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FAN8010MP

1 Channel DC Motor Driver

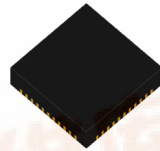
Features

- Current mode control
- High output current(I_{omax} 0.6A)
- Low saturation voltage(0.3V typ)
- Low voltage operation(2~6.5V)
- Very low standby current($< 1\mu A$)
- Leadless miniature package(3*3*1mm³).
- Selectable output current level
- Available saturation mode control
- Built in brake function.
- Built in TSD

Description

The FAN8010MP is designed for Mobile camera, Digital still camera, and portable equipment.

10MLP3X3



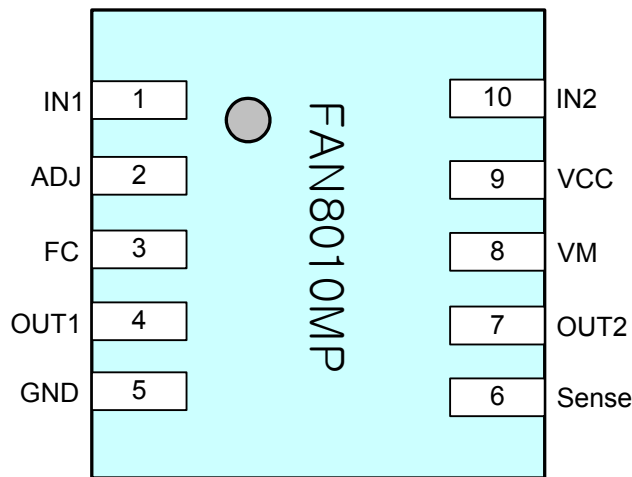
Typical Applications

- General DC Motor
- Digital Still Camera
- Mobile Camera

Ordering Information

Device	Package	Operating Temp.
FAN8010MPX	10MLP3X3	-30°C ~ +80°C

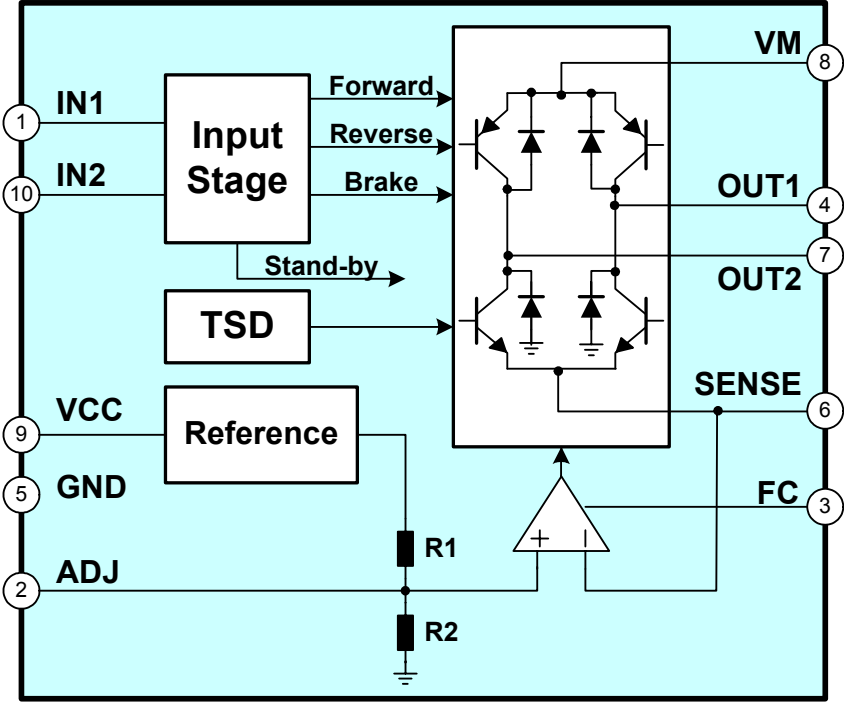
Pin Assignments



Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description	Remark
1	IN 1	I	Logic Input 1	-
2	ADJ	A	Output Current Adjust	-
3	FC	A	Compensation Capacitor	-
4	OUT1	A	Motor Ouput1	-
5	GND	P	Ground	-
6	SENSE	A	Motor Current Sensing	-
7	OUT2	A	Motor Output2	-
8	VM	P	Power Supply For Output Stage	-
9	VCC	P	Power Supply For Signal Block	-
10	IN 2	I	Logic Input 2	-

