XZ1030

30V Low Dropout Linear LED Driver

DESCRIPTION

XZ1030 is a universal purpose linear LED driver.30V operating voltage is well suited for all kinds of applications. Separated VDD can be easily configured for high voltage input.

XZ1030 only need one current setting resistor. No capacitors are required.With a strong internal power transistor and 200mV low CS voltage, XZ1030 can drive up to 500mA current with only 500mV total dropout. Careful design and fine trimming keeps current accuracy within ±5%.

PWM dimming can be as high as 1MHz, while still holding good dimming linearity. With a proprietary design, XZ1030 is also compatible with simple two wire switched dimming up to 1MHz frequency.

OTP function prevents XZ1030 from extreme conditions. XZ1030 is in ESOP8 package.

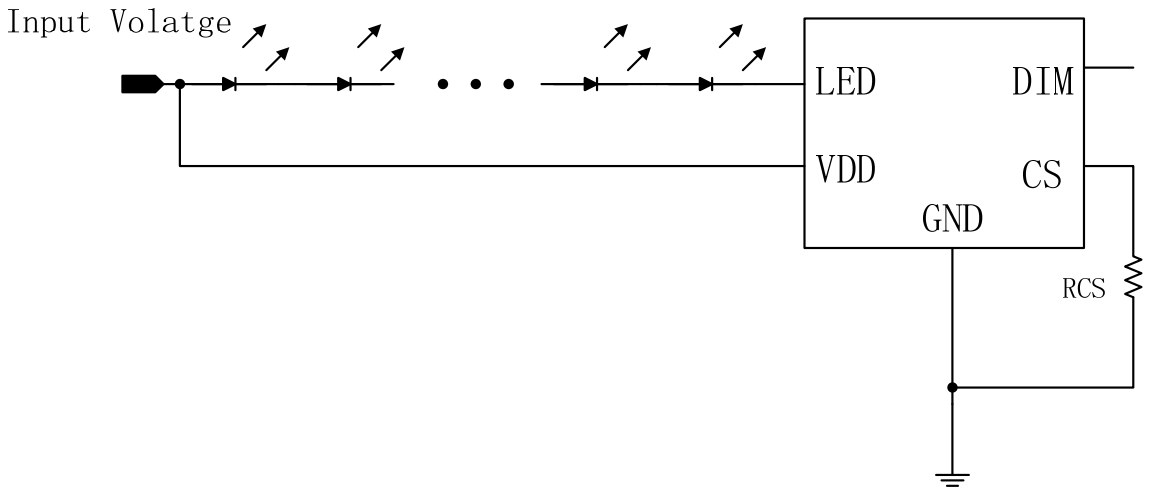
FEATURES

- 36V operating voltage on VDD and LED pin
- 500mA output current
- Small Dropout Voltage on LED pin 500mV@500mA (including 200mV CS voltage)
- Highly Accuracy:±5%
- Easily configurable for multi purposes
- Extreme simple application with only one setting resistor
- High dimming frequency up to 1MHz
- Over temperature protection
- ESOP8 package

APPLICATION

- Isolated Offline LED lamps
- LED lighting
- Automotive LED driver
- Constant Current source and sink
- Current limiting

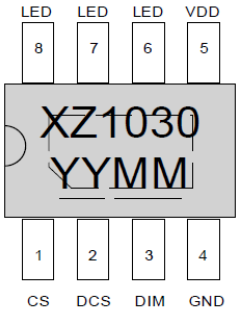
TYPICAL APPLICATION CIRCUIT



ORDERING INFORMATION

PACKAGE	PRODUCTID	
ESOP8	XZ1030-H8TR	2500pcs/Reel

PACKAGE / MARKING / PINOUT



Package: ESOP8
XZ1030: Product ID
YY: Number of Years
WW: Number of Weeks

ABSOLUTE RATING

(note: Exceeding or exposure to these absolute rating limits may damage the device permanently or affect its reliability)

VDD,LED to SGND voltage .....-0.3V to 36V
All other pins .....-0.3V to 7V
LED output current 500mA
Operating temperature range .....-40°C to 85°C
Storage temperature range ..... -55°C to 150°C
ESD Human body mode 2KV
Thermal Resistance θ_{JA} θ_{JC}
ESOP8.....50.....10..... °C/W

