1MBI1200VC-120P

IGBT Modules

IGBT MODULE (V series)
1200V / 1200A / 1 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
Collector current	I_c	Continuous	T_c=25°C	1600	A
			T_c=100°C	1200	
	I_{cp}	1ms		2400	
	$-I_c$			1200	
	$-I_{c\ pulse}$	1ms		2400	
Collector power dissipation	P_c	1 device		7890	W
Junction temperature	T_j			175	°C
Operating junction temperature (under switching conditions)	T_{jop}			150	
Storage temperature	T_{stg}			-40 ~ +150	
Isolation voltage — Between terminal and copper base *1	V_{iso}	AC : 1min.		4000	VAC
Screw torque *2	Mounting	M6		5.75	Nm
	Main Terminals	M8		10	
	Sense Terminals	M4		2.5	

(*1) All terminals should be connected together when isolation test will be done.
(*2) Recommendable Value :Mounting 4.25~5.75 Nm (M6) , Main Terminals 8~10 Nm (M8) , Sense Terminals 1.7~2.5 Nm (M4)

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

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
Zero gate voltage collector current	I_{CES}	V_{GE} = 0V, V_{CE} = 1200V		-	-	1.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE}=±20V		-	-	2400	nA
Gate-Emitter threshold voltage	$V_{GE\ (th)}$	V_{CE} = 20V, I_c = 1200mA		6.0	6.5	7.0	V
Collector-Emitter saturation voltage	$V_{CE\ (sat)}$ (main terminal)	V_{GE}=15V I_c = 1200A	T_j=25°C	-	1.88	2.15	V
			T_j=125°C	-	2.18	-	
			T_j=150°C	-	2.28	-	
	$V_{CE\ (sat)}$ (chip)		T_j=25°C	-	1.70	1.95	
			T_j=125°C	-	2.00	-	
			T_j=150°C	-	2.10	-	
Internal gate resistance	Int $_{Rg}$			-	1.45	-	Ω
Input capacitance	C_{ies}	V_{CE}=10V,V_{GE}=0V,f=1MHz		-	106	-	nF
Turn-on	t_{on}	V_{CC} = 600V, I_c =1200A Lm = 56nH, V_{GE}=±15V ,T_j=125°C R_{gon} = 1.2 Ω R_{goff} = 0.56 Ω		-	1.73	-	μs
	t_r			-	0.57	-	
Turn-off	t_{off}			-	1.52	-	
	t_f			-	0.15	-	
Forward on voltage	V_F (main terminal)	V_{GE}= 0V I_F = 1200A	T_j=25°C	-	1.88	2.15	V
			T_j=125°C	-	2.03	-	
	V_F (chip)		T_j=150°C	-	1.98	-	
			T_j=25°C	-	1.70	1.95	
			T_j=125°C	-	1.85	-	
			T_j=150°C	-	1.80	-	
Reverse recovery time	t_{rr}	I_F = 1200A,T_j=125°C		-	0.31	-	μs
Lead resistance, terminal-chip	R $_{lead}$			-	0.146	-	mΩ

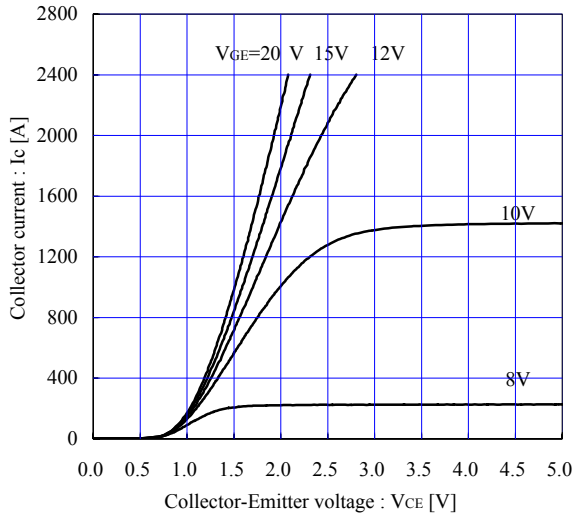
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance	$R_{th(j-c)}$	IGBT	-	-	0.0190	°C/W
		FWD	-	-	0.0305	
Contact Thermal resistance	$R_{th(c-f)}$	with Thermal Compound(*)	-	0.0060	-	

