

2MBI600VE-060-50

IGBT Modules

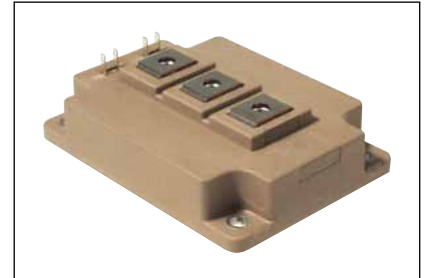
IGBT MODULE (V series) 600V / 600A / 2 in one package

■ 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



■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at T_c=25°C unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units	
Inverter	Collector-Emitter voltage	V _{CEs}	600	V	
	Gate-Emitter voltage	V _{GES}	±20	V	
	Collector current	I _c	Continuous	T _c =80°C T _c =25°C	600 780
		I _{c pulse}	1ms		1200
		-I _c			600
		-I _{c pulse}	1ms		1200
	Collector power dissipation	P _c	1 device		2940
W					
Junction temperature	T _j			175	
Operating junction temperature (under switching conditions)	T _{jop}			150	
Case temperature	T _c			125	
Storage temperature	T _{stg}			-40 ~ +125	
Isolation voltage	V _{iso}	AC : 1min.		2500	
Screw torque	between terminal and copper base (*1)			6.0	
	Mounting (*2)			5.0	
	Terminals (*3)			N m	

Note *1: All terminals should be connected together during the test.

Note *2: Recommendable Value : 3.0-6.0 Nm (M5 or M6)

Note *3: Recommendable Value : 2.5-5.0 Nm (M6)

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

Items	Symbols	Conditions	Characteristics			Units		
			min.	typ.	max.			
Inverter	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	-	-	800	nA	
	Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20V, I _c = 600mA	6.2	6.7	7.2	V	
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V I _c = 600A	T _j =25°C	-	1.85	2.40	V
				T _j =125°C	-	2.15	-	
		T _j =150°C		-	2.35	-		
		V _{CE(sat)} (chip)		T _j =25°C	-	1.60	1.85	
				T _j =125°C	-	1.90	-	
	Internal gate resistance	R _{g(int)}	-	-	1.5	-	Ω	
	Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	38.8	-	nF	
	Turn-on time	t _{on}	V _{CC} = 300V, I _c = 600A V _{GE} = ±15V, R _g = 2.2Ω T _j = 150°C, L _s =30nH	-	0.75	-	μsec	
		t _r		-	0.40	-		
	Turn-off time	t _(l)		-	0.15	-		
		t _{off}		-	0.75	-		
	Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 600A	T _j =25°C	-	1.75	2.35	V
T _j =125°C				-	1.65	-		
T _j =150°C				-	1.62	-		
V _F (chip)		T _j =25°C		-	1.60	1.85		
		T _j =125°C		-	1.50	-		
		T _j =150°C		-	1.47	-		
Reverse recovery time	t _{rr}	I _F = 600A	-	0.25	-	μsec		

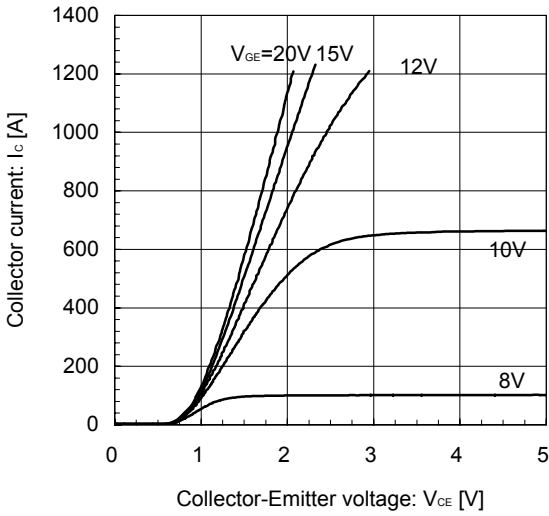
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT	-	-	0.051	°C/W
		FWD	-	-	0.088	
Contact thermal resistance (1device) (*4)	R _{th(c-f)}	with Thermal Compound	-	0.0125	-	

