



**ISOCOM**  
COMPONENTS

## IS341W



### DESCRIPTION

The IS341W Photocoupler is ideally suited for driving power IGBTs and MOSFETs used in inverters of motor control and of power supply system. It contains an AlGaAs LED optically coupled to an integrated circuit with a power output stage. The high peak output current of 3.0A is capable to direct drive IGBT with ratings up to 1200 V/100 A. For IGBTs with higher ratings, IS341W can be used to drive a discrete power stage which drives the IGBT gate.

The device is supplied in Stretched SO6 package with wide lead separation.

### FEATURES

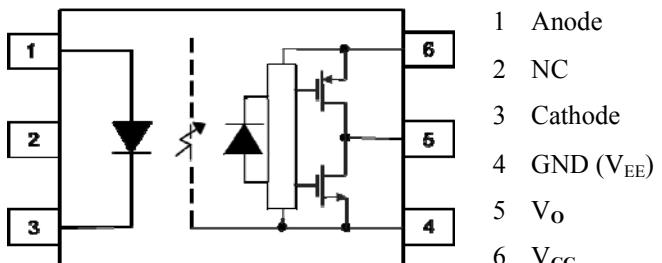
- 3.0A Maximum Peak Output Current
- 2.5A Minimum Peak Output Current
- Rail-to-Rail Output Voltage
- 20kV/μs Minimum Common Mode Rejection at  $V_{CM}$  1500V
- Maximum Propagation Delay 200ns
- Maximum Propagation Delay Difference 100ns
- Wide Operating Voltage Range  $V_{CC}$  15 to 30 V
- Under Voltage Lock Out (UVLO) Protection with Hysteresis
- Guaranteed Performance over Temperature Range - 40°C to +105°C
- MSL Level 1
- Lead Free and RoHS Compliant
- Safety Approvals Pending

### APPLICATIONS

- IGBT/MOSFET Gate Drive
- UPS
- Industrial Inverters
- Switching Power Supplies
- AC Brushless and DC Motor Drives

### ORDER INFORMATION

- Supplied in Tape & Reel



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

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ )

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	25mA
Forward Peak Current (Pulse Width $\leq 1\mu s$ , 300pps)	1.0A
Reverse Voltage	5V
Forward Current Rise / Fall Time	500ns
Power dissipation	45mW

#### Output

High Level Peak Output Current Exponential waveform. Pulse width $\leq 0.3\mu s$ , $f \leq 15\text{ kHz}$	3.0A
Low Level Peak Output Current Exponential waveform. Pulse width $\leq 0.3\mu s$ , $f \leq 15\text{ kHz}$	3.0A
Supply Voltage ( $V_{CC} - V_{EE}$ )	35V
Output Voltage	$V_{CC}$
Power Dissipation	700mW

#### Total Package

Isolation Voltage	5000V <sub>RMS</sub>
Total Power Dissipation	745mW
Operating Temperature	-40 to 105 °C
Storage Temperature	-55 to 125 °C
Lead Soldering Temperature (10s)	260°C

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### Truth Table

LED	$V_{CC} - GND$ (Turn ON, +ve going)	$V_{CC} - GND$ (Turn OFF -ve going)	$V_o$
OFF	0 – 30V	0 – 30V	LOW
ON	0 – 11.0V	0 – 9.5V	LOW
ON	11.0 – 13.5V	9.5 – 12.0V	TRANSITION
ON	13.5 – 30V	12 – 30V	HIGH

### Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating Temperature	$T_A$	- 40	105	°C
Supply Voltage	$V_{CC} - V_{EE}$	15	30	V
Input Current (ON)	$I_{F(ON)}$	7	16	mA
Input Voltage (OFF)	$V_{F(OFF)}$	-3.0	0.8	V



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**ELECTRICAL CHARACTERISTICS** (Typical Values at  $V_{CC} - V_{EE} = 30V$  and  $T_A = 25^\circ C$ ,  
Minimum and Maximum Values at Recommended Operating Conditions,  
unless otherwise specified)

### INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	$V_F$	$I_F = 10mA$	1.2	1.37	1.8	V
Forward Voltage Temperature Coefficient	$\Delta V_F/\Delta T$	$I_F = 10mA$		-1.237		mV/°C
Reverse Voltage	$V_R$	$I_R = 10\mu A$	5			V
Input Threshold Current (Low to High)	$I_{FLH}$	$V_{CC} = 30V$ $V_O > 5V$		1.8	5	mA
Input Threshold Voltage (High to Low)	$V_{FHL}$	$V_{CC} = 30V$ $V_O < 5V$	0.8			V
Input Capacitance	$C_{IN}$	$V_F = 0V, f = 1MHz$		33		pF

### OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
High Level Supply Current	$I_{CCH}$	$I_F = 10mA, V_{CC} = 30V$ $V_O = \text{Open}$		2.4	3.5	mA
Low Level Supply Current	$I_{CCL}$	$I_F = 0mA, V_{CC} = 30V$ $V_O = \text{Open}$		2.5	3.5	mA
High Level Output Current	$I_{OH}$	$V_O = V_{CC} - 1.5V$ Pulse Width = 50μs			-1.0	A
		$V_O = V_{CC} - 4V$ Pulse Width = 10μs			-2.5	
Low Level Output Current	$I_{OL}$	$V_O = V_{EE} + 1.5V$ Pulse Width = 50μs	1.0			A
		$V_O = V_{EE} + 4V$ Pulse Width = 10μs	2.5			
High Level Output Voltage	$V_{OH}$	$I_F = 10mA, I_O = -100mA$	$V_{CC} - 0.3$	$V_{CC} - 0.1$		V
Low Level Output Voltage	$V_{OL}$	$I_F = 0mA, I_O = 100mA$		$V_{EE} + 0.1$	$V_{EE} + 0.25$	V
UVLO Threshold	$V_{UVLO+}$	$V_O > 5V, I_F = 10mA$	11.0	12.7	13.5	V
	$V_{UVLO-}$	$V_O < 5V, I_F = 10mA$	9.5	11.2	12.0	V
UVLO Hysteresis	$UVLO_{HYS}$			1.5		V



