

OPTOELECTRONICS



Short Form Catalog 2009

Light Emitting Diodes

Featuring:

Ultra Bright LED Lamps in:

- Red: to 11,000 mcd typical
- Orange-Amber: to 11,750 mcd typical
- Yellow: to 9,750 mcd typical
- Green: to 5,000 mcd typical
- White: to 10,000 mcd typical
- Blue: to 1,500 mcd typical

**T-3, T-1 3/4, T-1,
Surface Mount Packages
Dual Color
Special Packages**

Contact Us for Segment Displays

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Red LED Lamps

| Part Number | LED Color | Lens Color | λ Peak (nm) | Luminous Intensity, I_v (mcd) | | $(I_F - mA)$ | Total Angle (degree) | Material |
|---|-----------|----------------|---------------------|---------------------------------|--------|--------------|----------------------|----------|
| | | | | Min | Typ | | | |
| T-3 Package (10mm) | | | | | | | | |
| AND190CRP | Red | Clear | 660 | 6,000 | 11,000 | 20 | 8 | GaAlAs |
| AND191CRP | Red | White Diffused | 660 | 180 | 600 | 20 | 20 | GaAlAs |
| AND190HRP | Red | Clear | 644 | 5,600 | 10,000 | 20 | 8 | InGaAlP |
| T-1 3/4 Package (5mm) | | | | | | | | |
| AND113R | Red | Red, Clear | 700 | 5 | 18 | 10 | 30 | GaP |
| AND113RP | Red | Red, Clear | 700 | 5 | 18 | 10 | 30 | GaP |
| AND114R | Red | Red, Diffused | 700 | 2 | 5 | 10 | 60 | GaP |
| AND114RP | Red | Red, Diffused | 700 | 2 | 5 | 10 | 60 | GaP |
| AND180CRP | Red | Clear | 660 | 2,000 | 3,600 | 20 | 10 | GaAlAs |
| AND130CR | Red | Clear | 660 | 1,200 | 2,000 | 20 | 16 | GaAlAs |
| AND120CRP | Red | Clear | 660 | 1,200 | 2,000 | 20 | 22 | GaAlAs |
| AND120CR | Red | Clear | 660 | 1,200 | 2,000 | 20 | 22 | GaAlAs |
| AND155CRP | Red | Clear | 660 | 630 | 1,250 | 20 | 20 | GaAlAs |
| AND120BR | Red | Clear | 660 | 500 | 1,100 | 20 | 35 | GaAlAs |
| AND134CRP | Red | Red Diffused | 660 | 360 | 600 | 20 | 40 | GaAlAs |
| AND116CR | Red | Milky Diffused | 660 | 56 | 130 | 20 | 60 | GaAlAs |
| AND180HRP | Red | Clear | 644 | 1,800 | 6,000 | 20 | 8 | InGaAlP |
| AND157HRP | Red | Clear | 644 | 700 | 1,800 | 20 | 20 | InGaAlP |
| AND113S | Red | Red, Clear | 625 | 50 | 150 | 10 | 30 | GaAsP |
| AND114S | Red | Red, Diffused | 625 | 20 | 50 | 10 | 60 | GaAsP |
| AND114SP | Red | Red, Diffused | 625 | 20 | 50 | 10 | 60 | GaAsP |
| AND180HSP | Red | Clear | 623 | 3,200 | 6,000 | 20 | 8 | InGaAlP |
| AND157HSP | Red | Clear | 632 | 4,500 | 5,650 | 20 | 30 | InGaAlP |
| T-1 Package (3mm) | | | | | | | | |
| AND123R | Red | Red, Clear | 700 | 5 | 12 | 10 | 50 | GaP |
| AND124R | Red | Red, Diffused | 700 | 1.3 | 3.0 | 10 | 60 | GaP |
| AND125CRP | Red | Clear | 660 | 360 | 600 | 20 | 36 | GaAlAs |
| AND126CR | Red | Milky Diffused | 660 | 75 | 180 | 20 | 65 | GaAlAs |
| AND262HS | Red | Clear | 632 | 400 | 630 | 20 | 10 | InGaAlP |
| Surface Mount Package: Flat Lens (2.0 x 1.25 x 1.1 mm); Flat Lens LP (1.6 x 0.80 x 0.40 mm); Domed Lens (3.2 x 2.4 x 2.5 mm); TOP LED (3.5 x 2.8 x 1.9 mm); Rt Angle Lens (3.0 x 1.0 x 2.0 mm) | | | | | | | | |
| AND4RA (Flat) | Red | Clear | 660 | 20 | 40 | 20 | 140 | GaAlAs |
| AND4RRA (Rt Agl) | Red | Clear | 632 | 90 | 139 | 20 | 120 | InGaAlP |
| AND4SA (Flat) | Red | Clear | 640 | 1.53 | 5.0 | 20 | 140 | GaAsP |
| AND5RA (Domed) | Red | Clear | 660 | 290 | 480 | 20 | 30 | GaAlAs |
| AND5SA (Domed) | Red | Clear | 640 | 24 | 40 | 20 | 30 | GaAsP |
| AND7RA (Flat LP) | Red | Clear | 624 | 90 | 135 | 20 | 120 | InGaAlP |

