

MITSUBISHI IGBT MODULES

CM150DY-24A

HIGH POWER SWITCHING USE

CM150DY-24A



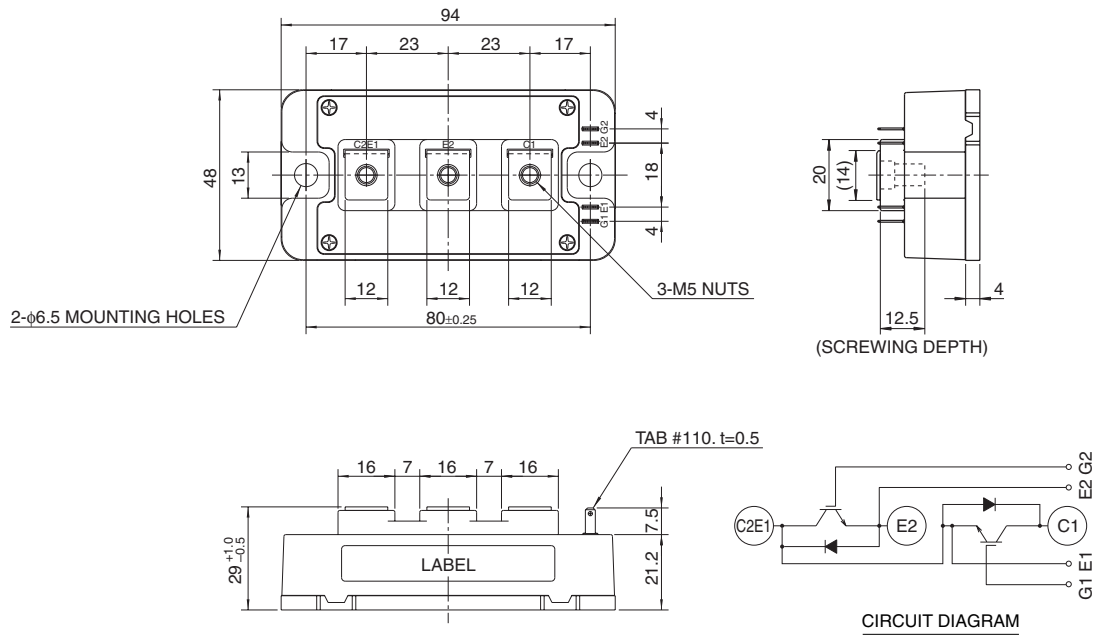
- Ic 150A
- VCES 1200V
- Insulated Type
- 2-elements in a pack

APPLICATION

AC drive inverters & Servo controls, etc

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



Feb. 2009

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ABSOLUTE MAXIMUM RATINGS (T_j = 25°C, unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
V _{CES}	Collector-emitter voltage	G-E Short	1200	V
V _{GES}	Gate-emitter voltage	C-E Short	±20	V
I _C	Collector current	DC, T _C = 81°C* ¹	150	A
I _{CM}		Pulse (Note 2)	300	
I _E (Note 1)	Emitter current		150	A
I _{EM} (Note 1)		Pulse (Note 2)	300	
P _C (Note 3)	Maximum collector dissipation	T _C = 25°C* ¹	960	W
T _j	Junction temperature		−40 ~ +150	°C
T _{stg}	Storage temperature		−40 ~ +125	°C
V _{iso}	Isolation voltage	Terminals to base plate, f = 60Hz, AC 1 minute	2500	Vrms
—	Torque strength	Main terminals M5 screw	2.5 ~ 3.5	N • m
—		Mounting M6 screw	3.5 ~ 4.5	
—	Weight	Typical value	310	g

ELECTRICAL CHARACTERISTICS (T_j = 25°C, unless otherwise specified)

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		6	7	8	V
IGES	Gate leakage current	±VGE = VGES, VCE = 0V		—	—	0.5	μA
VCE(sat)	Collector-emitter saturation voltage	IC = 150A, VGE = 15V	Tj = 25°C	—	2.1	3.0	V
			Tj = 125°C	—	2.4	—	
Cies	Input capacitance	VCE = 10V VGE = 0V		—	—	23	nF
Coes	Output capacitance			—	—	2	
Cres	Reverse transfer capacitance			—	—	0.45	
QG	Total gate charge	VCC = 600V, IC = 150A, VGE = 15V		—	675	—	nC
td(on)	Turn-on delay time	VCC = 600V, IC = 150A VGE = ±15V RG = 2.1Ω, Inductive load IE = 150A		—	—	130	ns
tr	Turn-on rise time			—	—	100	
td(off)	Turn-off delay time			—	—	450	
tf	Turn-off fall time			—	—	350	
trr (Note 1)	Reverse recovery time					—	—
Qrr (Note 1)	Reverse recovery charge			—	6.0	—	μC
VEC(Note 1)	Emitter-collector voltage	IE = 150A, VGE = 0V		—	—	3.8	V
Rth(j-c)Q	Thermal resistance	IGBT part (1/2 module)* ¹		—	—	0.13	K/W
Rth(j-c)R		FWDi part (1/2 module)* ¹		—	—	0.23	
Rth(c-f)	Contact thermal resistance	Case to heat sink, Thermal compound Applied (1/2 module)* ^{1,2}		—	0.022	—	
RG	External gate resistance			2.1	—	31	Ω

*1 : Case temperature (T_C), heat sink temperature (T_H) measured point is just under the chips.

