



DESCRIPTION

The IS181 series of optocoupler consists of an infrared light emitting diode optically coupled to an NPN silicon photo transistor in a space efficient Mini Flat Package.

FEATURES

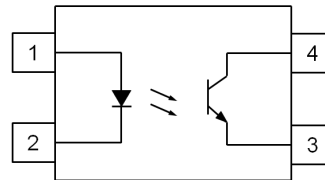
- Low Profile Package
- AC Isolation Voltage 3750V_{RMS}
- CTR Selections Available
- Wide Operating Temperature Range
-55°C to +110°C
- Lead Free and RoHS Compliant
- UL File E91231 model "FPT1" and "FPT2"

APPLICATIONS

- Computer Terminals
- Industrial System Controllers
- Measuring Instruments
- Signal Transmission between Systems of Different Potentials and Impedance

ORDER INFORMATION

- Available in Tape and Reel with 3000 pieces per reel



- 1 Anode
- 2 Cathode
- 3 Emitter
- 4 Collector

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device.

Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

Input

| | |
|-------------------|------|
| Forward Current | 50mA |
| Reverse Voltage | 6V |
| Power dissipation | 70mW |

Output

| | |
|--|-------|
| Collector to Emitter Voltage BV _{CEO} | 80V |
| Emitter to Collector Voltage BV _{ECO} | 6V |
| Collector Current | 50mA |
| Power Dissipation | 150mW |

Total Package

| | |
|-------------------------------------|----------------------|
| Isolation Voltage | 3750V _{RMS} |
| Total Power Dissipation | 170mW |
| Operating Temperature | -55 to 110 °C |
| Storage Temperature | -55 to 150 °C |
| Lead Soldering Temperature (10s) | 260°C |

ISOCOM COMPONENTS 2004 LTD

Unit 25B, Park View Road West, Park View Industrial Estate
Hartlepool, Cleveland, TS25 1PE, United Kingdom
Tel : +44 (0)1429 863 609 Fax : +44 (0)1429 863 581
e-mail : sales@isocom.co.uk
<http://www.isocom.com>

ISOCOM COMPONENTS ASIA LTD

Hong Kong Office,
Block A, 8/F, Wah Hing Industrial Mansions,
36 Tai Yau Street, San Po Kong, Kowloon, Hong Kong.
Tel : +852 2995 9217 Fax : +852 8161 6292
e-mail : sales@isocom.com.hk

IS181

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

INPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|----------------------|--------|----------------------------------|-----|------|-----|---------------|
| Forward Voltage | V_F | $I_F = 20\text{mA}$ | | 1.2 | 1.4 | V |
| Reverse Current | I_R | $V_R = 4\text{V}$ | | | 10 | μA |
| Terminal Capacitance | C_t | $V = 0\text{V}, f = 1\text{KHz}$ | | 30 | 250 | pF |

OUTPUT

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-------------------------------------|------------|---|-----|------|-----|------|
| Collector-Emitter Breakdown Voltage | BV_{CEO} | $I_C = 0.1\text{mA}, I_F = 0\text{mA}$ | 80 | | | V |
| Emitter-Collector Breakdown Voltage | BV_{ECO} | $I_E = 10\mu\text{A}, I_F = 0\text{mA}$ | 6 | | | V |
| Collector-Emitter Dark Current | I_{CEO} | $V_{CE} = 20\text{V}, I_F = 0\text{mA}$ | | | 100 | nA |

COUPLED

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|---------------|---|-----|------|-----|---------------|
| Current Transfer Ratio | CTR | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$ | 50 | | 600 | % |
| | | Optional CTR Grades | | | | |
| | | IS181A | 80 | | 160 | |
| | | IS181B | 130 | | 260 | |
| | | IS181C | 200 | | 400 | |
| | | IS181D | 300 | | 600 | |
| | | IS181GR | 100 | | 300 | |
| IS181GB | 100 | | 600 | | | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_F = 20\text{mA}, I_C = 1\text{mA}$ | | | 0.2 | V |
| Floating Capacitance | C_f | $V = 0\text{V}, f = 1\text{MHz}$ | | 0.6 | 1 | pF |
| Output Rise Time | t_r | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$ | | 4 | 18 | μs |
| Output Fall Time | t_f | $V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$ | | 3 | 18 | μs |

