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CTD206, CTD207, CTD208, CTD211, CTD213, CTD217

DC Input SOP8 DMC-Isolator® Phototransistor Optocoupler

Features

- High isolation 3750 VRMS
- Patented coplanar structure DMC-Isolator®
- Various CTR selection available
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- External Creepage ≥ 4.0mm
- Insulation thickness ≥ 0.4mm
- Clearance Distance ≥ 4.0mm
- RoHS and REACH compliance
- Halogen Free compliance
- MSL class 1
- Regulatory Approvals
  - ✓ UL - UL1577 (E364000)
  - ✓ VDE - EN60747-5-5(40039590)
  - ✓ CQC – GB4943.1, GB8898 (17001167067)
  - ✓ IEC62368 (FI/41119)

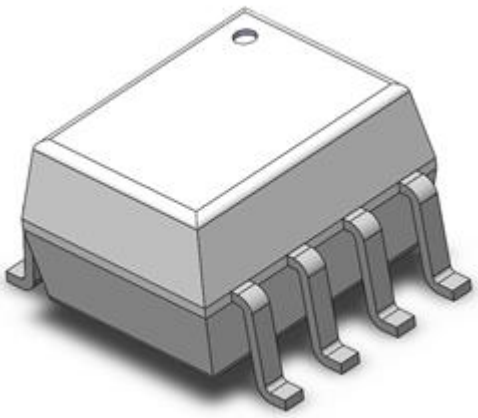
Description

The CTD206, CTD207, CTD208, CTD211, CTD213 and CTD217 consists of dual channels each contains a photo transistor optically coupled to an Infrared-emitting diode in a SOP8 DMC-Isolator® package different lead forming options.

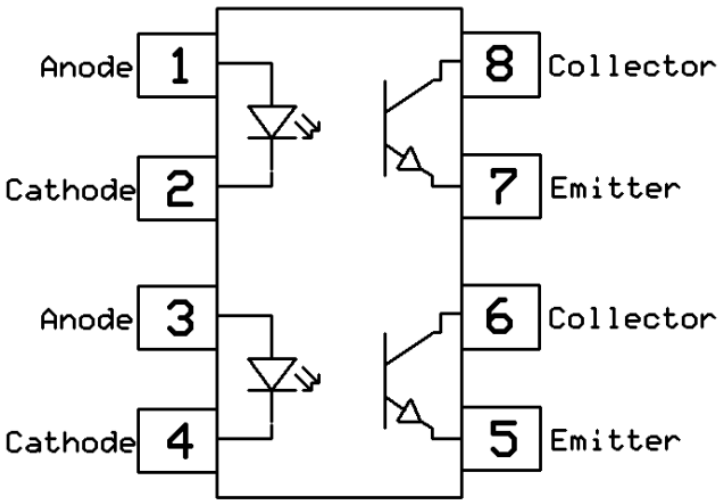
Applications

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

Package Outline



Schematic



Absolute Maximum Ratings T_A = 25°C, unless otherwise specified

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameters		Ratings	Units	Notes
V_{ISO}	Isolation voltage (AC, 1 minute, RH = 40 ~ 60 %.)		3750	V_{RMS}	
P_{TOT}	Total power dissipation		225	mW	
T_{OPR}	Operating temperature		-55 ~ +110	°C	
T_{STG}	Storage temperature		-55 ~ +150	°C	
T_{SOL}	Soldering temperature (For 10 seconds)		260	°C	***1***
Emitter (1 circuit)					
I_F	Forward current		30	mA	***2***
$I_{F(TRANS)}$	Peak transient current (≤1μs P.W,300pps)		1	A	***2***
V_R	Reverse voltage		6	V	***2***
P_D	Emitter power dissipation		50	mW	***2***
Detector (1 circuit)					
P_D	Detector power dissipation		125	mW	***2***
B_{VCEO}	Collector-Emitter Breakdown Voltage	CTD206,CTD207 CTD208,CTD213	80	V	***2***
		CTD211,CTD217	35		***2***
B_{VECO}	Emitter-Collector Breakdown Voltage		7	V	***2***
I_C	Continuous Collector Current		50	mA	***2***

Notes

1. For reflow process
2. Each Channel

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 = 6V	-	0.1	5	μA	
C_{IN}	Input Capacitance	f= 1MHz	-	10	30	pF	