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### SWITCHING

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Propagation Delay Time to High Output Level	$t_{PLH}$	$I_F = 7$ to $16mA$ , $V_{CC} = 15$ to $30V$ , $V_{EE} = 0V$ $R_g = 10\Omega$ , $C_g = 25nF$ , $f = 10kHz$ , Duty Cycle = 50%	50	130	200	ns
Propagation Delay Time to Low Output Level	$t_{PHL}$		50	130	200	
Pulse Width Distortion $ t_{PHL} - t_{PLH} $ for any given Device	PWD			5	70	
Propagation Delay Difference between any two Devices	PDD		-100		100	
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	$CM_H$	$I_F = 10$ to $16mA$ , $V_{CC} = 30V$ $V_{CM} = 1500V$ , $T_A = 25^\circ C$	20	25		kV/μs
Common Mode Transient Immunity at Low Output Level	$CM_L$	$V_F = 0V$ , $V_{CC} = 30V$ $V_{CM} = 1500V$ , $T_A = 25^\circ C$	20	25		kV/μs



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**ELECTRICAL CHARACTERISTICS** (Typical Values at  $V_{CC} - V_{EE} = 10V$  to  $30V$  and  $T_A = 25^\circ C$ ,  
Minimum and Maximum Values at Recommended Operating Conditions,  
unless otherwise specified)

### ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Insulation Voltage	$V_{ISO}$	$RH \leq 40\%$ to $60\%$ , $t = 1$ min, $T_A = 25^\circ C$	5000			V
Input - Output Resistance	$R_{I-O}$	$V_{I-O} = 500$ VDC		$10^{12}$		$\Omega$
Input - Output Capacitance	$C_{I-O}$	$f = 1$ MHz, $T_A = 25^\circ C$		0.92		pF

#### Note :

1. A 0.1uF or bigger bypass capacitor must be connected across pin 6 and pin 4.
2. PDD is the difference of Propagation Delays between any two IS341W devices under same test conditions.
3.  $CM_H$ , Common Mode Transient Immunity in High stage is the maximum tolerable positive  $dV_{CM}/dt$  on the leading edge of the common mode impulse signal,  $V_{CM}$ , to assure that the output will remain high ( $V_o > 15V$ ).
4.  $CM_L$ , Common Mode Transient Immunity in Low stage is the maximum tolerable negative  $dV_{CM}/dt$  on the trailing edge of the common mode impulse signal,  $V_{CM}$ , to assure that the output will remain low ( $V_o < 1V$ ).



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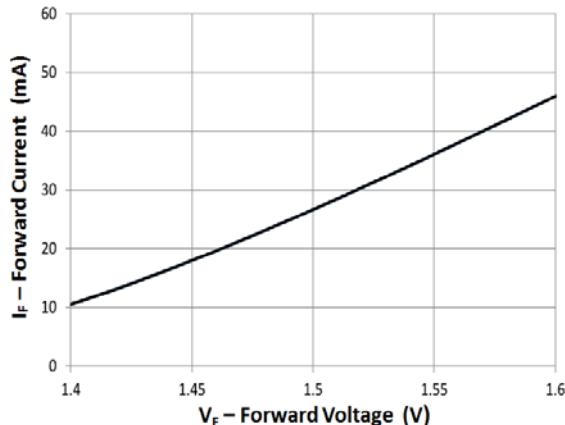


