

MITSUBISHI IGBT MODULES

CM150E3U-24F

HIGH POWER SWITCHING USE

CM150E3U-24F



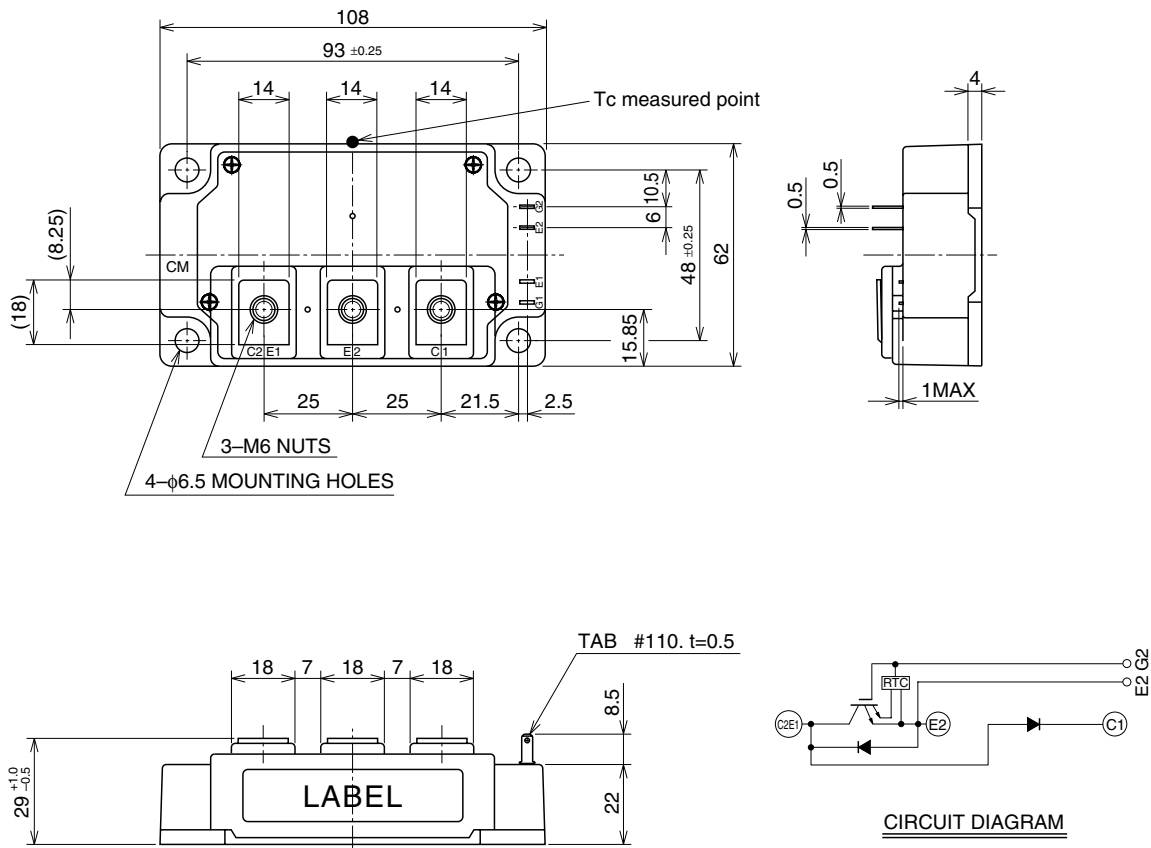
- IC 150A
- VCES 1200V
- Insulated Type
- 1-element in a pack

