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## 4N2X, 4N3X, H11BX, TIL113 6Pin Photo Darlington Coupler

### Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Temperature range - 55 °C to 100 °C

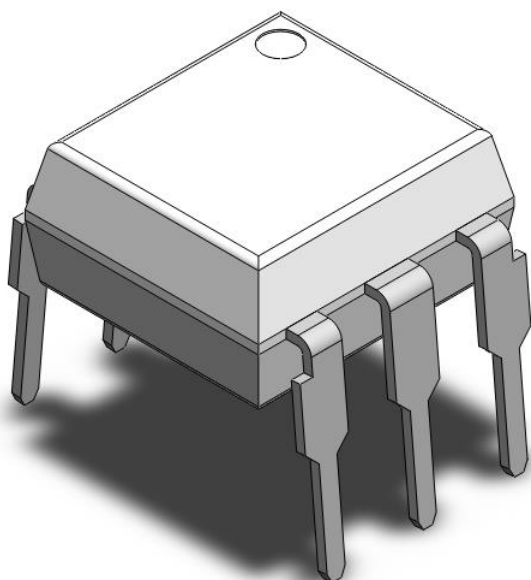
### Applications

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

### Description

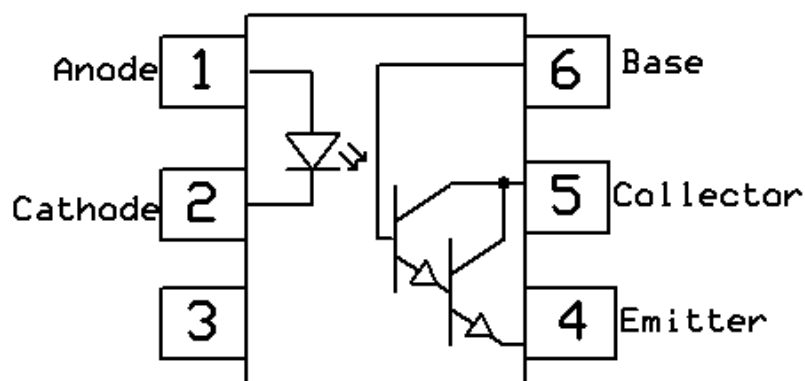
The 4N2X, 4N3X, H11BX and TIL113 series consists of a photo darlington optically coupled to a gallium arsenide Infrared-emitting diode in a 6-lead DIP package with bending options.

### Package Outline



*Note: Different bending options available. See package dimension.*

### Schematic





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### Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V <sub>ISO</sub>	Isolation voltage	5000	V <sub>RMS</sub>	
T <sub>OPR</sub>	Operating temperature	-55 ~ +100	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +125	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	60	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Power dissipation	100	mW	
<b>Detector</b>				
P <sub>D</sub>	Power dissipation	150	mW	
B <sub>VCEO</sub>	Collector-Emitter Breakdown Voltage	55	V	
B <sub>VCB0</sub>	Collector-Base Breakdown Voltage	55	V	
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	7	V	
B <sub>VEBO</sub>	Emitter-Base Breakdown Voltage	7	V	



# 4N2X, 4N3X, H11BX, TIL113

## 6Pin Photo Darlington Coupler

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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	1.7	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	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	$I_E = 1\text{mA}$	7	-	-	V	
$B_{V_{CBO}}$	Collector-Base Breakdown	$I_C = 100\mu\text{A}$	55	-	-	V	
$I_{CEO}$	Collector-Emitter Dark Current	$V_{CE} = 10\text{V}, I_F = 0\text{mA}$	-	-	50	nA	

#### Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	4N29, 4N30	100	-	-	%	
		4N31	50	-	-		
		4N32, 4N33	500	-	-		
		H11B1	500	-	-		
		H11B2	200	-	-		
		H11B3	100	-	-		
		H11B255	100	-	-		
		TIL113	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	$I_F = 8\text{mA}, I_C = 2\text{mA}$	-	-	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	$V_{IO} = 500\text{V}_{DC}$	$1 \times 10^{11}$			$\Omega$	
$C_{IO}$	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 <sub>ON</sub>	Turn On Time	4N2X, 4N3X, TIL113	I <sub>F</sub> = 200mA, I <sub>C</sub> = 50mA, R <sub>L</sub> = 100Ω	-	-	4.7	μs	
		H11BX	I <sub>F</sub> = 10mA, V <sub>CE</sub> = 10V, R <sub>L</sub> = 100Ω	-	24	-		
T <sub>OFF</sub>	Turn Off Time	4N29, 4N30, 4N31	I <sub>F</sub> = 200mA, I <sub>C</sub> = 50mA, R <sub>L</sub> = 100Ω	-	-	30	μs	
		4N32, 4N33, TIL113		-	-	90		
		H11BX	I <sub>F</sub> = 10mA, V <sub>CE</sub> = 10V, R <sub>L</sub> = 100Ω	-	17	-		