Fig 1 Forward Current vs Forward Voltage

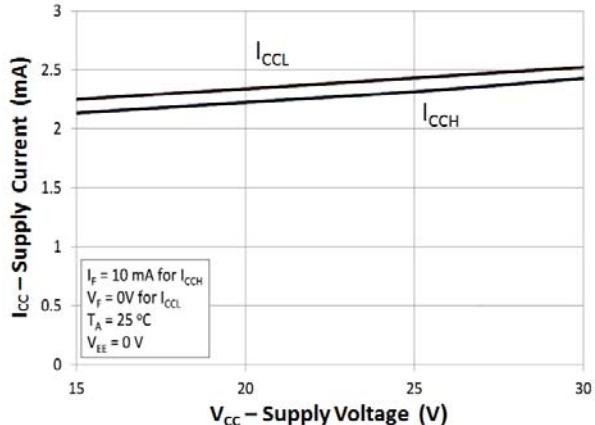


Fig 2 Supply Current vs Supply Voltage

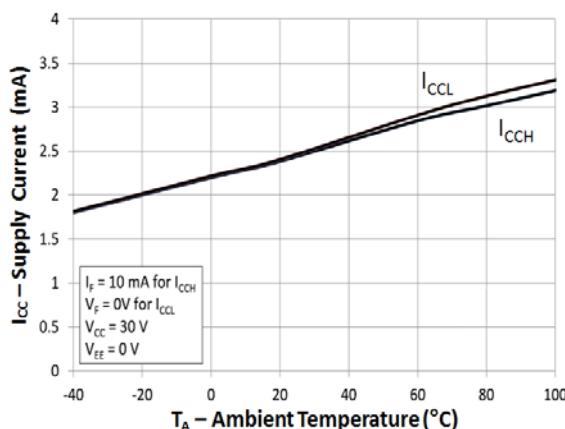


Fig 3 Supply Current vs Ambient Temperature

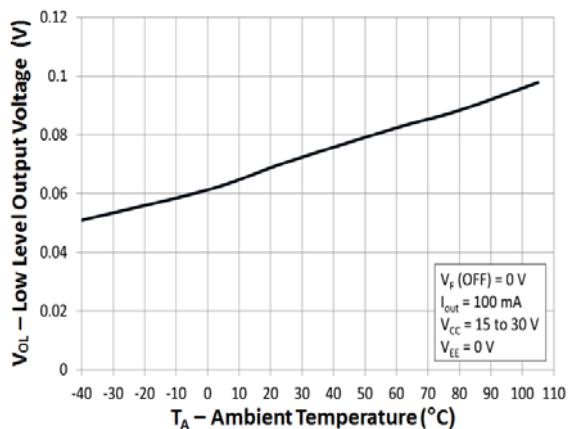


Fig 4 Low Level Output Voltage vs Ambient temperature

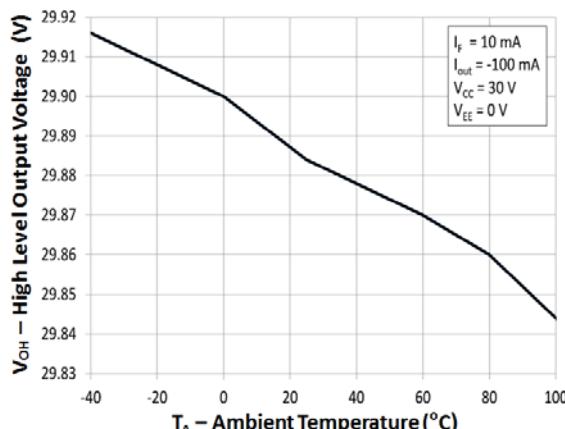


Fig 5 High Level Output Voltage vs Ambient Temperature

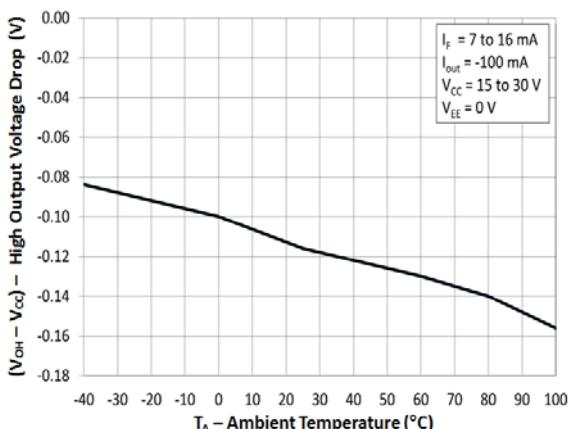


Fig 6 High Output Voltage Drop vs Ambient Temperature



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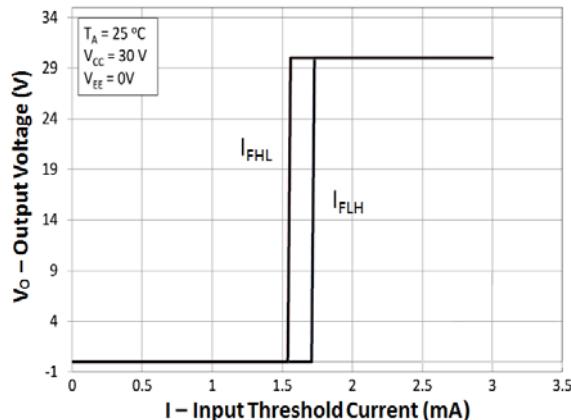


