4N29, 4N30, 4N31, 4N32, 4N33
H11B1, H11B2, H11B3, H11B255, TIL113
DC Input 6-Pin Photodarlington Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Temperature range - 55 ℃ to 100 ℃
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

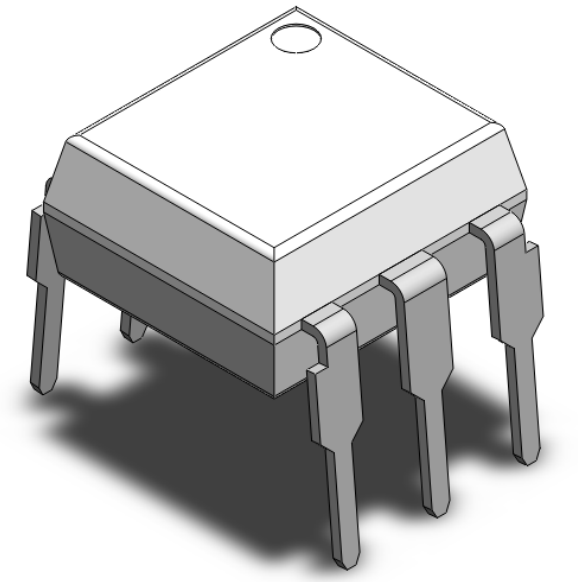
Description

The 4N29, 4N30, 4N31, 4N32, 4N33, H11B1, H11B2, H11B3, H11B255, and TIL113 series consists of a photodarlington transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead DIP package with bending option.

Applications

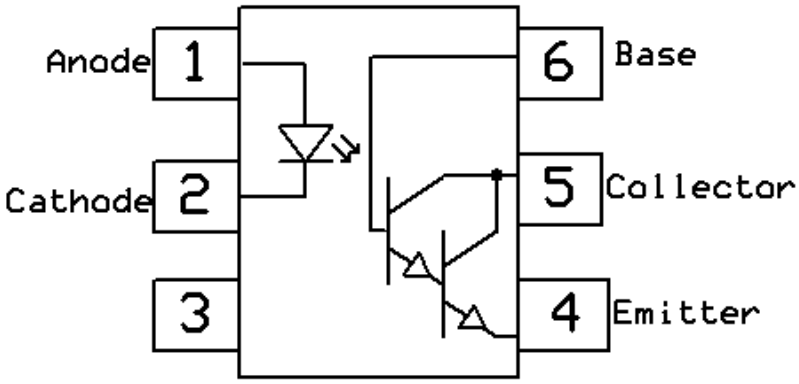
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

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 ~ +100	^0C	
T_{STG}	Storage temperature	-55 ~ +150	^0C	
T_{SOL}	Soldering temperature	260	^0C	
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	120	mW	
Detector				
P_D	Power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	55	V	
B_{VCBO}	Collector-Base Breakdown Voltage	55	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	
V_F	Forward voltage	H11B3	I_F=50mA		1.45	1.5	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= 100μA	55	-	-	V	
B_{VECO}	Emitter-Collector Breakdown	I_E= 100μA	7	-	-	V	
B_{VCBO}	Collector-Base Breakdown	I_C= 100μA	55	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	V_{CE}= 10V, I_F=0mA	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	4N29, 4N30	I_F= 10mA, V_{CE}= 10V	100	-	-	%	
		4N31		50	-	-		
		4N32, 4N33		500	-	-		
		H11B1	I_F= 1mA, V_{CE}= 10V	500	-	-		
		H11B2		200	-	-		
		H11B3		100	-	-		
		H11B255	I_F= 10mA, V_{CE}= 5V	100	-	-		
		TIL113	I_F= 10mA, V_{CE}= 1V	300	-	-		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	4N29, 4N30, 4N32, 4N33	I_F= 8mA, I_C= 2mA	-	-	1.0	V	
		4N31, TIL113	I_F= 8mA, I_C= 2mA	-	-	1.2		
		H11B1, H11B2, H11B3	I_F= 1mA, I_C= 1mA	-	-	1.0		
		H11B255	I_F=50mA, I_C= 50mA	-	-	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	4N29, 4N30, 4N31, 4N32, 4N33, TIL113	I_F= 200mA, I_c= 50mA, R_L= 100Ω	-	-	4.7	µs	
		H11B1, H11B2, H11B3, H11B255	I_F= 10mA, V_{CE}= 10V, R_L= 100Ω	-	24	-		
T_{OFF}	Turn Off Time	4N29, 4N30, 4N31	I_F= 200mA, I_c= 50mA, R_L= 100Ω	-	-	30	µs	
		4N32, 4N33, TIL113		-	-	90		
		H11B1, H11B2, H11B3, H11B255	I_F= 10mA, V_{CE}= 10V, R_L= 100Ω	-	17	-		

