



4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 H11A1, H11A2, H11A3, H11A4, H11A5 DC Input 6-Pin Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- Regulatory Approvals
 - UL - UL1577 (E364000)
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898
 - IEC60065, IEC60950

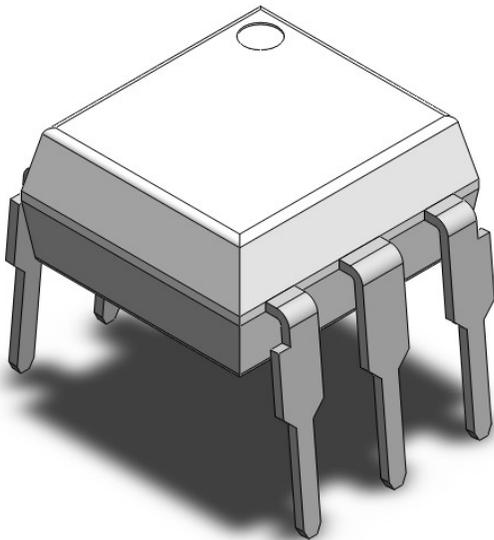
Applications

- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Description

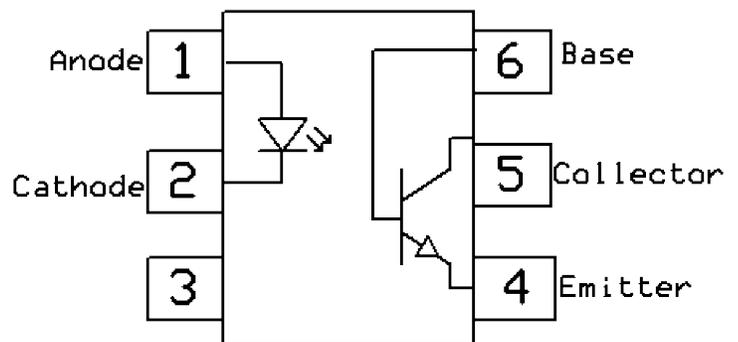
The 4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38, H11A1, H11A2, H11A3, H11A4, H11A5 series consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 6-lead DIP package different lead forming options.

Package Outline



Note: Different bending options available. See package dimension.

Schematic





4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38
H11A1, H11A2, H11A3, H11A4, H11A5
DC Input 6-Pin Phototransistor Optocoupler

Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage	5000	V _{RMS}	
T _{OPR}	Operating temperature	-55 ~ +110	°C	
T _{STG}	Storage temperature	-55 ~ +150	°C	
T _{SOL}	Soldering temperature	260	°C	
Emitter				
I _F	Forward current	60	mA	
I _{F(TRANS)}	Peak transient current (≤1μs P.W,300pps)	1	A	
V _R	Reverse voltage	6	V	
P _D	Power dissipation	100	mW	
Detector				
P _D	Power dissipation	150	mW	
B _{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B _{VCBO}	Collector-Base Breakdown Voltage	80	V	
B _{VECO}	Emitter-Collector Breakdown Voltage	7	V	
B _{VEBO}	Emitter-Base Breakdown Voltage	7	V	



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

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward voltage	$I_F = 10\text{mA}$		1.24	1.4	V	
I_R	Reverse Current	$V_R = 6\text{V}$	-	-	5	μA	
C_{IN}	Input Capacitance	$f = 1\text{MHz}$	-	45	-	pF	

Detector Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown		$I_C = 0.1\text{mA}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown		$I_E = 0.1\text{mA}$	7	-	-	V	
$B_{V_{CBO}}$	Collector-Base Breakdown		$I_C = 0.1\text{mA}$	80	-	-	V	
$B_{V_{EBO}}$	Emitter-Base Breakdown		$I_E = 0.1\text{mA}$	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5	$V_{CE} = 10\text{V}, I_F = 0\text{mA}$	-	-	50	nA	
		4N35,4N36,4N37,4N38	$V_{CE} = 60\text{V}, I_F = 0\text{mA}$	-	-	50	nA	
I_{CBO}	Collector-Base Dark Current		$V_{CB} = 10\text{V}, I_F = 0\text{mA}$	-	-	20	nA	

