

4.57um 20mW DFB-CW QCL Continuous Wave Quantum Cascade Laser



● Product Description

QCL is a type of semiconductor laser that emits in the mid-infrared region (from 4 um to 10um). Due to its emission principle being completely different from that of conventional laser diodes (LD), QCL has attracted great attention as an innovative solution for mid-infrared applications such as trace gas analysis in environmental monitoring. The quantum cascade laser adopts SPC (Single Phonon Continuum) depopulation and DFB (Distributed Feedback) structure, enabling continuous-wave mid-infrared



laser emission at room temperature. By controlling the operating temperature of the chip using a Peltier element integrated in the HHL package, it is possible to tune the emission wavelength without mode hopping while maintaining longitudinal single-mode operation.

● Product features

Continuous wave output; DFB single-mode characteristics; precise temperature control; low-noise driving; industrial-grade package

● Part Number

MP-QCL-4570-DFB-20

● Application area

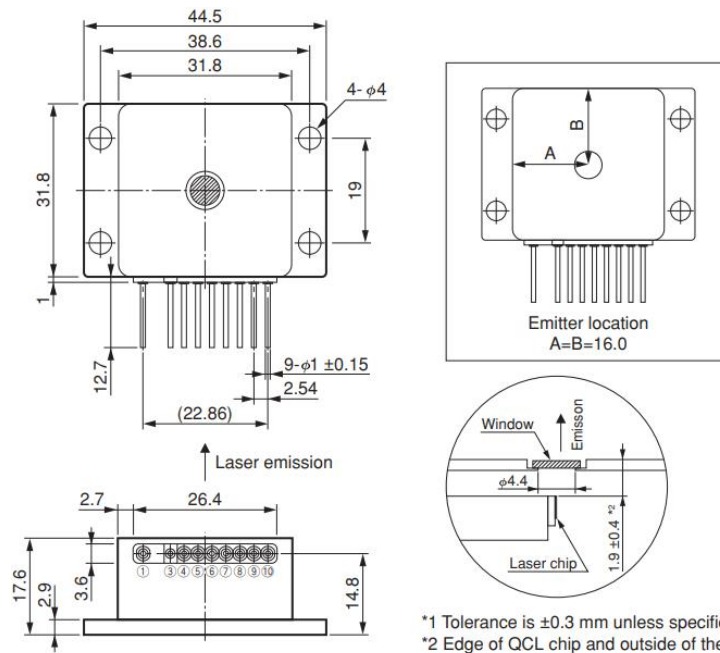
Gas Sensing | Medical Diagnostics | Defense and Security | Environmental Monitoring | Semiconductor Metrology

● Core parameters

Center Wavelength	Output Power
4.57um	20 mW



● Dimension Drawing



Pin No. *3	Function	Pin No. *3	Function
①	TEC cathode (-)	⑦	QCL cathode (-)
③	N.C.	⑧	Thermistor, (Top(c))
④	QCL anode (+)	⑨	Thermistor, (Top(c))
⑤	Thermistor, (T _{op(qcl)})	⑩	TEC anode (+)
⑥	Thermistor, (T _{op(qcl)})	—	—

*3 Pin of ③ is electrically connected to the case; package body. Other all pins are floating to the case

● General Parameters

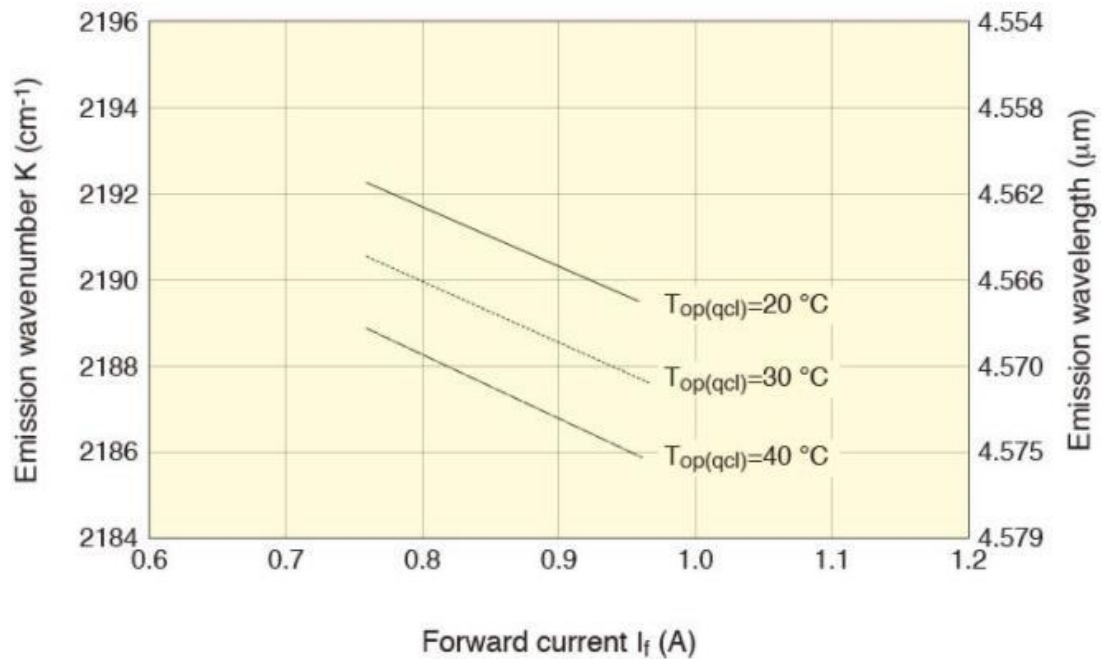
Model Parameters

Parameter	Specification
Type	DFB-CW Type
Typical Peak Emission Wavelength	4.57 μm
Tuning Range Min.	±1.0 cm ⁻¹