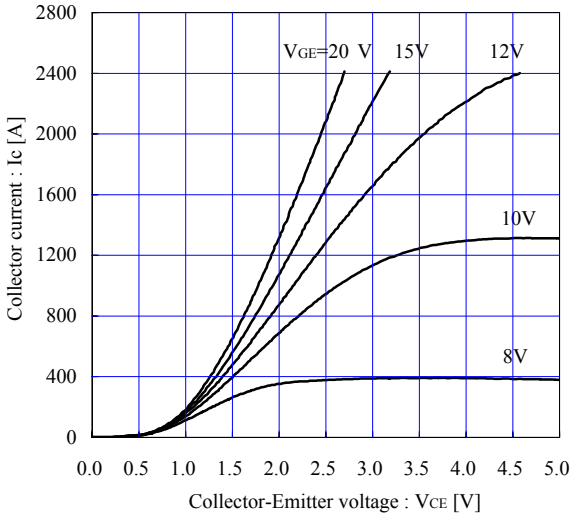
* This is the value which is defined mounting on the additional cooling fin with thermal compound.

Characteristics (Representative)

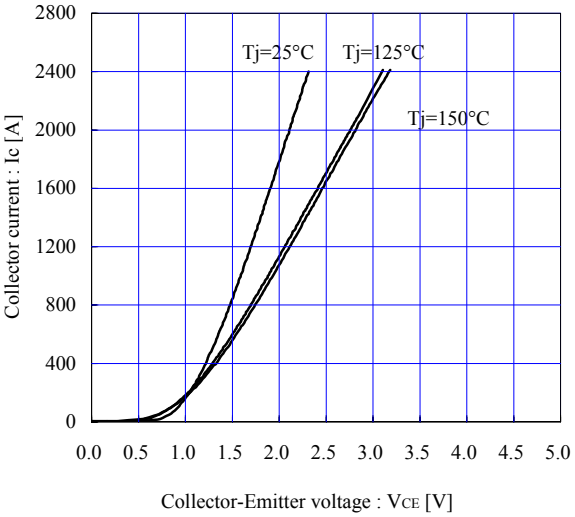
Collector current vs. Collector-Emitter voltage (typ.)
Tj=25℃,chip



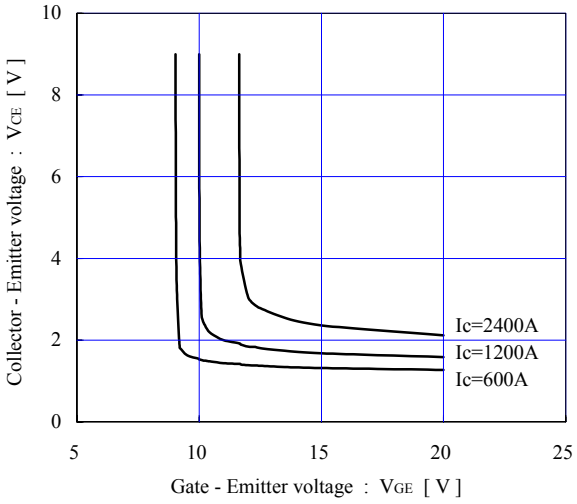
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 150°C, chip