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	4N35	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	100	-	-	%	
		4N25,4N26, 4N38, H11A2, H11A3		20	-	-		
		4N27, 4N28, H11A4		10	-	-		
		H11A1		50	-	-		
		H11A5		30	-	-		
		4N36	$I_F = 2\text{mA}, V_{CE} = 5\text{V}$	130	-	260		
		4N37		200	-	400		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	4N25,4N26, 4N27,4N28	$I_F = 50\text{mA}, I_C = 2\text{mA}$	-	-	0.5	V	
		4N35,4N36,4N37		-	-	0.3		
	H11A1,H11A2, H11A3,H11A4,H11A5	$I_F = 10\text{mA}, I_C = 0.5\text{mA}$	-	-	0.4			
			4N38	$I_F = 20\text{mA}, I_C = 4\text{mA}$	-	-		1.0



4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 H11A1, H11A2, H11A3, H11A4, H11A5 DC Input 6-Pin Phototransistor Optocoupler

Transfer Characteristics

R _{IO}	Isolation Resistance	V _{IO} = 500V _{DC}	1x10 ¹¹			Ω	
C _{IO}	Isolation Capacitance	f= 1MHz		0.25		pF	

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes	
t _{on}	Turn On Time	4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5	I _F = 10mA, V _{CC} = 10V, R _L = 100Ω	-	4.3	9.8	μs	
		4N35,4N36,4N37,4N38	I _C = 2mA, V _{CC} = 10V, R _L = 100Ω	-	9.8	11.5		
t _{off}	Turn Off Time	4N25,4N26,4N27,4N28 H11A1,A2,A3,A4,A5	I _F = 10mA, V _{CC} = 10V, R _L = 100Ω	-	3.9	9.8	μs	
		4N35,4N36,4N37,4N38	I _C = 2mA, V _{CC} = 10V, R _L = 100Ω	-	6.9	11.5		



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DC Input 6-Pin Phototransistor Optocoupler

