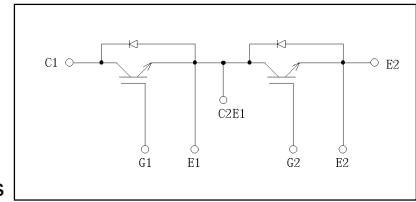


2MBI600U2E-060



IGBT Module U-Series 600V / 600A 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	600	A
	I _{cp}	1ms	1200	
	-I _c		600	
	-I _c pulse		1200	
Collector Power Dissipation	P _c	1 device	2400	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 3.5N·m(M5 or M6), Terminal 3.5 to 4.5 N·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 _{CES} =600V	–	–	3.0	mA	
Gate-Emitter leakage current	I _{GES}	V _{CES} =0V, V _{GE} =±20V	–	–	600	nA	
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CES} =20V, I _c =600mA	6.2	6.7	7.7	V	
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} =15V, I _c =600A	T _j =25°C	–	2.15	2.45	V
			T _j =125°C	–	2.40	–	
	V _{CE(sat)} (chip)		T _j =25°C	–	1.85	–	
			T _j =125°C	–	2.10	–	
Input capacitance	C _{ies}	V _{CES} =10V, V _{GE} =0V, f=1MHz	–	43	–	nF	
Turn-on time	t _{on}	V _{CC} =300V	–	0.40	1.20	µs	
	t _r	I _c =600A	–	0.22	0.60		
	t _{r(i)}	V _{GE} =±15V	–	0.16	–		
Turn-off time	t _{off}	R _G = 4.7 Ω	–	0.48	1.20	µs	
	t _f		–	0.07	0.45		
Forward on voltage	V _F (terminal)	V _{GE} =0V I _F =600A	T _j =25°C	–	1.90	2.30	V
			T _j =125°C	–	1.95	–	
	V _F (chip)		T _j =25°C	–	1.60	–	
			T _j =125°C	–	1.65	–	
Reverse recovery time	t _{rr}	I _F =600A	–	–	0.35	µs	
Lead resistance, terminal-chip*3	R _{lead}		–	0.45	–	mΩ	

*3:Biggest internal terminal resistance among arm.

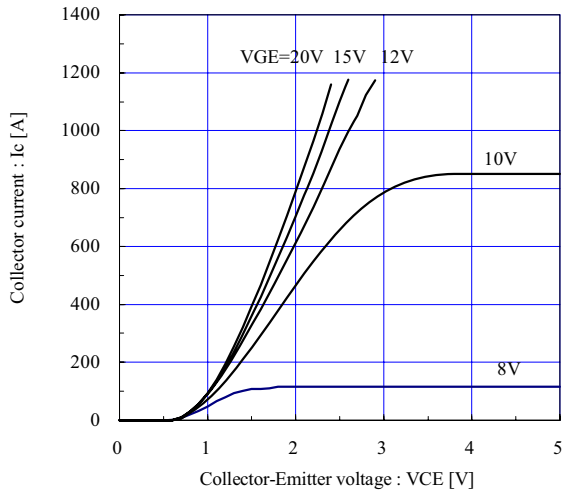
Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{th(j-c)}	IGBT	–	–	0.052	°C/W
	R _{th(j-c)}	FWD	–	–	0.086	°C/W
Contact Thermal resistance	R _{th(c-f)} *4	With thermal compound	–	0.0167	–	°C/W

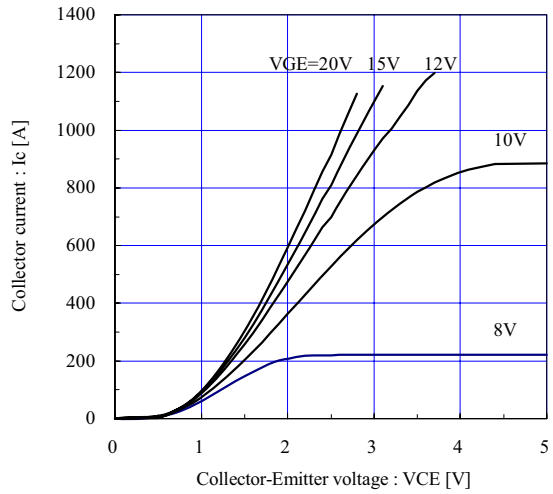
*4 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

Characteristics (Representative)

