



## 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

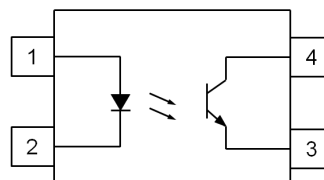
- Low Profile Package
- AC Isolation Voltage 3750V<sub>RMS</sub>
- CTR Selections Available
- Wide Operating Temperature Range -55°C to +110°C
- Lead Free and RoHS Compliant
- UL File E91231 model "FPT1" and "FPT2"

## 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<sub>A</sub> = 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 <sub>CEO</sub>	80V
Emitter to Collector Voltage BV <sub>ECO</sub>	6V
Collector Current	50mA
Power Dissipation	150mW

### Total Package

Isolation Voltage	3750V <sub>RMS</sub>
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	$\mu\text{A}$
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	$\mu\text{s}$
Output Fall Time	$t_f$	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$		3	18	$\mu\text{s}$

#### 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	$R_{I-O}$	$V_{I-O} = 500\text{VDC}$	$5 \times 10^{10}$			$\Omega$

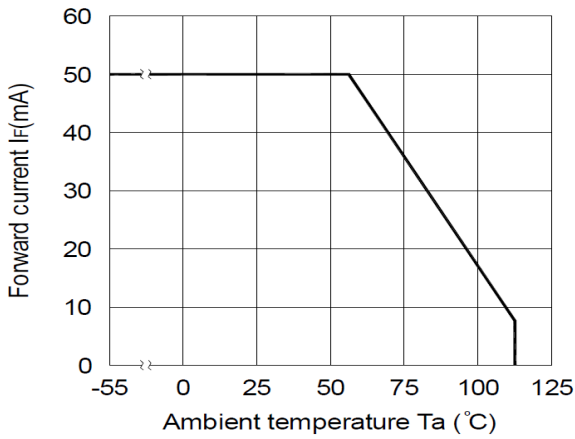


Fig 1 Forward Current vs  $T_A$

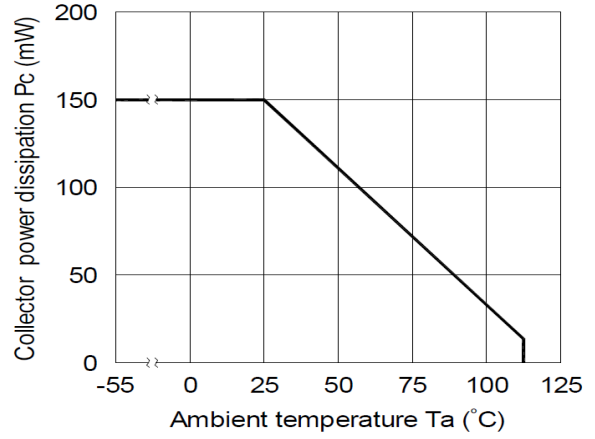


Fig 2 Collector Power Dissipation vs  $T_A$

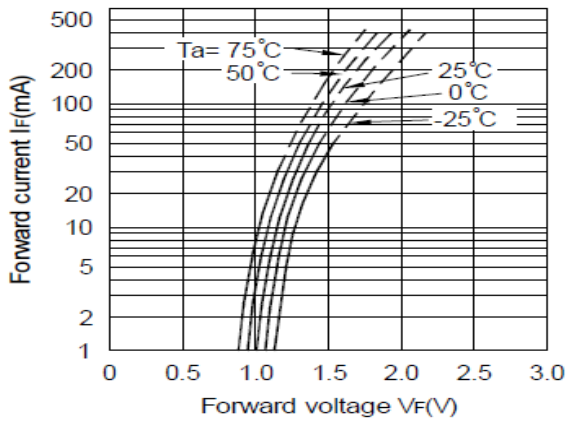


Fig 3 Forward Current vs Forward Voltage

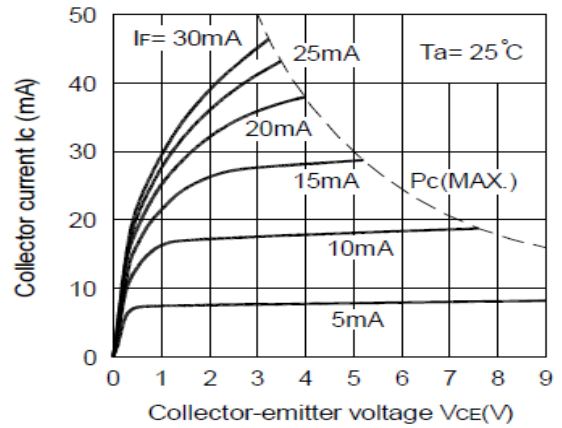


Fig 4 Collector Current vs Collector-Emitter Voltage

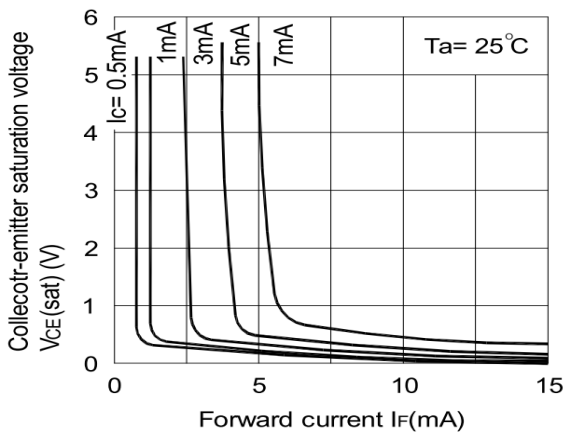


Fig 5 Collector-Emitter Saturation Voltage vs Forward Current

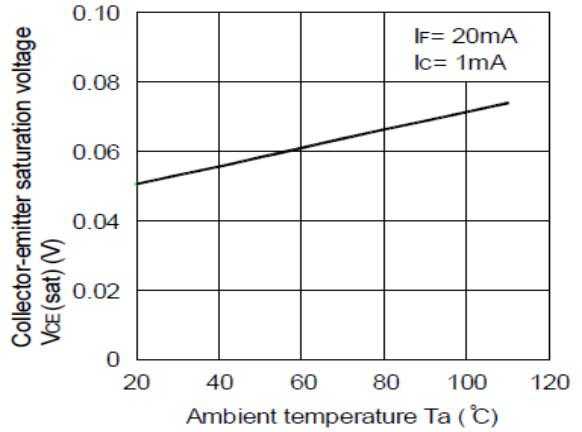
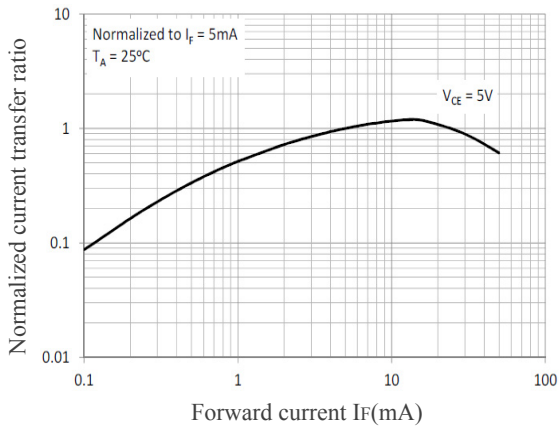
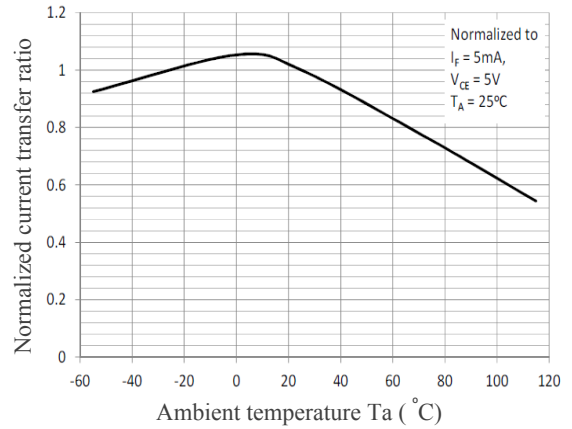


