

Feature

TM1808 is the fixed pattern of the LED driver IC, the present products own internal oscillator, a PWM output 16-level brightness gradually change, 12 output port; A Power-On Reset, the chip immediately to work, the output PWM duty cycle, without the need microcontroller control, a 12-channel LED turn cycle control, water droplets effect, three-stage speed setting; the chip comes with a 24V and a 5V regulator tube, the peripheral device clean, simple design, this product is excellent performance, reliable quality, suitable for Decoration Lights.

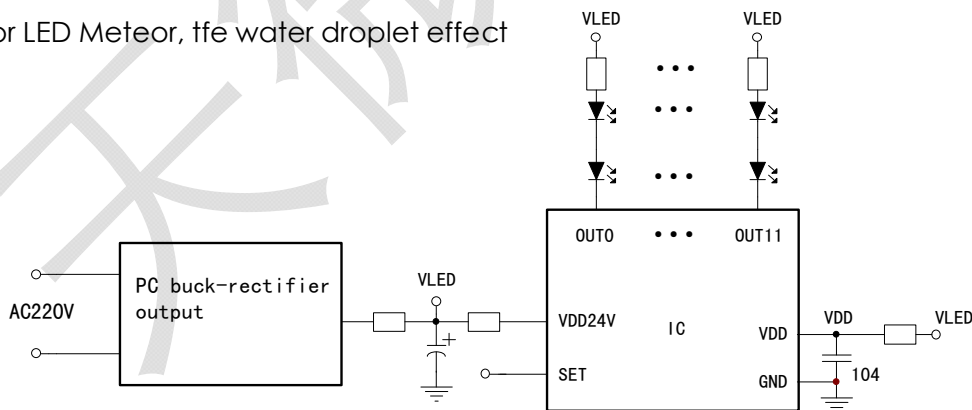
Function

- The use of high-voltage power CMOS process
 - OUT output port pressure 24V
 - Comes with a 24V regulator and a 5V regulator
 - 12 PWM output port
 - 16-level PWM brightness level output
 - Built-in oscillator, power-on reset after ctip automatic output PWM
- VDD typical Operating voltage: 5.0 V
- Package form: SOP16, AND DIP16

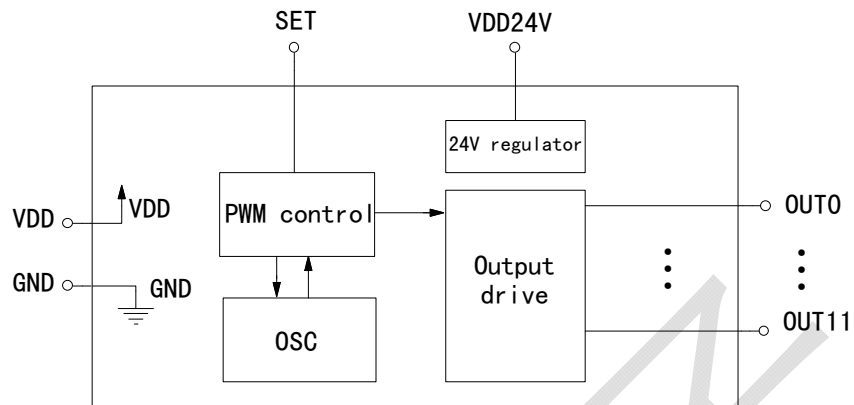
The external Application Block diagram.

Applicable areas:

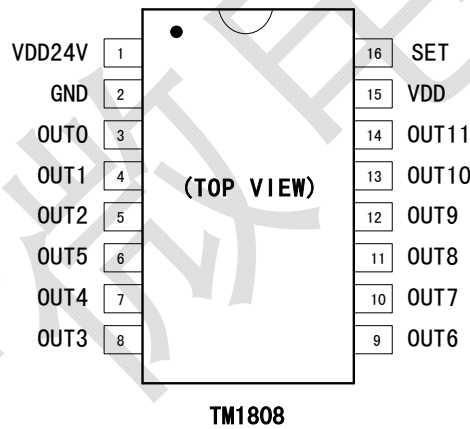
- ✧ Indoor, Outdoor LED Meteor, tfe water droplet effect decoration



