

< M F T >  
**RT8H052C**

The over current protection of three shunt method

**DESCRIPTION**

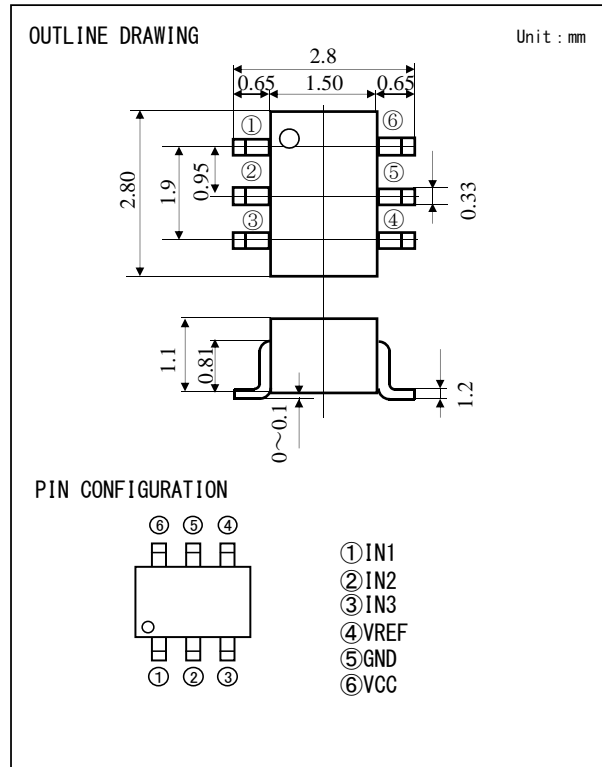
RT8H052C is composed by NPN transistors, PNP transistors and resistors. It can miniaturization of a set and reduce parts or time necessary for completion. This MFT composed the circuit for the over current protection of three shunt method.

**FEATURES**

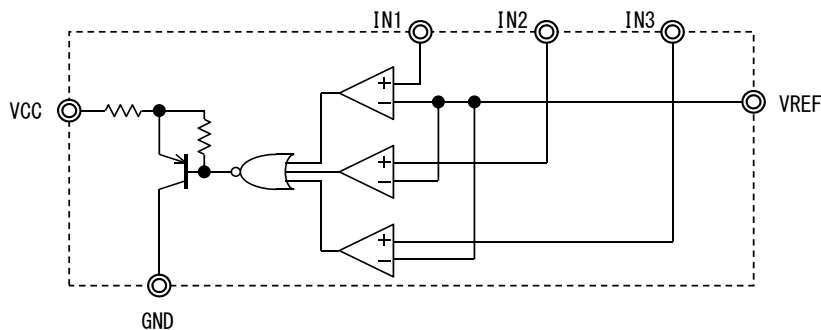
- Miniaturization of a set.
- Variable VREF by external resistance.

**APPLICATION**

The over current protection of three shunt method.



**BLOCK DIAGRAM**



The over current protection of three shunt method

**ABSOLUTE MAXIMUM RATINGS (Ta=25°C)**

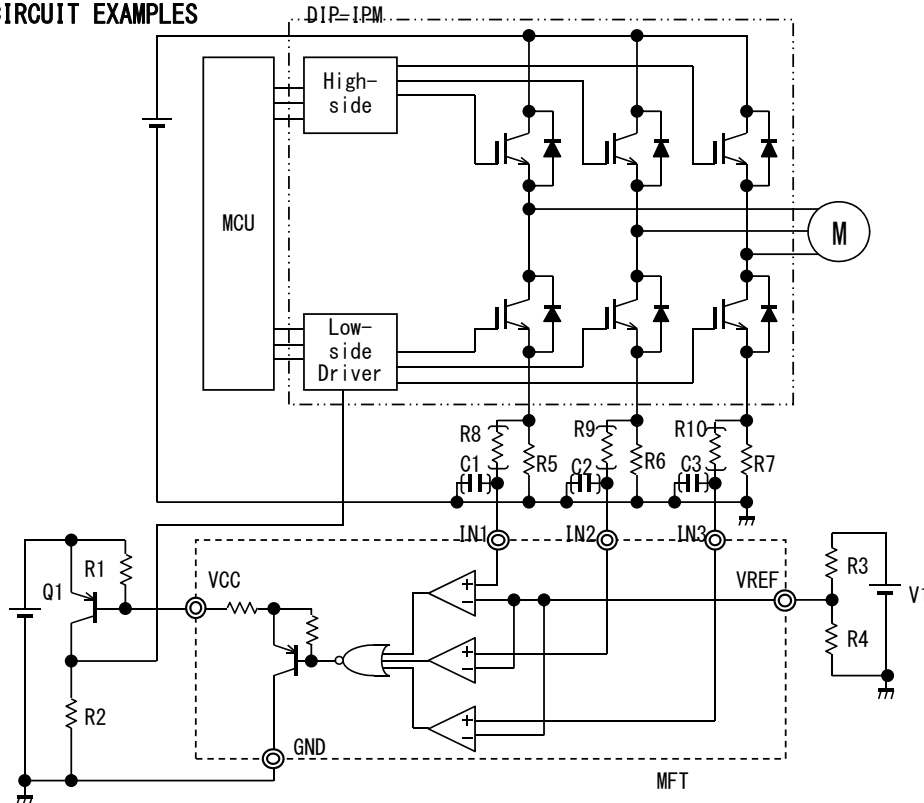
Symbol	Parameter	Conditions	Ratings	Unit
V <sub>CC</sub>	Supply voltage		12	V
V <sub>IN</sub>	Input voltage		-0.3~V <sub>CC</sub>	V
P <sub>d</sub>	Internal power dissipation		200	mW
K $\theta$	Thermal derating	T <sub>a</sub> ≥ 25°C	1.6	mW/°C
T <sub>j</sub>	Junction temperature		150	°C
T <sub>stg</sub>	Storage temperature	(keep dry)	-40~150	°C
T <sub>opr</sub>	Operating temperature	T <sub>j</sub> (keep dry)	-30~150	°C

