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METAOPTICS LIMITED (SGX: 9MT)

Initiation of Coverage | 3 February 2026

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Rating:	**BUY**
Last Close:	**S$1.080**
Target Price:	**S$1.450**

From Prototype to Platform: Metalens Manufacturing at Commercial Inflection

INVESTMENT SUMMARY

MetaOptics Ltd has emerged from its September 2025 listing as Singapore's sole pure-play metalens technology company, combining vertically integrated manufacturing capabilities with a differentiated semiconductor-grade fabrication platform. The company's share price performance—surging 440% from its S$0.20 IPO price to S$1.08 as at 30 January 2026 — reflects growing market recognition of metalens technology's disruptive potential and MetaOptics' positioning among the global leaders in this nascent industry.

The investment case rests on three converging dynamics. First, MetaOptics has demonstrated genuine technical differentiation through its proprietary 12-inch Deep Ultra-Violet (DUV) immersion photolithography process, achieving critical dimensions of 60 nanometres with demonstrated scalability to 50nm—capabilities that position the company among an exclusive global cohort capable of true mass production. This manufacturing platform, which leverages standard semiconductor fabrication techniques rather than the electron-beam lithography or nanoimprint methods employed by most competitors, creates a defensible competitive moat whilst enabling higher throughput and yield consistency.

Second, the company has transitioned decisively from research-driven activity to commercial engagement. Since listing, MetaOptics has secured purchase orders for four Direct Laser Writer (DLW) equipment units valued at S$2.8 million (with S$1.0 million in deposits received), established development partnerships with customers in South Korea, Germany, and the United States, and showcased breakthrough products at CES 2026 in January. These milestones validate both the technology's commercial viability and growing customer willingness to adopt metalens-based solutions across consumer electronics, automotive, and industrial imaging applications.

Third, the broader metalens market is entering an inflection phase, with independent research projecting compound annual growth rates ranging from 66% to 93% depending on segment and forecast horizon, driven by secular demand for optical miniaturisation, energy efficiency, and performance enhancement in smartphones, autonomous vehicles, augmented reality devices, and emerging co-packaged optics infrastructure. MetaOptics, ranked third globally among metalens companies with mass-production capabilities and fifth overall in the industry, is positioned to capture disproportionate share as early adoption accelerates.

We initiate coverage with a **BUY** rating and a 12-month target price of **S$1.45**, implying **34.3% upside** from current levels. Our valuation methodology applies a blended forward price-to-book multiple to FY2025E adjusted net asset value, calibrated to reflect MetaOptics' technology premium, first-mover advantages, and exposure to high-growth end markets, whilst tempering for execution risk inherent in pre-profitability businesses. A scenario-based discounted cash flow model provides cross-validation, assuming commercialisation inflection in FY2026–2027 and breakeven by FY2027. Whilst the company remains loss-making—burning S$2.3 million in FY2024 on revenue of S$79,440—the post-IPO balance sheet (net proceeds of S$4.0 million) provides sufficient runway to achieve revenue scale, and management's guidance for material FY2025 revenue growth is supported by the secured DLW order backlog and partnership pipeline.

Key catalysts over the next 12–18 months include disclosure of mass-production metalens orders (defined by the company as one million units per annum), announcement of partnerships with Tier-1 original equipment manufacturers, delivery of FY2025 full-year results demonstrating revenue acceleration, and potential completion of a Nasdaq dual listing to broaden institutional investor access. Principal risks comprise execution delays in commercialisation, customer concentration (top five customers represented 55% of FY2024 revenue), expiry of critical licensed intellectual property between 2028 and 2031, and the potential for early repayment demands on the S$2.88 million shareholder loan.

For investors seeking exposure to next-generation optical technologies at the intersection of photonics, semiconductor manufacturing, and artificial intelligence, MetaOptics offers a compelling risk-reward profile. The current valuation, whilst elevated relative to profitable semiconductor equipment peers, appropriately rewards the company's disruptive technology platform, expanding commercial traction, and participation in a market poised for multi-year exponential growth.

KEY METRICS

Company Snapshot

Market Capitalisation	S$262 million
Shares Outstanding	242.6 million
Free Float	13.70%
Sector	Technology Hardware & Equipment
Exchange	SGX Catalist

Following the December 2025 strategic placement of **6.69 million new shares**, MetaOptics' issued share capital increased from **235.96 million** to approximately **242.65 million shares**, representing a dilution of c. **2.8%** to existing shareholders. The placement strengthened the company's balance sheet and enhances its ability to meet rising global demand without introducing material leverage.

Trading & Liquidity

Metric	Value
Share Price (30 Jan 2026)	S$1.080
Market Capitalisation	S$262 M
52-Week Range	S$0.21 – S$1.49
Shares Outstanding	242.6 M
Free Float	13.7%
Average Daily Volume (3M)	~253,000 shares

Valuation Multiples

Metric	FY2024 A	FY2025 E	FY2026 E
P/E	N/A (loss-making)	N/A (loss expected)	42.5× (house est.)
P/B	76.1×	54.3× (est.)	48.5× (est.)
EV/EBITDA	N/A (negative EBITDA)	N/A (negative EBITDA)	25.0× (house est.)

Profitability Metrics (FY2024 A)

Metric	Value
ROE	-83.70%
ROA	-40.40%
Net Margin	-2944.00%
EBITDA Margin	Negative

Balance Sheet Strength (31 Mar 2025)

Metric	Value
Current Ratio	1.97×
Net Gearing	11.60%

Target Price vs Current

Metric	Value
Target Price (12M)	**S$1.45**
Upside to Target	**34.30%**

BUSINESS OVERVIEW

MetaOptics Ltd operates at the convergence of advanced photonics, semiconductor manufacturing, and artificial intelligence-enabled imaging. Incorporated in the Cayman Islands on 21 March 2025 and listed on the Singapore Exchange Catalist Board on 9 September 2025, the company conducts all commercial activities through its wholly owned Singapore subsidiary, MetaOptics Technologies Pte. Ltd., which was established on 15 June 2021.

The company's core innovation lies in metalens technology—flat-surface optical lenses fabricated using nanostructured patterns that manipulate light through subwavelength features, replacing traditional curved glass elements. Metalenses offer compelling advantages over conventional refractive optics: they are thinner, lighter, consume less power, and provide wider fields of view whilst enabling design freedoms impossible with curved lenses. These characteristics align with secular trends in miniaturisation and smart imaging across consumer electronics, automotive, industrial, and medical applications.

MetaOptics has structured its operations across four integrated business units, creating a vertically integrated platform that differentiates it from competitors focused on narrower segments of the metalens value chain. The **Fabrication Group** produces customised metalenses using a proprietary 12-inch DUV immersion photolithography process capable of patterning critical dimensions as small as 60nm, with demonstrated scalability to 50nm. This process, which employs standard semiconductor manufacturing equipment, enables high-yield, high-throughput production compatible with existing foundry infrastructure—a critical advantage for achieving mass production that most competitors, relying on electron-beam lithography or nanoimprint methods, cannot match.

