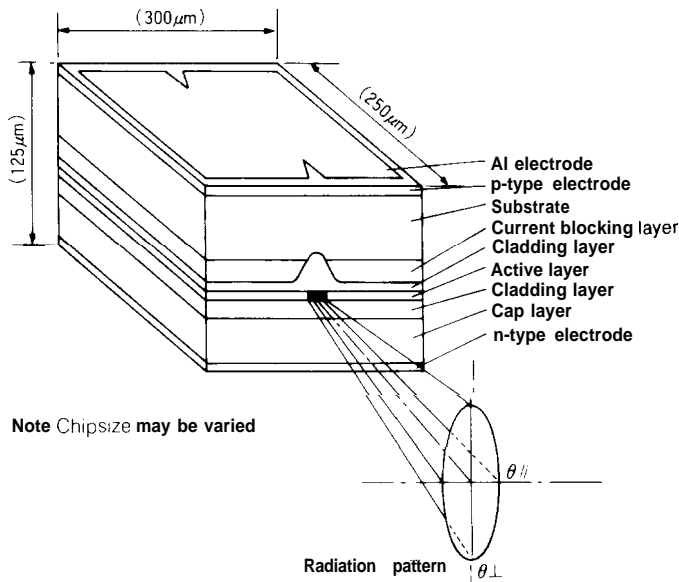


VSIS Chip Structure

VSIS Chip Structure

Sharp's Laser Diodes employ a unique VSIS structure that uses a p-type GaAs substrate. By carefully varying and controlling the dimensions of the structure and the material compositions during the manufacturing process, Sharp is able to produce single mode and multi-mode lasers with a wide range of characteristics.

Fig 16-1 VSIS Structure (MD, PDtypes)



Note Chip size may be varied

Features

(1) Inner Stripe Structure

- Current confinement is facilitated by the use of a p-type substrate and an n-type current blocking layer.
- Active gain area and laser oscillation area are automatically aligned within the V-channel to provide stable transverse mode operation.
- Elimination of diffusion processes avoids thermal distortion during manufacturing and improves yield.
- Small waste current allows low threshold current and high differential efficiency.
- Thick cap layer eliminates mounting distortion and simplifies mounting procedure.

(2) Flat Active Layer

- Stable transverse mode facilitates high power capabilities.
- Layer thickness is easily controlled.
- Laser characteristics can be easily adjusted for each application.

The structure shown in Fig. 16-1 is the basic VSIS structure. Sharp also uses a variation of this structure, as described below.

● Three Channel Structure

Damage caused by high optical power density at the emitting facet of the laser chip is the factor which limits the maximum allowable power output of the device. The Three Channel Structure (Fig. 16-2) uses three V-channels and three separate emission points on a single chip. By distributing the optical power between three emission points, it is possible to achieve higher total power output from the chip, without exceeding the safe level of optical power density. This structure is used for Sharp's LT090MD/MF which is rated for a maximum power output of 100 milliwatts.

Fig.1 6-2 Three Channel Structure

