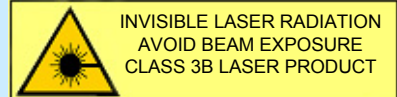


Single Mode VCSEL 775 \pm 3 nm TO46 & TEC

- ◆ Vertical Cavity Surface-Emitting Laser
- ◆ internal TEC and Thermistor
- ◆ Narrow linewidth
- ◆ 2nm tunability with TEC
- ◆ High performance and reliability



ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	λ_R	nm	772	775	778	T=20°C, I _{TEC} =0, P _{OP} =0.3mW
Threshold current	I _{TH}	mA		0,5		T=20°C
Output power	P _{opt}	mW	0,3			T=0 .. 50°C
Threshold voltage	U _{TH}	V		1,8		
Laser current	I _{OP}	mA			2,0	P _{opt} =0.3 mW
Laser voltage	U _{OP}	V		2,0		P _{opt} =0.3 mW
Wallplug efficiency	η_{WP}	%		12		P _{opt} =0.3mW
Slope efficiency	η_S	W/A		0,3		T= 20°C
Differential series resistance	R _S	Ω		250		P _{opt} =0.3 mW
3dB modulation bandwidth	V _{3dB}	GHz	0.1			P _{opt} =0.3 mW (due to ESD protection diode)
Relative intensity noise	RIN	dB/Hz		-130,0	-120,0	P _{opt} = 0.3 mW @ 1 GHz
Wavelength tuning over current		nm/mA		0,60		
Wavelength tuning over temperature		nm/K		0,06		
Thermal resistance (VCSEL chip)	R _{thermal}	K/mW	3		5	
Side mode suppression		dB	30			
Beam divergence	θ	°	10		25	P _{opt} =0.3 mW, full width 1/e ²
Spectral bandwidth	$\Delta\lambda$	MHZ		100,0		P _{opt} =0.3 mW
TEC current		mA			500,0	appropriate heatsink required
NTC Thermistor Resistance		K Ω	9,5	10	11	T=25°C
NTC Temperature Dependence		K Ω	10/exp[3892*(1/298K-1/T _{op})]			
Wavelength tuning over TEC current		nm/mA		0,008		TEC current < 200 mA
ESD damage treshold		V	2.000			Human body model

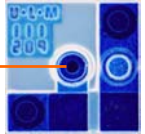
ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 .. 125°C
Operating temperature	-20 .. 80°C
Electrical power dissipation	5 mW
Continuous forward laser current	2 mA
Laser reverse voltage	8V
Soldering temperature*:	270°C
(*TEC temperature must be below 150°C)	

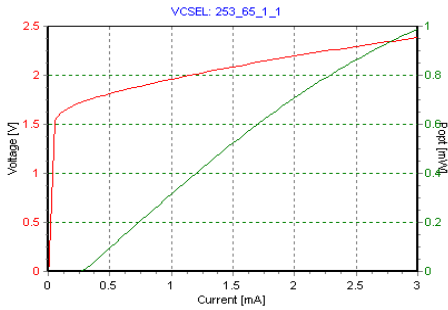
NOTICE: Stresses greater than those listed under „Absolute Maximum Ratings“ may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated for extended periods of time may effect device reliability.



