6MBI50S-120

IGBT Modules

IGBT MODULE (S series)
1200V / 50A 6 in one-package

■ Features
· Compact package
· P.C.board mount
· Low V_{CE}(sat)

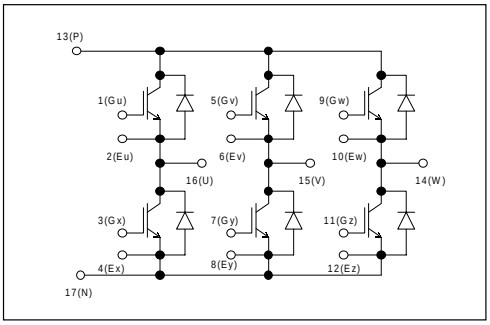
■ Applications
· Inverter for motor drive
· AC and DC servo drive amplifier
· Uninterruptible power supply
· Industrial machines, such as welding machines

■ Maximum ratings and characteristics
● Absolute maximum ratings (Tc=25°C unless otherwise specified)

Item			Symbol	Rating	Unit
Collector-Emitter voltage			V_{CES}	1200	V
Gate-Emitter voltage			V_{GES}	±20	V
Collector current	Continuous	Tc=25°C	I_C	75	A
		Tc=80°C		50	
	1ms	Tc=25°C	I_C pulse	150	A
		Tc=80°C		100	
			-I_C	50	A
	1ms		-I_C pulse	100	A
Max. power dissipation (1 device)			P_C	360	W
Operating temperature			T_j	+150	°C
Storage temperature			T_{stg}	-40 to +125	°C
Isolation voltage			V_{is}	AC 2500 (1min.)	V
Screw torque			Mounting *1	3.5	N·m

*1 : Recommendable value : 2.5 to 3.5 N·m (M5)

■ Equivalent Circuit Schematic



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

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Zero gate voltage collector current	I_{CES}	–	–	1.0	V_{GE}=0V, V_{CE}=1200V	mA
Gate-Emitter leakage current	I_{GES}	–	–	0.2	V_{CE}=0V, V_{GE}=±20V	μA
Gate-Emitter threshold voltage	$V_{GE(th)}$	5.5	7.2	8.5	V_{CE}=20V, I_C=50mA	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	–	2.3	2.65	Tj=25°C V_{GE}=15V, I_C=50A	V
		–	2.8	–	Tj=125°C	
Input capacitance	C_{ies}	–	6000	–	V_{GE}=0V	pF
Output capacitance	C_{oes}	–	1250	–	V_{CE}=10V	
Reverse transfer capacitance	C_{res}	–	1100	–	f=1MHz	
Turn-on time	t_{on}	–	0.35	1.2	V_{CC}=600V	μs
	t_r	–	0.25	0.6	I_C=50A	
	$t_{r(i)}$	–	0.1	–	V_{GE}=±15V	
Turn-off time	t_{off}	–	0.45	1.0	R_G=24Ω	
	t_f	–	0.08	0.3		
Diode forward on voltage	V_F	–	2.5	3.3	Tj=25°C I_F=50A, V_{GE}=0V	V
		–	2.0	–	Tj=125°C	
Reverse recovery time	t_{rr}	–	–	0.35	I_F=50A	μs

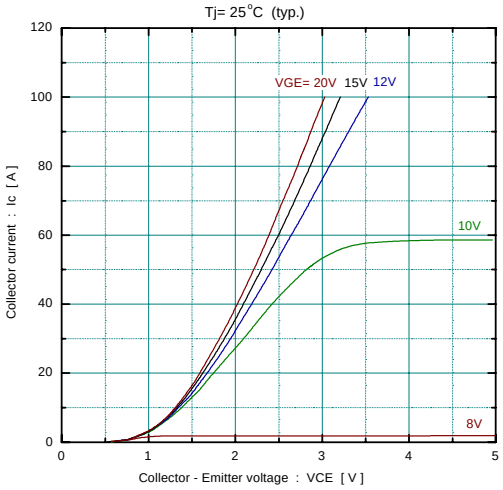
● Thermal resistance characteristics

Item	Symbol	Characteristics			Conditions	Unit
		Min.	Typ.	Max.		
Thermal resistance	Rth(j-c)	–	–	0.35	IGBT	°C/W
	Rth(j-c)	–	–	0.75	FWD	°C/W
	Rth(c-f)*2	–	0.05	–	the base to cooling fin	°C/W

