

MITSUBISHI IGBT MODULES  
**CM75TL-12NF**

HIGH POWER SWITCHING USE

**CM75TL-12NF**



- IC ..... 75A
- VCES ..... 600V
- Insulated Type
- 6-elements in a pack

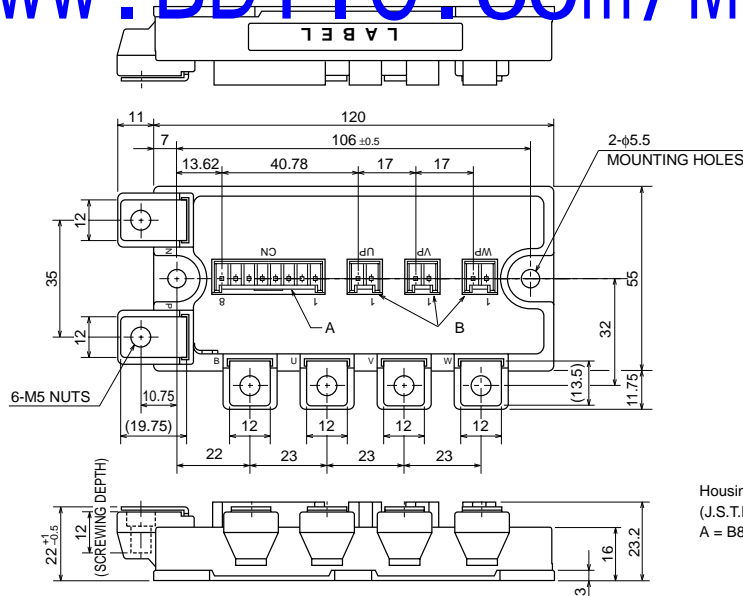
**APPLICATION**

AC drive inverters & Servo controls, etc

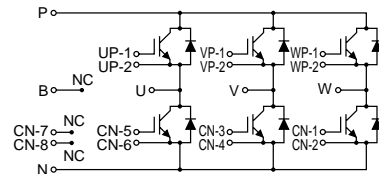
**OUTLINE DRAWING & CIRCUIT DIAGRAM**

Dimensions in mm

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



CIRCUIT DIAGRAM

ABSOLUTE MAXIMUM RATINGS ( $T_j = 25^\circ\text{C}$ )

Symbol	Parameter	Conditions	Ratings	Unit
VCES	Collector-emitter voltage	G-E Short	600	V
VGES	Gate-emitter voltage	C-E Short	$\pm 20$	V
IC	Collector current	DC, $T_c = 102^\circ\text{C}^{*1}$	75	A
ICM		Pulse (Note 2)	150	A
IE (Note 1)	Emitter current		75	A
IEM (Note 1)		Pulse (Note 2)	150	A
PC (Note 3)	Maximum collector dissipation	$T_c = 25^\circ\text{C}$	430	W
Tj	Junction temperature		$-40 \sim +150$	$^\circ\text{C}$
Tstg	Storage temperature		$-40 \sim +125$	$^\circ\text{C}$
Viso	Isolation voltage	Main Terminal to base plate, AC 1 min.	2500	V
—	Torque strength	Main Terminal M5	2.5 ~ 3.5	N•m
—		Mounting holes M5	2.5 ~ 3.5	N•m
—	Weight	Typical value	350	g

ELECTRICAL CHARACTERISTICS ( $T_j = 25^\circ\text{C}$ )