Detector Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
B_{VCEO}	Collector-Emitter Breakdown	CTD211, CTD217	I_C= 100μA	35	-	-	V	
		CTD206,CTD207 CTD208,CTD213		80	-	-		
B_{VECO}	Emitter-Collector Breakdown		I_E= 100μA	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current		V_{CE}= 10V, I_F=0mA	-	1	50	nA	

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	CTD206	I_F= 10mA, V_{CE}= 5V	63	-	125	%	
		CTD207		100	-	200		
		CTD208		40	-	125		
		CTD211		20	-	-		
		CTD213		100	-	-		
		CTD206	I_F= 1mA, V_{CE}= 5V	22	45			
		CTD217		100	-	-		

Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	CTD206,CTD207 CTD208,CTD211 CTD213	I_F= 10mA, I_C= 2.5mA	-	-	0.4	V	
		CTD217	I_F= 1mA, I_C= 100μA	-	-	0.4		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
t_r	Rise Time	I_C= 2mA, V_{CE}= 2V	-	6	18	μs	
t_f	Fall Time	R_L= 100Ω	-	8	18		
R_{IO}	Isolation Resistance	V_{IO}= 500V_{DC}, 40 ~ 60% R.H.	10^{11}	-	-	Ω	
C_{IO}	Isolation Capacitance	f= 1MHz	-	0.2	-	pF	

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified*

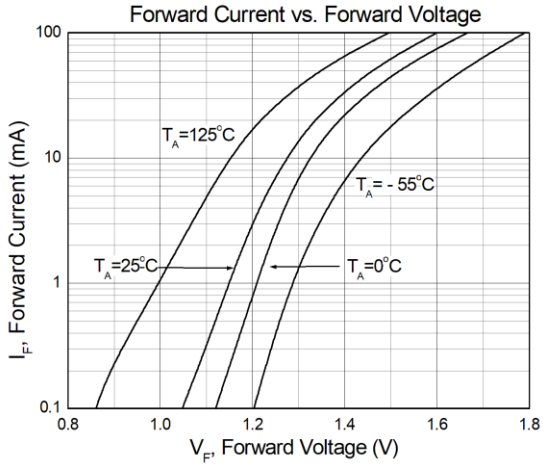
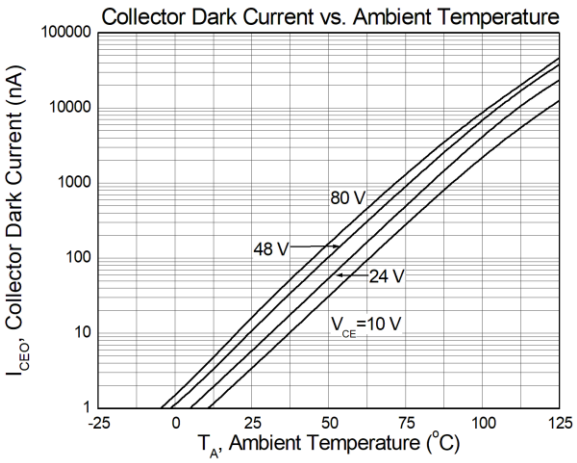