Fig 7  $I_{FLH}$  Hysteresis

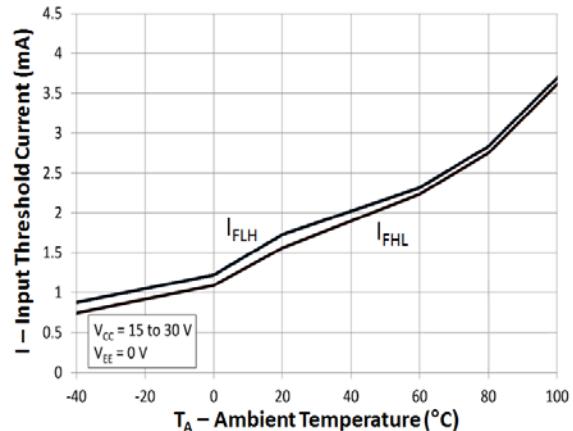


Fig 8 Input Threshold Current vs Ambient Temperature

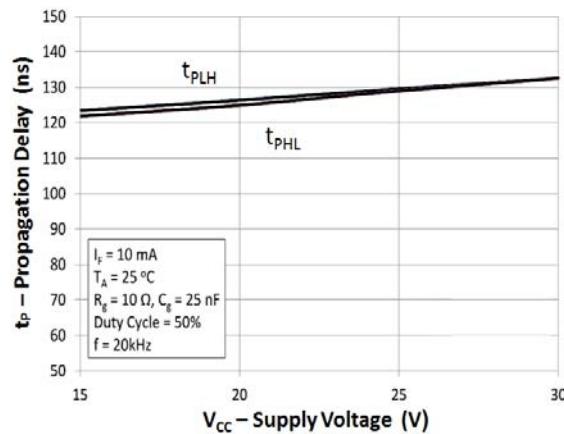


Fig 9 Propagation Delay vs Supply Voltage

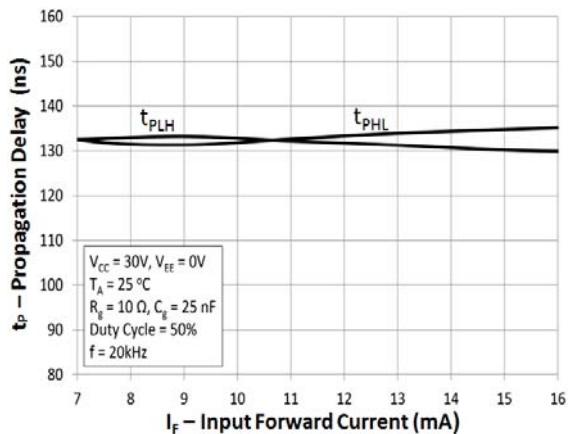


Fig 10 Propagation Delay vs Forward Current

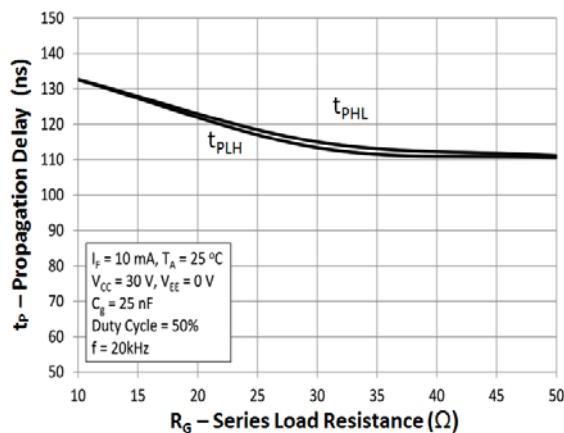


Fig 11 Propagation Delay vs Series Load Resistance

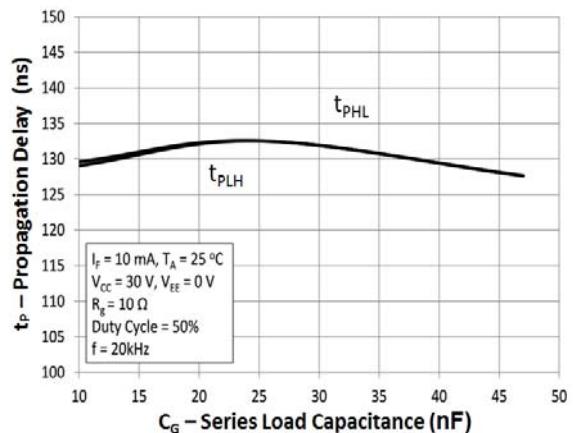


Fig 12 Propagation Delay vs Series Load Capacitance



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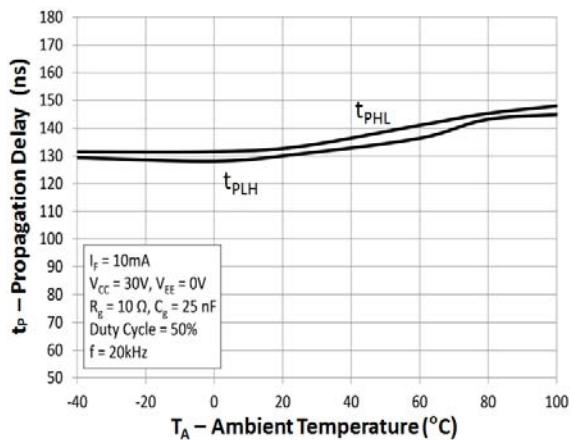
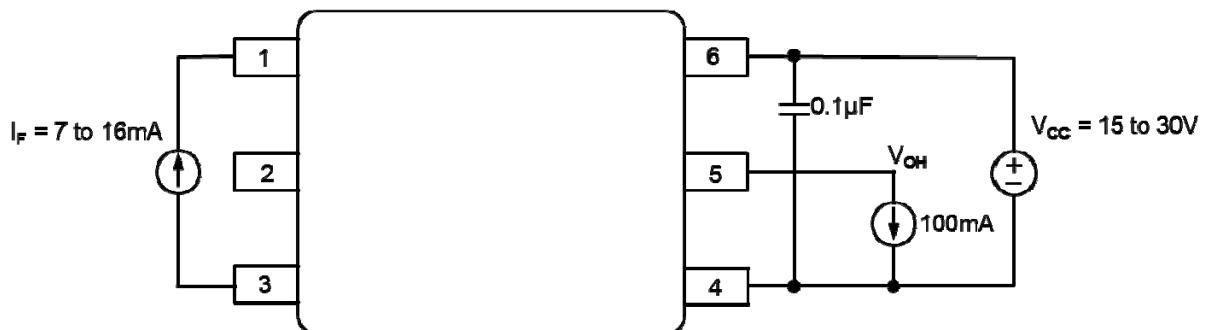
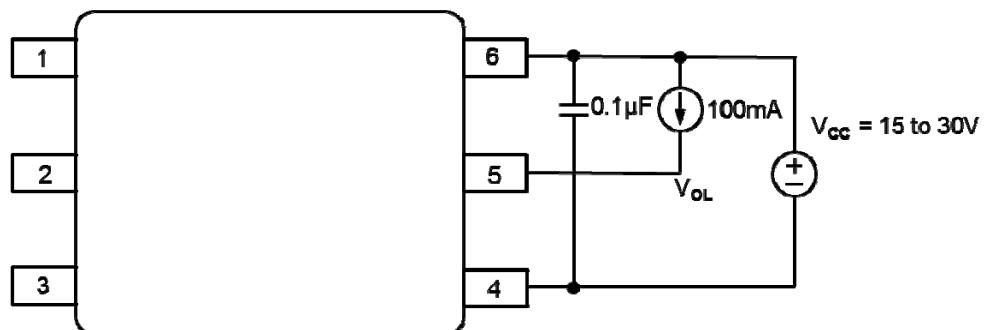


