



CT415 Series

DC Input 4-Pin Mini-Flat Photodarlington Optocoupler

Features

- High isolation 3750 V_{RMS}
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- Green Package
- Regulatory Approvals
 - UL - UL1577 (E364000)
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898
 - IEC60065, IEC60950

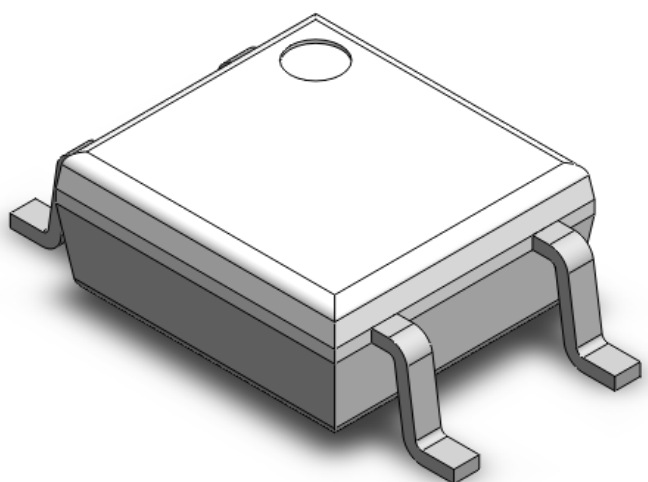
Description

The CT415 series consists of a photodarlington transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead Mini-Flat package.

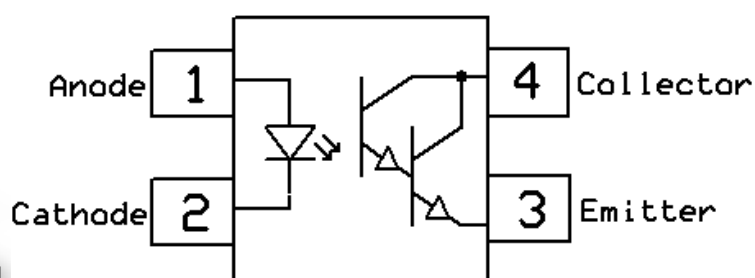
Applications

- Power supply regulators
- Digital logic outputs
- Microprocessor inputs

Package Outline



Schematic





CT415 Series

DC Input 4-Pin Mini-Flat Photodarlington Optocoupler

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	170	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 _D	Power dissipation	150	mW	
B _{VCEO}	Collector-Emitter Breakdown Voltage	60	V	
B _{VECO}	Emitter-Collector Breakdown Voltage	7	V	
I _C	Collector Current	80	mA	

**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	$I_F = 10\text{mA}$		1.4	1.6	V	
I_R	Reverse Current	$V_R = 6\text{V}$	-	-	5	μA	
C_{IN}	Input Capacitance	$f = 1\text{MHz}$	-	30	250	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 100\mu\text{A}$	35	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 100\mu\text{A}$	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 10\text{V}$, $I_F = 0\text{mA}$	-	-	1	μA	

