# UMW 4Nxx

## 1.Description

The UMW 4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP6 package with different lead forming options.

## 2.Features

- High isolation 5000 $V_{RMS}$
- DC input with transistor output
- Operating temperature range -55°C to 110°C
- RoHS & REACH Compliance
- MSL class 1
- UL-approved: UL1577, File No.E547318

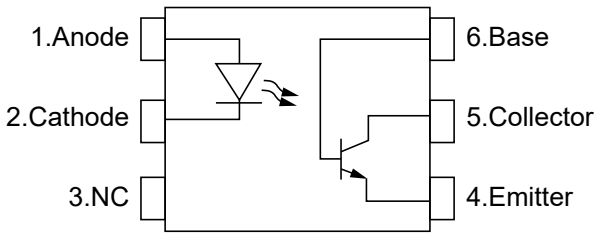
## 3.Applications

- Sequence controller
- Telephone/FAX
- System appliances, measuring instrument
- Programmable logic controller

## 4.Pinning information

Truth Table (Positive Logic)

| Input | Input | Input |
|---|---|---|
| H | H | L |
| L | H | H |
| H | L | H |
| L | L | H |
| H | NC | L |
| L | NC | H |




**DIP-6/SOP-6**

## 5.Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit | Note |
|---|---|---|---|---|
| **INPUT** | | | | |
| Forward Current | $I_F$ | 60 | mA | |
| Peak Forward Current(t=10μs) | $I_{FM}$ | 1 | A | 1 |
| Reverse Voltage | $V_R$ | 6 | V | |
| Power Dissipation($T_A$=25°C) | $P_D$ | 70 | mW | |
| **OUTPUT** | | | | |
| Collector - Emitter Voltage | $V_{CEO}$ | 80 | V | |
| Collector-Base Breakdown Voltage | $V_{CBO}$ | 80 | V | |
| Emitter -Collector Voltage | $V_{ECO}$ | 7 | V | |
| Emitter-Base Breakdown Voltage | $V_{EBO}$ | 7 | V | |
| Collector Current | $I_C$ | 80 | mA | |
| Power Dissipation($T_A$=25°C) | $P_C$ | 150 | mW | |
| **COMMON** | | | | |
| Total Power Dissipation | $P_{TOT}$ | 220 | mW | |
| Isolation Voltage | $V_{ISO}$ | 5000 | Vrms | 2 |
| Operating Temperature | $T_{OPR}$ | -55 to 110 | °C | |
| Storage Temperature | $T_{STG}$ | -55 to 110 | °C | |
| Soldering Temperature | $T_{SOL}$ | 260 | °C | |

Notes:

1. AC For 1 Minute, R.H. = 40 ~ 60%

2. For 10μs

## 6.Electrical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **INPUT** | | | | | | |
| Forward Voltage | $V_F$ | $I_F$=10mA | | 1.24 | 1.4 | V |
| Reverse Current | $I_R$ | $V_R$=6V | | | 10 | μA |
| Input Capacitance | $C_{IN}$ | V=0, f=1kHZ | | 30 | | pF |
| **OUTPUT** | | | | | | |
| Collector Dark Current | $I_{CEO}$ | $V_{CE}$=10V, $I_F$=0 | | | 20 | nA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$=1mA, $I_F$=0 | 80 | | | V |
| Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | $I_E$=1mA, $I_F$=0 | 7 | | | V |
| Collector-Base Breakdown | $BV_{CBO}$ | $I_C$= 0.1mA, $I_F$=0 | 80 | | | V |
| Emitter-Base Breakdown | $BV_{EBO}$ | $I_E$= 0.1mA, $I_F$=0 | 7 | | | V |

