iC-HN
SHORT PULSE 1.4A LASER DRIVER

preliminary

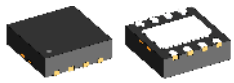
FEATURES

- Pulsed operation with up to 1.4 A
- Spike-free switching of the laser current
- Operates as switched, voltage-controlled current sink
- Up to 30 V laser supply voltage
- LVDS switching input

APPLICATIONS

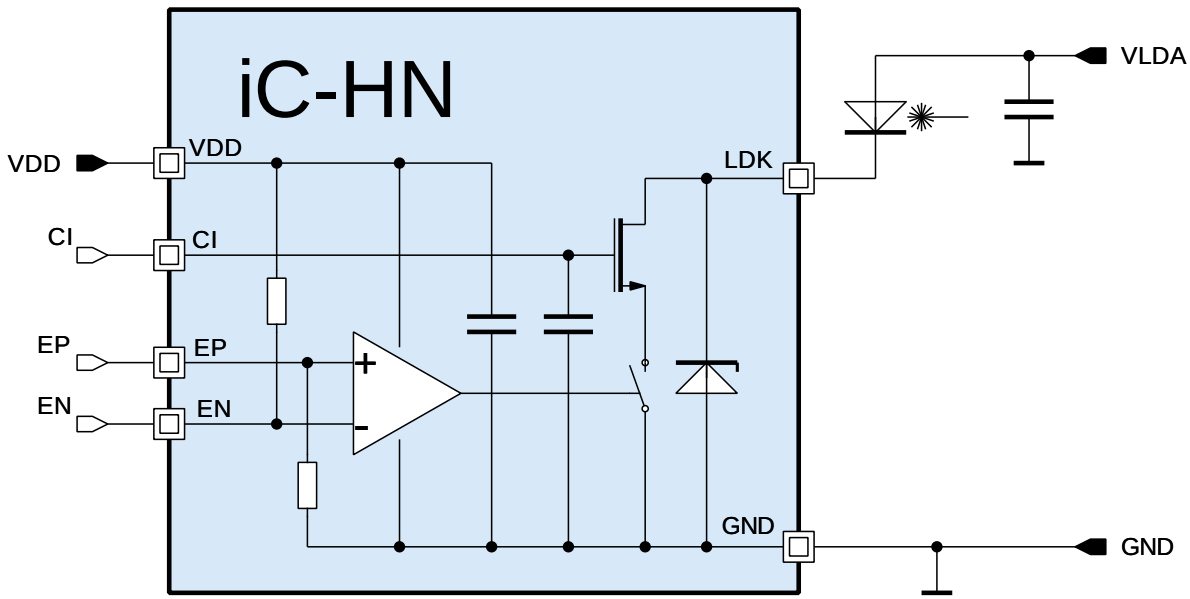
- TOF Range Finders
- LIDAR
- 3D scanning
- Gesture recognition
- IR security illumination

PACKAGES



DFN8
3 mm x 3 mm x 0.9 mm
RoHS compliant

BLOCK DIAGRAM



DESCRIPTION

Laser Switch iC-HN enables the spike-free switching of laser diodes with well-defined current pulses.

Pulse width adjustable down to 2 ns.

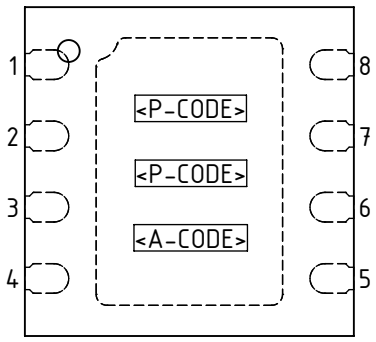
The diode current is determined by the voltage at pin CI.

The switch is controlled via LVDS inputs.

The output channel can be operated up to 1400 mA pulsed current depending on the frequency, duty cycle and heat dissipation.

