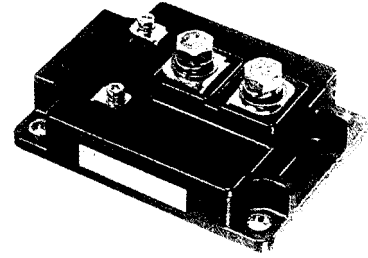


# 1MBI600PX-140

## IGBT Module P-Series

### 1400V / 600A 1 in one-package



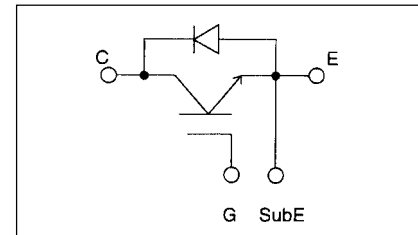
#### ■ Features

- 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 <sub>CES</sub>		1400	V		
Gate-Emitter voltage	V <sub>GES</sub>		±20	V		
Collector current	I <sub>c</sub>	Continuous	T <sub>c</sub> =25°C	800	A	
			T <sub>c</sub> =80°C	600		
	I <sub>c</sub> pulse	1ms	T <sub>c</sub> =25°C	1600		
			T <sub>c</sub> =80°C	1200		
	-I <sub>c</sub>	Continuous	600			
-I <sub>c</sub> pulse	1ms	1200				
Collector Power Dissipation	P <sub>c</sub>		4100	W		
Junction temperature	T <sub>j</sub>		+150	°C		
Storage temperature	T <sub>stg</sub>		-40 to +125			
Isolation voltage	between terminal and copper base *1		V <sub>iso</sub>	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 T<sub>j</sub>=25°C unless otherwise specified)

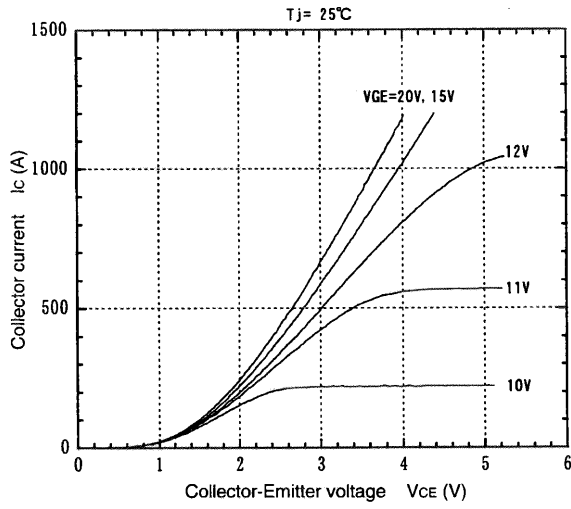
Item	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Zero gate voltage collector current	I <sub>CES</sub>	V <sub>GE</sub> =0V, V <sub>CES</sub> =1400V	–	–	2.0	mA
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CES</sub> =0V, V <sub>GE</sub> =±20V	–	–	0.5	µA
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CES</sub> =20V, I <sub>c</sub> =600mA	6.0	8.0	9.0	V
Collector-Emitter saturation voltage	V <sub>CES(sat)</sub>	V <sub>GE</sub> =15V, I <sub>c</sub> =600A, T <sub>j</sub> =25°C	–	2.85	3.2	V
Input capacitance	C <sub>ies</sub>	V <sub>CES</sub> =10V	–	60	–	nF
			–	9	–	
Output capacitance	C <sub>oes</sub>	V <sub>GE</sub> =0V	–	9	–	
Reverse transfer capacitance	C <sub>res</sub>	f=1MHz	–	4	–	
Turn-on time	t <sub>on</sub>	V <sub>CC</sub> =600V	–	0.75	1.20	µs
		I <sub>c</sub> =600A	–	0.20	0.60	
Turn-off time	t <sub>off</sub>	V <sub>GE</sub> =±15V	–	0.65	1.00	
		R <sub>G</sub> =2.0 Ω	–	0.10	0.30	
Diode forward on voltage	V <sub>F</sub>	I <sub>F</sub> =600A, V <sub>GE</sub> =0V	–	–	3.4	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =600A	–	–	0.35	µs