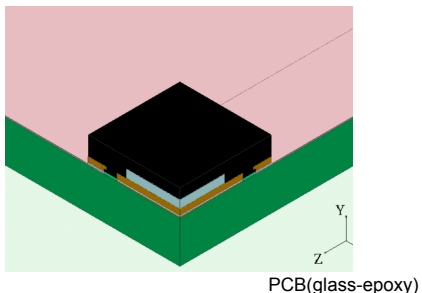
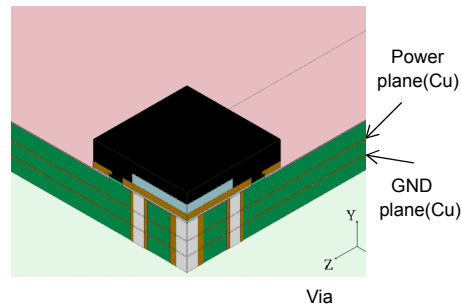
Internal Block Diagram



Absolute Maximum Ratings (Ta = 25°C)

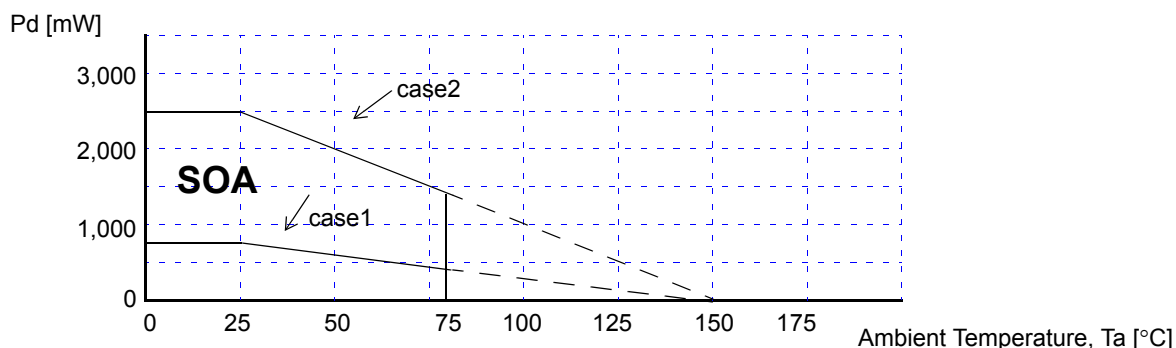
Parameter	Symbol	Value	Unit
Maximum Power Supply Voltage	VMMAX	7.5	V
Maximum Power Supply VoNtage	VCCMAX	7.5	V
Maximum Power Supply Current	IOMAX	600	mA
Maximum Logic Input Voltage	VINMAX	7.5	V
Maximum Output Sustain Voltage	VOUTMAX	8.5	V
Maximum Power Dissipation	PdMAX ^{Note1}	0.7 / 2.5	W
Operating Temperature	TOPR	-30 ~ +80	°C
Storage Temperature	TSTG	-55 ~ +150	°C

Note :

Case 1	Case 2	Remark
 PCB(glass-epoxy)	 Power plane(Cu) GND plane(Cu) Via	Pd is measured base on the JEDEC/STD(JESD 51-2)
Pd=0.7W	Pd=2.5W	

1. Refer: EIA/JESD 51-2 & EIA/JESD 51-3 & EIA/JESD 51-5 & EIA/JESD 51-7
2. Case 1: Single layer PCB with 1 signal plane only, PCB size 76mm × 114mm × 1.6mm.
3. Case 2: Multi layer PCB with 1 signal, 1 power and 1 ground planes, PCB size 76mm × 114mm × 1.6mm, Cu plane sizes for power and ground 74mm × 74mm × 0.035mm, thermal via hole pitch 0.9mm, via hole ϕ size 0.3mm, 6 via hole.
4. Should not exceed Pd or ASO value.

