

## TLP260J

Triac Drivers  
Programmable Controllers  
AC-Output Modules  
Solid-State Relays

The TOSHIBA mini-flat coupler TLP260J is a small-outline coupler suitable for surface mount assembly.

The TLP260J consists of a photo-triac optically coupled to a gallium arsenide infrared-emitting diode.

- Peak off-state voltage : 600 V (min)
- Trigger LED current : 10 mA (max)
- On-state current : 70 mA (max)
- Isolation voltage : 3000 Vrms (min)
- UL-recognized : UL1577, file No. E67349
- Option (V4) type : VDE-approved : EIN EN 60747-5-2 satisfied
- Maximum operating insulation voltage : 565 Vpk
- Highest permissible overvoltage : 6000 Vpk

Note: When an EN 60747-5-2 approved type is needed, be sure to specify "Option (V4)".

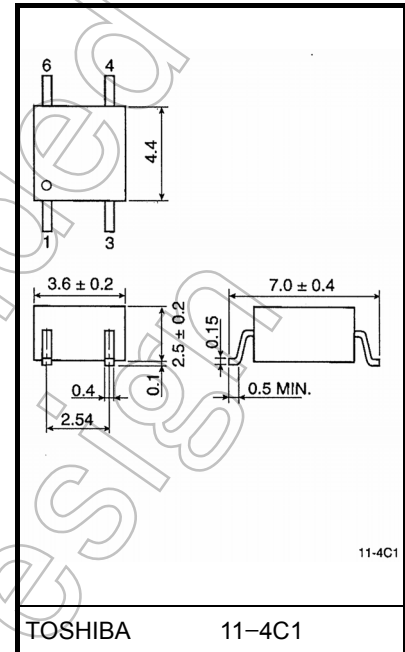
- Construction Mechanical Rating
  - Creepage distance : 4.0 mm (min)
  - Clearance : 4.0 mm (min)
  - Insulation thickness : 0.4 mm (min)

### Trigger LED Current

| Classification* | Trigger LED Current (mA)                    |     | Product Classification Marking |
|-----------------|---------------------------------------------|-----|--------------------------------|
|                 | V <sub>T</sub> = 6 V, T <sub>a</sub> = 25°C |     |                                |
|                 | Min                                         | Max |                                |
| Standard        | —                                           | 10  | Blank                          |

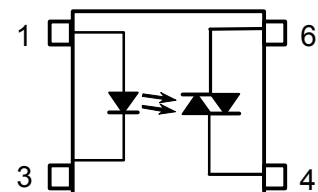
Note: Be sure to use standard product type names when submitting type names for safety certification testing, i.e., TLP260J.

Unit: mm



Weight: 0.09 g (typ.)

### Pin Configuration



- 1. Anode
- 3. Cathode
- 4. Terminal 1
- 6. Terminal 2

Start of commercial production  
1996/07

## Absolute Maximum Ratings (Ta = 25°C)

| Characteristic                                        |                                               | Symbol                        | Rating  | Unit    |
|-------------------------------------------------------|-----------------------------------------------|-------------------------------|---------|---------|
| LED                                                   | Forward current                               | $I_F$                         | 50      | mA      |
|                                                       | Forward current derating (Ta ≥ 53°C)          | $\Delta I_F / ^\circ\text{C}$ | -0.7    | mA / °C |
|                                                       | Peak forward current (100 μs pulse, 100 pps)  | $I_{FP}$                      | 1       | A       |
|                                                       | Reverse voltage                               | $V_R$                         | 5       | V       |
|                                                       | Junction temperature                          | $T_j$                         | 125     | °C      |
| Detector                                              | Off-state output terminal voltage             | $V_{DRM}$                     | 600     | V       |
|                                                       | On-state RMS current                          | $I_{T(RMS)}$                  | 70      | mA      |
|                                                       |                                               |                               | 40      |         |
|                                                       | On-state current derating (Ta ≥ 25°C)         | $\Delta I_T / ^\circ\text{C}$ | -0.67   | mA / °C |
|                                                       | Peak on-state current (100 μs pulse, 120 pps) | $I_{TP}$                      | 2       | A       |
|                                                       | Peak nonrepetitive surge current (PW = 10 ms) | $I_{TSM}$                     | 1.2     | A       |
|                                                       | Junction temperature                          | $T_j$                         | 100     | °C      |
| Storage temperature range                             |                                               | $T_{stg}$                     | -55~125 | °C      |
| Operating temperature range                           |                                               | $T_{opr}$                     | -40~100 | °C      |
| Lead soldering temperature (10 s)                     |                                               | $T_{sol}$                     | 260     | °C      |
| Isolation voltage (AC, 1 minute, R.H. ≤ 60%) (Note 1) |                                               | $BV_S$                        | 2500    | Vrms    |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Device considered as a two-terminal device: Pins 1 and 3 shorted together and pins 4 and 6 shorted together.

