

2MBI600VE-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 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 Tc=25°C unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units
Collector-Emitter voltage	V _{CES}		1200	V
Gate-Emitter voltage	V _{GES}		±20	V
Inverter	Collector current	Continuous	Tc=100°C	600
			Tc=25°C	700
		Ic pulse	1ms	1200
		-Ic		600
		-Ic pulse	1ms	1200
Collector power dissipation	Pc	1 device	4800	W
Junction temperature	Tj		175	°C
Operating junction temperature (under switching conditions)	Tjop		150	
Case temperature	Tc		125	
Storage temperature	Tstg		-40 ~ +125	
Isolation voltage	between terminal and copper base (*1) Mounting (*2)	AC : 1min.	2500	VAC
Screw torque	Terminals (*3)		6.0	N m
			5.0	

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)

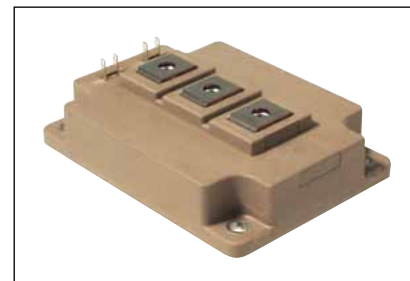
● Electrical characteristics (at Tj= 25°C unless otherwise specified)

Items			Symbols	Conditions	Characteristics			Units		
					min.	typ.	max.			
Inverter	Zero gate voltage collector current		I _{CES}	V _{GE} = 0V, V _{CE} = 1200V		-	-	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		6.0	6.5	7.0	V	
	Collector-Emitter saturation voltage		V _{CE(sat)} (terminal)	V _{GE} = 15V I _C = 600A	T _J =25°C	-	2.05	2.55	V	
					T _J =125°C	-	2.40	-		
			T _J =150°C		-	2.45	-			
			T _J =25°C		-	1.75	2.15			
			T _J =125°C		-	2.05	-			
			V _{CE(sat)} (chip)		T _J =150°C	-	2.10	-		
	Internal gate resistance		R _{g(int)}	-		-	-	1.3	-	Ω
	Input capacitance		C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz		-	-	48.5	-	nF
	Turn-on time		t _{on}	V _{CC} = 600V L _S = 30nH		-	-	0.60	-	μsec
			t _r	I _C = 600A		-	-	0.20	-	
			t _{r(i)}	V _{GE} = ±15V		-	-	0.05	-	
	Turn-off time		t _{off}	R _G = 0.62Ω		-	-	0.80	-	μsec
			t _f	T _J = 150°C		-	-	0.08	-	
Forward on voltage		V _F (terminal)	V _{GE} = 0V I _F = 600A	T _J =25°C	-	1.85	2.45	V		
				T _J =125°C	-	2.00	-			
				T _J =150°C	-	1.95	-			
		V _F (chip)		T _J =25°C	-	1.70	2.15			
				T _J =125°C	-	1.85	-			
Reverse recovery time		t _{rr}	I _F = 600A		-	-	0.15	-	μsec	

● Thermal resistance characteristics

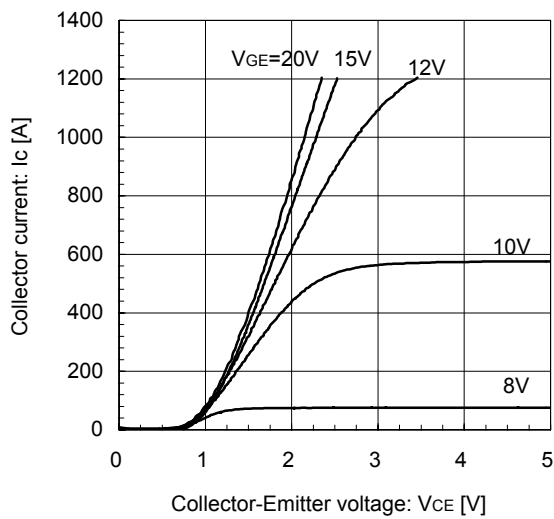
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	Rth(j-c)	IGBT	-	-	0.031	°C/W
		FWD	-	-	0.054	
Contact thermal resistance (1device) (*4)	Rth(c-f)	with Thermal Compound	-	0.0125	-	