## 7.Transfer Characteristics

| Parameter | | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|
| Current Transfer Ratio | 4N35, 4N36, 4N37 | $C_{TR}$ | $I_F$=10mA, $V_{CE}$=10V | 100 | | | % |
| | 4N25, 4N26, 4N38 | | | 20 | | | |
| | 4N27, 4N28 | | | 10 | | | |
| Collector-Emitter Saturation Voltage | 4N25, 4N26 | $V_{CE(SAT)}$ | $I_F$=10mA, $V_{CE}$=10V | | | 0.5 | V |
| | 4N27, 4N28 | | | | | | |
| | 4N35, 4N36, 4N37 | | $I_F$=10mA, $I_C$=0.5mA | | | 0.3 | |
| | 4N38 | | $I_F$=20mA, $I_C$=4mA | | | 1 | |
| | 4N25, 4N26 | | $I_F$=50mA, $I_C$=2mA | | | 0.5 | |
| | 4N27, 4N28 | | | | | | |
| Isolation Resistance | | $R_{IO}$ | $V_{IO}$=500$V_{DC}$ | 10^12 | 10^14 | | Ω |
| Floating Capacitance | | $C_{IO}$ | V=0, f=1MHz | | 0.2 | 1 | pF |
| Cut-off Frequency | | fc | $V_{CE}$=5V, $I_C$=2mA $R_L$=100Ω, -3dB | | 6 | | kHz |
| Turn On Time | 4N25, 4N26, 4N27 4N28 | $T_{ON}$ | $I_F$=10mA, $V_{CC}$=10V $R_L$=100Ω | | 3 | 15 | μs |
| | 4N35, 4N36, 4N37 4N38 | | $I_C$=2mA, $V_{CC}$=10V $R_L$=100Ω | | 10 | 12 | μs |
| Turn Off Time | 4N25, 4N26, 4N27 4N28 | $T_{OFF}$ | $I_F$=10mA, $V_{CC}$=10V $R_L$=100Ω | | 3 | 16 | μs |
| | 4N35, 4N36, 4N37 4N38 | | $I_C$=10mA, $V_{CC}$=10V $R_L$=100Ω | | 9 | 12 | μs |

