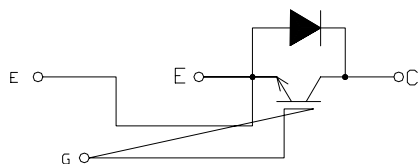


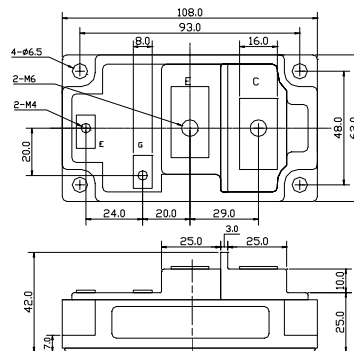
IGBT MODULE Single 400A 1200V

PHMB400B12

CIRCUIT



OUTLINE DRAWING



Dimension(mm)

MAXMUM RATINGS (Tc=25°C)

Approximate Weight : 500g

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		°C
Storage Temperature Range		T _{stg}	-40 to +125		°C
Isolation Voltage Terminal to Base AC, 1 min.)		V _{ISO}	2500		V
Mounting Torque	Module Base to Heatsink		3		N•m
	Bus Bar to Main Terminals		M4	1.4	
			M6	3	

ELECTRICAL CHARACTERISTICS (Tc=25°C)

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		C_{ies}	$V_{CE}=10V, V_{GE}=0V, f=1MHz$	-	33000	-	pF
Switching Time	Rise Time	t_r	$V_{CC}=600V$ $R_L=1.5\text{ ohm}$ $R_G=1.0\text{ ohm}$ $V_{GE}=+/- 15V$	-	0.25	0.45	μs
	Turn-on Time	t_{on}		-	0.40	0.70	
	Fall Time	t_f		-	0.25	0.35	
	Turn-off Time	t_{off}		-	0.80	1.10	

FREE WHEELING DIODES RATINGS & CHARACTERISTICS (Tc=25°C)

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}	$I_F=400A, V_{GE}=-10V, di/dt=800A/\mu s$	-	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	°C/W
	DIODE			-	-	0.12	

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PHMB400B12

Fig.1- Output Characteristics (Typical)

