MITSUBISHI IGBT MODULES

CM150DY-34A

HIGH POWER SWITCHING USE

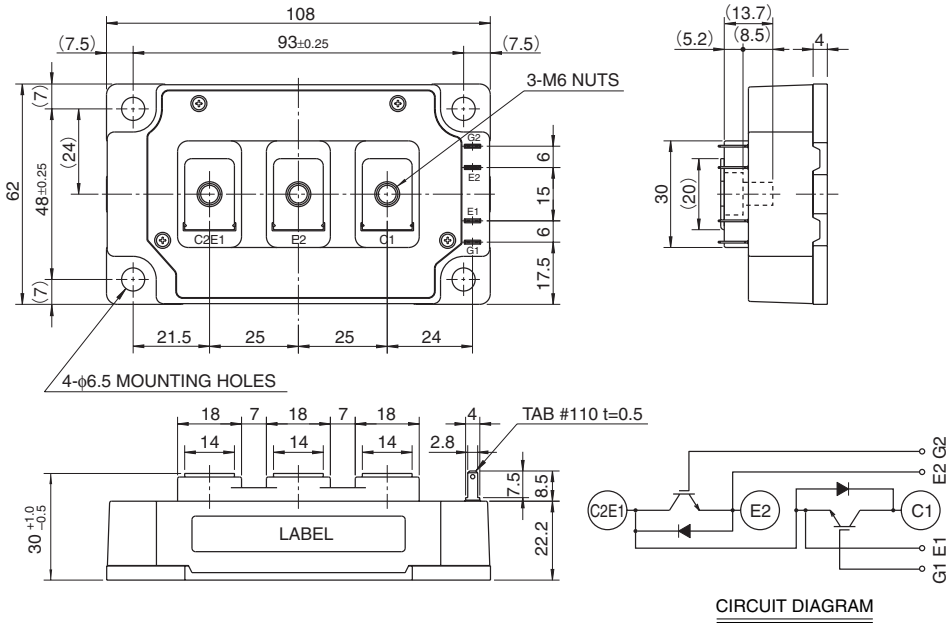
CM150DY-34A

- I_C 150A
- V_{CES} 1700V
- Insulated Type
- 2-elements in a pack

APPLICATION

General purpose inverters & Servo controls, etc

OUTLINE DRAWING & CIRCUIT DIAGRAM **Dimensions in mm**



MITSUBISHI ELECTRIC

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

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	G-E Short	1700	V
V_{GES}	Gate-emitter voltage	C-E Short	±20	V
I_C	Collector current	DC, T_C = 112°C*1 (Note 2)	150	A
I_{CM}		Pulse (Note 2)	300	
I_E (Note 1)	Emitter current	Operation (Note 2)	150	A
I_{EM} (Note 1)		Pulse (Note 2)	300	
P_C (Note 3)	Maximum collector dissipation	T_C = 25°C*1	1600	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	3500	Vrms
—	Torque strength	Main terminals M6 screw	3.5 ~ 4.5	N • m
—		Mounting M6 screw	3.5 ~ 4.5	
—	Weight	Typical value	400	g

