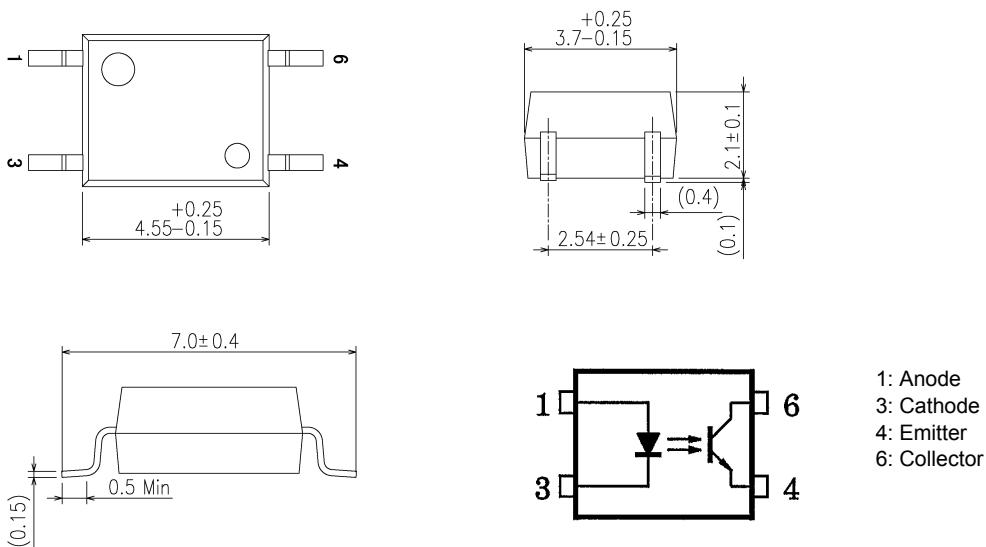


OFFICE MACHINE
 PROGRAMMABLE CONTROLLERS
 AC/DC-INPUT MODULE
 TELECOMMUNICATION

The MINI FLAT COUPLER TLP181 is a small outline coupler, suitable for surface mount assembly. TLP181 consist of a photo transistor optically coupled to a gallium arsenide infrared emitting diode in a four lead plastic DIP package.

- Collector-Emitter Voltage : 80V (Min.)
- Current Transfer Ratio : 50% (Min.)
 Rank GB : 100% (Min.)
- Isolation Voltage : 3750V_{rms} (Min.)
- UL Recognized : UL1577, File No. E492440



1: Anode
 3: Cathode
 4: Emitter
 6: Collector

CURRENT TRANSFER RATIO

| TYPE | CLASSI- FICATION *1 | CURRENT TRANSFER RATIO (%) (I_C / I_F) | | MARKING OF CLASSIFICATION |
|--------|---------------------------|--|------|---|
| | | $I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$ | | |
| | | MIN. | MAX. | |
| TLP181 | (None) | 50 | 600 | BLANK, Y, Y [■] , G, G [■] , B, B [■] , GB |
| | Rank Y | 50 | 150 | Y, Y [■] |
| | Rank GR | 100 | 300 | G, G [■] |
| | Rank BL | 200 | 600 | B, B [■] |
| | Rank GB | 100 | 600 | G, G [■] , B, B [■] , GB |

*1 : EX, Rank GB : TLP181GB

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|---|---------------------|-------------------------------|------------------|
| ED | Forward Current | I _F | 50 | mA |
| | Forward Current Detating | ΔI _F /°C | -0.7 (Ta ≥ 53°C) | mA/°C |
| | Pulse Forward Current | I _{FP} | 1 (100μs pulse, 100pps) | A |
| | Reverse Voltage | V _R | 5 | V |
| | Junction Temperature | T _j | 125 | °C |
| DETECTOR | Collector-Emitter Voltage | V _{CEO} | 80 | V |
| | Emitter-Collector Voltage | V _{ECO} | 7 | V |
| | Collector Current | I _C | 50 | mA |
| | Collector Power Dissipation (1 Circuit) | P _C | 150 | mW |
| | Collector Power Dissipation Derating (1 Circuit Ta ≥ 25°C) | ΔP _C /°C | -1.5 | 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 _{sol} | 260 (10s) | °C |
| Total Package Power Dissipation | | P _T | 200 | mW |
| Total Package Power Dissipation Derating (Ta ≥ 25°C) | | ΔP _T /°C | -2.0 | mW/°C |
| Isolation Voltage (Note 1) | | BV _S | 3750 (AC, 1min., RH ≤ 60%) | V _{rms} |