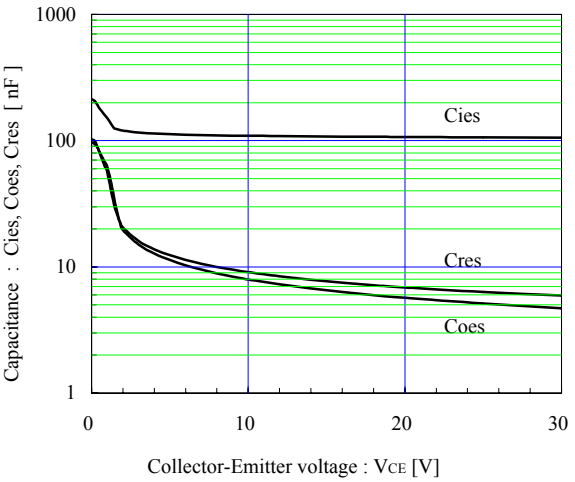
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
VGE=+15V,chip



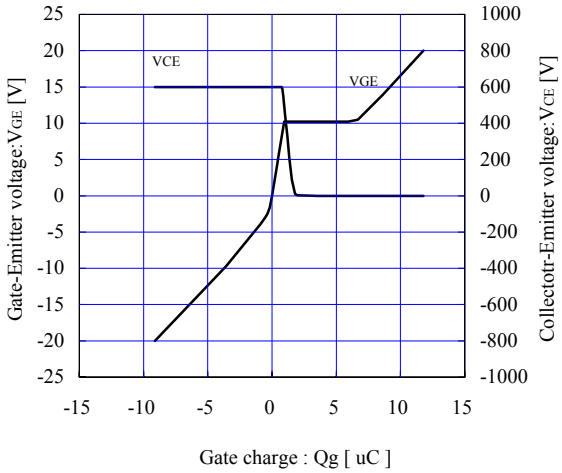
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25℃,chip



Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C

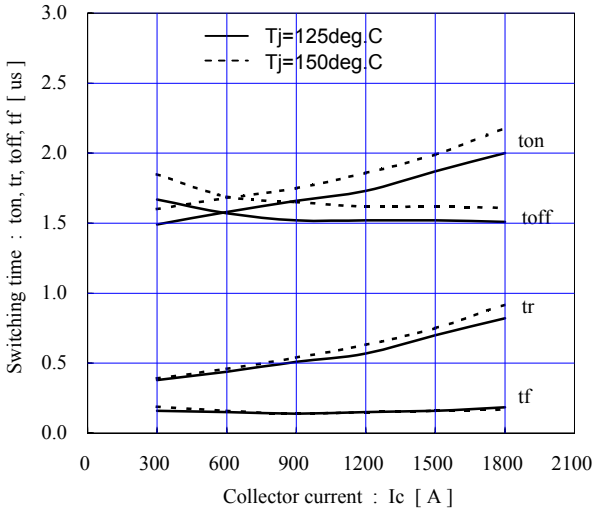


Dynamic Gate charge (typ.)
Tj= 25°C



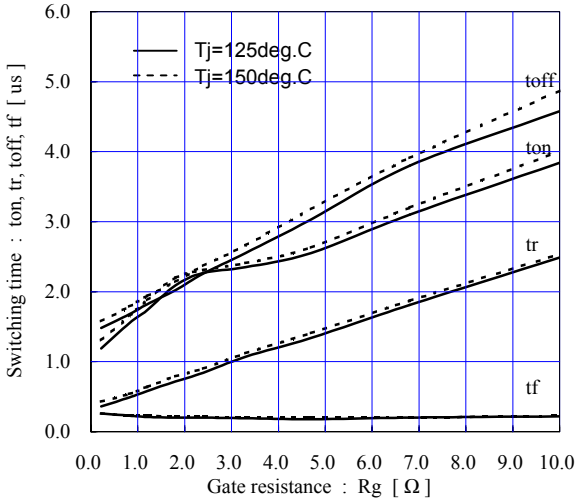
Switching time vs. Collector current (typ.)

