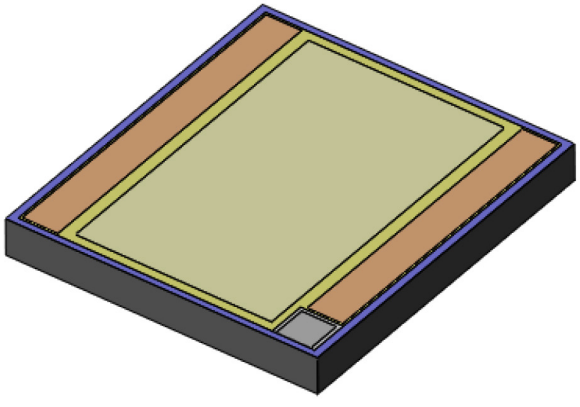
LUMENTUM

3.2 W 940 nm VCSEL Array

22169709



The Lumentum 3.2 Watt 940 nm VCSEL array is a solution designed for time-of-flight (ToF) 3D sensing applications. This product enables 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

- 3.2 W peak optical power
- 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

Specifications

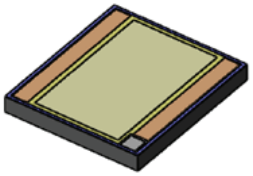
Parameter	Units	Minimum	Typical	Maximum	Specification Comments
Electro-optical in range of Pulse Conditions					
Operating temperature	°C	-20	60	85	
Operating temperature, extended	°C	-40		105	Operation for <1% of time
Operating current	A	-	3.5	6.0	
Threshold current	A	0.3	0.5	0.8	-20 to 85°C chip backside temperature
3.5A Operating voltage	V	1.75	2.05	2.30	3.5A, 50°C chip backside temperature
3.5A Peak power at 50°C	W	2.8	3.1	3.4	3.5A, 50°C chip backside temperature
3.5A Peak power at 70°C	W	2.7	3.0	3.3	3.5A, 70°C chip backside temperature
3.5A Peak power at 85°C	W	2.4	2.7	3.1	3.5A, 85°C chip backside temperature
3.5A PCE[1] at 50°C	%	38%	41%	47%	3.5A, 50°C chip backside temperature
3.5A PCE[1] at 70°C	%	37%	41%	47%	3.5A, 70°C chip backside temperature
3.5A PCE[1] at 85°C	%	34%	38%	44%	3.5A, 85°C chip backside temperature
3.5A Slope efficiency	W/A	0.88	0.93	1.00	2A to 3.5A, 50°C chip backside temperature
3.5A Differential resistance	ohm	-	0.19	0.24	2A to 3.5A, 50°C chip backside temperature
6.0A Operating voltage	V	2.05	2.35	2.60	6.0A, 50°C chip backside temperature
6.0A Peak power at 50°C	W	4.60	4.90	5.30	6.0A, 50°C chip backside temperature
6.0A Peak power at 70°C	W	4.20	4.50	4.80	6.0A, 70°C chip backside temperature
6.0A Peak power at 85°C	W	3.90	4.20	4.60	6.0A, 85°C chip backside temperature
6.0A PCE[1] at 50°C	%	33%	36%	42%	6.0A, 50°C chip backside temperature
6.0A PCE[1] at 70°C	%	31%	34%	40%	6.0A, 70°C chip backside temperature
6.0A PCE[1] at 85°C	%	28%	31%	37%	6.0A, 85°C chip backside temperature
6.0A Slope efficiency	W/A	0.80	0.86	0.93	3A to 6A, 50°C chip backside temperature
6.0A Differential resistance	ohm	-	0.14	0.19	3A to 6A, 50°C chip backside
Beam Quality in range of Pulse Conditions					
3.5A Divergence (FW D86)	deg	17.0	19.5	23.0	3.5A, 50°C chip backside temperature
3.5A Center wavelength	nm	934	940	946	3.5A, 50°C chip backside temperature
6.0A Divergence (FW D86)	deg	19.0	22.5	25.0	6.0A, 50°C chip backside temperature
6.0A Center wavelength	nm	935	942	948	6.0A, 50°C chip backside temperature
Spectral width (RMS)	nm	-	-	2.5	≤6A, 50°C chip backside
Pulsed Operation Conditions					
Within burst modulation	MHz	5	50	100	Need to choose all parameters consistent with the ranges Example conditions - 20MHz, 50% DC, 1.0ms - 60MHz, 25% DC, 1.3ms
Within burst pulse width	ns	2	20	100	
Within burst duty cycle	%	-	30	50	
Burst duration	ms	0.1	1.0	3.0	
Burst-to-burst duty cycle	%	-	25	33	
Rise/fall time	ps	-	-	300	Driver/module limited, VCSEL array guaranteed by design
Maximum ratings in range of Pulse Conditions					
Forward voltage Vmax	V	-	-	2.6	To prevent die damage / power drop
Forward current Imax1	A	-	-	4.0	
Junction temperature Tjmax	°C	-	-	150	

