

# FAN8010MP

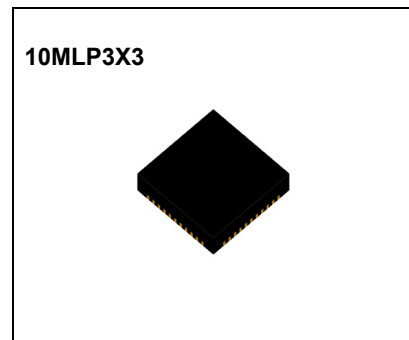
## 1 Channel DC Motor Driver

### 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( < 1uA)
- Leadless miniature package(3\*3\*1mm<sup>3</sup>).
- 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.



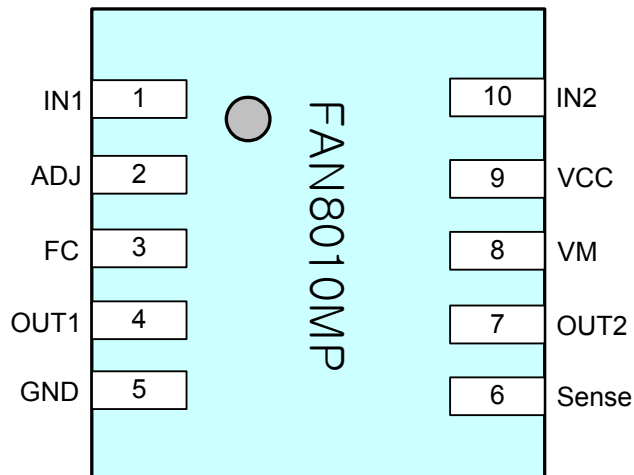
### Typical Applications

- General DC Motor
- Digital Still Camera
- Mobile Camera

### Ordering Information

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

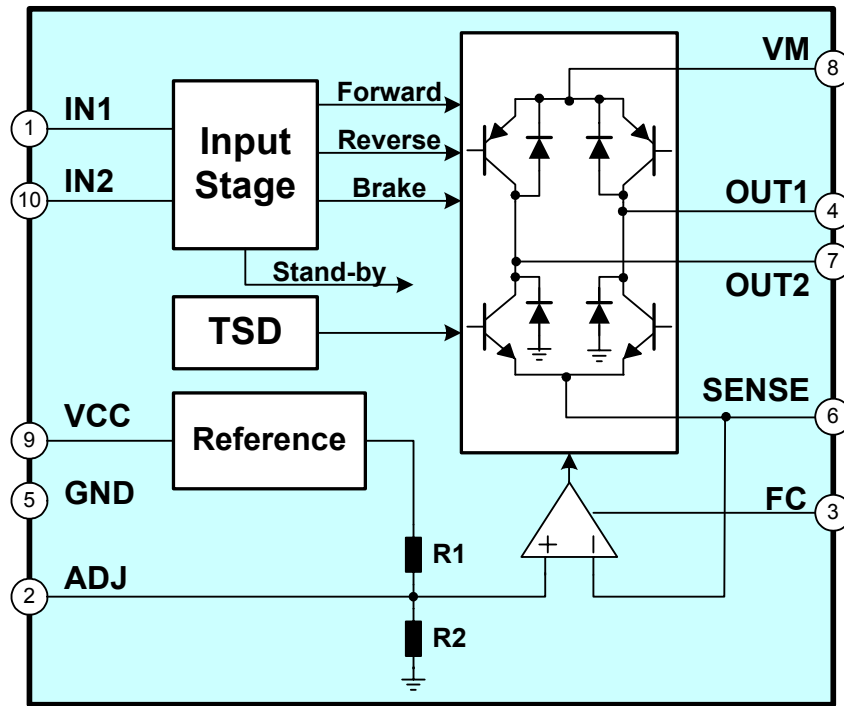
## Pin Assignments



## 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	-

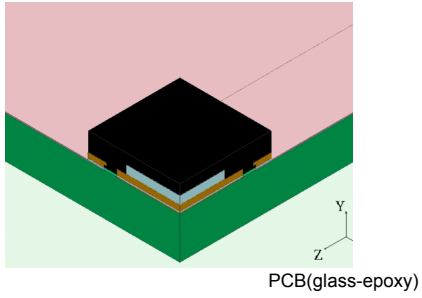
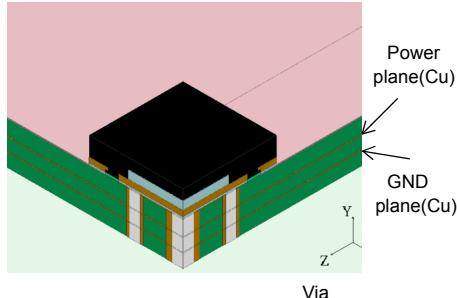
# Internal Block Diagram



## Absolute Maximum Ratings (Ta = 25°C)

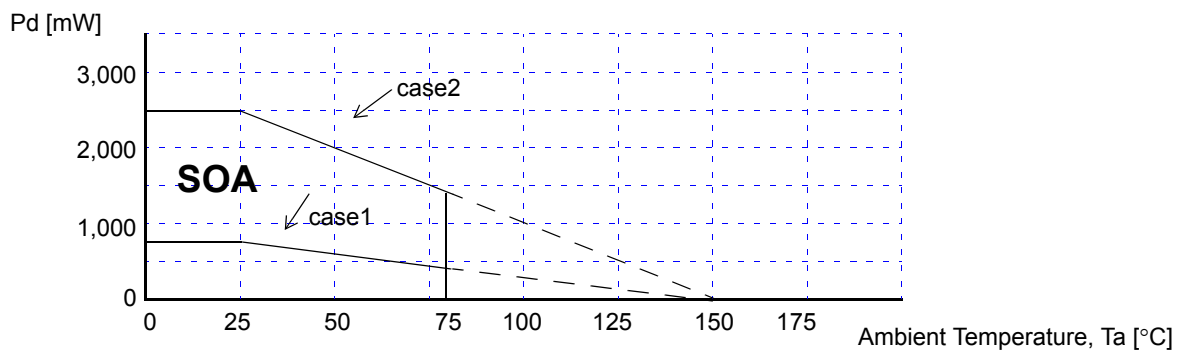
