CT1110, CT1111, CT1112, CT1113, CT1114, CT1115, CT1116, CT1117, CT1118, CT1119

DC Input 5-Pin Long Mini-Flat Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- Extra low coupling capacitance
- DC input with transistor output
- OperatingTemperature range - 55 °C to 110 °C
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950
- Creepage distance > 8 mm
- Green Package

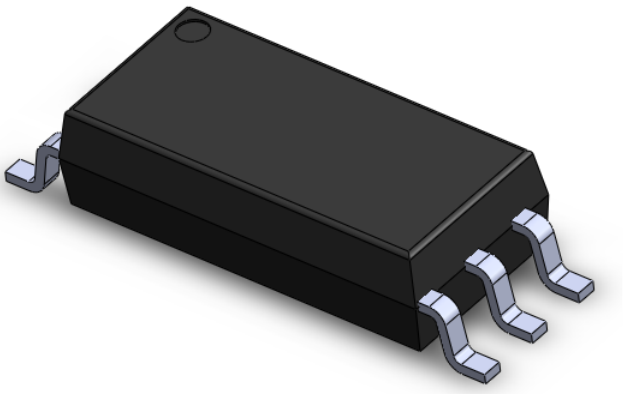
Applications

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

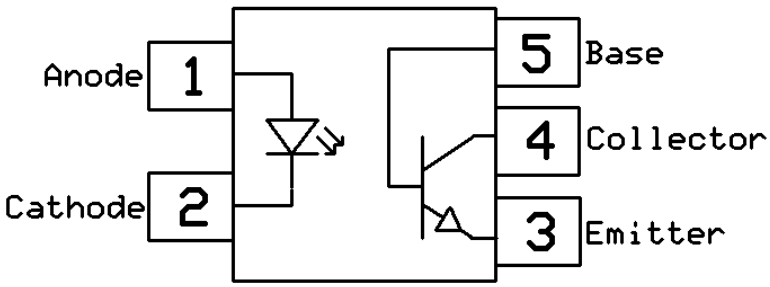
Description

The CT1110, CT1111, CT1112, CT1113, CT1114, CT1115, CT1116, CT1117, CT1118, CT1119 series consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 5-lead SOP Package.

Package Outline



Schematic



Absolute Maximum Rating at 25°C

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{ISO}	Isolation voltage *1	5000	V_{RMS}	
T_{OPR}	Operating temperature	-55 ~ +110	°C	
T_{STG}	Storage temperature	-55 ~ +125	°C	
T_{SOL}	Soldering temperature *2	260	°C	
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	85	mW	
Detector				
P_D	Power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B_{VECO}	Emitter-Collector Breakdown Voltage	7	V	
B_{VCBO}	Collector-Base Breakdown Voltage	80	V	
B_{VEBO}	Emitter-Base Breakdown Voltage	7	V	
I_C	Collector Current	50	mA	

Note:

1. Bias for 1minute with R.H.=40~60%. For this test, Pins 1 and 2 are common, and Pins 3 and 4 are common.
2. Soldering Time: 10 seconds

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_F = 50mA	-	1.45	1.5	V	
I_R	Reverse Current	V_R = 6V	-	-	5	μA	
C_{IN}	Input Capacitance	f= 1kHz	-	45	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
B_{VCEO}	Collector-Emitter Breakdown	I_C= 100μA	80	-	-	V	
B_{VECO}	Emitter-Collector Breakdown	I_E= 100μA	7	-	-	V	
B_{VCBO}	Collector-Base Breakdown	I_C= 100μA	80	-	-	V	
B_{VEBO}	Emitter-Base Breakdown	I_E= 100μA	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	V_{CE}= 10V	-	-	100	nA	
I_{CBO}	Collector-Base Dark Current	V_{CB}= 10V			20	nA	

