



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
- Operating Temperature 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

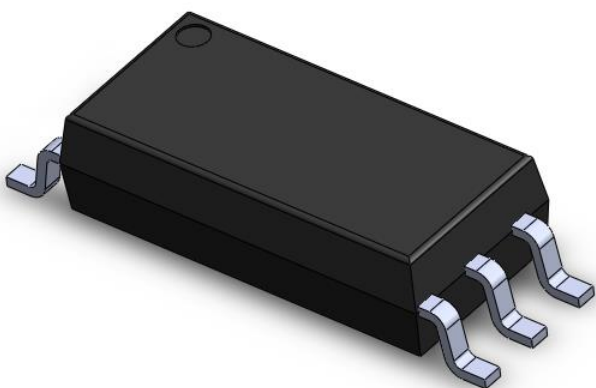
Applications

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

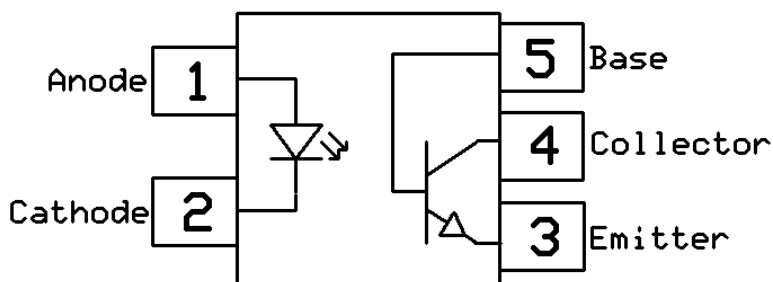
Description

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





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

DC Input 5-Pin Long Mini-Flat Phototransistor Optocoupler

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	

Thermal Characteristics

Symbol	Parameters	Ratings	Units	Notes
R _{θJA}	Thermal Resistance Junction-Ambient	475.4	°C/W	
T _J	Junction temperature	125	°C	

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



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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	$I_F = 10\text{mA}$		1.24	1.4	V	
		$I_F = 50\text{mA}$	-	1.45	1.5	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	$I_E = 100\mu\text{A}$	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 Dark Current	$V_{CE} = 20\text{V}$	-	-	100	nA	
I_{CBO}	Collector-Base Dark Current	$V_{CB} = 20\text{V}$			20	nA	



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

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Transfer Characteristics

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

Switching Characteristics

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



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

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Typical Characteristic Curves

