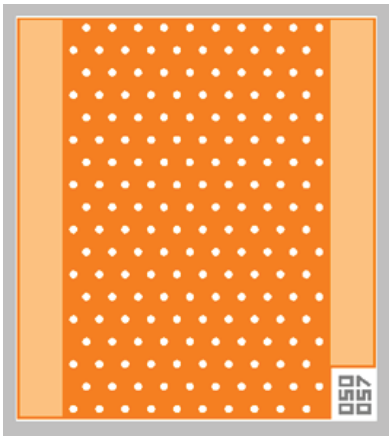
LUMENTUM

10 W 940 nm Triple-Junction VCSEL Array

22184910



The Lumentum 10 Watt 940 nm triple-junction VCSEL array is a solution designed for time-of-flight (ToF) 3D sensing applications. Our triple-junction design takes advantage of the market-leading multi-junction technology to reach 10 Watt high peak power to enable more capable sensing and vision systems that can operate under a wide range of lighting conditions and creates diverse use cases, ranging from extended reality to industrial applications like robotics, intelligent buildings, and logistics systems.

Key Features

- 10 W peak optical power
- Triple-junction design
- High efficiency and reliability
- 940 nm VCSEL array for both indoor and outdoor use

Applications

- Time-of-flight (ToF) 3D sensing applications
- Robotics: obstacle avoidance and visual simultaneous localization and mapping (SLAM)
- Smart buildings: people counting and occupancy sensing
- Artificial intelligence of things (AIoT) applications and machine vision ranging from industrial automation to logistics, healthcare and augmented reality
- Standalone 3D camera

Specifications

Parameter	Units	Minimum	Typical	Maximum	Comments
Electro-Optical in Range of Pulse Conditions					
Operating temperature[1]	oC	-20	50	85	
Operating current	A	-	3.5	4.5	-20 to 85°C
Operating current, extended	A	-	-	5.0	-20 to 70°C
Threshold current	A	0.35	0.60	0.90	-20 to 85°C
Operating voltage	V	4.5	4.9	5.3	3.5A, 50°C
Peak power at 25°C	W	8.4	8.9	9.2	3.5A, 25°C
Peak power at 50°C	W	8.3	8.8	9.1	3.5A, 50°C
Peak power at 70°C	W	8.0	8.5	8.8	3.5A, 70°C
Peak power at 85°C	W	7.4	7.9	8.2	3.5A, 85°C
PCE2 at 50°C	%	47	51	55	3.5A, 50°C
3PCE2 at 70°C	%	46	50	54	3.5A, 70°C
Operating voltage	V	4.7	5.1	5.5	4.5A, 50°C
Peak power at 25°C	W	11.0	11.5	11.8	4.5A, 25°C
Peak power at 50°C	W	10.6	11.1	11.4	4.5A, 50°C
Peak power at 70°C	W	9.8	10.3	10.6	4.5A, 70°C
Peak power at 85°C	W	8.3	8.8	9.1	4.5A, 85°C
PCE2 at 50°C	%	45	49	53	4.5A, 50°C
PCE2 at 70°C	%	42	46	50	4.5A, 70°C
Slope efficiency	W/A	2.6	2.8	3.2	3A to 4A, 50°C
Differential resistance	ohm	0.12	0.14	0.18	3A to 4A, 50°C
Beam Quality in Range of Pulse Conditions					
3.5A Divergence (FW D86)	deg	20.0	24.0	27.0	3.5A, 50°C
4.5A Divergence (FW D86)	deg	20.0	25.5	28.0	4.5A, 50°C
Center wavelength	nm	934	940	946	3.5A to 4.5A, 50°C
Spectral width (RMS)	nm	-	-	2.0	≤4.5A, 50°C
Electro-Optical in Range of Pulse Conditions					
Pulse	ns	1.5	20	100	Choose all parameters to be consistent with the ranges - Example conditions shown below †Recommend max 35% burst duty for highest PCE over temperature
Modulation (1/Pulse Period)	MHz	5	50	300	
Pulse duty cycle	%	-	30	50†	
Burst width	ms	0.1	1.0	3.0	
Burst duty cycle	%	-	-	50	
Overall duty cycle	%	-	4	8	
Rise/fall time	ps	-	-	300	Driver/module limited, VCSEL array guaranteed by design
Maximum Ratings in Range of Pulse Conditions					
Forward voltage Vmax	V	-	-	6.0	To prevent die damage/power drop
Forward current Imax	A	-	-	5.5	
Junction temperature Tjmax	°C	-	-	150	

