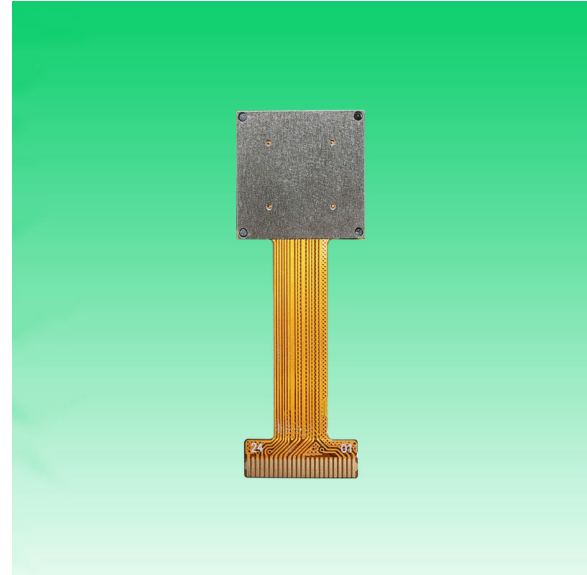


KLT-KD6-OV5640-1B V5.0 IR850D

**5MP OmniVision OV5640-1B MIPI Interface 850nm Dual Pass M12
Fixed Focus Camera Module**



Front View



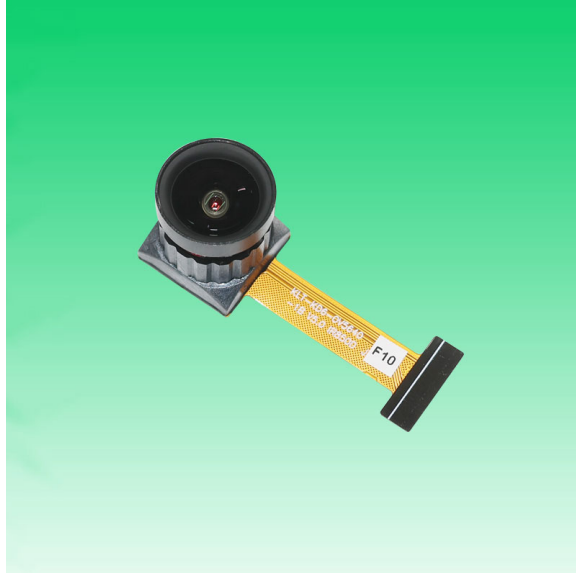
Back View

Specifications

Camera Module No.	KLT-KD6-OV5640-1B V5.0 IR850D
Resolution	5MP
Image Sensor	OV5640-1B
Sensor Type	1/4"
Pixel Size	1.4 μ m x 1.4 μ m
EFL	3.38 mm
F.NO	2.20
Pixel	2592 x 1944
View Angle	66.4°(DFOV) 55.4°(HFOV) 43.2°(VFOV)
Lens Dimensions	14.00 x 14.00 x 15.30 mm
Module Size	40.00 x 14.00 mm
Module Type	Fixed Focus
Interface	MIPI
Auto Focus VCM Driver IC	Embedded
Lens Type	650nm IR Cut + 850nm IR Pass
Operating Temperature	-30°C to +70°C
Mating Connector	FH12-24S-0.5SH