Transfer Characteristics

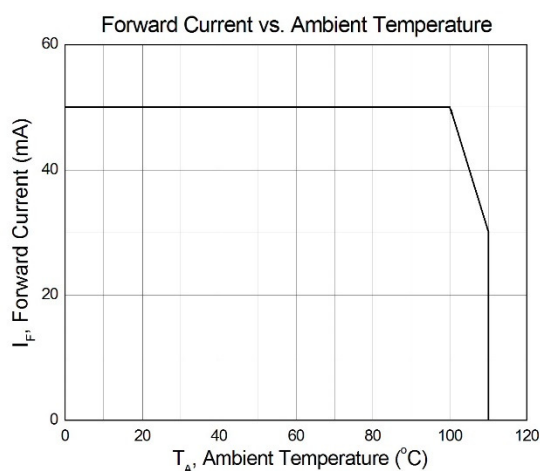
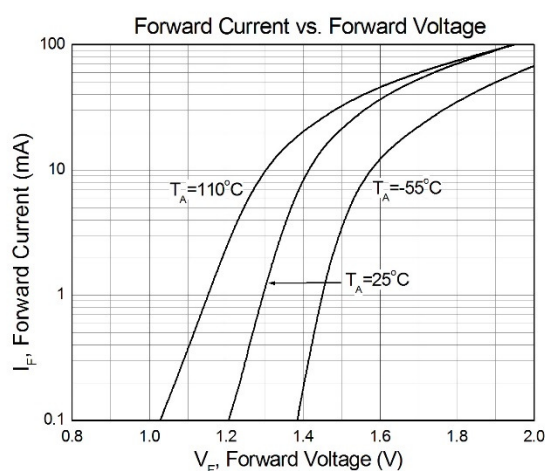
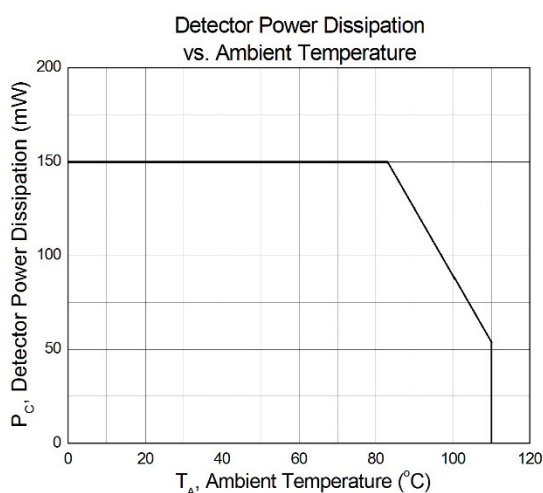
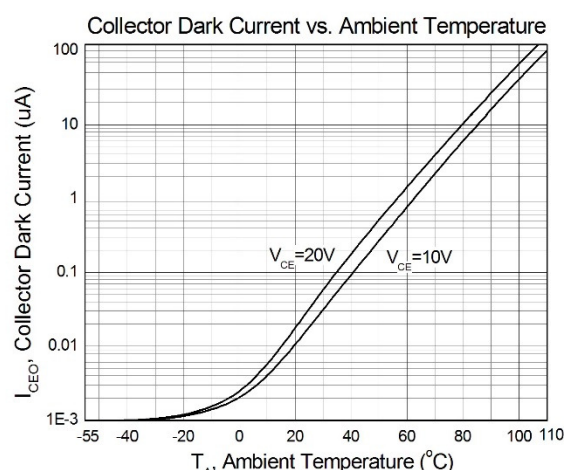
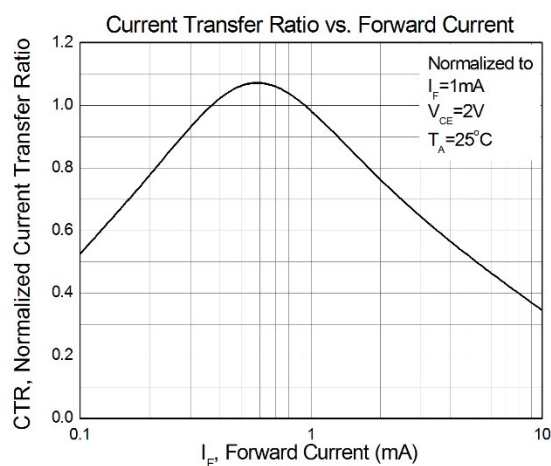
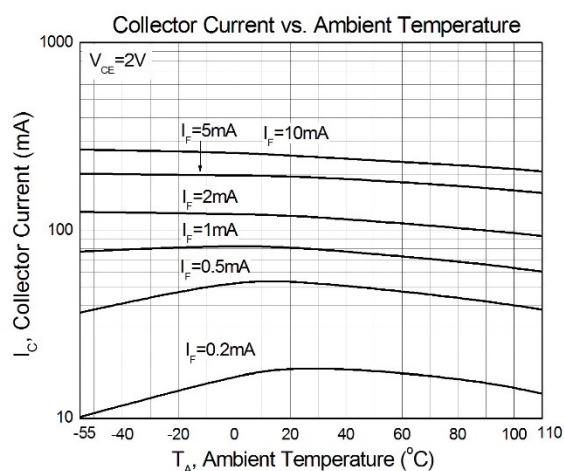
Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	CT415	$I_F = 1\text{mA}$, $V_{CE} = 2\text{V}$	600	-	-	%	
		CT415A		3000	-	6500		
		CT415B		5500	-	-		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		$I_F = 20\text{mA}$, $I_C = 5\text{mA}$	-	0.8	1	V	
R_{IO}	Isolation Resistance		$V_{IO} = 500\text{V}_{DC}$	5×10^{10}				
C_{IO}	Isolation Capacitance		$f = 1\text{MHz}$		0.5	1	pF	

