CTW20X Series

Widebody High-Linearity Analong Optocoupler

Features

- High isolation 8000 VRMS
- Operating temperature range - 55 °C to 100 °C
- DMC® structure

Applications

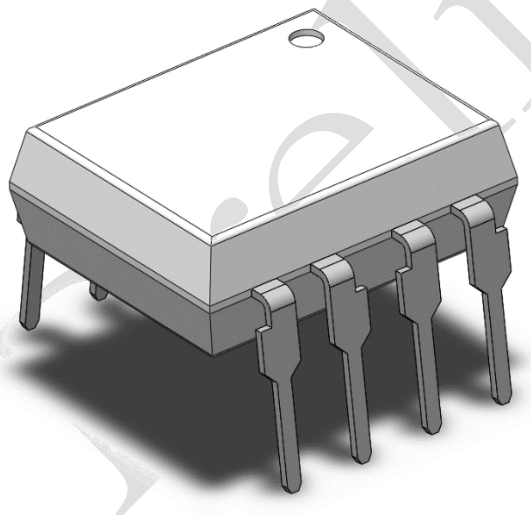
- Power supply feedback voltage / current
- Medical sensor isolation
- Audio signal interfacing
- Isolated process control transducers
- Digital telephone isolation

Description

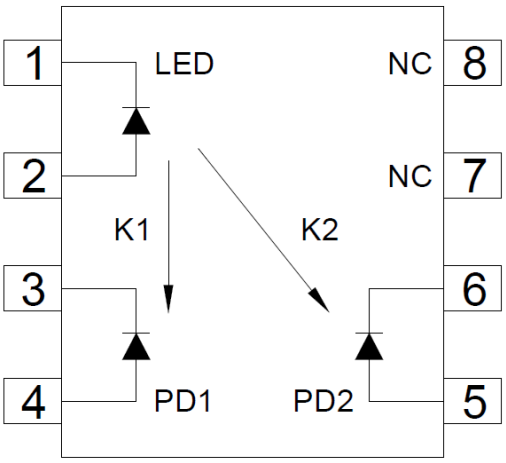
The CTW20X linear optocoupler consists of an AlGaAs IRLED irradiating an isolated feedback and an output PIN photodiode in a bifurcated arrangement. The feedback photodiode captures a percentage of the LEDs flus and generates a control signal (I_{P1}) that can be used to servo the LED deive current. This technique compensates for the LED's non-linear, time, and temperature characteristics. The output PIN photodiode produces an output signal (I_{P2}) that is linearly related to the servo optical flus created by the LED.

The time and temperature stability of the input-output coupler gain (K3) is insured by using matched PIN photodiode that accurately track the output flus of the LED.

Package Outline



Schematic



Absolute Maximum Rating at 25°C

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{ISO}	Isolation voltage	8000	V_{RMS}	
T_{OPR}	Operating temperature	-55 ~ +100	°C	
T_{STG}	Storage temperature	-55 ~ +150	°C	
T_J	Junction temperature	125	°C	
T_{SOL}	Soldering temperature	260	°C	
Emitter				
I_F	Forward current	25	mA	
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)	40	mA	
V_R	Reverse voltage	2.5	V	
P_D	Emitter power dissipation (1 Circuit)	60	mW	
Detector				
$P_{DR(3-4)}$	Reverse Output Photodiode Voltage	30	V	
$P_{DR(6-5)}$	Reverse Input Photodiode Voltage	30	V	

Electrical Characteristics T_A = 25°C (unless otherwise specified)

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward voltage	I_F = 10mA	1.3	1.45	1.85	V	
I_R	Reverse Current	V_R = 5V	-	-	10	μA	
C_{IN}	Input Capacitance	f = 1MHz	-	30	-	pF	