ISOLATION

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---------------------------|-----------|--|--------------------|------|-----|----------|
| Insulation Voltage | V_{ISO} | $RH = 40\% \text{ to } 60\%, t = 1 \text{ min},$ | 3750 | | | V |
| Input - Output Resistance | R_{I-O} | $V_{I-O} = 500\text{VDC}$ | 5×10^{10} | | | Ω |

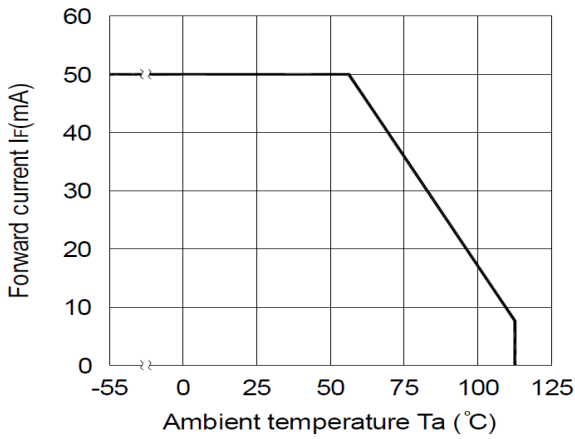


Fig 1 Forward Current vs T_A

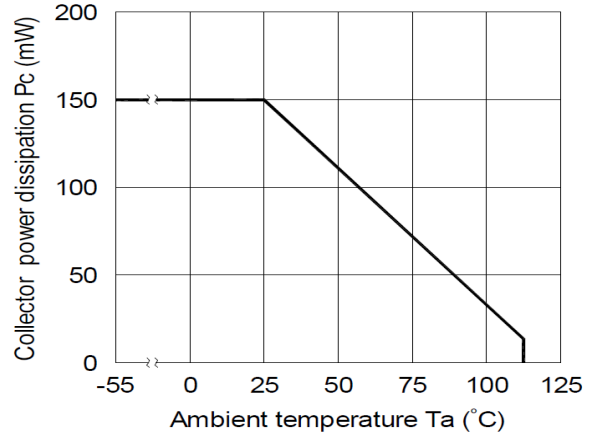


