

VCSEL pulsed laser in small footprint QFN - 0.6 W pulsed power Preliminary Version 0.1

PLPVQ 940A



Features:

- Multimode VCSEL
- Optical output power 0.6 W (pulsed)
- Laser wavelength 940 nm
- Laser aperture 10 μm (diameter) x 40 μm (pitch)
- Cost effective package for high volume applications

Applications

- Flood illuminator for mobile applications

Notes

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 "Safety of laser products".

Ordering Information

Type:	Peak wavelength λ_{peak} [nm]	Peak output power P_{opt} [W] $I_{\text{F}} = 1 \text{ A}, t_{\text{p}} = 9 \text{ ms}$	Ordering Code
PLPVQ 940A	940	0.6	Q65112A6002

Maximum Ratings

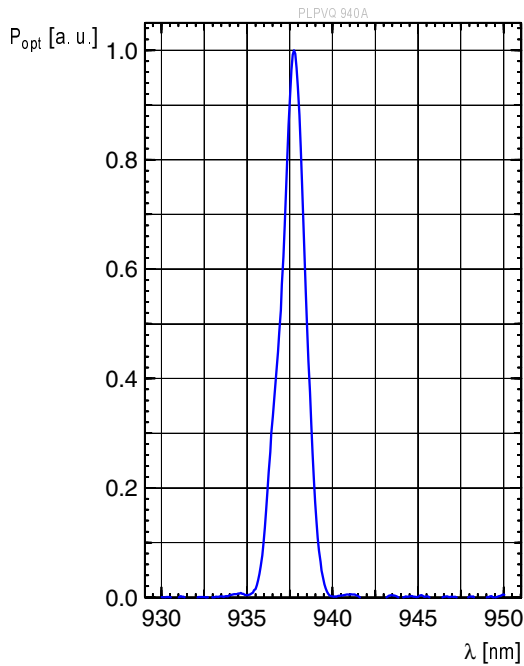
Parameter	Symbol	Values	Unit
Operating temperature range	T_{op}	0 ... 60	°C
Storage temperature range	T_{stg}	-40 ... 85	°C
Junction temperature	T_j	110	°C
Reverse voltage	V_R	5	V
Forward current	I_F	0.75	A
Surge current	I_{FSM}	1.2	A
Output power (continuous wave)	P_{cw}	0.48	W

Characteristics ($I_F = 1$ A, $t_p = 9$ ms, $f = 60$ Hz, $T_A = 25$ °C)

Parameter	Symbol	Values			Unit
		min	typ	max	
Peak wavelength ^{2) page 10}	λ_{peak}	932	940	948	nm
Spectral width (FWHM) ^{2) page 10}	$\Delta\lambda$		1.5		nm
Peak output power ^{2) page 10}	P_{opt}	0.5	0.6	0.75	W
Threshold current	I_{th}		0.11		A
Forward voltage ^{2) page 10}	V_F	1.5	2.2	2.5	V
Fall Time	t_f		1		ns
Rise time	t_r		1		ns
Aperture size			10		μm
Field of view (HFOV)	Θ		65		°
Field of view (VFOV)	Θ_{\perp}		78		°
Wall plug efficiency (after diffusor)	WPE		27		%
Temperature coefficient of wavelength	TC_{λ}		0.07	0.1	nm / K
Thermal resistance	$R_{th,JS}$		22		K / W

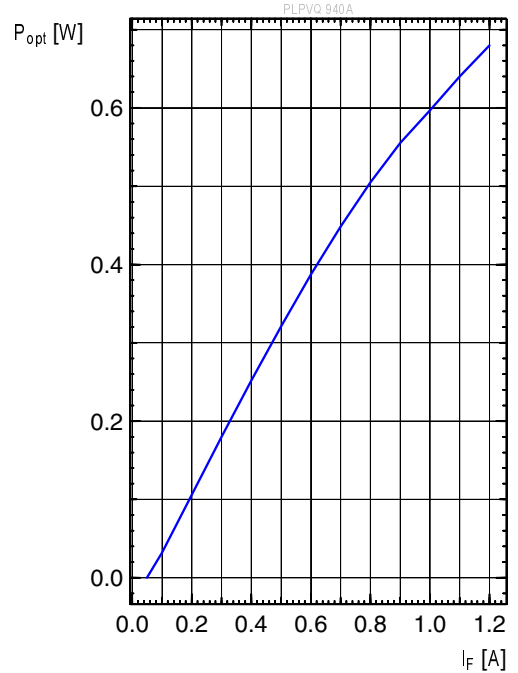
Relative Spectral Emission ^{3) page 10}

