MBI5026

16 位恒流 *LED* 驱动器

概述：

MBI5026是一种16位LED恒流驱动器。采用先进的Bi_CMOS工艺生产，其恒流值可以通过外接电阻调节（Iout=5~90mA）。MBI5026含有16位移位寄存器，16位锁存器，1.2V基准源,以及16位高精度恒流驱动器等模块构成。

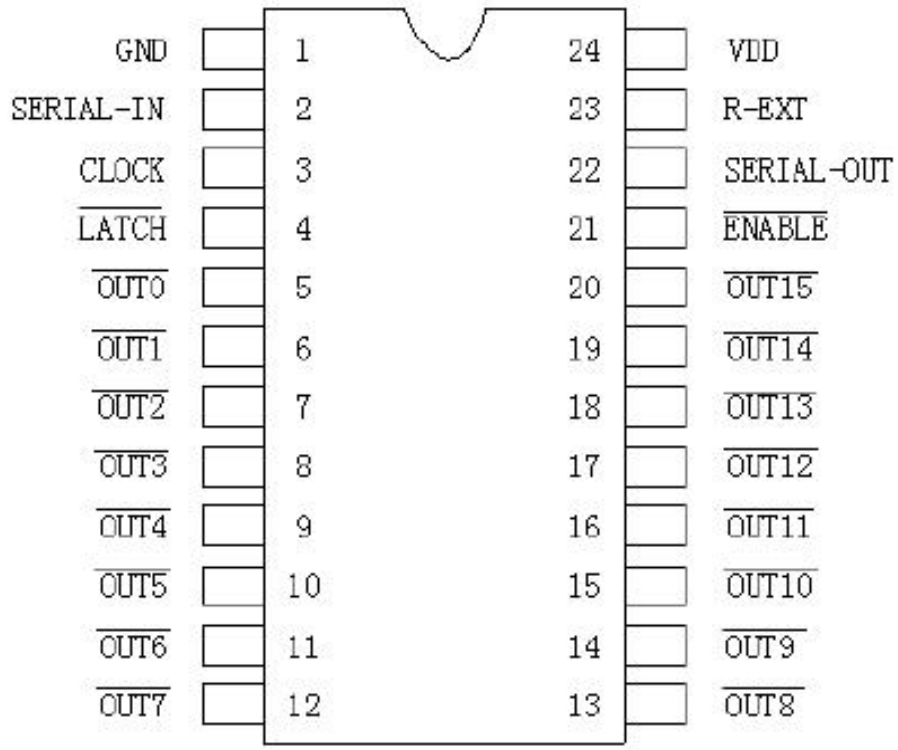
特点：

1．输出恒流范围：2~90 mA（通过调节外接电阻实现）
2．最高时钟频率：30MHZ
3．输入：兼容5V CMOS
4．封装形式：SDIP24， SSOP24（1.0）SSOP24（0.635）
5．电流均匀性： (Ta=25 ^{o}C, VDD=5.0V) Bit-to-Bit: ±3%; Chip-to-Chip: ±4%
6．兼容性：与TB62726 、ST2221C 功能及引脚均兼容