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

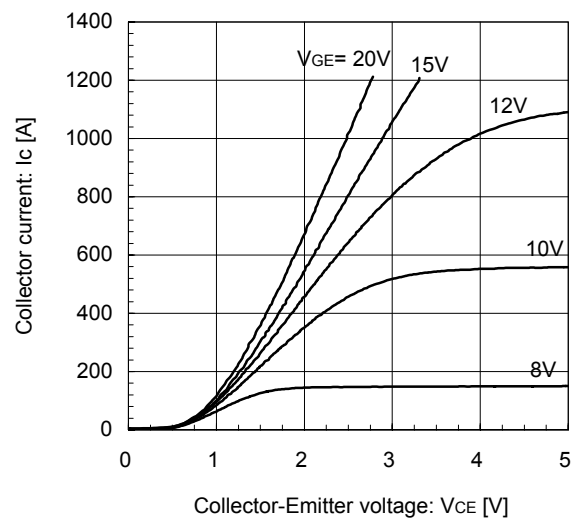


■ Characteristics (Representative)

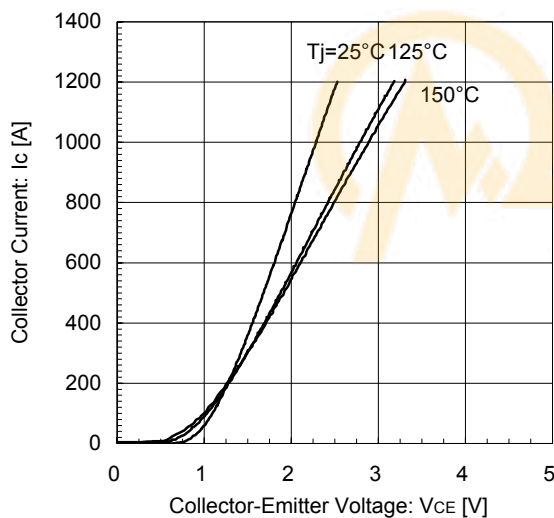
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 25°C / chip



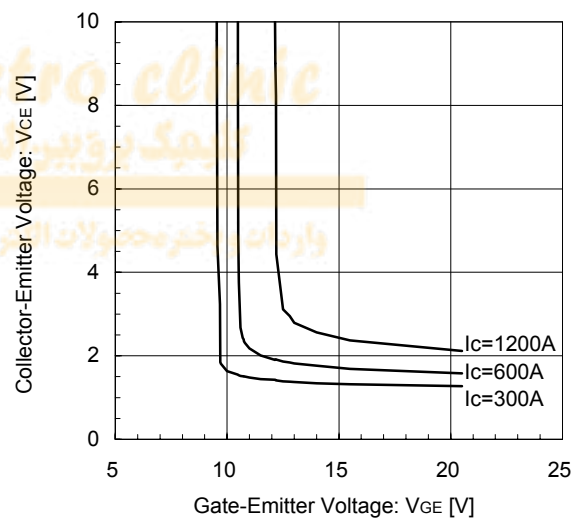
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 150°C / chip



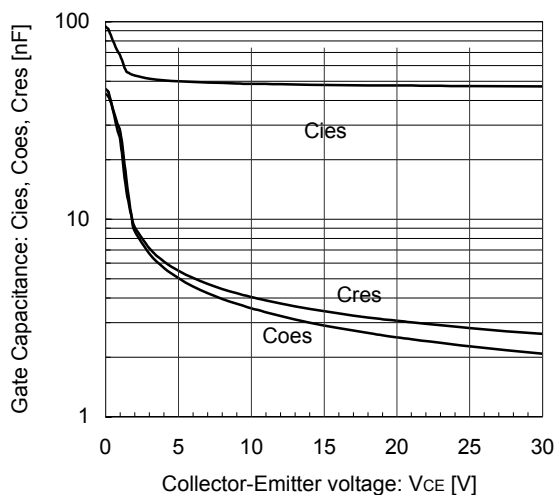
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE} = 15V / chip



