

DESCRIPTION

The IS480P High Speed Photocoupler contains a AIGaAs LED and Photo detector with built-in Schmitt Trigger to provide logic-compatible waveforms, eliminating the need for additional wave shaping.

The totem pole output eliminates the need for a pull up resistor and allows for direct Intelligent Power Module Drive or Gate Drive. Minimized Propagation Delay difference between devices makes this photocoupler excellent solutions for improving inverter efficiency through reduced switching dead time.

The device is in Stretched SO6 package.



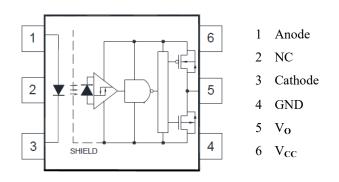
- Totem Pole Output
- Wide Operating Voltage Range
 V_{cc} 4.5V to 30V
- Operating Temperature Range - 40°C to +105°C
- Performance specified for Common IPM Applications over Industrial Temperature range.
- Maximum Propagation Delays t_{PLH} / t_{PHL} : 200ns / 220ns
- Propagation Delay Difference
 Min / Max : -210ns / 210ns
- Maximum Pulse Width Distortion
 PWD : 120ns
- Hysteresis
- 20kV/µs Minimum Common Mode Rejection at V_{CM} 1500V
- Lead Free and RoHS Compliant
- Safety Approvals Pending

APPLICATIONS

- Isolated IGBT/MOSFET Gate Drive
- IPM Interface Isolation
- Industrial Inverters
- AC Brushless and DC Motor Drives
- Digital Isolation

ORDER INFORMATION

• Supply in Tape & Reel



A 0.1µF bypass Capacitor must be connected between Pins 6 and 4.

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

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

Input

Forward Current	10mA
Forward Peak Current (Pulse Width < 1µs, 300pps)	1.0A
Reverse Voltage	5V

Output

Output Current	50mA
Output Voltage	-0.5V to 35V
Supply Voltage	35V

Total Package

Isolation Voltage5000V_{RMS}Total Power Dissipation145mWOperating Temperature-40 to 105 °CStorage Temperature-55 to 125 °CLead Soldering Temperature (10s)260°C

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Truth Table

LED	Vo
ON	HIGH
OFF	LOW

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T _A	- 40	105	°C
Supply Voltage	V _{CC}	4.5	30	V
Input Current (ON)	I _{F(ON)}	1.6	5	mA
Input Voltage (OFF)	V _{F(OFF)}		0.8	V

Note :

- 1: Photo Detector requires a V_{CC} of 4.5 V or higher for stable operation as output might be unstable if V_{CC} is lower than 4.5 V.
- 2: The initial switching threshold is 1.6 mA or less. It is recommended that 2.2 mA be used to permit a guard band.

$\begin{array}{l} \textbf{ELECTRICAL CHARACTERISTICS} \text{ (Over Recommended Operating Conditions,} \\ V_{CC} = 4.5V \text{ to } 30V, I_{F(ON)} = 1.6\text{mA to } 5\text{mA}, V_{F(OFF)} = 0V \text{ to } 0.8V, \\ T_A = -40^\circ\text{C} \text{ to } 105^\circ\text{C}, \text{ unless otherwise specified.} \\ Typical Values at T_A = 25^\circ\text{C}) \end{array}$