Parameter	Symbol	Value	Unit
Maximum Power Supply Voltage	VMMAX	7.5	V
Maximum Power Supply VoNtage	VCCMAX	7.5	V
Maximum Power Supply Current	IOMAX	600	mA
Maximum Logic Input Voltage	VINMAX	7.5	V
Maximum Output Sustain Voltage	VOUTMAX	8.5	V
Maximum Power Dissipation	PdMAX <sup>Note1</sup>	0.7 / 2.5	W
Operating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

Note :

Case 1	Case 2	Remark
 <p>PCB(glass-epoxy)</p>	 <p>Power plane(Cu) GND plane(Cu) Via</p>	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.

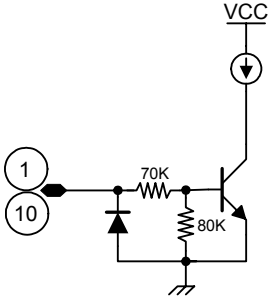
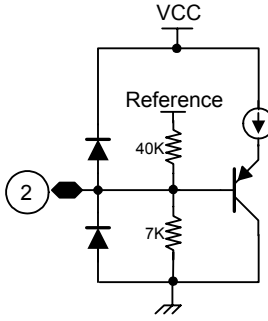
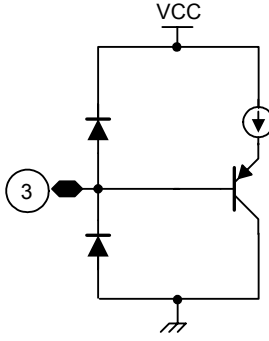
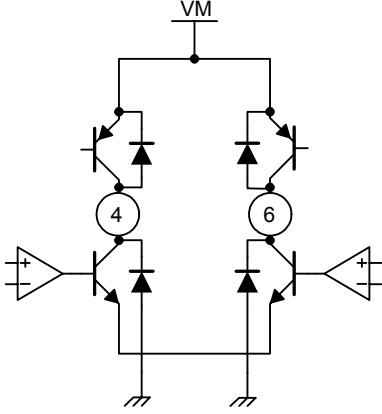
## Power Dissipation Curve



