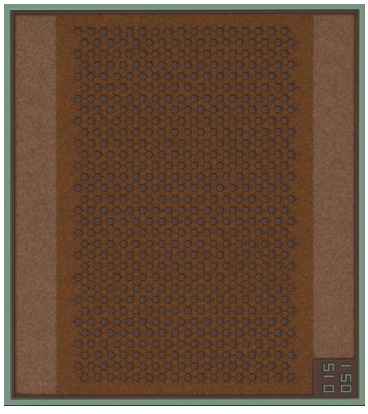
LUMENTUM

Automotive-Grade 10 W 940 nm VCSEL Array for In-Cabin Applications



The Lumentum 10 W 940 nm Multi-Junction VCSEL array is a time-of-flight (ToF) illuminator designed to meet automotive-grade standards for in-cabin 3D sensing. Manufactured at an IATF-16949 certified foundry, this high reliability product is a perfect solution for automotive and industrial applications such as driver monitoring systems, occupant monitoring systems, and gesture recognition and control.

Key Features

- 10 W peak optical power at 6A, 50°C
- 940 nm multi-junction VCSEL array
- Double-bond pad design
- Uniform VCSEL array with 544 emitters
- High efficiency and reliability
- AEC-Q102 qualified

Applications

- ToF sensing applications
- Short-range ToF flash LiDAR
- Vehicle in-cabin monitoring systems
- Driver monitoring systems
- Occupant monitoring systems
- Gesture recognition and control

Specifications

Parameter	Units	Minimum	Typical	Maximum	Comments
Electro-Optical @ 6.0 A					
Operating temperature	°C	-40	50	105	Defined as at backside of VCSEL chip
Operating current	A	-	6.0	7.0	-40 to 85°C
Operating voltage	V	3.4	3.75	4.1	6.0A, 50°C
Peak power	W	9.9	10.9	12.1	6.0A, 50°C, iTOF data
Threshold current	A	0.5	0.9	1.6	0 to 85°C
Power conversion efficiency	%	42	47	52	6.0A, 50°C
Slope efficiency	W/A	1.7	1.95	2.2	2A to 3A, 50°C
Series resistance	ohm	0.15	0.19	0.24	6.0A, 50°C
Beam Quality @ 6.0 A					
Divergence (FW D86)	deg	13.0	15.5	18.0	iTOF, 6.0A, 50°C
Center wavelength	nm	933	940	947	6.0A, 50°C
Spectral width (-8.6dB from peak)	nm	-	2.3	4.0	≤6.0A, 50°C
Pulsed Operation					
Duty cycle modulation (1/pulse period)	MHz	5	50	300	
Pulsed duration	ns	1.5	20	100	
Burst duration	ms	0.1	1.0	3.0	
Rise/fall time	ps	-	-	300	
Rise/fall time	ps	-	-	300	Driver/module limited, VCSEL array guaranteed by design
Maximum Rating					
Forward voltage Vmax	V	-	-	4.5	
Forward current Imax	A	-	-	7.0	
Junction temperature Tj_{max}	°C	-	-	150	

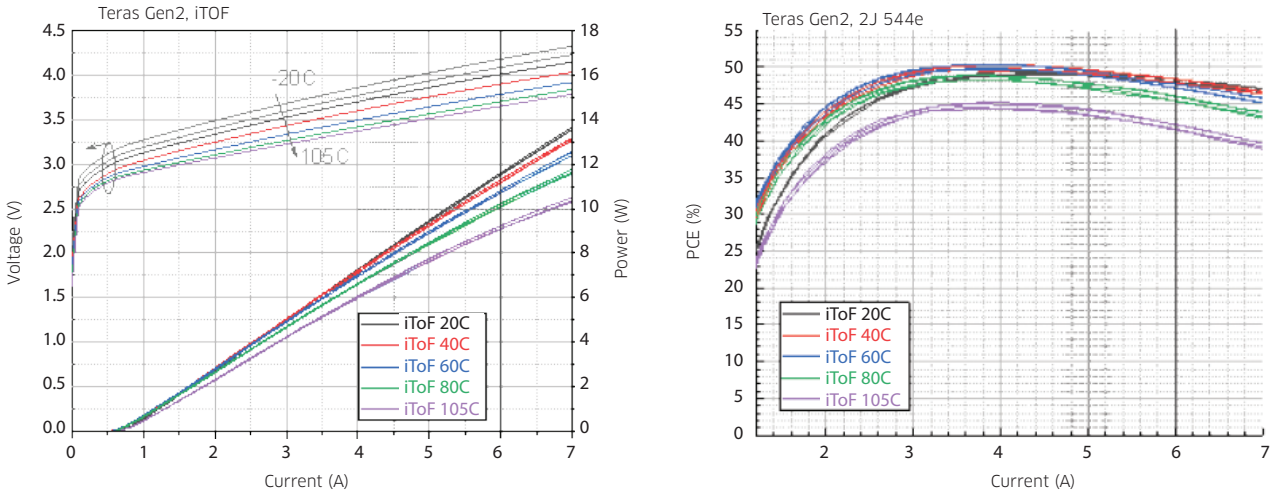
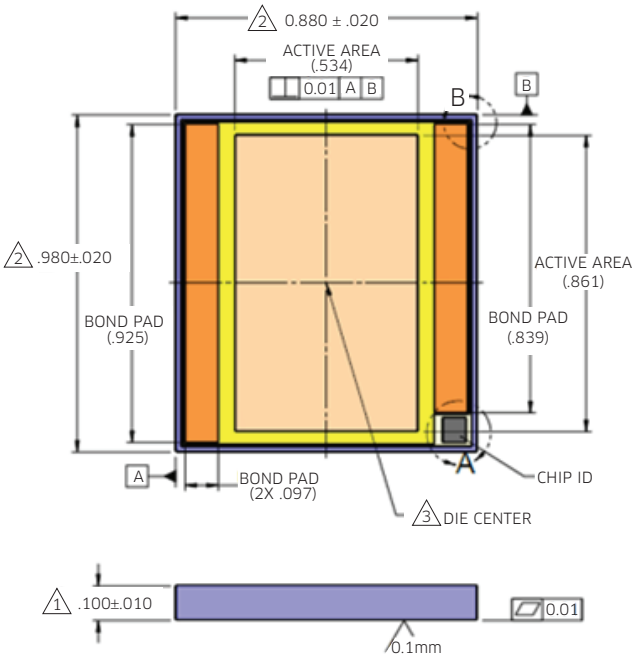


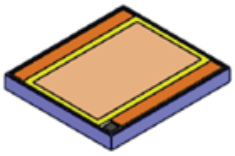
Figure 1: Typical iTOF LIV Performance

Mechanical Specifications

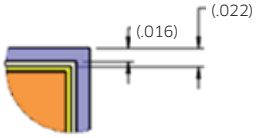
NOTE: UNLESS OTHERWISE SPECIFIED

1. DIE THICKNESS = 100µm ± 10µm
2. DIE SIZE: X = 880µm ± 20µm
   Y = 980µm ± 20µm
3. DIE CENTER: (0,0)
   ACTIVE AREA CENTER: (0. -0.021µm)

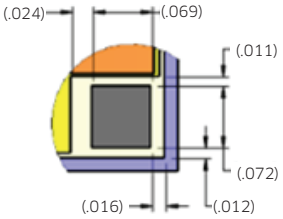




ISO VIEW
SCALE 60:1



DETAIL B
SCALE 250:1



DETAIL A
SCALE 250:1

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. 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
10 W 940 nm VCSEL Array	22226595

LUMENTUM

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