

MITSUBISHI IGBT MODULES

CM50TL-24NF

HIGH POWER SWITCHING USE

CM50TL-24NF



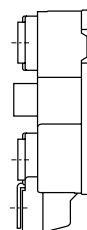
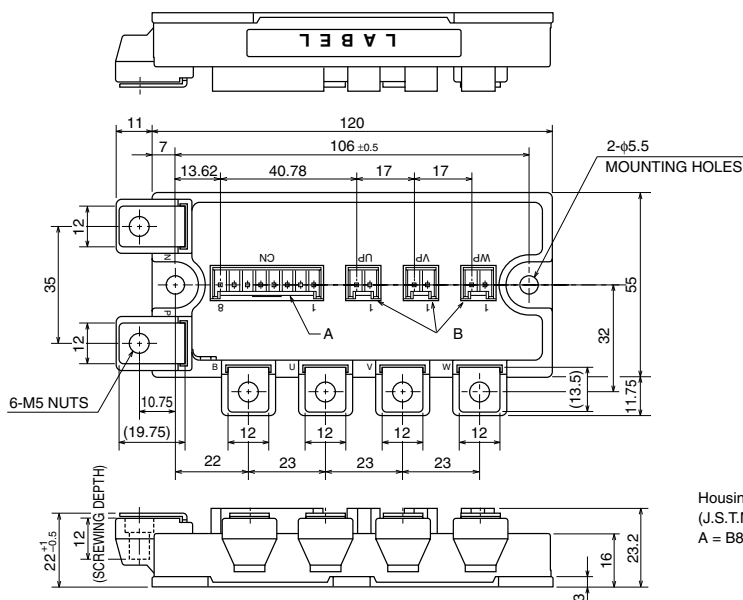
- Ic 50A
- VCES 1200V
- Insulated Type
- 6-elements in a pack

APPLICATION

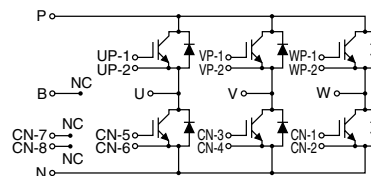
AC drive inverters & Servo controls, etc

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

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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 = 94°C ^{*1}	50	A
I _{CM}		Pulse (Note 2)	100	A
I _E (Note 1)	Emitter current		50	A
I _{EM} (Note 1)		Pulse (Note 2)	100	A
P _C (Note 3)	Maximum collector dissipation	T _C = 25°C	390	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	350	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 = 5.0mA, 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 = 50A, 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	—	—	0.75	nF
Q _G	Total gate charge	V _{GE} = 0V	—	—	0.17	nF
t _{d(on)}	Turn-on delay time	V _{CC} = 600V, I _C = 50A, V _{GE} = 15V	—	250	—	nC
t _r	Turn-on rise time		—	—	100	ns
t _{d(off)}	Turn-off delay time	V _{CC} = 600V, I _C = 50A	—	—	50	ns
t _f	Turn-off fall time	V _{GE} = ±15V	—	—	300	ns
t _{rr} (Note 1)	Reverse recovery time	R _G = 6.3Ω, Inductive load	—	—	350	ns
Q _{rr} (Note 1)	Reverse recovery charge	I _E = 50A	—	—	100	ns
V _{EC} (Note 1)	Emitter-collector voltage	I _E = 50A, V _{GE} = 0V	—	2	—	μC
R _{th(j-c)Q}	Thermal resistance	I _E = 50A, V _{GE} = 0V	—	—	3.8	V
R _{th(j-c)R}		IGBT part (1/6 module) ^{*1}	—	—	0.32	K/W
R _{th(c-f)}	Contact thermal resistance	FWDi part (1/6 module) ^{*1}	—	—	0.43	K/W
R _G	External gate resistance	Case to heat sink, Thermal compound Applied (1/6 module) ^{*2}	—	0.085	—	K/W
			6.3	—	96	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.