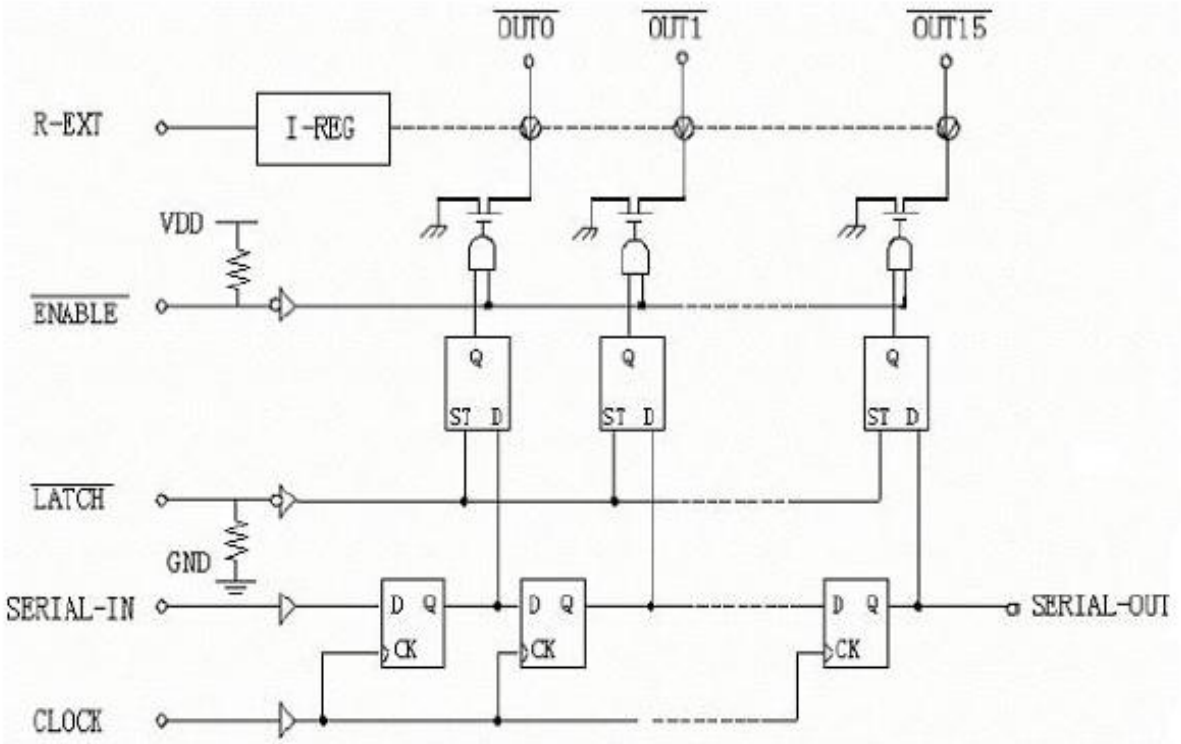
引脚说明：

脚位号	脚位名称	功能
1	GND	芯片接地端
2	SERIAL-IN	移位寄存器的串行数据输入端
3	CLOCK	数据移位时钟，上升沿有效
4	LATCH	数据锁存输入端。LATCH 端高电平输入时，锁存器传递数据，数据不输出到电流驱动部分；LATCH 端低电平输入时， 锁存器保持数据。
5~20	OUT 0~15	恒流驱动输出端
21	ENABLE	恒流驱动输出使能输入端。ENABLE 端高电平输入时，所有的输出端关闭，ENABLE 端低电平输入时，所有的输出端开启。
22	SERIAL-OUT	串行输入数据输出端，提供下一级串行数据输入端的串行输入数据
23	R-EXT	调节恒流值的电阻输入端
24	V_{DD}	芯片 5 V 电源端

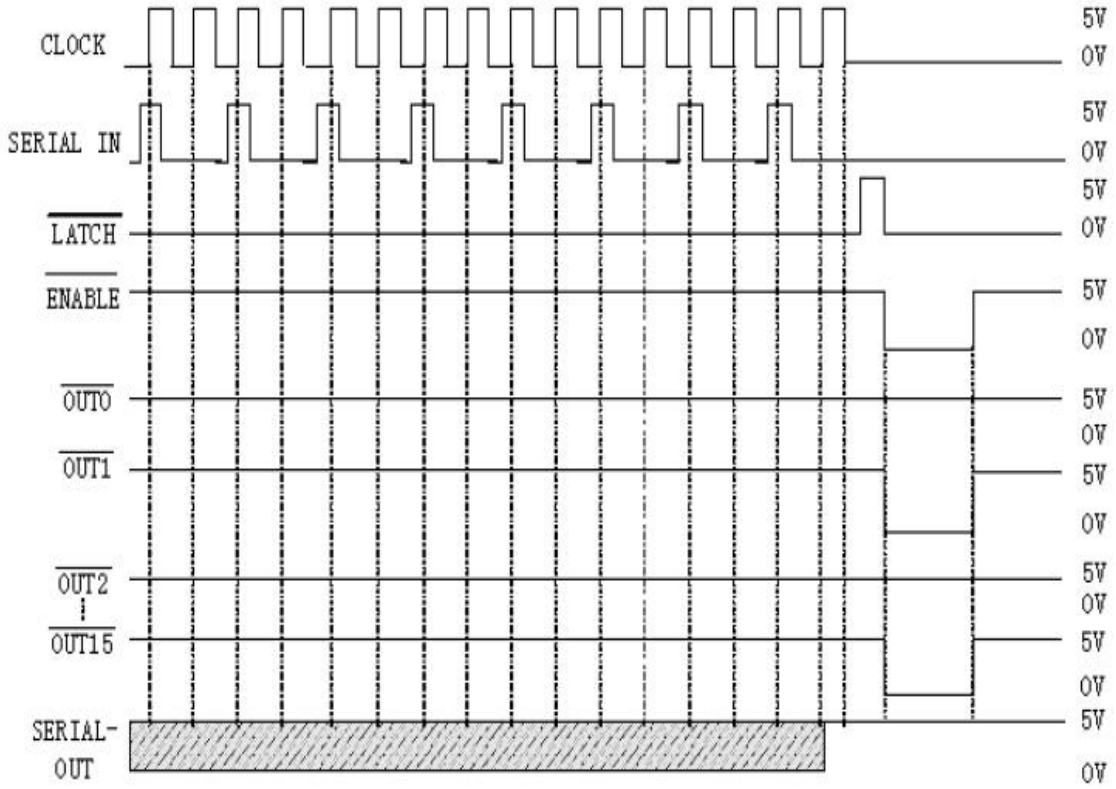
脚位图(顶视图)：


GND 1
SERIAL-IN 2
CLOCK 3
LATCH 4
OUT0 5
OUT1 6
OUT2 7
OUT3 8
OUT4 9
OUT5 10
OUT6 11
OUT7 12
24 VDD
23 R-EXT
22 SERIAL-OUT
21 ENABLE
20 OUT15
19 OUT14
18 OUT13
17 OUT12
16 OUT11
15 OUT10
14 OUT9
13 OUT8