Typical Characteristic Curves

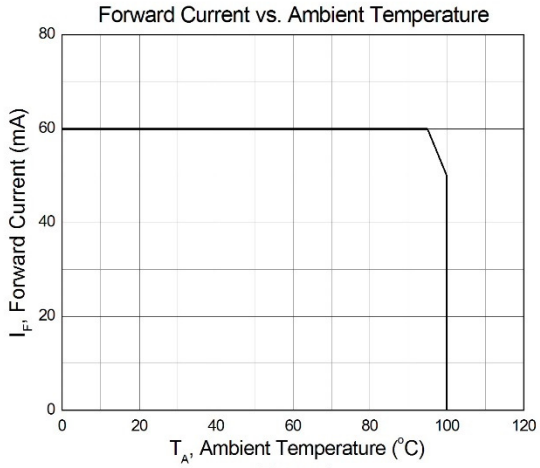


Figure 1

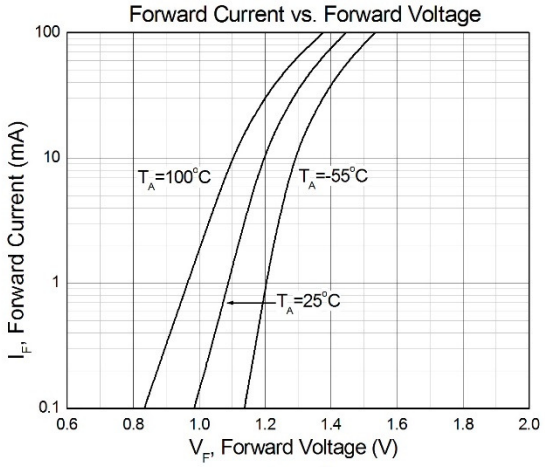


Figure 2

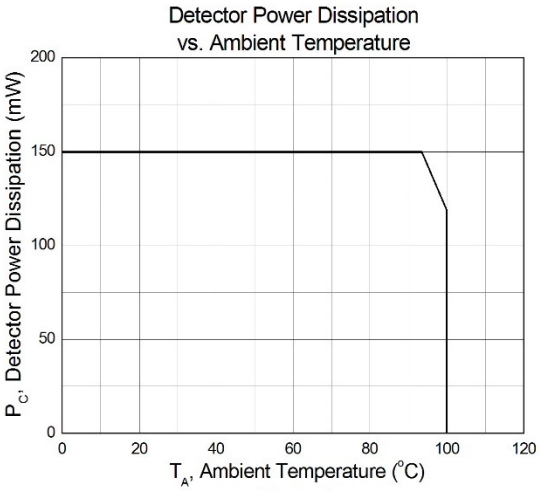


Figure 3

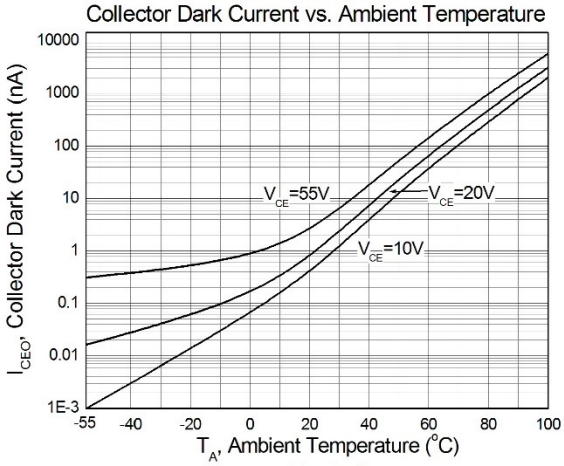


Figure 4

