

PN: K0-0940M-0000-00009

Desc: Assy/ Die; 940; MM; R10X40; 0.5W; 0.515mm X 0.515mm

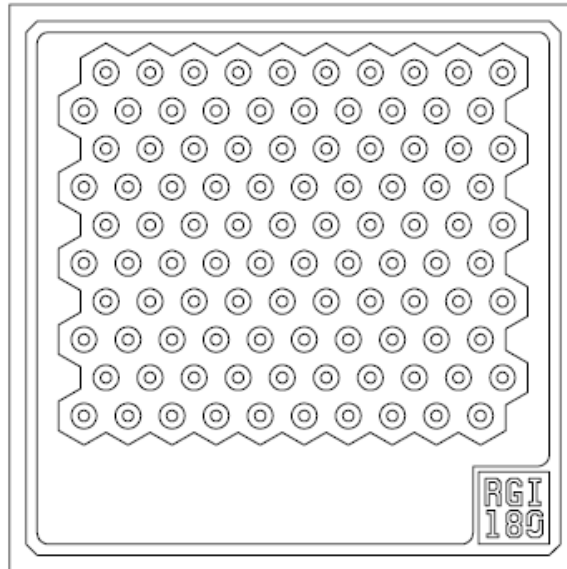


Figure 1 K0-0940M-0000-00009

Near Infra-Red Vertical Cavity Surface Emitting Laser (VCSEL)

Model: Multi Mode Array VCSEL
Center wavelength: 940nm
Optical power without diffuser: 0.5 Watt

Applications

- Motion Control
- Time of Flight
- Automotive Sensing
- 3D Scanning
- Gesture Recognition
- IR illumination for Security



COMPLIES WITH IEC 60825-1, 2nd Edition 2007.
COMPLIES WITH 21 CFR 1040.10 AND 1040-10.11 EXCEPT FOR DEVIATIONS PURSUANT TO LASER NOTICE NO.50 DATED 27 MAY 2001.

Absolute Maximum Ratings

Parameter	Rating	Notes
Storage temperature	-40 to 100 °C	
Operating temperature (VCSEL)	-20 to 65 °C	85 °C with reduced efficiency
Maximum package SMT solder reflow temperature	260°C, 10 seconds	
Maximum pulsed current	1 A	≤ 200 μs pulse width, ≤ 10% duty cycle, Temp ≤ 40 °C, Note 1
Laser reverse voltage	5 V	Note 1
ESD damage threshold	±2kV	MIL_STD-883D, Method 3015.7 human body model, Note 1

Note 1 Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated for extended periods of time may affect device reliability.

Electro-Optical Characteristics

VCSEL Operating Temp (Tv) = 25 °C, Test condition: 100μs pulse width & 1% duty cycle unless otherwise noted. Die performance parameters require the VCSEL die to have adequate heat sinking and proper thermal management.

Parameter	Symbol	Units	Without Diffuser			With Diffuser			Notes
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Threshold current	Ith	mA	--	110	--	--	110	--	
Differential resistance	Rs	Ω	--	1	--	--	1	--	
Operating voltage	Vf	V	--	2	2.3	--	2	2.3	at I = 650 mA
Optical operating power	Lop	W	--	0.50	--	--	0.42	--	at I = 650 mA
Slope efficiency	SE	W/A	--	.98	--	--	.8	--	at I = 650 mA
Power conversion efficiency	PCE	%	--	39	--	--	34	--	at I = 650 mA
Breakdown voltage	Vrb	V	--	-10	-8	--	-10	-8	Irb = -1 μA
Beam divergence	FWHM	deg	--	21	--	N/A	N/A	N/A	
Beam divergence	1/e ²	deg	--	26	--	N/A	N/A	N/A	Full width
Operating peak wavelength	WLpeak	nm	930	940	950	930	940	950	
Wavelength-Temp tuning		nm/°C	--	0.066	--	--	0.066	--	
Rise time		ps	--	--	800	--	--	--	20%-80%
Fall time		ps	--	--	1000	--	--	--	20%-80%

Electro-Optical Characteristic require further evaluation. Values are based on limited sample size. Parameter's "With Diffuser" are based on estimated values. Actual performance requires further evaluation.