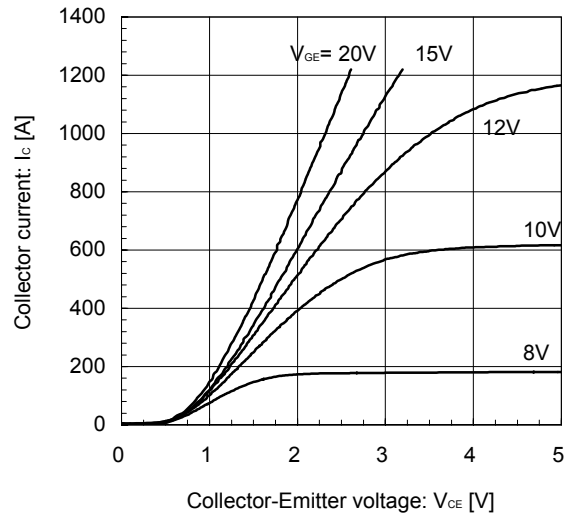
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

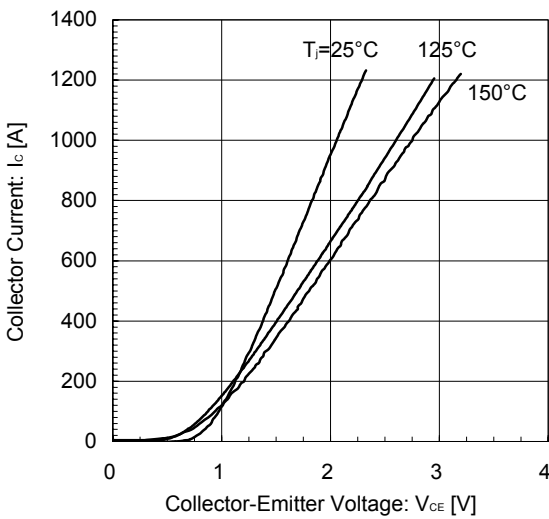
Collector current vs. Collector-Emitter voltage (typ.)
 $T_J = 25^\circ\text{C}$ / chip



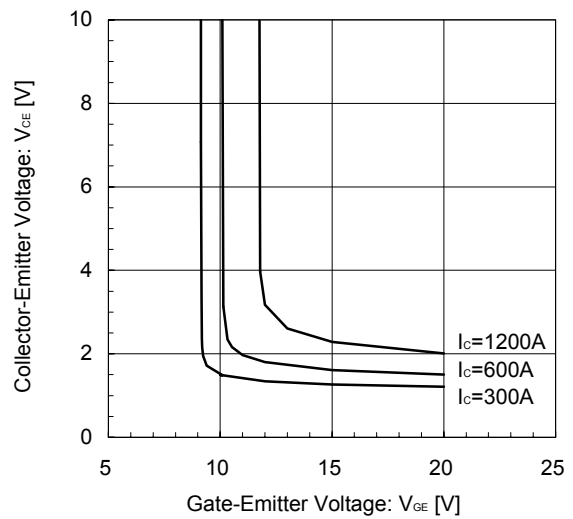
Collector current vs. Collector-Emitter voltage (typ.)
 $T_J = 150^\circ\text{C}$ / chip



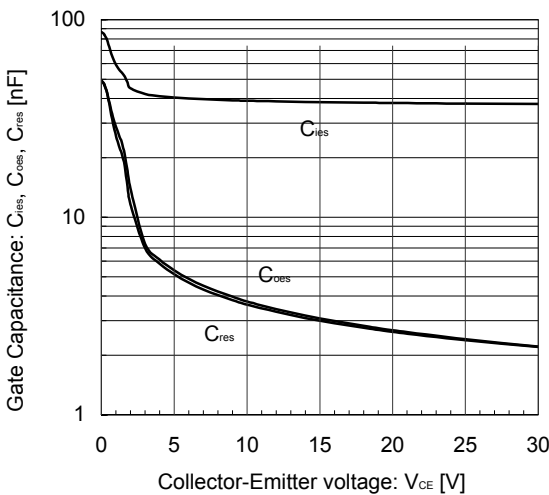
Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



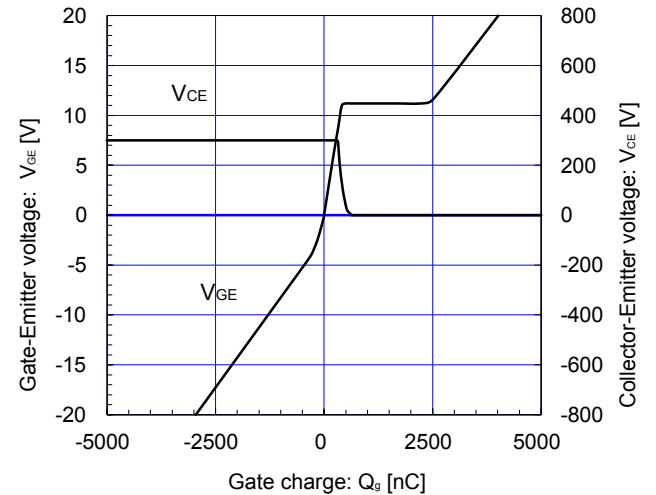
Collector-Emitter voltage vs. Gate-Emitter voltage
 $T_J = 25^\circ\text{C}$ / chip