Min. Output Power	20 mW
Max. Laser Threshold Current	1 A
Min. Side Mode Suppression Ratio (SMSR)	25 dB
Package	HHL

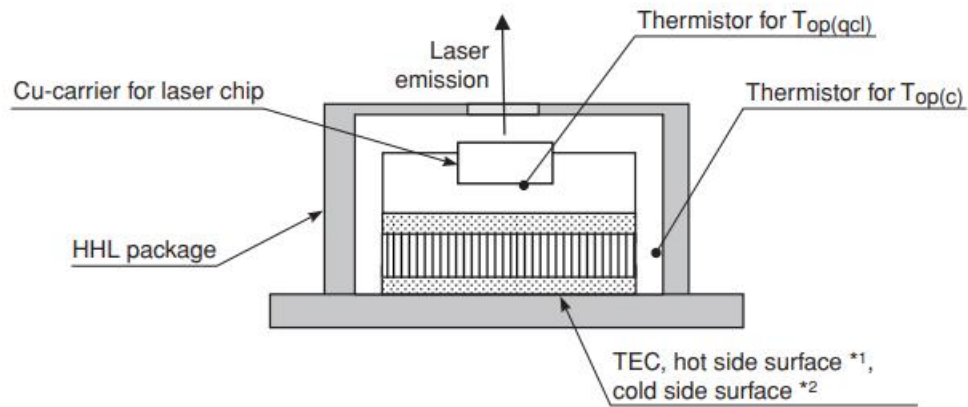
Typical Characteristics



Parameter	Symbol	Condition	Typical value
Temperature coefficient of wavenumber	δK_T	I_f fixed	-0.18 cm ⁻¹ /°C
Current coefficient of wavenumber	δK_C	$T_{op(qcl)}$ fixed	-0.015 cm ⁻¹ /mA

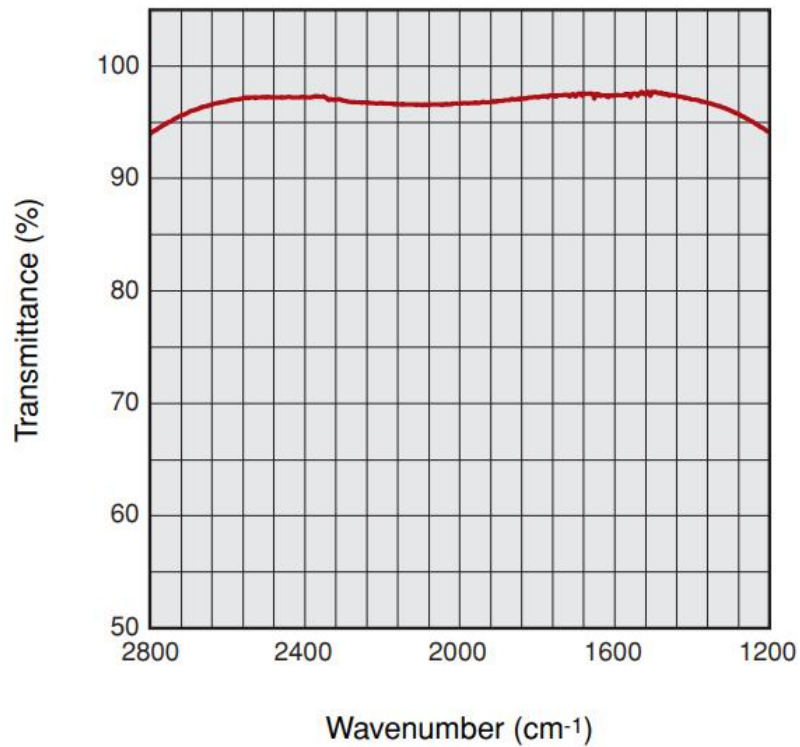
General Parameters

Thermistor Configuration (Schematic Diagram)



*1 when TEC is operated in cooling mode.
*2 when TEC is operated in heating mode.

Typical Transmittance Curve of the Window



DFB-CW QCL Continuous Wave Quantum Cascade Laser Model List

HHL Package

Wavelength	Wavenumber	Target gases
4.33 μm	2310 cm^{-1}	CO_2 , CO_2 isotope
4.53 μm	2209 cm^{-1}	N_2 O
4.57 μm	2190 cm^{-1}	N_2 O, CO
5.26 μm	1900 cm^{-1}	NO
6.13 μm	1631 cm^{-1}	NO_2
7.18 μm	1392 cm^{-1}	SO_3
7.39 μm	1354 cm^{-1}	SO_2
7.73 μm	1294 cm^{-1}	CH_4