

THIN-FILM METROLOGY & CHARACTERIZATION FIELD CHECKLIST

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Rev: 2.0

Date: Dec 14, 2021

Substrate / Film ID: _____	Batch / Run ID: _____	Work Order #: _____
Lead Tech: Kadeem Manning (Tier II)	Material Type: SiO ₂ / Al ₂ O ₃ / Metal / TCO	Cleanroom Level: ISO Class 6

Item #	Metrology Step & Acceptance Criteria	Target Parameter / Value	Measured Value	Status
1	EHS & Cleanroom Controls: ISO Class 6 PPE verified; 6 mil nitrile gloves & ANSI Z87.1 eyewear active.	Glove & Eyewear active	☐ Verified	PASS / FAIL
2	Substrate Handling: Teflon/vacuum tweezers used exclusively; edge contact ≤ 1.0 mm.	≤ 1.0 mm contact	☐ Verified	PASS / FAIL
3	Ellipsometer Zero Check: NIST 100 nm SiO ₂ /Si wafer intensity alignment & fit MSE test.	Fit MSE < 2.5	MSE = _____	PASS / FAIL
4	Optical Thickness Measurement: Acquire Cauchy/Tauc-Lorentz thickness d_{opt} across 3 angles.	Target: _____ nm	d_{opt} = _____ nm	PASS / FAIL
5	Refractive Index Extraction: Record n at $\lambda = 632.8$ nm against bulk reference.	Reference n = _____	Measured n = _____	PASS / FAIL
6	Profilometer Step Height: 2.5 μ m diamond stylus scan across shadow-masked step edge.	$\pm 3\%$ vs. d_{opt}	d_{prof} = _____ nm	PASS / FAIL
7	Surface Roughness Check: Measure average surface roughness R_a across 1.0 mm scan.	Target R_a < 1.0 nm	R_a = _____ nm	PASS / FAIL
8	QCM Rate Calibration Check: Pre-run acoustic mass frequency check & Z-factor match.	Frequency 6.0 MHz	F_0 = _____ MHz	PASS / FAIL
9	4-Point Probe Zero Audit: FPP calibration wafer contact verification & forward/reverse EMF cancel.	$I = 1.0$ mA – 10 mA	☐ Verified	PASS / FAIL
10	Sheet Resistance Measurement: Dual-configuration sheet resistance R_s recording.	Target R_s Ω /sq	R_s = _____ Ω /sq	PASS / FAIL
11	VNA SOLT Calibration: Full 2-port Electronic Calibration Module SOLT calibration (1–20 GHz).	Cal error < -40 dB	☐ Verified	PASS / FAIL
12	Microwave Dielectric Permittivity: Resonance shift f_r & Q-factor $\epsilon_r' / \tan \delta$ calculation.	Shift Δf recorded	$\epsilon_r' =$ _____	PASS / FAIL
13	ALCOA+ File Saving: Raw spectrum files (.dat, .s2p, .csv) archived on network server.	Contemporaneous	☐ Archived	PASS / FAIL
14	CMMS PDF Upload: 300 DPI PDF characterization certificate attached to Work Order.	Within 24 Hours	☐ Attached	PASS / FAIL

TECHNICIAN REMARKS & ANOMALY LOG:

Lead Tech Signature: Kadeem Manning

Date: Dec 14, 2021

QA Manager Approval: Genevieve Lariviere