Orange-Amber LED Lamps

| | | | | | | | | |
|---|--------|-------|-----|-------|--------|----|-----|---------|
| T-3 Package (10mm) | | | | | | | | |
| AND190HAP | Amber | Clear | 612 | 4,500 | 8,000 | 20 | 6 | InGaAlP |
| AND190HOP | Orange | Clear | 620 | 4,000 | 6,000 | 20 | 6 | InGaAlP |
| T-1 3/4 Package (5mm) | | | | | | | | |
| AND157HAP | Amber | Clear | 612 | 1,200 | 2,000 | 20 | 20 | InGaAlP |
| AND185HOP | Orange | Clear | 620 | 9,000 | 11,750 | 20 | 6 | InGaAlP |
| AND185HAP | Amber | Clear | 612 | 8,500 | 11,150 | 20 | 6 | InGaAlP |
| AND156HOP | Orange | Clear | 620 | 630 | 800 | 20 | 25 | InGaAlP |
| T-1 Package (3mm) | | | | | | | | |
| AND262HOP | Orange | Clear | 620 | 250 | 420 | 20 | 40 | InGaAlP |
| AND262HAP | Amber | Clear | 612 | 240 | 390 | 20 | 40 | InGaAlP |
| Surface Mount Package: | | | | | | | | |
| Flat Lens (2.0 x 1.25 x 1.1 mm); Domed Lens (3.2 x 2.4 x 2.5 mm); TOP LED (3.5 x 2.8 x 1.9 mm); Rt Angle Lens (3.0 x 1.0 x 2.0 mm) | | | | | | | | |
| AND4OA (Flat) | Orange | Clear | 620 | 27 | 60 | 20 | 140 | InGaAlP |
| AND5OA (Domed) | Orange | Clear | 620 | 490 | 750 | 20 | 30 | InGaAlP |

Notes:

- Surface Mount Devices are supplied in Tape & Reel packaging in the following manner:
Flat Lens 3,000 pcs/reel; Domed Lens 1,000 pcs/reel; Right Angle & TOP LED 2,000 pcs/reel
- T-1 and T1 3/4 LEDs can be supplied in Tape & Reel with a minimum order and shipment of 10K pcs of each part.
T-1 type 2,000 pcs/reel; T-1 3/4 type 1,000 pcs/reel