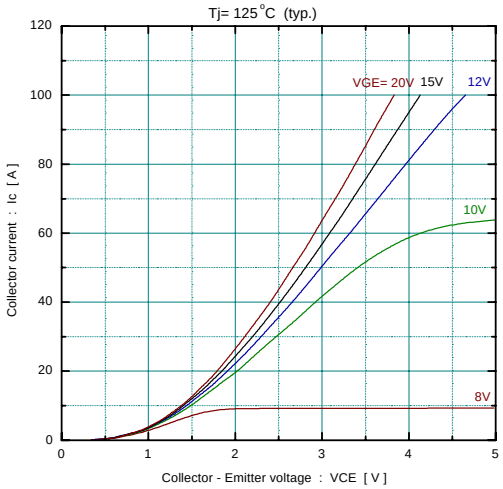
*2 : This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics

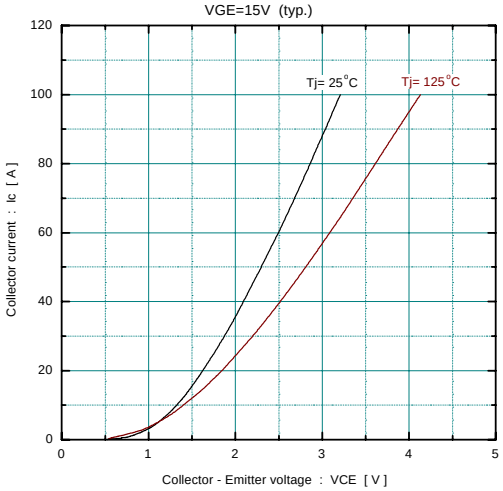
Collector current vs. Collector-Emitter voltage
Tj= 25°C (typ.)



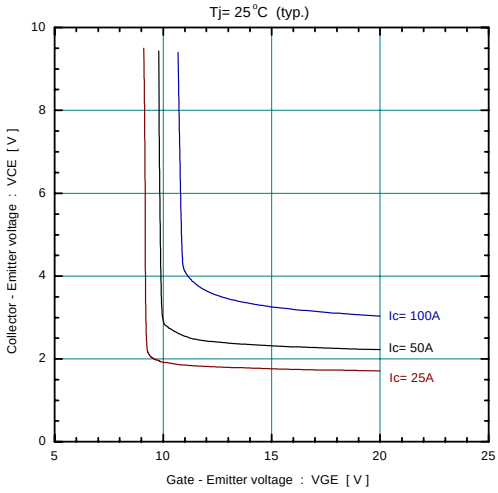
Collector current vs. Collector-Emitter voltage
Tj= 125°C (typ.)



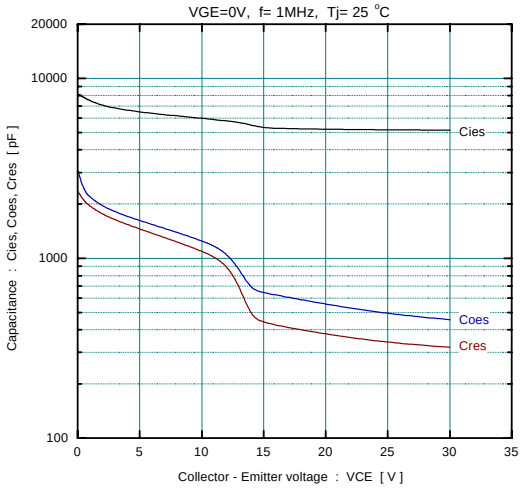
Collector current vs. Collector-Emitter voltage
VGE=15V (typ.)



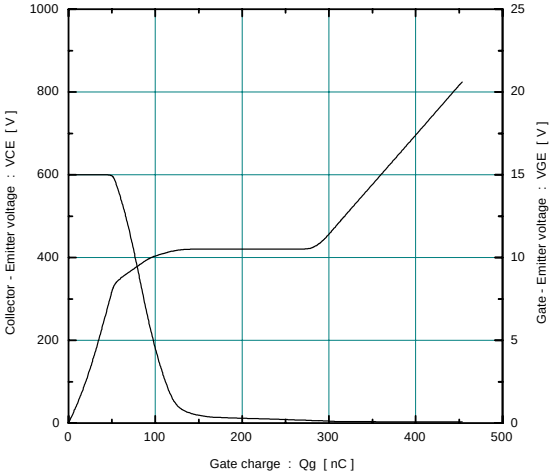
Collector-Emitter voltage vs. Gate-Emitter voltage
Tj= 25°C (typ.)



