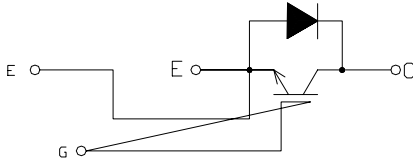
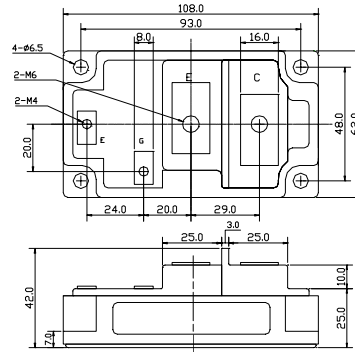


**CIRCUIT**

**OUTLINE DRAWING**


Dimension(mm)

**MAXIMUM RATINGS (T<sub>c</sub>=25°C)**

Approximate Weight : 500g

Item		Symbol	PHMB400B12	Unit	
Collector-Emitter Voltage		V <sub>CEs</sub>	1200	V	
Gate - Emitter Voltage		V <sub>GES</sub>	+/- 20	V	
Collector Current	DC	I <sub>C</sub>	400	A	
	1 ms	I <sub>CP</sub>	800		
Collector Power Dissipation		P <sub>C</sub>	1900	W	
Junction Temperature Range		T <sub>j</sub>	-40 to +150	°C	
Storage Temperature Range		T <sub>stg</sub>	-40 to +125	°C	
Isolation Voltage Terminal to Base AC, 1 min.)		V <sub>ISO</sub>	2500	V	
Mounting Torque	Module Base to Heatsink	F <sub>TOR</sub>	3	N•m	
	Bus Bar to Main Terminals		M4		1.4
			M6		3

**ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C)**

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-Emitter Cut-Off Current		I <sub>CEs</sub>	V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V	-	-	8.0	mA
Gate-Emitter Leakage Current		I <sub>GES</sub>	V <sub>GE</sub> =+/- 20V, V <sub>CE</sub> =0V	-	-	1.0	μA
Collector-Emitter Saturation Voltage		V <sub>CE(sat)</sub>	I <sub>C</sub> =400A, V <sub>GE</sub> =15V	-	1.9	2.4	V
Gate-Emitter Threshold Voltage		V <sub>GE(th)</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =400mA	4.0	-	8.0	V
Input Capacitance		C <sub>ies</sub>	V <sub>CE</sub> =10V, V <sub>GE</sub> =0V, f=1MHz	-	33000	-	pF
Switching Time	Rise Time	t <sub>r</sub>	V <sub>CC</sub> = 600V R <sub>L</sub> = 1.5 ohm R <sub>G</sub> = 1.0 ohm V <sub>GE</sub> = +/- 15V	-	0.25	0.45	μs
	Turn-on Time	t <sub>on</sub>		-	0.40	0.70	
	Fall Time	t <sub>f</sub>		-	0.25	0.35	
	Turn-off Time	t <sub>off</sub>		-	0.80	1.10	

**FREE WHEELING DIODES RATINGS & CHARACTERISTICS (T<sub>c</sub>=25°C)**

Item		Symbol	Rated Value	Unit
Forward Current	DC	I <sub>F</sub>	400	A
	1 ms	I <sub>FM</sub>	800	

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Peak Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =400A, V <sub>GE</sub> =0V	-	1.9	2.4	V
Reverse Recovery Time	t <sub>r</sub>	I <sub>F</sub> =400A, V <sub>GE</sub> =-10V, di/dt=800A/μs	-	0.20	0.30	μs

**THERMAL CHARACTERISTICS**

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Thermal Impedance	IGBT	R <sub>th(j-c)</sub>	Junction to Case	-	-	0.065	°C/W
	DIODE			-	-	0.12	

# PHMB400B12

Fig.1- Output Characteristics (Typical)