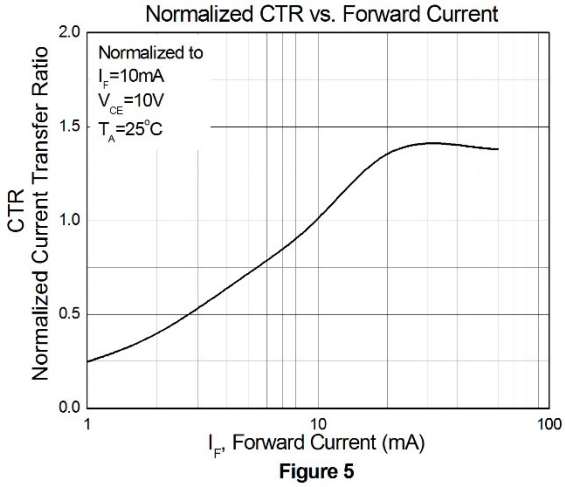


Figure 5

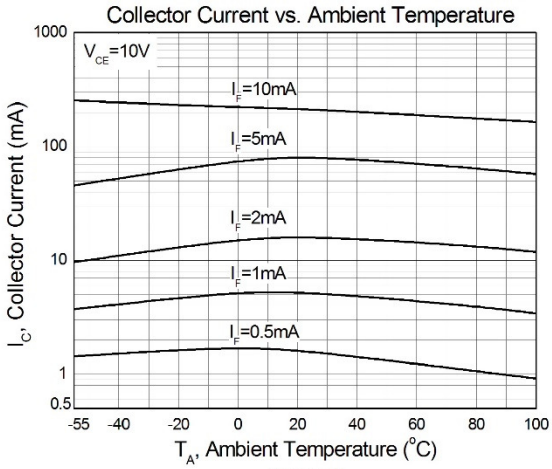


Figure 6

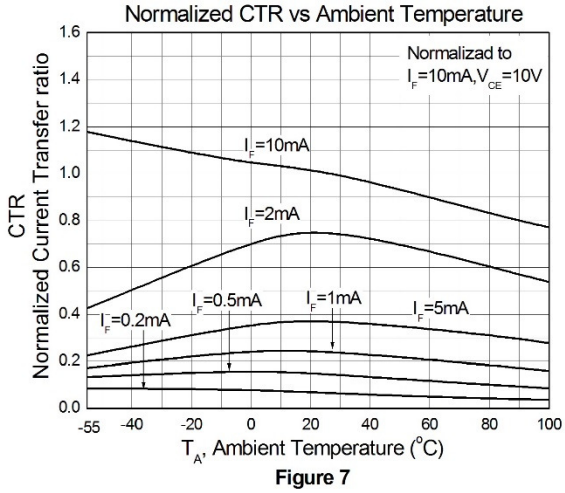


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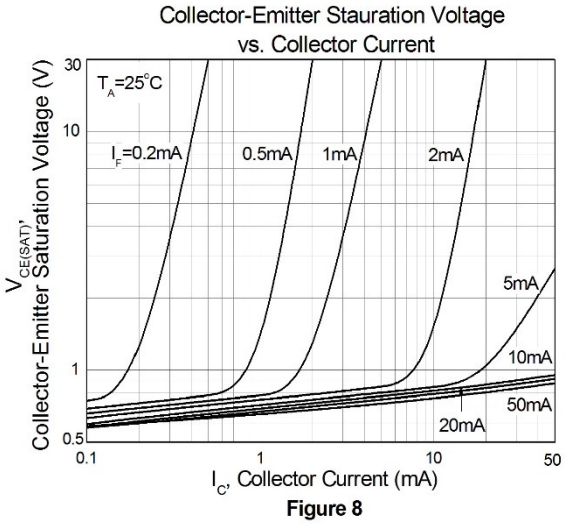