The internal structure block diagram



Pin information



Pin function

Port		I/O	Functional Description
Name	Pin		
VDD24V	1	I	Built-in 24V regulator, required external resistor and capacitor
GND	2	--	GND
VDD	15	--	Chip power input, built-in 5V regulator tube
SET	16	I	PWM speed control. Floating: the normal speed. Ground: normal speed slow of 50% ± 7 per cent. Connected to VDD: normal speed fast 20% ± 7%
OUT0	3	O	16-level PWM output terminal
OUT1	4	O	16-level PWM output terminal
OUT2	5	O	16-level PWM output terminal
OUT3	8	O	16-level PWM output terminal
OUT4	7	O	16-level PWM output terminal
OUT5	6	O	16-level PWM output terminal
OUT6	9	O	16-level PWM output terminal
OUT7	10	O	16-level PWM output terminal
OUT8	11	O	16-level PWM output terminal
OUT9	12	O	16-level PWM output terminal
OUT10	13	O	16-level PWM output terminal
OUT11	14	O	16-level PWM output terminal



In the dry season or dried for use within the environment, easy to produce large amounts of static electricity, electrostatic discharge may damage the integrated circuit, the laws of microelectronics recommended to take all appropriate integrated prevention, treatment measures, if improper operation, and welding, may be caused by ESD damage or performance degradation, the chip does not work.

The Absolute Maximum Ratings range ^{(1) (2)}

Parameters		Range	Units
VDD	Logic supply voltage	-0.4~7.0	V
VOUT	The output port pressure	OUT0~OUT11	24
IO1	The drive output current	OUT0~OUT11 Port voltage=2V	90
FCLK	Clock frequency	OUT	2.0
Topr	Operating Temperature Range	-40~+85	°C
Tstg	Storage Temperature Range	-55~+150	°C
ESD	Human body model (HBM)	3000	V
	Machine mode (MM)	300	

(1) The table above these levels, the chip in a long time under the conditions of use, may cause the device permanent damage, may reduce device reliability. Day microelectronics is not recommended in any other conditions, the chip exceeds the limit parameter to work. (2) All voltage values are with respect to network to test

Recommended working conditions range

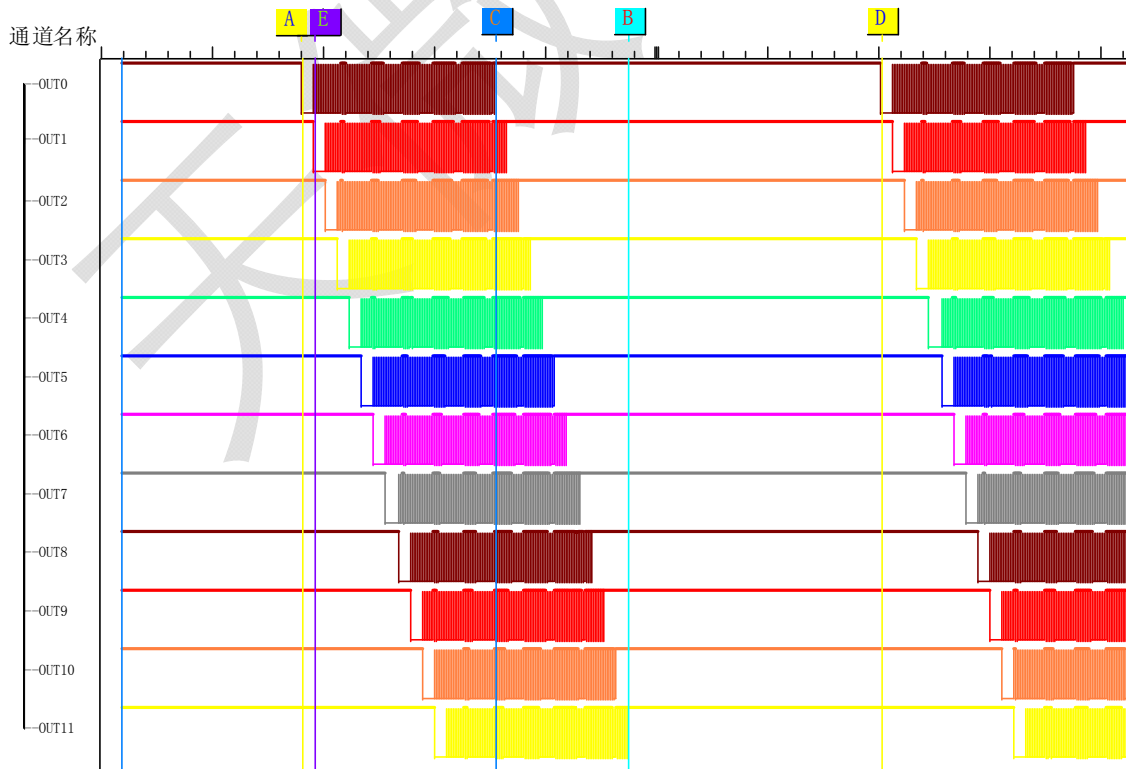
(In-40°C~+85°CUnder) Unless otherwise indicated

