CT185GB

Input 4-Pin Mini-Flat Phototransistor Optocoupler

Features

- High isolation 3750 V_{RMS}
- Multiple CTR selection available
- Creepage distance ≥5mm
- Operating temperature range - 55 °C to 110 °C
- Green Package
- Regulatory Approvals
  - UL - UL1577 (Pending Approval)
  - VDE - EN60747-5-5 (Pending Approval)
  - CQC – GB4943.1, GB8898 (Pending Approval)
  - IEC60065, IEC60950 (Pending Approval)

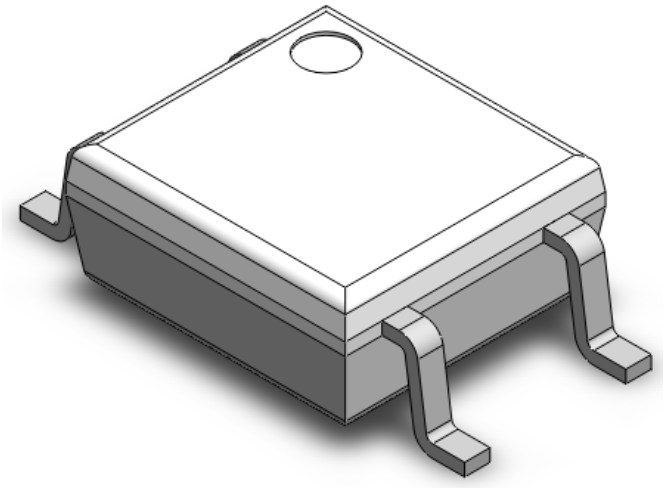
Description

CT185GB of general purpose optocoupler consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead Mini-Flat package.

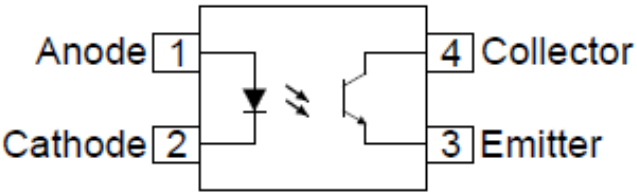
Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipment
- Hybrid substrates that require high density mounting

Package Outline



Schematic



CT185

Absolute Maximum Rating at 25°C

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{ISO}	Isolation voltage	3750	V_{RMS}	
T_{OPR}	Operating temperature	-55 ~ +110	°C	
T_{STG}	Storage temperature	-55 ~ +150	°C	
T_{SOL}	Soldering temperature	260	°C	
P_{TOT}	Total power dissipation	200	mW	
Emitter				
I_F	Forward current	50	mA	
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)	1	A	
V_R	Reverse voltage	6	V	
P_D	Power dissipation	70	mW	
Detector				
P_C	Power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B_{VECO}	Emitter-Collector Breakdown Voltage	7	V	
I_C	Collector Current	50	mA	

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	-	1.24	1.4	V	
I_R	Reverse Current	V_R = 5V	-	-	5	μA	
C_{IN}	Input Capacitance	f= 1MHz	-	10	250	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
B_{VCEO}	Collector-Emitter Breakdown	I_C= 500μA	80	-	-	V	
B_{VECO}	Emitter-Collector Breakdown	I_E= 100μA	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	V_{CE}= 48V	-	0.01	0.08	μA	
		V_{CE}= 48V, T_A=85ºC	-	2	50	μA	
C_{CE}	Collector-Emitter Capacitance	f= 1MHz	-	10	-	pF	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	I_F= 5mA, V_{CE}= 5V	100	-	400	%	
		I_F= 1mA, V_{CE}= 0.4V	30	-	-	%	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	I_F= 8mA, I_C= 2.4mA	-	-	0.3	V	
$I_{C(off)}$	Off-state collector current	V_{CE}= 48V, V_F=0.7V	-	1	10	μA	