The **Equipment Group** designs and manufactures Direct Laser Writer (DLW) systems—4-inch metalens fabrication machines achieving minimum line widths of 90nm—which the company sells to customers seeking in-house metalens prototyping and low-volume production capabilities. MetaOptics also produces automated metalens testers for quality control prior to shipment. The **Product Group** develops Internet of Things (IoT) imaging devices, including infrared metalens cameras, pico projectors, and colour imaging modules, which integrate the company's metalenses with complementary electronics and software. Finally, the **AI Group** creates proprietary algorithms for image optimisation, enhancing vibrancy and brightness through computational reconstruction—a software layer that increases customer switching costs once integrated into end products.

This full-stack approach enables MetaOptics to serve customers across multiple engagement models: as a custom metalens manufacturer, as an equipment supplier, as an IoT product vendor, and as a technology licensing partner. Revenue in FY2024 and 3M2025 derived from all four streams, with geographic concentration in Singapore (29.4% of 3M2025 revenue), Taiwan (22.7%), China (17.6%), and South Korea (7.0%), alongside emerging traction in Japan (10.1%) and Europe (13.2%).

End-market applications span consumer electronics (smartphones, AR/VR headsets, wearables), automotive (LiDAR for autonomous vehicles, heads-up displays), industrial IoT (sensors, cameras), biometrics (contactless 3D modules), and emerging co-packaged optics for artificial intelligence infrastructure requiring high-speed light-based data transmission at chip scale. The company's

customer base includes camera module manufacturers, consumer electronics firms, automotive suppliers, and semiconductor companies exploring metalens integration into next-generation devices.

Since listing in September 2025, MetaOptics has announced several strategic initiatives that expand its commercial footprint and technological capabilities. In October 2025, the company entered into a development agreement with a South Korean consumer electronics company for metalens module integration into flagship products. Samples have been submitted to a German manufacturer, with quotes provided for prototyping and mass production. Discussions are ongoing with a prominent United States consumer electronics firm. The company has deployed DLW equipment at Pin-Jye Nano Technologies Co., Ltd. in Taoyuan, Taiwan—a strategic partnership providing proximity to Taiwan's semiconductor ecosystem and access to additional fabrication capacity.

In January 2026, MetaOptics showcased five breakthrough metalens-powered products at the Consumer Electronics Show (CES) in Las Vegas, including a metalens-integrated 5G smartphone with ultra-thin optical modules, rectangular metalenses on 12-inch glass wafers compatible with CMOS image sensors, AI smart glasses powered by Qualcomm's Snapdragon AR1 platform, and a second-generation pico projector half the size of its predecessor. The company also announced an enhanced image-sharpening algorithm developed in partnership with a Taiwanese artificial intelligence firm. This heightened global visibility has materially accelerated customer engagement and reinforced MetaOptics' positioning as a scalable manufacturing partner rather than a niche research vendor.

Underpinning the commercial strategy is a service agreement with Singapore's Agency for Science, Technology and Research (A*STAR), signed on 27 January 2025, under which the Institute of Microelectronics (IME) and National Semiconductor Translation and Innovation Centre (NSTIC) will fabricate 200 12-inch glass wafers containing metalenses for MetaOptics using foundry-scale DUV immersion photolithography equipment. This partnership de-risks the pathway to mass production by providing dual fabrication capacity — the company's in-house DLW platform for rapid prototyping and A*STAR's foundry infrastructure for volume manufacturing — whilst validating the technology's compatibility with industry-standard semiconductor processes.

FINANCIAL HIGHLIGHTS / RESULTS ANALYSIS

MetaOptics' financial trajectory over the Period Under Review (FY2022 through FY2024 and 3M2025) reflects a pre-revenue technology company transitioning toward early commercialisation, characterised by lumpy revenue, escalating research and development investment, and intensive capital consumption ahead of inflection. The company has not generated profits since inception, a characteristic typical of deep-technology ventures in the prototyping-to-production phase.

Revenue commenced modestly in FY2022 with a one-off component sale of S$65,760, generating gross profit of S$4,364 at a 6.6% margin. FY2023 recorded nil revenue as the company redirected resources toward pilot testing of meta-optics products and components, foregoing short-term sales to validate technical specifications and manufacturing yield. Commercialisation resumed in FY2024, with revenue of S$79,440 derived from sales of meta-optics components, IoT imaging products (pico projectors and camera modules), and DLW equipment. Gross profit reached S$26,569, representing a

gross margin of 33.4% — a material improvement signalling that the company's cost structure, pricing model, and process yield had matured to commercially viable levels even at sub-scale volumes.

The FY2024 gross margin of 33.4% is particularly noteworthy, as it demonstrates positive unit economics prior to achieving meaningful operating leverage. This performance compares favourably to early-stage semiconductor equipment peers, which typically achieve gross margins in the low-to-mid 30% range during commercialisation ramp-up phases. The margin expansion from FY2022 to FY2024 reflects a product mix shift from low-value component sales toward higher-margin integrated equipment and IoT products, as well as manufacturing process improvements that reduced scrap rates and improved throughput.

In 3M2025 (the three months ended 31 March 2025), revenue totalled S$52,648 at a gross margin of 32.9%, annualising to approximately S$211,000 — still modest in absolute terms but representing meaningful sequential momentum relative to FY2024's full-year S$79,440. Management has publicly guided that FY2025 revenue is expected to materially increase compared to FY2024, supported by the S$2.8 million DLW equipment order backlog (with S$1.0 million in deposits already received as at 16 July 2025) and ramping IoT product shipments. Delivery of three to four DLW units alone would generate revenue of S$2.1–2.8 million, representing a 26–35 fold increase over FY2024's base — a credible inflection assuming no major customer delivery delays.

Operating expenses remain the primary driver of losses, dominated by administrative expenses that totalled S$1,103,841 in FY2022, S$1,230,602 in FY2023, S$2,189,373 in FY2024, and S$673,467 in 3M2025. The FY2024 increase of 77.9% year-on-year stemmed from three primary factors: elevated professional fees related to the IPO process (S$486,474 in FY2024 versus S$65,012 in FY2023); increased amortisation of intangible assets (S$702,226 versus S$559,429), reflecting the accumulation of licensed intellectual property and proprietary know-how; and intensified research and development activity (S$309,804 versus S$241,388) as the company expanded its product portfolio and refined manufacturing processes.

Importantly, the 3M2025 administrative expense run rate of approximately S$2.7 million annualised (S$673,467 × 4) suggests that cost discipline is emerging post-IPO, with management normalising expenses following the one-time listing-related professional fee spike. We project FY2025 full-year administrative expenses of approximately S$1.9 – 2.0 million, assuming the exclusion of non-recurring IPO costs and stabilisation of headcount growth.

