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 ℃ to 110 ℃
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

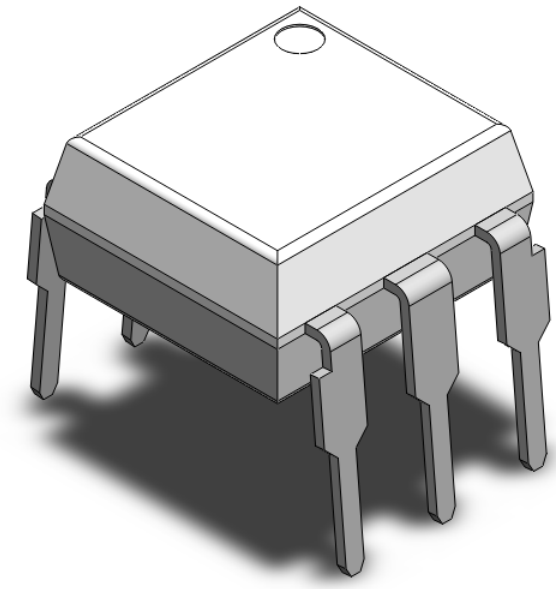
Description

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.

Applications

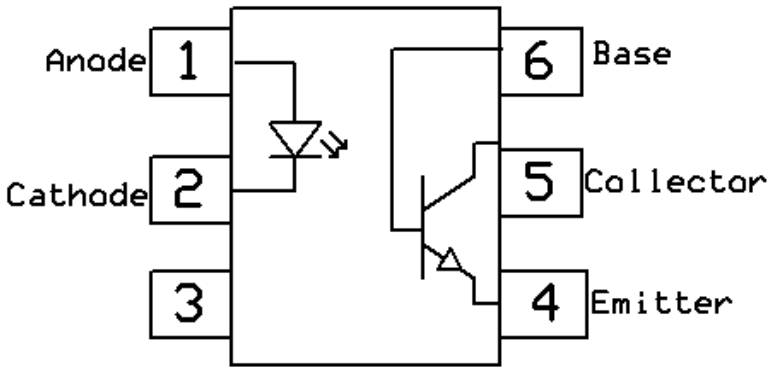
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Package Outline



Note: Different bending options available. See package dimension.

Schematic



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	

Electrical Characteristics T_A = 25℃ (unless otherwise specified)

