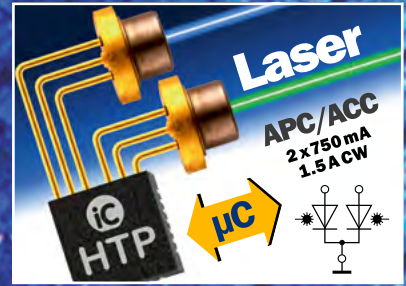# iC-HTP
DUAL CW P-TYPE LASER DIODE DRIVER

iC-HTP is suitable for CW laser driver applications with one or two laser diodes of up to 1.5 A or 2 x 750 mA.
The IC requires only very few external components: a low cost microcontroller and the laser diode(s).
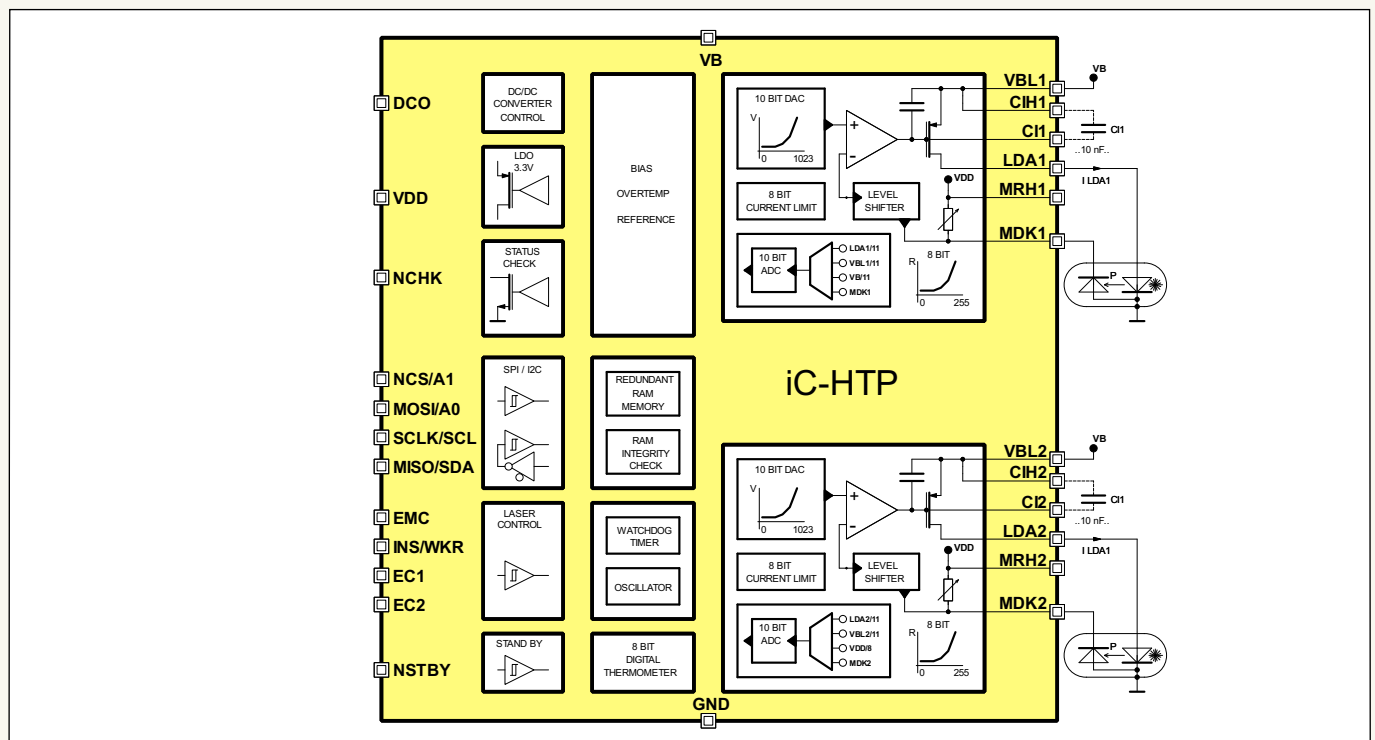The driver is completely controllable and monitorable with a microcontroller via SPI or I2C.

Laser control can be APC (Automatic Power Control) or ACC (Automatic Current Control), or the connected microcontroller takes over parameter control digitally.

