



## DC-DC Constant Current Step-Down LED driver

## LDD-L series



### ■ Features :

- DC/DC step-down converter
- Constant current output: 300mA to 700mA
- Wide input voltage: 9 ~ 36VDC
- Wide output LED string voltage: 2 ~ 32VDC
- High efficiency up to 95%
- Built-in EMI filter, comply with EN55015 and FCC part15 without additional input filter and capacitors
- Built-in PWM dimming and remote ON/OFF control
- Protections: Short circuit / Over temperature
- Cooling by free air convection
- Fully encapsulated with IP67 level for pin and wire style
- Non-potted, optional conformal coating for SMD style (Order No.: LDD-~~350~~LSC)
- Compact size
- Low cost, high reliability
- Suitable for driving illumination LED
- 3 years warranty



LDD-350L ☒ Blank : pin style  
W : wire style  
S : SMD style

### SPECIFICATION

| ORDER NO.                                      |                                                                                                                                                                                                                                                                                                               | LDD-300L <input type="checkbox"/>                          | LDD-350L <input type="checkbox"/>                                                                                                          | LDD-500L <input type="checkbox"/> | LDD-600L <input type="checkbox"/> | LDD-700L <input type="checkbox"/> |       |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-------|
| OUTPUT                                         | CURRENT RANGE                                                                                                                                                                                                                                                                                                 | 300mA                                                      | 350mA                                                                                                                                      | 500mA                             | 600mA                             | 700mA                             |       |
|                                                | VOLTAGE RANGE <span>Note.4</span>                                                                                                                                                                                                                                                                             | 2 ~ 32VDC for LDD-300~700L/LW ; 2~ 28VDC for LDD-300~700LS |                                                                                                                                            |                                   |                                   |                                   |       |
|                                                | CURRENT ACCURACY (Typ.)                                                                                                                                                                                                                                                                                       | ±5% at 24VDC input                                         |                                                                                                                                            |                                   |                                   |                                   |       |
|                                                | RIPPLE & NOISE(max.) <span>Note.2</span>                                                                                                                                                                                                                                                                      | 150mVp-p                                                   | 150mVp-p                                                                                                                                   | 150mVp-p                          | 200mVp-p                          | 200mVp-p                          |       |
|                                                | SWITCHING FREQUENCY                                                                                                                                                                                                                                                                                           | 40KHz ~ 1000KHz                                            |                                                                                                                                            |                                   |                                   |                                   |       |
| EXTERNAL CAPACITANCE LOAD (max.)               |                                                                                                                                                                                                                                                                                                               | 2.2uF                                                      |                                                                                                                                            |                                   |                                   |                                   |       |
| INPUT                                          | VOLTAGE RANGE                                                                                                                                                                                                                                                                                                 |                                                            | 9 ~ 36VDC for LDD-300~700L/LW ; 9~ 32VDC for LDD-300~700LS                                                                                 |                                   |                                   |                                   |       |
|                                                | EFFICIENCY (max.)                                                                                                                                                                                                                                                                                             |                                                            | 95% at full load and 24VDC/36VDC input for LDD-300~700L/LW ; 95% at full load and 24VDC input for LDD-300~700LS                            |                                   |                                   |                                   |       |
|                                                | DC CURRENT                                                                                                                                                                                                                                                                                                    | Full load <span>Note.3</span>                              | 300mA                                                                                                                                      | 350mA                             | 500mA                             | 600mA                             | 700mA |
|                                                |                                                                                                                                                                                                                                                                                                               | No load                                                    | 5mA                                                                                                                                        |                                   |                                   |                                   |       |
| FILTER                                         |                                                                                                                                                                                                                                                                                                               | Capacitor                                                  |                                                                                                                                            |                                   |                                   |                                   |       |
| PWM DIMMING & ON/OFF CONTROL                   | REMOTE ON/OFF                                                                                                                                                                                                                                                                                                 |                                                            | Leave open if not use                                                                                                                      |                                   |                                   |                                   |       |
|                                                |                                                                                                                                                                                                                                                                                                               |                                                            | Power ON with dimming: DIM ~ -Vin >3.5 ~ 8VDC or open circuit                                                                              |                                   |                                   |                                   |       |
|                                                |                                                                                                                                                                                                                                                                                                               |                                                            | Power OFF : DIM ~ -Vin < 0.5VDC or short                                                                                                   |                                   |                                   |                                   |       |
|                                                | PWM FREQUENCY                                                                                                                                                                                                                                                                                                 |                                                            | 100 ~ 1KHz                                                                                                                                 |                                   |                                   |                                   |       |
