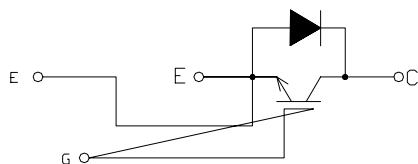
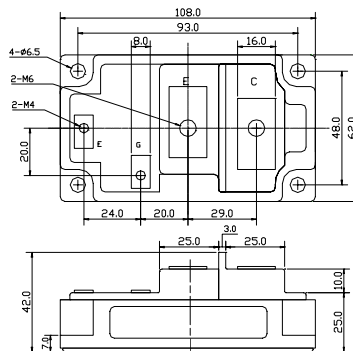


CIRCUIT



OUTLINE DRAWING



Dimension(mm)

Approximate Weight : 500g

MAXIMUM RATINGS (Tc=25°C)

Item	Symbol	PHMB400B12	Unit	
Collector-Emitter Voltage	V_{CES}	1200	V	
Gate - Emitter Voltage	V_{GES}	+/- 20	V	
Collector Current	DC	I_C	400	
	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}	$V_{GE}=\pm 20V, V_{CE}=0V$	-	-	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	$V_{CC}=600V$ $R_L=1.5\text{ ohm}$ $R_G=1.0\text{ ohm}$ $V_{GE}=\pm 15V$	-	0.25	0.45	μs
	Turn-on Time		-	0.40	0.70	
	Fall Time		-	0.25	0.35	
	Turn-off Time		-	0.80	1.10	

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

Item	Symbol	Rated Value	Unit
Forward Current	DC	I_F	400
	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_r	$I_F=400A, V_{GE}=-10V, di/dt=800A/\mu s$	-	0.20	0.30	μs

THERMAL CHARACTERISTICS

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Thermal Impedance	IGBT	Junction to Case	-	-	0.065	°C/W
	DIODE		-	-	0.12	

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Fig.1- Output Characteristics (Typical)

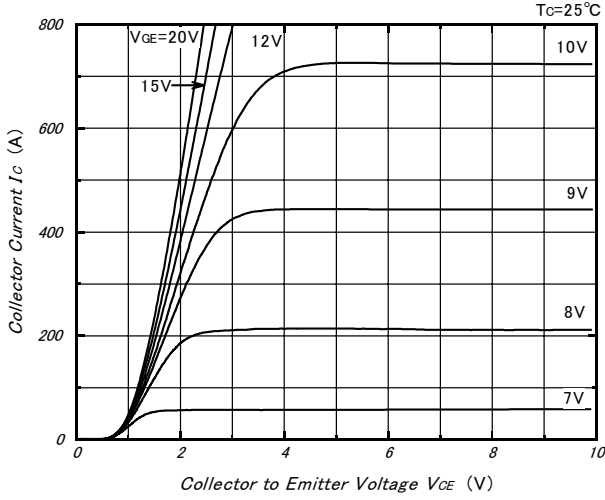


Fig.2- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

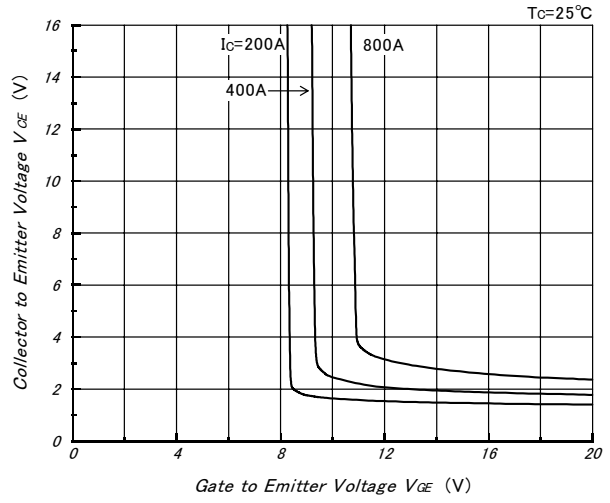


Fig.3- Collector to Emitter On Voltage vs. Gate to Emitter Voltage (Typical)

