Function describtion：

UCS512D is a DMX512 differential parallel protocol LED driver chip, which can select 1/2/3/4 channel high precision constant current output with gray level of 65536. The UCS512D-H is a high current output version with a heat sink package. UCS512D series decoding technology accurately decodes DMX512 signals, which can be compatible with and expand 512 protocol signals. UCS512D fully adaptively decodes DMX512 signals with transmission frequency less than 200K-750K, without any speed setting, addressing up to 4096 channels. UCS512D has built-in E2PROM and no external connection is required. UCS512D adopts the online writing code of AB line writing code, which can write code without connecting the writing code line of the lamp to the code writer. The connection is simple and the form is flexible. At the same time, UCS512D can set parameters in E2 (power on state, field selection, current adjustment). The chip provides four high-precision constant current output channels with a voltage of 28V or more and up to 200 mA. The output current can be set by an external resistor, and 64-level adjustment can be independently performed by software for each channel current. And has an independent 4-color current setting mode. UCS512D and UCS512D-H have PWM reverse polarity output function. This function is suitable for external triode, MOS tube or high current constant current drive IC application, and has RGBW output time compensation (adjustable) function. 4K high port refresh rate, greatly improving the screen refresh rate. The UCS512D and UCS512D-H can also expand the current drive capability by shorting multiple sets of constant current output interfaces. It is mainly designed for building decoration and stage lighting effect LED lighting system. It is suitable for LED lighting system that needs to be connected. The abnormality of one chip does not affect the normal operation of other chips at all, and the maintenance is simple and convenient.
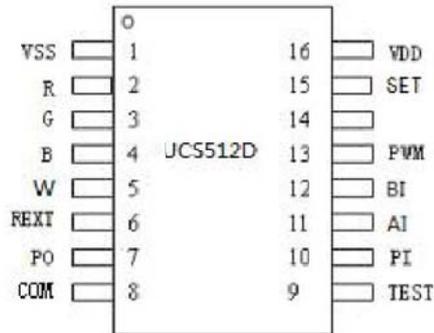
characteristic:

1- Compatible with and extend the DMX512 (1990) signal protocol;

2- Control mode: differential parallel, maximum support for 4096 channels

3- Up to 12-bit precision adaptive decoding technology for accurate and adaptive decoding of DMX512 signals with signal transmission rates from 200K to 750kbps

4- Built-in 485 module has the advantages of high differential signal resolution and large differential input impedance, which can greatly enhance the load capacity.

5- The built-in pull-up of the A port of the IC has certain anti-interference ability when the AB line is suspended.

6- The AB line writes code online, and the longest distance of the write code line is limited only by the length of the AB bus.

7- Independent parameter writing function for writing parameters without rewriting addresses

8- USC512D (UCS512D-H) can set parameters: 1. Power on status + field selection + no signal on status 2. Current file

9- UCS512D (UCS512D-H) can be used to set the pin "W" current by 3 times (4 color mode) through the SET pin. Power-on status selection parameters: You can select any gray level combination of 4 output ports of RGBW after power-on. As a unique brand identity

10- Field selection parameters: You can select 1, 2, 4 fields, select the appropriate field to reduce the amount of data transmission while expanding the stream.

11- No signal lighting parameter: set when 1S is no signal. Is the screen retaining the last frame or returning to the color of the power-on lighting?

12- Current file parameters: The current adjustment resistor sets the current maximum value, and the current file parameter can classify the current maximum value.

13- Both the code writing and the writing of the parameters take effect immediately, without re-powering.

14- The code is successful: the first light is 22% bright yellow, then the white light is 22%, visually showing the breakpoint position.

15- Write parameters (power-on lighting + field +1S no signal lighting) success: the first light is bright yellow light 22%, then the data is turned on according to the data of the power-on lighting byte

16- The write current parameter is successful: the first light is bright yellow 22%, and then the red light is 22%.

17- UCS512D /UCS512D-H corrects 256 levels of gray to 655356 levels, correction factor: Gamma 2.2

18- R/G/B/W four-bit constant current output channel, ±3% high-precision current difference between chips

19- External output constant current adjustable resistor, UCS512D/UCS512D-H current range of 10~200mA per channel

20- UCS512D and UCS512D-H with over temperature protection

21- Port refresh rate: patented T-PWM extended frequency mode, port refresh rate up to 4K, cell phone/camera shooting without stripe level 1 250HZ, level 2 500HZ, level 4 1KHZ, level 8 2KHZ, level 16 4KHZ

22- The PWM selector selects the reverse polarity function, and the reverse polarity output does not change the port refresh rate.
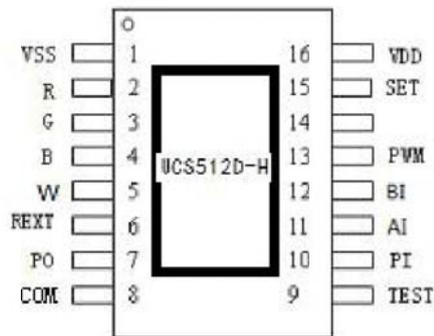
Pins chart:

1. UCS512D   SOP16

```
         ┌─────────────────┐
         │ o               │
   VSS  ─┤ 1            16 ├─ VDD
   R    ─┤ 2            15 ├─ SET
   G    ─┤ 3            14 ├─
   B    ─┤ 4   UCS512D  13 ├─ PWM
   W    ─┤ 5            12 ├─ BI
   REXT ─┤ 6            11 ├─ AI
   PO   ─┤ 7            10 ├─ PI
   COM  ─┤ 8             9 ├─ TEST
         └─────────────────┘
```

2. UCS512D-H   ESOP16

```
         ┌─────────────────┐
         │ o               │
   VSS  ─┤ 1            16 ├─ VDD
   R    ─┤ 2            15 ├─ SET
   G    ─┤ 3            14 ├─
   B    ─┤ 4  UCS512D-H 13 ├─ PWM
   W    ─┤ 5            12 ├─ BI
   REXT ─┤ 6            11 ├─ AI
   PO   ─┤ 7            10 ├─ PI
   COM  ─┤ 8             9 ├─ TEST
         └─────────────────┘
```

脚位说明

序号	符号	UCS512D/UCS512D-H 功 能 描 述	
1	GND	Ground line	
2~5	RGBW	Terminal of PWM output	
6	REXT	Constant current feedback terminal, adjust the output current to the grounding resistance	
7	PO	Address writing control line output	
8	COM	RGBW output port delay off compensation pin	
9	TEST	Test pin	