1 Temperature is defined at backside of VCSEL chip

2 PCE is power conversion efficiency = Pop / Iop*Vop at peak of pulse

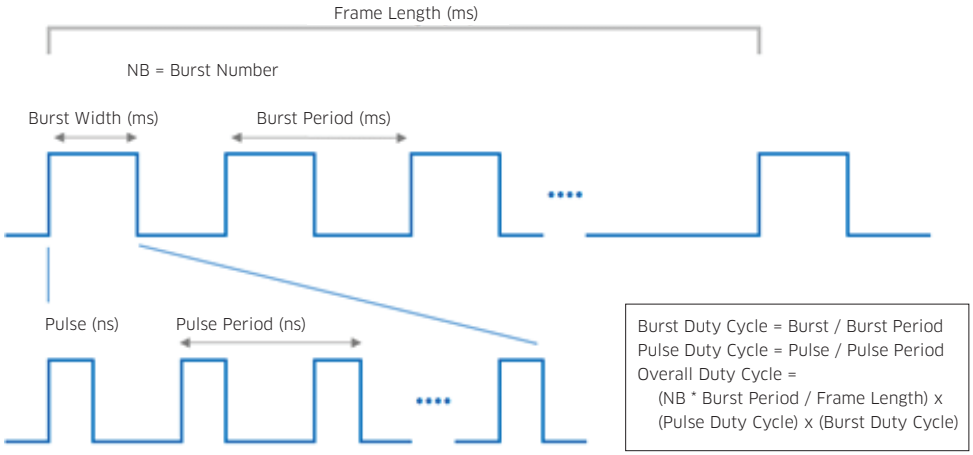


Figure 1: Modulation

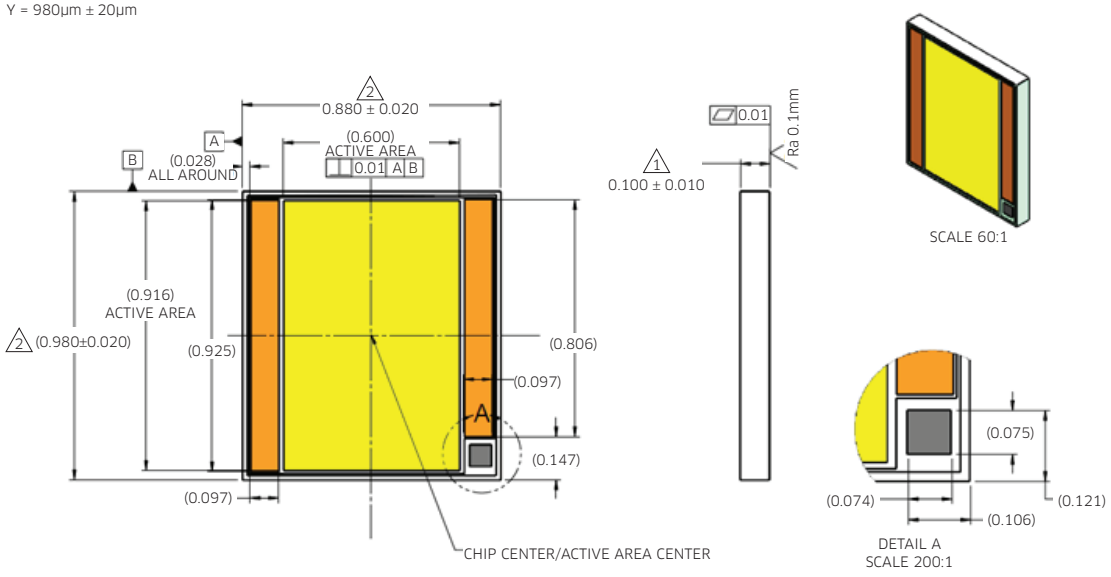
Typical Parameters

- Pulse = 10ns, Pulse Period=30ns, Pulse Duty Cycle=33%
- Burst width = 0.5ms, Burst Period = 1.0ms, Burst Duty Cycle = 50%
- Pulse Number = 4, Frame Length = 16ms, Overall Duty Cycle = 33% x 50% x 4ms/16ms = 4.1%

Mechanical Specifications

NOTE: UNLESS OTHERWISE SPECIFIED

1. DIE THICKNESS = 100µm ± 10µm
2. DIE SIZE: X = 880µm ± 20µm
   Y = 980µm ± 20µm



Laser Safety

Notes:
1. This is an OEM component laser product and does not comply with 21 CFR 1040.10 or IEC 60825-1 requirements for complete laser products. Both IEC 60825-1 and FDA/CDRH certifications are system level requirements.

2. This component requires the provision of drive and control electronics before emitting laser radiation.

3. Laser classification depends upon the system control circuit and any laser safety features provided.

4. Lumentum has registered this laser component with the FDA/CDRH as an OEM component. Please contact Lumentum for an FDA accession no. for this laser component.

Ordering Information

For more information on this or other products and their availability, please contact your local Lumentum account manager or Lumentum directly at customer.service@lumentum.com.

Description	Ordering Number
10 W 940 nm Triple-Junction VCSEL Array	22184910

LUMENTUM

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