Isolation Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R_{IO}	Isolation Resistance	V_{IO}= 500V_{DC}	1x10^{12}	10^{14}	-	Ω	
C_{IO}	Isolation Capacitance	f=1MHz	-	0.5	-	pF	
V_{ISO}	Isolation voltage	AC, 60s	3750	-	-	Vrms	
		AC, 1s in oil	-	10000	-		
		DC, 60s in oil	-	10000	-		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
t_r	Rise Time	V_{CC}= 10V, I_C= 2mA, R_L= 100Ω	-	5	-	μs	
t_f	Fall Time		-	9	-		
t_{on}	Turn-on time		-	9	-		
t_{off}	Turn-off time		-	9	-		
t_{on}	Turn-on time	V_{CC}= 5V, I_F= 16mA, R_L= 1.9kΩ	-	2	-		
t_s	Storage time		-	30	-		
t_{off}	Turn-off time		-	70	-		

Typical Characteristic Curves

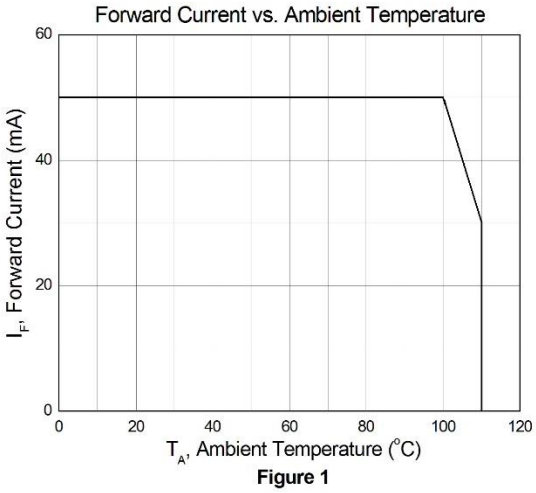


Figure 1

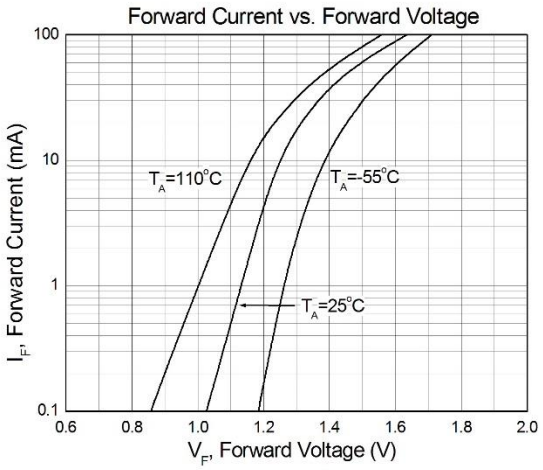


Figure 2

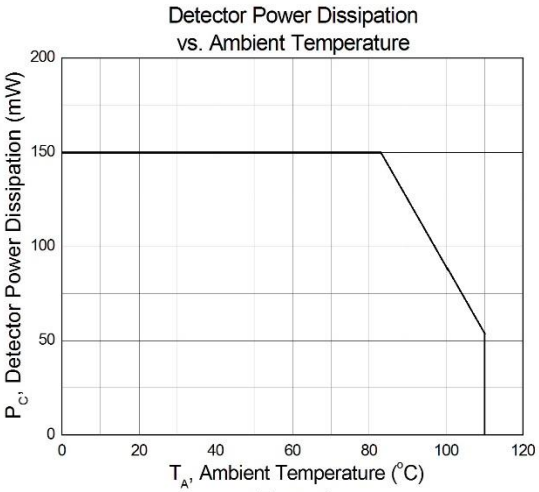


Figure 3

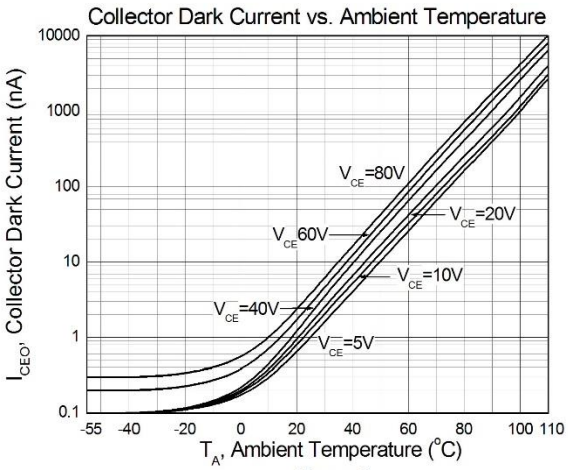


Figure 4