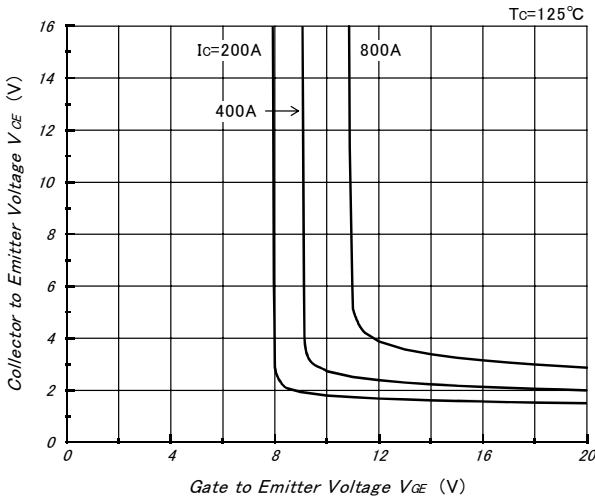


Fig.4- Gate Charge vs. Collector to Emitter Voltage (Typical)

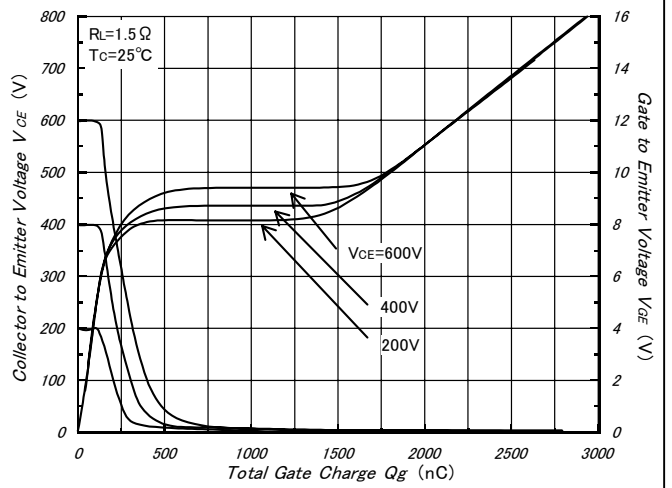


Fig.5- Capacitance vs. Collector to Emitter Voltage (Typical)

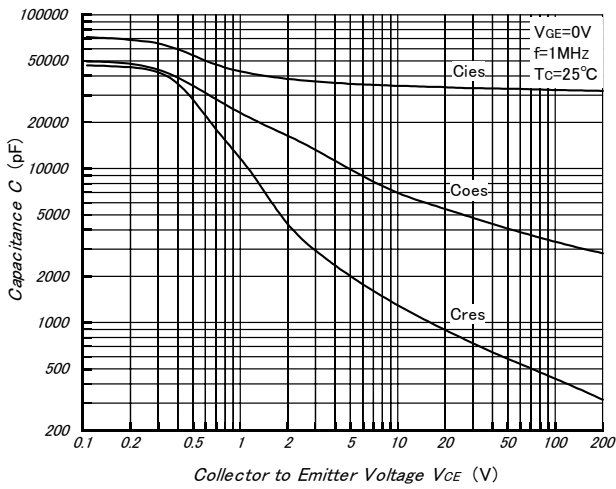
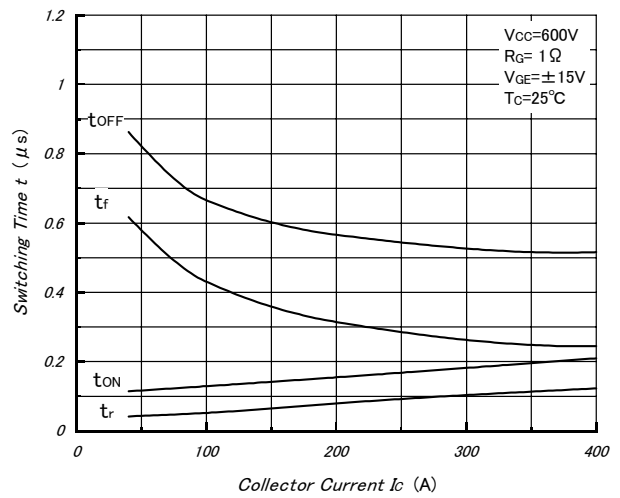


Fig.6- Collector Current vs. Switching Time (Typical)