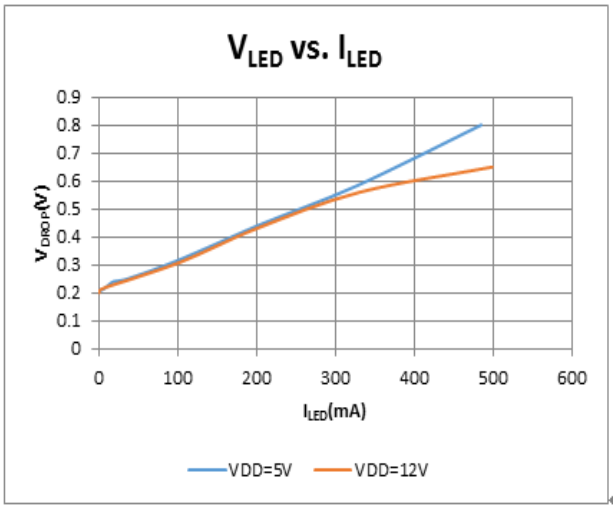
PIN DESCRIPTION

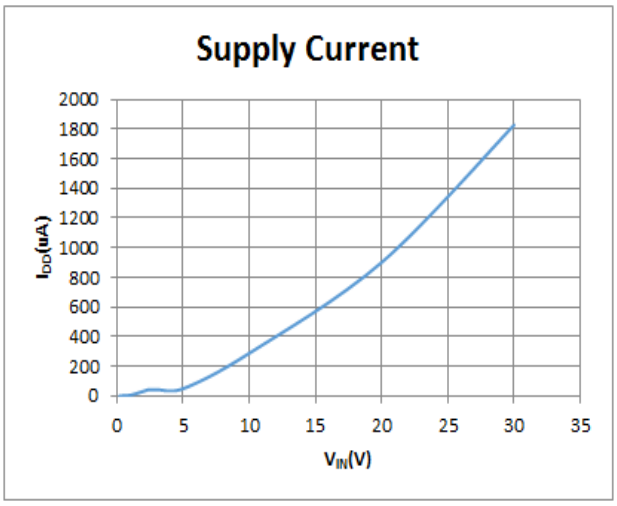
PIN NO.	PIN NAME	DESCRIPITON
1	CS	The feedback Input. Connect an external resistor betweenCS and GND pin to set the LED current.
4	GND	The Ground pin of this device.
3	DIM	The Dimming pin. Not higher than 7V
5	VDD	Supply Voltage pin
2	DCS	DC dimming, Not higher than 7V
6,7,8	LED	The pin to connect LED cathod.

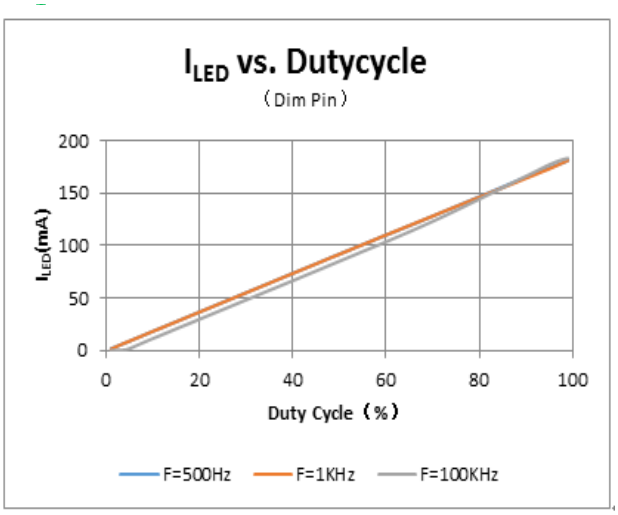
ELECTRICAL CHRACTERISTICS

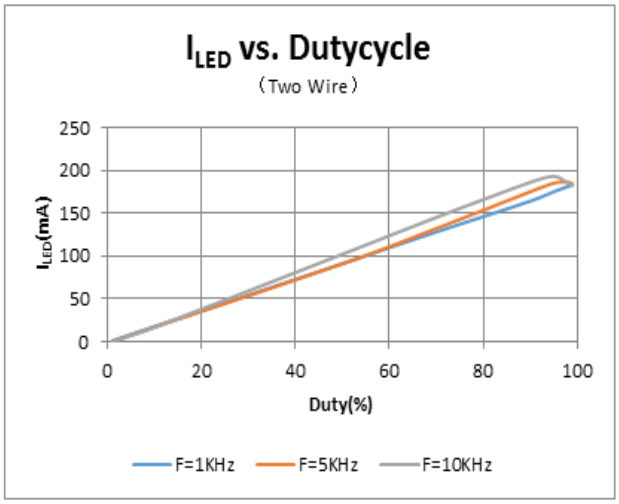
Symbol.	Description	Condition	Min	Typ	Max	Unit
V_{DD}	Supply power		5		36	V
V_{LED}	Dropout Voltage between LED pin to GND pin		0.35		36	V
V_{CS}	Reference Voltage	V_{DD}=9V, V_{SGND}=V_{LED}=0V	190	200	210	mV
I_{LED}	LED Current	V_{DD}=12V			500	mA
I_{DD}	Bias Current	V_{DD}=5V		50		uA

