



4N2X, 4N3X, H11AX

6Pin Photo Transistor Coupler

CT Micro

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Temperature range - 55 °C to 110 °C

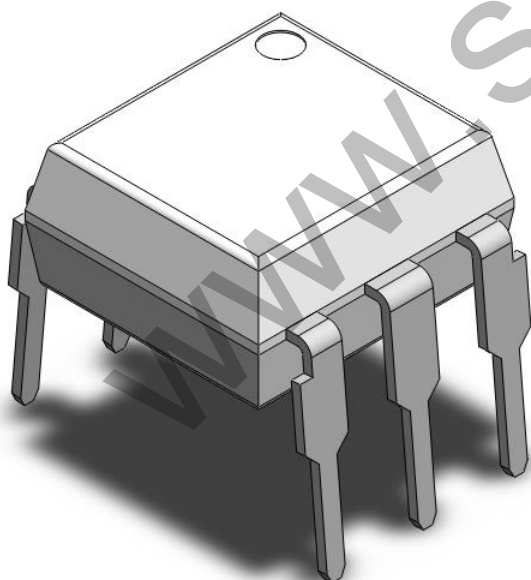
Applications

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

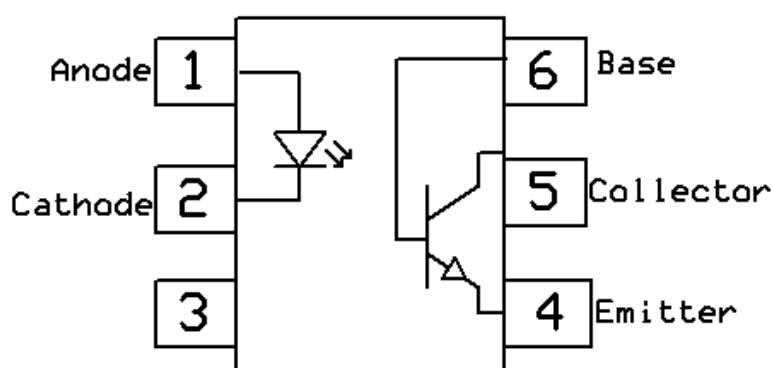
Description

The 4N2X, 4N3X and H11AX series consists of a phototransistor optically coupled to a gallium arsenide Infrared-emitting diode in a 6-lead DIP package with bending options.

Package Outline



Schematic



Note: Different bending options available. See package dimension.



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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 ~ +125	°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 _{VCEO}	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	$I_F = 10\text{mA}$		1.2	1.4	V	
I_R	Reverse Current	$V_R = 6\text{V}$	-	-	5	μA	
C_{IN}	Input Capacitance	$f = 1\text{kHz}$	-	45	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 100\mu\text{A}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 1\text{mA}$	7	-	-	V	
$B_{V_{CBO}}$	Collector-Base Breakdown	$I_C = 100\mu\text{A}$	80	-	-	V	
$B_{V_{EBO}}$	Emitter-Base Breakdown	$I_E = 100\mu\text{A}$	7	-	-	V	
I_{CEO}	Collector-Emitter	4N2X, H11AX	$V_{CE} = 10\text{V}, I_F = 0\text{mA}$	-	-	45	nA
	Dark Current	4N3X	$V_{CE} = 60\text{V}, I_F = 0\text{mA}$	-	-	45	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, 4N36, 4N37	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	100	-	-	%
		4N25, 4N26, 4N38, H11A2, H11A3		20	-	-	
		4N27, 4N28, H11A4		10	-	-	
		H11A1		50	-	-	
		H11A5		30	-	-	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	4N2X	$I_F = 50\text{mA}, I_C = 2\text{mA}$	-	-	0.5	V
		4N35, 4N36, 4N37	$I_F = 10\text{mA}, I_C = 0.5\text{mA}$	-	-	0.3	
		H11AX		-	-	0.4	
		4N38	$I_F = 20\text{mA}, I_C = 4\text{mA}$	-	-	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	4N2X, H11AX I _F = 10mA, V _{CE} = 10V, R _L = 100Ω	-	2.6	9.8	μs	
		4N3X I _C = 2mA, V _{CE} = 10V, R _L = 100Ω	-	9.5	11.5		
T _{OFF}	Turn Off Time	4N2X, H11AX I _F = 10mA, V _{CE} = 10V, R _L = 100Ω	-	2.6	9.8	μs	
		4N3X I _C = 2mA, V _{CE} = 10V, R _L = 100Ω	-	9.5	11.5		



