

CND0216A

Infrared Optocal Module (IrDA)

Infrared data link for cellular phones, peripheral devices

■ Features

- Compliant with IrDA Ver.1.2
- Light emitting function for remote controller
- Corresponding reflow solder (260°C)
- Ultra-small top view package (1.6 mm × 7.2 mm × 2.6 mm)

■ Type

- GaAlAs LED + IC + PIN Photodiode

■ Absolute Maximum Ratings $T_a = 25^{\circ}\text{C} \pm 3^{\circ}\text{C}$

| Parameter | Symbol | Rating | Unit |
|-------------------------------|------------|--------------|------|
| Output voltage | V_O | -0.5 to +3.8 | V |
| Input voltage | V_I | -0.5 to +3.8 | V |
| Shutdown input voltage | V_{SD} | -0.5 to +3.8 | V |
| LED operating supply voltage | V_{LEDA} | -0.5 to +7.0 | V |
| Pulse forward current * | I_{FP} | 300 | mA |
| Low level output current | I_{OL} | 10 | mA |
| Operating ambient temperature | T_{opr} | -20 to +70 | °C |
| Storage temperature | T_{stg} | -30 to +85 | °C |

Note) *: $t_w \leq 90 \mu\text{s}$, Duty $\leq 25\%$

■ Operating Condition

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------------------------|----------|------------|-----|-----|-----|------|
| Operating supply voltage | V_{CC} | | 2.8 | | 4.5 | V |
| Input/output supply voltage | V_{IO} | | 1.5 | 1.8 | 3.0 | V |

■ Electrical-Optical Characteristics $V_{CC} = 3.2 \text{ V}$, $V_{IO} = 1.8 \text{ V}$, $T_a = 25^{\circ}\text{C} \pm 3^{\circ}\text{C}$

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-------------------------------|------------|---|----------------|-----|----------|---------------|
| High level supply current *1 | I_{CCH} | $E_I = 0$, $V_I = 0.5 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$ | | 110 | 150 | μA |
| Low level supply current *1 | I_{CCL} | $E_I = 3 \text{ mW/cm}^2$, $V_I = 0.5 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$ | | 170 | 380 | μA |
| Shut down supply current *1 | I_{CCSD} | $V_I = 0.5 \text{ V}$, $V_{IO} \geq V_{SD} \geq V_{IO} - 0.3$ (SD = High) | | 10 | 200 | nA |
| Maximum reception distance *4 | L_{max} | $V_{SD} \leq 0.5 \text{ V}$, External components | 23 | 40 | | cm |
| RC maximum reception distance | L_{maxR} | RC S = $0.05 \mu\text{W/cm}^2$ | 5 | | | m |
| Data Rates | — | | 9.6 | | 115.2 | kbps |
| SD high level input voltage | V_{IHSD} | | $V_{IO} - 0.5$ | | V_{IO} | V |
| SD low level input voltage | V_{ILSD} | | 0 | | 0.5 | V |