Vcc=600V, V_{GE}=±15V, R_{gon}=1.2Ω, R_{goff}=0.56Ω



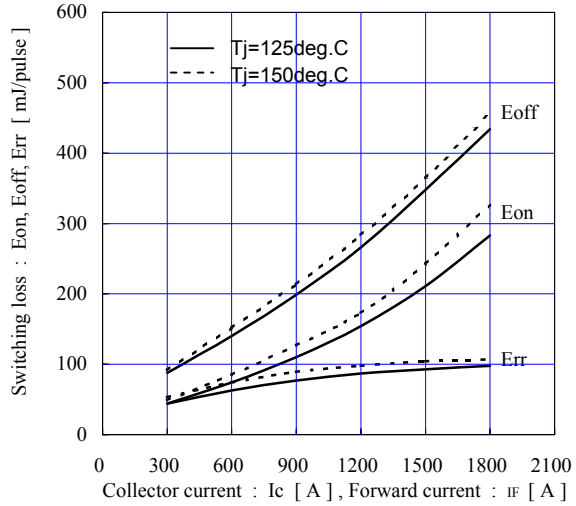
Switching time vs. Gate resistance (typ.)

Vcc=600V, Ic=1200A,V_{GE}=±15V



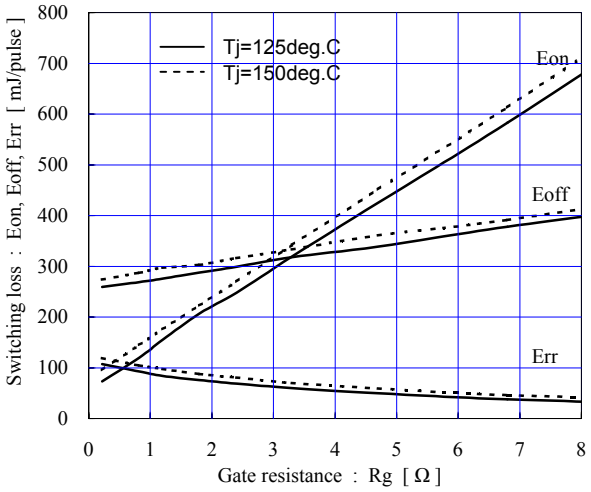
Switching loss vs. Collector current (typ.)

Vcc=600V, V_{GE}=±15V, R_{gon}=1.2 Ω, R_{goff}=0.56Ω



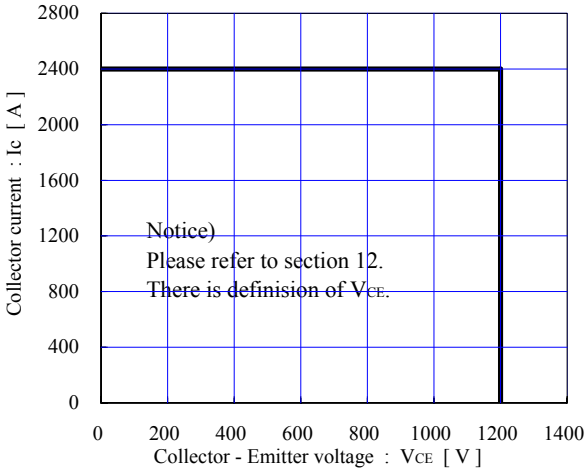
Switching loss vs. Gate resistance (typ.)

Vcc=600V, Ic=1200A,V_{GE}=±15V

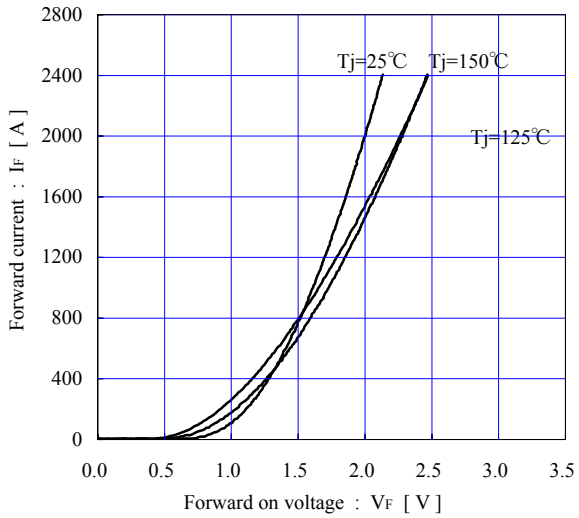


Reverse bias safe operating area (max.)