(typ) $I_{rel} = f(\lambda)$, $P_{opt} = 0.6 \text{ W}$, $t_p = 9 \text{ ms}$, $T_A = 25 \text{ }^\circ\text{C}$



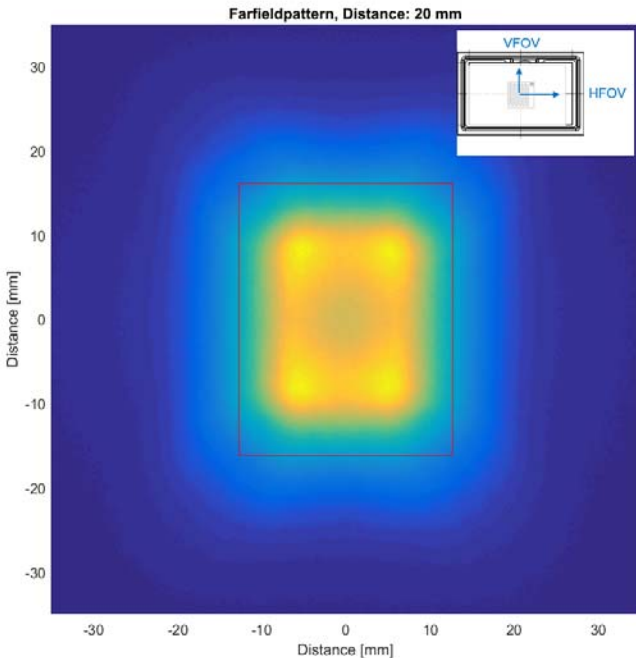
Optical Peak Output Power ^{3) page 10}

$P_{opt} = f(I_F)$, $t_p = 9 \text{ ms}$, $T_A = 25 \text{ }^\circ\text{C}$



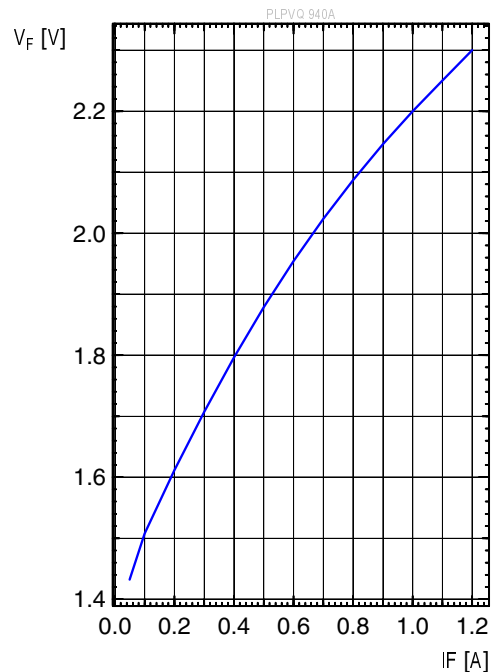
Far-Field Illumination Pattern ^{3) page 10}

$P_{opt} = 0.6 \text{ W}$, $d = 20 \text{ mm}$ (distance to flat screen), $T_A = 25 \text{ }^\circ\text{C}$ (rectangle shows HFOV & VFOV)

