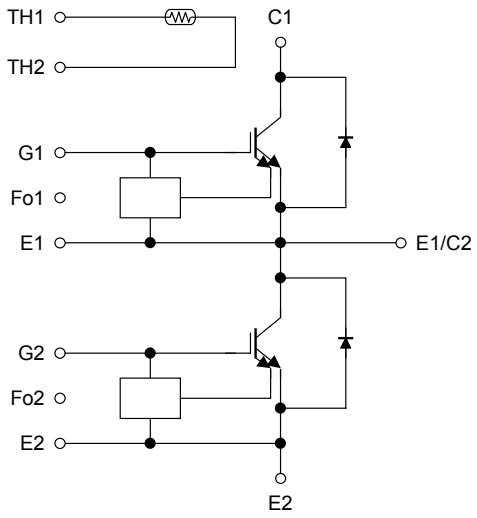
MITSUBISHI IGBT Module

MG400V2YS60A

High Power Switching Applications
Motor Control Applications

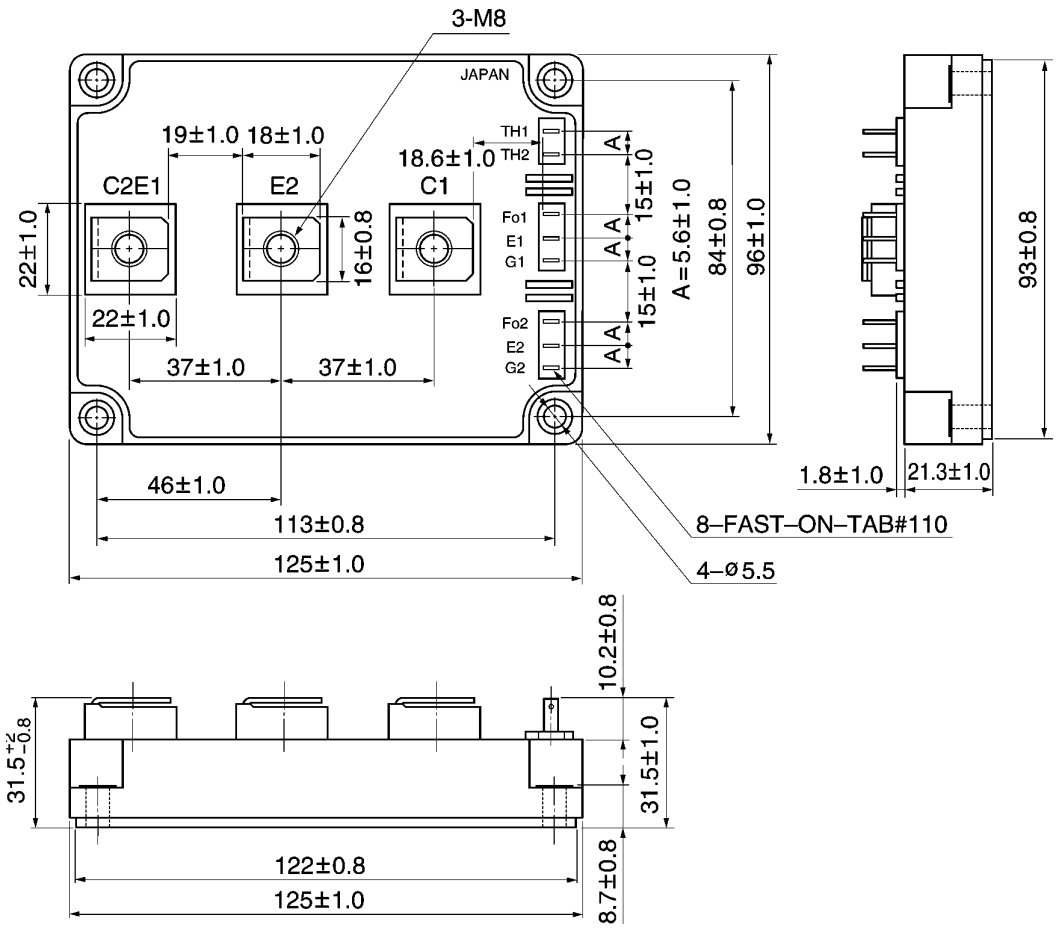
- The electrodes are isolated from case.
- Enhancement−mode
- Thermal output terminal (TH)