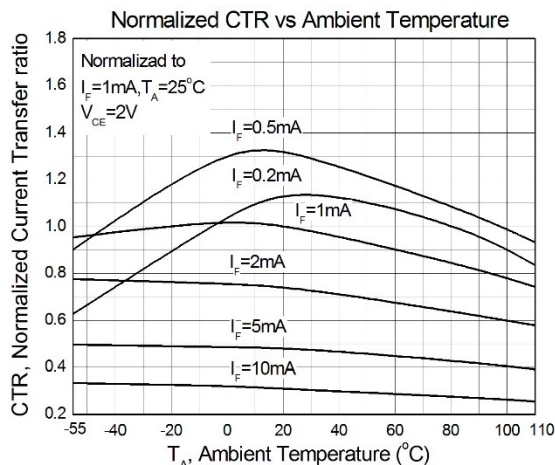
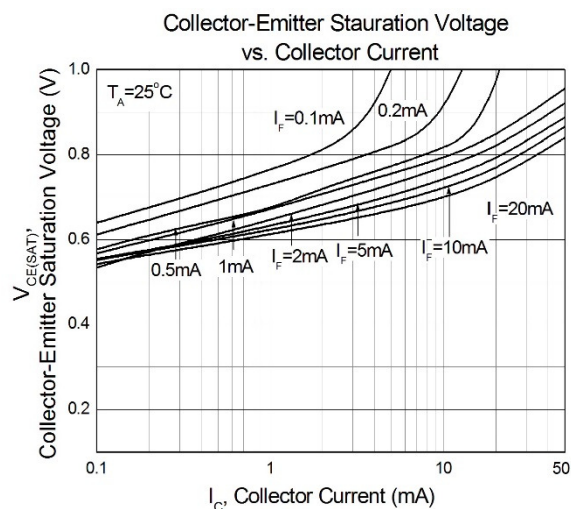
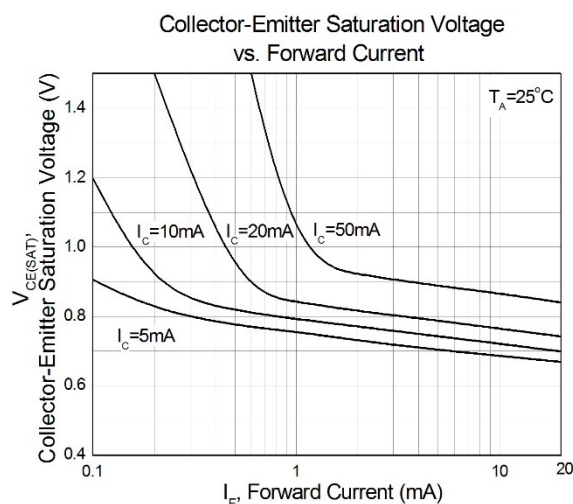
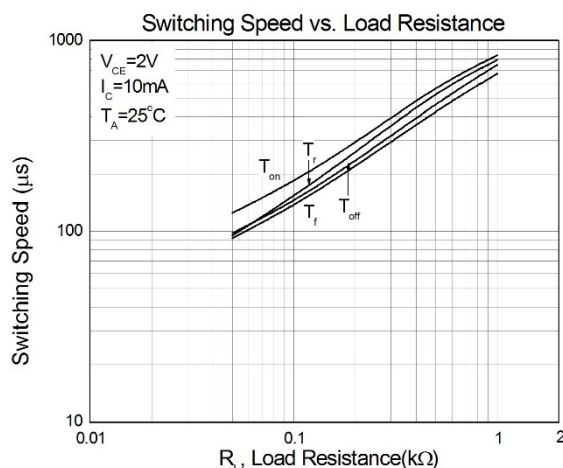
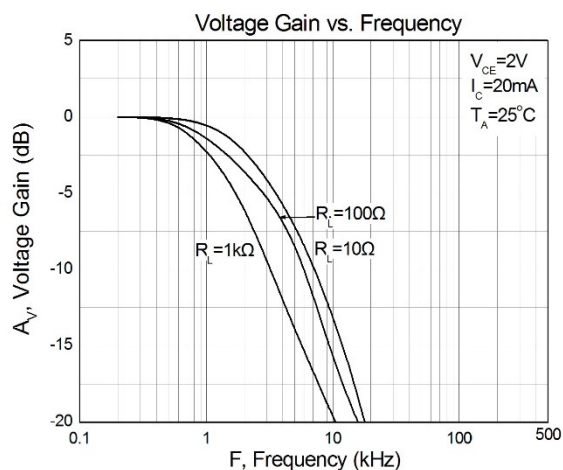
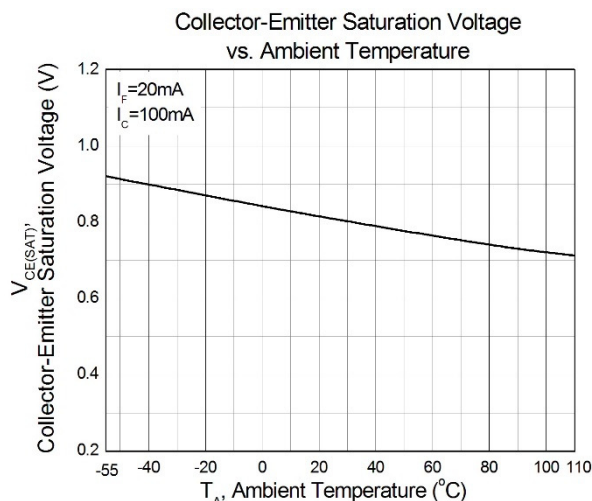
Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
t_r	Rise Time	$I_C = 10\text{mA}$, $V_{CE} = 2\text{V}$, $R_L = 100$	-	-	300	μs	
t_f	Fall Time		-	-	250		