Note 2: Rise and Fall time will vary depending on driver board and electrical layout.

Typical Performance

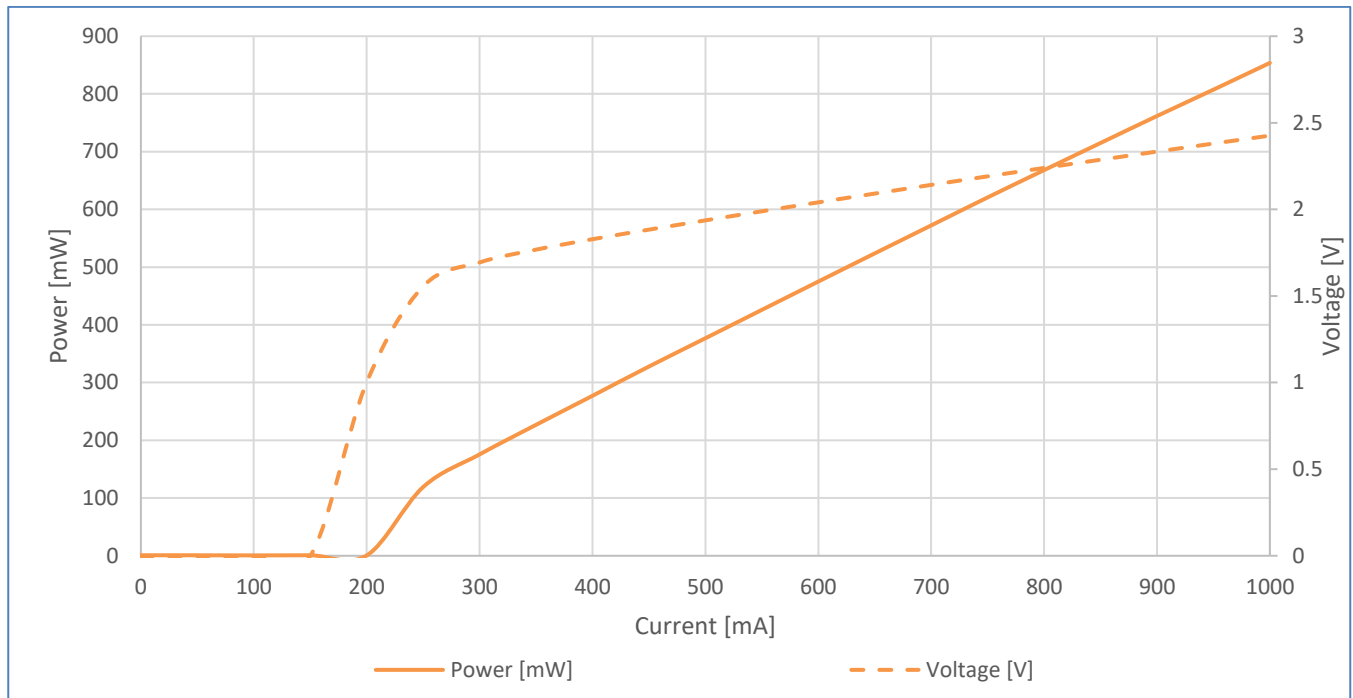


Figure 2 Typical 940nm 500mW LIV at 25°C, 100µs pulse, 1% duty cycle. No Diffuser

