# UMW TLP127GB-S

## 1.Description

UMW TLP127GB-S is a small patch optocoupler product suitable for surface mount assembly. UMW TLP127GB-S is a high-voltage optocoupler composed of gallium arsenide infrared light-emitting diodes and Darlington phototransistors with integrated base emitter resistors, with a VCEO of over 300V.

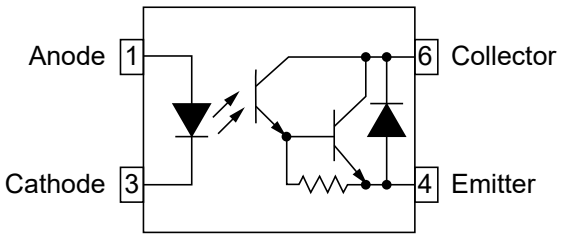
## 2.Applications

- Switching power supply, intelligent instrument
- Industrial control, measuring instruments photocopiers and other office equipment
- Household appliances: such as air conditioners fans, water heaters, etc.

## 3.Features

- Collector-Emitter Voltage: 300V (Min.)
- Current Transfer Ratio: 1000% (Min.)
- Isolation Voltage: Viso=3750Vrms(min.)
- UL Recognized: UL1577,File NO.E547318
- RoHScompliance

## 4.Pinning information




**SOP-4**

## 5.Limit parameter (Ta=25°C)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| LED | Forward Current | $I_F$ | 50 | mA |
| | Forward Current Derating | $\Delta I_F$/°C | -7(Ta≥53°C) | mA/°C |
| | Pulse Forward Current | $I_{FP}$ | 1(100μs pulse,100pps) | A |
| | Reverse Voltage | $V_R$ | 6 | V |
| | Junction Temperature | $T_J$ | 125 | °C |
| DETECTOR | Collector-Emitter Voltage | $V_{CEO}$ | 300 | V |
| | Emitter-Collector Voltage | $V_{ECO}$ | 0.3 | V |
| | Collector Current | $I_C$ | 150 | mA |
| | Collector Power Dissipation | $P_C$ | 150 | mW |
| | Collector Power Dissipation Derating (Ta≥25°C) | $\Delta P_C$/°C | -1.5 | mW/°C |
| | Junction Temperature | $T_J$ | 125 | °C |
| Storage Temperature Range | | $T_{STG}$ | -55 to 125 | °C |
| Operating Temperature Range | | $T_{OPR}$ | -55 to 110 | °C |
| Lead Soldering Temperature | | $T_{SOL}$ | 260(10s) | °C |
| Total Package Power Dissipation | | $P_T$ | 200 | mW |
| Total Package Power Dissipation Derating(Ta≥25°C) | | $\Delta P_T$/°C | -2 | mW/°C |

Notes1: Device considered a two terminal device : Pins 1, 3 shorted together andpins 4,6 shorted together.

## 6.Electrical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Input** | | | | | | |
| Forward Voltage | $V_F$ | $I_F$=10mA | 1 | 1.15 | 1.3 | V |
| Reverse Voltage | $I_R$ | $V_R$=5V | | | 10 | μA |
| Terminal Capacitor | $C_T$ | V=0, f=1kHZ | | 30 | | pF |
| **Output** | | | | | | |
| Collector Dark Current | $I_{CEO}$ | $V_{CE}$=200V | | 10 | 200 | nA |
| | | $V_{CE}$=200V, Ta =85°C | | | 20 | μA |
| Collector Emitter Breakdown Voltage | | $I_C$=0.1mA, $I_F$=0 | 300 | | | V |
| Emitter Collector Breakdown Voltage | $V_{(BR)ECO}$ | $I_E$=0.1mA, $I_F$=0 | 0.3 | | | V |
| Capacitor (Collector To Emitter) | $C_{CE}$ | V=0, f=1MHz | | 12 | | pF |

## 7.Coupling electrical characteristics (Ta=25°C)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Current transmission ratio(CTR) | $I_C/I_F$ | $I_F$=10mA, $V_{CE}$=1V | 1000 | 4000 | | % |
| Saturation current transfer ratio(CTR) | $I_C/I_{F(SAT)}$ | $I_F$=10mA, $V_{CE}$=1V | 500 | | | % |
| Saturation pressure drop | $V_{CE\ (sat)}$ | $I_C$=10mA, $I_F$=1mA | | | 1 | V |
| | | $I_C$=100mA, $I_F$=10mA | 0.3 | | 1.2 | V |

