

■ Features

- Pulsed DFB-QCL (TO-8) included
(emission wavelength: 7.82 μm , peak power : typ. 100 mW)
- Integrated pulsed driver circuit and TEC controller
- With collimation lens (L14147-1278-02)
- Uses DC 24 V input
- Ethernet connection for software control
- Connect up to 4 units in parallel



■ Applications

- Continuous emission monitoring systems (CEMS)
- Environmental gas measurement
- Infrared laser spectroscopy

■ Outline

The pulsed and play pulsed QCL module is a compact module containing pulsed Quantum Cascade Laser (QCL), pulsed driver and TEC controller. The module can be remotely controlled via Ethernet connection. Pulsed QCL is also selectable from the line-up of standard products.

■ Absolute maximum ratings

Limiting values that must not be exceeded even momentarily, and even any one of the ratings must not be exceeded.
Pulse width is set at 500ns at the factory.

Parameter	Value	Unit
Input voltage (main body)	DC 26.4	V
Input current (main body)	1.0	A
External trigger ^{*1)}	Repetition frequency ^{*2)}	120
	Input voltage	+5
Control voltage HV ^{*3)}	This product has individual difference. Confirm data sheet attached to a product.	
Operating temperature (QCL) ^{*4)}	-15 to +65	°C
Operating temperature (main body)	+5 to +60	°C

*1) In case of external trigger mode.

*2) The repetition frequency is also limited to 120 kHz in internal trigger mode.

*3) The control voltage controls amplitude of pulsed forward current for the laser (QCL). The upper limit of the control voltage setting differs in each product.
The upper limit is set at factory before shipping and can not be changed.

*4) The laser operating temperature controlled by the internal Peltier cooler (TEC).

Pulsed QCL Module L14147-1278-01/-02

Specifications (laser)

Repetition frequency=100 kHz, operating temperature (QCL)=20 °C, unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating temperature (QCL)	$T_{op(qcl)}$	$K^{*1})=1278 \text{ cm}^{-1}$	+10	-	+60	°C
Pulsed radiant power	Φ_{ep}		50	100	400	mW
Repetition frequency ^{*2)}	f_r	Factory setting=100 kHz	50	100	120	kHz
Pulse width	t_w	Set at factory	-	500	-	ns
Droop ^{*3)}	P_{decay}	$\Phi_{ep}=100 \text{ mW}$	-	-	50	%
Spectral linewidth ^{*4)}	ΔK_L		1.0	-	-	cm^{-1}
Side mode suppression ratio	SMSR		25 ^{*5)}	-	-	dB
Wavenumber tuning range ^{*6)}	ΔK_T	-	1.0	-	-	cm^{-1}
Rise/Fall time ^{*7)}	-	10 % to 90 %	-	-	20	ns
Delay time ^{*8)}	-	-	-	-	200	ns
Jitter ^{*9)}	-	-	-	-	±1	ns
Beam spread angle ^{*10), *11)}	θ	-	0	3	5	mrاد
Beam waist position ^{*10), *12)}	Z_{wo}	-	50	-	1000	mm
Beam waist width ^{*10), *13)}	w_o	-	0.5	1.5	3	mm

*1) K is the emission wavenumber at any point in the intermediate region specified by Figure (A).

*2) The range in which the repetition range can be set (internal trigger mode).

*3) Droop is defined as shown in Figure (B).

*4) FWHM of emission spectrum.

*5) This is limited by the resolution and S/N ration of the inspection equipment.

*6) The range in which the emission wavenumber can be continuously varied by changing the operating temperature (QCL).

*7) Depends on the rise/fall times of external pulses when in external trigger mode.

*8) Delay time of radiant output pulse for internal trigger.

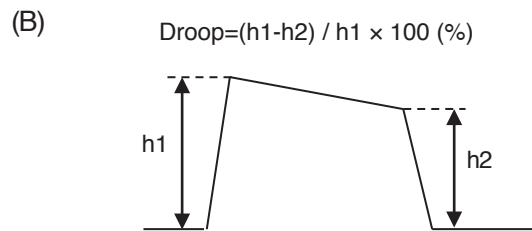
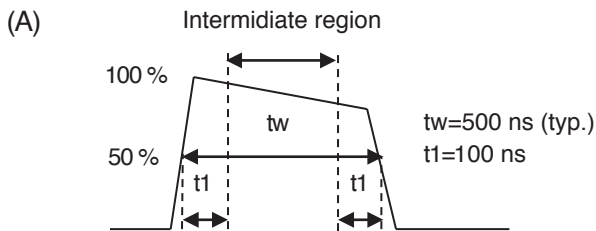
*9) Jitter of radiant output pulse.