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	CT1110	I_F= 5mA, V_{CE}= 5V	50	-	600	%	
		CT1115		50	-	150		
		CT1116		100	-	300		
		CT1117		80	-	160		
		CT1118		130	-	260		
		CT1119		200	-	400		
		CT1111	I_F= 10mA, V_{CE}= 5V	60	-	300		
		CT1112		63	-	125		
		CT1113		100	-	200		
		CT1114		160	-	320		
		CT1112	I_F= 1mA, V_{CE}= 5V	22	-	-		
		CT1113		34	-	-		
		CT1114		56	-	-		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		I_F= 10mA, I_C= 1mA	-	-	0.4	V	
R_{IO}	Isolation Resistance		V_{IO}= 500V_{DC}	5x10^{10}			Ω	
C_{IO}	Isolation Capacitance		f= 1MHz			1	pF	

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
T_{ON}	Turn On Time	I_C= 5mA, V_{CE}= 5V, R_L= 100Ω	-	5	-	μs	
T_{OFF}	Turn Off Time		-	4.2	-		
t_r	Rise Time		-	2.8	-		
t_f	Fall Time		-	4.1	-		

Typical Characteristic Curves

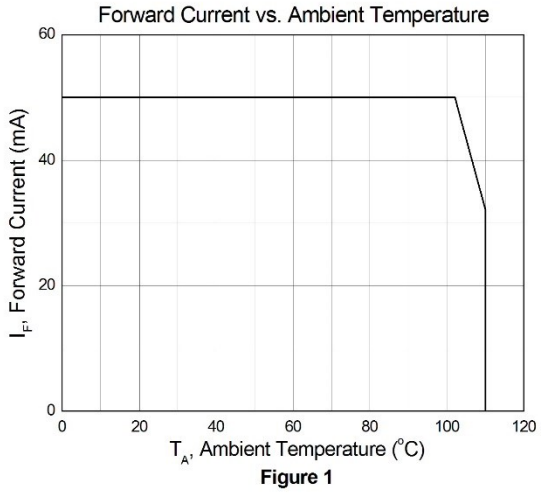


Figure 1

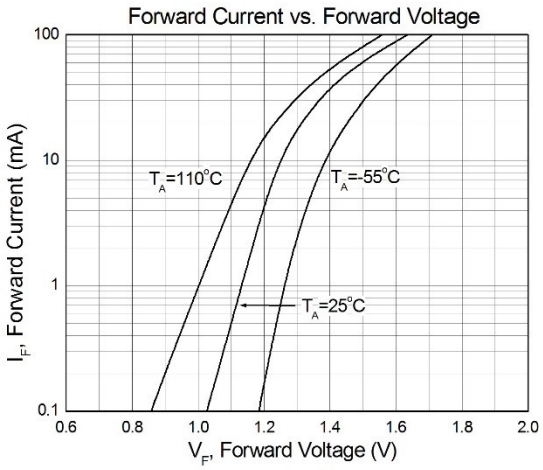


Figure 2

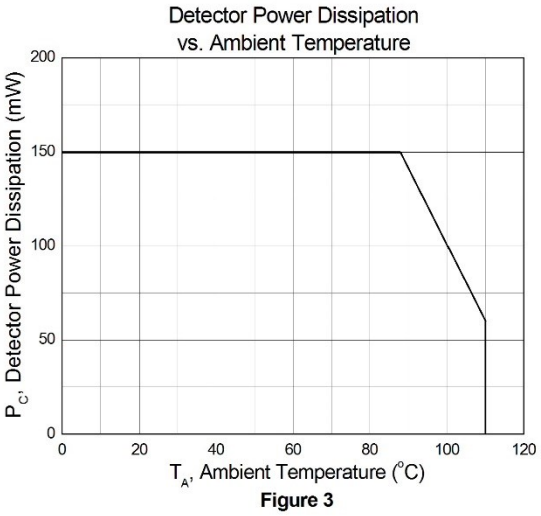


