

MITSUBISHI IGBT MODULES
CM400DY-12NF

HIGH POWER SWITCHING USE

CM400DY-12NF



- IC 400A
- VCES 600V
- Insulated Type
- 2-elements in a pack

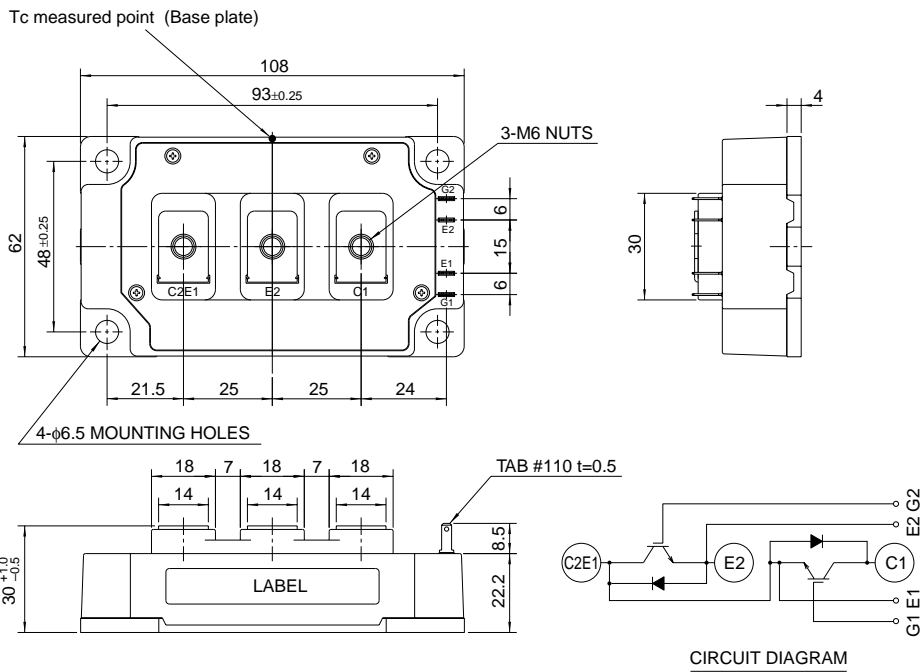
APPLICATION

General purpose inverters & Servo controls, etc

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm

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MAXIMUM RATINGS (Tj = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
VCES	Collector-emitter voltage	G-E Short	600	V
VGES	Gate-emitter voltage	C-E Short	±20	V
IC	Collector current	DC, Tc' = 92°C*3	400	A
ICM		Pulse (Note 2)	800	A
IE (Note 1)	Emitter current		400	A
IEM (Note 1)		Pulse (Note 2)	800	A
PC (Note 3)	Maximum collector dissipation	Tc = 25°C	1130	W
Tj	Junction temperature		-40 ~ +150	°C
Tstg	Storage temperature		-40 ~ +125	°C
Viso	Isolation voltage	Main Terminal to base plate, AC 1 min.	2500	V
—	Torque strength	Main Terminal M6	3.5 ~ 4.5	N • m
—		Mounting holes M6	3.5 ~ 4.5	N • m
—	Weight	Typical value	400	g