Equivalent Circuit



Package Dimensions

Unit: mm



Weight: 680 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristic			Symbol	Rating	Unit
Collector–emitter voltage			V_{CES}	1700	V
Gate–emitter voltage			V_{GES}	±20	V
Collector current		DC	I_C	400	A
Forward current		DC	I_F	400	A
Collector power dissipation (Tc = 25°C)			P_C	4300	W
Junction temperature			T_j	150	°C
Storage temperature range			T_{stg}	–40~125	°C
Isolation voltage			V_{Isol}	4000 (AC 1 min)	V
Screw torque	Terminal: M8		—	10	N·m
	Mounting: M5		—	3	N·m

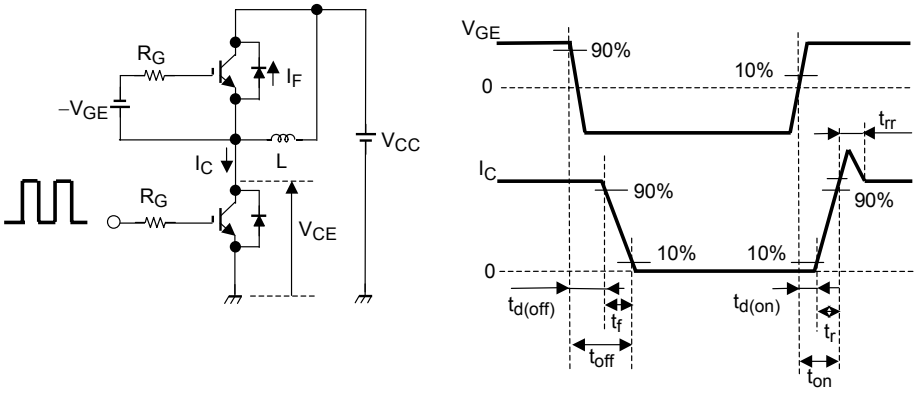
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition		Min.	Typ.	Max.	Unit
Gate leakage current		I_{GES}	V_{GE} = ±20V, V_{CE} = 0V		—	—	±10	μA
Collector cut–off current		I_{CES}	V_{CE} = 1700V, V_{GE} = 0V		—	—	1	mA
Gate–emitter cut–off voltage		$V_{GE(off)}$	I_C = 400mA, V_{CE} = 5V		4.5	5.5	6.5	V
Collector–emitter saturation voltage		$V_{CE(sat)}$	I_C = 400A V_{GE} = 15V	T_j = 25°C	—	3.0	3.4	V
				T_j = 125°C	—	3.8	4.2	
Input capacitance		C_{ies}	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz		—	45000	—	pF
Gate–emitter voltage		V_{GE}	—		13	15	17	V
Gate resistance		R_G	—		8.2	—	15	Ω
Switching time	Turn–on delay time	$t_{d(on)}$	Inductive load		—	0.35	—	μs
	Rise time	t_r	V_{CC} = 900V		—	0.2	—	
	Turn–on time	t_{on}	I_C = 400A		—	0.55	—	
	Turn–off delay time	$t_{d(off)}$	V_{GE} = ±15V		—	0.9	—	
	Fall time	t_f	R_G = 8.2Ω		—	0.4	0.6	
	Turn–off time	t_{off}	(Note)		—	1.3	—	
Forward voltage		V_F	I_F = 400A, V_{GE} = 0V	T_j = 25°C	—	3.2	4.2	V
				T_j = 125°C	—	2.4	—	
Reverse recovery time		t_{rr}	I_F = 400A, V_{GE} = –15V di/dt = 2000A/μs		—	0.20	0.40	μs
Thermal resistance		$R_{th(j–c)}$	Transistor stage		—	—	0.029	°C / W
			Diode stage		—	—	0.056	
RTC operating current		I_{rtc}	T_j = 25°C		800	—	—	A