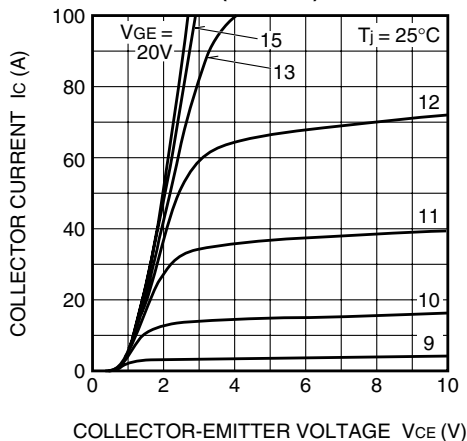
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

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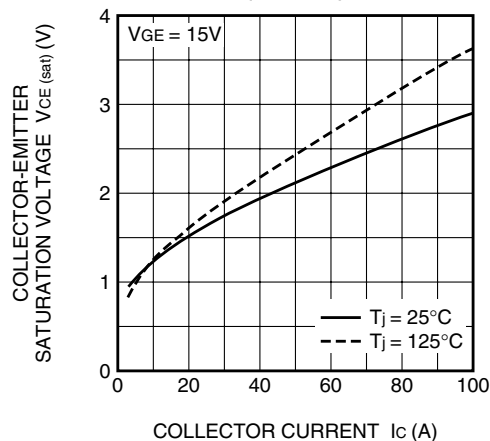
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PERFORMANCE CURVES

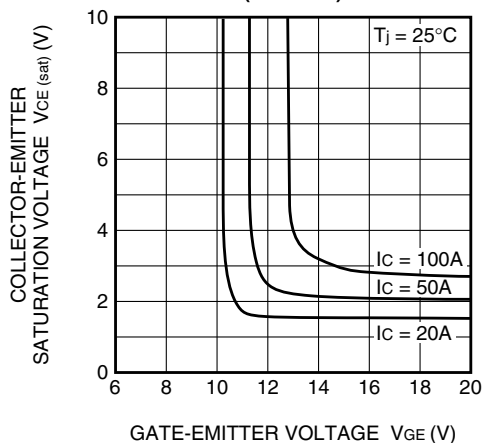
OUTPUT CHARACTERISTICS
(TYPICAL)



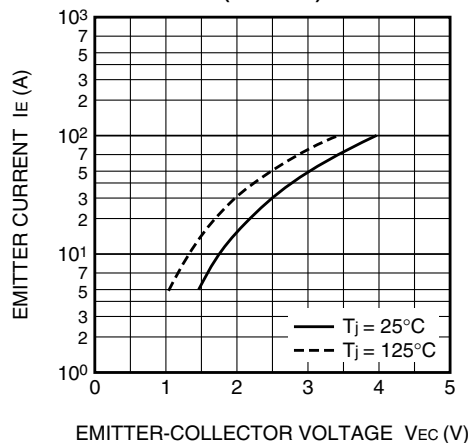
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



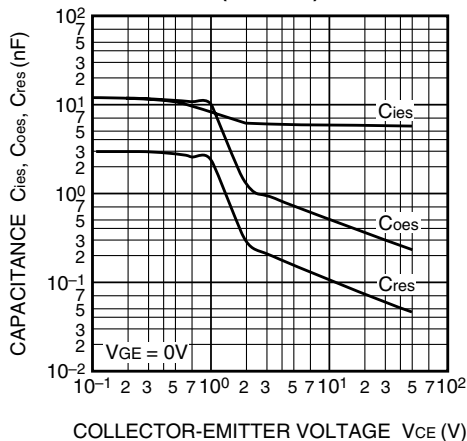
COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)



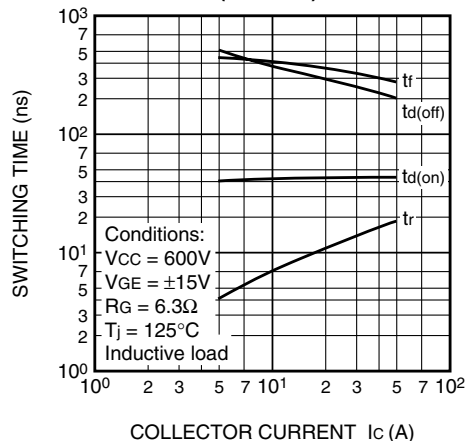
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



CAPACITANCE- V_{CE}
CHARACTERISTICS
(TYPICAL)