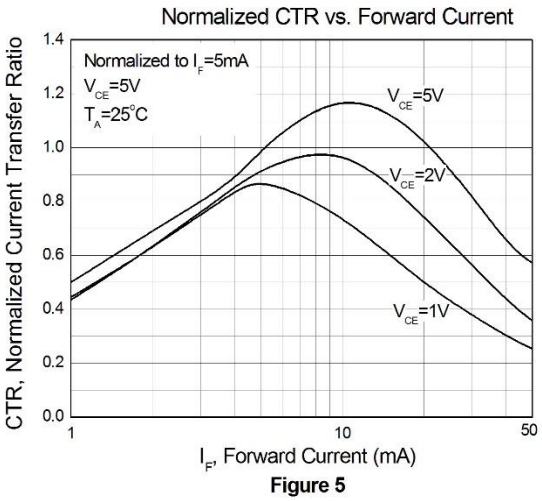


Figure 5

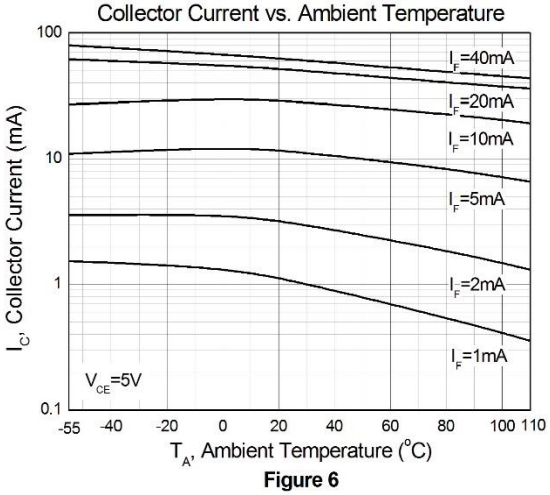


Figure 6

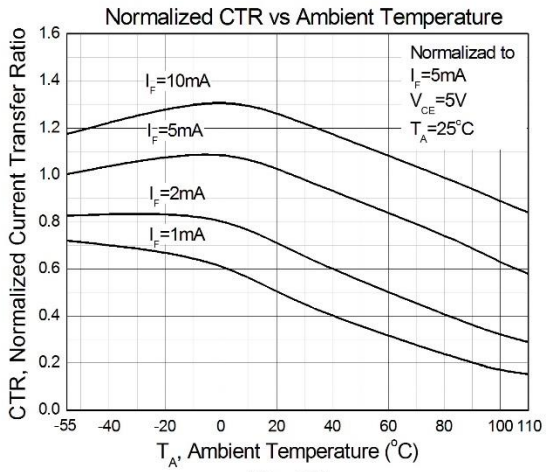


Figure 7

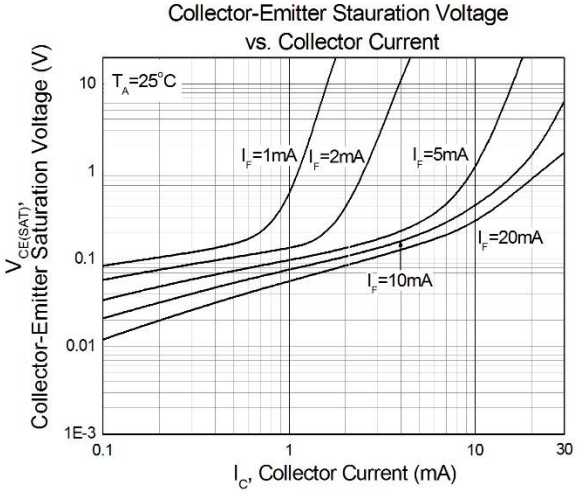


Figure 8

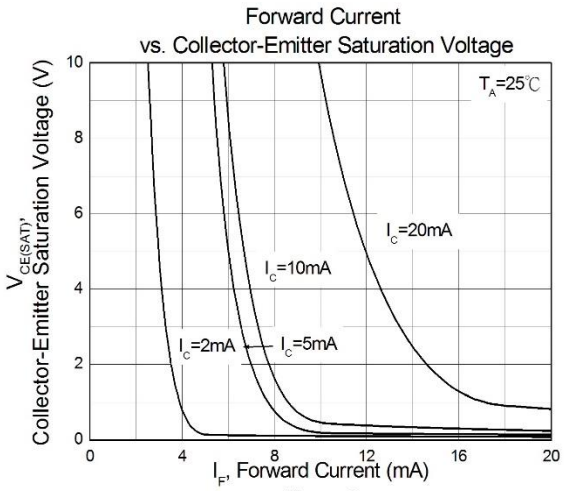


Figure 9

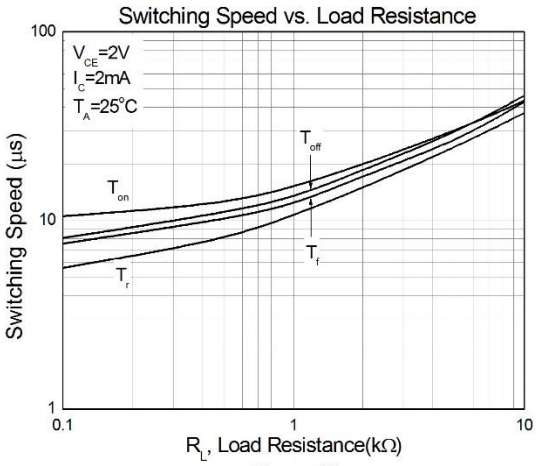


Figure 10

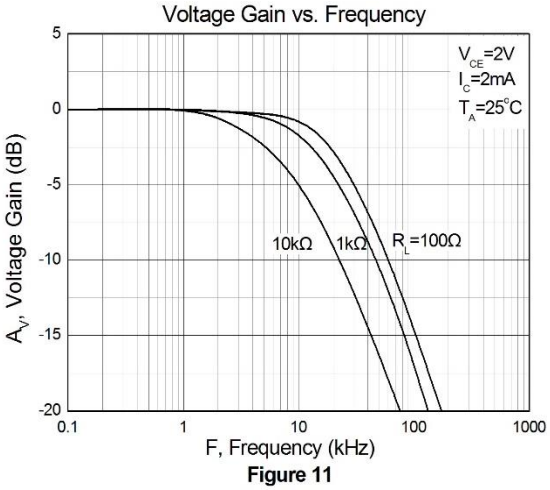
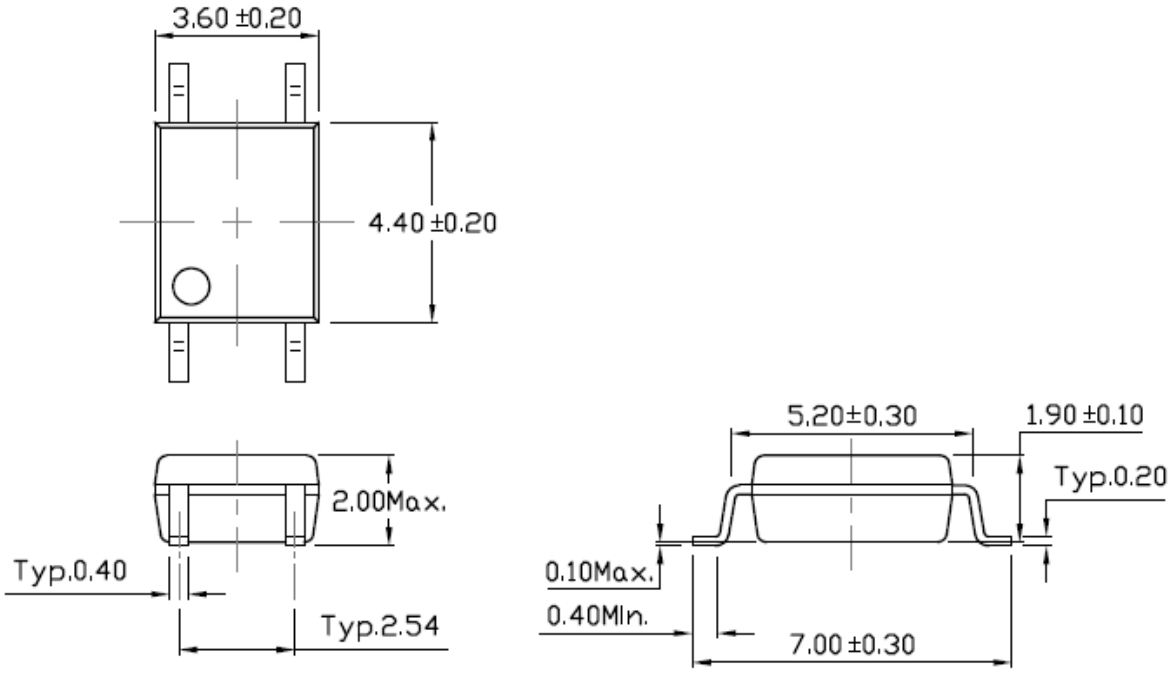
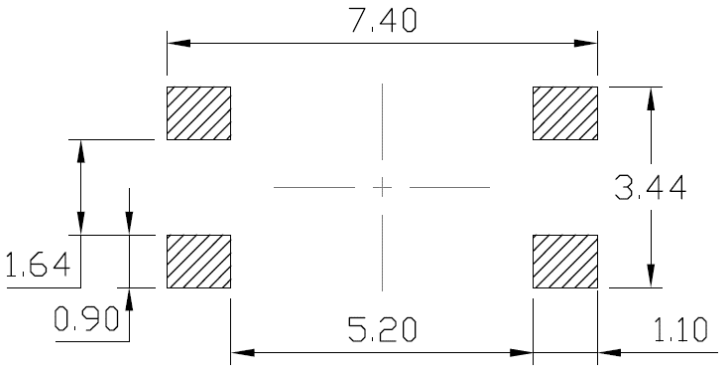