## 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
	

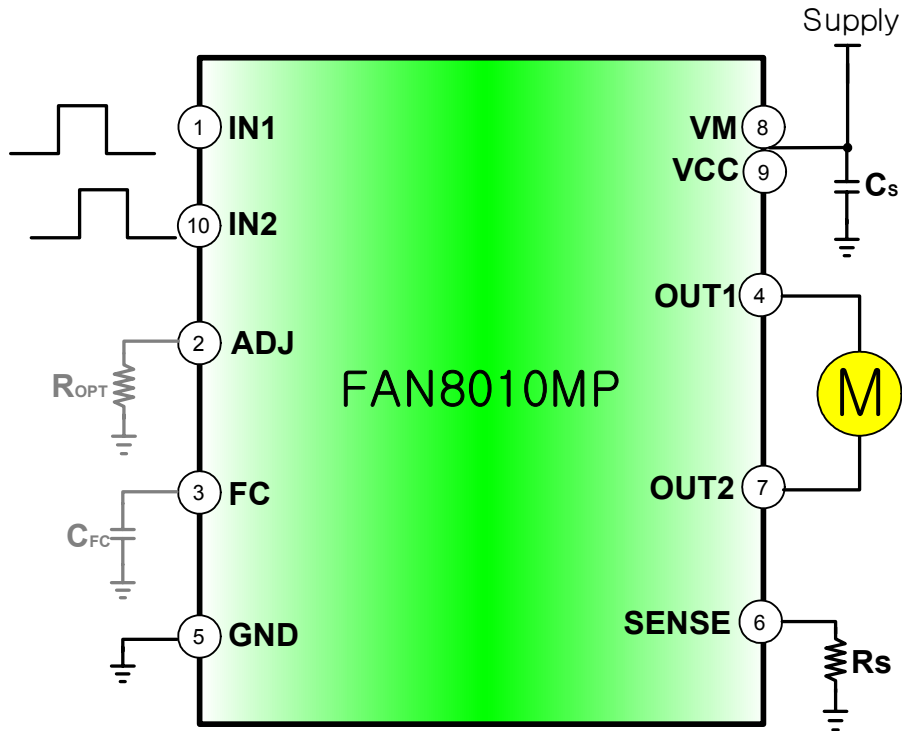
## Electrical Characteristics

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

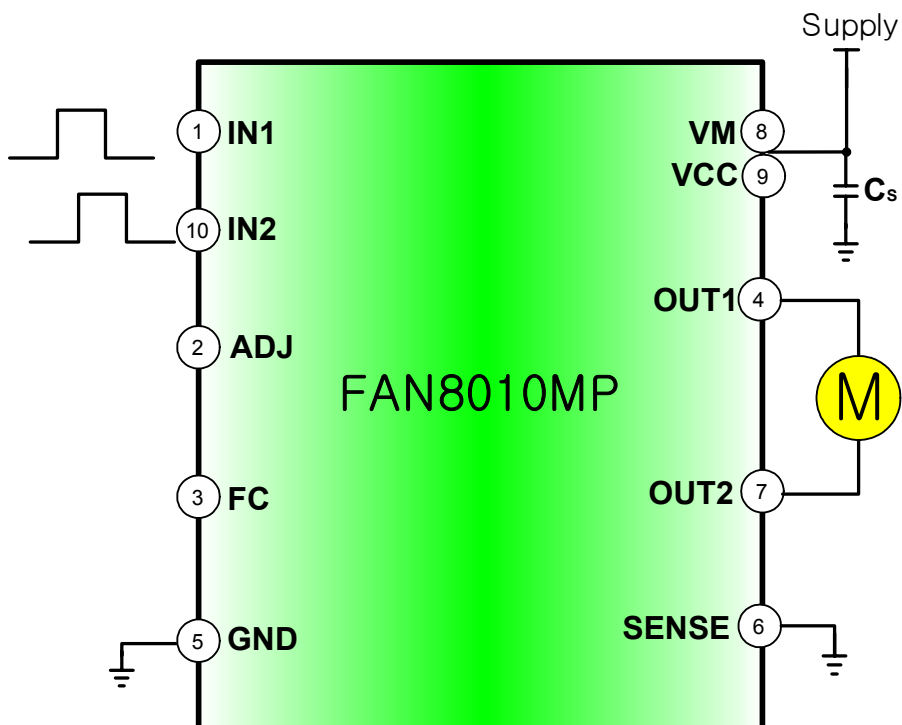
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>COMMON BLOCK</b>						
Standby Current	ISTB	VCC=7.5V, IN1=IN2=L	-	-	1.0	μA
Operating Current1	ICC1	IN1=H or IN2 =H	-	6	11	mA
Operating Current2	ICC2	IN1=IN2=H	-	16	25	mA
<b>LOGIC INPUTS</b>						
Logic Input High Level Voltage	VH		1.8	-	VCC	V
Logic Input Low Level Voltage	VL		-0.3	-	0.4	V