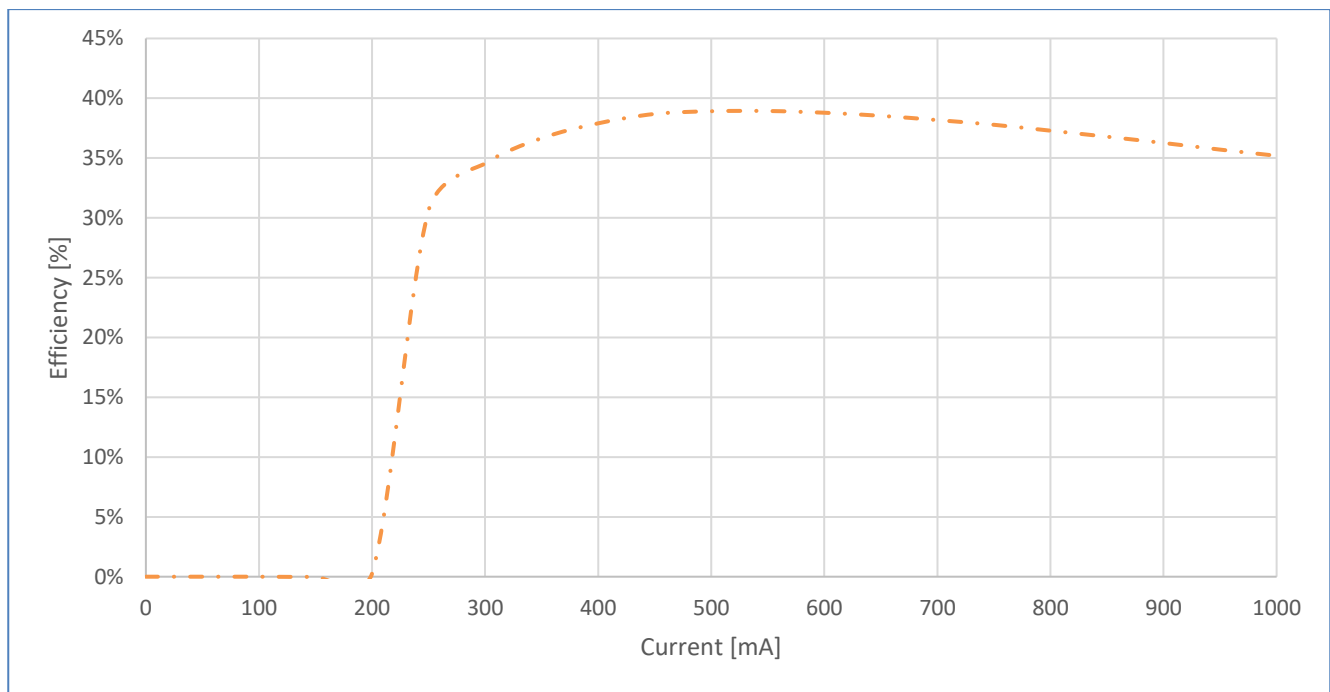


Figure 3 Typical 940nm 500mW Efficiency at Operational mode: 100µs pulse, 1% duty cycle 25°C. No Diffuser