## 8.1Typical characteristic

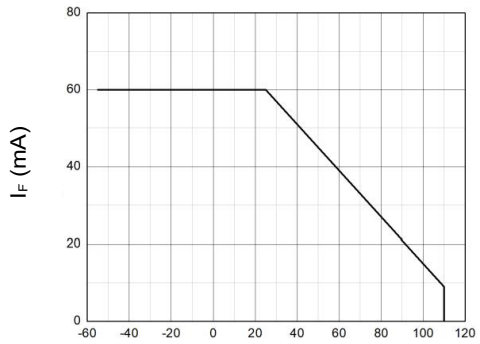



Figure 1: Forward Current vs. Ambient Temperature

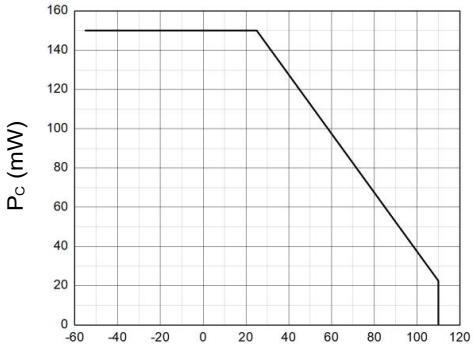



Figure 2: Collector Power Dissipation vs. Ambient Temperature

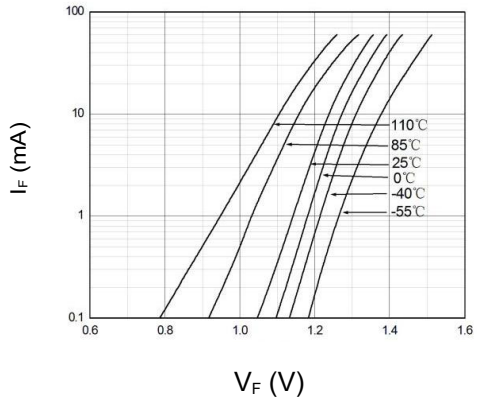



Figure 3: Forward Current vs. Forward Voltage

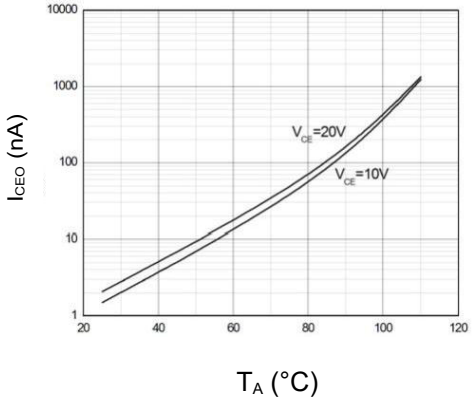



Figure 4: Collector Dark Current vs. Ambient Temperature

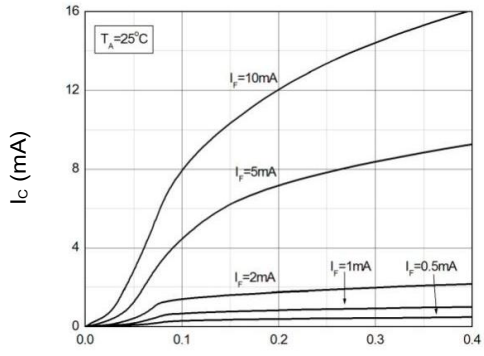



Figure 5: Collector Current vs. Collector-emitter Voltage

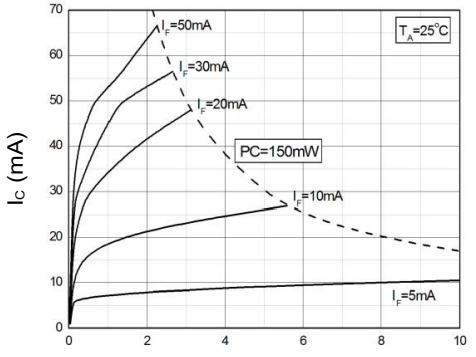



Figure 6: Collector Current vs. Collector-emitter Voltage

## 8.2Typical characteristic

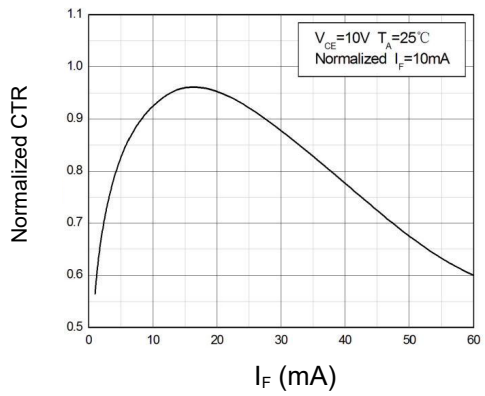



Figure 7: Normalized Current Transfer Ratio vs. Forward Current

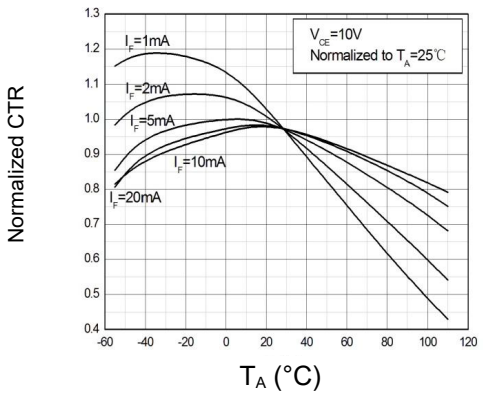



Figure 8: Normalized Current Transfer Ratio vs. Ambient Temperature

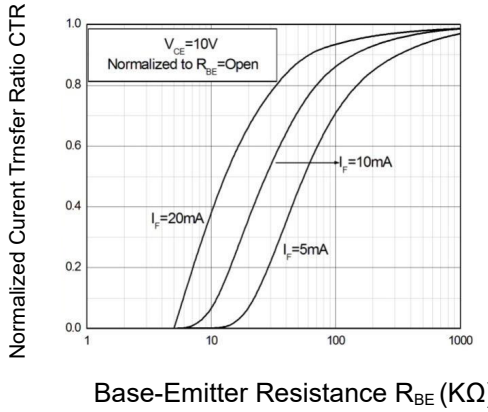



Figure 9: Current Transfer Ratlo(Unsaturated) vs Base-Emitter Resistance

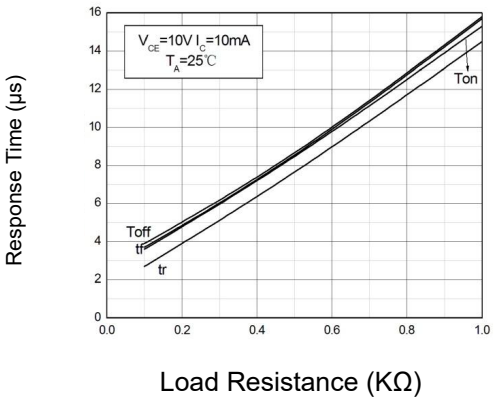
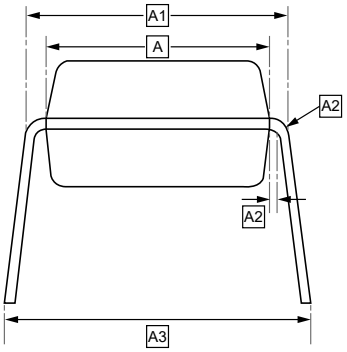
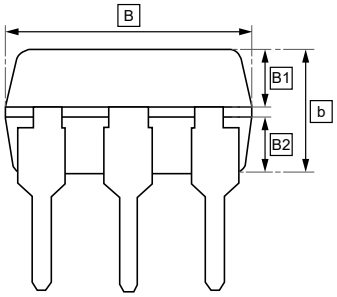
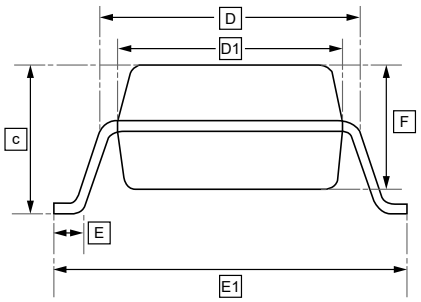



Figure 10: Switching Time vs. Load Resistance

## 9.DIP-6/SOP-6 Package Outline Dimensions



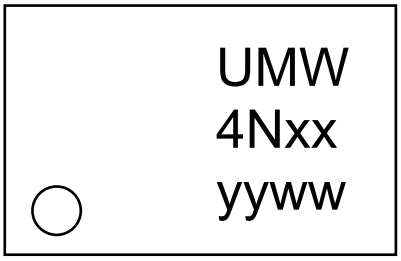