Typical Characteristic Curves

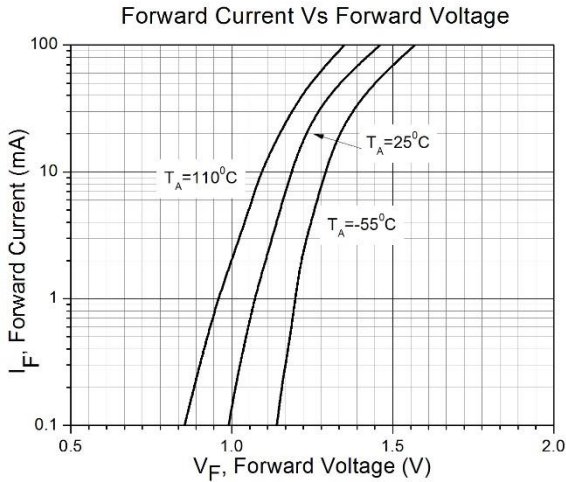


Figure 1

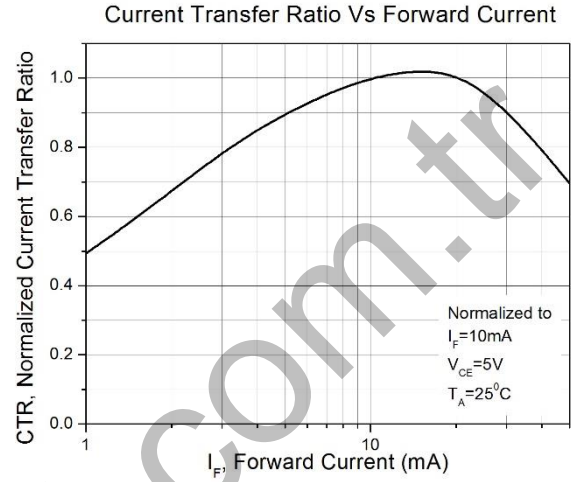


Figure 2

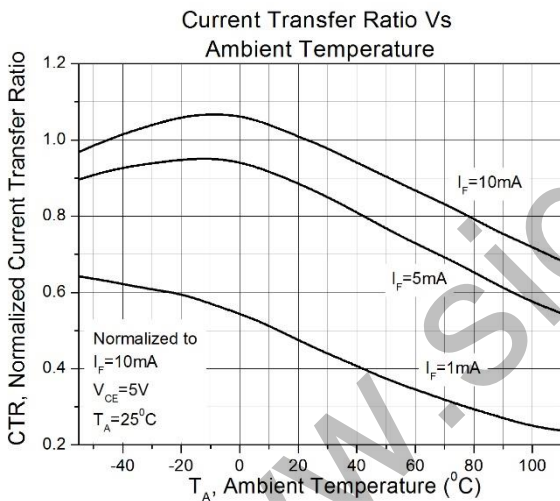


Figure 3

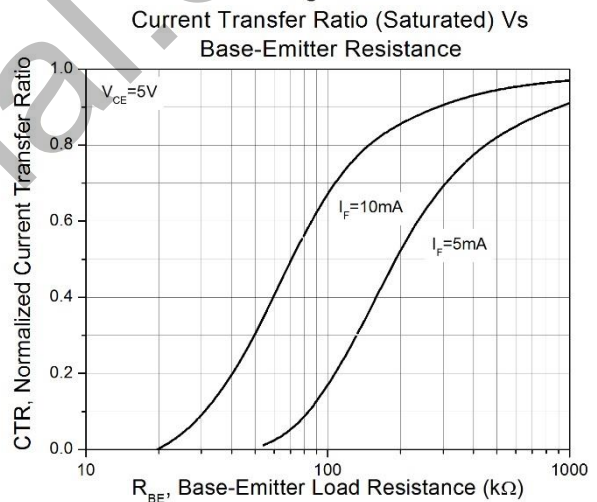


