

# 2MBI300P-140

## IGBT Module P-Series

### 1400V / 300A 2 in one-package



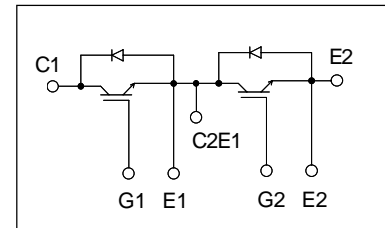
#### ■ Features

- 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 and DC Servo drive amplifier
- 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	400	A
			T <sub>c</sub> =80°C	300	
	I <sub>cp</sub>	1ms	T <sub>c</sub> =25°C	800	
			T <sub>c</sub> =80°C	600	
	-I <sub>c</sub>			300	
-I <sub>c</sub> pulse			600		
Collector Power Dissipation	P <sub>c</sub>	1 device	2500	W	
Junction temperature	T <sub>j</sub>		+150	°C	
Storage temperature	T <sub>stg</sub>		-40 to +125		
Isolation voltage	V <sub>iso</sub>	between terminal and copper base *1	2500	VAC	
Screw Torque	Mounting *2		3.5	N·m	
	Terminals *3		4.5		

\*1: All terminals should be connected together when isolation test will be done.

\*2: Recommendable value : 2.5 to 3.5 N·m(M5) \*3: Recommendable value : 3.5 to 4.5 N·m(M6)

