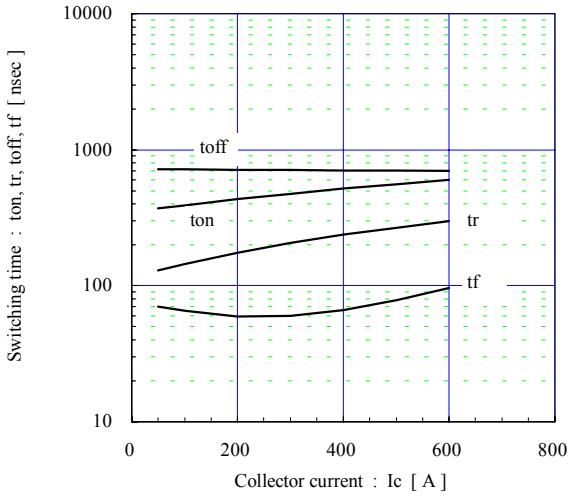
Capacitance vs. Collector-Emitter voltage (typ.)



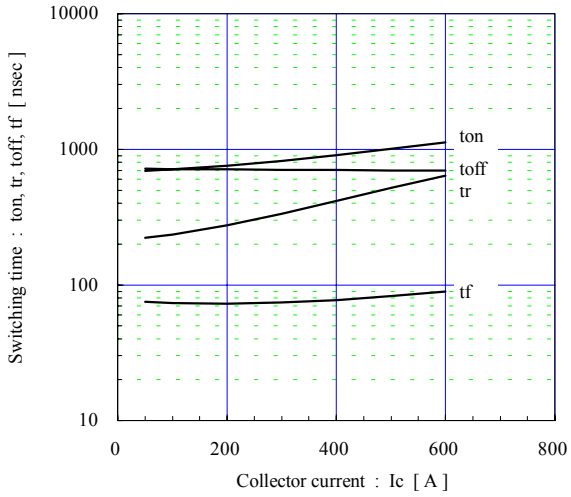
Dynamic Gate charge (typ.)
Vcc=300V, Ic=400A, Tj= 25°C



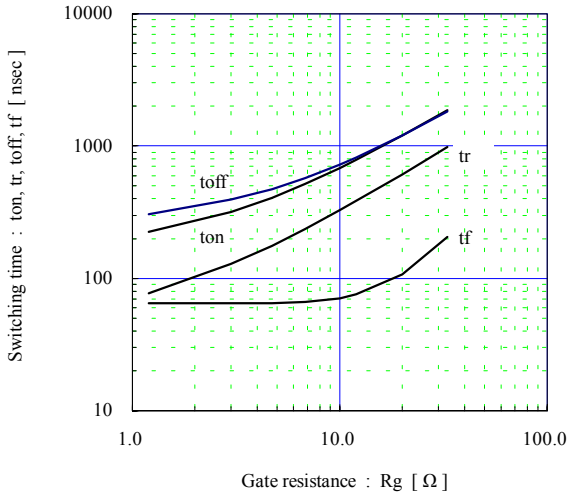
Switching time vs. Collector current (typ.)
Vcc=300V, VGE=±15V, Rg=6.8Ω, Tj= 25°C



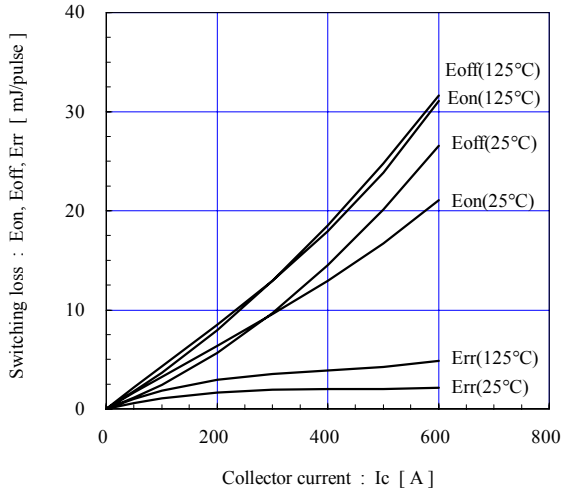
Switching time vs. Collector current (typ.)
Vcc=300V, VGE=±15V, Rg=6.8Ω, Tj=125°C



