e-Front runners

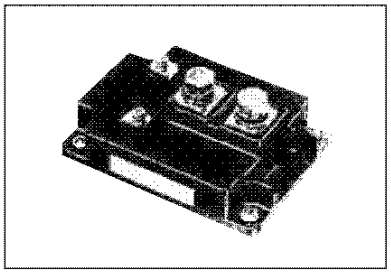
1MBI600S-120

IGBT Modules

IGBT MODULE (S series)
1200V / 600A / 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	Ic	Continuous	Tc=25°C	900	A
			Tc=80°C	600	
	Ic pulse	1ms	Tc=25°C	1800	
			Tc=80°C	1200	
	-Ic			600	
	-Ic pulse	1ms		1200	
Collector power dissipation	Pc	1 device		4150	W
Junction temperature	Tj			150	°C
Storage temperature	Tstg			-40 to +125	°C
Isolation voltage (*1)	V_{iso}	AC : 1min.		2500	V
Screw torque	Mounting (*2)			4.5	N·m
	Terminals (*2)			11.0	
	Terminals (*2)			1.7	

Note *1: All terminals should be connected together when isolation test will be done.
Note *2: Recommendable value : Mounting : 4.0+-0.5 N·m (M6), Terminal : 10.0+-1.0 N·m (M8), 1.5+-0.2 N·m (M4)

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

Items	Symbols	Conditions		Characteristics min.	typ.	max.	Units
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		-	-	1.6	μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE} = 20V, I_C = 600mA		5.5	7.2	8.5	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	V_{GE} = 15V, I_C = 600A	Tj=25°C	-	2.3	2.6	V
			Tj=125°C	-	2.8	-	
Input capacitance	Cies	V_{GE} = 0V, V_{CE} = 10V, f = 1MHz		-	72000	-	pF
Output capacitance	Coes			-	15000	-	
Reverse transfer capacitance	Cres			-	13200	-	
Turn-on time	ton	V_{CC} = 600V, I_C = 600A, V_{GE} = ±15V, R_G = 1.5Ω		-	0.8	1.2	μs
	tr			-	0.25	0.6	
	tr (i)			-	0.1	-	
Turn-off time	toff			-	0.7	1.0	
	tf			-	0.1	0.3	
Forward on voltage	V_F	I_F = 600A	Tj=25°C	-	2.8	3.4	V
			Tj=125°C	-	2.4	-	
Reverse recovery time	trr	I_F = 600A		-	-	0.35	μs

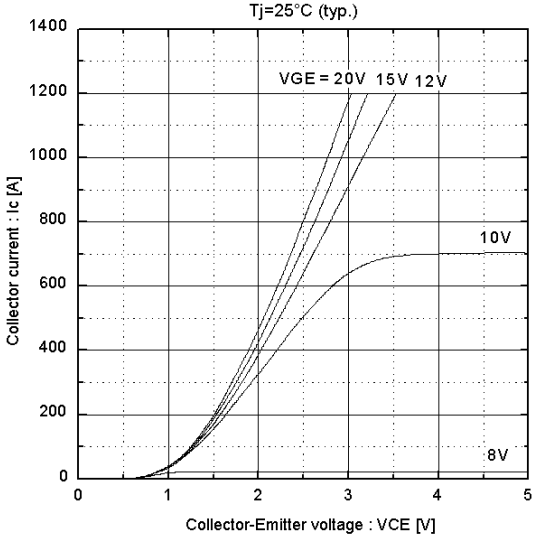
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	typ.	max.	Units
Thermal resistance (1device)	Rth(j-c)	IGBT	-	-	0.03	°C/W
		FWD	-	-	0.06	
Contact thermal resistance	Rth(c-f)	with Thermal Compound (*3)	-	0.0063	-	