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

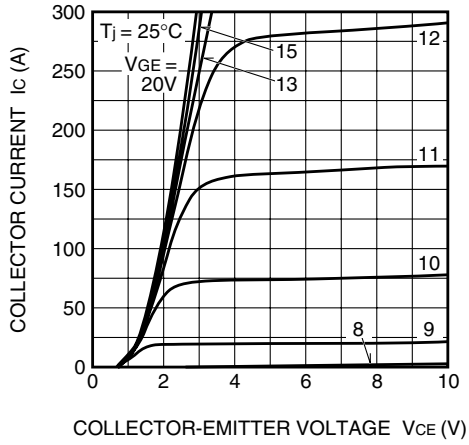
Symbol	Parameter	Test conditions		Limits			Unit
				Min.	Typ.	Max.	
I_{CES}	Collector cutoff current	V_{CE} = V_{CES}, V_{GE} = 0V		—	—	1	mA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C = 15mA, V_{CE} = 10V		5.5	7.0	8.5	V
I_{GES}	Gate leakage current	±V_{GE} = V_{GES}, V_{CE} = 0V		—	—	2.0	µA
$V_{CE(sat)}$	Collector to emitter saturation voltage	I_C = 150A, V_{GE} = 15V	T_j = 25°C	—	2.2	2.8	V
			T_j = 125°C	—	2.45	—	
C_{ies}	Input capacitance	V_{CE} = 10V, V_{GE} = 0V		—	—	37	nF
C_{oes}	Output capacitance			—	—	4.2	
C_{res}	Reverse transfer capacitance			—	—	0.8	
Q_G	Total gate charge	V_{CC} = 1000V, I_C = 150A, V_{GE} = 15V		—	1000	—	nC
$t_{d(on)}$	Turn-on delay time	V_{CC} = 1000V, I_C = 150A, V_{GE} = ±15V, R_G = 3.2Ω, Inductive load, I_E = 150A		—	—	550	ns
t_r	Turn-on rise time			—	—	190	
$t_{d(off)}$	Turn-off delay time			—	—	750	
t_f	Turn-off fall time			—	—	350	
t_{rr} (Note 1)	Reverse recovery time			—	—	450	
Q_{rr} (Note 1)	Reverse recovery charge			—	15	—	µC
V_{EC}(Note 1)	Emitter-collector voltage	I_E = 150A, V_{GE} = 0V		—	—	3.0	V
$R_{th(j-c)Q}$	Thermal resistance	IGBT part (1/2 module)*1		—	—	0.078	K/W
$R_{th(j-c)R}$		FWDi part (1/2 module)*1		—	—	0.15	
$R_{th(c-f)}$	Contact thermal resistance	Case to heat sink, Thermal compound applied (1/2 module)*1,*2		—	0.02	—	
R_G	External gate resistance			3.2	—	32	Ω

*1 : Case temperature (T_C), heat sink temperature (T_f) measured point is just under the chips.
*2 : Typical value is measured by using thermally conductive grease of λ = 0.9[W/(m • K)].

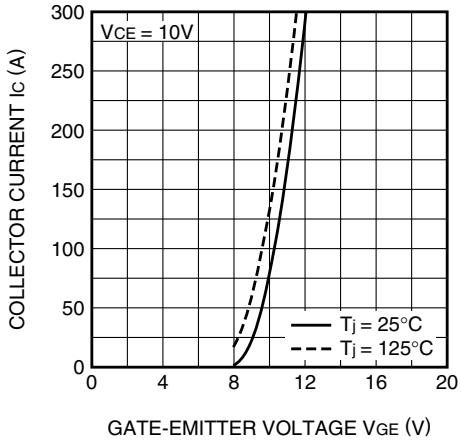
Note 1. I_E, I_{EM}, V_{EC}, t_{rr} & Q_{rr} represent characteristics of the anti-parallel, emitter-collector free-wheel diode (FWDi).
2. Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed T_{jmax} rating.
3. Junction temperature (T_j) should not increase beyond 150°C.
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

PERFORMANCE CURVES

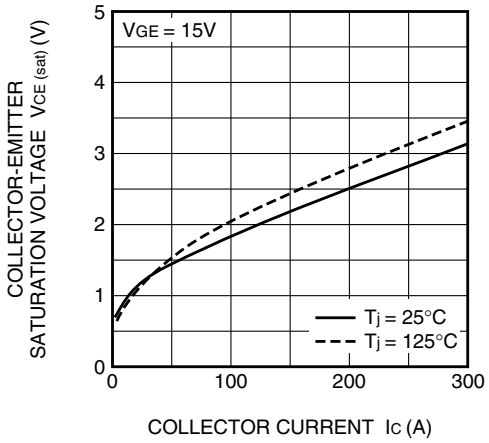
OUTPUT CHARACTERISTICS (TYPICAL)