Figure 4

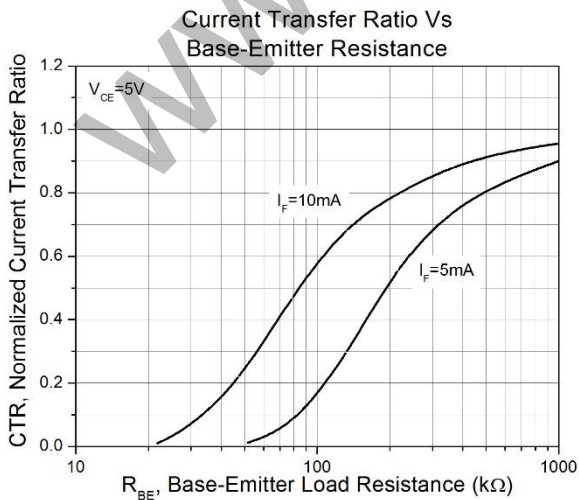


Figure 5

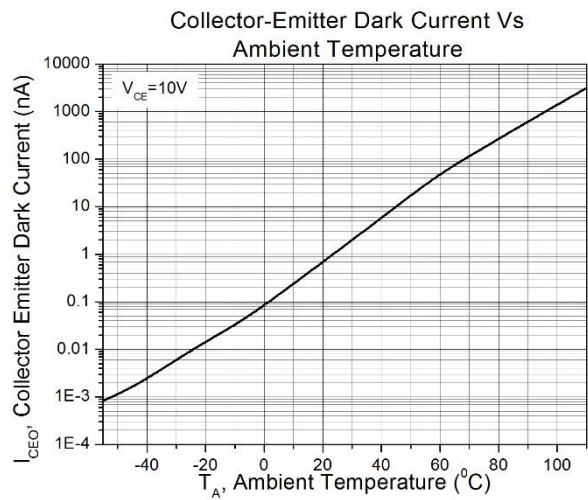


Figure 6



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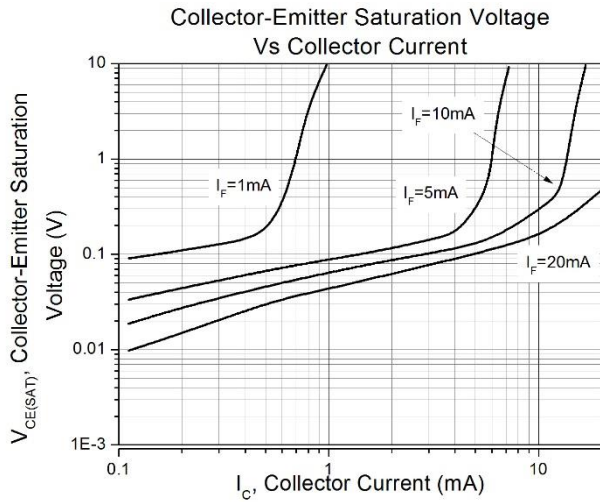


