

MITSUBISHI IGBT MODULES

CM150TL-24NF

HIGH POWER SWITCHING USE

CM150TL-24NF



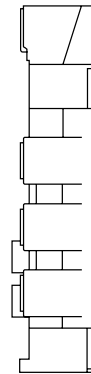
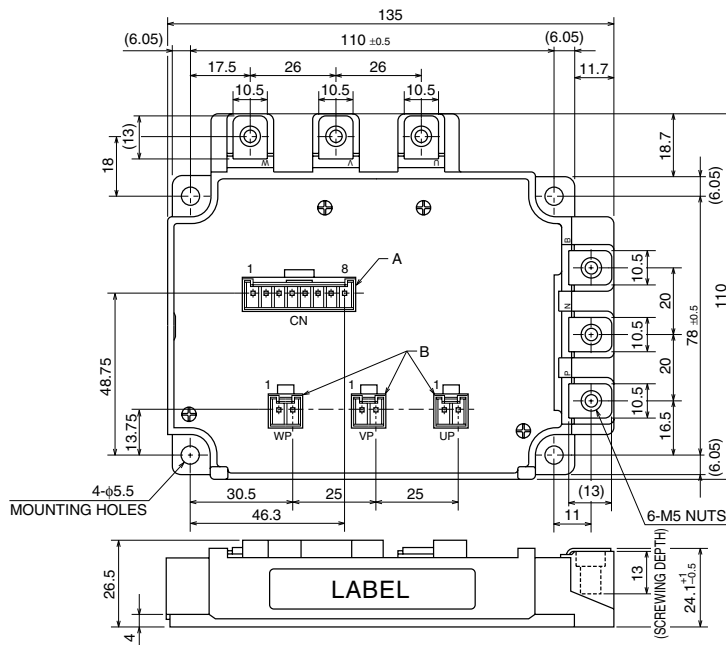
- Ic 150A
- VCES 1200V
- Insulated Type
- 6-elements in a pack

APPLICATION

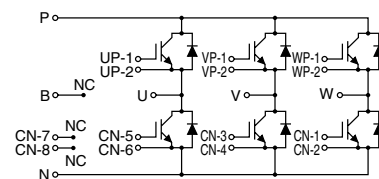
AC drive inverters & Servo controls, etc

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



Housing Type of A and B
(J.S.T.Mfg.Co.Ltd)
A = B8P-VH-FB-B, B = B2P-VH-FB-B



CIRCUIT DIAGRAM

CM150TL-24NF

HIGH POWER SWITCHING USE

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 = 76°C ^{*1}	150	A
I _{CM}		Pulse (Note 2)	300	A
I _E (Note 1)	Emitter current		150	A
I _{EM} (Note 1)		Pulse (Note 2)	300	A
P _C (Note 3)	Maximum collector dissipation	T _C = 25°C	890	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 M5 screw	2.5 ~ 3.5	N • m
—	Weight	Typical value	750	g

ELECTRICAL CHARACTERISTICS (T_j = 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	6	7	8	V
I _{GES}	Gate leakage current	±V _{GE} = V _{GES} , V _{CE} = 0V	—	—	0.5	μA
V _{CE(sat)}	Collector-emitter saturation voltage	I _C = 150A, V _{GE} = 15V	—	2.1	3.0	V
C _{ies}	Input capacitance	T _j = 25°C	—	2.4	—	nF
C _{oes}	Output capacitance	T _j = 125°C	—	—	—	nF
C _{res}	Reverse transfer capacitance	V _{CE} = 10V	—	—	2	nF
Q _G	Total gate charge	V _{GE} = 0V	—	—	0.45	nF
t _{d(on)}	Turn-on delay time	V _{CC} = 600V, I _C = 150A, V _{GE} = 15V	—	675	—	nC
t _r	Turn-on rise time		—	—	130	ns
t _{d(off)}	Turn-off delay time	V _{CC} = 600V, I _C = 150A	—	—	70	ns
t _f	Turn-off fall time	V _{GE} = ±15V	—	—	400	ns
t _{rr} (Note 1)	Reverse recovery time	R _G = 2.1Ω, Inductive load	—	—	350	ns
Q _{rr} (Note 1)	Reverse recovery charge	I _E = 150A	—	—	150	ns
V _{EC} (Note 1)	Emitter-collector voltage		—	5.8	—	μC
R _{th(j-c)Q}	Thermal resistance	I _E = 150A, V _{GE} = 0V	—	—	3.8	V
R _{th(j-c)R}			—	—	—	—
R _{th(c-f)}	Contact thermal resistance	IGBT part (1/6 module) ^{*1}	—	—	0.14	K/W
R _G	External gate resistance	FWDi part (1/6 module) ^{*1}	—	—	0.23	K/W
		Case to heat sink, Thermal compound Applied (1/6 module) ^{*2}	—	0.051	—	K/W
			2.1	—	31	Ω

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

If you use this value, R_{th(t-a)} should be measured 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.