Detector Characteristics

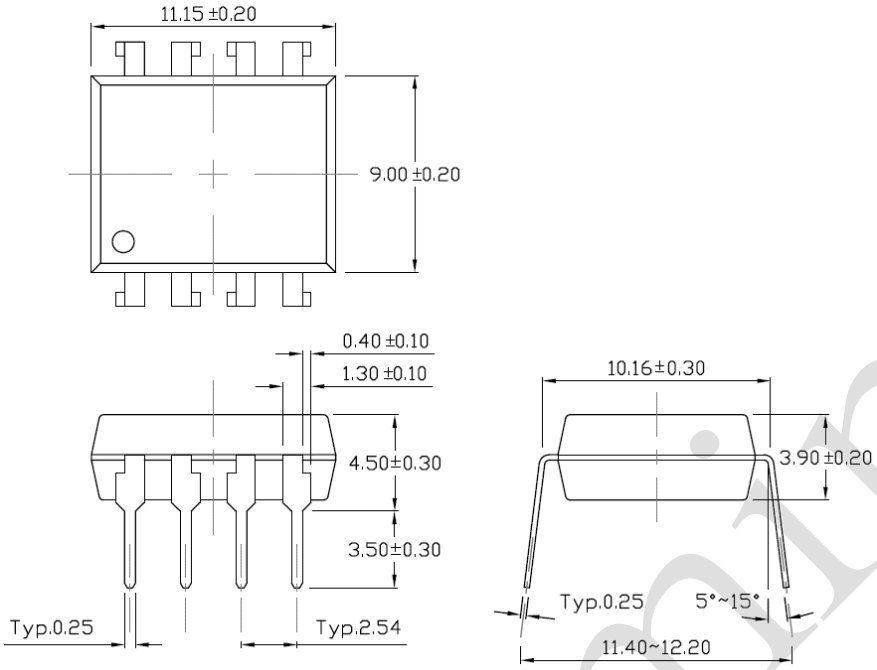
Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
K_3	Transfer Gain	CTW200	5nA < I_{PD} < 50μA,	0.85	1.00	1.15		
		CTW201	0V < V_{PD} < 15V	0.95	1.00	1.05		
$\Delta K_3/\Delta T_A$	Temperature Coefficient of Transfer Gain		-40℃ < T_A < 85℃, 5nA < I_{PD} < 50μA, 0V < V_{PD} < 15V		-65		ppm/℃	
NL_{BF}	DC NonLinearity (Best Fit)	CTW200	5nA < I_{PD} < 50μA,		0.01	0.25	%	
		CTW201	0V < V_{PD} < 15V		0.01	0.05		
NL_{EF}	DC NonLinearity (Ends Fit)		5nA < I_{PD} < 50μA, 0V < V_{PD} < 15V		0.016		%	
C_{PD}	Photodiode Capacitance		V_{PD} = 0V		22		pF	

Transfer Characteristics

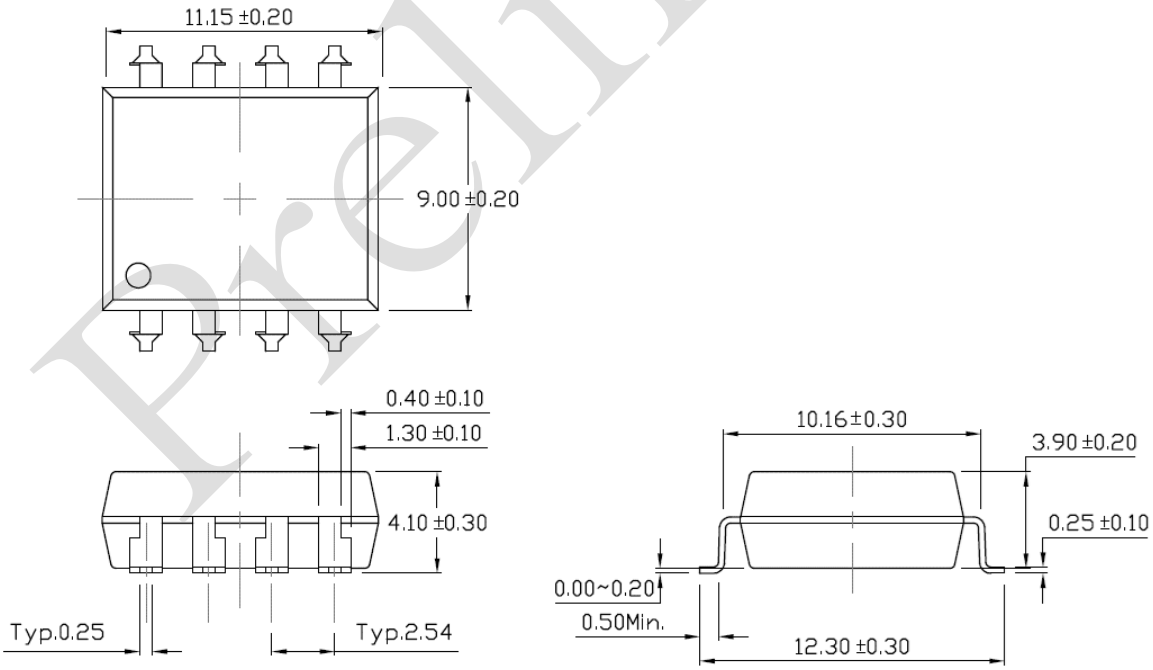
Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
K_1	Input Photo-diode Current Transfer Ratio (I_{PD}/I_F)	CTW200	I_F = 10mA, 0V < V_{PD1} < 15V	0.25	0.50	0.75	%	
		CTW201		0.36	0.48	0.72		
$\Delta K_1/\Delta T_A$	Temperature Coefficient of K_1		-40℃ < T_A < 85℃, I_F = 10mA, 0V < V_{PD1} < 15V		-0.3		%/℃	
I_{LK}	Photodiode Leakage Current		I_F = 0mA, V_{PD1} = 15V		0.5	25	nA	
BV_{RPD}	Photodiode Reverse Breakdown Voltage		I_R = 100μA	30	150		V	

