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

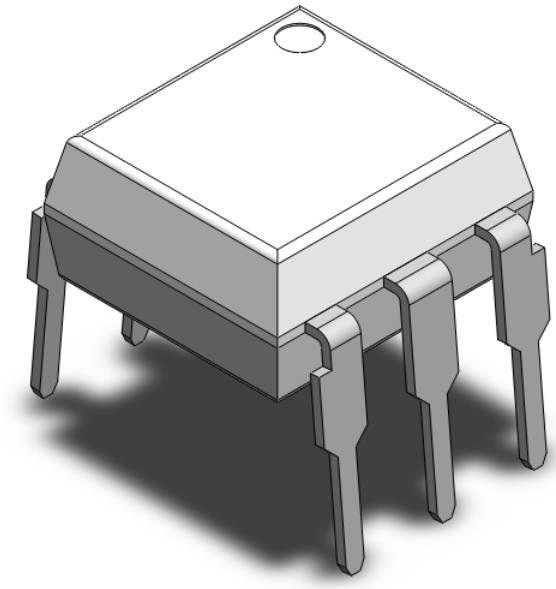
Description

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

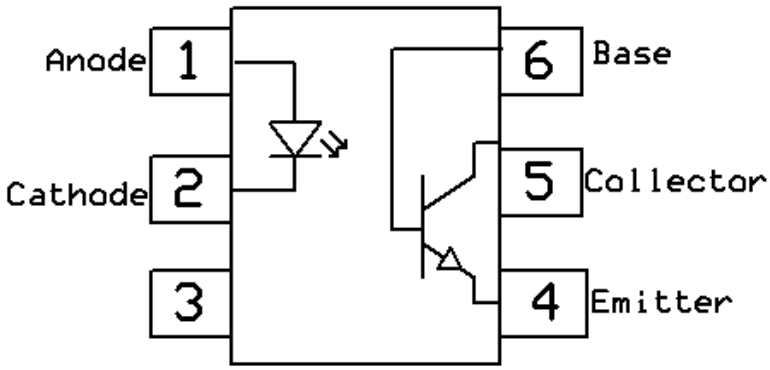
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

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, 4N36, 4N37	I_F= 10mA, V_{CE}= 10V	100	-	-	%	
		4N25,4N26, 4N38, H11A2, H11A3		20	-	-		
		4N27, 4N28, H11A4		10	-	-		
		H11A1		50	-	-		
		H11A5		30	-	-		
$V_{CE(SAT)}$	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		
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

