



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 °C to 100 °C
- Regulatory Approvals
 - UL - UL1577 (E364000)
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898
 - IEC60065, IEC60950

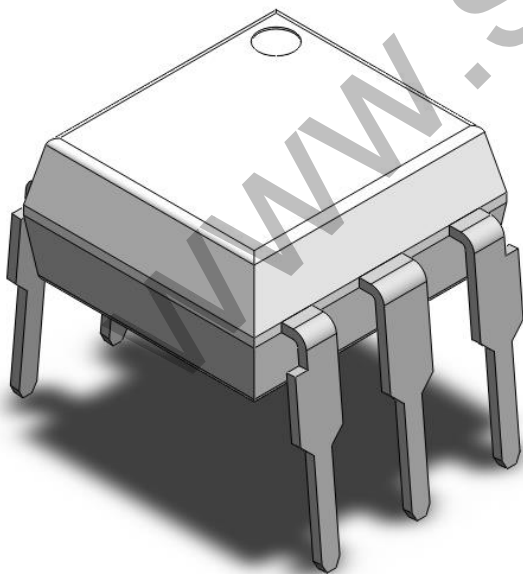
Applications

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

Description

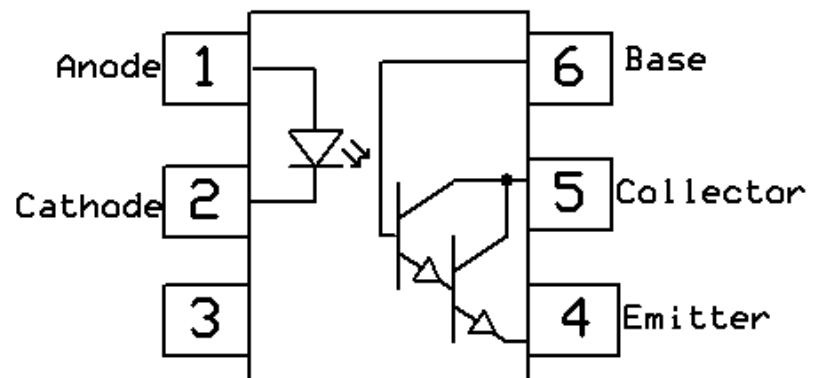
The 4N29, 4N30, 4N31, 4N32, 4N33, H11B1, H11B2, H11B3, H11B255, and TIL113 series consists of a photodarlington transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead DIP package with bending option.

Package Outline



Note: Different bending options available. See package dimension.

Schematic





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

Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage	5000	V _{RMS}	
T _{OPR}	Operating temperature	-55 ~ +100	°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	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	



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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	
V_F	Forward voltage	H11B3 $I_F=50\text{mA}$		1.45	1.5	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	$I_C = 100\mu\text{A}$	55	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 100\mu\text{A}$	7	-	-	V	
$B_{V_{CBO}}$	Collector-Base Breakdown	$I_C = 100\mu\text{A}$	55	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 10\text{V}, I_F = 0\text{mA}$	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	4N29, 4N30	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	100	-	-	%
		4N31		50	-	-	
		4N32, 4N33		500	-	-	
		H11B1	$I_F = 1\text{mA}, V_{CE} = 10\text{V}$	500	-	-	
		H11B2		200	-	-	
		H11B3		100	-	-	
		H11B255		$I_F = 10\text{mA}, V_{CE} = 5\text{V}$	100	-	
		TIL113	$I_F = 10\text{mA}, V_{CE} = 1\text{V}$	300	-	-	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	4N29, 4N30, 4N32, 4N33	$I_F = 8\text{mA}, I_C = 2\text{mA}$	-	-	1.0	V
		4N31, TIL113		-	-	1.2	
		H11B1, H11B2, H11B3	$I_F = 1\text{mA}, I_C = 1\text{mA}$	-	-	1.0	
		H11B255	$I_F = 50\text{mA}, I_C = 50\text{mA}$	-	-	1.0	
R_{IO}	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	1×10^{11}			Ω	
C_{IO}	Isolation Capacitance	$f = 1\text{MHz}$		0.25		pF	