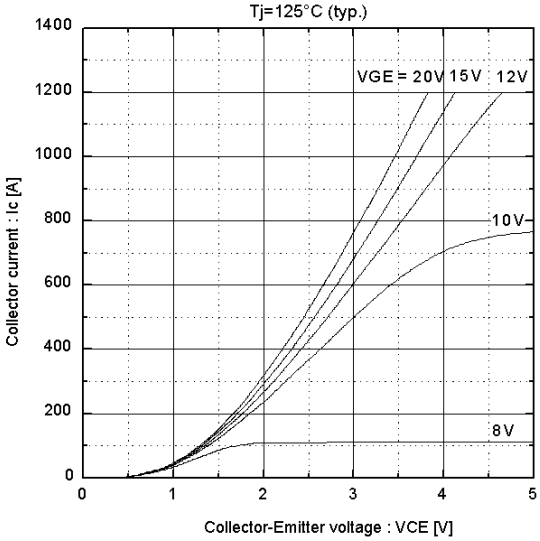
Note *3: This is the value which is defined mounting on the additional cooling fin with thermal compound.

Characteristics (Representative)

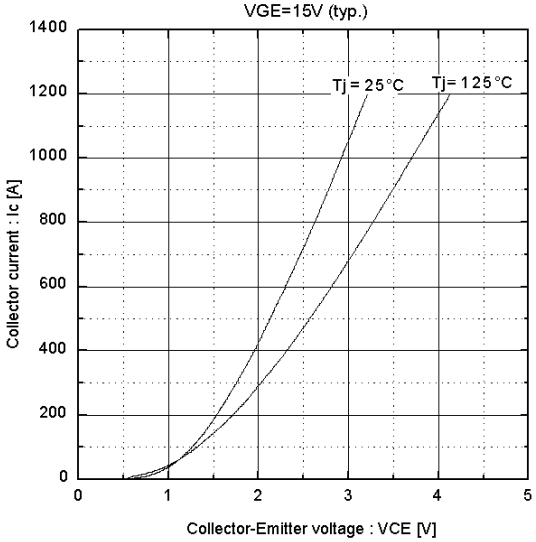
Collector current vs. Collector-Emiiter voltage
Tj=25°C (typ.)



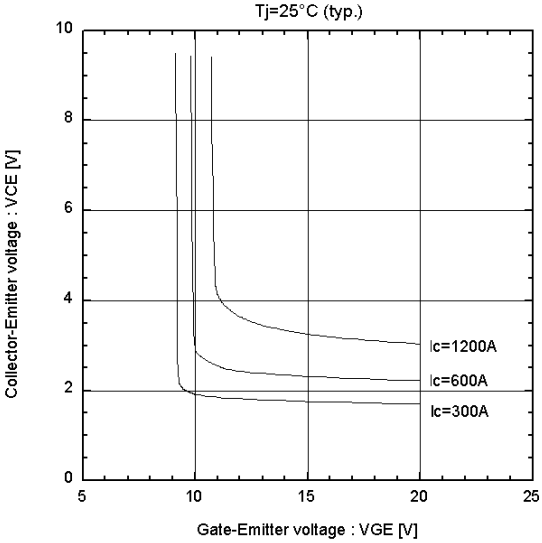
Collector current vs. Collector-Emiiter voltage
Tj=125°C (typ.)



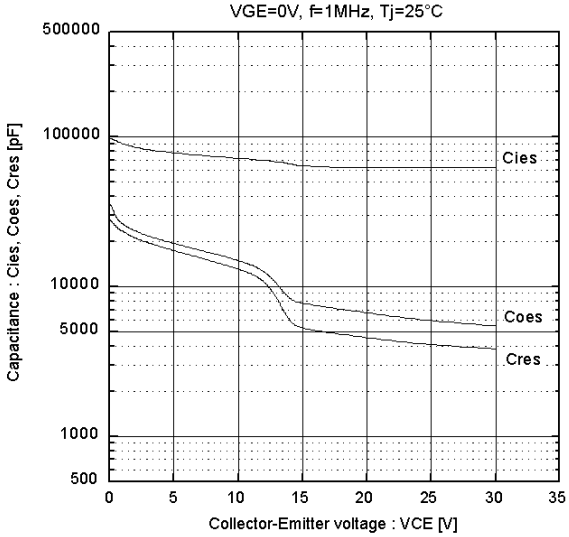
Collector current vs. Collector-Emiiter voltage
VGE=15V (typ.)