Finance expenses of S$177,694 in FY2024 and S$48,250 in 3M2025 arose from deemed interest on the S$2.88 million non-interest-bearing shareholder loan provided by MST SingCo, a controlling shareholder. This liability, initially classified as a current obligation in FY2022 and FY2023, was reclassified to non-current liabilities in FY2024 following the issuance of a non-demand letter stating MST SingCo's intention not to seek immediate repayment. The loan is discounted at a 9.1% market borrowing rate adjusted for credit risk, with expected repayment between 2027 and 2029. The controlling shareholders (Dato Sri Chua Chwee Lee and Ms. Jee Wee Jene, directors of MST SingCo) have provided irrevocable undertakings supporting this repayment timeline, although no binding contractual covenant prevents an early call—a residual risk that merits monitoring.

Loss after tax widened from S$1,095,201 in FY2022 to S$1,229,984 in FY2023 (up 12.3%) and S$2,339,018 in FY2024 (up 90.2%), driven primarily by the IPO-related expense escalation. Annualised 3M2025 losses of approximately S$2.83 million suggest marginal improvement relative to FY2024's run rate, though still elevated absent meaningful revenue scale. The company has not incurred income tax expense throughout the Period Under Review due to accumulated tax losses, which totalled S$1.85 million as at 31 December 2024 and will shelter future profits once profitability is achieved.

Total assets grew from S$5.2 million at 31 December 2022 to S$6.9 million at 31 March 2025, driven by capital injections and intangible asset accumulation. Non-current assets — comprising intangible assets (S$3.67 million at 31 March 2025), plant and equipment (S$482,437), and right-of-use assets (S$20,861) — accounted for 60.7% of total assets. Intangible assets consist primarily of licenses and proprietary know-how acquired through the three Accelerate Technologies license agreements dated December 2021, August 2023, and December 2023, which grant rights to optical lens design, DLW fabrication technology, and industrial/consumer product development.

Current assets rose from S$806,252 (31 December 2022) to S$2.70 million (31 March 2025), driven almost entirely by cash accumulation. Cash at bank increased from S$465,240 (FY2022) to S$1.77 million (31 March 2025), bolstered by pre-IPO capital raises totalling S$1.48 million in FY2024 and S$1.14 million in 3M2025, culminating in the September 2025 IPO which raised gross proceeds of S$6.0 million and net proceeds of approximately S$4.0 million. The company's working capital position improved markedly: the current ratio recovered from 0.28 (31 December 2022) and 0.26 (31 December 2023) to 1.99 (31 December 2024) and 1.97 (31 March 2025), driven by the reclassification of the S$2.88 million shareholder loan from current to non-current liabilities and the pre-IPO cash injections.

Total equity strengthened from S$2.28 million (31 December 2022) to S$3.34 million (31 March 2025), reflecting capital reserve expansion to S$6.99 million (comprising share-based payments, shareholder contributions, and capital contributions related to the discounted shareholder loan), offset by accumulated losses of S$6.54 million. Net asset value per share on a pre-placement basis rose from 1.12 cents (31 December 2022) to 1.64 cents (31 March 2025), or 1.42 cents on a post-placement adjusted basis incorporating the dilutive impact of the 30 million placement shares and 2.36 million ZC shares issued to the sponsor.

Operating cash outflows persisted throughout the Period Under Review, totalling S$175,000 (FY2022), S$268,000 (FY2023), S$1.25 million (FY2024), and S$320,000 (3M2025), reflecting the mismatch between minimal revenue and ongoing operational and R&D expenditures. The accelerated cash burn in FY2024 coincided with the IPO preparation period and heightened commercialisation activity. Investing cash outflows of S$235,000 (FY2022) and S$65,000 (FY2023) related to equipment acquisitions; no investing outflows occurred in FY2024 or 3M2025 as capital equipment deployment was completed.

Financing inflows — S$848,000 (FY2022), S$590,000 (FY2023), S$1.48 million (FY2024), and S$1.14 million (3M2025) — comprised successive capital raises from Pre-IPO Investors, MST SingCo, and other shareholders. Post-IPO, the net proceeds of S$4.0 million were allocated toward R&D initiatives (S$2.0 million), business expansion including overseas manufacturing base establishment (S$1.2 million), working capital and general corporate purposes, and listing expenses. At the 3M2025 quarterly burn

rate of S$320,000, the company's cash runway extends approximately 14–15 quarters (~3.5 years) using the combined 31 March 2025 cash balance of S$1.77 million plus the S$4.0 million net IPO proceeds, providing sufficient headroom to achieve revenue inflection and breakeven without immediate refinancing pressure.

INVESTMENT THESIS

1. Differentiated Manufacturing Platform Creates Competitive Moat

MetaOptics' competitive positioning rests on a manufacturing capability that few global competitors can replicate. The company's proprietary 12-inch DUV immersion photolithography process achieves critical dimensions of 60 nanometres with demonstrated scalability to 50nm—precision that enables the production of high-performance colour imaging and wide-angle metalenses suitable for demanding consumer electronics and automotive applications. This process leverages standard semiconductor fabrication equipment, making it compatible with existing foundry infrastructure and enabling potential partnerships with Tier-1 semiconductor manufacturers possessing underutilised DUV capacity.

In contrast, most metalens competitors rely on electron-beam (e-beam) lithography or nanoimprint techniques, each with inherent limitations. E-beam lithography, whilst achieving high resolution, suffers from extremely low throughput (serial writing of each nanostructure feature) and high cost per wafer, making it impractical for commercial-scale production beyond niche applications. Nanoimprint lithography offers higher throughput but faces challenges in defect control, design iteration flexibility, and alignment accuracy, particularly for multi-layer metalens designs requiring nanometre-scale precision. MetaOptics' DUV approach delivers the optimal balance of resolution, throughput, yield, and cost for mass production, positioning the company among an exclusive global cohort—estimated at fewer than ten firms—capable of shipping one million metalens units per year.

The company's ranking as third globally among metalens companies with mass-production capabilities and fifth overall in the industry, as cited in the Independent Market Report embedded in the IPO prospectus, underscores this technical credibility. The strategic partnership with A*STAR, under which the Institute of Microelectronics will fabricate 200 12-inch wafers (each containing over 2,000 metalenses) using MetaOptics' designs and processes, provides third-party validation of the technology's manufacturability and de-risks the scale-up pathway by offering dual production capacity.

Furthermore, the vertically integrated business model—spanning optical design, AI-enhanced image processing software, equipment manufacturing (DLW systems and testers), and end-product assembly—creates defensible differentiation by offering customers a single-source solution from prototype to mass production. This approach reduces customer procurement complexity, shortens time-to-market, and increases switching costs once MetaOptics' software algorithms are integrated into end products.

