

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP620, TLP620-2, TLP620-4

PROGRAMMABLE CONTROLLERS

AC/DC-INPUT MODULE

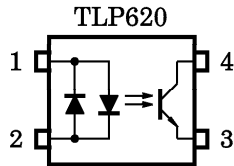
TELECOMMUNICATION

The TOSHIBA TLP620, -2 and -4 consists of a photo-transistor optically coupled to two gallium arsenide infrared emitting diode connected in inverse parallel.

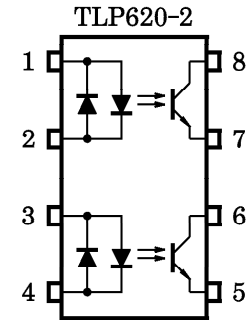
The TLP620-2 offers two isolated channels in an eight lead plastic DIP, while the TLP620-4 provides four isolated channels in a sixteen plastic DIP.

- Collector-Emitter Voltage : 55V (Min.)
 - Current Transfer Ratio : 50% (Min.)
- Rank GB : 100% (Min.)

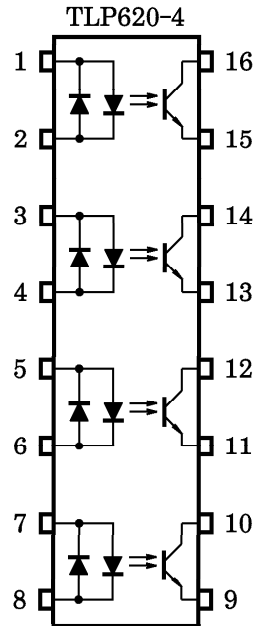
PIN CONFIGURATIONS (TOP VIEW)



- 1 : ANODE
 CATHODE
 2 : CATHODE
 ANODE
 3 : EMITTER
 4 : COLLECTOR

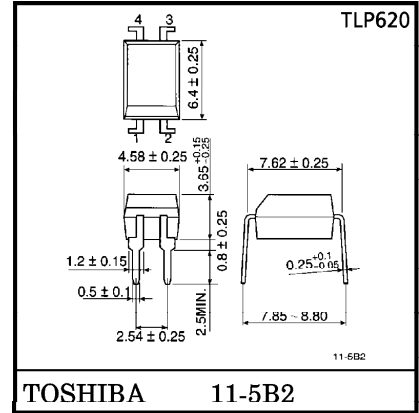


- 1, 3 : ANODE
 CATHODE
 2, 4 : CATHODE
 ANODE
 5, 7 : EMITTER
 6, 8 : COLLECTOR

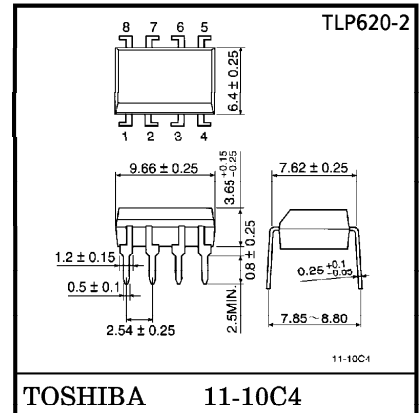


- 1, 3, 5, 7 : ANODE, CATHODE
 2, 4, 6, 8 : CATHODE, ANODE
 9, 11, 13, 15 : EMITTER
 10, 12, 14, 16 : COLLECTOR

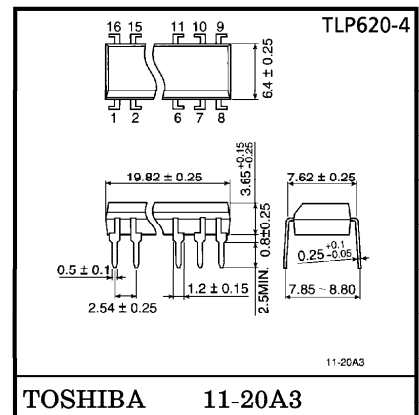
Unit in mm



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.

| | 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

- Isolation Voltage : 5000V_{rms} (Min.)
- Option (D4) type
VDE Approved : DIN VDE0884 / 06.92, Certificate No. 68384
Maximum Operating Insulation Voltage : 890V_{PK}
Highest Permissible Over Voltage : 8000V_{PK}

(Note) When a VDE0884 approved type is needed, please designate the "Option (D4)".

- Creepage Distance : 6.4mm (Min.)
Clearance : 6.4mm (Min.)
Insulation Thickness : 0.4mm (Min.)