功能框图：


OUT0
OUT1
OUT15
R-EXT
I-REG
VDD
ENABLE
LATCH
GND
SERIAL-IN
CLOCK
SERIAL-OUT
Q
ST D
D Q
CK

时序图：

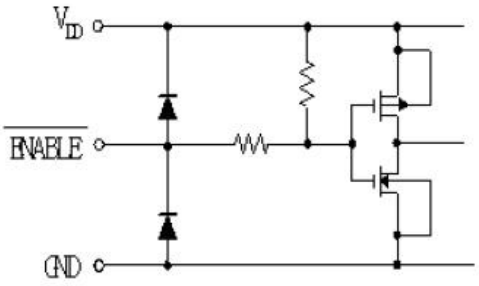


注释：

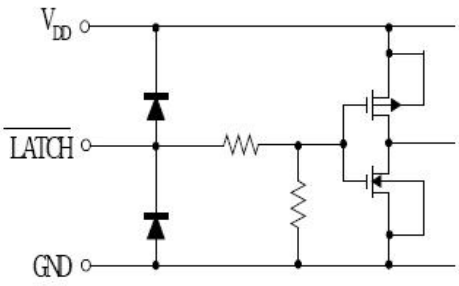
1、LATCH= 高电平，锁存器无效，传递数据
2、LATCH= 低电平，锁存数据
3、ENABLE 高电平时，所有的输出端关闭，呈高阻状态
4、在R-EXT 和GND 之间串一外接电阻可调整所有输出电流
5、数据传输在时钟上升沿有效