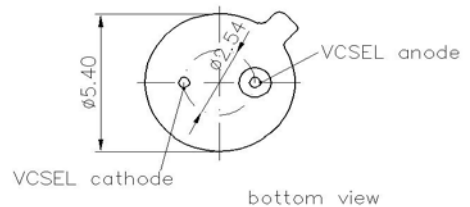
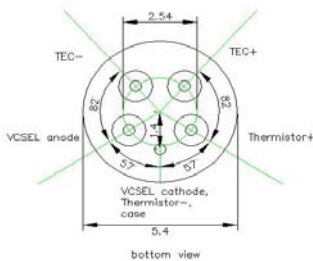
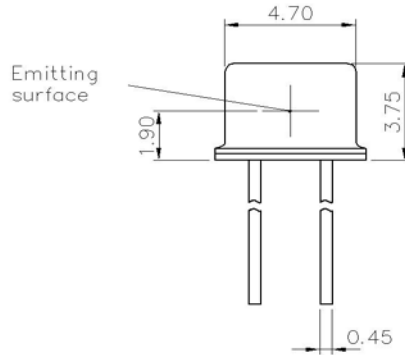
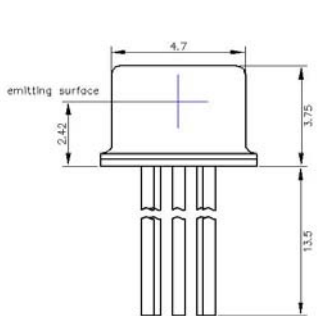
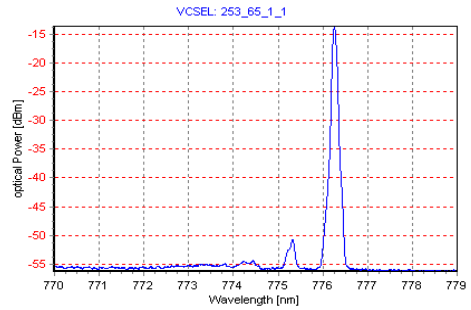
ATTENTION: Electrostatic Sensitive Devices
Observe Precautions for Handling



LIV



Spectral Characteristics



For order please use:

with TEC/Thermistor: ULM775-03-TN-S46FTT

without TEC/Thermistor: ULM775-03-TN-S46FOP

**OPTION: Wide range of TO headers & caps (flat, tilted, ball)
Customer specific wavelength selection on request**

Single Mode VCSEL 850nm TO46 flat window



- ◆ Ideal circular gaussian beam
- ◆ Astigmatism free, diffraction limited
- ◆ Narrow linewidth
- ◆ High reliability, >10⁵ h @ 70°C, 2.5 mA



INVISIBLE LASER RADIATION
AVOID BEAM EXPOSURE
CLASS 3B LASER PRODUCT

ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	λ_R	nm	840	850	860	T=20°C, P _{opt} =1.0 mW
Threshold current	I _{TH}	mA	0,2	0,5	0,7	T=20°C
Variation of I _{TH} over Temp.	$\Delta I_{TH}(T)$	mA			0,7	T=0 .. 70°C
Threshold voltage	U _{TH}	V	1,6	1,8	2,0	
Laser current	I _{OP}	mA	1,5	2,1	2,5	P _{opt} =1.0 mW
Laser voltage	U _{OP}	V	1,9	2,2	2,6	P _{opt} =1.0 mW
Wallplug efficiency	η_{WP}	%	10	15	25	P _{opt} =1.0 mW
Slope efficiency	η_s	W/A	0,3	0,4	0,9	T= 20°C
Variation of η_s over Temp.	$\Delta \eta_s(T)$	W/A				T= 0 .. 70°C
Differential series resistance	R _S	Ω	160	200	300	P _{opt} =1.0 mW
3dB modulation bandwidth	ν_{3dB}	GHz	0.1			P _{opt} =1.0 mW (due to ESD protection diode)
Rise and fall time	t _R /t _F	ps		80		20%..80%; P _{off/on} =0.1/1.0mW
Relative intensity noise	RIN	dB/Hz		-130	-120	P _{opt} = 1.0 mW @ 1 GHz
Wavelength tuning over current		nm/mA	0,7	0,9	1,2	
Wavelength tuning over temperature		nm/K		0,06		
Thermal resistance (VCSEL chip)	R _{thermal}	K/mW	3		5	
Beam divergence	θ	°		20	30	P _{opt} =1.0 mW, full width 1/e ²
Side mode suppression ratio	SMSR	dB	30			P _{opt} =1.0 mW
ESD damage treshold		V	2.000			Human body model