Emitter Characteristics

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

Detector Characteristics

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

Transfer Characteristics

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

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		

Typical Characteristic Curves

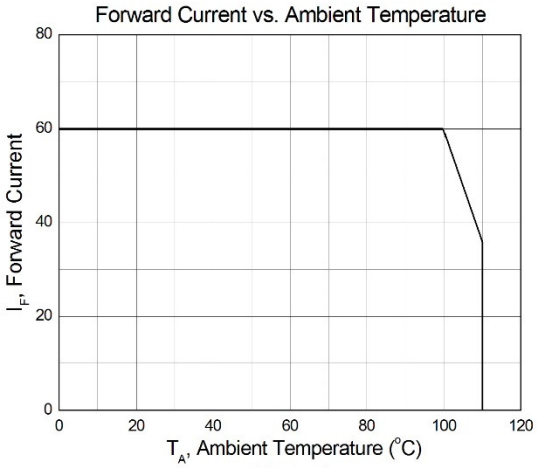


Figure 1

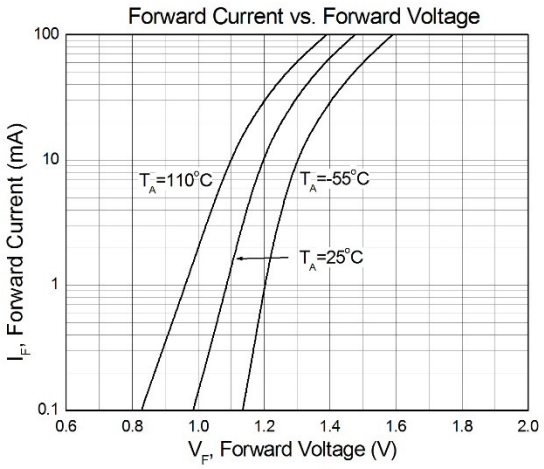


Figure 2

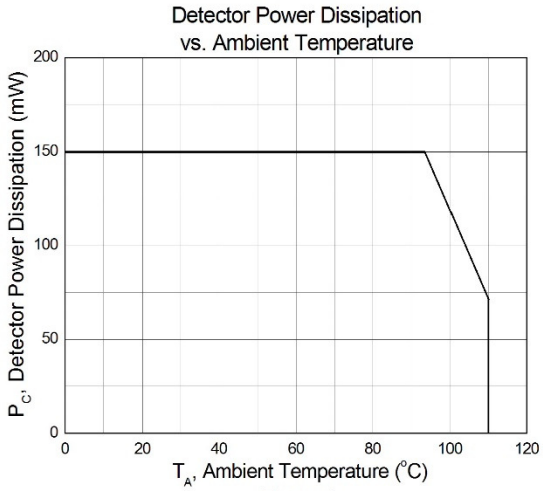


Figure 3

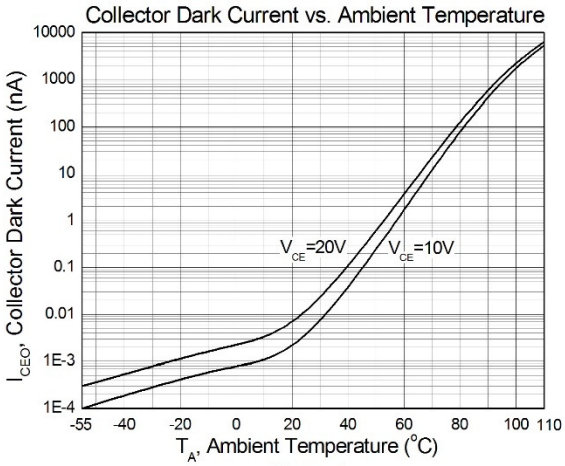


Figure 4

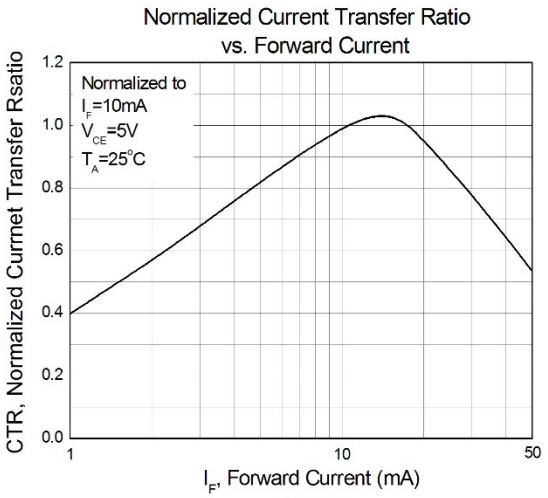


Figure 5

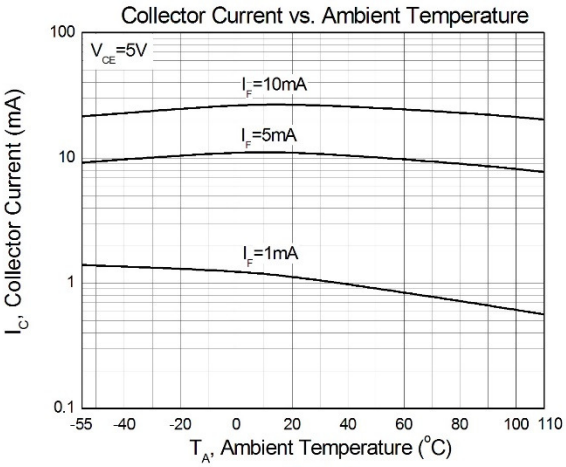


Figure 6

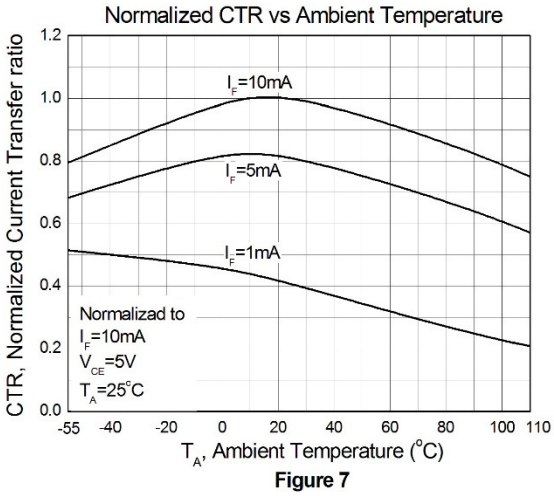


Figure 7

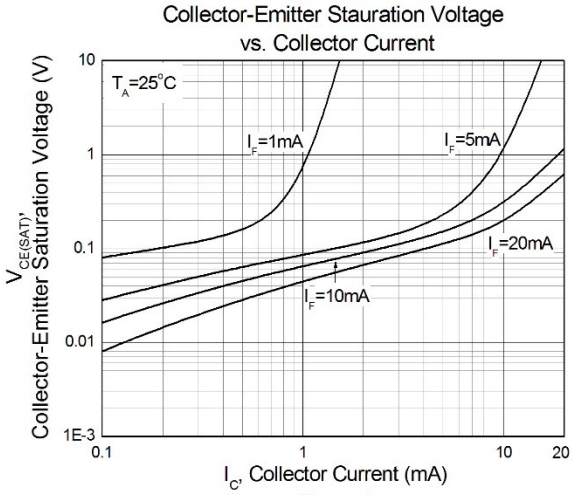


