

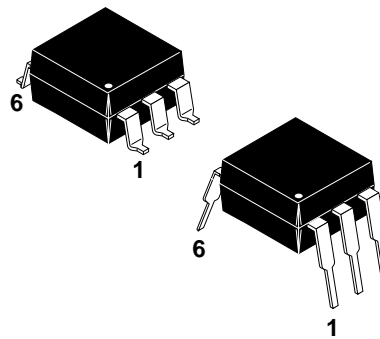
## DESCRIPTION

The CNW82, CNW83, CNW84 and CNW85 optocouplers consist of a GaAs infrared emitting diode which is optically coupled to an NPN phototransistor.

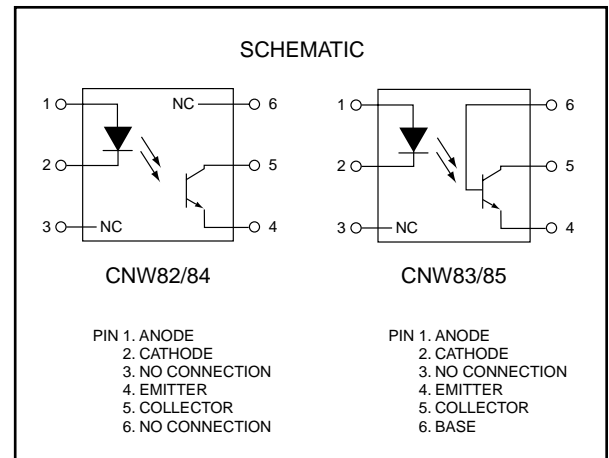
The CNW82 and CNW84 do not have the base pin connected for improved noise immunity.

## FEATURES

- Wide body DIL encapsulation, with a pin distance of 10.16 mm.
- Minimum creepage distance 10 mm.
- High current transfer ratio and Low Saturation Voltage, making the device suitable for use with TTL integrated circuits.
- High degree of AC and DC insulation (5900 V (RMS) and 8340 V (DC)).
- Minimum 2 mm isolation thickness between emitter and detector. (CNW84/85 only).
- An external clearance of 9.6 mm minimum and an external creepage distance of 10 mm minimum.
- Collector-Emitter Breakdown Voltage: 50 V (CNW82/83 only).
- Collector-Emitter Breakdown Voltage: 80 V (CNW84/85 only).
- UL recognized (File # E90700)



**CNW82**  
**CNW83**  
**CNW84**  
**CNW85**



## ABSOLUTE MAXIMUM RATINGS

| Parameter   | Symbol    | Value      | Units                |
|---|-----------|------------|----------------------|
| <b>EMITTER</b>  |           |            |                      |
| Forward Current - Continuous                                      | $I_F$     | 100        | mA                   |
| Forward Current - Peak (PW = 100 $\mu$ s, 120pps)                 | $I_F(pk)$ | 3          | A                    |
| Reverse Voltage   | $V_R$     | 5          | V                    |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$                | $P_D$     | 200        | mW                   |
| Derate above 25 $^\circ\text{C}$                                  |           | 2.0        | mW/ $^\circ\text{C}$ |
| <b>DETECTOR</b>   |           |            |                      |
| Collector Current-Continuous                                      | $I_C$     | 100        | mA                   |
| Emitter-Collector Voltage   | $V_{ECO}$ | 7          | V                    |
| Collector-Emitter Voltage   | $V_{CEO}$ | 50         | V                    |
| (CNW82/CNW83)   |           | 80         |                      |
| Collector-Base Voltage  | $V_{CBO}$ | 70         | V                    |
| (CNW83)   |           | 120        |                      |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$                | $P_D$     | 200        | mW                   |
| Derate above 25 $^\circ\text{C}$                                  |           | 2.0        | mW/ $^\circ\text{C}$ |
| <b>TOTAL DEVICE</b>   |           |            |                      |
| Storage Temperature Range   | $T_{stg}$ | -55 to 150 | $^\circ\text{C}$     |
| Ambient Operating Temperature Range                               | $T_A$     | -40 to 100 | $^\circ\text{C}$     |
| Lead Soldering Temperature<br>(1/16" from case, 10 sec. duration) | $T_L$     | 260        | $^\circ\text{C}$     |