Figure 11

Package Dimension *Dimensions in mm unless otherwise stated*



Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information

Note:

CT : Denotes “CT Micro”
185 : Part Number
GB : CTR Rank
V : VDE Safety Option (V or none)
Y : Fiscal Year
WW : Work Week
K : Manufacturing Code

Ordering Information

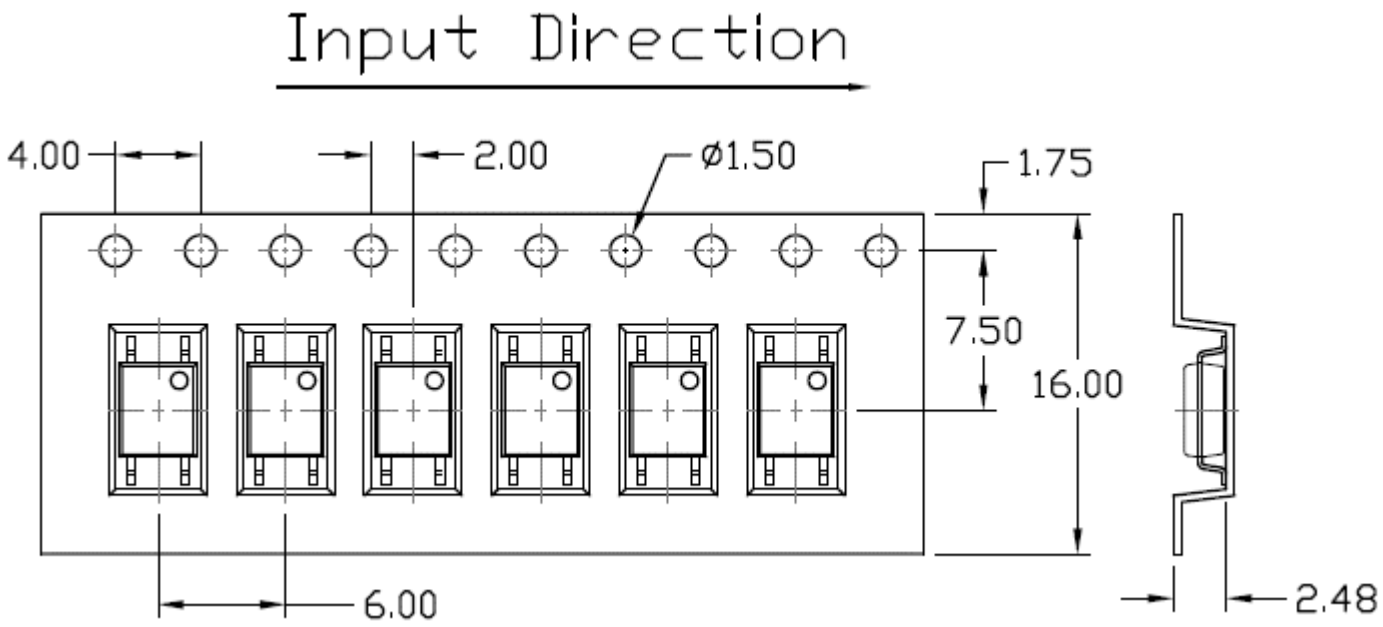
CT185GB(V)(Y)