Figure 7

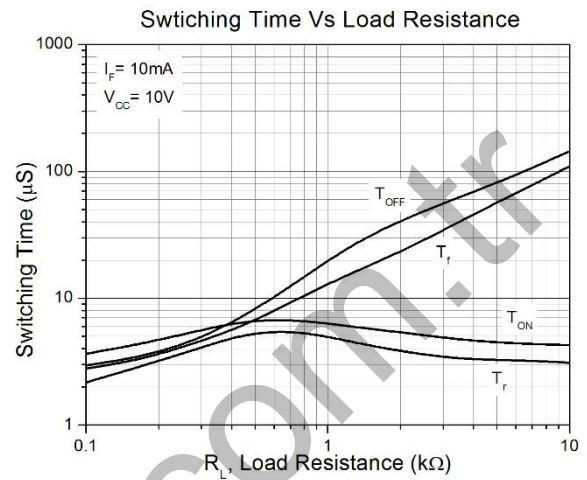


Figure 8

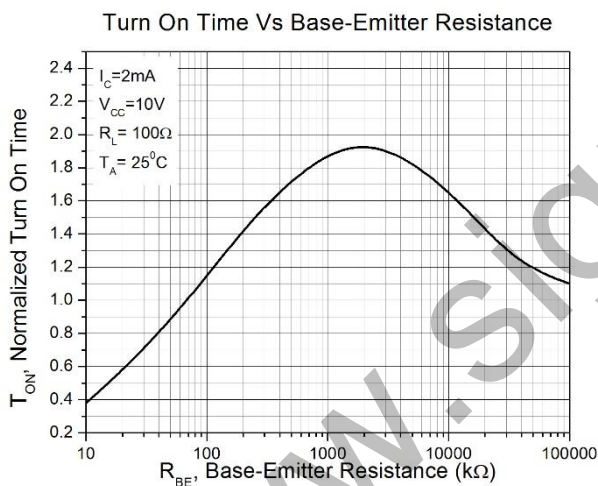


Figure 9

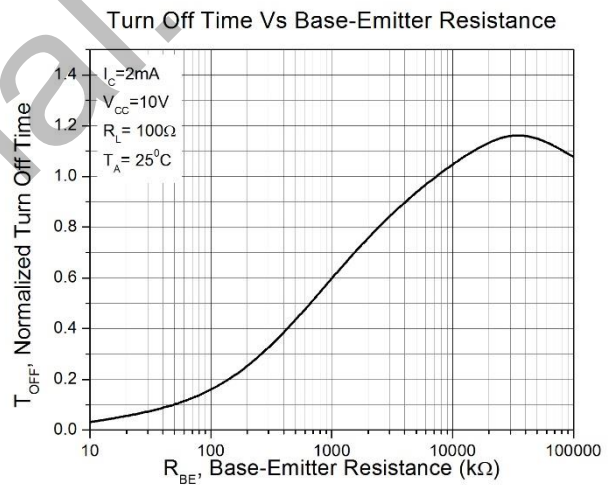


Figure 10



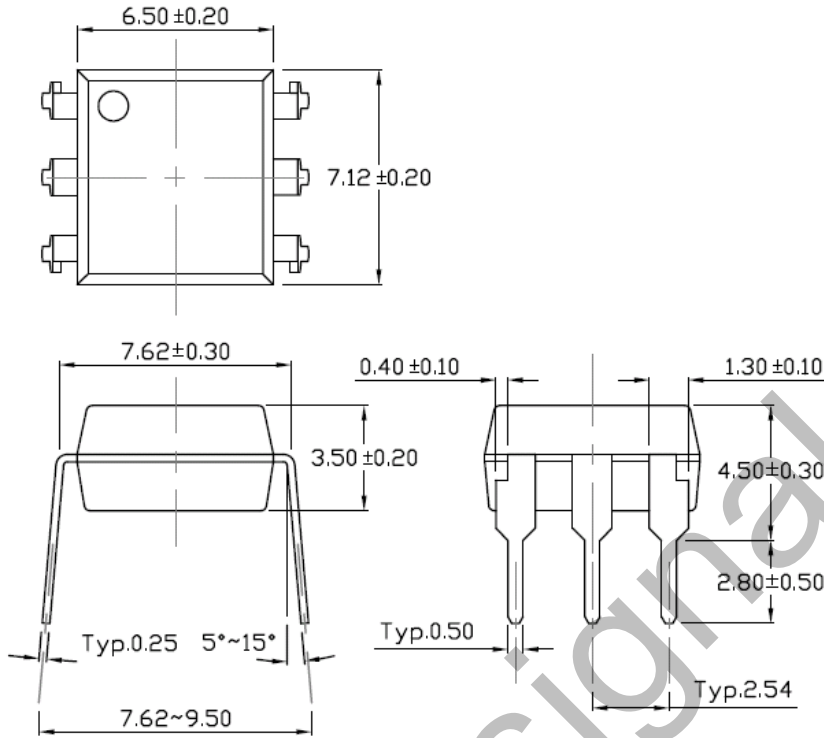