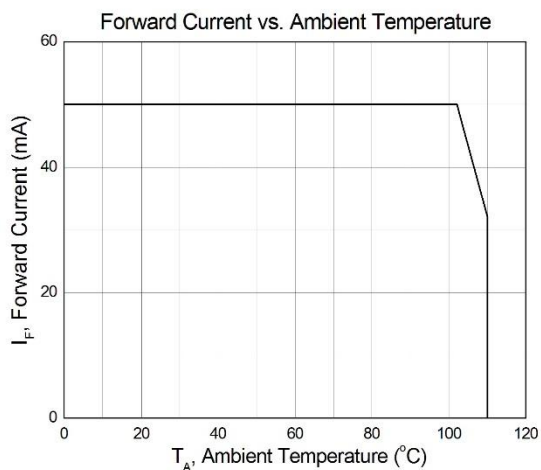


Figure 1

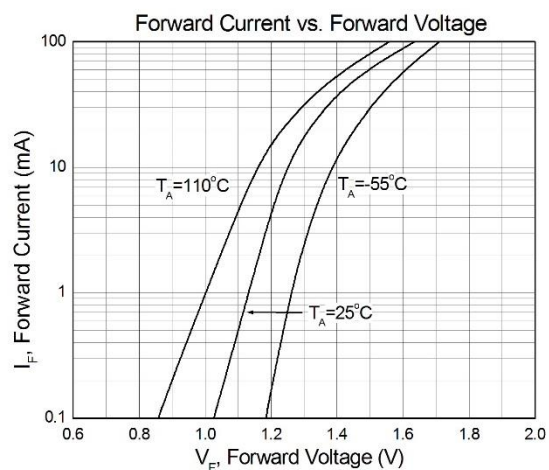


Figure 2

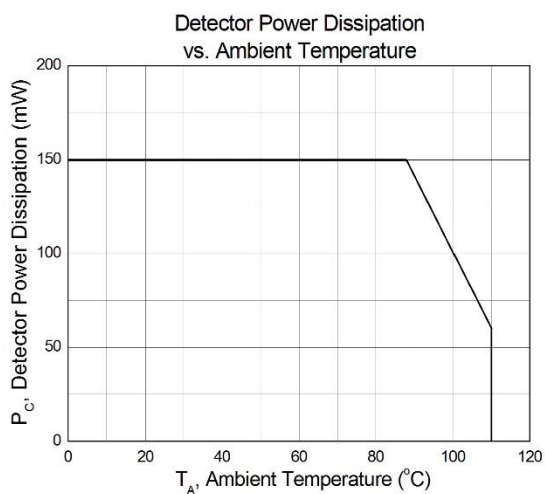


Figure 3

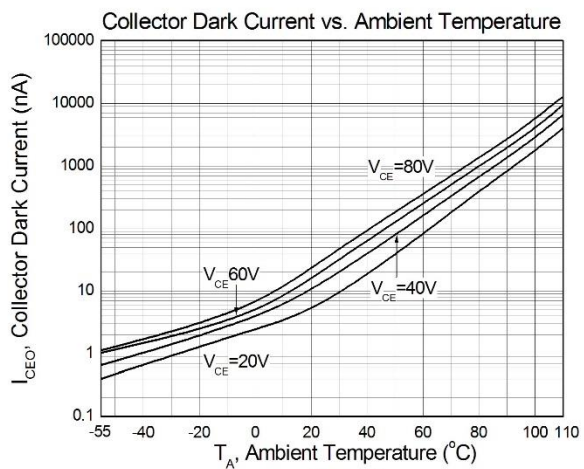


Figure 4

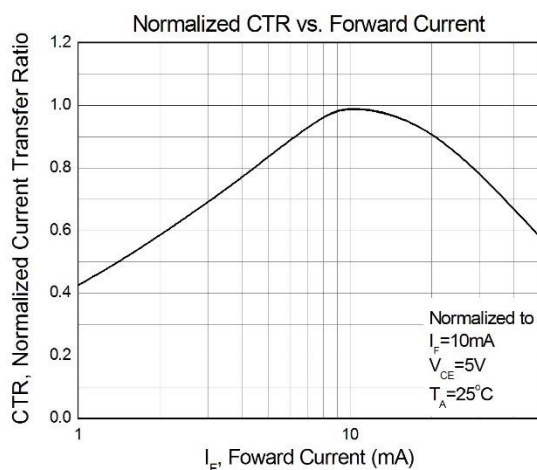


Figure 5