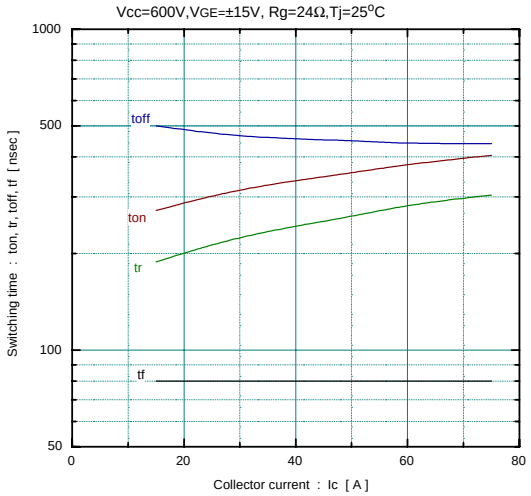
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25 °C



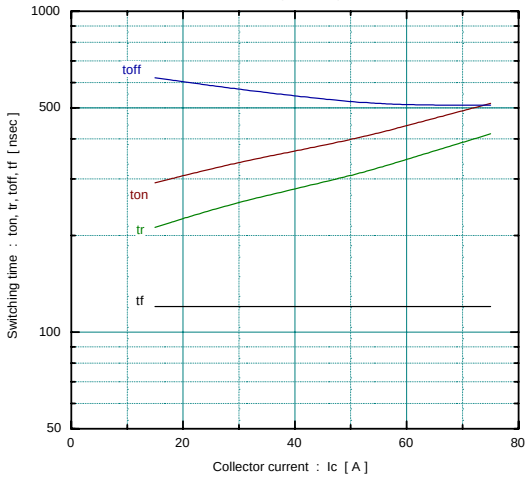
Dynamic Gate charge (typ.)
Vcc=600V, Ic=50A, Tj= 25 °C



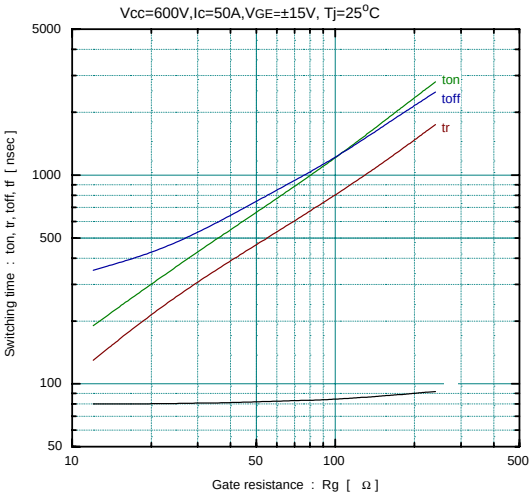
Switching time vs. Collector current (typ.)
Vcc=600V,VGE=±15V, Rg=24Ω,Tj=25°C



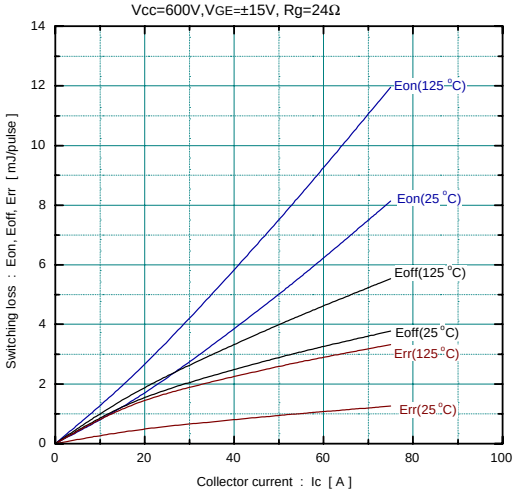
Switching time vs. Collector current (typ.)
Vcc=600V,VGE=±15V, Rg=24Ω,Tj=125°C



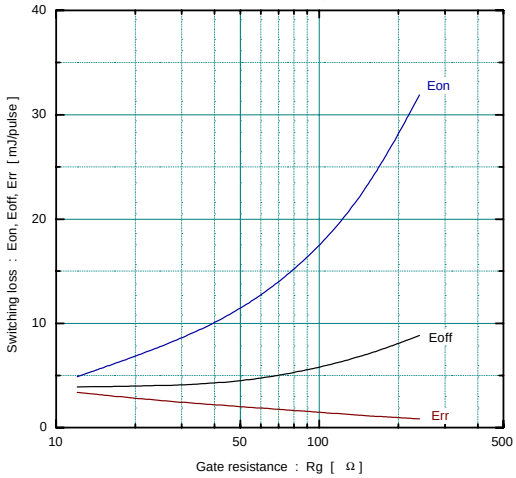
Switching time vs. Gate resistance (typ.)
Vcc=600V,Ic=50A,VGE=±15V, Tj=25°C