*2 : Typical value is measured by using thermally conductive grease of λ = 0.9[W/(m • K)].

Note 1. I_E, V_{EC}, t_{rr} & Q_{rr} represent characteristics of the anti-parallel, emitter-collector free-wheel diode (FWDi).

2. Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed T_{jmax} rating.

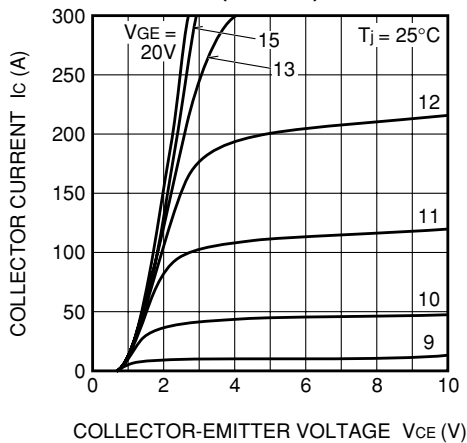
3. Junction temperature (T_j) should not increase beyond 150°C.

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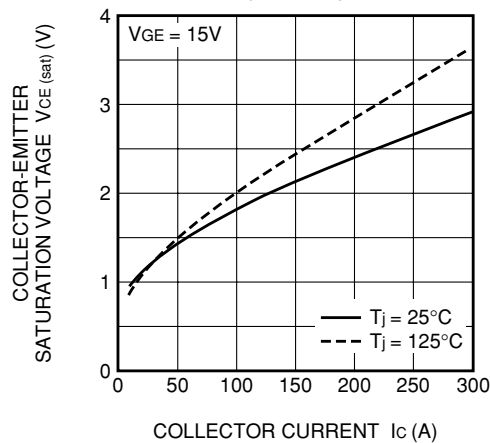
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PERFORMANCE CURVES

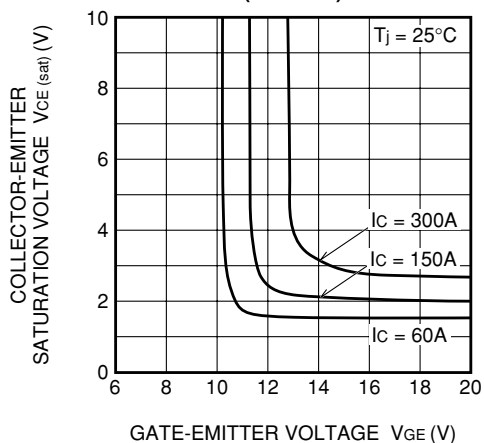
OUTPUT CHARACTERISTICS (TYPICAL)



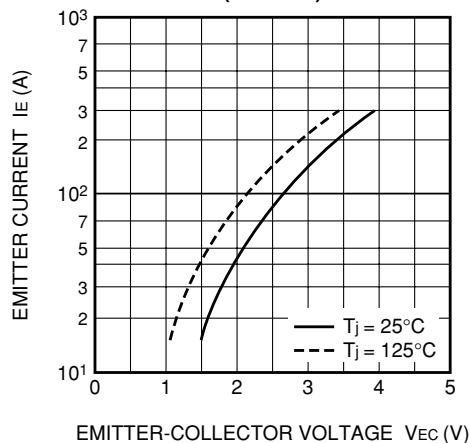
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



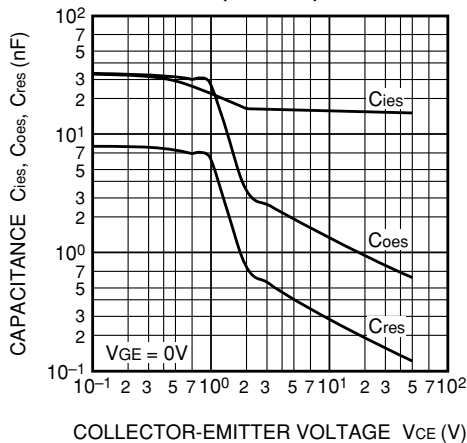
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



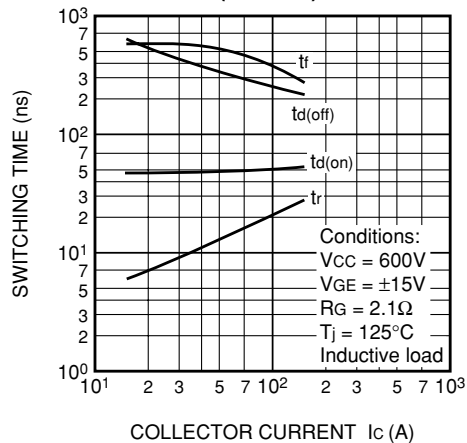
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