Figure 8

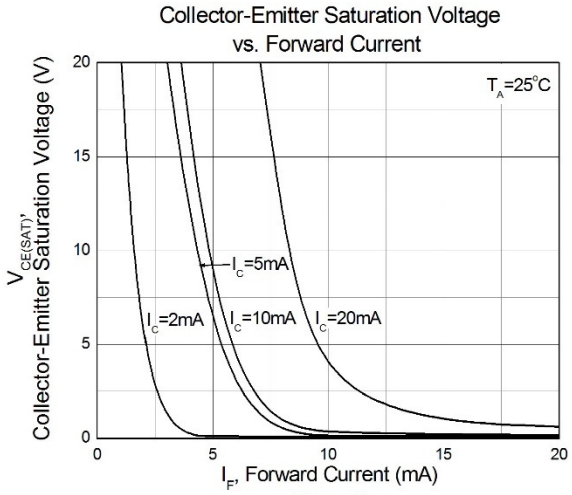


Figure 9

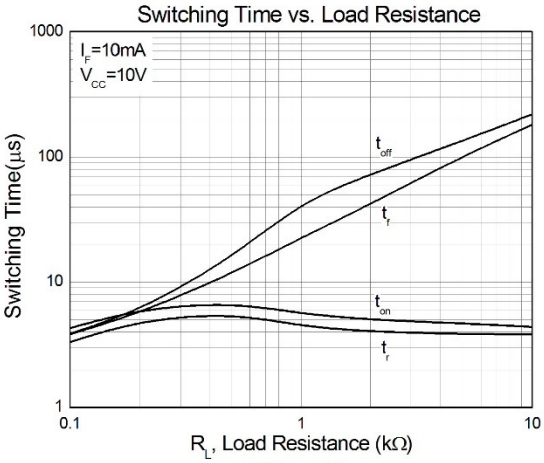


Figure 10

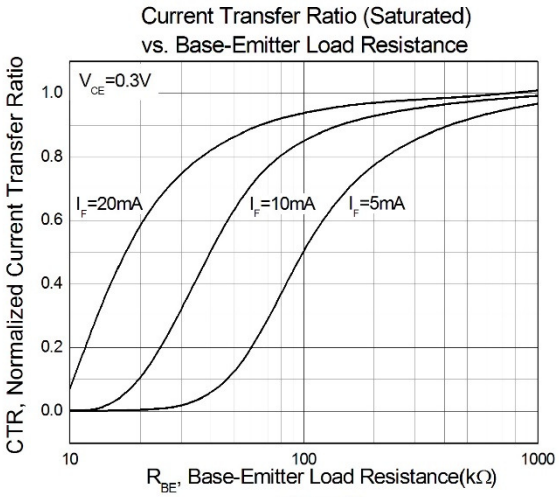


Figure 11

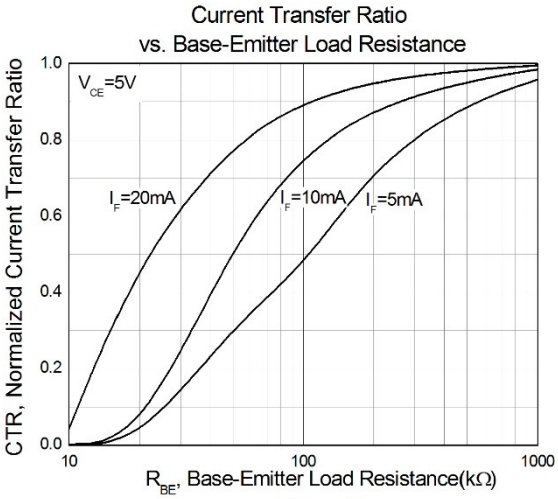


Figure 12

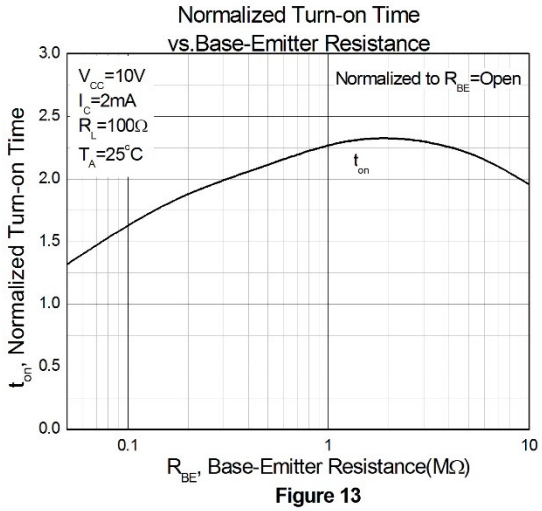


Figure 13

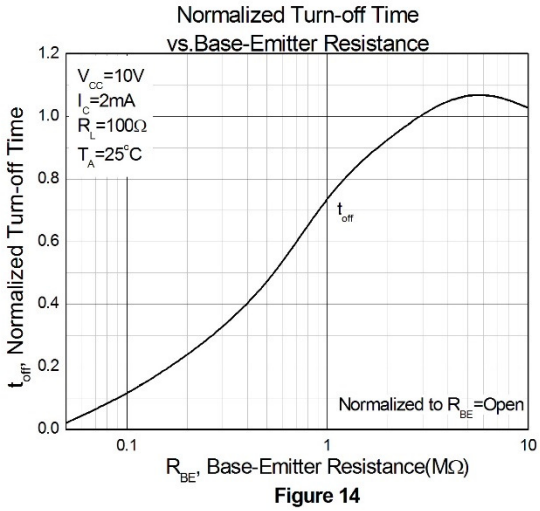
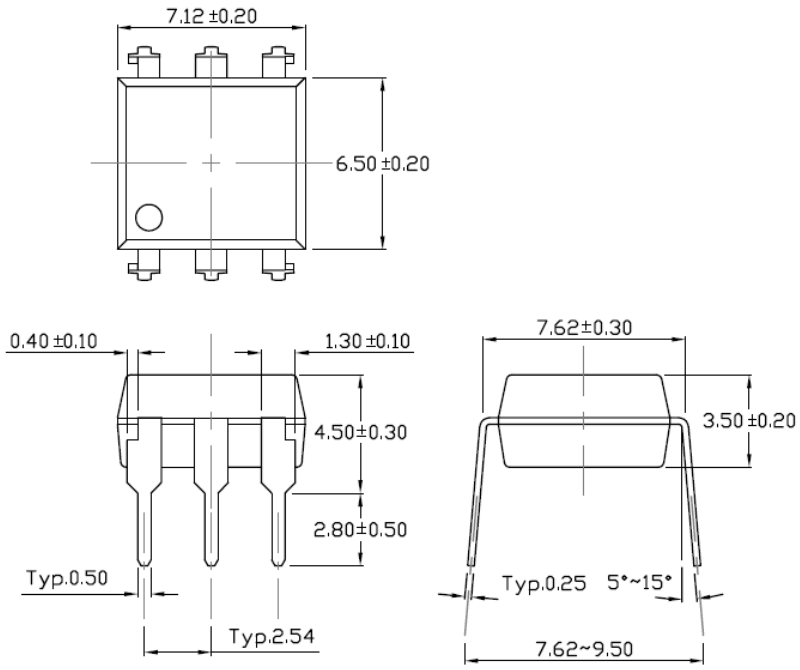