输入及输出等效电路：

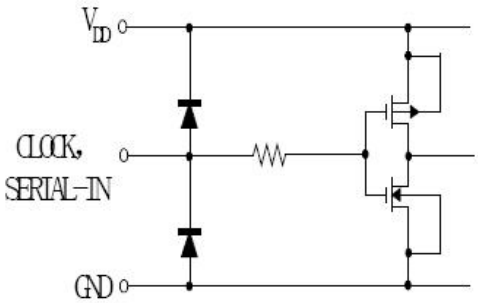
1.ENABLE TERMINAL



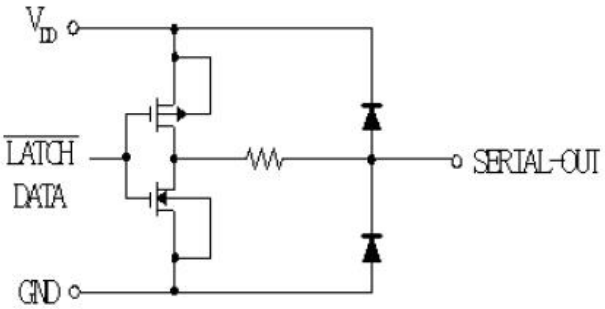
2.LATCH TERMINAL



3.CLOCK, SERIAL-IN TERMINAL

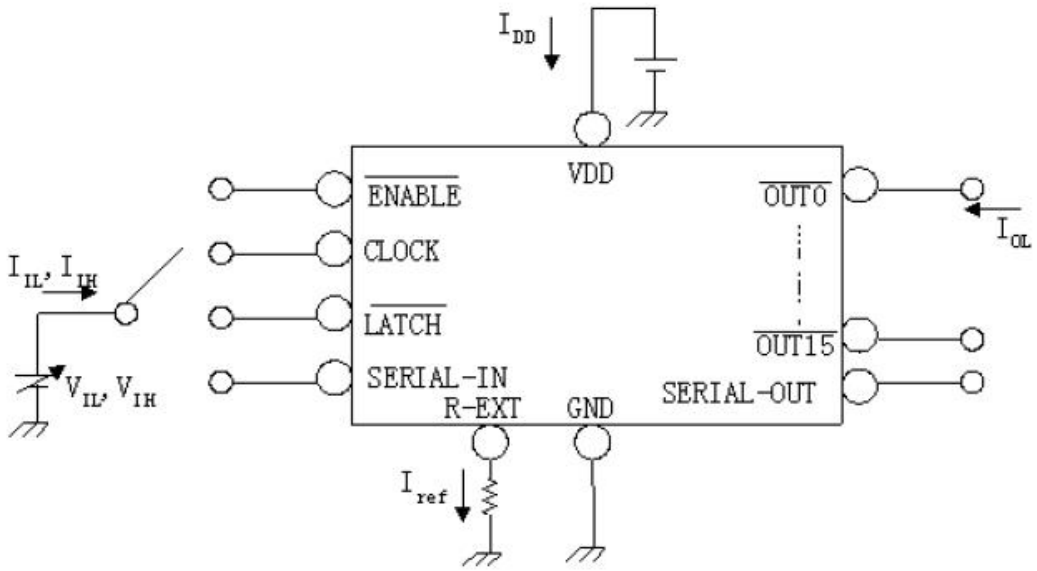


4.SERIAL-OUT TERMINAL

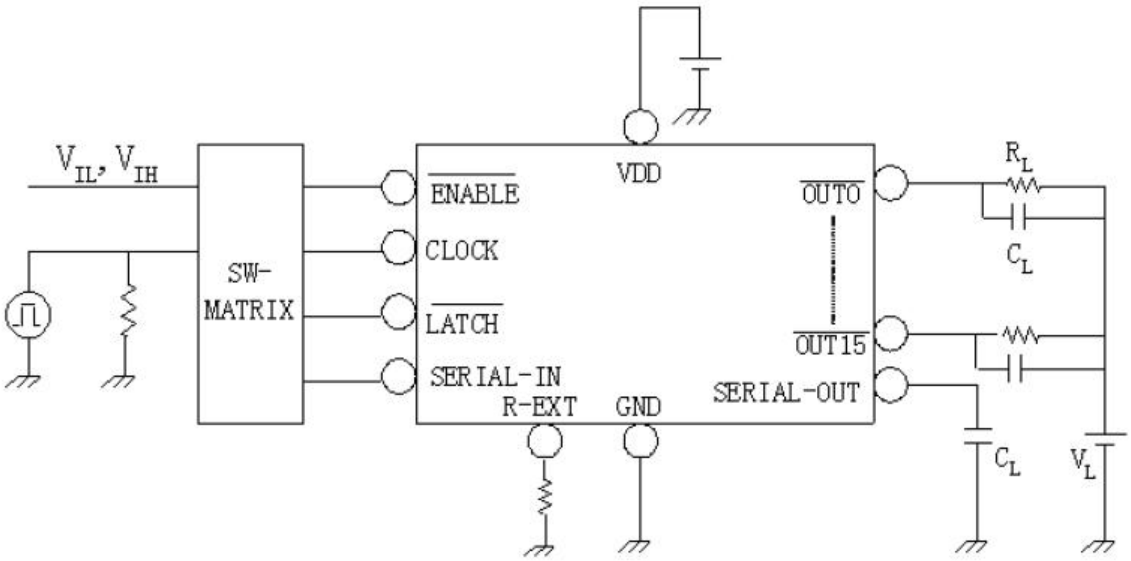


测试电路：

直流特性

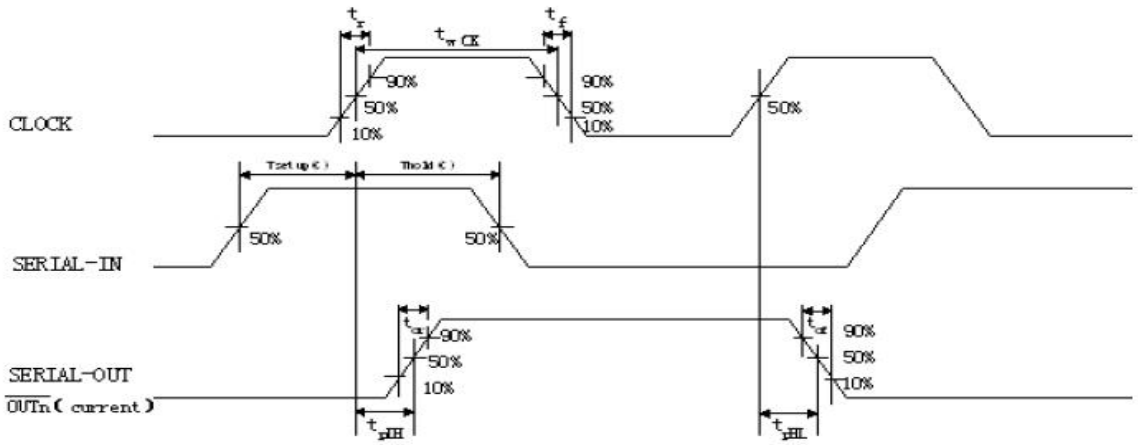


交流特性

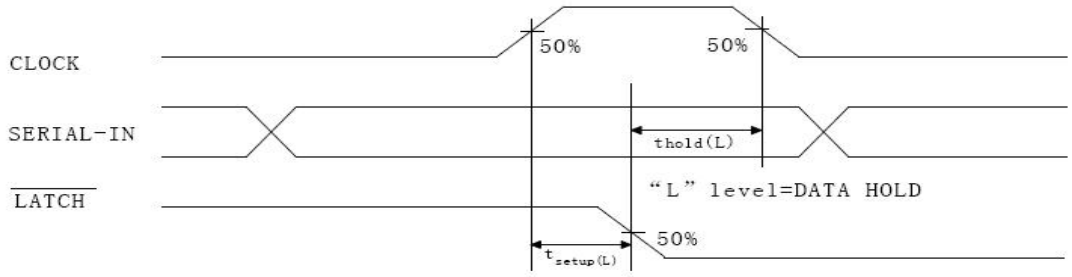


时序波形图：

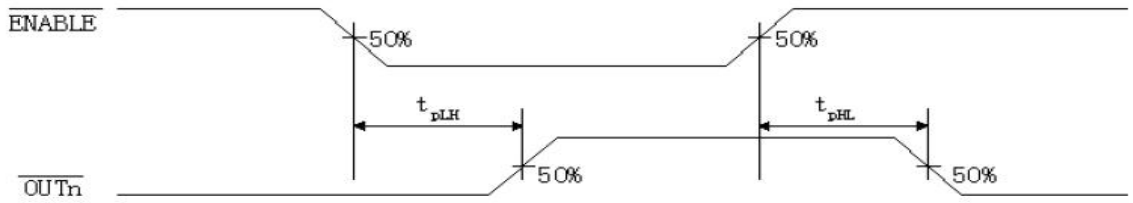
1. CLOCK-SERIAL-IN, SERIAL-OUT, $\overline{OUTn}$



2. CLOCK-$\overline{LATCH}$



3. $\overline{ENABLE}$ -$\overline{OUTn}$



电气特性:

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Input Voltage "H" Level	V_{IH}	Ta=-40~85 °C	0.7VDD	—	VDD	V
Input Voltage "L" Level	V_{IL}	Ta=-40~85 °C	GND	—	0.3VDD	
Output Leakage Current	I_{OH}	V_{OH}=15.0V	—	—	10	uA
Output Voltage (S-OUT)	V_{OL}	I_{OL}=+2.0mA	—	—	0.4	V
	V_{OH}	I_{OH}= -2.0mA	4.6	—	—	
Output Current 1	I_{OL1}	V_{DS}=0.7V R_{EXT}=470Ω(include Current Matching)	34.1	40.0	45.9	mA
	I_{OL2}	V_{DS}=0.4V R_{EXT}=470Ω(include Current Matching)	33.7	39.5	45.3	
Output Current 2	I_{OL3}	V_{DS}=0.7V R_{EXT}=250 Ω (include Current Matching)	64.2	72.5	80.8	mA
