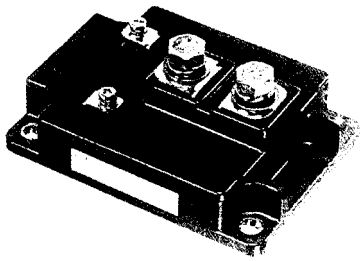
1MBI600PX-140

IGBT Module P-Series

1400V / 600A 1 in one-package



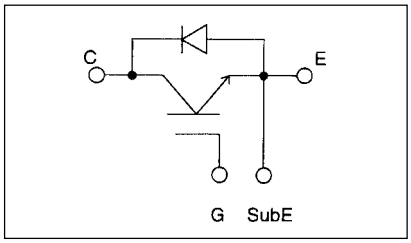
■ Features

· Small temperature dependence of the turn-off switching loss
· Easy to connect in parallel
· Wide RBSOA (square up to 2 time of rated current) and high short-circuit withstand capability
· Low loss and soft-switching (reduction of EMI noise)

■ Applications

· General purpose inverter
· AC Servo systems (Drive unit)
· UPS (Uninterruptible Power Supply)

■ Equivalent Circuit Schematic



■ Maximum ratings and characteristics

● **Absolute maximum ratings (at Tc=25°C unless otherwise specified)**

Item		Symbol	Conditions		Rating	Unit
Collector-Emitter voltage		V_{CES}			1400	V
Gate-Emitter voltage		V_{GES}			±20	V
Collector current		I_C	Continuous	Tc=25°C	800	A
				Tc=80°C	600	
		I_C pulse	1ms	Tc=25°C	1600	
				Tc=80°C	1200	
		-I_C	Continuous		600	
		-I_C pulse	1ms		1200	
Collector Power Dissipation		P_C			4100	W
Junction temperature		T_j			+150	°C
Storage temperature		T_{stg}			-40 to +125	
Isolation voltage	between terminal and copper base *1	V_{iso}	AC:1min.		2500	VAC
Screw Torque	Mounting *2				4.5	N·m
	Terminals *3				11.0	
	*4				1.7	

*1 : All terminals should be connected together when isolation test will be done.
Recommendable value : *2 4.0±0.5 N·m(M6), *3 10.0±1.0 N·m(M8), *4 1.50±0.2 N·m(M4)

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

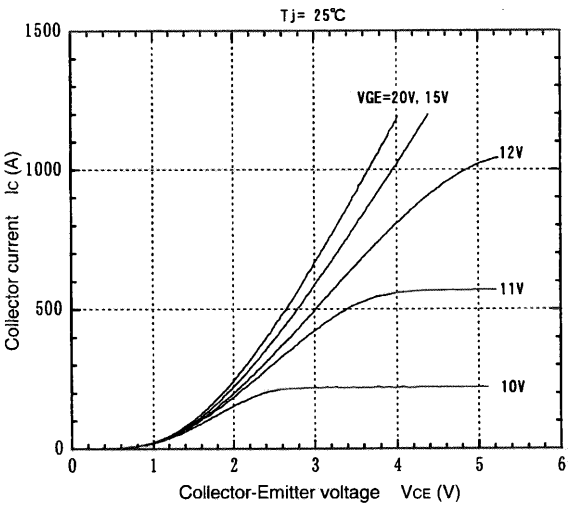
Item	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Zero gate voltage collector current	I_{CES}	V_{GE}=0V, V_{CE}=1400V	–	–	2.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=±20V	–	–	0.5	µA
Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE}=20V, I_C=600mA	6.0	8.0	9.0	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=600A, Tj=25°C	–	2.85	3.2	V
Input capacitance	C_{ies}	V_{CE}=10V	–	60	–	nF
Output capacitance	C_{oes}	V_{GE}=0V	–	9	–	
Reverse transfer capacitance	C_{res}	f=1MHz	–	4	–	
Turn-on time	t_{on}	V_{CC}=600V	–	0.75	1.20	µs
	t_r	I_C=600A	–	0.20	0.60	
Turn-off time	t_{off}	V_{GE}=±15V	–	0.65	1.00	
	t_f	R_G=2.0 Ω	–	0.10	0.30	
Diode forward on voltage	V_F	I_F=600A, V_{GE}=0V	–	–	3.4	V
Reverse recovery time	t_{rr}	I_F=600A	–	–	0.35	µs

