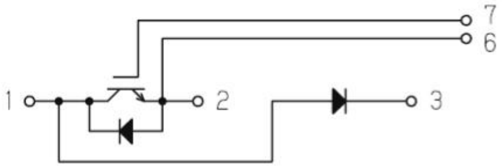
IGBT Module
400 A／1200V

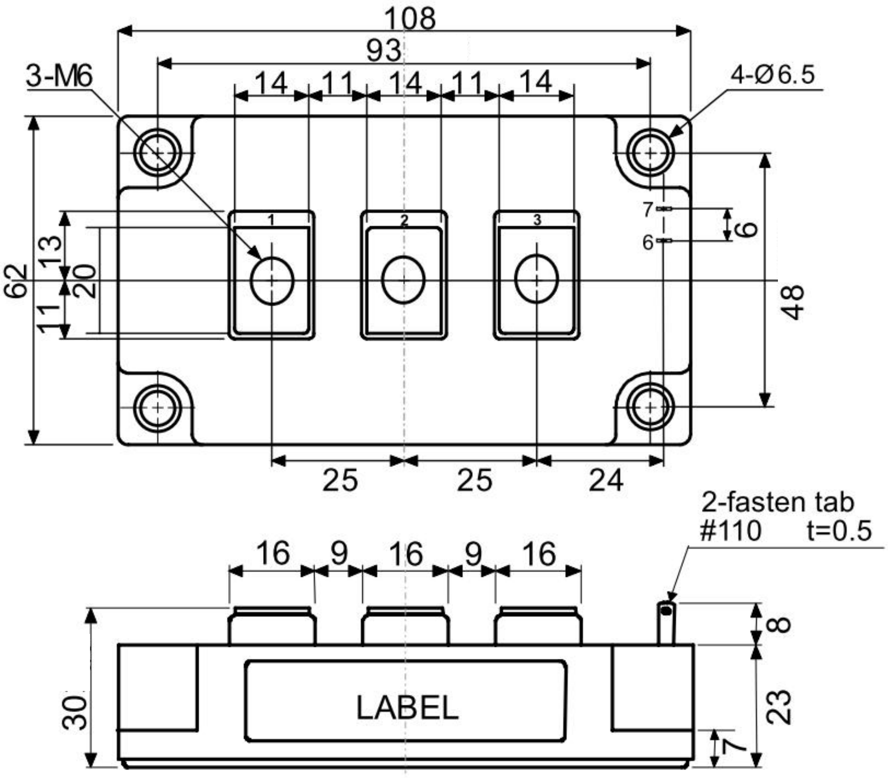
PRFMB400W12

□ 回路図 ： *CIRCUIT*



□ 概略図 ： *SCHEMATIC DIAGRAM*

Dimension: [mm]



□ 最大定格 ： *MAXIMUM RATINGS* (at Tc=25℃ unless otherwise specified)

Item			Symbol	Condition	Rated Value	Unit
IGBT	コレクタ・エミッタ間電圧 Collector-Emitter Voltage		V_{CES}	G-E Short	1200	V
	ゲート・エミッタ間電圧 Gate-Emitter Voltage		V_{GES}	C-E Short	±20	V
	コレクタ電流 Collector Current		I_C	DC Tc=85℃	400	A
			I_{CP}	Pulse ≦ 1ms	800	
	コレクタ損失 Collector Power Dissipation		P_C	Tj=175℃	2307	W
				Tj=150℃	1923	
FWD	繰り返しピーク逆電圧 Repetitive peak reverse voltage		V_{RRM}		1200	V
	順電流 Forward Current		I_F		400	A
			I_{FM}	Pulse ≦ 1ms	800	
最大接合温度 Maximum Junction Temperature			T_{jMAX}	瞬時動作(過負荷) Instantaneous Overload	175	℃
接合温度 Junction Temperature Range			T_j		−40～+150	℃
保存温度 Storage Temperature Range			Tstg		−40～+125	℃
絶縁耐圧 Isolation Voltage			V_{ISO}	Terminal to Base AC,1minute	2,500	V (RMS)
締め付けトルク Mounting Torque		Module Base to Heatsink	Ftor	M6	3	N・m
		Busbar to Main Terminal		M6	3	

