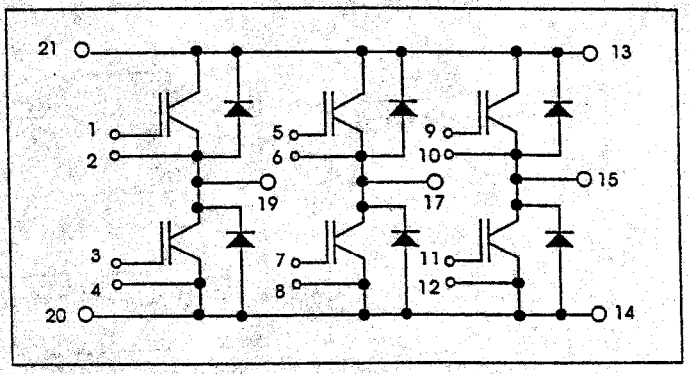
SPECIFICATION	Prep.	MG	REV	A	03-06-99 : emission		
	Appr.	DLM					

POWER IGBT MODULE SPECIFICATION

TENTATIVE

1. Type number **CM50TJ-24F**
2. Application General purpose inverter
3. Outline Sixpack page 3



4. Related Specifications

5. Maximum ratings (Tj = 25°C)

Item	Symbol	Unit	Rating	Conditions
5.1.1 Collector-emitter voltage	V_{CES}	V	1200	G - E Short
5.1.2 Gate-emitter voltage	V_{GES}	V	±20	C - E Short
5.1.3 Collector current	I_C	A	50	Tc=25°C
5.1.4 Maximum collector current	I_{CM}	A	100	Pulse ②
5.1.5 Emitter current	I_E ①	A	50	Tc=25°C
5.1.6 Maximum emitter current	I_{EM} ①	A	100	Pulse ②
5.1.7 Maximum power dissipation	Pc ③	W	219	Tc=25°C
5.1.8 Junction temperature	Tj	°C	-40~+150	
5.1.9 Storage temperature	Tstg	°C	-40~+125	
5.1.10 Isolation voltage	Viso	Vrms	2500	Main terminal to baseplate, A.C. 1 minute

6. Electrical characteristics (Tj = 25°C)

Item	Symbol	Unit	Min.	Typ.	Max.	Conditions	
6.1.1 Collector cut-off current	I_{CES}	mA	-	-	1	V_{CE} = V_{CES}, V_{GE} = 0V	
6.1.2 Gate-emitter threshold voltage	$V_{GE(th)}$	V	5	6	7	I_C = 5mA, V_{CE} = 10V	
6.1.3 Gate leakage current	I_{GES}	µA	-	-	20	V_{GE} = V_{GES}, V_{CE} = 0V	
6.1.4 Collector to emitter saturation voltage	$V_{CE(sat)}$	V	-	1.8	2.4	Tj=25°C	I_C = 50
			-	1.9	-	Tj=125°C	V_{GE} = 15V ④
6.1.5 Input capacitance	Cies	nF	-	-	20	V_{CE} = 10V	
6.1.6 Output capacitance	Coes		-	-	0.85	V_{GE} = 0V	
6.1.7 Reverse transfer capacitance	Cres		-	-	0.80	f=1MHz	
6.1.8 Total gate charge	Q_G	nC	-	550	-	V_{CC} = 600V, I_C = 50A, V_{GE} = 15V	
6.1.9 Turn-on delay time	td(on)	ns	-	70	-	V_{CC} = 600V, I_C = 50A	
6.1.10 Turn-on rise time	tr		-	40	-	V_{GE1} = V_{GE2} = 15V	
6.1.11 Turn-off delay time	td(off)		-	250	-	R_G = 6.3Ω	
6.1.12 Turn-off fall time	tf		-	175	-	Inductive load switching operation	
6.1.13 Reverse recovery time	trr ①	ns	-	-	150	dIec/dt≥ 2000A/µs	
6.1.14 Reverse recovery charge	Qrr ①	µC	-	2.1	-		
6.1.15 Emitter to Collector voltage	V_{EC} ①	V	-	2.3	3.2	I_E = 50A, V_{GE} = 0V	

7. Thermal resistances

Item	Symbol	Unit	Min.	Typ.	Max.	Conditions
7.1 Thermal resistance	Rth(j-c) ⑤,⑥	°C/W	-	-	0.57	IGBT part Per 1/6 module
7.2 Thermal resistance	Rth(j-c) ⑤,⑥	°C/W	-	-	0.96	FWD part Per 1/6 module
7.3 Thermal resistance	Rth(c-f) ⑤	°C/W	-	0.13	-	Case to Fin , thermal compound applied (1/6 module)
7.4 Thermal resistance	Rth(j-c') ⑤,⑦	°C/W	-	0.34	-	IGBT part - Per 1/6 module Tc measured just under the chip
7.5 Thermal resistance	Rth(j-c') ⑤,⑦	°C/W	-	0.45	-	FWD part - Per 1/6 module Tc measured just under the chip

8. Mechanical characteristics

Item	Symbol	Unit	Min.	Typ.	Max.	Conditions
8.1 Mounting torque		N.m	2.5	-	3.5	Mounting screw M5
8.2 Weight		g	-	300	-	Typical value

① : Ie,V_{EC},trr,Qrr & dIe/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode

② : Pulse width and repetition rate should be such that the device junction temperature (Tj) does not exceed Tjmax rating .