● **Thermal resistance characteristics**

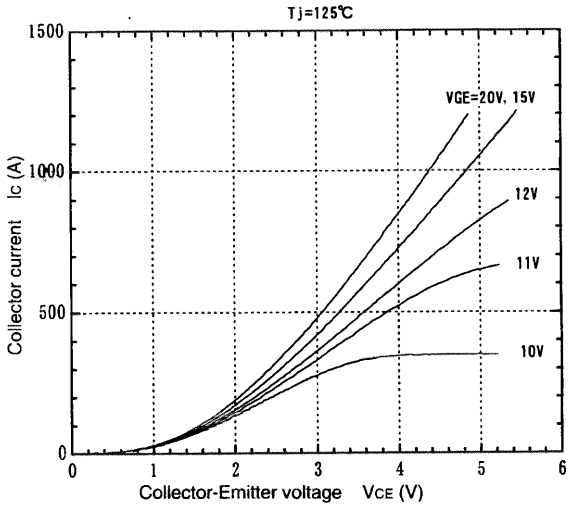
Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	Rth(j-c)	IGBT	–	–	0.03	°C/W
	Rth(j-c)	Diode	–	–	0.06	°C/W
Contact Thermal resistance	Rth(c-f)*4	the base to cooling fin	–	0.0063	–	°C/W

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

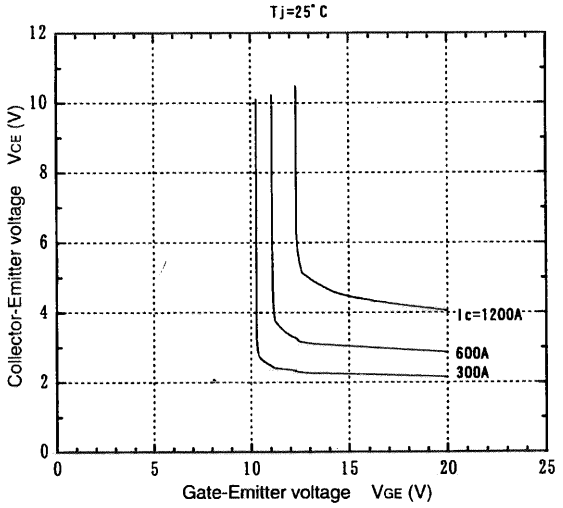
■ Characteristics (Representative)



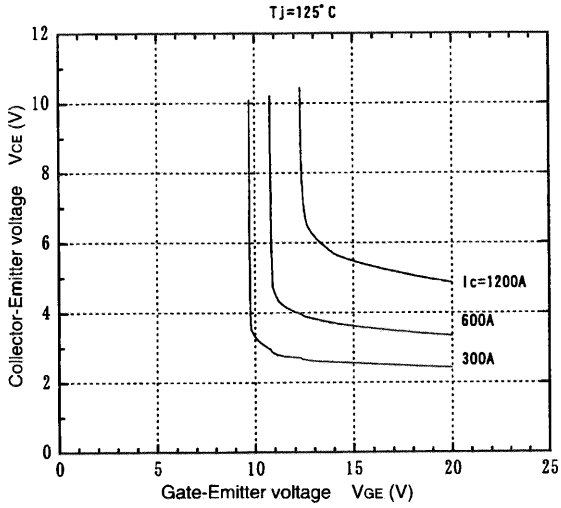
Collector current vs. Collector-Emitter voltage