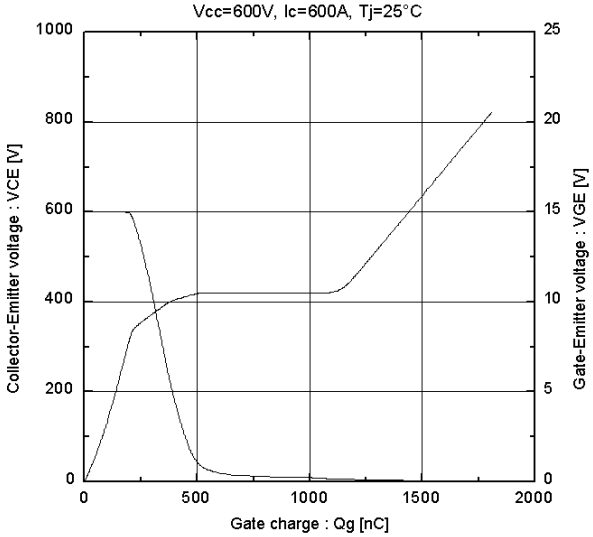
Collector-Emiiter voltage vs. Gate-Emitter voltage
Tj=25°C (typ.)



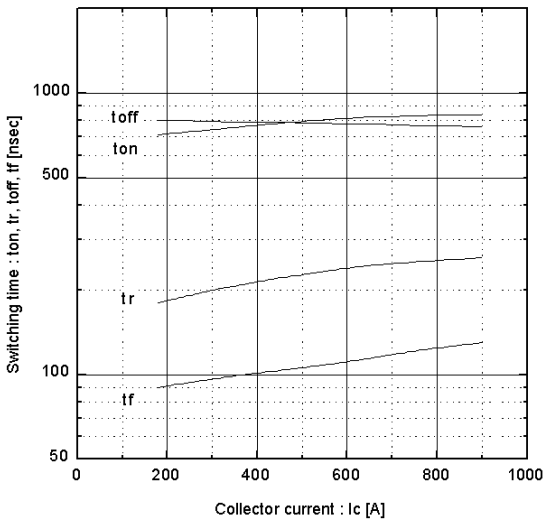
Capacitance vs. Collector-Emiiter voltage (typ.)
VGE=0V, f=1MHz, Tj=25°C



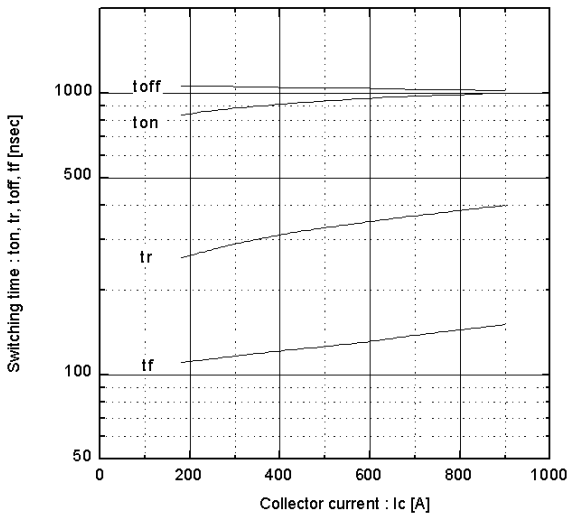
Dynamic Gate charge (typ.)
Vcc=600V, Ic=600A, Tj=25°C



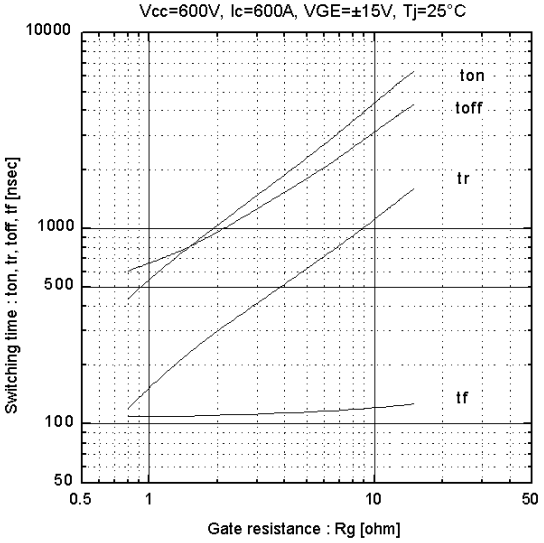
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=1.5ohm, Tj=25°C