Yellow LED Lamps

| Part Number | LED Color | Lens Color | λ Peak (nm) | Luminous Intensity, I_v (mcd) | | $(I_F - mA)$ | Total Angle (degree) | Material |
|---|-----------|------------------|---------------------|---------------------------------|-------|--------------|----------------------|----------|
| | | | | Min | Typ | | | |
| T-3 Package (10mm) | | | | | | | | |
| AND190HYP | Yellow | Clear | 590 | 4,500 | 6,300 | 20 | 6 | InGaAlP |
| T-1 3/4 Package (5mm) | | | | | | | | |
| AND180HYP | Yellow | Clear | 590 | 6,000 | 9,750 | 20 | 6 | InGaAlP |
| ANDS4E38XX16 | Yellow | Clear | 590 | 2,500 | 3,200 | 20 | 16 | InGaAlP |
| ANDS4E38XX20 | Yellow | Clear | 590 | 2,000 | 3,000 | 20 | 20 | InGaAlP |
| AND180AYP | Yellow | Clear | 590 | 1,600 | 2,500 | 20 | 6 | InGaAlP |
| AND157HYP | Yellow | Clear | 590 | 1,200 | 2,500 | 20 | 15 | InGaAlP |
| AND156EYP | Yellow | Clear | 590 | 300 | 700 | 20 | 50 | InGaAlP |
| AND156QYP | Yellow | Clear | 590 | 3,600 | 4,000 | 20 | 30 | InGaAlP |
| AND156SYP | Yellow | Clear | 590 | 4,500 | 6,200 | 20 | 30 | InGaAlP |
| AND181YP | Yellow | Yellow, Clear | 590 | 37 | 75 | 10 | 15 | GaAsP |
| AND113Y | Yellow | Yellow, Clear | 590 | 20 | 50 | 10 | 30 | GaAsP |
| AND113YP | Yellow | Yellow, Clear | 590 | 20 | 50 | 10 | 30 | GaAsP |
| AND114Y | Yellow | Yellow, Diffused | 590 | 5 | 18 | 10 | 60 | GaAsP |
| AND114YP | Yellow | Yellow, Diffused | 590 | 5 | 18 | 10 | 60 | GaAsP |
| T-1 Package (3mm) | | | | | | | | |
| AND262YAP | Yellow | Clear | 595 | 72 | 120 | 20 | 36 | InGaAlP |
| AND123Y | Yellow | Yellow, Clear | 590 | 10 | 45 | 10 | 50 | GaAsP |
| AND124Y | Yellow | Yellow, Diffused | 590 | 8 | 20 | 10 | 60 | GaAsP |
| Surface Mount Package: Flat Lens (2.0 x 1.25 x 1.1 mm); Flat Lens LP (1.6 x 0.80 x 0.40 mm); Domed Lens (3.2 x 2.4 x 2.5 mm); TOP LED (3.5 x 2.8 x 1.9 mm); Rt Angle Lens (3.0 x 1.0 x 2.0 mm) | | | | | | | | |
| AND4YA (Flat) | Yellow | Clear | 590 | 58 | 80 | 20 | 140 | InGaAlP |
| AND5YA (Domed) | Yellow | Clear | 590 | 395 | 625 | 20 | 30 | InGaAlP |
| AND7YA (Flat LP) | Yellow | Clear | 589 | 90 | 135 | 20 | 120 | InGaAlP |