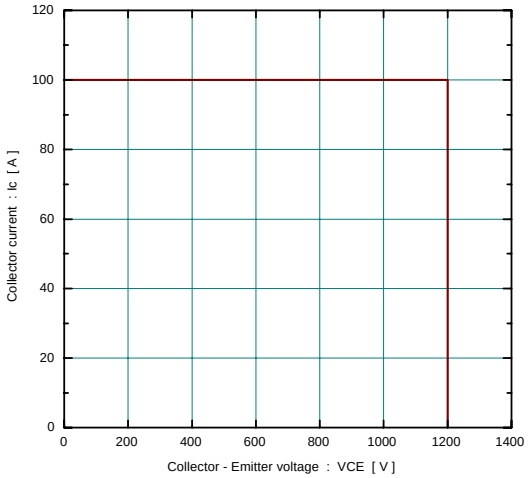
Switching loss vs. Collector current (typ.)
Vcc=600V,VGE=±15V, Rg=24Ω



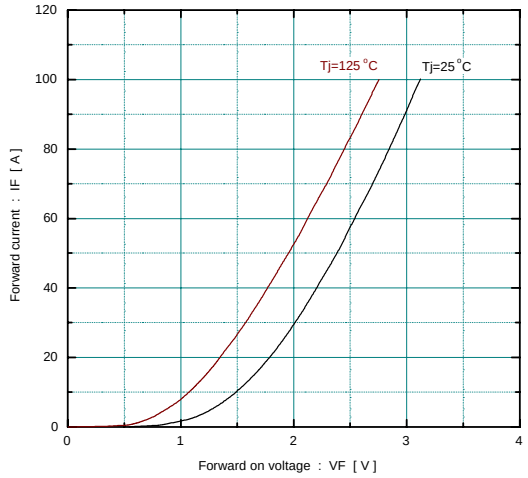
Switching loss vs. Gate resistance (typ.)
Vcc=600V,Ic=50A,VGE=±15V, ,Tj=125°C



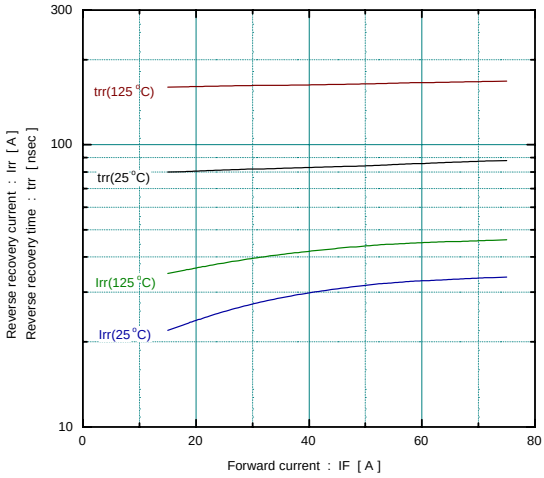
Reverse bias safe operating area
+VGE=15V,-VGE≦15V, Rg≧24Ω,Tj≦125°C



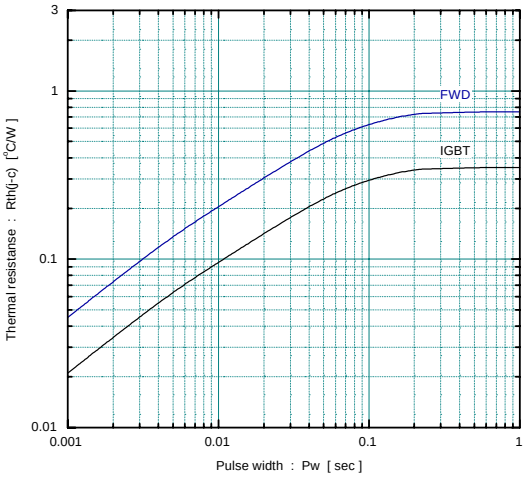
Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=24Ω



Transient thermal resistance



■ Outline Drawings, mm