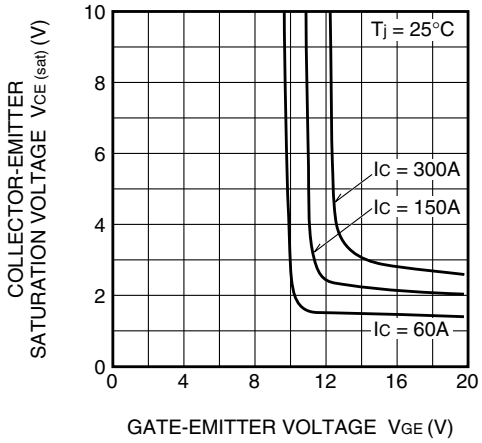
TRANSFER CHARACTERISTICS (TYPICAL)



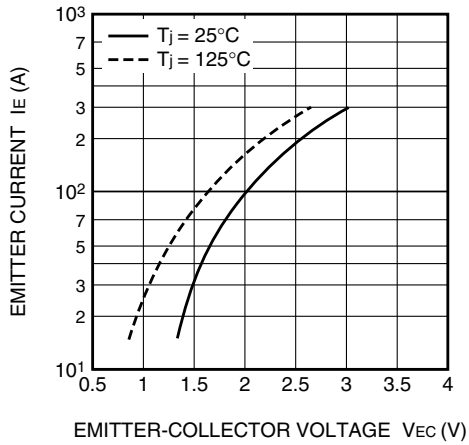
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



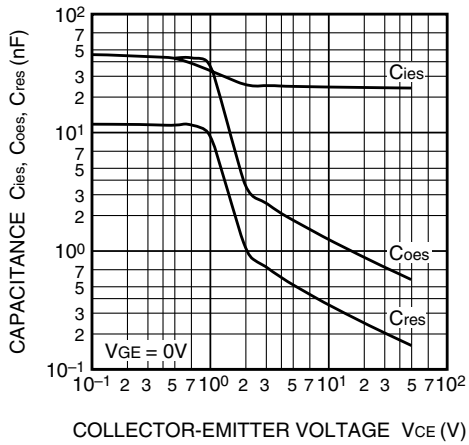
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



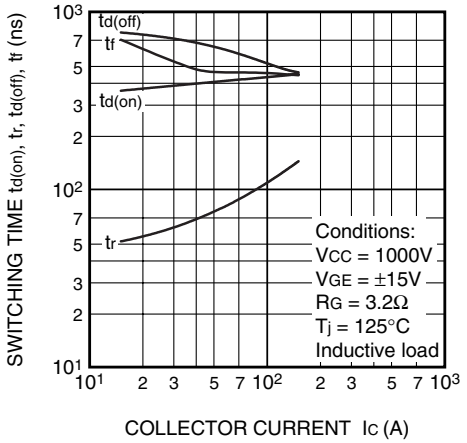
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



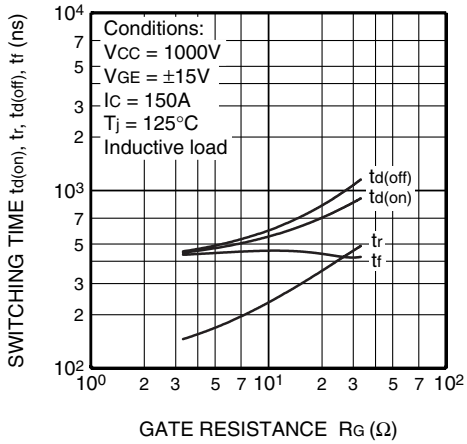
CAPACITANCE–VCE CHARACTERISTICS (TYPICAL)