KLT-KD6-OV5640-1B V5.0 IR850D

**5MP OmniVision OV5640-1B MIPI Interface 850nm Dual Pass M12
Fixed Focus Camera Module**



Top View



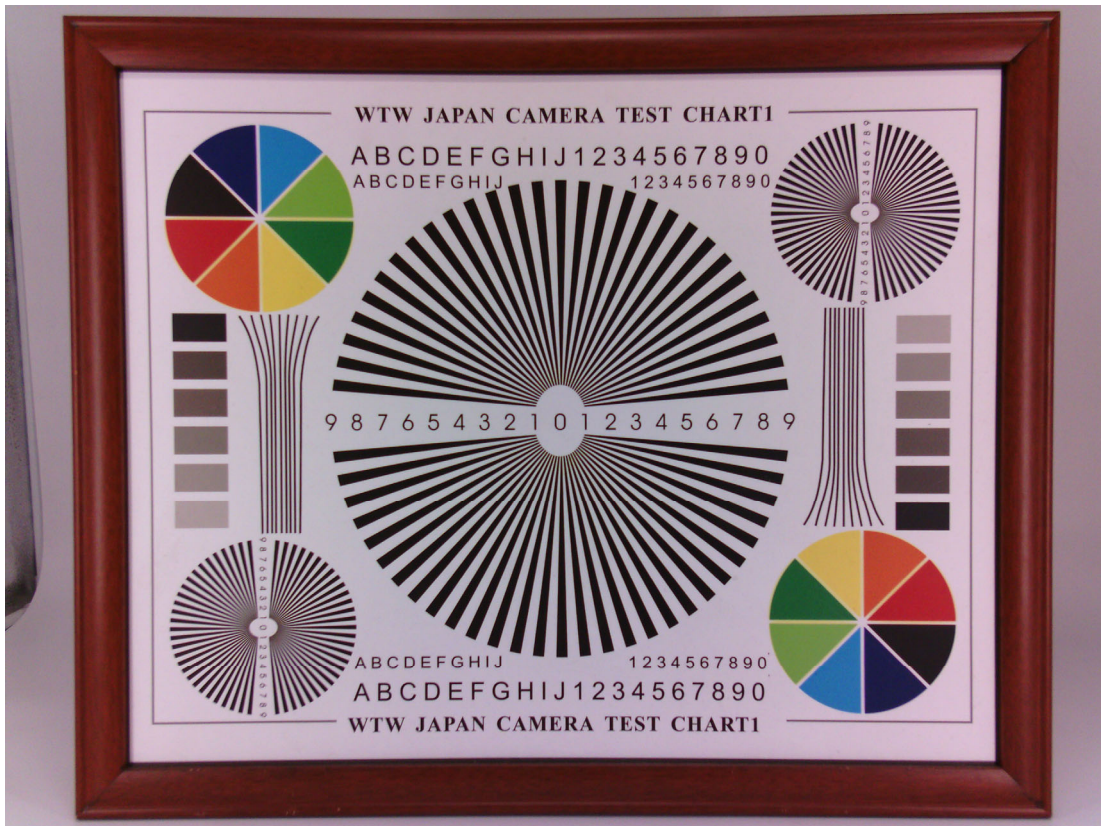
Side View

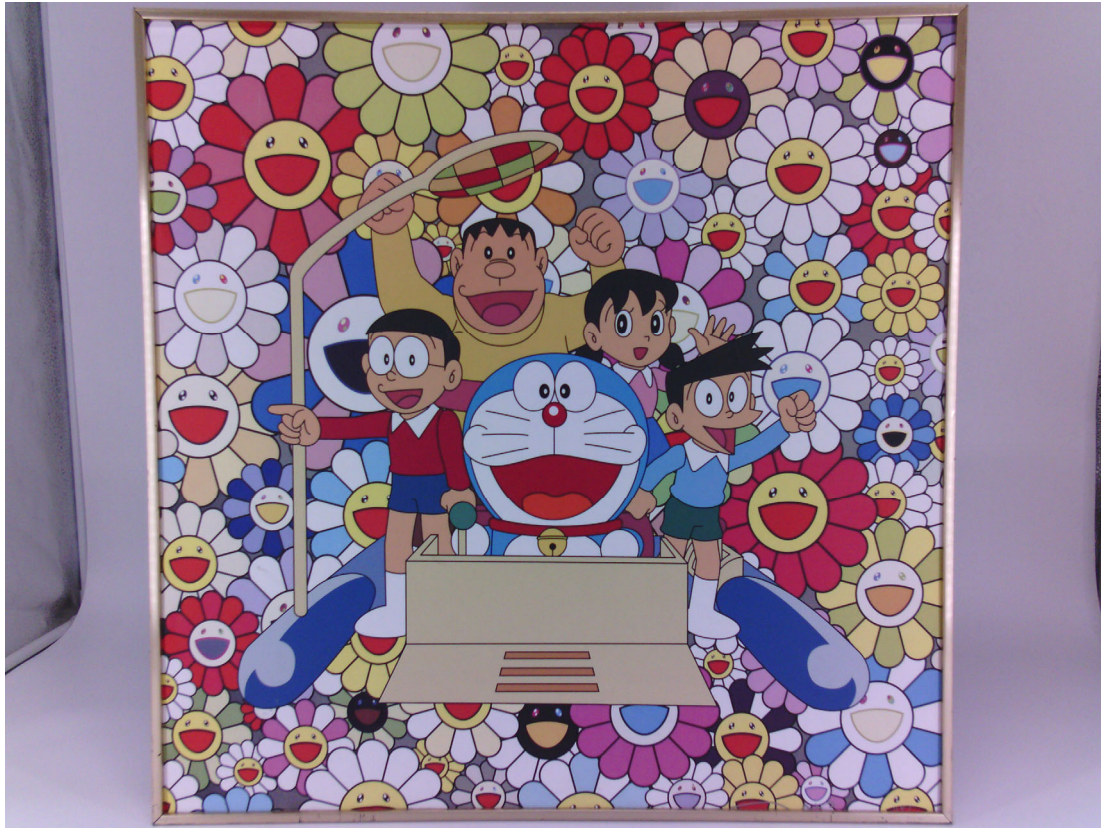


Bottom View

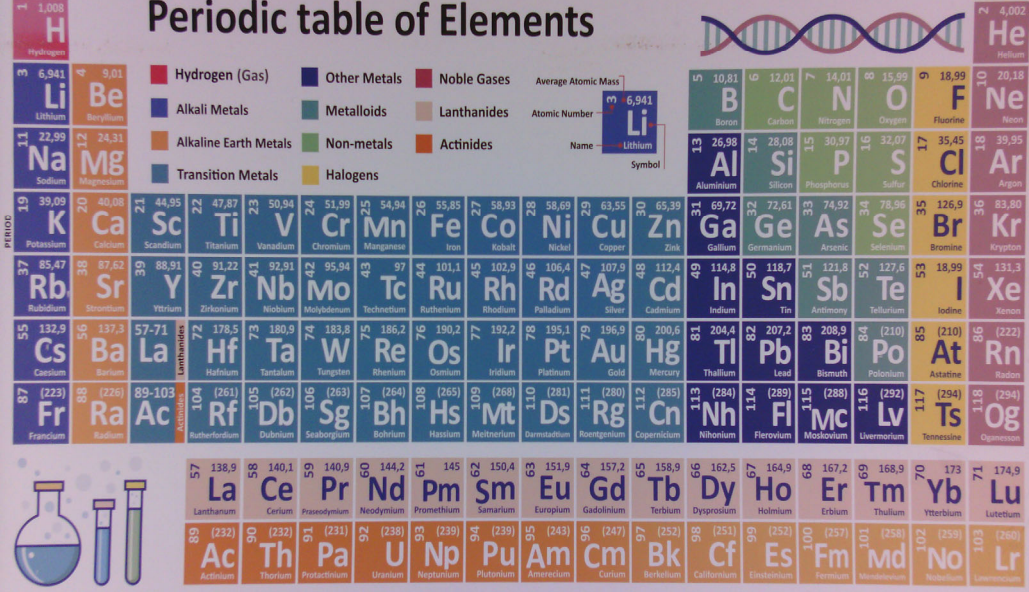


Mating Connector





Periodic table of Elements



GROUP

1 1,008 H Hydrogen

2 6,941 Li Lithium

3 9,012 Be Beryllium

4 11 22,99 Na Sodium

5 12 24,31 Mg Magnesium

6 13 26,98 Al Aluminium

7 14 28,08 Si Silicon

8 15 30,97 P Phosphorus

9 16 32,07 S Sulfur

10 17 35,45 Cl Chlorine

11 18 39,95 Ar Argon

12 19 39,09 K Potassium

13 20 40,08 Ca Calcium

14 21 44,96 Sc Scandium

15 22 47,87 Ti Titanium

16 23 50,94 V Vanadium

17 24 51,99 Cr Chromium

18 25 54,94 Mn Manganese

19 26 55,85 Fe Iron

20 27 58,93 Co Cobalt

21 28 58,69 Ni Nickel

22 29 63,55 Cu Copper

23 30 65,39 Zn Zinc

24 31 69,72 Ga Gallium

25 32 72,61 Ge Germanium

26 33 74,92 As Arsenic

27 34 78,96 Se Selenium

28 35 79,90 Br Bromine

29 36 83,80 Kr Krypton

30 37 85,47 Rb Rubidium

31 38 87,62 Sr Strontium

32 39 88,91 Y Yttrium

33 40 91,22 Zr Zirconium

34 41 92,91 Nb Niobium

35 42 95,94 Mo Molybdenum

36 43 97,94 Tc Technetium

37 44 101,1 Ru Ruthenium

38 45 102,9 Rh Rhodium

39 46 106,4 Pd Palladium

40 47 107,9 Ag Silver

41 48 112,4 Cd Cadmium

42 49 114,8 In Indium

43 50 118,7 Sn Tin

44 51 121,8 Sb Antimony

45 52 127,6 Te Tellurium

46 53 126,9 I Iodine

47 54 131,3 Xe Xenon

48 55 132,9 Cs Cesium

49 56 137,3 Ba Barium

50 57 175,1 La Lanthanum

51 58 178,5 Hf Hafnium

52 59 180,9 Ta Tantalum

53 60 183,8 W Tungsten

54 61 186,2 Re Rhenium

55 62 188,9 Os Osmium

56 63 192,2 Ir Iridium

57 64 195,1 Pt Platinum

58 65 196,9 Au Gold

59 66 200,6 Hg Mercury

60 67 204,4 Tl Thallium

61 68 207,2 Pb Lead

62 69 208,9 Bi Bismuth

63 70 209 Po Polonium

64 71 210 At Astatine

65 72 222 Rn Radon

66 73 223 Fr Francium

67 74 226 Ra Radium

68 75 227 Ac Actinium

69 76 228 Th Thorium

70 77 231 Pa Protactinium

71 78 232 U Uranium

72 79 233 Np Neptunium

73 80 237 Pu Plutonium

74 81 243 Am Americium

75 82 247 Cm Curium

76 83 251 Bk Berkelium

77 84 254 Cf Californium

78 85 257 Es Einsteinium

79 86 261 Fm Fermium

80 87 265 Md Mendelevium

81 88 269 No Nobelium

82 89 271 Lr Lawrencium

83 90 272 Ac Actinium

84 91 273 Th Thorium

85 92 274 Pa Protactinium

86 93 275 U Uranium

87 94 276 Np Neptunium

88 95 277 Pu Plutonium

89 96 278 Am Americium

90 97 279 Cm Curium

91 98 280 Bk Berkelium

92 99 281 Cf Californium

93 100 282 Es Einsteinium

94 101 283 Fm Fermium

95 102 285 Md Mendelevium

96 103 286 No Nobelium

97 104 287 Lr Lawrencium

98 105 288 Ac Actinium

99 106 289 Th Thorium

100 107 290 Pa Protactinium

101 108 291 U Uranium

102 109 292 Np Neptunium

103 110 293 Pu Plutonium

104 111 294 Am Americium

105 112 295 Cm Curium

106 113 296 Bk Berkelium

107 114 297 Cf Californium

108 115 298 Es Einsteinium

109 116 299 Fm Fermium

110 117 300 Md Mendelevium

111 118 301 No Nobelium

112 119 302 Lr Lawrencium

113 120 303 Ac Actinium

114 121 304 Th Thorium

115 122 305 Pa Protactinium

116 123 306 U Uranium

117 124 307 Np Neptunium

118 125 308 Pu Plutonium

119 126 309 Am Americium

120 127 310 Cm Curium

121 128 311 Bk Berkelium

122 129 312 Cf Californium

123 130 313 Es Einsteinium

124 131 314 Fm Fermium

125 132 315 Md Mendelevium

126 133 316 No Nobelium

127 134 317 Lr Lawrencium

128 135 318 Ac Actinium

129 136 319 Th Thorium

130 137 320 Pa Protactinium

131 138 321 U Uranium

132 139 322 Np Neptunium

133 140 323 Pu Plutonium

134 141 324 Am Americium

135 142 325 Cm Curium

136 143 326 Bk Berkelium

137 144 327 Cf Californium

138 145 328 Es Einsteinium

139 146 329 Fm Fermium

140 147 330 Md Mendelevium

141 148 331 No Nobelium

142 149 332 Lr Lawrencium

143 150 333 Ac Actinium

144 151 334 Th Thorium

145 152 335 Pa Protactinium

146 153 336 U Uranium

147 154 337 Np Neptunium

148 155 338 Pu Plutonium

149 156 339 Am Americium

150 157 340 Cm Curium

151 158 341 Bk Berkelium

152 159 342 Cf Californium

153 160 343 Es Einsteinium

154 161 344 Fm Fermium

155 162 345 Md Mendelevium

156 163 346 No Nobelium

157 164 347 Lr Lawrencium

158 165 348 Ac Actinium

159 166 349 Th Thorium

160 167 350 Pa Protactinium

161 168 351 U Uranium

162 169 352 Np Neptunium

163 170 353 Pu Plutonium

164 171 354 Am Americium

165 172 355 Cm Curium

166 173 356 Bk Berkelium

167 174 357 Cf Californium

168 175 358 Es Einsteinium

169 176 359 Fm Fermium

170 177 360 Md Mendelevium

171 178 361 No Nobelium

172 179 362 Lr Lawrencium

173 180 363 Ac Actinium

174 181 364 Th Thorium

175 182 365 Pa Protactinium

176 183 366 U Uranium

177 184 367 Np Neptunium

178 185 368 Pu Plutonium

179 186 369 Am Americium

180 187 370 Cm Curium

181 188 371 Bk Berkelium

182 189 372 Cf Californium

183 190 373 Es Einsteinium

184 191 374 Fm Fermium

185 192 375 Md Mendelevium

186 193 376 No Nobelium

187 194 377 Lr Lawrencium

188 195 378 Ac Actinium

189 196 379 Th Thorium

190 197 380 Pa Protactinium

191 198 381 U Uranium

192 199 382 Np Neptunium

193 200 383 Pu Plutonium

194 201 384 Am Americium

195 202 385 Cm Curium

196 203 386 Bk Berkelium

197 204 387 Cf Californium