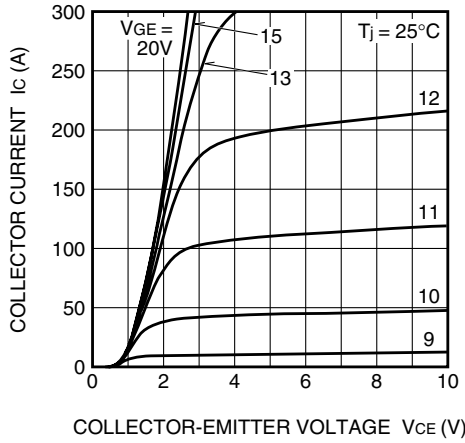
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

CM150TL-24NF

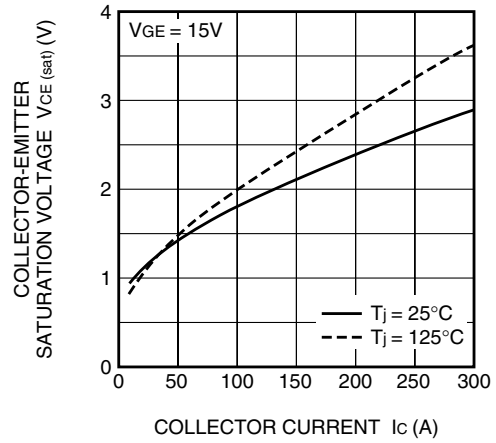
HIGH POWER SWITCHING USE

PERFORMANCE CURVES

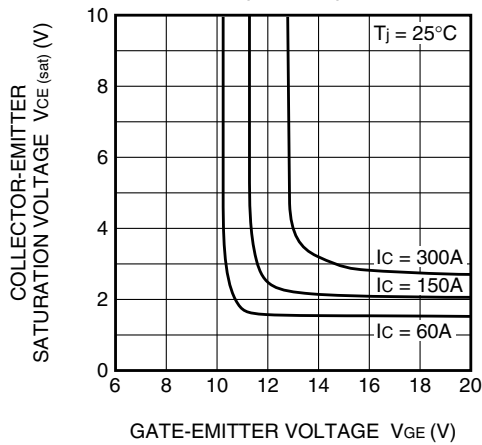
**OUTPUT CHARACTERISTICS
(TYPICAL)**



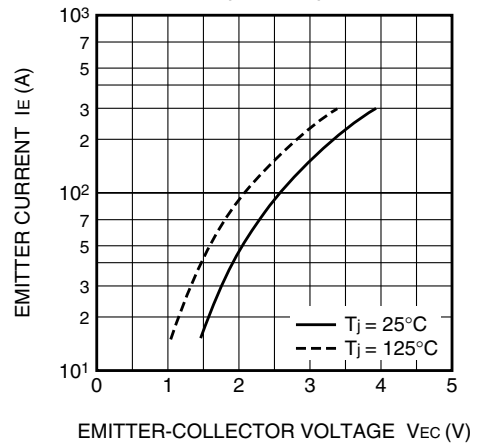
**COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)**



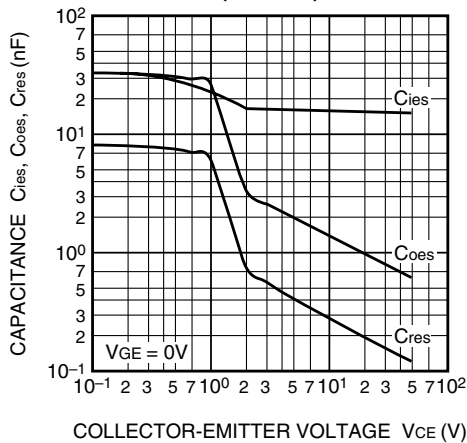
**COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)**



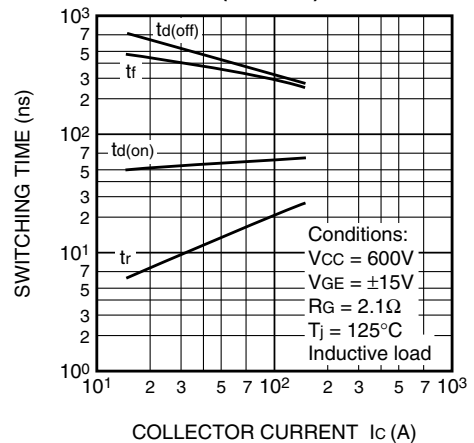
**FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)**