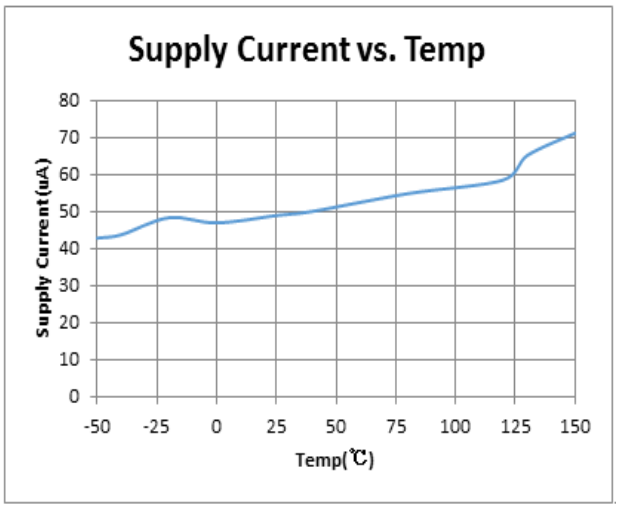
PERFORMANCE and CHARACTERISTICS

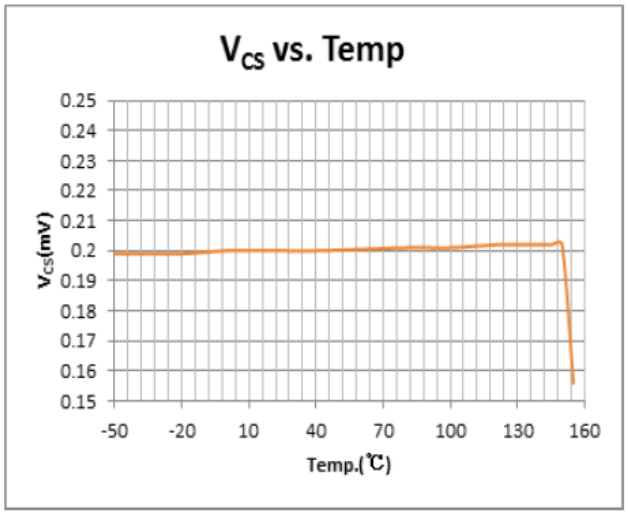












APPLICATION INFOMATION

SETTING LED CURRENT

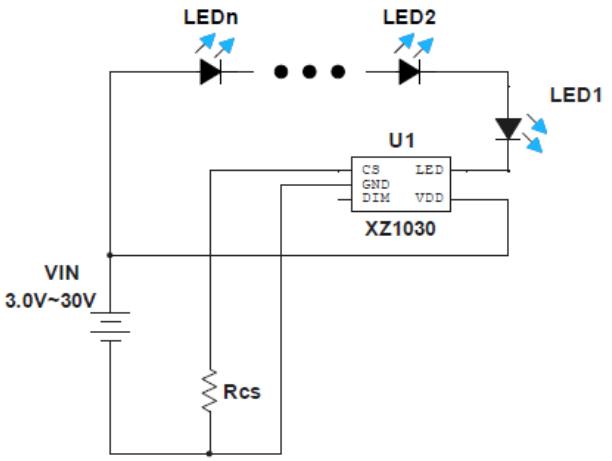
LED current can be calculated from reference voltageandRiset:

$$I_{LED} = \frac{V_{CS}}{R_{CS}} = 0.2V/R_{CS}$$

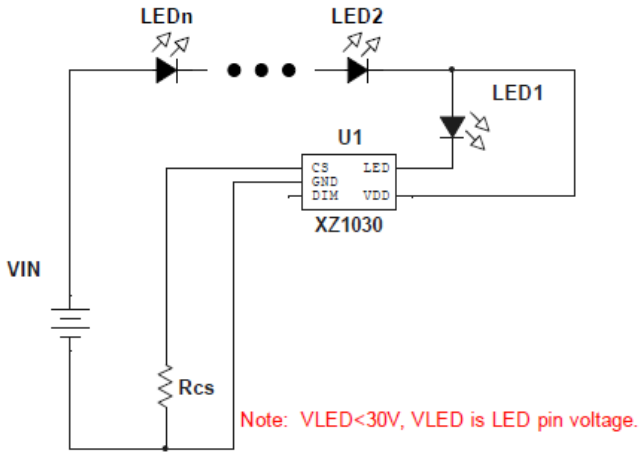
SoRiset is set by：

$$R_{iset} = \frac{V_{ref}}{I_{LED}} = 0.2V/I_{LED}$$

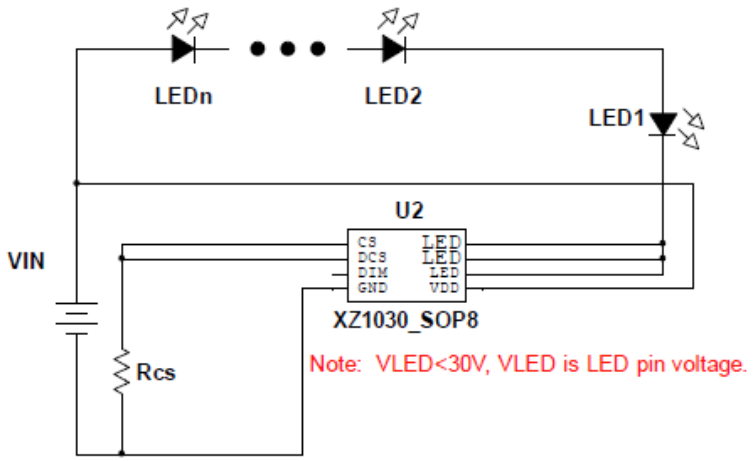
Typical applications



Typical applications 1

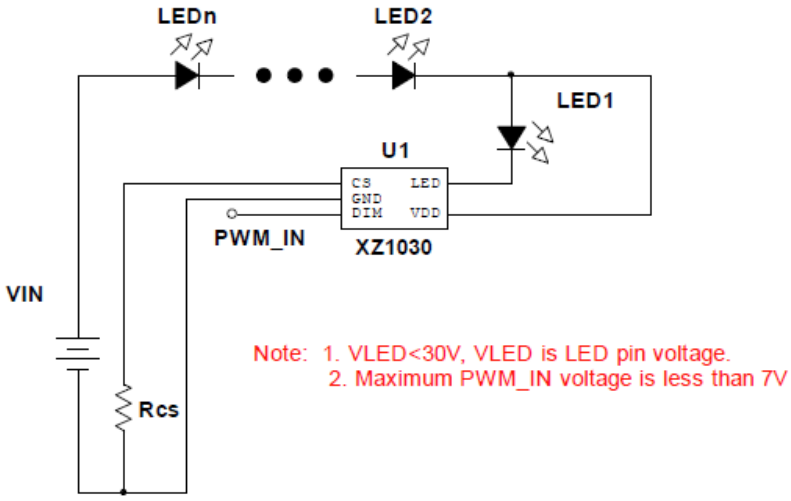


Typical applications 2

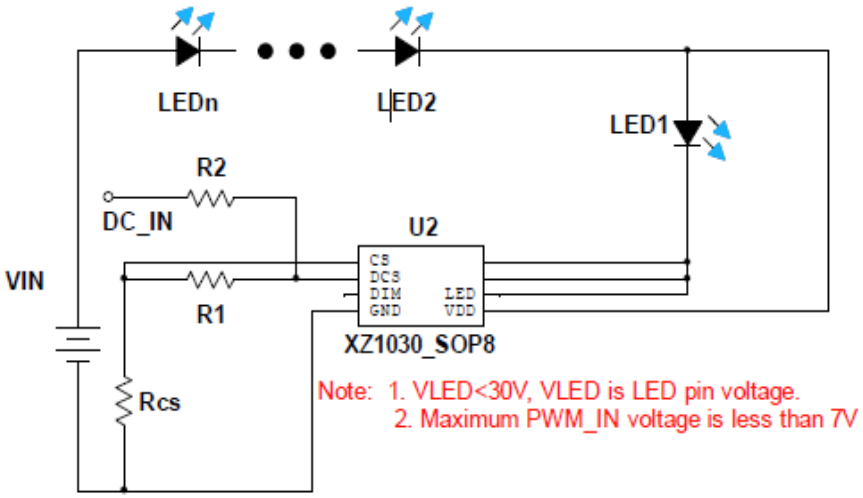


※The DCS and CS connect together directly if it don't need to dimming

Typical applications 3,



Typical applications 4



Typical applications 5,

THERMAL CONSIDERATION

To pursue a small package, the ESOP-8 has limited heat dissipation capability. But the device is linear system and could generate a high power defined by:

$$P_D=(V_{DC}-V_{LED})x\ I_{LED}$$

Given the case of LED-driver application, VDC is 12V and 3 LEDs is series, the power consumed in the IC could be as high as