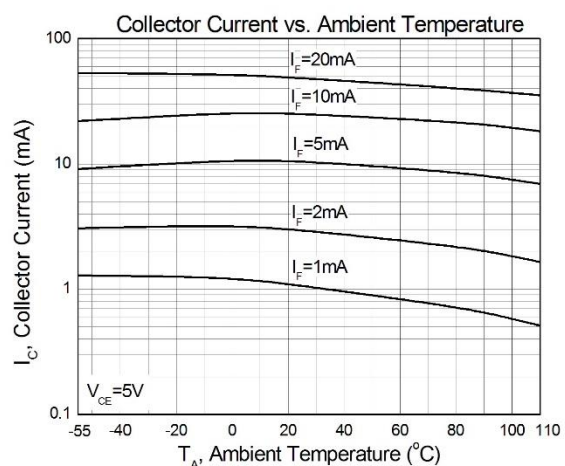
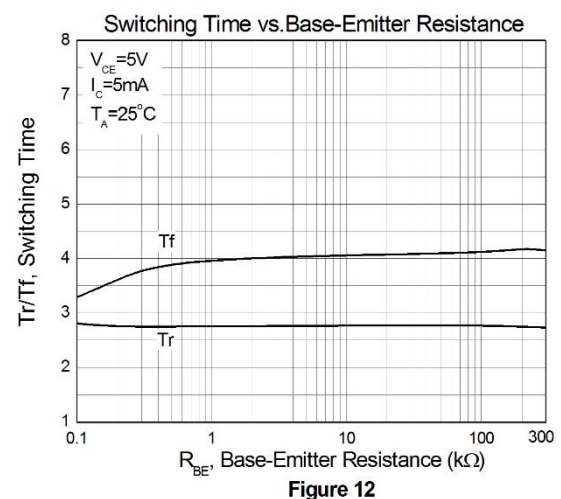
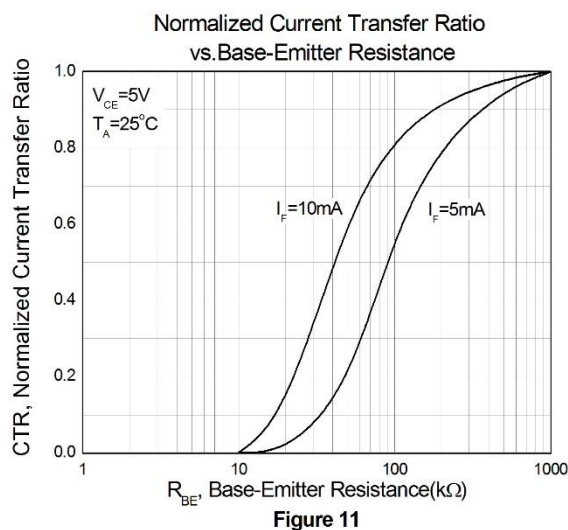
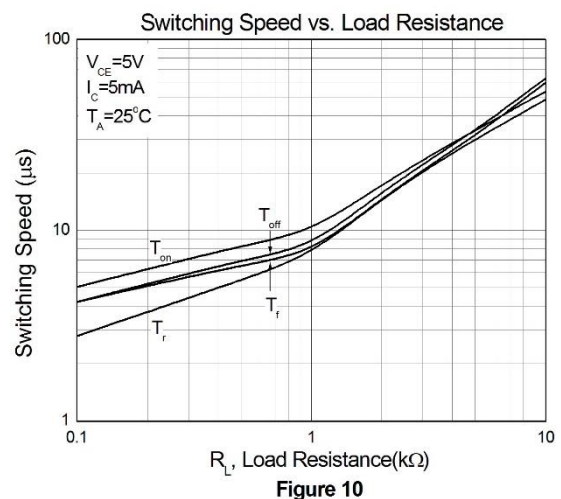
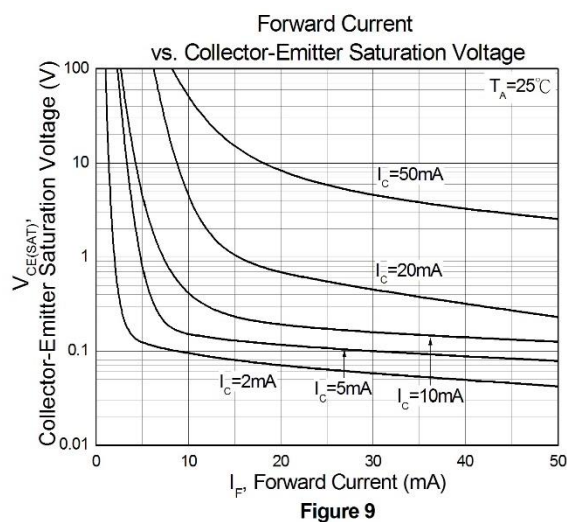
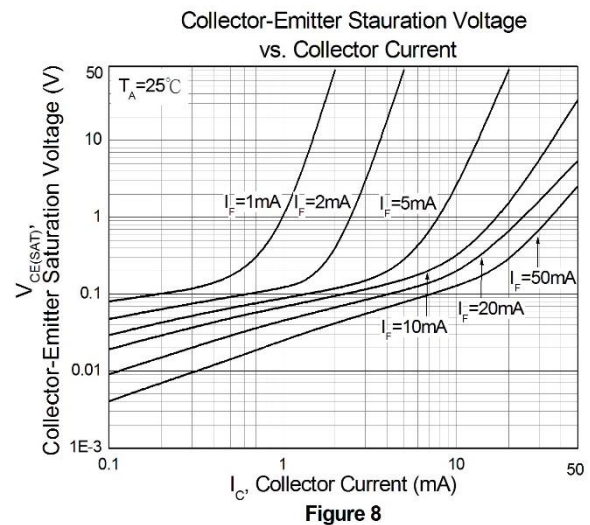
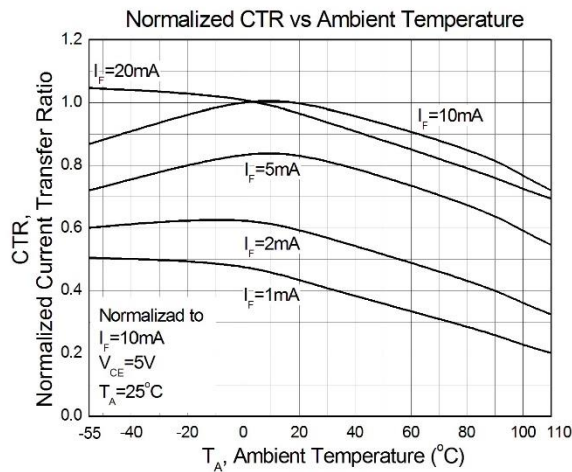