**DIMENSIONS (mm are the original dimensions)**

| Symbol | A | A1 | A2 | A3 | B | B1 | B2 | b | c | D | D1 | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min | 6.45 | 7.45 | 0.2 | 8.7 | 7.07 | 1.625 | 1.595 | 3.45 | 4.2 | 7.45 | 6.45 | 0.76 |
| Max | 6.55 | 7.75 | (typ.) | 9.1 | 7.14 | (typ.) | 1.655 | 3.55 | 4.4 | 7.75 | 6.55 | (typ.) |

| Symbol | E1 | F |
|---|---|---|
| Min | 10.0 | 3.45 |
| Max | 10.4 | 3.55 |

## 10.Ordering information




yy: Year Code
ww: Week Code

| Order Code | Package | Base QTY | Delivery Mode |
|---|---|---|---|
| UMW 4N25SM | SOP-6 | 1000 | Tape and reel |
| UMW 4N26SM | SOP-6 | 1000 | Tape and reel |
| UMW 4N27SM | SOP-6 | 1000 | Tape and reel |
| UMW 4N28SM | SOP-6 | 1000 | Tape and reel |
| UMW 4N35SM | SOP-6 | 1000 | Tape and reel |
| UMW 4N36SM | SOP-6 | 1000 | Tape and reel |
| UMW 4N37SM | SOP-6 | 1000 | Tube and box |
| UMW 4N38SM | SOP-6 | 1000 | Tube and box |
| UMW 4N25 | DIP-6 | 3250 | Tube and box |
| UMW 4N26 | DIP-6 | 3250 | Tube and box |
| UMW 4N27 | DIP-6 | 3250 | Tube and box |
| UMW 4N28 | DIP-6 | 3250 | Tube and box |
| UMW 4N35 | DIP-6 | 3250 | Tube and box |
| UMW 4N36 | DIP-6 | 3250 | Tube and box |
| UMW 4N37 | DIP-6 | 3250 | Tube and box |
| UMW 4N38 | DIP-6 | 3250 | Tube and box |



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