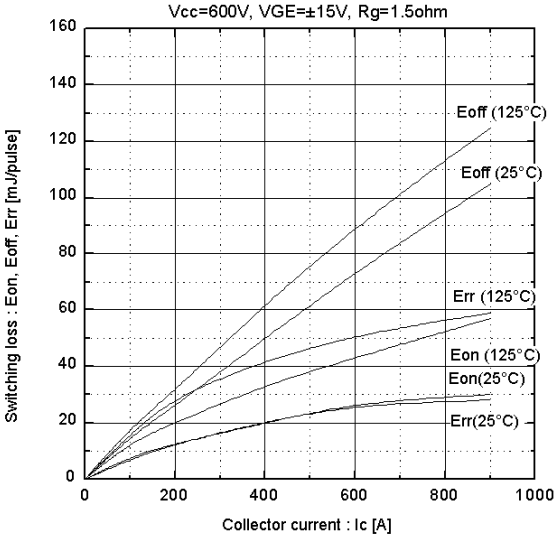
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=1.5ohm, Tj=125°C



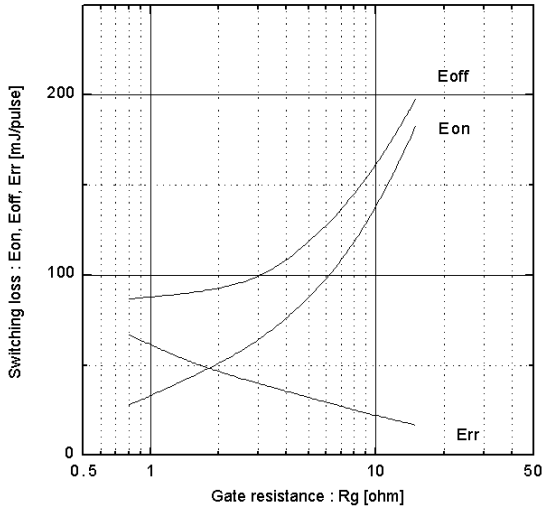
Switching time vs. Gate resistance (typ.)
Vcc=600V, Ic=600A, VGE=±15V, Tj=25°C



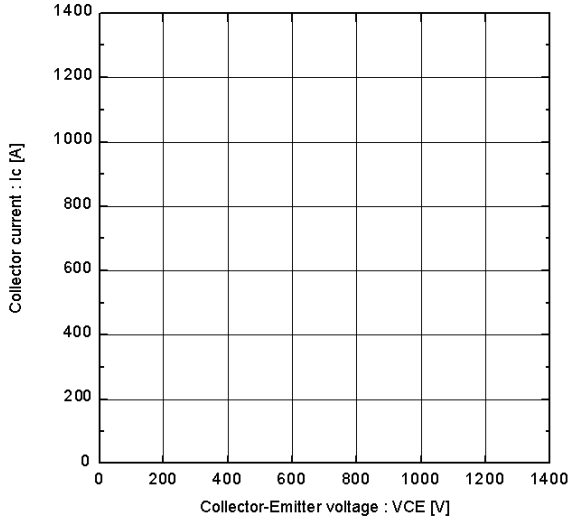
Switching loss vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=1.5ohm



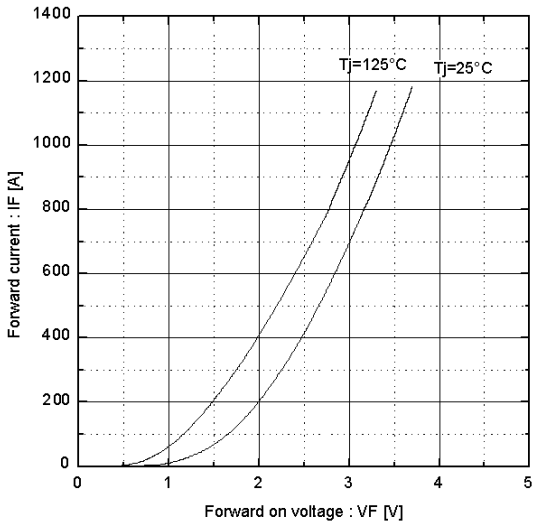
Switching loss vs. Gate resistance (typ.)
Vcc=600V, Ic=600A, VGE=±15V, Tj=125°C