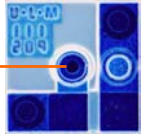
ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 .. 125°C
Operating temperature	-20 .. 85°C
Electrical power dissipation	6 mW
Continous forward laser current	2.5 mA
Laser reverse voltage	8V
Soldering temperature	330°C

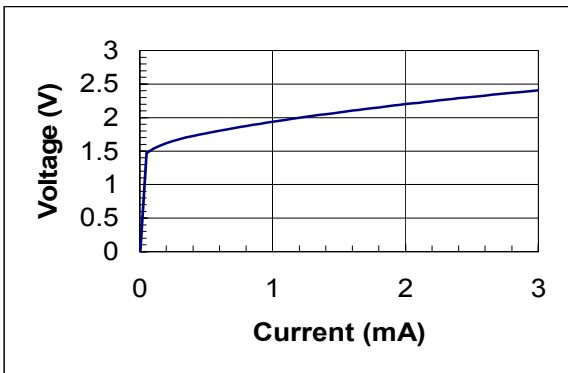
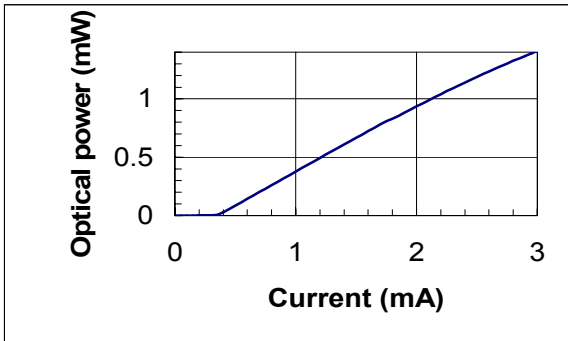
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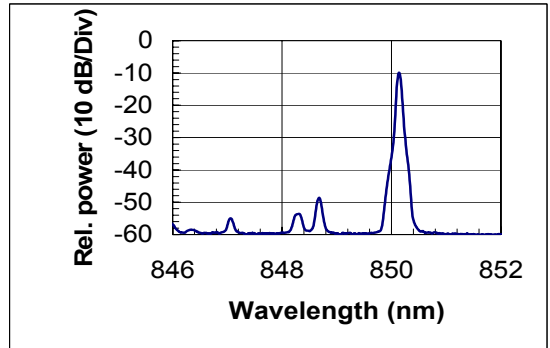
ATTENTION: Electrostatic Sensitive Devices
Observe Precautions for Handling



Electro-optical characteristics



Spectral Characteristics

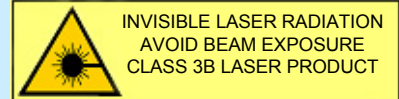


<p>Typ <i>Descriptn.</i> Cap</p>	<p>ULM850-10-TN-S46FOP 850nm SM VCSEL TO46 Flat window</p>	<p>Package / pin layout</p>
<p>Pin 1 Pin 2</p>	<p>VCSEL Anode VCSEL Cathode, Case</p>	

OPTIONS: Wide range of TO headers & caps (flat, tilted, ball)
Eye safe products

Single Mode VCSEL 850 \pm 3 nm TO46 & TEC

- ◆ Vertical Cavity Surface-Emitting Laser
- ◆ internal TEC and Thermistor
- ◆ Narrow linewidth
- ◆ 2nm tunability with TEC
- ◆ High performance and reliability



ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	λ_R	nm	847	850	853	T=20°C, I _{TEC} =0, P _{OP} =0.5 mW
Threshold current	I _{TH}	mA		0,5		T=20°C
Output power	P _{opt}	mW	0,5			T=0 .. 50°C
Threshold voltage	U _{TH}	V		1,8		
Laser current	I _{OP}	mA			2,0	P _{opt} =0.5 mW
Laser voltage	U _{OP}	V		2,0		P _{opt} =0.5 mW
Wallplug efficiency	η_{WP}	%		12		P _{opt} =0.5 mW
Slope efficiency	η_S	W/A		0,3		T= 20°C
Differential series resistance	R _S	Ω		250		P _{opt} =0.5 mW
3dB modulation bandwidth	ν_{3dB}	GHz	0.1			P _{opt} =0.5 mW (due to ESD protection diode)
Relative intensity noise	RIN	dB/Hz		-130,0	-120,0	P _{opt} = 0.5 mW @ 1 GHz
Wavelength tuning over current		nm/mA		0,60		
Wavelength tuning over temperature		nm/K		0,06		
Thermal resistance (VCSEL chip)	R _{thermal}	K/mW	3		5	
Side mode supression		dB	30			
Beam divergence	θ	°	10		25	P _{opt} =0.5 mW, full width 1/e ²
Spectral bandwidth	$\Delta\lambda$	MHZ		100,0		P _{opt} =0.5 mW
TEC current		mA			500,0	appropriate heatsink required
NTC Thermistor Resistance		K Ω	9,5	10,0	10,5	T=25°C
NTC Temperature Dependence		K Ω	10/exp[3892*(1/298K-1/T _{op})]			
Wavelength tuning over TEC current		nm/mA		0,008		TEC current < 200 mA
ESD damage treshold		V	2.000			Human body model

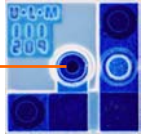
ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 .. 125°C
Operating temperature	-20 .. 80°C
Electrical power dissipation	5 mW
Continuous forward laser current	2 mA
Laser reverse voltage	8V
Soldering temperature*:	270°C
(*TEC temperature must be below 150°C)	

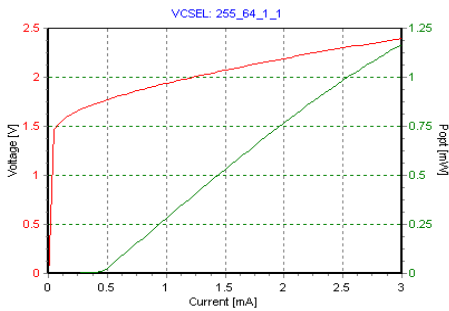
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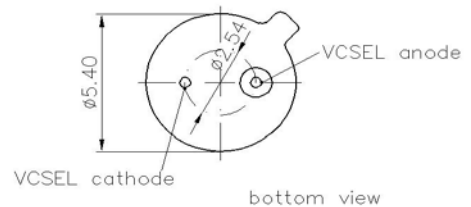
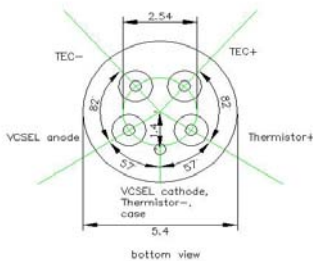
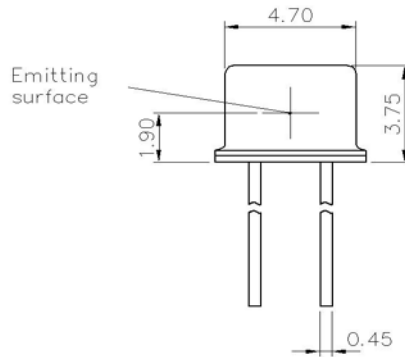
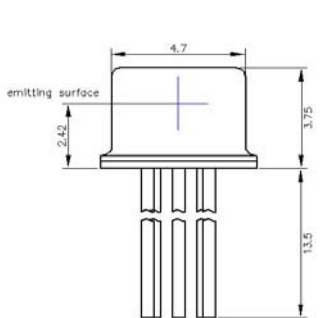
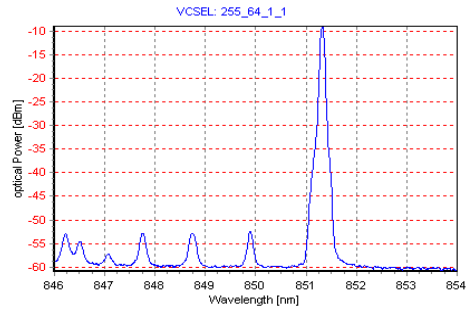
ATTENTION: Electrostatic Sensitive Devices
Observe Precautions for Handling