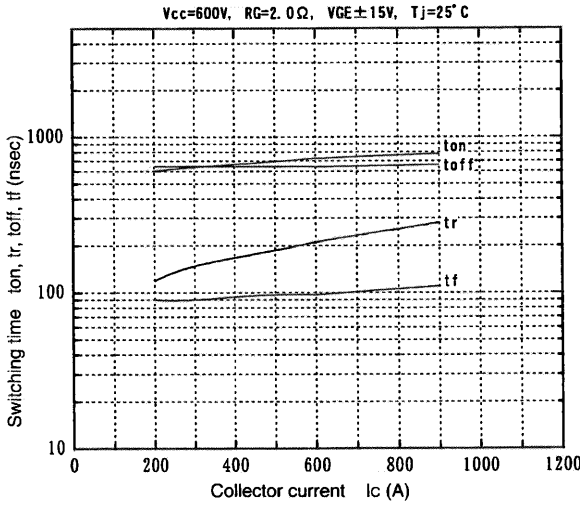
Collector current vs. Collector-Emitter voltage



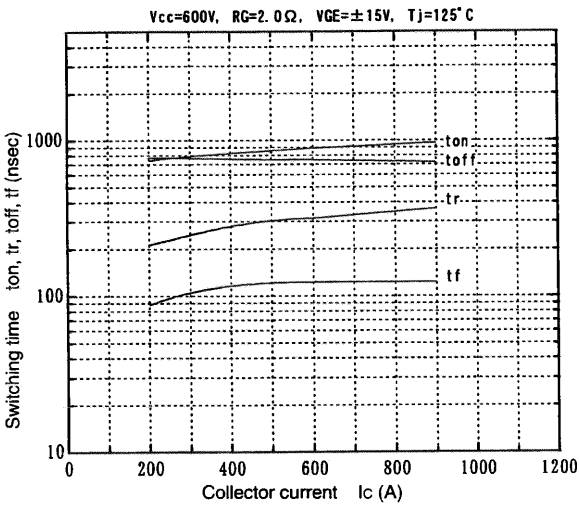
Collector-Emitter voltage vs. Gate-Emitter voltage



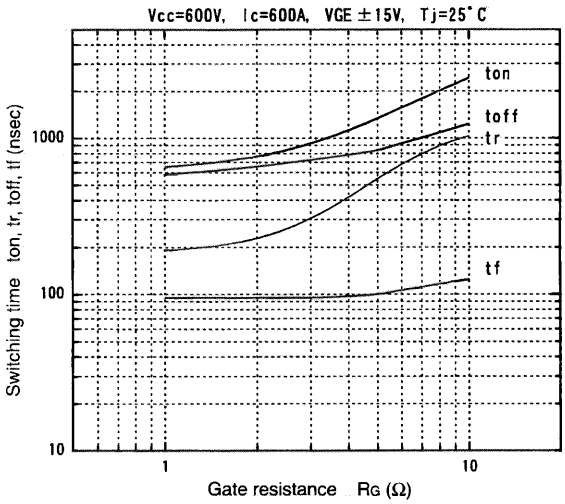
Collector-Emitter voltage vs. Gate-Emitter voltage