	I_{OL4}	V_{DS}=0.4V R_{EXT}=300 Ω (include Current Matching)	50.0	57.0	64.0	
Supply Voltage Regulation	% / VDD	R_{EXT}=470 Ω,Ta=-40~+85 °C	—	±1.5	±5.0	% / V
Pull-Up Resistor	RIN (up)	—	150	300	600	KΩ
Pull-Down Resistor	RIN (down)	—	100	200	400	KΩ
Supply Current "OFF"	$I_{DD(off)1}$	R-EXT=OPEN, $\overline{OUT0\sim15}$=off	—	0.1	0.5	mA
	$I_{DD(off)2}$	R-EXT=470 Ω,$\overline{OUT0\sim15}$=off	—	6.5	10	
	$I_{DD(off)3}$	R-EXT=250 Ω,$\overline{OUT0\sim15}$=off	—	7.0	10	
Supply Current "ON"	$I_{DD(on)1}$	R-EXT=470 Ω,$\overline{OUT0\sim15}$=on	—	7.0	10	
	$I_{DD(on)2}$	R-EXT=250 Ω,$\overline{OUT0\sim15}$=on	—	10	15	

芯片极限值：

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{DD}	0~7.0	V
Input Voltage	V_{IN}	-0.4~VDD+0.4	V
Output Current	I_{OUT}	+90	mA
Output Voltage	V_{OUT}	-0.5~+17.0	V
Clock Frequency	f_{CLK}	25	MHz
GND Terminal Current	I_{GND}	1440	mA
Power Dissipation	P_D	1.78(SDIP-24: ON PCB Ta=25$_o$C)	W
		1.00(SSOP-24: ON PCB Ta=25 $_o$C)	
Thermal Resistance	$R_{th(j-a)}$	70.0(SDIP-24: ON PCB)	$_o$C/W
		120(SSOP-24: ON PCB)	
Storage Temperature	T_{stg}	-55~+150	$_o$C
Operating Temperature	Topr	-40~+85	$_o$C

