

ZD1680DM-n 10W to 150W Driver Module Manual

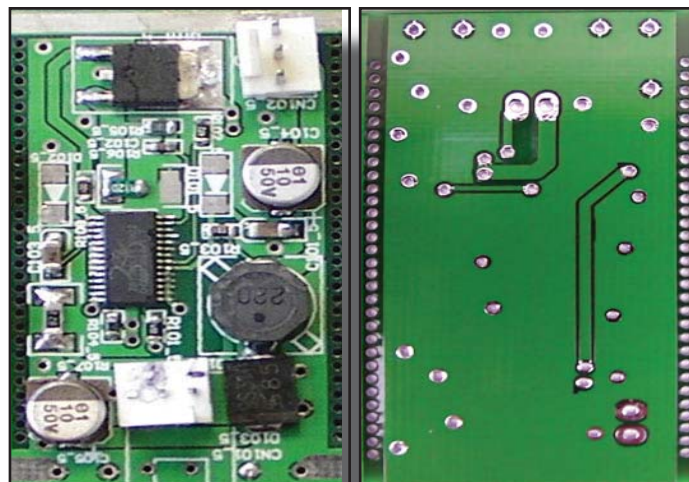
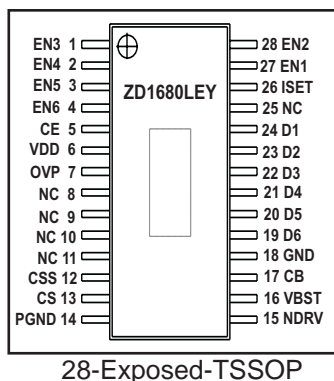
General Description

ZD1680DM-n

The ZD1680 is a high efficiency step-up controller especially designed for driving multiple strings of serially connected LEDs. 6 channels of low dropout current sinks are included to provide excellent matching of currents for each LED string. The boost converter control loop regulates the current source outputs to 0.3V for maximum efficiency. All 6 channel LED current outputs are set by a resistor RSET to ground at the ISET pin. A CHIP ENABLE (CE) input provides an enable or shutdown function to the IC and the ISET pin can be used to adjust the LED string current (dimming control) with a PWM signal or an analog DC voltage. In this ZD1680DM board, all 6 LED channels are tied together and controlled by a single EN pin (with EN1~EN6 tied together to allow the max driving current of 360mA). Also included is an Under Voltage Lockout (UVLO) circuit to discontinue operation when input VDD falls below 2.7V and automatic soft start to limit inrush currents during power start-up or following a re-CHIP ENABLE function. Output Over-Voltage Protection (OVP) is available by user-defined resistor network setting to protect the LEDs, the IC, and the port module.

The ZD1680DM-n is a 29mm x (26mm x n) port module where n=1 to 10 ports. It is available as a single port (n=1) or up to a 10 port (n=10) driver module. The ZD1680DM-n is configured using n ports (n=1 to 10) of ZD1680 to operate with a single power supply with an input range of 12V to 24VDC at the VBATT, providing a voltage source to the VDD and VBST of the device, with RVDD and RVBST connected in series respectively. Each port can drive up to 15 x 1W LEDs in series with all 6 channels tied together. (Details of a single port are shown in Figure 1 and details of 10 port are in Figure 2).

Pin Configuration



Ordering Information

Part Number	Temperature Range	Board Dimensions
ZD1680DM-n	n/a	29mm x (26mm x n)

The number of port modules (n = 1 to 10) is specified by customer's request.

Typical Application

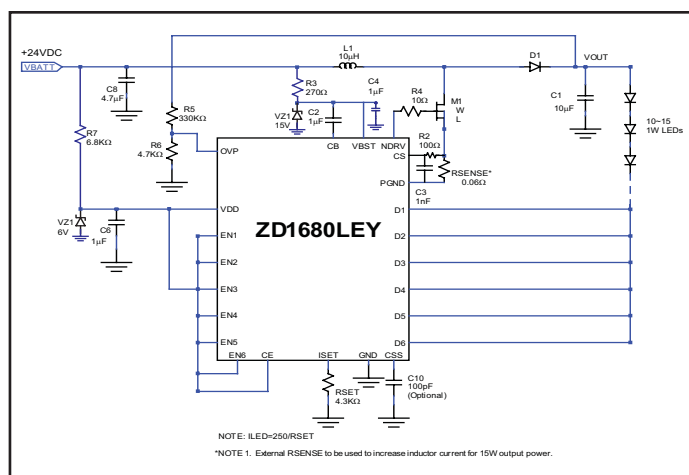


Figure 1. Single port of ZD1680DM-1 driving 10~15 x 1W LEDs.

