

DRV200 - Low noise laser diode driver with modulation



Koheron DRV200 drivers are ultra-low noise current drivers combining a very stable current bias with a ± 1 V modulation input from DC to 5 MHz. Current bias can be set from 0 to 200 mA with a manual potentiometer. A jumper allows to choose between 3 modulation gains.

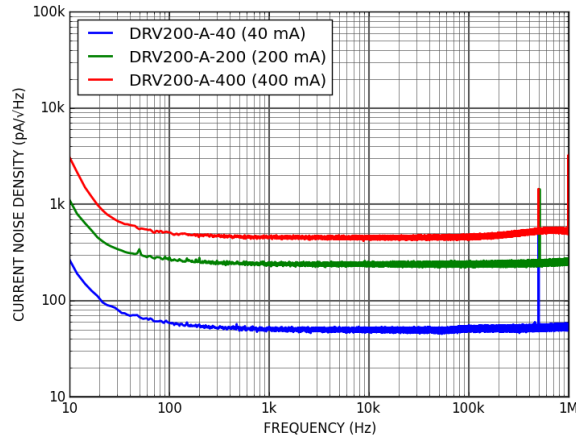
Specifications

	DRV200-A-40	DRV200-A-200	DRV200-A-400
Laser current	0 - 40 mA	0 - 200 mA	0 - 400 mA
Supply voltage V_S	5 V or 6 V	5 V or 6 V	5 V or 6 V
Compliance voltage 5V supply	2.8 V at 50 % current max., 1.8 V at current max.	2.8 V at 50 % current max., 1.8 V at current max.	2.8 V at 50 % current max., 1.8 V at current max.
Compliance voltage 6V supply	3.8 V at 50 % current max., 2.8 V at current max.	3.8 V at 50 % current max., 2.8 V at current max.	3.8 V at 50 % current max., 2.8 V at current max.
3 db modulation bandwidth	8 MHz	6 MHz	6 MHz
Current monitor gain	100 mV/mA (up to 40 mA)	20 mV/mA (up to 200 mA)	10 mV/mA (up to 400 mA)
Temperature coefficient	30 ppm/°C	30 ppm/°C	30 ppm/°C
RMS noise (10 Hz - 1 MHz)	65 nA _{rms}	255 nA _{rms}	530 nA _{rms}
Current noise density (1 kHz)	55 pA/ $\sqrt{\text{Hz}}$	270 pA/ $\sqrt{\text{Hz}}$	480 pA/ $\sqrt{\text{Hz}}$
Current limit	48 mA (ILIM H), 32 mA (ILIM L)	240 mA (ILIM H), 160 mA (ILIM L)	480 mA (ILIM H), 320 mA (ILIM L)
Slow start (90 % setpoint)	1.0 s	1.0 s	1.0 s
Modulation gains	200 $\mu\text{A/V}$, 2 mA/V, 20 mA/V	1 mA/V, 10 mA/V, 100 mA/V	2 mA/V, 20 mA/V, 200 mA/V
Outside Dimensions	72 mm x 38 mm x 14 mm	72 mm x 38 mm x 14 mm	72 mm x 38 mm x 14 mm
Compatible lasers	Floating diodes / anode-grounded	Floating diodes / anode-grounded	Floating diodes / anode-grounded

Characterization

Current noise

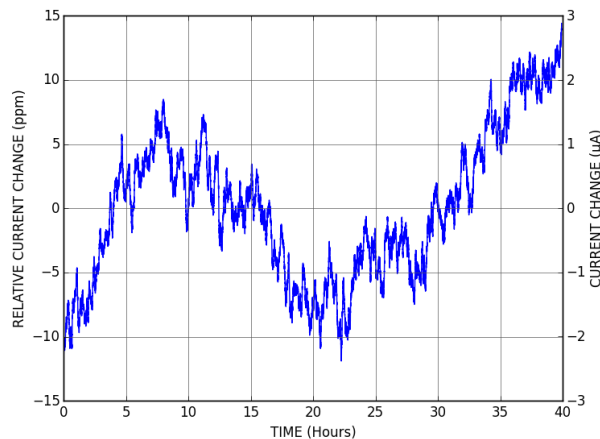
The figure below shows the current noise of the different DRV200 laser driver variants operated at a maximum rated current:



[Current noise was measured](#) across a 30 Ω resistor for the 40 mA laser current version (A-40) and a 5 Ω resistor for the 200 mA laser current version (A-200) and for the 400 mA laser current version (A-400).