##### ● Thermal resistance characteristics

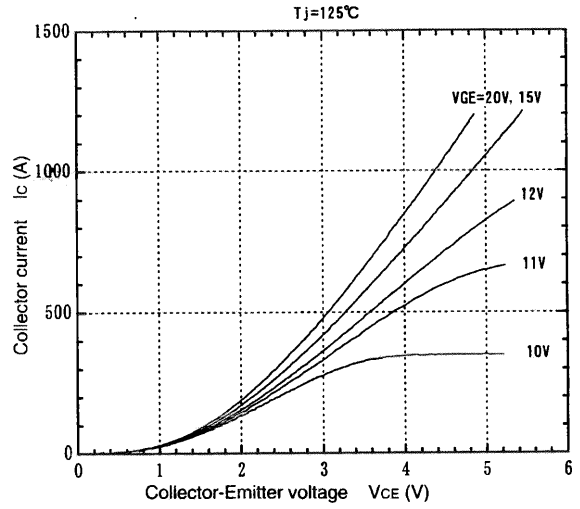
Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R <sub>th(j-c)</sub>	IGBT	–	–	0.03	°C/W
	R <sub>th(j-c)</sub>	Diode	–	–	0.06	
Contact Thermal resistance	R <sub>th(c-f)</sub> *4	the base to cooling fin	–	0.0063	–	°C/W

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

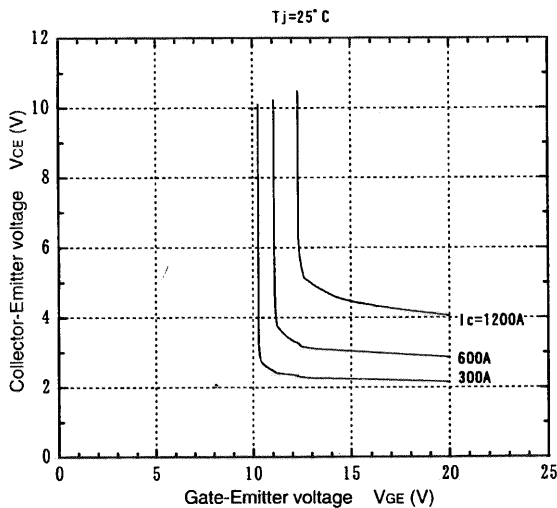
■ Characteristics (Representative)



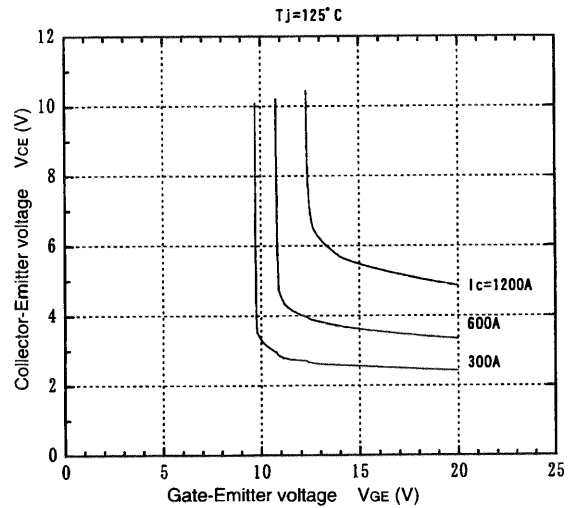
Collector current vs. Collector-Emittor voltage