Figure 6



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

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

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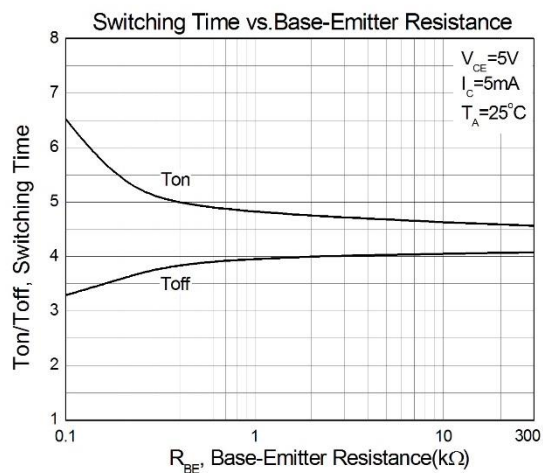


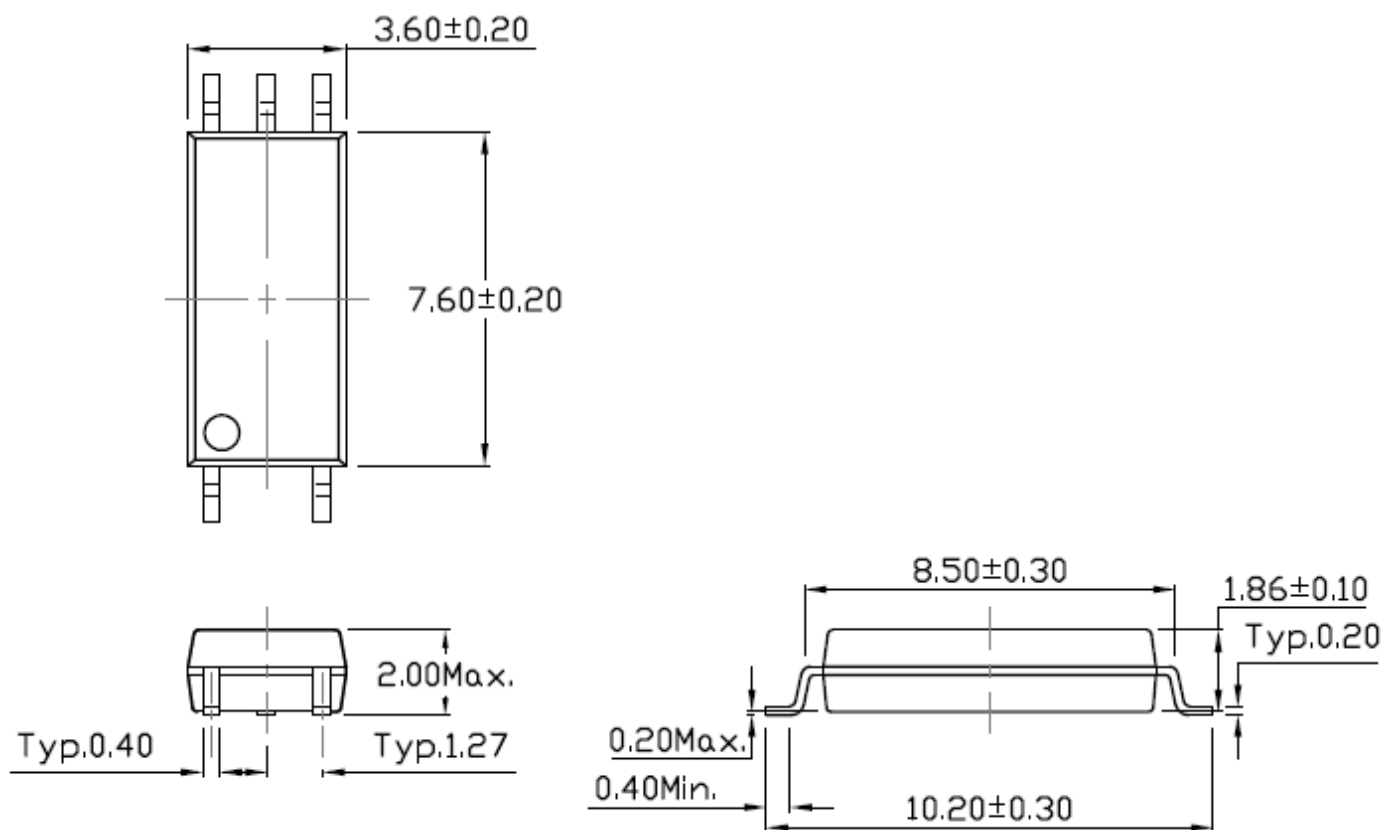
Figure 13



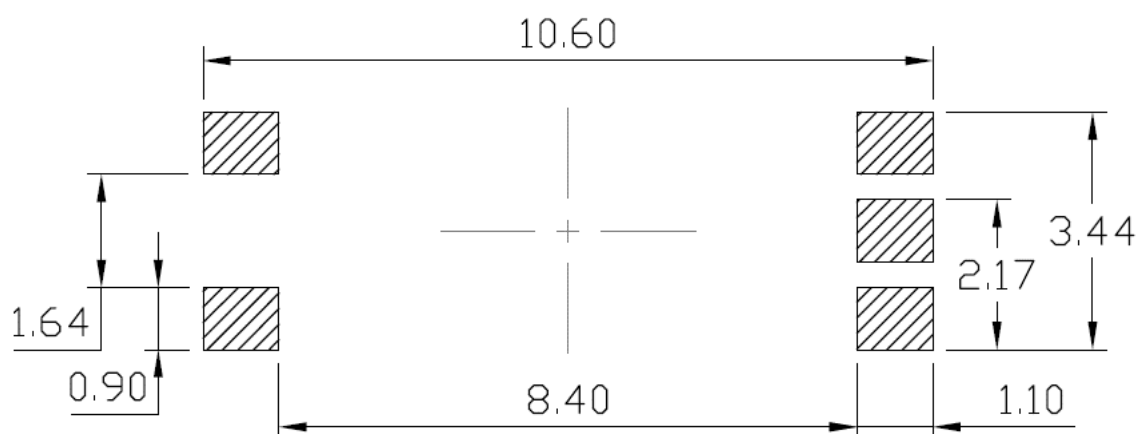
CT1110, CT1111, CT1112, CT1113, CT1114, CT1115, CT1116, CT1117, CT1118, CT1119

DC Input 5-Pin Long Mini-Flat Phototransistor Optocoupler

Package Dimension *Dimensions in mm unless otherwise stated*



Recommended Solder Mask *Dimensions in mm unless otherwise stated*

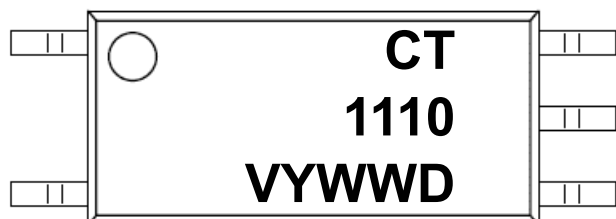




CT1110, CT1111, CT1112, CT1113, CT1114, CT1115, CT1116, CT1117, CT1118, CT1119

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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)-G

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)