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INPUT

Parameter	Symbol	Test Condition	Min	Тур.	Мах	Unit
Forward Voltage	$V_{\rm F}$	$I_F = 5mA$	1.2	1.33	1.6	V
Forward Voltage Temperature Coefficient	$\Delta V_F / \Delta T$	$I_F = 5mA$		-1.237		mV/°C
Reverse Voltage	V _R	$I_R = 10 \mu A$	5			V
Input Threshold Current (Low to High)	$\mathbf{I}_{\mathrm{FLH}}$			0.7	1.5	mA
Input Threshold Voltage (High to Low)	$\mathrm{V}_{\mathrm{FHL}}$		0.8			V
Input Capacitance	C _{IN}	$V_F = 0V, f = 1MHz$		33		pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Тур.	Мах	Unit
High Level Supply Current	I _{CCH}	$V_{CC} = 5.5V, I_F = 5mA$ $I_O = 0mA$			3.0	mA
		$V_{CC} = 30V, I_F = 5mA$ $I_O = 0mA$		1.9	3.0	
Low Level Supply Current	I _{CCL}	$V_{CC} = 5.5V, V_F = 0V$ $I_O = 0mA$			3.0	mA
		$V_{CC} = 30V, V_F = 0V$ $I_O = 0mA$		2.0	3.0]
High Level Short Circuit Output Current	I _{OSH}	$V_{CC} = 5.5V, I_F = 5mA, V_O = GND$ Duration < 500 μ s			-160	mA
		$V_{CC} = 20V, I_F = 5mA, V_O = GND$ Duration < 500 μ s			-200]
Low Level Short Circuit Output Current	I _{OSL}	$V_{O} = V_{CC} = 5.5V, V_{F} = 0V$ Duration < 500 μs	160			mA
		$\label{eq:V_C} \begin{split} V_O = V_{CC} = 20V, \ V_F = 0V \\ Duration < 500 \mu s \end{split}$	200]
High Level Output Voltage	V _{OH}	$I_{OH} = -6.5 \text{mA}$	V _{CC} - 0.5	V _{CC} - 0.025		V
Low Level Output Voltage	V _{OL}	$I_{OL} = 6.5 \text{mA}$		0.015	0.5	V



ELECTRICAL CHARACTERISTICS (Over Recommended Operating Conditions,

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 $V_{CC} = 4.5V$ to 30V, $I_{F(ON)} = 1.6mA$ to 5mA, $V_{F(OFF)} = 0V$ to 0.8V, $T_A = -40^{\circ}C$ to 105°C, unless otherwise specified. Typical Values at $T_A = 25^{\circ}C$)

SWITCHING

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Propagation Delay Time to High Output Level	t _{PLH}	$V_F = 0V \rightarrow I_{F(ON)} = 1.6mA$ $C_L = 100pF$		120	200	ns
Propagation Delay Time to Low Output Level	t _{PHL}	$I_{F(ON)} = 1.6mA \rightarrow V_F = 0V$ $C_L = 100pF$		130	220	
Pulse Width Distortion $ t_{PHL} - t_{PLH} $ for any given device	PWD	$C_L = 100 pF$			120	
Propagation Delay Difference (t _{PHL} - t _{PLH}) between any two devices	PDD	$C_L = 100 pF$	-210		210	
Output Rise Time (10% to 90%)	t _r			35		
Output Fall Time (90% to 10%)	t _f			35		
Common Mode Transient Immunity at High Output Level	CM _H	$I_{F} = 6.0mA$ $V_{CC} = 5V$ $V_{CM} = 1500V$ $T_{A} = 25^{\circ}C$	20			kV/μs
Common Mode Transient Immunity at Low Output Level	CM _L	$V_{F} = 0V$ $V_{CC} = 5V$ $V_{CM} = 1500V$ $T_{A} = 25^{\circ}C$	20			kV/μs

Note :

- A 0.1uF or bigger bypass capacitor must be connected across pin 6 and pin 4. 1.
- t_{PLH} propagation delay is measured from the 50% point on the leading edge of the input pulse to the 1.3 V point on the 2. leading edge of the output pulse. tPHL propagation delay is measured from the 50% point on the trailing edge of the input pulse to the 1.3 V point on the trailing edge of the output pulse.
- 3. PDD is the difference of t_{PHL} and t_{PLH} between any two devices under same test conditions.
- CM_H, Common Mode Transient Immunity in High stage is the maximum tolerable slew rate of the common mode 4. impulse signal, V_{CM}, to assure that the output will remain high (V₀ > 2V). Equal value split resistors must be used at both ends of the LED.
- 5. CML, Common Mode Transient Immunity in Low stage is the maximum tolerable slew rate of the common mode impulse signal, V_{CM}, to assure that the output will remain low (V₀ < 0.8V). Equal value split resistors must be used at both ends of the LED.



