

DOCUMENT TITLE: Image defect criteria for LCOS based displays	PIN: 102458	
	REV: B	Page 1 of 4

REVISIONS

Date	Rev	CR/ECO	Brief Description	Created By
01 JAN 2008	0	-	New issue (OLD PIN D10802)	MB
14 MAR 2008	1	-	Spellings and other minor corrections (OLD PIN D10802)	MB
05 MAY 2009	2	-	Revised format and confidentiality; Clarified allowable pixel defects definition. (OLD PIN D10802)	MB
14 AUG 2013	A	CR-0920	Released using new part numbering method, format, title, updated microdisplay specifications, and other misc. changes.	MB
14 JUL 2014	B	CR-1005	Addition of "zone 3" and stuck on and off pixel definitions and changes to DC3 criteria	JE

APPROVALS

NVIS uses ISO 9001:2008 approved electronic workflow approval system for released drawings and documents.

DOCUMENT TITLE: Image defect criteria for LCOS based displays	PIN: 102458	
	REV: B	Page 2 of 4

1. Description and applicability

This defect criteria is applicable to all commercially available NVIS products using the 4DD Liquid Crystal on Silicon (LCOS) microdisplay unless otherwise specified according to the defect criteria in specific product specification document (product datasheet). The defect criteria defined herein are subject to change without notice.

2. Definitions

Active Area: Active area: 1280 pixel x 1024 pixel region (refer to Figure 1)

Zone 1: Central circular region of 900 pixel diameter = approximately 50% of the total active area = approximately 35° round FOV for a 60° diagonal FOV display.

Zone 2: Region outside zone 1 but inside the active area.

Zone 3: Region outside of the active area but restricted to the viewable area through the optic when the unit is worn in the intended operational configuration.

Blemish: Refers to visible opaque or semi-opaque spots. Blemishes do not include or refer to liquid crystal defects of microdisplay or scratch/dig (20/3) rating of microdisplay glass.

Blemish size: Defined as $\frac{(\text{max length in pixels} + \text{max breadth in pixels})}{2}$

Measured by comparing the blemish size to a known size displayed on the active area of the microdisplay.

LC Defects: Liquid crystal defects

Defective Pixel: A Defective Pixel is defined as a pixel with more than 25% of its area either not fully functional or not fully visible. A pixel area is considered to be not fully visible when the pixel's visibility is affected due to a cause such as, but not limited to, the presence of an opaque or a translucent obstruction.

DOCUMENT TITLE: Image defect criteria for LCOS based displays	PIN: 102458	
	REV: B	Page 3 of 4