Figure 8

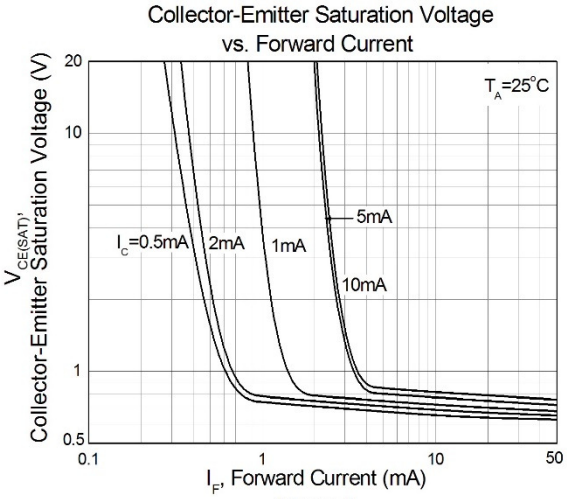


Figure 9

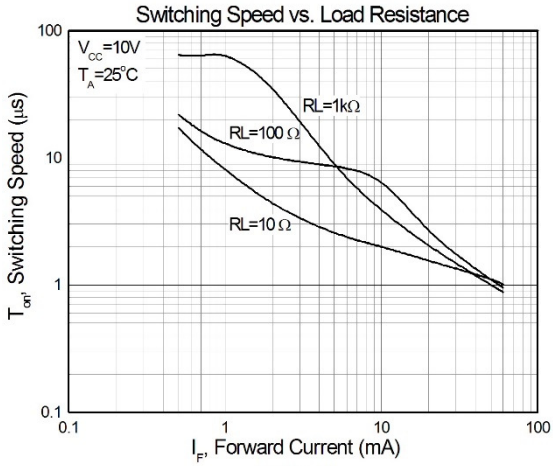


Figure 10

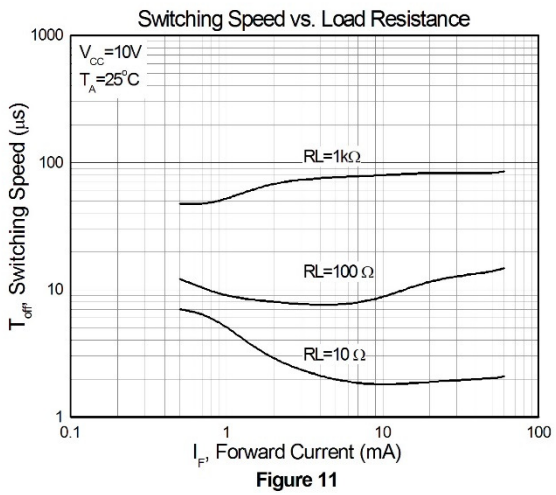
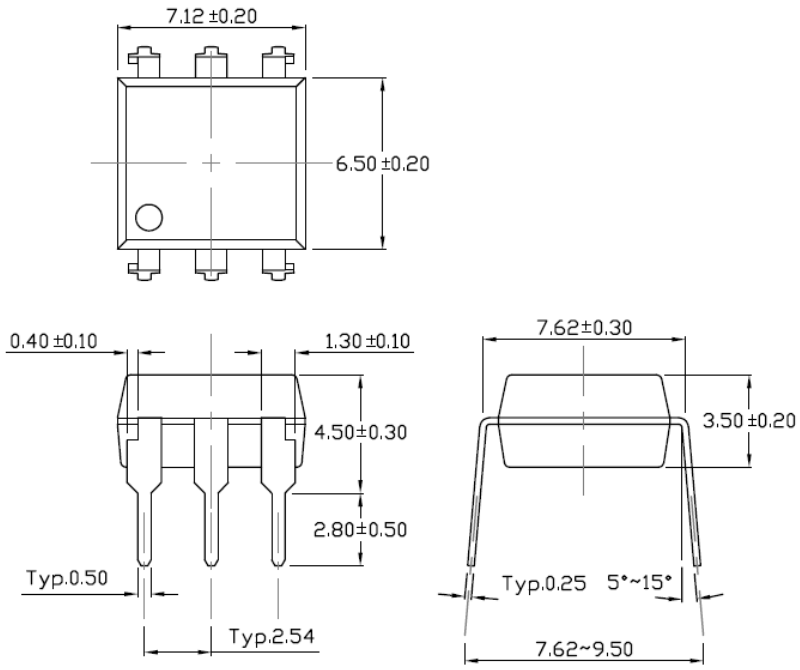