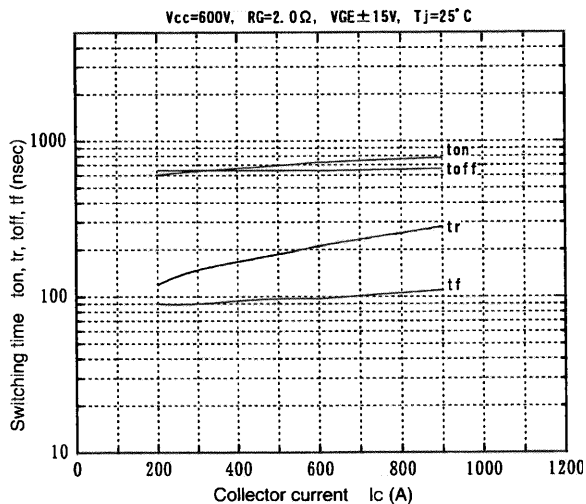
Collector current vs. Collector-Emittor voltage



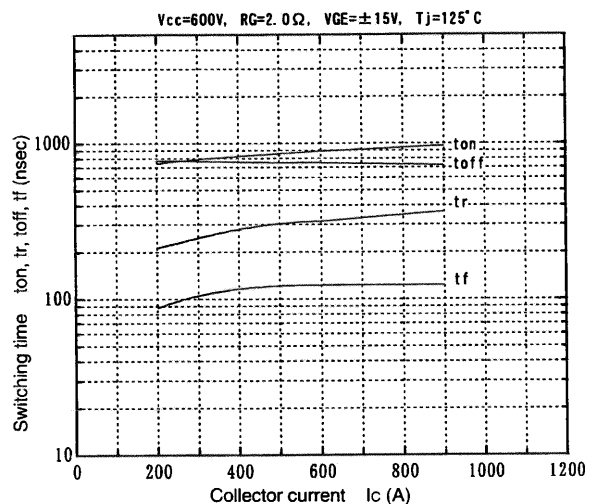
Collector-Emittor voltage vs. Gate-Emittor voltage



