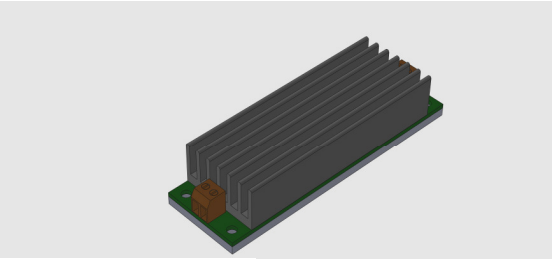
AccurIC

Precision driven

PRODUCT FAMILY DATASHEET

AR Series: Ripple-free, high accuracy, constant current drivers for high-brightness LEDs, with deep dimming capability.



AR150/175/300/350

Features:

- Provides regulated current for HB-LEDs at 150mA, 175mA, 300mA, 350mA
- No external components required
- MTBF > 1,700,000 Hours
- No switch-mode ripple
- Ultra-high current-setting accuracy (+/- 2 %)
- Low temperature coefficient (typically 0.02 %/°C = 200 ppm/°C)
- High output power (up to 23.5 W @ 350mA)
- Deep PWM capability. Dimmable down to below 0.5% of full regulated current
- Overvoltage protection to 100 V
- Overtemperature protection built in
- Reverse polarity protection, RPP (optional)
- Delivered as a fully integrated, fully packaged part (with heatsink attached)

Applications include:

- General lighting
- Architectural lighting
- Industrial lighting
- Conference room lighting
- Cinema/Theatre lighting
- Signage
- Street lighting ...

Description:

The 'AR' family is a series of linear current drivers, based on new (patent pending) technology, enabling high-accuracy constant current regulation at levels required by high-brightness LEDs and LED chains. Through the use of a completely linear regulation method, these true constant current drivers eliminate the problems associated with switch-mode noise and ripple, that can reduce the lifetime of an LED. Each member of the 'AR' family of drivers delivers a previously unachieved combination of setting accuracy, dimming range and MTBF for fully-integrated drivers at currents up to 350mA.

These devices come ready packaged, with a fully integrated heatsink, providing 'plug and play' functionality over a wide ambient temperature range.

RoHS

Web: www.accuric.com **Email:** info@accuric.com Specifications subject to change without notice

Absolute maximum ratings (at Ta = 25 °C, unless otherwise stated):

Parameter	Max Value	Note
Rail voltage, Vrail	72 V	See Figure 1
LED chain voltage, Vchain	66 V	See Figure 1
Ambient temperature	55 °C	
Current dimming range	≤0.5 – 100% (Current Contrast Ratio ≥ 200:1)	Using PWM frequency of 200Hz

Basic operation:

The AR current driver is designed to be used as a 'low side' regulator, whereby connections are made, as shown in Figure 1:

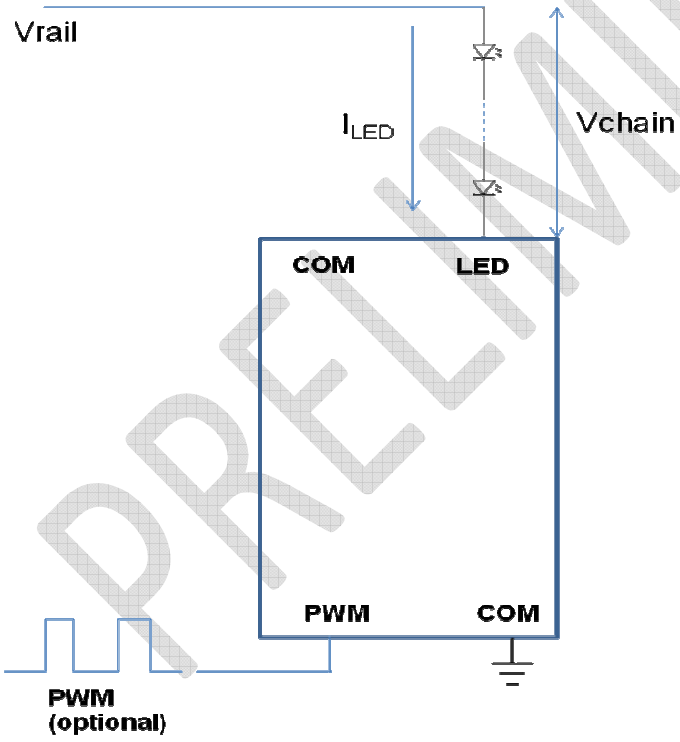


Figure 1: Driving a single chain of LEDs using an AR driver. ***Note: either of the COM pins can be used as the current return and PWM GND.***

Due to the high maximum value of Vchain, each member of the AR family of drivers is suitable for driving long chains of LEDs – reducing the system cost of multi-LED installations.

Electrical specifications: All parameters specified at Ta = 25 °C, unless otherwise stated.

Parameter	Conditions	Min	Typ	Max
LED Current, I_{LED} (mA). AR350	*Over the complete specified temperature range*	343	350	357
LED Current, I_{LED} (mA). AR300	*Over the complete specified temperature range*	294	300	306
LED Current, I_{LED} (mA). AR175	*Over the complete specified temperature range*	171	175	179
LED Current, I_{LED} (mA). AR150	*Over the complete specified temperature range*	147	150	153
Temperature coefficient (%/°C)	*Over the complete specified temperature range*	-	0.02	-
Output power (Watts)	*AR350, with V_{rail} = 72 V*	-	-	23.5
Efficiency (%)	*V_{rail} = 72 V, without RPP, fully-loaded (see Figure 2 for other voltages)*	-	92	-
PWM frequency, Hz		200	-	1,000
PWM dimming range (%)	*At PWM frequency = 200 Hz*	0.5	-	100
MTBF (Hours)	*MIL-HDBK-217F, GB*	-	1,700,000	-
Ambient temp, Ta (°C)		-40	-	+55
Case temp, Tc (°C)		-40	-	+110
Storage temp,Ts (°C)		-40	-	+110

Electrical specifications for the AR family of current drivers

Typical efficiency plot:

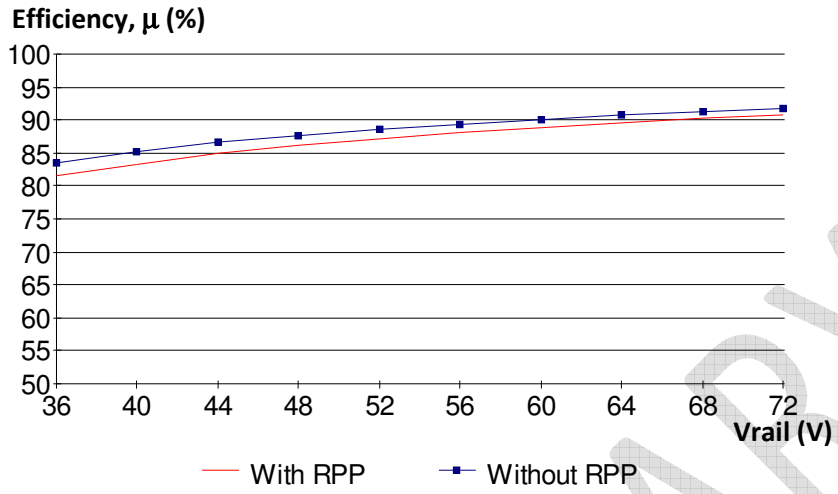
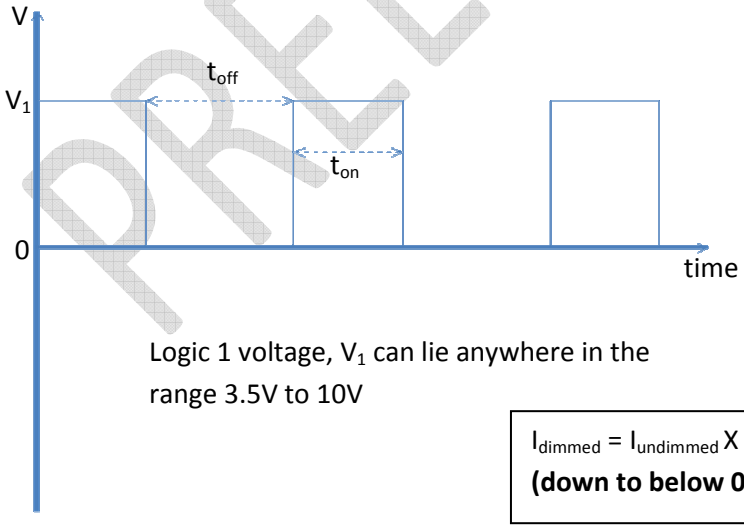