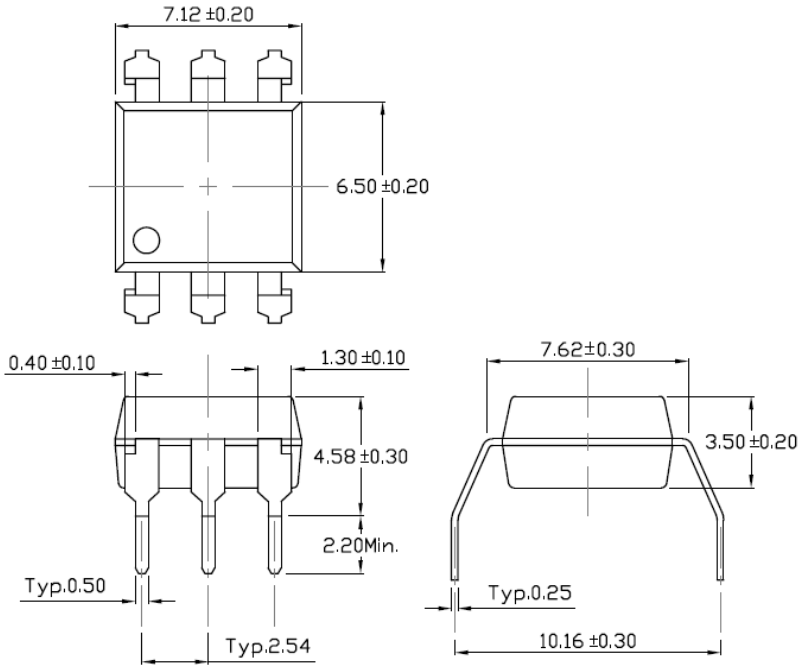
Figure 14

Package Dimension *Dimensions in mm unless otherwise stated*

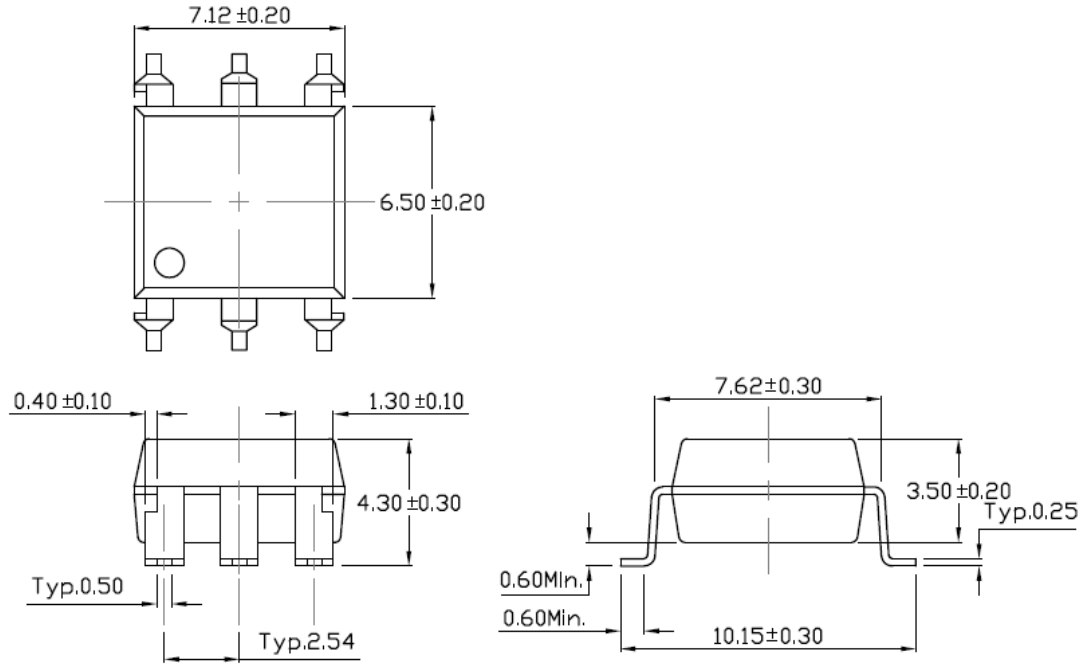
Standard DIP – Through Hole



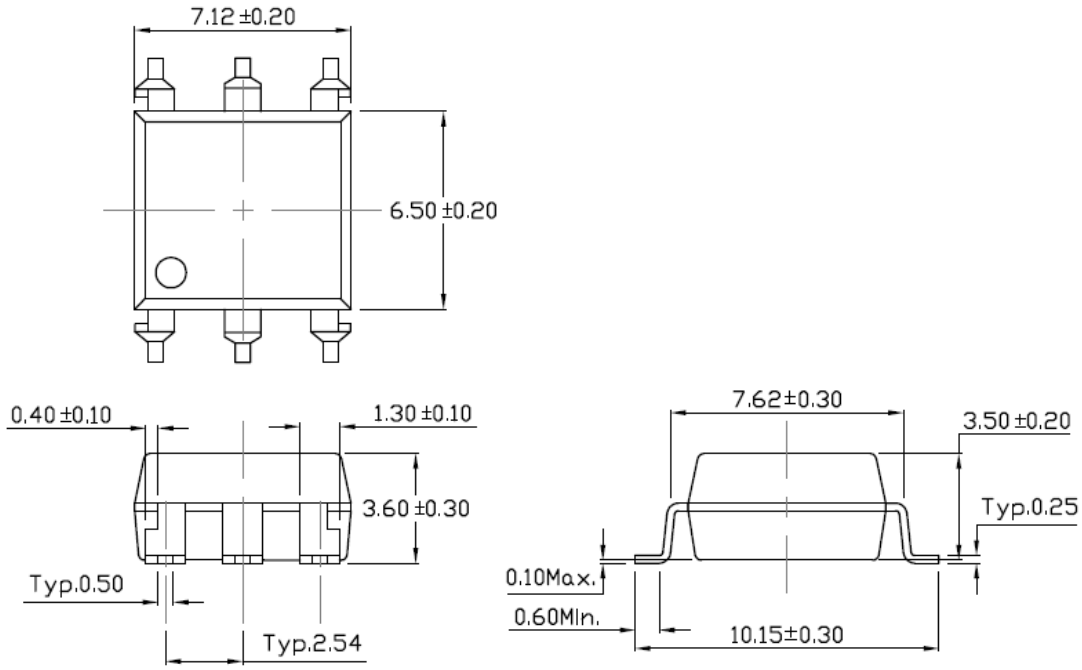