Logic Input Current	IH	VH=5.0V, IN1=H or IN2=H	-	60	90	μA
<b>OUTPUT STAGE</b>						
Current Command	VADJ		0.19	0.2	0.21	V
Output Current	IO	RS=1.0Ω	180	200	220	mA
Output Saturation Voltage (PNP+NPN)	VSAT	IO=200mA	-	0.3	0.45	V

## Typical Application Circuits

### Constant Current Driver



### Normal H-Bridge Driver



## Application Informations

### 1. Logic Inputs and Outputs

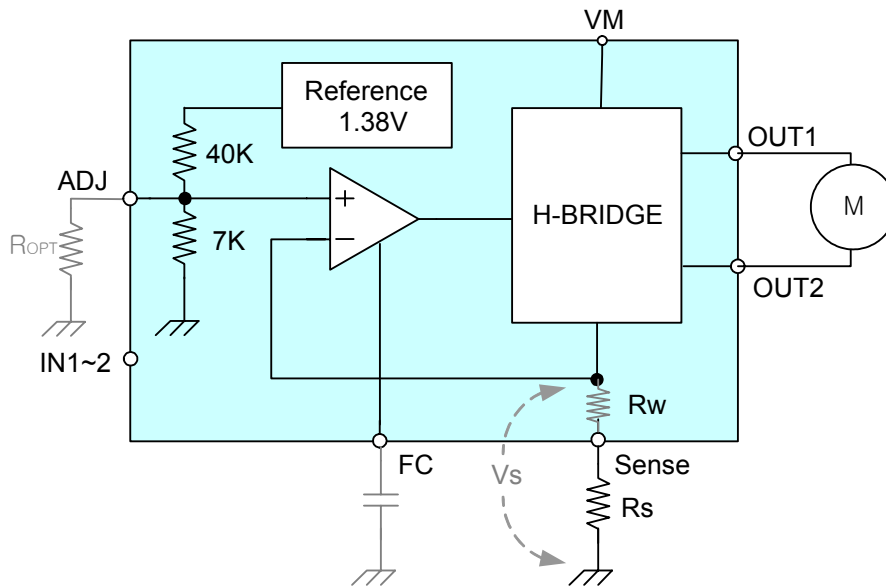
FAN8010MP has two input pins, IN1 and IN2. The following truth table shows the relationship of the inputs and outputs.