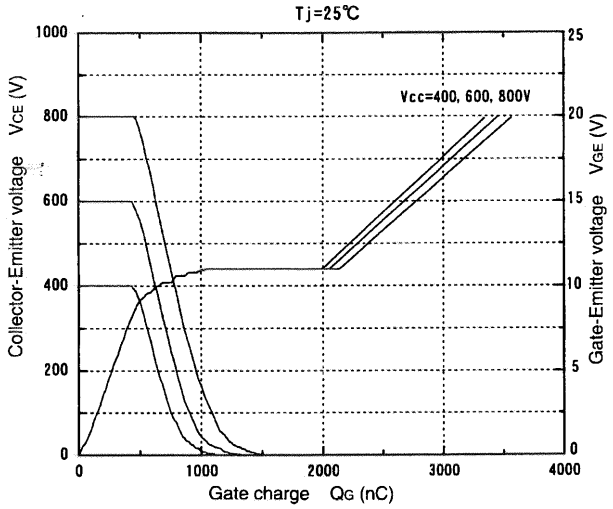
Switching time vs. Collector current



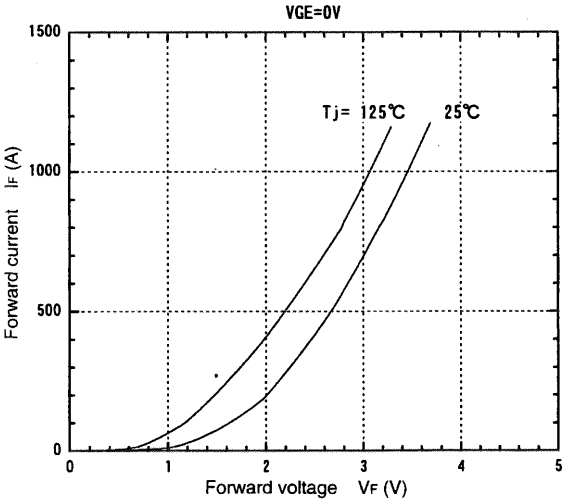
Switching time vs. Collector current



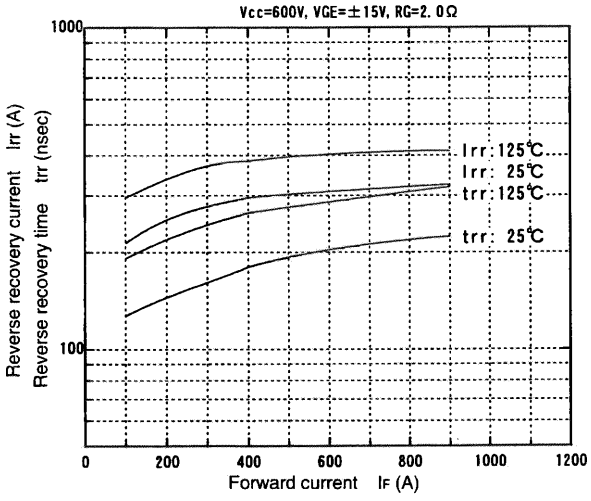
Switching time vs. Gate resistance



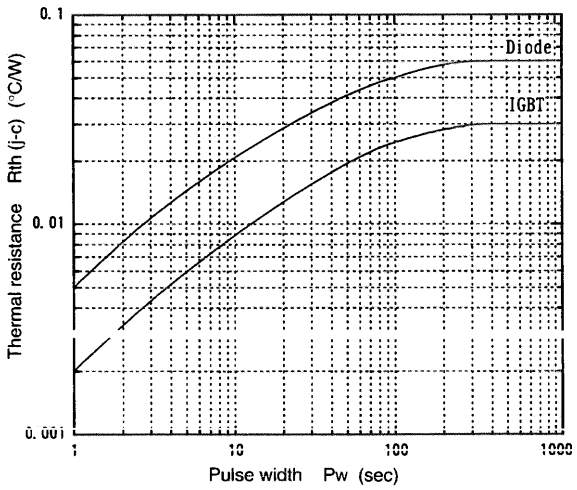
Dynamic input characteristics



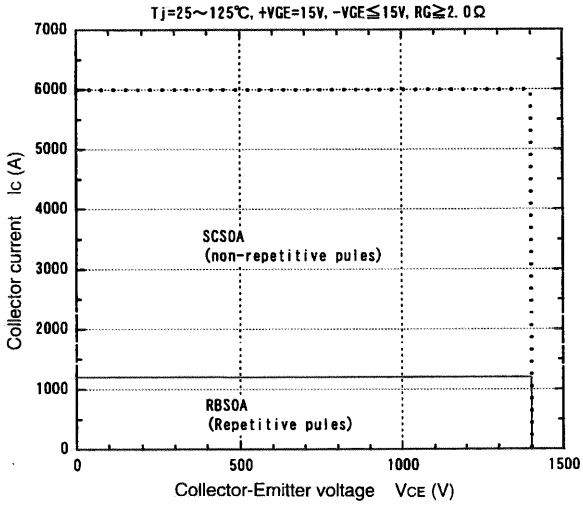