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

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

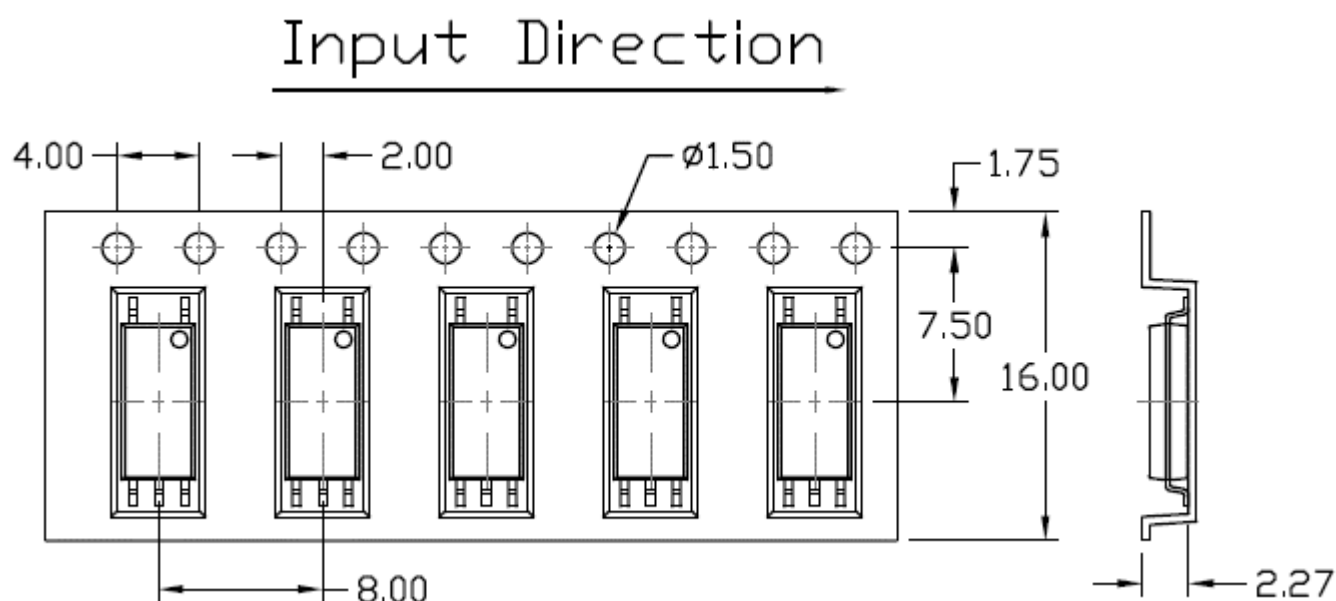


CT1110, CT1111, CT1112, CT1113, CT1114, CT1115, CT1116, CT1117, CT1118, CT1119

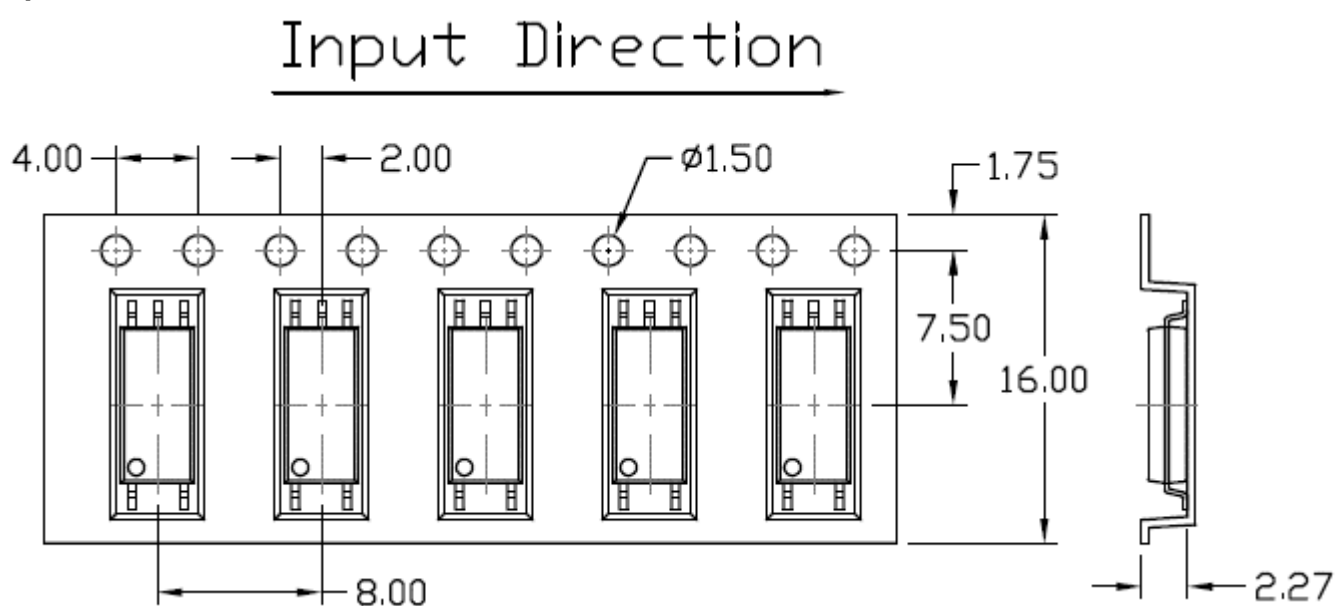
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1