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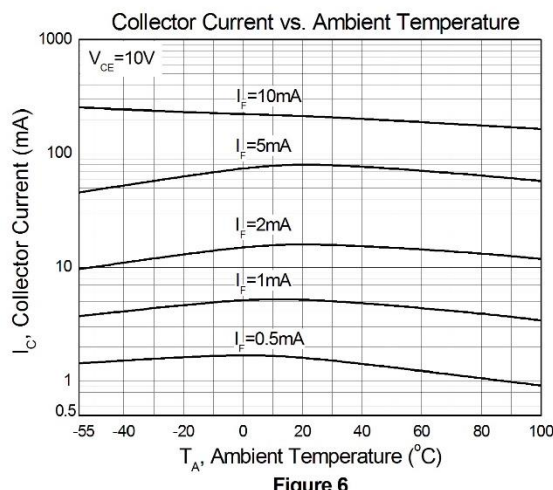
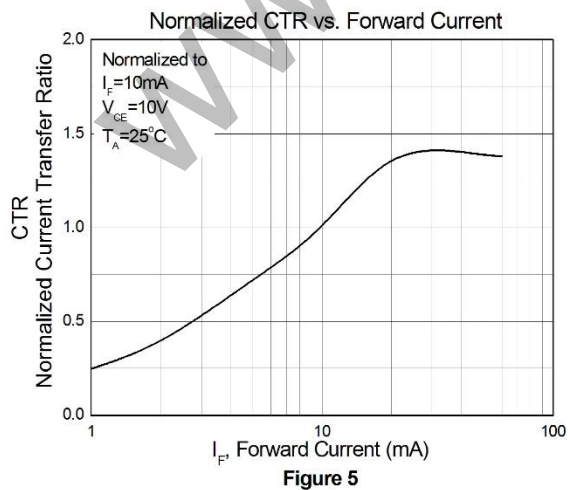
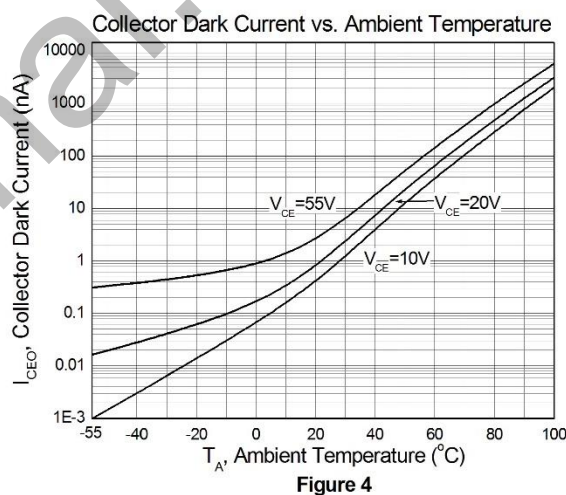
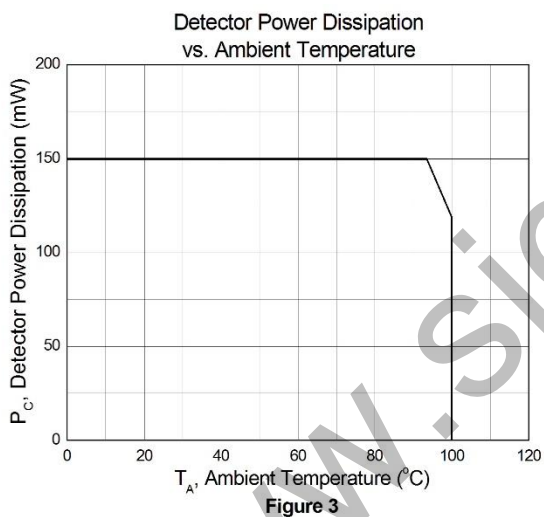
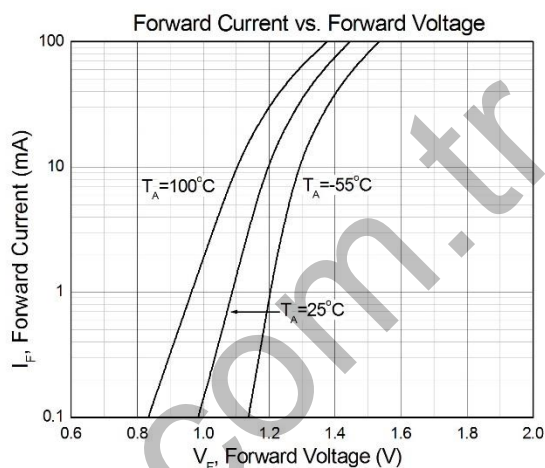
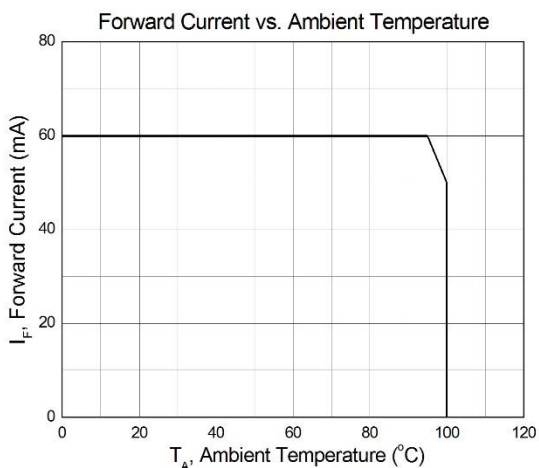
Switching Characteristics