| QUIESCENT INPUT CURRENT IN SHUTDOWN MODE(max.) |                                                                                                                                                                                                                                                                                                               | 1mA at PWM dimming OFF and 24VDC input                     |                                                                                                                                            |                                   |                                   |                                   |       |
| PROTECTION                                     | SHORT CIRCUIT                                                                                                                                                                                                                                                                                                 |                                                            | Regulated at rated output current                                                                                                          |                                   |                                   |                                   |       |
|                                                |                                                                                                                                                                                                                                                                                                               |                                                            | Protection type: Can be continued, recovers automatically after fault condition is removed                                                 |                                   |                                   |                                   |       |
|                                                | OVER TEMPERATURE                                                                                                                                                                                                                                                                                              |                                                            | Tj 150℃ typically(IC1) detect on main control IC                                                                                           |                                   |                                   |                                   |       |
|                                                |                                                                                                                                                                                                                                                                                                               |                                                            | Protection type : Shut down, recovers automatically after temperature goes down                                                            |                                   |                                   |                                   |       |
| ENVIRONMENT                                    | WORKING TEMP.                                                                                                                                                                                                                                                                                                 |                                                            | -40 ~ + 85℃ (Refer to derating curve)                                                                                                      |                                   |                                   |                                   |       |
|                                                | WORKING HUMIDITY                                                                                                                                                                                                                                                                                              |                                                            | 20% ~ 90% RH non-condensing for LDD-300~700L/LW ; 20% ~ 85% RH non-condensing for LDD-300~700LS                                            |                                   |                                   |                                   |       |
|                                                | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                       |                                                            | -55 ~ +125℃, 10 ~ 95% RH                                                                                                                   |                                   |                                   |                                   |       |
|                                                | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                             |                                                            | ±0.03% / ℃                                                                                                                                 |                                   |                                   |                                   |       |
|                                                | VIBRATION                                                                                                                                                                                                                                                                                                     |                                                            | 10 ~ 500Hz, 2G 10min./1 cycle, period for 60min. each along X, Y, Z axes                                                                   |                                   |                                   |                                   |       |
|                                                | OPERATING CASE TEMP. (max.)                                                                                                                                                                                                                                                                                   |                                                            | 100℃                                                                                                                                       |                                   |                                   |                                   |       |
| EMC                                            | EMC EMISSION                                                                                                                                                                                                                                                                                                  |                                                            | Compliance to EN55015, FCC part 15 class B                                                                                                 |                                   |                                   |                                   |       |
|                                                | EMC IMMUNITY                                                                                                                                                                                                                                                                                                  |                                                            | Compliance to EN61000-4-2,3,4,6,8, light industry level, criteria A                                                                        |                                   |                                   |                                   |       |
| OTHERS                                         | MTBF                                                                                                                                                                                                                                                                                                          |                                                            | 2000Khrs min. MIL-HDBK-217F (25℃)                                                                                                          |                                   |                                   |                                   |       |
|                                                | DIMENSION                                                                                                                                                                                                                                                                                                     |                                                            | 22.6*9.9*8.9mm or 0.89**0.39**0.35" inch (L*W*H) for LDD-300~700L/LW ; 25.4*10.5*9.3mm or 1**0.4135**0.366" inch (L*W*H) for LDD-300~700LS |                                   |                                   |                                   |       |
|                                                | WEIGHT                                                                                                                                                                                                                                                                                                        |                                                            | LDD-300~700L:4g ; LDD-300~700LW:7.3g ; LDD-300~700LS :3.4g                                                                                 |                                   |                                   |                                   |       |
|                                                | POTTING MATERIAL                                                                                                                                                                                                                                                                                              |                                                            | Epoxy(UL94-V0) for LDD-300~700L/LW ; without potted for LDD-300~700LS                                                                      |                                   |                                   |                                   |       |
| NOTE                                           | 1.All parameters are specified at normal input(24VDC), rated load, 25℃ 70% RH ambient.<br>2.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1uf capacitor.<br>3.Test condition: 24VDC input.<br>4.Output voltage will always step down by 3 volts from input DC voltage. |                                                            |                                                                                                                                            |                                   |                                   |                                   |       |