□ 電気的特性 ： *ELECTRICAL CHARACTERISTICS* （at T_j=25℃ unless otherwise specified）

	Characteristic		Symbol	Test Condition		Min.	Typ.	Max.	Unit
IGBT	コレクタ遮断電流 Collector-Emitter Cut-Off Current		I_{CES}	V_{CE}= 1200V, V_{GE}= 0V		ー	ー	1.0	mA
	ゲート漏れ電流 Gate-Emitter Leakage Current		I_{GES}	V_{GE}= ±20V, V_{CE}= 0V		ー	ー	1.0	μA
	コレクタ・エミッタ間飽和電圧 Collector-Emitter Saturation Voltage		$V_{CE(sat.)}$	I_C= 400A, V_{GE}= 15V (chip level)	T_j=25℃	ー	1.50	2.00	V
					T_j=125℃	ー	1.70	ー	
					T_j=150℃	ー	1.80	ー	
	ゲートしきい値電圧 Gate-Emitter Threshold Voltage		$V_{GE(th.)}$	V_{CE}= 10V, I_C= 13.4mA		4.8	ー	7.0	V
	入力容量 Input Capacitance		Cies	V_{CE}= 25V, V_{GE}= 0V, f= 1MHz		ー	38.0	ー	nF
	出力容量 Output Capacitance		Coes			ー	1.12	ー	
	帰還容量 Reverse Transfer Capacitance		Cres			ー	0.90	ー	
	ゲート電荷量 Gate Charge		Qg	V_{CC}=600V, I_C=400A, V_{GE}=-15～+15V		ー	4400	ー	nC
	スイッチング時間 Switching Time	上昇時間 Rise Time	tr	V_{CC}= 600V Inductive Load I_C= 400A R_G= 2.0Ω V_{GE}= ±15V T_j= 150℃		ー	90	ー	ns
		ターンオン遅延時間 Turn-on Delay Time	td(on)			ー	220	ー	
		下降時間 Fall Time	tf			ー	290	ー	
		ターンオフ遅延時間 Turn-off Delay Time	td(off)			ー	800	ー	
FWD	順電圧 Peak Forward Voltage		V_F	I_F= 400A, V_{GE}=0V (chip level)	T_j=25℃	ー	2.00	2.60	V
					T_j=125℃	ー	1.98	ー	
					T_j=150℃	ー	1.95	ー	
	逆回復時間 Reverse Recovery Time		trr	V_{CC}= 600V Inductive Load I_F= 400A R_G= 2.0Ω V_{GE}= ±15V T_j= 150℃		ー	250	ー	ns

□ 熱的特性 ： *THERMAL CHARACTERISTICS*

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
熱抵抗 Thermal Resistance	IGBT	Rth(j-c)	Junction to Case Per 1 Arm （Tc測定点：チップ直下）	ー	ー	0.065	℃／W
	FWD			ー	ー	0.105	

□ 特性図 : *CHARACTERISTICS CURVES*

Fig.1- Output Characteristics (Typical)

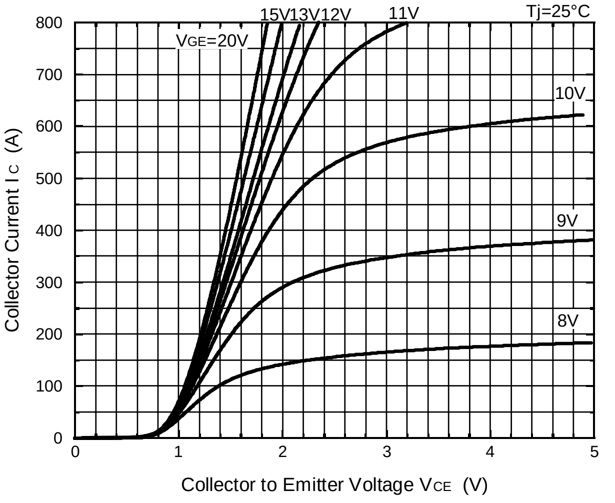


Fig.2- Saturation Voltage Characteristics (Typical)