10	PI	Write code control line input, built-in pull-up
11	AI	Differential signal, positive
12	BI	Differential signal, negative
13	PWM	The output polarity is selected, generally floating, and the output polarity is opposite after connecting to VDD. Reverse polarity. Do not change the port refresh rate
14	NC	Empty pin
15	SET	W channel current 3x mode setting: floating, W channel is REXT setting current. Connect VDD, W is 3 times REXT set power
16	VDD	Power supply, built-in 5V regulator

Maximum rating （Ta＝ 25 ℃，Vdd＝ 5 V）

parameter	symbol	range	unit
Logic supply voltage	Vdd	＋2.5～＋6.5	V
Output port withstand voltage	Vout	30	V
Logic input voltage	Vi	－0.5～Vdd＋0.5	V
Operating temperature	Topt	－45～＋85	℃
Storage temperature	Tstg	－55～＋150	℃
Antistatic	ESD	8000	V
Rated output power（UCS512D）	Pd	600	mW
Puissance de sortie nominale（UCS512D-H）	Pd	1.2	W

Recommended work range （Ta＝－40～＋85℃，Vdd＝5 V）

parameter	symbol	Min.	Typical	Max.	unit	Test
Logic supply voltage	Vdd	2.5	5.5	6	V	-
High level input voltage	Vih	0.7 Vdd	-	Vdd	V	-
Low level input voltage	Vil	0	-	0.3 Vdd	V	-
Output port withstand voltage	Vout			30	V	

Electrical parameters （，Ta＝－40～＋85℃，Vss＝0 V, Vdd＝4.5～5.5 V）

| parameter	symbol	Min.	Typical	Max.	Unit	Test
Low level input voltage	Iol	10	-	-	mA	Vpo＝0.4 V
High level input voltage	Ioh	10	-	-	mA	Vpo＝4.6 V
Current input	Ii	-	-	±1	µA	PI
Differential input common mode voltage	Vcm			12	V	
Differential input current	Iab			28	uA	VDD=5V
Differential input threshold voltage	Vth	-0.2		0.2	V	0<Vcm<12V

Differential input hysteresis voltage			70		mV	Vcm=0V
Differential input impedance	Rin		250		KΩ	A,B 对地
Output pin current	Isink			200	mA	R，G，B，W（REXT 对地电阻欧姆）
High level input voltage	Vih	0.7 Vdd	-		V	PI
Low level input voltage	Vil	-	-	0.3 Vdd	V	PI
Current offset (between channels)	dIout		±1.5	±3.0	%	Vds=1V，Iout=17mA
Current offset (between chips)	dIout		±3.0	±5.0	%	Vds=1V，Iout=17mA
Voltage offset VS-Vds	%dVds		±0.1	±0.5	%/V	1V<Vds<3V
Voltage offset VS-Vdd	%dVds		±1.0	±2.0	%/V	4.5V<Vdd<5.5V
Dynamic current loss	IDDdyn		3		mA	无负载，VDD=5V
Power consumption UCS512D	PD			540	mW	（Ta=25℃）
Power consumption UCS512D—H				1.1	W	（Ta=25℃）
Thermal resistance UCS512D	Rth(j-a)	80		100	℃/W	（Ta=25℃）
Thermal resistance UCS512D—H		60		80	℃/W	（Ta=25℃）
Over temperature protection open threshold	Tovt（H）	145			℃	
Over temperature protection close threshold	Tovt(L)	125			℃	

Switching characteristics （Ta＝－４０～＋８５℃，Vss＝0 V, Vdd＝4.5～5.5 V）

parameter	symbol	Min.	Typical	Max.	unit	Test
Transmission delay time	Tflz	-	-	300	ns	Cl＝15 pF，D_{IN}→D_{OUT}，Rl ＝ 10 kΩ
Fall time	Tthz	-	-	120	μs	Cl＝300 pF，OUTR / OUTG / OUT/OUTW
Data transfer rate	F			500	Kbps	
Input capacitance	Ci	-	-	15	pF	-

Communication data protocol：

UCS512D/D-H data reception is compatible with the standard DMX512 (1990) protocol and extended DMX512 protocol, data transmission rate 200kbps to 750K adaptive decoding. The protocol waveform is as follows: The chip is an AB differential input. The timing waveform of A is shown in the figure, and B is opposite to A.
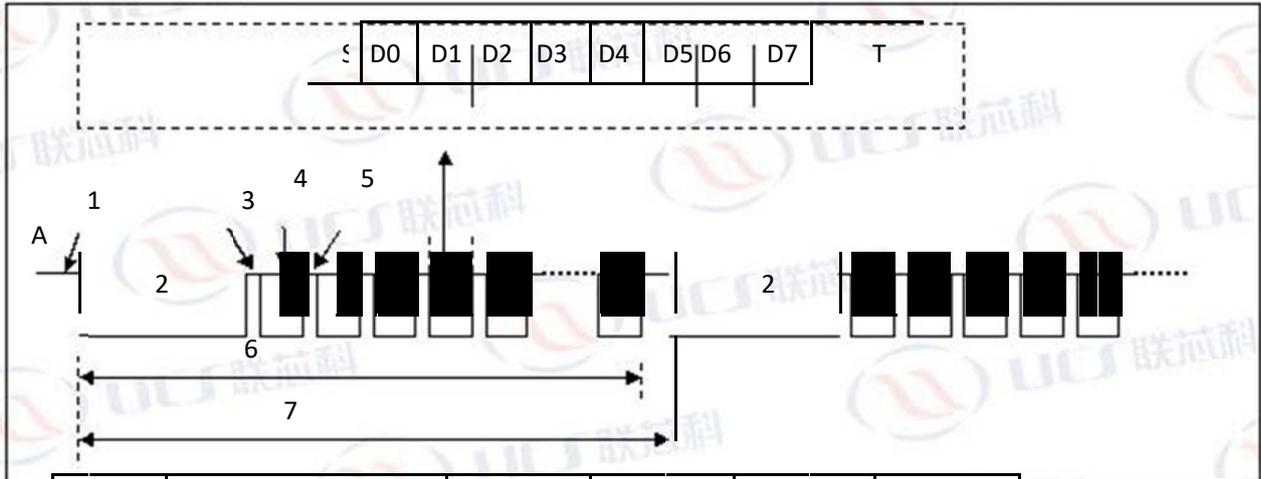
No.	Des.	Min.	Typical	Max	unit
	Bit rate	200	250	500	Kbps
	Bit time	5	4	2	us
S	Start bit	5	4	2	us
D0~D7	Data bit	5	4	2	us
T	2 stop bits	10	8	4	us
1	Pre-reset flag	0		1000000	us
2	Reset signal	88		1000000	us
3	Mark after reset	8		1000000	us
4	Field（note1）	55	44	22	us
5	Range of field	0		1000000	us
6	Packet length	1024		1000000	us
7	Reset signal interval	4096		1000000	us