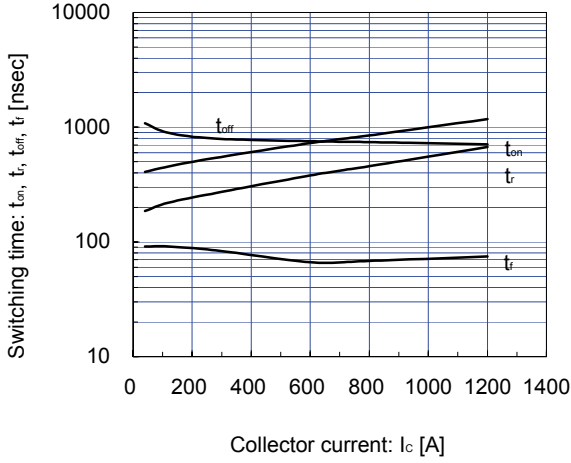
Gate Capacitance vs. Collector-Emitter Voltage
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$



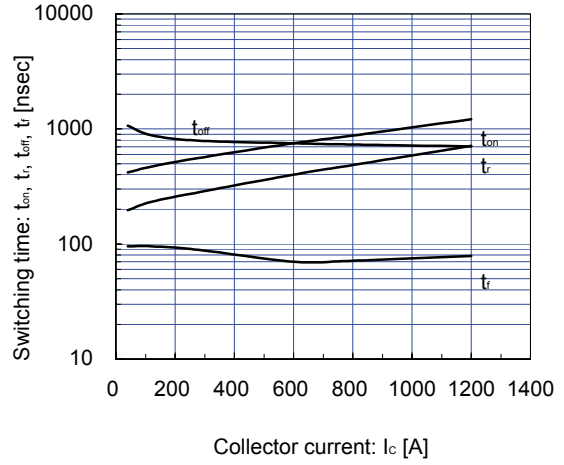
Dynamic Gate Charge (typ.)
 $V_{CC} = 300\text{V}$, $I_c = 600\text{A}$, $T_J = 25^\circ\text{C}$



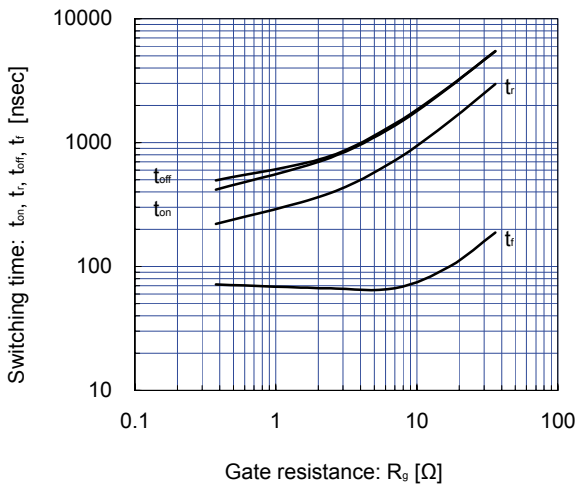
Switching time vs. Collector current (typ.)
 $V_{CC}=300V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_j=125^\circ C$



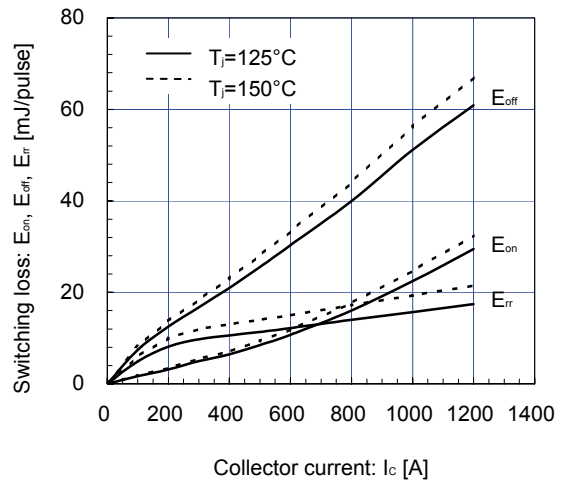
Switching time vs. Collector current (typ.)
 $V_{CC}=300V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_j=150^\circ C$