##### ● Electrical characteristics (at T<sub>j</sub>=25°C unless otherwise specified)

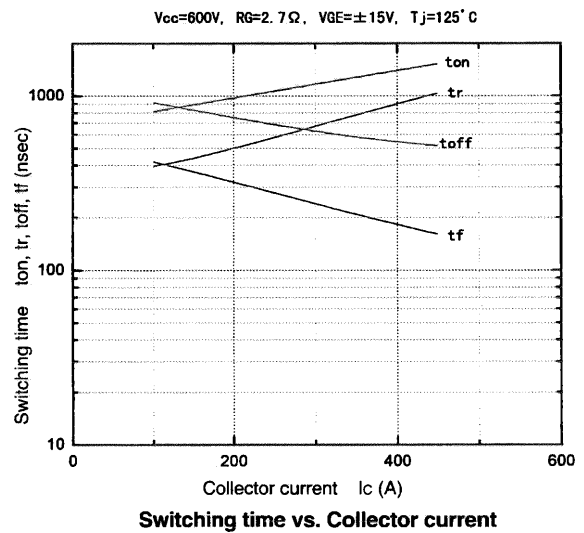
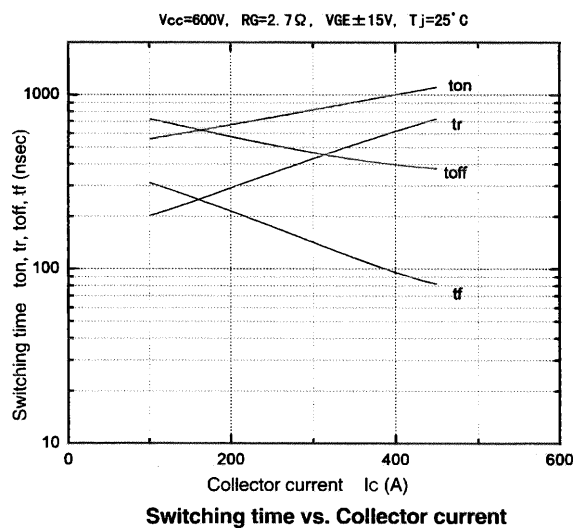
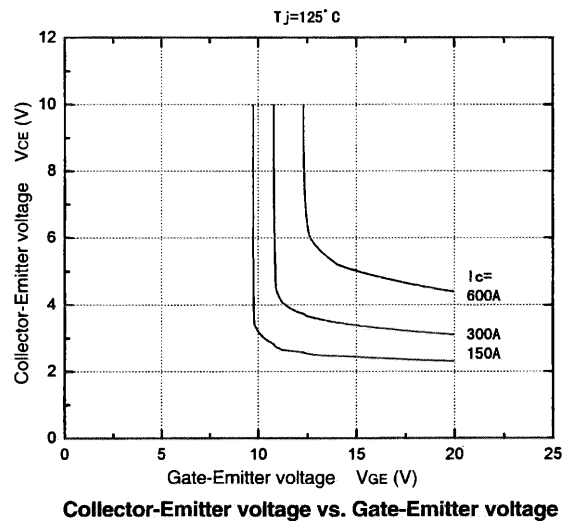
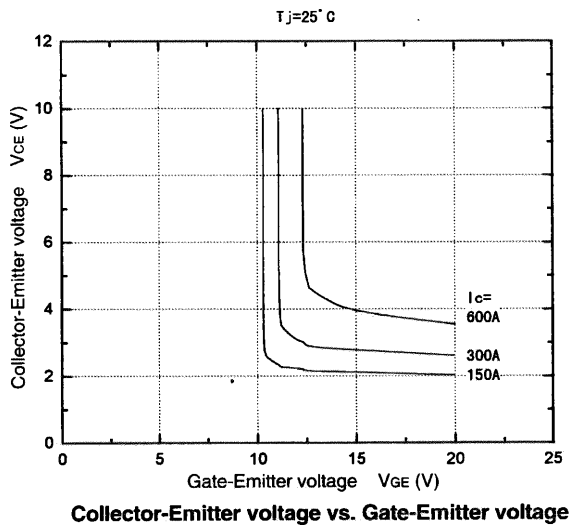
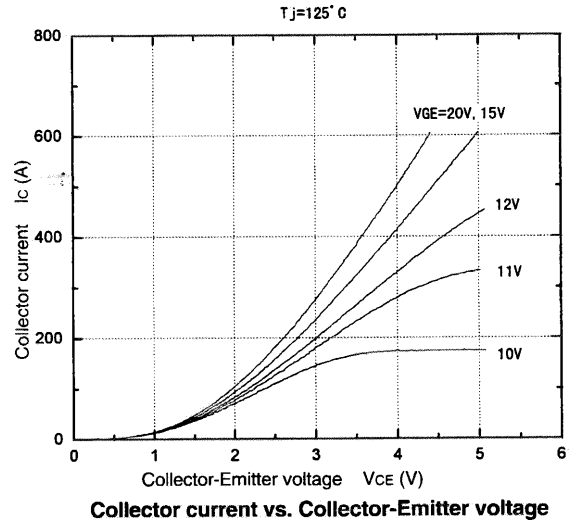
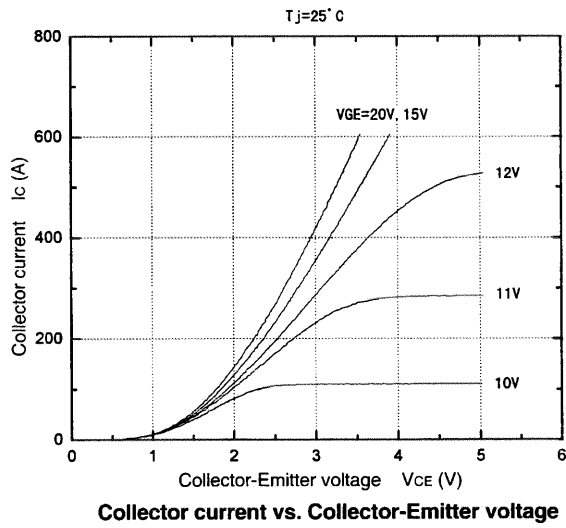
Item	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Zero gate voltage collector current	I <sub>CEs</sub>	V <sub>GE</sub> =0V, V <sub>CE</sub> =1400V	–	–	3.0	mA
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V	–	–	600	nA
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> =20V, I <sub>c</sub> =300mA	6.0	8.0	9.0	V
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	V <sub>GE</sub> =15V, I <sub>c</sub> =300A, T <sub>j</sub> =25°C	–	2.7	3.0	V
		V <sub>GE</sub> =15V, I <sub>c</sub> =300A, T <sub>j</sub> =125°C	–	3.3	–	
Input capacitance	C <sub>ies</sub>	V <sub>CE</sub> =10V	–	30000	–	pF
Output capacitance	C <sub>oes</sub>	V <sub>GE</sub> =0V	–	4500	–	
Reverse transfer capacitance	C <sub>res</sub>	f=1MHz	–	2000	–	
Turn-on time	t <sub>on</sub>	V <sub>CC</sub> =600V	–	–	1.20	μs
	t <sub>r</sub>	I <sub>c</sub> =300A	–	–	0.60	
Turn-off time	t <sub>off</sub>	V <sub>GE</sub> =±15V	–	–	1.00	μs
	t <sub>f</sub>	R <sub>G</sub> = 2.7 Ω	–	–	0.30	
Diode forward on voltage	V <sub>F</sub>	I <sub>F</sub> =300A, V <sub>GE</sub> =0V	–	2.4	3.3	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =300A	–	–	0.35	μs

