

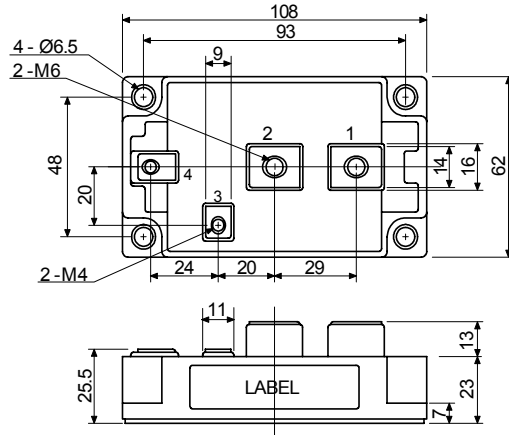
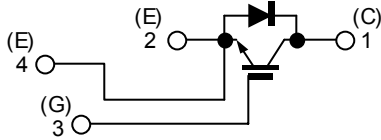
IGBT Module-Single

400 A, 1200V

PHMB400BS12

□ 回路図 : CIRCUIT

□ 外形寸法図 : OUTLINE DRAWING



Dimension: [mm]

□ 最大定格 : MAXIMUM RATINGS ( $T_c = 25^\circ\text{C}$ )

Item	Symbol	Rated Value	Unit
コレクタ・エミッタ間電圧 Collector-Emmitter Voltage	$V_{CES}$	1,200	V
ゲート・エミッタ間電圧 Gate-Emmitter Voltage	$V_{GES}$	$\pm 20$	V
コレクタ電流 Collector Current	DC	$I_C$	A
	1ms	$I_{CP}$	
コレクタ損失 Collector Power Dissipation	$P_C$	2,400	W
接合温度 Junction Temperature Range	$T_j$	$-40 \sim +150$	$^\circ\text{C}$
保存温度 Storage Temperature Range	$T_{stg}$	$-40 \sim +125$	$^\circ\text{C}$
絶縁耐圧(Terminal to Base AC, 1 minute) Isolation Voltage	$V_{ISO}$	2,500	$V_{(RMS)}$
締め付けトルク Mounting Torque	$F_{tor}$	3 (30.6)	$\text{N}\cdot\text{m}$ ( $\text{kgf}\cdot\text{cm}$ )

□ 電気的特性 : ELECTRICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ )

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
コレクタ遮断電流 Collector-Emmitter Cut-Off Current	$I_{CES}$	$V_{CE} = 1200\text{V}, V_{GE} = 0\text{V}$	—	—	4.0	mA
ゲート漏れ電流 Gate-Emmitter Leakage Current	$I_{GES}$	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}$	—	—	1.0	$\mu\text{A}$
コレクタ・エミッタ間飽和電圧 Collector-Emmitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 400\text{A}, V_{GE} = 15\text{V}$	—	2.3	2.7	V
ゲートしきい値電圧 Gate-Emmitter Threshold Voltage	$V_{GE(th)}$	$V_{CE} = 5\text{V}, I_C = 400\text{mA}$	4.0	—	8.0	V
入力容量 Input Capacitance	$C_{ies}$	$V_{CE} = 10\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$	—	25,200	—	pF
スイッチング時間 Switching Time	上昇時間 Rise Time	$V_{CC} = 600\text{V}$ $R_L = 1.5\Omega$ $R_G = 3.9\Omega$ $V_{GE} = \pm 15\text{V}$	—	0.25	0.45	$\mu\text{s}$
	ターンオン時間 Turn-on Time		—	0.40	0.70	
	下降時間 Fall Time		—	0.25	0.35	
	ターンオフ時間 Turn-off Time		—	0.80	1.10	

□ フリーホイールダイオードの特性 : FREE WHEELING DIODE RATINGS & CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ )

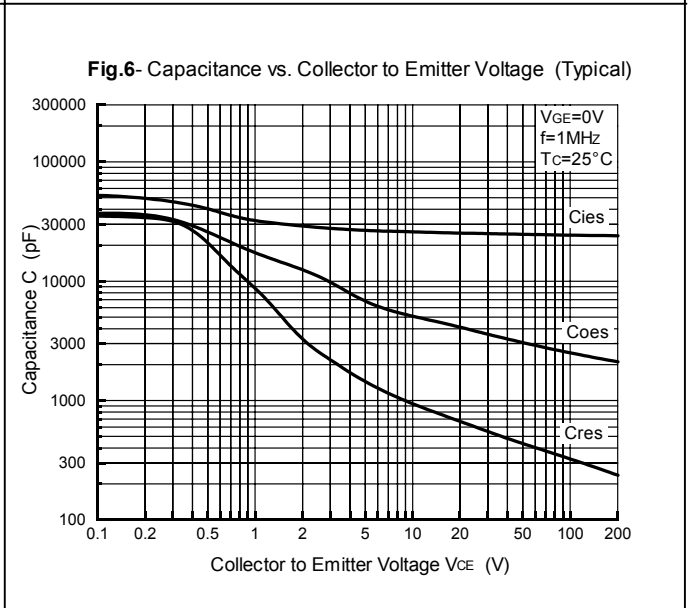
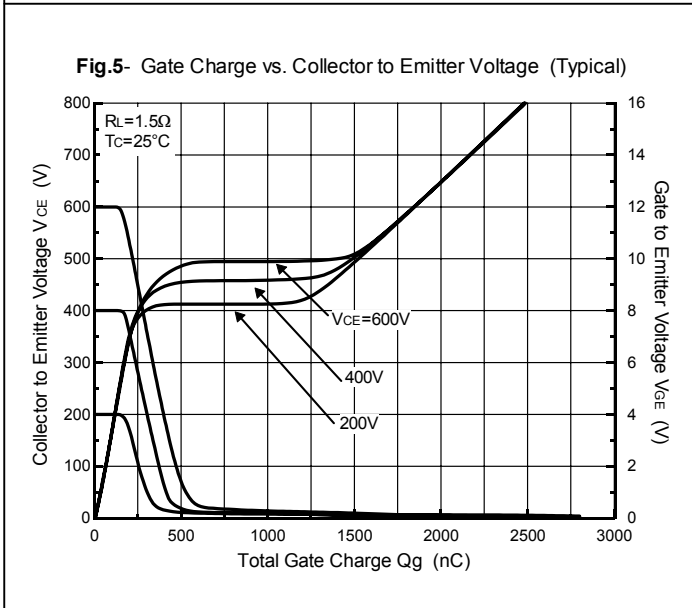
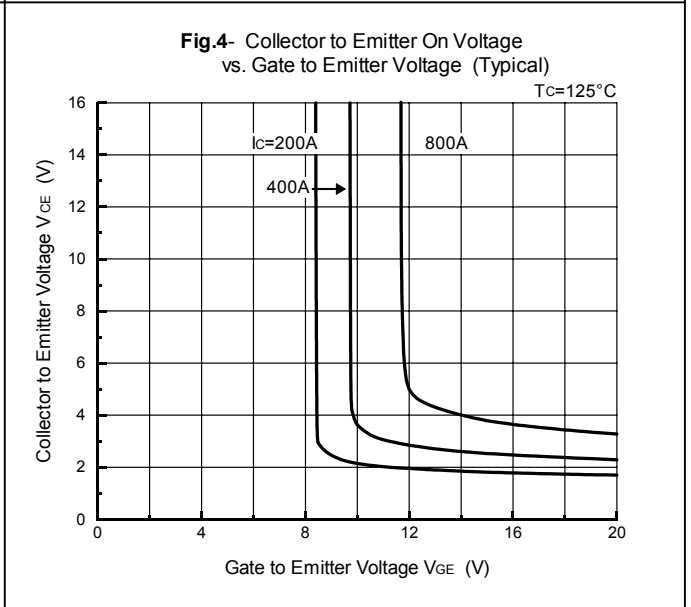
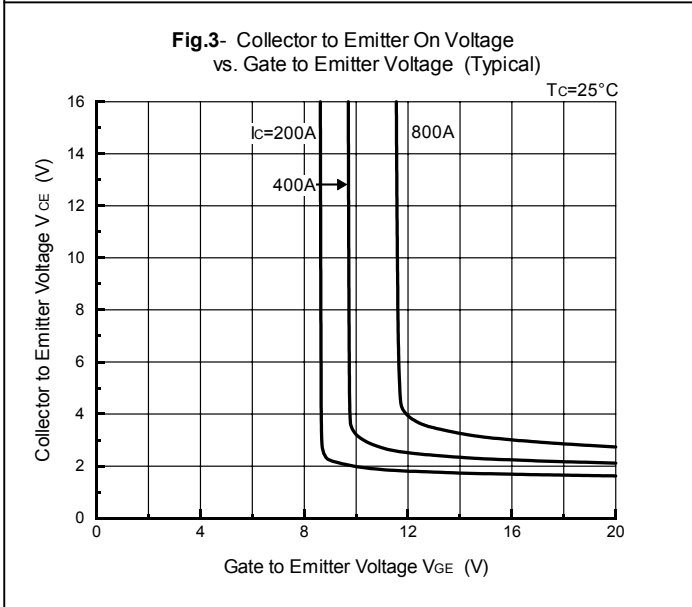
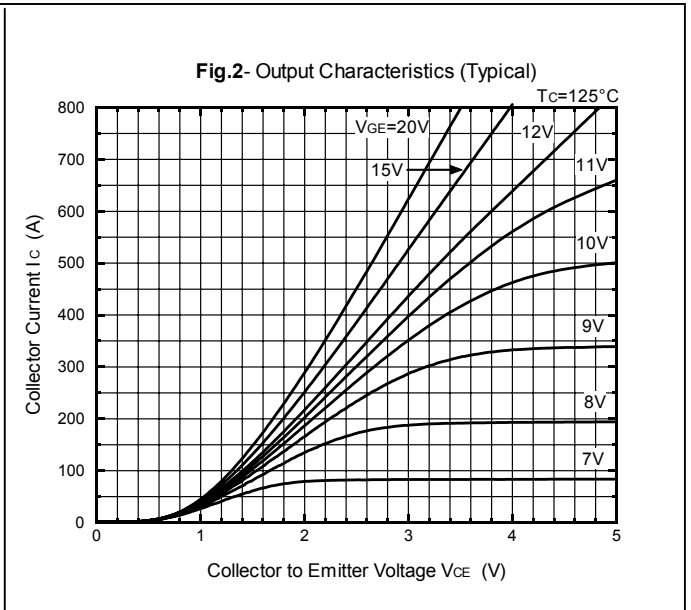
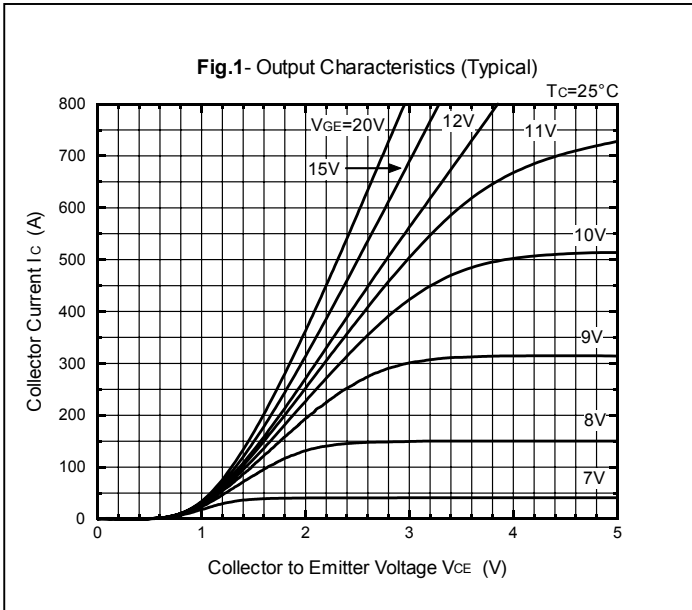
Item	Symbol	Rated Value	Unit
順電流 Forward Current	DC	$I_F$	A
	1ms	$I_{FM}$	