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# 4N2X, 4N3X, H11BX, TIL113

## 6Pin Photo Darlington Coupler

### Typical Characteristic Curves

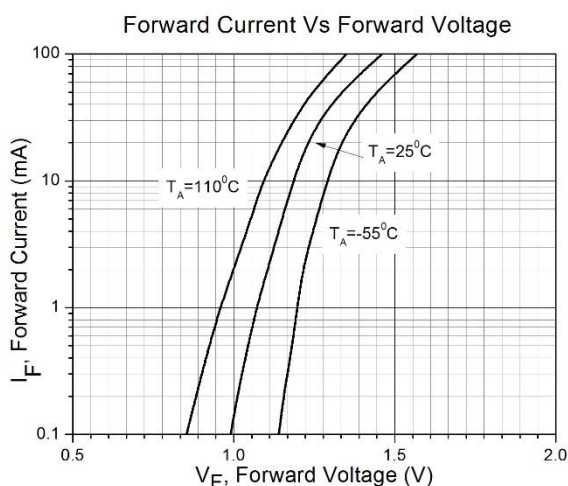


Figure 1

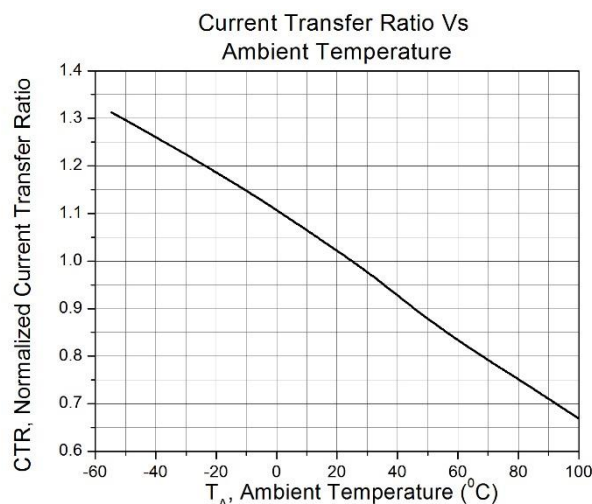


Figure 2

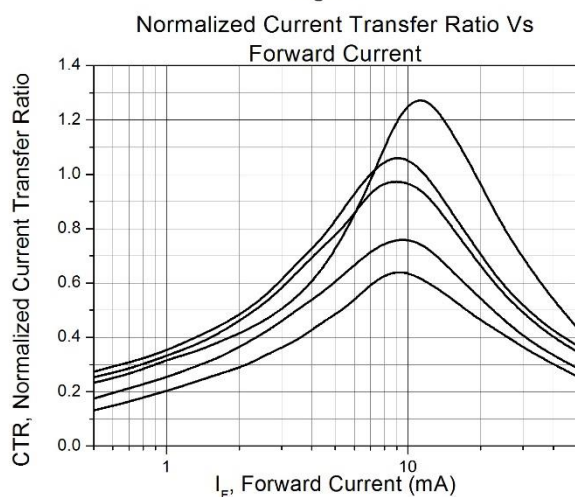


Figure 3

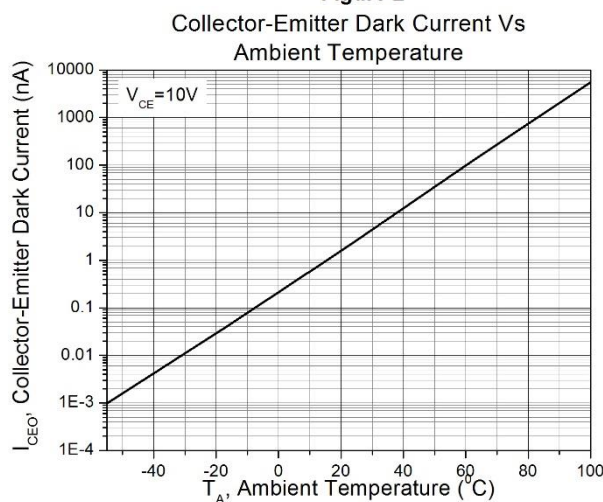


Figure 4