Package Dimension *Dimensions in mm unless otherwise stated*

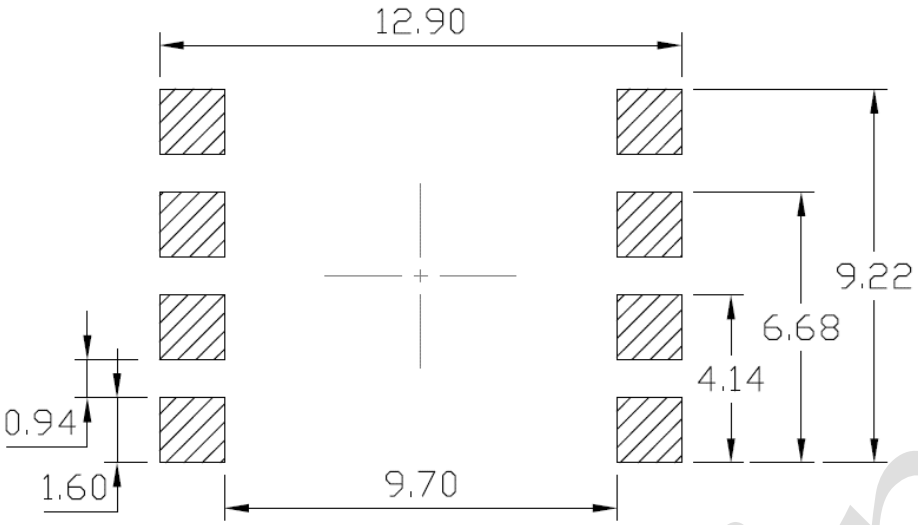
Standard DIP – Through Hole



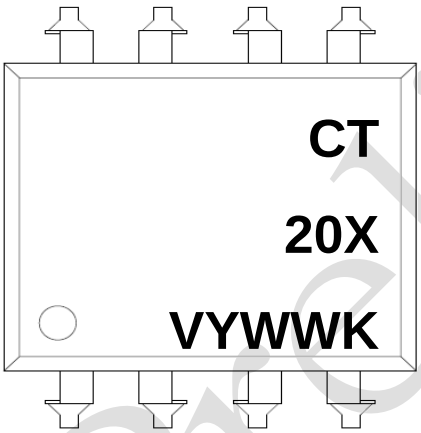
Surface Mount Lead Forming (SL Type)



Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information



Note:

CT	: Denotes “CT Micro”
20	: Part Number
X	: Rank (X= 0 or 1)
V	: Safety House Option (V or none)
Y	: Fiscal Year
WW	: Work Week
K	: Manufacturing Code