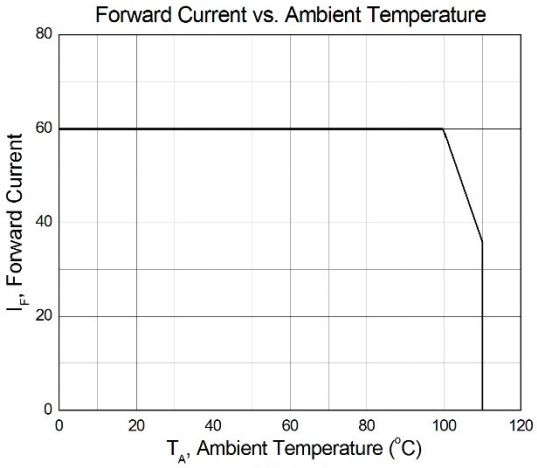


Figure 1

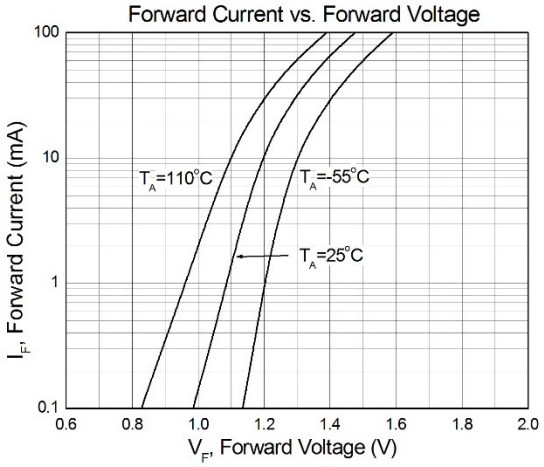


Figure 2

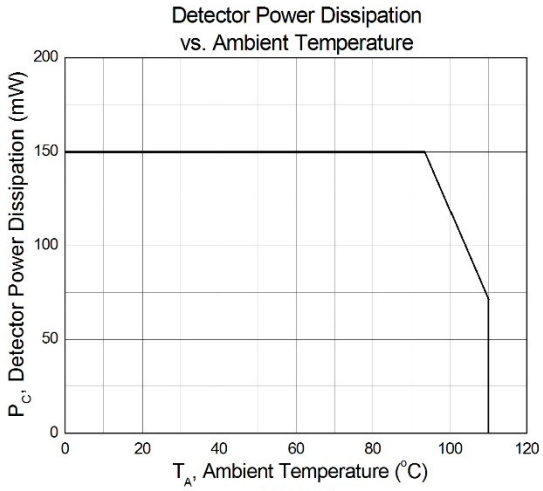


Figure 3

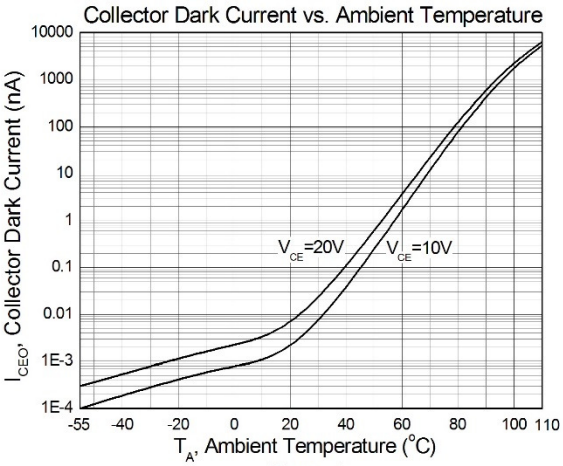


Figure 4

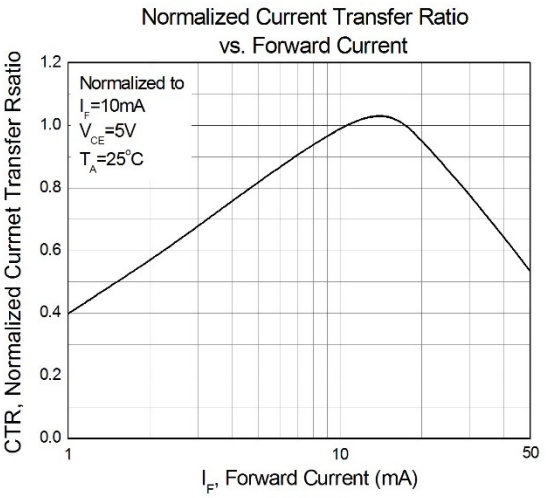