Note 1 Device considered a two-terminal device : Pin 1, 3 shorted together and pins 4, 6 shorted together

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 |
| ELECTOR | Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 0.5\text{mA}$ | 80 | — | — | V |
| | Emitter-Collector Breakdown Voltage | $V_{(BR)ECO}$ | $I_E = 0.1\text{mA}$ | 7 | — | — | V |
| | Collector Dark Current | I_{CEO} | $V_{CE} = 48\text{V}$, (Ambient Light Below 1000 lx) | — | 0.01 (2) | 0.1 (10) | μA |
| | | | $V_{CE} = 48\text{V}$, $T_a = 85^\circ\text{C}$, (Ambient Light Below 1000 lx) | — | 2 (4) | 50 (50) | 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 | $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$ Rank GB | 50 | — | 600 | % | |
| | | | 100 | — | 600 | | |
| Saturated CTR | $I_C / I_F (\text{sat})$ | $I_F = 1\text{mA}$, $V_{CE} = 0.4\text{V}$ Rank GB | — | 60 | — | % | |
| | | | 30 | — | — | | |
| Collector-Emitter Saturation Voltage | $V_{CE} (\text{sat})$ | $I_C = 2.4\text{mA}$, $I_F = 8\text{mA}$ $I_C = 0.2\text{mA}$, $I_F = 1\text{mA}$ Rank GB | — | — | 0.4 | V | |
| | | | — | 0.2 | — | | |
| | | | — | — | 0.4 | | |
| Off-State Collector Current | $I_C (\text{off})$ | $V_F = 0.7\text{V}$, $V_{CE} = 48\text{V}$ | — | 1 | 10 | μA | |

ISOLATION CHARACTERISTICS (Ta = 25°C)

| | CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|-------------------------------|----------------|--|--------------------|-----------|------|------------------|------|
| Capacitance (Input to Output) | C_S | $V_S = 0\text{V}$, $f = 1\text{MHz}$ | — | 0.8 | — | pF | |
| Isolation Resistance | R_S | $V_S = 500\text{V}$ | 5×10^{10} | 10^{14} | — | Ω | |
| Isolation Voltage | BV_S | AC, 1 minute AC, 1 second, in oil DC, 1 minute, in oil | 3750 | — | — | V_{rms} | |
| | | | — | 10000 | — | | |
| | | | — | 10000 | — | V_{dc} | |

SWITCHING CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------|-----------|---|------|------|------|---------|
| Rise Time | t_r | $V_{CC} = 10V, I_C = 2mA$ $R_L = 100\Omega$ | — | 2 | — | μs |
| Fall Time | t_f | | — | 3 | — | |
| Turn-on Time | t_{on} | | — | 3 | — | |
| Turn-off Time | t_{off} | | — | 3 | — | |
| Turn-on Time | t_{ON} | $R_L = 1.9k\Omega$ (Fig.1) $V_{CC} = 5V, I_F = 16mA$ | — | 2 | — | μs |
| Storage Time | t_s | | — | 25 | — | |
| Turn-off Time | t_{OFF} | | — | 40 | — | |

RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|-----------------------|-----------|------|------|------|------|
| Supply Voltage | V_{CC} | — | 5 | 48 | V |
| Forward Current | I_F | — | 16 | 20 | mA |
| Collector Current | I_C | — | 1 | 10 | mA |
| Operating Temperature | T_{opr} | -25 | — | 85 | °C |

Fig.1 SWITCHING TIME TEST CIRCUIT