Ordering Information

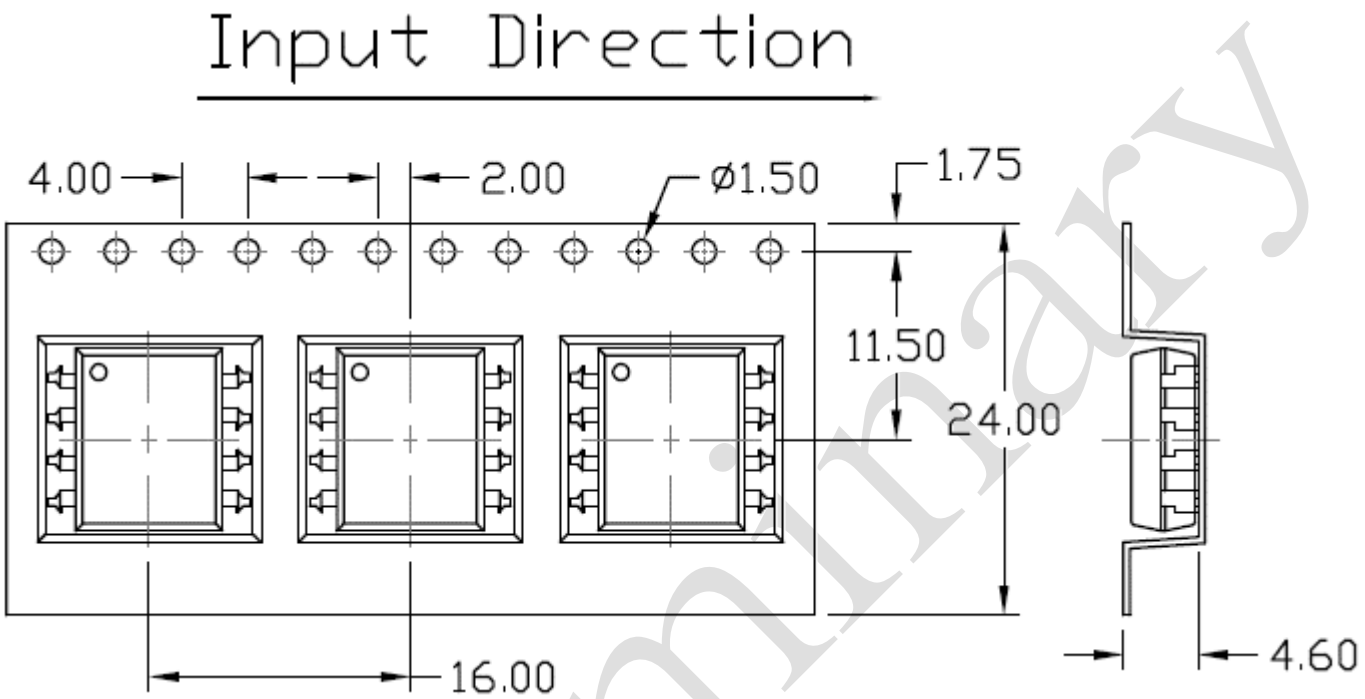
CTW20X(V)(Y)(Z)

X : Part No. (X= 0 or 1)
V : VDE Option (V or none)
Y : Lead form option (SL or none)
Z : Tape and reel option (T1, T2 or none)

