

# 2MBI50P-140

## IGBT Module P-Series

### 1400V / 50A 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

#### ■ 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	75	A
			T <sub>c</sub> =80°C	50	
	I <sub>cp</sub>	1ms	T <sub>c</sub> =25°C	150	
			T <sub>c</sub> =80°C	100	
	-I <sub>c</sub>			50	
-I <sub>c</sub> pulse			100		
Collector Power Dissipation	P <sub>c</sub>	1 device	400	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 AC:1min.	2500	VAC	
Screw Torque	Mounting *2		3.5	N·m	
	Terminals *2		3.5		

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

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

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

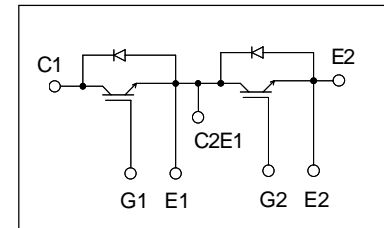
Item	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Zero gate voltage collector current	I <sub>CES</sub>	V <sub>GE</sub> =0V, V <sub>CES</sub> =1400V	–	–	1.0	mA
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CES</sub> =0V, V <sub>GE</sub> =±20V	–	–	200	nA
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CES</sub> =20V, I <sub>c</sub> =50mA	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> =50A, T <sub>j</sub> =25°C	–	2.7	3.0	V
		V <sub>GE</sub> =15V, I <sub>c</sub> =50A, T <sub>j</sub> =125°C	–	3.3	–	
Input capacitance	C <sub>ies</sub>	V <sub>CES</sub> =10V	–	5000	–	pF
Output capacitance	C <sub>oes</sub>	V <sub>GE</sub> =0V	–	750	–	
Reverse transfer capacitance	C <sub>res</sub>	f=1MHz	–	330	–	
Turn-on time	t <sub>on</sub>	V <sub>CC</sub> =600V	–	–	1.20	μs
	t <sub>r</sub>	I <sub>c</sub> =50A	–	–	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> =24 Ω	–	–	0.30	
Diode forward on voltage	V <sub>F</sub>	I <sub>F</sub> =50A, V <sub>GE</sub> =0V	–	2.4	3.3	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =50A	–	–	0.35	μs

##### ● Thermal resistance characteristics

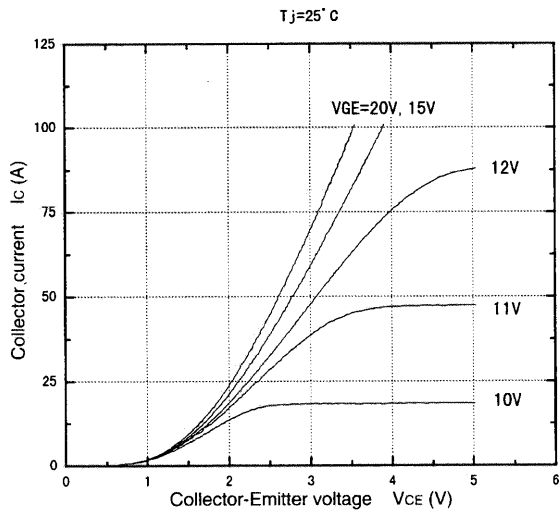
Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R <sub>th(j-c)</sub>	IGBT	–	–	0.31	°C/W
	R <sub>th(j-c)</sub>	Diode	–	–	0.66	
Contact Thermal resistance	R <sub>th(c-f)</sub> *4	the base to cooling fin	–	0.05	–	°C/W

