ATX LED Consultants Inc

Merged IoT and Power Solutions
LED Drivers Room quality sensors

Atx Led Consultants Inc
815-A Brazos #326
Austin Tx, 78701
512 377 6052
http://atx-led.com

AL-LED-Doubler

5 volt to 56 volt
dimmable, equal current
for 2 LEDs from one driver
1x 0 to 720 mA input
2x 0 to 360 mA outputs

Product Description - AL-LED-Doubler

This device connects one 0 to 720 ma LED driver to two LEDs up to 360 mA each. Dimming is supported from 1% to 100%.

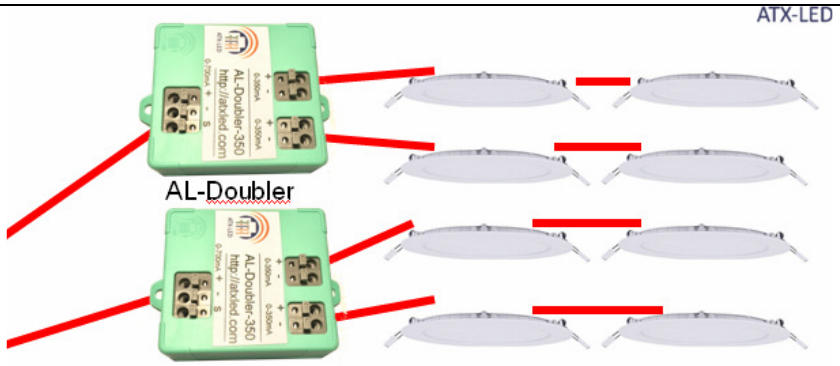
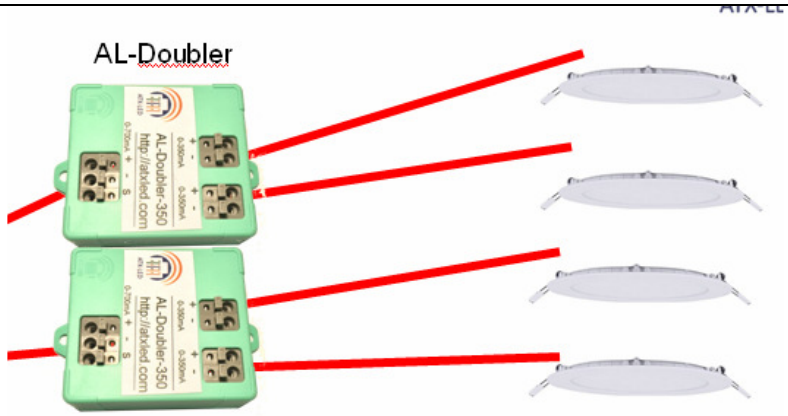
This device compensates for mismatched LED fixtures, wire distance variations, and temperature variations. Since no two fixtures are exactly matched in the real world – a simple parallel connection will not operate correctly. Because of production differences, cable distance, small temperature variations and other factors – LED fixtures cannot be wired in parallel because they these small differences add up to a significant power imbalance. One would be operating far above specifications – resulting in shorter lifetimes. In real world installations – two LEDs with the same wattage can have an up to 40% imbalance if wired in parallel. Therefore – for long life – parallel wiring is not acceptable.

The AL-LED-Doubler is effectively a microprocessor controlled current mirror. It allows very low cost LEDs to be mixed into a reliable installation solution since one driver can be used for two fixtures. Multiple fixtures can be wired in series up to 50 volts at 360 mA each – a total of 35 watts for the 2 outputs.

With this device – the current flowing in each of 2 attached strings of LEDs will be in balance within 2%. It is a current splitter that automatically balances the load, yet allows dimming. Temperature changes are tracked automatically.