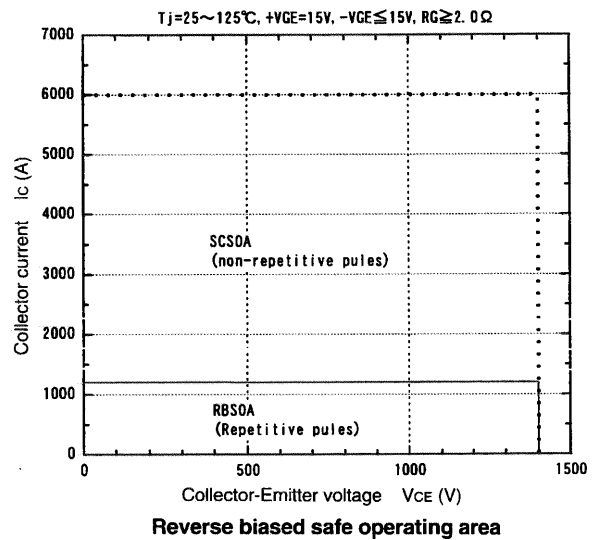
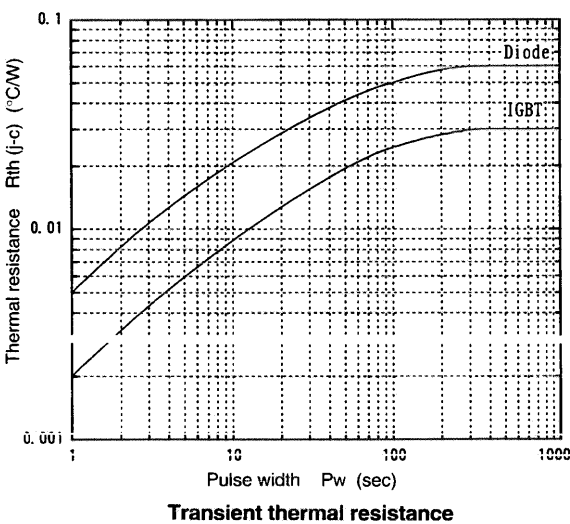
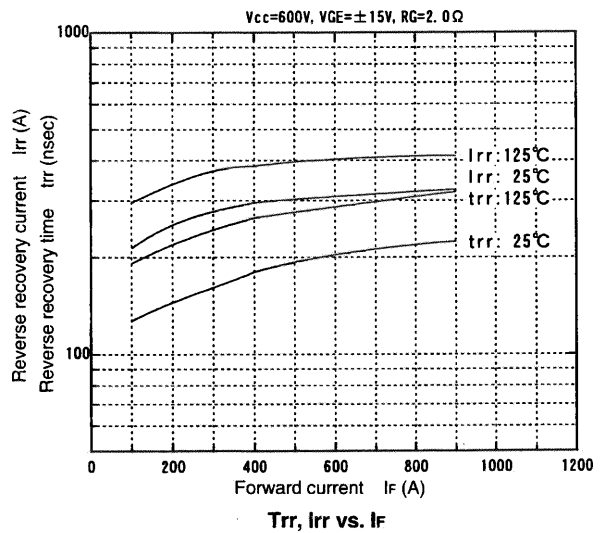
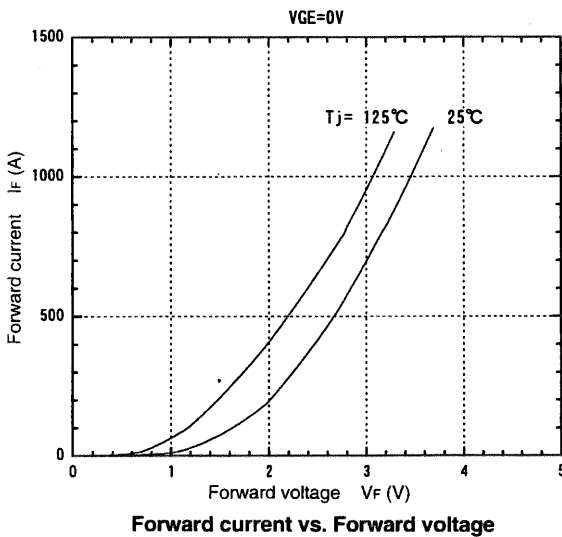
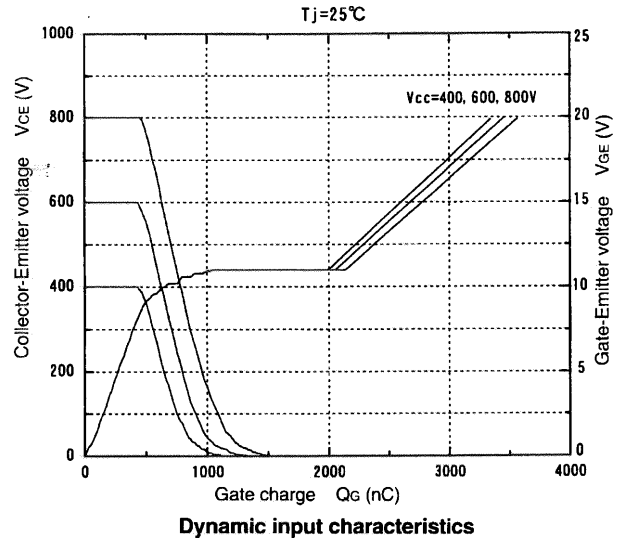
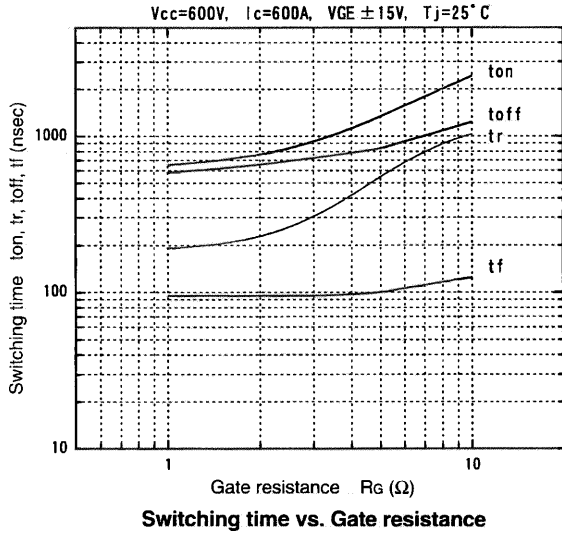
Collector-Emittor voltage vs. Gate-Emittor voltage