APPLICATION

Brake

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	1200	V
VGES	Gate-emitter voltage	C-E Short	±20	V
IC	Collector current	Tc = 25°C	150	A
ICM		Pulse (Note 2)	300	
IE (Note 1)	Emitter current	Tc = 25°C	150	A
IEM (Note 1)		Pulse (Note 2)	300	
PC (Note 3)	Maximum collector dissipation	Tc = 25°C	600	W
VRRM	Repetitive peak reverse voltage	Clamp diode part	1200	V
IF	Forward current	Tc = 25°C	150	A
IFM		Pulse Clamp diode part (Note 2)	300	
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 = 15mA, VCE = 10V	5	6	7	V
IGES	Gate leakage current	VGE = VCES, VCE = 0V	—	—	20	μA
VCE(sat)	Collector-emitter saturation voltage	Tj = 25°C	—	1.8	2.4	V
		Tj = 125°C	—	1.9	—	
Cies	Input capacitance	VCE = 10V VGE = 0V	—	—	59	nF
Coes	Output capacitance		—	—	2.6	
Cres	Reverse transfer capacitance		—	—	1.5	
QG	Total gate charge	VCC = 600V, IC = 150A, VGE = 15V	—	1650	—	nC
td(on)	Turn-on delay time	VCC = 600V, IC = 150A VGE1 = VGE2 = 15V RG = 2.1Ω, Inductive load switching operation	—	—	150	ns
tr	Turn-on rise time		—	—	80	
td(off)	Turn-off delay time		—	—	450	
tf	Turn-off fall time		—	—	300	
trr (Note 1)	Reverse recovery time	IE = 150A	—	—	150	ns
Qrr (Note 1)	Reverse recovery charge		—	6.0	—	μC
VEC(Note 1)	Emitter-collector voltage	IE = 150A, VGE = 0V	—	—	3.2	V
RG	External gate resistance		2.1	—	21	Ω
Rth(j-c)Q	Thermal resistance*1	IGBT part	—	—	0.21	°C/W
Rth(j-c)R		FWDi part	—	—	0.24	
Rth(j-c)Q	Thermal resistance	Tc measured point is just under the chips	—	—	0.13*3	
VFM	Forward voltage drop	IF = 150A, Clamp diode part	—	—	3.2	V
trr	Reverse recovery time	IF = 150A VCC = 600V, VGE1 = VGE2 = 15V RG = 2.1Ω, Inductive load switching operation, Clamp diode part	—	—	150	ns
Qrr	Reverse recovery charge		—	6.0	—	μC
Rth(j-c)R	Thermal resistance*1	Clamp diode part	—	—	0.24	°C/W
Rth(c-f)	Contact thermal resistance	Case to fin, Thermal compound applied*2 (1/2 module)	—	0.04	—	

Note 1. IE, VEC, trr, Qrr, die/dt 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.

4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

*1 : Tc measured point is indicated in OUTLINE DRAWING.

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

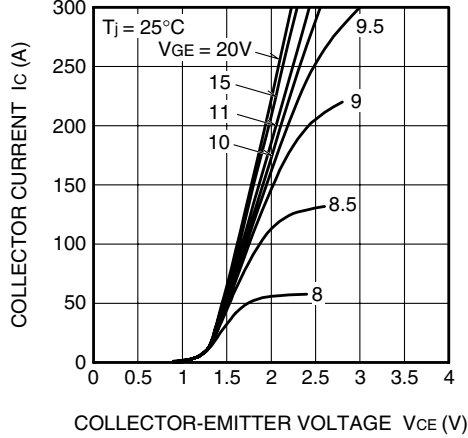
*3 : If you use this value, Rth(f-a) should be measured just under the chips.

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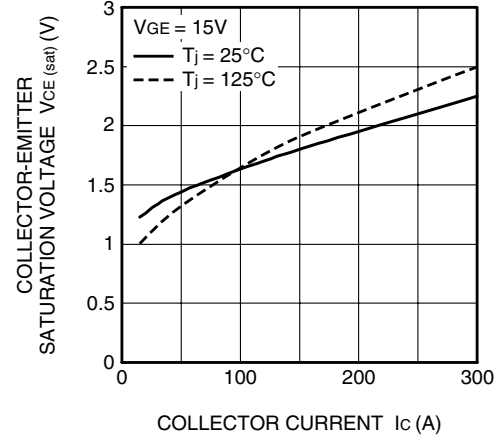
HIGH POWER SWITCHING USE

PERFORMANCE CURVES

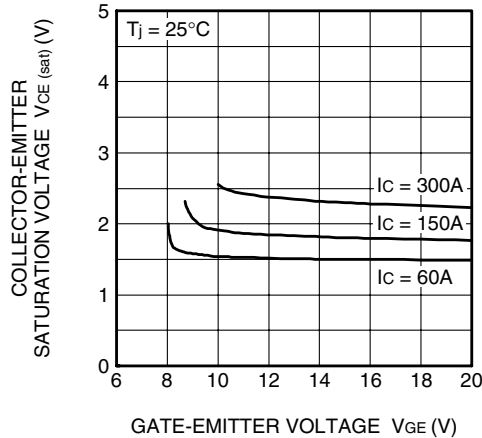
OUTPUT CHARACTERISTICS
(TYPICAL)