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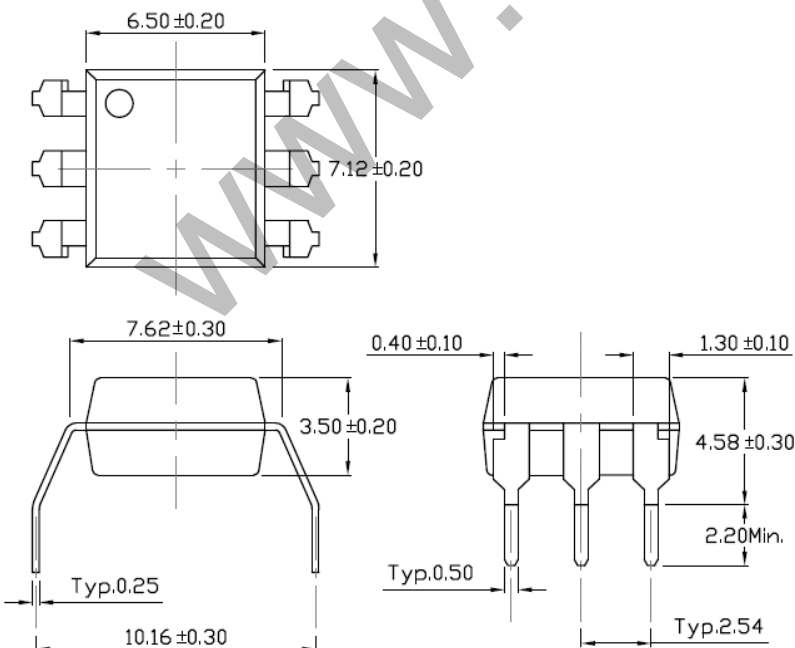
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Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