LIV



Spectral Characteristics



For order please use:

with TEC/Thermistor: ULM850-03-TN-S46FTT

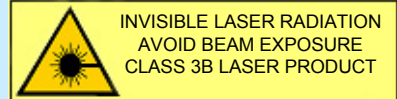
without TEC/Thermistor: ULM850-03-TN-S46FOP

OPTION: Wide range of TO headers & caps (flat, tilted, ball)
Customer specific wavelength selection on request

Single Mode VCSEL

980±1 nm TO46 & TEC

- ◆ Vertical Cavity Surface-Emitting Laser
- ◆ internal TEC and Thermistor
- ◆ Narrow linewidth
- ◆ 2nm tunability with TEC
- ◆ High performance and reliability



ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	λ_R	nm	979	980	981	T=20°C, I _{TEC} =0, P _{OP} =0.5mW
Threshold current	I _{TH}	mA		0,5		T=20°C
Output power	P _{opt}	mW	0,5			T=0 .. 50°C
Threshold voltage	U _{TH}	V		1,6		
Laser current	I _{OP}	mA			2,0	Popt=0.5 mW
Laser voltage	U _{OP}	V		2,0		Popt=0.5 mW
Wallplug efficiency	η_{WP}	%		12		Popt=0.5mW
Slope efficiency	η_S	W/A		0,5		T= 20°C
Differential series resistance	R _S	Ω		250		Popt=0.5 mW
3dB modulation bandwidth	ν_{3dB}	GHz	0.1			Popt=0.5 mW (due to ESD protection diode)
Relative intensity noise	RIN	dB/Hz		-130,0	-120,0	Popt = 0.5 mW @ 1 GHz
Wavelength tuning over current		nm/mA		0,60		
Wavelength tuning over temperature		nm/K		0,06		
Thermal resistance (VCSEL chip)	R _{thermal}	K/mW	3		5	
Side mode supression		dB	30			
Beam divergence	θ	°	10		25	Popt=0.5 mW, full width 1/e2
Spectral bandwidth	$\Delta\lambda$	MHZ		100,0		Popt=0.5 mW
TEC current		mA			500,0	appropriate heatsink required
NTC Thermistor Resistance		K Ω	9,5	10	11	T=25°C
NTC Temperature Dependence		K Ω				10/exp[3892*(1/298K-1/T _{op})]
Wavelength tuning over TEC current		nm/mA		0,008		TEC current < 200 mA
ESD damage treshold		V	2000			Human body model

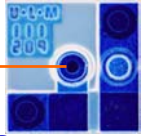
ABSOLUTE MAXIMUM RATINGS

Storage temperature	-40 .. 125°C
Operating temperature	-20 .. 80°C
Electrical power dissipation	5 mW
Continuous forward laser current	2 mA
Laser reverse voltage	8V
Soldering temperature*:	270°C
(*TEC temperature must be below 150°C)	