Note1: The field has a total of 11 bits, including 0 start bit, 8 data bits and 2 stop bits. The 0 start bit is low level, the stop bit is high level, the data in the data bit is 0, then the corresponding time period is low level; if 1, the corresponding time period is high level. 0 start bit, stop bit and data bit must be the same bit length

IC receiving instructions:

1. When a reset signal appears on the AB line, the IC enters the receive ready state. Address counter clear 0

2. The first field in the packet is the start field, and its 8-bit data must be "0000_0000". This field is not used as display data.

The valid field for display begins with the second field, and the second field of the 512 packet is the first field of valid data.

The IC's adaptive data transmission frequency is 200K-750K. The length of the field corresponding to different frequencies is different, but regardless of the transmission frequency is 200K or 750K, just make sure that the length of all valid fields is the same as the duration of the starting field. It should be noted that the higher the transmission rate, the shorter the bus length, and the higher the frequency will increase the instability, so it is recommended that the transmission frequency not exceed 500K.

3. The IC determines the corresponding field in the 512 packet based on the address in its E2. If the chip address is 0000_0000_0000, it is intercepted from the first valid field of the packet, and the address 0000_0000_0001 is intercepted from the second valid field. How many fields are used by the chip, written by the control system.

Mode	effect
4 field mode	Intercept 4 fields, corresponding to R, G, B, W
2 field mode	Intercept 2 fields, corresponding to RG, BW

	Intercept 2 fields, corresponding to RGBW
1 field mode	

In the above table, the 1 field mode and the 2 field mode can realize the function of expanding the current in the case of the minimum data transmission amount, for example, in the 1 field mode (generally a monochrome application), the RGBW 4 output pins can be used in parallel, which The maximum output current is up to 4 times the single channel current. The above field selection is only required when the flow is expanded. When the flow is not required, the 4-field mode can be directly selected.

A, B port description:

A receiving port has a built-in pull-up resistor, and the B receiving port has a built-in pull-down resistor. It is generally not recommended to add a pull-down resistor. If you need to add, please consult our company, plus too small resistance may cause the number of parallel points to be greatly affected.

Function Description:
The following types of parameters can be written by the controller:
1. Field selection parameters: 1, 2, 4 field mode can be selected. It can be seen that there is no 3 field mode selection. This is because, in the case of point source application, the 4-field mode can be fully used in R, G, B output and R, G, B, W output. In the case of R, G, B output applications, the W port is left floating. You can do it without having to add a 3-field mode selection.
2. Power-on status parameter: It can be set to output any combination of gray levels on any of the 4 ports of RGBW after power-on, which greatly enhances engineering flexibility and, more importantly, users can Set a unique combination of power-on lighting grayscale, which is used as an independent identification of the brand in engineering.
3. 1S no signal status parameter: It can be set after the IC does not receive the valid DMX512 protocol data 1S, whether it keeps the last frame or restores the color set in the power-on lighting parameter.
4. Current file parameters: The current adjustment resistor sets the current maximum value. Each channel of RGBW has independent current file parameters. It can classify the current maximum value of each channel, and arbitrarily set the level 1-64, so that several functions can be realized. : 1. RGB with white balance 2. Individually adjust the current of the W channel (white light) 3. Adjust the brightness as a whole. The implementation of the above functions does not require sacrificing gray scale.
5. The code writing and writing parameters are completely independent, and the independent writing and writing parameters have multiple advantages:
A. Reduce unnecessary repeated writes to E2, especially if the interference is large. B. The parameters are generally written in the factory. Generally, there is no need to write again in the project. If the writing code and the writing parameters are not independent, the wrong parameters may be written while writing in the project.
6. If no parameter writing has been made, the factory default power-on blue light, 4-field mode, 1S no signal to retain the last frame, current file is level 64. If the parameter has been written, it will be executed according to the parameters stored in E2 after power-on.

High port refresh frequency and output port compensation function description

    1. The UCS512D's port output uses the patented T-PWM spread spectrum technology, and the refresh rate is up to 4K.

    T-PWM: 65536 gray scale level 1 250HZ, level 2 500HZ, level 4 1KHZ, level 8 2KHZ, level 16 4KHZ

It can be seen from the above that the T-PWM technology is used to multiply the frequency, and the 4K refresh frequency is reached at the 16th level of 65536. Our company's T-PWM patent technology is superior to other frequency diffusion technologies. Other diffusion technologies cannot multiply the frequency by step, and reach the preset frequency at the fastest speed. Generally, several hundred gray levels are required to reach the preset frequency, and the frequency is broken. The effect is poor.

Advantages of high port refresh rate: lamps do not appear when using cameras, cameras, mobile phones, etc. for taking pictures and recording videos.

The streaking phenomenon helps to improve the image of the lighting project.

2. Output port compensation: When the 65536 gray scale output is output, the output open time of each stage is only 60nS. When the external constant current IC is externally connected, the output may not be opened due to the slow operation time of the external constant current IC. In case you should join

The compensation time is turned off by the delay so that the level 1 gray scale is effectively turned on. The COM pin-to-ground resistor will change the delay off compensation time.

Note: The first-level gray scale of the external constant current IC can effectively turn on the brightness. The COM foot compensation function is generally not used when the human eye recognizes it.

UCS512D/DH has over-temperature protection function. When the power consumption is too high, the ambient temperature is high or the heat dissipation is poor, the internal cell temperature of UCS512D/DH may be too high. At this time, the over-temperature protection function is activated to prevent the IC wafer from being used. Excessive temperature and permanent damage.

Over-temperature protection function: When the internal wafer temperature exceeds 150°, the current is reduced by half. When the temperature is lower than 130°, the current returns to normal.

Writing code / parameter notes:

1. Before writing the code/parameter, connect the A (D+), B (D-), and GND ports on the code writer to the fixture with copper wire and check it carefully.

2. Before writing the code/parameter, perform R, G, B, and full light (the whole four-color synchronous jump test) to confirm whether there is a problem with the AB line. If the program is not normal, do not perform the code/parameter operation. Please check this problem before writing code/parameters.

