

ELECTRO-OPTICAL AND MECHANICAL RESULTS SHEET	DAS770208AS-3
PALOMAR_ZTF CCD231-C6-1-F79, BI, 6k x 6k, NIMO, FOUR OUTPUT	Version 1 Sheet 1 of 2

Associated Documents: Palomar CVM, PALOMAR-E2V-CM-001
 Palomar Test Plan : PALOMAR-E2V-PL-003

Device Serial Number	12423-04-01	Tester (Initials & No.)	CPP 31305	Date	13/11/2013
Device Type	CCD231-C6-1-F79	Connector I.D. Number	017		

All test performed at 173K, on output E, at 500 kHz and in mode-1 unless stated otherwise

TEST	RESULT	LIMITS	PASS / FAIL	UNITS	
Amplifier Responsivity 500 kHz (mode-1)	OS-E	8.39	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
	OS-F	8.36	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
	OS-G	8.53	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
	OS-H	8.42	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
Amplifier Responsivity 500 kHz (mode-2)	OS-E	3.10	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-F	3.13	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-G	3.10	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-H	3.12	-	FIO	$\mu\text{V}/\text{e}^-$
Amplifier Responsivity 50 kHz (mode-1)	OS-E	8.46	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-F	8.51	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-G	8.50	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-H	8.36	-	FIO	$\mu\text{V}/\text{e}^-$
Noise 500 kHz	OS-E	5.4	6.0 max	PASS	rms e^-
	OS-F	5.6	6.0 max	PASS	rms e^-
	OS-G	5.7	6.0 max	PASS	rms e^-
	OS-H	5.5	6.0 max	PASS	rms e^-
Noise 50 kHz	OS-E	2.3	3.0 max	PASS	rms e^-
	OS-F	2.1	3.0 max	PASS	rms e^-
	OS-G	2.5	3.0 max	PASS	rms e^-
	OS-H	2.8	3.0 max	PASS	rms e^-
Output Node Capacity	OS-E	306	200 min	PASS	ke
	OS-F	308	200 min	PASS	ke
	OS-G	300	200 min	PASS	ke
	OS-H	297	200 min	PASS	ke
Max Non-Linearity (between 2000 e^- and 180,000 e^-)	OS-E	-0.70	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
	OS-F	0.40	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
	OS-G	0.56	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
	OS-H	-0.63	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
Full Well/Blooming Limit (mode-2)	317	275 min		PASS	ke^-/pix
CTE (Serial)	OS-E	0.999999	0.999990 min, 1.000000 max	PASS	n/a
	OS-F	0.999999	0.999990 min, 1.000000 max	PASS	n/a
	OS-G	0.999999	0.999990 min, 1.000000 max	PASS	n/a
	OS-H	0.999998	0.999990 min, 1.000000 max	PASS	n/a
CTE (Parallel)	0.999999	0.999990 min, 1.000000 max		PASS	n/a
Mean Dark Signal at -100°C	5.34	100 max		PASS	$\text{e}^-/\text{pix}/\text{hr}$
Mean Dark Signal at -120°C (calculated)	0.03	-		FIO	$\text{e}^-/\text{pix}/\text{hr}$

Key: n/a = not applicable FIO = for information only



ELECTRO-OPTICAL AND MECHANICAL RESULTS SHEET	DAS770208AS-3
PALOMAR_ZTF CCD231-C6-1-F79, BI, 6k x 6k, NIMO, FOUR OUTPUT	Version 1 Sheet 2 of 2

Device serial number	12423-04-01	Connector I.D. Number	017
-----------------------------	--------------------	------------------------------	------------

TEST		RESULT	LIMITS	PASS / FAIL	UNITS
Quantum Efficiency	400 nm	82.5	60 min	PASS	%
	500 nm	97.0	75 min	PASS	%
	650 nm	83.8	75 min	PASS	%
	700 nm	80.9	70 min	PASS	%
	900 nm	29.5	-	FIO	%
PRNU (1σ)	400 nm	0.9	3.0 max	PASS	%
	650 nm	1.4	3.0 max	PASS	%
	900 nm	2.8	5.0 max	PASS	%
<u>Cosmetics:</u>			Grade 1	PASS / FAIL	
Defects in Darkness	Point Defects (a)	0	FIO	FIO	n/a
	Bright Columns (b)	0	FIO	FIO	n/a
PR Defects	Dark Points (c)	12	FIO	FIO	n/a
	Dark Columns (d)	2	FIO	FIO	n/a
	Bright Columns (e)	3	FIO	FIO	n/a
Traps (>200e ⁻)		7	30 max	PASS	n/a
Total Spots (a)+(c)		12	2000 max	PASS	n/a
Total Columns (b)+(d)+(e)		5	15 max	PASS	n/a
<u>Mechanical Measurements:</u>					
Chip Flatness Peak to Valley at -100°C (estimated)		12	30 max	PASS	µm
Package Height Maximum		20.011	20.020 max	PASS	mm
Package Height Minimum		19.992	19.980 min	PASS	mm

Key: n/a = not applicable FIO = for information only

CUSTOM TESTS (If applicable)

TEST	RESULT	LIMITS	PASS / FAIL	UNITS

OPERATING CONDITIONS (for clocks, high levels non-charge dumping shown)

VOLTAGE	VALUE	MIN - MAX	UNITS	VOLTAGE	VALUE	MIN - MAX	UNITS
VOD, VDOD	30	25 - 31	V	VSS	0	0 - 10	V
VRD	18	16 - 19	V	VRØ	10	9 - 12	V
VOG (mode-1)	2.5	1 - 5	V	VØR	12	9 - 14	V
VOG (mode-2)	18	18	V	VIØ, VTGØ	10	9 - 12	V
VSW (mode-1)	9	9 - 12	V	VDG	0	-2 - 0.5	V
VSW (mode-2)	2	1 - 5	V	VDD	29	25 - 31	V

ELECTRO-OPTICAL TEST TEMPERATURES

MEASUREMENT	TYPICAL VALUE	ACTUAL VALUE	UNITS
All E-O Tests	-100	-100	°C

NOTES

--