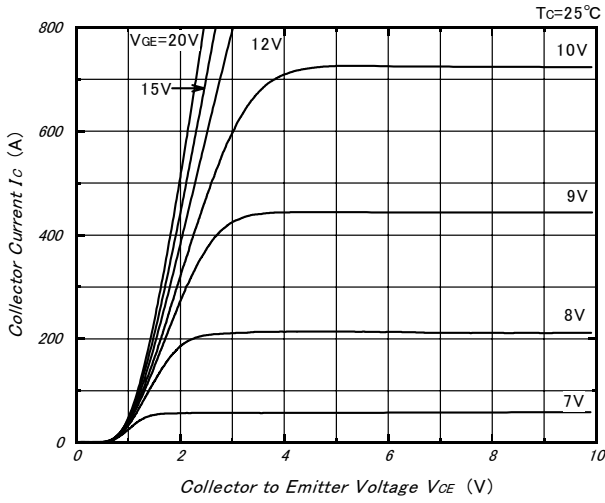


Fig.2- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

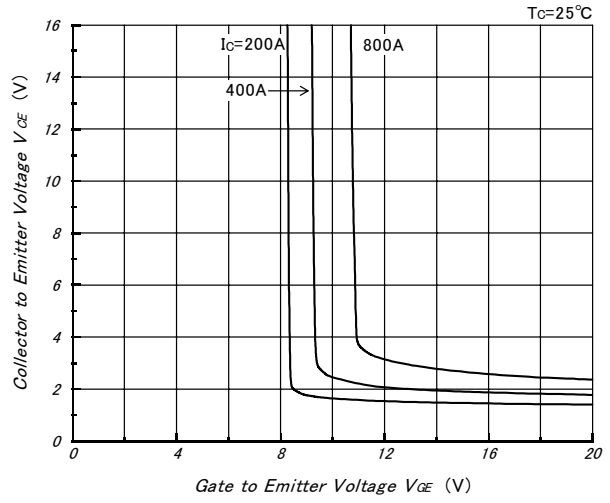


Fig.3- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

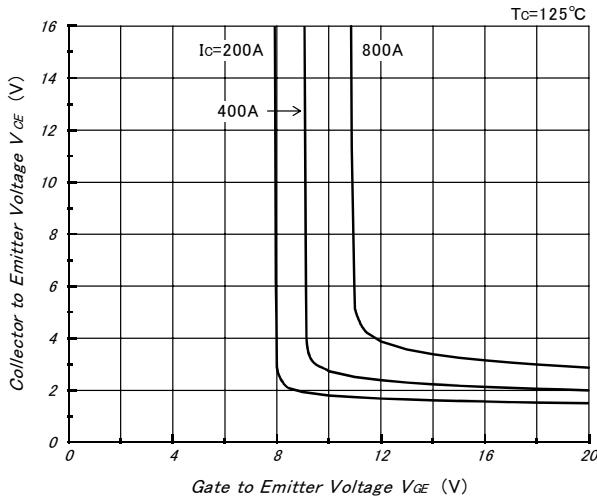


Fig.4- Gate Charge vs. Collector to Emitter Voltage (Typical)

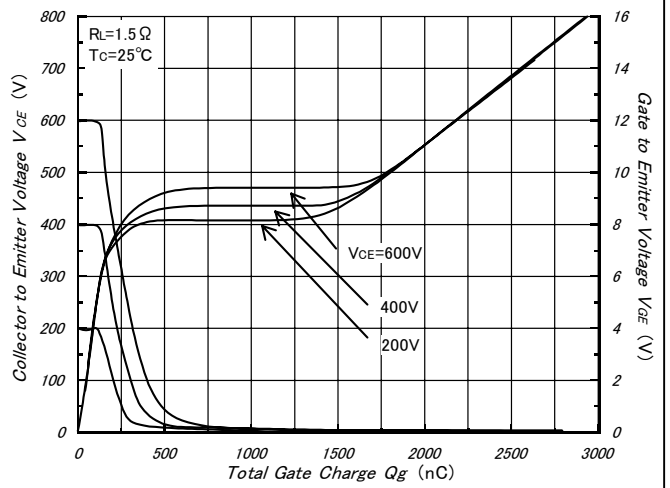


Fig.5- Capacitance vs. Collector to Emitter Voltage (Typical)

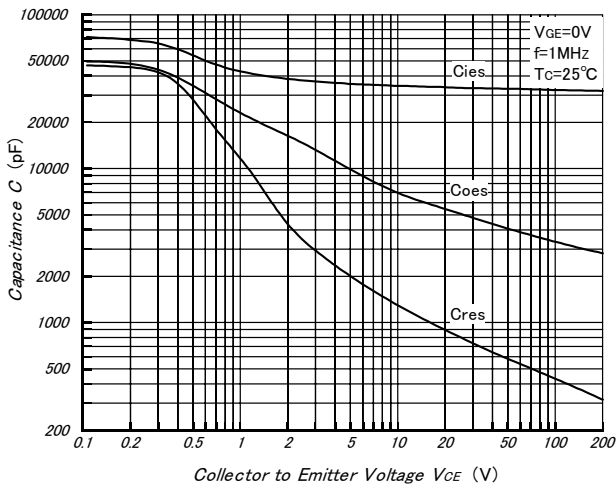
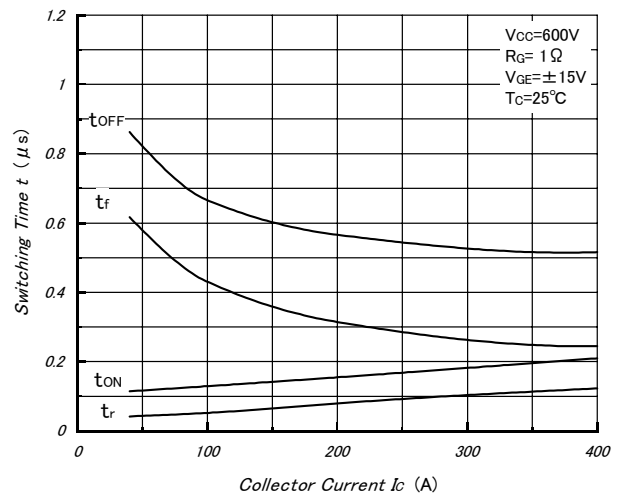