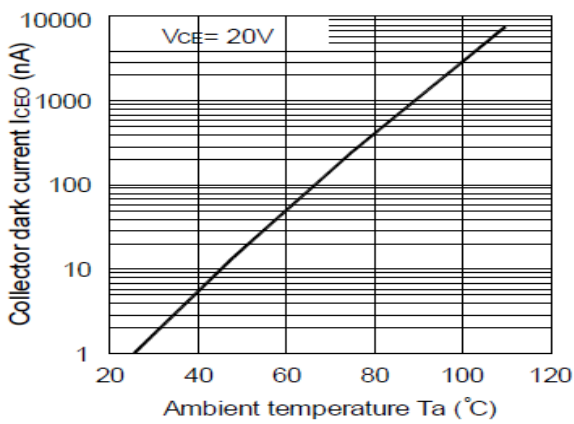
Fig 6 Collector-Emitter Saturation Voltage vs  $T_A$



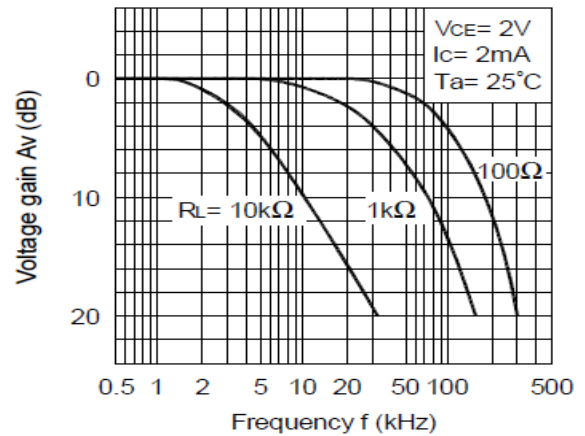
**Fig 7 Normalized Current Transfer Ratio vs Forward Current**



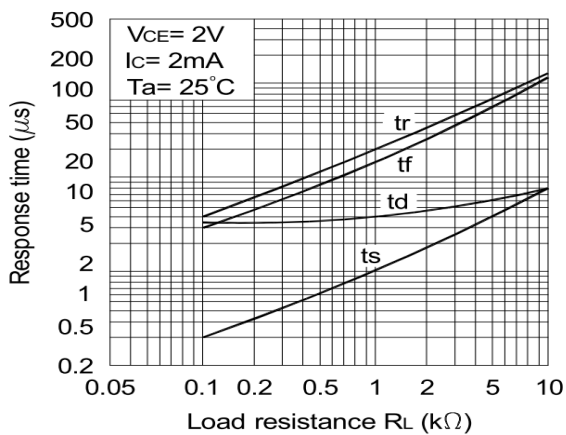
**Fig 8 Normalized Current Transfer Ratio vs T<sub>A</sub>**



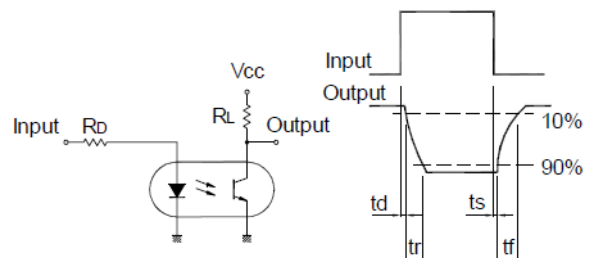
**Fig 9 Collector Dark Current vs T<sub>A</sub>**