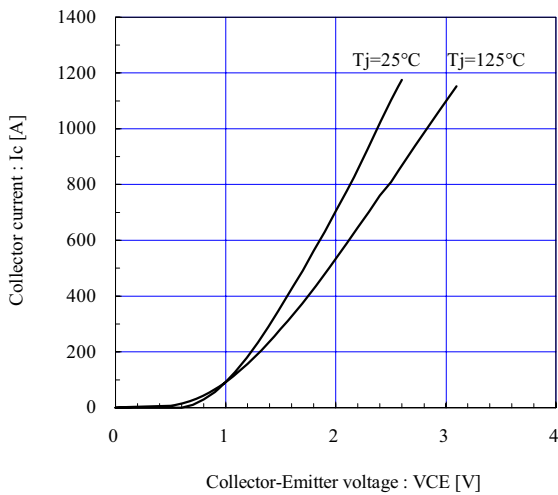
Collector current vs. Collector-Emittor voltage (typ.)
T_j= 25°C / chip



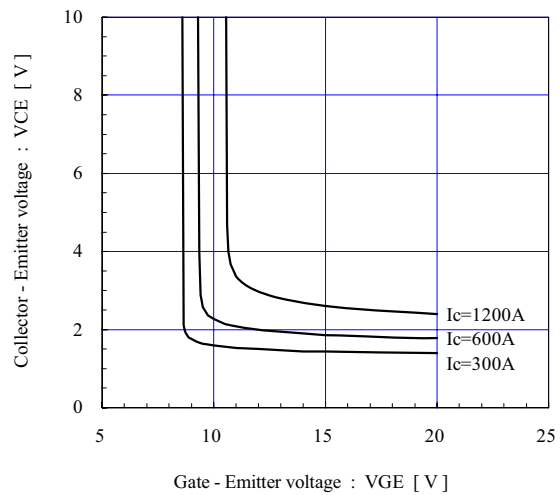
Collector current vs. Collector-Emittor voltage (typ.)
T_j= 125°C / chip



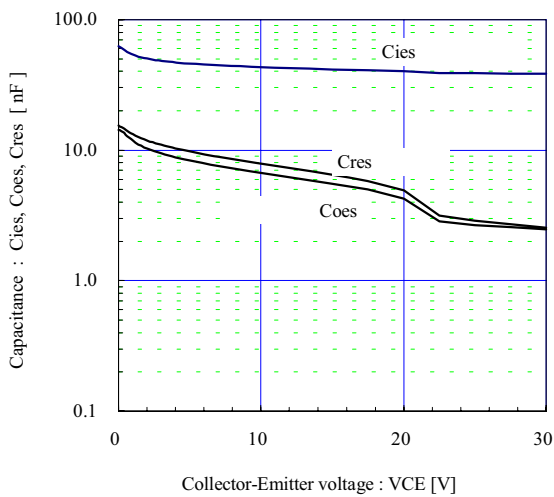
Collector current vs. Collector-Emittor voltage (typ.)
VGE=15V / chip



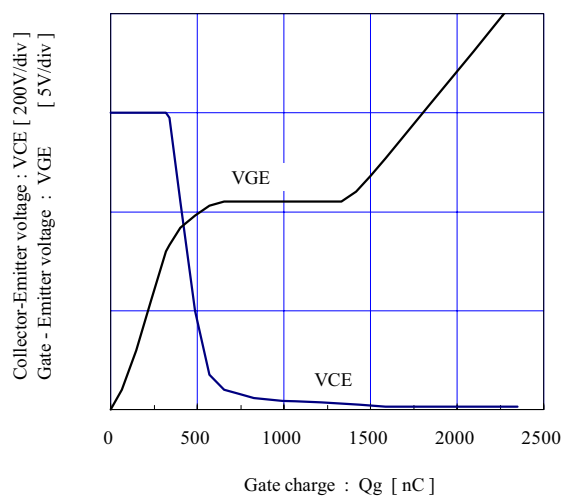
Collector-Emittor voltage vs. Gate-Emittor voltage (typ.)
T_j=25°C / chip



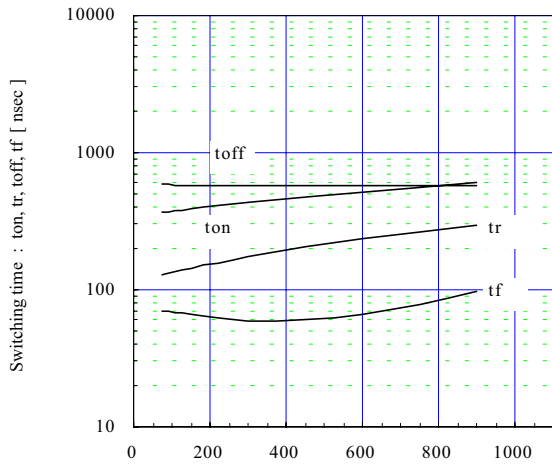
Capacitance vs. Collector-Emittor voltage (typ.)