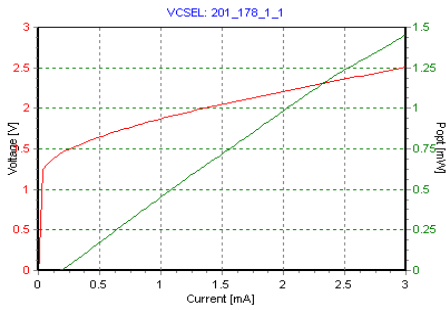
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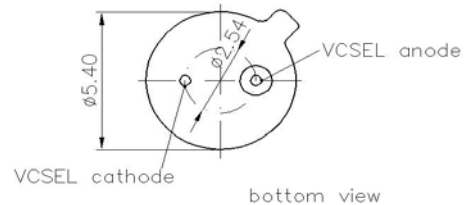
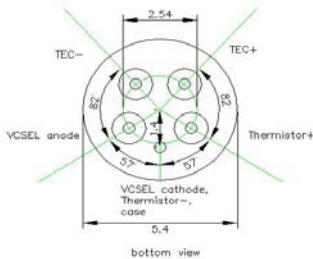
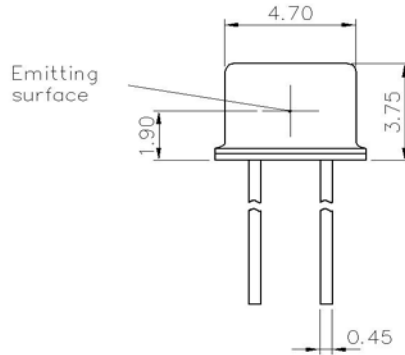
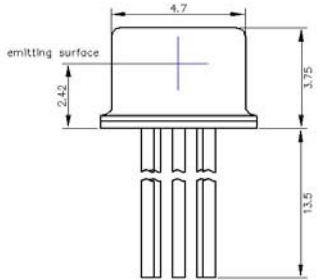
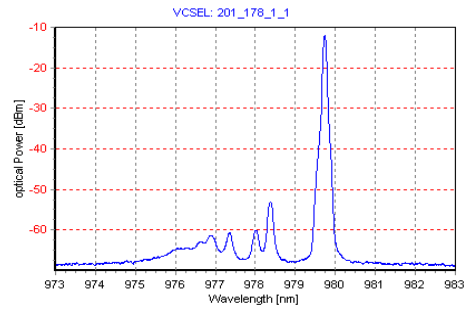
ATTENTION: Electrostatic Sensitive Devices
Observe Precautions for Handling



LIV



Spectral Characteristics



For order please use:

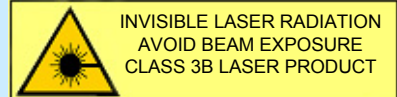
with TEC/Thermistor: ULM980-01-TN-S46FTT

without TEC/Thermistor: ULM980-01-TN-S46FOP

**OPTION: Wide range of TO headers & caps (flat, tilted, ball)
Customer specific wavelength selection on request**

Single Mode VCSEL 980 \pm 3 nm TO46 & TEC

- ◆ Vertical Cavity Surface-Emitting Laser
- ◆ internal TEC and Thermistor
- ◆ Narrow linewidth
- ◆ 2nm tunability with TEC
- ◆ High performance and reliability



ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	UNITS	MIN	TYP	MAX	TEST CONDITIONS
Emission wavelength	λ_R	nm	977	980	983	T=20°C, I _{TEC} =0, P _{OP} =0.5mW
Threshold current	I _{TH}	mA		0,5		T=20°C
Output power	P _{opt}	mW	0,5			T=0 .. 50°C
Threshold voltage	U _{TH}	V		1,6		
Laser current	I _{OP}	mA			2,0	Popt=0.5 mW
Laser voltage	U _{OP}	V		2,0		Popt=0.5 mW
Wallplug efficiency	η_{WP}	%		12		Popt=0.5mW
Slope efficiency	η_S	W/A		0,5		T= 20°C
Differential series resistance	R _S	Ω		250		Popt=0.5 mW
3dB modulation bandwidth	ν_{3dB}	GHz	0.1			Popt=0.5 mW (due to ESD protection diode)
Relative intensity noise	RIN	dB/Hz		-130,0	-120,0	Popt = 0.5 mW @ 1 GHz
Wavelength tuning over current		nm/mA		0,60		
Wavelength tuning over temperature		nm/K		0,06		
Thermal resistance (VCSEL chip)	R _{thermal}	K/mW	3		5	
Side mode supression		dB	30			
Beam divergence	θ	°	10		25	Popt=0.5 mW, full width 1/e2
Spectral bandwidth	$\Delta\lambda$	MHZ		100,0		Popt=0.5 mW
TEC current		mA			500,0	appropriate heatsink required
NTC Thermistor Resistance		K Ω	9,5	10	11	T=25°C
NTC Temperature Dependence		K Ω	10/exp[3892*(1/298K-1/T _{op})]			
Wavelength tuning over TEC current		nm/mA		0,008		TEC current < 200 mA
ESD damage treshold		V	2.000			Human body model