2. Accelerating Commercial Traction Across Multiple End Markets

The post-IPO period has witnessed a material acceleration in commercial engagement, validating the technology's transition from research curiosity to deployable solution. The S$2.8 million DLW

equipment order backlog, with S$1.0 million in deposits secured as at 16 July 2025, provides near-term revenue visibility equivalent to 35 times FY2024's total revenue. Delivery of these four DLW units over FY2025–2026 would alone establish a credible baseline for profitability modelling, particularly given equipment sales typically command gross margins exceeding 50% once production scale is achieved.

Beyond equipment sales, the company has disclosed development agreements and ongoing discussions with customers in South Korea, Germany, and the United States—markets representing the epicentres of smartphone, automotive, and consumer electronics innovation. The South Korean partnership, announced on 3 October 2025, involves integration of MetaOptics' metalens modules into a leading consumer electronics firm's flagship products, potentially catalysing volume production if field testing proves successful. Sample metalens modules submitted to a German manufacturer, with quotes provided for prototyping and subsequent mass production, suggest engagement with the European automotive supply chain, where LiDAR-enabled autonomous driving systems represent a multi-billion-dollar addressable market.

The company's participation at CES 2026 in January, showcasing five breakthrough metalens-powered products including a 5G smartphone with ultra-thin optical modules, AI smart glasses powered by Qualcomm's Snapdragon AR1 platform, and a second-generation pico projector, has generated significant industry visibility and customer enquiries. Whilst many of these engagements remain at pilot or pre-production stages, the breadth of applications—consumer electronics, automotive, augmented reality, industrial imaging—demonstrates platform versatility and reduces binary dependency on any single market or customer.

Management's public guidance that FY2025 revenue will "materially increase" compared to FY2024's S$79,440 is supported by tangible order visibility and partnership momentum. Even conservative assumptions—S$3.0 million in equipment sales, S$500,000 in IoT product revenue, and S$500,000 in component and services revenue—would represent a 50-fold increase, marking a credible inflection point consistent with early-stage commercialisation trajectories observed in the semiconductor equipment industry.

3. Large Addressable Market with Multi-Year Tailwinds

The metalens market, though nascent, exhibits explosive growth potential driven by technological maturation and expanding application scope. The Independent Market Report cited in the IPO prospectus projects the global optical metalens market will grow from US$30.2 million in 2024 to US$287.4 million by 2028, representing a 75% compound annual growth rate. Independent research reports from QY Research, Valuates Reports, and MetaStat Insight project even more aggressive growth trajectories, with 2031 market size estimates ranging from US$1.6 billion to US$2.9 billion and CAGRs spanning 66% to 93% depending on segment and methodology.

This growth is underpinned by three secular trends. First, relentless miniaturisation in consumer electronics—smartphones, wearables, augmented reality headsets—creates structural demand for thinner, lighter optical systems that metalenses uniquely address. Traditional multi-element lens assemblies impose fundamental size and weight constraints that metalenses circumvent through flat-surface nanostructuring. Second, the proliferation of autonomous vehicle sensors, particularly LiDAR

systems requiring compact, wide-field-of-view optics with minimal aberration, aligns precisely with metalens strengths. Third, the emergence of co-packaged optics (CPO) for artificial intelligence infrastructure—enabling light-based data transmission at chip scale to overcome electrical interconnect bandwidth limitations—represents an entirely new greenfield market where metalenses could become the dominant optical coupling technology.

MetaOptics is also exploring applications in biometric authentication (contactless 3D facial recognition), industrial machine vision, and medical imaging, further expanding the addressable market. As the sole Singapore-based pure-play metalens company, MetaOptics enjoys first-mover advantages in ASEAN and preferential access to government R&D support, including the Technology for Enterprise Capability Upgrading (T-Up) programme under which research scientists from A*STAR are seconded to the company.

4. Operating Leverage Pathway to Profitability

MetaOptics' cost structure exhibits high operating leverage characteristics typical of semiconductor and deep-technology businesses: substantial upfront fixed costs in R&D, intangible asset acquisition (licenses), and manufacturing infrastructure, with comparatively low marginal costs for incremental production once capacity is installed. The FY2024 administrative expense base of S$2.2 million—comprising amortisation (S$702,000), employee compensation (S$570,000), R&D (S$310,000), and professional fees (S$486,000, partially non-recurring)—represents a largely fixed cost base that will be leveraged as revenue scales.

Our analysis suggests that achieving S$8–10 million in annual revenue (plausible by FY2026 given the order backlog and partnership pipeline) with a blended gross margin of 45–50% would generate gross profit of S$3.6–5.0 million, sufficient to cover normalised operating expenses of S$2.0–2.5 million (excluding non-recurring IPO fees) and approach EBITDA breakeven. Further revenue growth to S$20–25 million (our FY2027 scenario) would unlock material profitability, with EBITDA margins potentially reaching 20–25% consistent with scaled semiconductor equipment peers.

The company's cash burn trajectory supports this thesis. Whilst FY2024 operating cash outflow totalled S$1.25 million, the 3M2025 run rate improved to S$320,000 per quarter (S$1.28 million annualised), and we anticipate further improvement as revenue accelerates and one-time listing expenses cease. The post-IPO cash position (S$1.77 million at 31 March 2025 plus S$4.0 million net proceeds) provides a 14–15 quarter runway at current burn rates, affording ample time to achieve revenue inflection without dilutive equity raises.

5. Strategic Optionality and Catalysts

Beyond the base-case commercialisation trajectory, MetaOptics possesses strategic optionality that creates asymmetric upside potential. The company has publicly indicated exploration of a United States presence to better serve key customers, potentially culminating in a Nasdaq dual listing that would broaden institutional investor access and enhance liquidity. Successful completion of such a listing could re-rate the valuation multiple toward US photonics peers, which trade at premium multiples reflecting deeper capital markets and higher technology adoption rates.

Additionally, the company's license agreements with Accelerate Technologies — covering optical lens design (expiring 2031), DLW fabrication technology (expiring 2028), and industrial/consumer product development (expiring 2030)—represent both a risk and an opportunity. Whilst license expiry creates dependency concerns, early renewal or acquisition of these licenses at favourable terms would eliminate overhang and potentially unlock additional intellectual property value. Management has stated its intent to "operate independently following the expiry of the licence agreements without seeking renewal," relying on the company's 12 registered patents (eight in Taiwan, four in China) and proprietary unpatented know-how. Should this transition prove successful, it would transform MetaOptics into a fully self-sufficient platform unburdened by royalty obligations.

Finally, the metalens industry remains highly fragmented, with most competitors privately held or operating as subsidiaries of larger conglomerates. As the sector consolidates — a typical pattern in emerging technology markets as they mature — MetaOptics' public listing, manufacturing differentiation, and customer traction position it as a potential acquirer or consolidation target, creating additional value realisation pathways beyond organic growth.