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

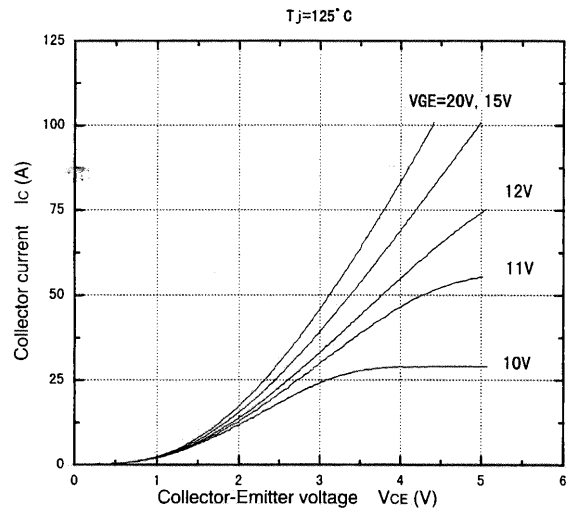
#### ■ Equivalent Circuit Schematic



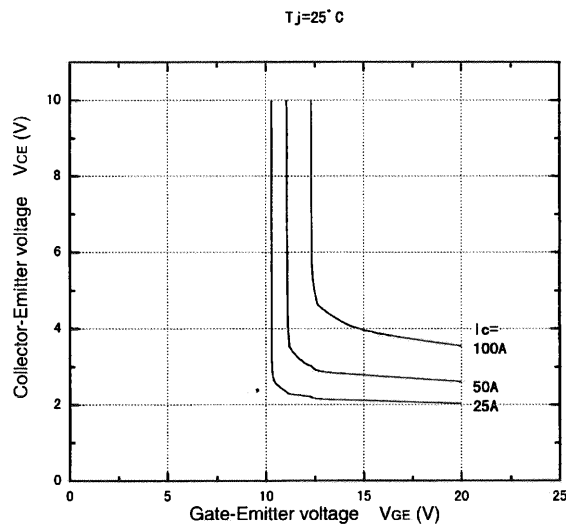
■ Characteristics (Representative)



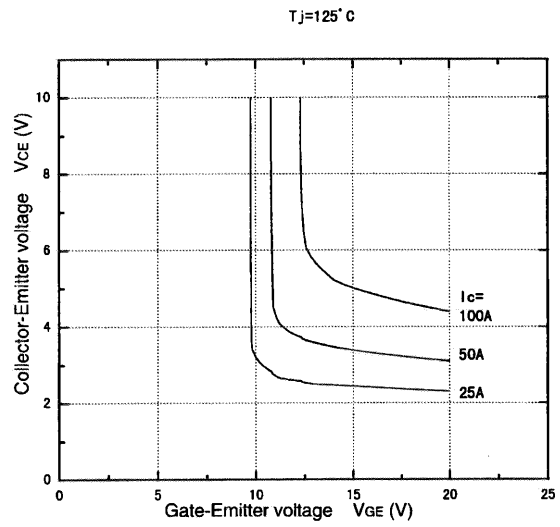
Collector current vs. Collector-Emmitter voltage



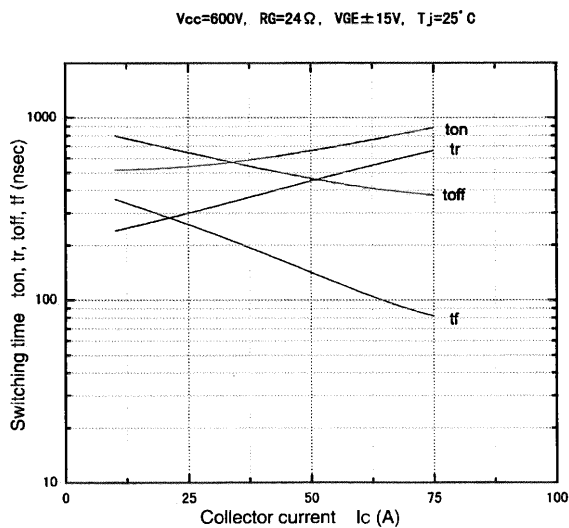
Collector current vs. Collector-Emmitter voltage



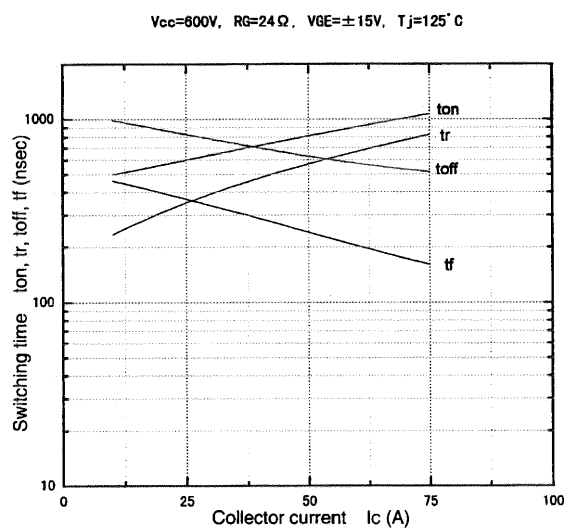
Collector-Emmitter voltage vs. Gate-Emmitter voltage



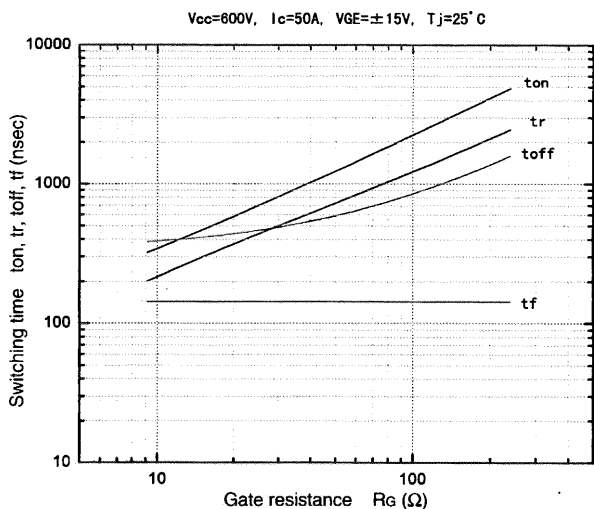
Collector-Emmitter voltage vs. Gate-Emmitter voltage