198 205 388 Es Einsteinium

199 206 389 Fm Fermium

200 207 390 Md Mendelevium

201 208 391 No Nobelium

202 209 392 Lr Lawrencium

203 210 393 Ac Actinium

204 211 394 Th Thorium

205 212 395 Pa Protactinium

206 213 396 U Uranium

207 214 397 Np Neptunium

208 215 398 Pu Plutonium

209 216 399 Am Americium

210 217 400 Cm Curium

211 218 401 Bk Berkelium

212 219 402 Cf Californium

213 220 403 Es Einsteinium

214 221 404 Fm Fermium

215 222 405 Md Mendelevium

216 223 406 No Nobelium

217 224 407 Lr Lawrencium

218 225 408 Ac Actinium

219 226 409 Th Thorium

220 227 410 Pa Protactinium

221 228 411 U Uranium

222 229 412 Np Neptunium

223 230 413 Pu Plutonium

224 231 414 Am Americium

225 232 415 Cm Curium

226 233 416 Bk Berkelium

227 234 417 Cf Californium

228 235 418 Es Einsteinium

229 236 419 Fm Fermium

230 237 420 Md Mendelevium

231 238 421 No Nobelium

232 239 422 Lr Lawrencium

233 240 423 Ac Actinium

234 241 424 Th Thorium

235 242 425 Pa Protactinium

236 243 426 U Uranium

237 244 427 Np Neptunium

238 245 428 Pu Plutonium

239 246 429 Am Americium

240 247 430 Cm Curium

241 248 431 Bk Berkelium

242 249 432 Cf Californium

243 250 433 Es Einsteinium

244 251 434 Fm Fermium

245 252 435 Md Mendelevium

246 253 436 No Nobelium

247 254 437 Lr Lawrencium

248 255 438 Ac Actinium

249 256 439 Th Thorium

250 257 440 Pa Protactinium

251 258 441 U Uranium

252 259 442 Np Neptunium

253 260 443 Pu Plutonium

254 261 444 Am Americium

255 262 445 Cm Curium

256 263 446 Bk Berkelium

257 264 447 Cf Californium

258 265 448 Es Einsteinium

259 266 449 Fm Fermium

260 267 450 Md Mendelevium

261 268 451 No Nobelium

262 269 452 Lr Lawrencium

263 270 453 Ac Actinium

264 271 454 Th Thorium

265 272 455 Pa Protactinium

266 273 456 U Uranium

267 274 457 Np Neptunium

268 275 458 Pu Plutonium

269 276 459 Am Americium

270 277 460 Cm Curium

271 278 461 Bk Berkelium

272 279 462 Cf Californium

273 280 463 Es Einsteinium

274 281 464 Fm Fermium

275 282 465 Md Mendelevium

276 283 466 No Nobelium

277 284 467 Lr Lawrencium

278 285 468 Ac Actinium

279 286 469 Th Thorium

280 287 470 Pa Protactinium

281 288 471 U Uranium

282 289 472 Np Neptunium

283 290 473 Pu Plutonium

284 291 474 Am Americium

285 292 475 Cm Curium

286 293 476 Bk Berkelium

287 294 477 Cf Californium

288 295 478 Es Einsteinium

289 296 479 Fm Fermium

290 297 480 Md Mendelevium

291 298 481 No Nobelium

292 299 482 Lr Lawrencium

293 300 483 Ac Actinium

294 301 484 Th Thorium

295 302 485 Pa Protactinium

296 303 486 U Uranium

297 304 487 Np Neptunium

298 305 488 Pu Plutonium

299 306 489 Am Americium

300 307 490 Cm Curium

301 308 491 Bk Berkelium

302 309 492 Cf Californium

303 310 493 Es Einsteinium

304 311 494 Fm Fermium

305 312 495 Md Mendelevium

306 313 496 No Nobelium

307 314 497 Lr Lawrencium

308 315 498 Ac Actinium

309 316 499 Th Thorium

310 317 500 Pa Protactinium

311 318 501 U Uranium

312 319 502 Np Neptunium

313 320 503 Pu Plutonium

314 321 504 Am Americium

315 322 505 Cm Curium

316 323 506 Bk Berkelium

317 324 507 Cf Californium

318 325 508 Es Einsteinium

319 326 509 Fm Fermium

320 327 510 Md Mendelevium

321 328 511 No Nobelium

322 329 512 Lr Lawrencium

323 330 513 Ac Actinium

324 331 514 Th Thorium

325 332 515 Pa Protactinium

326 333 516 U Uranium

327 334 517 Np Neptunium

328 335 518 Pu Plutonium

329 336 519 Am Americium

330 337 520 Cm Curium

331 338 521 Bk Berkelium

332 339 522 Cf Californium

333 340 523 Es Einsteinium

334 341 524 Fm Fermium

335 342 525 Md Mendelevium

336 343 526 No Nobelium

337 344 527 Lr Lawrencium

338 345 528 Ac Actinium

339 346 529 Th Thorium

340 347 530 Pa Protactinium

341 348 531 U Uranium

342 349 532 Np Neptunium

343 350 533 Pu Plutonium

344 351 534 Am Americium

345 352 535 Cm Curium

346 353 536 Bk Berkelium

347 354 537 Cf Californium

348 355 538 Es Einsteinium

349 356 539 Fm Fermium

350 357 540 Md Mendelevium

351 358 541 No Nobelium

352 359 542 Lr Lawrencium

353 360 543 Ac Actinium

354 361 544 Th Thorium

355 362 545 Pa Protactinium

356 363 546 U Uranium

357 364 547 Np Neptunium

358 365 548 Pu Plutonium

359 366 549 Am Americium

360 367 550 Cm Curium

361 368 551 Bk Berkelium

362 369 552 Cf Californium

363 370 553 Es Einsteinium

364 371 554 Fm Fermium

365 372 555 Md Mendelevium

366 373 556 No Nobelium

367 374 557 Lr Lawrencium

368 375 558 Ac Actinium

369 376 559 Th Thorium

370 377 560 Pa Protactinium

371 378 561 U Uranium

372 379 562 Np Neptunium

373 380 563 Pu Plutonium

374 381 564 Am Americium

375 382 565 Cm Curium

376 383 566 Bk Berkelium

377 384 567 Cf Californium

378 385 568 Es Einsteinium

379 386 569 Fm Fermium

380 387 570 Md Mendelevium

381 388 571 No Nobelium

382 389 572 Lr Lawrencium

383 390 573 Ac Actinium

384 391 574 Th Thorium

385 392 575 Pa Protactinium

386 393 576 U Uranium

387 394 577 Np Neptunium

388 395 578 Pu Plutonium

389 396 579 Am Americium

390 397 580 Cm Curium

391 398 581 Bk Berkelium

392 399 582 Cf Californium

393 400 583 Es Einsteinium

394 401 584 Fm Fermium

395 402 585 Md Mendelevium

396 403 586 No Nobelium

397 404 587 Lr Lawrencium

398 405 588 Ac Actinium

399 406 589 Th Thorium

400 407 590 Pa Protactinium