Power Dissipation Curve



Recommended Operating Conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage For Signal Block	VCC	2.2	-	6.5	V
Supply Voltage For Power Stage	VM	2.2	-	6.5	V

Equivalent Circuit

IN1/IN2	ADJ
FC	OUT1/OUT2

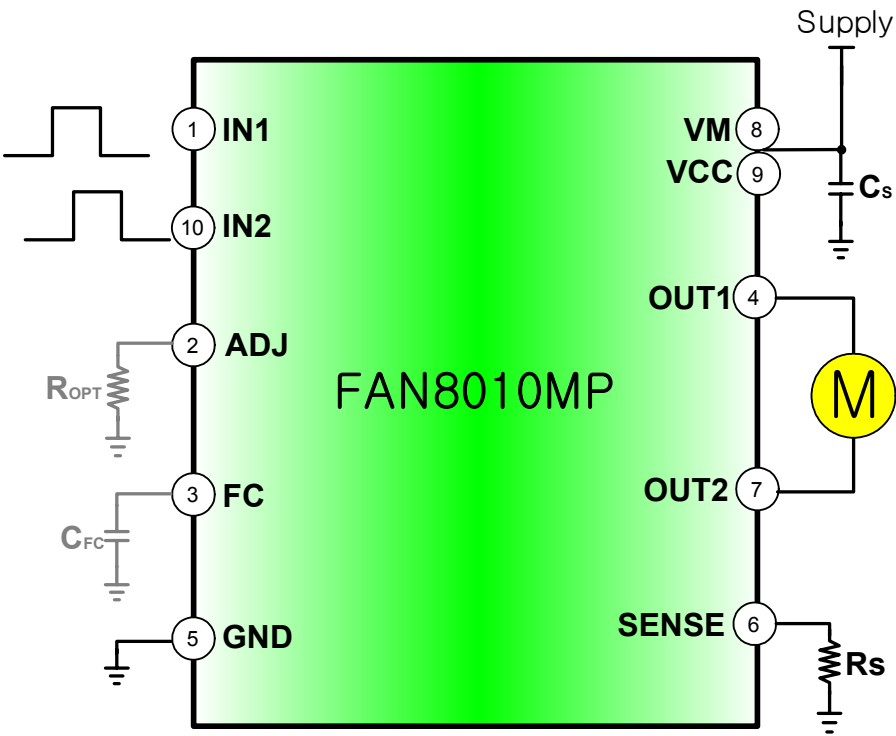
Electrical Characteristics

(Ta= 25°C, VCC=3.3V, VM=3.3V unless otherwise specified)

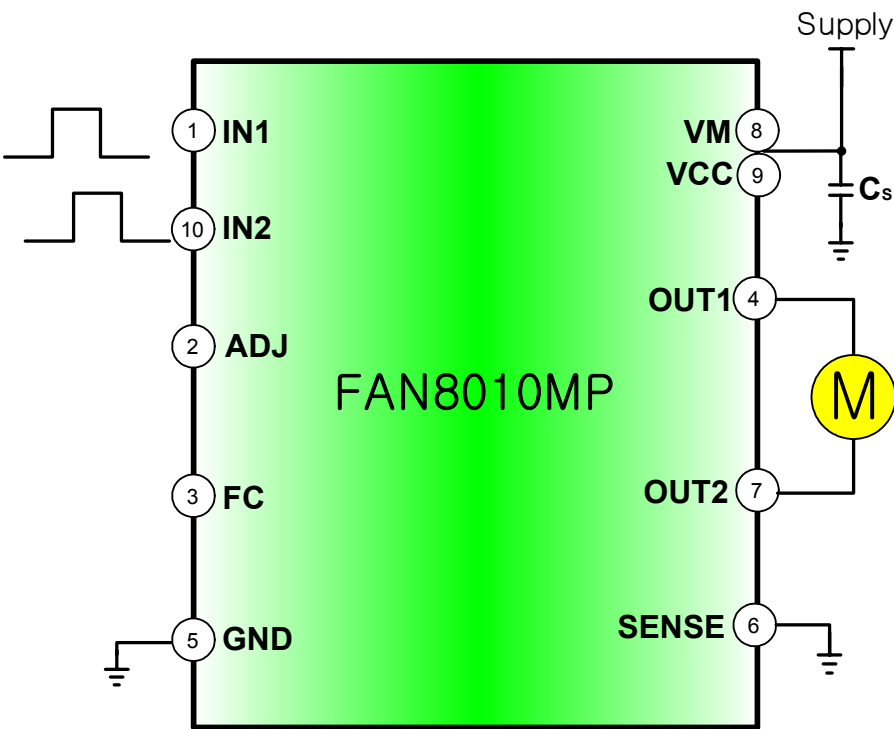
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
COMMON BLOCK						
Standby Current	I _{STB}	VCC=7.5V, IN1=IN2=L	-	-	1.0	μA
Operating Current1	I _{CC1}	IN1=H or IN2 =H	-	6	11	mA
Operating Current2	I _{CC2}	IN1=IN2=H	-	16	25	mA
LOGIC INPUTS						
Logic Input High Level Voltage	V _H		1.8	-	VCC	V
Logic Input Low Level Voltage	V _L		-0.3	-	0.4	V
Logic Input Current	I _H	V _H =5.0V, IN1=H or IN2=H	-	60	90	μA
OUTPUT STAGE						
Current Command	V _{ADJ}		0.19	0.2	0.21	V
Output Current	I _O	RS=1.0Ω	180	200	220	mA
Output Saturation Voltage (PNP+NPN)	V _{SAT}	I _O =200mA	-	0.3	0.45	V