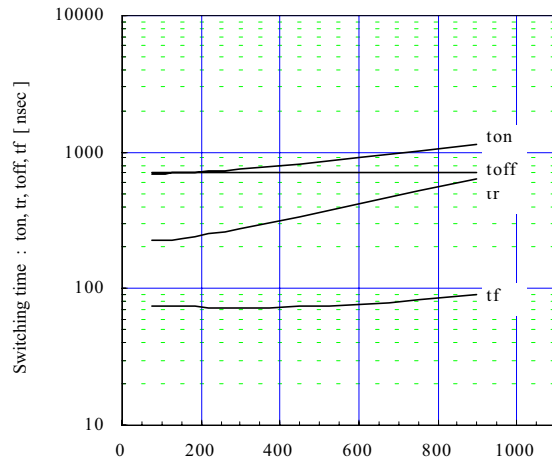
Dynamic Gate charge (typ.)
V_{cc}=300V, I_c=600A, T_j= 25°C



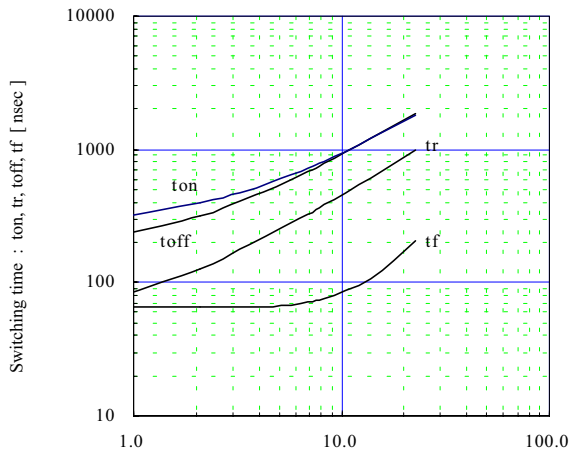
Switching time vs. Collector current (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=4.7\Omega, T_j=25^\circ C$



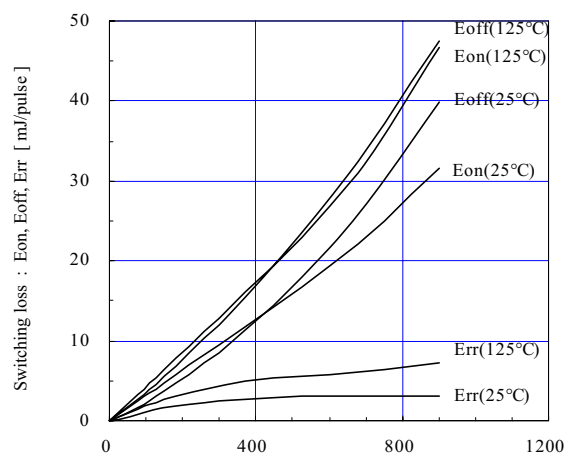
Switching time vs. Collector current (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=4.7\Omega, T_j=125^\circ C$



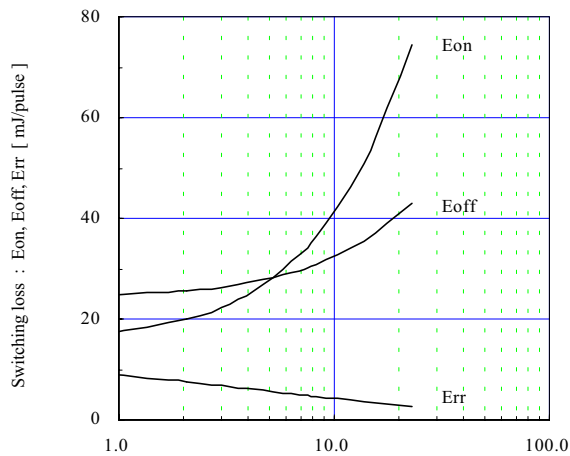
Switching time vs. Gate resistance (typ.)
 $V_{cc}=300V, I_c=600A, V_{GE}=\pm 15V, T_j=25^\circ C$