#### ■ Features :

- DC/DC step-down converter
- Constant current output: 1000mA to 1500mA
- Wide input voltage: 6 ~ 36VDC
- Wide output LED string voltage: 2 ~ 30VDC
- High efficiency up to 95%
- Built-in EMI filter, comply with EN55015 and FCC part15 without additional input filter and capacitors
- Built-in PWM +analog dimming and remote ON/OFF control
- Protections: Short circuit
- Cooling by free air convection
- Fully encapsulated with IP67 level for pin and wire style
- Non-potted, optional conformal coating for SMD style (Order No.: LDD-1000LSC)
- Compact size
- Low cost, high reliability
- Suitable for driving illumination LED
- 3 years warranty



LDD-1000L ☐ Blank : pin style  
W : wire style  
S : SMD style

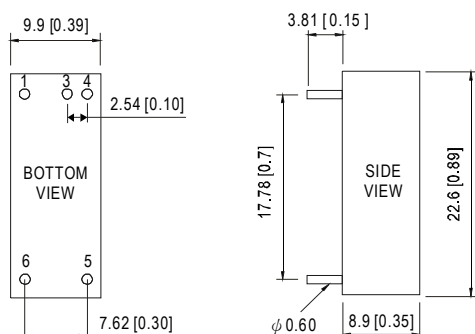
#### SPECIFICATION

| ORDER NO.                                      |                                                                                                                                                                                                                                                                                                                   | LDD-1000L <input type="checkbox"/>                                                                                                              | LDD-1200L <input type="checkbox"/> | LDD-1500L <input type="checkbox"/> |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------|
| OUTPUT                                         | CURRENT RANGE                                                                                                                                                                                                                                                                                                     | 1000mA                                                                                                                                          | 1200mA                             | 1500mA                             |
|                                                | VOLTAGE RANGE <span>Note.4</span>                                                                                                                                                                                                                                                                                 | 2 ~ 30VDC                                                                                                                                       |                                    |                                    |
|                                                | CURRENT ACCURACY (Typ.)                                                                                                                                                                                                                                                                                           | ±5% at 24VDC input                                                                                                                              |                                    |                                    |
|                                                | RIPPLE & NOISE(max.) <span>Note.2</span>                                                                                                                                                                                                                                                                          | 1.5Vp-p                                                                                                                                         | 1.5Vp-p                            | 1.5Vp-p                            |
|                                                | SWITCHING FREQUENCY                                                                                                                                                                                                                                                                                               | 1000KHz                                                                                                                                         |                                    |                                    |
| EXTERNAL CAPACITANCE LOAD (max.)               |                                                                                                                                                                                                                                                                                                                   | 2.2uF                                                                                                                                           |                                    |                                    |
| INPUT                                          | VOLTAGE RANGE                                                                                                                                                                                                                                                                                                     | 6 ~ 36VDC                                                                                                                                       |                                    |                                    |
|                                                | EFFICIENCY (max.)                                                                                                                                                                                                                                                                                                 | 95% at full load and 24VDC/36VDC input for LDD-1000~1500L/LW                                                                                    |                                    |                                    |
|                                                | DC CURRENT                                                                                                                                                                                                                                                                                                        | Full load <span>Note.3</span> 990mA                                                                                                             | 1160mA                             | 1450mA                             |
|                                                | No load                                                                                                                                                                                                                                                                                                           | 5mA                                                                                                                                             |                                    |                                    |
| FILTER                                         |                                                                                                                                                                                                                                                                                                                   | Capacitor                                                                                                                                       |                                    |                                    |
| PWM DIMMING & ON/OFF CONTROL                   | REMOTE ON/OFF                                                                                                                                                                                                                                                                                                     | Leave open if not use                                                                                                                           |                                    |                                    |
|                                                |                                                                                                                                                                                                                                                                                                                   | Power ON with dimming: DIM ~ -Vin >2.6 ~ 5.5VDC or open circuit                                                                                 |                                    |                                    |
|                                                |                                                                                                                                                                                                                                                                                                                   | Power OFF : DIM ~ -Vin < 0.4VDC or short                                                                                                        |                                    |                                    |
|                                                | PWM FREQUENCY                                                                                                                                                                                                                                                                                                     | 100 ~ 500Hz                                                                                                                                     |                                    |                                    |