Fig.6- Collector Current vs. Switching Time (Typical)



# PHMB400B12

Fig.7- Series Gate Impedance vs. Switching Time (Typical)

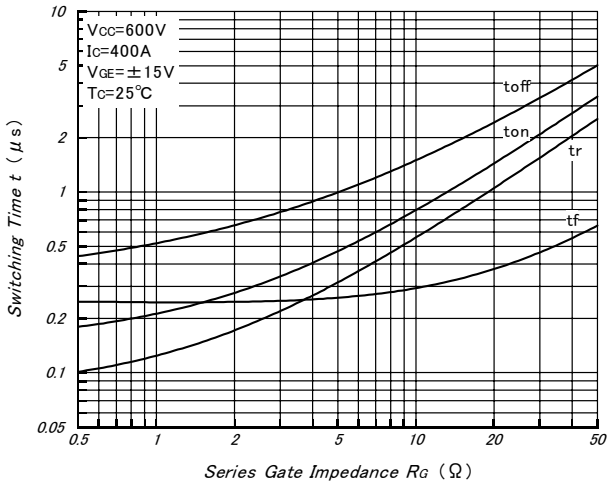


Fig.8- Forward Characteristics of Free Wheeling Diode (Typical)

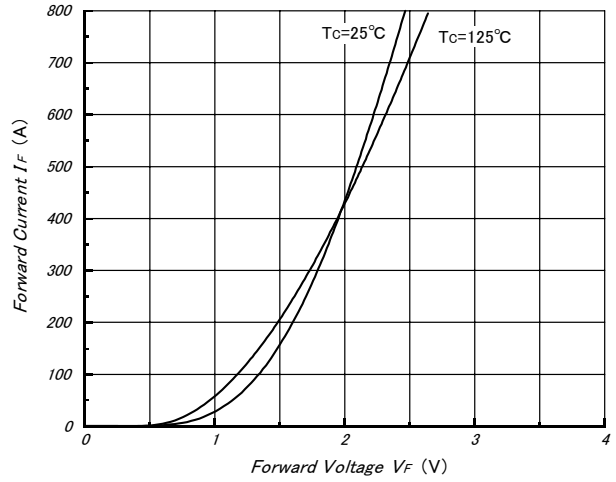


Fig.9- Reverse Recovery Characteristics (Typical)

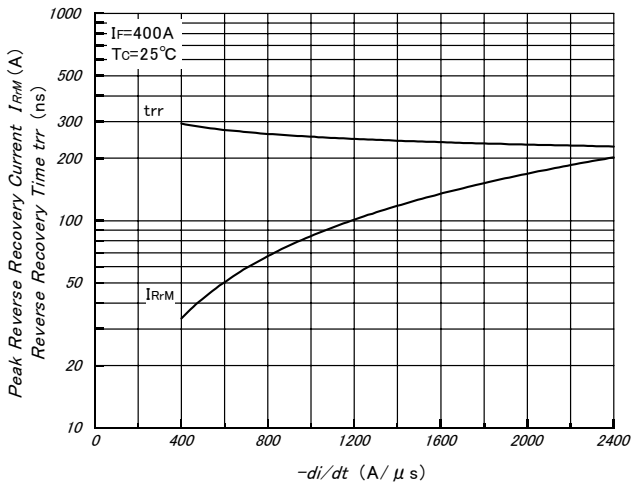


Fig.10- Reverse Bias Safe Operating Area (Typical)

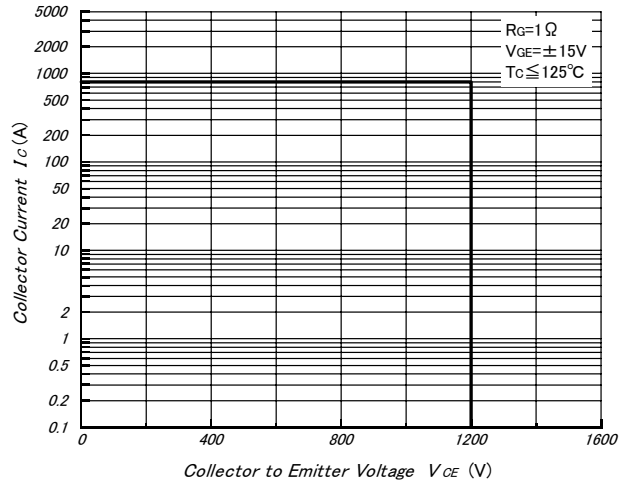


Fig.11- Transient Thermal Impedance