Fig 13 Propagation Delay vs Ambient Temperature



$V_{OH}$  Test Circuit

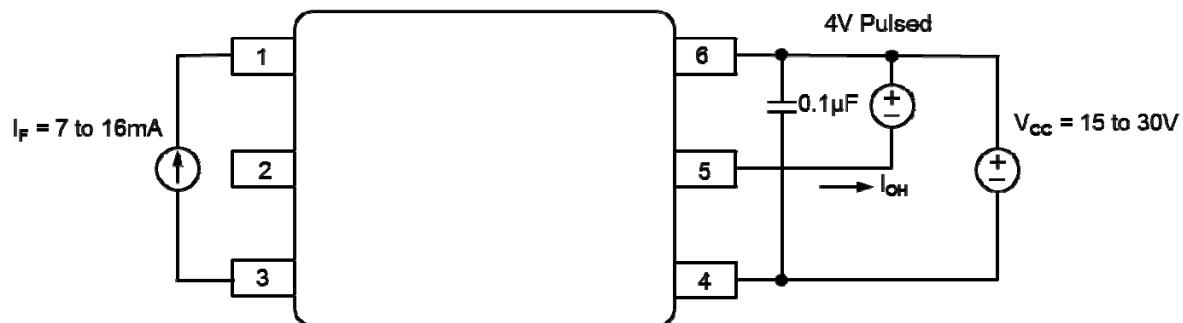


$V_{OL}$  Test Circuit

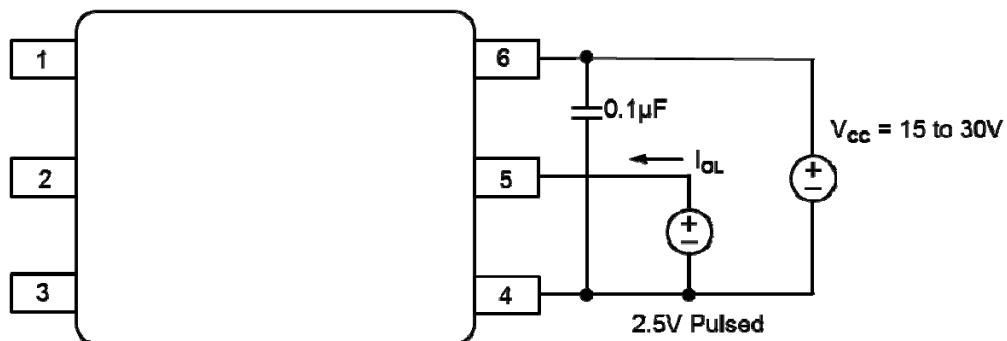


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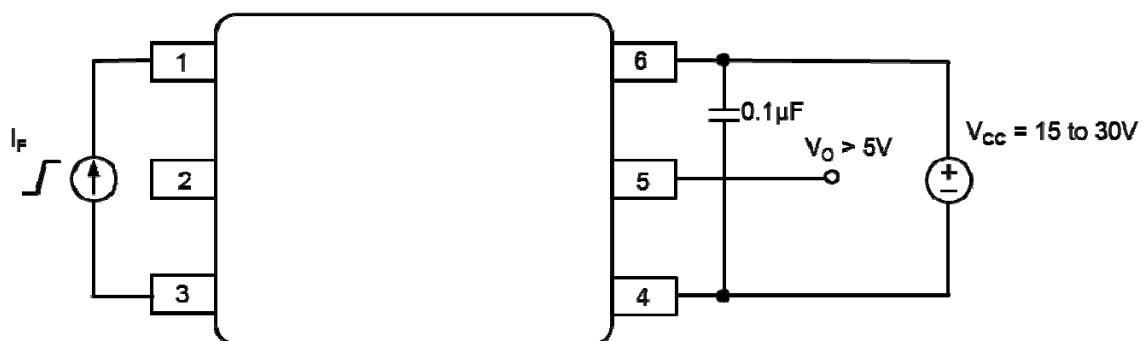
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**I<sub>OH</sub> Test Circuit**