**ELECTRICAL CHARACTERISTIC (Ta=25°C, VCC=5V unless otherwise noted.)**

Symbol	Parameter	Test conditions	Designed value			Unit
			Min	Typ	Max	
V <sub>CC</sub>	Operating supply voltage range		3	5	10	V
ICC <sub>off</sub>	Circuit current of off states	IN1=IN2=IN3=0V、VREF=0.5V		0.2		mA
ICC <sub>on</sub>	Circuit current of on states	IN1=1V、IN2=IN3=0V、VREF=0.5V		2.9		mA
V <sub>INCM</sub>	Common mode input voltage range		0.3	-	V <sub>CC</sub> -0.8	V
V <sub>IN1th</sub>	IN1 threshold voltage	VREF=0.5V、IN2=IN3=0V		0.5		V
V <sub>IN2th</sub>	IN2 threshold voltage	VREF=0.5V、IN1=IN3=0V		0.5		V
V <sub>IN3th</sub>	IN3 threshold voltage	VREF=0.5V、IN1=IN2=0V		0.5		V

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**APPLICATION CIRCUIT EXAMPLES**



**OPERATING EXPLANATION**

This MFT has a VREF terminal, so the threshold voltage can be freely set by external connected resistance. MFT doesn't have the output terminal for six pins MFT (VCC, GND, VREF, IN1, IN2, IN3).

The terminal VCC uses two functions of the power-supply voltage terminal and the output terminal.

The circuit current flows about 200uA, when the threshold voltage does not get over than neither of IN1~IN3 setting of VREF. When the voltage of VREF (V) or more is impressed to either of terminal of IN1~IN3, it enters the state of detection, the circuit current flows to VCC becomes about 2.9mA. By using the characteristic of this circuit current, the output signal can be made by connecting the PNP transistor outside. The output terminal is the collector terminal of the Q1:PNP transistor. At the usual state, the PNP transistor is turning off and output Low. At the detecting state, the PNP transistor is turning on and output High.

**SELECTION OF PARTS**

How to select the resistance at above application circuit example.

Resistance R1 connected between emitter bases of the Q1:PNP transistor is set to turn on the PNP transistor when the PNP transistor is usually turned off in the circuit current in the state, and the detected circuit current flows about MFT.

please set resistance R1 at range 390Ω~1.5kΩ.

The current thrown into the Q1:PNP transistor is adjusted by resistance R2 between collectors GND.

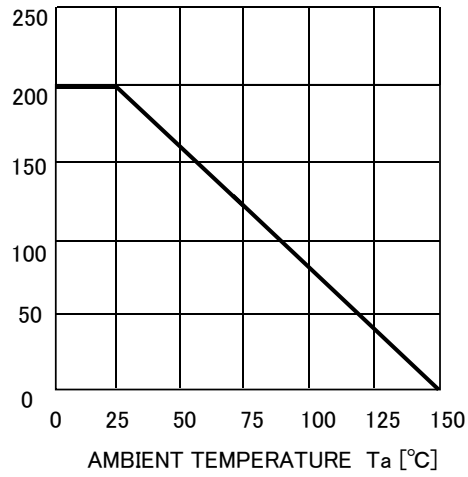
Calculation formula, if making VREF from resistance.

$$VREF(V) = R4 / (R3 + R4) * V1$$

R5, R6, and R7 are the shunt resistance. R8, R9, R10, C1, C2, and C3 are noise filters. Please connect it if necessary.

The above value is a theory value. Please set it after an enough evaluation.

**THERMAL DERATING**





**Keep safety first in your circuit designs!**

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