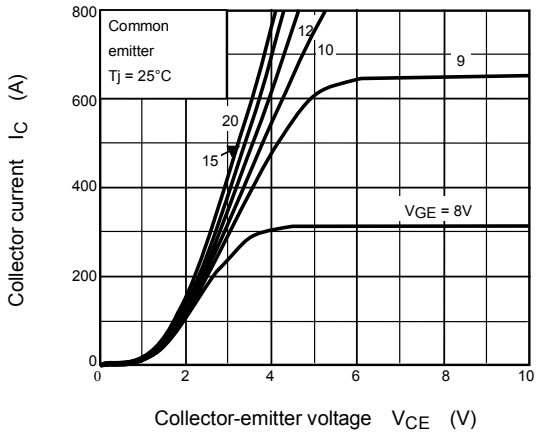
Thermistor

Characteristic	Symbol	Test Condition	MIn.	Typ.	Max.	Unit
Zero power resistance	R25	Tc = 25°C	—	100	—	kΩ
B value	R25 / 85	Tc = 25°C / Tc = 85°C	—	4390	—	K
Isolation voltage		Tc = 25°C	2500	—	—	Vrms

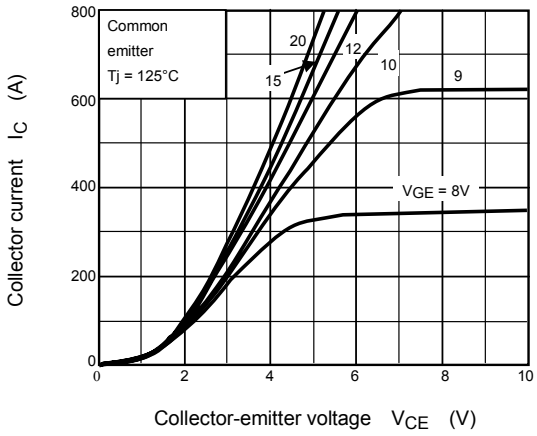
(Note) : Switching time measurement circuit and input / output waveforms