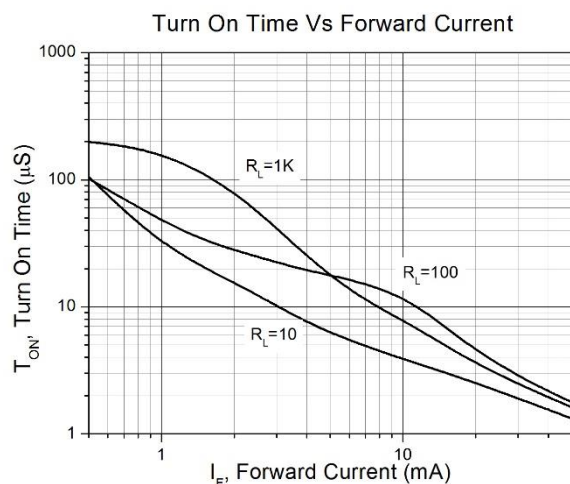


Figure 5

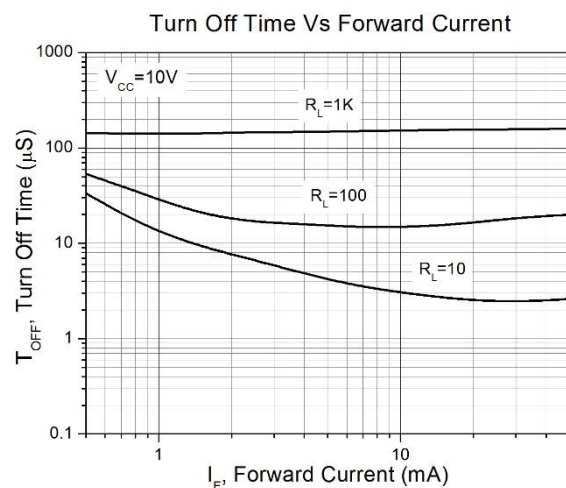


Figure 6

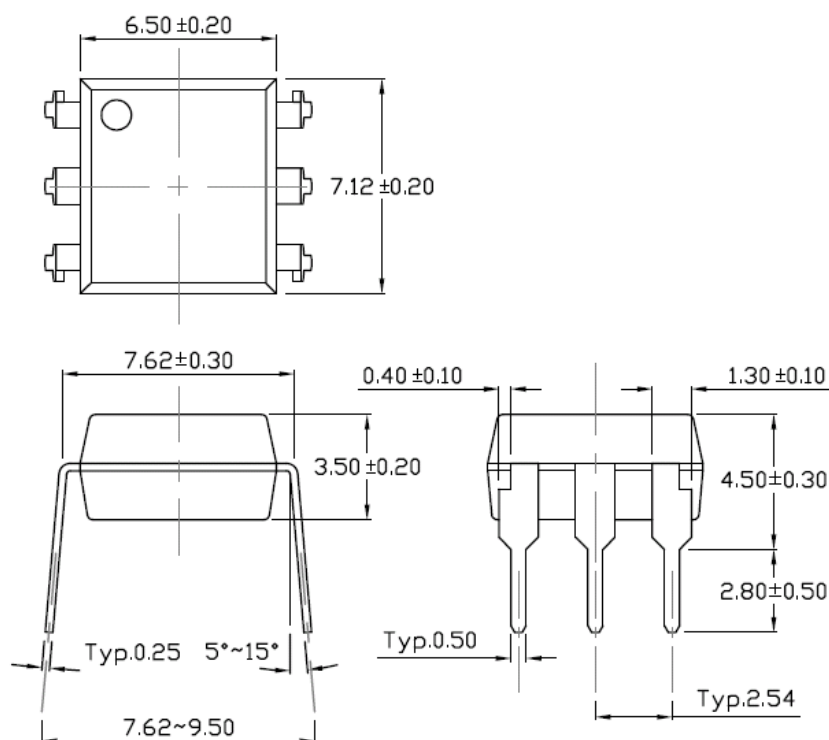


# 4N2X, 4N3X, H11BX, TIL113 6Pin Photo Darlington Coupler

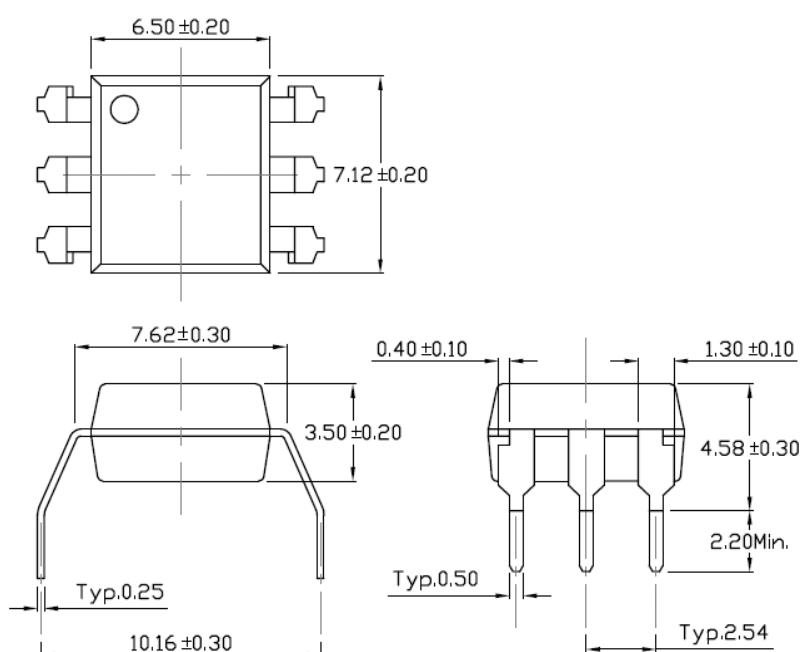
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## Package Dimension *Dimensions in mm unless otherwise stated*