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
順電圧 Peak Forward Voltage	$V_F$	$I_F = 400\text{A}, V_{GE} = 0\text{V}$	—	2.2	2.6	V
逆回復時間 Reverse Recovery Time	$t_{rr}$	$I_F = 400\text{A}, V_{GE} = -10\text{V}$ $di/dt = 800\text{A}/\mu\text{s}$	—	0.2	0.3	$\mu\text{s}$

□ 熱的特性 : THERMAL CHARACTERISTICS

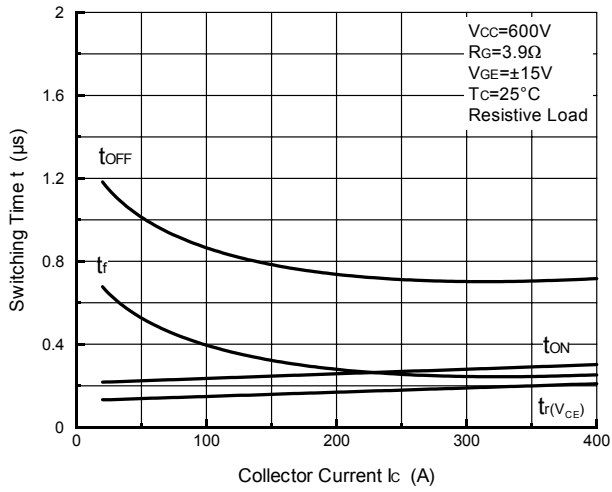
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
熱抵抗 Thermal Impedance	IGBT	Junction to Case	—	—	0.052	$^\circ\text{C}/\text{W}$
	Diode		—	—	0.107	

