



AN-20 BEAM PROFILE OF MULTIMODE LASER DIODES

In the fast axis, the divergence of a wide-stripe, multimode diode is determined by the structure of the epi layers, and should be quite consistent from one device to another. The fast axis divergence will also remain fairly constant across a wide range of drive current and operating temperature.

The slow-axis divergence does change with variation of drive current. Slightly above threshold current, when the device is just beginning to lase, the slow axis divergence will be low; perhaps 4 degrees full width. As the current is increased to full power, the slow axis divergence will gradually increase to 6-8 degrees full width. There is also more device-to-device variation in the slow axis divergence, up to about 2 degrees.

Since these are multimode devices, the beam profile in the slow axis will be irregular, and will vary with drive current, temperature, and time. The laser has many (50 or more) spatial modes in the slow axis, so the beam profile is an unpredictable interference pattern between these modes. In some cases the slow axis profile might become heavier on one side or the other, leading to some variation of the centroid of the beam pattern.

The laser chip itself is aligned to the package axis within +/-2 degrees. But as described above, the centroid of the slow axis emission could vary with drive current or temperature due to modal effects.