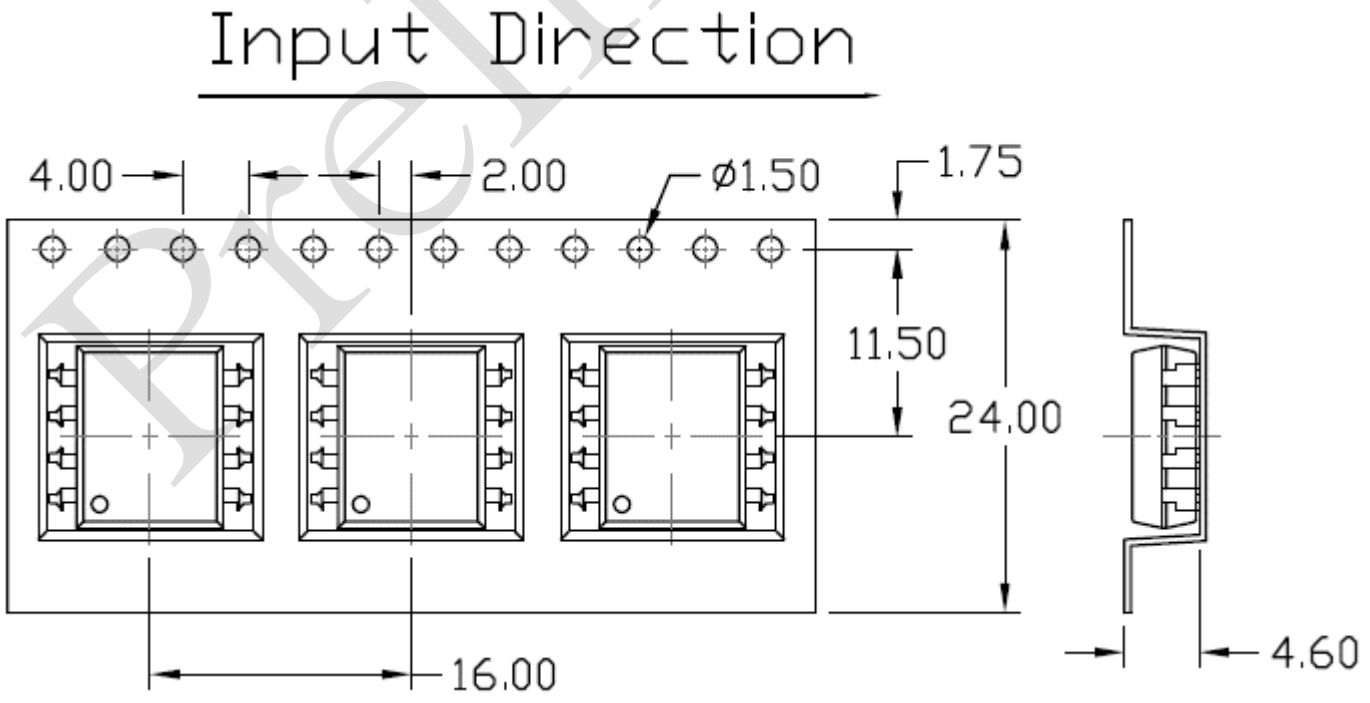
Option	*Description*	*Quantity*
None	Standard 8 Pin Dip	40 Units/Tube
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	750 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming– With Option 2 Taping	750 Units/Reel

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option SL(T1)

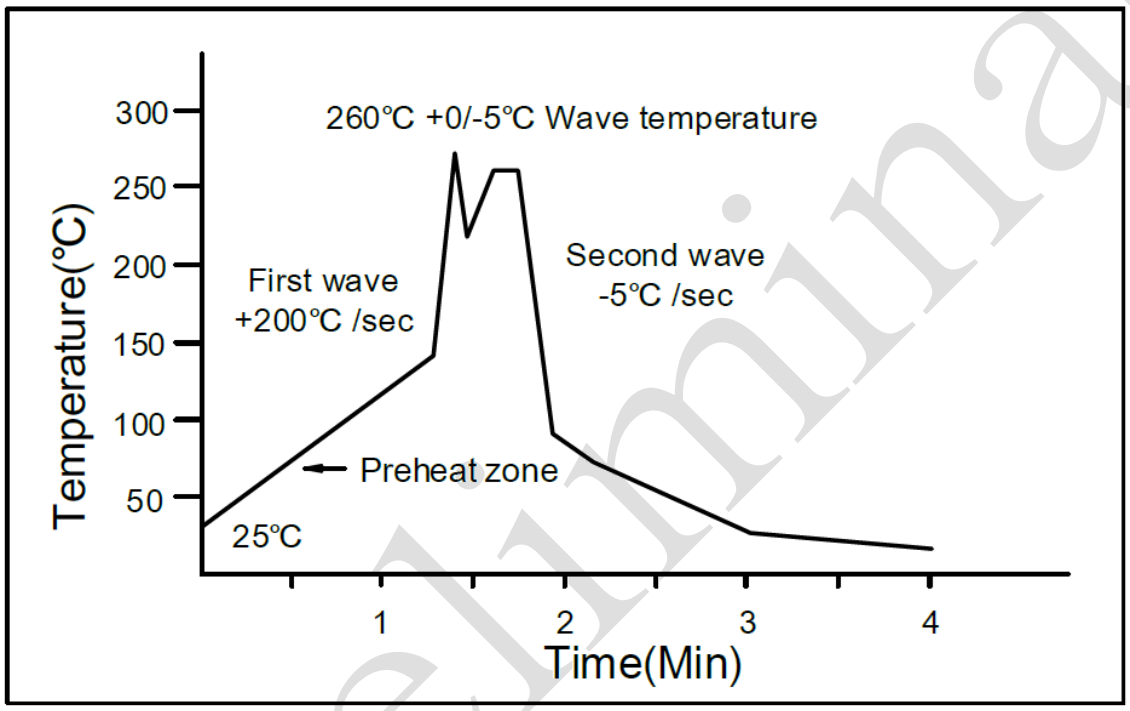


Option SL(T2)