3. After the code is successful: the first light is bright yellow 22%, then the white light is 22%, the special color first light can effectively identify the breakpoint.

4. After the code is successfully written, the new address code will take effect immediately.

5. After the code is completed, apply the special test program (usually point-by-point running or brush color) that comes with the code writer to test whether the code is completely correct.

Note on writing parameters:

1. Write parameters (field + no signal lighting + power-on lighting) success: the first light is bright yellow 22%, then press the data of the power-on lighting byte stored in E2 to light.

2. The write current parameter is successful: the first light is bright yellow 22%, then the red light is 22%

3. After the parameters are successfully written, the new parameters take effect immediately.

Differential bus connection considerations:

1. Common ground between the controller and the IC and between the IC and the IC to prevent excessive common mode voltage breakdown. When shielded wires are used, the shielded layer can be used as a common ground to reliably connect multiple IC nodes, and the ground can be reliably connected at one point, and cannot be connected to the ground at both ends or multiple ends.

2. The protection resistance of the serial connection between the A line and the B line to the IC on the board must be the same, and the AB line on the board should be wired side by side. There may be no other traces or components between the AB lines.

3. AB bus generally uses twisted pair cable, you can also use ordinary sheathed wire, but pay attention to buy copper wire material. In the joint project of strong and weak electric troughs, near the launch tower or in areas with more lightning, shielded twisted pairs can be used to reduce interference and lightning strikes.

1. The 485 node in the 485 bus should minimize the distance from the trunk. It is generally recommended that the 485 bus adopt a bus topology that is hand-held. A structure having a main line plus a branch line characteristic such as a star structure or a tree structure may generate a reflection signal, which affects the quality of 485 communication. If the main line plus branch line wiring structure has been adopted during the construction process, and the branch line exceeds 1 m in length, it is recommended to use a 485 repeater to make a 485 bus bifurcation at each branch line more than 1 m. The relay should be close to the main line. Multiple branches 485 repeaters can also be used to connect multiple branches.

5. 485 bus will generate echo reflection signal with the extension of transmission distance. If the transmission distance of 485 bus is long, it is recommended to connect a 120 ohm terminal matching resistor on the AB line at the end of 485 communication during construction.

S-AI anti-jamming patent technology: one of our patented technologies, used in high-speed communication interface IC, through a built-in algorithm module to filter out a range of differential mode interference signals, and common mode anti-interference ability of differential bus Form a certain degree of complementarity and expand the ability to resist interference. It is suitable for use in engineering environments with high interference, and also for products with high interference such as switch-type high-power constant-current drive modules.

Output constant current setting:

R, G, B, W are constant current outputs, and UCS512D series currents up to 200mA. The constant current value is determined by the resistance of REXT to ground. Current formula:

$I=128/Rext$ (1)

$Rext=128/I$ (2)

Rext is the resistor across the REXT pin and ground, and I is the current output from the R, G, B, and W ports.

For example, if you want to get 20mA current, use (2), Rext=128/20mA, and finally get Rext=6400 ohms.

To get a current of 120mA, use (2), Rext = 128/120mA, and finally get Rext = 1066 ohms.
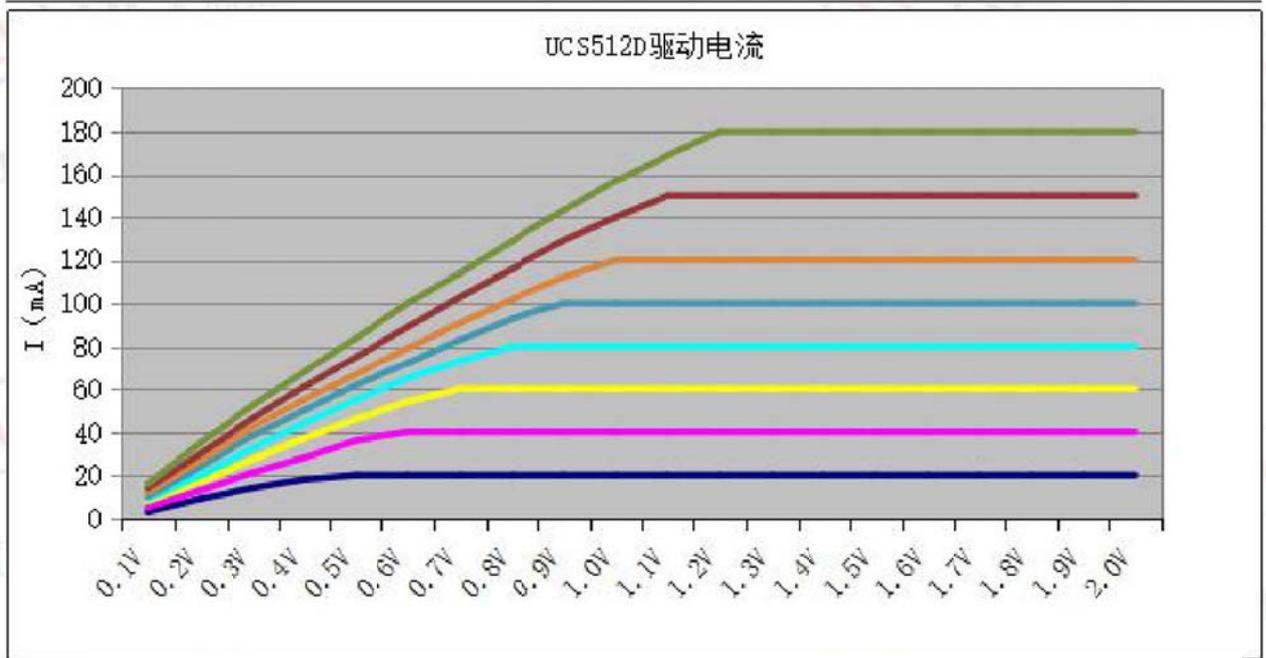
Constant current curve:

UCS512D/UCS512D—H Excellent constant current characteristics, and the current difference between channels and even between chips is extremely small.

(1): The current error between channels is ±3c/o maximum, and the current error between chips is ±5c/o.

(2): When the voltage at the load terminal changes, the output current is not affected, as shown in the figure below.

(3): As shown in the figure below, the relationship between the current I of the output port and the voltage Vds applied to the port shows that the smaller the I current, the smaller the Vds required in the constant current state.

