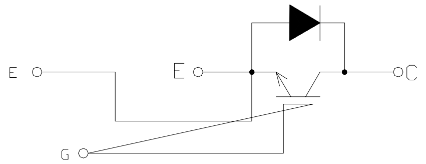
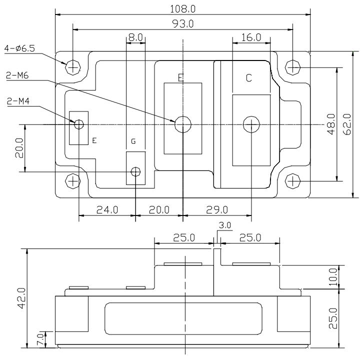
Nihon Inter Electronics Corporation

IGBT MODULE Single 400A 1200V PHMB400B12

CIRCUIT



OUTLINE DRAWING



Dimension(mm)

Approximate Weight : 500g

MAXMUM RATINGS (Tc=25℃)

Item		Symbol	PHMB400B12		Unit
Collector-Emitter Voltage		V_{CES}	1200		V
Gate - Emitter Voltage		V_{GES}	+/- 20		V
Collector Current	DC	I_C	400		A
	1 ms	I_{CP}	800		
Collector Power Dissipation		P_C	1900		W
Junction Temperature Range		T_j	-40 to +150		℃
Storage Temperature Range		T_{stg}	-40 to +125		℃
Isolation Voltage Terminal to Base AC, 1 min.)		V_{ISO}	2500		V
Mounting Torque	Module Base to Heatsink	F_{TOR}	3		N•m
	Bus Bar to Main Terminals		M4	1.4	
			M6	3	

ELECTRICAL CHARACTERISTICS (Tc=25℃)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-Emitter Cut-Off Current		I_{CES}	V_{CE}=1200V,V_{GE}=0V	-	-	8.0	mA
Gate-Emitter Leakage Current		I_{GES}	V_{GE}=+/- 20V,V_{CE}=0V	-	-	1.0	μA
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=400A,V_{GE}=15V	-	1.9	2.4	V
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	V_{CE}=5V,I_C=400mA	4.0	-	8.0	V
Input Capacitance		Cies	V_{CE}=10V,V_{GE}=0V,f=1MHz	-	33000	-	pF
Switching Time	Rise Time	t_r	V_{CC}= 600V	-	0.25	0.45	μs
	Turn-on Time	t_{on}	R_L= 1.5 ohm	-	0.40	0.70	
	Fall Time	t_f	R_G= 1.0 ohm	-	0.25	0.35	
	Turn-off Time	t_{off}	V_{GE}= +/- 15V	-	0.80	1.10	

FREE WHEELING DIODES RATINGS & CHARACTERISTICS (Tc=25℃)

Item		Symbol	Rated Value	Unit
Forward Current	DC	I_F	400	A
	1 ms	I_{FM}	800	

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Peak Forward Voltage	V_F	I_F=400A,V_{GE}=0V	-	1.9	2.4	V
Reverse Recovery Time	t_{rr}	I_F=400A,V_{GE}=-10V,di/dt=800A/μs	-	0.20	0.30	μs

THERMAL CHARACTERISTICS

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Thermal Impedance	IGBT	$R_{th(j-c)}$	Junction to Case	-	-	0.065	℃/W
	DIODE			-	-	0.12	

PHMB400B12

Fig.1– Output Characteristics (Typical)