401 408 591 U Uranium

402 409 592 Np Neptunium

403 410 593 Pu Plutonium

404 411 594 Am Americium

405 412 595 Cm Curium

406 413 596 Bk Berkelium

407 414 597 Cf Californium

408 415 598 Es Einsteinium

409 416 599 Fm Fermium

410 417 600 Md Mendelevium

411 418 601 No Nobelium

412 419 602 Lr Lawrencium

413 420 603 Ac Actinium

414 421 604 Th Thorium

415 422 605 Pa Protactinium

416 423 606 U Uranium

417 424 607 Np Neptunium

418 425 608 Pu Plutonium

419 426 609 Am Americium

420 427 610 Cm Curium

421 428 611 Bk Berkelium

422 429 612 Cf Californium

423 430 613 Es Einsteinium

424 431 614 Fm Fermium

425 432 615 Md Mendelevium

426 433 616 No Nobelium

427 434 617 Lr Lawrencium

428 435 618 Ac Actinium

429 436 619 Th Thorium

430 437 620 Pa Protactinium

431 438 621 U Uranium

432 439 622 Np Neptunium

433 440 623 Pu Plutonium

434 441 624 Am Americium

435 442 625 Cm Curium

436 443 626 Bk Berkelium

437 444 627 Cf Californium

438 445 628 Es Einsteinium

439 446 629 Fm Fermium

440 447 630 Md Mendelevium

441 448 631 No Nobelium

442 449 632 Lr Lawrencium

443 450 633 Ac Actinium

444 451 634 Th Thorium

445 452 635 Pa Protactinium

446 453 636 U Uranium

447 454 637 Np Neptunium

448 455 638 Pu Plutonium

449 456 639 Am Americium

450 457 640 Cm Curium

451 458 641 Bk Berkelium

452 459 642 Cf Californium

453 460 643 Es Einsteinium

454 461 644 Fm Fermium

455 462 645 Md Mendelevium

456 463 646 No Nobelium

457 464 647 Lr Lawrencium

458 465 648 Ac Actinium

459 466 649 Th Thorium

460 467 650 Pa Protactinium

461 468 651 U Uranium

462 469 652 Np Neptunium

463 470 653 Pu Plutonium

464 471 654 Am Americium

465 472 655 Cm Curium

466 473 656 Bk Berkelium

467 474 657 Cf Californium

468 475 658 Es Einsteinium

469 476 659 Fm Fermium

470 477 660 Md Mendelevium

471 478 661 No Nobelium

472 479 662 Lr Lawrencium

473 480 663 Ac Actinium

474 481 664 Th Thorium

475 482 665 Pa Protactinium

476 483 666 U Uranium

477 484 667 Np Neptunium

478 485 668 Pu Plutonium

479 486 669 Am Americium

480 487 670 Cm Curium

481 488 671 Bk Berkelium

482 489 672 Cf Californium

483 490 673 Es Einsteinium

484 491 674 Fm Fermium

485 492 675 Md Mendelevium

486 493 676 No Nobelium

487 494 677 Lr Lawrencium

488 495 678 Ac Actinium

489 496 679 Th Thorium

490 497 680 Pa Protactinium

491 498 681 U Uranium

492 499 682 Np Neptunium

493 500 683 Pu Plutonium

494 501 684 Am Americium

495 502 685 Cm Curium

496 503 686 Bk Berkelium

497 504 687 Cf Californium

498 505 688 Es Einsteinium

499 506 689 Fm Fermium

500 507 690 Md Mendelevium

501 508 691 No Nobelium

502 509 692 Lr Lawrencium

503 510 693 Ac Actinium

504 511 694 Th Thorium

505 512 695 Pa Protactinium

506 513 696 U Uranium

507 514 697 Np Neptunium

508 515 698 Pu Plutonium

509 516 699 Am Americium

510 517 700 Cm Curium

511 518 701 Bk Berkelium

512 519 702 Cf Californium

513 520 703 Es Einsteinium

514 521 704 Fm Fermium

515 522 705 Md Mendelevium

516 523 706 No Nobelium

517 524 707 Lr Lawrencium

518 525 708 Ac Actinium

519 526 709 Th Thorium

520 527 710 Pa Protactinium

521 528 711 U Uranium

522 529 712 Np Neptunium

523 530 713 Pu Plutonium

524 531 714 Am Americium

525 532 715 Cm Curium

526 533 716 Bk Berkelium

527 534 717 Cf Californium

528 535 718 Es Einsteinium

529 536 719 Fm Fermium

530 537 720 Md Mendelevium

531 538 721 No Nobelium

532 539 722 Lr Lawrencium

533 540 723 Ac Actinium

534 541 724 Th Thorium

535 542 725 Pa Protactinium

536 543 726 U Uranium

537 544 727 Np Neptunium

538 545 728 Pu Plutonium

539 546 729 Am Americium

540 547 730 Cm Curium

541 548 731 Bk Berkelium

542 549 732 Cf Californium

543 550 733 Es Einsteinium

544 551 734 Fm Fermium

545 552 735 Md Mendelevium

546 553 736 No Nobelium

547 554 737 Lr Lawrencium

548 555 738 Ac Actinium

549 556 739 Th Thorium

550 557 740 Pa Protactinium

551 558 741 U Uranium

552 559 742 Np Neptunium

553 560 743 Pu Plutonium

554 561 744 Am Americium

555 562 745 Cm Curium

556 563 746 Bk Berkelium

557 564 747 Cf Californium

558 565 748 Es Einsteinium

559 566 749 Fm Fermium

560 567 750 Md Mendelevium

561 568 751 No Nobelium

562 569 752 Lr Lawrencium

563 570 753 Ac Actinium

564 571 754 Th Thorium

565 572 755 Pa Protactinium

566 573 756 U Uranium

567 574 757 Np Neptunium

568 575 758 Pu Plutonium

569 576 759 Am Americium

570 577 760 Cm Curium

571 578 761 Bk Berkelium

572 579 762 Cf Californium

573 580 763 Es Einsteinium

574 581 764 Fm Fermium

575 582 765 Md Mendelevium

576 583 766 No Nobelium

577 584 767 Lr Lawrencium

578 585 768 Ac Actinium

579 586 769 Th Thorium

580 587 770 Pa Protactinium

581 588 771 U Uranium

582 589 772 Np Neptunium

583 590 773 Pu Plutonium

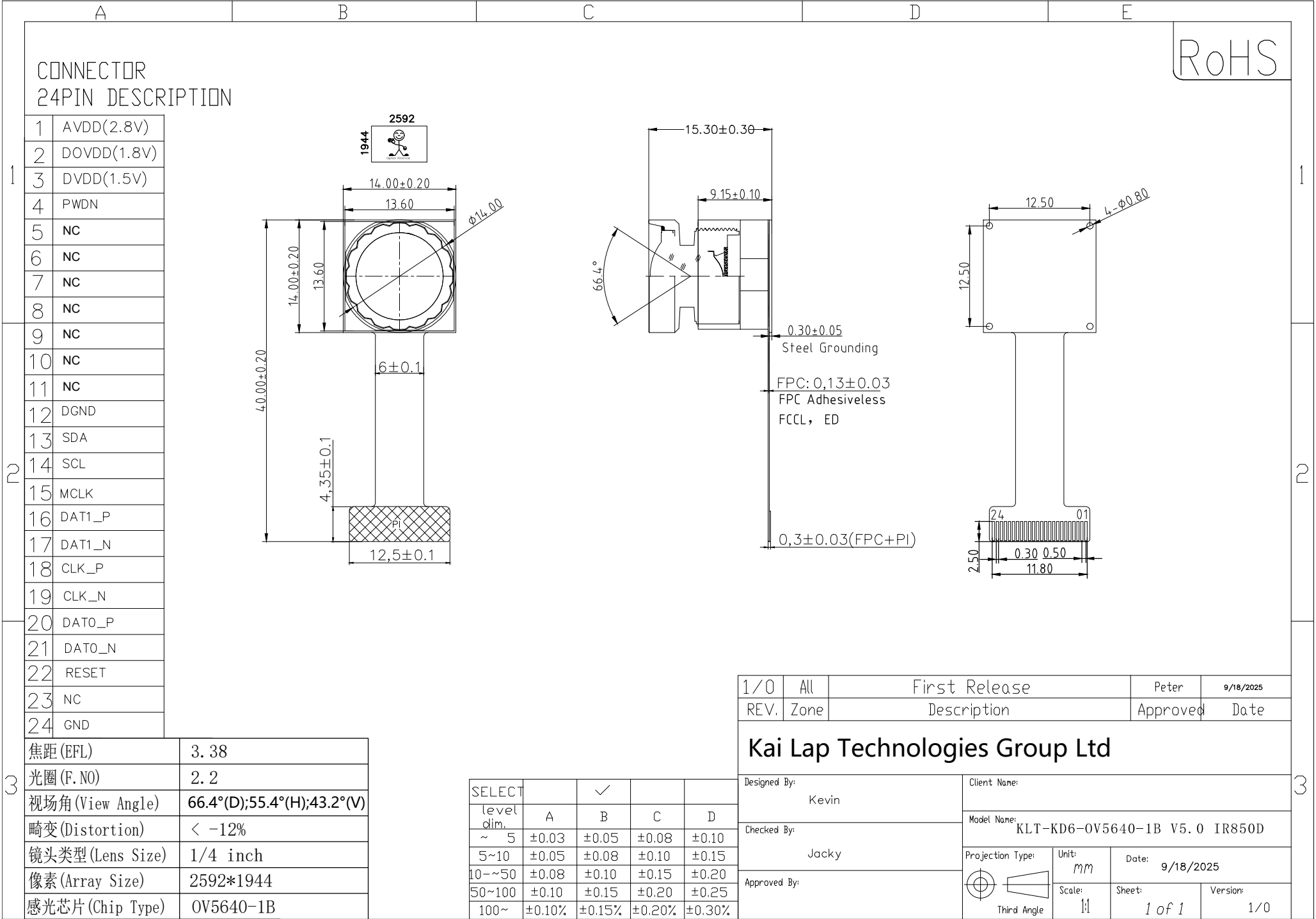
584 591 774 Am Americium

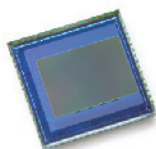
585 592 775 Cm Curium

586 593 776 Bk Berkelium

587 594 777 Cf Californium

588 595 778





OV5640 5-megapixel product brief



available in
a lead-free
package

1/4-inch, 5-Megapixel SOC Image Sensor Optimized for High-Volume Mobile Markets

