

TENTATIVE

CM450TJ-24NF

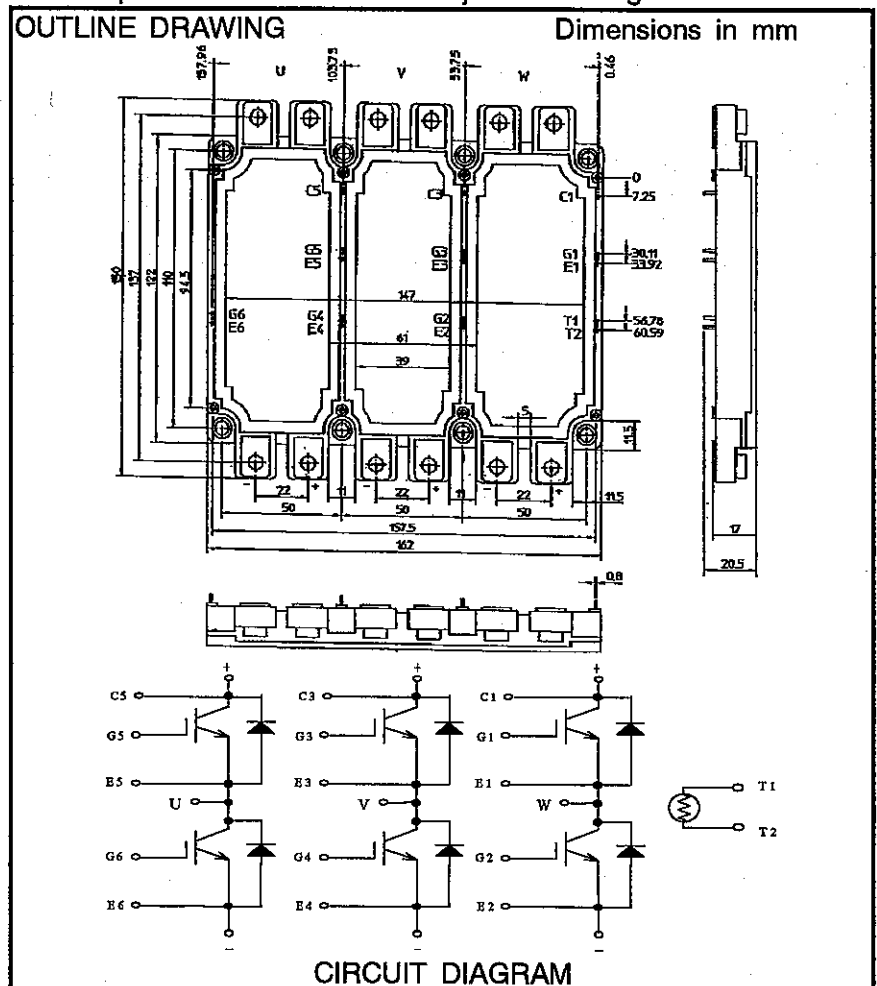
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Apr.	M.Yamamoto July 31.'01			M.Yamamoto Mar.14.'03

HIGH POWER SWITCHING USE

Notice : This is not a final specification. Some parametric limits are subject to change.

CM450TJ-24NF

- $I_C$ .....450A
- $V_{CES}$ .....1200V
- Insulated Type
- 6-elements in a pack



APPLICATION

General purpose inverters & Servo controls, etc

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

Symbol	Item	Conditions	Ratings	Units
$V_{CES}$	Collector-emitter voltage	G-E Short	1200	V
$V_{GES}$	Gate-emitter voltage	C-E Short	$\pm 20$	V
$I_C$	Collector current	DC, $T_c' = 96\text{ }^\circ\text{C}^*1$	450	A
$I_{CM}$		Pulse ②	900	
$I_E$ ①	Emitter current		450	A
$I_{EM}$ ①		Pulse ②	900	
$P_C$ ③	Maximum collector dissipation	$T_c' = 25\text{ }^\circ\text{C}$	3040	W
$T_j$	Junction temperature		$-40\sim+150$	$^\circ\text{C}$
$T_{stg}$	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 M6	$3.5\sim4.5$	N·m
-	Torque strength	Mounting holes M5	$2.5\sim3.5$	N·m
-	Weight	Typical value	1100	g

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

Symbol	Item	Conditions	Min.	Typ.	Max.	Units			
$I_{CES}$	Collector cutoff current	$V_{CE}=V_{CES}, V_{GE}=0V$	—	—	2	mA			
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=45mA, V_{CE}=10V$	6	7	8	V	C		
$I_{GES}$	Gate leakage current	$V_{GE}=V_{GES}, V_{CE}=0V$	—	—	0.5	$\mu\text{A}$	A		
$V_{CE(sat)}$	Collector to emitter saturation voltage	$T_j = 25^\circ\text{C}$   $I_C = 450A$	—	2.0**	2.6**	V			
		$T_j = 125^\circ\text{C}$   $V_{GE} = 15V$	—	2.2**	—				
$C_{ies}$	Input capacitance	$V_{CE}=10V$	—	—	70	nF	B		
$C_{oes}$	Output capacitance	$V_{GE}=0V$	—	—	8.1		B		
$C_{res}$	Reverse transfer capacitance		—	—	1.5		B		
$Q_G$	Total gate charge	$V_{CC}=600V, I_C=450A, V_{GE}=15V$	—	2400	—	nC	A		
$t_{d(on)}$	Turn-on delay time	$V_{CC}=600V, I_C=450A$	—	—	500	ns	B D		
$t_r$	Turn-on rise time	$V_{GE1}=V_{GE2}=15V$	—	—	150		B D		
$t_{d(off)}$	Turn-off delay time	$R_G=0.7\Omega$ , Inductive load switching operation	—	—	600		B		
$t_f$	Turn-off fall time		—	—	300		B		
$t_{rr}$ ①	Reverse recovery time		$I_E=450A$	—	—		250	ns	B D
$Q_{rr}$ ①	Reverse recovery charge			—	15		—	$\mu\text{C}$	B D
$V_{EC}$ ①	Emitter-collector voltage	$I_E=450A, V_{GE}=0V$	—	—	3.2**	V			
$R_{th(j-c)Q}$	Thermal resistance*	IGBT part	—	—	0.041	$^\circ\text{C/W}$	B		
$R_{th(j-c)R}$		FWDi part	—	—	0.048		B		
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, Thermal compound Applied (1/6module)	—	0.048 <sup>2</sup>	—				
$R_G$	External gate resistance		0.7	—	7	$\Omega$	B D		

\*\* : without package drop voltage

\*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".

## Thermistors part

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
$R_{TH}$	Resistance	$T_C=25^\circ\text{C}$	—	5	—	$k\Omega$
B	B Constant	Resistance at $25^\circ\text{C}, 50^\circ\text{C}$ ⑤	—	3375	—	K

①  $I_E, V_{EC}, t_{rr}, Q_{rr}$  & die/dt 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. ( $T_j$ ) dose 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.

⑤  $B = (\ln R_1 - \ln R_2) / (1/T_1 - 1/T_2)$   $R_1$ : Resistance at  $T_1(K)$   $R_2$ : Resistance at  $T_2(K)$