# PHMB 400BS12

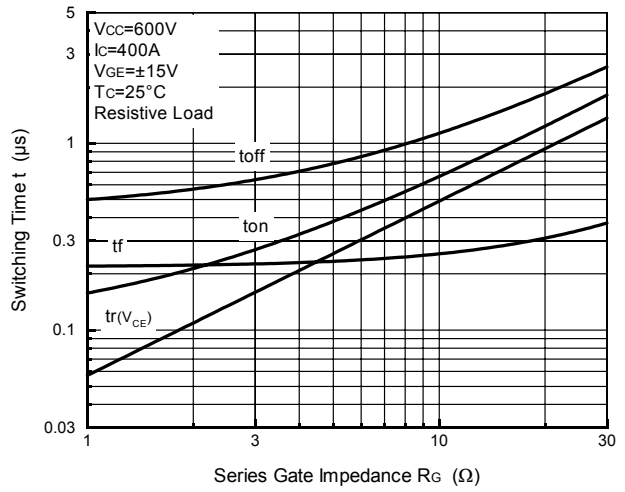


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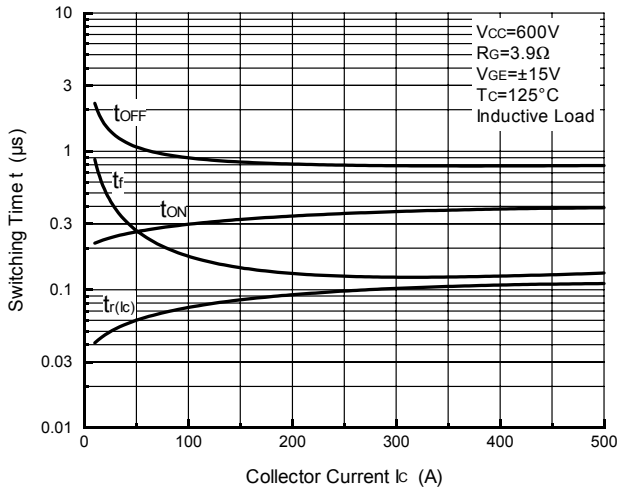
**Fig.7- Collector Current vs. Switching Time (Typical)**



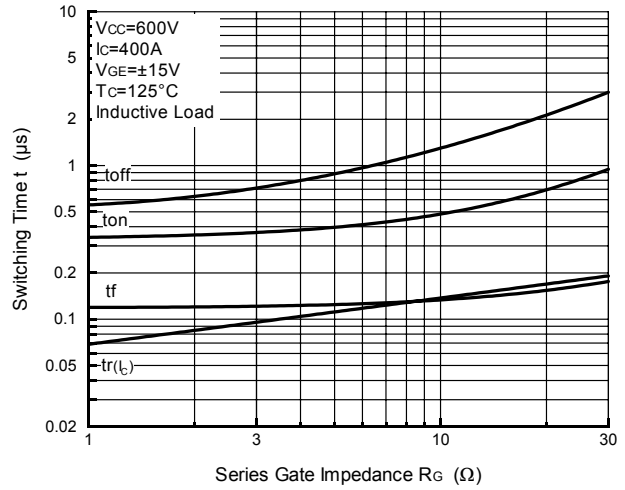
**Fig.8- Series Gate Impedance vs. Switching Time (Typical)**



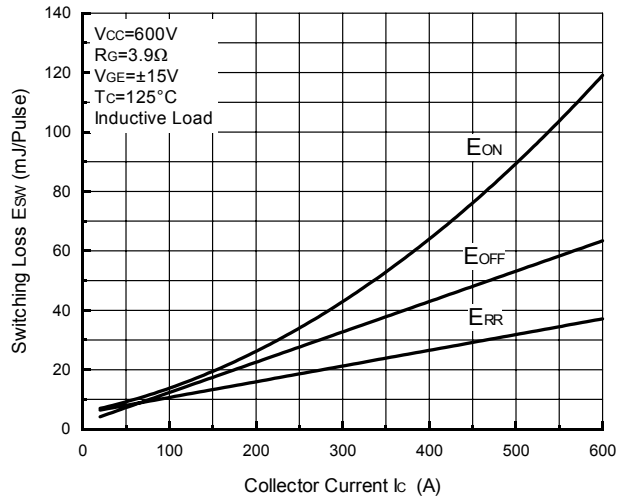
**Fig.9- Collector Current vs. Switching Time**