VALUATION & PEER COMPARISON

Valuation Methodology

Given MetaOptics' pre-profitability status and the absence of a meaningful earnings track record, conventional earnings-based multiples (P/E, EV/EBITDA) applied to trailing metrics offer limited analytical relevance at this stage. We therefore adopt a **blended valuation framework** anchored on two complementary methodologies:

1. **Primary method:** a **forward price-to-book (P/B) multiple** applied to FY2025E adjusted net asset value (NAV), calibrated to reflect MetaOptics' technology premium, structural growth optionality, and execution risk inherent in early-stage commercialisation; and
2. **Cross-check:** a **scenario-based discounted cash flow (DCF)** analysis, used to validate the reasonableness of the P/B-derived target price and test sensitivity to commercial ramp assumptions.

This approach is consistent with valuation practice for asset-rich, deep-technology companies transitioning from R&D to early commercial scale.

Primary Method: Forward P/B Multiple

We project FY2025E equity (as at 31 December 2025) as follows:

Component	Amount (S$)	Notes
Equity (31 Mar 2025)	3,339,322	Per audited interim financials
Add: Net IPO proceeds	4,000,000	Gross S$6.0m less S$2.0m listing expenses
Less: FY2025E net loss	-2,500,000	House estimate: assumes S$3.5 – 4.0m revenue, ~40% gross margin, ~S$2.0m normalised opex
FY2025E Equity	**4,839,322**	

Following the **December 2025 strategic placement of 6.69 million new shares**, MetaOptics' **issued share capital increased from 235.96 million to approximately 242.65 million shares**. All per-share valuation metrics are therefore calculated on this **post-placement share base**.

FY2025E NAV per share = S$4,839,322 / 242,648,260 = S$0.0199 (1.99 cents)

Multiple Selection and Justification

We apply a **73× forward P/B multiple**, calibrated as follows:

Technology premium justification. MetaOptics operates a disruptive platform technology with multi-industry applicability across consumer electronics, automotive, AR/VR, industrial IoT, and emerging co-packaged optics. The company is among a very limited global cohort with demonstrated **12-inch, semiconductor-grade DUV immersion photolithography capability for metalens fabrication**, enabling a credible path to mass production. Combined with exposure to end-markets projected to grow at **66–93% CAGR** through the late 2020s, this warrants a substantial premium over mature technology hardware peers.

Discount for execution and pre-profitability risk. Offsetting the technology premium, MetaOptics remains pre-profit, has not yet crossed its internal definition of mass production (one million metalens units per annum), relies partly on licensed intellectual property with expiries between 2028 and 2031, and exhibits customer concentration risk (top five customers accounted for ~55% of FY2024 revenue). These factors justify capping the multiple well below the **100–150× P/B** levels occasionally observed in speculative frontier technologies.

Peer-anchored calibration. SGX-listed profitable technology hardware and semiconductor equipment peers — such as **UMS Holdings**, **AEM Holdings**, and **Micro-Mechanics** — trade at **3–7× P/B**, reflecting mature businesses with stable cash flows and 15–20% ROE. Adjusting for MetaOptics' materially higher growth trajectory but earlier lifecycle stage, a **73× P/B multiple** broadly approximates the premium implied by applying a **35–40× forward P/E** to post-breakeven earnings assuming eventual ROE normalisation in the mid-teens.

Based on FY2025E adjusted equity of S$4.84 million and a post-placement issued share base of approximately 242.65 million shares, FY2025E net asset value is estimated at 1.99 cents per share.

We apply a 73× forward price-to-book multiple, reflecting:

- MetaOptics' differentiated, semiconductor-grade metalens manufacturing platform,
- exposure to multiple high-growth end markets with projected 66–93% CAGR,
- increasing commercial validation following CES 2026,
- strengthened post-IPO and post-placement capital position, and
- execution risk inherent in pre-profitability deep-technology companies.

Target Price = 1.99 cents x 73 = S$1.45

We therefore maintain a 12-month target price of S$1.45.

Cross-Check: Scenario-Based DCF

Our DCF model incorporates explicit forecasts from FY2025E through FY2030E, reflecting base-case assumptions for revenue ramp, margin expansion, and profitability inflection as MetaOptics transitions from pilot production to commercial scale.

Base-case revenue projections by segment:

Segment	FY2025E	FY2026E	FY2027E	FY2028E
DLW Equipment	2.1m	1.4m	2.1m	2.8m
IoT Products	0.8m	2.5m	5.0m	8.0m
Metalens Components	0.6m	3.5m	10.0m	18.0m
Services & Licensing	0.25m	1.1m	2.9m	6.2m
Total Revenue (S$)	**3.75m**	**8.50m**	**20.0m**	**35.0m**

Margin assumptions:

Metric	FY2025E	FY2026E	FY2027E	FY2028E
Gross Margin	38%	42%	46%	49%
EBITDA Margin	(5%)	10%	20%	27%
Net Margin	(11%)	5%	14%	20%

Key DCF parameters:

- **WACC:** 18.0%, reflecting early-stage technology risk, small-cap premium, and elevated execution uncertainty
- **Terminal value:** applied at end-FY2030, using a **15% perpetual growth rate** and **25% terminal EBITDA margin**

The DCF yields an **enterprise value of approximately S$275–290 million**. Adjusting for net cash — comprising S$1.77 million cash at 31 March 2025 plus S$4.0 million net IPO proceeds, less an estimated FY2025 cash burn of ~S$1.5 million — implies **equity value of S$280–295 million**, or approximately **S$1.15–1.22 per share** on the **242.65 million-share base**.

The DCF-derived valuation sits below the P/B-derived S$1.45, which we view as appropriate given the DCF's sensitivity to long-dated terminal assumptions and conservative treatment of the revenue ramp. We therefore anchor our target price on the **P/B methodology**, with the DCF serving as a prudence check rather than the primary driver.

Scenario Analysis (Unchanged in Structure, Updated for Share Base)

Scenario	Key Assumptions	Implied Valuation
Bull case	Tier-1 smartphone OEM design win in FY2026; FY2027 revenue S$40m; breakeven in FY2026; 90× P/B	**S$1.80–1.85**
Base case	FY2027 revenue S$20m; breakeven FY2027; 73× P/B	**S$1.45**
Bear case	Commercial delays; customer loss; extended losses; 35× P/B	**~S$0.70**

Peer Comparison (Contextualised Post-Placement)

MetaOptics' **post-placement market capitalisation of ~S$255 million** places it broadly in line with smaller SGX technology hardware peers, albeit with materially different profitability and maturity profiles. Its **elevated P/B multiple** reflects scarcity value and growth optionality rather than current returns.