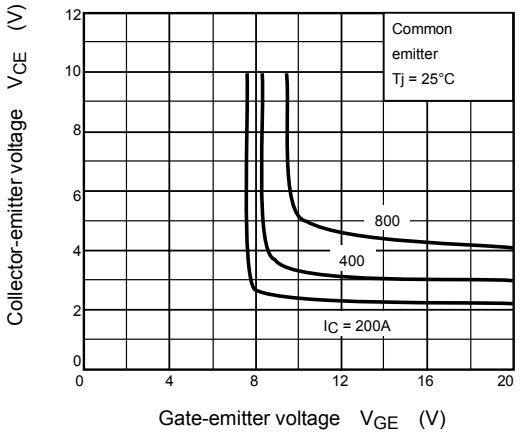
$I_C - V_{CE}$



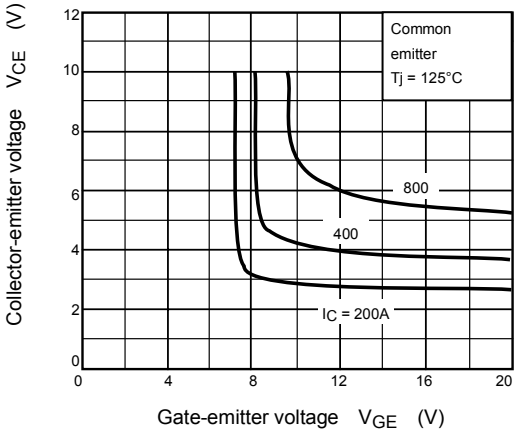
$I_C - V_{CE}$



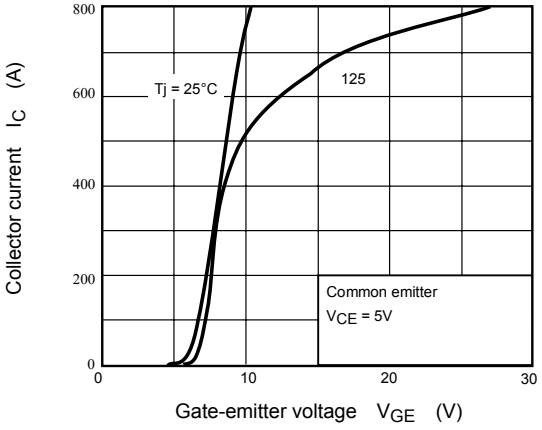
$V_{CE} - V_{GE}$



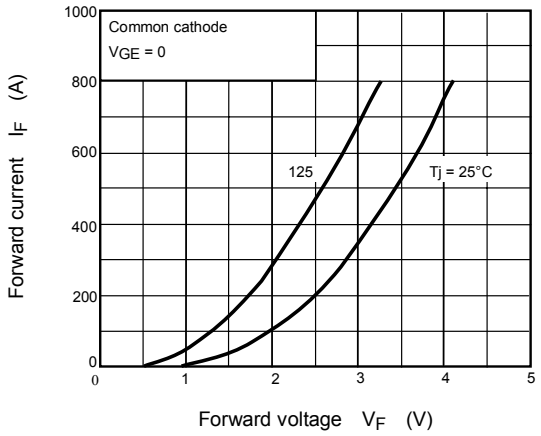
$V_{CE} - V_{GE}$



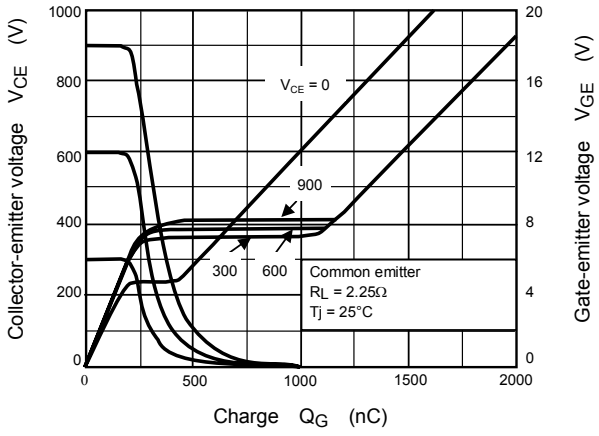
$I_C - V_{GE}$



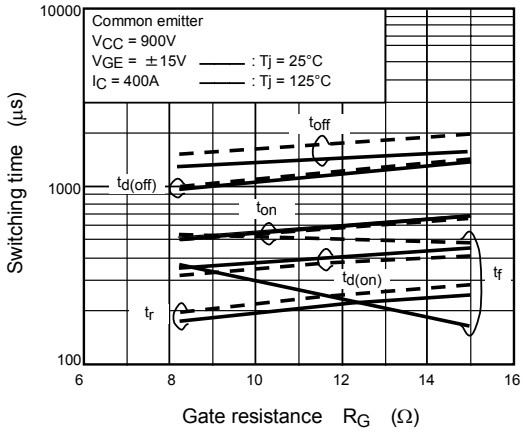
$I_F - V_F$



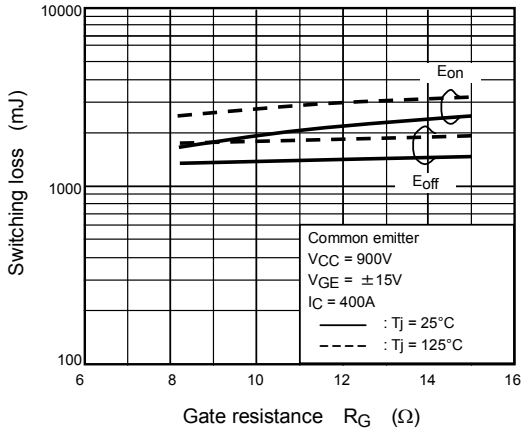
V_{CE} , V_{GE} –Q_G



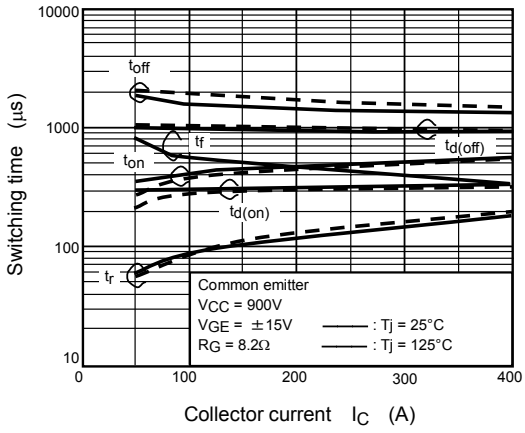