Parameters	Test Conditions	TM1808			Unit	
		Min	Typ	Max		
The DC parameter specifications table: VDD=5.0V						
VDD	Logic supply voltage	--	3.5	5.0	6.0	V
IDD	No-load current	VDD=5V,OUT0-OUT11、SET Vacant	0.18	0.25	5.0	mA
VO	output end pressure range	OUT0~OUT11	--	22	24	V
IOLC	Output Sink Current	VDD=5V,VOUTn=1.0V	40	45	50	mA
VZ24	VDD24V Regulator	VDD24V String R300Ω	21.0	23.0	25.0	V
VZ5	VDD Regulator	VDD String R=4KΩ	4.5	5.0	5.5	V
TA	Operating Temperature Range	--	-40	--	+85	°C
TJ	As junction temperature range	--	-40	--	+125	°C

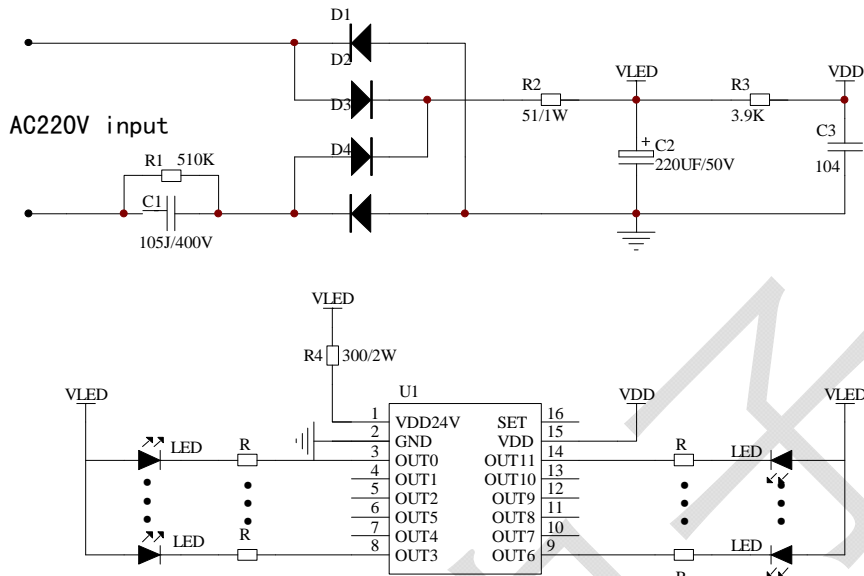
Electrical Characteristics

(In VDD=3.5V~5.5V And -40°C~+85°C Under, Typ VDD=5V And TA=+25°C) Unless otherwise indicated