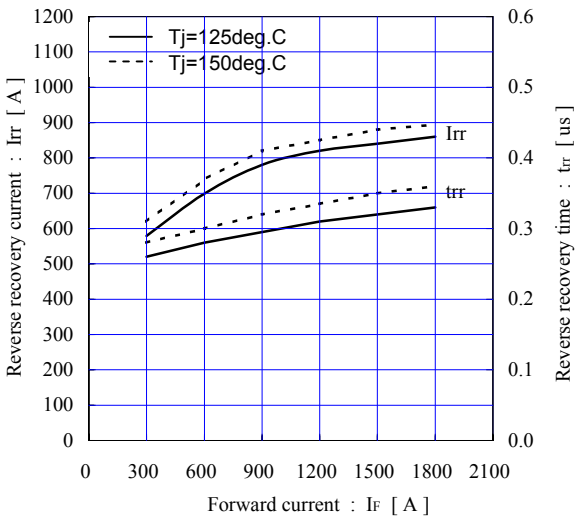
±V_{GE}=15V ,Tj = 150°C



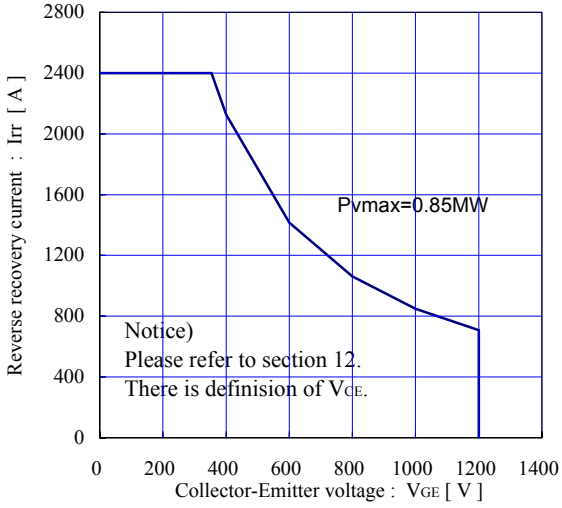
Forward current vs. Forward on voltage (typ.)
chip



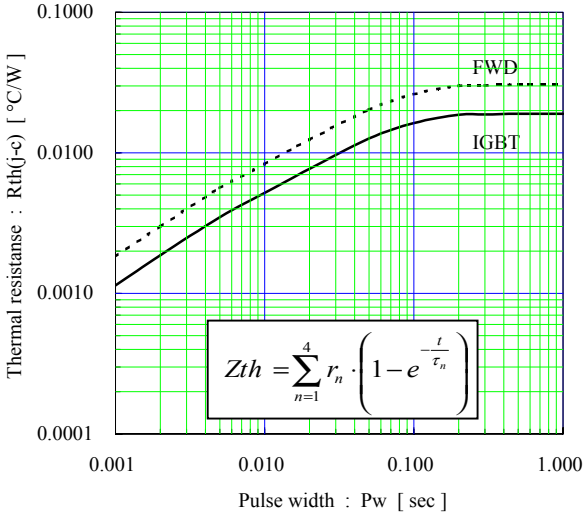
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rgon=1.2Ω