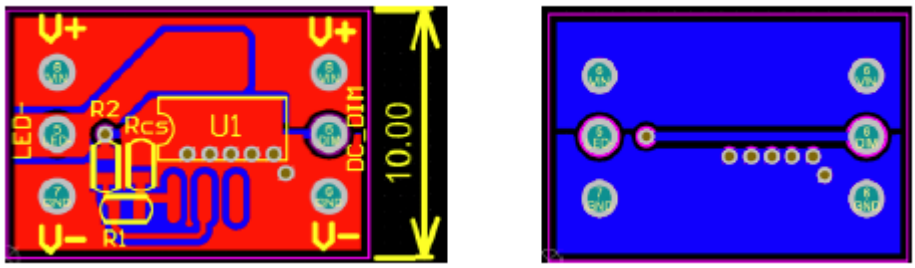
$$P_D=(12V-9V)\ x\ 0.2A = 0.6W$$

The ESOP-8 package can only withstand a power as high as 1.8W. So LED current set is very important to decrease the power and lower the temperature of the IC.

THERMAL BALANCE, NEGATIVE TEMERATURE CHARACTERISTICS

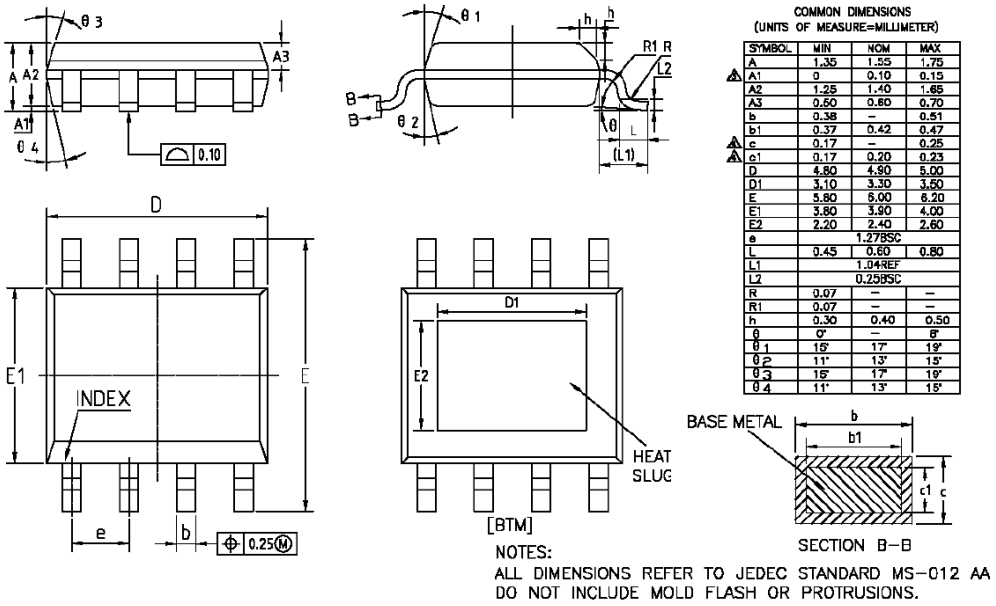
To avoid the lifetime decrease under high temperature, XZ1030 employ a thermal balance control module. When the IC's temperature is higher than 130^{o}C, the XZ1030 will regulate the drive current to be lower and lower until the chip reach the thermal balance. And thus, XZ1030 is well protected from extremely high temperature which could cause reliability issue.

PCB LAYOUT



PACKAGE

ESOP8



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0	0.10	0.15
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	–	0.51
b1	0.37	0.42	0.47
c	0.17	–	0.25
c1	0.17	0.20	0.23
D	4.80	4.90	5.00
D1	3.10	3.30	3.50
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
E2	2.20	2.40	2.60
e	1.27BSC		
L	0.45	0.60	0.80
L1	1.04REF		
L2	0.25BSC		
R	0.07	–	–
R1	0.07	–	–
h	0.30	0.40	0.50
θ	0°	–	8°
θ1	15°	17°	19°
θ2	11°	13°	15°
θ3	15°	17°	19°
θ4	11°	13°	15°

NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD MS-012 AA
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.