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 _{CC} = 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 _{CC} = 10V, R _L = 100Ω	-	17	-	



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

Typical Characteristic Curves





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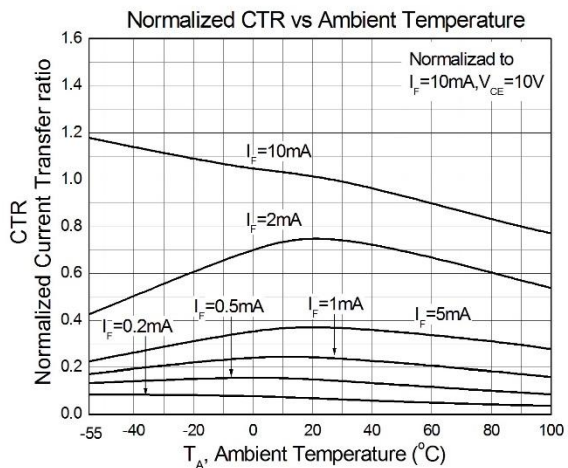


Figure 7

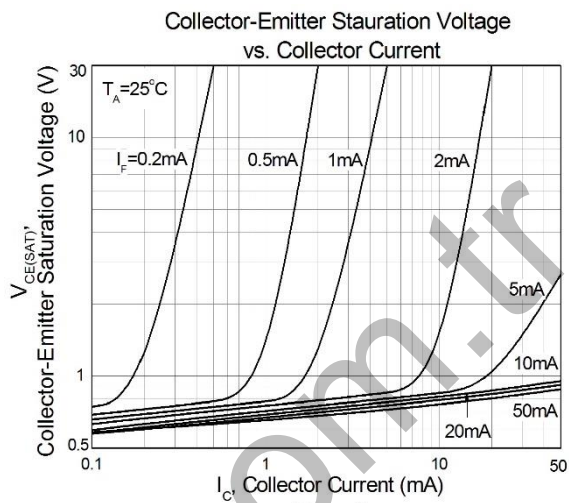


Figure 8

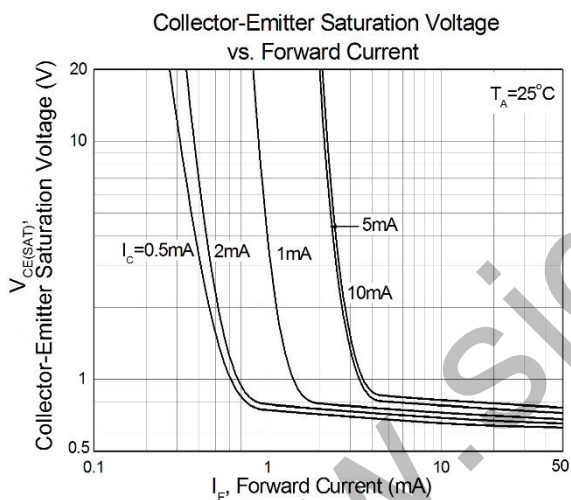


Figure 9

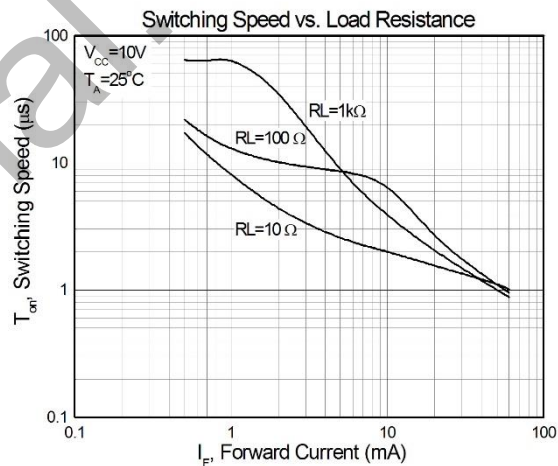


Figure 10

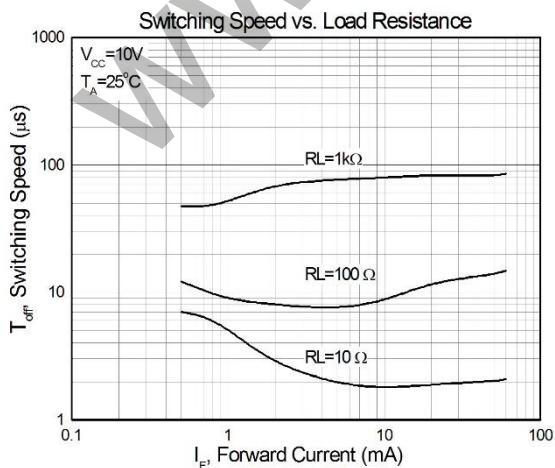