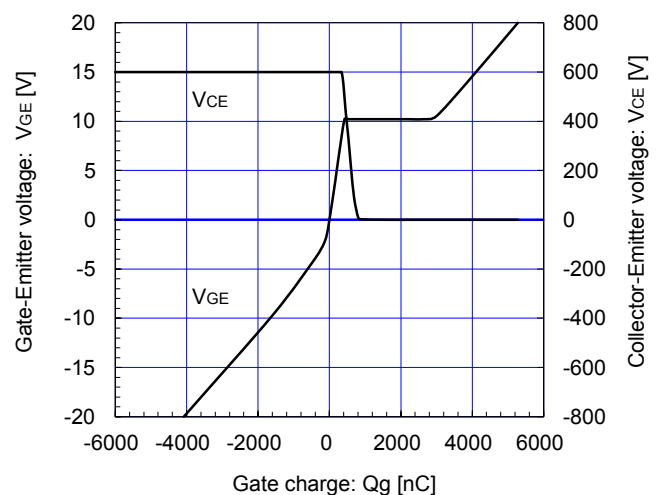
Collector-Emitter voltage vs. Gate-Emitter voltage
T_j = 25°C / chip



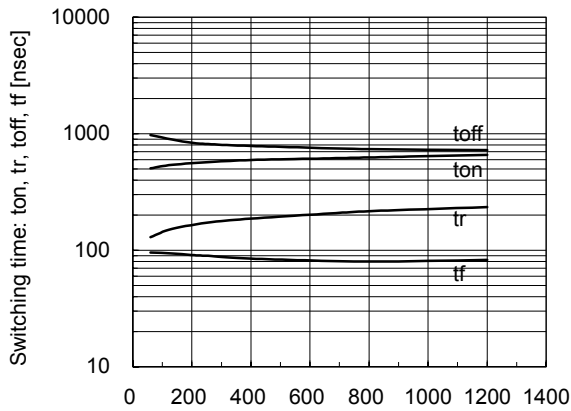
Gate Capacitance vs. Collector-Emitter Voltage
V_{GE} = 0V, f = 1MHz, T_j = 25°C



Dynamic Gate Charge (typ.)
V_{CC} = 600V, I_C = 600A, T_j = 25°C

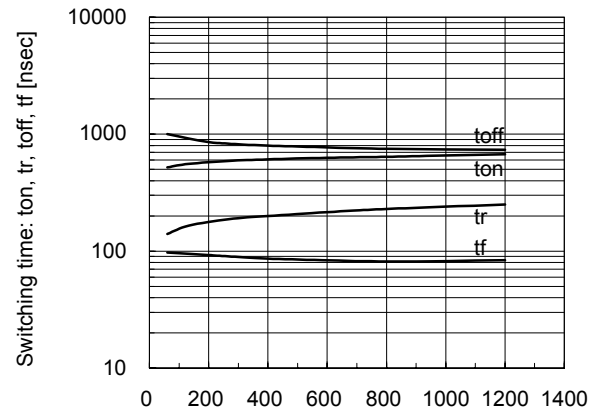


Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=0.62\Omega$, $T_J=125^\circ C$



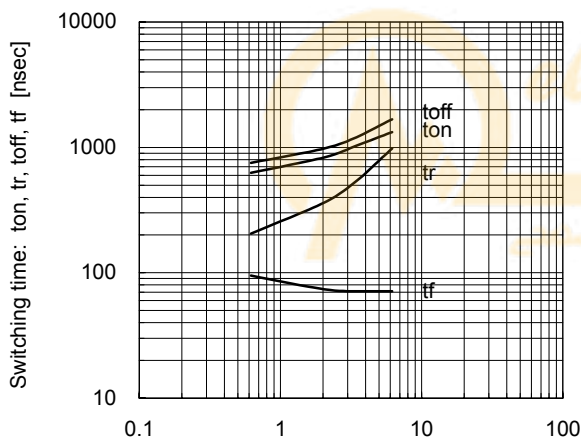
Collector current: I_C [A]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=0.62\Omega$, $T_J=150^\circ C$