## Recommended Operating Conditions

| Characteristic        | Symbol    | Min | Typ. | Max | Unit |
|-----------------------|-----------|-----|------|-----|------|
| Supply voltage        | $V_{AC}$  | —   | —    | 240 | Vac  |
| Forward current       | $I_F$     | 15  | 20   | 25  | mA   |
| Peak on-state current | $I_{TP}$  | —   | —    | 1   | A    |
| Operating temperature | $T_{opr}$ | -25 | —    | 85  | °C   |

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

## Individual Electrical Characteristics (Ta = 25°C)

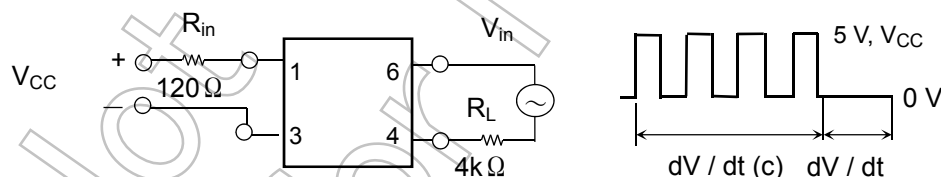
| Characteristic |                                              | Symbol       | Test Condition                                               | Min | Typ. | Max  | Unit              |
|----------------|----------------------------------------------|--------------|--------------------------------------------------------------|-----|------|------|-------------------|
| 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   | $\mu\text{A}$     |
|                | Capacitance                                  | $C_T$        | $V = 0, f = 1 \text{ MHz}$                                   | —   | 30   | —    | pF                |
| Detector       | Peak off-state current                       | $I_{DRM}$    | $V_{DRM} = 600 \text{ V}$                                    | —   | 10   | 1000 | nA                |
|                | Peak on-state voltage                        | $V_{TM}$     | $I_{TM} = 70 \text{ mA}$                                     | —   | 1.7  | 2.8  | V                 |
|                | Holding current                              | $I_H$        | —                                                            | —   | 1.0  | —    | mA                |
|                | Critical rate of rise of off-state voltage   | $dv / dt$    | $V_{in} = 240 \text{ Vrms}, T_a = 85^\circ\text{C}$ (Fig. 1) | —   | 500  | —    | V / $\mu\text{s}$ |
|                | Critical rate of rise of commutating voltage | $dv / dt(c)$ | $I_T = 15 \text{ mA}, V_{in} = 60 \text{ Vrms}$ (Fig. 1)     | —   | 0.2  | —    | V / $\mu\text{s}$ |