CAPACITANCE- V_{CE} CHARACTERISTICS (TYPICAL)



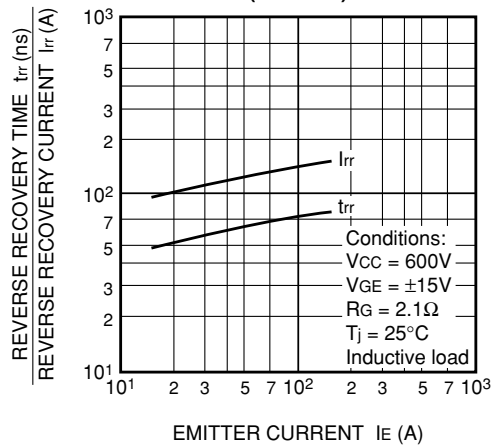
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



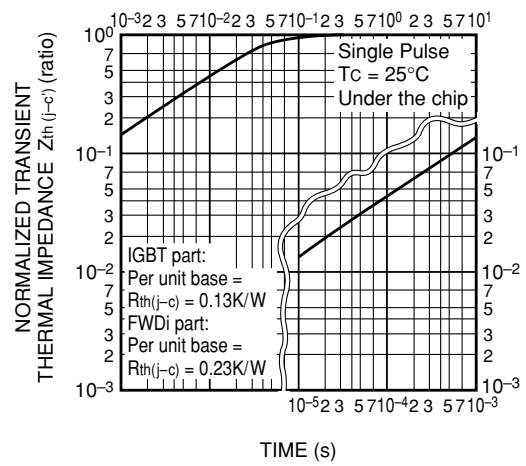
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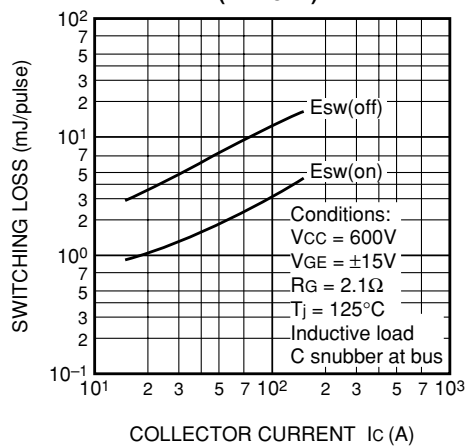
**REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)**



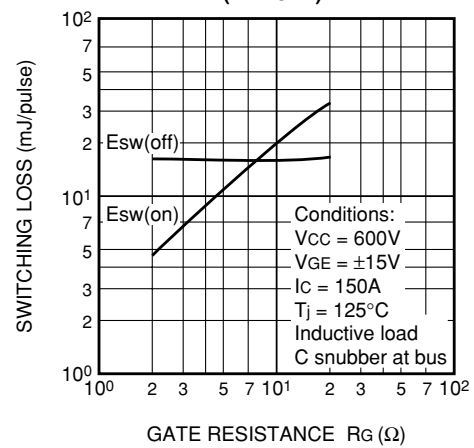
**TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT part & FWDi part)**



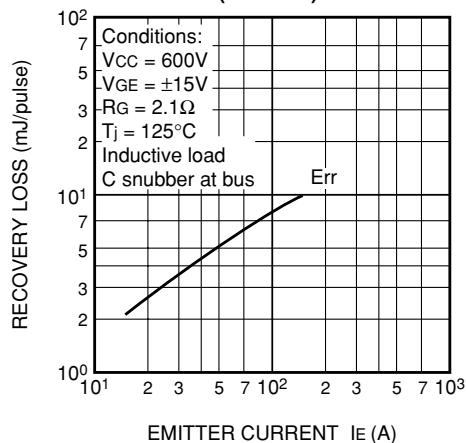
**SWITCHING LOSS vs.
COLLECTOR CURRENT
(TYPICAL)**



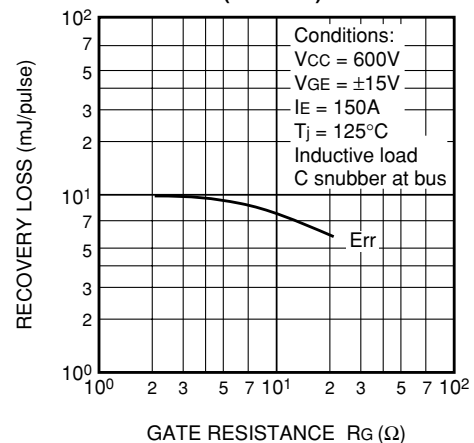
**SWITCHING LOSS vs.
GATE RESISTANCE
(TYPICAL)**



**RECOVERY LOSS vs. IE
(TYPICAL)**



**RECOVERY LOSS vs.
GATE RESISTANCE
(TYPICAL)**



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