ELECTRICAL CHARACTERISTICS (Tj = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
ICES	Collector cutoff current	VCE = VCES, VGE = 0V	—	—	1	mA
VGE(th)	Gate-emitter threshold voltage	IC = 40mA, VCE = 10V	5	6	7.5	V
IGES	Gate leakage current	VGE = VGES, VCE = 0V	—	—	0.5	µA
VCE(sat)	Collector-emitter saturation voltage	Tj = 25°C Tj = 25°C	—	1.7	2.2	V
Ciss	Input capacitance	IC = 400A, VGE = 15V	—	1.7	—	nF
Coss	Output capacitance		VCE = 10V VGE = 0V	—	—	7.3
Cres	Reverse transfer capacitance		—	—	2.4	nF
QG	Total gate charge	VCC = 300V, IC = 400A, VGE = 15V	—	1600	—	nC
td(on)	Turn-on delay time	VCC = 300V, IC = 400A	—	—	300	ns
tr	Turn-on rise time		VGE1 = VGE2 = 15V	—	—	200
td(off)	Turn-off delay time	RG = 3.1Ω, Inductive load switching operation IE = 400A	—	—	450	ns
tf	Turn-off fall time		—	—	300	ns
trr (Note 1)	Reverse recovery time		—	—	250	ns
Qrr (Note 1)	Reverse recovery charge		—	6.8	—	µC
VEC(Note 1)	Emitter-collector voltage	IE = 400A, VGE = 0V	—	—	2.6	V
Rth(j-c)Q	Thermal resistance*1	IGBT part (1/2 module)	—	—	0.11	°C/W
Rth(j-c)R		FWDi part (1/2 module)	—	—	0.19	°C/W
Rth(c-f)	Contact thermal resistance	Case to fin, Thermal compound Applied*2 (1/2 module)	—	0.04	—	°C/W
Rth(j-c')Q	Thermal resistance	Tc measured point is just under the chips	—	—	0.066*3	°C/W
RG	External gate resistance		1.6	—	16	Ω

*1 : Tc measured point is shown in page OUTLINE DRAWING.

*2 : Typical value is measured by using Shin-etsu Silicone "G-746".

*3 : Tc' measured point is just under the chips.

If you use this value, Rth(f-a) should be measured just under the chips.

Note 1. IE, VEC, trr & Qrr represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).

2. Pulse width and repetition rate should be such that the device junction temp. (Tj) does not exceed Tjmax rating.

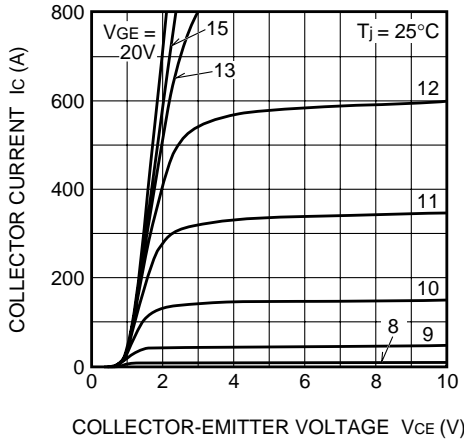
3. Junction temperature (Tj) should not increase beyond 150°C.

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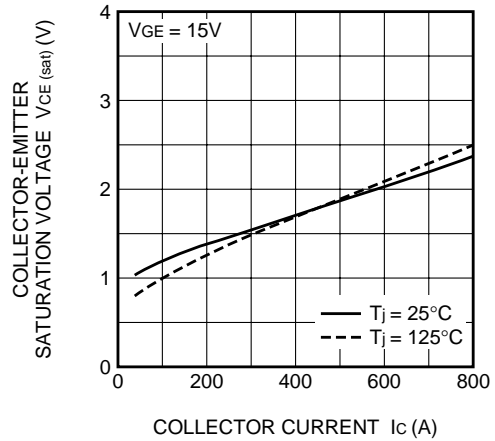
HIGH POWER SWITCHING USE

PERFORMANCE CURVES

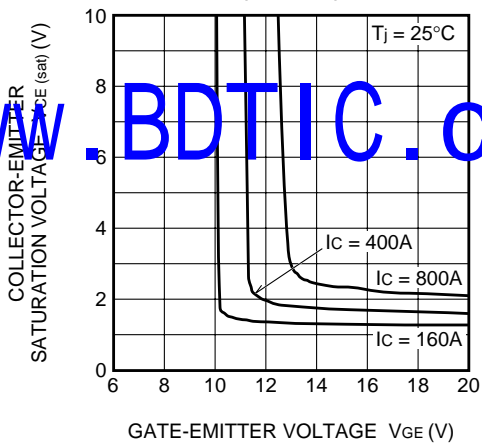
OUTPUT CHARACTERISTICS (TYPICAL)