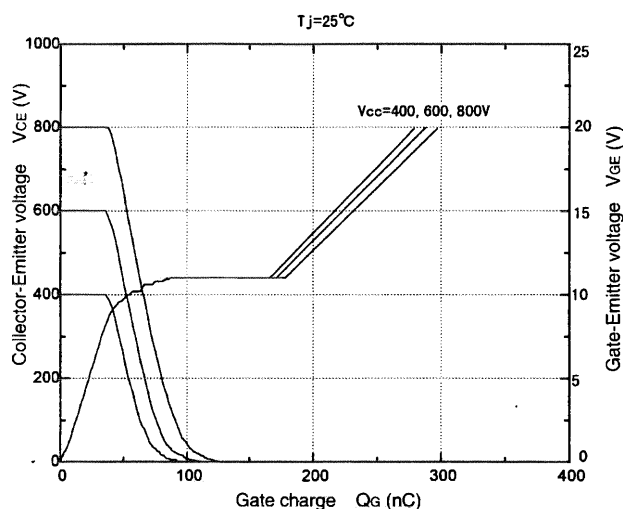
Switching time vs. Collector current



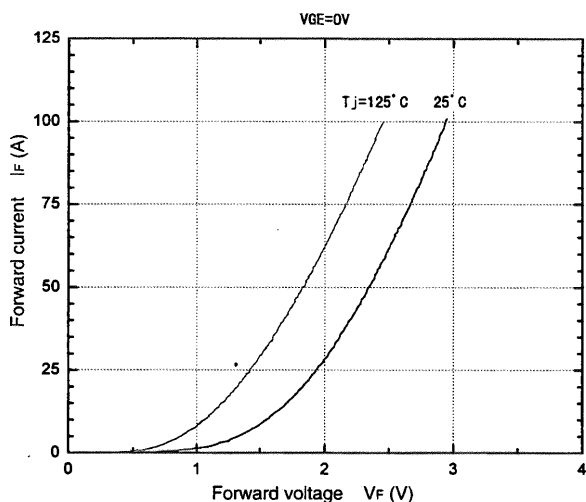
Switching time vs. Collector current



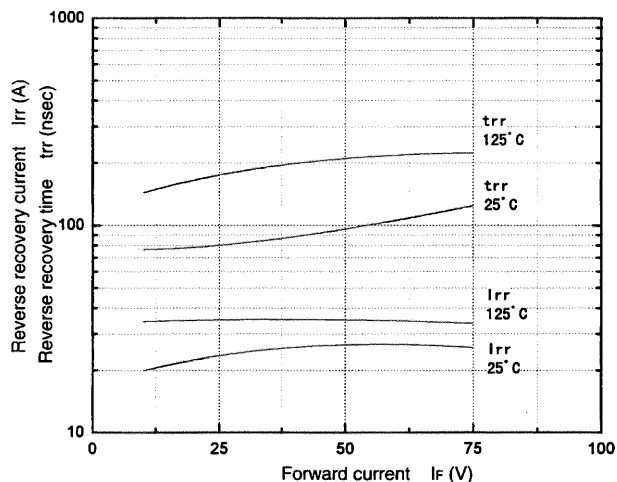
Switching time vs. Gate resistance



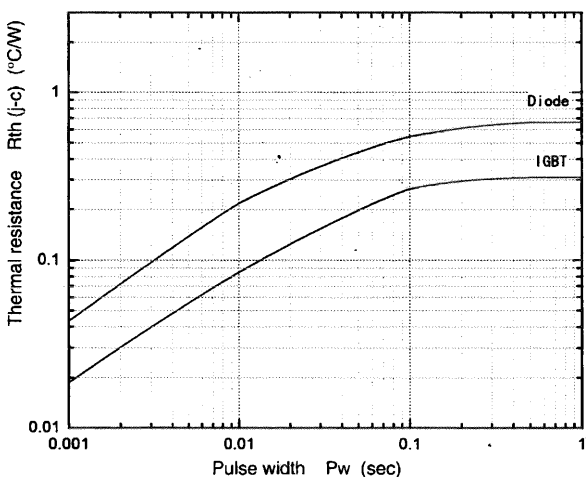
Dynamic input characteristics



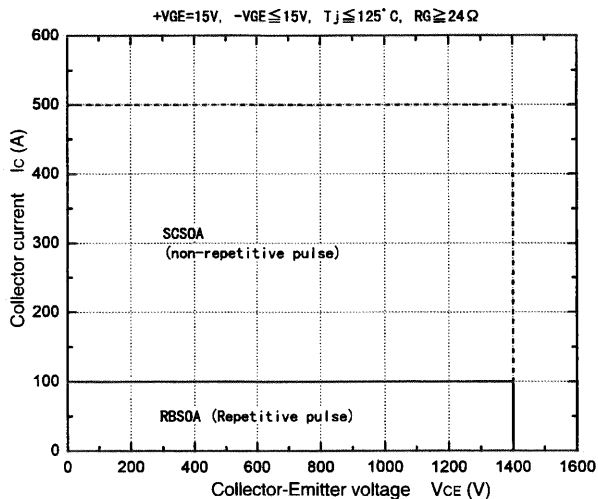