Green LED Lamps

| | | | | | | | | |
|---|-------|-----------------|-----|-------|-------|----|-----|---------|
| T-3 Package (10mm) | | | | | | | | |
| AND190HGP | Green | Clear | 574 | 1,200 | 2,000 | 20 | 8 | InGaAlP |
| AND190GCP | Green | Clear | 567 | 370 | 700 | 20 | 8 | GaP |
| T-1 3/4 Package (5mm) | | | | | | | | |
| AND183HGP | Green | Clear | 574 | 850 | 2,500 | 20 | 8 | InGaAlP |
| AND412HG | Green | Clear | 505 | 1,250 | 2,200 | 20 | 12 | InGaN |
| AND520HG | Green | Clear | 525 | 2,500 | 5,000 | 20 | 20 | InGaN |
| AND240GCP | Green | Clear | 567 | 350 | 780 | 20 | 20 | GaP |
| AND135PGP | Green | Clear | 567 | 300 | 500 | 20 | 25 | GaP |
| AND113G | Green | Green, Clear | 565 | 20 | 50 | 10 | 30 | GaP |
| AND113GP | Green | Green, Clear | 565 | 20 | 50 | 10 | 30 | GaP |
| AND114G | Green | Green, Diffused | 565 | 5 | 18 | 10 | 60 | GaP |
| AND114GP | Green | Green, Diffused | 565 | 5 | 18 | 10 | 60 | GaP |
| T-1 Package (3mm) | | | | | | | | |
| AND160NG | Green | Clear | 570 | 200 | 250 | 20 | 15 | GaP |
| AND262GCP | Green | Clear | 567 | 70 | 110 | 20 | 36 | GaP |
| AND262HG | Green | Clear | 525 | 630 | 1,000 | 20 | 35 | GaN |
| AND123G | Green | Green, Clear | 565 | 20 | 50 | 10 | 50 | GaP |
| AND124G | Green | Green, Diffused | 565 | 8 | 20 | 10 | 60 | GaP |
| Surface Mount Package: Flat Lens (2.0 x 1.25 x 1.1 mm); Flat Lens LP (1.6 x 0.80 x 0.40 mm); Domed Lens (3.2 x 2.4 x 2.5 mm); TOP LED (3.5 x 2.8 x 1.9 mm); Rt Angle Lens (3.0 x 1.0 x 2.0 mm) | | | | | | | | |
| AND4GA (Flat) | Green | Clear | 570 | 8 | 15 | 20 | 140 | GaP |
| AND4GRA (Rt Angle) | Green | Clear | 540 | 84 | 140 | 20 | 120 | InGaN |
| AND4PGA (Flat) | Green | Clear | 555 | 0.85 | 2.0 | 20 | 140 | GaP |
| AND5GA (Domed) | Green | Clear | 570 | 75 | 125 | 20 | 30 | GaP |
| AND5G (Domed) | Green | Clear | 570 | 70 | 120 | 20 | 30 | GaP |
| AND5PGA (Domed) | Green | Clear | 555 | 20 | 35 | 20 | 30 | GaP |
| AND6GA (TOP LED) | Green | Clear | 525 | 110 | 170 | 20 | 120 | InGaN |
| AND7GA (Flat LP) | Green | Clear | 525 | 112 | 180 | 20 | 120 | InGaN |
| AND7GB (Flat LP) | Green | Clear | 573 | 30 | 45 | 20 | 120 | InGaN |



Blue LED Lamps

| Part Number | LED Color | Lens Color | λ Peak (nm) | Luminous Intensity, I_v (mcd) | | $(I_F - mA)$ | Total Angle (degree) | Material |
|---|-----------|------------|---------------------|---------------------------------|-------|--------------|----------------------|----------|
| | | | | Min | Typ | | | |
| T-3 Package (10mm) | | | | | | | | |
| AND190HBA | Blue | Clear | 430 | 1,000 | 1,500 | 20 | 10 | GaN |
| AND190HBB | Blue | Clear | 470 | 630 | 1,250 | 20 | 15 | InGaN |
| T-1 3/4 Package (5mm) | | | | | | | | |
| AND410HB | Blue | Clear | 430 | 250 | 400 | 20 | 10 | GaN |
| AND520HB | Blue | Clear | 475 | 630 | 900 | 20 | 20 | InGaN |
| T-1 Package (3mm) | | | | | | | | |
| AND262HBA | Blue | Clear | 430 | 160 | 250 | 20 | 40 | GaN |
| AND262HBB | Blue | Clear | 470 | 150 | 300 | 20 | 45 | InGaN |
| Surface Mount Package: Flat Lens (2.0 x 1.25 x 1.1 mm); Flat Lens LP (1.6 x 0.80 x 0.40 mm); Domed Lens (3.2 x 2.4 x 2.5 mm); TOP LED (3.5 x 2.8 x 1.9 mm); Rt Angle Lens (3.0 x 1.0 x 2.0 mm) | | | | | | | | |
| AND4BA (Flat) | Blue | Clear | 430 | 16 | 20 | 20 | 140 | GaN |
| AND4BC (Flat) | Blue | Clear | 468 | 30 | 50 | 20 | 140 | InGaN |
| AND4BRA (Rt Angle) | Blue | Clear | 430 | 17 | 22 | 20 | 120 | GaN |
| AND4BRB (Rt Angle) | Blue | Clear | 470 | 23 | 29 | 20 | 120 | InGaN |
| AND5BA (Domed) | Blue | Clear | 430 | 90 | 112 | 20 | 30 | GaN |
| AND5BB (Domed) | Blue | Clear | 470 | 118 | 150 | 20 | 30 | InGaN |
| AND6BA (TOP LED) | Blue | Clear | 430 | 35 | 55 | 20 | 120 | GaN |
| AND6BC (TOP LED) | Blue | Clear | 468 | 57 | 85 | 20 | 120 | InGaN |
| AND6BD (TOP LED) | Blue | Clear | 468 | 90 | 135 | 20 | 120 | InGaN |
| AND7BA (Flat LP) | Blue | Clear | 470 | 18 | 30 | 5 | 120 | InGaN |