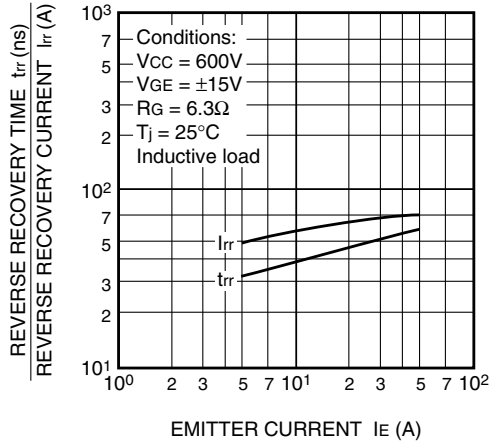
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



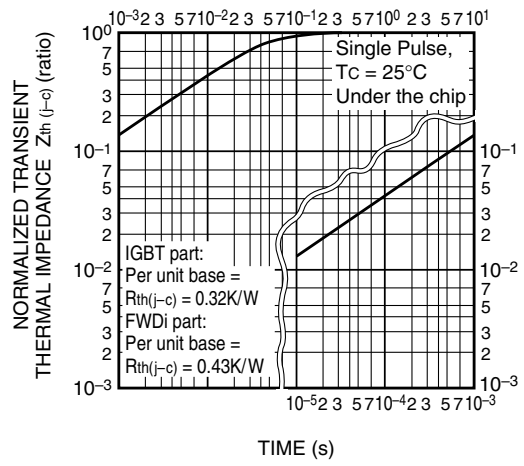
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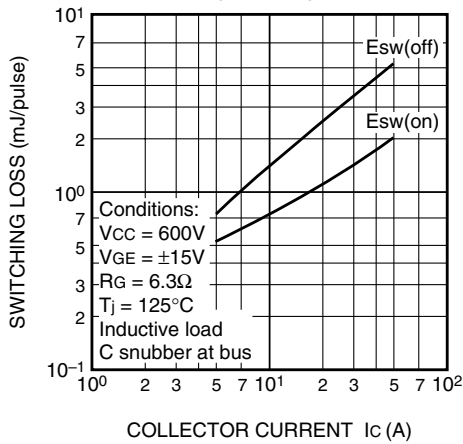
**REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)**



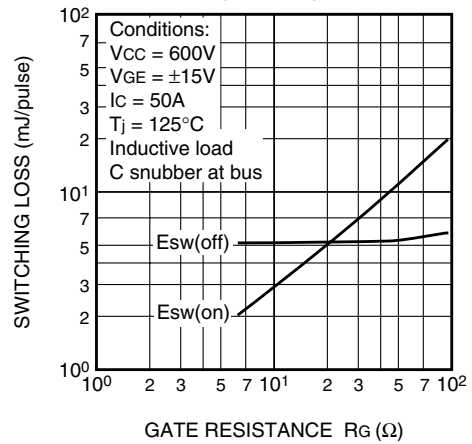
**TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT part & FWDi part)**



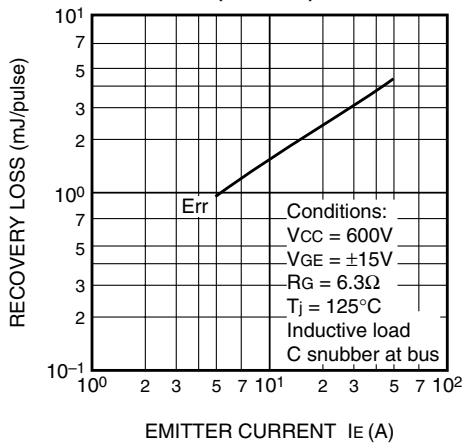
**SWITCHING LOSS vs.
COLLECTOR CURRENT
(TYPICAL)**



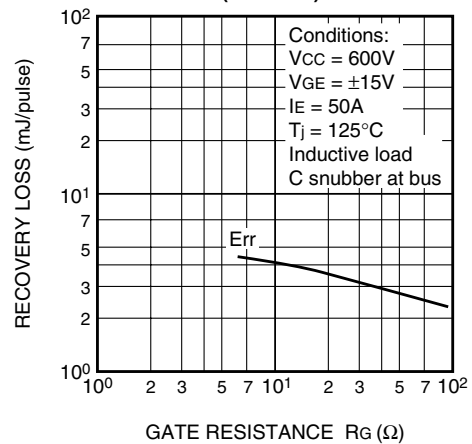
**SWITCHING LOSS vs.
GATE RESISTANCE
(TYPICAL)**



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



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



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