Typical Characteristic Curves

**Figure 1****Figure 2****Figure 3****Figure 4****Figure 5****Figure 6**

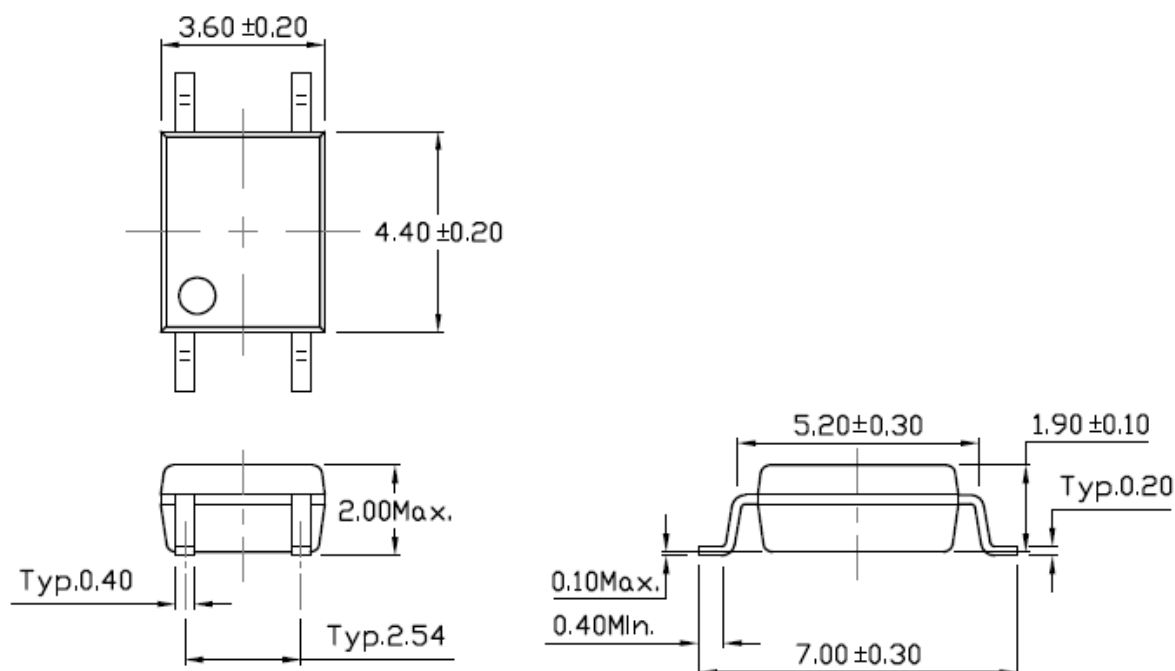
**DC Input 4-Pin Mini-Flat Photodarlington Optocoupler****Figure 7****Figure 8****Figure 9****Figure 10****Figure 11****Figure 12**