Switching Time – R_G



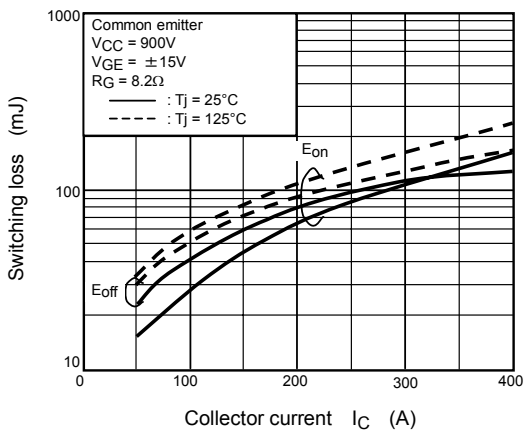
Switching Loss – R_G



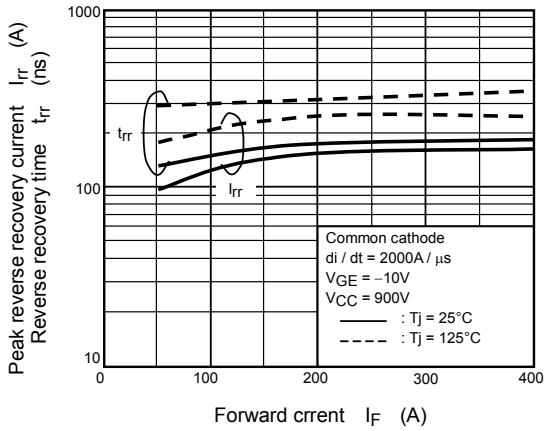
Switching Time – I_C



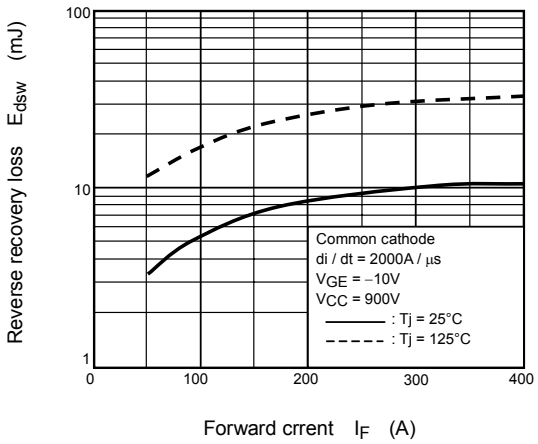
Switching Loss – I_C



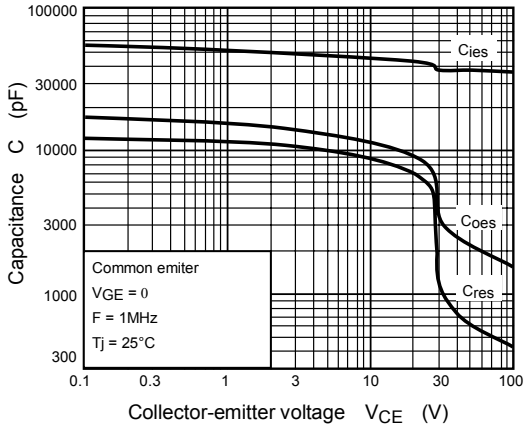
t_{rr}, I_{rr} – I_F



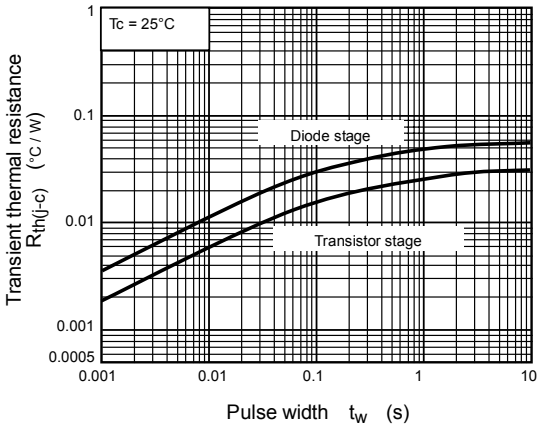
E_{dsw} – I_F



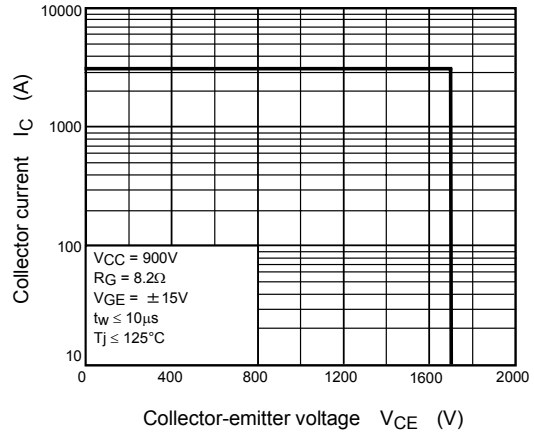
C – V_{CE}



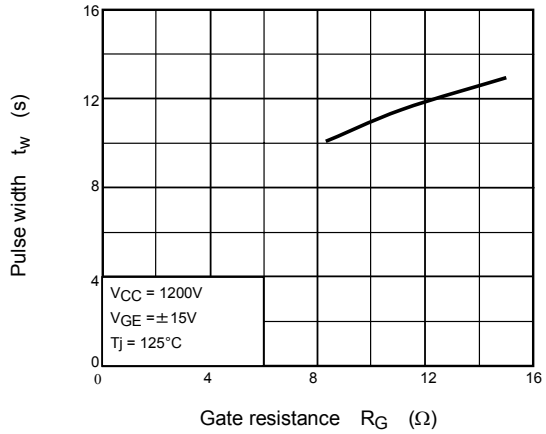