Single power supply driving 10 ~ 150 X 1W LEDs

The ZD1680DM-n is designed to drive 1 string of 10~15 1W LEDs on each port, with a maximum of 10 ports. The ZD1680DM-n is driven by a single 12V to 24V power supply applied to the VBATT with the D1~D6 tied together to provide and output current of 360mA from each port. The values for the V_{OVP} resistors (see datasheet for details), will have $N = 10$ and $V_{Dmax} = 3.5V$ which will give $R5 = 330k\Omega$ and $R6 = 4.7k\Omega$ as the closest common resistors available for a $V_{OVP} = 35.6V$. The output current is calculated using the formula $I_{LED} = 250/RSET$.

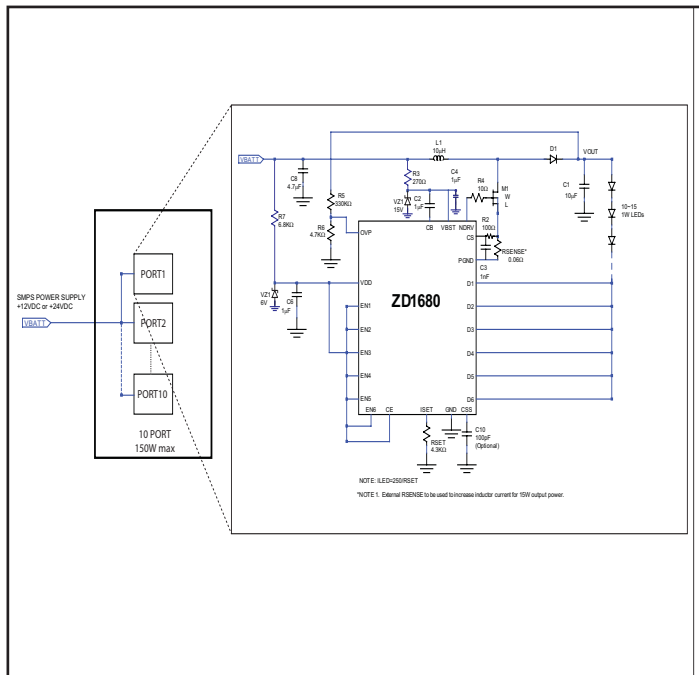


Figure 2. Block Diagram of 10 ports of ZD1680DM-n driving 10~15 x 1W LEDs each port (150W max).

Bill of Materials Listing for driving a single port of ZD1680DM-1 with 10 ~ 15 1W LEDs application. (Up to 10 ports for ZD1680DM-10.)

Item	Quantity	Location	Part	Outline
1	1	ZD1680	Zywyn ZD1680LEY	28-EX-TSSOP
2	1	R101	348kΩ	0603
3	1	R102	4.7kΩ	0603
4	1	R103	18kΩ	0603
5	1	R104	4.3kΩ	0603
6	1	R105	100Ω	0603
7	1	R106	0.12Ω/0.5W	1812
8	1	R107	360Ω/ 0.5W	1812
9	1	R108	10Ω	0603
10	1	C101	1μF/16V	3216
11	1	C102	1nF, MLCC, ±5%/16V	0603
12	1	C103	1μF/16V	3216
13	1	C104	47μF/50V	6 x 7
14	1	C105	22μF/50V	6 x 7
15	1	L101	22μH/2A	SMD 7.8mm
16	1	D101	6V Zener	SMA
17	1	D102	15V Zener	SMA
18	1	D103	RB160M60 Schottky	PMDU or SMA
19	1	Q101	2SK2782	SOT252
20	1	CN101	2 PIN terminal	2.5mm
21	1	CN102	2 PIN terminal	2.5mm
22	1	PCB	260 x 50 FR4, 1.2mm	29mm x 26mm x [1]
23	10~15	LED	CREE XLAMP® 7090 XR-E	