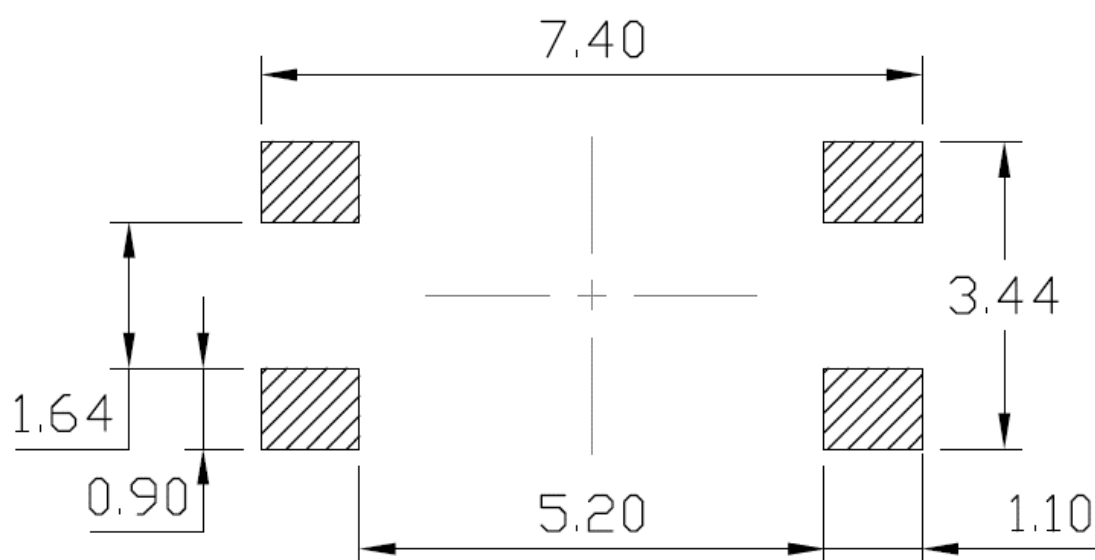
CT415 Series

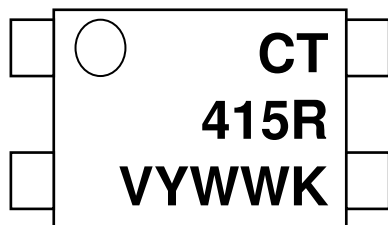
DC Input 4-Pin Mini-Flat Photodarlington Optocoupler

Package Dimension *Dimensions in mm unless otherwise stated*



Recommended Solder Mask *Dimensions in mm unless otherwise stated*



**Marking Information****Note:**

CT : Denotes "CT Micro"

415 : Product Number

R : CTR Rank

V : VDE Option

Y : Fiscal Year

WW : Work Week

K : Manufacturing Code

Ordering Information**CT415X(V)(Z)**

X = Part No. (X=A, B or None)

V = VDE option (V or none)

Z = Tape and reel option (T1, T2 or none)