Typical Characteristic Curves

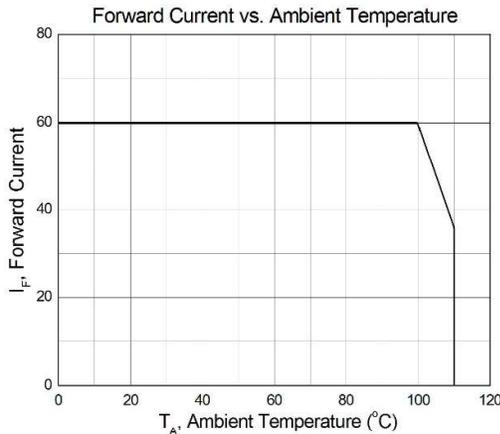


Figure 1

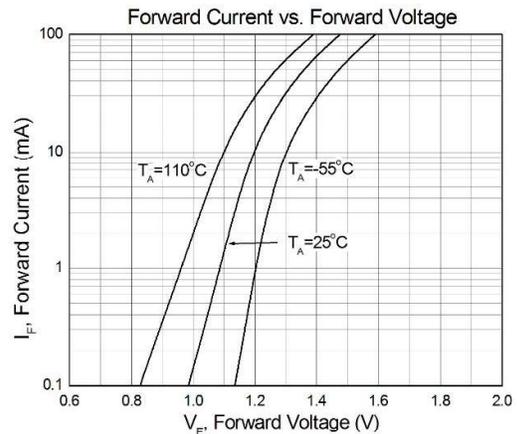


Figure 2

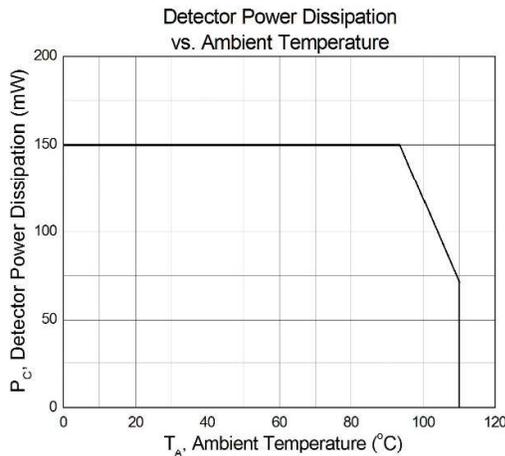


Figure 3

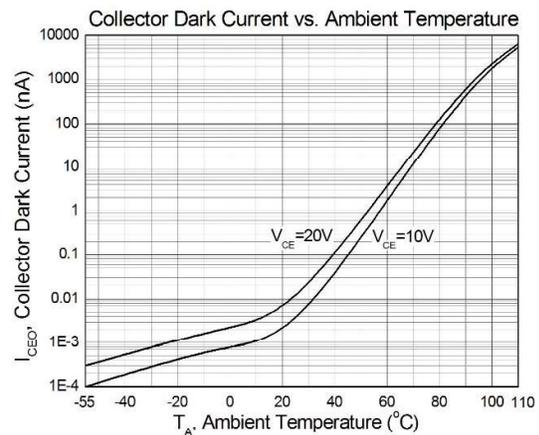


Figure 4

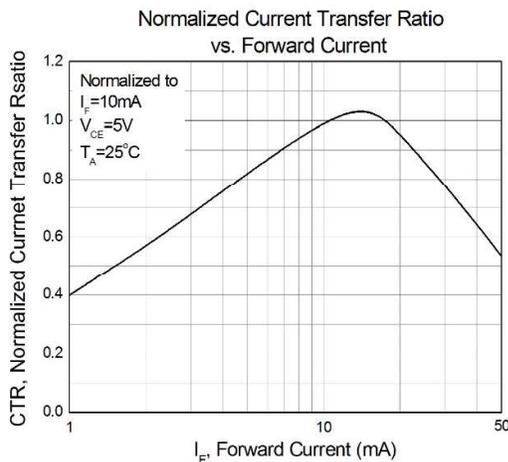


Figure 5

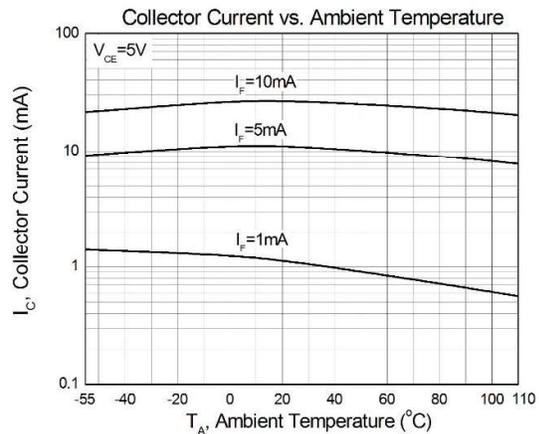


Figure 6



4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38

H11A1, H11A2, H11A3, H11A4, H11A5