The OV5640 delivers a complete 5-megapixel camera solution on a single chip, aimed at offering cost efficiencies that serve the high-volume autofocus (AF) camera phone market. The system-on-a-chip (SOC) sensor features OmniVision's 1.4 micron OmniBSI™ backside illumination architecture to deliver excellent pixel performance and best-in-class low-light sensitivity, while enabling ultra compact camera module designs of 8.5 mm x 8.5 mm with <6 mm z-height. The OV5640 provides the full functionality of a complete camera, including anti-shake technology, AF control, and MIPI while being easier to tune than two-chip solutions, making it an ideal choice in terms of cost, time-to-market and ease of platform integration.

The OV5640 enables 720p HD video at 60 frames per second (fps) and 1080p HD video at 30 fps with complete user control over formatting and output data transfer. The 720p/60 HD video is captured in full field of view (FOV) with 2 x 2 binning, which doubles the sensitivity and improves the signal-to-noise ratio (SNR). Additionally, a unique post-binning re-sampling filter function removes zigzag artifacts around slant edges and minimizes spatial artifacts to deliver even sharper, crisper

color images. To further improve camera performance and user experience, the OV5640 features an internal anti-shake engine for image stabilization, and it supports Scalado™ tagging for faster image preview and zoom.

The OV5640 offers a digital video port (DVP) parallel interface and a high-speed dual lane MIPI interface, supporting multiple output formats. An integrated JPEG compression engine simplifies data transfer for bandwidth-limited interfaces. The sensor's automatic image control functions include automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), 50/60 Hz automatic luminance detection, and automatic black level calibration (ABLC). The OV5640 delivers programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning. It also offers color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling to improve image quality.

Find out more at www.ovt.com.



applications

- cellular phones
- toys
- PC multimedia
- digital still cameras

ordering information

- **OV05640-A71A-1B** (color, lead-free)
71-pin CSP

features

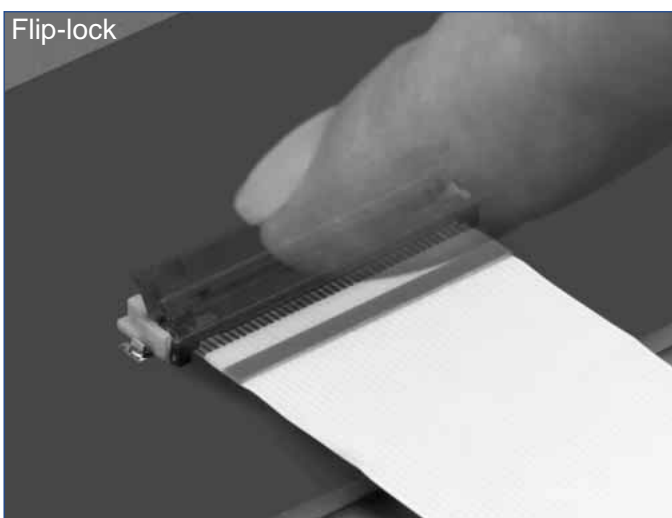
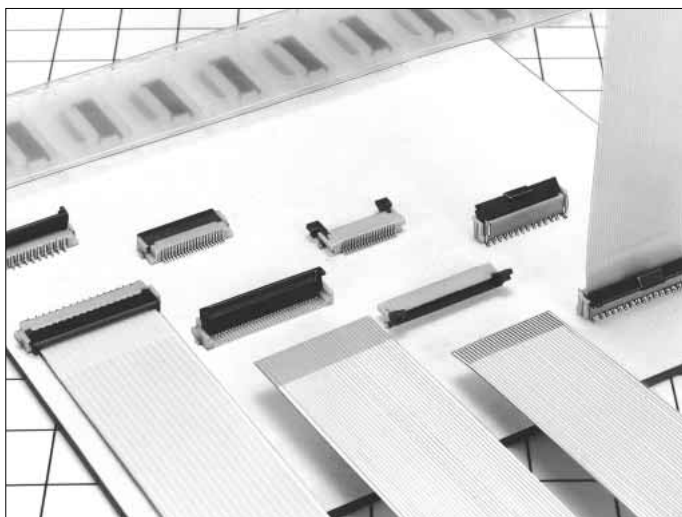
- 1.4 μm x 1.4 μm pixel with OmniBSI technology for high performance (high sensitivity, low crosstalk, low noise, improved quantum efficiency)
- optical size of 1/4"
- automatic image control functions: automatic exposure control (AEC), automatic white balance (AWB), automatic band filter (ABF), automatic 50/60 Hz luminance detection, and automatic black level calibration (ABLC)
- programmable controls for frame rate, AEC/AGC 16-zone size/position/weight control, mirror and flip, cropping, windowing, and panning
- image quality controls: color saturation, hue, gamma, sharpness (edge enhancement), lens correction, defective pixel canceling, and noise canceling
- support for output formats: RAW RGB, RGB565/555/444, CCIR656, YUV422/420, YCbCr422, and compression
- support for video or snapshot operations
- support for internal and external frame synchronization for frame exposure mode
- support for LED and flash strobe mode
- support for horizontal and vertical sub-sampling, binning
- support for minimizing artifacts on binned image
- support for data compression output
- support for anti-shake
- standard serial SCCB interface
- digital video port (DVP) parallel output interface and dual lane MIPI output interface
- embedded 1.5V regulator for core power
- programmable I/O drive capability, I/O tri-state configurability
- support for black sun cancellation
- support for images sizes: 5 megapixel, and any arbitrary size scaling down from 5 megapixel
- support for auto focus control (AFC) with embedded AF VCM driver
- embedded microcontroller
- suitable for module size of 8.5 x 8.5 x <6mm with both CSP and RW packaging

key specifications (typical)

- **active array size:** 2592 x 1944
- **power supply:**
 - core: 1.425 ~ 1.675V (with embedded 1.5V regulator)
 - analog: 2.6 ~ 3.0V (2.8V typical)
 - I/O: 1.8V / 2.8V
- **power requirements:**
 - active: 140 mA
 - standby: 20 μA
- **temperature range:**
 - operating: -30°C to 70°C junction temperature (see [table 8-2](#))
 - stable image: 0°C to 50°C junction temperature (see [table 8-2](#))
- **output formats:** 8-/10-bit RGB RAW output
- **lens size:** 1/4"
- **lens chief ray angle:** 24° (see [figure 10-2](#))
- **input clock frequency:** 6~27 MHz
- **max S/N ratio:** 36 dB
- **dynamic range:** 68 dB @ 8x gain
- **maximum image transfer rate:**
 - QSXGA (2592x1944): 15 fps
 - 1080p: 30 fps
 - 1280x960: 45 fps
 - 720p: 60 fps
 - VGA (640x480): 90 fps
- **sensitivity:** 600 mV/Lux-sec
- **shutter:** rolling shutter / frame exposure
- **maximum exposure interval:** 1964 x t_{ROW}
- **pixel size:** 1.4 μm x 1.4 μm
- **dark current:** 8 mV/s @ 60°C junction temperature
- **image area:** 3673.6 μm x 2738.4 μm
- **package dimensions:** 5985 μm x 5835 μm

0.5mm and 1mm Pitch Connectors For FPC/FFC

FH12 Series



■ Features

1. Ease of Use and Space Savings

Only one finger or 6.9N (Newtons) of force is required to lock Hirose's rotational actuator (flip-lock) as compared to using 2 fingers and 39.2N to close a FFC/FPC connector from our competition.

