PWM to Analog V1.1 by Egon.Net

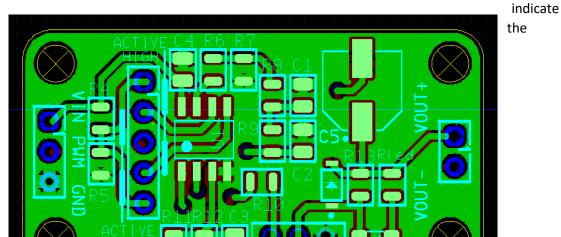## Parts:

Resistors	
2x	1M
3x	100k
5x	10k
1x	4k7
2x	1k
1x	2k

Capacitors	
4x	100n
1x	47u

Transistor	
1x	BD139

OpAmp	
1x	TLV9352

Diode	
1x	2SS100L-W

LED	
LED	0805 LED

Resistors	
R1	10k
R2	1k
R3	10k
R4	100k
R5	4k7
R6	10k
R7	10k
R8	100k
R9	100k
R10	1k
R11	1M
R12	1M
R13	10k
Rled	2k
Capacitors	
C1	100n
C2	100n
C3	100n
C4	100n
C5	47u
Diode	
D1	2SS100L-W
Transistor	
Q1	BD139
OpAmp	
U1	TLV9352
LED	
LED	0805 LED

Board configuration:

Two jumpers should be used to configure PWM active high or low. The white marks on the board indicate the

jumper/short position: PWM ACTIVE LOW, marks on the left. PWM ACTIVE HIGH, marks on the right, so:

PWM ACTIVE LOW: pins 2-3 and 4-5 should be shorted, pin 1 unconnected.

PWM ACTIVE HIGH: pins 1-2 and 3-4 should be shorted, pin 5 unconnected.

(Pin 1 is topmost, marked with "1", and down from there bottommost pin is pin 5.)

Led configuration:

The provided 0805 led has a 2k Rled for max led current (20mA) at 40V.

Connections:

Vin: from 4.5V to 40V (although in test it worked as low as 3V)

PWM: from 0V to Vin (do not use a PWM voltage higher than Vin or lower than 0V). Duet open drain outputs can be used normally (PWM input is pulled high)

Vout: analog output (Vout- to Vout+) Vout+ = Vin, Vout- = Vin-analog_level

WARNING: <u>DO NOT</u> CONNECT VOUT- TO GND!! ALWAYS MEASURE VOUT- AS A GND-REFERENCED VOLTAGE OR MEASURE DIFFERENTIAL FROM VOUT+ TO VOUT-