Figure 5

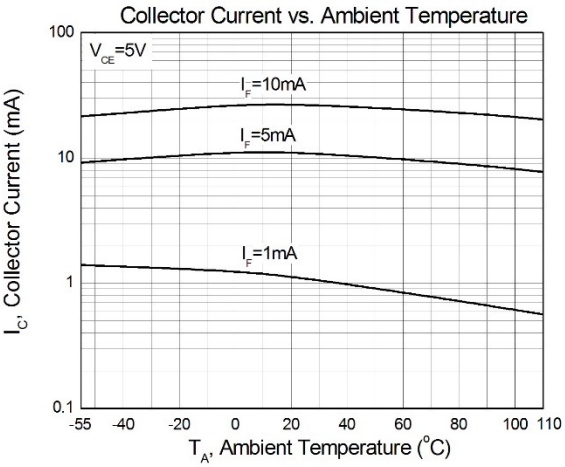


Figure 6

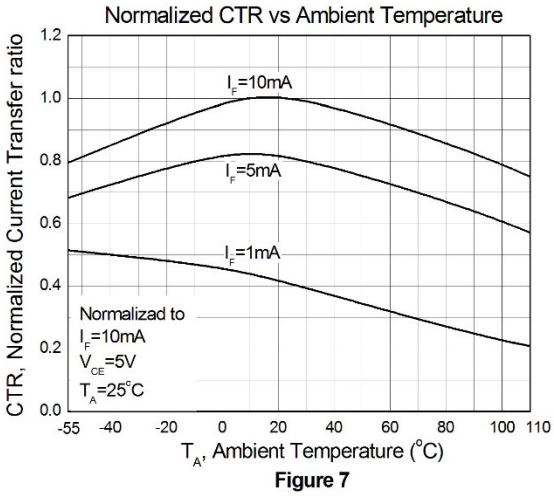


Figure 7

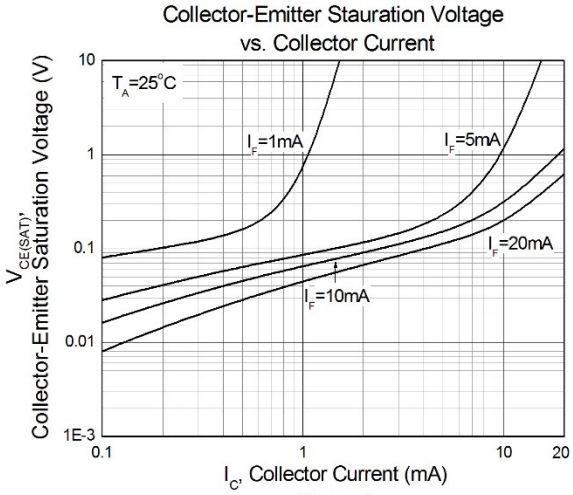


Figure 8

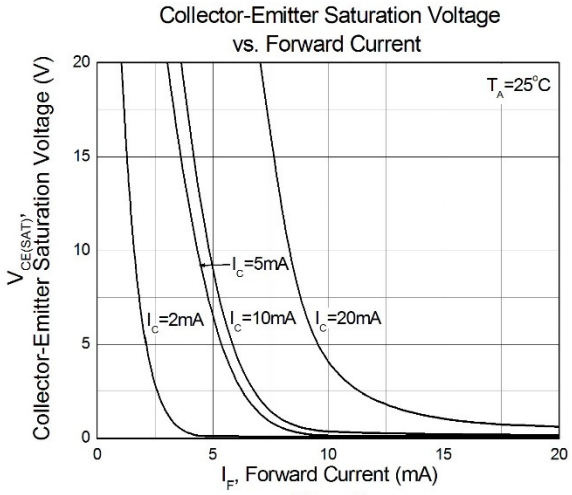


Figure 9

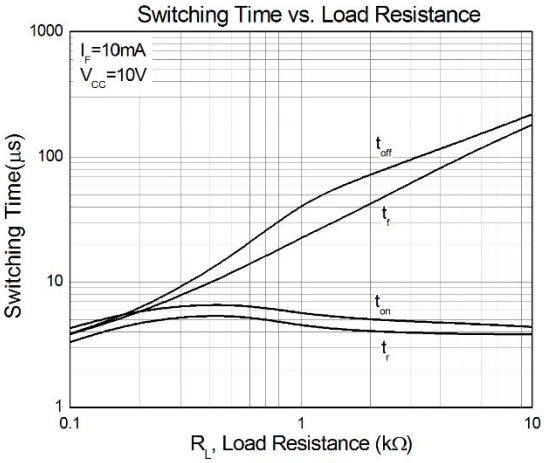