| QUIESCENT INPUT CURRENT IN SHUTDOWN MODE(max.) |                                                                                                                                                                                                                                                                                                                   | 1mA at PWM dimming OFF and 24VDC input                                                                                                          |                                    |                                    |
| ANALOG DIMMING & ON/OFF CONTROL                | REMOTE ON / OFF                                                                                                                                                                                                                                                                                                   | Leave open if not use                                                                                                                           |                                    |                                    |
|                                                |                                                                                                                                                                                                                                                                                                                   | Power ON with dimming : DIM ~ -Vin>0.5~2.5VDC or open circuit                                                                                   |                                    |                                    |
|                                                |                                                                                                                                                                                                                                                                                                                   | Power OFF : DIM ~ -Vin<0.4VDC or short                                                                                                          |                                    |                                    |
| PROTECTION                                     | SHORT CIRCUIT                                                                                                                                                                                                                                                                                                     | Regulated at rated output current                                                                                                               |                                    |                                    |
|                                                |                                                                                                                                                                                                                                                                                                                   | Protection type: Can be continued, recovers automatically after fault condition is removed                                                      |                                    |                                    |
| ENVIRONMENT                                    | WORKING TEMP.                                                                                                                                                                                                                                                                                                     | -40 ~ + 71℃ (Refer to derating curve)                                                                                                           |                                    |                                    |
|                                                | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                  | 20% ~ 90% RH non-condensing for LDD-1000~1500L/LW ; 20%~85% RH non-condensing for LDD-1000~1500LS                                               |                                    |                                    |
|                                                | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                           | -55 ~ +125℃, 10 ~ 95% RH                                                                                                                        |                                    |                                    |
|                                                | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                 | ±0.03% / ℃                                                                                                                                      |                                    |                                    |
|                                                | VIBRATION                                                                                                                                                                                                                                                                                                         | 10 ~ 500Hz, 2G 10min./1 cycle, period for 60min. each along X, Y, Z axes                                                                        |                                    |                                    |
| OPERATING CASE TEMP. (max.)                    |                                                                                                                                                                                                                                                                                                                   | 100℃                                                                                                                                            |                                    |                                    |
| EMC                                            | EMC EMISSION                                                                                                                                                                                                                                                                                                      | Compliance to EN55015, FCC part 15 class B                                                                                                      |                                    |                                    |
|                                                | EMC IMMUNITY                                                                                                                                                                                                                                                                                                      | Compliance to EN61000-4-2,3,4,6,8, light industry level, criteria A                                                                             |                                    |                                    |
| OTHERS                                         | MTBF                                                                                                                                                                                                                                                                                                              | 2000Khrs min. MIL-HDBK-217F (25℃)                                                                                                               |                                    |                                    |
|                                                | DIMENSION                                                                                                                                                                                                                                                                                                         | 31.8*20.3*12.2mm or 1.25**0.8**0.48" inch (L*W*H) for LDD-1000~1500L/LW ; 31.8*20.3*10.9mm or 1.25**0.8**0.43" inch (L*W*H) for LDD-1000~1500LS |                                    |                                    |
|                                                | WEIGHT                                                                                                                                                                                                                                                                                                            | LDD-1000~1500L: 15.6g ; LDD-1000~1500LW: 18g ; LDD-1000~1500LS: 12.8g                                                                           |                                    |                                    |
|                                                | POTTING MATERIAL                                                                                                                                                                                                                                                                                                  | Expoxy (UL94-V0) for LDD-1000~1500L/LW ; without potted for LDD-1000~1500LS                                                                     |                                    |                                    |
| NOTE                                           | 1. All parameters are specified at normal input(24VDC), rated load, 25℃ 70% RH ambient.<br>2. Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1uf capacitor.<br>3. Test condition: 36VDC input.<br>4. Output voltage will always step down by 3 volts from input DC voltage. |                                                                                                                                                 |                                    |                                    |