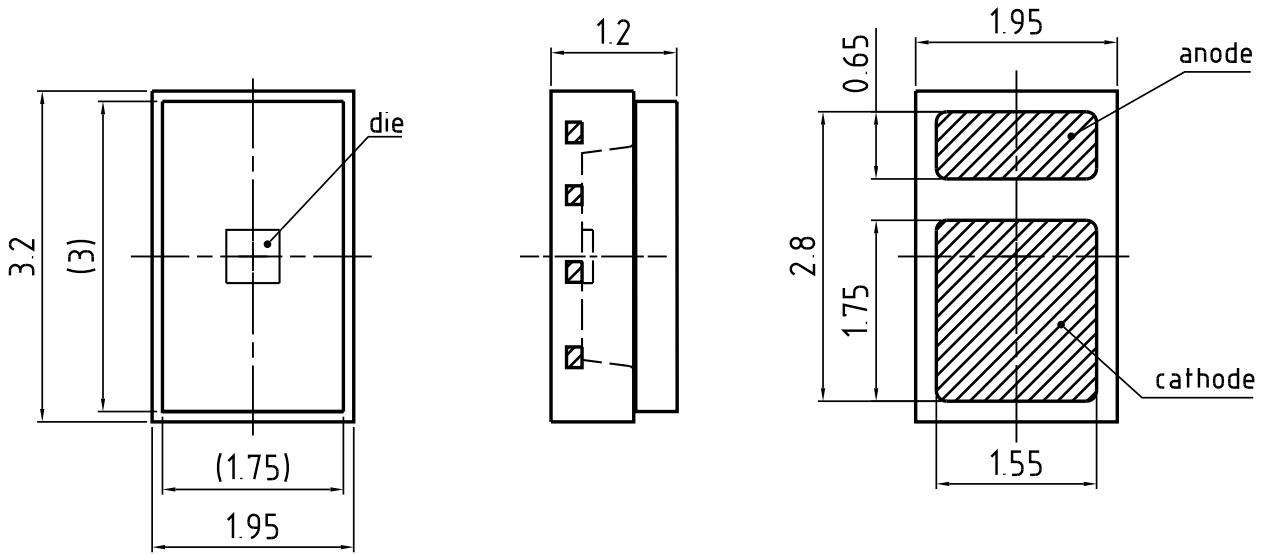


Forward Voltage ^{3) page 10}

$V_F = f(I_F)$, $t_p = 9 \text{ ms}$, $T_A = 25 \text{ }^\circ\text{C}$



Package Outline

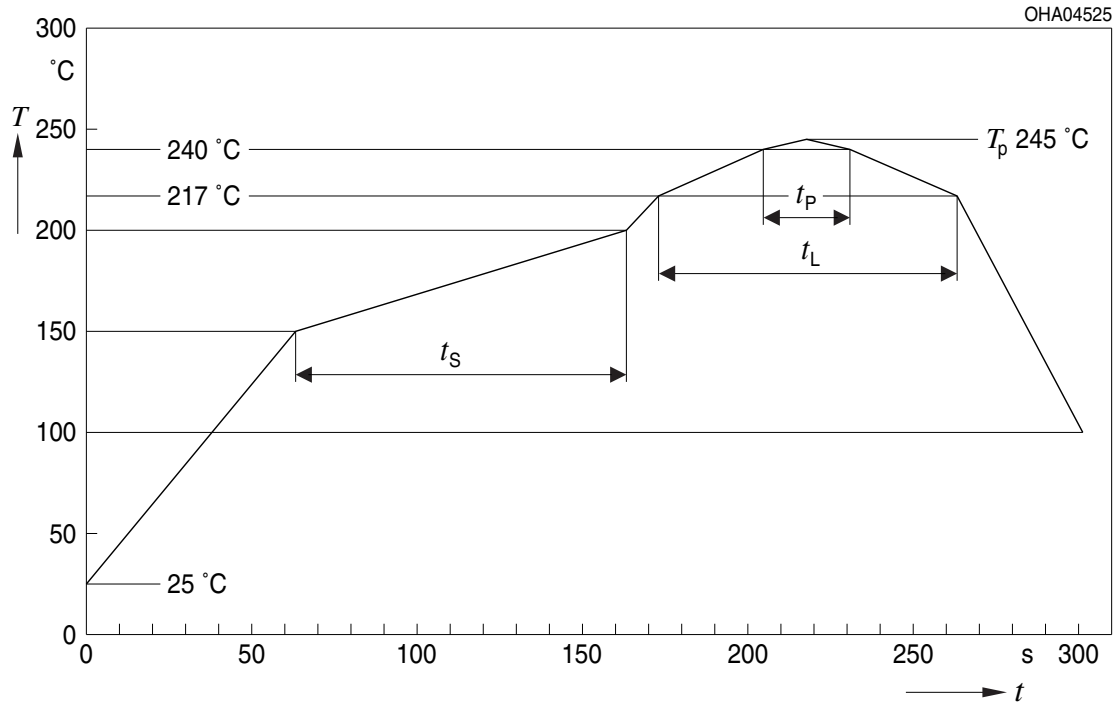


Dimensions in mm.
(tolerances are specified with ± 0.1 mm)

C67062-A0276-A1-03

Reflow Soldering Profile

Product complies to MSL Level 3 acc. to JEDEC J-STD-020E



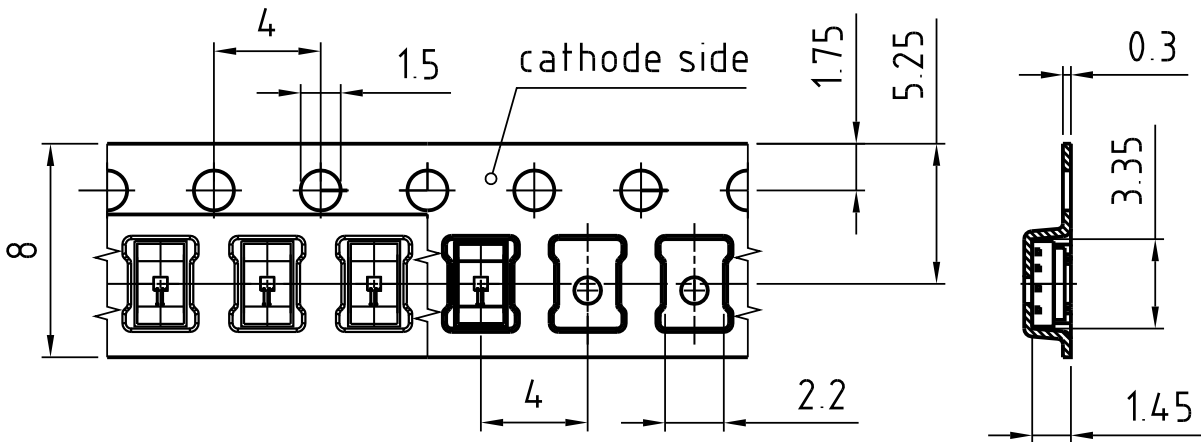
OHA04612

Profile Feature Profil-Charakteristik	Symbol Symbol	Pb-Free (SnAgCu) Assembly			Unit Einheit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_S T_{Smin} to T_{Smax}	t_S	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L	217			°C
Time above liquidus temperature	t_L		80	100	s
Peak temperature	T_P		245	260	°C
Time within 5 °C of the specified peak temperature $T_P - 5$ K	t_p	10	20	30	s
Ramp-down rate* T_P to 100 °C			3	6	K/s
Time 25 °C to T_P				480	s

All temperatures refer to the center of the package, measured on the top of the component

* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping

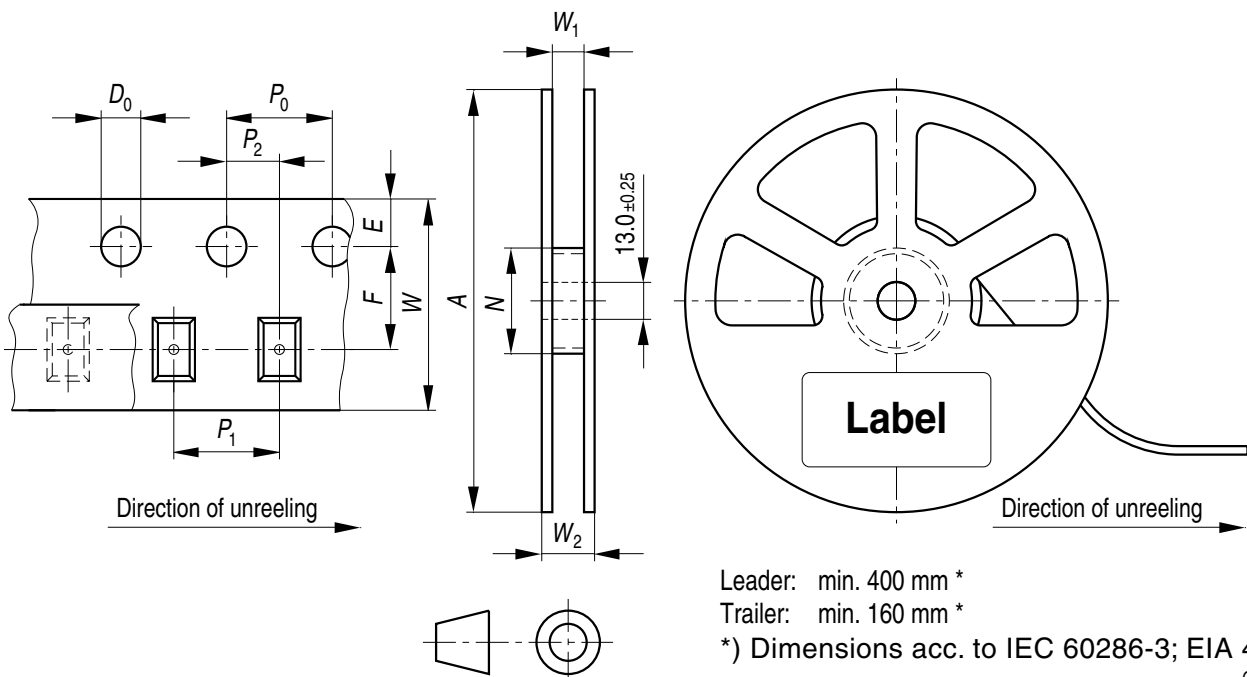


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Dimensions in mm.

Tape and Reel

8 mm tape with 2500 pcs. on Ø 180 mm reel



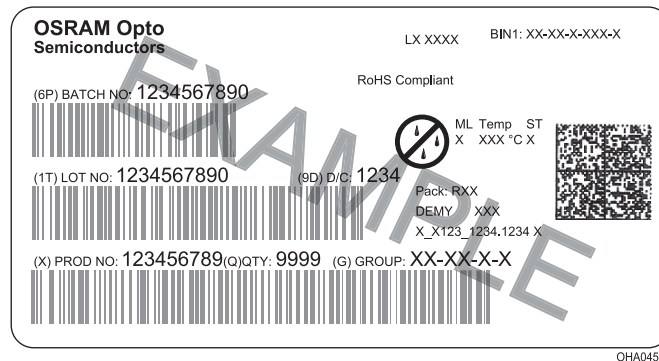
Tape dimensions [mm]

W	P ₀	P ₁	P ₂	D ₀	E	F
8 + 0.3 / -0.1	4 ± 0.1	2 ± 0.05 or 4 ± 0.1	2 ± 0.05	1.5 ± 0.1	1.75 ± 0.1	3.5 ± 0.05