White LED Lamps

| | | | | | | | | |
|---|-------|-------|---------|-------|--------|----|-----|-------|
| T-3 Package (10mm) | | | | | | | | |
| AND190HW | White | Clear | 420-700 | 3,300 | 6,500 | 20 | 15 | InGaN |
| T-1 3/4 Package (5mm) | | | | | | | | |
| AND420HWA | White | Clear | 420-700 | 2,500 | 3,500 | 20 | 15 | InGaN |
| AND420HWB | White | Clear | 420-700 | 7,150 | 10,000 | 20 | 20 | InGaN |
| AND520HW | White | Clear | 420-700 | 2,850 | 4,000 | 20 | 25 | InGaN |
| AND720HW | White | Clear | 420-700 | 7,150 | 9,000 | 20 | 20 | InGaN |
| T-1 Package (3mm) | | | | | | | | |
| AND262HW | White | Clear | 420-700 | 1,800 | 2,250 | 20 | 35 | InGaN |
| Surface Mount Package: Flat Lens (2.0 x 1.25 x 1.1 mm); Flat Lens LP (1.6 x 0.80 x 0.40 mm); Domed Lens (3.2 x 2.4 x 2.5 mm); TOP LED (3.5 x 2.8 x 1.9 mm); Rt Angle Lens (3.0 x 1.0 x 2.0 mm) | | | | | | | | |
| AND4WA (TOP LED) | White | Clear | 420-700 | 100 | 160 | 20 | 120 | InGaN |
| AND4WB (Flat) | White | Clear | 420-700 | 90 | 182 | 20 | 150 | InGaN |
| AND7WA (Flat LP) | White | Clear | 420-700 | 28.5 | 45 | 5 | 130 | InGaN |

Dual Color LED Lamps

| | | | | | | | | |
|-------------|--------------|-----------------|---------|---------|-----------|----|-----|-----------|
| AND-2451RGL | Red/Green | Milky, Diffused | 700/567 | 0.7/0.8 | 1.2/2.7 | 10 | 120 | GaAsP/GaP |
| AND126SG | Red/Green | Milky, Diffused | 635/565 | 12/12 | 14/14 | 10 | 60 | GaAsP/GaP |
| AND116SG | Red/Green | Milky, Diffused | 635/565 | 10/10 | 12/12 | 10 | 70 | GaAsP/GaP |
| AND208SGA | Red/Green | Milky, Diffused | 625/565 | 8.0/8.0 | 14.0/14.0 | 10 | 110 | GaAsP/GaP |
| AND208YGA | Yellow/Green | Milky, Diffused | 590/565 | 3.2/8.0 | 6.0/14.0 | 10 | 110 | GaAsP/GaP |

Special Shape Packaged LED Lamps

| | | | | | | | | |
|-----------|--------|------------------|-----|-----|-----|----|-------|--------|
| AND205RA | Red | Red, Diffused | 700 | 0.5 | 1.0 | 10 | 1 x 5 | GaP |
| AND208RA | Red | Red, Diffused | 700 | 0.5 | 1.0 | 10 | 2 x 5 | GaP |
| AND211RA | Red | Red, Diffused | 700 | 0.5 | 1.0 | 10 | 2 x 4 | GaP |
| AND218RPA | Red | Red, Diffused | 700 | 0.5 | 1.0 | 10 | 2 x 5 | GaP |
| AND226R | Red | Red, Diffused | 700 | 0.5 | 1.0 | 10 | Flat | GaP |
| AND233CRP | Red | Clear | 660 | 320 | 800 | 20 | 15 | GaAlAs |
| AND205YA | Yellow | Yellow, Diffused | 590 | 2.0 | 4.0 | 10 | 1 x 5 | GaAsP |
| AND211YA | Yellow | Yellow, Diffused | 590 | 2.0 | 4.0 | 10 | 2 x 4 | GaAsP |
| AND218YPA | Yellow | Yellow, Diffused | 590 | 2.0 | 4.0 | 10 | 2 x 5 | GaAsP |
| AND226Y | Yellow | Yellow, Diffused | 590 | 2.0 | 4.0 | 10 | Flat | GaAsP |
| AND208YA | Yellow | Yellow, Diffused | 590 | 2.0 | 3.5 | 10 | 2 x 5 | GaAsP |
| AND233GCP | Green | Clear | 567 | 60 | 150 | 20 | 25 | GaP |
| AND205GA | Green | Green, Diffused | 565 | 2.0 | 4.0 | 10 | 1 x 5 | GaP |
| AND211GA | Green | Green, Diffused | 565 | 2.0 | 4.0 | 10 | 2 x 4 | GaP |
| AND218GPA | Green | Green, Diffused | 565 | 2.0 | 4.0 | 10 | 2 x 5 | GaP |
| AND226G | Green | Green, Diffused | 565 | 2.0 | 4.0 | 10 | Flat | GaP |
| AND208GA | Green | Green, Diffused | 565 | 2.0 | 3.5 | 10 | 2 x 5 | GaP |