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

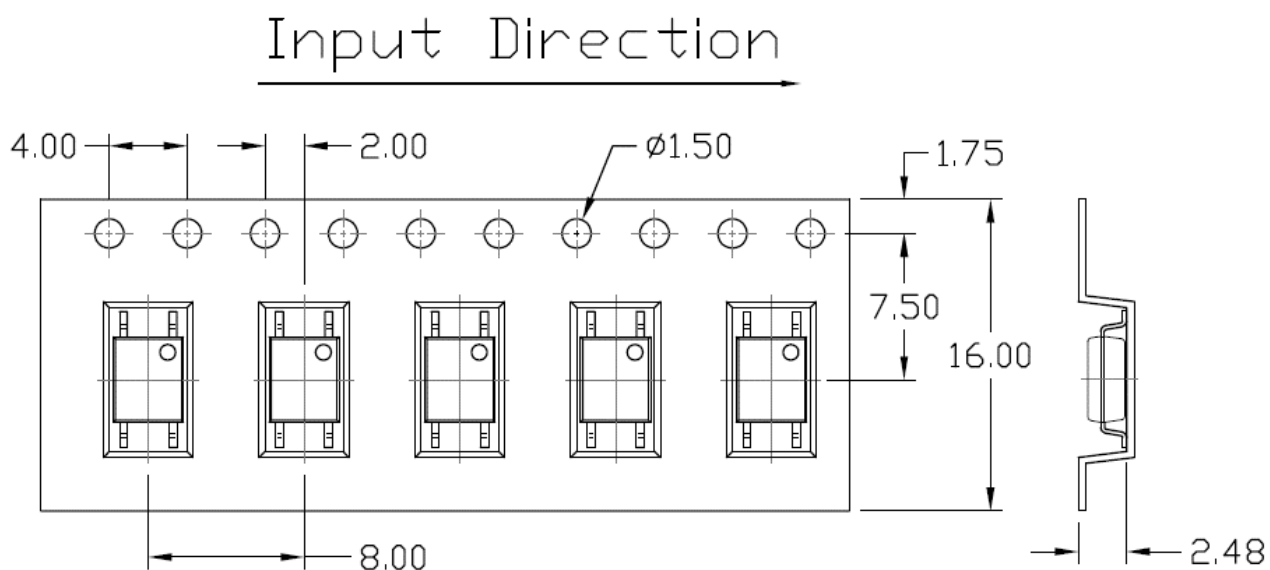


CT415 Series

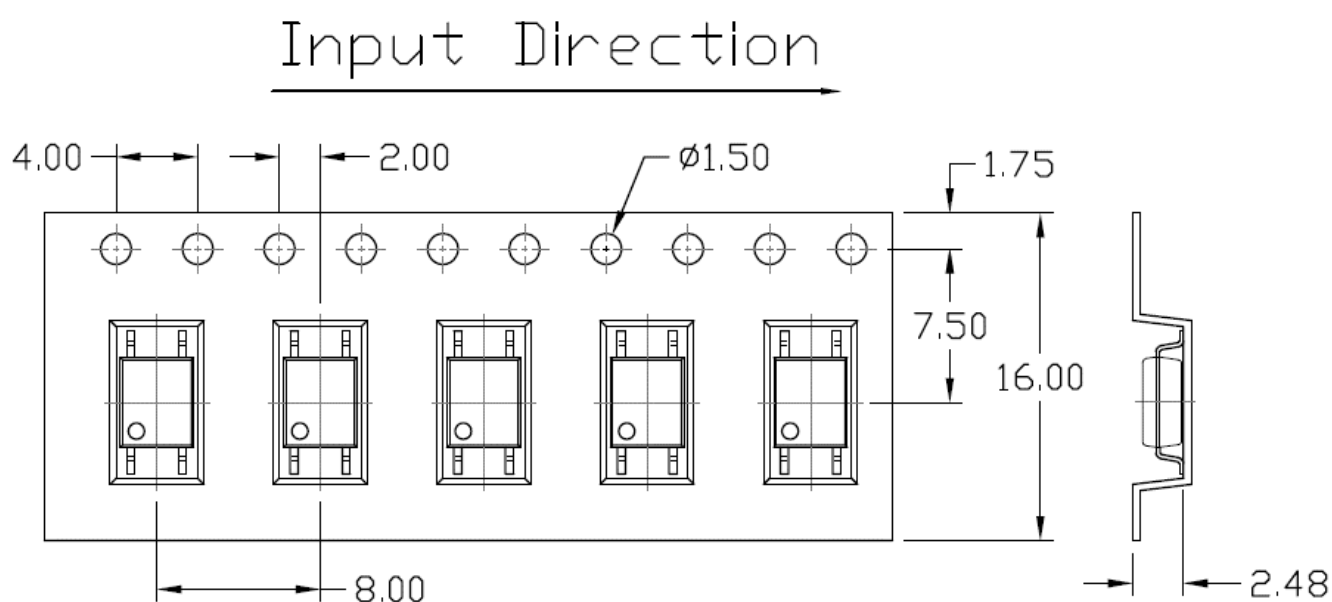
DC Input 4-Pin Mini-Flat Photodarlington Optocoupler

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option (T1)

