TENTATIVE

FM400TU-2A

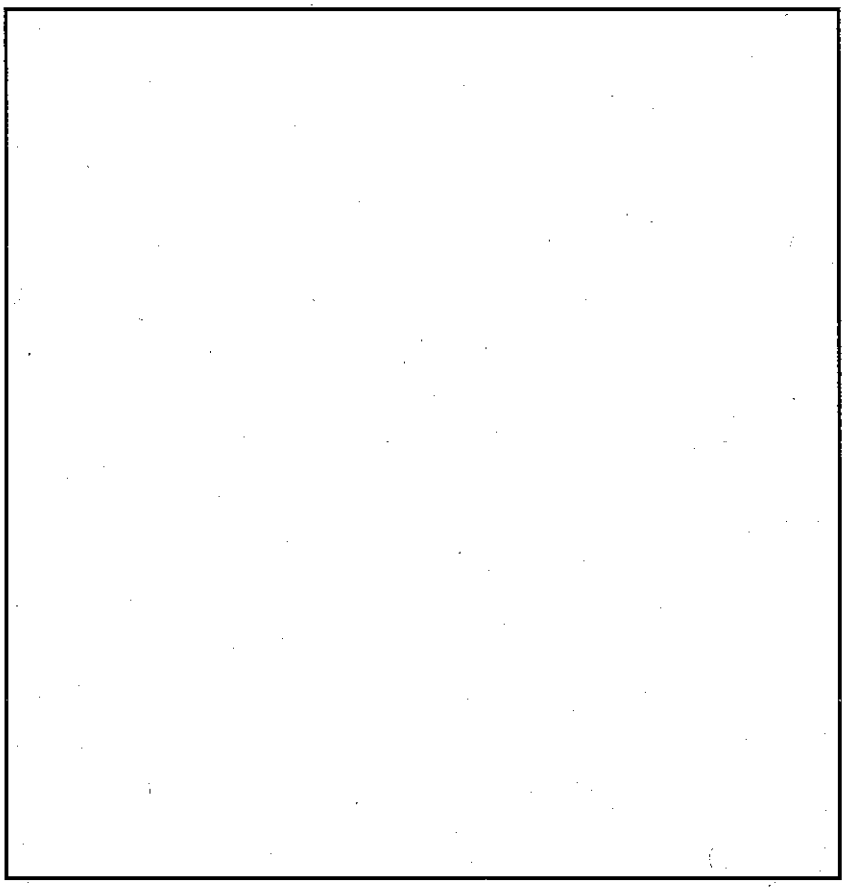
Pre.	M.Koura	Rev	C	M. Koura, T. Hiramoto, N. Hoshimoto,
Apr.	T.Furuie 3-Mar.-'04			D. Igarashi 26.Nov.'04

HIGH POWER SWITCHING USE

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

FM400TU-2A

- $I_{D(rms)}$ ····· 200A
- V_{DSS} ····· 100V
- Insulated Type
- 6-elements in a pack



A

B

APPLICATION

AC motor control of forklift (battery power source)

ABSOLUTE MAXIMUM RATINGS (T_{ch} = 25 °C)

Symbol	Item	Conditions	Ratings	Unit	
V_{DSS}	Drain-source voltage	G-S Short	100	V	
V_{GSS}	Gate-source voltage	D-S Short	±20	V	
$I_{D(rms)}$	Drain current	Tc'= 130 °C	200	$A_{(rms)}$	C
I_{DM}		Pulse ②	400	A	
I_{DA}	Avalanche current	L=10μH Pulse ②	200	A	B
$I_{S(rms)}$①	Source current		200	$A_{(rms)}$	
I_{SM} ①		Pulse ②	400	A	
P_D ③	Maximum power dissipation	Tc= 25 °C	650	W	
P_D ③	Maximum power dissipation	Tc'= 25 °C	880*1	W	
T_{ch}	Channel temperature		−40～+150	°C	
T_{stg}	Storage temperature		−40～+125	°C	
V_{iso}	Isolation voltage	Main terminal to base plate,AC 1 min.	2500	V	
—	Mounting torque	Main Terminal M 6	3.5～4.5	N·m	
		Mounting M 6	3.5～4.5	N·m	
—	Weight	Typical value	600	g	

TENTATIVE

FM400TU-2A

HIGH POWER SWITCHING USE

ELECTRICAL CHARACTERISTICS (T_{ch} = 25 °C)