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
ICES	Collector cutoff current	$V_{CE} = V_{CES}, V_{GE} = 0V$	—	—	1	mA
VGE(th)	Gate-emitter threshold voltage	$I_C = 7.5\text{mA}, V_{CE} = 10V$	6	7	8	V
IGES	Gate leakage current	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	$\mu\text{A}$
VCE(sat)	Collector-emitter saturation voltage	$I_C = 75A, V_{GE} = 15V$	—	1.7	2.2	V
Cies	Input capacitance	$V_{CE} = 10V, V_{GE} = 0V$	—	—	1.3	nF
Co(es)	Output capacitance	$V_{CE} = 10V, V_{GE} = 0V$	—	—	1.4	nF
Cres	Reverse transfer capacitance		—	—	0.45	nF
QG	Total gate charge	$V_{CC} = 300V, I_C = 75A, V_{GE} = 15V$	—	300	—	nC
td(on)	Turn-on delay time		—	—	120	ns
tr	Turn-on rise time	$V_{CC} = 300V, I_C = 75A$	—	—	100	ns
td(off)	Turn-off delay time	$V_{GE1} = V_{GE2} = 15V$	—	—	300	ns
tf	Turn-off fall time	$R_G = 8.3\Omega$ , Inductive load switching operation	—	—	300	ns
trr (Note 1)	Reverse recovery time	$I_E = 75A$	—	—	100	ns
Qrr (Note 1)	Reverse recovery charge		—	1.2	—	$\mu\text{C}$
VEC(Note 1)	Emitter-collector voltage	$I_E = 75A, V_{GE} = 0V$	—	—	2.8	V
Rth(j-c)Q	Thermal resistance	IGBT part (1/6 module) <sup>*1</sup>	—	—	0.29	$^\circ\text{C}/\text{W}$
Rth(j-c)R		FWDi part (1/6 module) <sup>*1</sup>	—	—	0.51	$^\circ\text{C}/\text{W}$
Rth(c-f)	Contact thermal resistance	Case to fin, Thermal compound Applied (1/6 module) <sup>*2</sup>	—	0.085	—	$^\circ\text{C}/\text{W}$
RG	External gate resistance		8.3	—	83	$\Omega$

\*1 :  $T_c$  measured point is just under the chips.

If you use this value,  $R_{th}(f-a)$  should be measured just under the chips.

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

Note 1. IE, VEC, trr & Qrr represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).

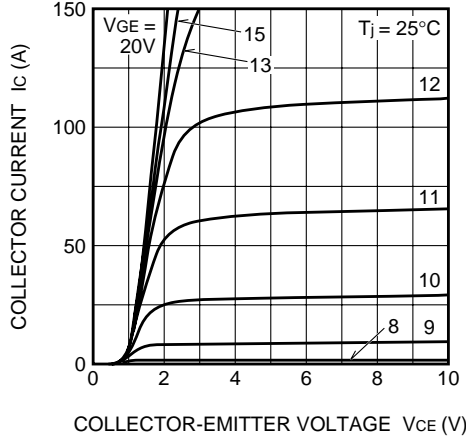
2. Pulse width and repetition rate should be such that the device junction temp. ( $T_j$ ) does not exceed  $T_{jmax}$  rating.

3. Junction temperature ( $T_j$ ) should not increase beyond  $150^\circ\text{C}$ .

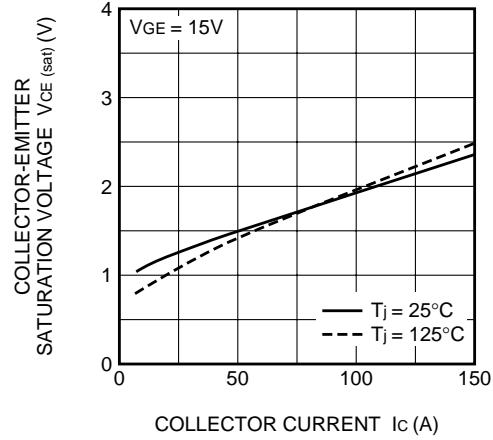
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

PERFORMANCE CURVES

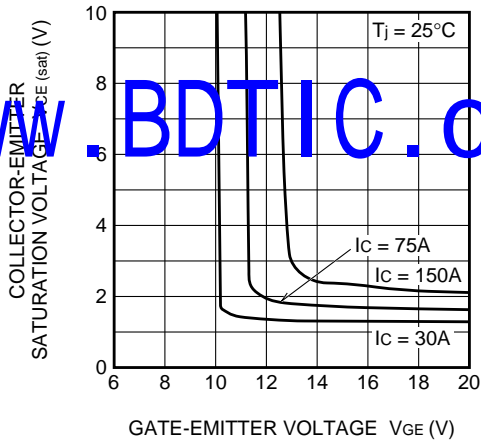
OUTPUT CHARACTERISTICS (TYPICAL)