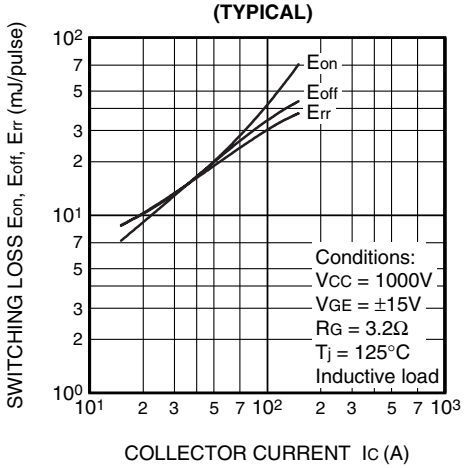
HALF-BRIDGE SWITCHING CHARACTERISTICS SWITCHING TIME vs. COLLECTOR CURRENT (TYPICAL)



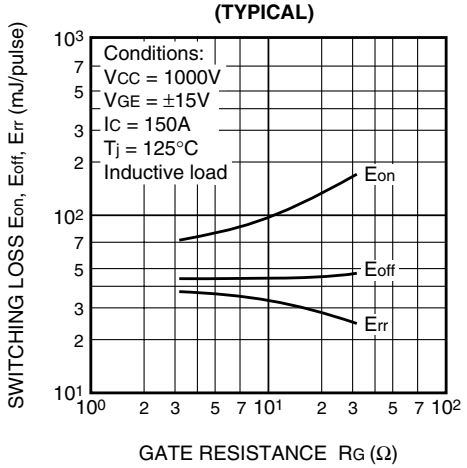
HALF-BRIDGE SWITCHING CHARACTERISTICS SWITCHING TIME vs. GATE RESISTANCE (TYPICAL)



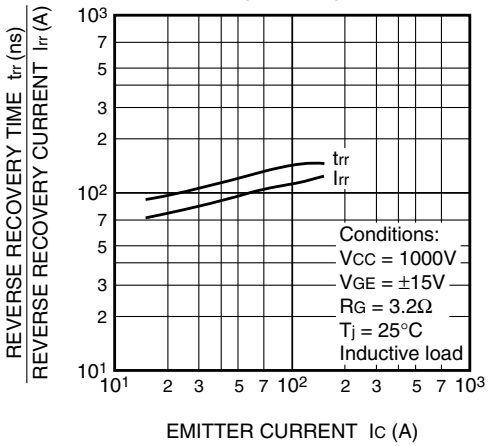
SWITCHING LOSS vs. COLLECTOR CURRENT (TYPICAL)



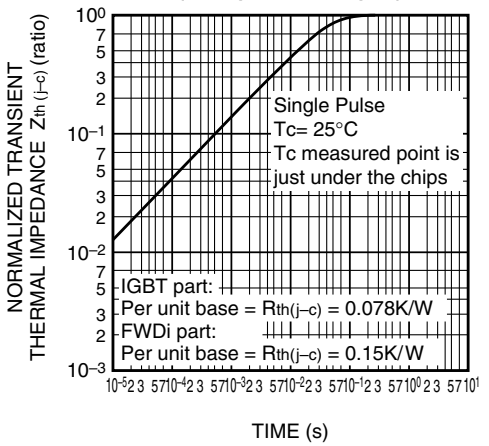
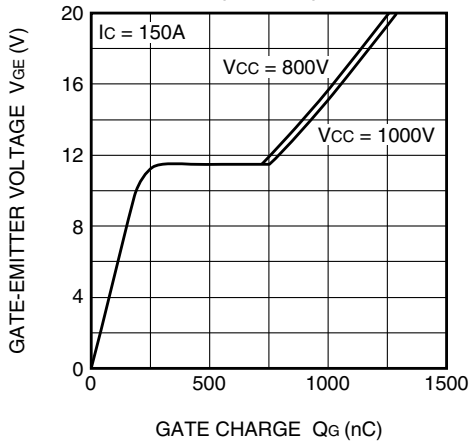
SWITCHING LOSS vs. GATE RESISTANCE (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



GATE CHARGE CHARACTERISTICS (TYPICAL)