CT : Denotes “CT Micro”
185 : Part Number
GB : CTR Rank
V : VDE Safety Option (V or none)
Y : Tape and reel option (T1 or T2)

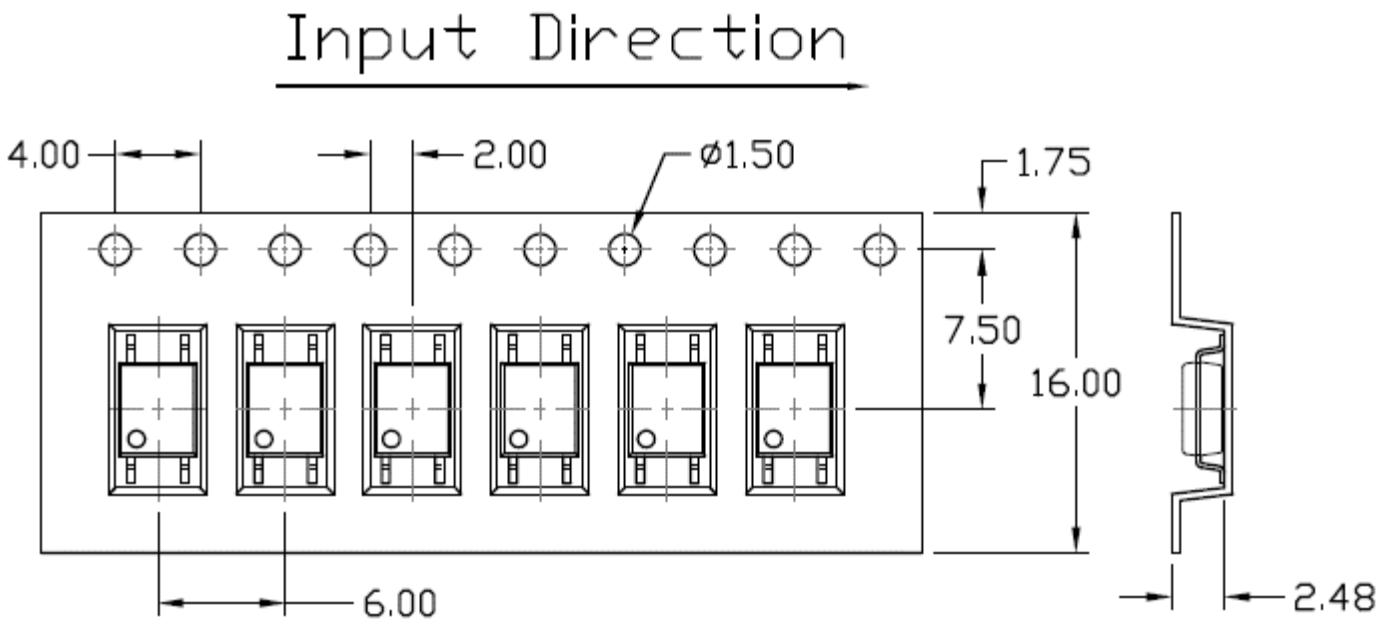
Option	*Description*	*Quantity*
T1	Surface Mount Lead Forming – With Option 1 Tapping	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Tapping	3000 Units/Reel