DC Input 6-Pin Phototransistor Optocoupler

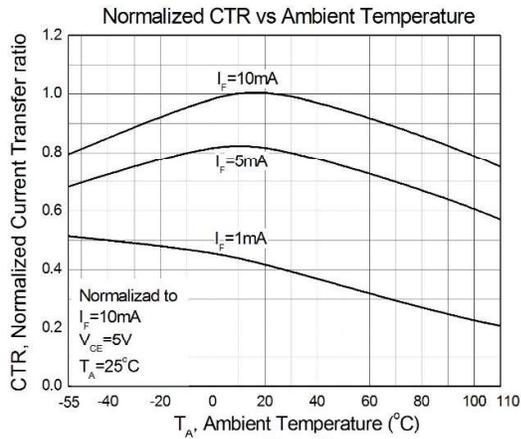


Figure 7

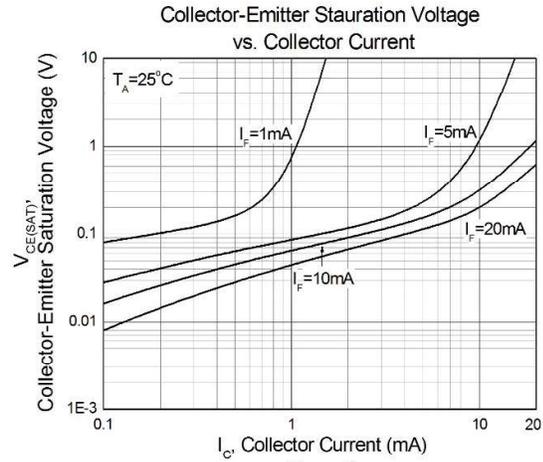


Figure 8

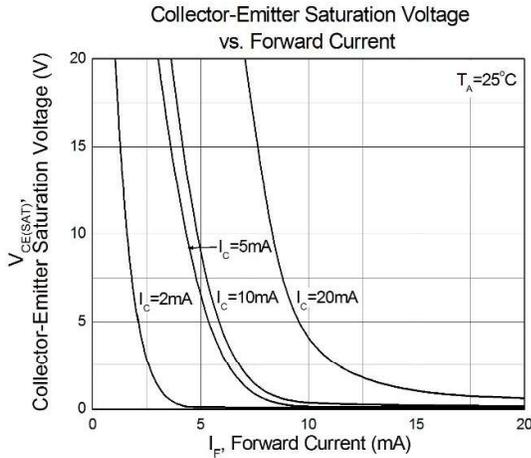


Figure 9

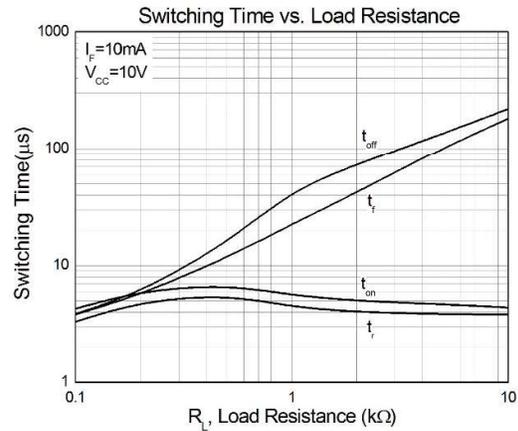


Figure 10

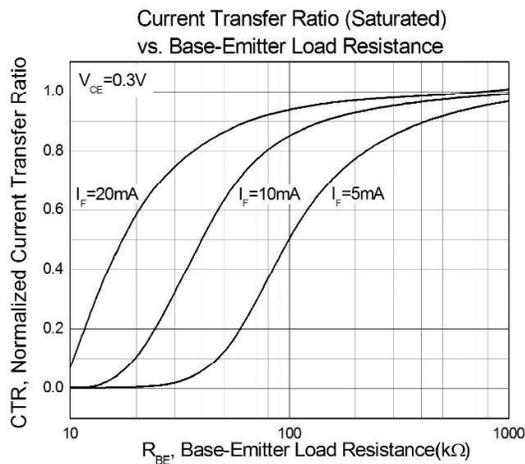


Figure 11

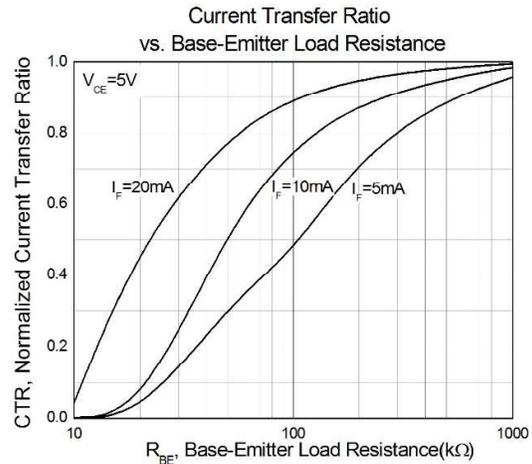


Figure 12



4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38

H11A1, H11A2, H11A3, H11A4, H11A5