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 an 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 follows ;

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



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

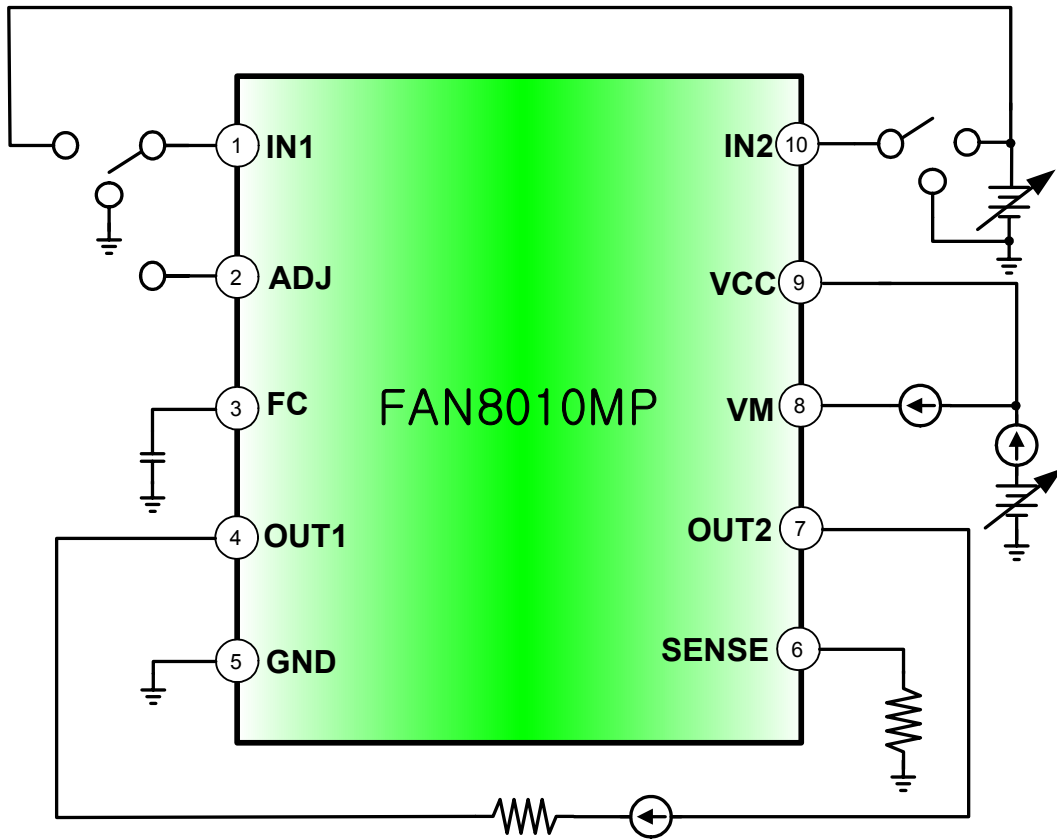
Thermal Shutdown Circuit turns OFF all outputs when the junction temperature typically reaches 175°C. It is intended to protect the device from failures due to excessive junction temperature.

The Thermal Shutdown has the hysteresis of 25°C approximately.

