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Advanced Products

λ (0.65, 0.78, 0.85, 0.98, 1.06, 1.3, 1.55, 1.7, 2.0⁺ μm)

- **Low-V π (20 & 40 & 65 GHz):** Phase & 1x1, 1x2, 2x2 X-, Z-cut Intensity Modulators
- **Low-V π :** Intensity & Phase Modulators (<4V, <3.5V, <3V, custom <2.5V, ~2V)
- **Low-V π : QPSK (I/Q)** Dual-Parallel Nested-MZM X-cut Modulators
- **1x1, 1x2 Dual-Drive Low-V π** (<2.5V/side) 10 & 20 & 40⁺ & 65 GHz Modulators
- Custom: **Extremely-High Extinction-ratio** (>30, >40, >50, >60dB) Modulators
- Custom: **High power-handling** Modulators: $\lambda 1.55\mu\text{m}$ (>1W); $\lambda 1.06\mu\text{m}$ (>1/2W); $0.8\mu\text{m}$ (please call)
- Custom: **Extremely-High temperature-handling** Modulators: -55°C → +150°C

65 × 8.9 × 8.9 mm³



- Custom: **Ultra-wideband** (DC → 65 GHz; DC → 110⁺GHz) LiNbO_3 Modulators
- Custom: **Y-branch 1x2 Phase** modulators
- Custom: **Ultra-compact** LiNbO_3 modulators
- Custom: **Application-specific** LiNbO_3 components



65×9×9mm³ with 2.9mm RF connector; thinner 65×5×9mm³ with GPPO

Low-V π 1x1, 1x2, 2x2 X-cut (0-chirp) Compact Modulators

- **20G version:** Low-V π ~ 3.5-3.8V@1GHz; >20-25GHz; <4dB (<3dB option)
- **40G version:** Large BW~ 30-40GHz; V π ~4.5-4.9V@1GHz; <4dB (<3dB option)
- **Extended frequency** operation versions (to ~65GHz) available



Low-V π QPSK (I/Q) Dual-Parallel MZM (X-cut Single-Drive)

- **25 Gbaud version:** Low-V π ~2.9-3.3V@1GHz; >20-25GHz; Excess Loss: <4dB
- **50 Gbaud version:** >30-40GHz; V π ~3.9-4.3V@1GHz; Excess Loss: <4dB

Short- λ : 0.65 → 0.78 → 0.85 → 0.98 → 1.06 μm Phase & Intensity

- 10 & 20 & 40 & 65 GHz, V π : <4V, <3V & <2V, Insertion loss: <4, <3 & 2dB-custom
- High-Extinction-Ratio versions ($\lambda=1.06\mu\text{m}$: 30, 40 & 50dB)

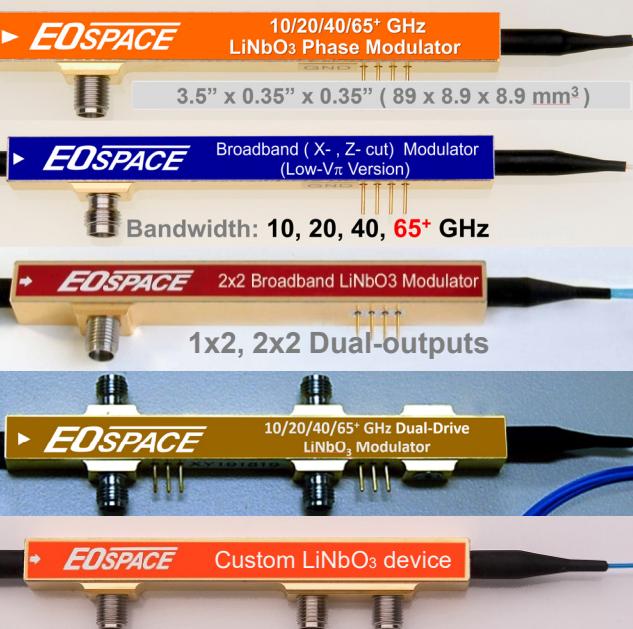
Short- λ (0.63 → 1.06 μm) Modulators



Long- λ : 2 μm Intensity & Phase Modulators (10 & 20 & 40⁺GHz)

- Insertion loss: <4dB, 3dB & (2dB – custom)
- V π : Intensity modulator: <7V, (5V-opt.); Phase Modulator: V π <10V, (7V, 6V-opt.)

Long- λ (2⁺ μm) Modulator



10 & 20 & 40 & 60⁺ GHz Phase Modulators

- Very-Low-Loss version: ~2dB & ~3dB, ~4dB
- V π ~ 5V, 4V and Ultra-low-V π ~ 3V, 2.5V-custom)
- Bandwidth: 10, 20, 40, 65+ GHz
- Extended frequency of operation option: ~50, ~60, ~70GHz

Intensity (Z-cut & X-cut) Modulators

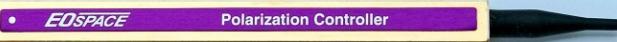
- **Z-cut: Pre-chirp:** Low-Loss ~3dB, (~2dB option)
 - BW >12GHz, (>18GHz version); V π <5V, ~4V@1GHz
 - Extended Frequency of operation option: 40 GHz, 65+ GHz
 - Lower-V π versions: V π ~3.5V@1GHz; ~3V, ~2.5V (custom)
- **X-cut: Zero-chirp:** Low-Loss ~4dB, (~3dB, ~2dB option)
 - BW >12GHz, (>18GHz version); V π ~5, ~4V@1GHz
 - Extended Frequency of operation: 40 GHz, 65+ GHz
 - Lower-V π versions: V π ~3V, ~2.5V (custom)

• 1x2, 2x2 (Dual-Outputs) 10-65GHz Modulators

• Dual-Drive Modulators (V π ~2.5V/side, <2V/side)

Other available : • 1x2 (& 2x2) Dual-Outputs • Dual- λ : 1300/1550nm • Integrated PD • Ultra-High-Power Handling (>1W, >2W)
device versions : • High Extinction-Ratio (>30 & >40 & >50 & >60dB) • Extended Temperature Range (-40° & -55°C → +100°C)

General Polarization Control, Tracking, Scrambling



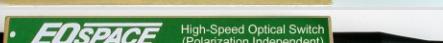
High-speed 1x2, 2x2, 1xN, NxN Switches

Single-Polarization (SP) or Polarization-Independent (PI)



1x8 SP Switches

1x2 (2x2) SP switch



1x2 (2x2) PI switch