Figure 1



Figrue 2

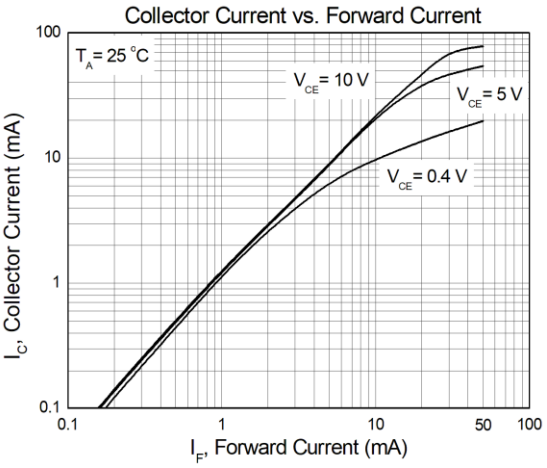


Figure 3

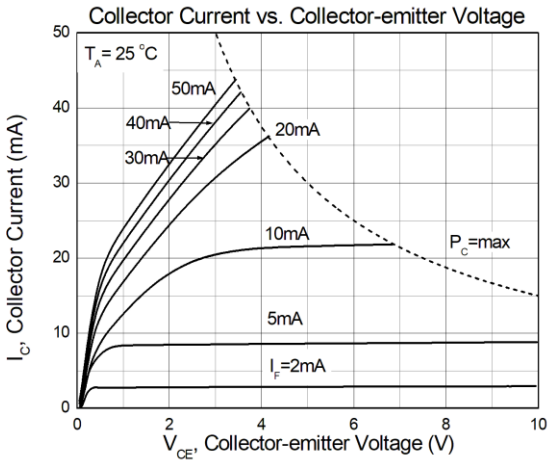


Figure 4

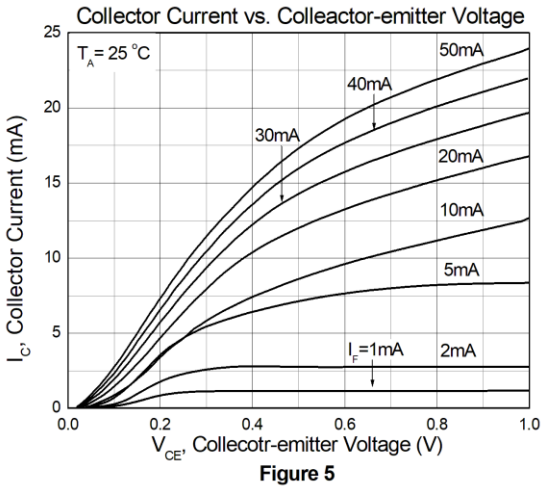


Figure 5

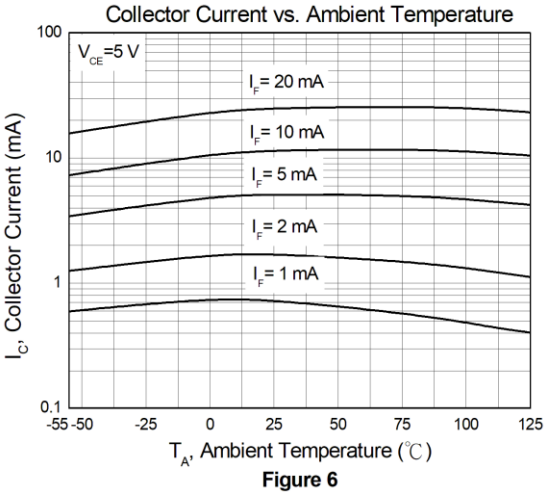


Figure 6

Typical Characteristic Curves *T_A = 25°C, unless otherwise specified (Continued)*