*10) Only for L14147-1278-02.

*11) Half angel. Larger spread angle either vertical or horizontal direction.

*12) Distance from the lens surface.

*13) $1/e^2$ beam diameter



Communication specifications

Parameter	Value
LAN	Auto-begotiation supported
	10BASE-T/100BASE-TX auto-recognition
	Full duplex/half duplex atuo-recognition

Supplied with product: Application (software) specifications

Parameter	Value
Operating enviromnent	Windows 7 (64 bit/32 bit), Windows 8/8.1 (64 bit/32 bit) PC with at least one free wired LAN port that connects to this port

Electrical interface specifications

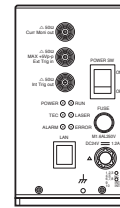
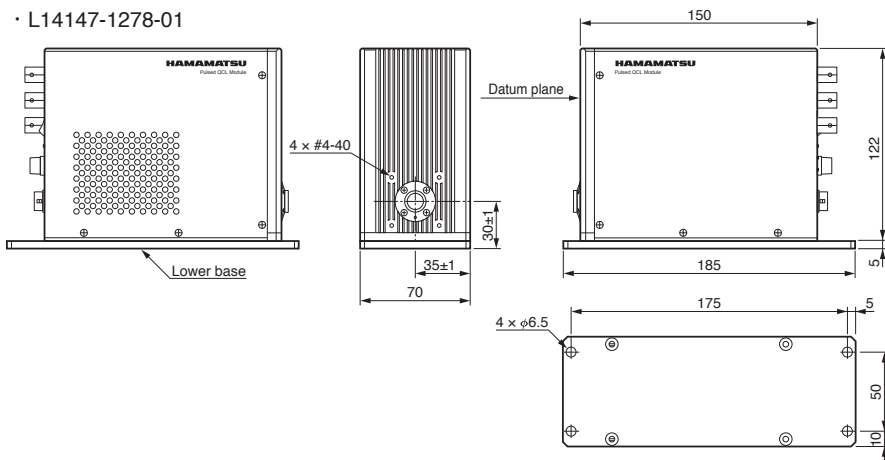
Parameter	Value	Function
Power input connector	HR10A-10R-10P (Hirose)	Input DC 24V from external power supply
Communication connector	RJ-45	Connects to a LAN port on a PC
External trigger input terminal *1)	BNC (50 Ω)	Connects to an external waveform generator via a coaxial cable
Current waveform monitor terminal *2)	BNC (50 Ω)	Outputs waveforms for monitoring the laser pulsed forward current

*1) Use only in external mode.

*2) Connects to an oscilloscope if necessary.

Dimensional outline and pin connection (Unit:mm)

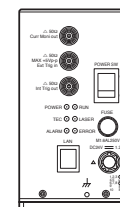
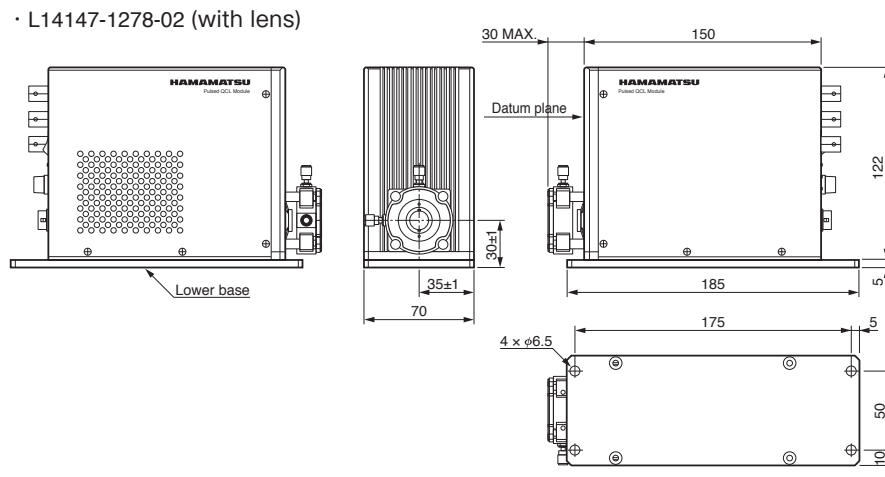
· L14147-1278-01



*1) Tolerance is +/- 0.1 mm unless specified.

Pin No.	Function	Pin No.	Function
①	DC 24 V	⑥	GND
②	DC 24 V	⑦	GND
③	DC 24 V	⑧	GND
④	N.C.	⑨	INTLK
⑤	N.C.	⑩	INTLK

· L14147-1278-02 (with lens)



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