Forward current vs. Forward voltage



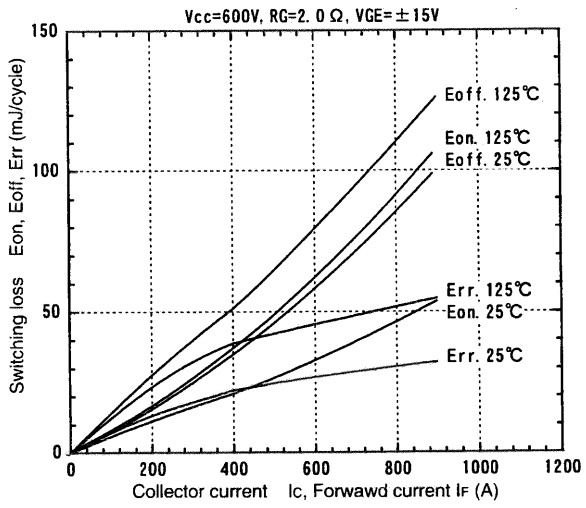
Trr, Irr vs. IF



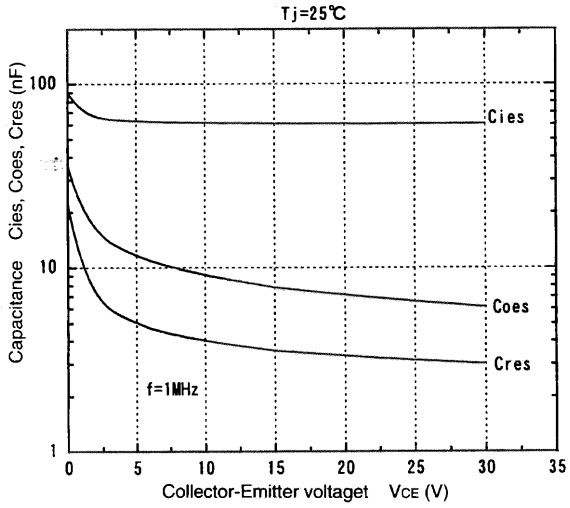
Transient thermal resistance



Reverse biased safe operating area



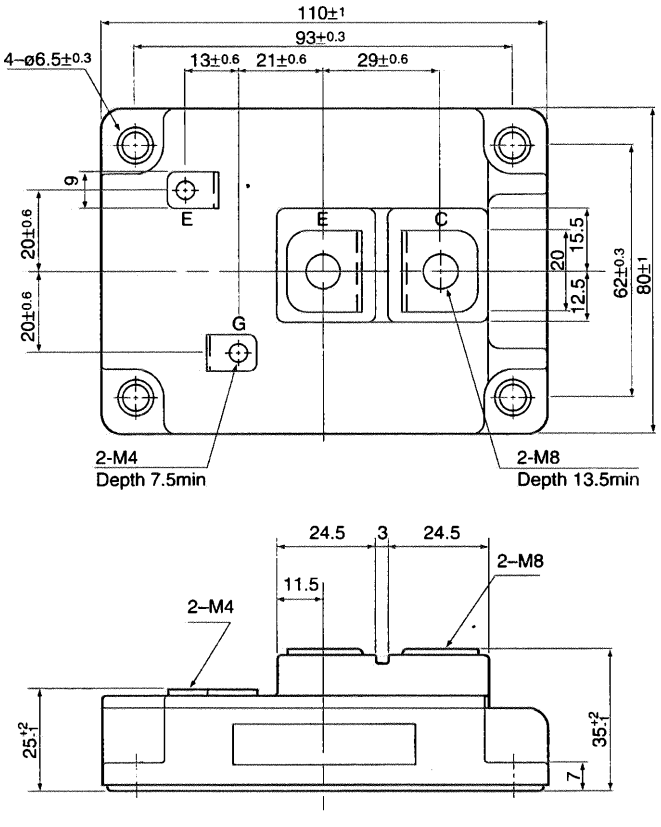
Switching loss vs. Collector or Forward current



Capacitance vs. Collector-Emitter voltage

■ Outline Drawings, mm

M138



Mass : 530g