Figure 3

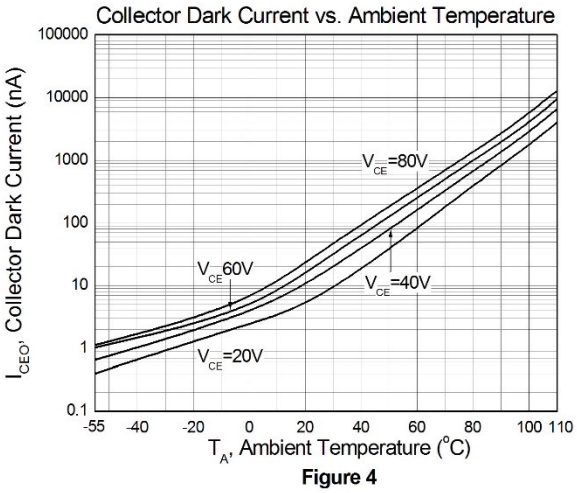


Figure 4

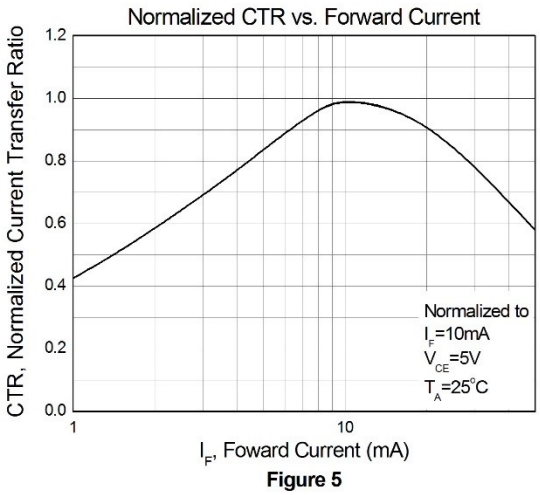


Figure 5

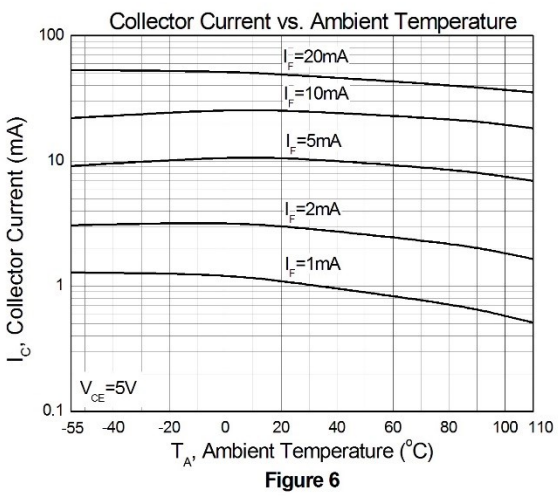


Figure 6

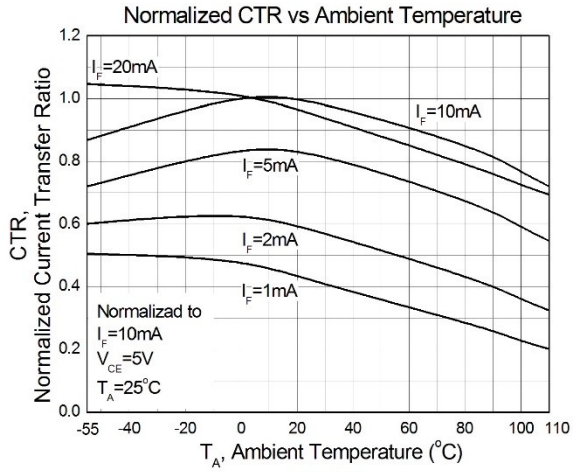


Figure 7

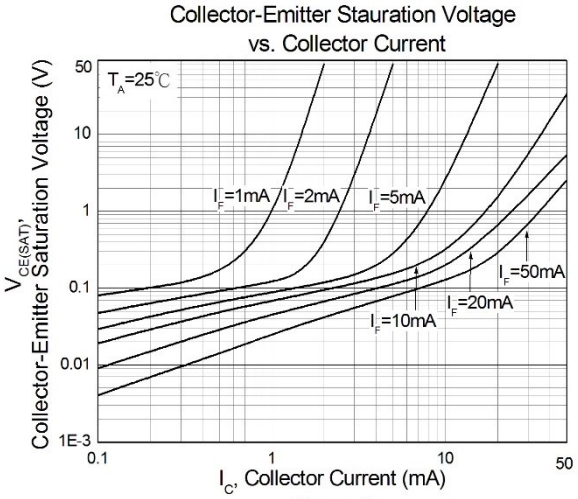


Figure 8

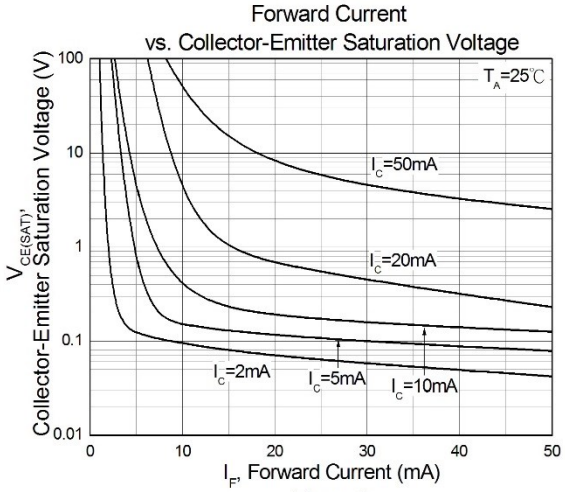