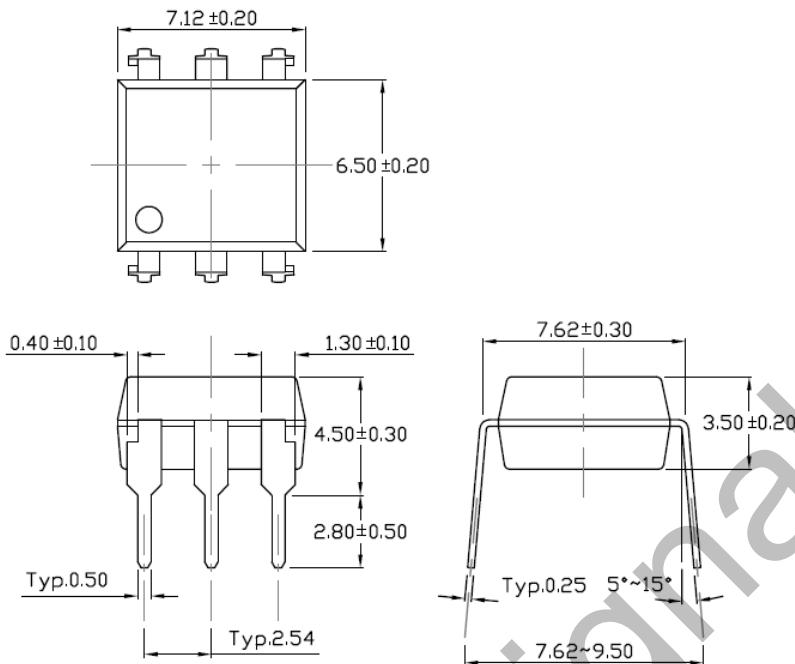
Figure 11



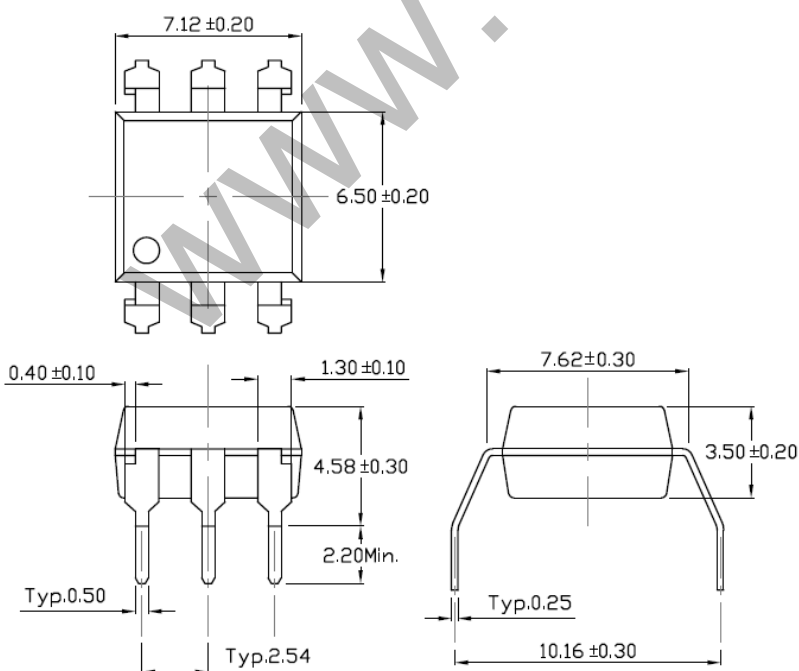
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Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



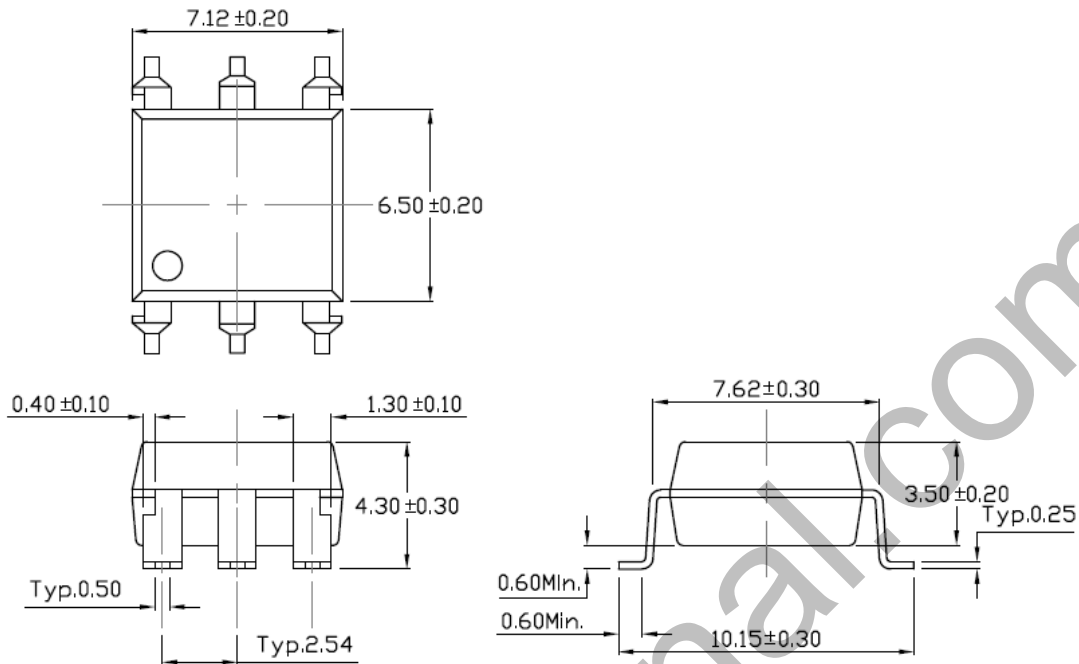
Wide Lead Forming – Through Hole (M Type)