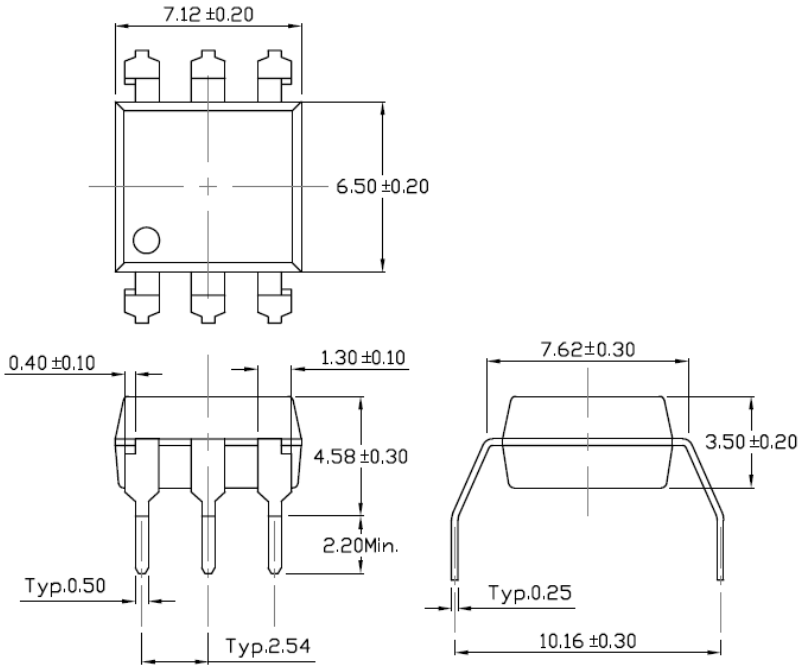
Figure 11

Package Dimension *Dimensions in mm unless otherwise stated*

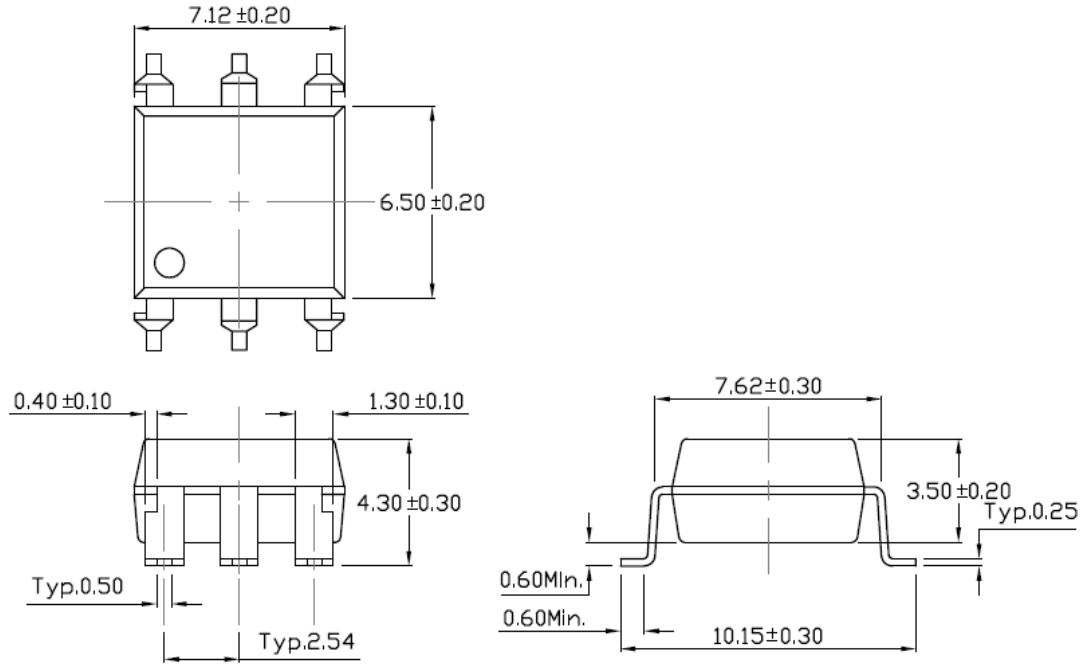
Standard DIP – Through Hole



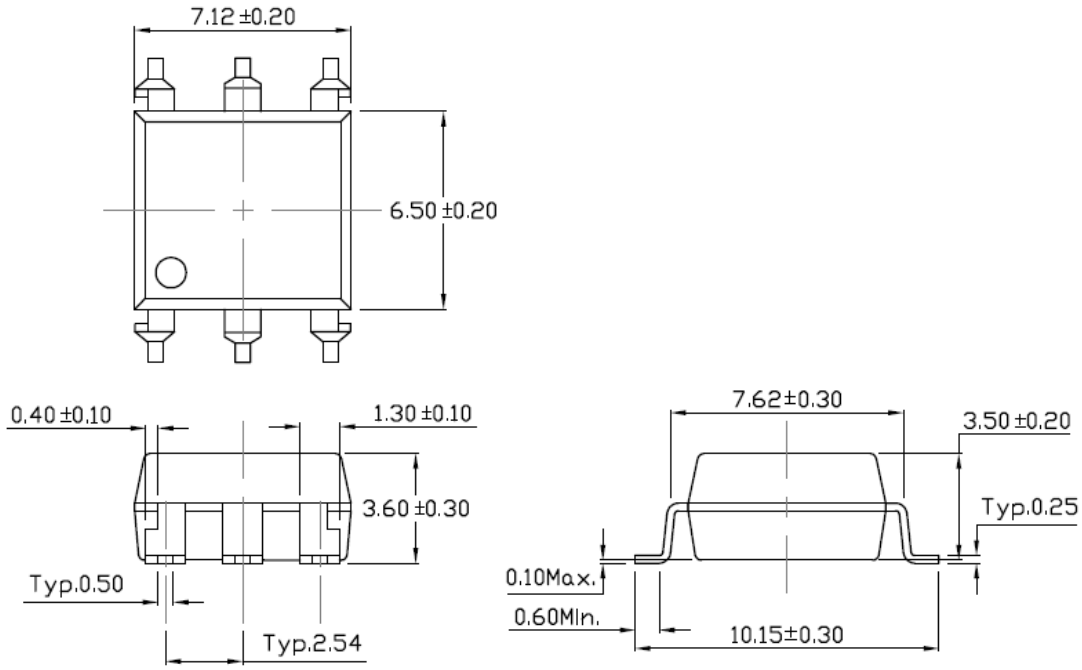
Wide Lead Forming – Through Hole (M Type)



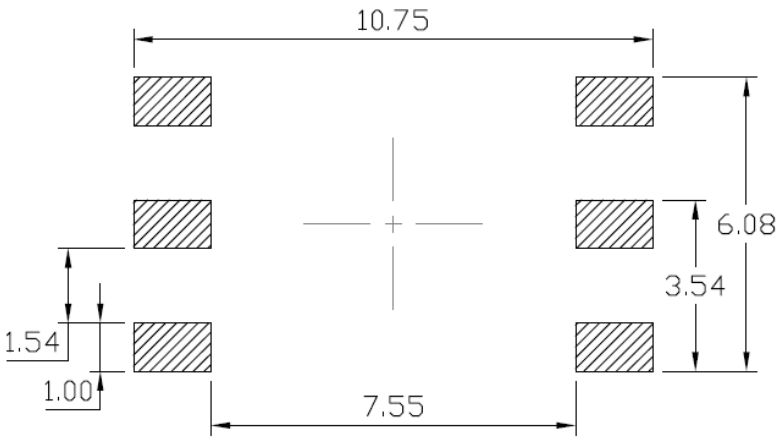
Surface Mount Forming (S Type)



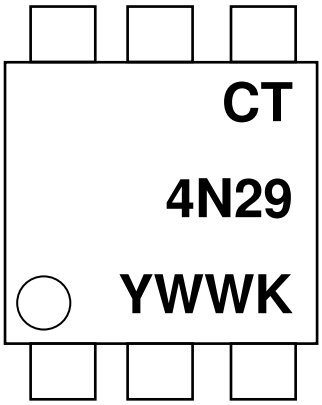
Surface Mount Forming (Low Profile) (SL Type)



Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information



Note:

CT : Denotes “CT Micro”
4N29 : Part Number
Y : Fiscal Year
WW : Work Week
K : Manufacturing Code

Ordering Information

4N2X(Y)(Z)-G, 4N3X(Y)(Z)-G, H11BX(Y)(Z)-G, TIL113(Y)(Z)-G

X = (9 for 4N2X), (0,1,2,3 for 4N3X series), (1,2,3,255 for H11BX series)