Wide Lead Forming – Through Hole



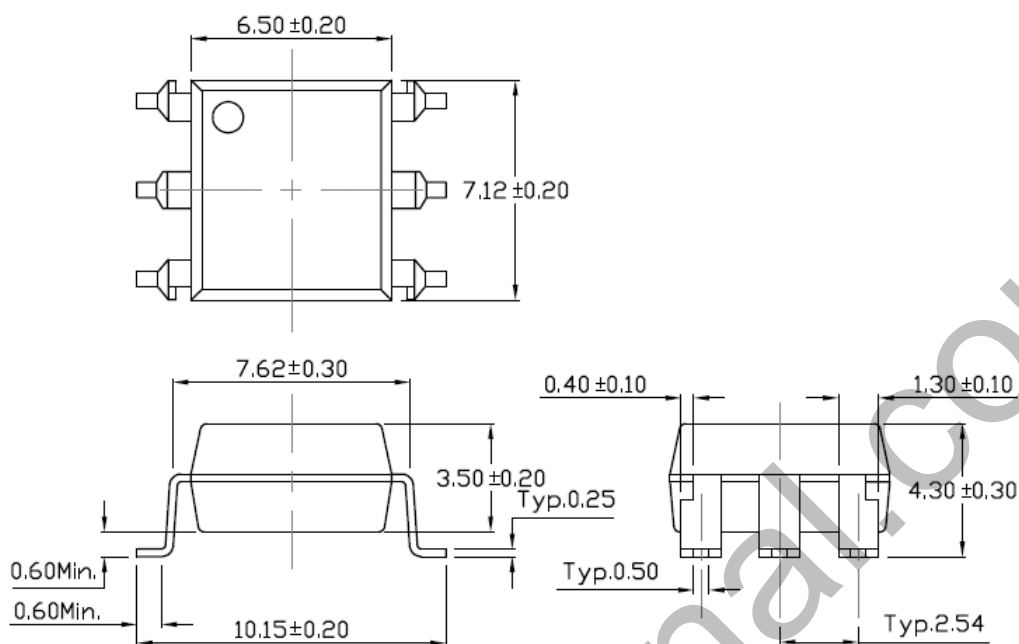


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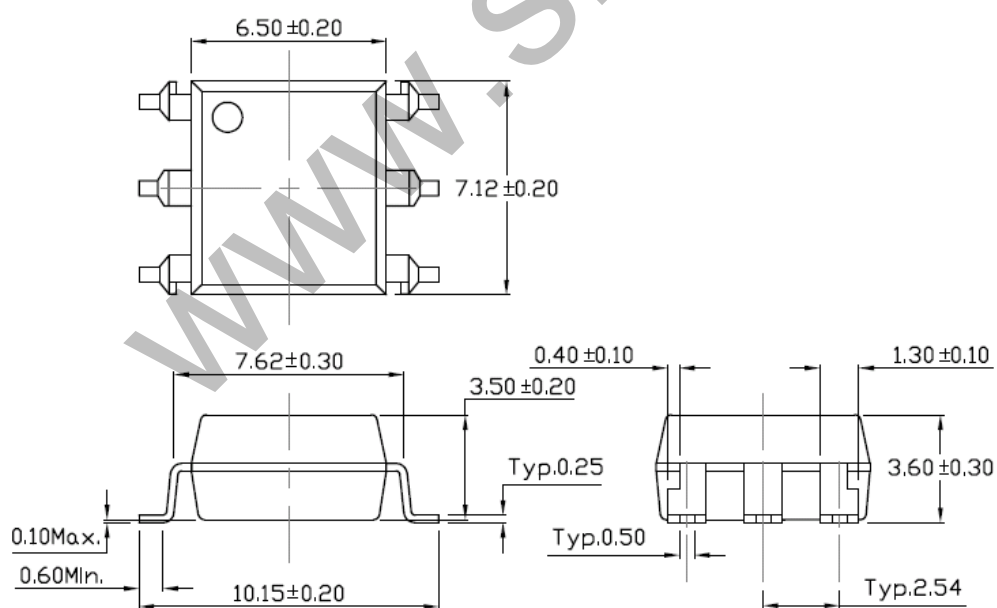
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Surface Mount Forming



Surface Mount Forming (Low Profile)



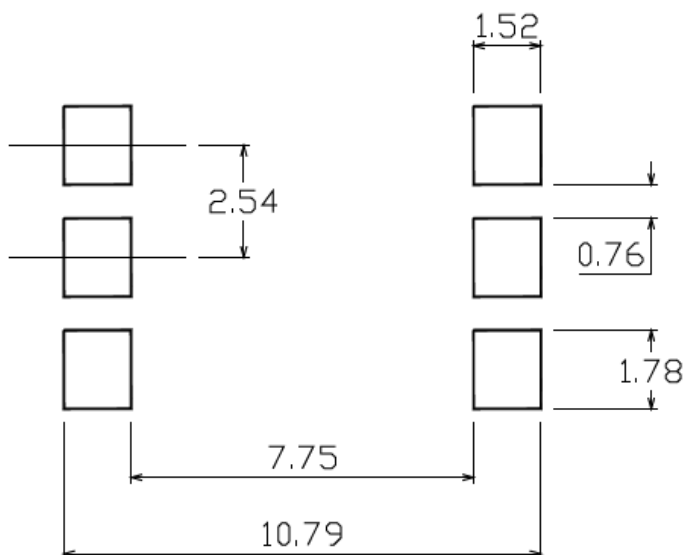


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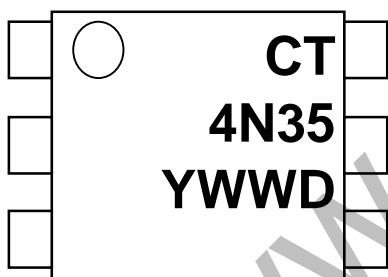
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Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information



Note:

- CT : Logo
- 4N35 : Product Number
- Y : Fiscal Year
- WW : Work Week
- D : Production Code



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Ordering Information

4N2X(Y)(Z)-G, 4N3XY(Z)-G, H11AXY(Z)-G

X = (5,6,7,8 for 4N2X & 4N3X series), (1,2,3,4,5 for H11AX series)