## CNW82, CNW83, CNW84, CNW85

| ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ Unless otherwise specified) |   |               |      |      |      |               |
|---|---|---------------|------|------|------|---------------|
| Parameter   | Test Conditions   | Symbol        | Min  | Typ  | Max  | Unit          |
| <b>EMITTER</b>  |   |               |      |      |      |               |
| Input Forward Voltage   | ( $I_F = 10\text{ mA}$ )  | $V_F$         | —    | 1.20 | 1.50 | V             |
| Reverse Leakage Current   | ( $V_R = 5.0\text{ V}$ )  | $I_R$         | —    | —    | 10   | $\mu\text{A}$ |
| <b>DETECTOR</b>   |   |               |      |      |      |               |
| Collector-Emitter Breakdown Voltage   | ( $I_C = 1.0\text{ mA}$ )   | $BV_{CEO}$    | 50   | 100  | —    | V             |
| Emitter-Collector Breakdown Voltage   | ( $I_E = 0.1\text{ mA}$ )   | $BV_{ECO}$    | 7    | 10   | —    | V             |
| Collector-Base Breakdown Voltage  | ( $I_C = 0.1\text{ mA}$ )   | $BV_{CBO}$    | 70   | 100  | —    | V             |
| Collector-Emitter Dark Current  | ( $V_{CE} = 10\text{ V}, I_F = 0$ )   | $I_{CEO}$     | —    | 1    | 50   | nA            |
| Collector-Base Cut-off Current  | ( $V_{CB} = 10\text{ V}, I_F = 0$ )   | $I_{CBO}$     | —    | —    | 20   | nA            |
| <b>COUPLED</b>  |   |               |      |      |      |               |
| Collector-Emitter Saturation Voltage  | ( $I_C = 4\text{ mA}, I_F = 10\text{ mA}$ )   | $V_{CE(sat)}$ | —    | 0.15 | 0.4  | V             |
| Isolation Voltage   | (DC Value) (t = 1.0 min.) <sup>(1)</sup><br>(RMS Value) (t = 1.0 min.) <sup>(1)</sup>   | $V_{ISO}$     | 8.34 | —    | —    | kV            |
| Isolation Resistance  | ( $V_{I-O} = 500\text{ V}$ )  | $R_{ISO}$     | 1    | 10   | —    | $T\Omega$     |
| Isolation Capacitance   | ( $V_{I-O} = 0, f = 1.0\text{ MHz}$ )   | $C_{ISO}$     | —    | 0.4  | 1    | pF            |
| Current Transfer Ratio  | ( $I_F = 10\text{ mA}, V_{CE} = 0.4\text{ V}$ )<br>( $I_F = 10\text{ mA}, V_{CE} = 5\text{ V}$ )  | CTR           | 0.4  | 0.8  | —    | %             |
| Capacitance   | ( $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$ )  | $C_{CB}$      | —    | 4.5  | —    | pF            |
| Turn-on Time  | ( $I_C = 2\text{ mA}, V_{CC} = 5\text{ V}, R_L = 100\ \Omega$ )<br>( $I_C = 2\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ k}\Omega$ ) | $T_{ON}$      | —    | 3    | —    | $\mu\text{s}$ |
| Turn-off Time   | ( $I_C = 2\text{ mA}, V_{CC} = 5\text{ V}, R_L = 100\ \Omega$ )<br>( $I_C = 2\text{ mA}, V_{CC} = 5\text{ V}, R_L = 1\text{ k}\Omega$ ) | $T_{OFF}$     | —    | 3    | —    | $\mu\text{s}$ |

**NOTE:**

1. Every product is tested with pins 1, 2 and 3 shorted together, and pins 4, 5 and 6 shorted together.

## CNW82, CNW83, CNW84, CNW85

Fig. 1 Forward Current vs. Forward Voltage

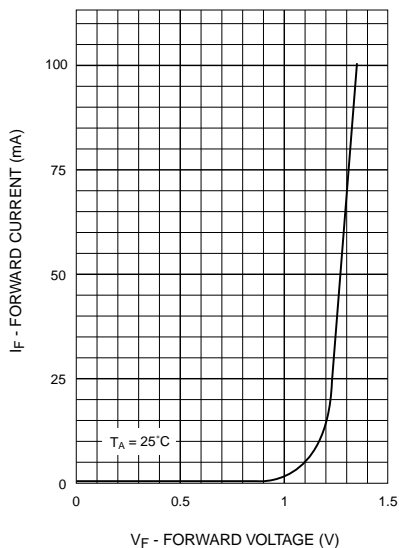


Fig. 2 Collector Current vs. Forward Current (for CNW84 and CNW85)