Applications

- Laser diode modules
- CW laser diode drivers
- Embedded laser diode controllers
- Safety-oriented laser controllers
- Structed-light 3D illuminations
- Multiple laser diode control
- Optical amplification/pumping

Features

- Up to 750 mA per channel, up to 1500 mA with joined channels
- 2.8 V to 11 V power supply
- Operation with or without microcontroller
- Individual enable input per channel
- Control loop accuracy better than 1%
- Internal programmable logarithmic monitor resistor
- Operating point setup with 10 bit logarithmic resolution
- Current or laser-power control (ACC or APC) per channel
- Analog level monitoring by A/D converter (per channel)
- Serial programming interface (SPI or I2C compliant)
- Configuration content verification and validation
- Programmable laser overcurrent shutdown
- Optimized for P-type laser diodes or dual common cathode
- Low-drop linear regulator output for 3.3 V (10 mA)
- Low-power standby mode
- On-chip temperature sensing
- Operating temperature range of -40 °C to 85 °C

iC-HTP
DUAL CW P-TYPE LASER DIODE DRIVER

iC-HTP provides a high-precision logarithmic configurable resistor for laser diode power or current control over a wide bandwidth of operation. The driver covers a wide dynamic power range and is flexible to be used with typical CW laser diodes, including blue and green laser diodes.

A 10-bit logarithmic D/A converter sets the internal laser regulator voltage reference. A 10-bit linear A/D converter permits the monitoring of all relevant system voltages. Besides, the driver temperature is measured with an on-chip sensor.

For safe operation iC-HTP provides safety-relevant system and per channel laser diode power-off events. The permissible laser diode operating current is configurable per channel. The system checks overcurrents, overvoltages, overtemperature, timer watchdog and the power down of VB and VDD.

Pin Functions

No.	Name	Function
1, 2	LDA1	Channel 1 Laser Diode Anode
3	VBL1	Channel 1 Analog Ground
4	CI1	Channel 1 Capacitor
5	CIH1	Channel 1 Capacitor high
6	MDK1	Channel 1 Monitor Diode Cathode
7	MRH1	Channel 1 Monitor Resistor high
8	EMC	Microcontroller Operation Enable Input (pin configuration is selected when low)
9	SCLK/SCL	SPI Clock / I²C Clock
10	MISO/SDA	SPI Master In Slave OUT / I²C Data line
11	MOSI/A0	SPI Master Out Slave In / I²C AD0
12	NCS/A1	Not Chip Select / I²C AD1
13	EC1	Channel 1 Enable Input
14	EC2	Channel 2 Enable Input
15	MRH2	Channel 2 Monitor Resistor high
16	MDK2	Channel 2 Monitor Diode Cathode
17	CIH2	Channel 2 Capacitor high
18	CI2	Channel 2 Capacitor
19	VBL2	Channel 2 Analog Ground
20, 21	LDA2	Channel 2 Laser Diode Anode
22	GND	Ground
23	DCO	Digital Current Output
24	INS/WKR	I²C not SPI / WK Reference
25	VDD	+3.3 V Supply Output
26	VB	+2.8 V to +11 V Power Supply
27	NCHK	Status Output (low active)
28	NSTBY	Standby Input (low active)
TP		Thermal Pad (GND)

Key Specifications

General

Supply Voltage	2.8 V to 11 V
Laser Driver Output Current	up to 750 mA each channel up to 1500 mA with joined channels
Standby Current Consumption	< 10 µA

Laser Driver

|	
Permissible Voltage at LDAx	-0.3 V to +11 V
Permissible CW Current LDAx	750 mA / 100 mA / 25 mA / 9 mA max.
Saturation Voltage at LDAx	0.7 V max., at I(LDAx) = 750 mA

Programmable Resistor

Minimum Resistor Value	typ. 100 Ω
Maximum Resistor Value	typ. 500 kΩ
Resistor Increments	typ. 3.3% per step

Safety Features

Individual Channel enable Inputs ECx, Overtemperature detection, VB and VDD Undervoltage detection, Power-On Detection, Watchdog Timer, RAM Integrity Check, Configuration Timeout, Safe mode detection (on pins EMC and INS)

Pin Configuration Operation (EMC = Io)

INS/WKR = HI (P-Type)	Reference voltage 0.5 V

I/O Interface

SPI Interface I²C Interface	clock rate 10 MHz max. clock rate 400 kHz max.

Application Example
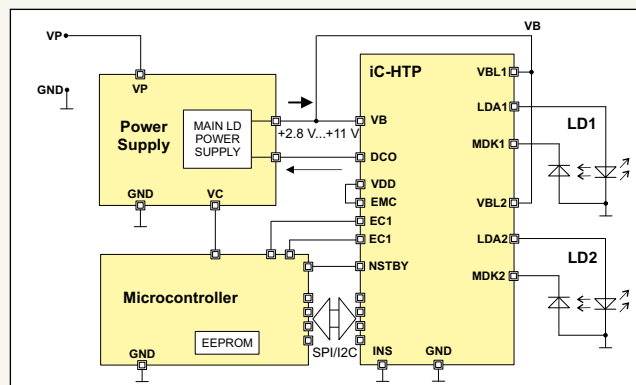
Pin Configuration QFN28 5 mm x 5 mm