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

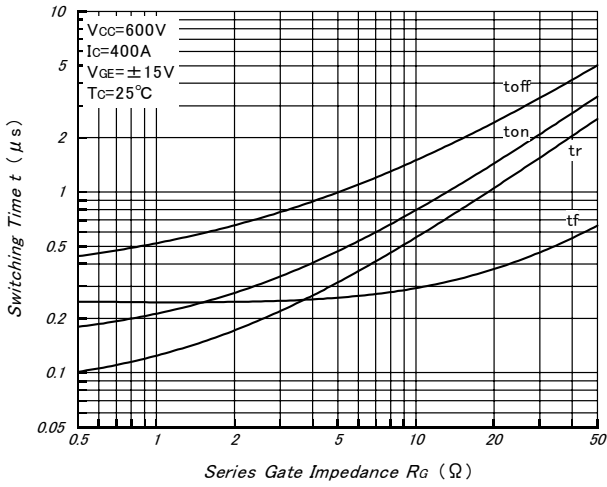


Fig.8- Forward Characteristics of Free Wheeling Diode (Typical)

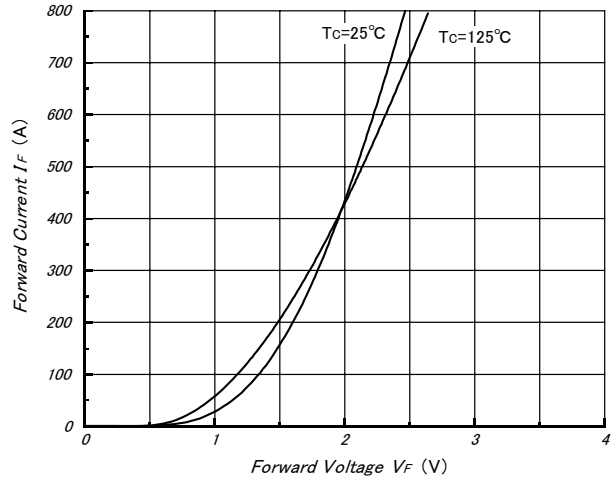


Fig.9- Reverse Recovery Characteristics (Typical)

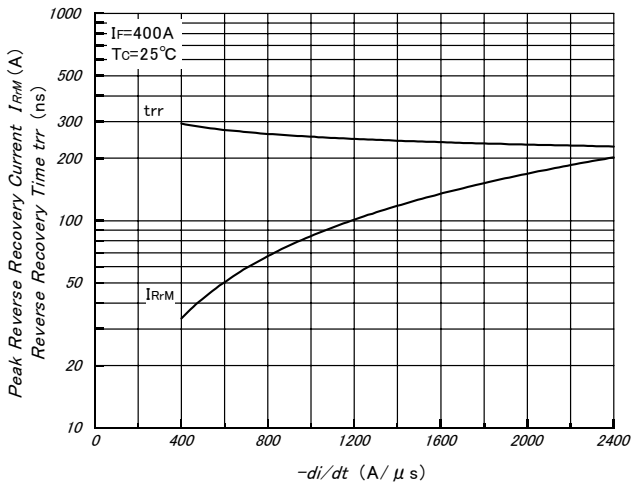


Fig.10- Reverse Bias Safe Operating Area (Typical)

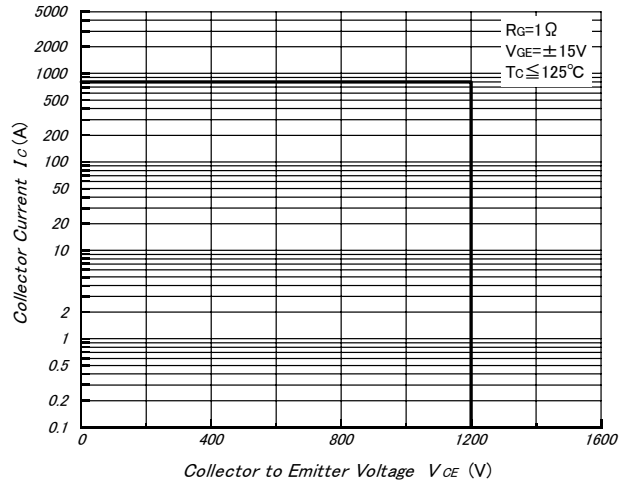


Fig.11- Transient Thermal Impedance