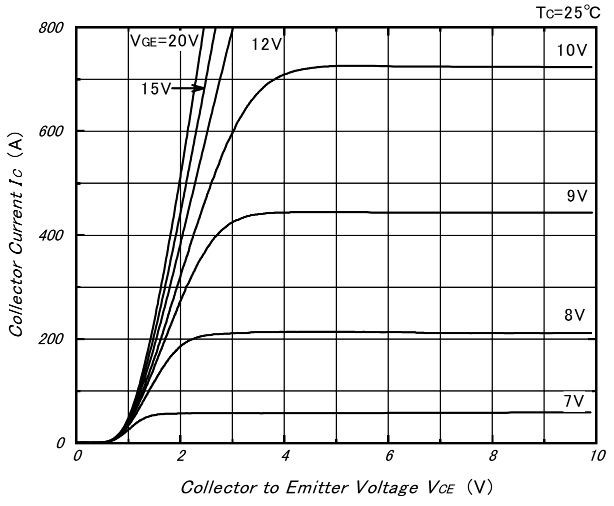


Fig.2– Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

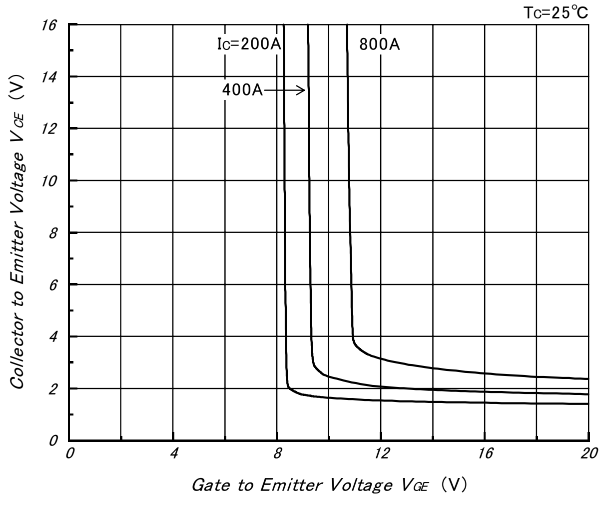


Fig.3– Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

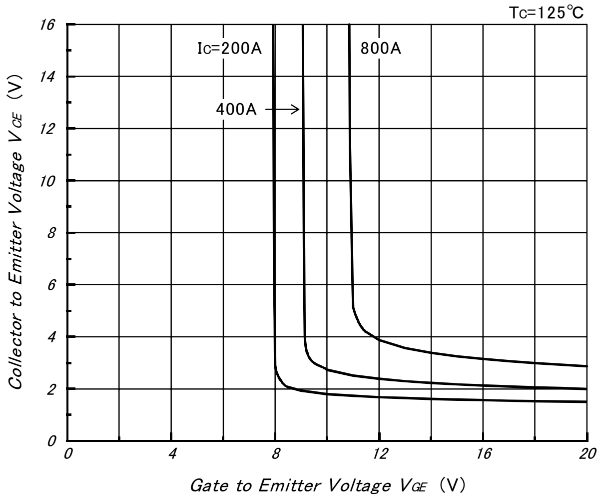


Fig.4– Gate Charge vs. Collector to Emitter Voltage (Typical)

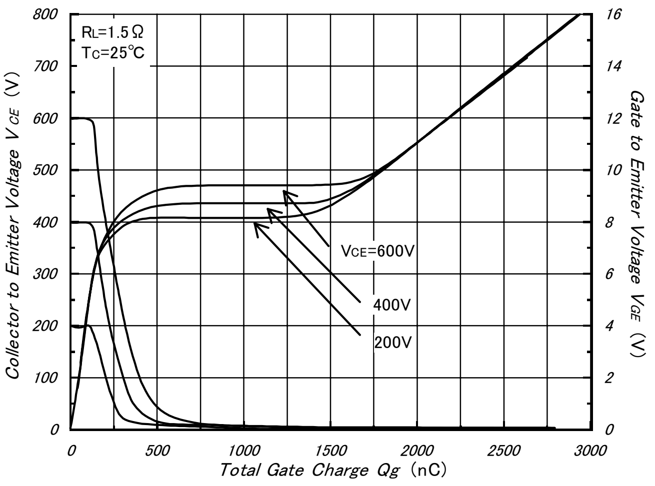


Fig.5– Capacitance vs. Collector to Emitter Voltage (Typical)

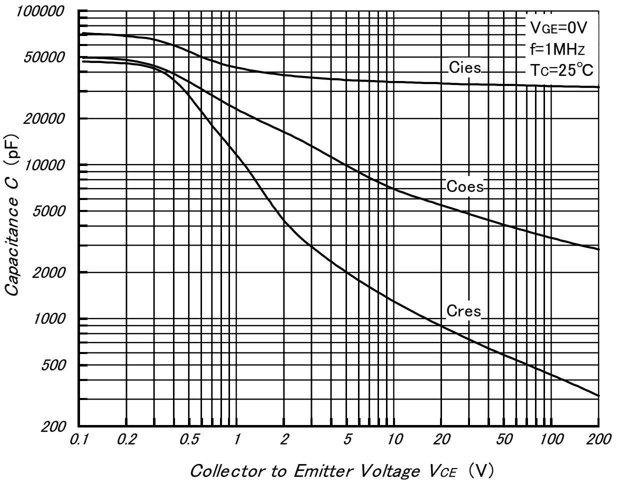


Fig.6– Collector Current vs. Switching Time (Typical)

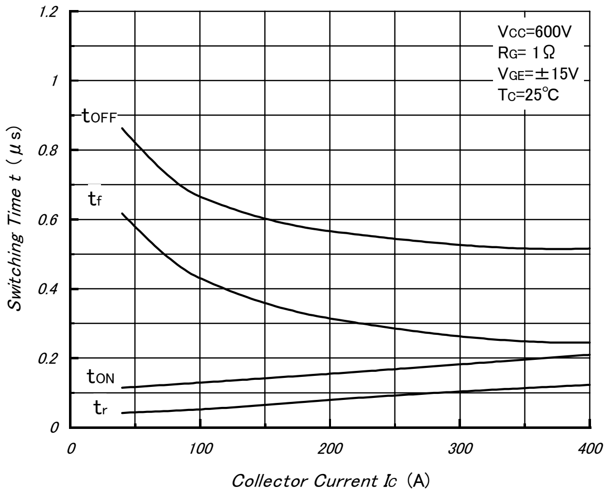


Fig.7– Series Gate Impedance vs. Switching Time (Typical)