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | RATING | | UNIT | |
|---|--|-----------------------------|-------------------------|------------------|---------|
| | | TLP620 | TLP620-2 TLP620-4 | | |
| LED | Forward Current | I _F (RMS) | 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 | ΔP _D / °C | -1.0 | -0.7 | mW / °C |
| | Junction Temperature | T _j | 125 | | °C |
| DETECTOR | Collector-Emitter Voltage | V _{CEO} | 55 | | V |
| | Emitter-Collector Voltage | V _{ECO} | 7 | | V |
| | Collector Current | I _C | 50 | | mA |
| | Collector Power Dissipation (1 Circuit) | P _C | 150 | 100 | mW |
| | Collector Power Dissipation Derating (1 Circuit) (Ta ≥ 25°C) | ΔP _C / °C | -1.5 | -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 (10s) | | °C | |
| Total Package Power Dissipation | P _T | 250 | 150 | mW | |
| Total Package Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit) | ΔP _T / °C | -2.5 | -1.5 | mW / °C | |
| Isolation Voltage | BV _S | 5000 (AC, 1 min., RH ≤ 60%) | | V _{rms} | |

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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.

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|----------------------|------|------|------|------|
| Supply Voltage | V _{CC} | — | 5 | 24 | V |
| Forward Current | I _F (RMS) | — | 16 | 20 | mA |
| Collector Current | I _C | — | 1 | 10 | mA |
| Operating Temperature | T _{opr} | -25 | — | 85 | °C |

INDIVIDUAL ELECTRICAL CHARACTERISTICS (T_a = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|------------------------------------|-------------------------------------|-------------------------------|--|------|------|------|------|
| LED | Forward Voltage | V _F | I _F = ±10mA | 1.0 | 1.15 | 1.3 | V |
| | Forward Current | I _F | V _F = ±0.7V | — | 2.5 | 20 | μA |
| | Capacitance | C _T | V = 0, f = 1MHz | — | 60 | — | pF |
| DETECTOR | Collector-Emitter Breakdown Voltage | V (BR) CEO | I _C = 0.5mA | 55 | — | — | V |
| | Emitter-Collector Breakdown Voltage | V (BR) ECO | I _E = 0.1mA | 7 | — | — | V |
| | Collector Dark Current | I _{CEO} | V _{CE} = 24V | — | 10 | 100 | nA |
| | | | V _{CE} = 24V, T _a = 85°C | — | 2 | 50 | μA |
| Capacitance (Collector to Emitter) | C _{CCE} | V _{CE} = 0, f = 1MHz | — | 10 | — | pF | |

COUPLED ELECTRICAL CHARACTERISTICS (T_a = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|---------------------------------------|---|------|------|------|------|
| Current Transfer Ratio | I _C / I _F | I _F = ±5mA, V _{CE} = 5V Rank GB | 50 | — | 600 | % |
| | | | 100 | — | 600 | |
| Saturated CTR | I _C / I _F (sat) | I _F = ±1mA, V _{CE} = 0.4V Rank GB | — | 60 | — | % |
| | | | 30 | — | — | |
| Collector-Emitter Saturation Voltage | V _{CE} (sat) | I _C = 2.4mA, I _F = ±8mA I _C = 0.2mA, I _F = ±1mA Rank GB | — | — | 0.4 | V |
| | | | — | 0.2 | — | |
| | | | — | — | 0.4 | |
| Off-State Collector Current | I _C (off) | V _F = ±0.7V, V _{CE} = 24V | — | 1 | 10 | μA |
| CTR Symmetry | I _C (ratio) | I _C (I _F = -5mA) / I _C (I _F = +5mA) | 0.33 | 1 | 3 | — |

ISOLATION CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-----------------------------|-----------------|---------------------------|--------------------|------------------|------|------------------|
| Capacitance Input to Output | C _S | V _S =0, f=1MHz | — | 0.8 | — | pF |
| Isolation Resistance | R _S | V _S =500V | 1×10 ¹² | 10 ¹⁴ | — | Ω |
| Isolation Voltage | BV _S | AC, 1 minute | 5000 | — | — | V _{rms} |
| | | AC, 1 second, in oil | — | 10000 | — | |
| | | DC, 1 minute, in oil | — | 10000 | — | V _{dc} |

SWITCHING CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|------------------|---|------|------|------|------|
| Rise Time | t _r | V _{CC} =10V I _C =2mA R _L =100Ω | — | 2 | — | μs |
| Fall Time | t _f | | — | 3 | — | |
| Turn-on Time | t _{on} | | — | 3 | — | |
| Turn-off Time | t _{off} | | — | 3 | — | |
| Turn-on Time | t _{ON} | R _L =1.9kΩ (Fig.1) V _{CC} =5V, I _F =±16mA | — | 2 | — | μs |
| Storage Time | t _s | | — | 15 | — | |
| Turn-off Time | t _{OFF} | | — | 25 | — | |

Fig.1 Switching Time Test Circuit