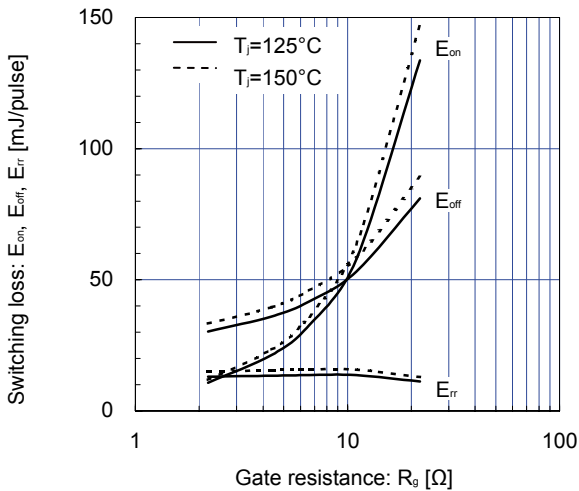
Switching time vs. Gate resistance (typ.)
 $V_{CC}=300V, I_c=600A, V_{GE}=\pm 15V, T_j=125^\circ C$



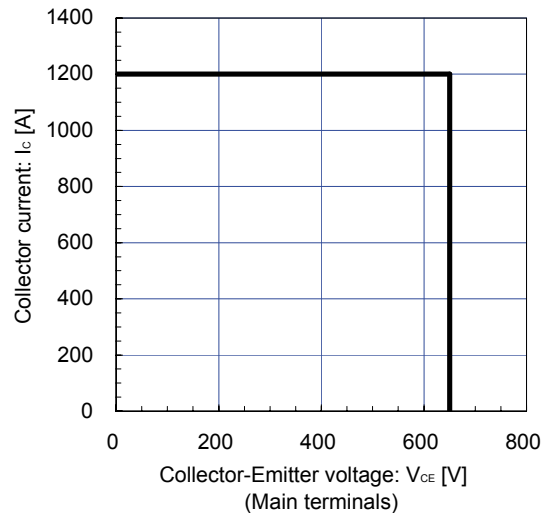
Switching loss vs. Collector current (typ.)
 $V_{CC}=300, V_{GE}=\pm 15V, R_g=2.2\Omega, T_j=125^\circ C$



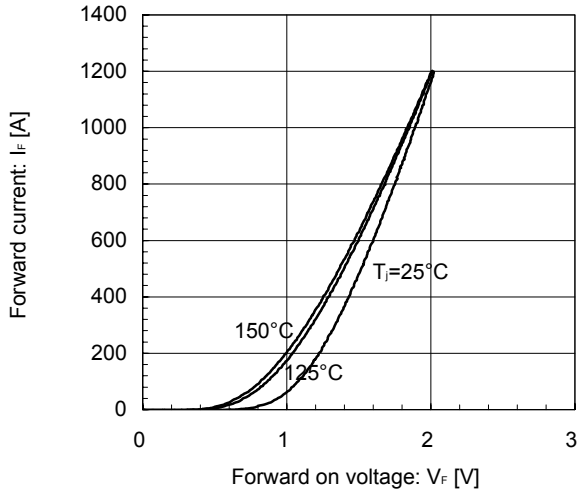
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=300V, I_c=600A, V_{GE}=\pm 15V, T_j=125^\circ C$



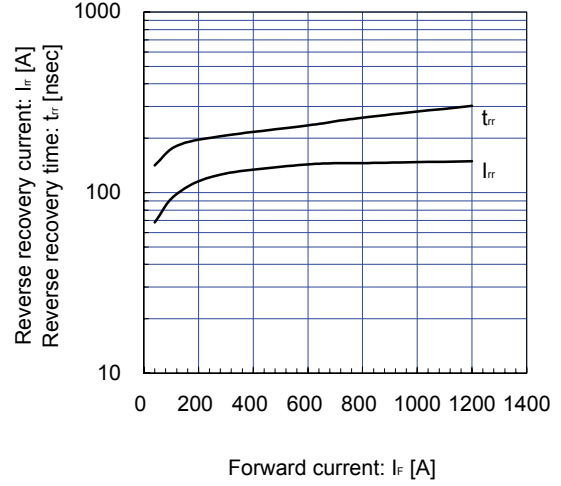
Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE}=15V, R_g=2.2\Omega, T_j=150^\circ C$