DC Input 6-Pin Phototransistor Optocoupler

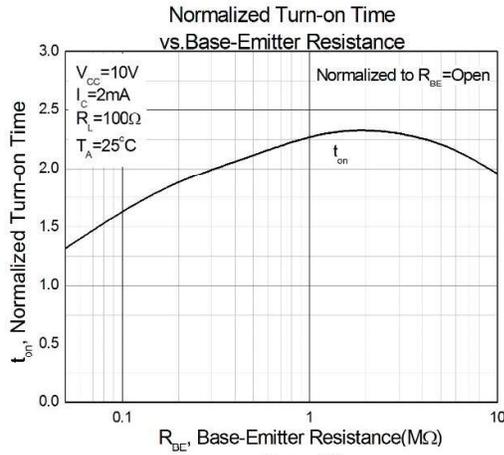


Figure 13

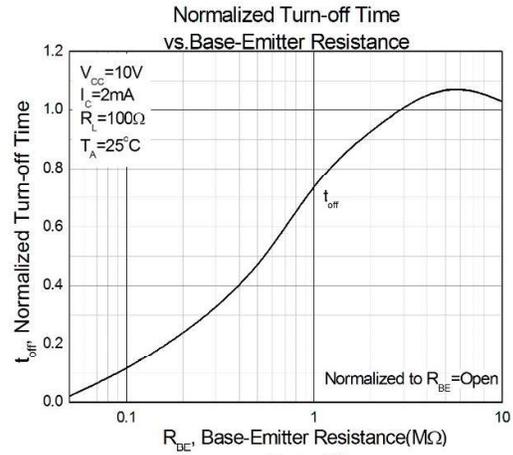


Figure 14



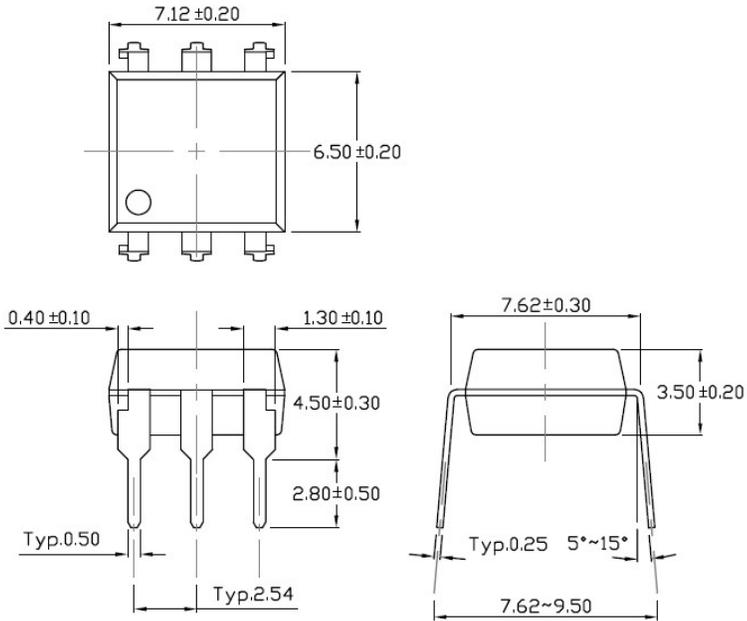
4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38

H11A1, H11A2, H11A3, H11A4, H11A5

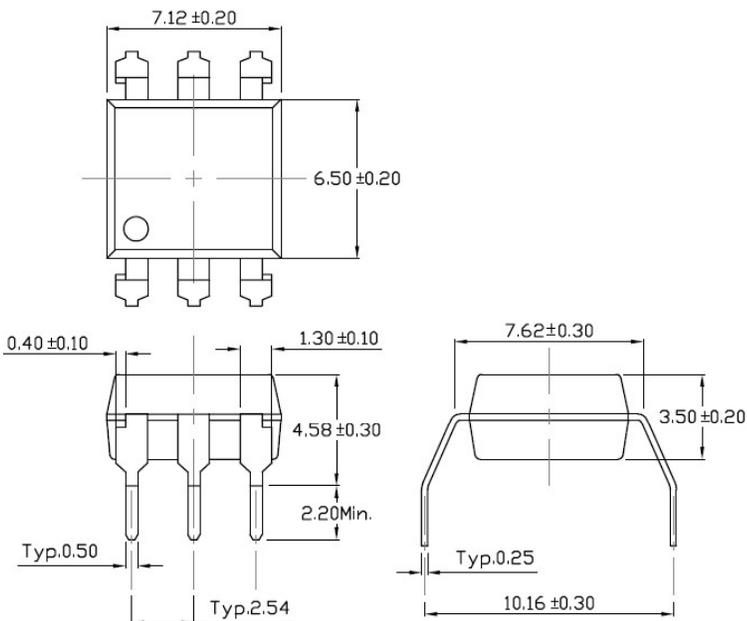
DC Input 6-Pin Phototransistor Optocoupler

Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



Wide Lead Forming – Through Hole (M Type)