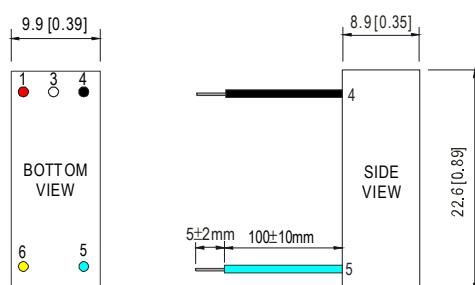
## Mechanical Specification

### Blank type(LDD-300~700L):

Unit: mm (inch)

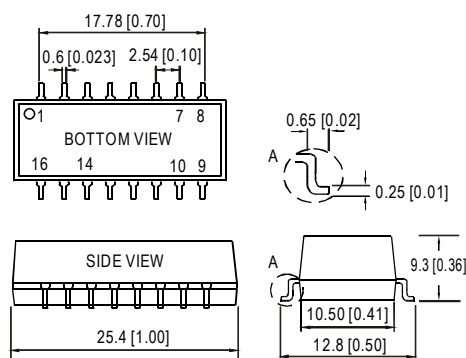

NOTE: Pin tolerance  $\pm 0.05\text{mm}$ 

### W type(LDD-300~700LW):

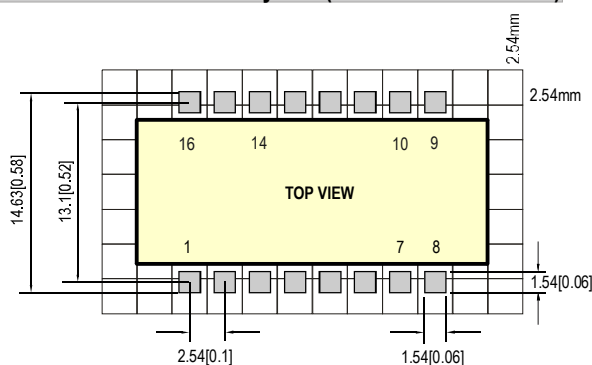


NOTE: All wires UL3385 22AWG

### S type(LDD-300~700LS):



## Recommended PCB layout (for LDD-300~700LS)



## Pin Configuration

| Pin No. | Output  | Comment                                         |
|---------|---------|-------------------------------------------------|
| 1       | +Vin    | DC Supply                                       |
| 3       | PWM DIM | ON/OFF and PWM Dimming (Leave open if not used) |
| 4       | -Vin    | Don't connect to -Vout                          |
| 5       | -Vout   | LED - Connection                                |
| 6       | +Vout   | LED + Connection                                |

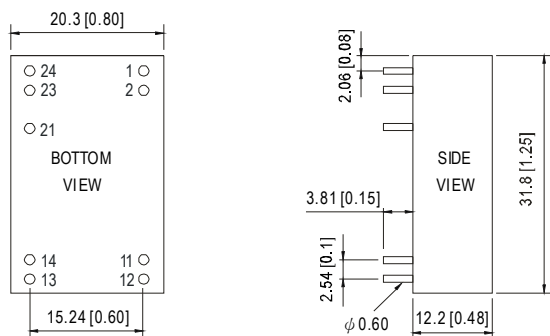
| Pin No. | Output          | Comment                                         |
|---------|-----------------|-------------------------------------------------|
| 1       | +Vin (Red)      | DC Supply                                       |
| 3       | PWM DIM (White) | ON/OFF and PWM Dimming (Leave open if not used) |
| 4       | -Vin (Black)    | Don't connect to -Vout                          |
| 5       | -Vout (Blue)    | LED - Connection                                |
| 6       | +Vout (Yellow)  | LED + Connection                                |