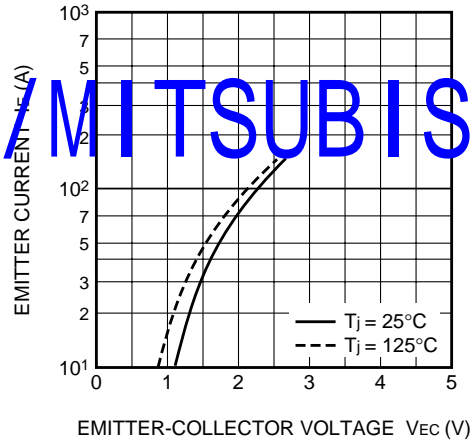
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



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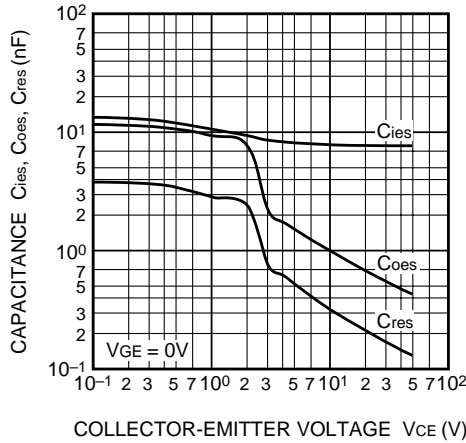


FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)

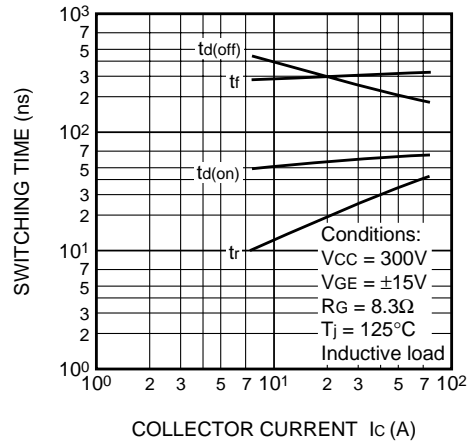


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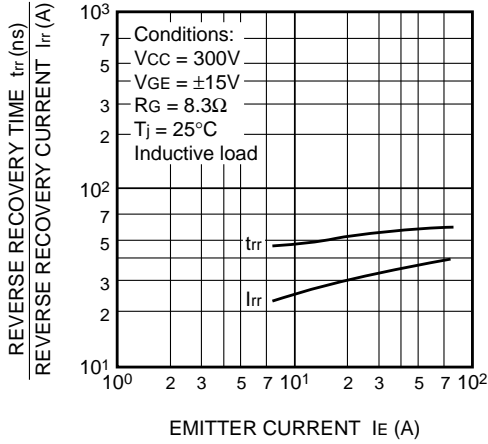
CAPACITANCE-VCE CHARACTERISTICS (TYPICAL)



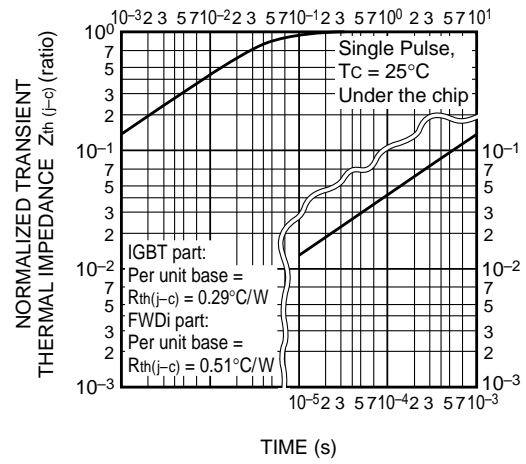
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