Typical Application Circuits

Constant Current Driver



Normal H-Bridge Driver



Application Informations

1. Logic Inputs and Outputs

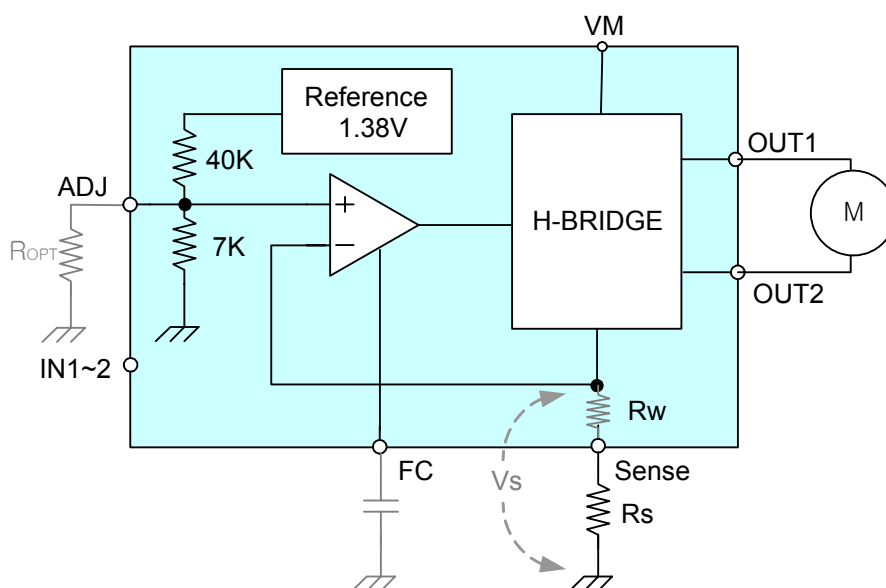
FAN8010MP has two input pins, IN1 and IN2. The following truth table shows the relationship of the inputs and outputs.

IN1	IN2	OUT1	OUT2	Remark
L	L	Z	Z	Standby
H	L	H	L	Rotation
L	H	L	H	Rotation
H	H	H	H	Brake

2. Constant Output Current Control

The voltage, V_{ADJ} pin is 0.2V typically which is obtained by a internal reference and a resistor divider as shown in the figure. The V_{ADJ} is used as the output current command and can be adjusted by the external resistor R_{OPT} between ADJ and GND. The output current is converted to the voltage V_S through the current sense resistor R_S. By the negative feedback loop, the V_S is regulated to V_{ADJ}. Actually 50mW, which is the sum of the internal bonding resistance and internal metal resistance, should be added to the R_S. The output current is calculated as followings ;

$$I_O = (V_{ADJ}) / (R_S + R_W) = 1.38(R_{OPT} \parallel 7K) / \{(40K + R_{OPT} \parallel 7K)(R_S + R_W)\}$$



If oscillation or overshoot get loaded on the output current, they can be removed by connecting a ceramic capacitor ranged from 1nF to 10nF between the FC pin and GND. When a capacitor is used, output response time is delayed as the capacitance increases.