ELECTRICAL CHARACTERISTICS (Over Recommended Operating Conditions, $T_A = -40^{\circ}C$ to 105°C, unless otherwise specified. Typical Values at $T_A = 25^{\circ}C$)

ISOLATION

Parameter	Symbol	Test Condition	Min	Тур.	Мах	Unit
Insulation Voltage	V _{ISO}	RH \leq 50%, t = 1 min, T _A = 25°C	5000			V _{RMS}
Input - Output Resistance	R _{I-O}	$V_{I-O} = 500 VDC$		10 ¹²		Ω
Input - Output Capacitance	C _{I-O}	$f = 1 MHz$, $T_A = 25^{\circ}C$		1.0		pF



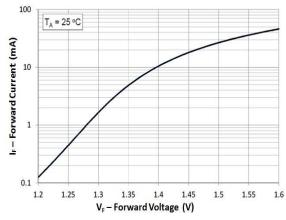
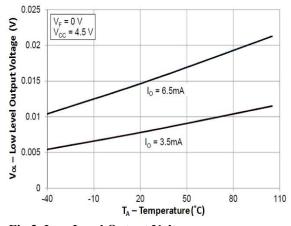
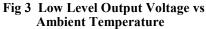
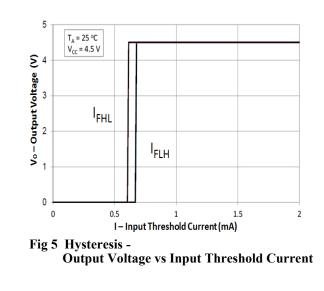


Fig 1 Forward Current vs Forward Voltage







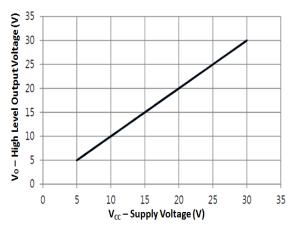


Fig 2 High Level Output Voltage vs Supply Voltage

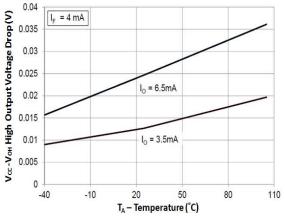
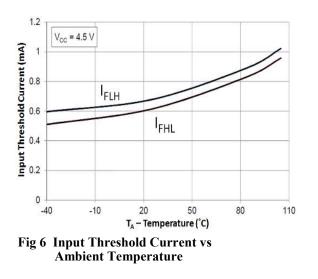
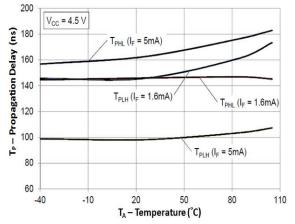
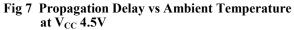