Fig 2 Collector Power Dissipation vs T_A

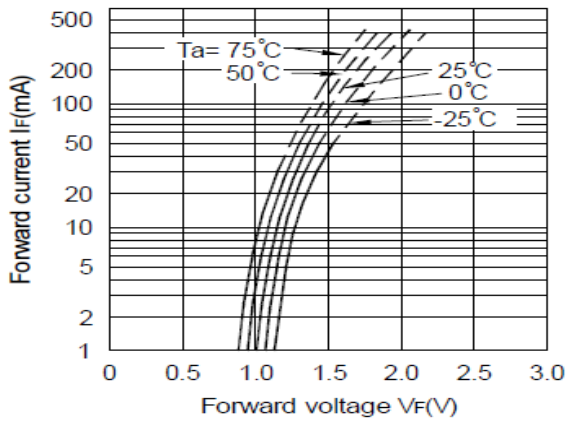


Fig 3 Forward Current vs Forward Voltage

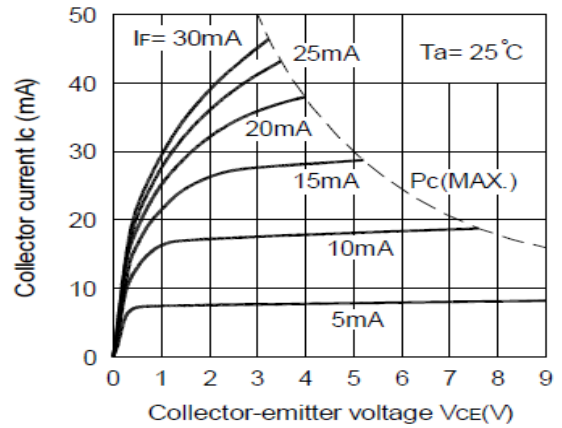


Fig 4 Collector Current vs Collector-Emitter Voltage

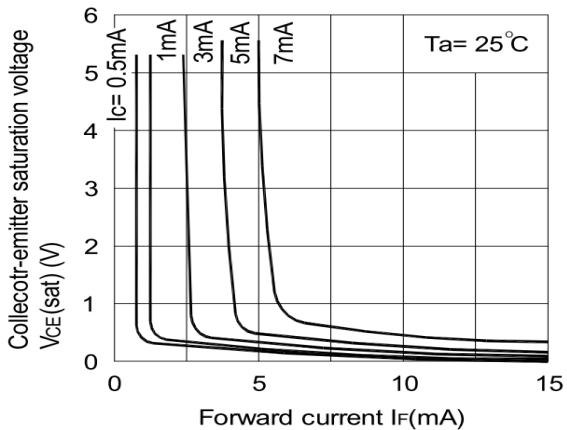


Fig 5 Collector-Emitter Saturation Voltage vs Forward Current

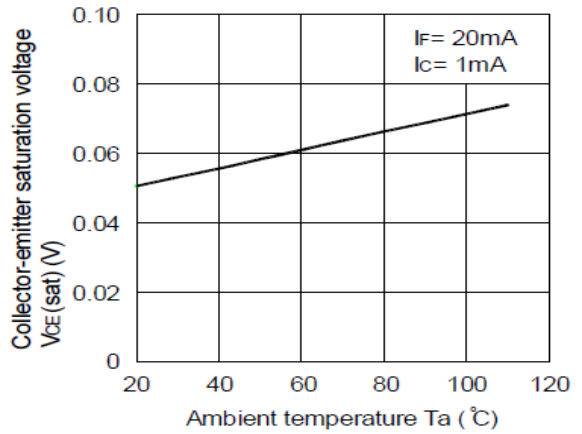


Fig 6 Collector-Emitter Saturation Voltage vs T_A