**Fig 10 Frequency response**



**Fig 11 Response Time vs Load Resistance**

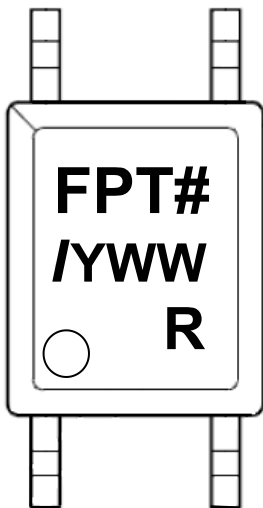


## IS181

### ORDER INFORMATION

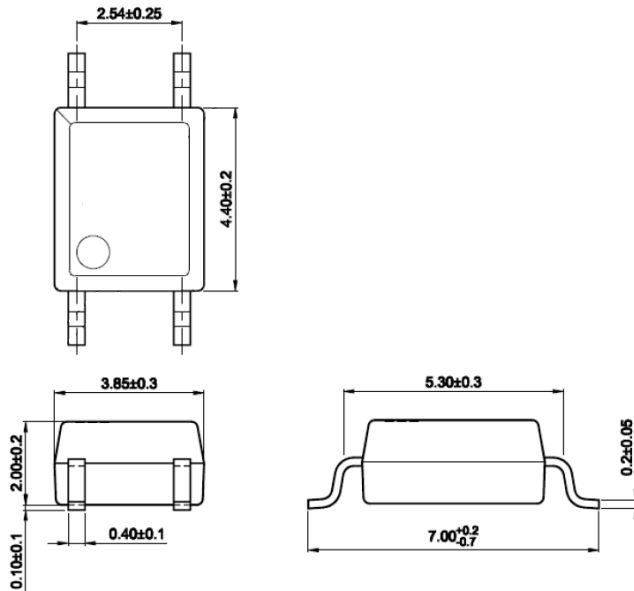
IS181			
After PN	PN	Description	Packing quantity
None	IS181	Surface Mount Tape & Reel	3000 pcs per reel
Any CTR Grade	IS181A, IS181B, IS181C, IS181D, IS181GR, IS181GB	Surface Mount Tape & Reel	3000 pcs per reel
<b>NOTE : Multiple Grades may be supplied to meet the requested specification.</b>			

### DEVICE MARKING

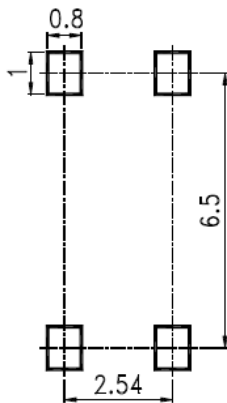


- FPT#      denotes Device Part Number where “#” is internal control number which can be “1” or ‘2”
- /          denotes Isocom
- Y          denotes 1 digit Year code
- WW        denotes 2 digit Week code
- R          denotes CTR Grade