**I<sub>OL</sub> Test Circuit**

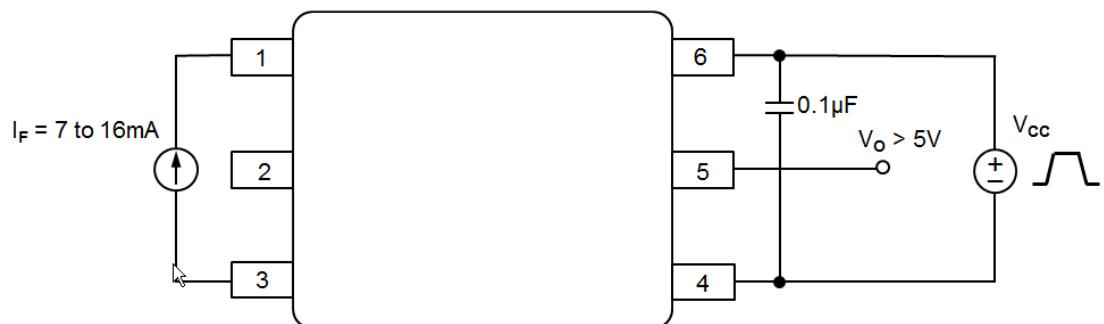


**I<sub>FLH</sub> Test Circuit**

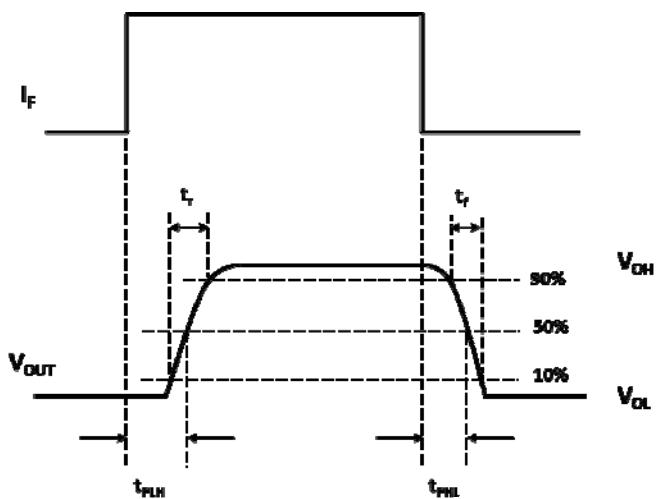
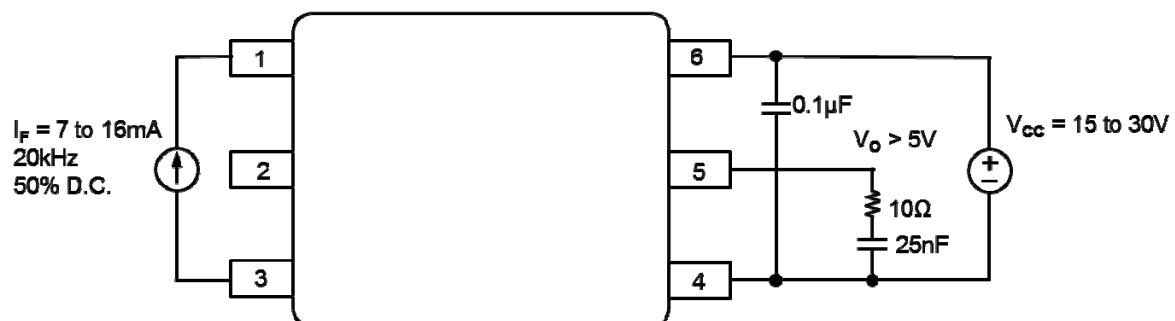


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**UVLO Test Circuit**

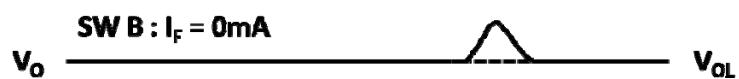
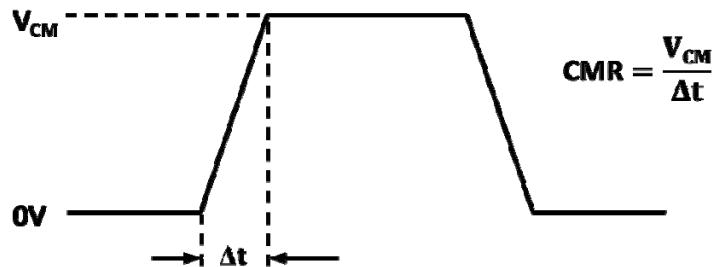
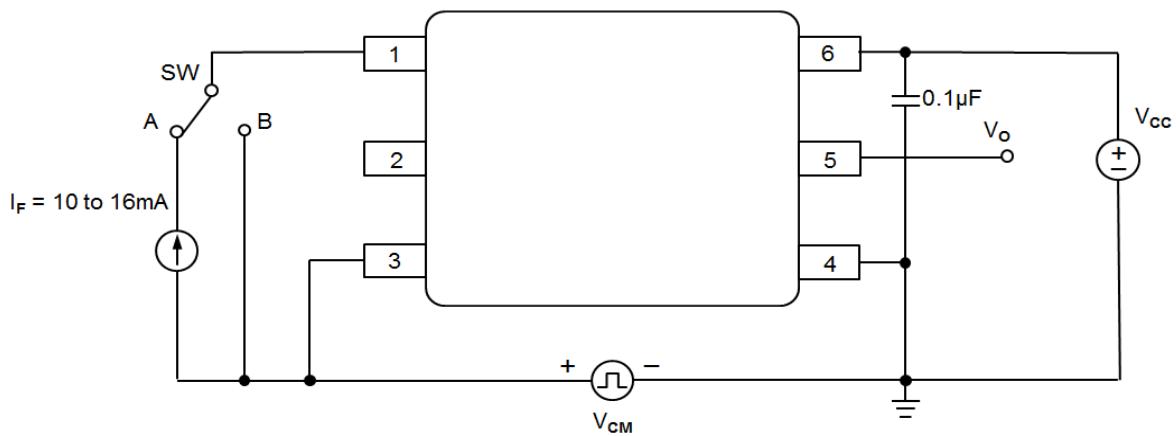


$t_r$ ,  $t_f$ ,  $t_{PLH}$  and  $t_{PHL}$  Test Circuit and Waveform



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**CMR Test Circuit and Waveform**



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### ORDER INFORMATION

IS341W			
After PN	PN	Description	Packing quantity
None	IS341W	Stretched SO6 Wide Lead Separation	1000 pcs per reel