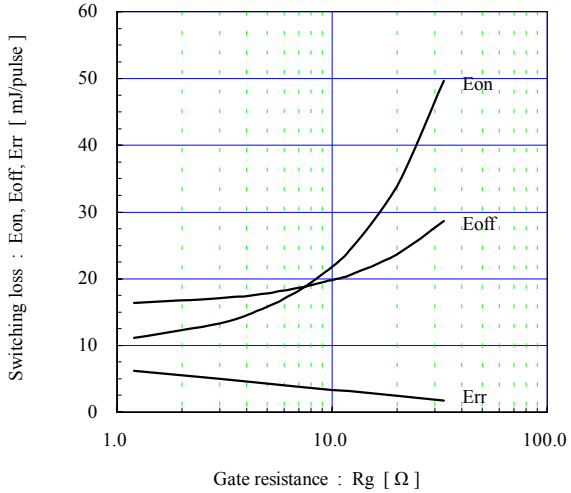
Switching time vs. Gate resistance (typ.)
Vcc=300V, Ic=400A, VGE=±15V, Tj= 25°C



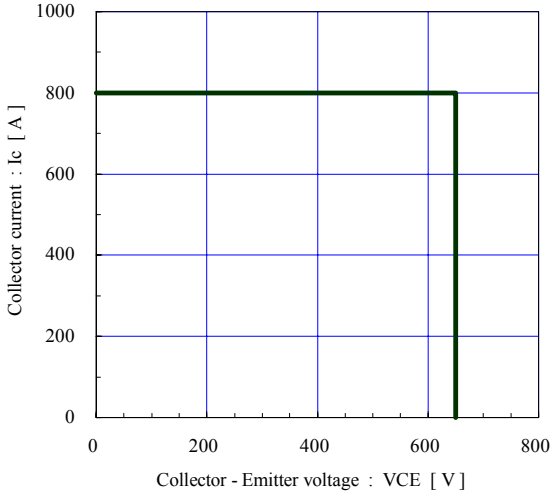
Switching loss vs. Collector current (typ.)
Vcc=300V, VGE=±15V, Rg=6.8Ω



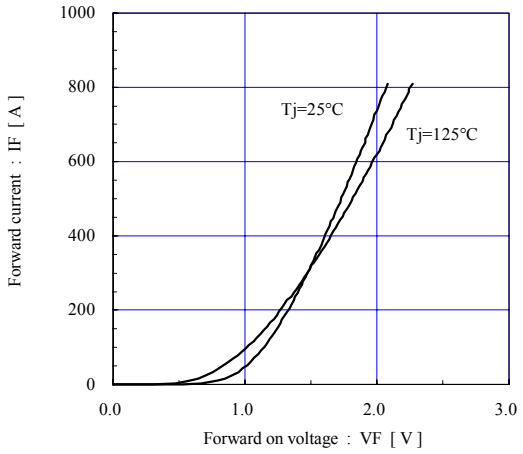
Switching loss vs. Gate resistance (typ.)
Vcc=300V, Ic=400A, VGE=±15V, Tj= 125°C



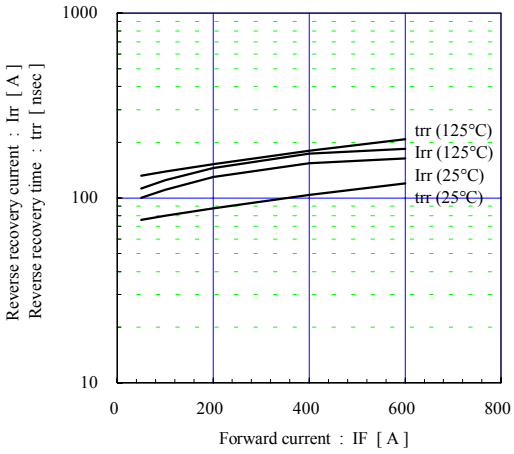
Reverse bias safe operating area (max.)
+VGE=15V,-VGE <= 15V, RG >= 6.8Ω ,Tj <= 125°C



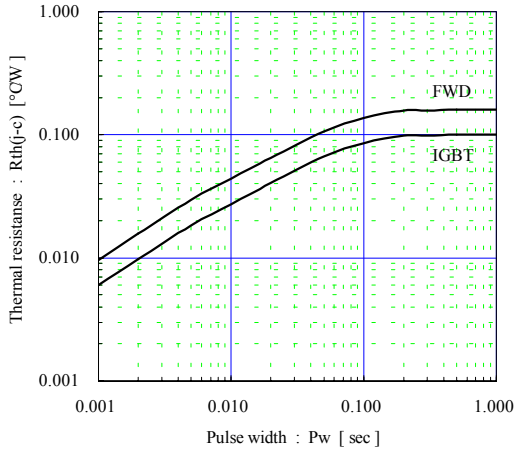
Forward current vs. Forward on voltage (typ.)
chip



Reverse recovery characteristics (typ.)
Vcc=300V, VGE=±15V, Rg=6.8Ω



Transient thermal resistance (max.)



■ Outline Drawings, mm

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