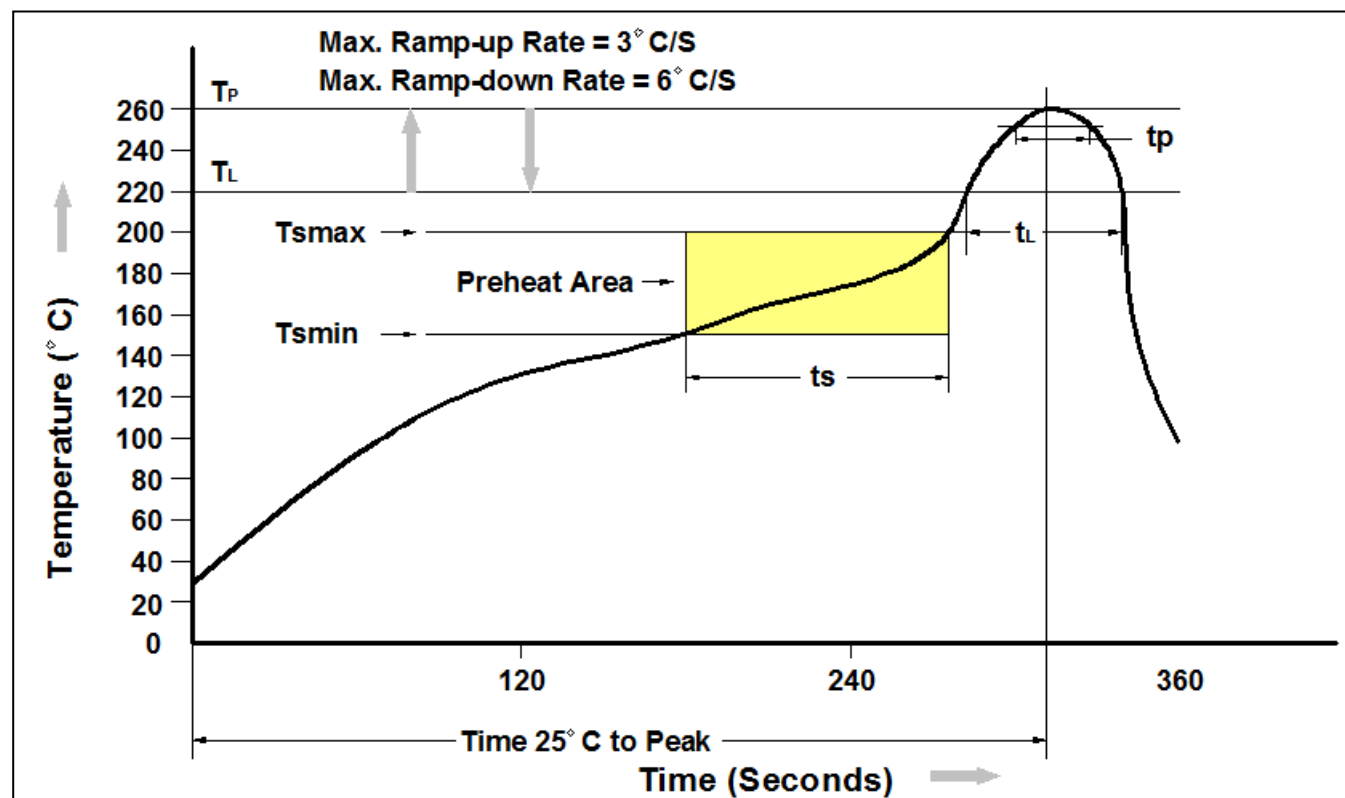


Option (T2)





Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmmin)	150 °C
Temperature Max. (Tsmmax)	200 °C
Time (ts) from (Tsmmin to Tsmmax)	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.



CT415 Series

DC Input 4-Pin Mini-Flat Photodarlington Optocoupler

DISCLAIMER

CT MICRO RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. CT MICRO DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

DISCOLORATION MIGHT OCCUR ON THE PACKAGE SURFACE AFTER SOLDERING, REFLOW OR LONG TERM USE. THIS DOES NOT IMPACT THE PRODUCT PERFORMANCE NOR THE PRODUCT RELIABILITY.

CT MICRO ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT EXPRESS WRITTEN APPROVAL OF CT MICRO INTERNATIONAL CORPORATION.

- 1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instruction for use provided in the labelling, can be reasonably expected to result in significant injury to the user.*
- 2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.*