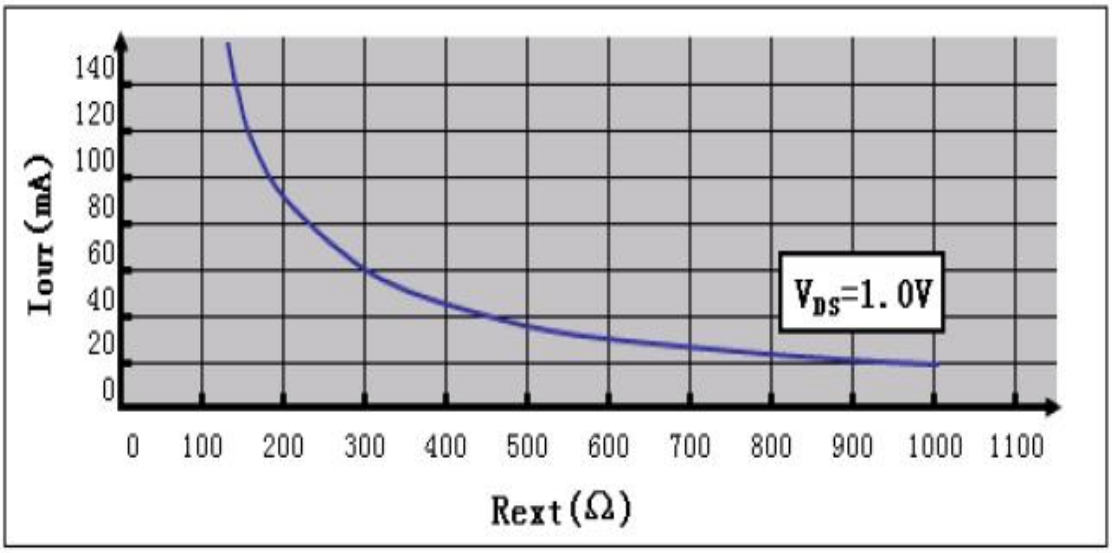
转换特性：

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Propagation Delay Time ("L" to "H")	CLK-$\overline{OUTn}$	t_{pLH}	V_{DD}=5.0V V_{CE}=0.4V V_{IH}=VDD V_{IL}=GND R_{EXT}=470 Ω V_L=3.0V R_L=1K C_L=10.5pF	—	1200	1500	ns
	$\overline{LATCH}$/-$\overline{OUTn}$/			—	1200	1500	
	$\overline{ENABLE}$/-$\overline{OUTn}$/			—	1200	1500	
	CLK - S-OUT			—	30	70	
Propagation Delay Time ("H" to "L")	CLK-$\overline{OUTn}$	t_{pHL}		—	700	1000	ns
	$\overline{LATCH}$/-$\overline{OUTn}$/			—	700	1000	
	$\overline{ENABLE}$/-$\overline{OUTn}$/			—	700	1000	
	CLK - S-OUT			—	30	70	
Output Current Rise Time		t_{or}		150	300	600	ns
Output Current Fall Time		t_{of}		150	300	600	ns

推荐工作条件：

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{DD}	—	4.5	5.0	5.5	V
Output Voltage	V_{OUT}	—	—	—	15.0	V
Output Current	I_{OUT}	OUTn	5	—	88	mA
	I_{OH}	SERIAL-OUT	—	-3.7	—	
	I_{OL}	SERIAL-OUT	—	-4.0	—	
Input Voltage	V_{IH}	—	0.7VDD	—	VDD+0.3	V
	V_{IL}	—	-0.3	—	0.3VDD	
$\overline{\text{LATCH}}$ Pulse Width	$t_{w\,LAT}$	V_{DD}=4.5~5.5V	100	—	—	ns
CLOCK Pulse Width	$t_{w\,CLK}$		50	—	—	ns
Set-up Time for DATA	$t_{setup(D)}$		60	—	—	ns
Hold Time for DATA	$t_{hold(D)}$		20	—	—	ns
Set-up Time for $\overline{\text{LATCH}}$	$t_{setup(L)}$		100	—	—	ns
Clock Frequency	f_{CLK}	Cascade operation	—	15.0	20.0	MHz
Power Dissipation	P_D	Ta=85°C(SDIP-24)	—	—	0.92	W
		Ta=85°C(SSOP-24)	—	—	0.50	