| Pin No. | Output  | Comment                                         |
|---------|---------|-------------------------------------------------|
| 1       | +Vin    | DC Supply                                       |
| 7,8     | +Vout   | LED + Connection                                |
| 9,10    | -Vout   | LED - Connection                                |
| 14      | PWM DIM | ON/OFF and PWM Dimming (Leave open if not used) |
| 16      | -Vin    | Don't connect to -Vout                          |
| others  | N.C     | LED - Connection                                |

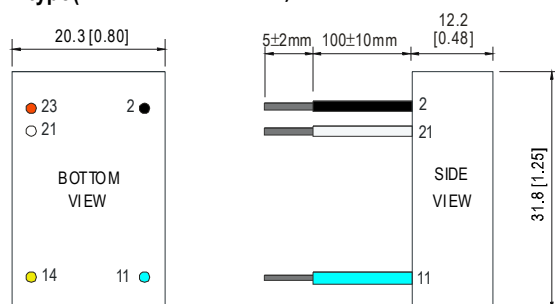
## Mechanical Specification

### Blank type(LDD-1000~1500L):

Unit: mm (inch)

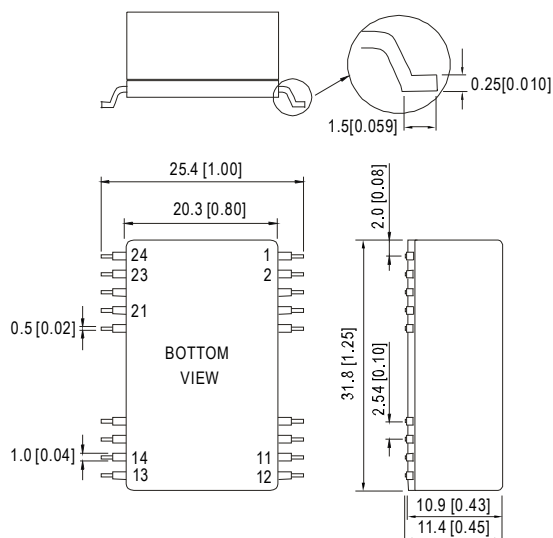

NOTE: Pin tolerance  $\pm 0.05$ mm

### W type(LDD-1000~1500LW):

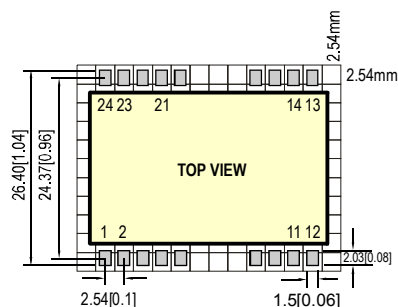


NOTE: All wires UL3385 22AWG

### S type(LDD-1000~1500LS):



## Recommended PCB layout (for LDD-1000~1500LS)



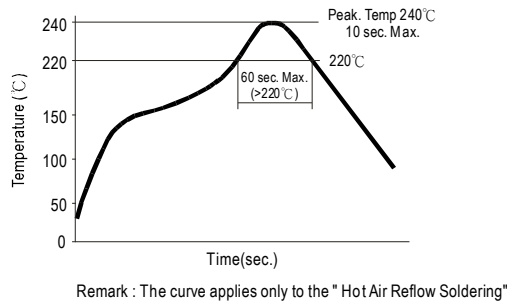
## Pin Configuration

| Pin No. | Output          | Comment                                                  |
|---------|-----------------|----------------------------------------------------------|
| 1,2     | -Vin            | Don't connect to -Vout                                   |
| 11,12   | -Vout           | LED - Connection                                         |
| 13,14   | +Vout           | LED + Connection                                         |
| 21      | PWM +analog DIM | ON/OFF and PWM / analog Dimming (Leave open if not used) |
| 23,24   | +Vin            | DC Supply                                                |