PACKAGING INFORMATION

PAD LAYOUT

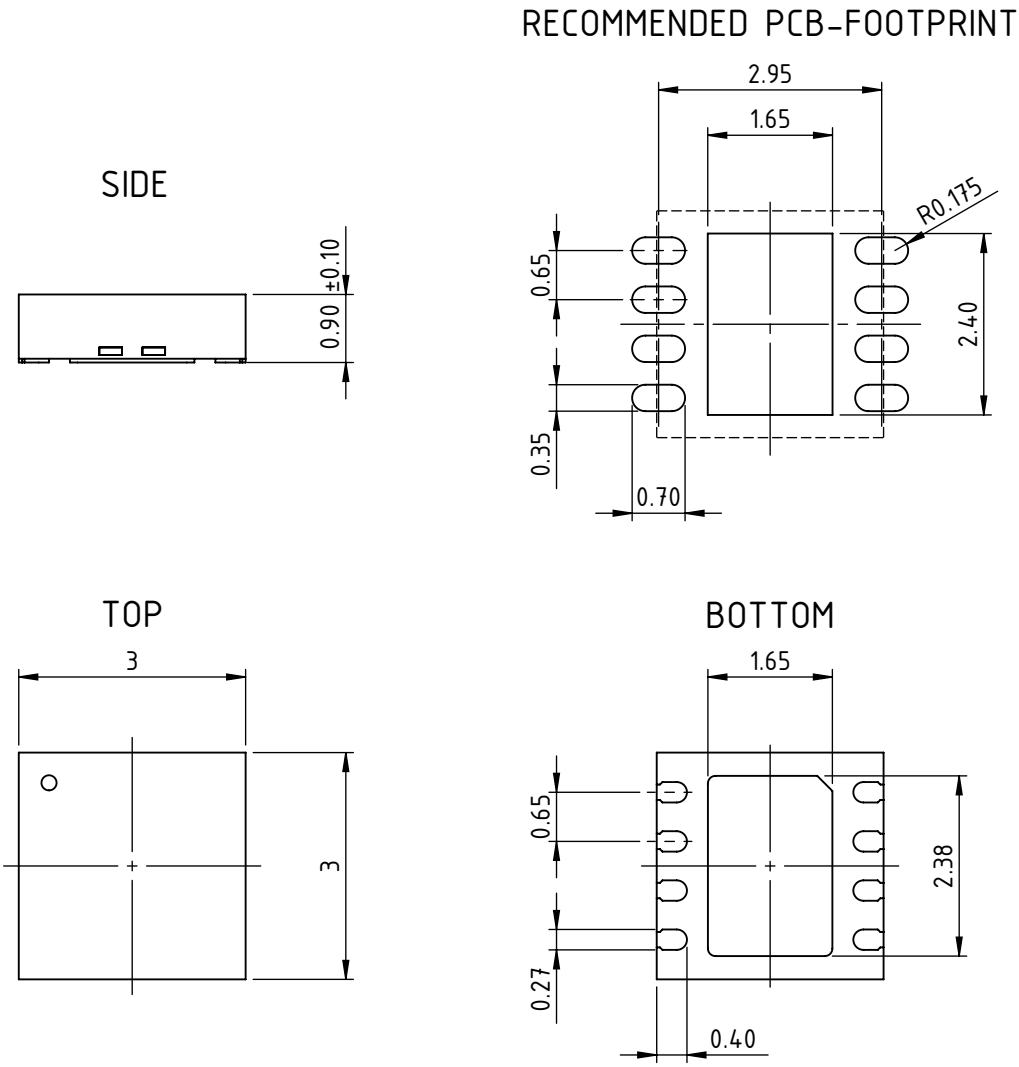


PAD FUNCTIONS

No.	Name	Function
1	CI	Current control voltage
2	VDD	Supply voltage
3	EP	Positive LVDS switch input
4	EN	Negative LVDS switch input
5	GND	Ground
6	GND	Ground
7	LDK	Laser diode cathode
8	LDK	Laser diode cathode
	BP	Backside Paddle [1)]

IC top marking: <P-CODE> = product code, <A-CODE> = assembly code (subject to changes);
1) The backside paddle is to be connected to a *Ground Plane* (GND) on the PCB.

PACKAGE DIMENSIONS



All dimensions given in mm. Tolerances of form and position according to JEDEC MO-229.

dra_dfn8-3x3-3_pack_1, 10:1

ABSOLUTE MAXIMUM RATINGS

Beyond these values damage may occur; device operation is not guaranteed.

Item No.	Symbol	Parameter	Conditions	Min.	Max.	Unit
G001	VDD	Voltage at VDD		-0.2	6	V
G002	V(LDK)	Voltage at LDK		-0.2	30.5	V
G003	V()	Voltage at EP, EN, CI		-0.3	6	V
G004	Vd()	ESD Susceptibility at all pins	HBM 100 pF discharged through 1.5 kΩ		2	kV
G005	Tj	Operating Junction Temperature		-40	125	°C
G006	Ts	Storage Temperature Range		-40	150	°C

THERMAL DATA

Item No.	Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
T01	Ta	Operating ambient temperature range		-40		105	°C

All voltages are referenced to ground unless otherwise stated.
All currents flowing into the device pins are positive; all currents flowing out of the device pins are negative.