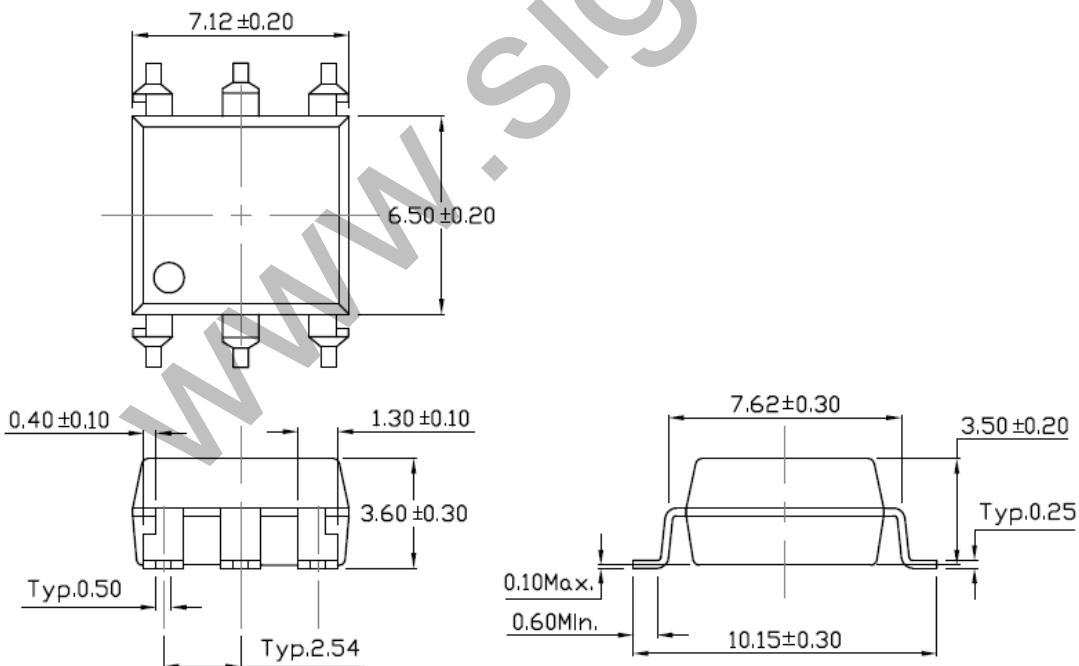


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Surface Mount Forming (S Type)



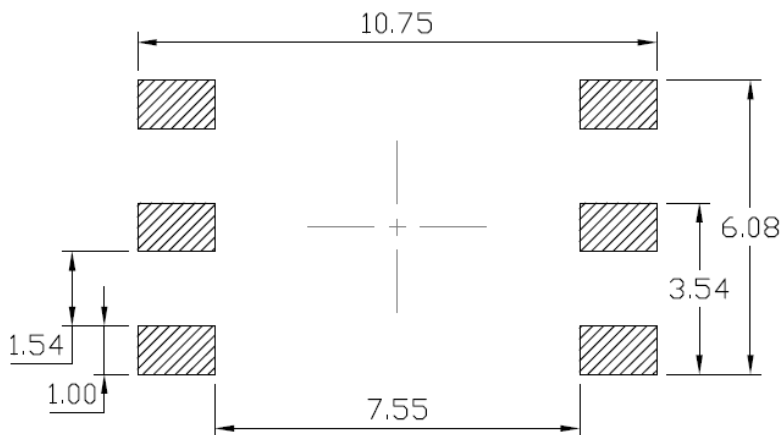
Surface Mount Forming (Low Profile) (SL Type)



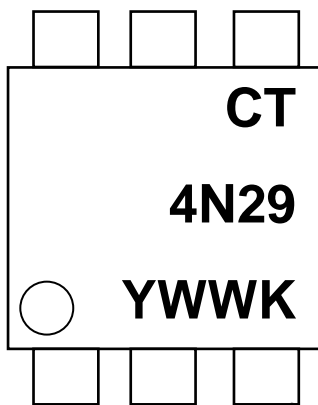


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Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information



Note:

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



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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)

