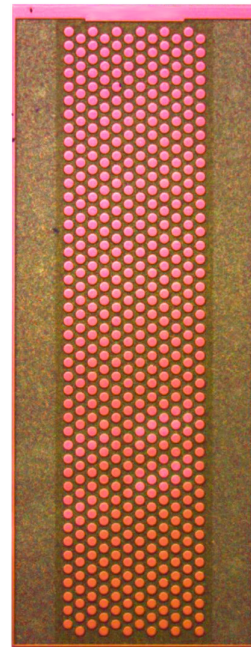


400 W 905 nm Multi-Junction VCSEL Array

M53-100



The M53-100, a 400 W 905 nm multi-junction VCSEL array, is an innovative, automotive-qualified product, ideal for short- to long-range flash time-of-flight (ToF) LiDAR solutions in automotive, industrial, and robotics applications. The M53-100 capitalizes on its unprecedented high 400 W peak optical power and small form factor to provide unparalleled power density for illumination of the scene, enabling the LiDAR systems of the future.

M53-100 is part of the M Series VCSEL products that are optimized for tomorrow's LiDAR, providing high quality, cost-effective solutions for automotive and industrial environments.

All M Series products are based on Lumentum's decades of large-scale consumer manufacturing and deliver advantages in efficiency, scalability, and reliability.

Key Features

- 1.08 mm² chip size
- 400 W typical peak optical power at 25°C (8ns PW, 0.1% DC, I_{op} 98A)
- 4.2 W/A typical slope efficiency
- IATF-16949 certified manufacturing and AEC-Q102 qualified

Benefits

- High power density with small form factor
- Best-in-class peak power enables short- to long-range flash LiDAR

Applications

- Automotive and industrial 3D sensing
- Advanced robotics
- Short- to long-range LiDAR
- Mechanical LiDAR
- Solid-state e-scanning LiDAR

Electrical and Optical Characteristics

	Units	Minimum	Typical	Maximum	Comments
Electrical					
Operating temperature	°C	-40	25	125	Junction temperature
Operating current	A	-	98	125	-40°C-125°C
Operating voltage	V	-	16	-	25°C
Peak power	W	300	400	-	-40°C-125°C
Pulse duration	ns	-	8	12	Pulse width used for specification; Chip may be driven under other conditions
Duty cycle	%	-		0.1	
Power conversion efficiency	%	-	25	-	25°C
Slope efficiency	W/A	-	4.2	-	25°C
Differential resistance	ohm	-	0.11	0.2	-40°C-125°C
Optical					
Divergence (FW D86)	deg	-	19	23	25°C
Central wavelength	nm	897	905	913	25°C
Spectral width (-8.5 dB from peak)	nm	-	2.0	4.0	25°C

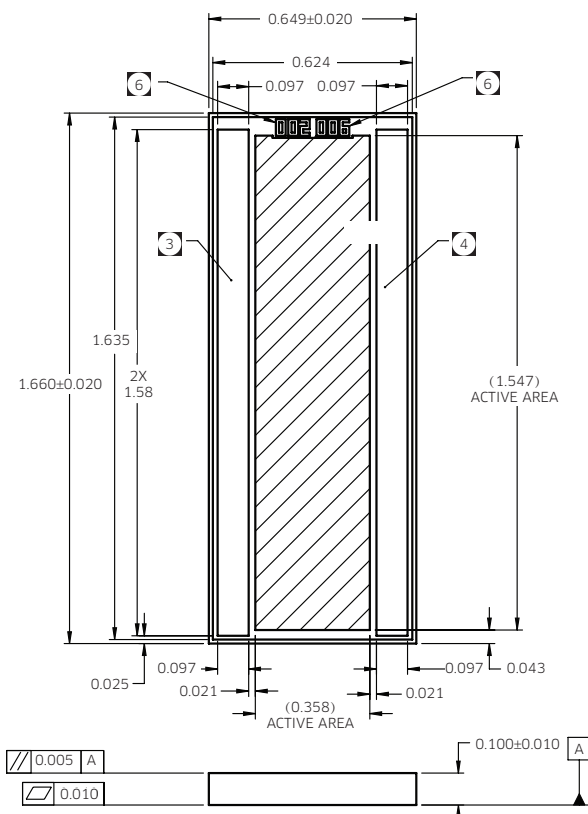
Absolute Maximum Characteristics

	Units	Minimum	Typical	Maximum	Comments
Absolute Maximum Rating					
Forward voltage $V_{\max}$	V	-	-	23	25°C, <12 ns pulse duration, < 0.1% duty-cycle
Forward current $I_{\max}$	A	-	-	150	
Active region temperature	°C	-	-	150	Under any drive conditions

Mechanical Characteristics:

NOTE: UNLESS OTHERWISE SPECIFIED

- ① DIE SIZE: $X=649\mu\text{m}\pm 20\mu\text{m}$
 $Y=1660\mu\text{m}\pm 20\mu\text{m}$
- ② DIE THICKNESS= $100\mu\text{m}\pm 0.10\mu\text{m}$
- ③ BONDPAD ZONE A SIZE: $X=97\mu\text{m}\pm 10\mu\text{m}$
 $Y=1580\mu\text{m}\pm 10\mu\text{m}$
- ④ BONDPAD ZONE B SIZE: $X=97\mu\text{m}\pm 10\mu\text{m}$
 $Y=1580\mu\text{m}\pm 10\mu\text{m}$
- ⑤ CHIP ACTIVE AREA: $1547\mu\text{m} \times 358\mu\text{m}$
- ⑥ CHIP ID LOCATION



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. Compliance with 21CFR 1040.10 and/or IEC 60825-1:2014 will need to be determined at the system level

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
400 W 905 nm Multi-Junction VCSEL Array, M53-100	22101077



North America
Toll Free: 844 810 LITE (5483)

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

China
Toll Free: 400 120 LITE (5483)

© 2022 Lumentum Operations LLC
Product specifications and descriptions in this document are subject to change without notice.