Parameters		Test Conditions	TM1808			Units
			Min	Typ	Max	
VOH	High-level output volt	IOH=0.1uA	VDD-0.4	VDD	0.5×VDD	V
VOL	Low-level output volt	IOL=20mA	0.2	0.4	0.6	V
IOLKG	Output leakage current	OUTn=OFF, VOUn=24V	--	--	0.1	uA
ISET	SET Sink Current	SET=5V	5	15	30	uA
FL	Low speed PWM Freq	SET=0	0.7	1.05	1.4	KHZ
FZ	Normal PWM Freq	SET=Vacant	1.7	2.1	2.5	KHZ
FH	High-speed PWM Freq	SET=1	2.1	2.5	2.8	KHZ
tAB	Channel total on-time	SET Vacant	0.7	0.9	1.1	s
tBD	Channel closing time	SET Vacant	400	600	800	mS
tAE	A state duration	SET Vacant	25	30	35	mS
tAC	One channel open time	SET Vacant	450	500	550	mS
tAD	A period of time	SET Vacant	1.3	1.5	1.7	s

Logic diagram


Application information



The peripheral element parameters configuration--reference:

Element symb	Min	Typ	Max	Note	Units
C1	0.5	1	--	At a certain AC voltage, the total current depends on the R and C	uf
R1	100	510	--	C1 The discharge resistor	KΩ
R2	0	51	--	The current limiting resistor	Ω
C2	100	220	--	VDD24V Regulator capacitor	Uf
R3	2.5	3.9	4.7	VDD Regulator resistor	K
C3	--	104	--	Chip filter capacitor	pf
R4	150	300	350	Less than 1W heat generation amount is large, the resistance value is too large the regulator failure	Ω
R values	According to OUT Ports connect in ser LED Lamp to determine the number of R Res-the ref				
LED Number	LED 3V Press drop	LED 2V Pressure drop	Conditions		Units
2 Lamp a set of	430	470	$R = (V_{LED} - nV_{led}) / I_{max}$ (Vled For LED Pressure drop)		Ω
3 Lamp a set of	330	430		Ω	
4 Lamp a set of	240	360		Ω	
5 Lamp a set of	180	330		Ω	
6 Lamp a set of	100	270		Ω	

Note8 should be based on the LED brightness requirements and the specific LED lamp performance parameters to configuration parameters.

220V/50HZ AC case, usually the capacitance C1 of the capacitor C and the total current ILED of the relationship can be approximated that: $C=14.5 \times I_{LED}$, where, C the capacity of the unit is μf , the ILED unit is Ampere.

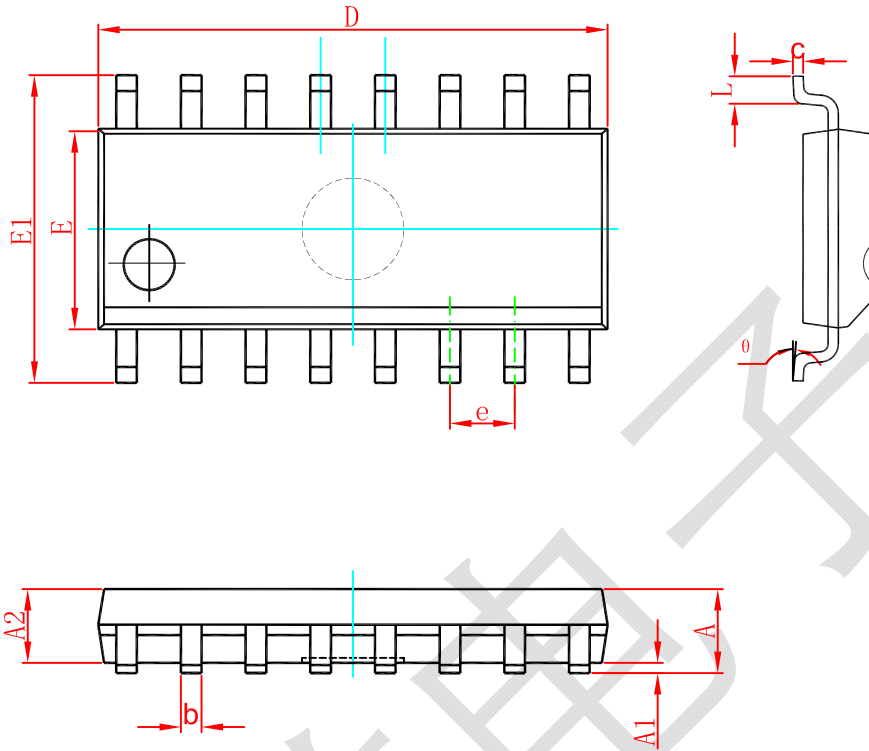
Allowed to flow through the LED, The maximum instantaneous current of I_{max} , $R=(V_{LED}-nV_{led})/I_{max}$. (V_{led} is the LED voltage drop is. LED lights all off, the minimum load, the current ILED all flow into the VDD24V feet, in this case, the resistor R4, the maximum power $P=V_{LED} \times I_{LED}$.