The Flip-Lock design also allows customers to place 2 or more connectors side by side as there is no need to waste additional board space for a side latch.

2. Strengthened Flip-lock Actuator

The standard Flip-Lock requires only 2.0mm height above the board. A strengthened lock lever is available which only requires an additional 0.4mm.

3. Supports Thin FPC (0.18mm)

Hirose does not require double-sided FPC to have any additional strengthening plate or stiffener and can therefore support a thickness of as little as 0.18mm +/- 0.05.

4. Hirose Ensures Reliability

Hirose's patented half tuning fork contacts maintain the required normal force without relying on the connector housing. With our competitor's conventional products the housing walls support the contact force, which does not provide for long-term reliability.

5. Prevention of Solder Bridge

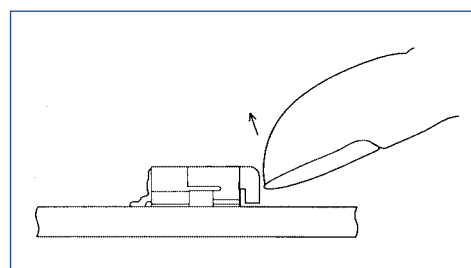
Excess solder cavity absorbs excessive solder and avoids solder bridging.

6. Three different assembly types

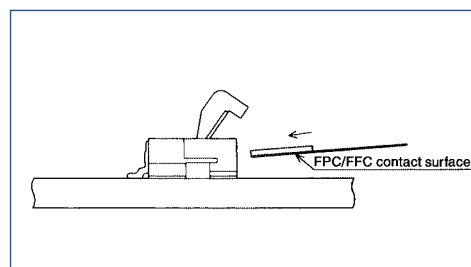
FH12 is offered in Top & Bottom Contact and Vertical Mount and offered in both a 0.5mm contact pitch as well as a 1.0mm contact pitch (bottom contact only).

Rotating One-touch Mechanism

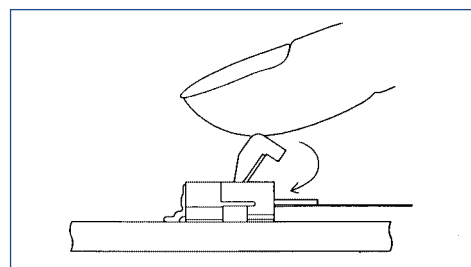
①



②



③



■ Applications

Notebook computers, printers, PDAs, digital cameras and other compact devices for interconnecting the main circuit board with the LCD, HDD or other device.

Product Specifications

Rating	Current rating: 0.5A DC(Note 1)	Operating Temperature Range: -40 to +70°C (Note 2)	Storage Temperature Range: -10 to +50°C (Note 3)
	Voltage rating: 50V AC	Operating Humidity Range: Relative humidity, 90% max. (Not dewed)	Storage Humidity Range: Relative humidity, 90% max. (Not dewed)

Applicable FPC	t=0.3±0.05 Gold plated	t=0.18 ± 0.05 for FH12F-*S-0.5SH
----------------	------------------------	----------------------------------

Item	Specification	Conditions
1. Insulation resistance	500M ohms minimum	100V DC
2. Withstanding voltage	No flashover or insulation breakdown.	150V AC/1 minute
3. Contact resistance	50m ohms maximum	1mA
4. Durability (Insertion/withdrawal)	Contact resistance: 50m ohms maximum No damage, cracks, or parts dislocation.	20 cycles
5. Vibration	No electrical discontinuity of 1μs or more Contact resistance: 50m ohms maximum. No damage, cracks, or parts dislocation.	Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 2 hours in each of the 3 directions.
6. Shock	No electrical discontinuity of 1μs or more Contact resistance: 50m ohms maximum. No damage, cracks, or parts dislocation.	Acceleration of 490 m/s ² , 11 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis.
7. Humidity(Steady state)	Contact resistance: 50m ohms maximum. Insulation resistance: 50M ohms minimum. No damage, cracks, or parts dislocation.	96 hours at 40°C and humidity of 90% to 95%
8. Temperature Cycle	Contact resistance: 50m ohms maximum. Insulation resistance: 50M ohms minimum. No damage, cracks, or parts dislocation.	Temperature: -40°C → 15 to 35°C → 85°C → 15 to 35°C, Time: 30 → 5 max. → 30 → 5 max.(minutes) 5 cycles
9. Resistance to Soldering heat	No deformation of components affecting performance.	Reflow: At the recommended temperature profile Manual soldering: 350±5°C for 3 seconds

Note 1: When passing the current through all of the contacts, use 70% of the current rating.

Note 2: Includes temperature rise caused by current flow.

Note 3: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating Temperature Range and Humidity range covers nonconducting condition of installed connectors in storage, shipment or during transportation.

Material

Part	Material	Finish	Remarks
Insulator	Polyamide, LCP(60 pos.)	Color : Beige	UL94V-0
Actuator	PPS	Color : Dark brown	
Contact	Phosphor bronze	Gold plated	_____
Metal Fittings	Brass	Tin plated	

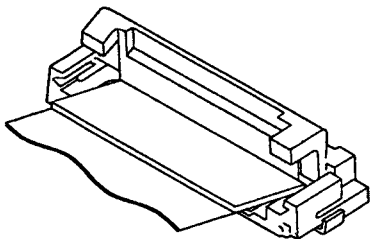
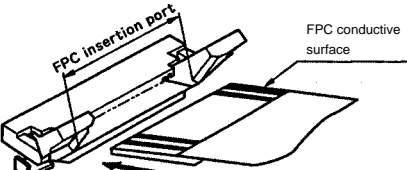
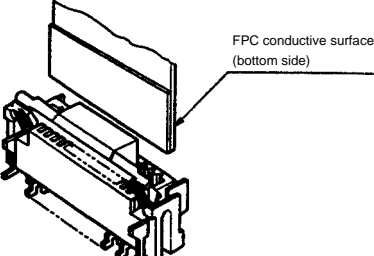
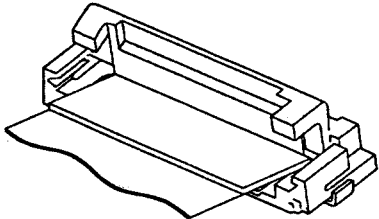
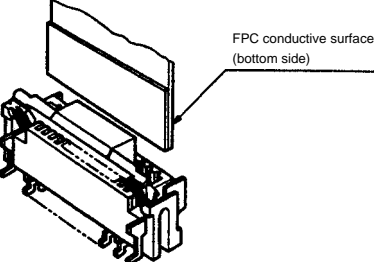
Ordering Information

FH12 A - 10 (4) - S A - 0.5 SH (55)
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

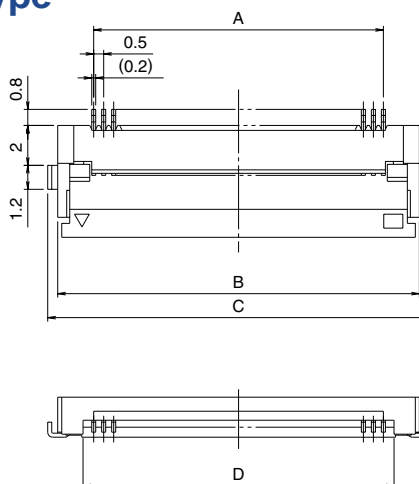
① Series Name : FH12	⑤ Contact alignment: Single
② Blank : standard type A : Top contact type S : Type with strengthened flip-lock actuator F : Type with 0.18mm FPC End Thickness	⑥ Eccentric direction: Blank : standard type A : Eccentric type
③ Standard type : Number of contacts Eccentric type : Number of contacts in 0.5mm housing	⑦ Contacts Pitch : 0.5mm, 1mm
④ Standard type : Blank Eccentric type : Number of contacts	⑧ Contact type SH : SMT horizontal mounting type SV : SMT vertical mounting type
	⑨ Plating specification (55) : Gold plated

FH12 Series 0.5mm and 1mm Pitch Connectors For FPC/FPC

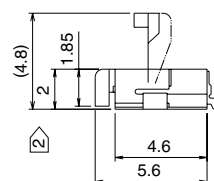
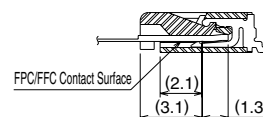
Series Configuration