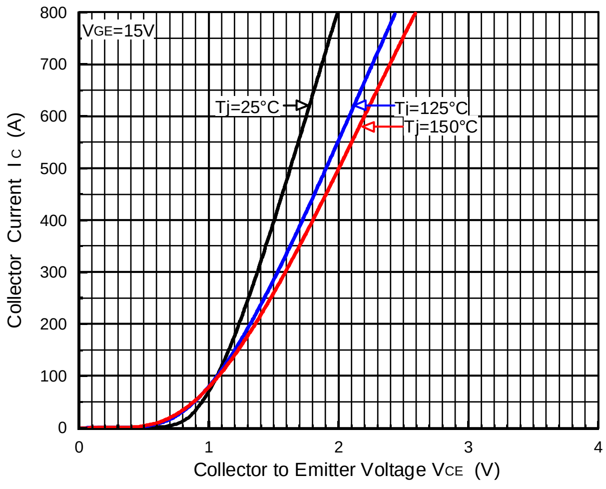


Fig.3- Transfer Characteristics (Typical)

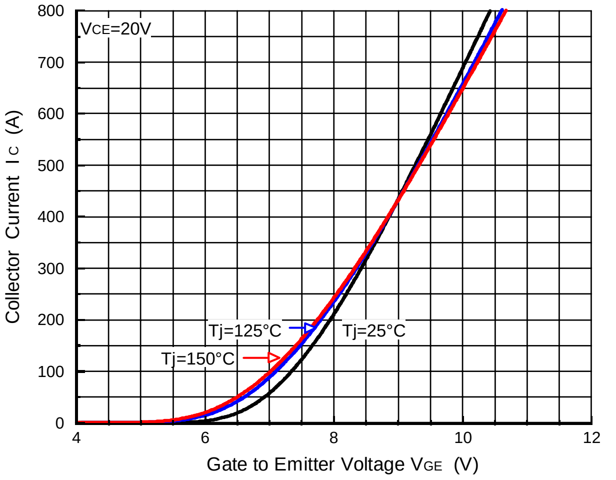


Fig.4 - Gate Charge vs. Collector to Emitter Voltage (Typical)