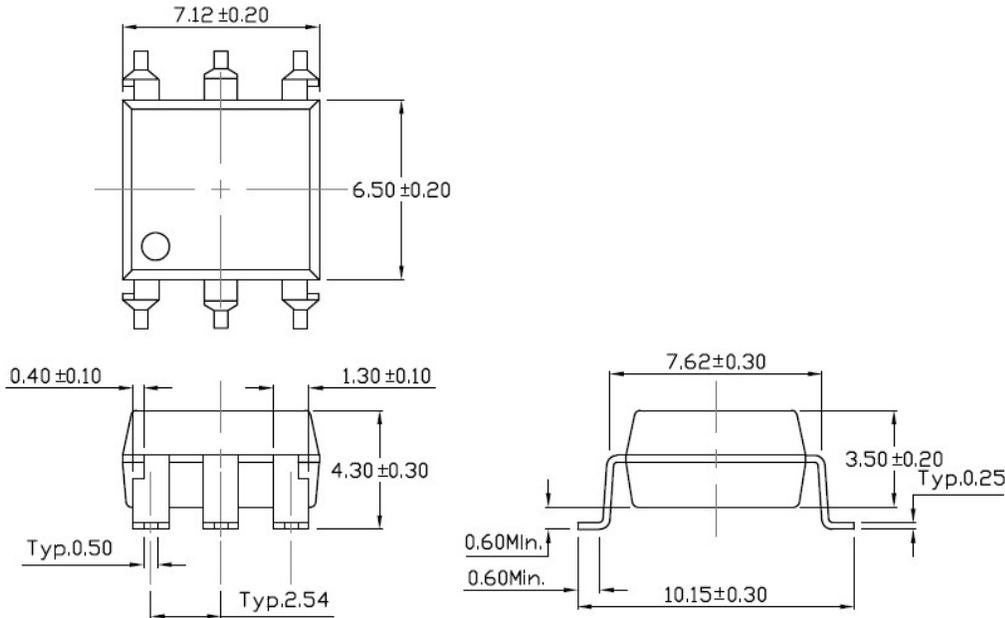


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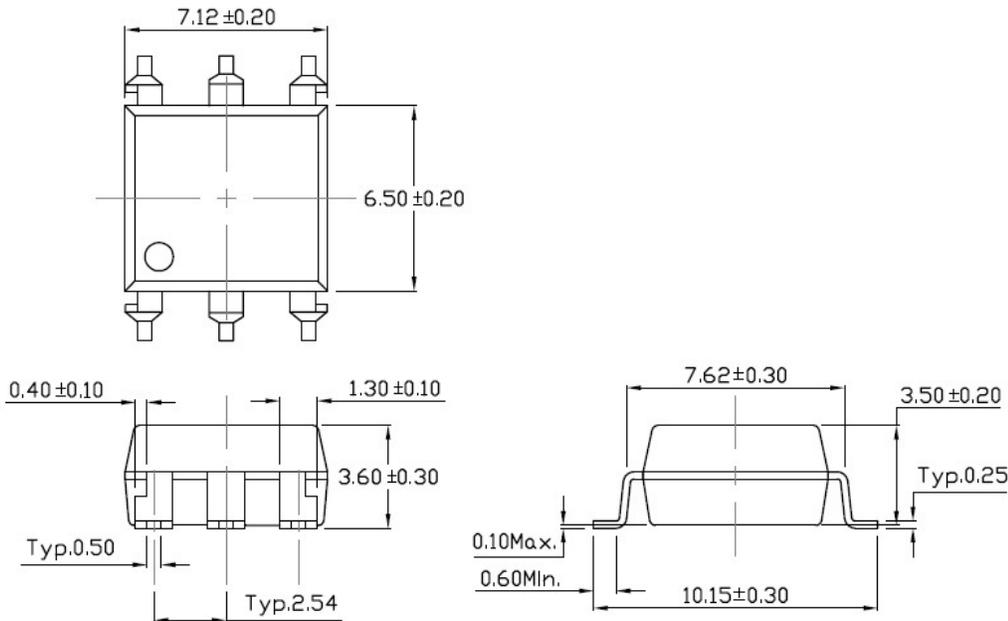
H11A1, H11A2, H11A3, H11A4, H11A5

DC Input 6-Pin Phototransistor Optocoupler

Surface Mount Forming (S Type)



Surface Mount Forming (Low Profile) (SL Type)



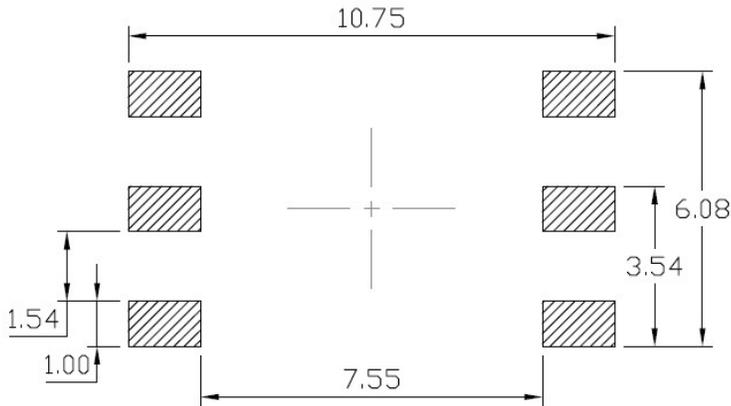


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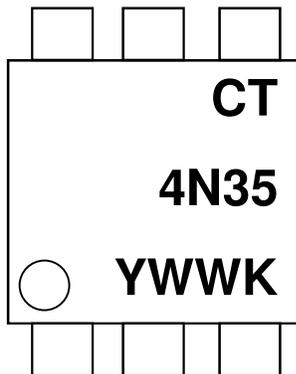
H11A1, H11A2, H11A3, H11A4, H11A5

DC Input 6-Pin Phototransistor Optocoupler

Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information



Note:

- CT : Denotes "CT Micro"
- 4N35 : Part Number
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code



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H11A1, H11A2, H11A3, H11A4, H11A5
DC Input 6-Pin Phototransistor Optocoupler

Ordering Information

4N2X(Y)(Z)-G, 4N3X(Y)(Z)-G, H11AX(Y)(Z)-G

X = Part No.