### Standard DIP – Through Hole



### Wide Lead Forming – Through Hole

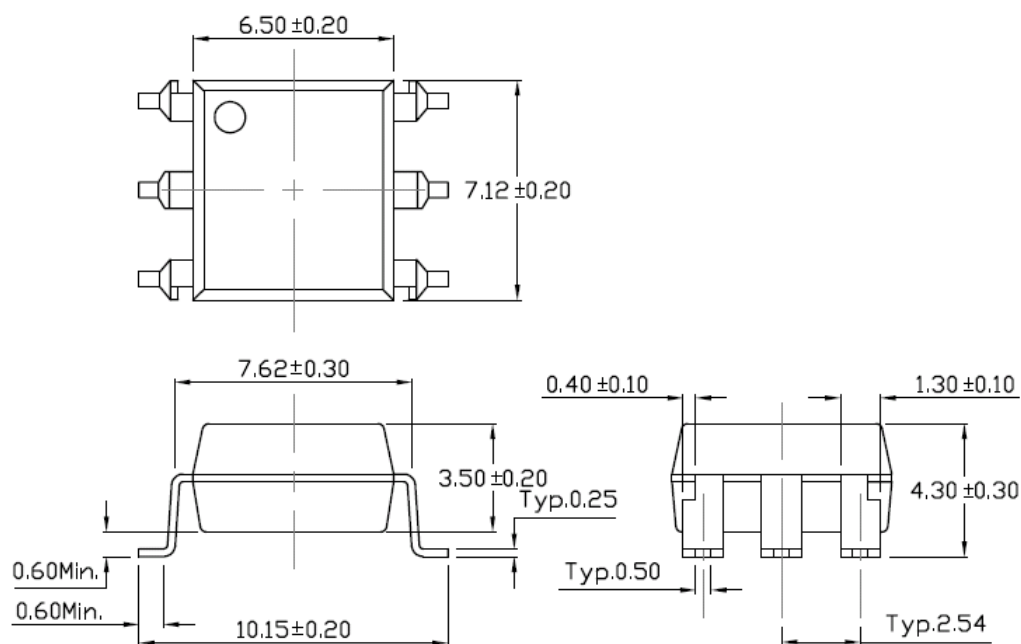




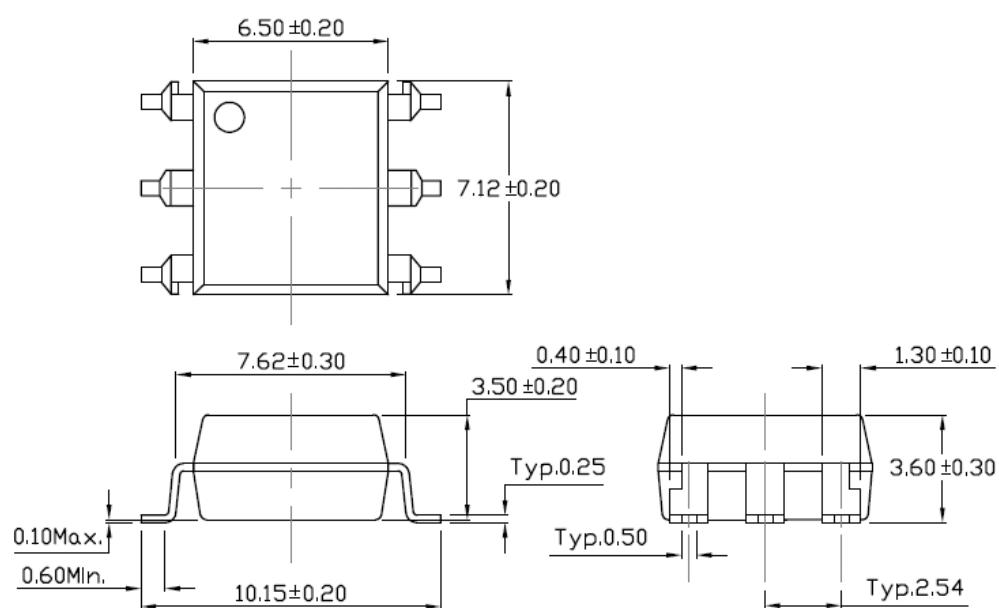
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## Surface Mount Forming



## Surface Mount Forming (Low Profile)

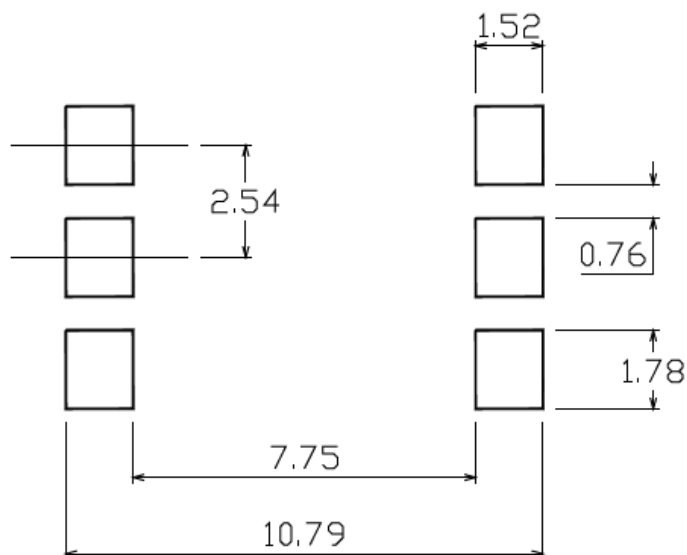




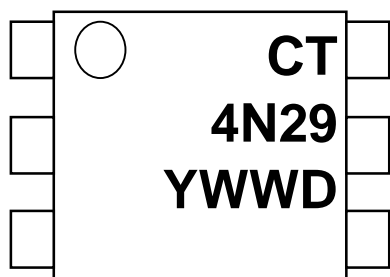
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## 4N2X, 4N3X, H11BX, TIL113 6Pin Photo Darlington Coupler

### Recommended Solder Mask Dimensions in mm unless otherwise stated



### Marking Information



#### Note:

CT : Logo  
4N29 : Product Number  
Y : Fiscal Year  
WW : Work Week  
D : Production Code