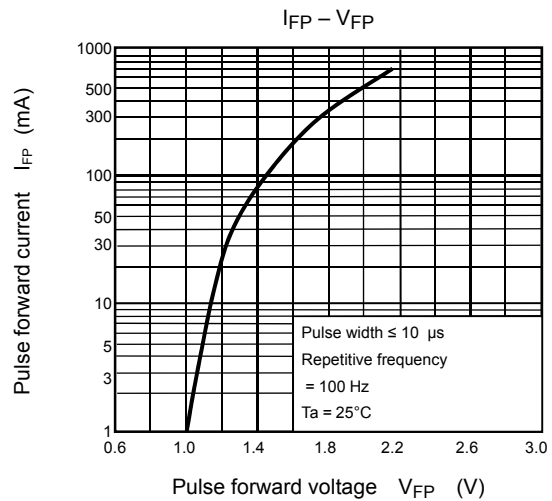
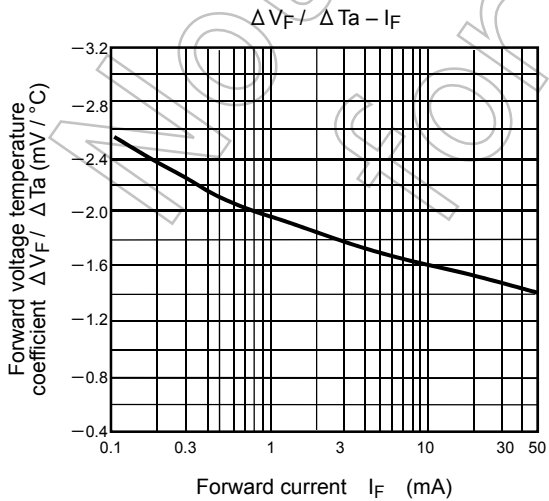
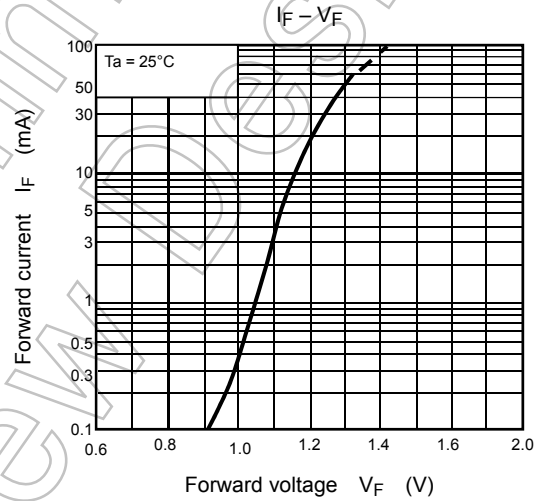
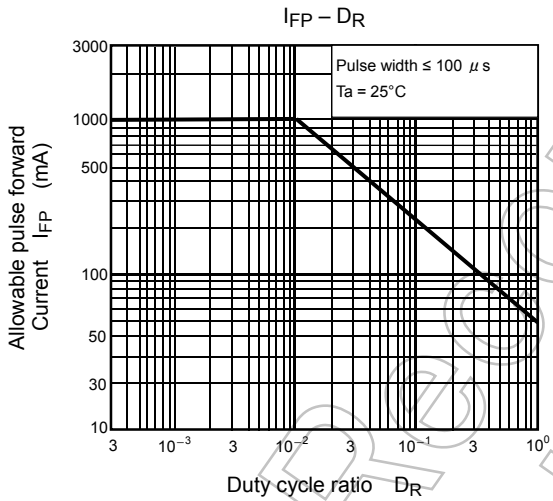
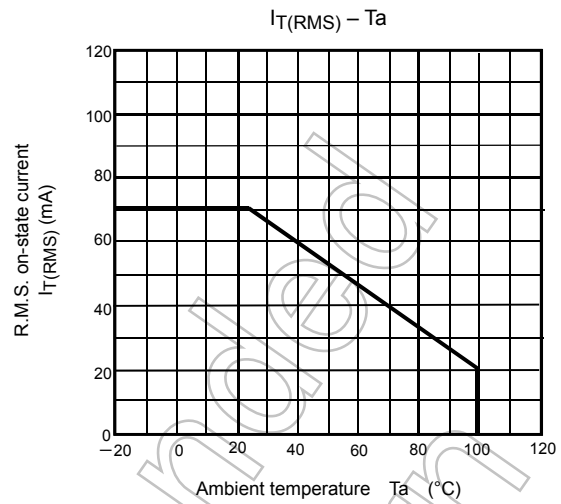
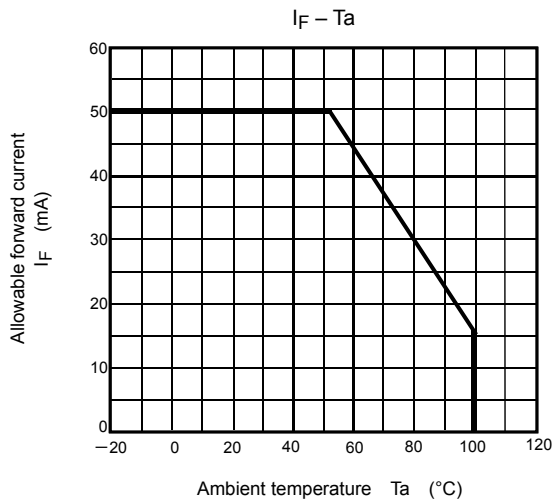
## Coupled Electrical Characteristics (Ta = 25°C)