■ Electrical-Optical Characteristics (Continued) $V_{CC} = 3.2\text{ V}$, $V_{IO} = 1.8\text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------------------------------|---------------------|---|----------------|-----|----------|---------------|
| Transmitter | | | | | | |
| Peak emission wavelength *1 | λ_p | $V_{SD} \leq 0.5\text{ V}$, Duty 3/16 (IrDA mode) | 878 | 883 | 888 | nm |
| | | $V_{SD} \leq 0.5\text{ V}$, Duty 25% (RC mode) | 878 | 894 | 910 | nm |
| Pulse forward current *1 | I_{FP} | $V_{SD} \leq 0.5\text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5\text{ V}$, (IrDA mode) | 40 | 60 | 90 | mA |
| | | $V_{CC} = 4.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5\text{ V}$, (RC mode) | 240 | 270 | 300 | mA |
| | | $V_{CC} = 3.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5\text{ V}$, (RC mode) | 190 | 220 | 250 | mA |
| Center radiant intensity *1, 2, 9 | $\theta_T = 0$ | $V_{CC} = 3.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5\text{ V}$, (IrDA mode) | 9 | 20 | | mW/sr |
| | | $V_{CC} = 4.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5\text{ V}$, (RC mode) | 40 | 73 | 110 | mW/sr |
| | | $V_{CC} = 3.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5\text{ V}$, (RC mode) | 36 | 68 | 102 | mW/sr |
| | $\theta_T = \pm 15$ | $V_{CC} = 3.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5\text{ V}$, (IrDA mode) | 6 | 10 | | mW/sr |
| | | $V_{CC} = 4.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5\text{ V}$, (RC mode) | 28 | 40 | 63 | mW/sr |
| | | $V_{CC} = 3.2\text{ V}$, $V_{SD} \leq 0.5\text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5\text{ V}$, (RC mode) | 28 | 38 | 60 | mW/sr |
| High level input voltage *1 | V_{IH} | I-TXD | $V_{IO} - 0.5$ | | V_{IO} | V |
| | | R-TXD | $V_{IO} - 0.5$ | | V_{IO} | V |
| Low level input voltage *1 | V_{IL} | | 0 | | 0.5 | V |
| TX half-angle | θ_T | | ± 15 | | | ° |
| Rise time *1, 3 | t_r | $t_w = 1.6\ \mu\text{s}$, $R_L = 50\ \Omega$ | | 0.3 | 0.6 | μs |
| Fall time *1, 3 | t_f | $t_w = 1.6\ \mu\text{s}$, $R_L = 50\ \Omega$ | | 0.3 | 0.6 | μs |
| TX wake up time *7 | t_{Twu} | | | 0.3 | 1 | μs |
| Intensity delay time *1, 3 | I_{DT} | | | | 400 | ns |
| Maximum pulse width | $T_{wLEDmax}$ | I-TXD, R-TXD = Low \rightarrow High | 20 | 50 | 100 | μs |
| Overshoot | O_S | | | | 25 | % |
| Edge jitter | E_J | | -40 | | 40 | ns |

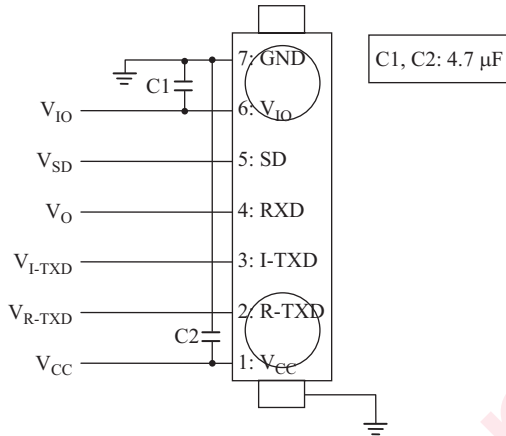
■ Electrical-Optical Characteristics (Continued) $V_{CC} = 3.2 \text{ V}$, $V_{IO} = 1.8 \text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------|-------------|---|----------------|-----|----------|---------------------------|
| Receiver | | | | | | |
| Minimum input irradiance | $E_{I\min}$ | $V_{SD} \leq 0.5 \text{ V}$ | | 2.2 | 6.8 | $\mu\text{W}/\text{cm}^2$ |
| Maximum input irradiance | $E_{I\max}$ | $V_{SD} \leq 0.5 \text{ V}$ | 500 | | | mW/cm^2 |
| High level output voltage *5 | V_{OH} | Non signal condition $I_{OH} = -200 \mu\text{A}$, $V_{SD} \leq 0.5 \text{ V}$ | $V_{IO} - 0.3$ | | V_{IO} | V |
| Low level output voltage *6 | V_{OL} | $I_{OL} = 200 \mu\text{A}$, $V_{SD} \leq 0.5 \text{ V}$ | | | 0.3 | V |
| RX half angle | θ_R | | ± 15 | | | ° |
| RXD output pulse width | T_{WR} | $C_L = 15 \text{ pF}$, 9.6 kbps to 115.2 kbps | 1.3 | 2.3 | 4.2 | μs |
| RX wake up time *8 | t_{Rwu} | $E_I = 8.1 \mu\text{W}/\text{cm}^2$ | | 250 | 400 | μs |
| Rise time | t_r | $C_L = 15 \text{ pF}$ | | 100 | 300 | ns |
| Fall time | t_f | $C_L = 15 \text{ pF}$ | | 100 | 300 | ns |