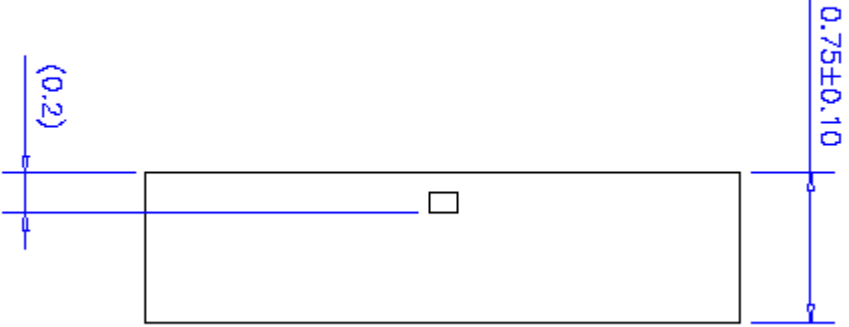
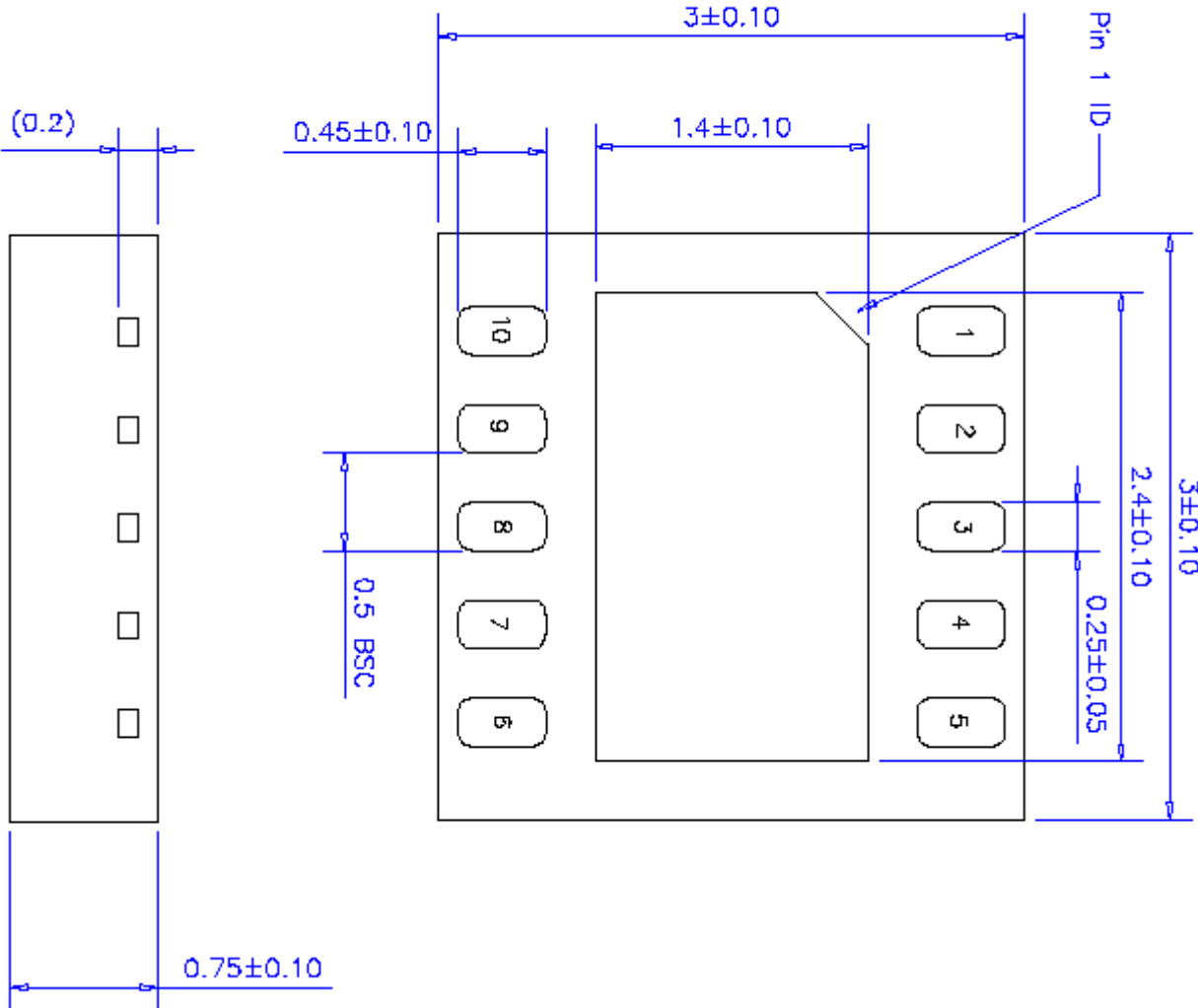




# Test Circuits



Package Dimensions (Unit: mm)



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