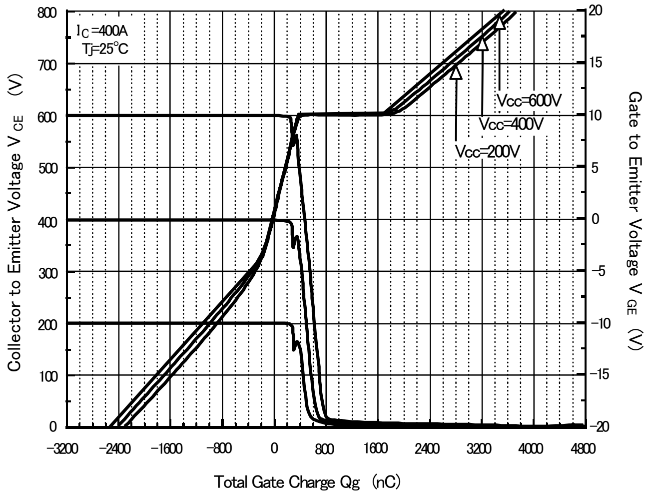


Fig.5- Collector Current vs. Switching Time

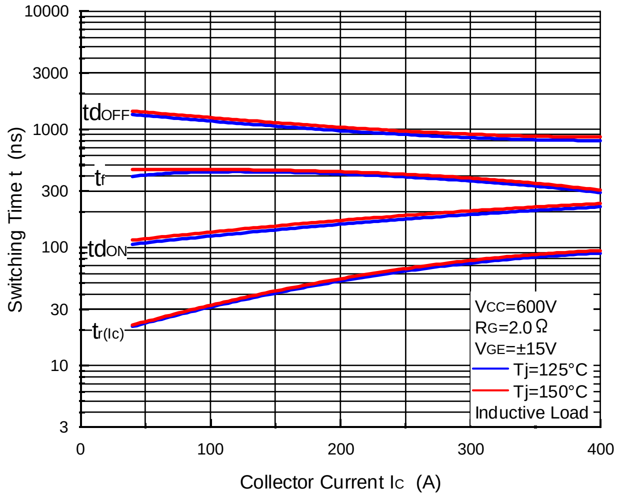
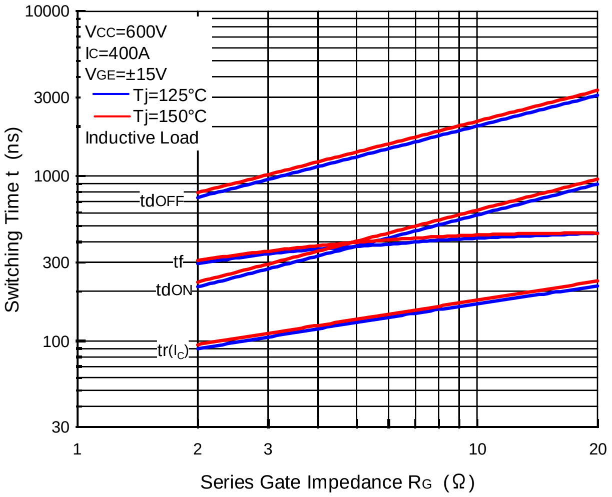