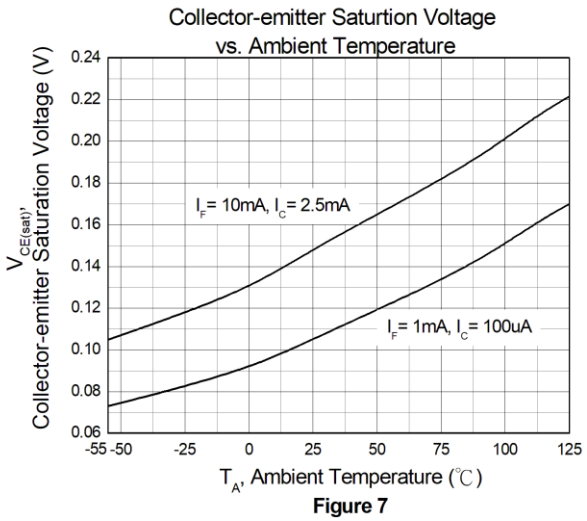


Figure 7

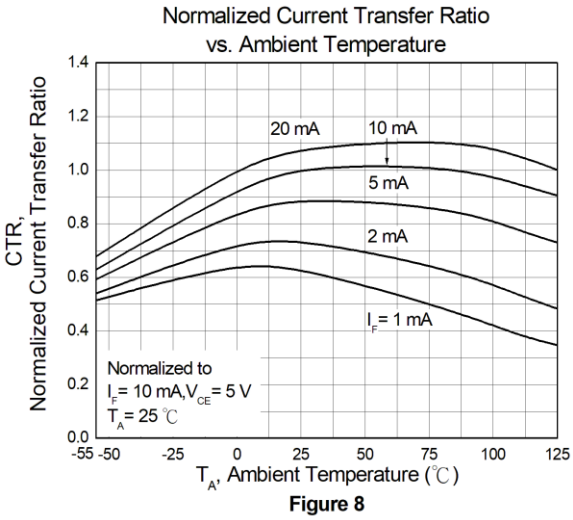


Figure 8

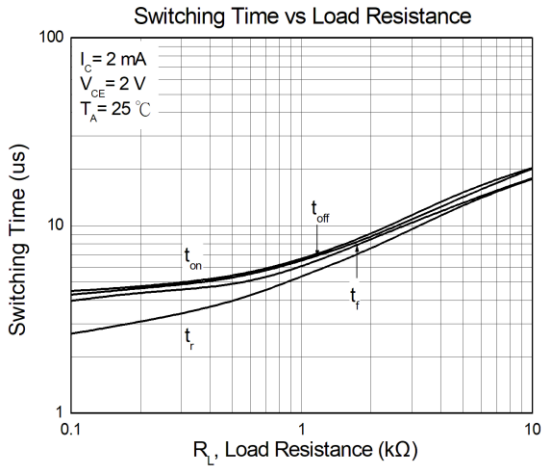


Figure 9

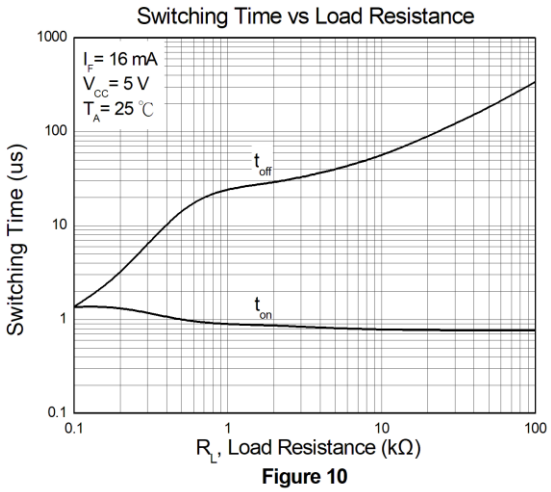


Figure 10