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## 4N2X, 4N3X, H11BX, TIL113 6Pin Photo Darlington Coupler

### Ordering Information

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

X = Part. No. (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 (TA, TB or none)

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

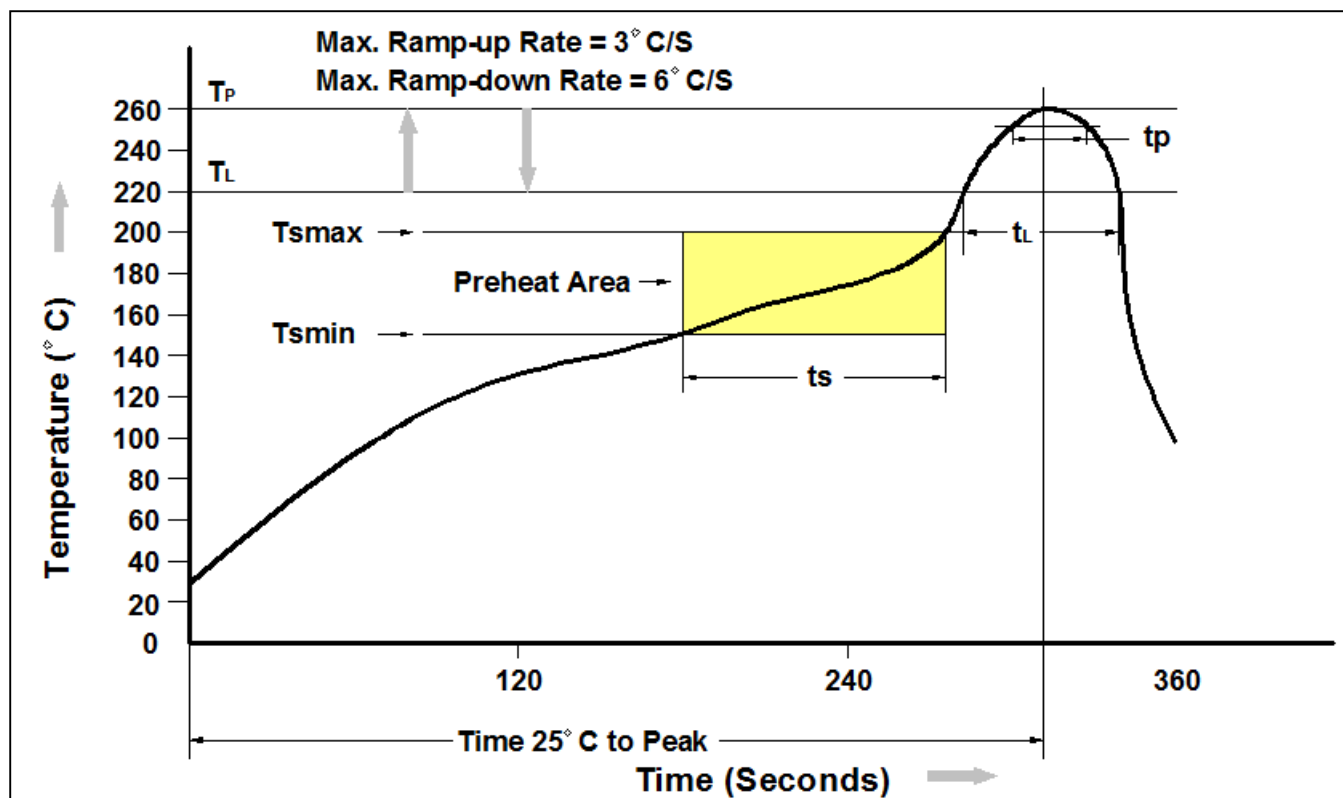
<b>Option</b>	<b>Description</b>	<b>Quantity</b>
None	Standard 6 Pin Dip	50Units/Tube
M	Wide Lead Forming	50Units/Tube
S(TA)	Surface Mount Lead Forming – With Option A Taping	1000 Units/Reel
S(TB)	Surface Mount Lead Forming – With Option B Taping	1000 Units/Reel
SL(TA)	Surface Mount Lead Forming(Low 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. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Ramp-up Rate (tL to tP)	3°C/second max.
Liquidous Temperature (TL)	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (tP) within 5°C of 260°C	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



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