When working properly, the flow through the VDD current I_{DD} 2mA-7mA, $R3=(V_{LED}-V_{DD})/I_{DD}$.

Note: the use of resistance-capacitance buck circuit, the need to pay attention to the following matters:

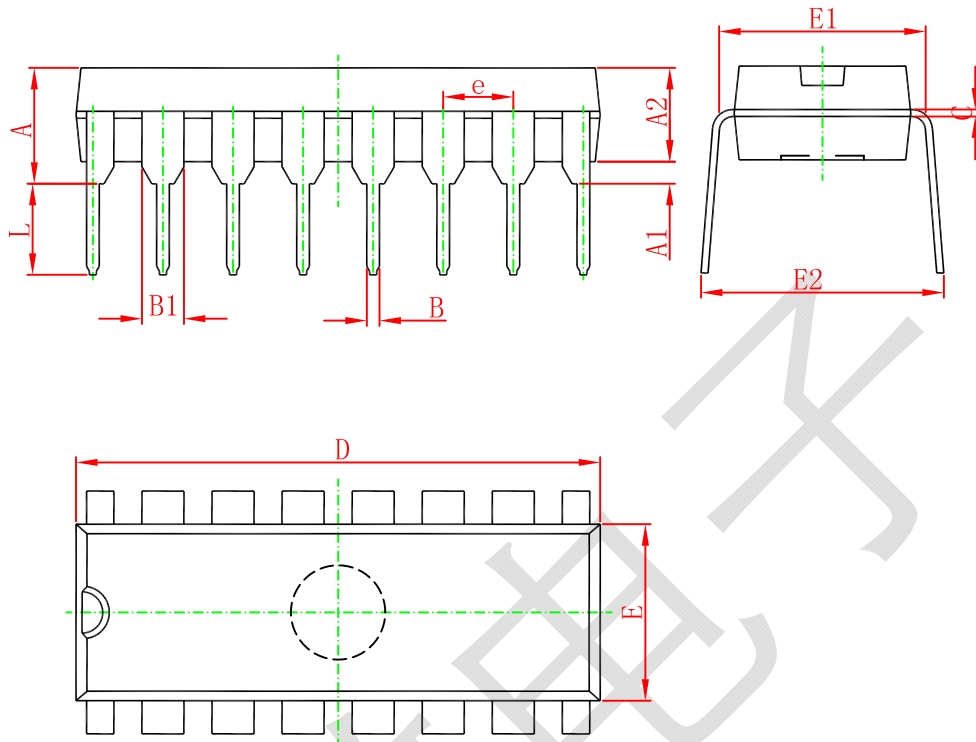
- 1, The circuit is not and 220V AC High-Voltage isolation, please pay attention to safety, prevent electric shock
- 2, The current limiting capacitor C1 and the resistance to the pressure to be sufficiently large 400V or more, and coupled with the discharge resistor R1 3, is strictly prohibited open-circuit power-on

Package (SOP16)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	9.800	10.200	0.386	0.402
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Package (DIP16)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524 (BSC)		0.060 (BSC)	
C	0.204	0.360	0.008	0.014
D	18.800	19.200	0.740	0.756
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540 (BSC)		0.100 (BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

Retision history

Version	Release date	Retised introduction
Ver1.0	2011-7-15	Issue of tfe first edition
Ver1.1	2012-3-31	Release

天微电子