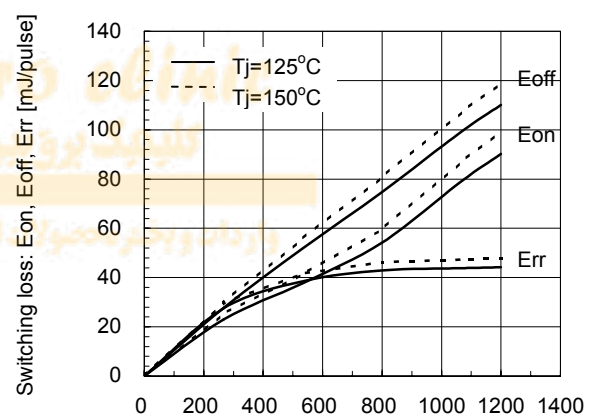
Collector current: I_C [A]

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



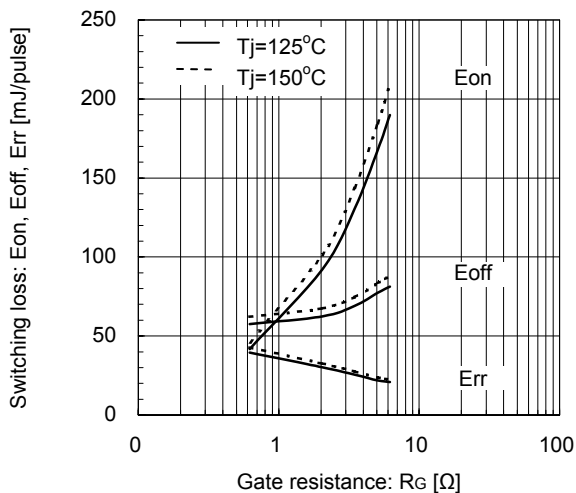
Gate resistance: R_G [Ω]

Switching loss vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=0.62\Omega$, $T_J=125^\circ C$, $150^\circ C$



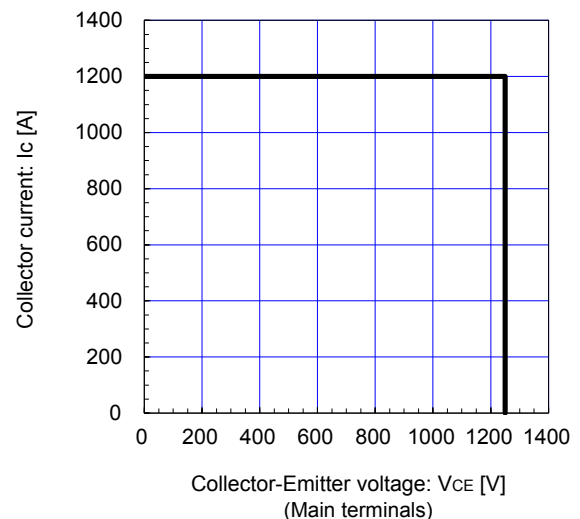
Collector current: I_C [A]

Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=600A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$, $150^\circ C$

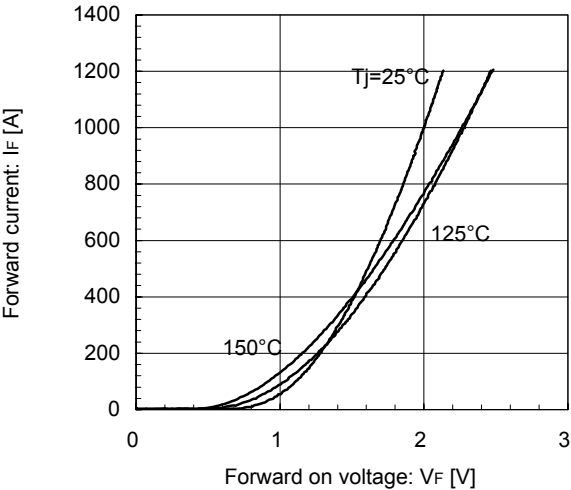


Gate resistance: R_G [Ω]