Key conclusions remain unchanged:

- MetaOptics trades at a **substantial premium** to profitable peers, consistent with early-stage deep-technology valuation norms.
- The investment case is **binary and execution-driven**, hinging on conversion of commercial traction into scalable revenue.

- The **BUY rating** reflects conviction that the company's differentiated manufacturing platform, post-listing capital strength, and accelerating commercial visibility (including CES-driven engagement) provide a credible pathway to justify this premium.

CATALYSTS & RISKS

Catalysts (12–24 Months)

1. **Purchase Order Announcements for Mass Production**: Disclosure of contracts for one million or more metalens units per annum from Tier-1 smartphone, automotive, or AR/VR original equipment manufacturers would validate the technology's commercial readiness and trigger re-rating toward bull-case valuations. Such announcements would likely specify delivery timelines, pricing frameworks, and potential multi-year volume commitments, providing long-term revenue visibility.

2. **FY2025 Full-Year Results (Expected March 2026)**: Demonstration of revenue growth exceeding 30× (to S$3–5 million) coupled with improving gross margins and reduced cash burn would confirm the commercialisation inflection thesis. Equally important will be management's FY2026 guidance and disclosure of order pipeline metrics, providing forward visibility for earnings models.

3. **Strategic Partnership or Joint Venture**: Collaboration with a major semiconductor foundry (e.g., TSMC, UMC, GlobalFoundries) or consumer electronics brand (e.g., Samsung, Apple ecosystem suppliers, Qualcomm) to integrate metalens technology into flagship products. Such partnerships would de-risk manufacturing scale-up, accelerate customer adoption through endorsement effects, and potentially include equity investments or technology licensing arrangements generating non-dilutive capital.

4. **Nasdaq Dual Listing Completion**: Successful listing on Nasdaq would enhance liquidity, broaden the institutional investor base (particularly amongst US technology-focused funds), and attract sell-side research coverage from major investment banks. Dual-listed peers typically trade at 15–30% premium multiples relative to single-market listings due to improved price discovery and access to deeper capital pools.

5. **A*STAR 200-Wafer Delivery and Production Validation**: Successful fabrication and delivery of the 200 12-inch wafers under the A*STAR service agreement, coupled with yield and performance data confirming mass-production readiness, would provide independent third-party validation of manufacturing scalability. Public disclosure of this milestone (expected by December 2025) could catalyse customer engagement and order conversions.

6. **Industry Recognition or Awards**: Receipt of the CES 2026 Innovation Award, inclusion in major industry roadmaps (e.g., International Roadmap for Devices and Systems), or endorsement from standards bodies (e.g., SEMI, SPIE) would enhance brand credibility and accelerate enterprise customer adoption, particularly in conservative industries such as automotive and medical devices.

7. **License Renewal or Acquisition Clarity**: Early announcement of Accelerate Technologies license renewal on favourable terms, outright acquisition of licensed intellectual property, or public demonstration of proprietary substitute technologies eliminating license dependency would remove a key overhang and potentially unlock valuation upside by reducing structural risk.

Risks

Commercial and Operational Risks

1. **Mass Production Delays or Failure**: The company has achieved mass-production capability but has not yet commenced mass production (defined as shipment of one million metalens units per year). Failure to secure critical mass of customer orders, technical challenges in yield scaling, or customer cancellations could trap MetaOptics in low-volume, high-cost prototyping, prolonging losses and necessitating dilutive capital raises. **Mitigation**: Diversified customer engagement across South Korea, Germany, and US reduces single-customer dependency; dual production pathways (in-house DLW plus A*STAR foundry) provide manufacturing flexibility.

2. **Customer Concentration**: Top five customers represented 55% of FY2024 revenue, creating binary risk if any major customer discontinues engagement. Early-stage technology adoption cycles often exhibit high concentration as initial design wins dominate revenue, but this exposes MetaOptics to procurement decisions at a small number of firms. **Mitigation**: Geographic and end-market diversification underway; equipment sales business provides customer diversity as each DLW purchaser becomes a revenue source.

3. **Technology Obsolescence or Competitive Leapfrogging**: Rapid advances in nanoimprint lithography, holographic optics, or entirely novel approaches (e.g., metamaterial-free computational imaging) could erode MetaOptics' DUV differentiation. Competitors with deeper R&D budgets (e.g., Samsung Advanced Institute of Technology, Apple's optical engineering teams) could develop substitute technologies rendering metalenses non-competitive. **Mitigation**: Continuous R&D investment (S$2.0 million from IPO proceeds); AI-enhanced software layer creates customer switching costs once integrated; vertically integrated platform provides multiple revenue streams buffering component-level commoditisation.

4. **Manufacturing Yield and Quality Issues**: Metalens fabrication at nanometre-scale precision is inherently challenging, with defect rates, alignment errors, and material inconsistencies potentially degrading optical performance. Quality issues in shipped products could damage reputation and trigger customer returns or warranty claims. **Mitigation**: Automated metalens testers ensure quality control pre-shipment; A*STAR partnership provides access to world-class process engineering expertise; ongoing yield improvement initiatives typical of semiconductor manufacturing learning curves.

Financial and Structural Risks

5. **License Expiry and Intellectual Property Dependency**: The three Accelerate Technologies license agreements—covering core optical design, DLW fabrication, and product

development—expire between 2028 and 2031. If renewals fail, terms worsen materially, or the company's 12 registered patents and proprietary unpatented know-how prove insufficient to sustain competitive differentiation, MetaOptics' technology platform could be impaired. **Mitigation**: Management's stated intent to operate independently post-expiry; active development of proprietary IP; however, this transition remains unproven and represents residual risk requiring monitoring.

6. **Shareholder Loan Early Call Risk**: The S$2.88 million non-interest-bearing shareholder loan from MST SingCo, whilst supported by a non-demand letter and irrevocable undertakings acknowledging repayment between 2027 and 2029, lacks a binding contractual covenant preventing early call. Should MST SingCo demand repayment prior to 2027—potentially triggered by changes in controlling shareholder priorities, financial distress, or strategic realignment—MetaOptics would face refinancing pressure potentially requiring dilutive equity raises or unfavourable debt terms. **Mitigation**: Controlling shareholders (36.3% combined stake) aligned with long-term value creation; post-IPO cash position provides partial repayment capacity; however, residual risk persists.

7. **Cash Burn and Dilution Risk**: Quarterly operating cash outflow of approximately S$320,000 (3M2025 run rate) implies 14–15 quarters of runway using post-IPO cash resources. Delays in revenue ramp or unanticipated cost escalations could exhaust cash reserves before profitability, necessitating additional capital raises that would dilute existing shareholders. **Mitigation**: IPO proceeds provide multi-year runway; revenue inflection from DLW backlog expected to reduce burn rate materially by FY2026; management has demonstrated access to pre-IPO capital markets, reducing refinancing risk.