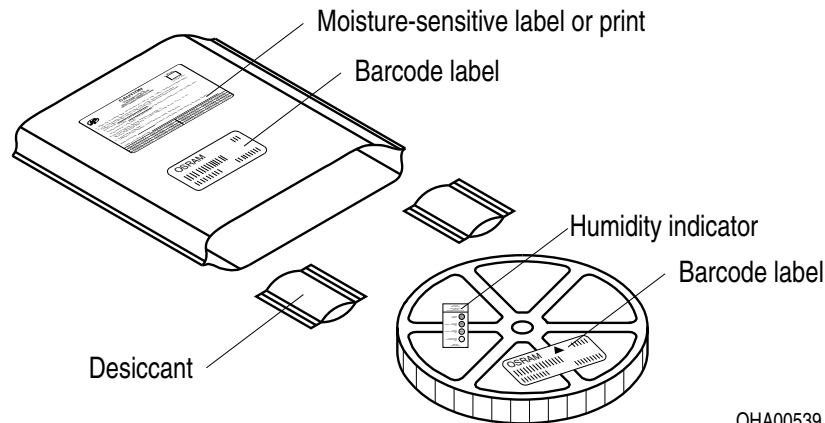
Reel dimensions [mm]

A	W	N _{min}	W ₁	W _{2max}
180	8	60	8.4 + 2	14.4

Barcode-Product-Label (BPL)



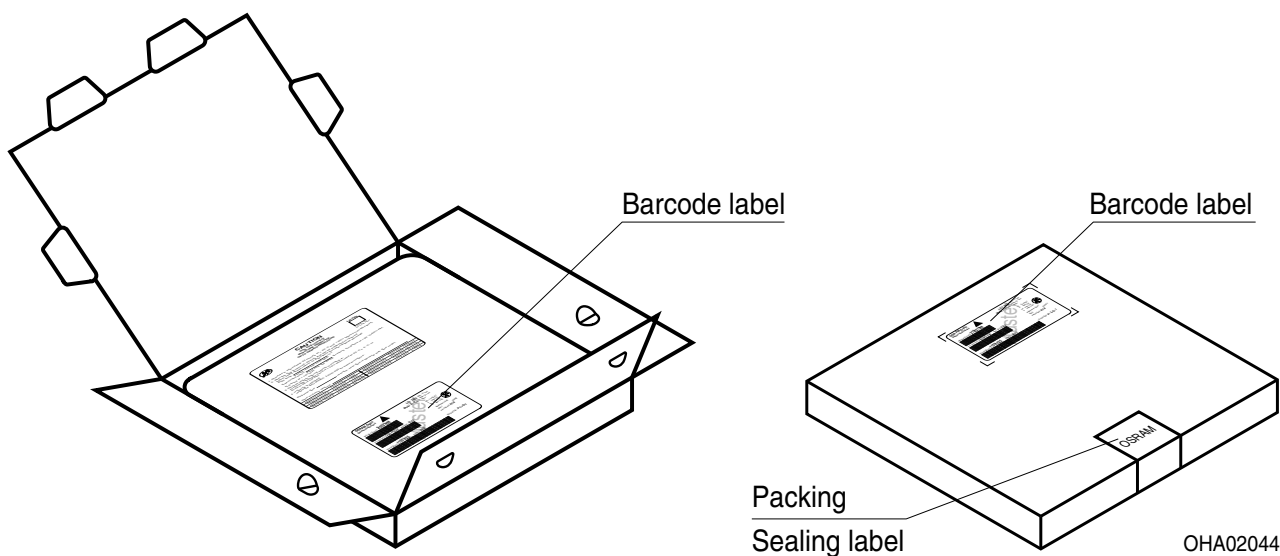
Dry Packing Process and Materials



Note:

Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card. Regarding dry pack you will find further information in the internet. Here you will also find the normative references like JEDEC.

Transportation Packing and Materials



Dimensions of transportation box in mm

Width	Length	Height
200 ± 5	195 ± 5	30 ± 5

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Glossary

- 1) **Soldering temperature:** 2 mm from bottom edge of case
- 2) **Standard operating conditions:** Standard operating conditions refer to pulses of 9 ms width at 60 Hz rate with 1 A operating current at $T_A = 25\text{ °C}$.
- 3) **Typical Values:** Due to the special conditions of the manufacturing processes of VCSEL Array, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.

Published by OSRAM Opto Semiconductors GmbH
Leibnizstraße 4, D-93055 Regensburg
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