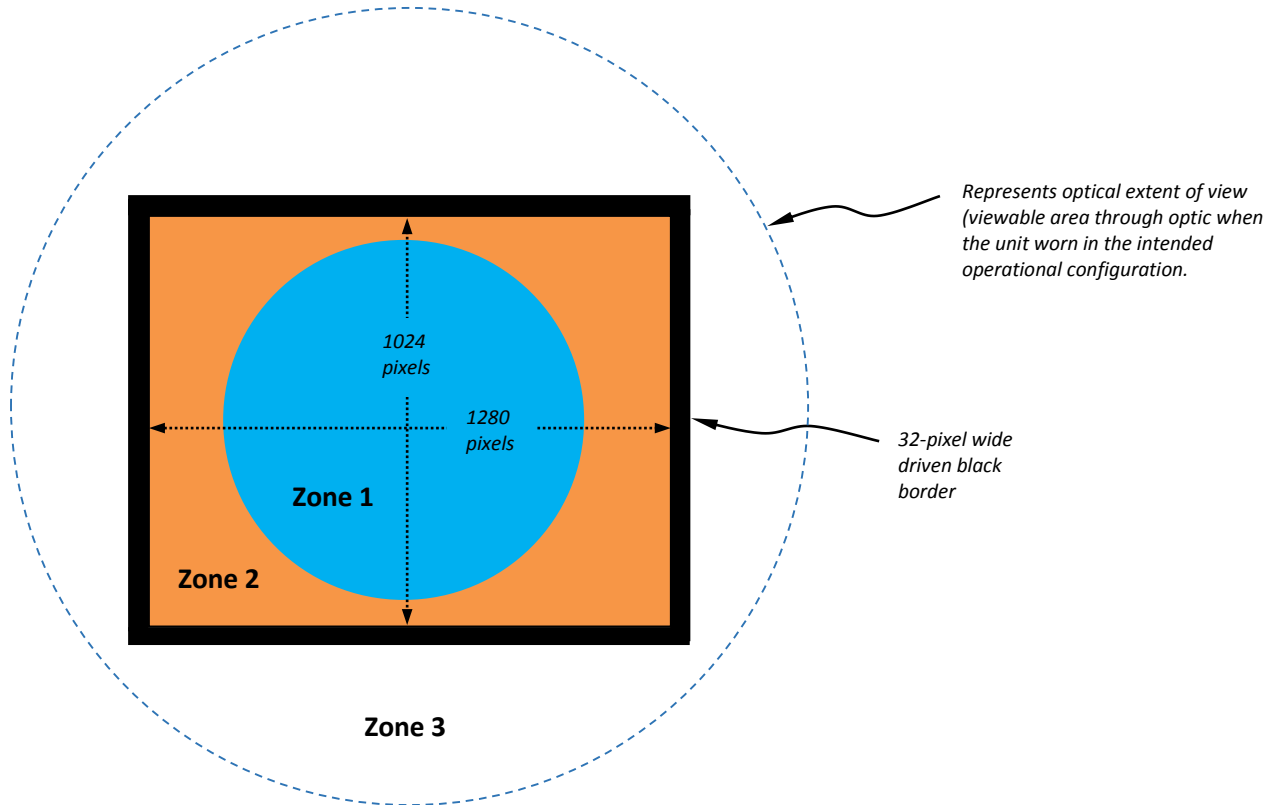


Figure 1: Quality Zones for Image Defect Criteria (not to scale)

DOCUMENT TITLE: Image defect criteria for LCOS based displays	PIN: 102458	
	REV: B	Page 4 of 4

2.1 Image Defect Criteria

Table 1 describes three image defect criteria: DC1, DC2, and DC3 applicable per optical channel of the display. Unless otherwise specified and agreed to by NVIS in writing, criteria DC1 is applicable. Criteria DC1 is based on the use of standard quality microdisplay, whereas criteria DC2 and DC3 are based on the use of two different premium varieties of microdisplays.

Table 1: Image defect Criteria per optical channel

	Parameter	Specification / Quantity Allowed (per optical channel)		
		Criteria DC1	Criteria DC2	Criteria DC3
Microdisplay related defects	Defective Pixels	2 Maximum, non-adjacent	2 Maximum, non-adjacent, only outside central 1040 pixel diameter area	None allowed in the active area and 32-pixel driven black border.
	LC defects ^[1]	Permissible inside only one extreme 150 (H) x 70 (V) pixel corner of the central 1216 X 960 pixel area, and in the surrounding 64-pixel border	Same as DC1	None allowed in active area and 32-pixel driven black border.
Non-microdisplay related defects^{[2] [3]}	Sharp focus Blemish Size ≤ 2 ; zone 1 / zone 2/zone 3	4 / 8 / (N/A)	Same as DC1	0 / 1 / 16
	Sharp focus Blemish Size $> 2 \leq 4$; zone 1 / zone 2/zone 3	0 / 3 / (N/A)	Same as DC1	0 / 0 / 8
	Sharp focus Blemish Size >4 ; zone 1 / zone 2/ zone 3	0 / 0 / (N/A)	Same as DC1	0 / 0 / 8
	Blurry focus Blemish Size ≤ 16 ; zone 1 / zone 2 / zone 3	1 / 1 / (N/A)	Same as DC1	0 / 0 / 0
	Blurry focus Blemish Size ≤ 8 ; zone 1 / zone 2 / zone 3	N/A	Same as DC1	0 / 0 / 1

[1] Contact NVIS if more details are needed

[2] Superior criteria with respect to non-microdisplay related defects may be available for meeting specific requirements, and must be agreed to in writing by NVIS at the time of order specifically referencing this document. Please contact NVIS to discuss.

[3] Image quality of products with intermediate screen (diffuser) is also characterized by microstructure-size and uniformity of the diffusing surface not covered by this document. NVIS recommends that potential customers request a demonstration unit for evaluating (typical) image quality.