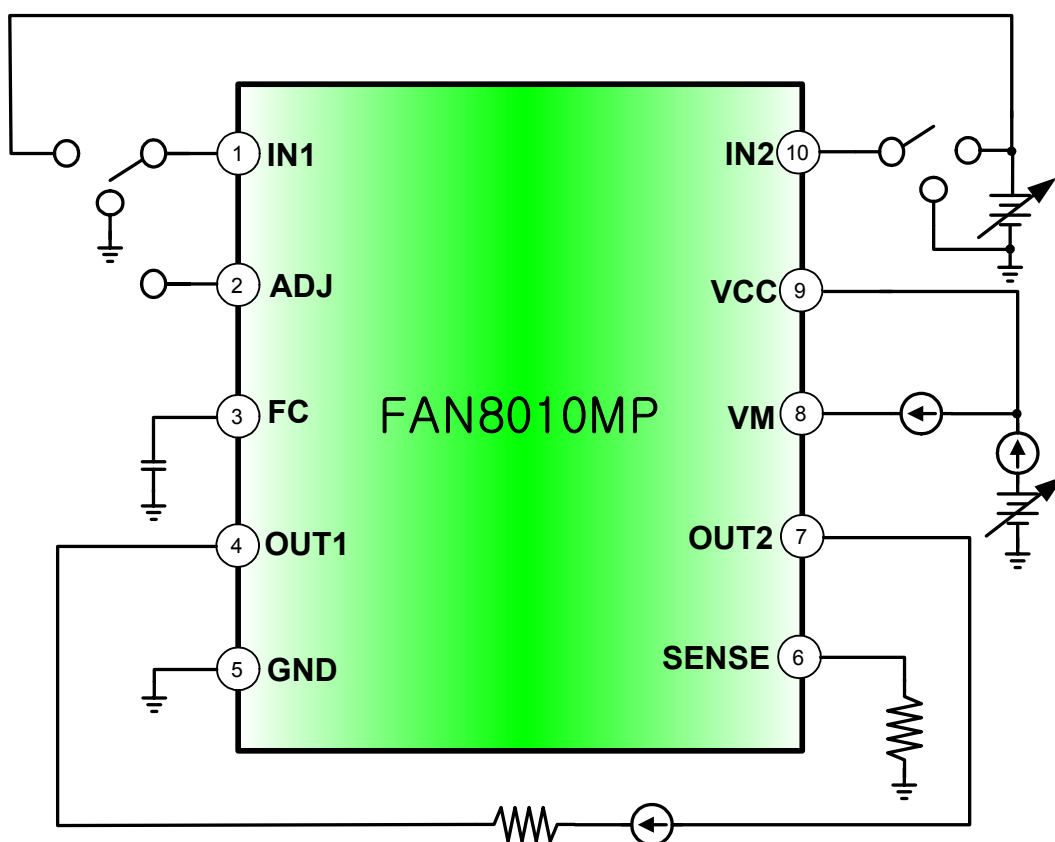
3. Unregulated Voltage Control

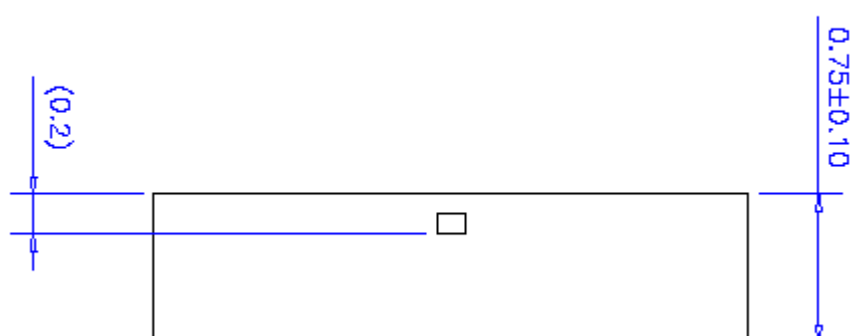
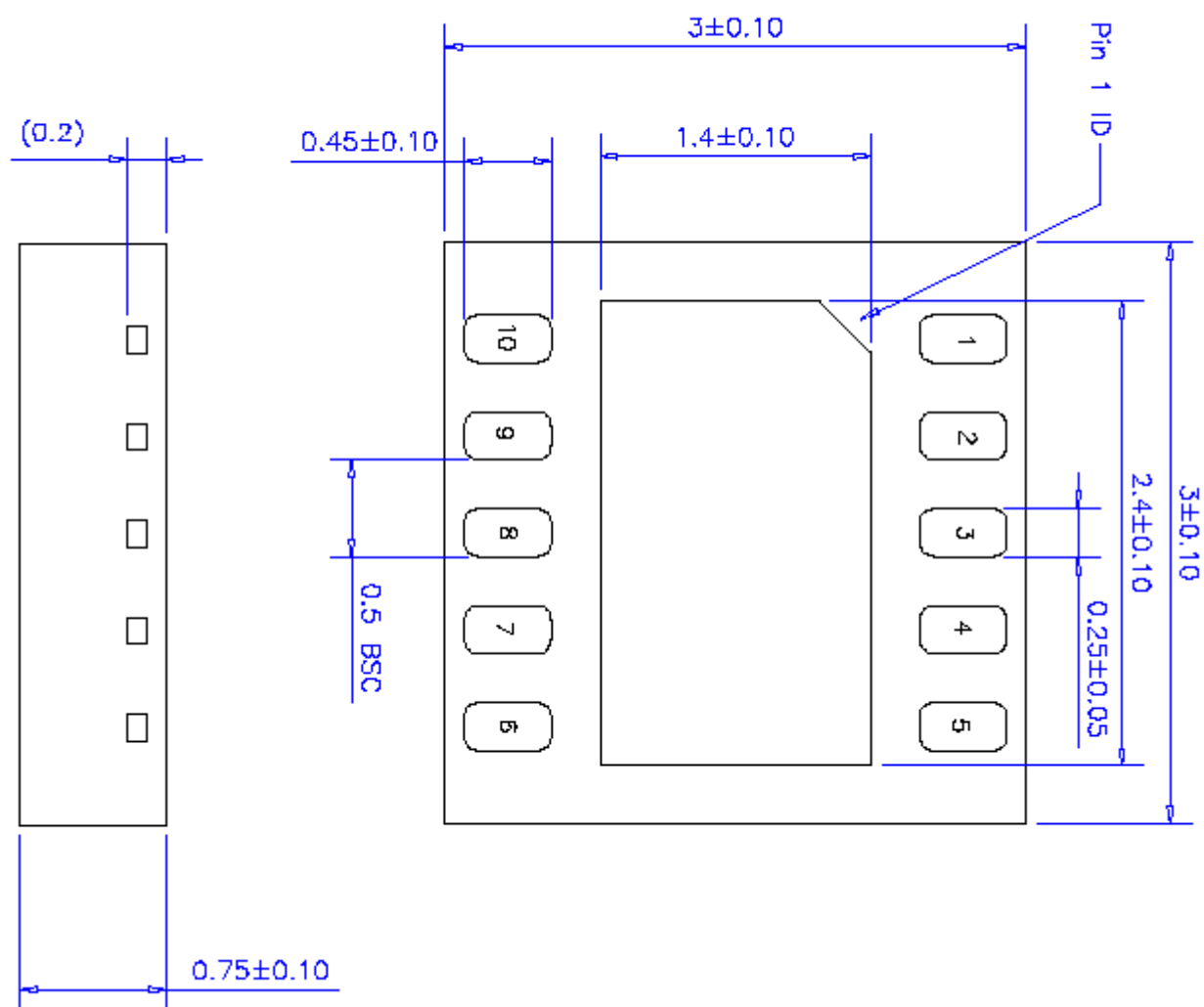
When the exact current control is not needed, the sense pin should be connected to the GND, and FAN8010MP is operated as a normal H-bridge driver.

4. Thermal Shutdown

Thermal Shutdown Circuit turns OFF all outputs when the junction temperature typically reaches 175°C. It is intended to protect the device from failures due to excessive junction temperature. The Thermal Shutdown has the hysteresis of 25°C approximately.

Test Circuits





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