Figure 2: Efficiency (fully-loaded) versus rail voltage – with and without reverse-polarity protection (optional)

PWM Dimming:

The AR series current regulators include the option of Pulse-Width Modulation (PWM) dimming. If this facility is not required, then the PWM pin should simply be left open-circuit. If PWM dimming is required, then the PWM pin can be driven from either CMOS (3.5V or 5V) or TTL circuitry. In either case, the dimmed current is related simply to the Duty Cycle, D, of the pulse train applied to the PWM pin. Figure 3 shows how dimming is achieved – in line with standard PWM practice.



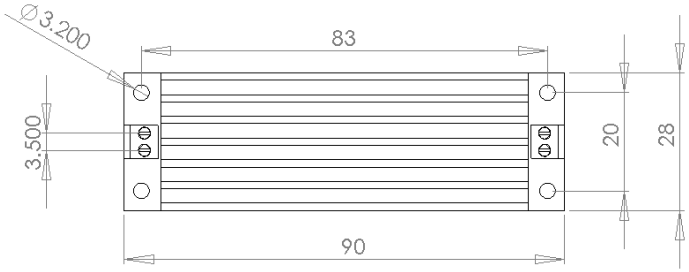
Logic 1 voltage, V_1 can lie anywhere in the range 3.5V to 10V

$I_{dimmed} = I_{undimmed} \times t_{on}/(t_{on} + t_{off})$
(down to below 0.5% of $I_{undimmed}$)

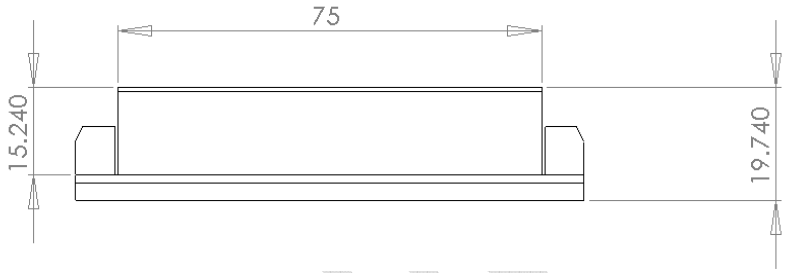
Figure 3: Voltage waveform applied to PWM pin (if PWM is not required, leave pin open-circuit).

Mechanical outline: *Including heatsink. No external components required.*

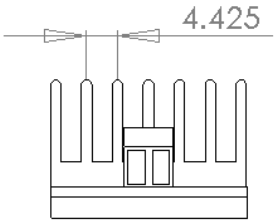
Top view:



Side view:



End view:



Model specification and ordering:

The following nomenclature should be used when ordering, or enquiring about AR Series drivers.

Current (mA)	With Reverse Polarity Protection (RPP)	Model Number
150	With	AR150W
	Without	AR150WO
175	With	AR175W
	Without	AR175WO
300	With	AR300W
	Without	AR300WO
350	With	AR350W
	Without	AR350WO

Document history:

Version	Release date	Revision details
1.0	14th October, 2011	First preliminary release
1.1	1st November, 2011	First full release