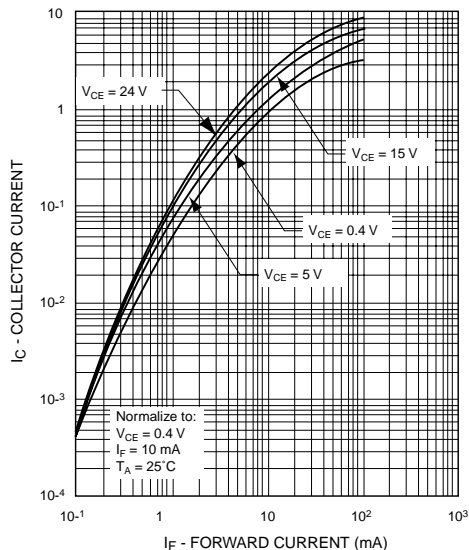


Fig. 3 Collector Current vs. Forward Current (for CNW82 and CNW83)

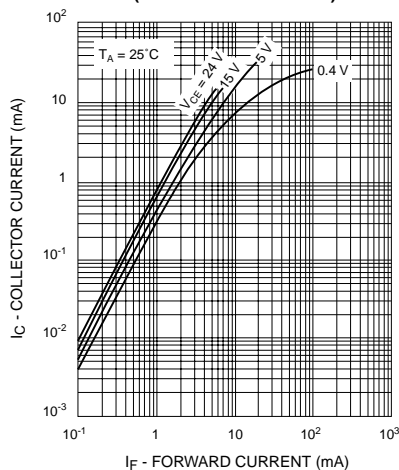


Fig. 4 Collector Current vs. Collector-Emitter Voltage

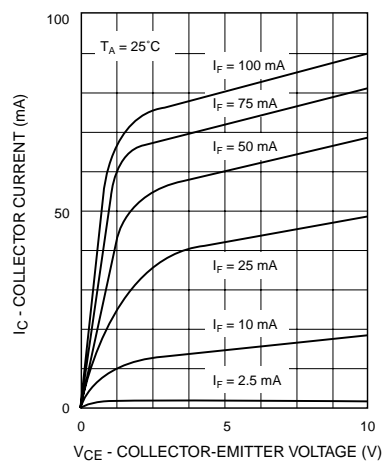


Fig. 5 Collector Current vs. Ambient Temperature (for CNW82 and CNW83)

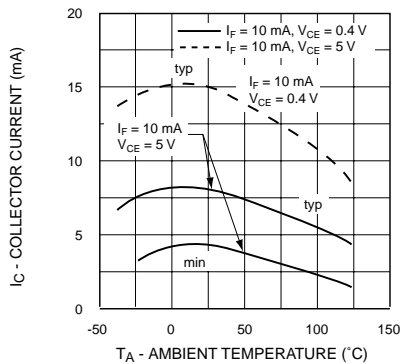
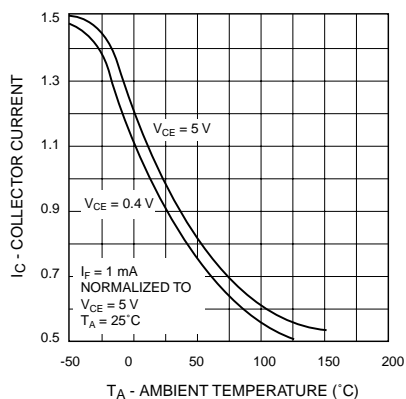
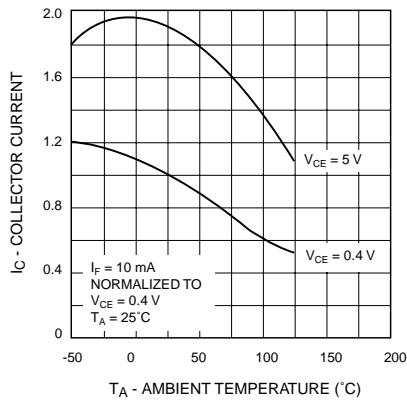


Fig. 6 Collector Current vs. Ambient Temperature (for CNW84 and CNW85)

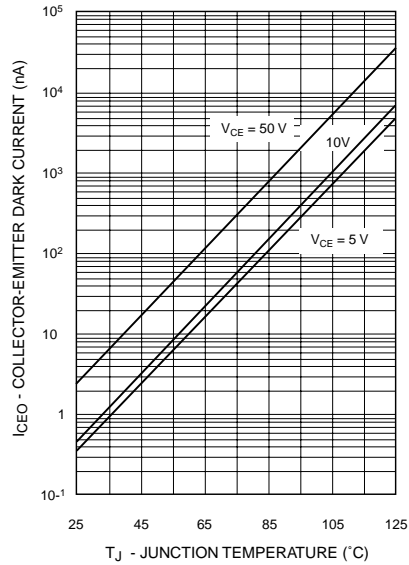


## CNW82, CNW83, CNW84, CNW85

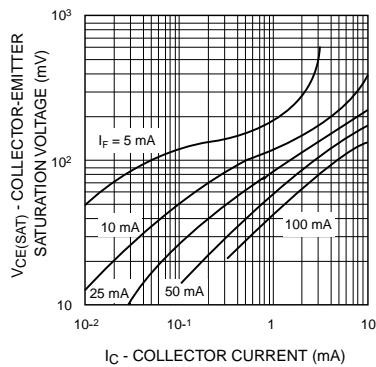
**Fig. 7 Collector Current vs. Ambient Temperature (for CNW84 and CNW85)**