Wave soldering (follow the JEDEC standard JESD22-A111)

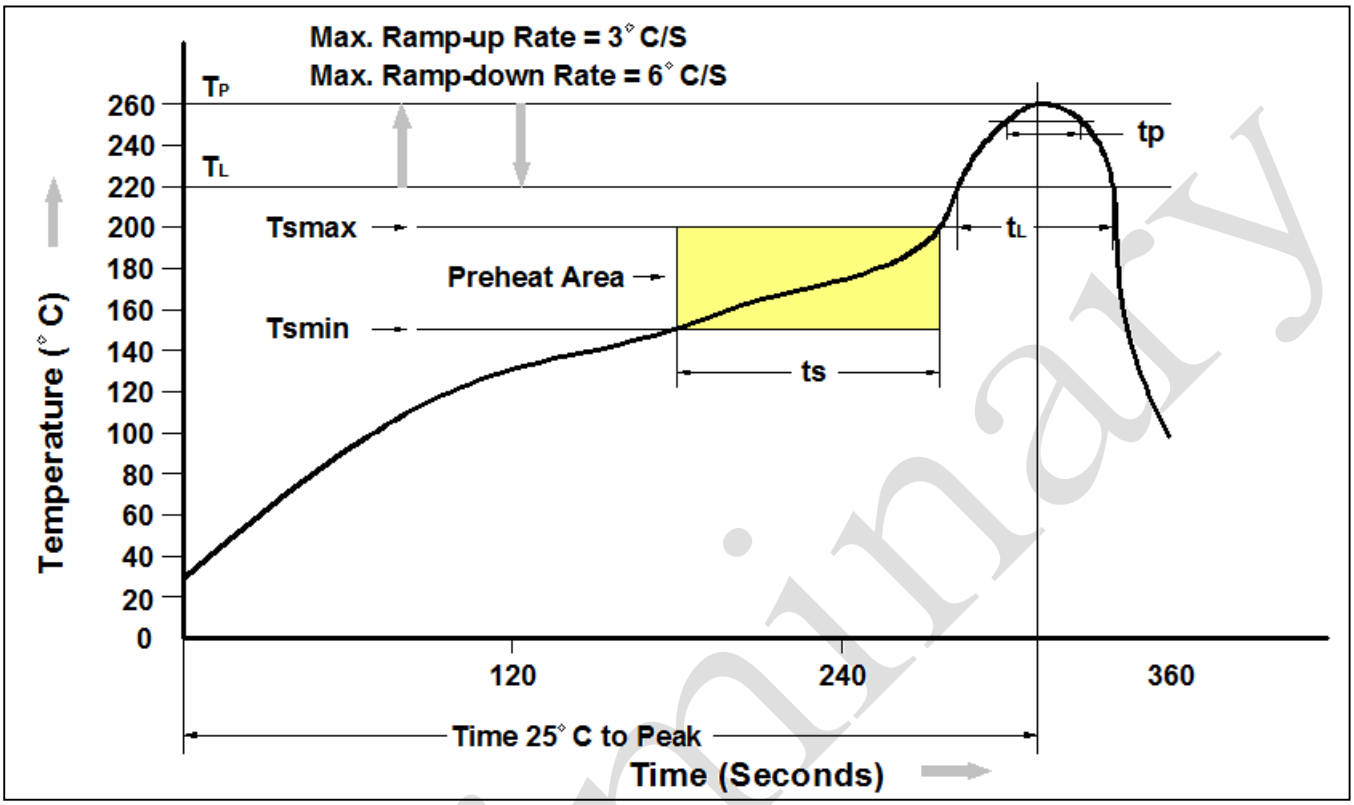
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature:25 to 140˚C.
Preheat time: 30 to 80 sec.



Iron soldering (follow the standard MIL-STD 202G, Method 210F)

Allow single lead soldering in every single process.
One time soldering is recommended. Temperature: 350+±10˚C
Time: 5 sec max.

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 (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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