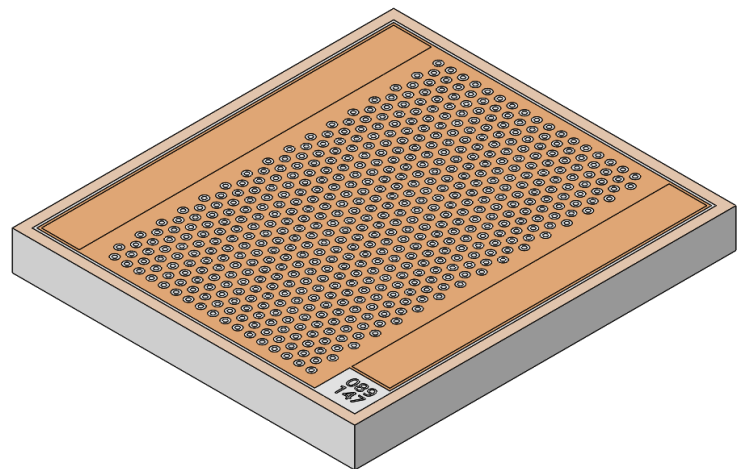


Automotive-Grade High-Power 940 nm VCSEL Array for In-Cabin Applications



Lumentum high-power VCSEL array is designed to meet automotive-grade standard for in-cabin 3D sensing applications. This product is manufactured at an IATF-16949 certified foundry. With a high optical power and reliability, this product is a perfect solution for driver monitoring systems and gesture control for in-cabin applications.

Key Features

- Operating temperature from -40°C to 125°C
- High efficiency and reliability
- Double-bond pad design

Applications

- Time of flight (ToF) 3D sensing
- Vehicle interior monitoring system
- Driver assistance system
- Gesture recognition and control

Product Specifications

	Units	Minimum	Typical	Maximum	Comments
Electro-optical @ 4.0 A					
Operating temperature	°C	-10	50	85	
Operating temperature - extended range	°C	-40		125	Extended operation for <1% of operating time
Operating current	A	–	4	–	
Operating voltage	V	1.7	2	2.3	4.0 A, 50°C chip backside temperature
Peak power	W	2.8	3.2	3.6	4.0 A, 50°C chip backside temperature
Threshold current	A	–	0.7	–	4.0 A, 50°C chip backside temperature
Beam Quality @ 4.0 A					
Far-field profile		–	M-Shape	–	4.0 A, 50°C chip backside temperature
Divergence (FW D86)	deg	18	21	24	4.0 A, 50°C chip backside temperature
Center wavelength	nm	934	940	946	4.0 A, 50°C chip backside temperature
Pulsed Operation					
50% duty cycle modulation	MHz	10	50	100	Simulated die test condition for actual ToF burst - specifications apply for this range of operating condition
Pulsed duration	nS	10	20	100	
Burst duration	mS	0.1	1.0	3.0	
Rise/Fall time	pS	–	–	500	Driver/Module limited, VCSEL array guaranteed by design
Mechanical					
Die height	µm	960	980	1000	–
Die width	µm	860	880	900	–
Die thickness	µm	90	100	110	–
Reliability					
Definition of failed (i.e. dead) emitter	mw	2.57	–	–	50% x 2.8W / 544
Number of dead emitters at beginning of life (BOL)	# of emitters	–	–	3	–
Definition of chip failure by power drop% (EOL)	%	–	–	10%	When power drop >=10%, defined to be chip failure
Cumulative failures over one year of system time	ppm	–	–	100	Cumulative VCSEL ON time = <120 hrs (estimated)
Cumulative failures over three years of system time	ppm	–	–	250	Cumulative VCSEL ON time = <360 hrs (estimated)

Typical Characteristics

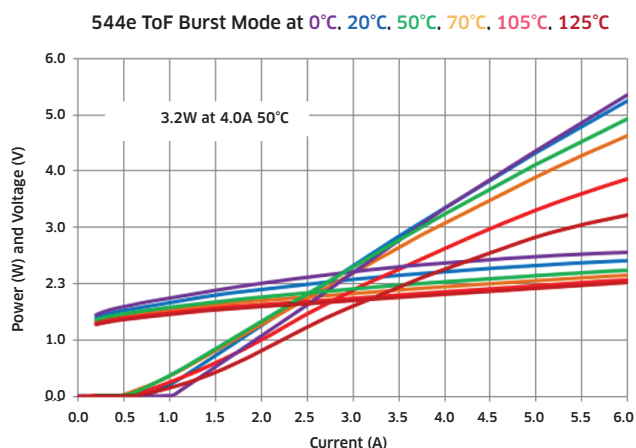


Figure 1: VCSEL LIV characterization

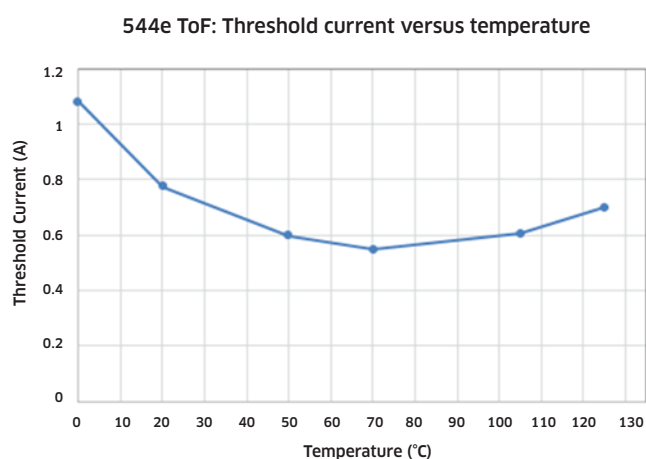


Figure 2: Threshold current vs temperature

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 number 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.



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