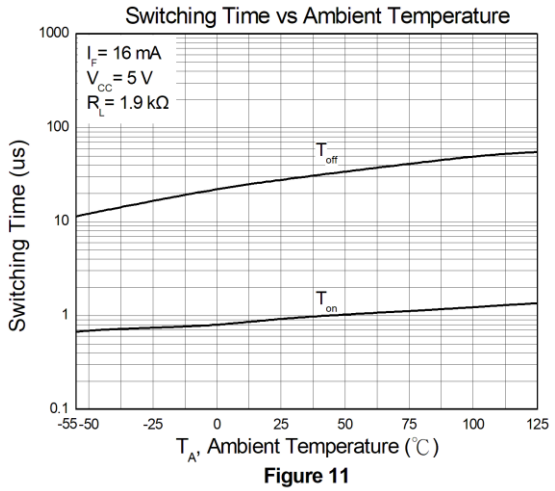


Figure 11

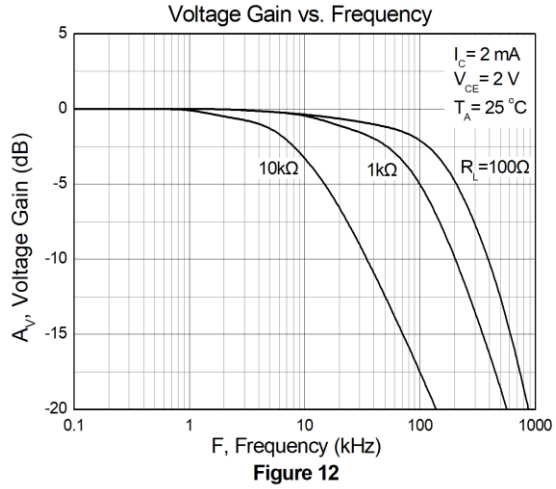


Figure 12

Test Circuit

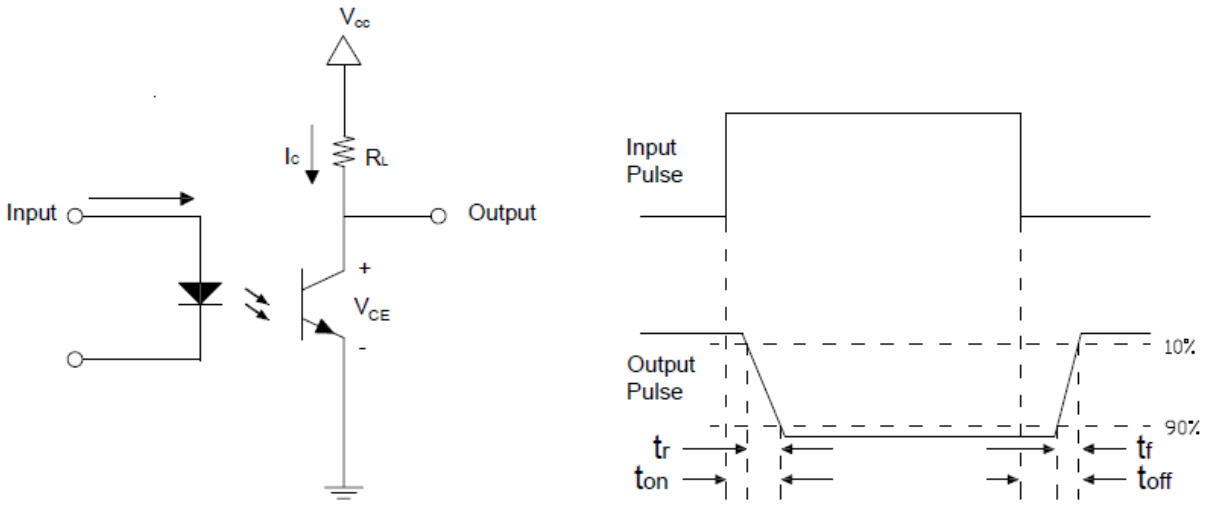
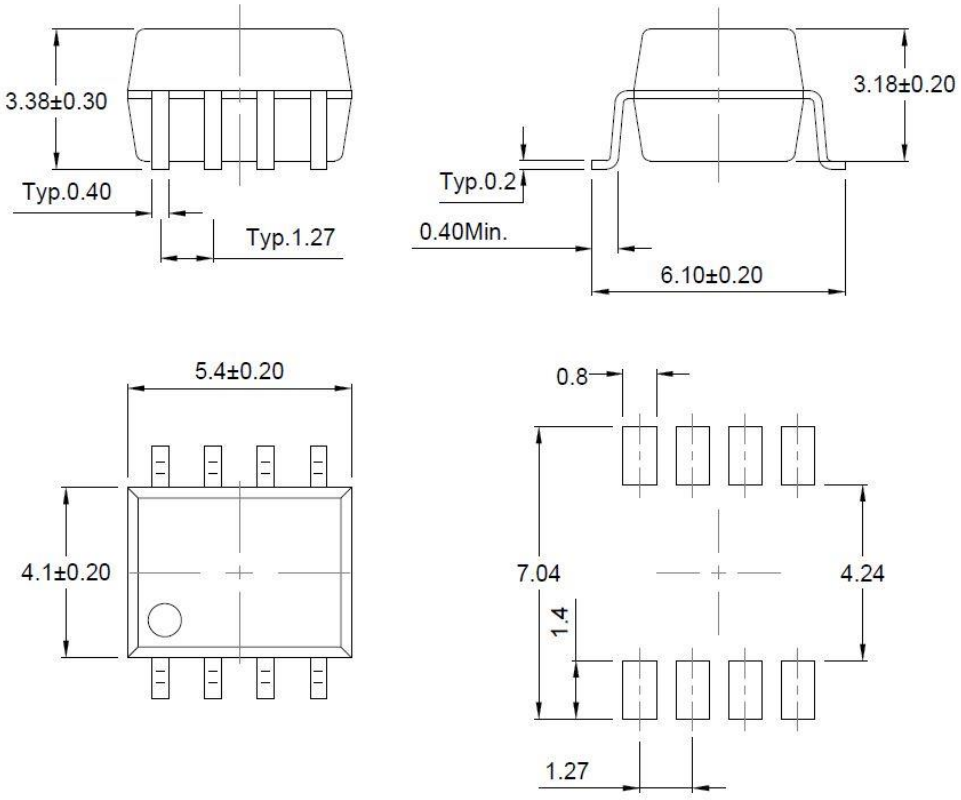
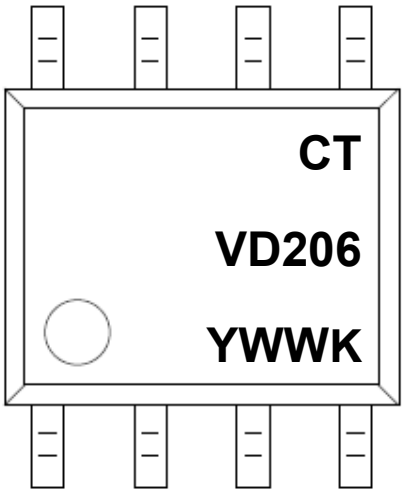