恒流调节曲线（IOUT-R-EXT ）：

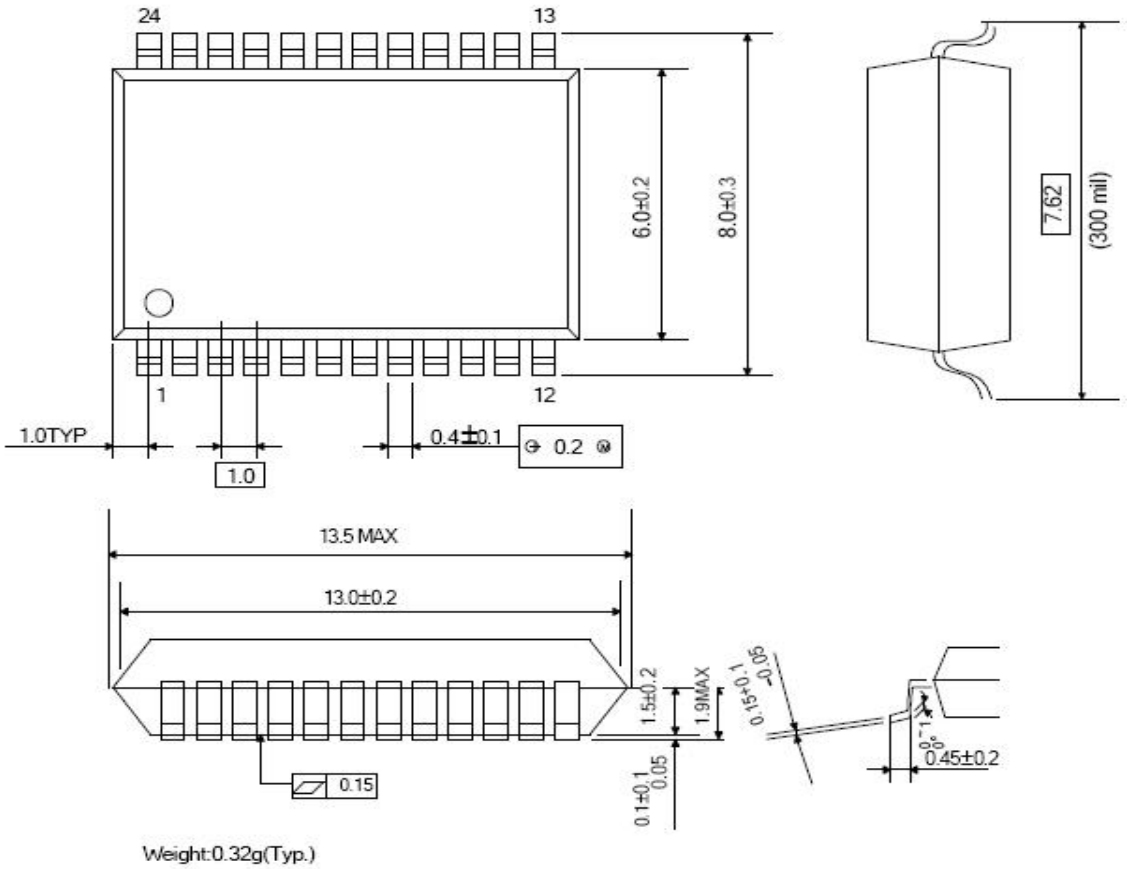


电流计算公式：Iout = (1.23/Rext)×15.3

外观轮廓图：

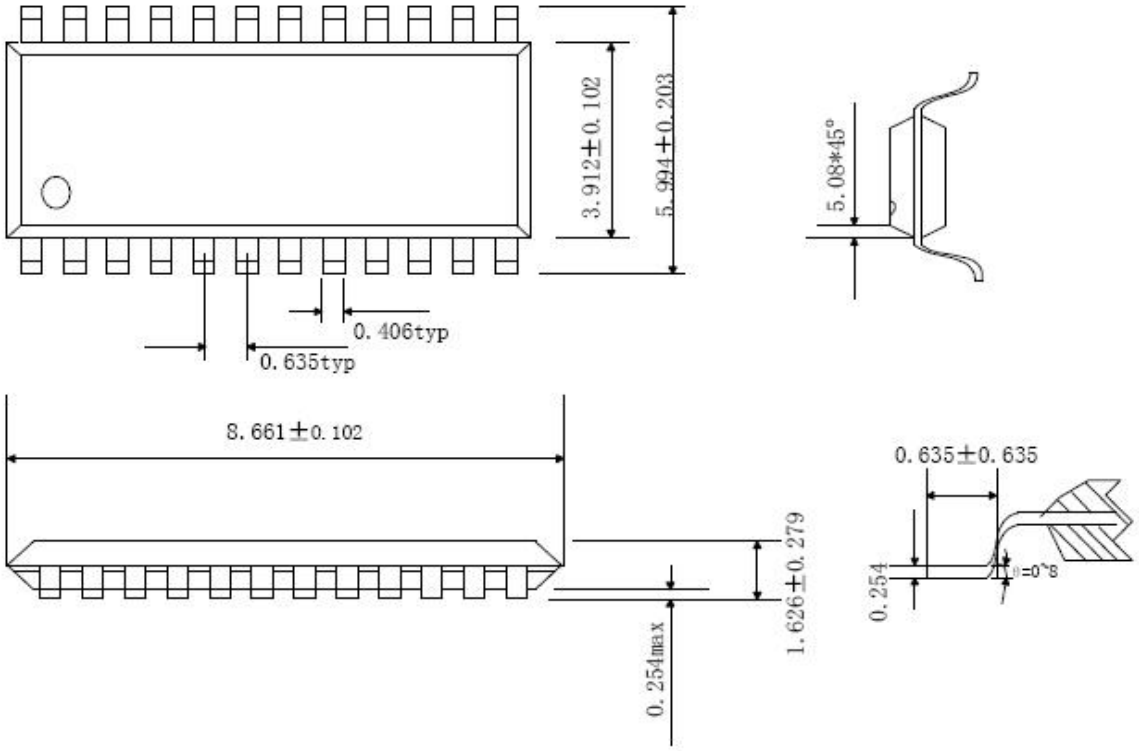
编号	封装形式
MBI5026	**SSOP24（1.0）**
MBI5026	**SSOP24（0.635）**
MBI5026	**SDIP24**