Forward current vs. Forward voltage



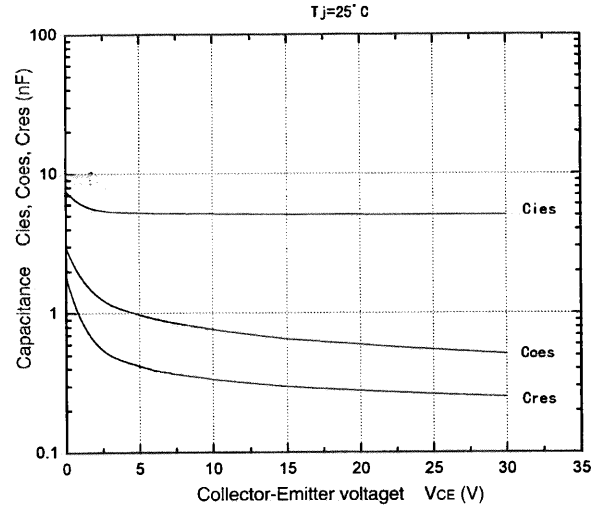
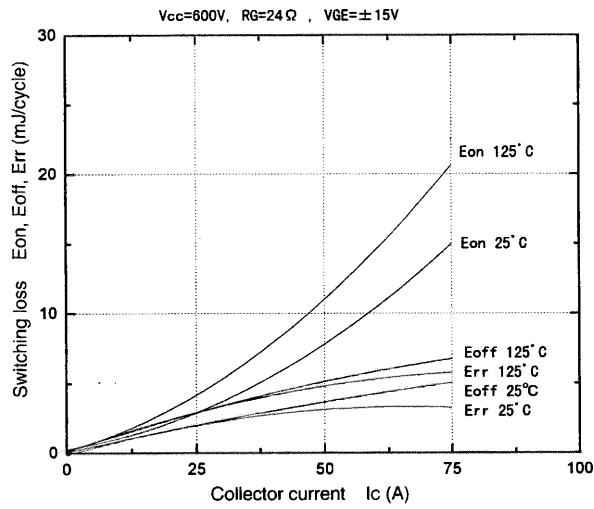
Trr, Irr vs. If



Transient thermal resistance

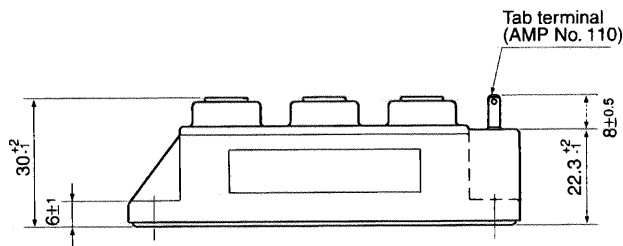
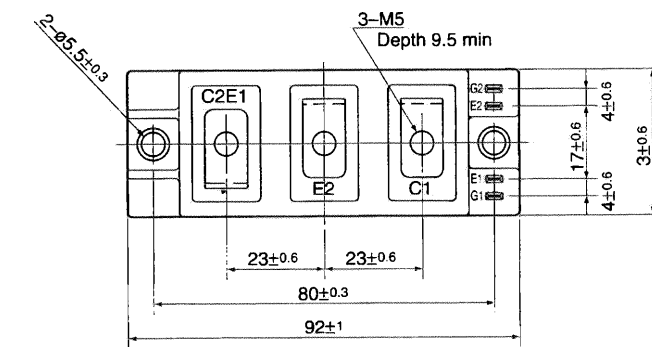


Reverse biased safe operating area



■ Outline Drawings, mm

M232



Mass : 180g