**PACKAGE DIMENSIONS (mm)**

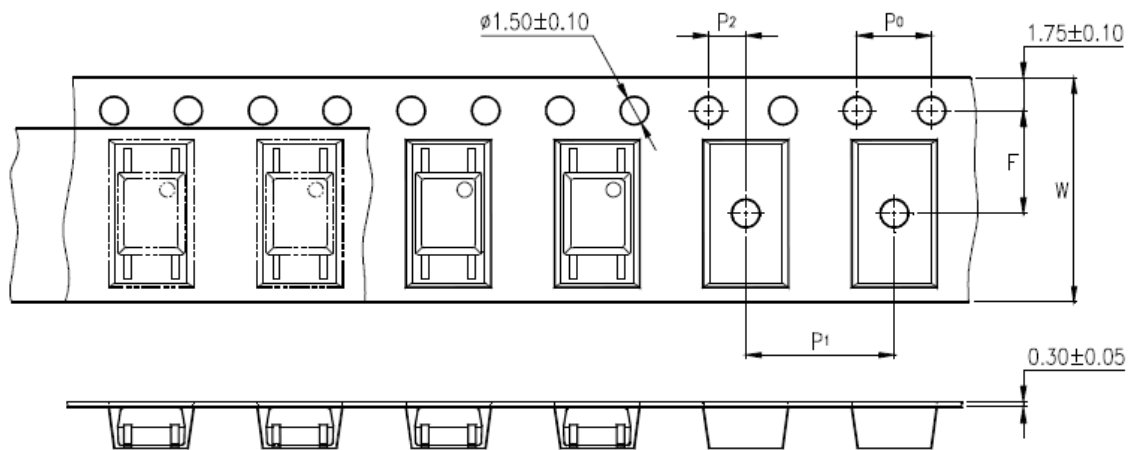


**RECOMMENDED SOLDER PAD LAYOUT (mm)**



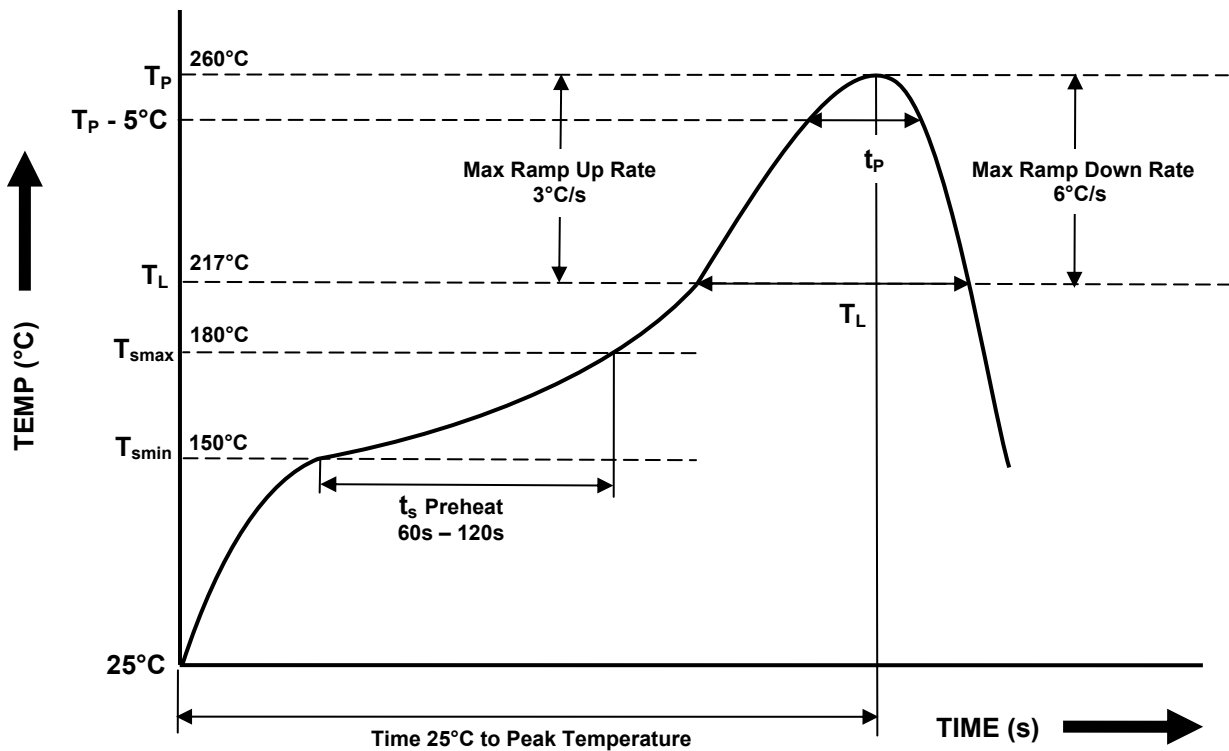
# IS181

## TAPE AND REEL PACKAGING



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

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



Profile Details	Conditions
<b>Preheat</b> - Min Temperature (T <sub>SMIN</sub> ) - Max Temperature (T <sub>SMAX</sub> ) - Time T <sub>SMIN</sub> to T <sub>SMAX</sub> (t <sub>s</sub> )	150°C 180°C 60s - 120s
<b>Soldering Zone</b> - Peak Temperature (T <sub>P</sub> ) - Liquidous Temperature (T <sub>L</sub> ) - Time within 5°C of Actual Peak Temperature (T <sub>P</sub> - 5°C) - Time maintained above T <sub>L</sub> (t <sub>L</sub> ) - Ramp Up Rate (T <sub>L</sub> to T <sub>P</sub> ) - Ramp Down Rate (T <sub>P</sub> to T <sub>L</sub> )	260°C 217°C 20s 60s 3°C/s max 3 - 6°C/s
Average Ramp Up Rate (T <sub>smax</sub> to T <sub>P</sub> )	3°C/s max
Time 25°C to Peak Temperature	8 minutes max



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