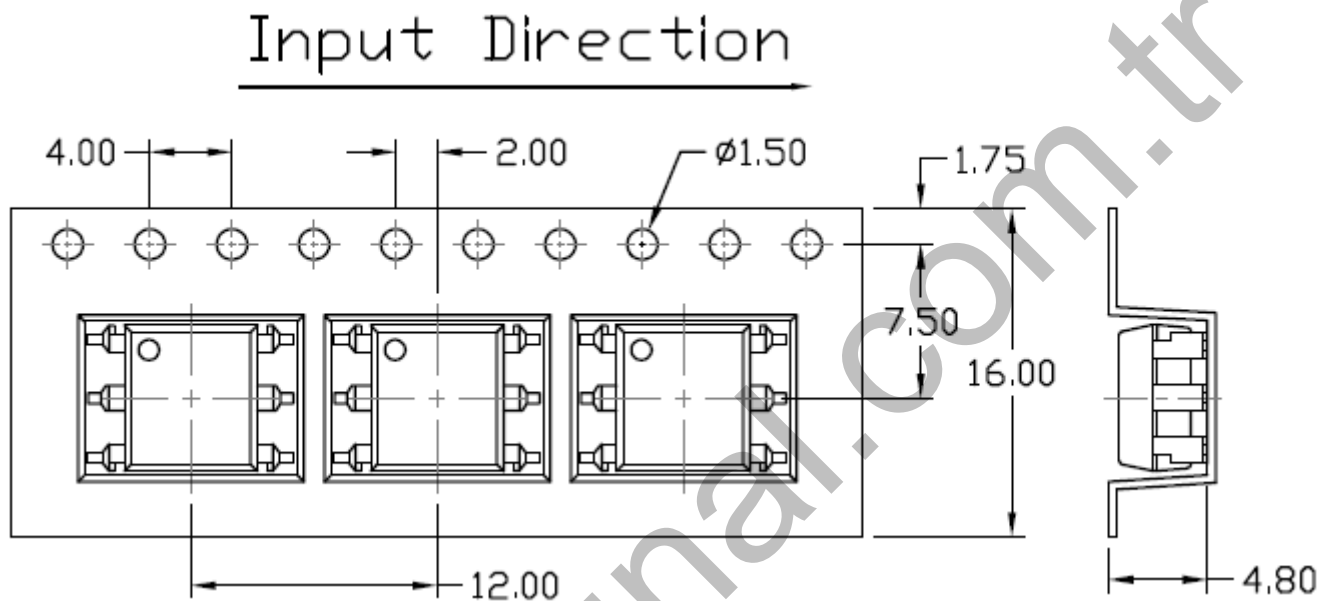
Option	Description	Quantity
None	Standard 6 Pin Dip	50Units/Tube
M	Wide Lead Forming	50Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount Lead Forming(Low Profile) – With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount Lead Forming(Low Profile) – With Option 2 Taping	1000 Units/Reel



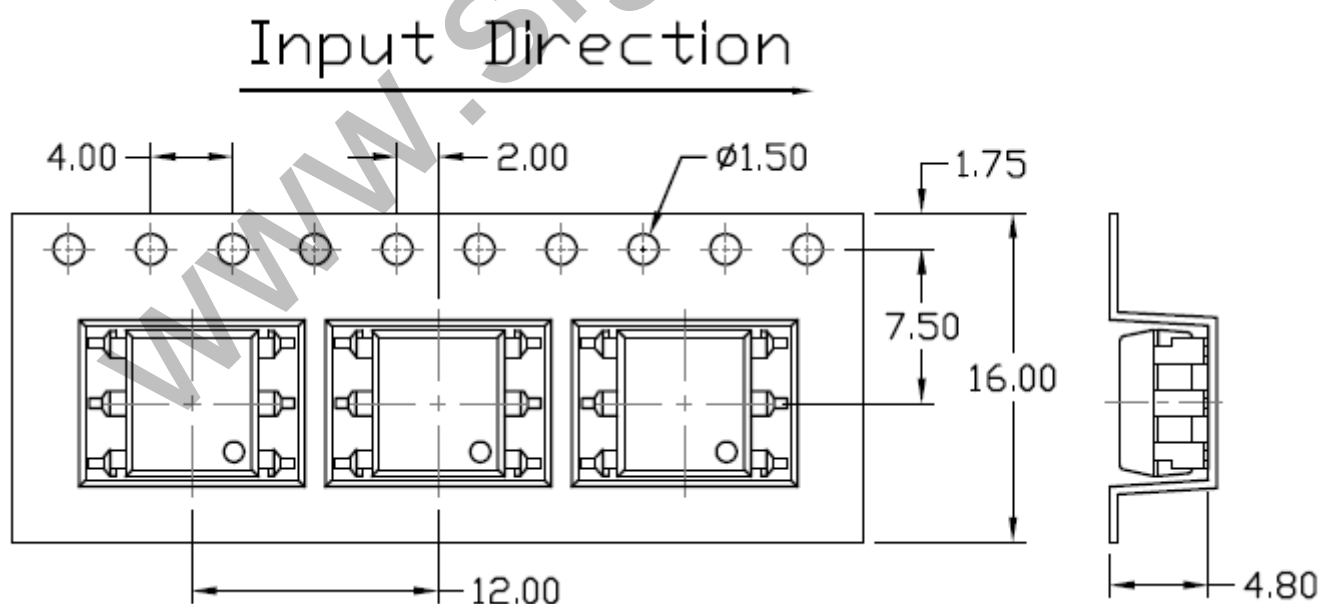
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)