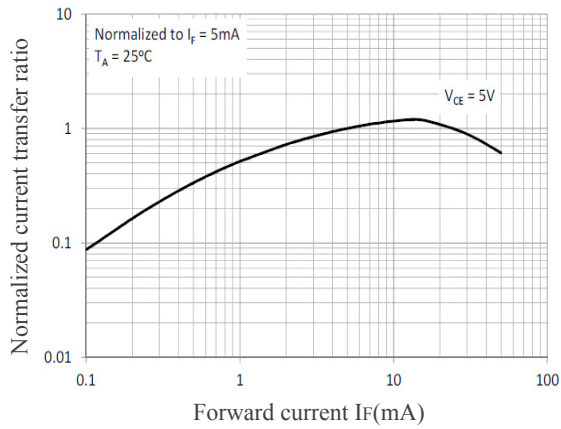


Fig 7 Normalized Current Transfer Ratio vs Forward Current

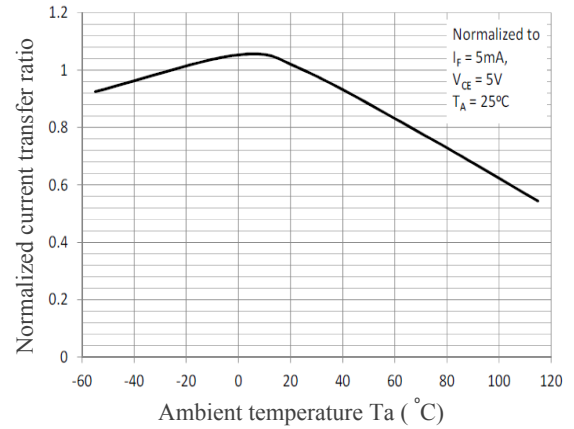


Fig 8 Normalized Current Transfer Ratio vs T_A

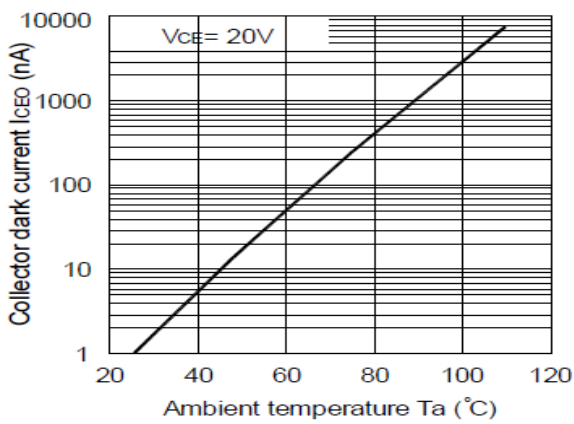


Fig 9 Collector Dark Current vs T_A

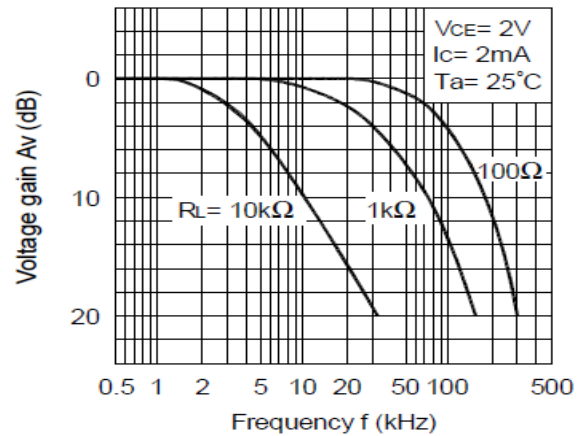


Fig 10 Frequency response

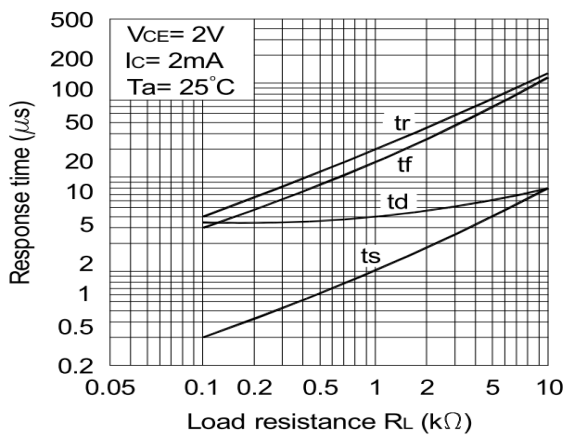
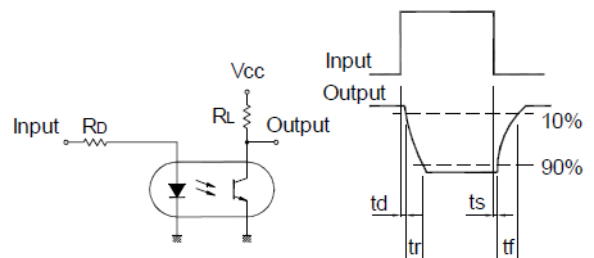