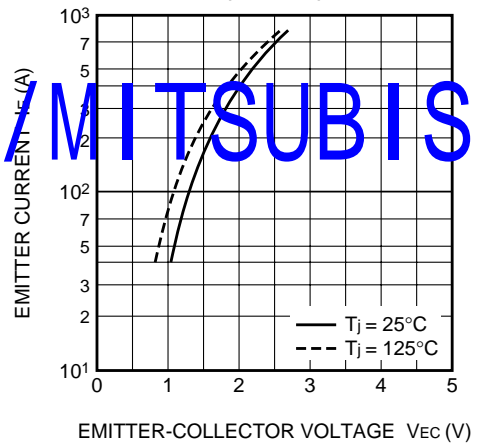
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



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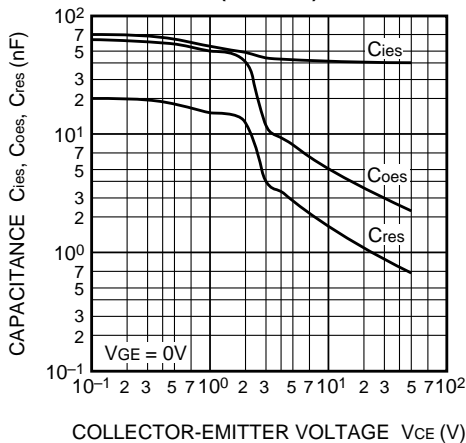


FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)

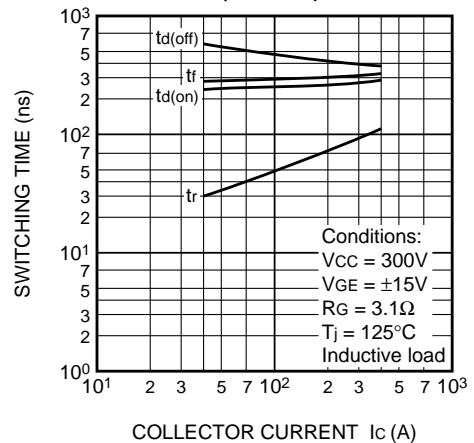


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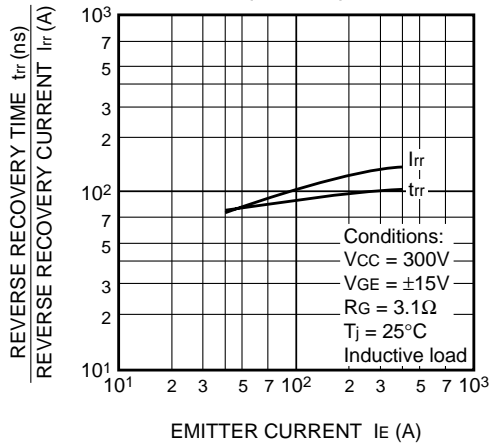
CAPACITANCE-VCE CHARACTERISTICS (TYPICAL)



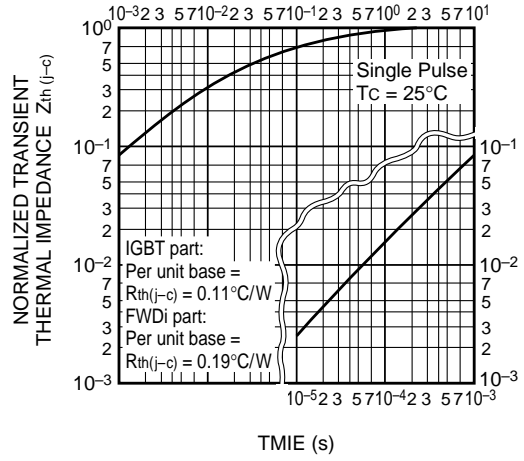
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



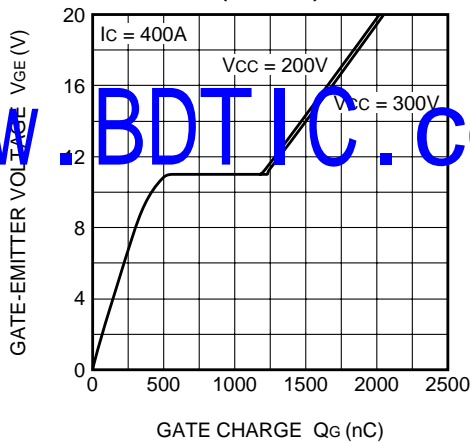
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)



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