Fig 4 High Level Output Voltage Drop vs Ambient temperature









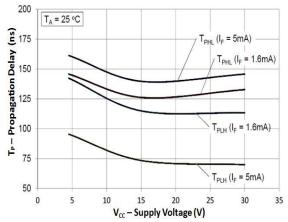
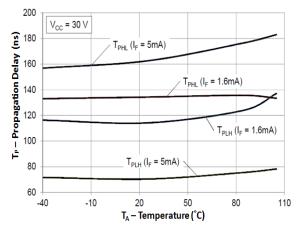
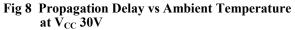
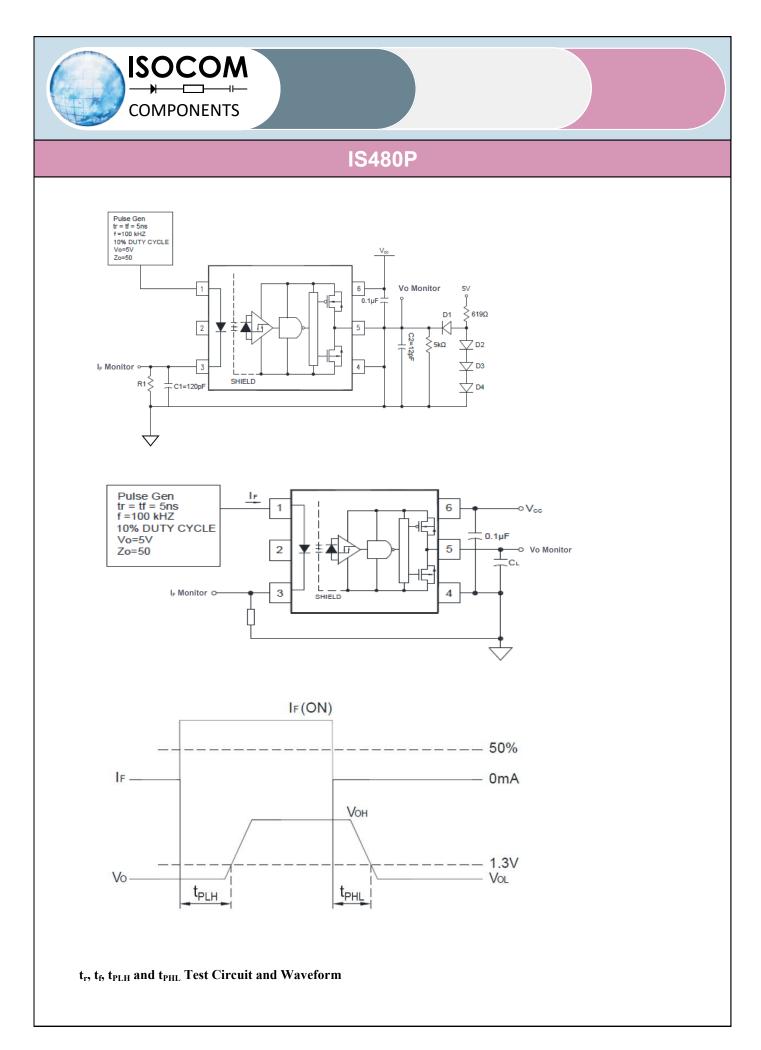
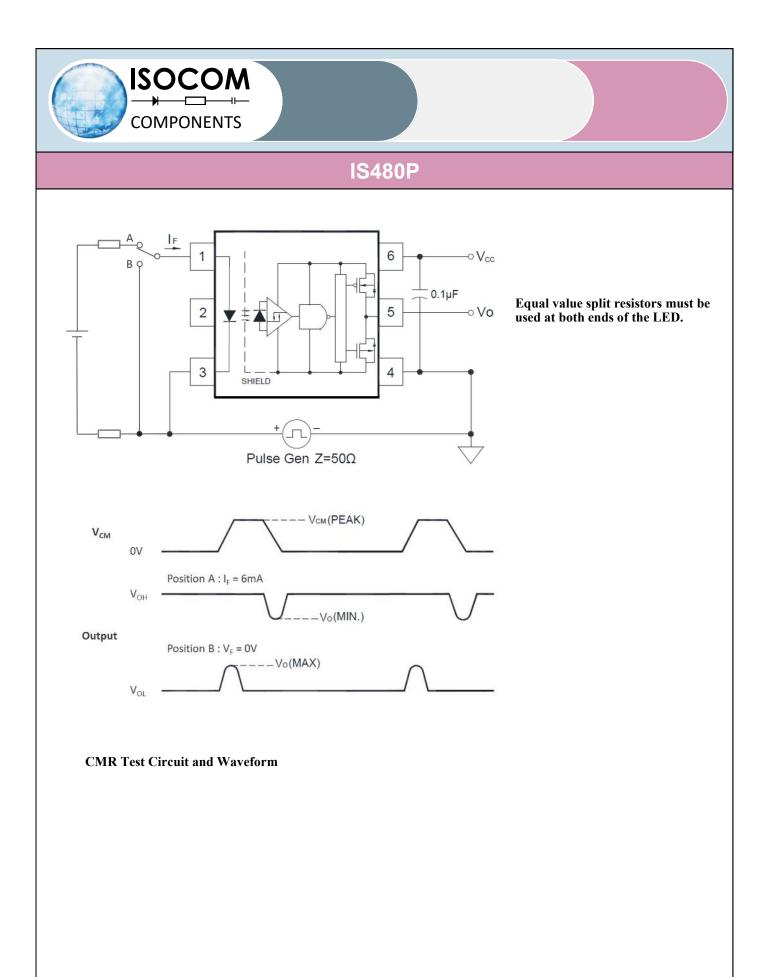