Figure 9

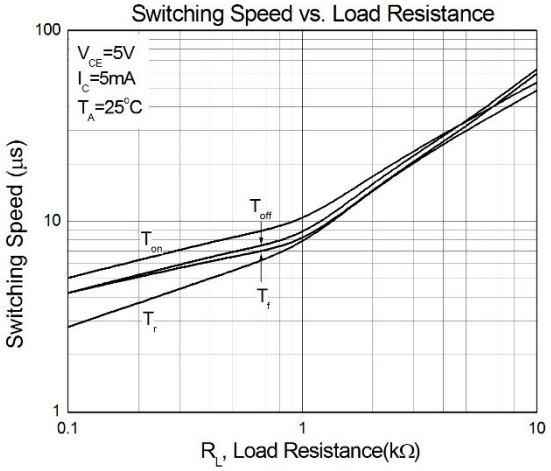


Figure 10

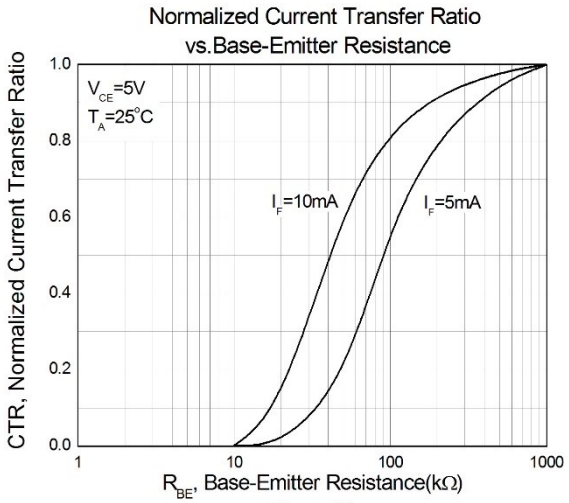


Figure 11

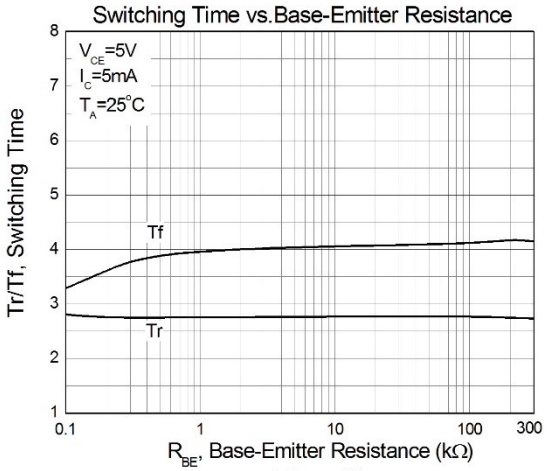


Figure 12

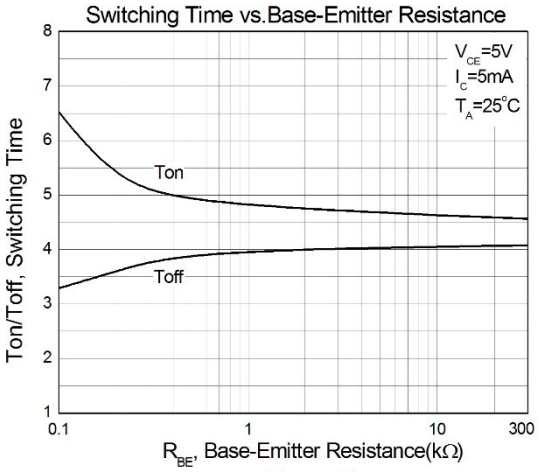
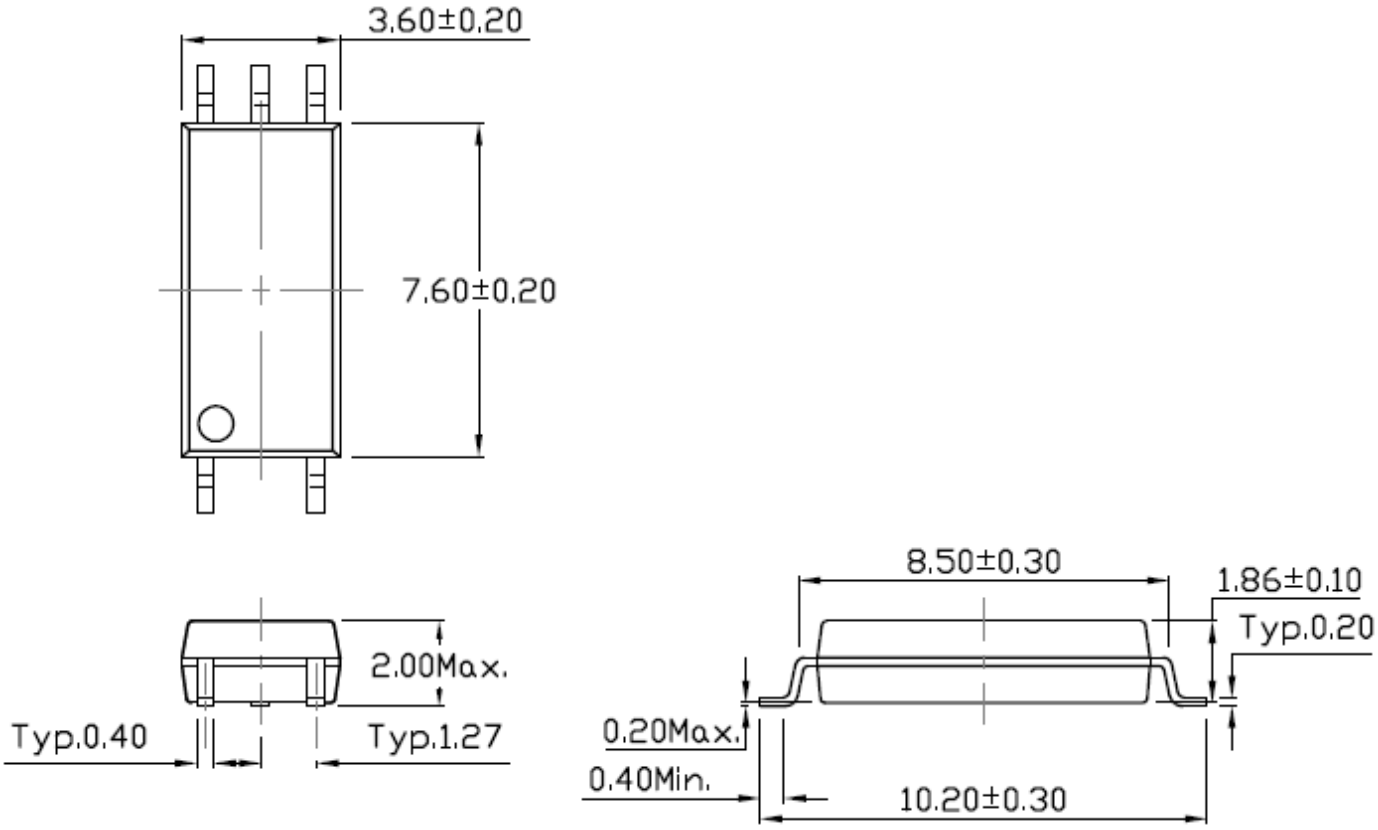
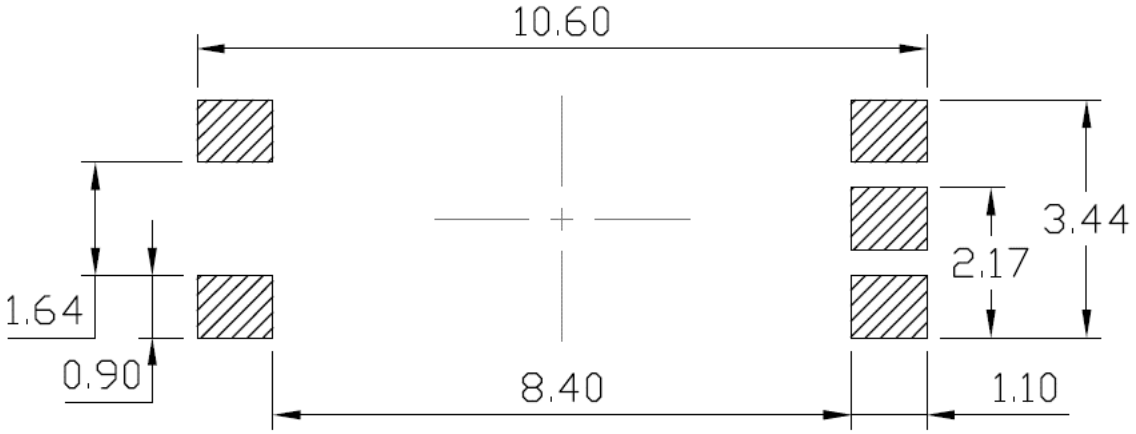