Pitch	Bottom Contact Type	Top Contact Type	Vertical mounting Type
0.5mm	 <p>FH12- ** S-0.5SH P.12</p> <p>Number of contacts 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 33, 34, 35, 36, 40, 45, 50, 53</p>		
	Type with Strengthened Lock Lever		
	<p>FH12S- ** S-0.5SH P.13</p> <p>Number of contacts 30, 40, 45, 50, 53</p>		
	Type with 0.18mm FPC End Thickness		
	<p>FH12F- ** S-0.5SH P.14</p> <p>Number of contacts 6, 8, 10, 12, 13, 14, 15, 16, 18, 20, 22, 24, 25, 26, 28, 30, 32, 34, 36, 40</p>	<p>FH12A- ** S-0.5SH P.15</p> <p>Number of contacts 10, 12, 15, 16, 18, 20, 22, 24, 26, 28, 29, 30, 32, 33, 34, 36, 40, 42, 45, 50</p>	<p>FH12- ** S-0.5SV P.16</p> <p>Number of contacts 10, 12, 13, 15, 16, 17, 18, 20, 22, 24, 26, 30, 32, 33, 34, 36, 40, 45, 49, 50, 60</p>
1mm	 <p>Standard FH12- ** S-1SH P.18 Eccentric FH12- ** (**) SA-1SH Standard Number of contacts 5, 6, 7, 8, 9, 11, 12, 16, 17, 22, 26 Eccentric Number of contacts 4, 6, 8, 10, 11, 14, 19, 24</p>		 <p>FH12- ** S-1SV P.19</p> <p>Number of contacts 6, 7, 8, 16, 20, 22, 24</p>

0.5mm Pitch Bottom Contact Type



Mated Cross-sectional Diagram



Unit:mm

Part Number	CL No.	Number of Contacts	A	B	C	D	RoHS
FH12- 6S-0.5SH(55)	586-0582-5-55	6	2.5	6.1	7.1	3.57	YES
FH12- 8S-0.5SH(55)	586-0744-5-55	8	3.5	7.1	8.1	4.57	
FH12-10S-0.5SH(55)	586-0522-3-55	10	4.5	8.1	9.1	5.57	
FH12-11S-0.5SH(55)	586-0600-5-55	11	5	8.6	9.6	6.07	
FH12-12S-0.5SH(55)	586-0704-0-55	12	5.5	9.1	10.1	6.57	
FH12-13S-0.5SH(55)	586-0549-0-55	13	6	9.6	10.6	7.07	
FH12-14S-0.5SH(55)	586-0533-0-55	14	6.5	10.1	11.1	7.57	
FH12-15S-0.5SH(55)	586-0523-6-55	15	7	10.6	11.6	8.07	
FH12-16S-0.5SH(55)	586-0531-4-55	16	7.5	11.1	12.1	8.57	
FH12-17S-0.5SH(55)	586-0606-1-55	17	8	11.6	12.6	9.07	
FH12-18S-0.5SH(55)	586-0530-1-55	18	8.5	12.1	13.1	9.57	
FH12-19S-0.5SH(55)	586-0534-2-55	19	9	12.6	13.6	10.07	
FH12-20S-0.5SH(55)	586-0524-9-55	20	9.5	13.1	14.1	10.57	
FH12-22S-0.5SH(55)	586-0532-7-55	22	10.5	14.1	15.1	11.57	
FH12-24S-0.5SH(55)	586-0521-0-55	24	11.5	15.1	16.1	12.57	
FH12-25S-0.5SH(55)	586-0692-3-55	25	12	15.6	16.6	13.07	
FH12-26S-0.5SH(55)	586-0576-2-55	26	12.5	16.1	17.1	13.57	
FH12-28S-0.5SH(55)	586-0612-4-55	28	13.5	17.1	18.1	14.57	
Note ② FH12-30S-0.5SH(55)	586-0525-1-55	30	14.5	18.1	19.1	15.57	
FH12-32S-0.5SH(55)	586-0681-7-55	32	15.5	19.1	20.1	16.57	
FH12-33S-0.5SH(55)	586-0520-8-55	33	16	19.6	20.6	17.07	
FH12-34S-0.5SH(55)	586-0617-8-55	34	16.5	20.1	21.1	17.57	
FH12-35S-0.5SH(55)	586-0740-4-55	35	17.0	20.6	21.6	18.07	
FH12-36S-0.5SH(55)	586-0526-4-55	36	17.5	21.1	22.1	18.57	
Note ② FH12-40S-0.5SH(55)	586-0527-7-55	40	19.5	23.1	24.1	20.57	
Note ② FH12-45S-0.5SH(55)	586-0528-0-55	45	22	25.6	26.6	23.07	
Note ② FH12-50S-0.5SH(55)	586-0529-2-55	50	24.5	28.1	29.1	25.57	
Note ② FH12-53S-0.5SH(55)	586-0595-7-55	53	26	29.6	30.6	27.07	

Note 1 : Embossed tape reel packaging (2,000 pieces/reel).
 Order by number of reels.

Note ② : If there is no problem with the connector height, we recommend the type with the strengthened Flip-lock actuator (FH12S-*S-0.5SH).
 Standard type connector height: 2 mm
 Connector height of type with strengthened Flip-lock actuator: 2.4 mm

Cameras Applications



Automotive Driver Pilot



Live Streaming



Video Conference



Eye Tracker Biometric Detection



Machine Vision



Agricultural Monitor



Night Vision Security



Drone and Sports Eagle Eyes



Interactive Pet Camera



Cameras Applications

your BEST camera module partner



IMAGING DEVICES



Camera Module Pinout Definition Reference Chart

OmniVision Sony Samsung On-Semi Aptina Himax GalaxyCore PixArt SmartSens Sensors	
Pin Signal	Description
DGND GND	ground for digital circuit
AGND	ground for analog circuit
PCLK DCK	DVP PCLK output
XCLR PWDN XSHUTDOWN STANDBY	power down active high with internal pull-down resistor
MCLK XVCLK XCLK INCK	system input clock
RESET RST	reset active low with internal pull-up resistor
NC NULL	no connect
SDA SIO_D SIOD	SCCB data
SCL SIO_C SIOC	SCCB input clock
VSYNC XVS FSYNC	DVP VSYNC output
HREF XHS	DVP HREF output
DOVDD	power for I/O circuit
AFVDD	power for VCM circuit
AVDD	power for analog circuit
DVDD	power for digital circuit
STROBE FSTROBE	strobe output
FSIN	synchronize the VSYNC signal from the other sensor
SID	SCCB last bit ID input
ILPWM	mechanical shutter output indicator
FREX	frame exposure / mechanical shutter
GPIO	general purpose inputs
SLASEL	I2C slave address select
AFEN	CEN chip enable active high on VCM driver IC
MIPI Interface	
MDN0 DN0 MD0N DATA_N DMO1N	MIPI 1st data lane negative output
MDP0 DP0 MD0P DATA_P DMO1P	MIPI 1st data lane positive output
MDN1 DN1 MD1N DATA2_N DMO2N	MIPI 2nd data lane negative output
MDP1 DP1 MD1P DATA2_P DMO2P	MIPI 2nd data lane positive output
MDN2 DN2 MD2N DATA3_N DMO3N	MIPI 3rd data lane negative output
MDP2 DP2 MD2P DATA3_P DMO3P	MIPI 3rd data lane positive output
MDN3 DN3 MD3N DATA4_N DMO4N	MIPI 4th data lane negative output
MDP3 DP3 MD3P DATA4_P DMO4P	MIPI 4th data lane positive output
MCN CLKN CLK_N DCKN	MIPI clock negative output
MCP CLKP MCP CLK_P DCKN	MIPI clock positive output
DVP Parallel Interface	
D0 DO0 Y0	DVP data output port 0
D1 DO1 Y1	DVP data output port 1
D2 DO2 Y2	DVP data output port 2
D3 DO3 Y3	DVP data output port 3
D4 DO4 Y4	DVP data output port 4
D5 DO5 Y5	DVP data output port 5
D6 DO6 Y6	DVP data output port 6
D7 DO7 Y7	DVP data output port 7
D8 DO8 Y8	DVP data output port 8
D9 DO9 Y9	DVP data output port 9
D10 DO10 Y10	DVP data output port 10
D11 DO11 Y11	DVP data output port 11