Beam Profile of VCSEL

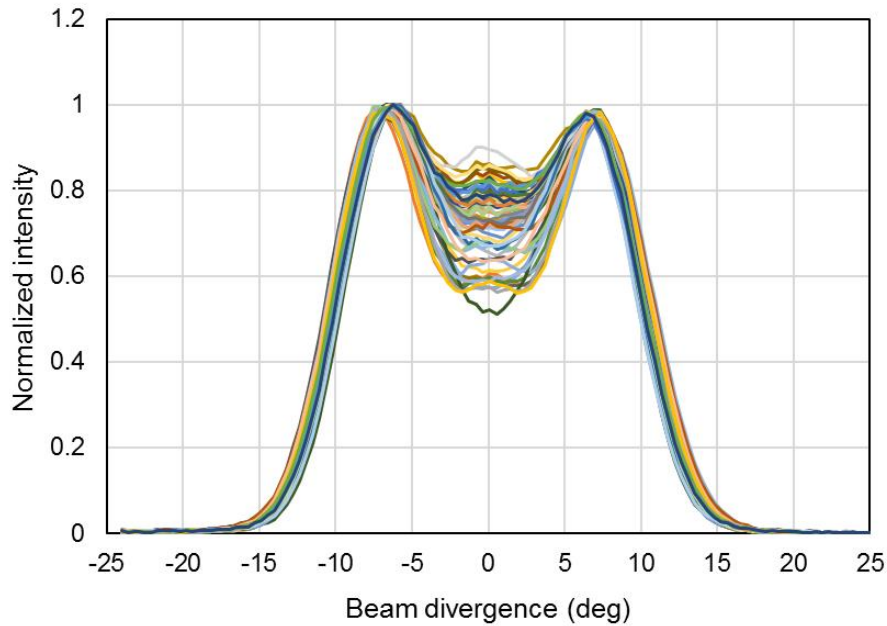


Figure 4 Typical beam divergence of bare die at 40°C, 675mA

Note: Beam divergence data for many VCSEL arrays are shown.

Beam Profile with Diffuser

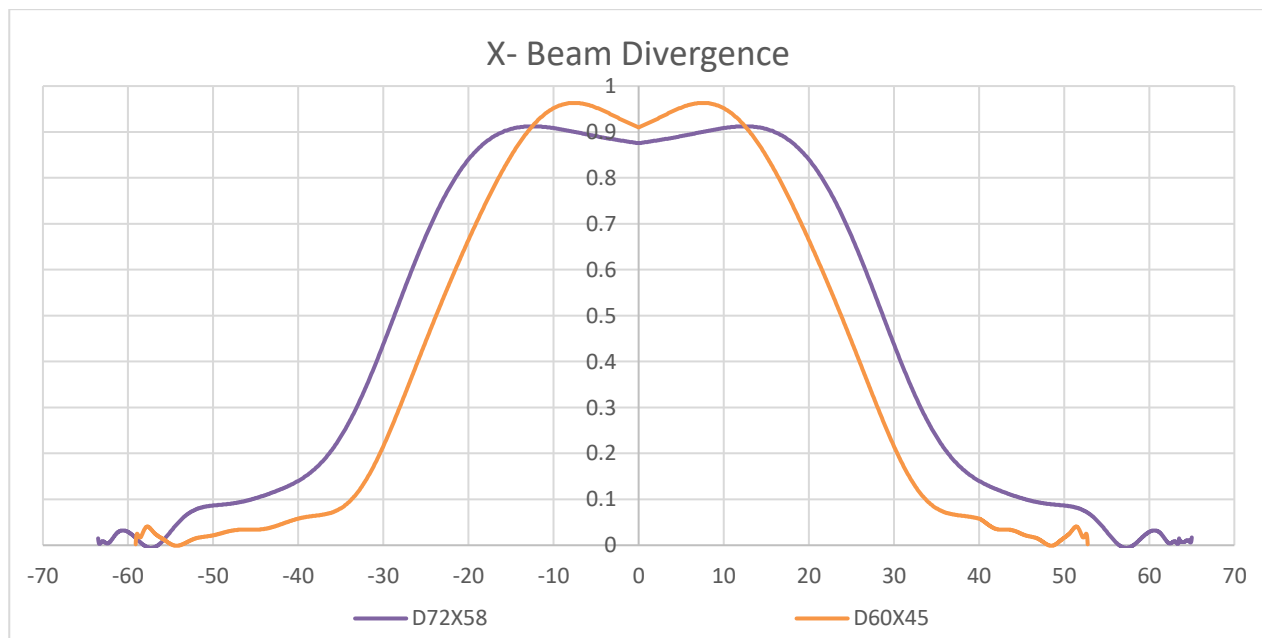


Figure 5 X-direction beam divergence with their respective diffuser at 25°C, 650mA. Operational Mode: 100µs 1% Duty Cycle