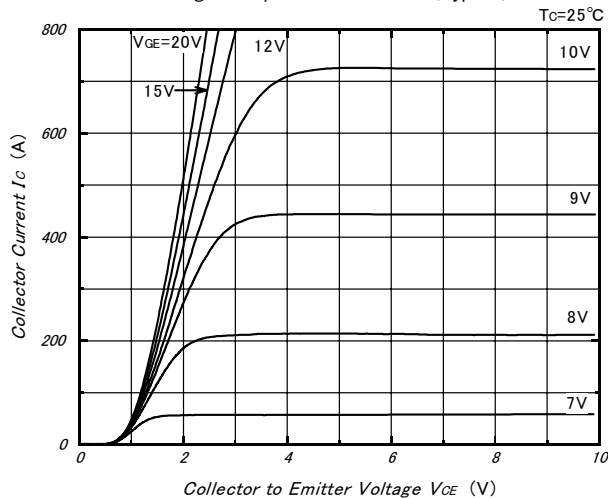


Fig.2- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

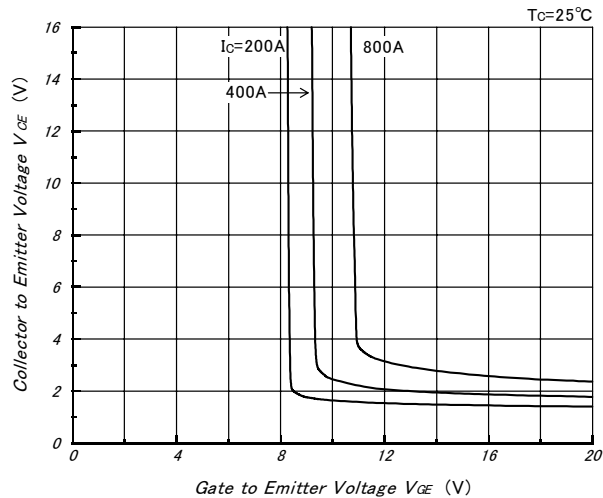


Fig.3- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

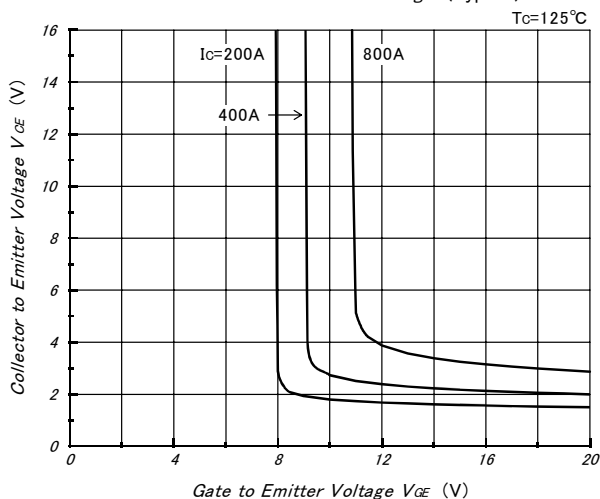


Fig.4- Gate Charge vs. Collector to Emitter Voltage (Typical)

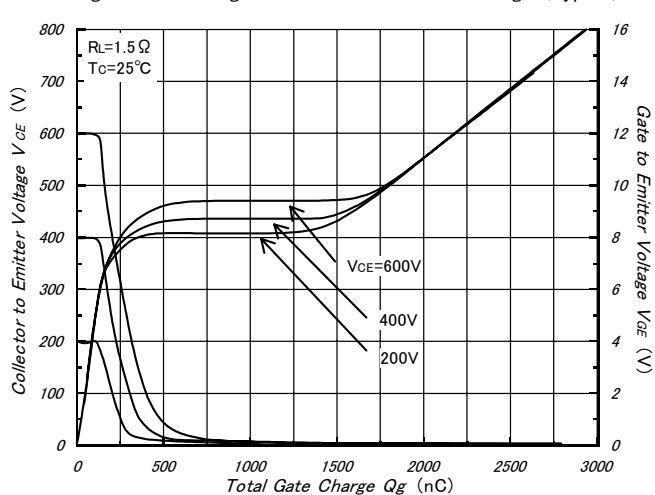


Fig.5- Capacitance vs. Collector to Emitter Voltage (Typical)

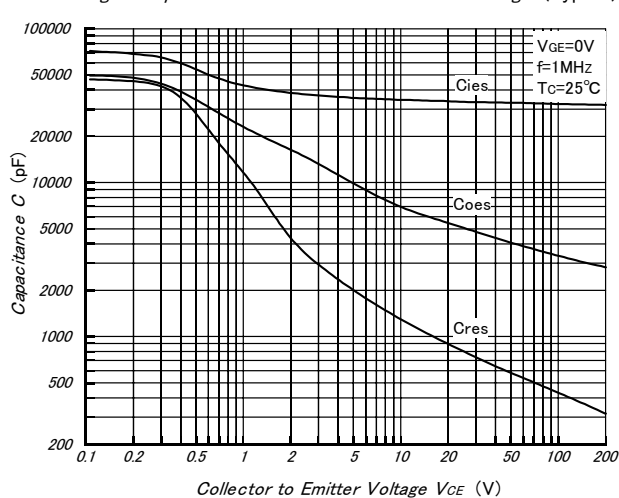
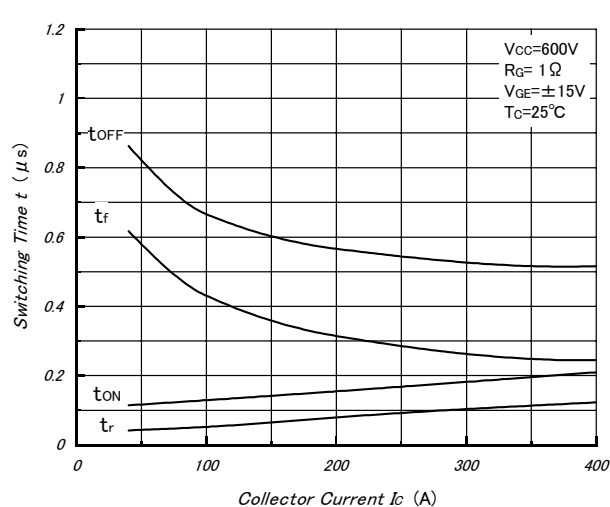


Fig.6- Collector Current vs. Switching Time (Typical)