Figure 10

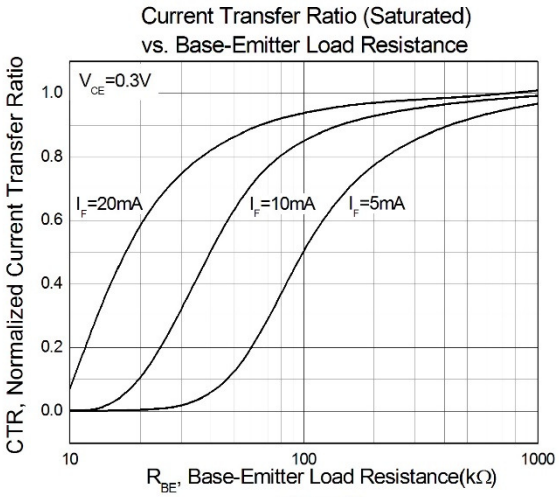


Figure 11

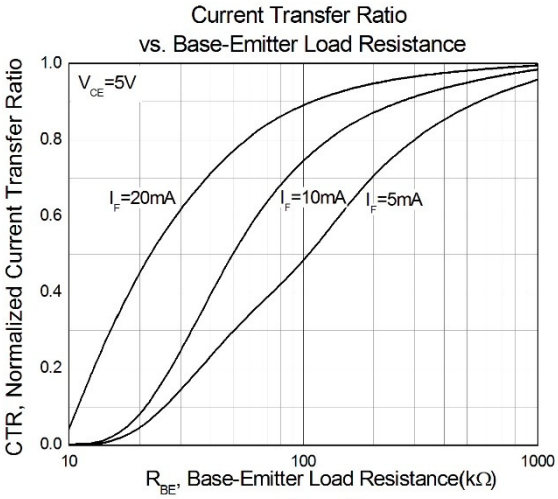


Figure 12

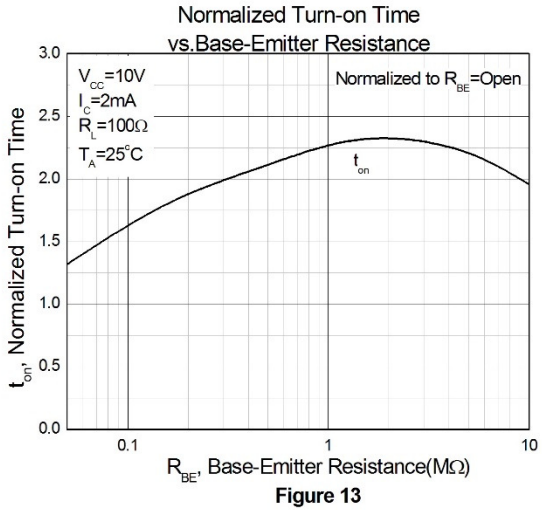


Figure 13

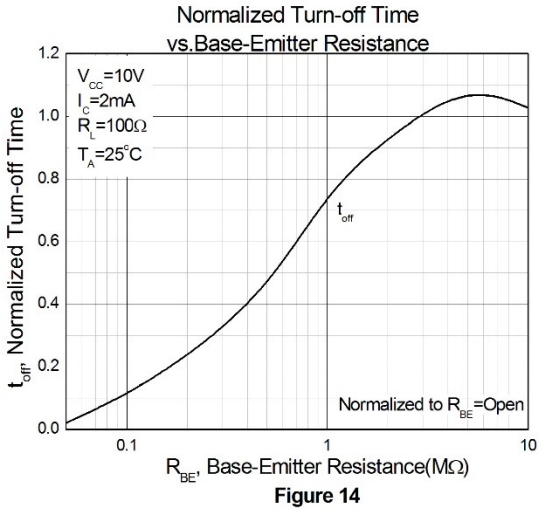
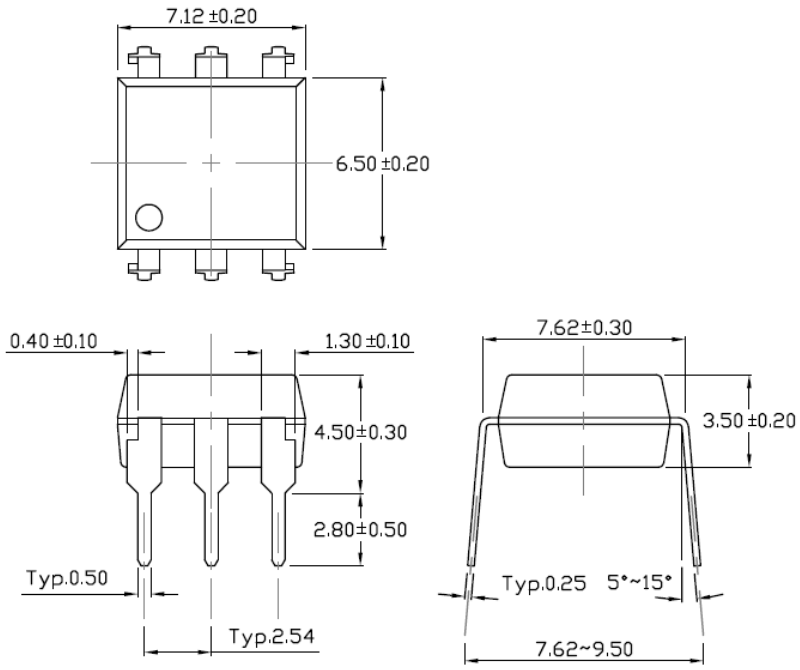