Wide Lead Forming – Through Hole (M Type)



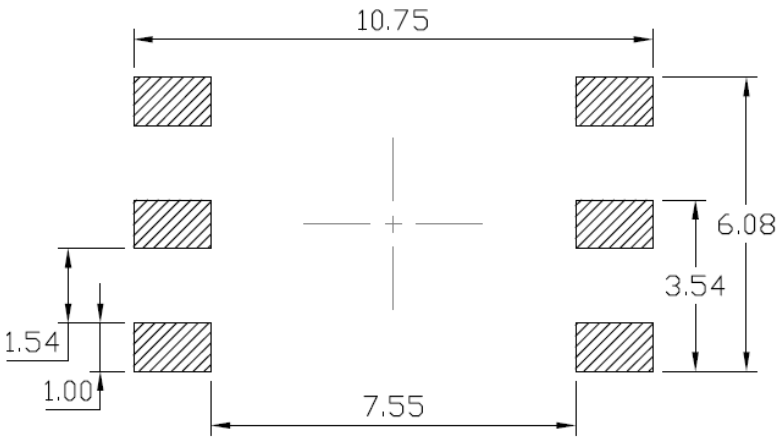
Surface Mount Forming (S Type)



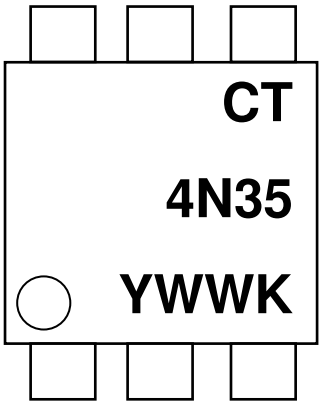
Surface Mount Forming (Low Profile) (SL Type)