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

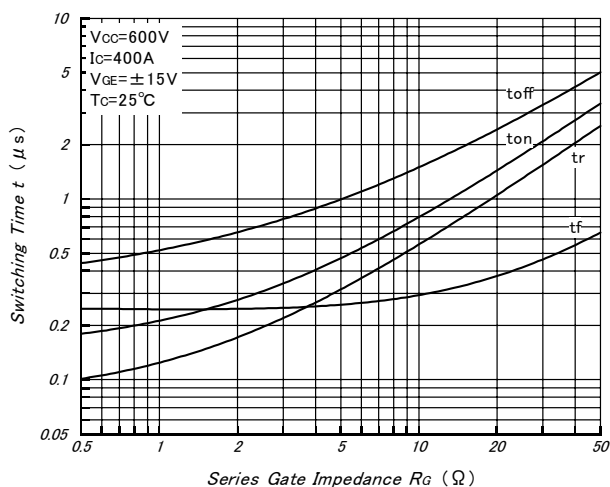


Fig.8- Forward Characteristics of Free Wheeling Diode (Typical)

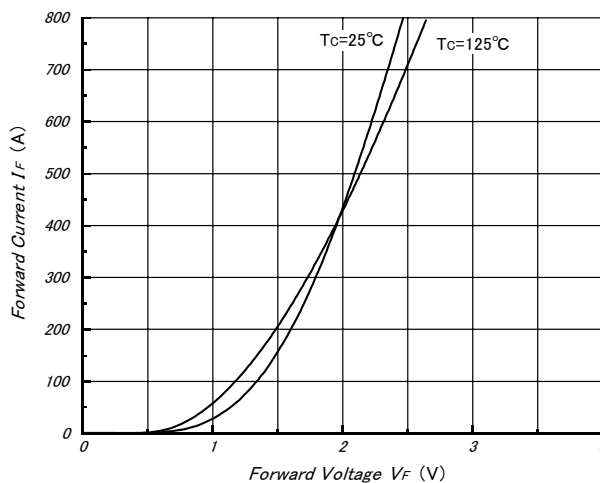


Fig.9- Reverse Recovery Characteristics (Typical)

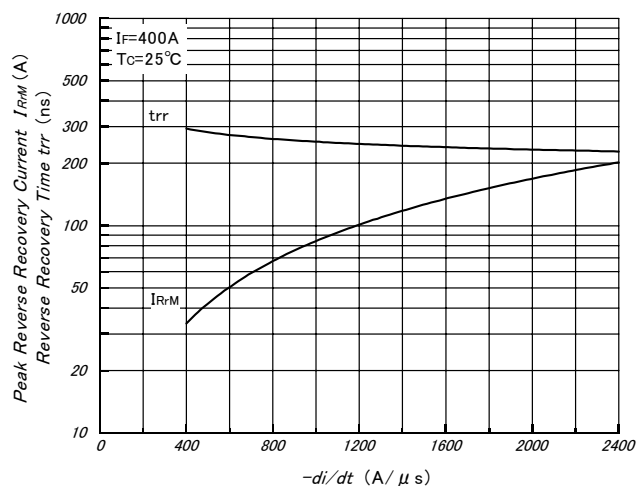


Fig.10- Reverse Bias Safe Operating Area (Typical)

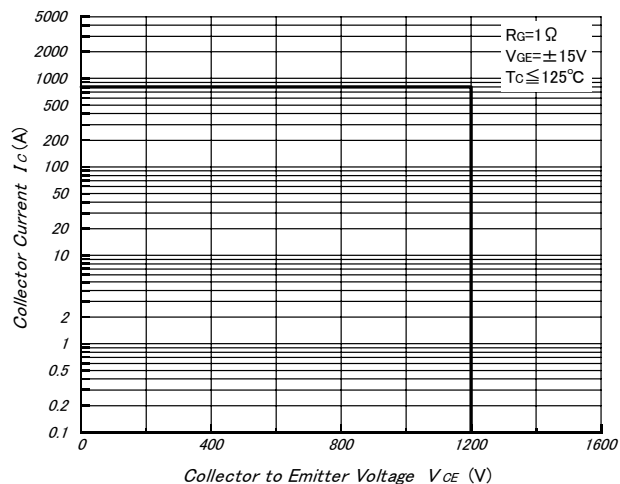


Fig.11- Transient Thermal Impedance