UCS512D驱动电流

Data of constant curretnt

| Data of contant current （mA）	min V_{DS} （V）
5	0.5
10	0.6
20	0.8
45	0.7
55	0.6
90	0.8
120	1
170	1.2

Application Figure 1:4 Field mode, factory default, the picture below shows RGBW, 4-color application
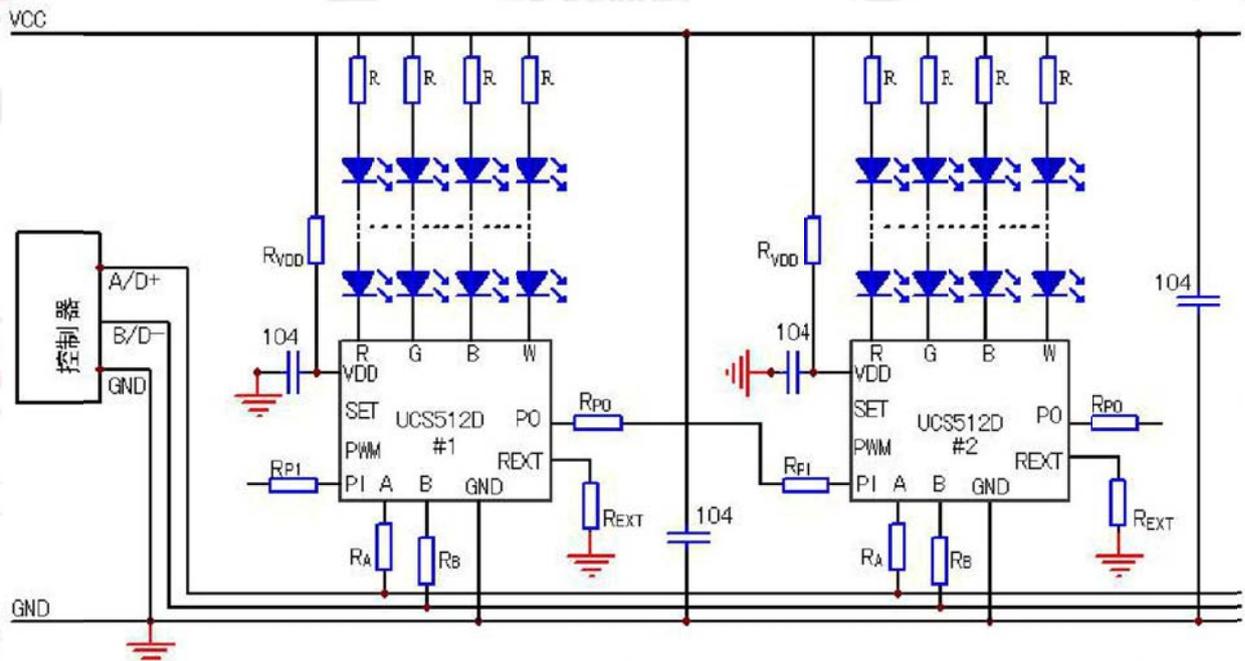
Note: When laying the circuit board, the connection between the REXT pin of the UCS512D/DH and the RREXT resistor pad should be short and thick, and the longest should not exceed 1cm. This connection cannot be routed with the lamp bead. IC to the lamp bead Connections and power lines have strong interference lines arranged in parallel to avoid interference and constant current value.

Application Figure 2: 4 field mode, factory default, the following picture shows the RGB 3 color application
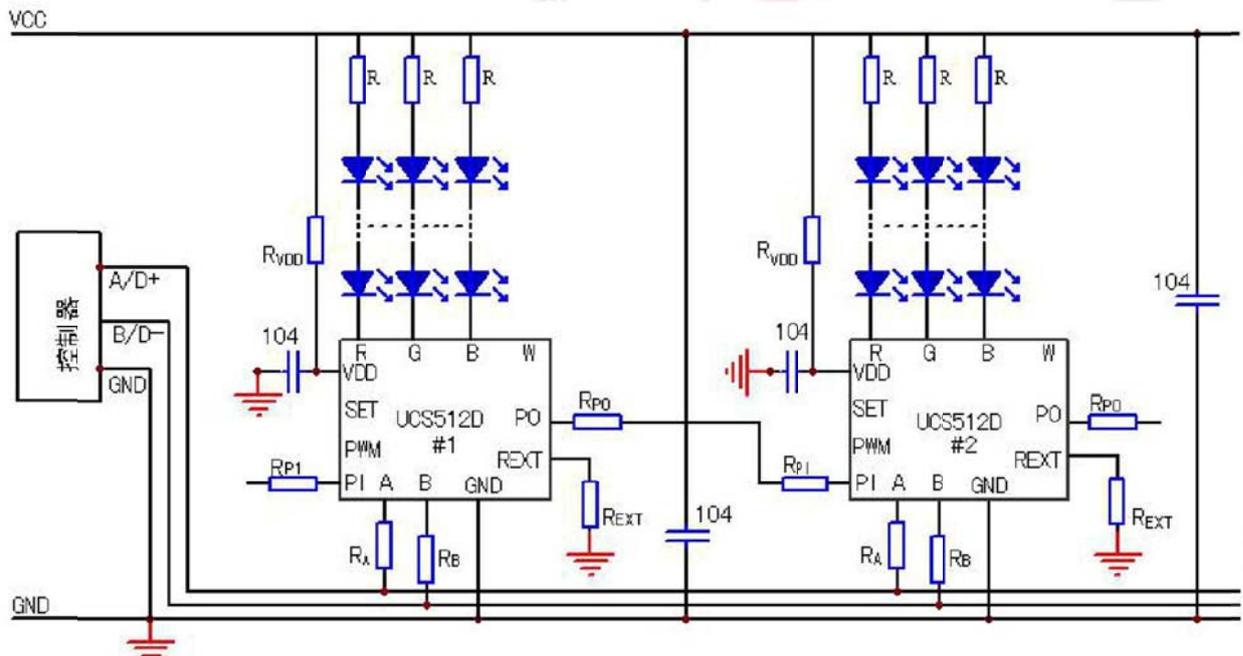
Note: When laying the circuit board, the connection between the REXT pin of the UCS512D/DH and the RREXT resistor pad should be short and thick, and the longest should not exceed 1cm. This connection cannot be routed with the lamp bead. IC to the lamp bead Connections and power lines have strong interference lines arranged in parallel to avoid interference and constant current value.