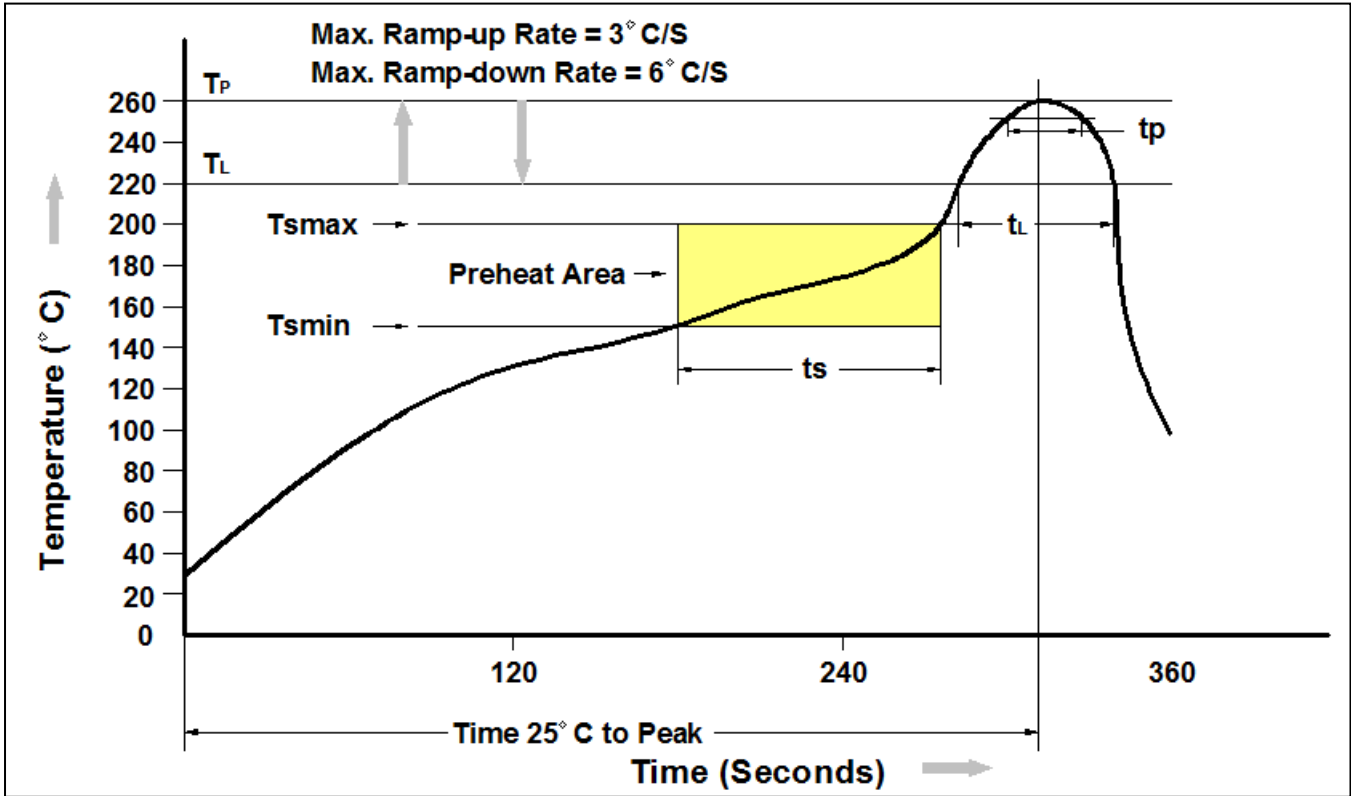
Option T2





CT1110, CT1111, CT1112, CT1113, CT1114,
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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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Wave soldering (JEDEC22A111 compliant)