Current stability

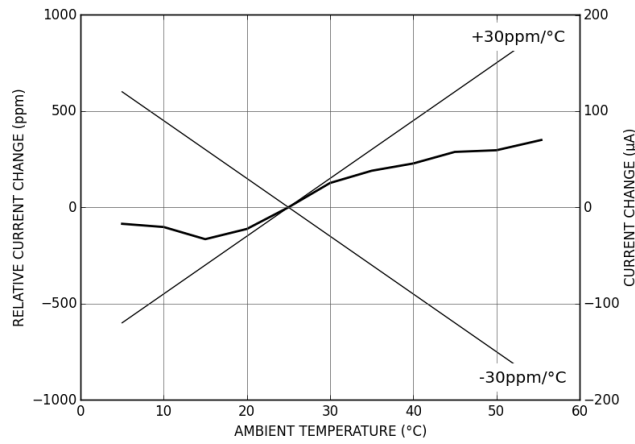
The figure below shows the current evolution of the 200 mA laser current version driver (A-200) delivering 200 mA over 40 hours. The ambient temperature is 25 °C. Current is measured using a 5 Ω precision resistor and a 7.5-digit digital voltmeter.



Fluctuation is about 10 ppm per day.

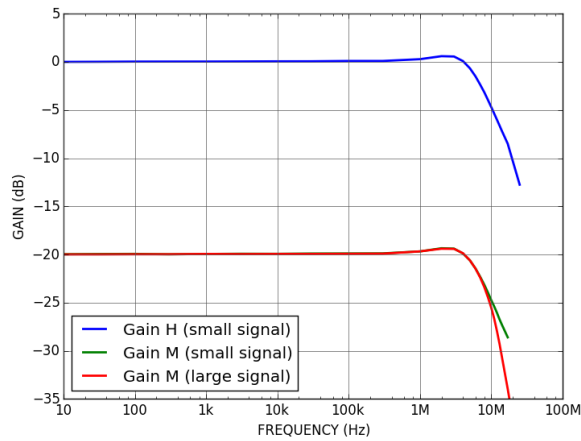
Temperature coefficient

The figure below shows the current variation for different ambient temperatures between 5 and 55 °C. Temperature coefficient is below 30 ppm/°C.

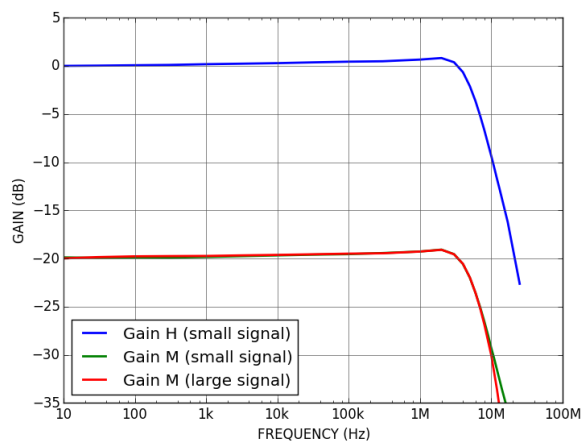


DC current modulation input

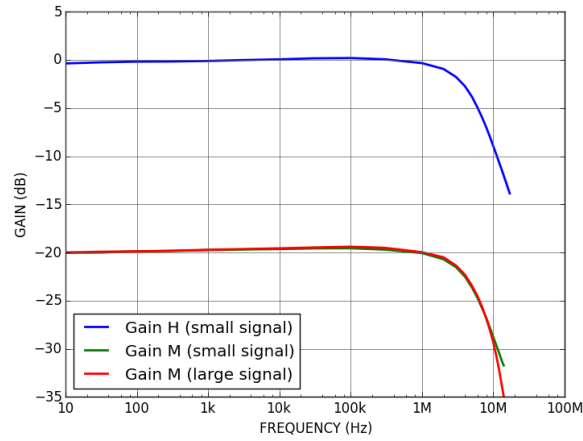
The DC modulation input controls the current setpoint. It combines large bandwidth and high linearity.



Transfer functions of the modulation input. 40 mA laser current version (A-40)



Transfer functions of the modulation input. 200 mA laser current version (A-200)



Transfer functions of the modulation input. 400 mA laser current version (A-400)

Modulation performance are characterized using a DFB laser. Large and small signal correspond to a modulation signal of $2 V_{pp}$ and $500 mV_{pp}$, respectively. The modulation is detected by a 70 MHz DC coupled [PD100 photodetector](#) and measured on an oscilloscope.