

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP627, TLP627-2, TLP627-4

PROGRAMMABLE CONTROLLERS.
DC - OUTPUT MODULE.
TELECOMMUNICATION.

The TOSHIBA TLP627, -2, and -4 consist of a gallium arsenide infreared emitting diode optically coupled to a darlington connected phototransistor which has an integral base-emitter resistor to optimize switching speed and elevated temperature characteristics.

The TLP627-2 offers two isolated channels in a eight lead plastic DIP, while the TLP627-4 provide four isolated channels per package.

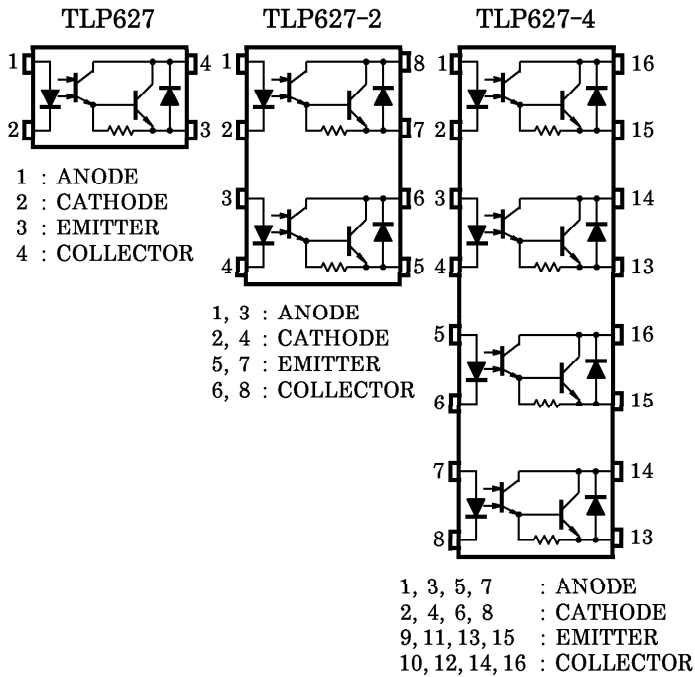
- Collector-Emitter Voltage : 300V (Min.)
- Current Transfer Ratio : 1000% (Min.)
- Isolation Voltage : 5000Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

| | MADE IN JAPAN | | MADE IN THAILAND | |
|---------------|---------------|----|------------------|----|
| UL Recognized | E67349 | *1 | E152349 | *1 |
| BSI Approved | 7426, 7427 | *2 | 7426, 7427 | *2 |

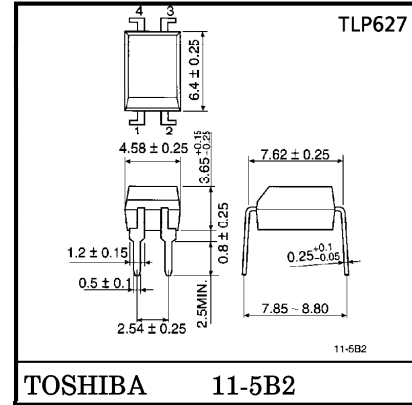
*1 UL1577

*2 BS EN60065 : 1994, BS EN60950 : 1992

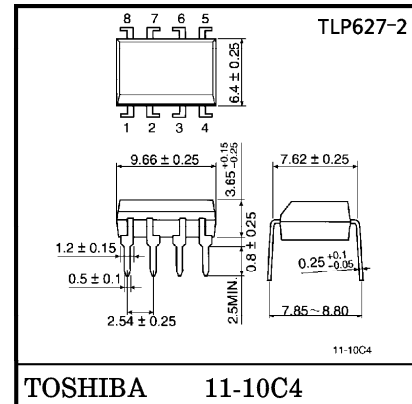
PIN CONFIGURATIONS (TOP VIEW)