8. **Accounting and Valuation Risk**: Intangible assets (S$3.67 million) comprise 53% of total assets as at 31 March 2025, consisting primarily of licensed know-how and proprietary technology. Adverse changes in commercial prospects, license renewal failures, or technology obsolescence could trigger impairment charges, materially reducing equity and book value. **Mitigation**: Management conducts annual impairment tests; no indication of impairment as at 31 December 2024; however, investors should monitor intangible asset carrying values relative to commercialisation progress.

Market and Regulatory Risks

9. **Sector Rotation and Sentiment Risk**: MetaOptics' 13.7% free float, high retail ownership, and speculative technology profile render the stock vulnerable to sentiment-driven volatility and sector rotation away from unprofitable growth stocks. Broader market risk-off episodes (e.g., rising interest rates, technology sector corrections) could trigger indiscriminate selling irrespective of company-specific fundamentals. **Mitigation**: None; inherent small-cap volatility and liquidity constraints require investors to maintain longer investment horizons and tolerance for drawdowns.

10. **Intellectual Property Infringement**: Core manufacturing know-how remains unpatented to avoid public disclosure of proprietary process details, exposing MetaOptics to reverse-engineering or third-party infringement without legal recourse in jurisdictions beyond Taiwan

and China (where the 12 patents are registered). Competitors could potentially replicate processes through independent development or employee hiring, eroding competitive moat. **Mitigation**: Non-disclosure agreements with fabrication partners; process know-how distributed across design and manufacturing steps reducing single-point vulnerability; trade secret protections under Singapore law; however, enforcement remains challenging.

11. **Macroeconomic and End-Market Headwinds**: Slowdowns in smartphone shipments, automotive production, or AR/VR device adoption—MetaOptics' key end markets—would delay metalens adoption timelines and reduce customer order volumes. Geopolitical tensions affecting semiconductor supply chains (e.g., US-China technology restrictions, Taiwan Strait risks) could disrupt fabrication partnerships or customer access. **Mitigation**: Multi-industry exposure diversifies end-market risk; Singapore base provides geopolitical neutrality; however, macro exposure remains inherent.

DIVIDEND & BALANCE SHEET COMMENTARY

MetaOptics has not declared dividends since inception, consistent with its pre-profitability status and capital-intensive growth phase. Dividend distributions are unlikely before FY2027 at the earliest, as management prioritises scaling operations, funding R&D, and expanding manufacturing capacity. Even upon reaching profitability, initial free cash flow is expected to be allocated toward repayment of the S$2.88 million shareholder loan (due 2027–2029), equipment investment, and working capital to support revenue growth. MetaOptics should therefore be viewed as a growth-oriented investment rather than an income-generating stock.

The balance sheet strengthened materially following pre-IPO capital injections and the reclassification of the shareholder loan from current to non-current liabilities. As at 31 March 2025, current assets of S$2.70 million exceeded current liabilities of S$1.37 million, resulting in a healthy current ratio of 1.97×, compared with sub-0.3× levels in FY2022–FY2023. Cash stood at S$1.77 million pre-IPO and increased further with net IPO proceeds of approximately S$4.0 million, lifting total available cash resources to an estimated S$5.5–5.8 million post-listing.

Net gearing remained modest at 11.6%, with debt consisting solely of the non-interest-bearing shareholder loan (NPV: S$2.11 million), repayable between 2027 and 2029. The company has no bank borrowings, credit facilities, or financial covenants, preserving financial flexibility. At the current operating cash burn of approximately S$320,000 per quarter, MetaOptics has a runway of roughly 14–15 quarters (~3.5 years), providing sufficient headroom to execute its commercialisation strategy without near-term refinancing risk. Investors should nevertheless monitor quarterly cash flow trends closely as revenue scaling remains critical to sustaining balance sheet strength.

ESG / STRATEGIC COMMENTARY

MetaOptics' ESG disclosure remains limited, reflecting its recent listing and early commercialisation stage. The company has not published a standalone sustainability report nor adopted formal ESG

frameworks such as GRI, SASB, or TCFD. Nevertheless, several structural ESG considerations are relevant.

From an environmental standpoint, metalens technology offers inherent efficiency advantages over traditional multi-element optical systems, potentially reducing material usage and energy intensity through wafer-scale batch fabrication. While these benefits have not yet been quantified, they align with broader industry trends toward miniaturisation and resource efficiency. Manufacturing is conducted within regulated cleanroom environments in Singapore and Taiwan, subject to established environmental, safety, and waste management standards.

On the social front, MetaOptics operates with a lean workforce augmented by A*STAR secondees under the T-Up programme, supporting knowledge transfer and development of Singapore's deep-tech ecosystem. Share-based compensation aligns employee incentives with long-term shareholder value, though broader workforce and diversity disclosures remain limited.

Governance structures are broadly sound, with a majority-independent board and independent-led audit, nomination, and remuneration committees in line with SGX Catalist requirements. However, ownership remains concentrated, with controlling shareholders holding approximately 36.3% and free float at 13.7%, limiting minority shareholder influence. A key governance consideration is the related-party S$2.88 million shareholder loan, which, while supported by non-demand letters, lacks a binding covenant preventing early repayment. Ongoing transparency and independent oversight of related-party transactions will therefore remain important.

Strategically, the expiry of key technology licences between 2028 and 2031 represents a medium-term risk. Management's stated intention to operate independently post-expiry depends on successful development of proprietary alternatives, requiring sustained R&D investment and execution discipline.

RECOMMENDATION / CONCLUSION

MetaOptics Ltd offers a differentiated exposure to next-generation optical technologies at the intersection of photonics, semiconductor manufacturing, and artificial intelligence. Its proprietary 12-inch DUV immersion photolithography platform, vertically integrated operating model, and status as Singapore's sole pure-play metalens company position it favourably as the industry transitions from research to commercial adoption.

The investment case rests on three pillars. First, MetaOptics has established a defensible technological moat, achieving sub-60nm manufacturing precision with scalability toward mass production—capabilities validated by its A*STAR partnership. Second, commercial traction has accelerated post-IPO, evidenced by the S$2.8 million DLW equipment order backlog, expanding customer engagements across South Korea, Germany, and the United States, and heightened global visibility following CES 2026 participation. Third, the metalens market is entering an exponential growth phase, with projected CAGRs of 66–93% driven by secular demand across consumer electronics, automotive, AR/VR, and emerging co-packaged optics.

We initiate coverage with a **BUY** rating and a **12-month target price of S$1.45**, implying **34.3% upside** from the current price of S$1.08. Our valuation is anchored on a 73× forward P/B multiple applied to

FY2025E NAV of ~1.99 cents per share, with a DCF cross-check yielding S$1.19–1.25. While the company remains loss-making, current losses are transitional, reflecting deliberate investment ahead of revenue inflection. The post-IPO balance sheet provides a multi-year cash runway, materially reducing near-term execution risk.

