TENTATIVE

FM600TU-3A

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Apr.	T.Furuie 3-Mar.-'04			T.Hiramoto 20-Jan-'05

HIGH POWER SWITCHING USE

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

FM600TU-3A

- $I_{D(rms)}$ ····· 300A
- V_{DSS} ····· 150V
- Insulated Type
- 6-elements in a pack
- UL Recognized
  Yellow Card No.E80276
  File No.E80271

A

B

B

APPLICATION

AC motor control of forklift (battery power source)

ABSOLUTE MAXIMUM RATINGS (T_{ch} = 25 ℃)

Symbol	Item	Conditions	Ratings	Unit	
V_{DSS}	Drain-source voltage	G-S Short	150	V	
V_{GSS}	Gate-source voltage	D-S Short	±20	V	
$I_{D(rms)}$	Drain current	Tc'=114℃	300	$A_{(rms)}$	B
I_{DM}		Pulse ②	600	A	
I_{DA}	Avalanche current	L=10μH Pulse ②	300	A	B
$I_{S(rms)}$①	Source current		300	$A_{(rms)}$	B
I_{SM} ①		Pulse ②	600	A	
P_D ③	Maximum power dissipation	Tc= 25 ℃	960	W	B
P_D ③	Maximum power dissipation	Tc'= 25 ℃	1300*1	W	
T_{ch}	Channel temperature		−40～+150	℃	
T_{stg}	Storage temperature		−40～+125	℃	
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	

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HIGH POWER SWITCHING USE

ELECTRICAL CHARACTERISTICS (T_{ch} = 25 ℃)

Symbol	Item	Conditions		Min.	Typ.	Max.	Unit
I_{DSS}	Drain cutoff current	V_{DS}=V_{DSS},V_{GS}= 0V		—	—	1	mA
$V_{GS(th)}$	Gate-source threshold voltage	I_D=30mA,V_{DS}= 10V		4.7	6	7.3	V
I_{GSS}	Gate leakage current	V_{GS}=V_{GSS} ,V_{DS}= 0V		—	—	1.5	μA
$r_{DS(ON)}$ (chip)	Static drain-source On-state resistance	I_D=300A V_{GS}=15V	T_{ch}= 25 ℃	—	1.6	2.2	mΩ
			T_{ch}=125 ℃	—	3.0	—	
$V_{DS(ON)}$ (chip)	Static drain-source On-state voltage	I_D=300A V_{GS}=15V	T_{ch}= 25 ℃	—	0.48	0.66	V
			T_{ch}=125 ℃	—	0.91	—	
$R_{(lead)}$	Lead resistance	I_D=300A terminal-chip	T_{ch}= 25 ℃	—	0.7	—	mΩ
			T_{ch}=125 ℃	—	1.0	—	
C_{iss}	Input capacitance	V_{DS}= 10V V_{GS}= 0V		—	—	110	nF
C_{oss}	Output capacitance			—	—	15	
C_{rss}	Reverse transfer capacitance			—	—	10	
Q_G	Total gate charge	V_{DD}=80V,I_D=300A,V_{GS}=15V		—	1950	—	nC
$t_{d(on)}$	Turn-on delay time	V_{DD}=80V,I_D=300A V_{GS1}=V_{GS2}=15V R_G=4.2Ω,Inductive load switching operation I_S=300A		—	—	400	ns
t_r	Turn-on rise time			—	—	400	
$t_{d(off)}$	Turn-off delay time			—	—	500	
t_f	Turn-off fall time			—	—	200	
t_{rr} ①	Reverse recovery time			—	—	200	ns
Q_{rr} ①	Reverse recovery charge			—	8.0	—	μC
V_{SD} ①	Source-drain voltage	I_S=300A,V_{GS}=0V		—	—	1.3	V
$R_{th(ch-c)}$	Thermal resistance	MOSFET part(1/6 module)		—	—	0.13	℃/W
$R_{th(ch-c')}$		MOSFET part(1/6 module)		—	—	0.096*1	
$R_{th(c-f)}$	Contact thermal resistance	Case to fin,Thermal compound Applied *2 (1/6 module)		—	0.1	—	

Thermistors part

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

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 “3-4”.

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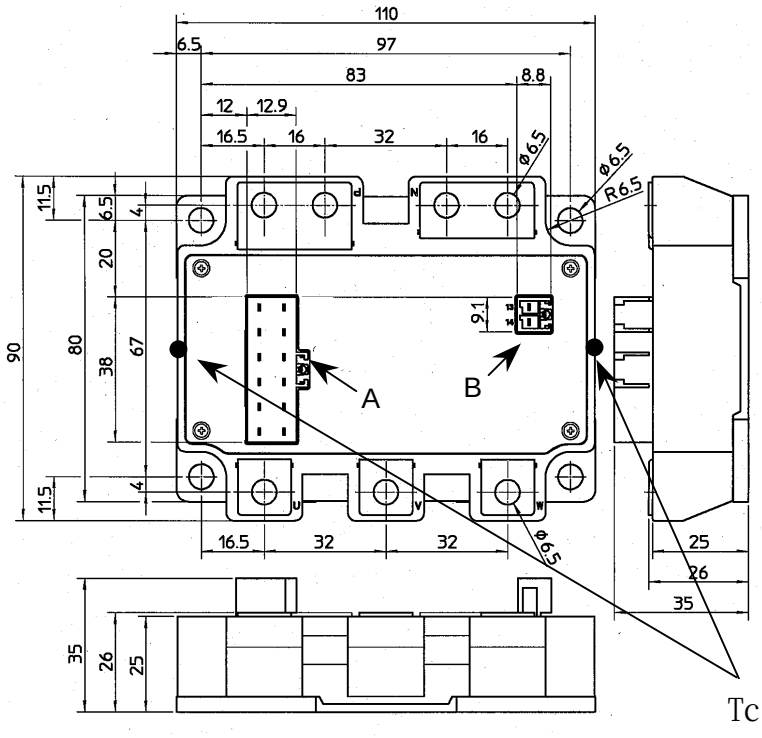
HIGH POWER SWITCHING USE

OUTLINE DRAWING Dimensions in mm

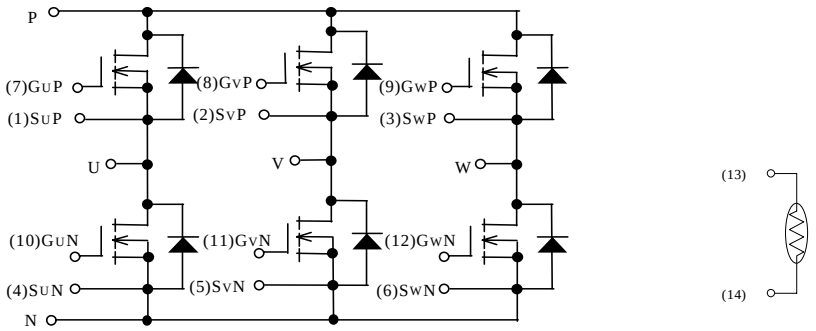
B



B

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**