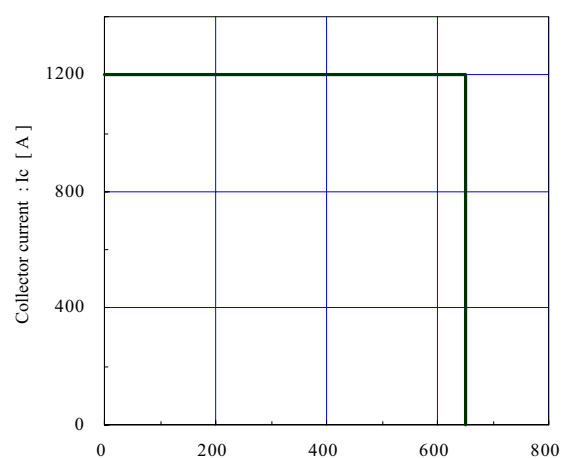
Switching loss vs. Collector current (typ.)
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=4.7\Omega$



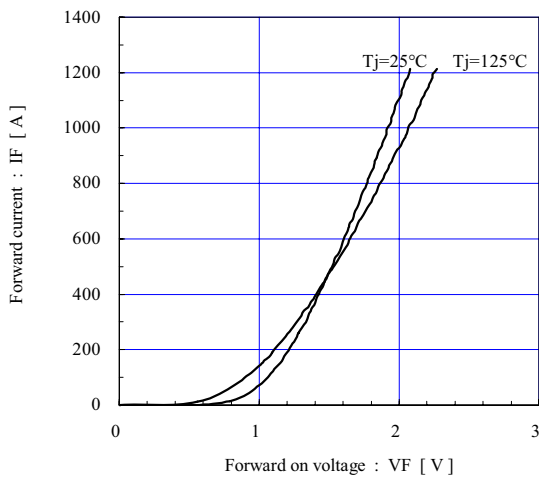
Switching loss vs. Gate resistance (typ.)
 $V_{cc}=300V, I_c=600A, V_{GE}=\pm 15V, T_j=125^\circ C$



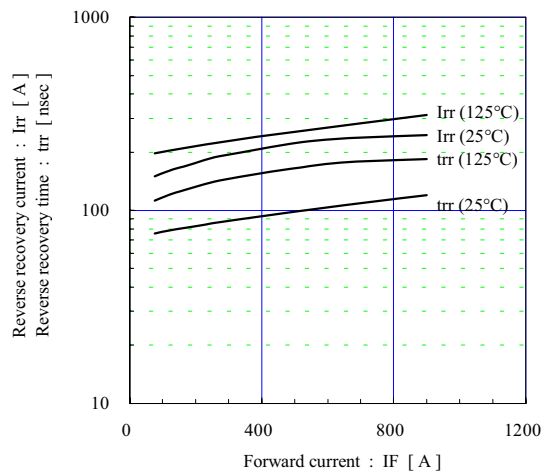
Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \le 15V, R_g \ge 4.7\Omega, T_j \le 125^\circ C$



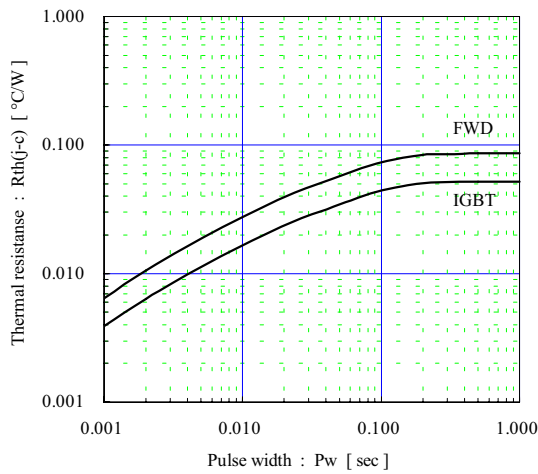
Forward current vs. Forward on voltage (typ.)
chip



Reverse recovery characteristics (typ.)
 $V_{cc}=300\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_g=4.7\Omega$



Transient thermal resistance (max.)



■ Outline Drawings, mm

M247