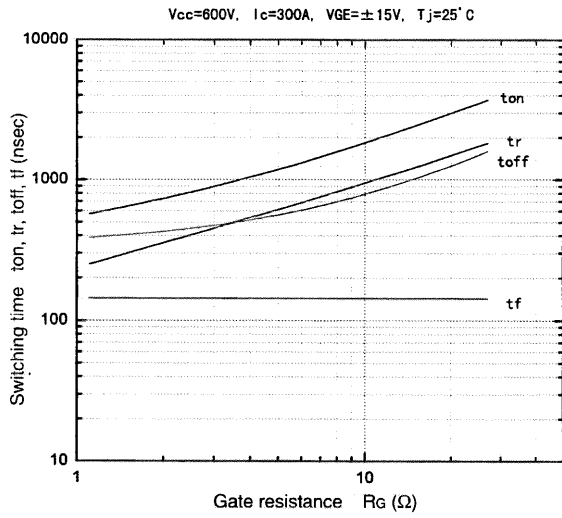
##### ● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R <sub>th(j-c)</sub>	IGBT	–	–	0.05	°C/W
	R <sub>th(j-c)</sub>	Diode	–	–	0.10	
Contact Thermal resistance	R <sub>th(c-f)</sub> *4	the base to cooling fin	–	0.0167	–	°C/W

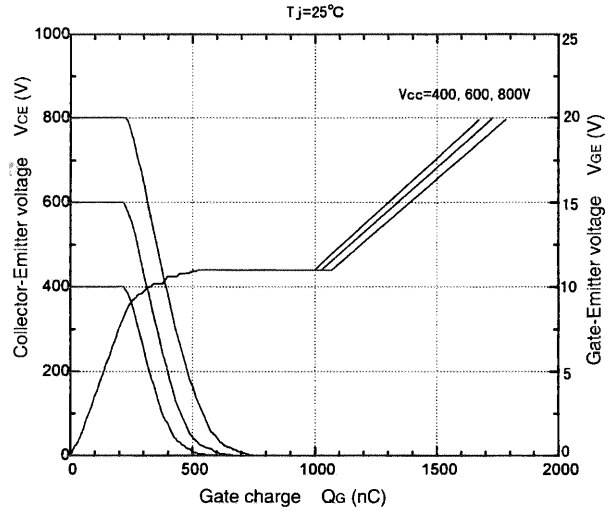
\*4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