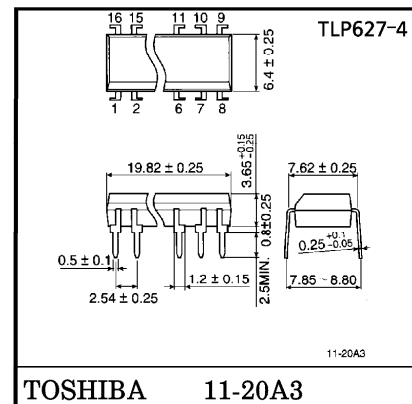
Unit in mm



Weight : 0.26g



Weight : 0.54g



Weight : 1.1g

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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | | UNIT |
|---|---|---------------------|------------------------------|----------------------|------------------|
| | | | TLP627 | TLP627-2 TLP627-4 | |
| LED | Forward Current | I _F | 60 | 50 | mA |
| | Forward Current Derating | ΔI _F /°C | -0.7 (Ta ≥ 39°C) | -0.5 (Ta ≥ 25°C) | mA/°C |
| | Pulse Forward Current | I _{FP} | 1 (100μs pulse, 100pps) | | A |
| | Power Dissipation (1 Circuit) | P _D | 100 | 70 | mW |
| | Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit) | ΔP _D /°C | -1.0 | -0.7 | mW/°C |
| | Reverse Voltage | V _R | 5 | | 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 (1 Circuit) | P _C | 150 (*300) | 100 | mW |
| | Collector Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit) | ΔP _C /°C | -1.5 (*-3.5) | -1.0 | mW/°C |
| | Junction Temperature | T _j | 125 | | °C |
| Storage Temperature Range | | T _{stg} | -55~125 | | °C |
| Operating Temperature Range | | T _{opr} | -55~100 | | °C |
| Lead Soldering Temperature | | T _{sold} | 260 (10sec) | | °C |
| Total Package Power Dissipation (1 Circuit) | | P _T | 250 (*320) | 150 | mW |
| Total Package Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit) | | ΔP _T /°C | -2.5 (*-3.2) | -1.5 | mW/°C |
| Isolation Voltage | | BV _S | 5000 (AC, 1min., R.H. ≤ 60%) | | V _{rms} |

* I_F = 20mA Max

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|------------------|------|------|------|------|
| Supply Voltage | V _{CC} | — | — | 200 | V |
| Forward Current | I _F | — | 16 | 25 | mA |
| Collector Current | I _C | — | — | 120 | mA |
| Operating Temperature | T _{opr} | -25 | — | 85 | °C |

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- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-------------------------------------|-----------------------------|---|------|------|------|---------------|
| LED | Forward Voltage | V_F | $I_F = 10\text{mA}$ | 1.0 | 1.15 | 1.3 | V |
| | Reverse Current | I_R | $V_R = 5\text{V}$ | — | — | 10 | μA |
| | Capacitance | C_T | $V = 0, f = 1\text{MHz}$ | — | 30 | — | pF |
| DETECTOR | Collector-Emitter Breakdown Voltage | $V(\text{BR})_{\text{CEO}}$ | $I_C = 0.1\text{mA}$ | 300 | — | — | V |
| | Emitter-Collector Breakdown Voltage | $V(\text{BR})_{\text{ECO}}$ | $I_E = 0.1\text{mA}$ | 0.3 | — | — | V |
| | Collector Dark Current | I_{CEO} | $V_{\text{CE}} = 200\text{V}$ | — | 10 | 200 | nA |
| | | | $V_{\text{CE}} = 200\text{V}, T_a = 85^\circ\text{C}$ | — | — | 20 | μA |
| Capacitance Collector to Emitter | C_{CE} | $V = 0, f = 1\text{MHz}$ | — | 10 | — | pF | |

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|-----------------------------|--|------|------|------|------|
| Current Transfer Ratio | I_C / I_F | $I_F = 1\text{mA}, V_{\text{CE}} = 1\text{V}$ | 1000 | 4000 | — | % |
| Saturated CTR | $I_C / I_F(\text{sat})$ | $I_F = 10\text{mA}, V_{\text{CE}} = 1\text{V}$ | 500 | — | — | % |
| Collector-Emitter Saturation Voltage | $V_{\text{CE}}(\text{sat})$ | $I_C = 10\text{mA}, I_F = 1\text{mA}$ | — | — | 1.0 | V |
| | | $I_C = 100\text{mA}, I_F = 10\text{mA}$ | 0.3 | — | 1.2 | |

ISOLATION CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------------|--------|------------------------------------|--------------------|-----------|------|----------|
| Capacitance Input to Output | C_S | $V_S = 0, f = 1\text{MHz}$ | — | 0.8 | — | pF |
| Isolation Resistance | R_S | $V_S = 500\text{V R.H.} \leq 60\%$ | 5×10^{10} | 10^{14} | — | Ω |
| Isolation Voltage | BV_S | AC, 1 minute | 5000 | — | — | Vrms |
| | | AC, 1 second, in oil | — | 10000 | — | Vdc |
| | | DC, 1 minute, in oil | — | 10000 | — | |

SWITCHING CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|-----------|---|------|------|------|---------|
| Rise Time | t_r | $V_{CC} = 10V$ $I_C = 10mA$ $R_L = 100\Omega$ | — | 40 | — | μs |
| Fall Time | t_f | | — | 15 | — | |
| Turn-on Time | t_{on} | | — | 50 | — | |
| Turn-off Time | t_{off} | | — | 15 | — | |
| Turn-on Time | t_{ON} | $R_L = 180\Omega$ (Fig.1) $V_{CC} = 10V, I_F = 16mA$ | — | 5 | — | μs |
| Storage Time | t_s | | — | 40 | — | |
| Turn-off Time | t_{OFF} | | — | 80 | — | |

Fig.1 SWITCHING TIME TEST CIRCUIT