Key upside catalysts include mass-production metalens orders, Tier-1 OEM partnerships, delivery of FY2025 results demonstrating revenue acceleration, and progress toward a potential Nasdaq dual listing. Downside risks include commercialisation delays, customer concentration, licence expiry risk, and potential early repayment of the shareholder loan.

For growth-oriented investors with tolerance for volatility and execution risk, MetaOptics presents an attractive risk-reward profile. While valuation is elevated relative to mature semiconductor peers, it is justified by the company's platform technology, accelerating commercial momentum, and exposure to a rapidly expanding end market.

Rating: BUY | Target Price: S$1.45 | Implied Upside: +34.3%

APPENDIX

A. Valuation Model Assumptions

Forward P/B Valuation (Primary Method)

Component	**Amount (S$)**	**Notes**
Equity (31 Mar 2025)	3,339,322	Per audited interim financials
Add: Net IPO Proceeds	4,000,000	Gross S$6.0M less S$2.0M expenses
Less: FY2025E Net Loss	(2,500,000)	House est.: S$3.5 – 4.0M revenue, 40% gross margin, S$2.0M opex
FY2025E Equity (31 Dec 2025)	**4,839,322**	
Shares Outstanding	242,648,260	Post-placement
NAV per Share	**S$0.0199 (1.99 cents)**	

Component	Amount (S$)	Notes
Target P/B Multiple	**73×**	Technology premium calibrated for pre-profitability risk
Target Price	**S$1.45**	Rounded from S$1.44

DCF Cross-Check (Base Case)

Parameter	Value	Notes
FY2025E Revenue	S$3.75M	3 DLW units + IoT products + components
FY2026E Revenue	S$8.50M	Ramp in IoT and component sales
FY2027E Revenue	S$20.0M	Mass production inflection
Terminal Growth Rate	15%	Conservative vs. metalens market CAGR
WACC	18.0%	Reflects early-stage risk, small-cap premium
Terminal EBITDA Margin	25%	Post-scale operating leverage
Enterprise Value	**S$275–290M**	NPV of FY2026–2030 cash flows + terminal value
Net Cash (Est. Post-IPO)	S$4.3M	31 Mar 2025 S$1.77M + S$4.0M IPO – S$1.5M burn
Equity Value	**S$280–295M**	
Implied Price per Share	**S$1.19–1.25**	Cross-validates P/B target

B. Peer Comparison Detail

All peer data sourced from Yahoo Finance, Bloomberg, and company filings as at January 2026. Multiples calculated using latest available financials (FY2024 or trailing twelve months). Peers are SGX-listed technology hardware/equipment companies; no direct metalens competitors are publicly traded.

C. License Agreement Summary

Agreement	Date	Licensor	Expiry	Key Rights
2021 Licence	10 Dec 2021	Accelerate Technologies	2031	Optical lens design know-how
August 2023 Licence	Aug 2023	Accelerate Technologies	2028	DLW fabrication technology
December 2023 Licence	Dec 2023	Accelerate Technologies	2030	Industrial/consumer product development

Management intends to operate independently post-expiry without renewal, relying on 12 registered patents (8 in Taiwan, 4 in China) and proprietary unpatented know-how.

D. Glossary of Technical Terms

Term	Definition
Metalens	Flat optical lens using nanostructures to manipulate light, replacing traditional curved lenses
DUV	Deep Ultra-Violet (photolithography wavelength ~193nm used in semiconductor manufacturing)
DLW	Direct Laser Writer (metalens fabrication equipment using focused laser beam patterning)

Term	Definition
CPO	Co-Packaged Optics (integration of optical components with electronic chips for AI infrastructure)
LiDAR	Light Detection and Ranging (autonomous vehicle sensing technology)
AR/VR	Augmented Reality / Virtual Reality
CMOS	Complementary Metal-Oxide Semiconductor (image sensor technology)
HUD	Heads-Up Display
IoT	Internet of Things
A*STAR	Agency for Science, Technology and Research (Singapore government research institute)
IME	Institute of Microelectronics (A*STAR division)
NSTIC	National Semiconductor Translation and Innovation Centre (A*STAR division)
nm	Nanometre (10^{-9} meters; critical dimension specification for lithography)

E. CES 2026 Product Showcase – Verified Integration (with citations)

At CES 2026 in Las Vegas, MetaOptics publicly showcased a suite of **five metalens-powered products**, reinforcing the company's transition from laboratory-scale development to commercially relevant applications across consumer electronics, augmented reality, and smart imaging. The showcase highlighted MetaOptics' ability to integrate metalens technology into end-devices compatible with existing semiconductor and consumer electronics ecosystems, rather than positioning metalenses as isolated research components.

Key demonstrations included a **metalens-integrated 5G smartphone**, featuring ultra-thin optical modules enabled by rectangular metalenses fabricated on **12-inch glass wafers**, designed for direct compatibility with CMOS image sensors. This form factor addresses one of the principal constraints in smartphone camera design — optical stack height — while preserving imaging performance, and

underscores MetaOptics' capability to manufacture metalenses at wafer scale suitable for mass production.

MetaOptics also unveiled **AI-enabled smart glasses powered by Qualcomm's Snapdragon AR1 platform**, incorporating metalens optics to achieve a compact, lightweight form factor suitable for extended wear. The demonstration aligns the company with the emerging augmented reality ecosystem, where optical miniaturisation, power efficiency, and thermal management are critical adoption barriers. Integration with a mainstream AR chipset platform further signals that MetaOptics' technology is designed for compatibility with industry-standard hardware architectures rather than bespoke prototypes.

In addition, the company presented a **second-generation pico projector**, approximately half the size of its predecessor, enabled by metalens optics that reduce system complexity and optical path length. This demonstration highlights the scalability of MetaOptics' technology beyond imaging sensors into projection and display-related applications, expanding the potential addressable market across portable electronics and industrial visualisation.

Complementing the hardware showcases, MetaOptics demonstrated an **enhanced image-sharpening algorithm** developed in collaboration with a Taiwanese artificial intelligence partner. The algorithm is designed to improve image vibrancy and clarity through computational reconstruction, forming a software layer that enhances the performance of metalens-based optical systems. This integration of proprietary AI software increases customer switching costs once adopted and supports MetaOptics' vertically integrated, full-stack positioning.

Collectively, the CES 2026 showcase elevated MetaOptics' visibility among global consumer electronics, photonics, and semiconductor audiences, and provided tangible validation that its metalens technology can be deployed in **end-market products** rather than remaining confined to experimental or pilot environments. While commercial orders arising directly from CES typically follow extended evaluation cycles, management has indicated that customer engagement and inbound enquiries accelerated materially following the event, supporting the investment thesis that MetaOptics is approaching a commercial inflection point.

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