Application Figure 3: 2 Field mode (expanding application, reducing data volume)
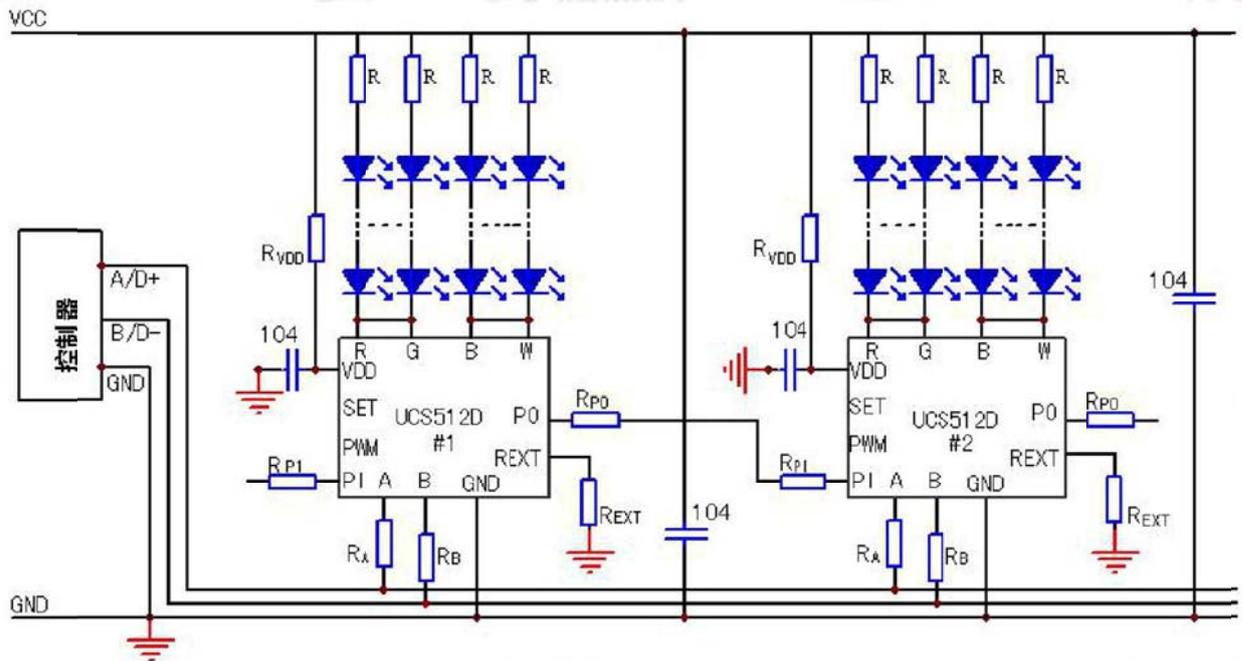
Note: 1. For two-color or other applications that need to be expanded, you can use the 2-field mode (software selection). The RG (BW) channel corresponds to the same address data, and the output is the same. The figure shows the parallel expansion application. Maximum output current after 2 channels in parallel: 120mA—UCS512D, 300mA—UCS512D-H
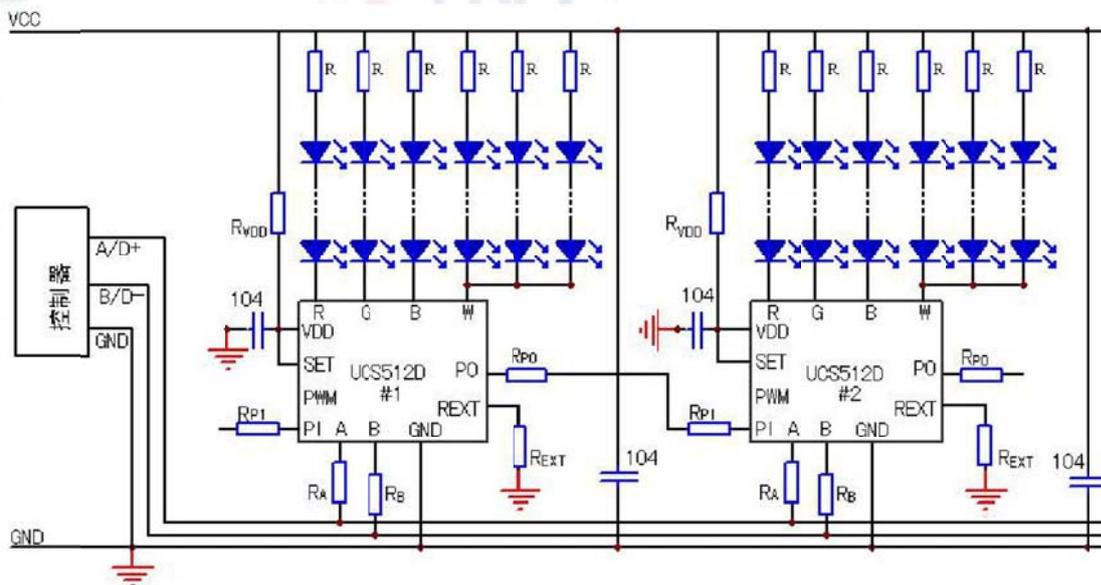
2. When laying the circuit board, the connection between the REXT pin of the UCS512D/DH and the RREXT resistor pad should be short and thick, and the longest should not exceed 1cm. This connection cannot be routed with the lamp bead, and the IC goes to the lamp bead. Connections and power lines have strong interference lines arranged in parallel to avoid interference and constant current value.