## 8.Isolation characteristics (Ta=25°C)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Capacitor (input to output) | $C_S$ | $V_S$=0, f =1MHz | | 0.8 | | pF |
| Isolation resistor | $R_S$ | $V_S$=500V, R.H.≤ 60% | $5x10^{10}$ | $10^{14}$ | | Ω |
| Isolation voltage | $BV_S$ | AC, 1 minute | 3750 | | | Vrms |
| | | AC, 1 second, in oil | | 5000 | | Vrms |
| | | DC, 1 minute, in oil | | 5000 | | Vdc |

## 9.Switch characteristics (Ta=25°C)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Rise time | $t_r$ | $V_{CC}$=10V, $I_C$=10mA<br>$R_L$=100Ω | | 40 | | μs |
| Descent time | $t_f$ | | | 15 | | μs |
| Open time | $t_{on}$ | | | 50 | | μs |
| Off time | $t_{off}$ | | | 15 | | μs |
| Open time | $t_{ON}$ | $R_L$=180Ω (Fig.1)<br>$V_{CC}$=10V, $I_F$=16mA | | 5 | | μs |
| Storage time | $t_s$ | | | 40 | | μs |
| Off time | $t_{OFF}$ | | | 80 | | μs |

## 10.Recommended operating conditions

| Parameter | Symbol | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Working voltage | $V_{CC}$ | | | 200 | V |
| Forward current | $I_F$ | | 16 | 25 | mA |
| Output current | $I_C$ | | | 120 | mA |
| Working temperature | $T_{OPR}$ | -25 | | 85 | °C |

## 11.Test circuit

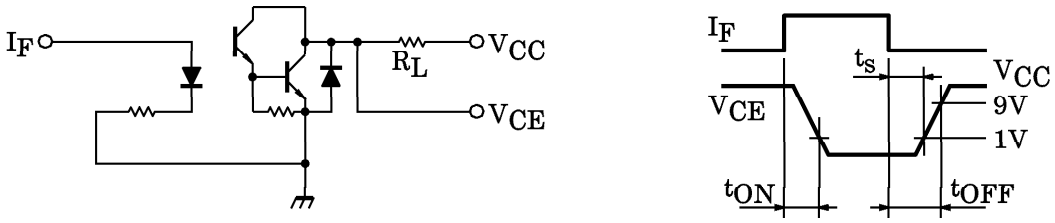
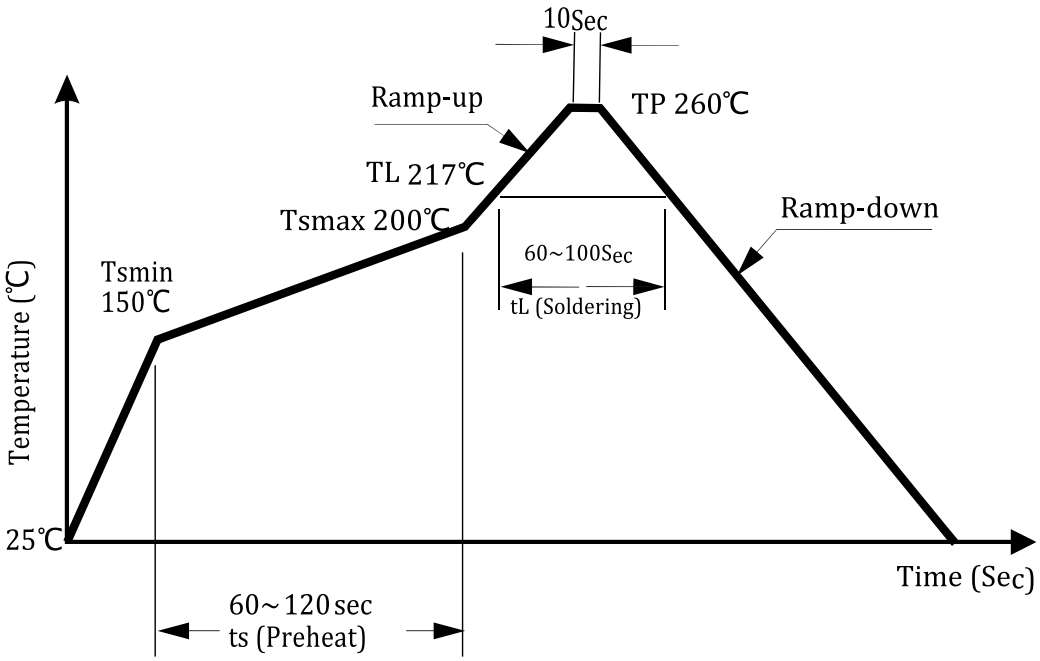
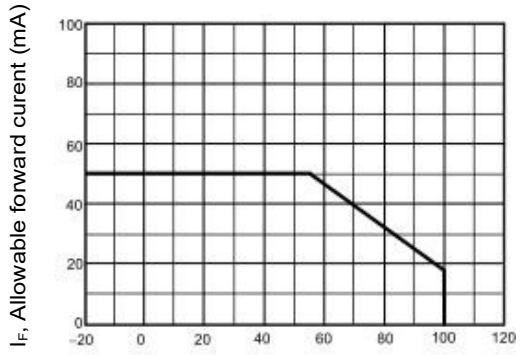