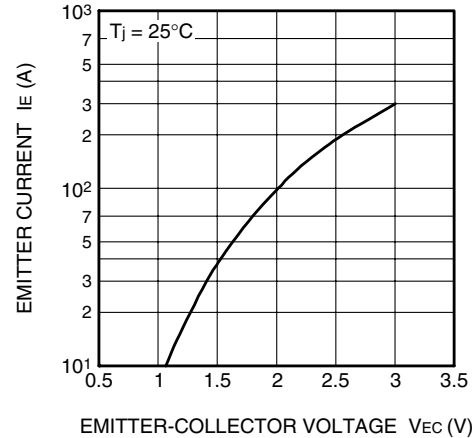
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



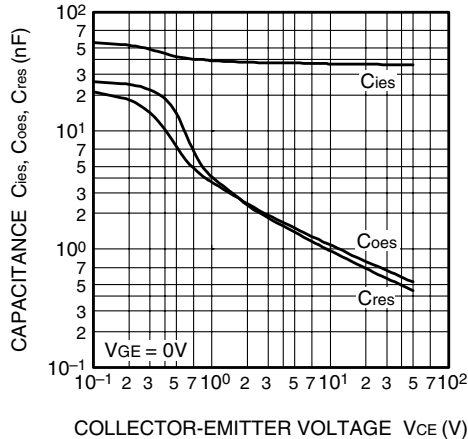
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



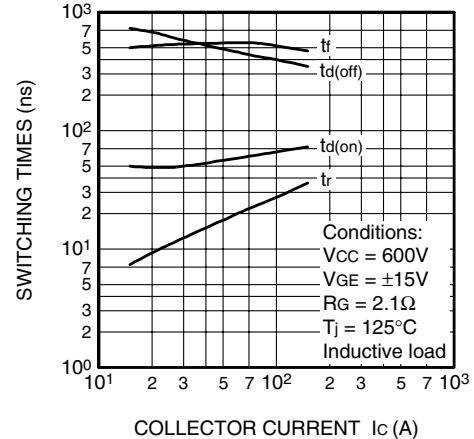
FREE-WHEEL DIODE AND CLAMP DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



CAPACITANCE- V_{CE}
CHARACTERISTICS
(TYPICAL)



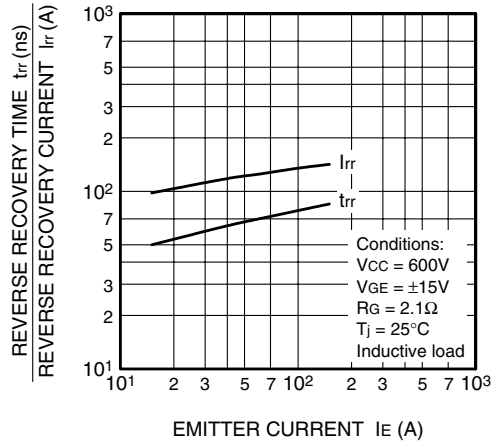
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



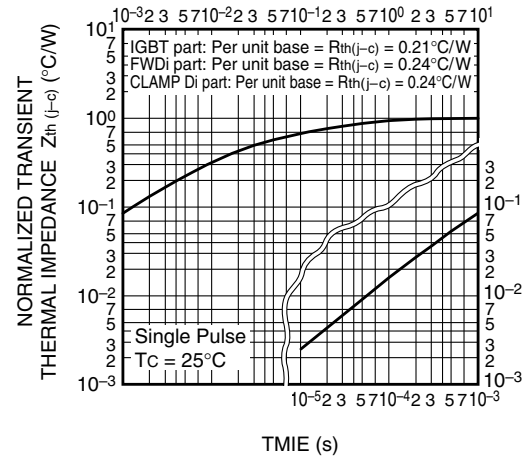
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HIGH POWER SWITCHING USE

**REVERSE RECOVERY CHARACTERISTICS
OF CLAMP DIODE
(TYPICAL)**



**TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT part & FWDi part)**



**GATE CHARGE
CHARACTERISTICS
(TYPICAL)**