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

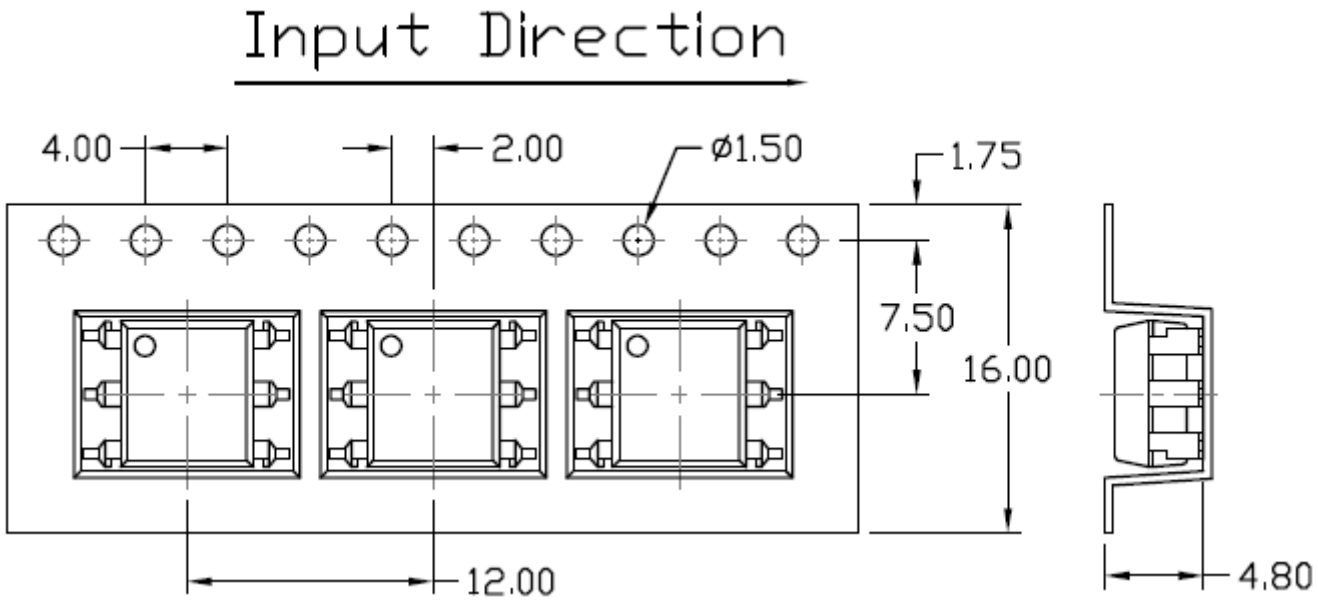
Z = Tape and reel option (T1, T2 or none)

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

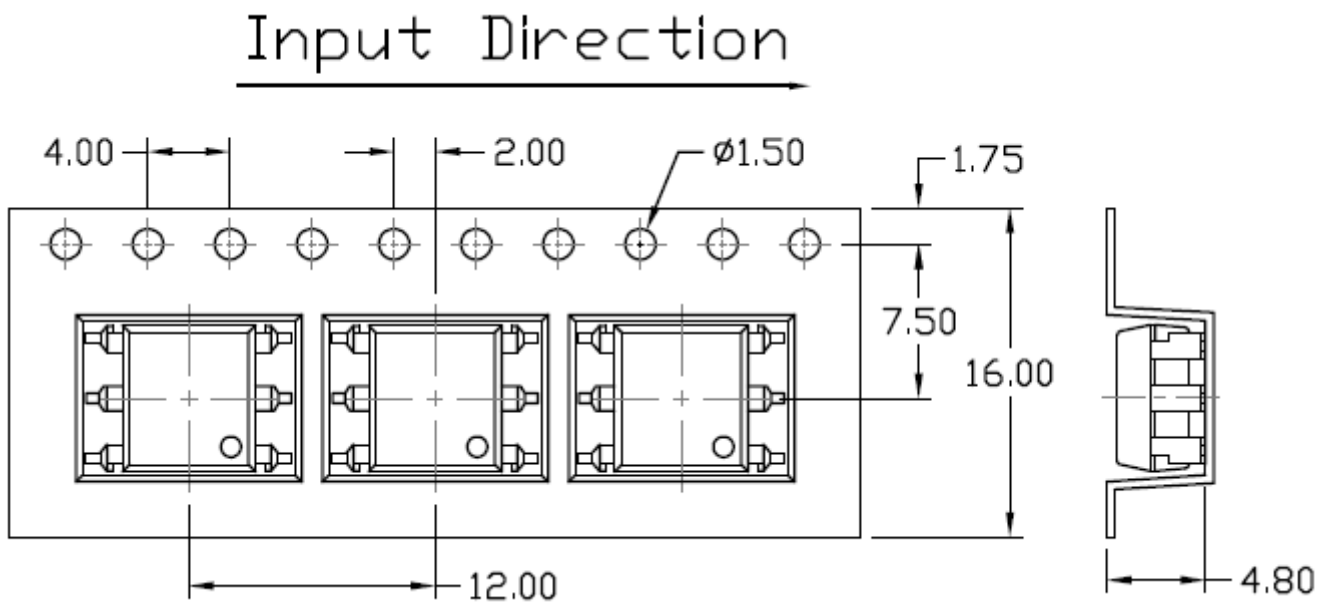
Option	***Description***	***Quantity***
None	Standard 6 Pin Dip	65Units/Tube
M	Wide Lead Forming	65Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount Lead Forming(Low Profile) – With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount Lead Forming(Low Profile) – With Option 2 Taping	1000 Units/Reel