$R_{th(j-c)}$ – t_w



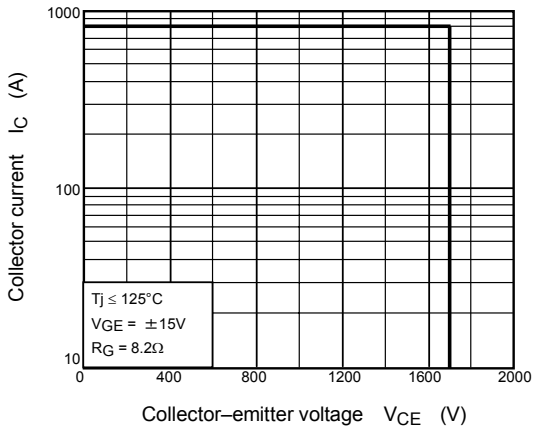
Short Circuit Soa



Short Circuit
t_w – R_G



Reverse Bias Soa



<$V_{CE(sat)}$ Rank>

$V_{CE(sat)}$

Rank Symbol	Min.	Max.
29	2.6	2.9
30	2.7	3.0
31	2.8	3.1
32	2.9	3.2
33	3.0	3.3
34	3.1	3.4

<V_F Rank>

V_F

Rank Symbol	Min	Max.
G	2.5	2.8
H	2.7	3.0
I	2.9	3.2
J	3.1	3.4
K	3.3	3.6
L	3.5	3.8
M	3.7	4.0
N	3.9	4.2

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