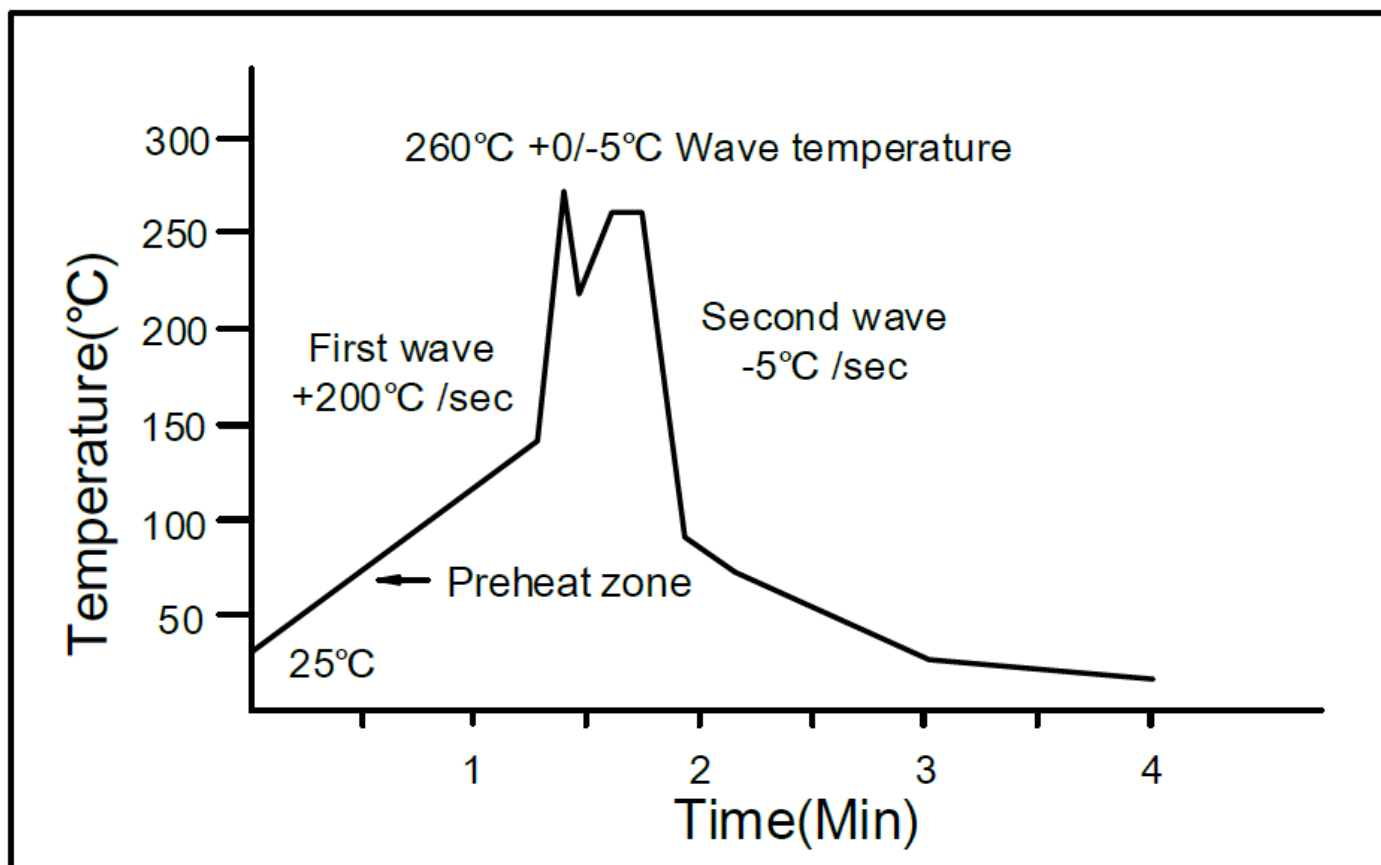
One time soldering is recommended within the condition of temperature.

Temperature: $260 \pm 0/-5^{\circ}\text{C}$.

Time: 10 sec.

Preheat temperature: 25 to 140°C .

Preheat time: 30 to 80 sec.



Hand soldering by soldering iron

Allow single lead soldering in every single process.

One time soldering is recommended. Temperature: $380 \pm 0/-5^{\circ}\text{C}$

Time: 3 sec max.



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