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

Ordering Information

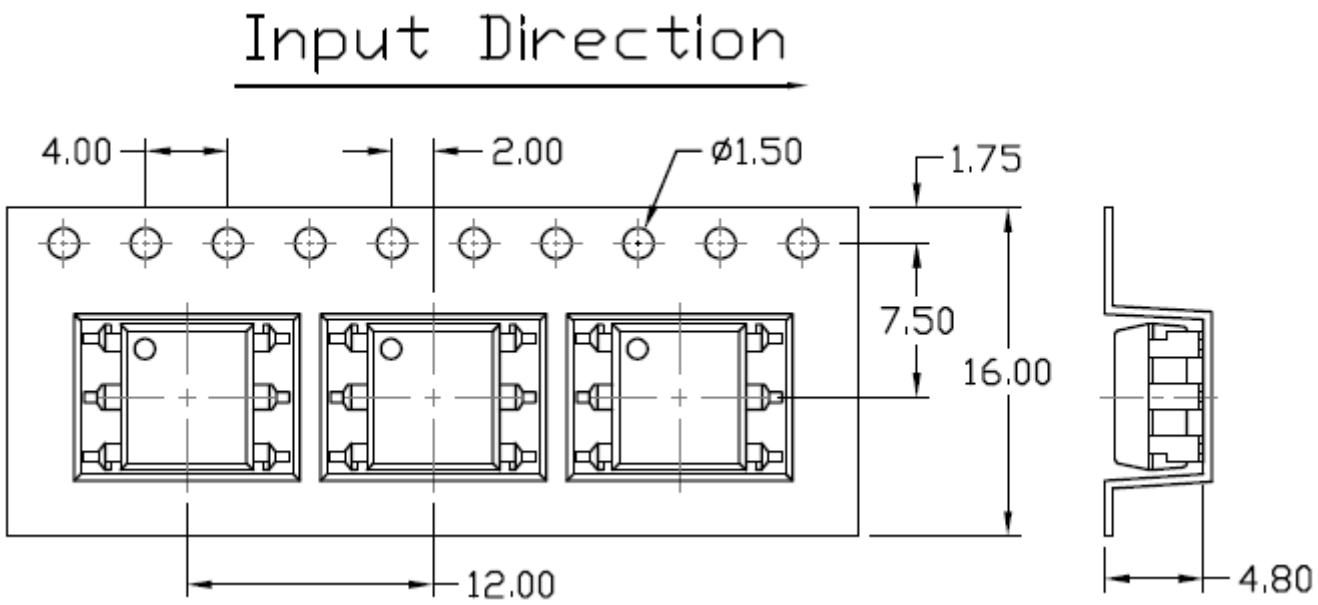
4N2X(Y)(Z)-G, 4N3X(Y)(Z)-G, H11AX(Y)(Z)-G

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)

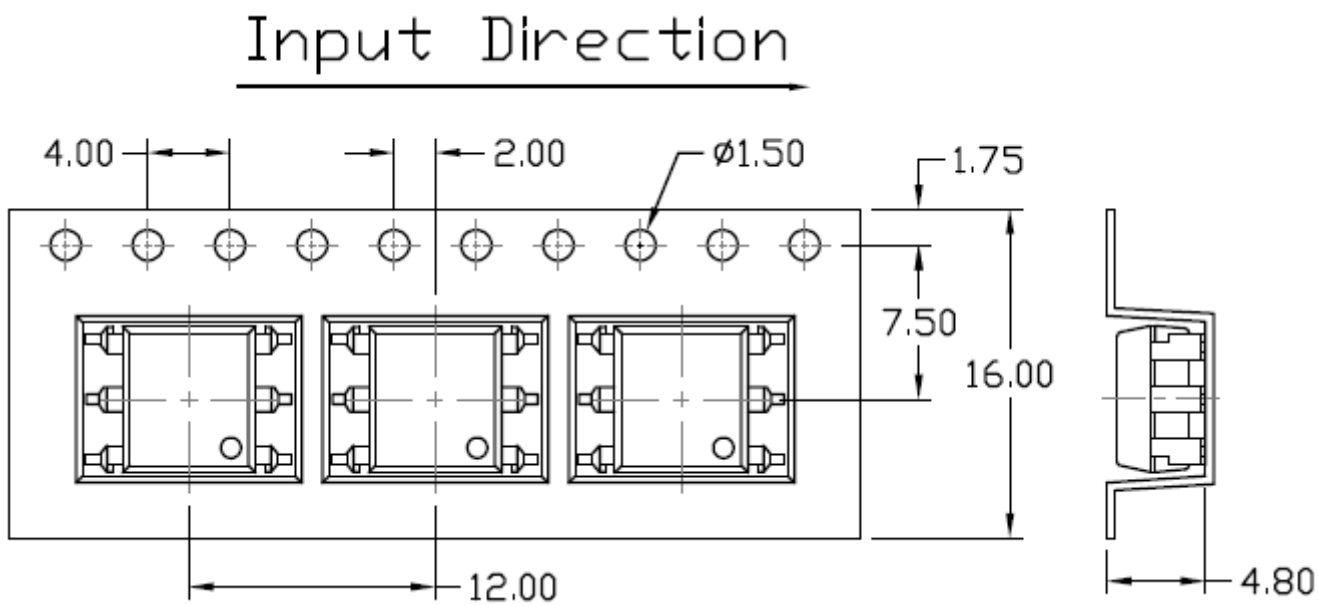
Option	***Description***	***Quantity***
None	Standard 6 Pin Dip	50Units/Tube
M	Wide Lead Forming	50Units/Tube
S(T1)	Surface Mount Lead Forming – With Option A Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option B Taping	1000 Units/Reel
SL(T1)	Surface Mount Lead Forming(Low Profile)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