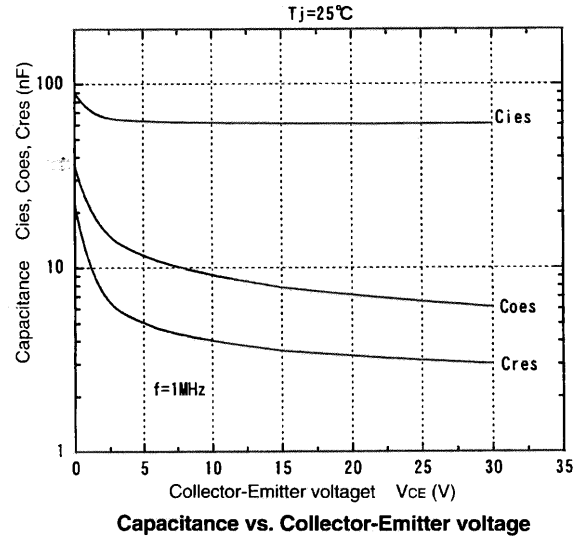
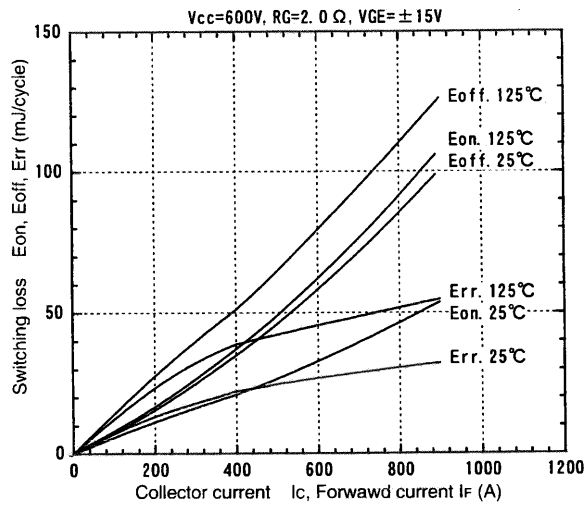


Switching time vs. Collector current



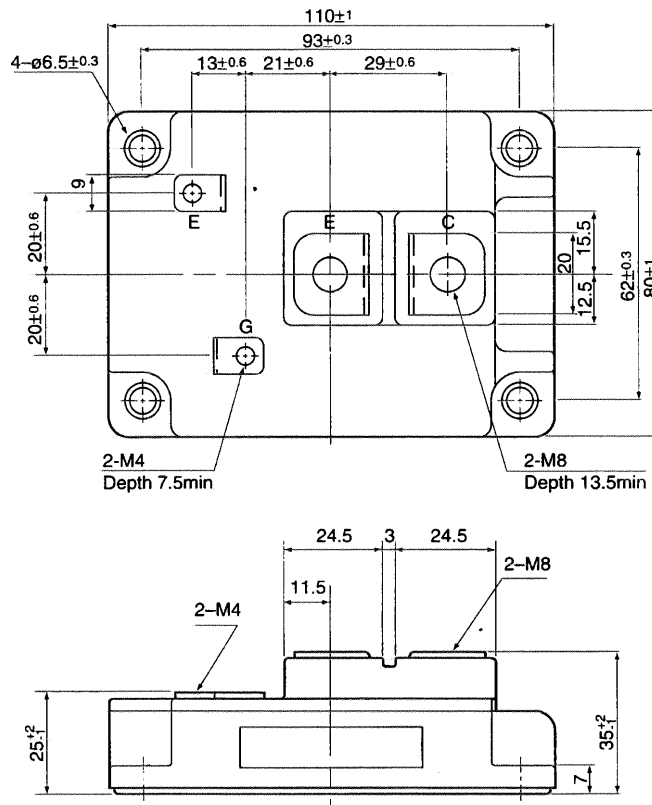
Switching time vs. Collector current





■ Outline Drawings, mm

M138



Mass : 530g