### DEVICE MARKING



IS341W      denotes Device Part Number

I      denotes Isocom

YY      denotes 2 digit Year code

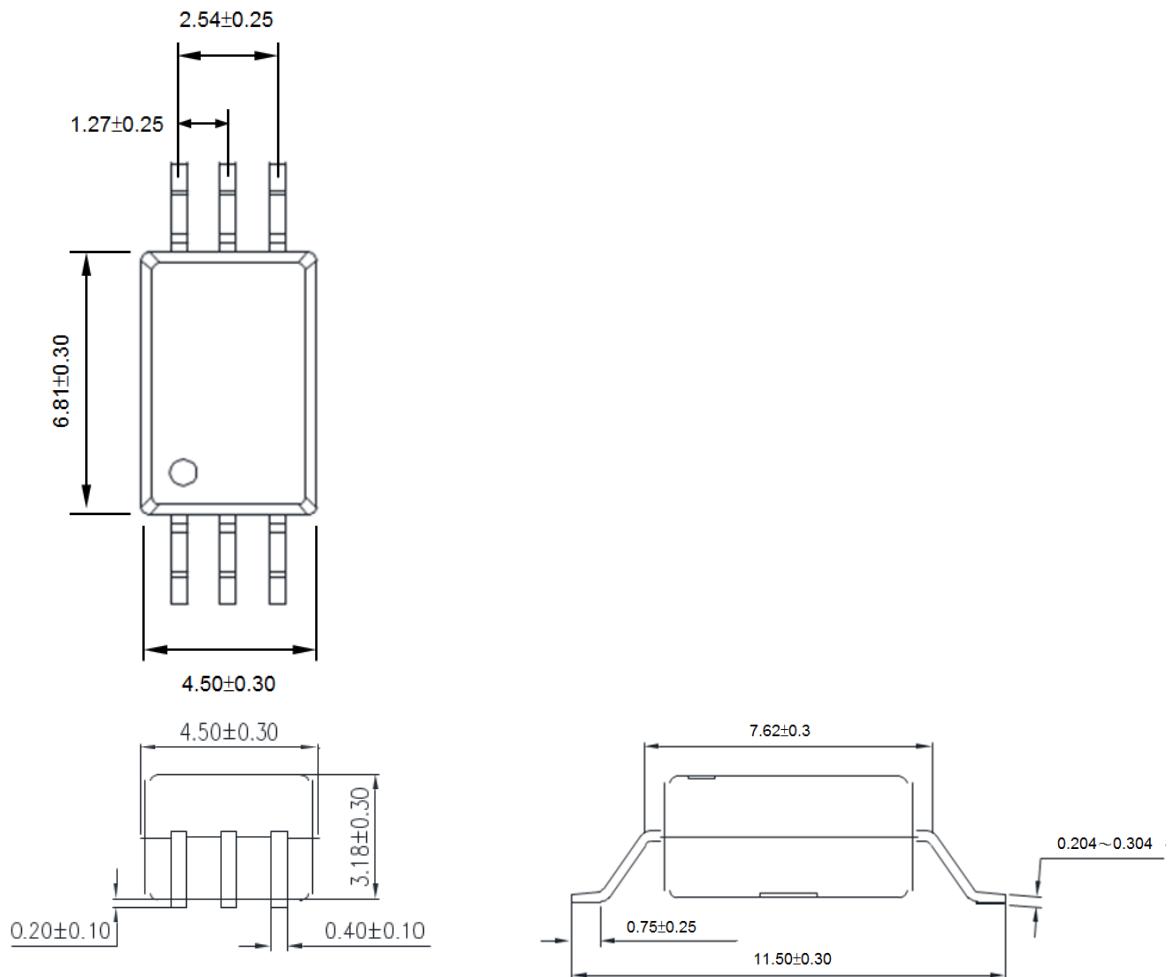
WW      denotes 2 digit Week code



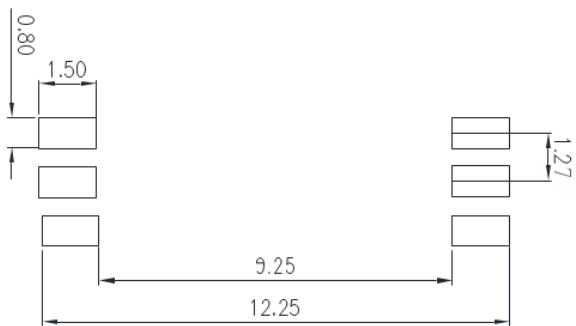
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### PACKAGE DIMENSIONS (mm)