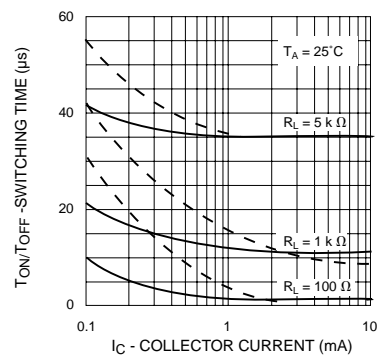
**Fig. 8 Collector-Emitter Dark Current vs. Junction Temperature**



**Fig. 9 Collector-Emitter Saturation Voltage vs. Collector Current**

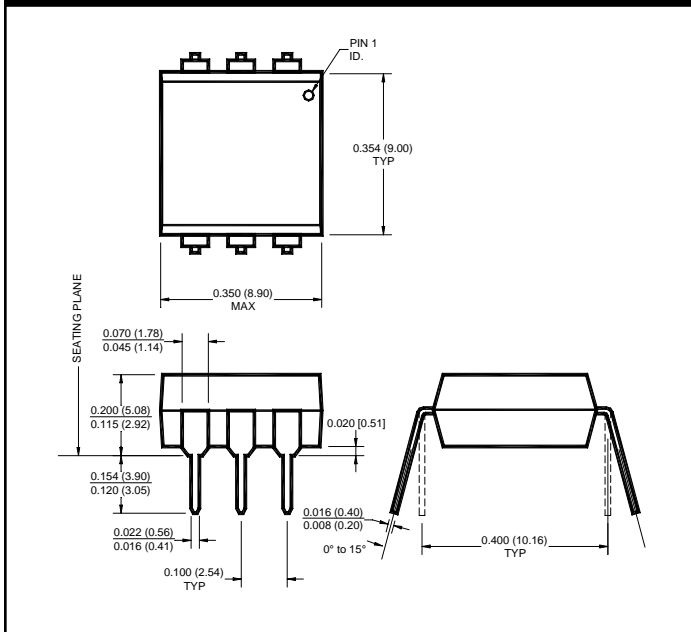


**Fig. 10 Rise and Fall Time vs. Collector Current**

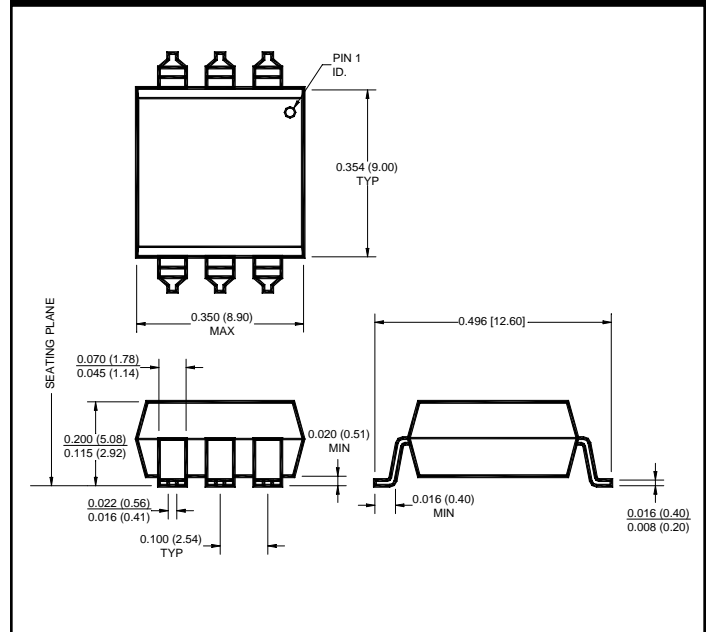


## CNW82, CNW83, CNW84, CNW85

### Package Dimensions (Through Hole)



### Package Dimensions (Surface Mount)



#### NOTE

All dimensions are in inches (millimeters)

**Call QT Optoelectronics for more information or the phone number of your nearest distributor.**

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