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

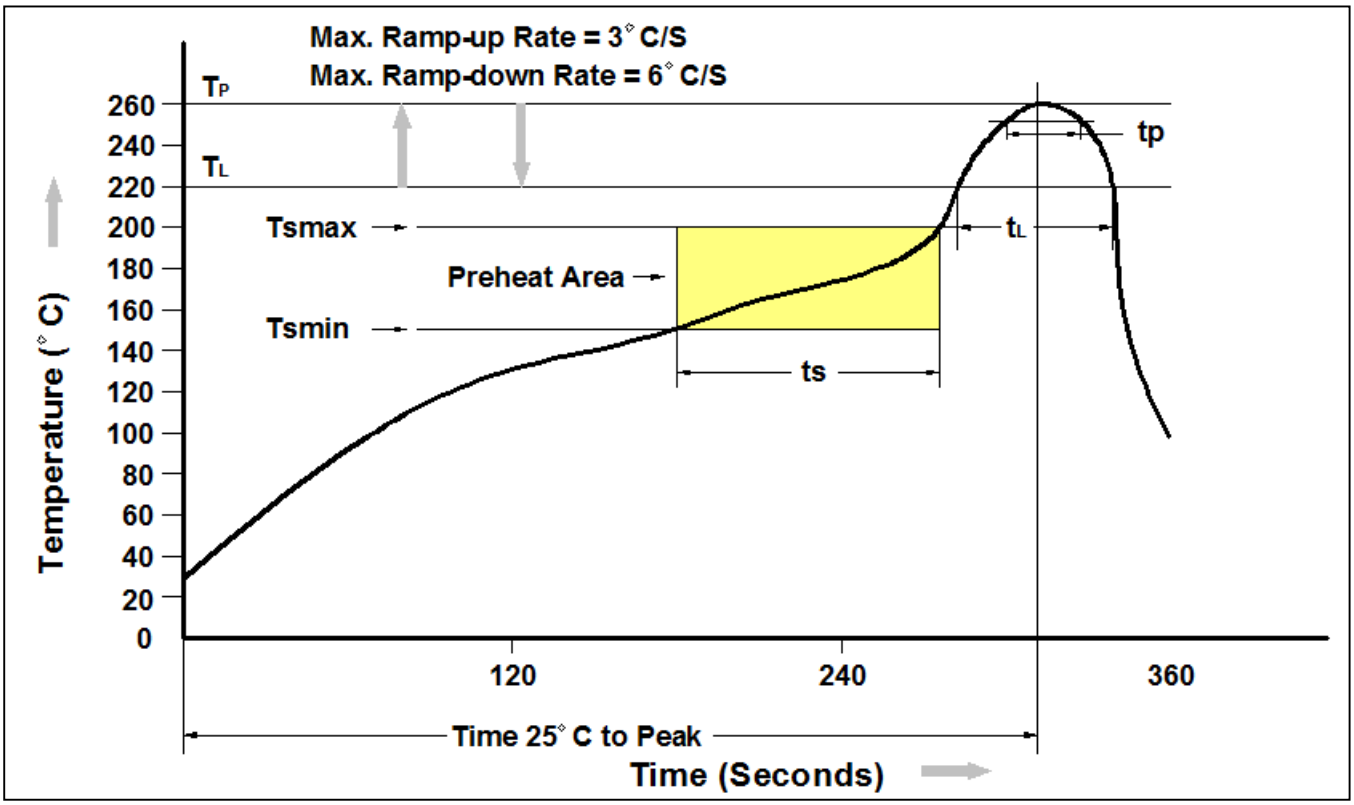
Option T1



Option T2



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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