

# Avalanche Photodiode Epiwafer (APD)

(LD) AND LIGHT-EMITTING DIODE (LED)

EPIWAFERS FOR VERTICAL CAVITY SURFACE EMITTING LASER DIODE (VCSEL)

SOLAR CELL EPIWAFERS

## Descriptions

2" or 3" epiwafer grown by MOVPE are available for avalanche photodiode (APD) fabrication. The main advantage of APD is its higher internal gain. This enables the avalanche photodiode to be used in low light level applications, traditionally dominated by the photomultiplier tube (PMT).

**Figure 1** shows the standard APD-epiwafer's layer structure. It specially comprises N-InP field control layer and a very thick top InP layer than an InGaAs-PIN's layer structure.

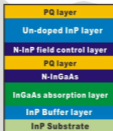


FIG. 1

## Wafer Characterization

Epiwafers are usually characterized by DCXD and E-CV tests. For some special inquiries, the doping profile could be analysed by SIMS.

**Figure 2** shows a typical DCXD rocking curve. The lattice mismatch can be well controlled within  $\pm 500$ ppm.

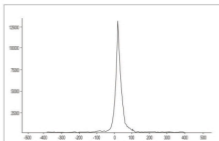


FIG. 2

**Figure 2** The DCXD rocking curve tested on an APD epiwafer.

# Avalanche Photodiode Epiwafer (APD)

LandMark

EPIWAFERS FOR PHOTODETECTOR (PD)

EPIWAFERS FOR VISIBLE-LIGHT LASER DIODE (LD) and RCLD

EPIWAFERS FOR LASER DIODE

## Wafer Characterization

Figure 3 shows low background concentration of InGaAs absorption layer. The background concentration is lower than  $1 \times 10^{15} \text{ cm}^{-3}$ .

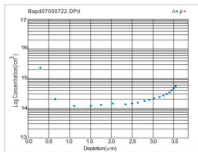


Figure 3 The concentration profile of the U-InGaAs absorption layer tested by depletion mode C-V method.

## Typical Epitaxy Parameters

Parameters	Values
Thickness control	Better than $\pm 5\%$
Thickness uniformity	Better than $\pm 2.5\%$ at the inner 40mm
N-InP doping ( $\text{cm}^{-3}$ )	Si-doped, $5 \times 10^{15}$ to $2 \times 10^{17}$
N-InGaAs doping ( $\text{cm}^{-3}$ )	Si-doped, $1$ – $3 \times 10^{16}$
i-InGaAsP background C.C. ( $\text{Cm}^{-3}$ )	$< 2 \times 10^{15}$ (special requested absorption layer)
i-InGaAs background C.C. ( $\text{Cm}^{-3}$ )	$< 1 \times 10^{15}$
Defect density control (Diameter)	$< 50 \text{ cm}^{-2}$ ( $D > 10 \mu\text{m}$ )