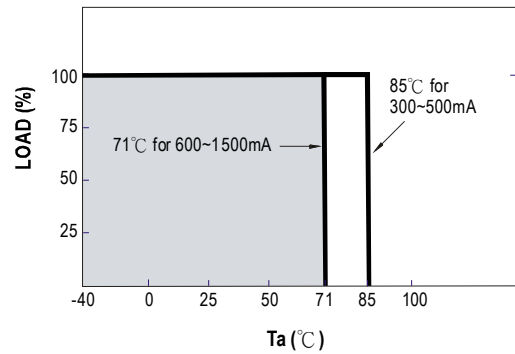
| Pin No. | Output                  | Comment                                                  |
|---------|-------------------------|----------------------------------------------------------|
| 2       | -Vin (Black)            | Don't connect to -Vout                                   |
| 11      | -Vout (Blue)            | LED - Connection                                         |
| 14      | +Vout (Yellow)          | LED + Connection                                         |
| 21      | PWM +analog DIM (White) | ON/OFF and PWM / analog Dimming (Leave open if not used) |
| 23      | +Vin (Red)              | DC Supply                                                |

| Pin No. | Output          | Comment                                                  |
|---------|-----------------|----------------------------------------------------------|
| 1,2     | -Vin            | Don't connect to -Vout                                   |
| 11,12   | -Vout           | LED - Connection                                         |
| 13,14   | +Vout           | LED + Connection                                         |
| 21      | PWM +analog DIM | ON/OFF and PWM / analog Dimming (Leave open if not used) |
| 23,24   | +Vin            | DC Supply                                                |
| others  | N.C             | No connection                                            |

## Reflow Soldering Curve (for LDD-300~1500LS)

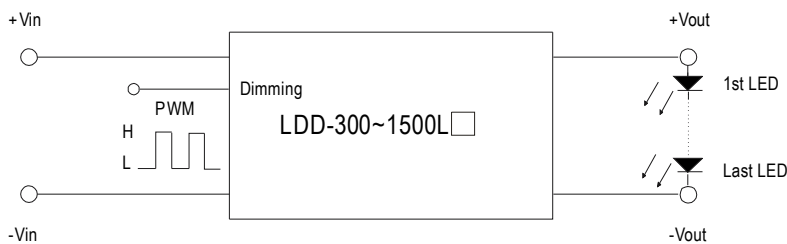


## Derating Curve



## PWM Dimming Control (for 300~1500mA)

To Adjustment by PWM signal :



300 ~ 700mA :

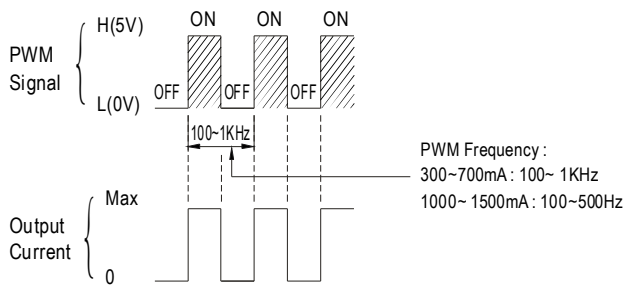
H: > 3.5~8VDC or open circuit

L: < 0.5VDC or short

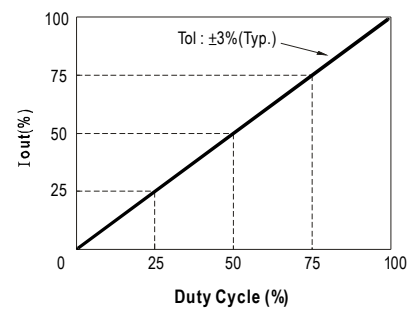
1000 ~ 1500mA :