### RECOMMENDED PAD LAYOUT (mm)

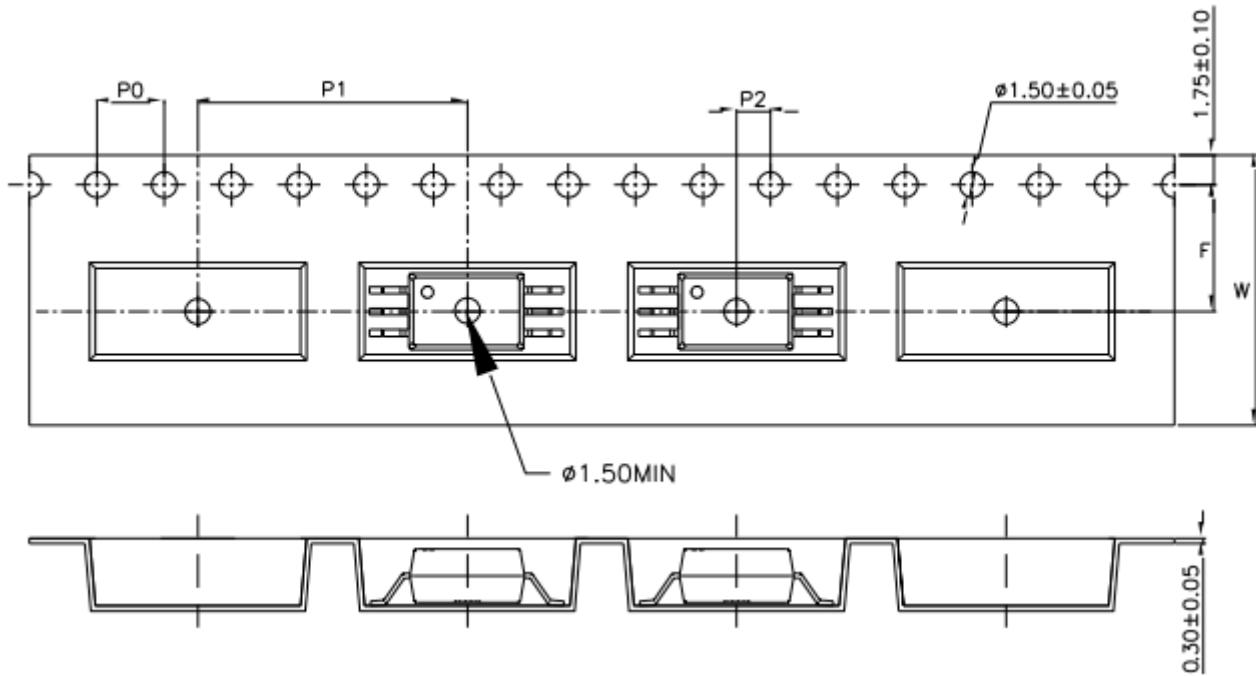




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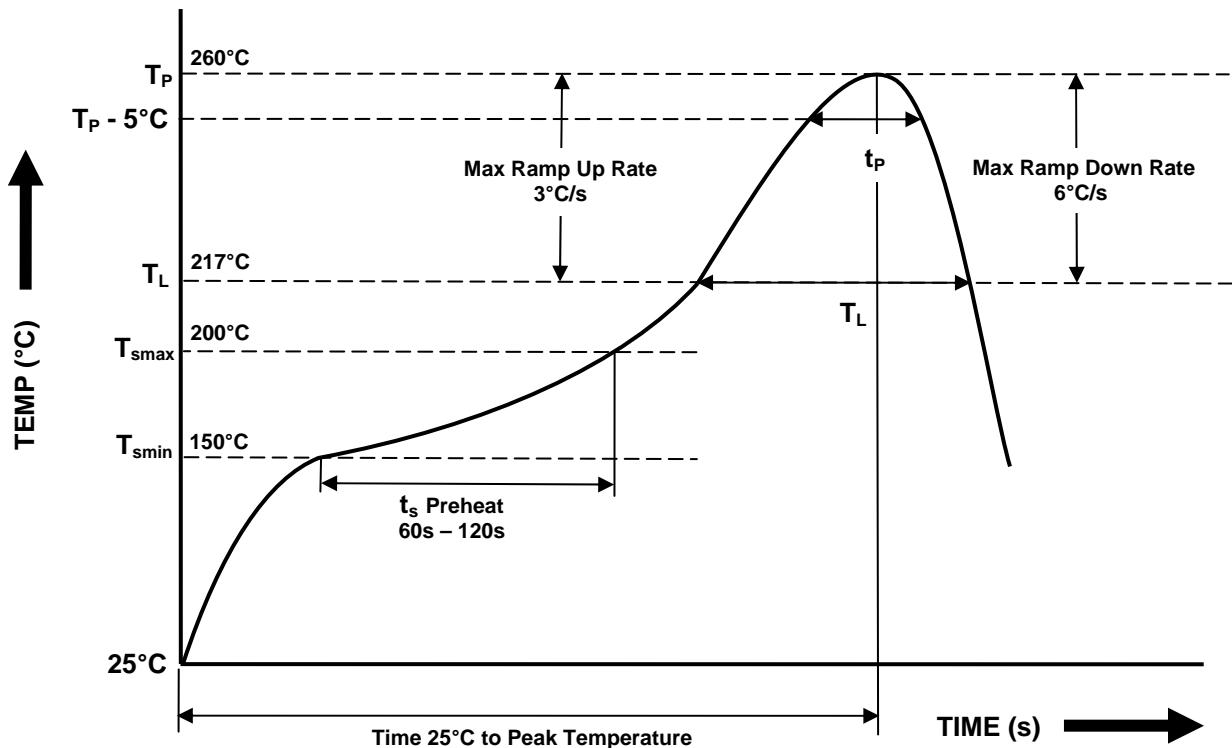
### TAPE AND REEL PACKAGING



Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P <sub>0</sub>	4 ± 0.1 (0.16)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.3)
	P <sub>2</sub>	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P <sub>1</sub>	16 ± 0.1 (0.63)



**IR REFLOW SOLDERING TEMPERATURE PROFILE**  
(One Time Reflow Soldering is Recommended)



Profile Details	Conditions
<b>Preheat</b> <ul style="list-style-type: none"><li>- Min Temperature (<math>T_{SMIN}</math>)</li><li>- Max Temperature (<math>T_{SMAX}</math>)</li><li>- Time <math>T_{SMIN}</math> to <math>T_{SMAX}</math> (<math>t_s</math>)</li></ul>	150°C 200°C 60s - 120s
<b>Soldering Zone</b> <ul style="list-style-type: none"><li>- Peak Temperature (<math>T_P</math>)</li><li>- Time at Peak Temperature</li><li>- Liquidous Temperature (<math>T_L</math>)</li><li>- Time within 5°C of Actual Peak Temperature (<math>T_P - 5°C</math>)</li><li>- Time maintained above <math>T_L</math> (<math>t_L</math>)</li><li>- Ramp Up Rate (<math>T_L</math> to <math>T_P</math>)</li><li>- Ramp Down Rate (<math>T_P</math> to <math>T_L</math>)</li></ul>	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
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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### NOTES :

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- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/application where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc., please contact our sales representatives.
- When requiring a device for any "specific" application, please contact our sales for advice.
- The contents described herein are subject to change without prior notice.
- Do not immerse device body in solder paste.



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