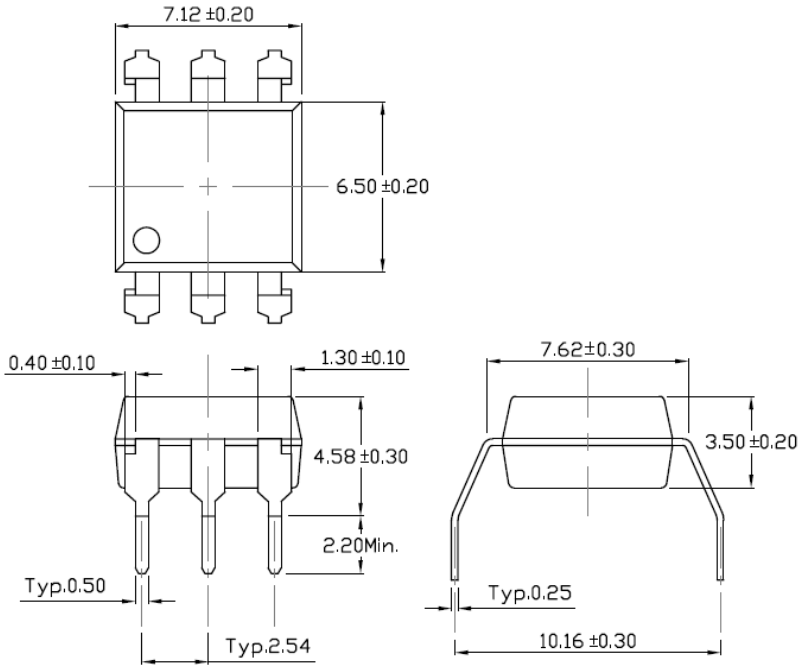
Figure 14

Package Dimension *Dimensions in mm unless otherwise stated*

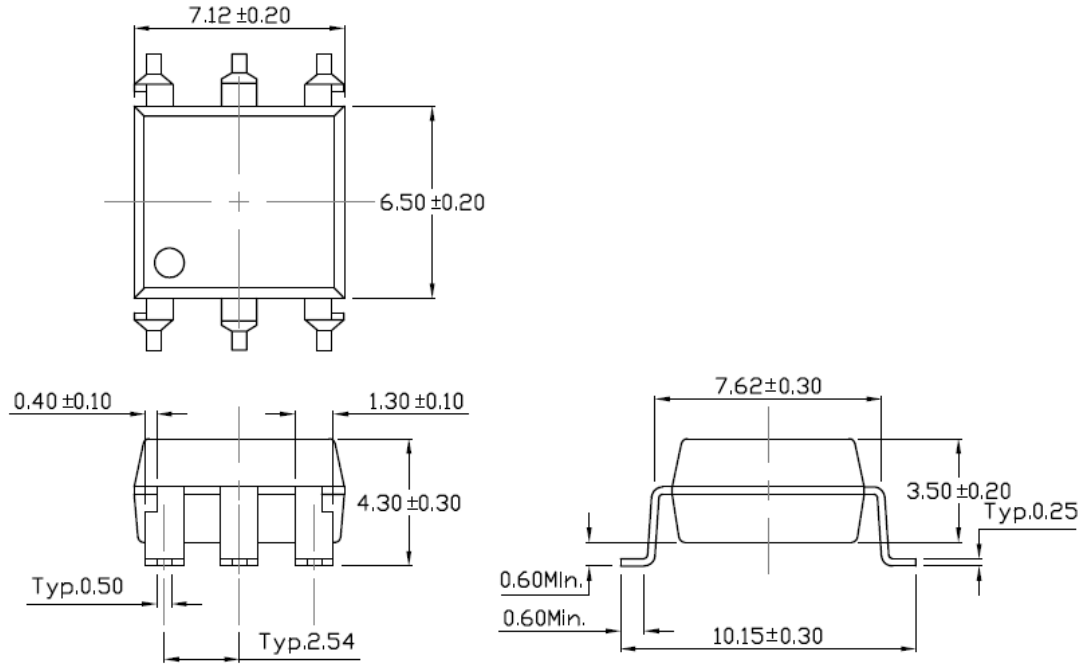
Standard DIP – Through Hole



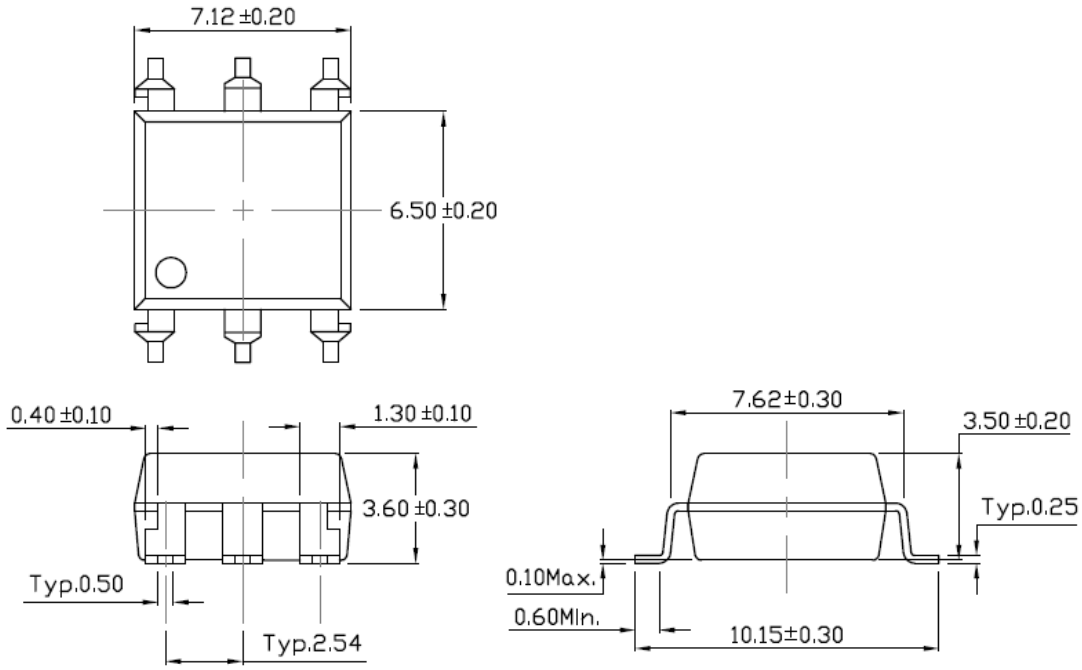