Fig.6- Series Gate Impedance vs. Switching Time



□ **特性図** ：*CHARACTERISTICS CURVES*

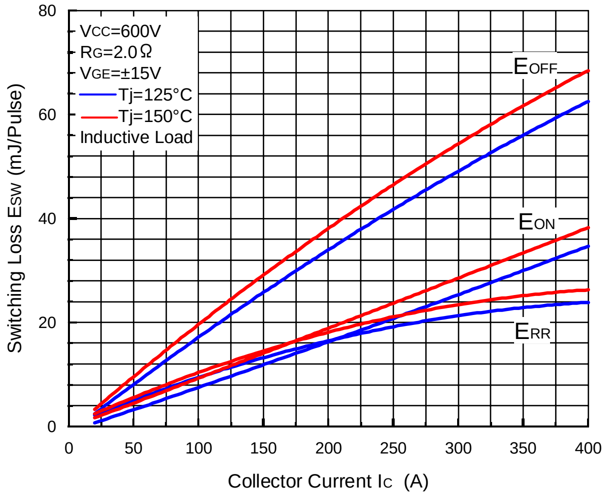


Fig.7- Collector Current vs. Switching Loss

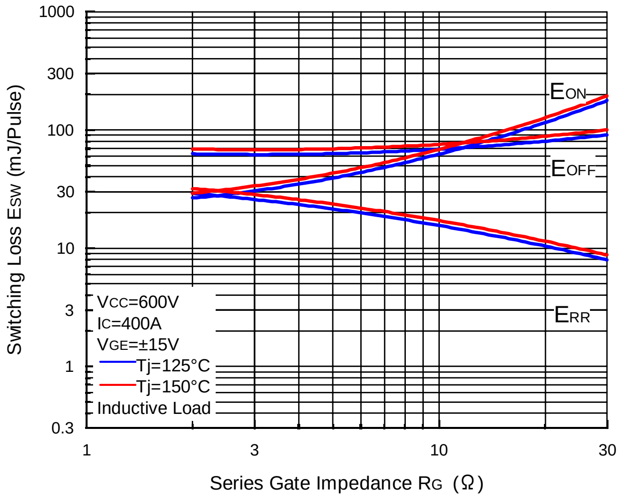


Fig.8- Series Gate Impedance vs. Switching Loss

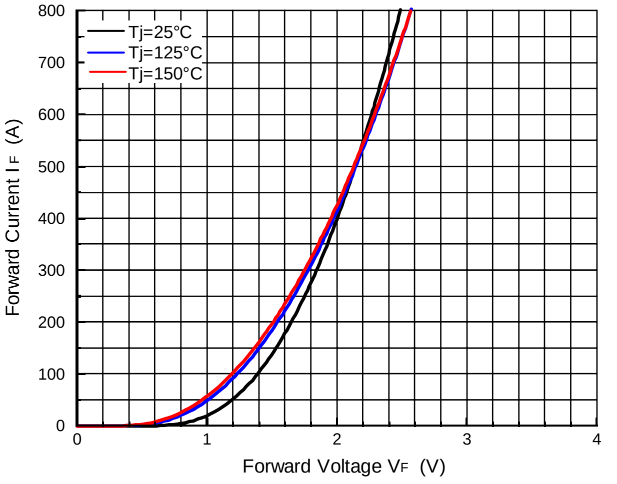


Fig.9- Forward Characteristics of FWD (Typical)

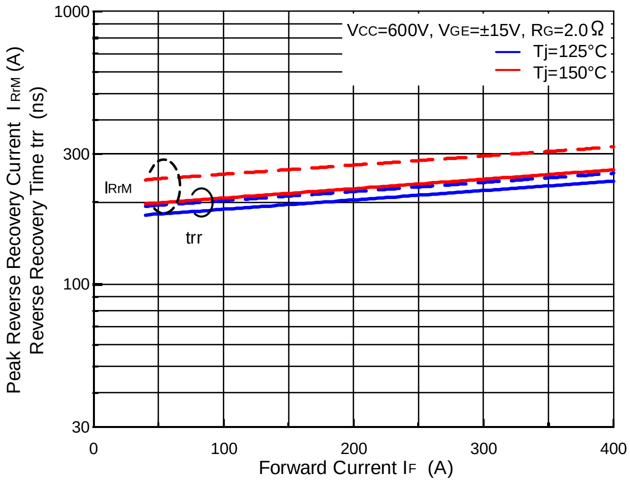


Fig.10- FWD Reverse Recovery Characteristics (Typical)

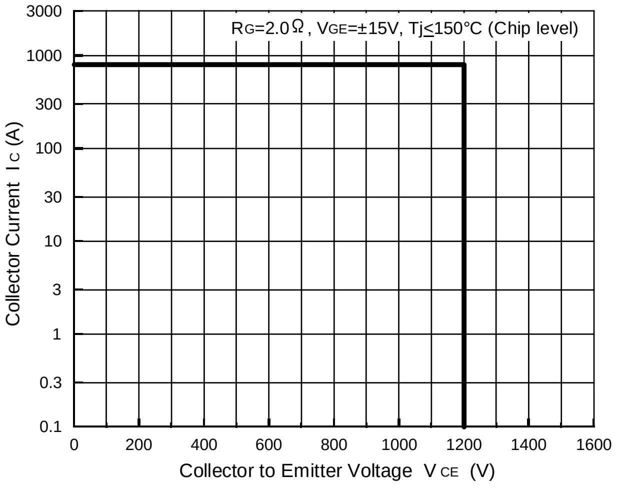


Fig.11- Reverse Bias Safe Operating Area

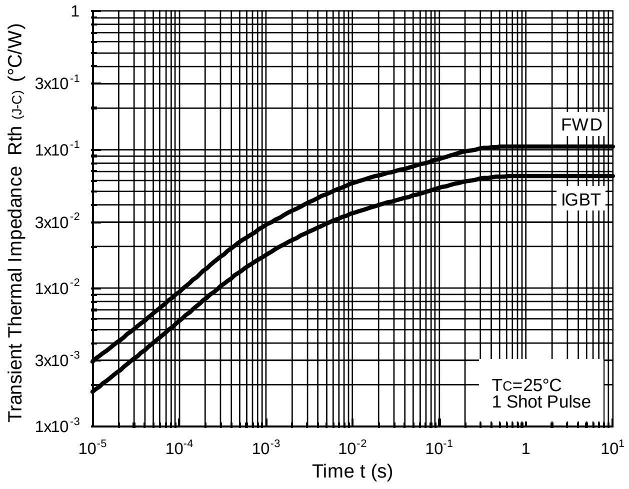


Fig.12- Transient Thermal Impedance