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

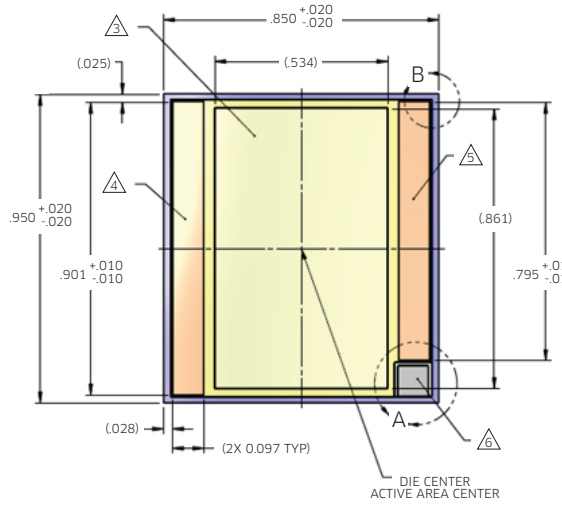
Mechanical Specifications

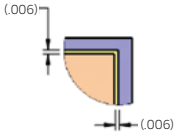
NOTE: UNLESS OTHERWISE SPECIFIED

1. DIE SIZE: X = 850µm ± 20µm
   Y = 950µm ± 20µm
2. DIE THICKNESS = 100µm ± 10µm
3. ACTIVE AREA SIZE: 534µm x 861µm
4. BONDPAD SIZE: X = 97µm TYPICAL, Y = 901µm ± 10µm
5. BONDPAD SIZE: X = 97µm TYPICAL, Y = 795µm ± 10µm
6. 2D BARCODE LOCATION AREA: 95µm x 95µm

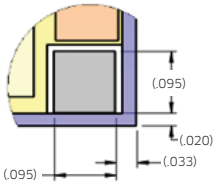


ISO VIEW
SCALE 60:1
REF ONLY

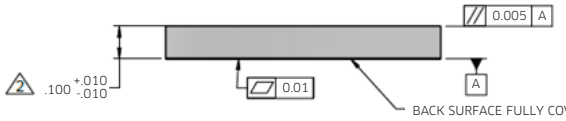




DETAIL B
SCALE 200:1



DETAIL A
SCALE 200:1



Laser Safety

Notes:
1. This component requires the provision of drive and control electronics before emitting laser radiation.
2. Laser classification depends upon the system control circuit and any laser safety features provided.
3. Both IEC 60825-1 and FDA/CDRH certifications are system-level requirements.
4. Laser is registered with the FDA/CDRH as an OEM component. FDA accession no. can be provided upon request.

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
3.2 W 940 nm VCSEL array	22169709

LUMENTUM

North America
Toll Free: 844 810 LITE (5483)

Outside North America
Toll Free: 800 000 LITE (5483)

China
Toll Free: 400 120 LITE (5483)

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