



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	12461-15-01	Tester (Initials & No.)	CPP 31305	Date	14/11/2013
Device Type	CCD231-C6-1-F79	Connector I.D. Number	014		

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	7.99	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
	OS-F	8.00	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
	OS-G	7.92	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
	OS-H	8.10	5.00 min	PASS	$\mu\text{V}/\text{e}^-$
Amplifier Responsivity 500 kHz (mode-2)	OS-E	3.00	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-F	3.01	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-G	2.93	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-H	3.01	-	FIO	$\mu\text{V}/\text{e}^-$
Amplifier Responsivity 50 kHz (mode-1)	OS-E	8.07	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-F	8.15	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-G	7.90	-	FIO	$\mu\text{V}/\text{e}^-$
	OS-H	8.08	-	FIO	$\mu\text{V}/\text{e}^-$
Noise 500 kHz	OS-E	5.7	6.0 max	PASS	rms e^-
	OS-F	5.7	6.0 max	PASS	rms e^-
	OS-G	5.9	6.0 max	PASS	rms e^-
	OS-H	5.5	6.0 max	PASS	rms e^-
Noise 50 kHz	OS-E	2.5	3.0 max	PASS	rms e^-
	OS-F	2.4	3.0 max	PASS	rms e^-
	OS-G	2.5	3.0 max	PASS	rms e^-
	OS-H	2.5	3.0 max	PASS	rms e^-
Output Node Capacity	OS-E	320	200 min	PASS	ke
	OS-F	319	200 min	PASS	ke
	OS-G	312	200 min	PASS	ke
	OS-H	306	200 min	PASS	ke
Max Non-Linearity (between 2000 e^- and 180,000 e^-)	OS-E	0.63	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
	OS-F	0.62	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
	OS-G	0.79	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
	OS-H	1.01	$\pm 1.0 + 50 \text{e}^-$ max	PASS	%
Full Well/Blooming Limit (mode-2)	313	275 min		PASS	ke^-/pix
CTE (Serial)	OS-E	1.000000	0.999990 min, 1.000000 max	PASS	n/a
	OS-F	1.000000	0.999990 min, 1.000000 max	PASS	n/a
	OS-G	0.999998	0.999990 min, 1.000000 max	PASS	n/a
	OS-H	0.999999	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	2.82	100 max		PASS	$\text{e}^-/\text{pix}/\text{hr}$
Mean Dark Signal at -120°C (calculated)	0.02	-		FIO	$\text{e}^-/\text{pix}/\text{hr}$

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



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Device serial number	12461-15-01	Connector I.D. Number	014
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TEST		RESULT	LIMITS	PASS / FAIL	UNITS
Quantum Efficiency	400 nm	83.0	60 min	PASS	%
	500 nm	96.9	75 min	PASS	%
	650 nm	82.6	75 min	PASS	%
	700 nm	79.8	70 min	PASS	%
	900 nm	28.9	-	FIO	%
PRNU (1σ)	400 nm	1.2	3.0 max	PASS	%
	650 nm	1.3	3.0 max	PASS	%
	900 nm	2.4	5.0 max	PASS	%
<u>Cosmetics:</u>			Grade 1	PASS / FAIL	
Defects in Darkness	Point Defects (a)	1	FIO	FIO	n/a
	Bright Columns (b)	0	FIO	FIO	n/a
PR Defects	Dark Points (c)	54	FIO	FIO	n/a
	Dark Columns (d)	0	FIO	FIO	n/a
	Bright Columns (e)	0	FIO	FIO	n/a
Traps (>200e ⁻)		5	30 max	PASS	n/a
Total Spots (a)+(c)		55	2000 max	PASS	n/a
Total Columns (b)+(d)+(e)		0	15 max	PASS	n/a
<u>Mechanical Measurements:</u>					
Chip Flatness Peak to Valley at -100°C (estimated)		18	30 max	PASS	µm
Package Height Maximum		20.015	20.020 max	PASS	mm
Package Height Minimum		19.992	19.980 min	PASS	mm

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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

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