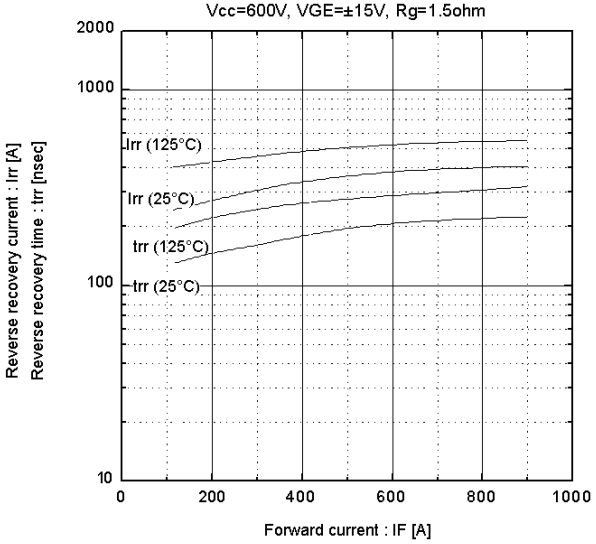
Reverse bias safe operating area
+VGE=15V, -VGE<=15V, Rg>=1.5ohm, Tj<=125°C



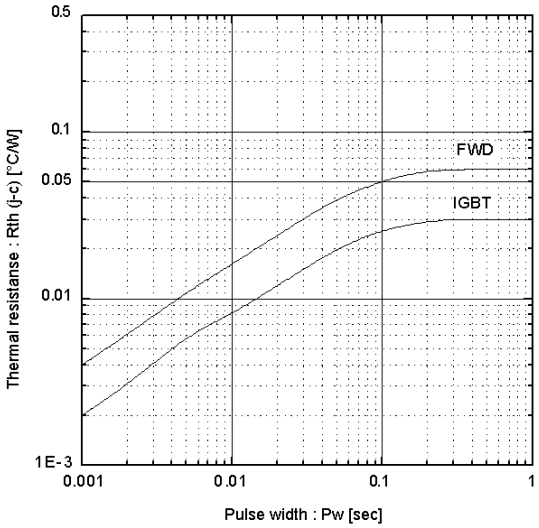
Forward current vs. Forward on voltage (typ.)



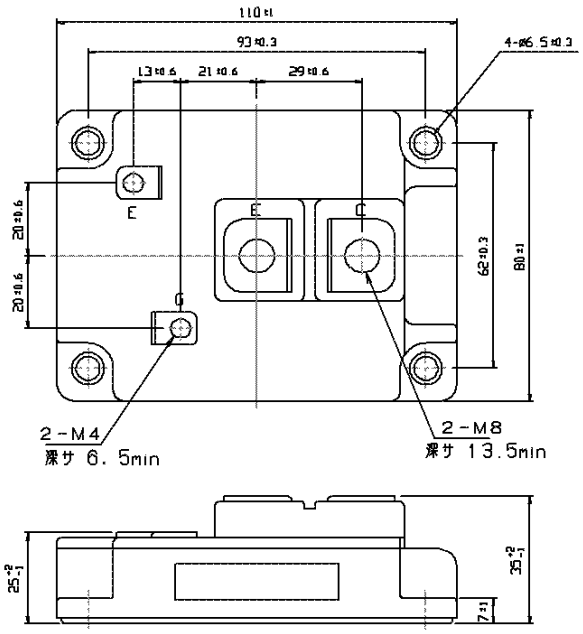
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=1.5ohm



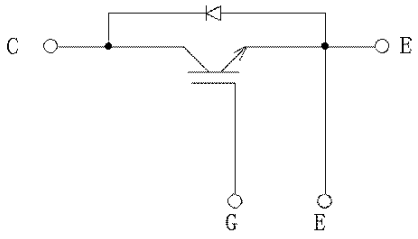
Transient thermal resistance



Outline Drawings, mm



Equivalent Circuit Schematic



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   • Medical equipment

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