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

Z = Tape and reel option (TA, TB or none)

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

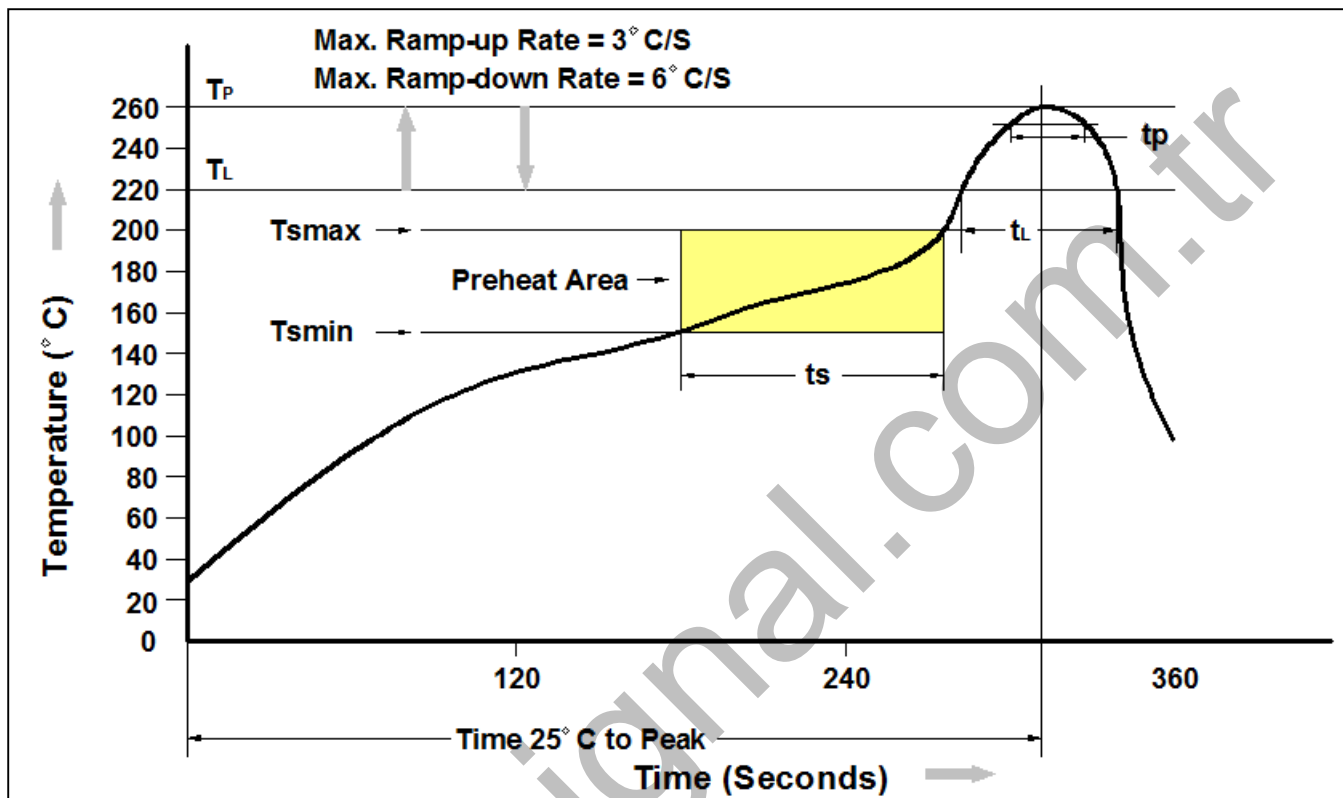
Option	Description	Quantity
None	Standard 6 Pin Dip	50Units/Tube
M	Wide Lead Forming	50Units/Tube
S(TA)	Surface Mount Lead Forming – With Option A Taping	1000 Units/Reel
S(TB)	Surface Mount Lead Forming – With Option B Taping	1000 Units/Reel
SL(TA)	Surface Mount Lead Forming(Low Profile) – With Option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



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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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