Fig.1 Switching Time Test Circuit

## 12.Reflow temperature curve

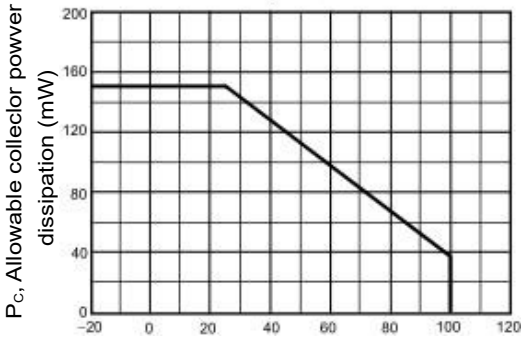


## 13.1Typical Characteristic



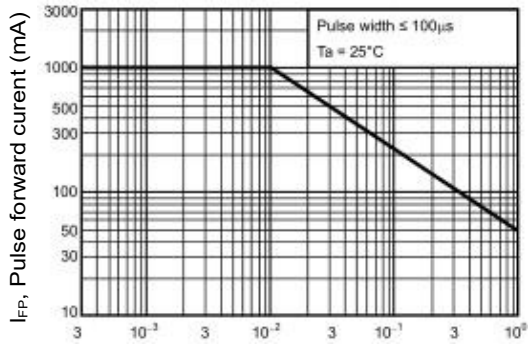

$T_A$, Ambient temperature (°C)

Figure 1: $I_F$-$T_a$



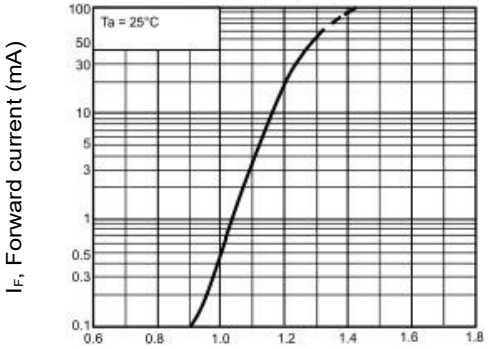

$T_A$, Ambient temperature (°C)

Figure 2: $P_C$-$T_a$



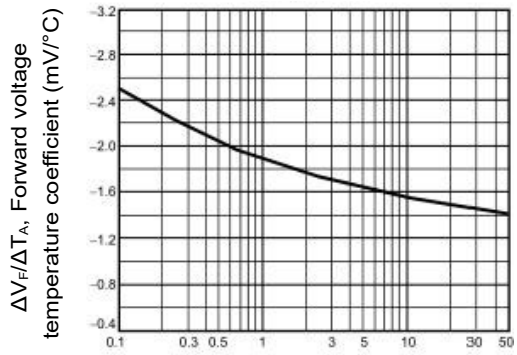

$D_R$, Duty cycle ratio

Figure 3: $I_{FP}$-$D_R$



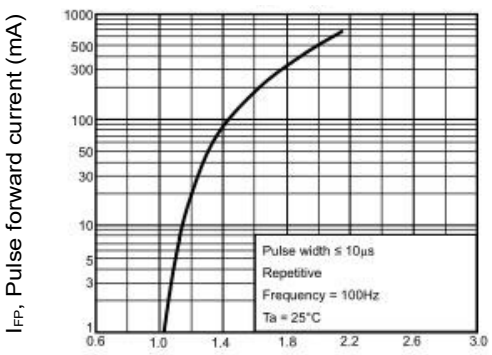

$V_F$, Forward voltage (V)