(4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38, H11A1, H11A2, H11A3, H11A4, H11A5)

Y = Lead form option (S, SL, M or none)

Z = Tape and reel option (T1, T2 or none)

G= Material option (G: Green, None: Non-green)

Option	Description	Quantity
None	Standard 6 Pin Dip	50Units/Tube
M	Wide Lead Forming	50Units/Tube
S(T1)	Surface Mount Lead Forming – With Option A Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option B Taping	1000 Units/Reel
SL(T1)	Surface Mount Lead Forming(Low Profile) – With Option A Taping	1000 Units/Reel
SL(T2)	Surface Mount Lead Forming(Low Profile) – With Option B Taping	1000 Units/Reel



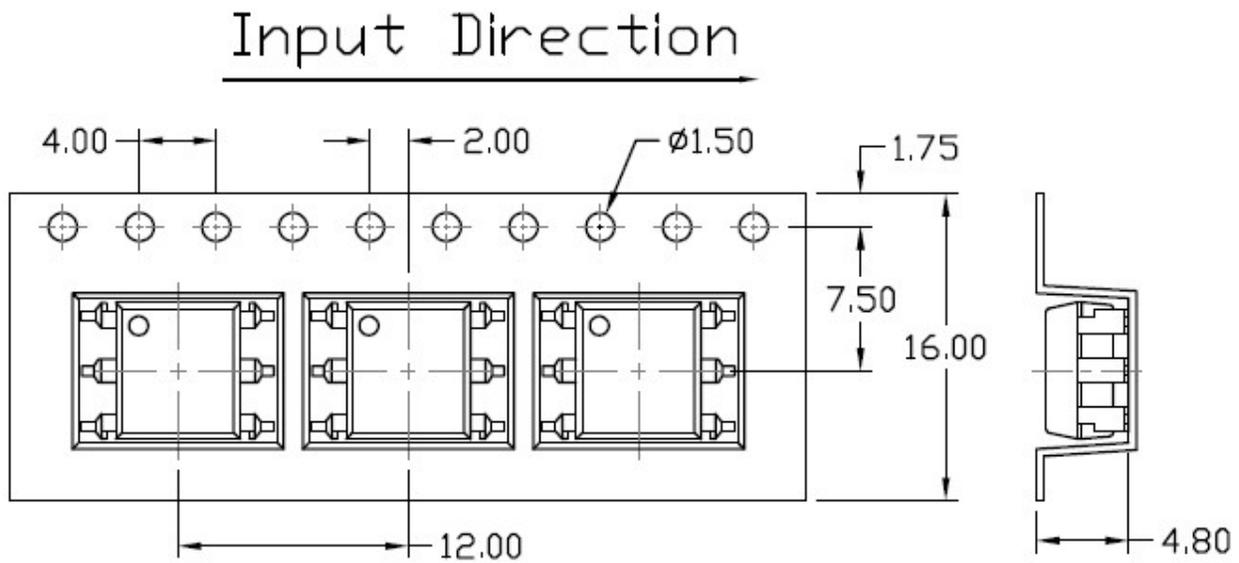
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H11A1, H11A2, H11A3, H11A4, H11A5

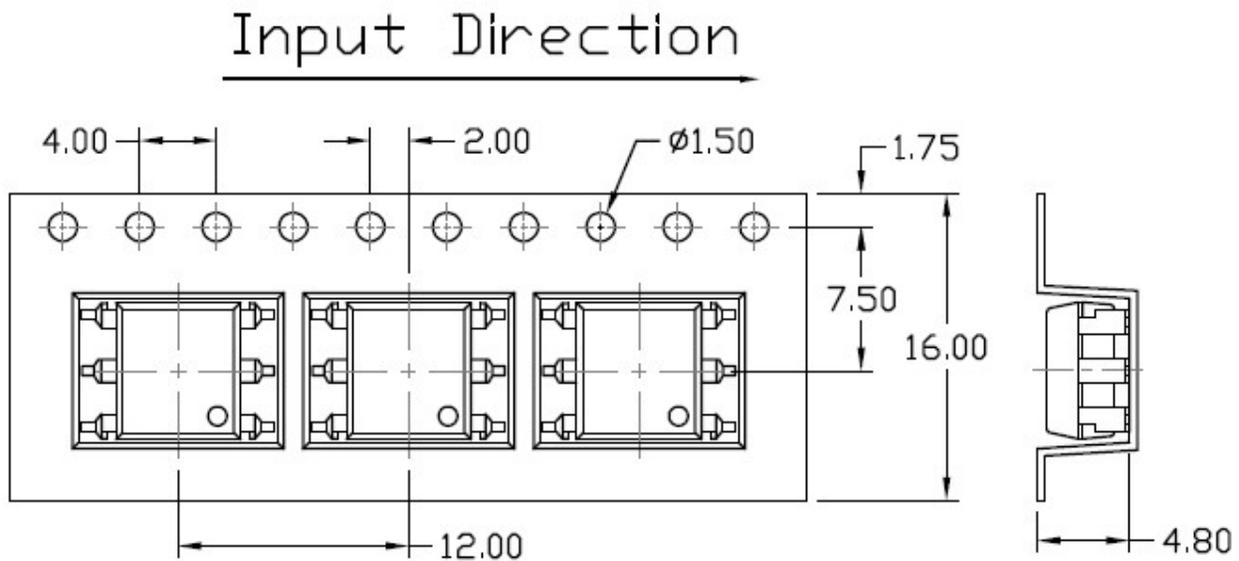
DC Input 6-Pin Phototransistor Optocoupler