ABSOLUTE MAXIMUM RATINGS

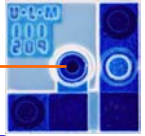
Storage temperature	-40 .. 125°C
Operating temperature	-20 .. 80°C
Electrical power dissipation	5 mW
Continuous forward laser current	2 mA
Laser reverse voltage	8V
Soldering temperature*:	270°C

(*TEC temperature must be below 150°C)

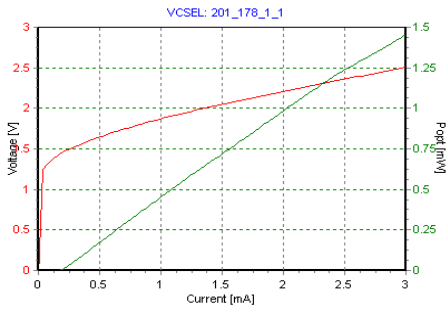
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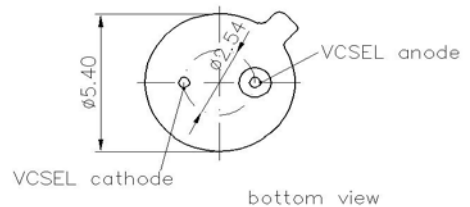
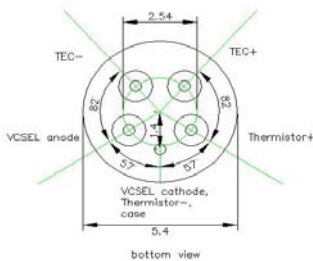
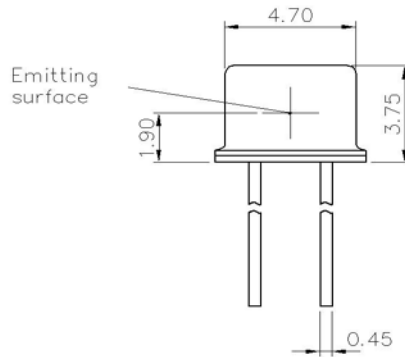
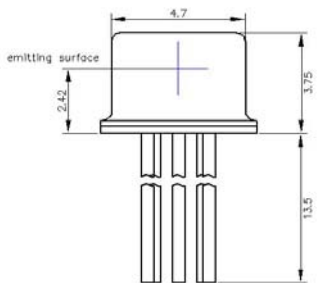
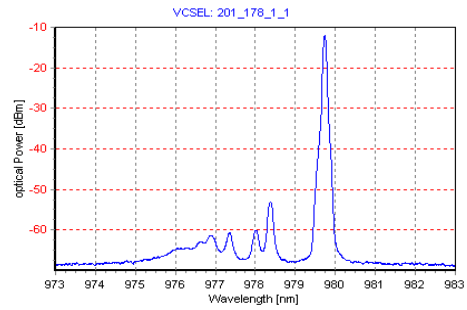
ATTENTION: Electrostatic Sensitive Devices
Observe Precautions for Handling