Symbol	Item	Conditions		Min.	Typ.	Max.	Unit	
I_{DSS}	Drain cutoff current	$V_{DS}=V_{DSS}, V_{GS}$= 0V		—	—	1	mA	C
$V_{GS(th)}$	Gate-source threshold voltage	I_D=20mA, V_{DS}= 10V		4.7	6	7.3	V	B
I_{GSS}	Gate leakage current	$V_{GS}=V_{GSS}$, V_{DS}= 0V		—	—	1.5	μA	C
$r_{DS(ON)}$ (chip)	Static drain-source On-state resistance	I_D=200A, V_{GS}=15V	T_{ch}= 25 °C	—	1.45	2.0	mΩ	B
			T_{ch}=125 °C	—	2.5	—		
$V_{DS(ON)}$ (chip)	Static drain-source On-state voltage	I_D=200A, V_{GS}=15V	T_{ch}= 25 °C	—	0.29	0.40	V	B
			T_{ch}=125 °C	—	0.50	—		
$R_{(lead)}$	lead resistance	I_D=200A terminal-chip	T_{ch}= 25 °C	—	0.8	—	mΩ	B
			T_{ch}=125 °C	—	1.12	—		
C_{iss}	Input capacitance	V_{DS}= 10V, V_{GS}= 0V		—	—	75	nF	
C_{oss}	Output capacitance			—	—	10		
C_{rss}	Reverse transfer capacitance			—	—	6		
Q_G	Total gate charge	V_{DD}=48V, I_D=200A, V_{GS}=15V		—	1200	—	nC	B
$t_{d(on)}$	Turn-on delay time	V_{DD}=48V, I_D=200A, $V_{GS1}=V_{GS2}$=15V, R_G=6.3Ω, Inductive load switching operation, I_S=200A		—	—	400	ns	B
t_r	Turn-on rise time			—	—	400		
$t_{d(off)}$	Turn-off delay time			—	—	450		
t_f	Turn-off fall time			—	—	300		
t_{rr} ①	Reverse recovery time			—	—	250	ns	B
Q_{rr} ①	Reverse recovery charge			—	6.0	—	μC	
V_{SD} ①	Source-drain voltage	I_S=200A, V_{GS}=0V		—	—	1.3	V	B
$R_{th(ch-c)}$	Thermal resistance	MOSFET part(1/6 module)		—	—	0.19	°C/W	
$R_{th(ch-c')}$		MOSFET part(1/6 module)		—	—	0.142*1		B
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, Thermal compound Applied *2 (1/6 module)		—	0.1	—		B

Thermistors part

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
R_{TH} ④	Resistance	T_C=25°C	—	100	—	kΩ
B ④	B Constant	Resistance at 25°C,50°C	—	4000	—	K

① I_S, V_{SD}, trr & Qrr represent characteristics of the anti-parallel, source to drain free-wheel diode(FWD).

② Pulse width and repetition rate should be such that the device channel temp.(T_{ch}) dose not exceed Tch max rating.

③ Channel temperature (T_{ch}) should not increase beyond 150°C.

④ $B = (\ln R_1 - \ln R_2)/(1/T_1 - 1/T_2)$ R_1: Resistance at T_1(K), R_2: Resistance at T_2(K)

*1: Tc' measured point is just under the chips. If you use this value , Rth(f-a) should be measured just under the chips.

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

*3: Tc measured point is shown in page "3-3".

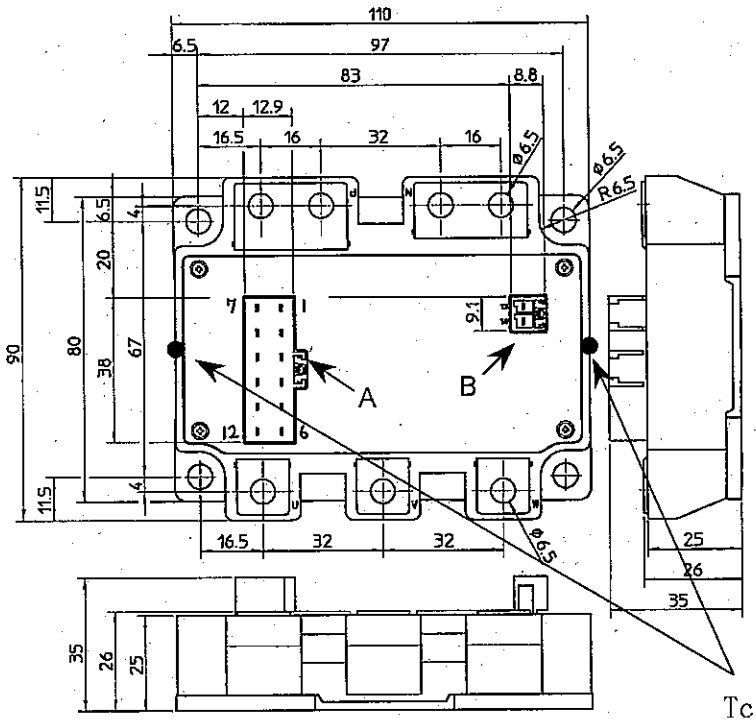
TENTATIVE

FM400TU-2A

HIGH POWER SWITCHING USE

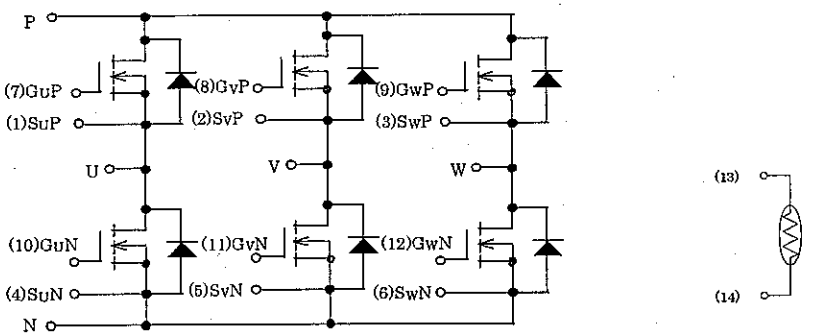
OUTLINE DRAWING

Dimensions in mm



Housing Type of A and B (Tyco Electronics P/N:)
A: 917353-1
B: 179838-1

CIRCUIT DIAGRAM



(1) S_{UP}	(2) S_{VP}	(3) S_{WP}	(4) S_{UN}	(5) S_{VN}	(6) S_{WN}	A
(7) G_{UP}	(8) G_{VP}	(9) G_{WP}	(10) G_{UN}	(11) G_{VN}	(12) G_{WN}	
(13) TH1	(14) TH2					B