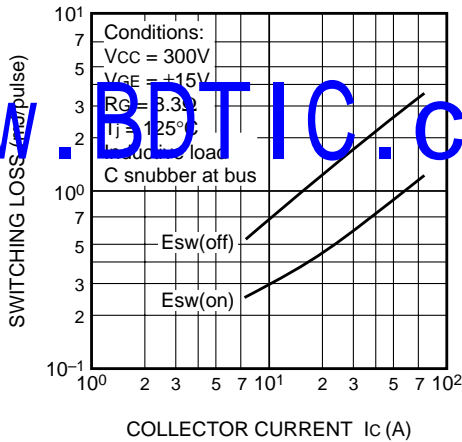
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



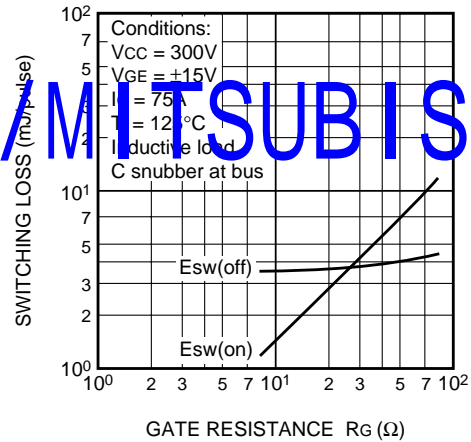
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT part & FWDi part)



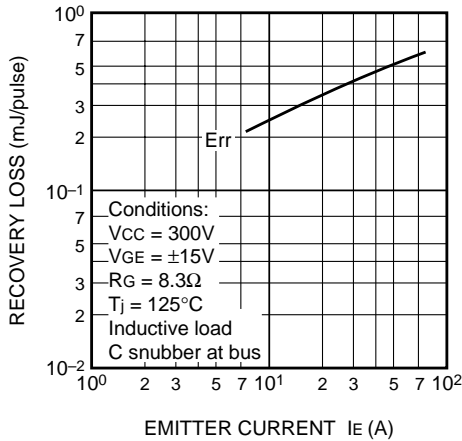
SWITCHING LOSS vs. COLLECTOR CURRENT (TYPICAL)



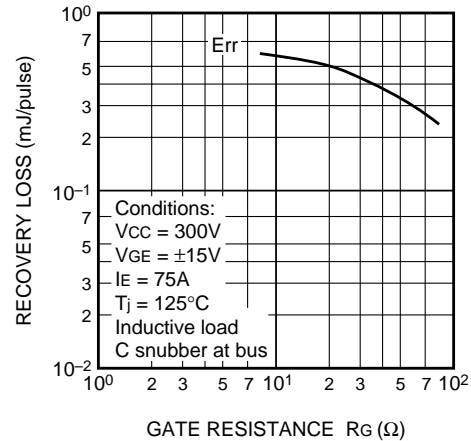
SWITCHING LOSS vs. GATE RESISTANCE (TYPICAL)



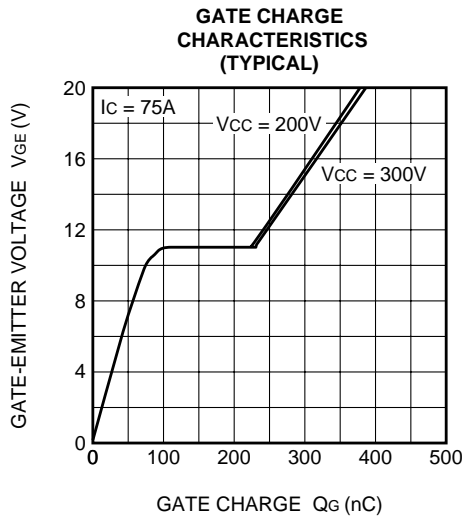
RECOVERY LOSS vs. IE (TYPICAL)



RECOVERY LOSS vs. GATE RESISTANCE (TYPICAL)



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