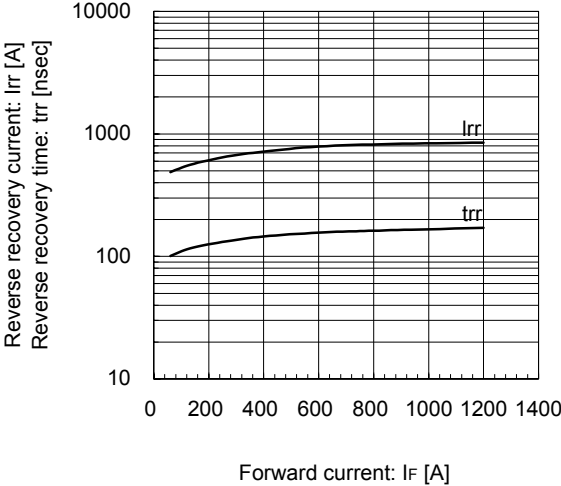
Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_G=0.62\Omega$, $T_J=150^\circ C$



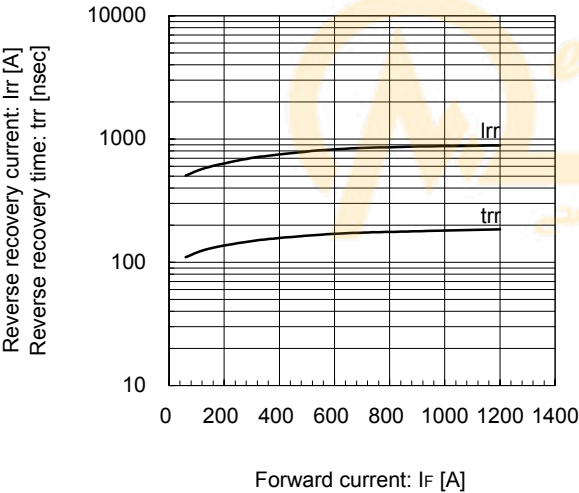
Forward Current vs. Forward Voltage (typ.)
chip



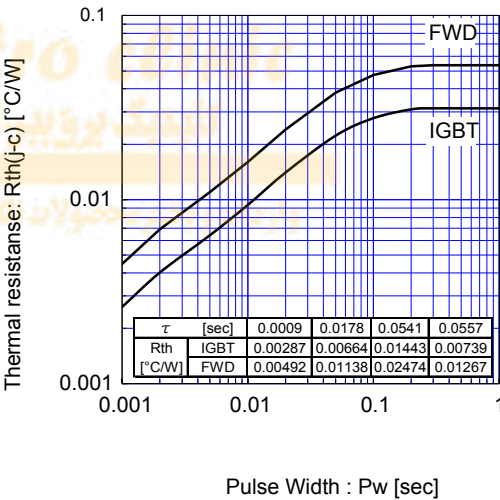
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=0.62\Omega$, $T_J=125^{\circ}\text{C}$



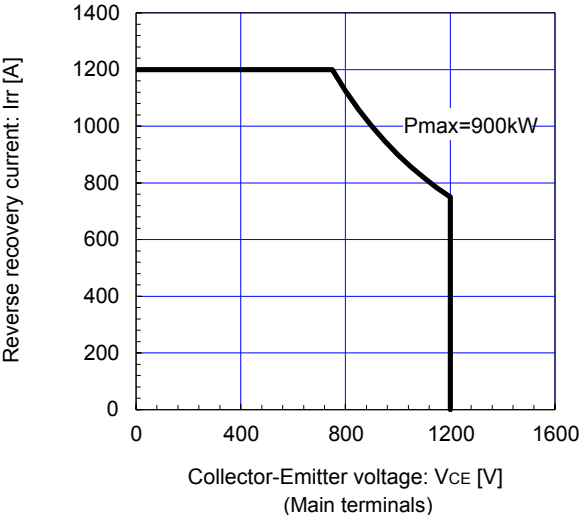
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=0.62\Omega$, $T_J=150^{\circ}\text{C}$



Transient Thermal Resistance (max.)



FWD safe operating area (max.)
 $T_J=150^{\circ}\text{C}$



WARNING

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			• Industrial robots etc.
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