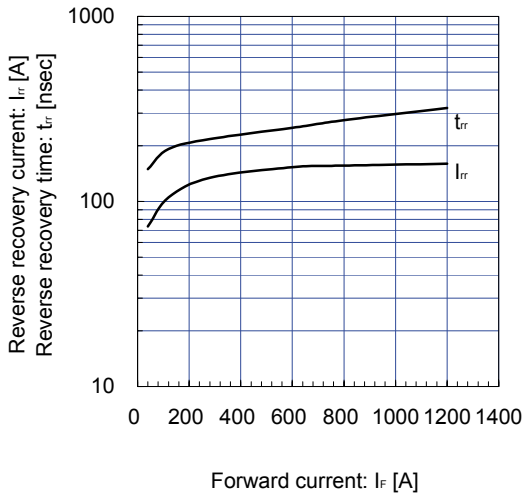
Forward Current vs. Forward Voltage (typ.)
chip



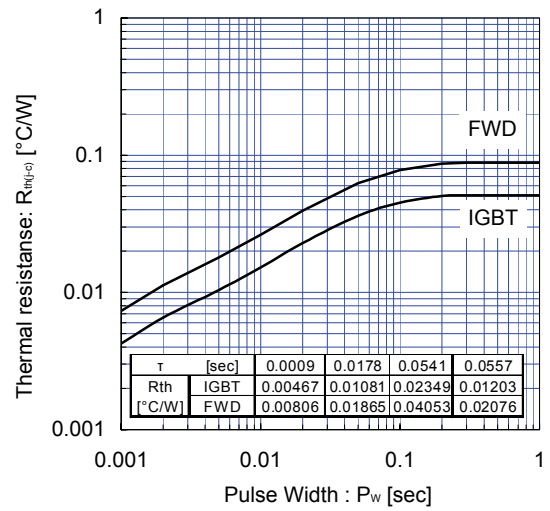
Reverse Recovery Characteristics (typ.)
 $V_{CC}=300V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_J=125^\circ C$



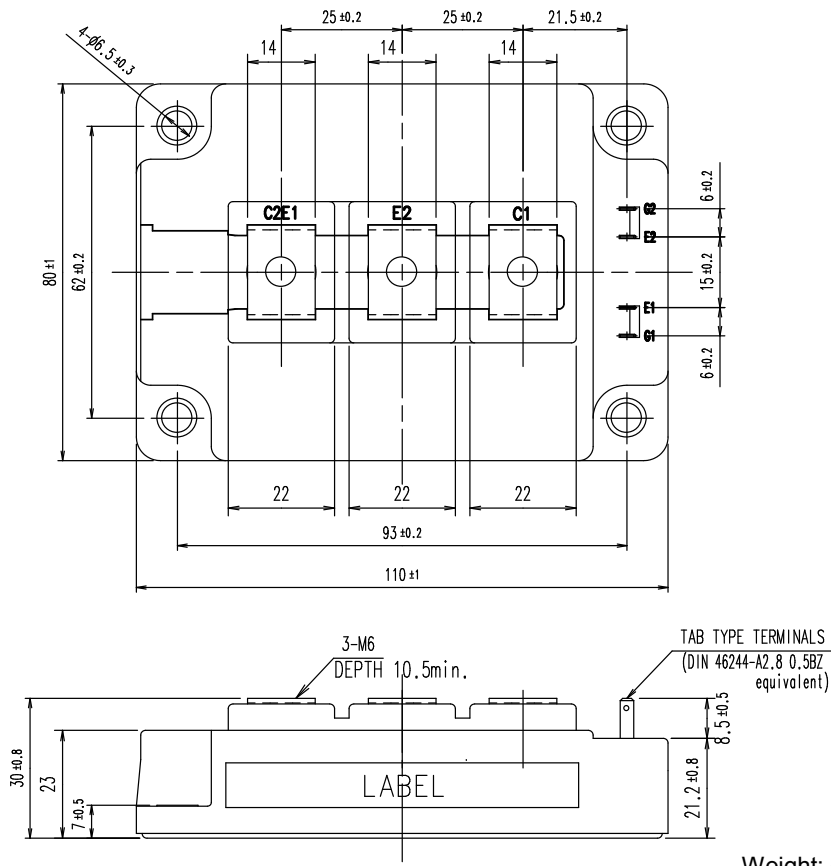
Reverse Recovery Characteristics (typ.)
 $V_{CC}=300V, V_{GE}=\pm 15V, R_g=2.2\Omega, T_J=150^\circ C$



Transient Thermal Resistance (max.)



■ Outline Drawings (Unit: mm)



Weight: 470g (typ.)

■ Equivalent Circuit