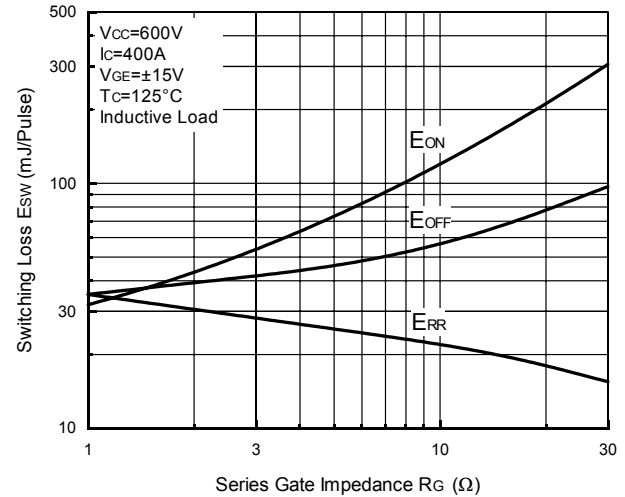
**Fig.10- Series Gate Impedance vs. Switching Time**



**Fig.11- Collector Current vs. Switching Loss**

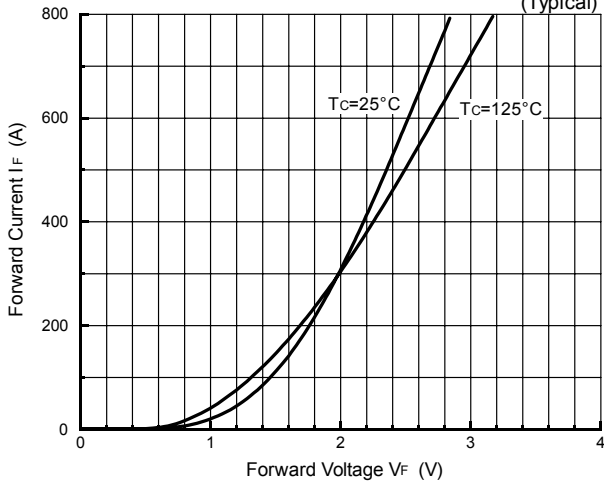


**Fig.12- Series Gate Impedance vs. Switching Loss**

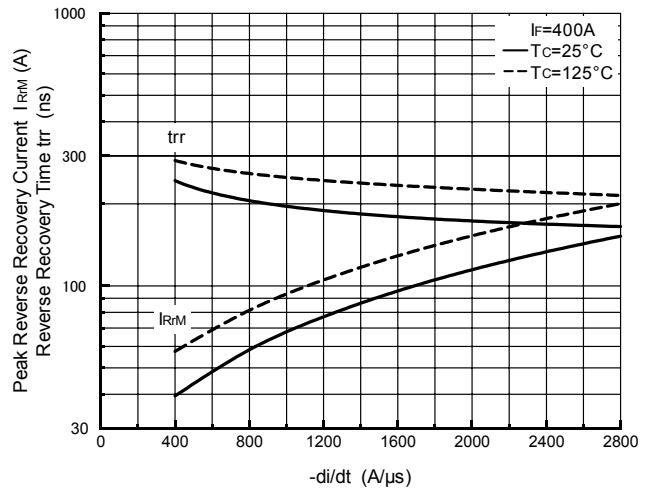


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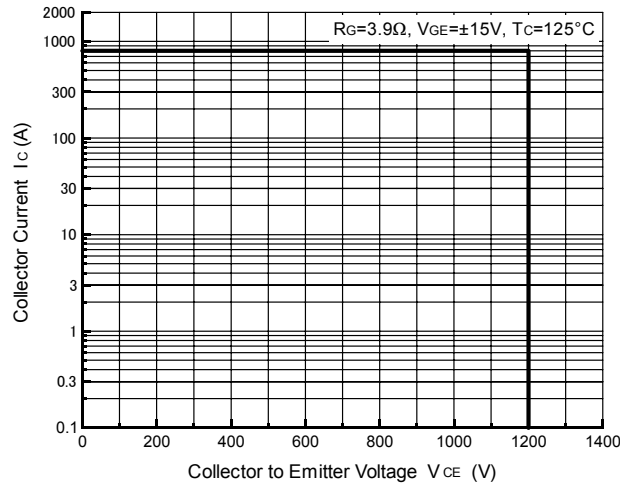
**Fig.13- Forward Characteristics of Free Wheeling Diode (Typical)**



**Fig.14- Reverse Recovery Characteristics (Typical)**



**Fig.15- Reverse Bias Safe Operating Area**



**Fig.16- Transient Thermal Impedance**