FWD safe operating area (max.)
Tj=150℃

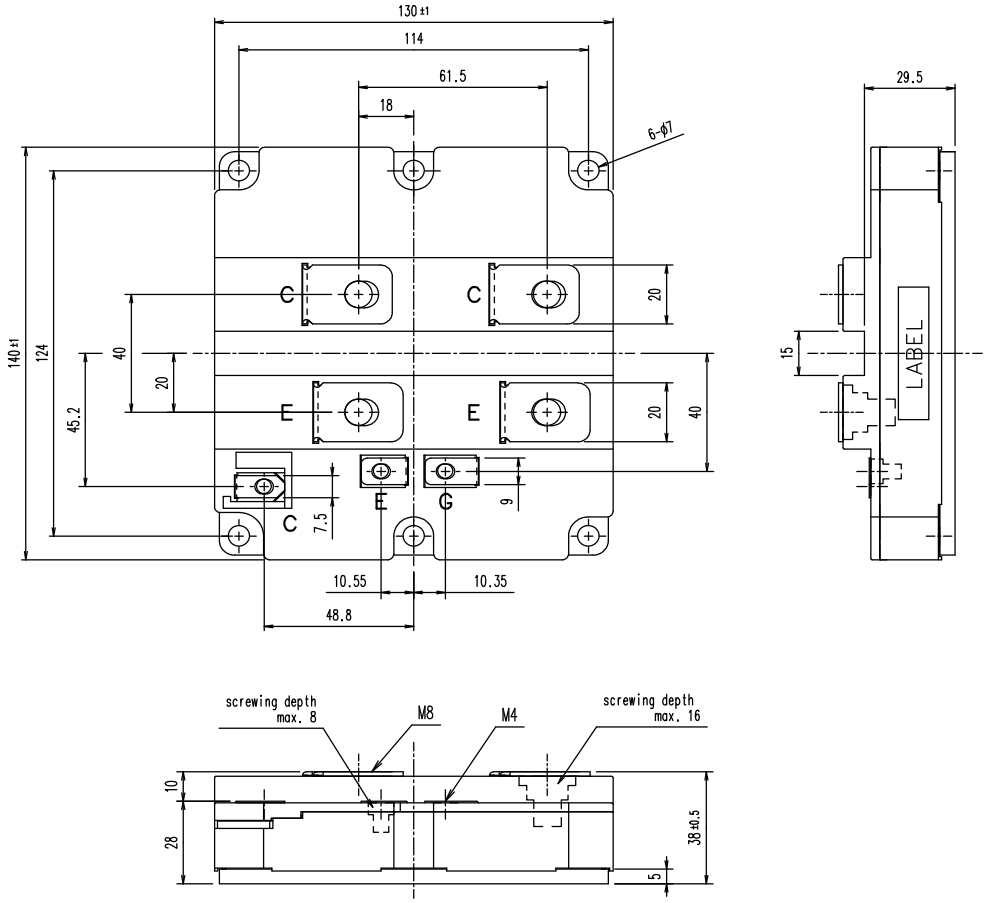


Transient thermal resistance (max.)

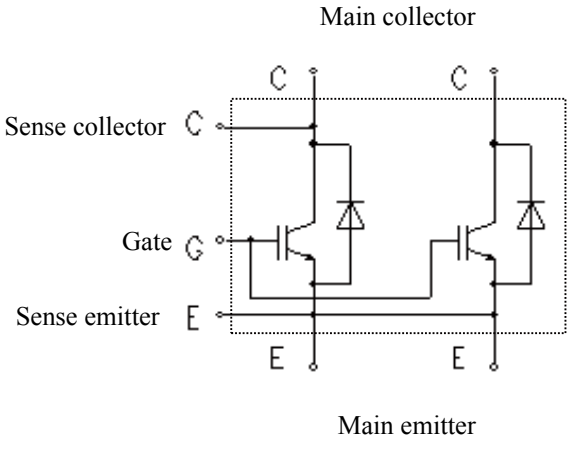


	IGBT	FWD
r1	0.00211	0.00337
r2	0.00734	0.01175
r3	0.00525	0.00842
r4	0.00430	0.00695
τ1	0.0024	0.0024
τ2	0.0355	0.0352
τ3	0.0638	0.0651
τ4	0.0733	0.0718

■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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