Wide Lead Forming – Through Hole (M Type)



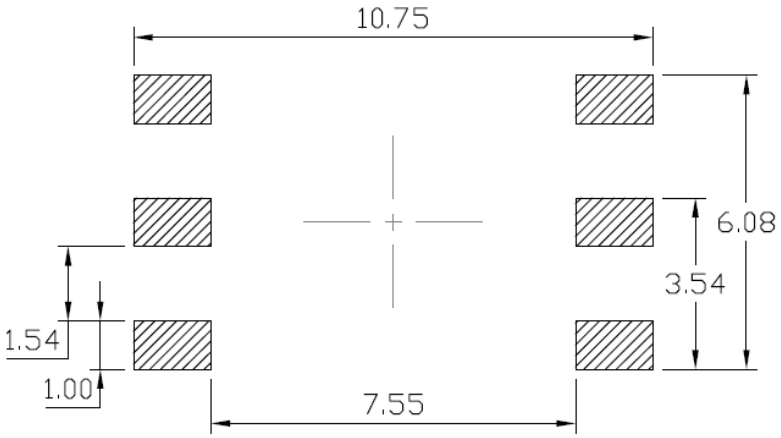
Surface Mount Forming (S Type)



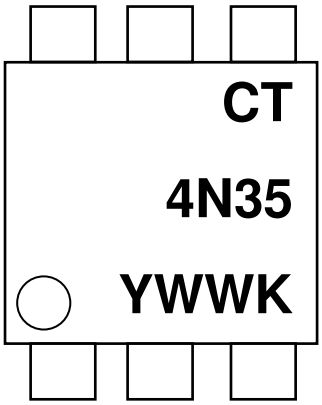
Surface Mount Forming (Low Profile) (SL Type)