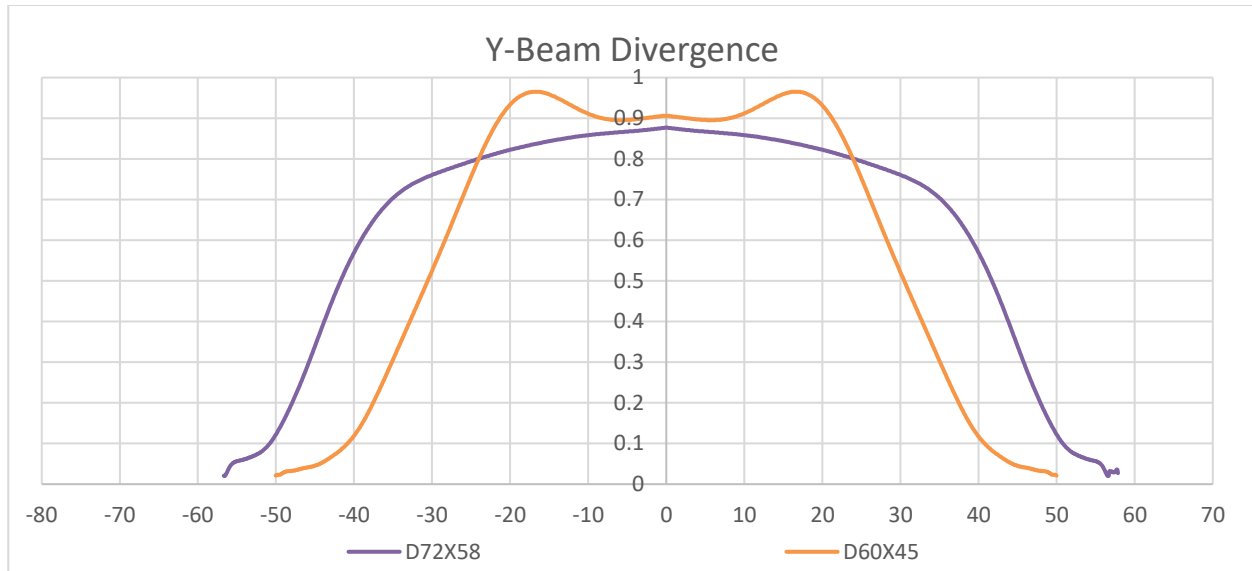
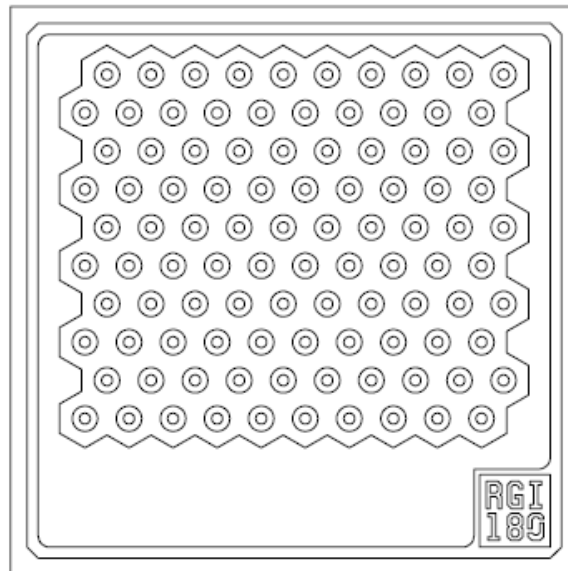


Figure 6 Y-direction beam divergence with their respective diffuser at 25°C, 650mA. Operational Mode: 100µS 1% Duty Cycle

VCSEL Mechanical Specifications



Parameter	Specification
Die size (x / y) final	0.515 mm X 0.515 mm
Number of Apertures	100
Die thickness	100µm

Ordering Information

Description	Part Number
Die; 940; MM; R10X40; 0.5W; 0.515mm X 0.515mm	K0-0940M-0000-00009
Assm; 940;MM;3B;R10X40;0.5W;0.515mm X 0.515mm;PLCC2835	I0-0940M-0000-00004

Note: For devices with diffusers contact Vixar at sales@vixarinc.com

Vixar
OSRAM

Opto Semiconductors

2950 Xenium Lane, Suite 104

Plymouth, MN 55441

763-746-8045

email: info@vixarinc.com

website: www.vixarinc.com

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