MBI5026 （SSOP24（ 1.0）） **UNIT: mm**



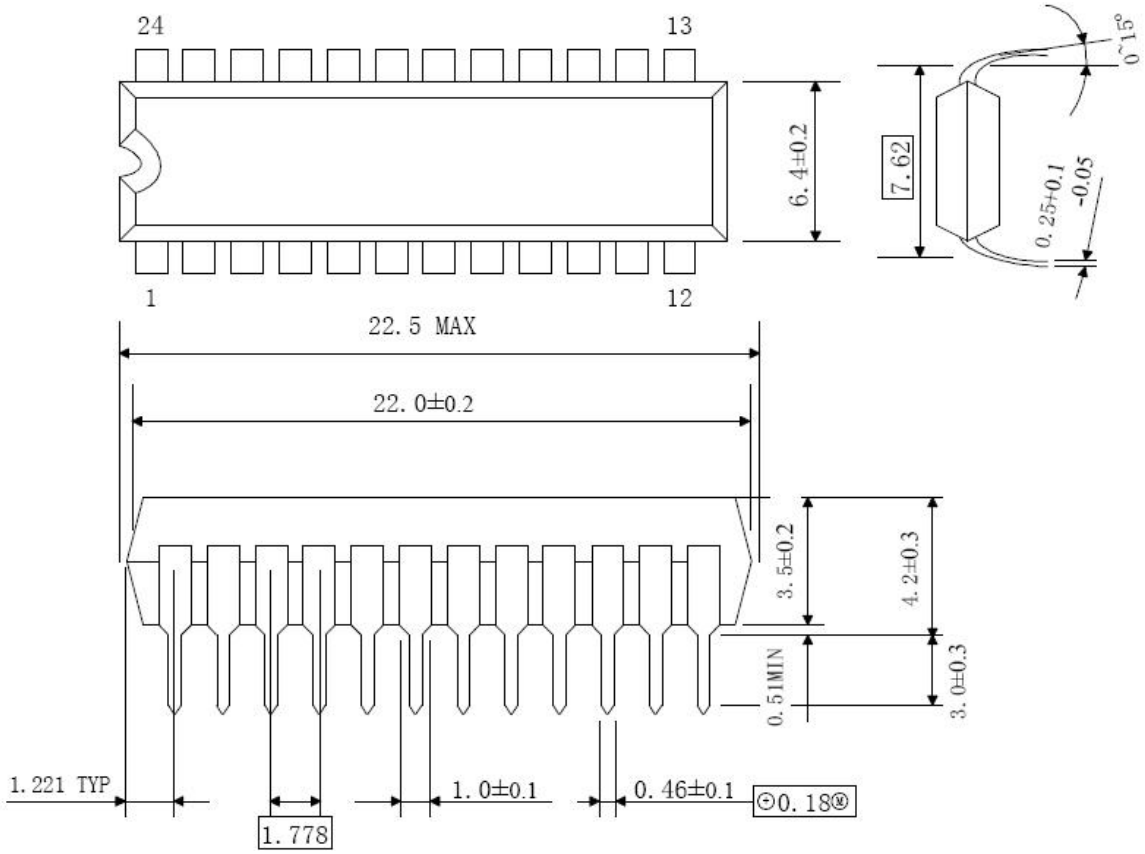
MBI5026 （SSOP24（0.635））

Unit : mm



MBI5026 （SDIP24）

UNIT:mm



Weight:1.22g (Typ.)