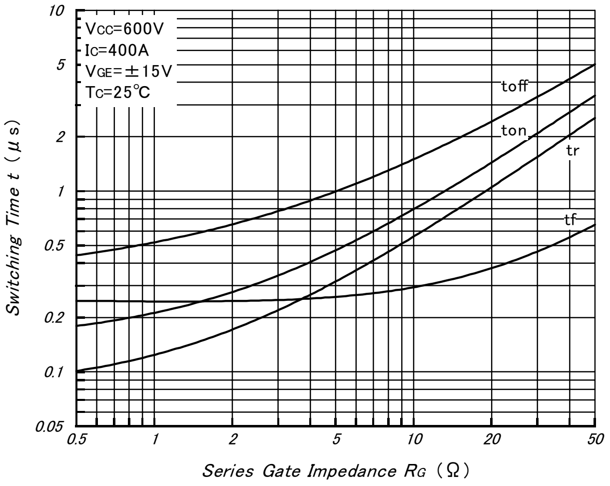


Fig.8– Forward Characteristics of Free Wheeling Diode (Typical)

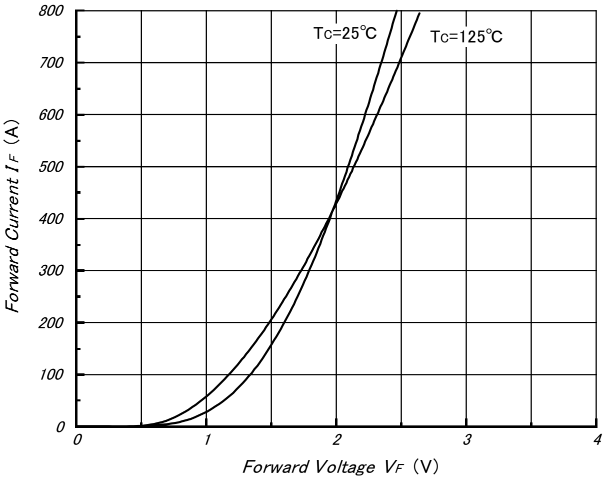


Fig.9– Reverse Recovery Characteristics (Typical)

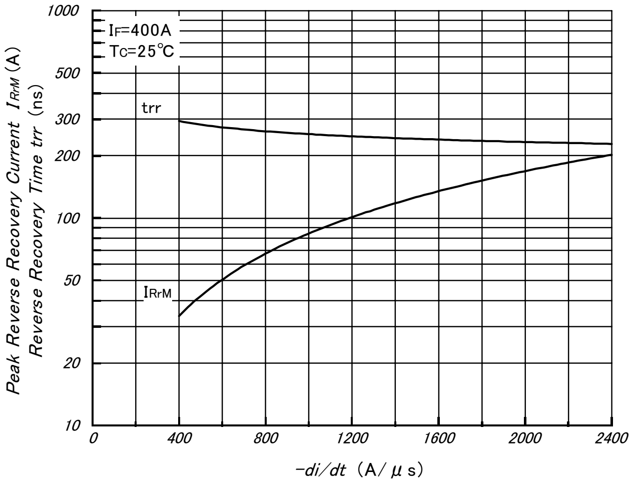


Fig.10– Reverse Bias Safe Operating Area (Typical)

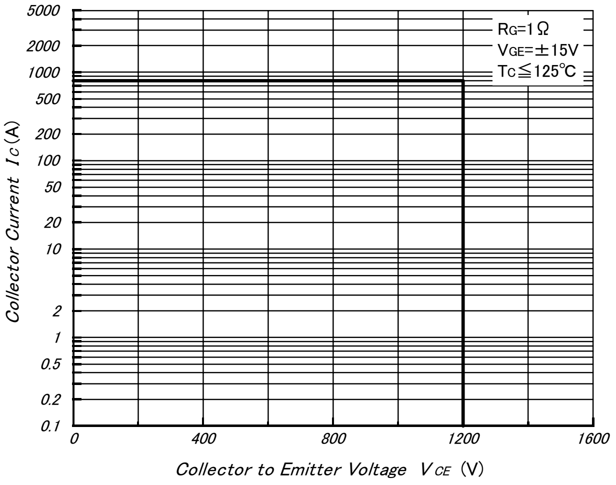


Fig.11– Transient Thermal Impedance