Specifications

Connectors	Spring loaded connectors, + and -
Power to LED 1	2.1mm x 5.5mm DC connector, female
Input voltage range	10v to 56 volts
Input current	0 to 720 mA
Internal Power consumption	.3 watts at 720 mA
Protection	Reverse protection and static protection
Operating Temperature	0°C ~ 50°C
Size	55 mm x 50mm x 20 mm
CCT mode	A PWM signal on the Control input allows the current in each leg to be varied from 50/50 to 95 / 5%

	8 individual 6 watt fixtures with 360 mA each on a AL-DALI-DR2 with 720 mA
	4 individual 12 watt fixtures with 360 mA each on a AL-DALI-DR2 with 720 mA

In addition, overcurrent protection is built in. In case a LED fails, or if the 2 loads are different wattages – the other string will be limited to 380ma max. If currents in excess are supplied by the driver – the working LED will operate at 10 ma – 400 milliwatts in most LED's. This provides enough light for people to navigate a room at night or to identify a bad LED.

The 2 attached LEDs can be intentionally driven at different currents to implement CCT tuning. An optional PWM signal to the control line will shift the current balance at the ratio of the PWM signal. The CCT input (if wired) allows the current to be intentionally imbalanced to allow color tuning of tunable white fixtures.

The key operational modes are:

- normal operation – LEDs are in balance to 2%
- failed or missing LED – current in the working LED is limited to 380 mA – operates at full intensity from 0 to 350 mA
- imbalanced LEDs – the higher power LED is active, yet limited to 380 mA,
- to prevent damage to any LED – large imbalances and overload trigger a fail safe mode limiting the LEDs to 10 mA

When used with the AL-DALI-DR2 dimmer / driver, please set both current selection jumpers for the output with the doubler attached. This will double the output current. – and allow up to 8 LEDs to be controlled / driven by one AL-DALI-DR2.

Current Balance Modes

Power On	Briefly operate each output at 25 mA, to detect if both have a LED attached
Normal Operation	Running: 50% of the current is balanced to each LED output. Fail: If the voltage offset between the two LEDs exceeds 500 mw of power loss (typically 1.6 volts at 600 mA input, 300 mA per output) – then the LEDs are too mismatched for reasonable operation, and the device enters Mis-Match mode. Exit: Mis-Match is detected within 2 seconds.
Open LED detection	Running: If one LED is open, the other operates at 0-380 mA normally, this is 'One LED' mode. Re-Test: Detect if a LED of the same rating is connected and if so go to Normal Operation. Large mis-matches will not be detected always. Limit: If currents above 380 mA are attempted to one output, then both led outputs are is limited to 10 mA until the next power cycle or the current source drops significantly below 300 mA.
Mis Match detection	Test: if the wattage of the connected LED's is greater than 10% - the higher wattage output will be full on. Running: the higher power LED will operate normally from 0-380 mA, and the lower wattage will operate at 10 mA. If currents above 380 mA are attempted - both LEDs will be limited to 10 mA each until the next power cycle. Mismatch could occur at installation, or during operation should one of the LEDs have a fault.
Short detection	Test: if either output exceeds 40 volts – it will be shut down within milliseconds. Damage may not be preventable. the shorted output(s) will be turned off, the other will operate in normally up to 380 mA. Above 380 mA – a non shorted output will be limited to 10 mA. Re-Test: This condition is cleared once the short is cleared.
Color Temperature Mode	If a PWM signal is applied to the Control input – the current in each LED can be offset. The default (no input) is 50/50%. If a signal is detected – then the two LEDs attached can be offset up to 95%. There is a non-zero insertion loss in this mode – the maximum loss is about 3% which occurs at 33/67 ratios
No LED's	If no LEDs are detected – the device will power cycled itself every second, no current will be sent to the Outputs

Input Current	No-LED	One LED	Mis-Match	Normal = two matched LEDs
Startup				Both Outputs On with 25 mA for 50 ms
0-24 mA	Off	Full On	Higher Power full on other 10 mA	Full On
25-380 mA	Off	Full On	Higher Power full on other 10 mA	50% of current each
> 390 mA	Off	10 mA	Each output – 10 mA	50% of current each