H: > 2.6~5.5VDC or open circuit

L: < 0.4VDC or short

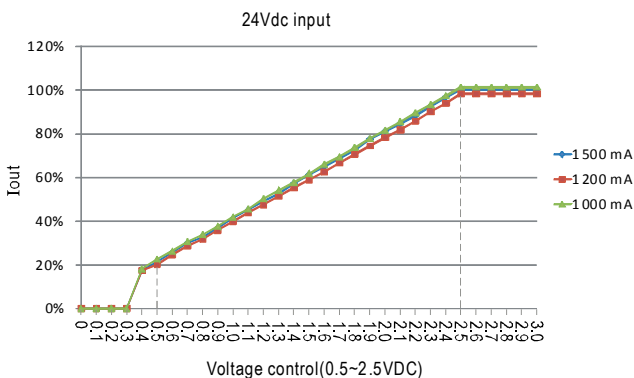
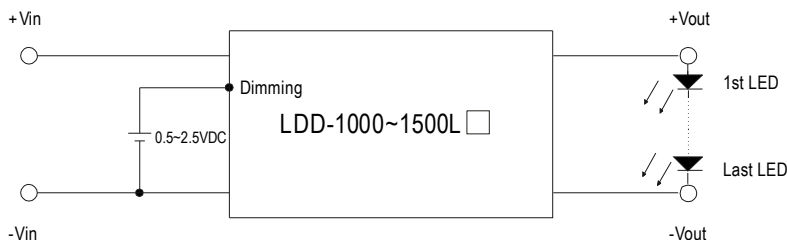


© During PWM dimming operation, the output current will change to PWM style.



## Analog Dimming Control for 1000~ 1500mA only

To Adjustment by DC voltage :



## ■ Efficiency VS Output Voltage(Number of LEDs)

Fig-1 12VDC input, 1~3 LEDs(Vf=3V)

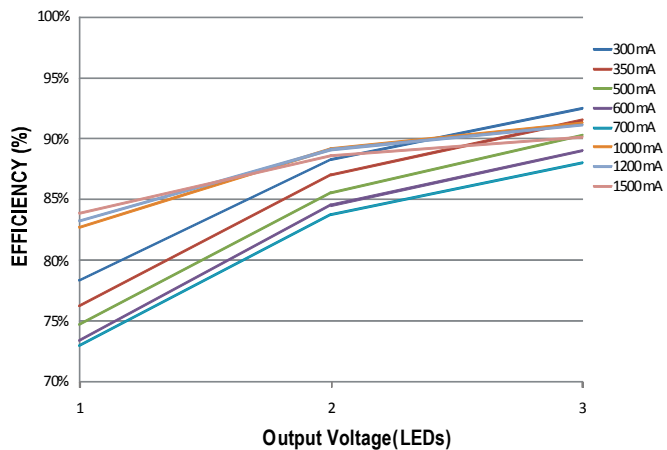


Fig-2 24VDC input, 1~7 LEDs(Vf=3V)

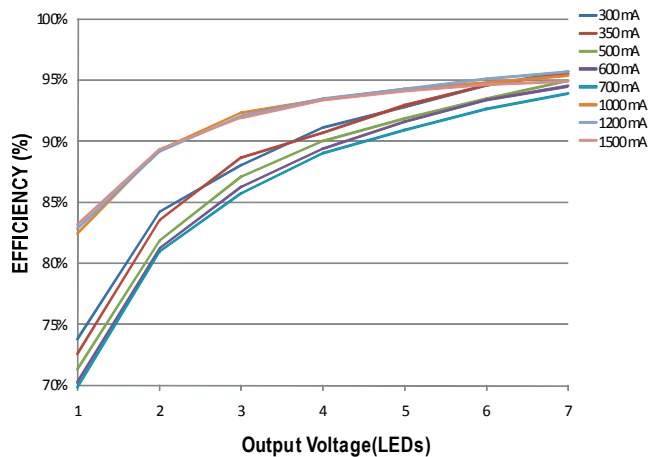


Fig-3 36VDC input, 1~10 LEDs(Vf=3V)