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)



Option S(T2) & SL(T2)



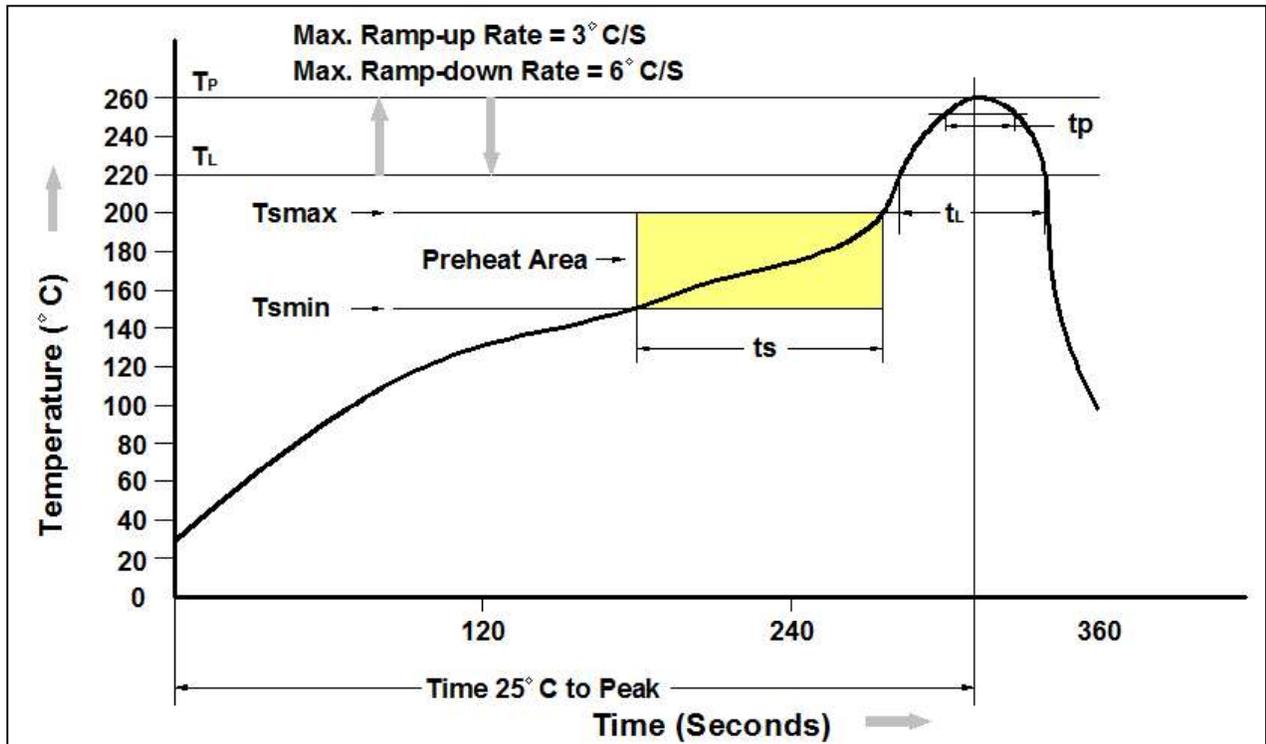


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Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150 °C
Temperature Max. (T _{smax})	200 °C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Ramp-up Rate (t _L to t _p)	3°C/second max.
Liquidous Temperature (T _L)	217 °C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Body Package Temperature	260 °C +0 °C / -5 °C
Time (t _p) within 5 °C of 260 °C	30 seconds
Ramp-down Rate (T _P to T _L)	6 °C/second max
Time 25 °C to Peak Temperature	8 minutes max.



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