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

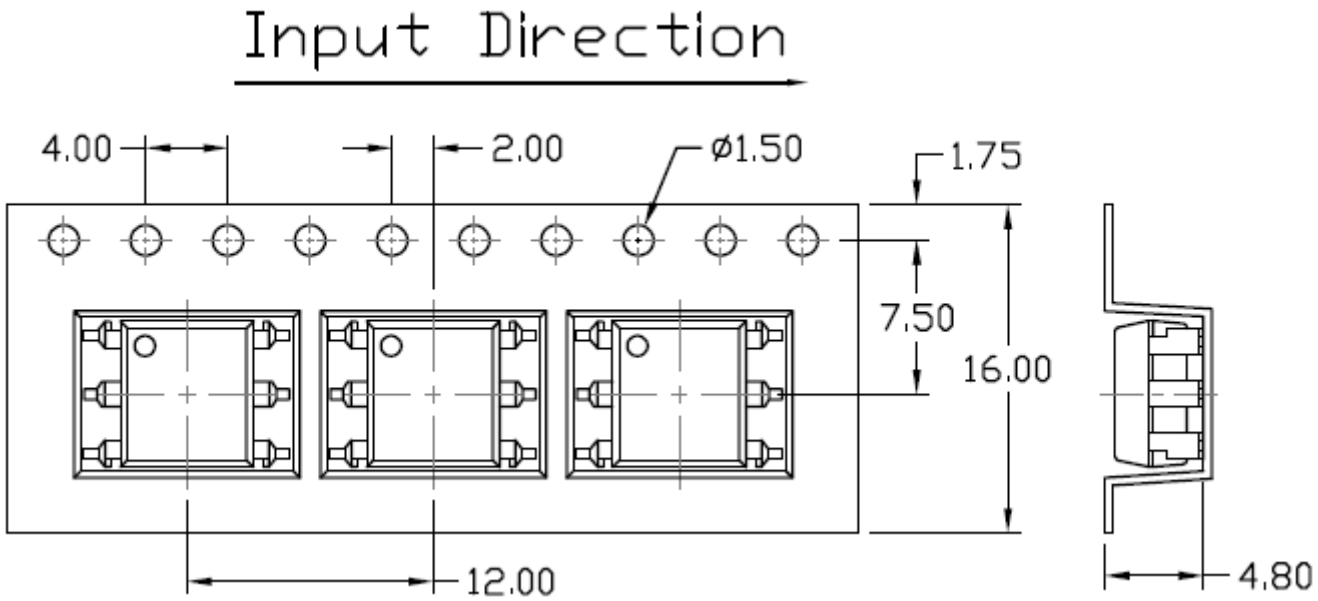
4N2X(Y)(Z)-G, 4N3X(Y)(Z)-G

X = Part No. (X=5,6,7 or 8)
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)

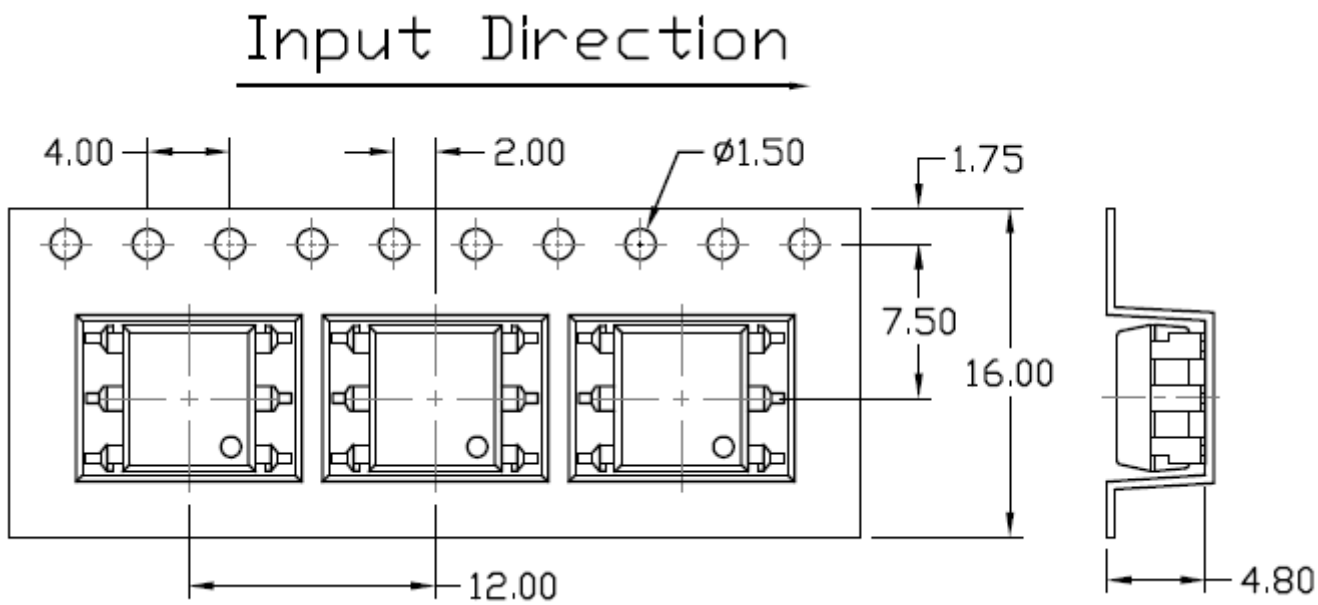
Option	***Description***	***Quantity***
None	Standard 6 Pin Dip	65Units/Tube
M	Wide Lead Forming	65Units/Tube
S(T1)	Surface Mount Lead Forming – With Option A Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option B Taping	1000 Units/Reel
SL(T1)	Surface Mount Lead Forming(Low Profile) – 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*