Switching Time vs.Base-Emitter Resistance
V_{CE}=5V
I_C=5mA
T_A=25°C
Ton
Toff
Ton/Toff, Switching Time
R_{BE}, Base-Emitter Resistance(kΩ)
8
7
6
5
4
3
2
1
0.1
1
10
300

Figure 13

Package Dimension *Dimensions in mm unless otherwise stated*



Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Marking Information

Note:

CT : Logo
1110 : Part Number
V : VDE Option
Y : Fiscal Year
WW : Work Week
D : Manufacturing Code

Ordering Information

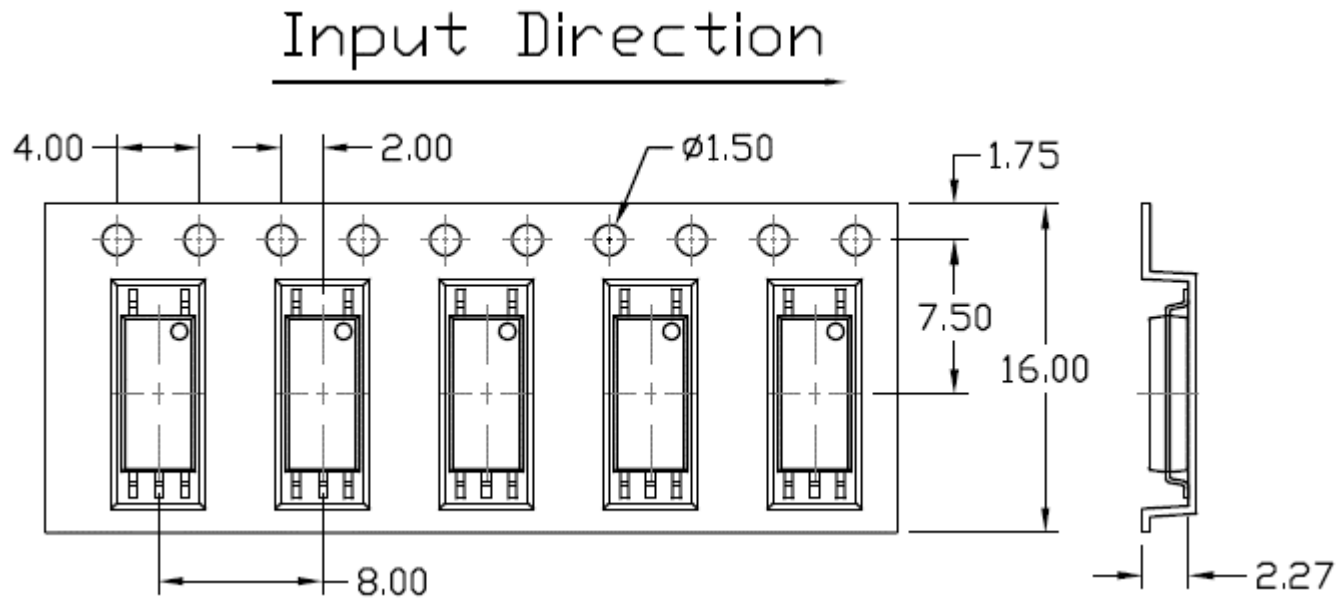
CT111X(V)(Y)

X = Part No. (0,1, 2, 3, 4, 5, 6, 7, 8, 9)
V = VDE Option (V or None)
Y = Tape and reel option (T1 or T2)

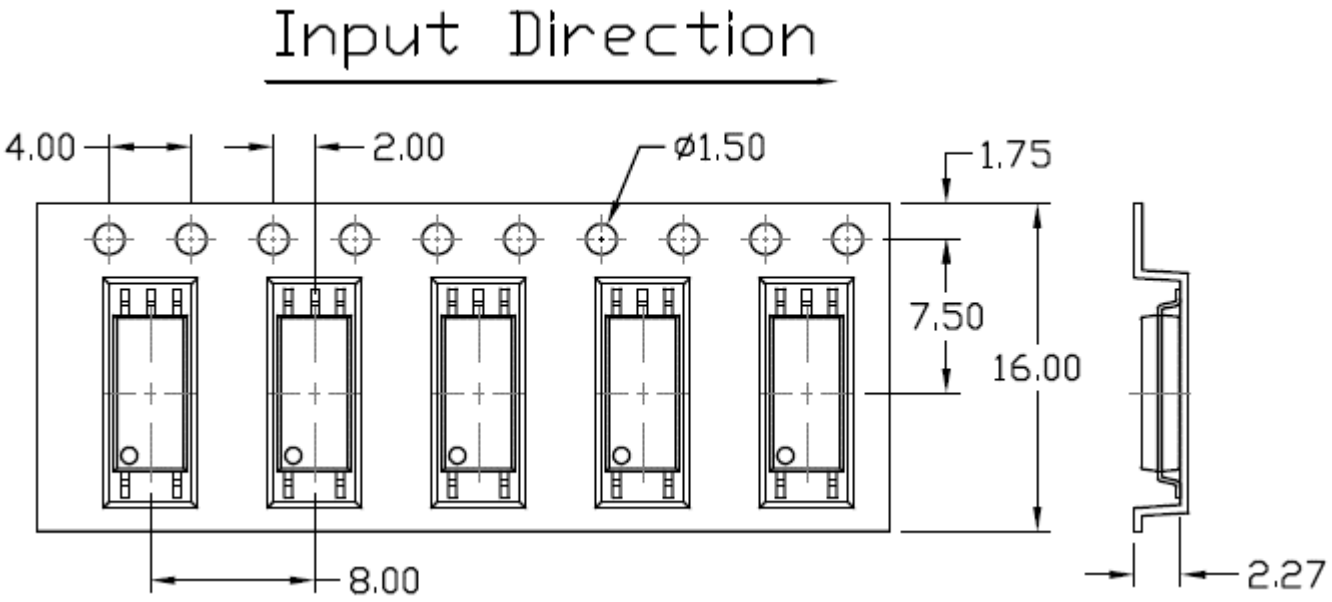
Option	*Description*	*Quantity*
T1	Surface Mount Lead Forming – With Option 1 Taping	3000Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000Units/Reel