ELECTRICAL CHARACTERISTICS

Operating Conditions: VDD = 3.0...5.5 V, Tj = -40...105 °C unless otherwise stated

Item No.	Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Total Device							
001	VDD	Permissible supply voltage		3		5.5	V
002	I(VDD)	Supply current in VDD	static			7	mA
003	Vc(LDK)hi	Clamp voltage hi at LDK	I() = 100 mA, t < 100 ms I(LDK) = 2 mA	32 30.5	35.5	40 38	V V
004	Vc()lo	Clamp voltage lo at LDK, VDD	I() = -10 mA	-1.6		-0.2	V
005	Vc()hi	Clamp voltage hi at CI, EP, EN	I() = 1 mA, t < 100 ms	7	8	9	V
006	Vc()lo	Clamp voltage lo at CI, EP, EN	I() = -1 mA	-1.6		-0.3	V
Laser switch LDK, CI							
101	I(LDK)	Permissible pulse current in LDK	Min. Pulse-Pause Ratio 1:10			1.4	A
102	Vs(LDK)	Saturation voltage at LDK	I(LDK) = 1.26 A, V(CI) = V(CI)@I(LDK) = 1.4 A			2	V
103	I0(LDK)	Leakage current in LDK	V(LDK) < 30 V			100	µA
104	tr()	LDK current rise time	Iop(LDK) = 1.4 A, I(LDK): 10% → 90% Iop			1	ns
105	tf()	LDK current fall time	Iop(LDK) = 1.4 A, I(LDK): 90% → 10% Iop			1	ns
106	tp()	Propagation delay V(EP) → I(LDK)	Differential LVDS Rise and Fall Time < 0.5 ns		5		ns
107	V(CI)	Permissible voltage at CI		0		5.5	V
108	Vt(CI)	Threshold voltage at CI	I(LDK) < 20 mA	0.4		1.2	V
109	V(CI)	Operating voltage at CI	I(LDK) = 1.4 A, V(LDK) > 2.3 V			3	V
110	Rpd(CI)	Pull-down resistor at CI		200	500	1250	kΩ
111	C(CI)	Capacitance at CI			1		nF
LVDS Interface EP, EN							
201	Rpd(EP)	Pull-down resistor at EP		80	200	500	kΩ
202	Rpu(EN)	Pull-up resistor at EN		80	200	500	kΩ
203	Vdiff	Differential voltage LVDS	Vdiff = |V(EP) − V(EN)|	200			mV
204	V()	Input voltage range LVDS		-0.2		VDD + 0.2	V
205	tp()	Pulse width at EP, EN	Differential LVDS Rise and Fall Time < 0.5 ns	2		500	ns
Power On							
301	VON	Power-on voltage VDD	rising voltage			2.9	V
302	VOFF	Power-down voltage VDD	falling voltage	1.2			V
303	Vhys			50		800	mV

LASER OUTPUT

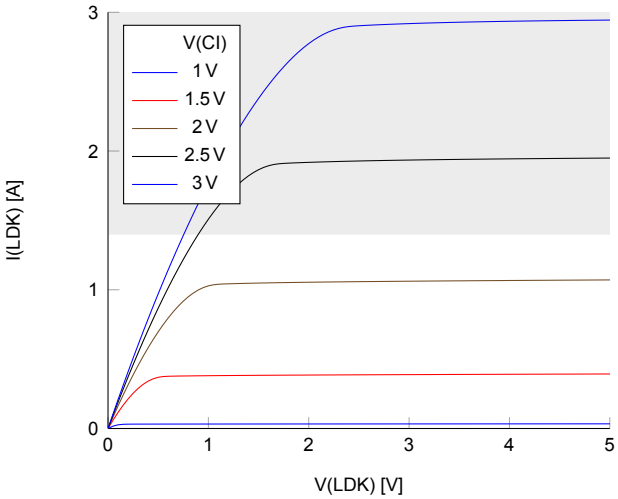


Figure 1: Output characteristics of LDK

ANALOG CURRENT

The voltage at pin CI sets the current in pin LDK. Figures 2 and 3 show the temperature dependency of the LDK output current versus the voltage at CI for a *typical* device. Figures 4 and 5 show the min., typ. and max. variations between devices at 27 °C temperature. The voltage at pin LDK is 2.5 V.