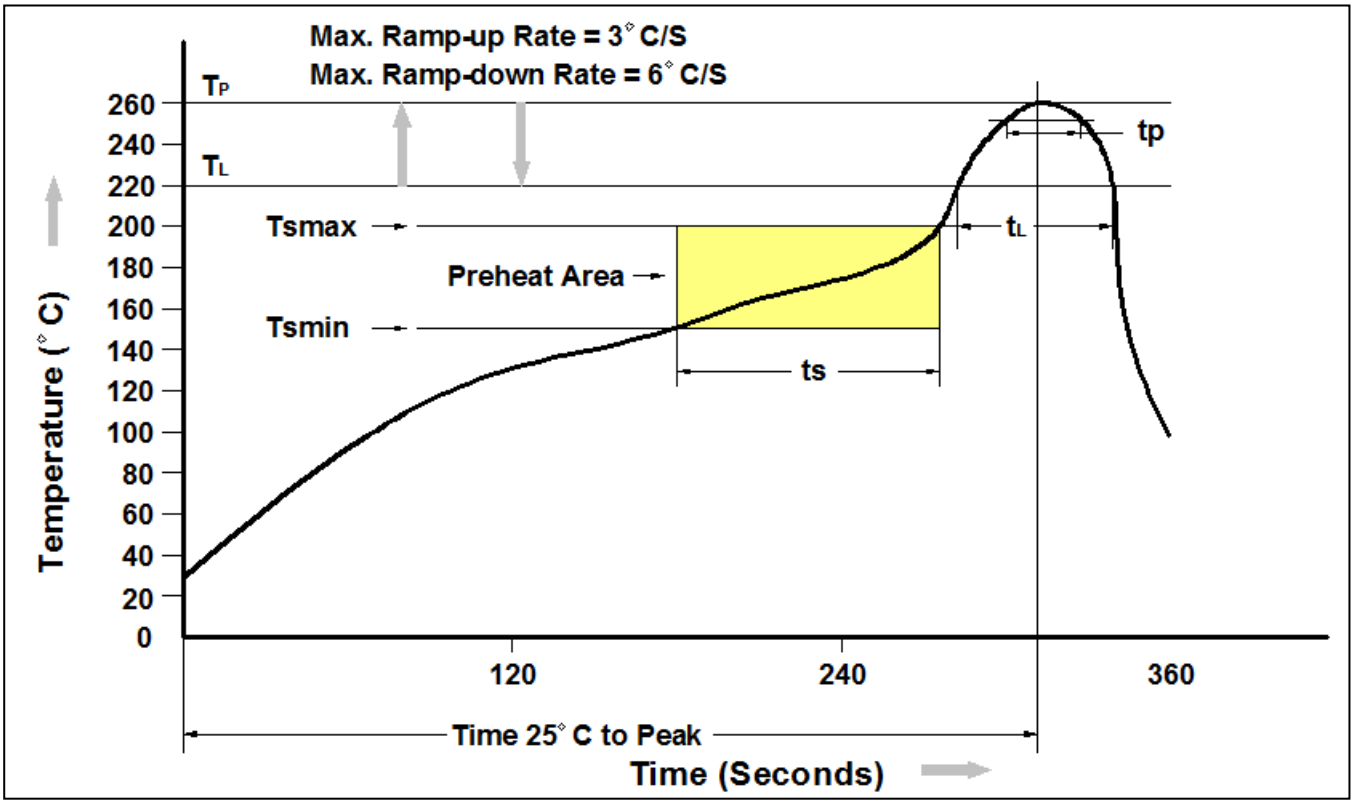
Option S(T1) & SL(T1)



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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2. *A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.*