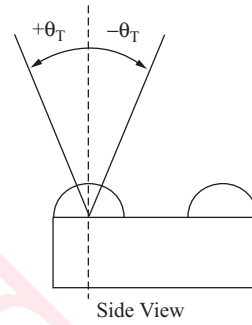
■ Electrical-Optical Characteristics (Continued)

Note) Measuring circuit

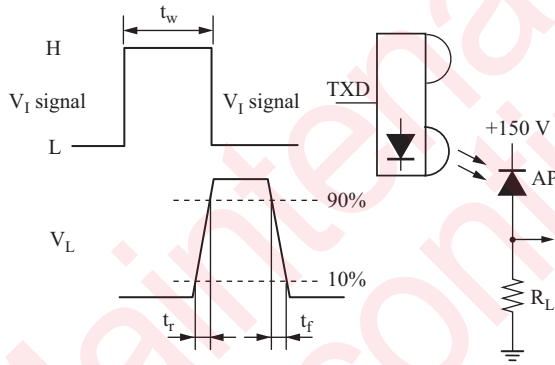
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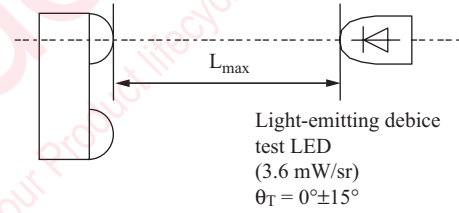
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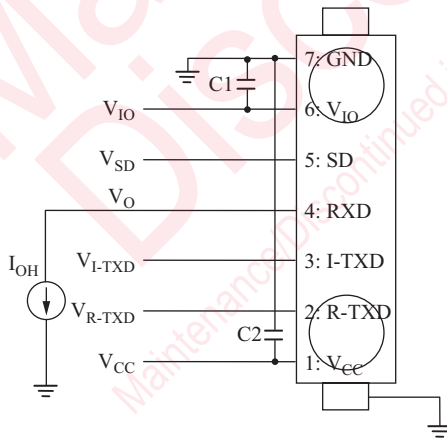
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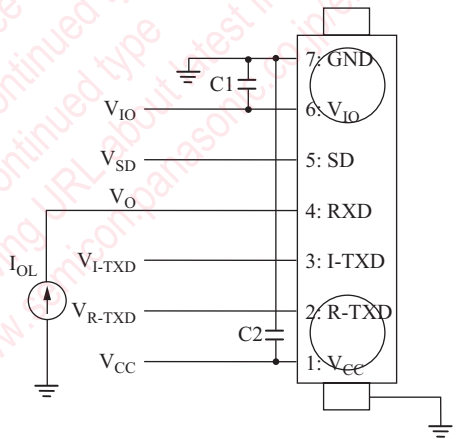
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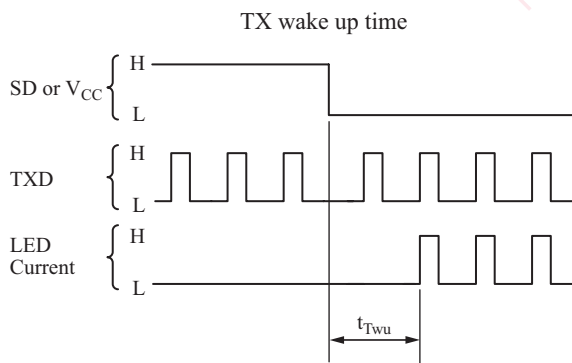
*5:



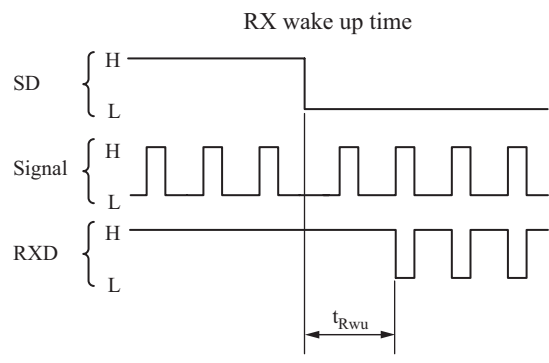
*6:



*7:



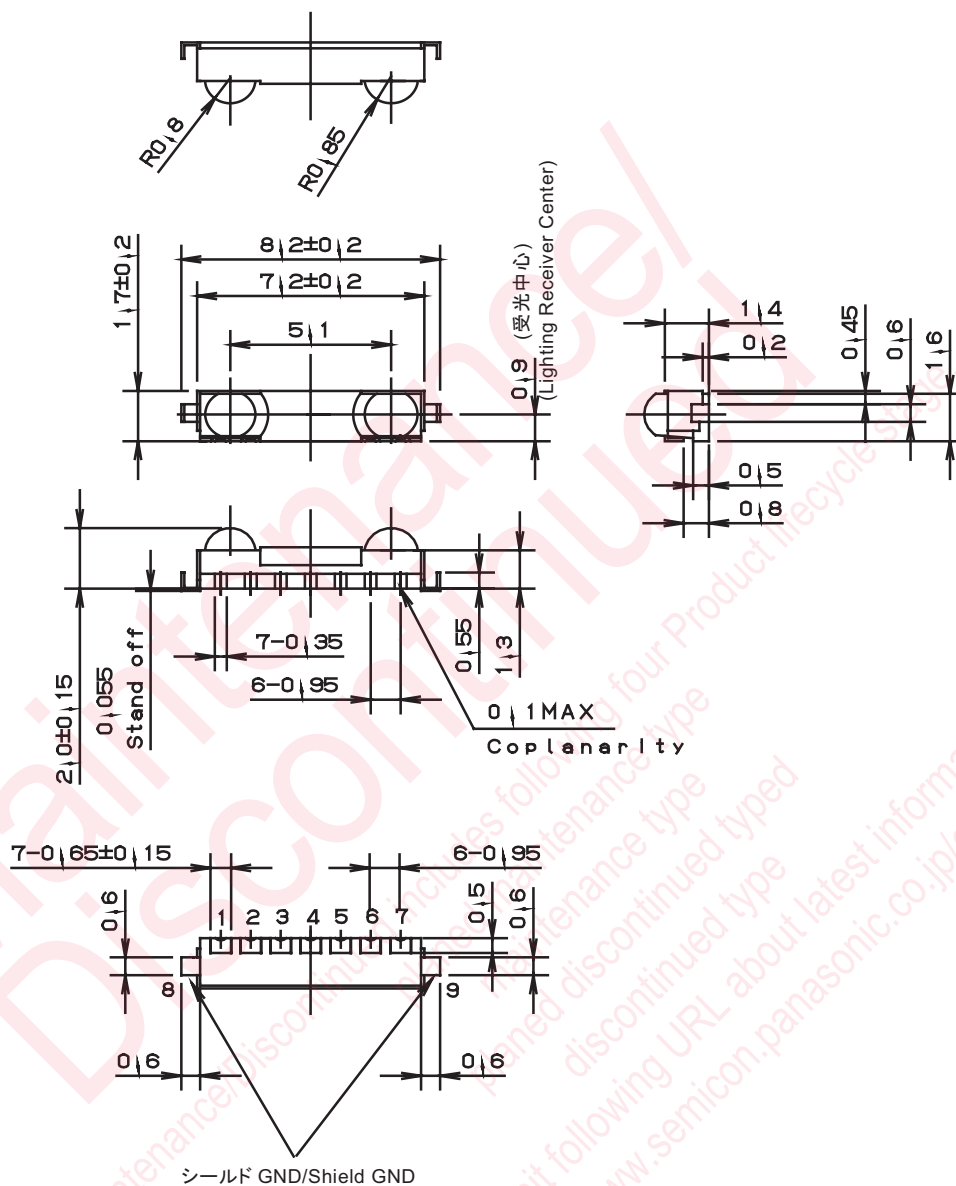
*8:



*9: Eye-Safety IEC60825-1 Class1 Eye safe

■ Package (Unit: mm)

KMTLTM7K0001



• Pin name

- | | |
|--------------------|--------------------|
| 1. V _{CC} | 6. V _{I0} |
| 2. R-TXD | 7. GND |
| 3. I-TXD | 8. Shield GND |
| 4. RXD | 9. Shield GND |
| 5. SD | |

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