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

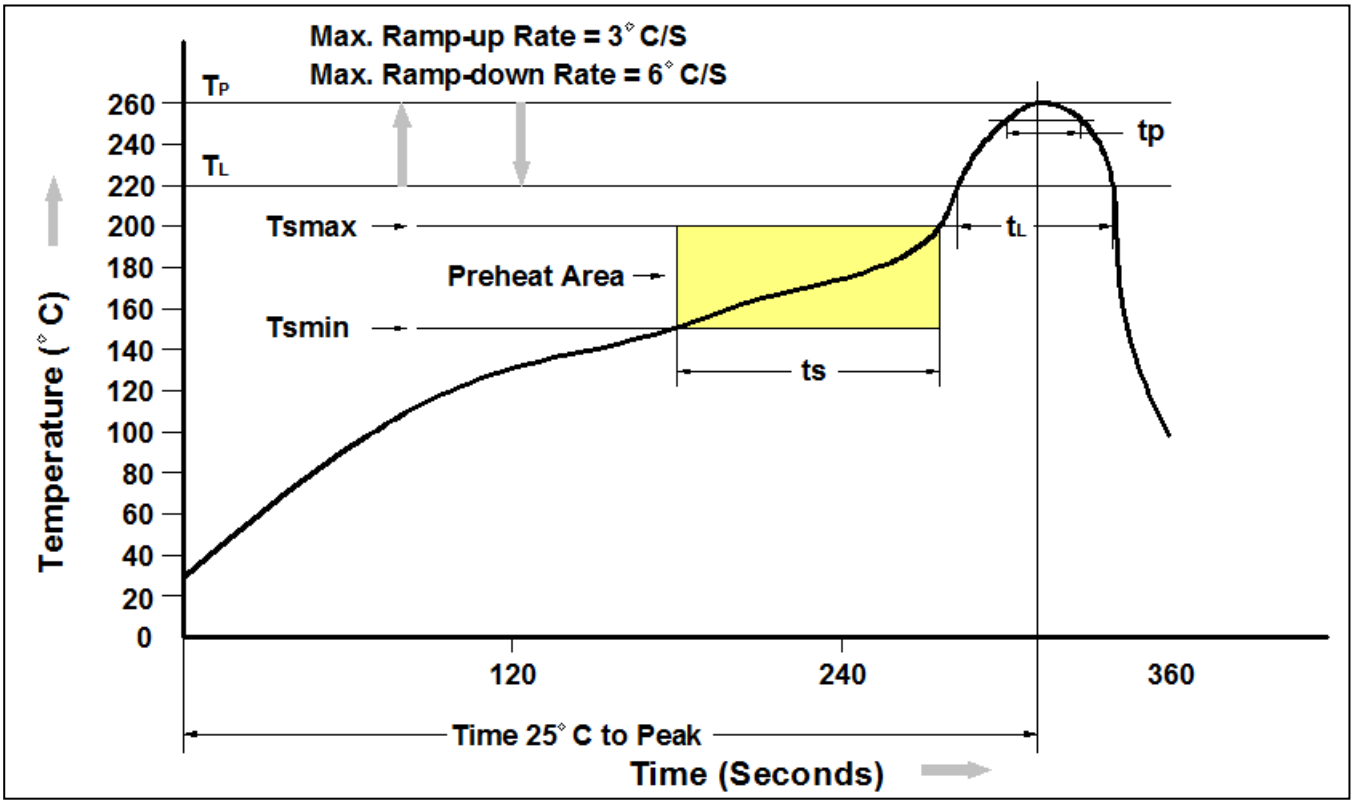
Option S(T1) & SL(T1)



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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