Fig 11 Response Time vs Load Resistance

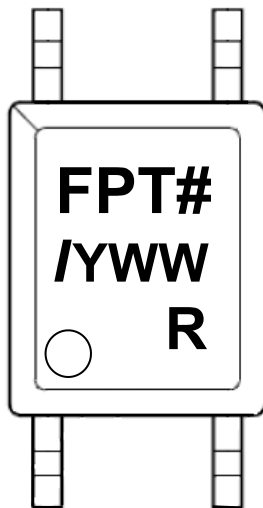


IS181

ORDER INFORMATION

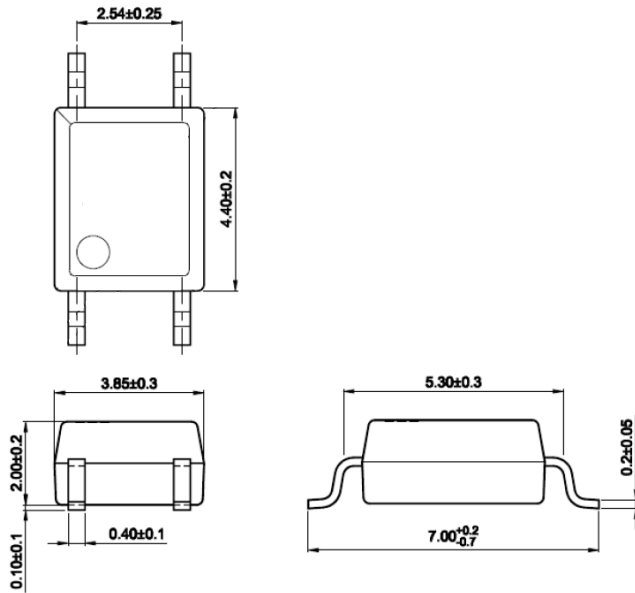
| IS181 | | | |
|--|--|---------------------------|-------------------|
| After PN | PN | Description | Packing quantity |
| None | IS181 | Surface Mount Tape & Reel | 3000 pcs per reel |
| Any CTR Grade | IS181A, IS181B, IS181C, IS181D, IS181GR, IS181GB | Surface Mount Tape & Reel | 3000 pcs per reel |
| NOTE : Multiple Grades may be supplied to meet the requested specification. | | | |

DEVICE MARKING

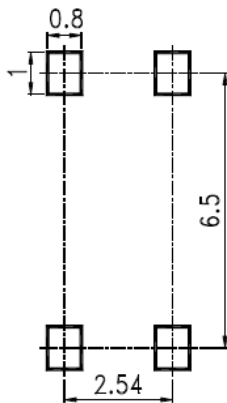


- FPT# denotes Device Part Number where “#” is internal control number which can be “1” or “2”
- / denotes Isocom
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- R denotes CTR Grade

PACKAGE DIMENSIONS (mm)

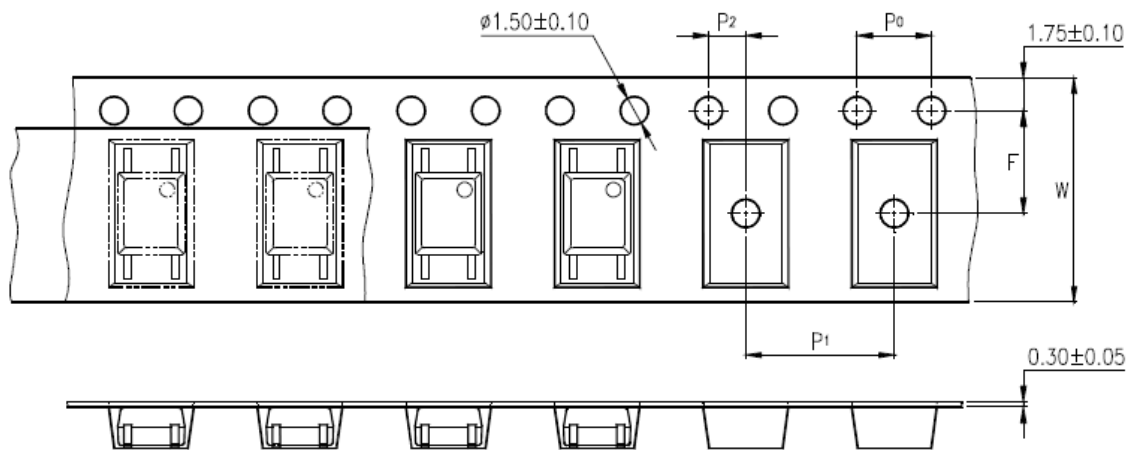


RECOMMENDED SOLDER PAD LAYOUT (mm)