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

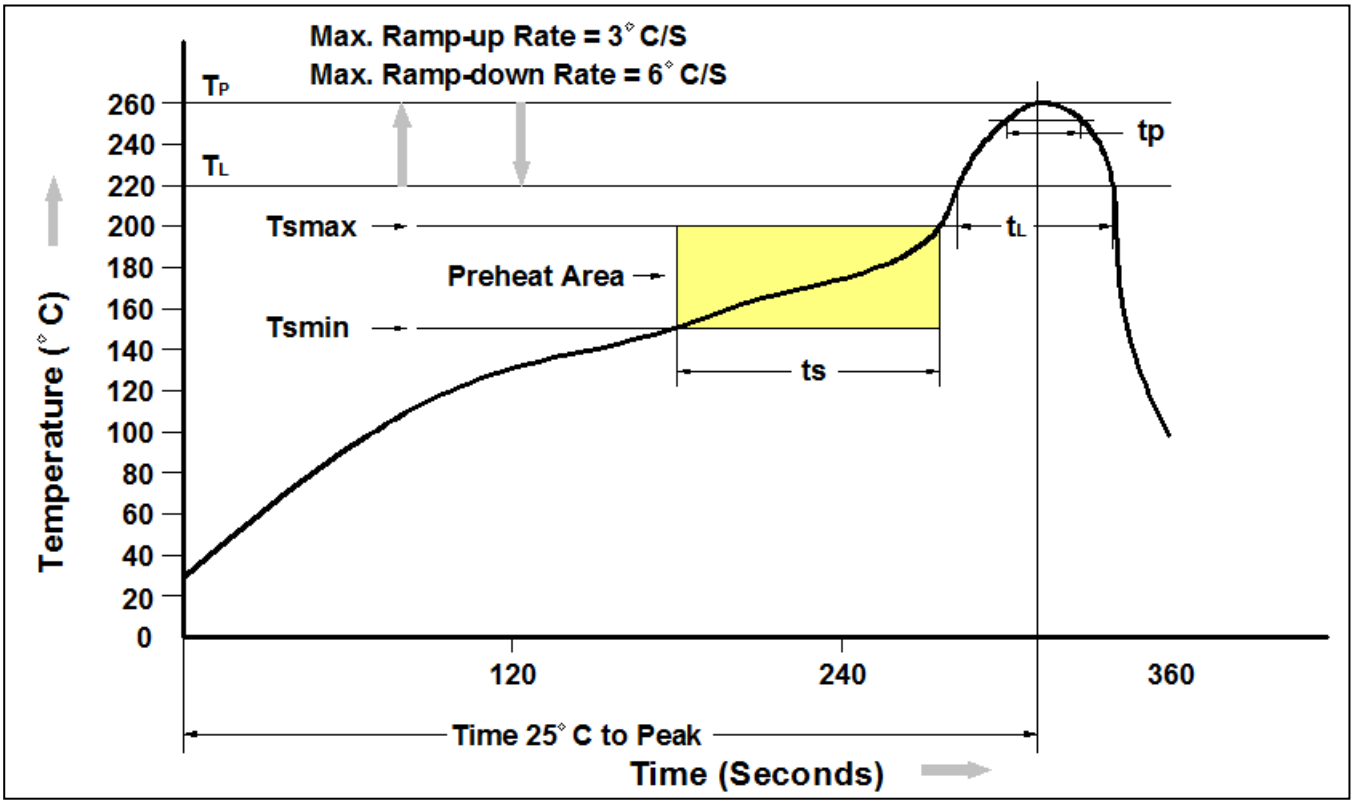
Option S(T1) & SL(T1)



Option S(T2) & SL(T2)



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150℃
Temperature Max. (Tsmax)	200℃
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Ramp-up Rate (t_L to t_P)	3℃/second max.
Liquidous Temperature (T_L)	217℃
Time (t_L) Maintained Above (T_L)	60 – 150 seconds
Peak Body Package Temperature	260℃ +0℃ / -5℃
Time (t_P) within 5℃ of 260℃	30 seconds
Ramp-down Rate (T_P to T_L)	6℃/second max
Time 25℃ to Peak Temperature	8 minutes max.

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