



CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- Patented coplanar structure DMC-Isolator®
- Various CTR selection available
- DC input with transistor output
- Low current operation guaranteed
- Operating Temperature range - 55 °C to 110 °C
- External Creepage $\geq 7.0\text{mm}$
- Distance Through Isolation $\geq 0.4\text{mm}$
- Clearances Distance $\geq 7.5\text{mm}$ (S/SL Type)
- Clearances Distance $\geq 8.0\text{mm}$ (M/SLM Type)
- RoHS and REACH compliance
- Halogen Free compliance (Optional)
- MSL class 1
- Regulatory Approvals
 - ✓ UL - UL1577 (E364000)
 - ✓ VDE - EN60747-5-5(VDE0884-5)
 - ✓ CQC – GB4943.1, GB8898 (14001104781)
 - ✓ IEC62368 (FI/41119)

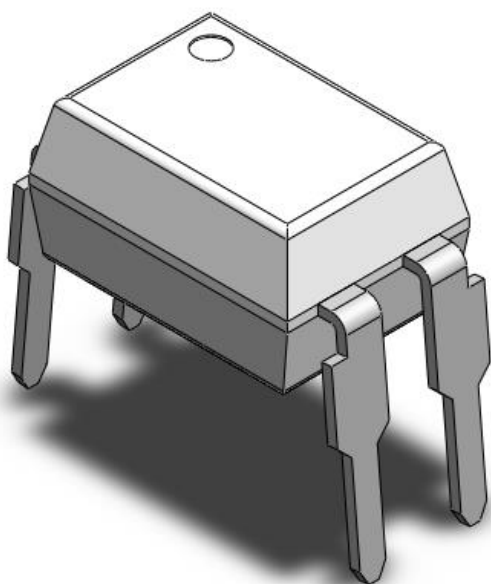
Description

The CT816D3 series consists of a photo transistor optically coupled to an Infrared-emitting diode in a 4-lead DIP DMC-Isolator® package with different lead forming options.

Applications

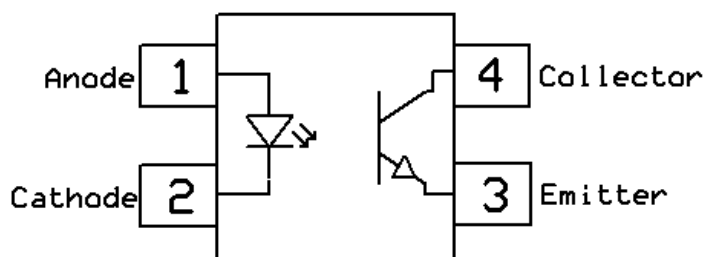
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Package Outline



Note: Different bending options available. See package dimension

Schematic





CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Absolute Maximum Ratings $T_A = 25^{\circ}\text{C}$, 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, 40 ~ 60% R.H.)	5000	V_{RMS}	
P_{TOT}	Total power dissipation	200	mW	
T_{OPR}	Operating temperature	-55 ~ +110	$^{\circ}\text{C}$	
T_{STG}	Storage temperature	-55 ~ +150	$^{\circ}\text{C}$	
T_{SOL}	Soldering temperature (For 10 seconds)	260	$^{\circ}\text{C}$	
Emitter				
I_{F}	Forward current	60	mA	
$I_{\text{F(TRANS)}}$	Peak transient current ($\leq 1\mu\text{s P.W, 300pps}$)	1	A	
V_{R}	Reverse voltage	6	V	
P_{D}	Emitter power dissipation	100	mW	
Detector				
P_{D}	Detector power dissipation	150	mW	
B_{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B_{VECO}	Emitter-Collector Breakdown Voltage	6	V	
I_{C}	Collector Current	50	mA	



CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

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	<1.3	V	
I_R	Reverse Current	$V_R = 6\text{V}$	-	-	5	μA	
C_{IN}	Input Capacitance	$f = 1\text{MHz}$	-	30	-	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	$I_E = 100\mu\text{A}$	6	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 20\text{V}$, $I_F = 0\text{mA}$	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	$I_F = 0.1\text{mA}$, $V_{CE} = 0.4\text{V}$	10	30	-	%	
		$I_F = 2\text{mA}$, $V_{CE} = 5\text{V}$	200	-	500		
		$I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$	300	-	450		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}$, $I_C = 1\text{mA}$	-	0.1	0.2	V	
R_{IO}	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	5×10^{10}	-	-	Ω	
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	$I_C = 2\text{mA}$, $V_{CE} = 2\text{V}$, $R_L = 100\Omega$	-	6	18	μs	
t_f	Fall Time		-	8	18		



CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Typical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified

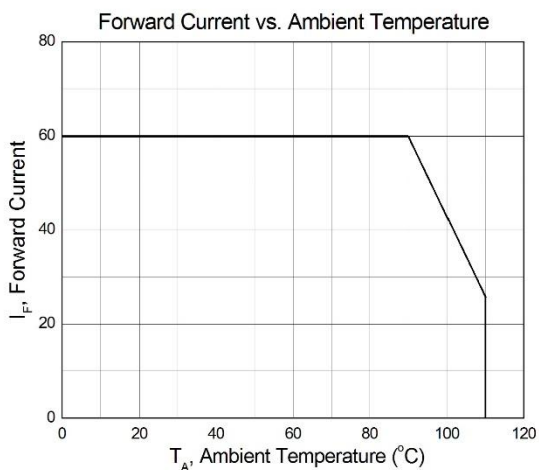


Figure 1

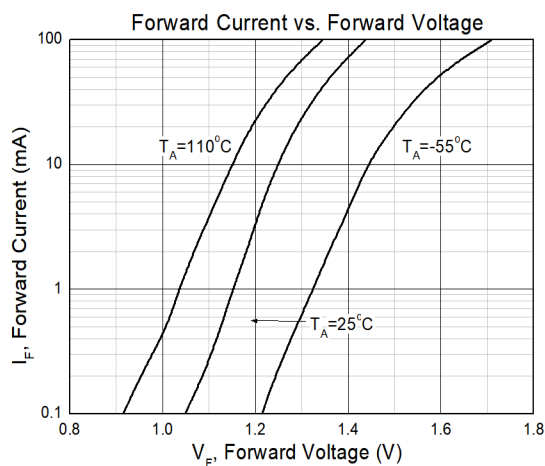


Figure 1

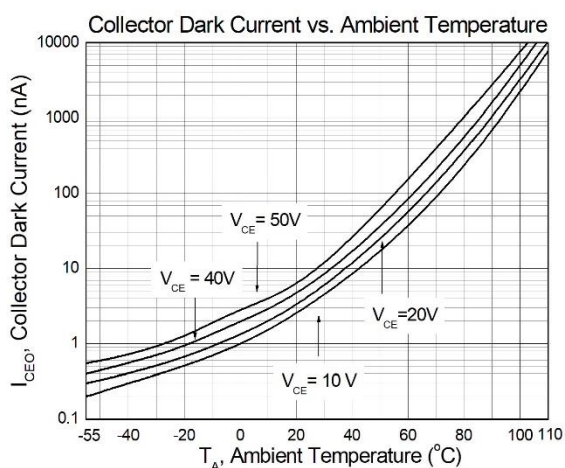


Figure 3

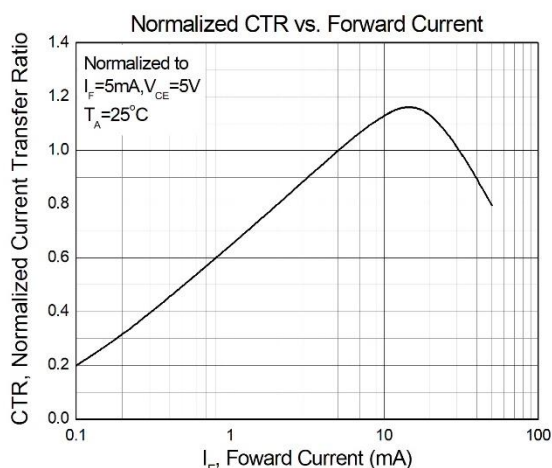


Figure 4

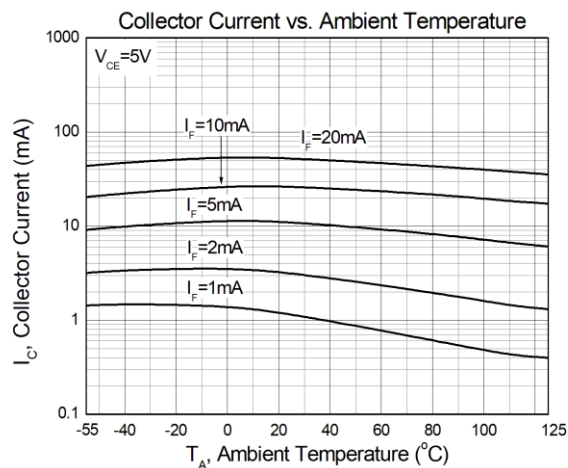


Figure 5

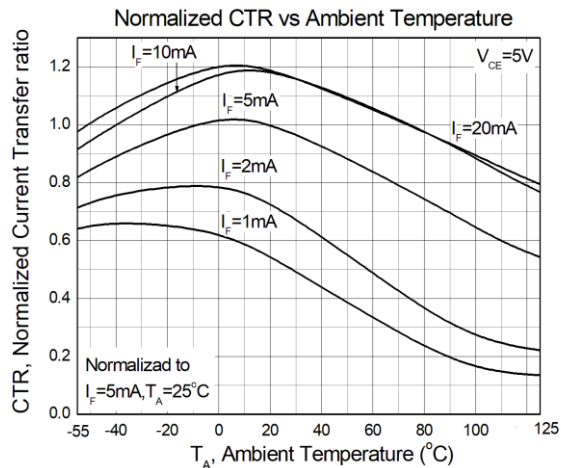


Figure 6



CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Typical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified (Continued)