Figure 13: Switching Time Test Circuits

Package Dimension *Dimensions in mm unless otherwise stated*



Device Marking



Note:

CT	: Denotes “CT Micro”
D206	: Part Number (D206, D207, D208, D211, D213, D217)
V	: VDE Safety Mark Option (Blank or V)
Y	: One Digit Year Code
WW	: Two Digit Work Week
K	: Manufacturing Code

Ordering Information

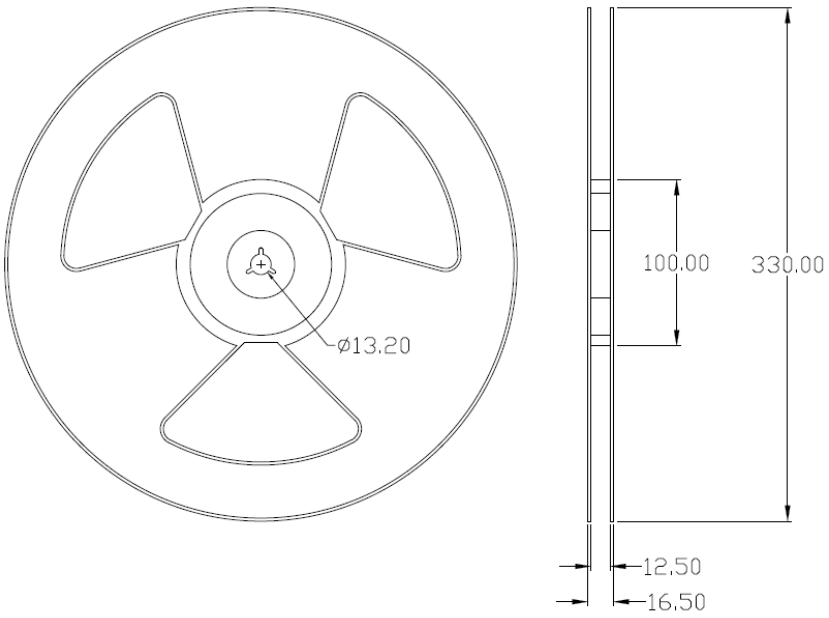
CTD2XX(V)(Z)

CT = Denotes “CT Micro”
D2XX = Product Number (XX=06, 07, 08, 11, 13, 17)
V = VDE Safety Mark Option (Blank or V)
Z = Tape and Reel Option (T1 or T2)

Option	*Description*	*Quantity*
T1	Surface Mount Lead Forming – With Option 1 Taping	2,000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	2,000 Units/Reel

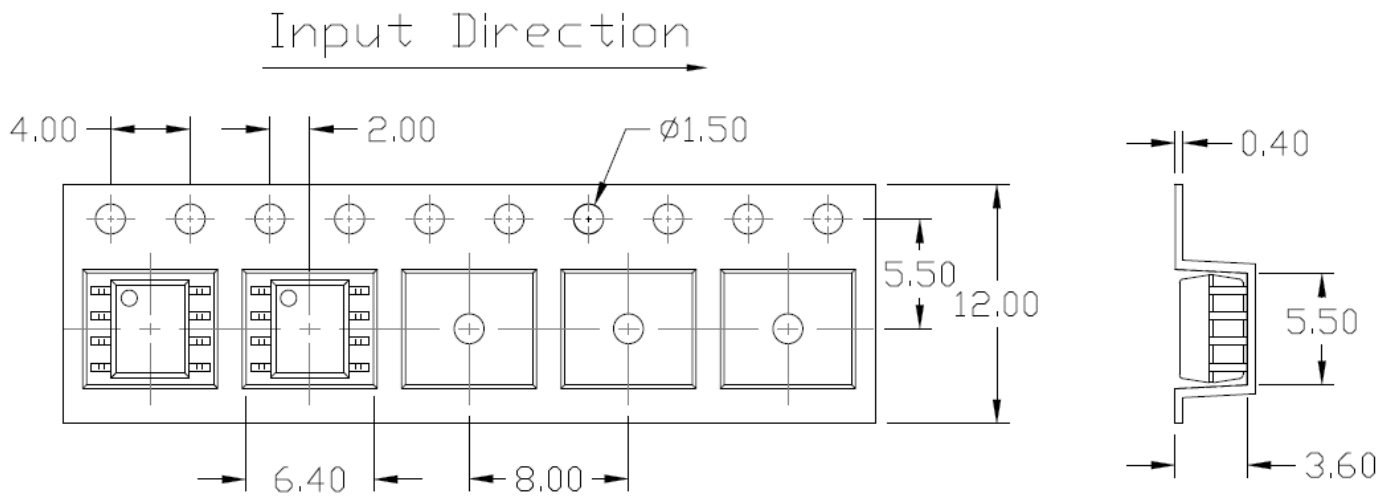
Reel Dimension *All dimensions are in mm, unless otherwise stated*