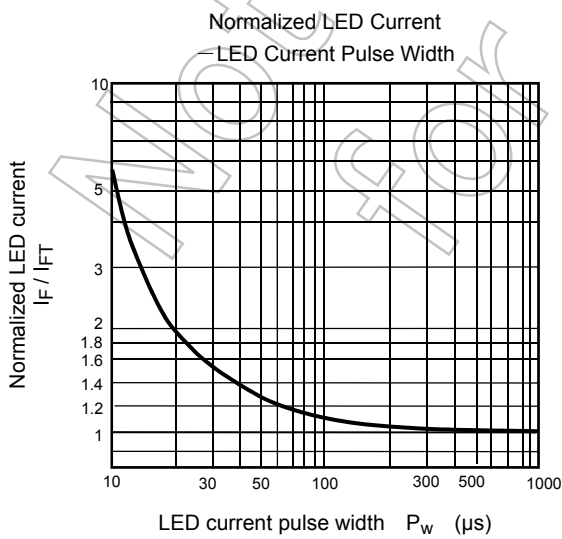
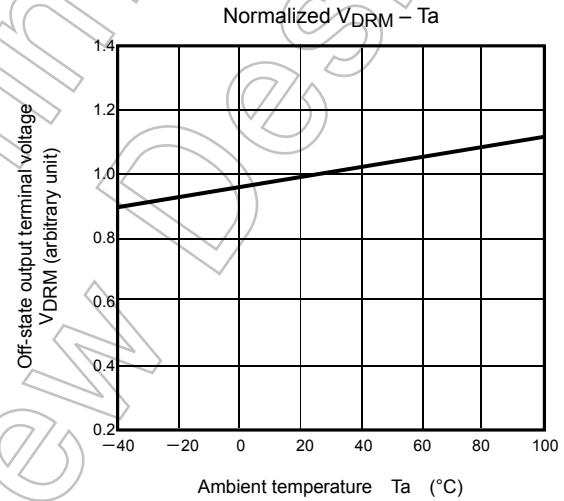
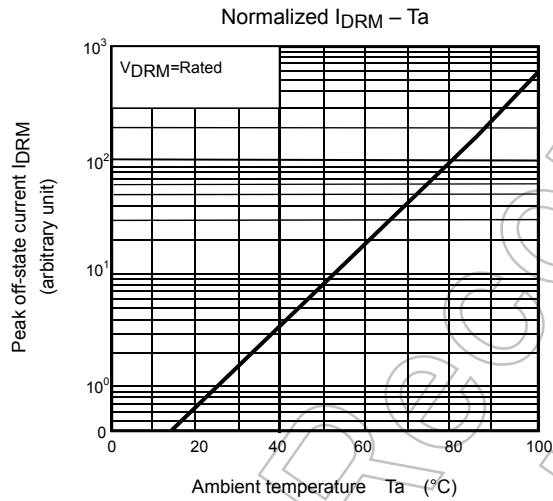
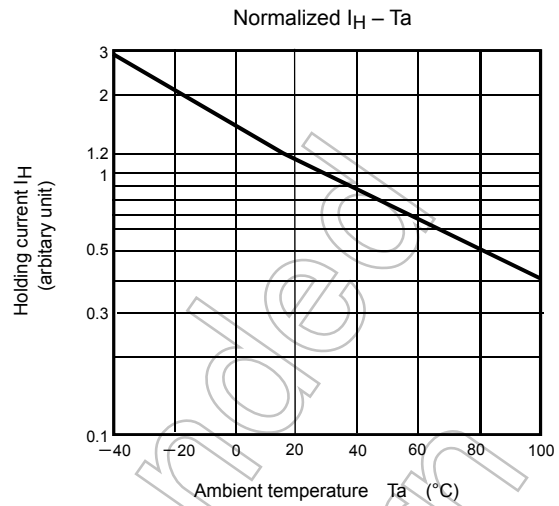
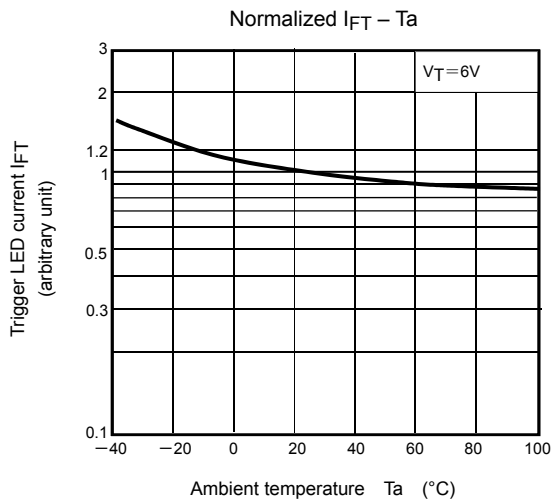
| Characteristic      | Symbol   | Test Condition                                                                                | Min | Typ. | Max | Unit          |
|---------------------|----------|-----------------------------------------------------------------------------------------------|-----|------|-----|---------------|
| Trigger LED current | $I_{FT}$ | $V_T = 6 \text{ V}$                                                                           | —   | 5    | 10  | mA            |
| Turn-on time        | $t_{ON}$ | $V_D = 6 \rightarrow 4 \text{ V}, R_L = 100\Omega$<br>$I_F = \text{rated } I_{FT} \times 1.5$ | —   | 30   | 100 | $\mu\text{s}$ |

## 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        | $R_S$  | $V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$ | $5 \times 10^{10}$ | $10^{14}$ | —   | $\Omega$ |
| Isolation voltage           | $BV_S$ | AC, 1 minute                                 | 3000               | —         | —   | Vrms     |
|                             |        | AC, 1 second, in oil                         | —                  | 5000      | —   |          |
|                             |        | DC, 1 minute, in oil                         | —                  | 5000      | —   | Vdc      |

Fig. 1:  $dv / dt$  test circuit





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