Figure 4: $I_F$ - $V_F$




$I_F$, Forward current (mA)

Figure 5: $\Delta V_F/\Delta T_A$ - $I_F$




$V_{FP}$, Pulse forward voltage (V)

Figure 6: $I_{FP}$-$V_{FP}$

## 13.2Typical Characteristic

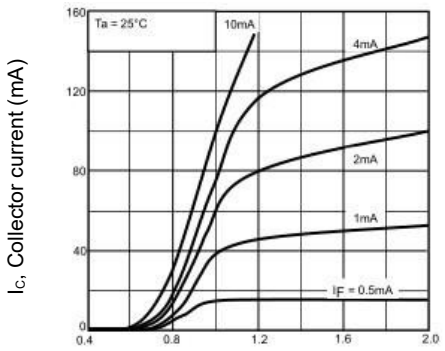



Figure 7: $I_C$ - $V_{CE}$

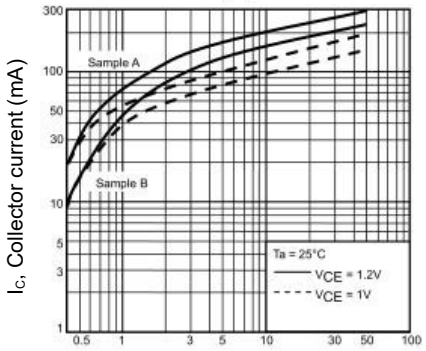



Figure 8: $I_C$ - $I_F$

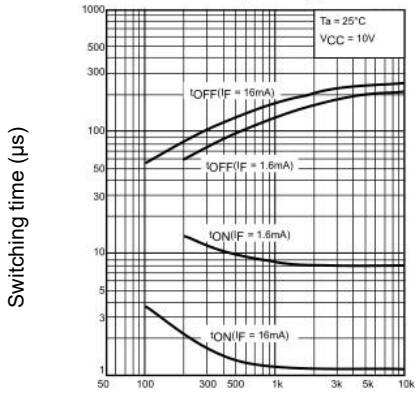



Figure 9: Switching Time -$R_L$

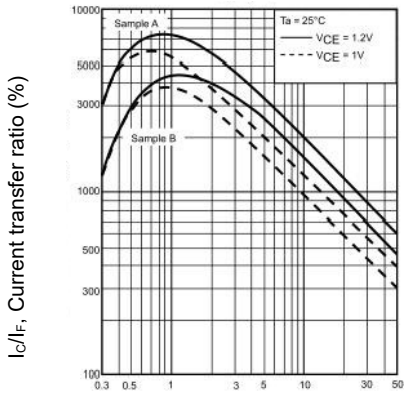



Figure 10: $I_C/I_F$ - $I_F$

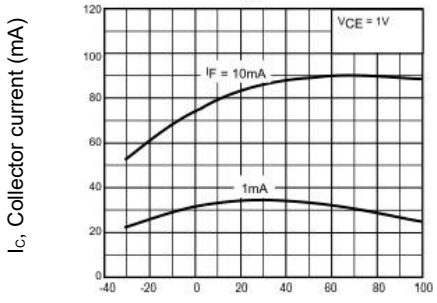



Figure 11: $I_C$ - $T_A$

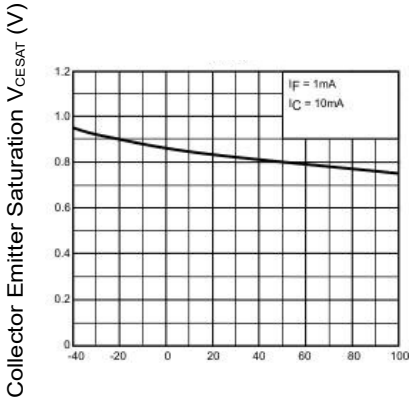



Figure 12: $V_{CE(SAT)}$-$T_A$

## 13.3Typical Characteristic

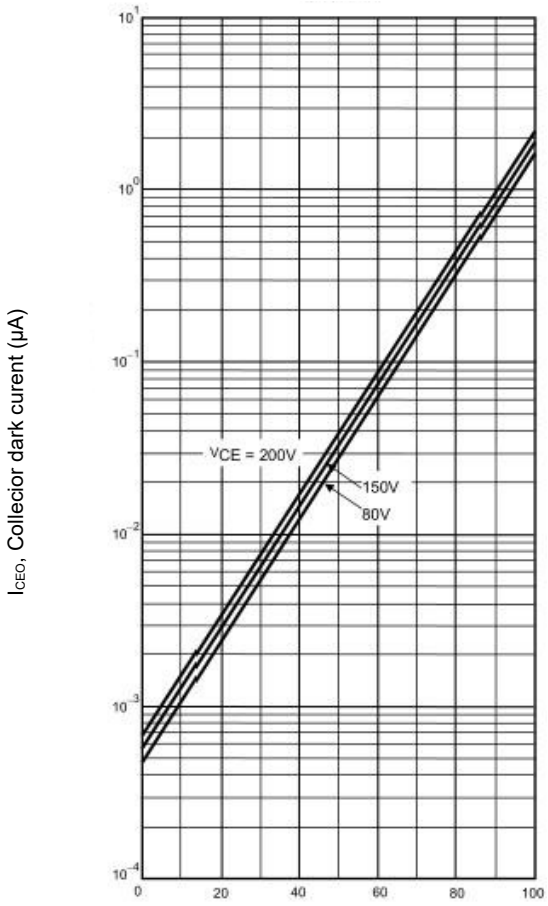