Red and Green LED Segment Displays

| Part Number | LED Color | Face Color | Display Height (inch) | Characteristics | Luminous Intensity, I_v (mcd) | $(I_F = 10\text{mA})$ | Polarity | Material |
|--------------------|-----------|------------|-----------------------|---------------------|---------------------------------|-----------------------|----------|-----------|
| | | | | | Typ. | | | |
| 7 Segments | | | | | | | | |
| AND2307SAL | Red | Red | 2.30 | RHDP, 10 pin | 7.5 | 10 | C-A | GaAsP |
| AND2307SCL | Red | Red | 2.30 | RHDP, 10 pin | 7.5 | 10 | C-C | GaAsP |
| AND1510SAL | Red | Red | 1.50 | RHDP, 10 pin | 4.6 | 10 | C-A | GaAsP |
| AND1510SCL | Red | Red | 1.50 | RHDP, 10 pin | 4.6 | 10 | C-C | GaAsP |
| AND4310SAL | Red | Red | 0.43 | RHDP & LHDP, 14 pin | 3.3 | 10 | C-A | GaAsP |
| AND4310SCL | Red | Red | 0.43 | RHDP & LHDP, 14 pin | 3.3 | 10 | C-C | GaAsP |
| AND5610SAL | Red | Red | 0.56 | RHDP, 10 pin | 3.3 | 10 | C-A | GaAsP |
| AND5610SCL | Red | Red | 0.56 | RHDP, 10 pin | 3.3 | 10 | C-C | GaAsP |
| AND8010SAL | Red | Red | 0.80 | RHDP, 16 pin | 3.8 | 10 | C-C | GaAsP/GaP |
| AND8010SCL | Red | Red | 0.80 | RHDP, 16 pin | 3.8 | 10 | C-C | GaAsP/GaP |
| 16 Segments | | | | | | | | |
| AND5420OALB | Red | Red | 0.54 | RHDP, 18 pin | 3.3 | 10 | C-A | GaAsP |
| AND5420OCLB | Red | Red | 0.54 | RHDP, 18 pin | 3.3 | 10 | C-C | GaAsP |
| AND8010SALB | Red | Red | 0.80 | RHDP, 18 pin | 3.8 | 10 | C-C | GaAsP/GaP |
| AND8010SCLB | Red | Red | 0.80 | RHDP, 18 pin | 3.8 | 10 | C-C | GaAsP/GaP |
| 7 Segments | | | | | | | | |
| AND2307GAL | Green | Gray | 2.30 | RHDP, 10 pin | 6.5 | 10 | C-A | GaP |
| AND2307GCL | Green | Gray | 2.30 | RHDP, 10 pin | 6.5 | 10 | C-C | GaP |
| AND8010GAL | Green | Gray | 0.80 | RHDP & LHDP, 16 pin | 3.3 | 10 | C-A | GaP |
| AND8010GCL | Green | Gray | 0.80 | RHDP & LHDP, 16 pin | 3.3 | 10 | C-C | GaP |
| AND4310GAL | Green | Green | 0.43 | RHDP & LHDP, 14 pin | 2.9 | 10 | C-A | GaP |