LIV



Spectral Characteristics



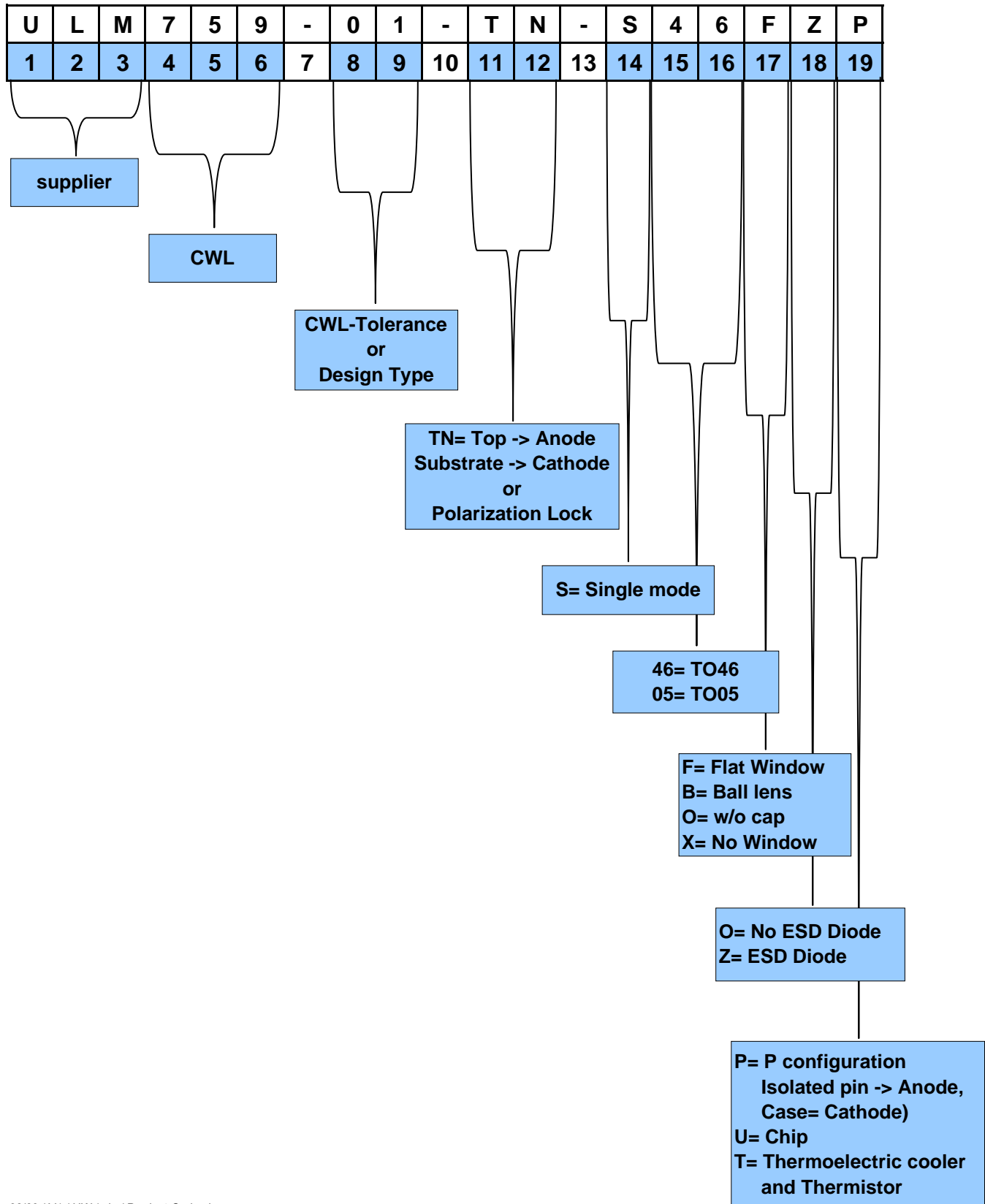
For order please use:

with TEC/Thermistor: ULM980-03-TN-S46FTT

without TEC/Thermistor: ULM980-03-TN-S46FOP

**OPTION: Wide range of TO headers & caps (flat, tilted, ball)
Customer specific wavelength selection on request**

Basic Product Code ULM Photonics



08/09 / V1 / HW / ulm/ Product-Code.xls