Fig 9 Propagation Delay vs Supply Voltage











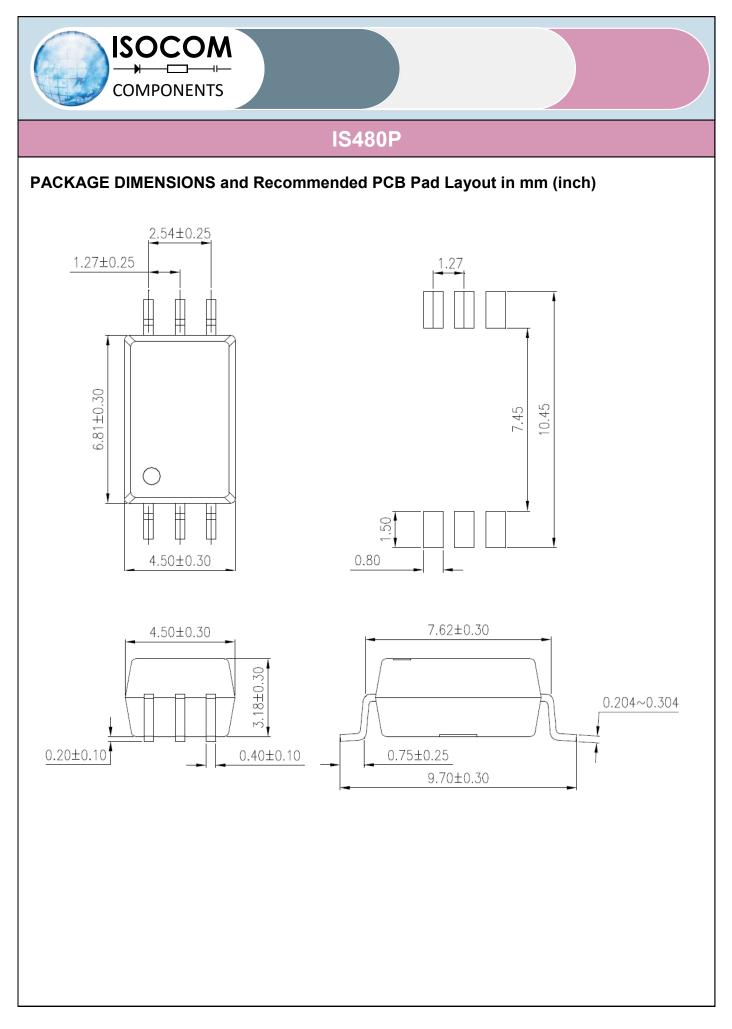
ORDER INFORMATION

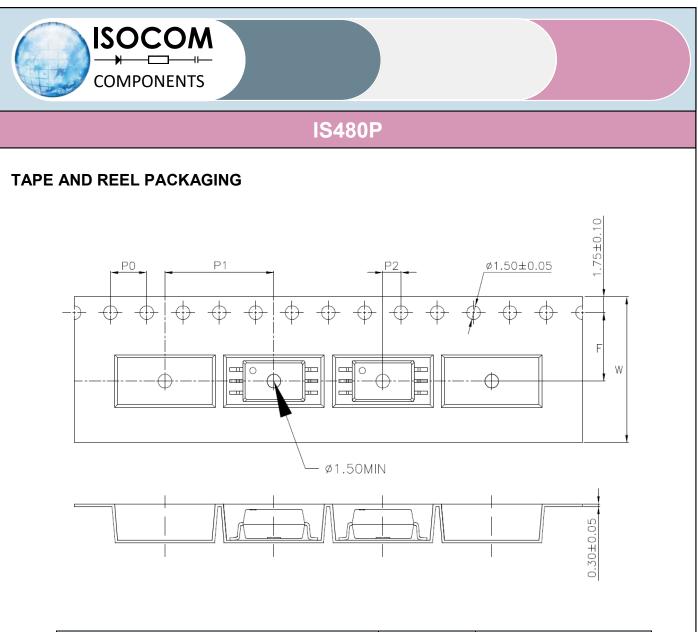
IS480P					
After PN	PN	Description	Packing quantity		
None	IS480P	Stretched SO6	1000 pcs per reel		

DEVICE MARKING

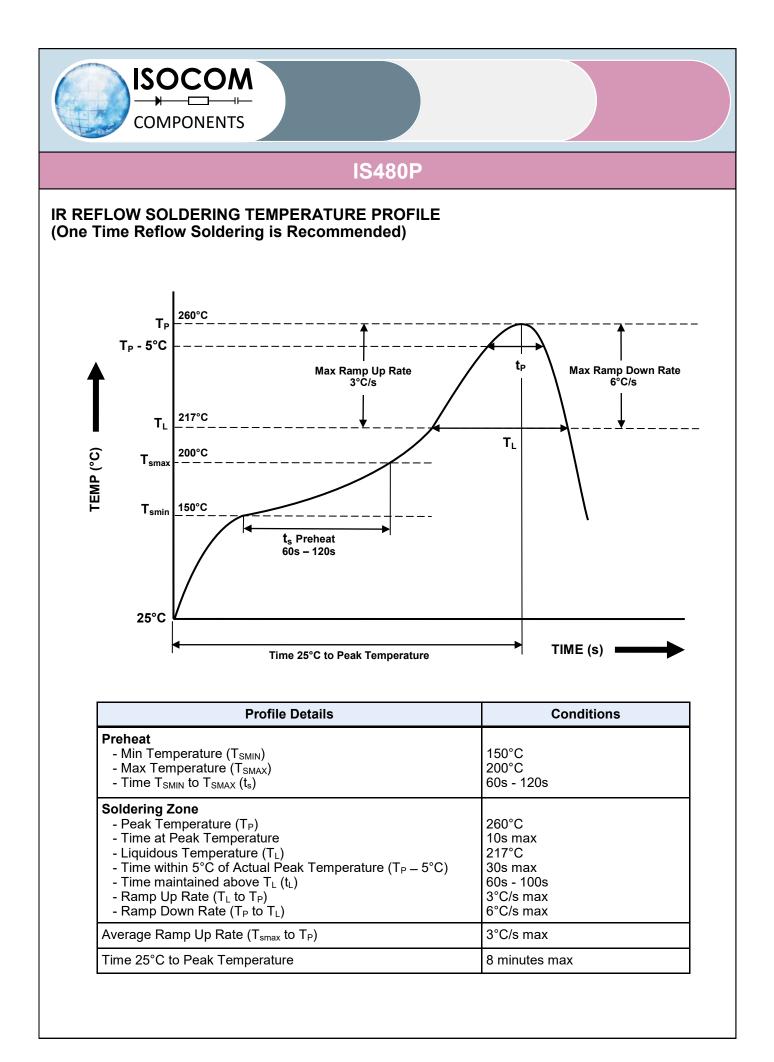


480P	denotes Device Part Number
YY	denotes 2 digit Year code
WW	denotes 2 digit Week code





Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	Po	4 ± 0.1 (0.16)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.3)
Distance of Compartment to Sprocket Holes	P ₂	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P ₁	12 ± 0.1 (0.47)



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- Do not immerse device body in solder paste.

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