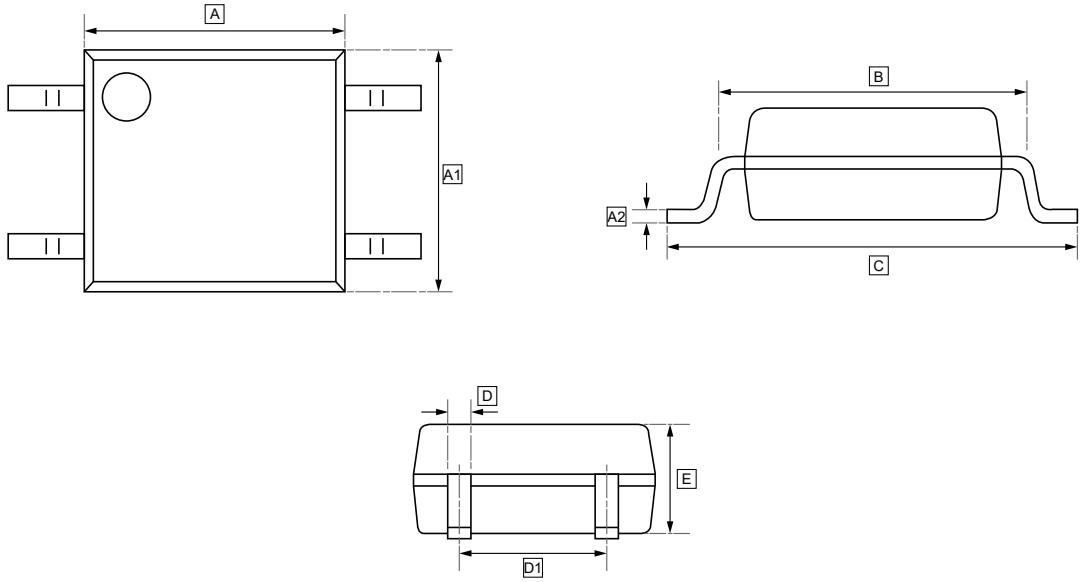



Figure 10: $I_{CEO}$ - $T_a$

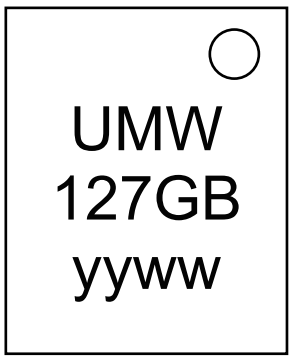
## 14.SOP-4 Package Outline Dimensions




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

| Symbol | A | A1 | A2 | B | C | D | D1 | E |
|---|---|---|---|---|---|---|---|---|
| **Min** | 4.40 | 3.60 | 0.15 | 5.00 | 6.70 | 0.30 | 2.54 | 1.82 |
| **Max** | 4.80 | 4.10 | | 5.40 | 7.30 | 0.50 | TYP | 2.02 |

## 15.Ordering information




yy: Year Code
ww: Week Code

| Order Code | Package | Base QTY | Delivery Mode |
|---|---|---|---|
| UMW TLP127GB-S | SOP-4 | 3000 | Tape and reel |

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