Application Figure 4: 1 Field mode (expanding application, reducing data volume)
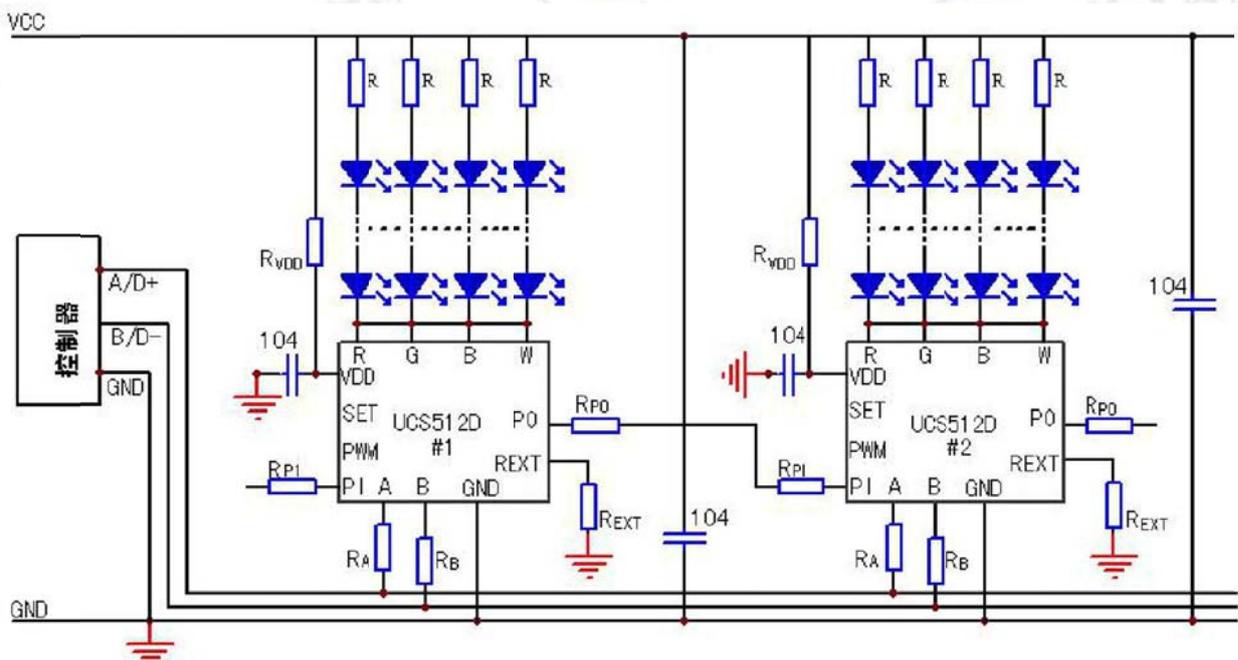
Note: 1. For monochrome or other expansion applications, the 1 field mode (software selection) can be used. The RGBW 4 channel corresponds to the same address data, and the output is the same. The figure shows the parallel expansion application. Maximum output current after 4 channels in parallel: 120 mA—UCS512D, 600mA—UCS512D-H

2. When laying the circuit board, the connection between the REXT pin of the UCS512D/DH and the RREXT resistor pad should be short and thick, and the longest should not exceed 1cm. This connection cannot be routed with the lamp bead, and the IC goes to the lamp bead. Connections and power lines have strong interference lines arranged in parallel to avoid interference and constant current value instability.。

Application 5: 4-color mode (W channel constant current value is 3 times that of RGB channel)

Note: 1. UCS512D/UCS512D-H has software current adjustment function. When the W channel current does not need to be 3 times of RGB, the current file can be selected in the controller to set the actual current required, and the 1-64 level is optional.

2. When laying the circuit board, the connection between the REXT pin of the UCS512D/DH and the RREXT resistor pad should be short and thick, and the longest should not exceed 1cm. This connection cannot be routed with the lamp bead, and the IC goes to the lamp bead. Connections and power lines have strong interference lines arranged in parallel to avoid interference and constant current value.

Application Figure 6: External Switching Constant Current Driver IC（for exanple：UCS2915 ）
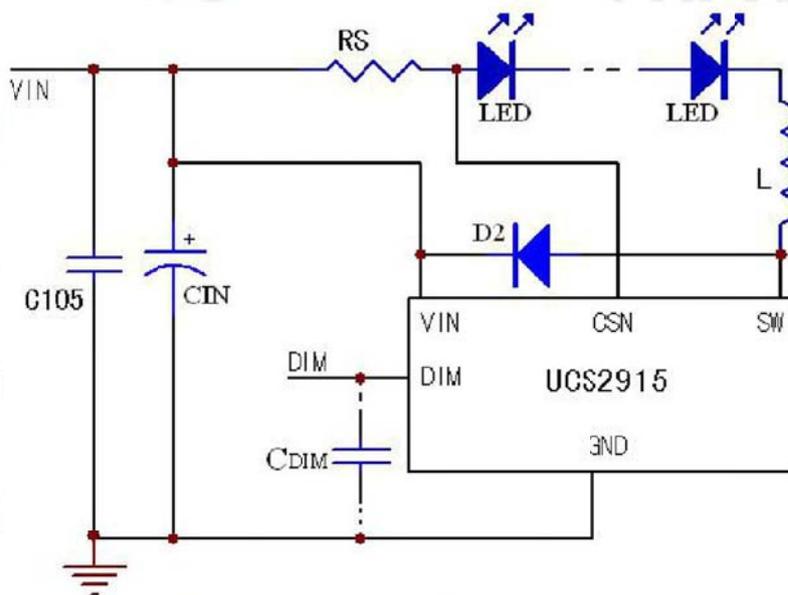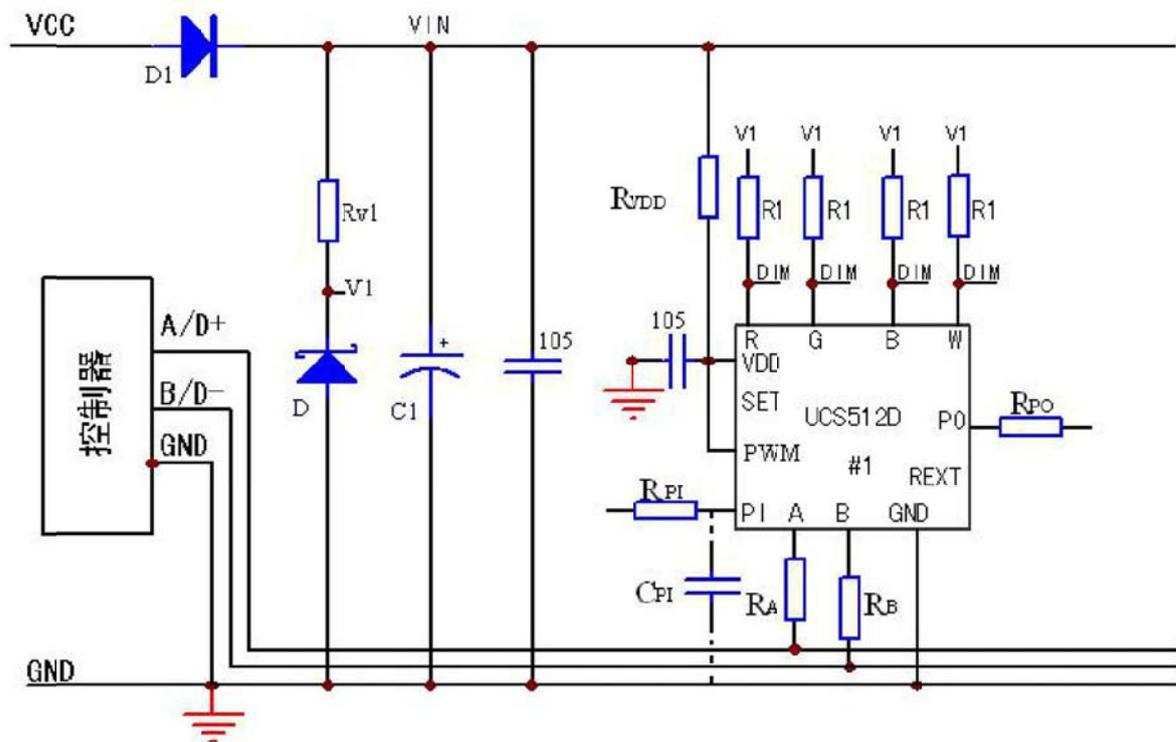
Note: When using a switching constant current drive IC, the interference may be very large (related to various factors such as power and wiring). Although the UCS2915 has a built-in noise suppression module to reduce noise and surge, the system still Noise and surge will occur, and in some cases it will be very serious. In order to avoid problems such as writing code or abnormal screen changes, it is recommended to proceed as follows:

A: Note that the position of the inductor L should be between the LED and the SW pin of the IC. Do not change the position of the LED and the inductor L, otherwise the interference will increase.

B: All UCS2915 VIN pins and UCS512 step-down resistor RVDD must be directly connected. After the same anti-reverse diode is connected, in order to reduce the surge effect, the UCS2915VIN pin and the UCS512 step-down resistor RVDD cannot be connected in different anti-reverse connections. Behind the diode.

C: The VIN pin of the UCS2915 on the board is connected to the UCS512 step-down resistor RVDD as thick and short as possible (as close as possible, etc.)

Potential), the trace between the GND pin of UCS2915 and the GND pin of UCS512 is as thick and short as possible (as close as possible to equipotential)

D: At each UCS2915 close to the VIN and GND pins and a 47uF electrolytic capacitor (as shown in Figure CIN) and 105 capacitors, near the UCS512 buck resistor RVDD and GND pin and a 47uF electrolytic capacitor (Figure Capacitors for C1) and 105.

E: The AB line should always be in parallel wiring on the board. In the special case where it is not possible to cross the line, do not insert other components or traces between the AB lines (even in special cases, the shortest part). Otherwise, the anti-jamming function of the balanced transmission of the AB line will be weakened.

F: When the interference is too large and the code writing occurs, first optimize according to the above suggestions. If the code is still unsuccessful afterwards, add a capacitor CPI filter capacitor to the GND of the IC to filter out. A certain degree of interference, the size of the capacitor can be selected according to the situation, too large capacitance may also lead to the inability to write code, generally recommended within 103.

G: In special cases, because the DIM pin is disturbed, the control is abnormal. In this case, add a capacitor CDIM to the GND of the DIM pin of UCS2915. The size of the capacitor is determined according to the actual situation, generally in the range of tens to 100 PF.

Component selection table:

element	24V	12V	5V
R$_{VDD}$	2K	750	82
R$_{PI}$	500	500	
R$_{PO}$	500	500	
R$_A$	5K	5K	3K
R$_B$	5K	5K	3K

DMX512 IC

**Component selection table: external constant current IC**

element	24V	12V	5V
R1	**2.4K**	**2.4K**	**2.4K**
Rv1	**1.2K**	**500**	

DMX512 and extension protocol use on luminaires

element	Sending frequency	Number of bus channels	Frame rate
Standard protocol	250K	512	44
Channel extension	250K	1024	22
Channel extension	250K	1536	15
Sending frequency and extension	500K	1024	44
Sending frequency and extension	500K	1536	30
Sending frequency and extension	500K	2048	22

Drawing and size

SOP16
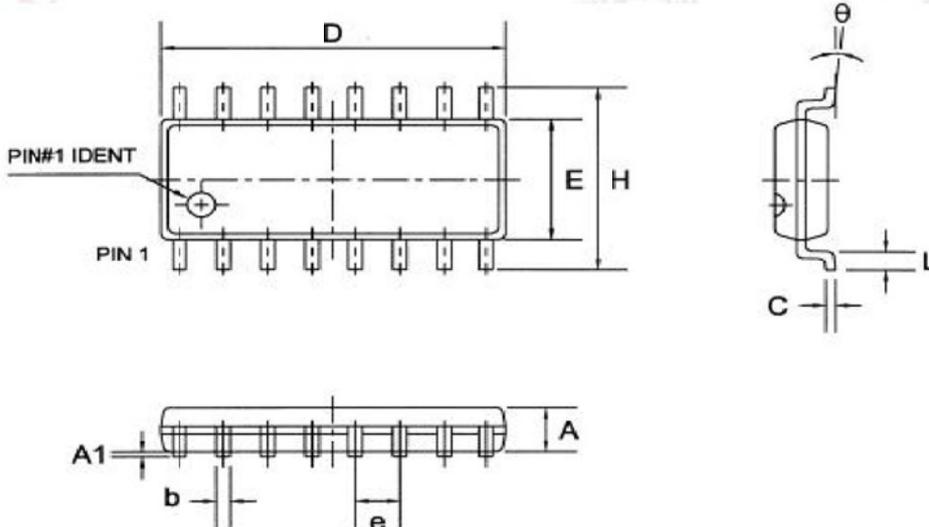
Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	1.30	1.50	1.70	0.051	0.059	0.067
A1	0.06	0.16	0.26	0.002	0.006	0.010
b	0.30	0.40	0.55	0.012	0.016	0.022
C	0.15	0.25	0.35	0.006	0.010	0.014
D	9.70	10.00	10.30	0.382	0.394	0.406
E	3.75	3.95	4.15	0.148	0.156	0.163
e	—	1.27	—	—	0.050	—
H	5.70	6.00	6.30	0.224	0.236	0.248
L	0.45	0.65	0.85	0.018	0.026	0.033
θ	0°	—	8°	0°	—	8°

ESOP16

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	--	--	1.75
A1	0	--	0.10
b	0.35	--	0.48
c	0.19	--	0.25
D	9.70	9.90	10.10
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
L	0.40	--	0.80
a°	0°	--	8°

尺寸 载体尺寸	D1	E2
90*150	4.27	2.29