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

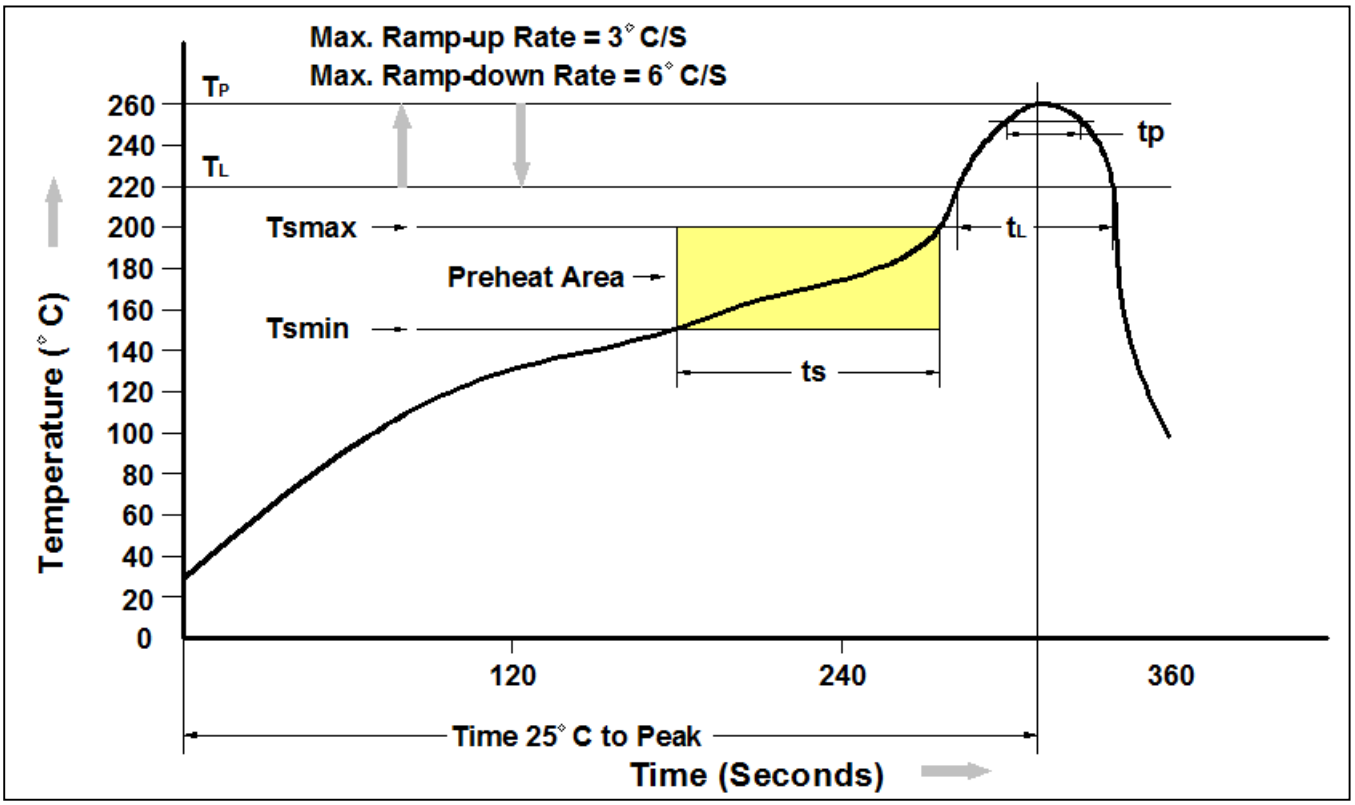
Option T1



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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