Camera Reliability Test

Reliability Inspection Item			Testing Method	Acceptance Criteria
Category		Item		
Environmental	Storage Temperature	High 60°C 96 Hours	Temperature Chamber	No Abnormal Situation
		Low -20°C 96 Hours	Temperature Chamber	No Abnormal Situation
	Operation Temperature	High 60°C 24 Hours	Temperature Chamber	No Abnormal Situation
		Low -20°C 24 Hours	Temperature Chamber	No Abnormal Situation
	Humidity	60°C 80% 24 Hours	Temperature Chamber	No Abnormal Situation
	Thermal Shock	High 60°C 0.5 Hours Low -20°C 0.5 Hours Cycling in 24 Hours	Temperature Chamber	No Abnormal Situation
Physical	Drop Test (Free Falling)	Without Package 60cm	10 Times on Wood Floor	Electrically Functional
		With Package 60cm	10 Times on Wood Floor	Electrically Functional
	Vibration Test	50Hz X-Axis 2mm 30min	Vibration Table	Electrically Functional
		50Hz Y-Axis 2mm 30min	Vibration Table	Electrically Functional
		50Hz Z-Axis 2mm 30min	Vibration Table	Electrically Functional
	Cable Tensile Strength Test	Loading Weight 4 kg 60 Seconds Cycling in 24 Hours	Tensile Testing Machine	Electrically Functional
Electrical	ESD Test	Contact Discharge 2 KV	ESD Testing Machine	Electrically Functional
		Air Discharge 4 KV	ESD Testing Machine	Electrically Functional
	Aging Test	On/Off 30 Seconds Cycling in 24 Hours	Power Switch	Electrically Functional
	USB Connector	On/Off 250 Times	Plug and Unplug	Electrically Functional



Inspection Item		Inspection Method	Standard of Inspection	
Category	Item			
Appearance	FPC/ PCB	Color	The Naked Eye	Major Difference is Not Allowed.
		Be Torn/Chopped	The Naked Eye	Copper Crack Exposure is Not Allowed.
		Marking	The Naked Eye	Clear, Recognizable (Within 30cm Distance)
	Holder	Scratches	The Naked Eye	The Inside Crack Exposure is Not Allowed
		Gap	The Naked Eye	Meet the Height Standard
		Screw	The Naked Eye	Make Sure Screws Are Presented (If Any)
		Damage	The Naked Eye	The Inside Crack Exposure is Not Allowed
	Lens	Scratch	The Naked Eye	No Effect On Resolution Standard
		Contamination	The Naked Eye	No Effect On Resolution Standard
		Oil Film	The Naked Eye	No Effect On Resolution Standard
		Cover Tape	The Naked Eye	No Issue On Appearance.
	Function	Image	No Communication	Test Board
Bright Pixel			Black Board	Not Allowed In the Image Center
Dark Pixel			White board	Not Allowed In the Image Center
Blurry			The Naked Eye	Not Allowed
No Image			The Naked Eye	Not Allowed
Vertical Line			The Naked Eye	Not Allowed
Horizontal Line			The Naked Eye	Not Allowed
Light Leakage			The Naked Eye	Not Allowed
Blinking Image			The Naked Eye	Not Allowed
Bruise			Inspection Jig	Not Allowed
Resolution			Chart	Follows Outgoing Inspection Chart Standard
Color			The Naked Eye	No Issue
Noise			The Naked Eye	Not Allowed
Corner Dark			The Naked Eye	Less Than 100px By 100px
Color Resolution			The Naked Eye	No Issue
Dimension			Height	The Naked Eye
	Width	The Naked Eye	Follows Approval Data Sheet	
	Length	The Naked Eye	Follows Approval Data Sheet	
	Overall	The Naked Eye	Follows Approval Data Sheet	

KLT Package Solutions

KLT Camera Module



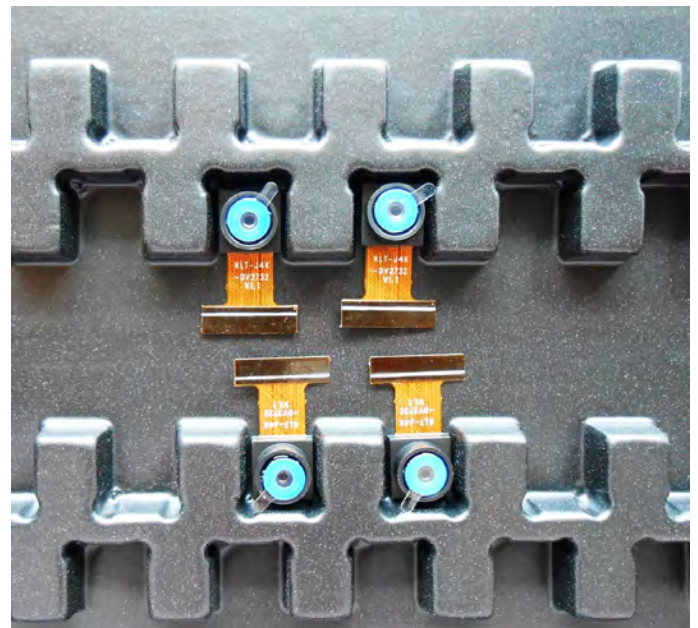
Complete with Lens Protection Film



Tray with Grid and Space



Place Cameras on the Tray



Camera Modules Package Solution

Full Tray of Cameras



Cover Tray with Lid



Put Tray into Anti-Static Bag



Vacuum the Anti-Static Bag



Camera Modules Package Solution

Sealed Vacuum Bag with Labels

1. Model and Description 2. Quantity 3. Shipping Date 4. Caution



Large Order Package Solution

Place Foam Sheets Between Trays



Foam Sheets are Slightly Larger than Trays



Place Foam Sheets and Trays into Box



Foam Sheets are Tightly Fitting Box



Small Order Package Solution

Place Foam Sheets and Trays into Small Box



Foam Sheets are Nicely Fitting the Small Box



Package in Small Box for Shipment

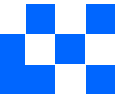


Place Small Boxes into Larger Box





CMOS CAMERA MODULES



your BEST camera module partner

Carbon Box Package Solution

Seal the Carbon Box

Final Package Labelled Box



Carbon Box Ready for Shipment

1. Delivery Address and Phone No. 2. Box No. and Ship Date 3. Fragile Caution



www.KaiLapTech.com sales@KaiLapTech.com Tel: (852) 6908 1256 Fax: (852) 3017 6778

All rights reserved @ Kai Lap Technologies Group Ltd. Specifications subject to change without notice.

Sample Order Package Solution

Place Sample into Small Anti-Static Bag



Place Connectors into Small Ant-Static Bag



Sample Labels on the Small Bag

1. Camera Module or Connector Model 2. Shipping Date and Quantity 3. Caution



Connectors Large Order Package Solution

Connectors in a Wheel



Label Connectors in the Wheel



The Wheel is Perfectly Fitting the Box



Connectors Box Ready for Shipment





CMOS CAMERA MODULES



your BEST camera module partner

Company Kai Lap Technologies (KLT)

Kai Lap Technologies Group Limited. (KLT) was established in 2009, a next-generation technology driven manufacturer specialized in research, design, and produce of audio and video products. KLT is occupying 20,000 square feet automated plants with 100 employees of annual throughput 30,000,000 units cameras.

KLT provides OEM, ODM design, contract manufacturing, and builds the camera products. You may provide the requirements to us, even with a hand draft, our sales and engineering work together to meet your needs. We consider ourselves your last-term partner in developing practical and innovative solutions.

Our team covers everything from initial concept development to mass produced product. KLT specializes in customized camera design, raw material, electronic engineering, firmware/software development, product testing, and packing design. Our experienced strategic supply systems offer a robust and dependable manufacturing capacity for orders of various sizes.



Limited Warranty

KLT provides the following limited warranty if you purchased the Product(s) directly from KLT company or from KLT's website, www.KaiLapTech.com. Product(s) purchased from other sellers or sources are not covered by this Limited Warranty. KLT guarantees that the Product(s) will be free from defects in materials and workmanship under normal use for a period of one (1) year from the date you receive the product ("Warranty Period").

For all Product(s) that contain or develop material defects in materials or workmanship during the Warranty Period, KLT will, at its sole option, either: (i) repair the Product(s); (ii) replace the Product(s) with a new or refurbished Product(s) (replacement Product(s) being of identical model or functional equivalent); or (iii) provide you a refund of the price you paid for the Product(s).

This Limited Warranty of KLT is solely limited to repair and/or replacement on the terms set forth above. KLT is not reliable or responsible for any subsequent events.



www.KaiLapTech.com sales@KaiLapTech.com Tel: (852) 6908 1256 Fax: (852) 3017 6778



CMOS CAMERA MODULES



your BEST camera module partner

KLT Strength

Powerful Factory



Professional Service



Promised Delivery



www.KaiLapTech.com sales@KaiLapTech.com Tel: (852) 6908 1256 Fax: (852) 3017 6778

All rights reserved @ Kai Lap Technologies Group Ltd. Specifications subject to change without notice.