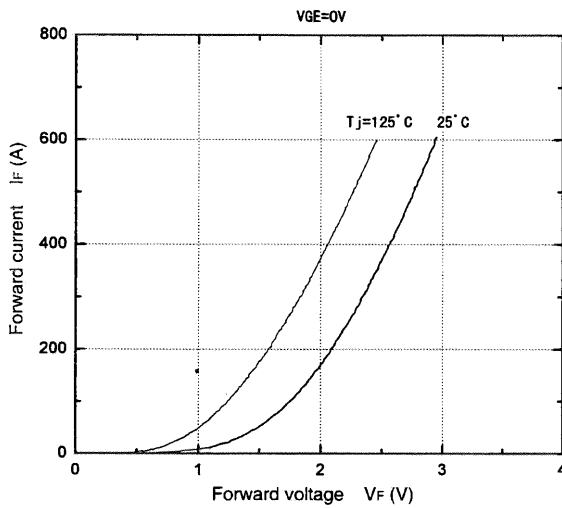




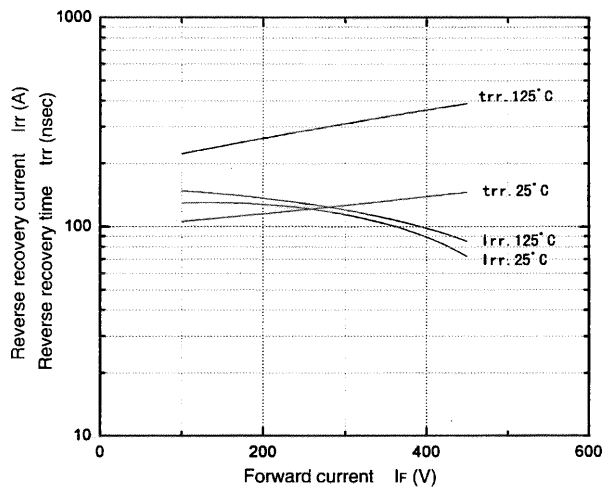
Switching time vs. Gate resistance



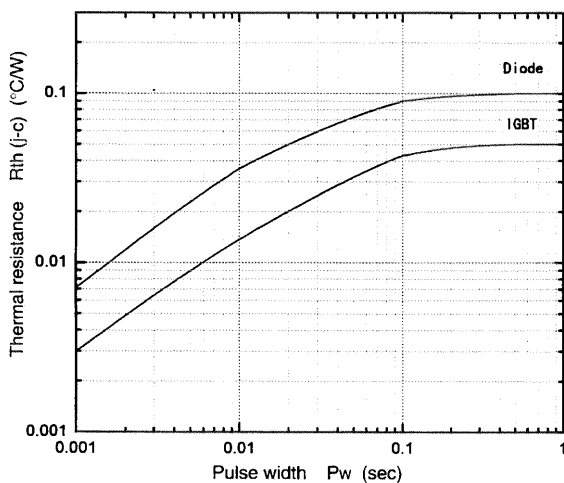
Dynamic input characteristics



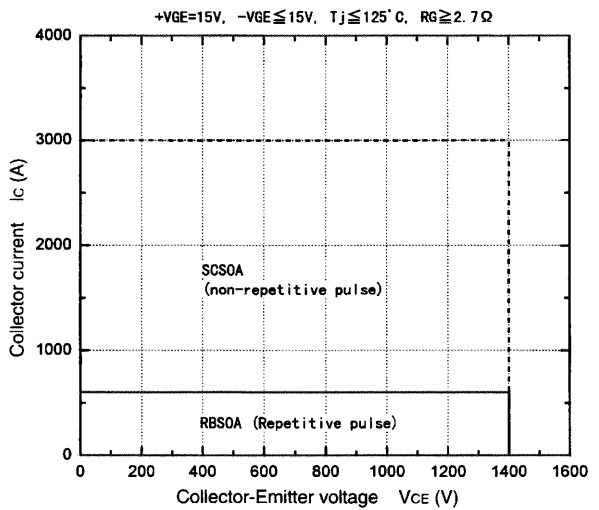
Forward current vs. Forward voltage



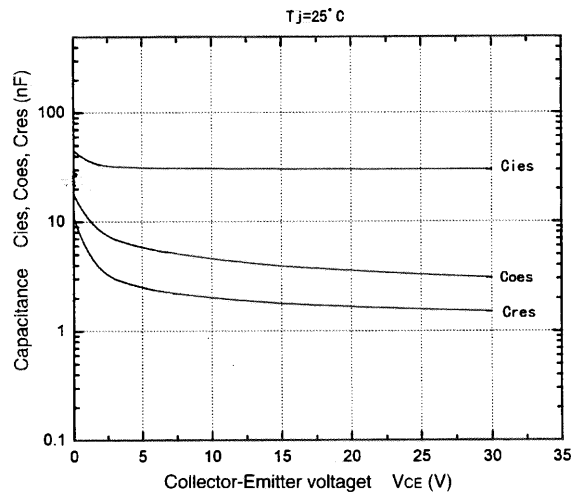
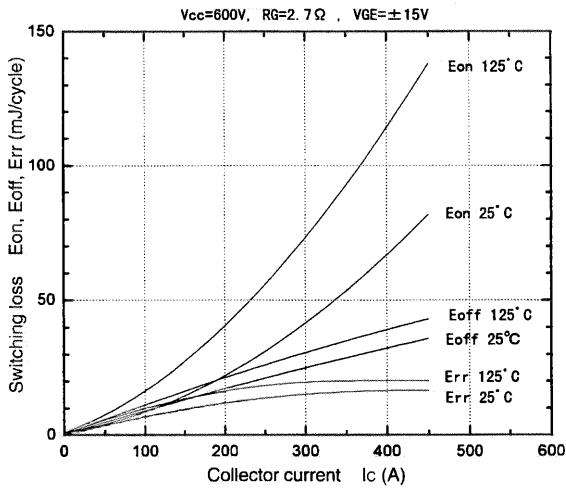
$T_{rr}, I_{rr}$  vs.  $I_F$



Transient thermal resistance



Reverse biased safe operating area



■ Outline Drawings, mm

M238