Option T1 & T2

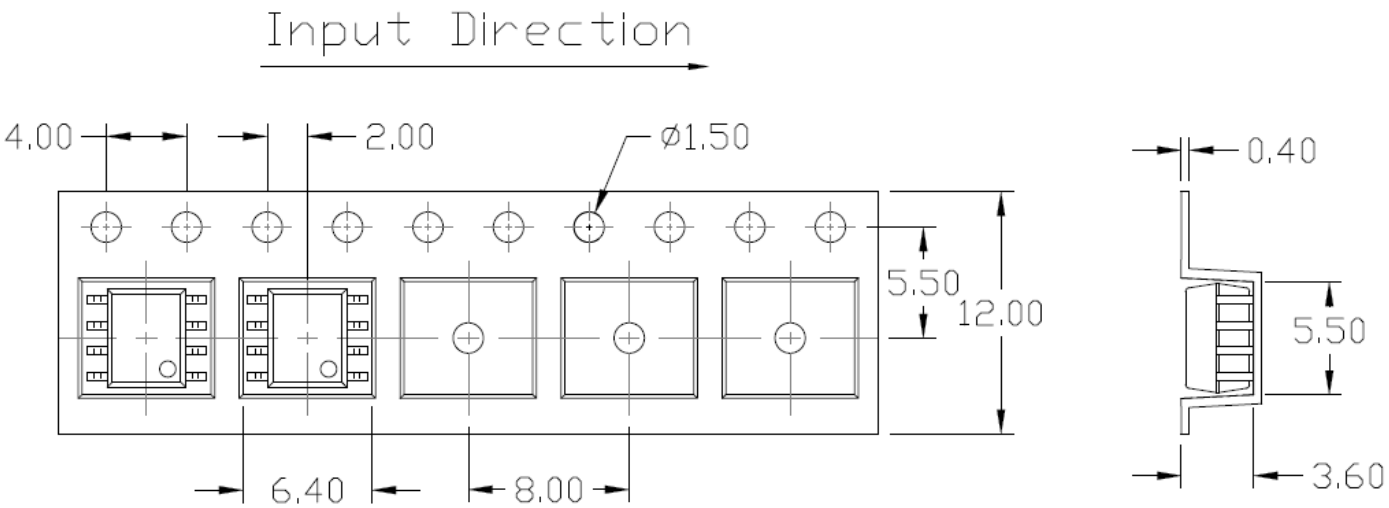


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1



Option T2

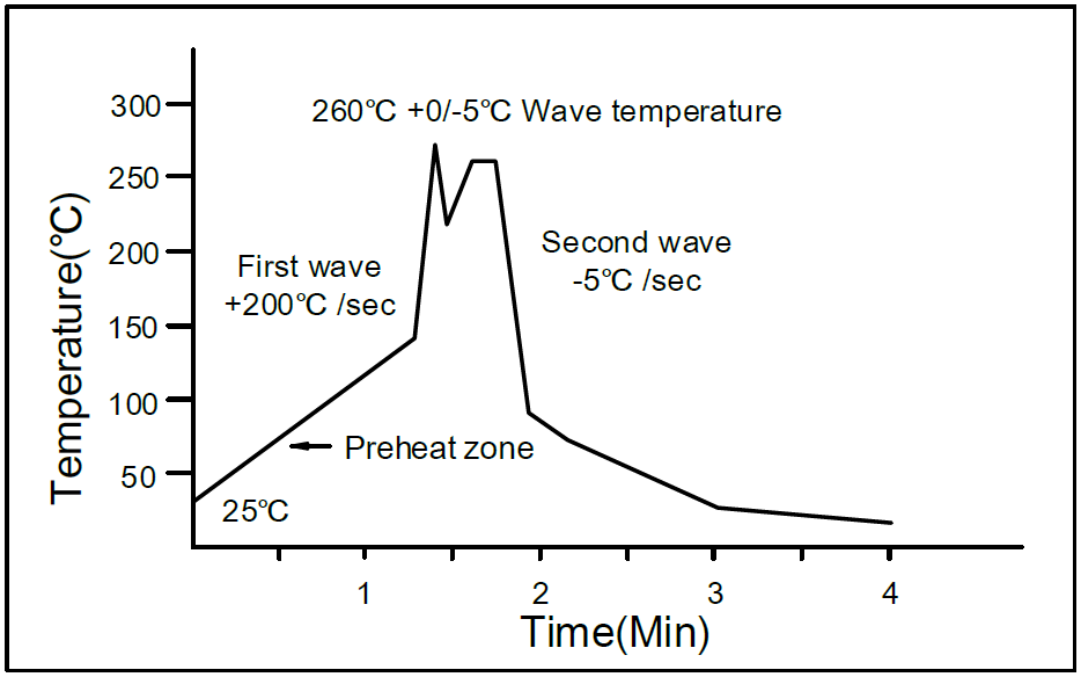


Solderability Specification (follow the JEDEC standard JESD22-B102)

Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.
Solder-Bath: More than 95% of the electrode must be covered with solder.

Wave Soldering (follow the JEDEC standard JESD22-A111)

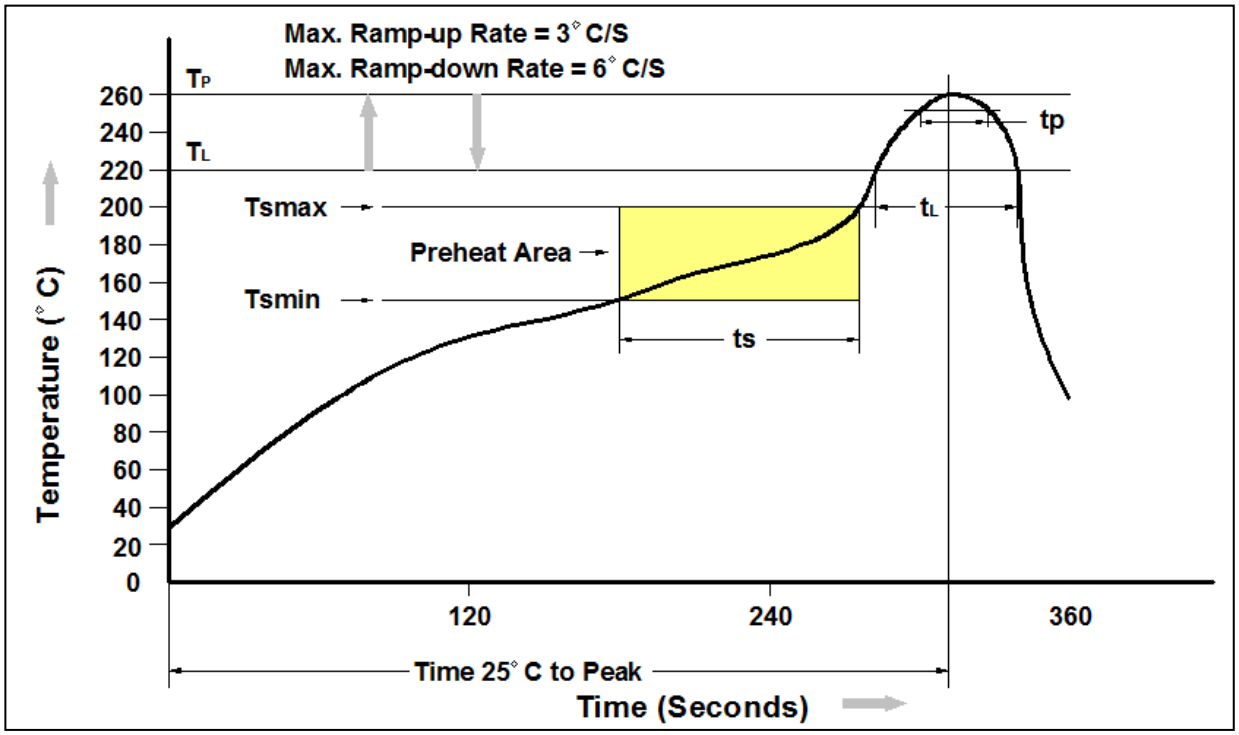
One time soldering is recommended within the condition of temperature.
Temperature: 260+0/-5˚C.
Time: 10 sec.
Preheat temperature: 25 to 140˚C.
Preheat time: 30 to 80 sec.



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 (follow the JEDEC standard J-STD-020)



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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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.*