③ : Junction temperature (Tj) should not increase beyond 150°C

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

⑤ : Thermal resistance is specified under following conditions :

. heatsink flatness : -100µm / +100µm (recommended ±20µm) with a surface finish of 12µm (Rt) or less.

. Shin-etsu silicone G-746 conductive grease applied uniformly (its thickness is 100µm / 200µm) between module and fin.

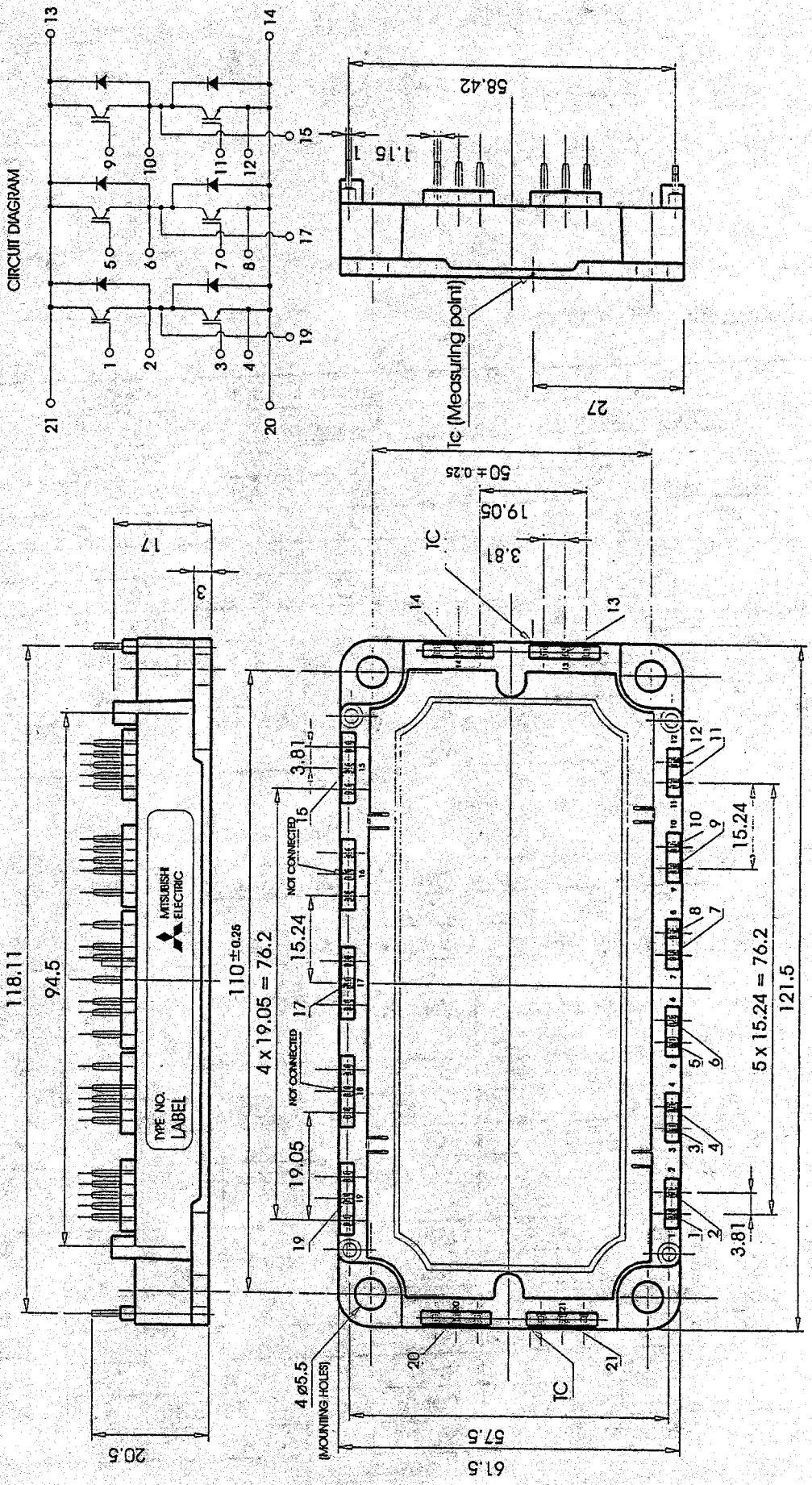
. Mitsubishi application manual mounting recommendations should be applied for :

. torquing order of mounting screws (avoiding one side tightening stress)

. using a torque wrench to tighten mounting screws to the specified torque.

⑥ : Tc measuring points for IGBT 21/19 and 15/14 respectively are shown on page 3.

⑦ : If you use this value, Rth(f-a) should be measured just under the chip


CIRCUIT DIAGRAM
13
14
15
17
19
21
20
1
2
3
4
5
6
7
8
9
10
11
12
58.42
1.15
27
Tc (Measuring point)
50 ± 0.25
19.05
3.81
TC
17
3
118.11
94.5
110 ± 0.25
4 x 19.05 = 76.2
15.24
19.05
3.81
5 x 15.24 = 76.2
121.5
NOT CONNECTED
TYPE NO.
LABEL
MITSUBISHI ELECTRIC
4 ø5.5
(MOUNTING HOLES)
20.5
57.5
61.5