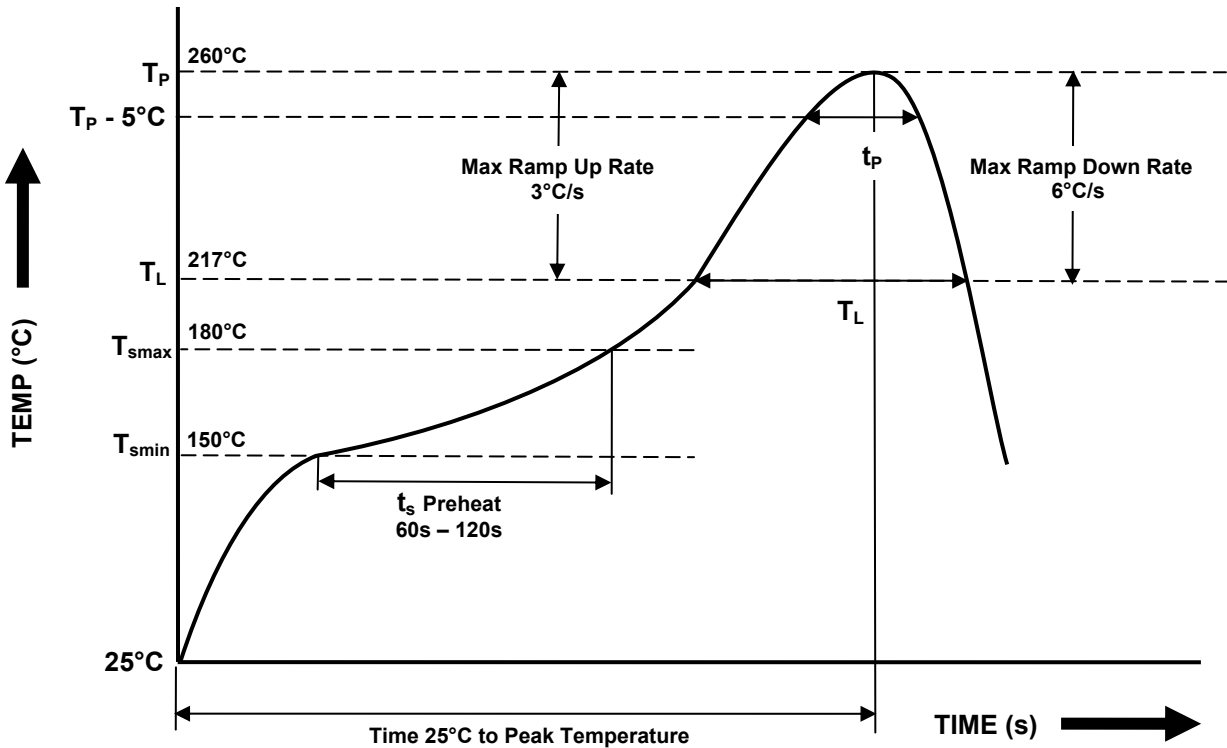
IS181

TAPE AND REEL PACKAGING



| Description | Symbol | Dimension mm (inch) |
|---|--------|------------------------|
| Tape Width | W | 12 ± 0.3 (0.47) |
| Pitch of Sprocket Holes | P_0 | 4 ± 0.1 (0.15) |
| Distance of Compartment to Sprocket Holes | F | 5.5 ± 0.1 (0.217) |
| | P_2 | 2 ± 0.1 (0.079) |
| Distance of Compartment to Compartment | P_1 | 8 ± 0.1 (0.315) |

IR REFLOW SOLDERING TEMPERATURE PROFILE
One Time Reflow Soldering is Recommended.
Do not immerse device body in solder paste.



| Profile Details | Conditions |
|---|--|
| Preheat - Min Temperature (T _{SMIN}) - Max Temperature (T _{SMAX}) - Time T _{SMIN} to T _{SMAX} (t _s) | 150°C 180°C 60s - 120s |
| Soldering Zone - Peak Temperature (T _P) - Liquidous Temperature (T _L) - Time within 5°C of Actual Peak Temperature (T _P - 5°C) - Time maintained above T _L (t _L) - Ramp Up Rate (T _L to T _P) - Ramp Down Rate (T _P to T _L) | 260°C 217°C 20s 60s 3°C/s max 3 - 6°C/s |
| Average Ramp Up Rate (T _{smax} to T _P) | 3°C/s max |
| Time 25°C to Peak Temperature | 8 minutes max |



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