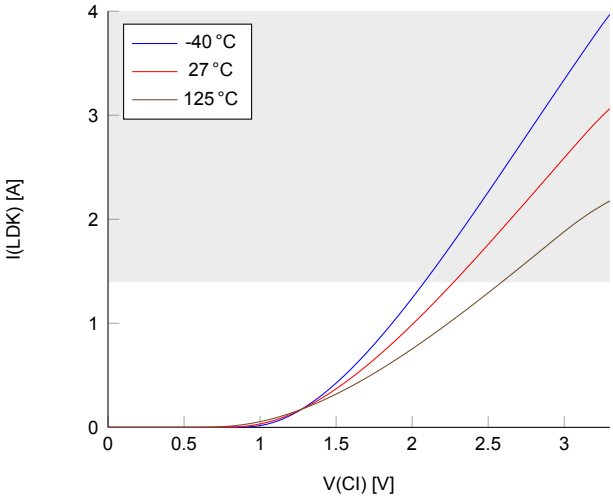


Figure 2: I(LDKx) vs. V(CIx) at VDD = 3.3 V

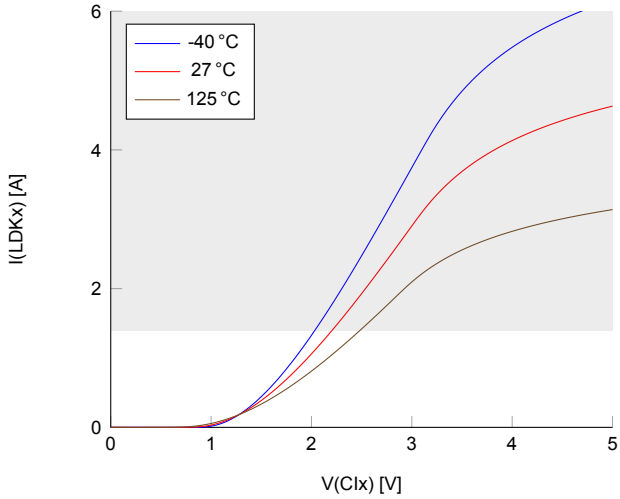


Figure 3: I(LDKx) vs. V(CIx) at VDD = 5 V

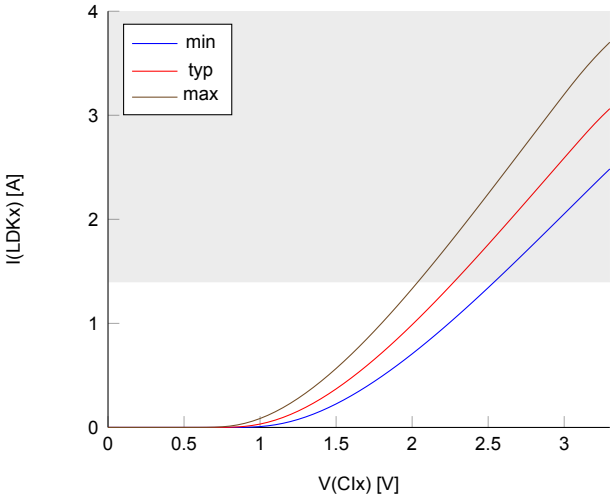


Figure 4: I(LDKx) vs. V(CIx) at VDD = 3.3 V

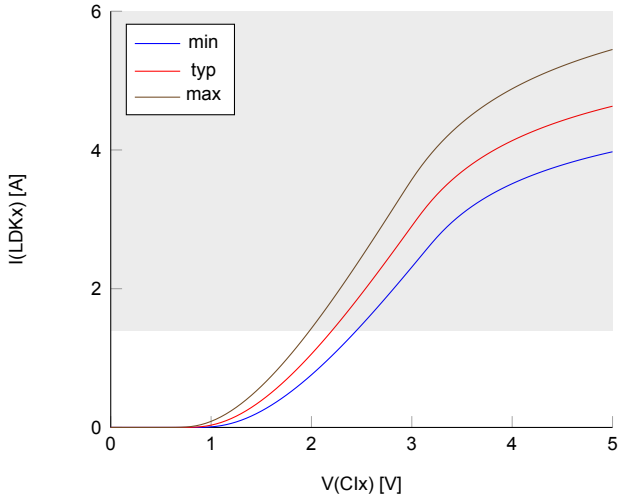


Figure 5: I(LDKx) vs. V(CIx) at VDD = 5 V

DESIGN REVIEW: Notes On Chip Functions

HN	Chip release Y, W	
No.	Function, Parameter/Code	Description and Application Hints
		None at time of printing.

Table 1: Design review

REVISION HISTORY

Rel.	Rel. Date*	Chapter	Modification	Page
A1	2017-11-21		Initial release	

Rel.	Rel. Date*	Chapter	Modification	Page
B1	2018-06-05	BLOCK DIAGRAM	Pin VLDA removed	1
		PACKAGING INFORMATION	Pad layout changed	2
		ABSOLUTE MAXIMUM RATINGS	VLDA removed	3
		ELECTRICAL CHARACTERISTICS	VLDA removed	4

Rel.	Rel. Date*	Chapter	Modification	Page
C1	2023-10-25	ELECTRICAL CHARACTERISTICS	Item No. 111 updated	5
		LASER OUTPUT	New	6
		ANALOG CURRENT	New	7
		DESIGN REVIEW: Notes On Chip Functions	New	8

* Release Date format: *YYYY-MM-DD*

ORDERING INFORMATION

Type	Package	Order Designation
iC-HN	8-pin DFN, 3 mm x 3 mm, 0.9 mm thickness RoHS compliant	iC-HN DFN8-3x3
Evaluation Board	High-speed module for laser diodes	iC-HN iCSY HN1M

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iC-Haus GmbH
Am Kuemmerling 18
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