**CAPACITANCE- V_{CE}
CHARACTERISTICS
(TYPICAL)**



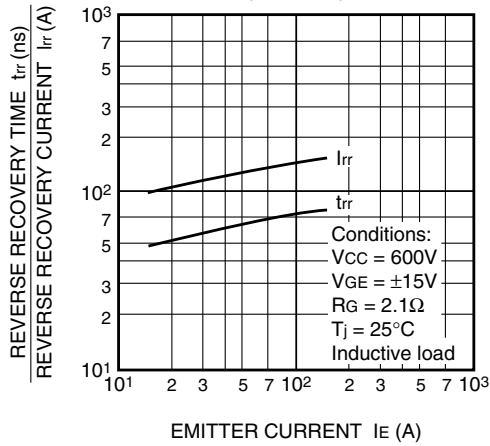
**HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)**



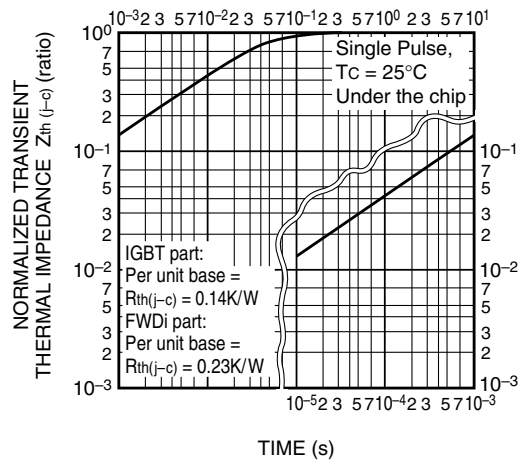
CM150TL-24NF

HIGH POWER SWITCHING USE

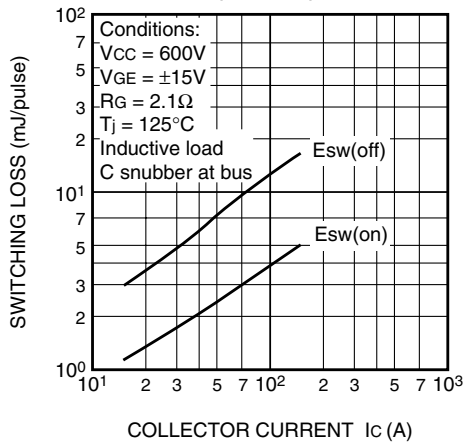
**REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)**



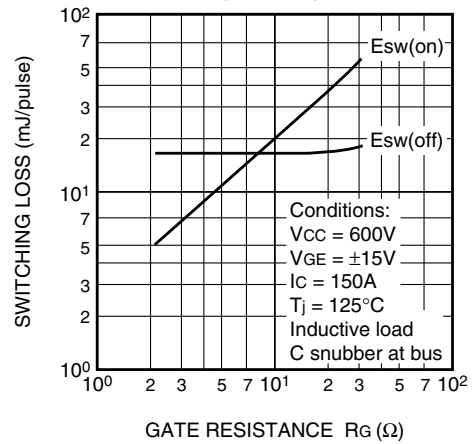
**TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT part & FWDi part)**



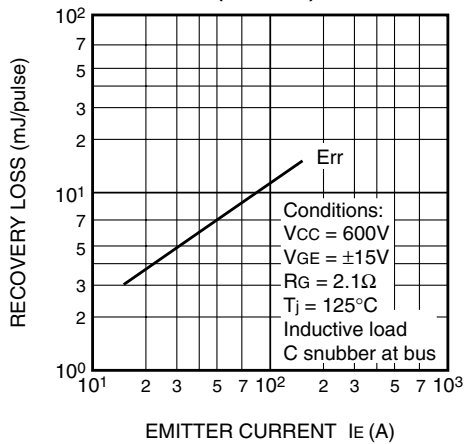
**SWITCHING LOSS vs.
COLLECTOR CURRENT
(TYPICAL)**



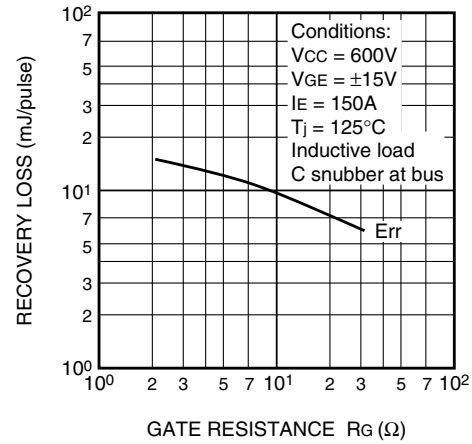
**SWITCHING LOSS vs.
GATE RESISTANCE
(TYPICAL)**



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



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



CM150TL-24NF

HIGH POWER SWITCHING USE

