



## TENTATIVE

## FM400TU-3A

## HIGH POWER SWITCHING USE

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

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	$I_D=20mA, V_{DS}=10V$	4.7	6	7.3	V	
$I_{GSS}$	Gate leakage current	$V_{GS}=V_{GSS}, V_{DS}=0V$	—	—	1.5	$\mu A$	
$r_{DS(ON)}$ (chip)	Static drain-source On-state resistance	$I_D=200A$ $V_{GS}=15V$	$T_{ch}=25\text{ }^{\circ}\text{C}$	—	2.6	3.55	m $\Omega$
			$T_{ch}=125\text{ }^{\circ}\text{C}$	—	4.8	—	
$V_{DS(ON)}$ (chip)	Static drain-source On-state voltage	$I_D=200A$ $V_{GS}=15V$	$T_{ch}=25\text{ }^{\circ}\text{C}$	—	0.52	0.71	V
			$T_{ch}=125\text{ }^{\circ}\text{C}$	—	0.96	—	
$R_{(lead)}$	Lead resistance	$I_D=200A$ terminal-chip	$T_{ch}=25\text{ }^{\circ}\text{C}$	—	0.8	—	m $\Omega$
			$T_{ch}=125\text{ }^{\circ}\text{C}$	—	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	$V_{DD}=80V, I_D=200A, V_{GS}=15V$	—	1300	—	nC	
$t_{d(on)}$	Turn-on delay time	$V_{DD}=80V, I_D=200A$ $V_{GS1}=V_{GS2}=15V$ $R_G=6.3\Omega$ , Inductive load switching operation	—	—	400	ns	
$t_r$	Turn-on rise time		—	—	300		
$t_{d(off)}$	Turn-off delay time		—	—	450		
$t_f$	Turn-off fall time		—	—	200		
$t_{rr}$ ①	Reverse recovery time		$I_S=200A$	—	—		200
$Q_{rr}$ ①	Reverse recovery charge		—	7.0	—	$\mu C$	
$V_{SD}$ ①	Source-drain voltage	$I_S=200A, V_{GS}=0V$	—	—	1.3	V	
$R_{th(ch-c)}$	Thermal resistance	MOSFET part(1/6 module)	—	—	0.19	$^{\circ}\text{C/W}$	
$R_{th(ch-e)}$		MOSFET part(1/6 module)	—	—	0.142 <sup>*1</sup>		
$R_{th(c-f)}$	Contact thermal resistance	Case to fin, Thermal compound Applied <sup>*2</sup> (1/6 module)	—	0.1	—		

## Thermistors part

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
$R_{TH}$ ④	Resistance	$T_C=25^{\circ}\text{C}$	—	100	—	k $\Omega$
B ④	B Constant	Resistance at $25^{\circ}\text{C}, 50^{\circ}\text{C}$	—	4000	—	K

①  $I_S, V_{SD}, t_{rr}$  &  $Q_{rr}$  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  $T_{ch}$  max rating.

③ Channel temperature ( $T_{ch}$ ) should not increase beyond  $150^{\circ}\text{C}$ .

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:  $T_c$  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".

\*3:  $T_c$  measured point is shown in page "3-3".

**TENTATIVE**

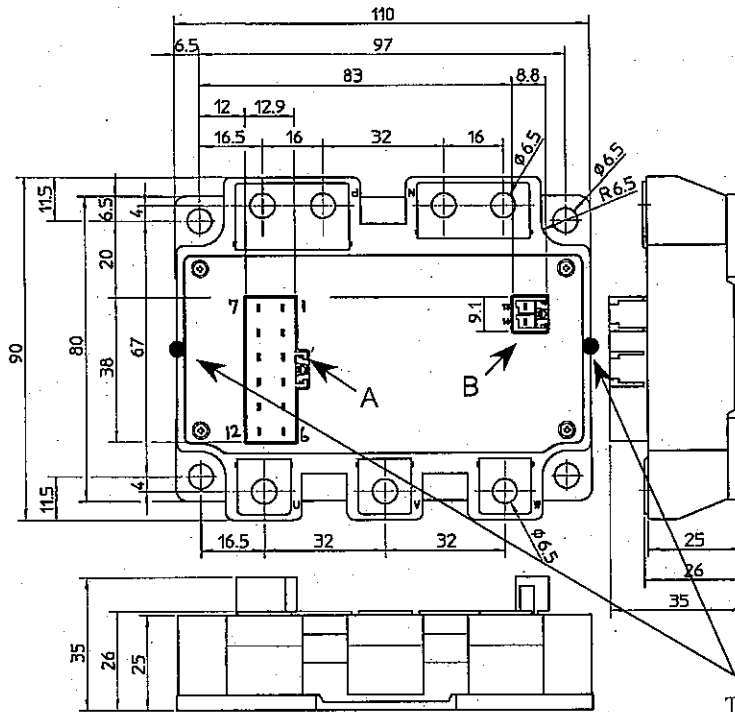
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HIGH POWER SWITCHING USE

OUTLINE DRAWING

Dimensions in mm

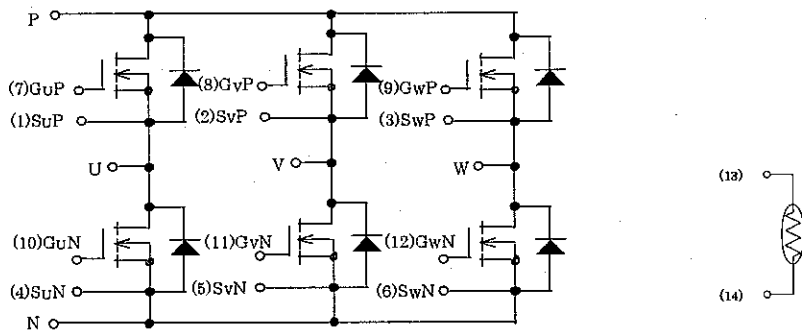
B



Tc measured point

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

CIRCUIT DIAGRAM



(1) S <sub>UP</sub>	(2) S <sub>VP</sub>	(3) S <sub>WP</sub>	(4) S <sub>UN</sub>	(5) S <sub>VN</sub>	(6) S <sub>WN</sub>	A
(7) G <sub>UP</sub>	(8) G <sub>VP</sub>	(9) G <sub>WP</sub>	(10) G <sub>UN</sub>	(11) G <sub>VN</sub>	(12) G <sub>WN</sub>	B
(13) TH1	(14) TH2					