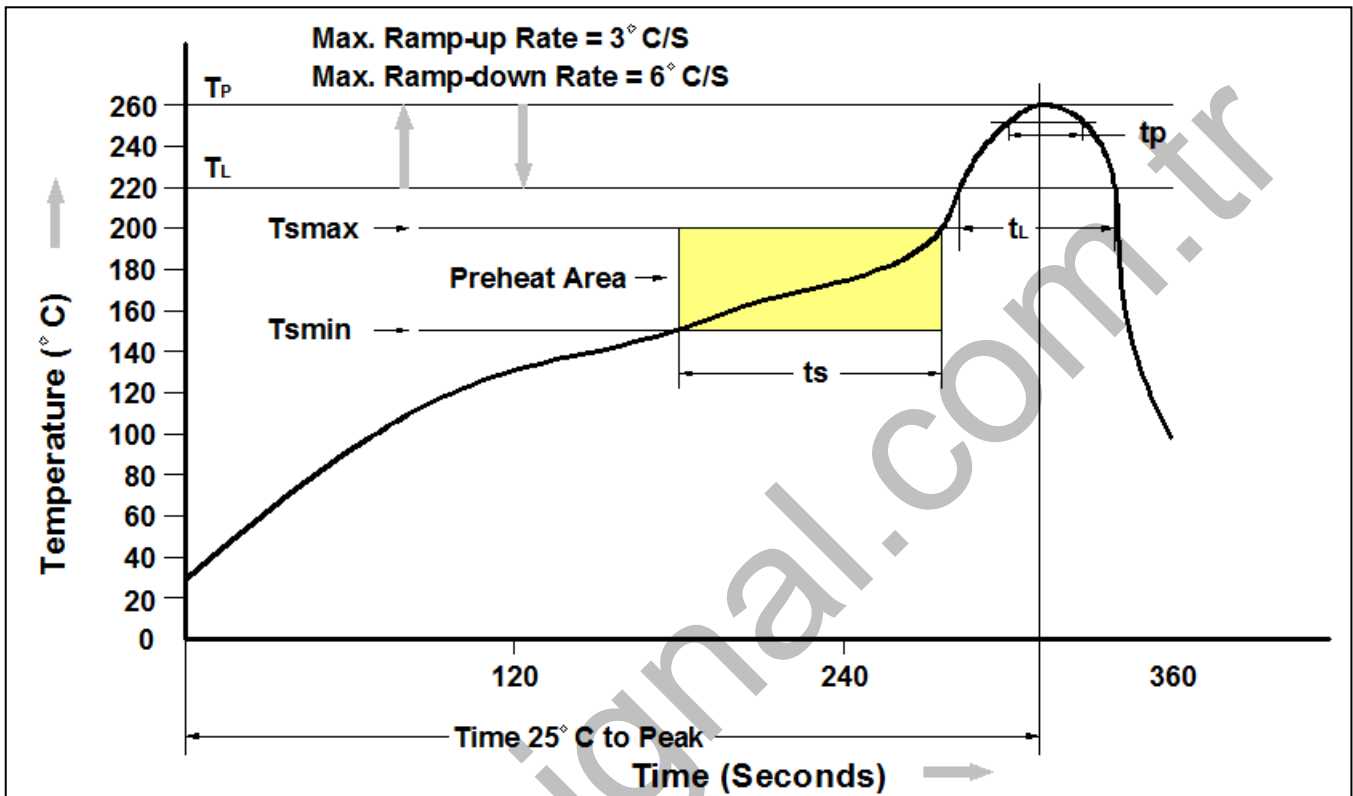
Option S(T2) & SL(T2)





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Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{min})	150°C
Temperature Max. (T _{max})	200°C
Time (t _s) from (T _{min} to T _{max})	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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