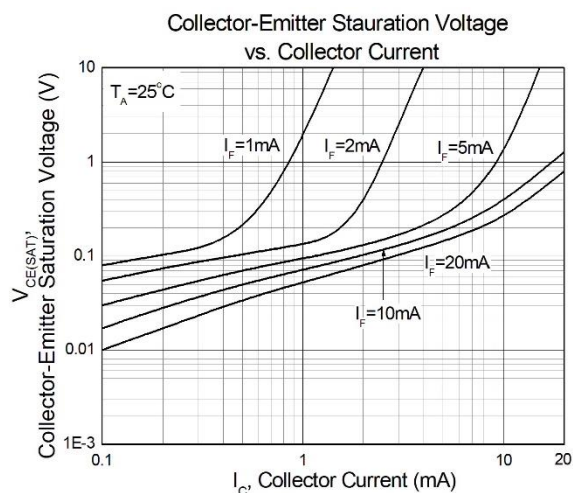


Figure 7

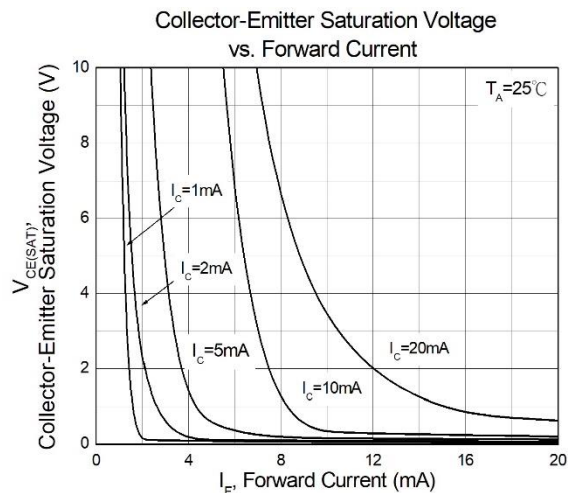


Figure 8

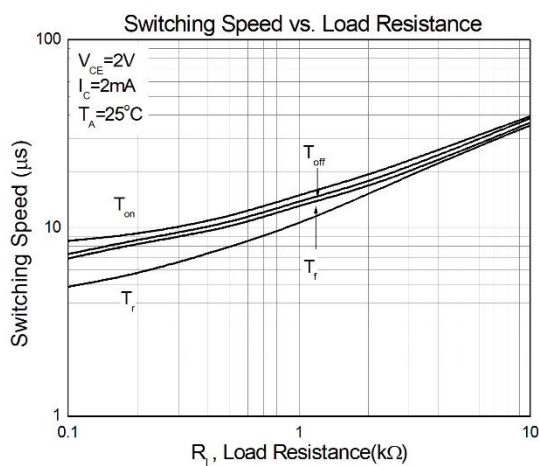


Figure 9

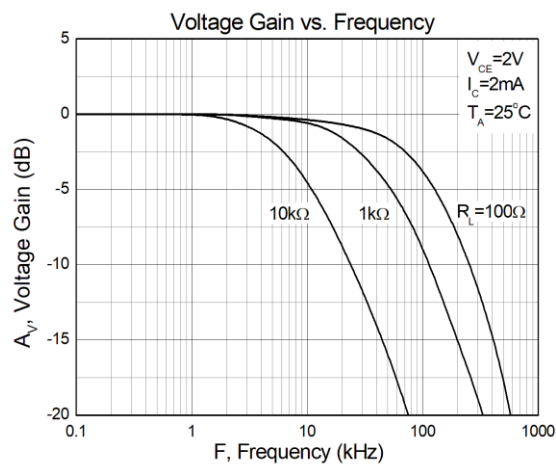


Figure 10



CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Test Circuit

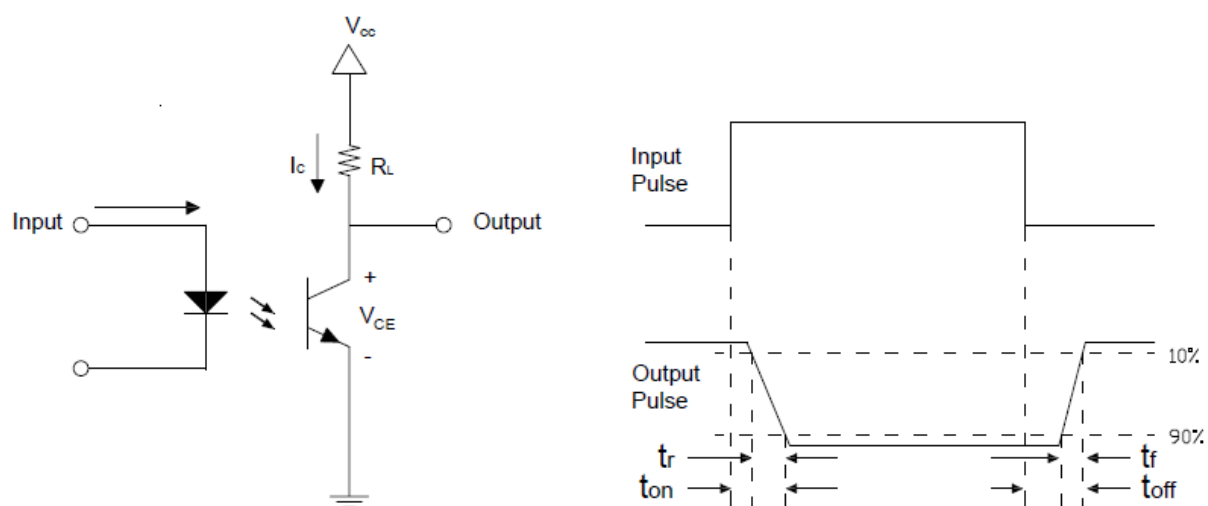


Figure 11: Switching Time Test Circuits



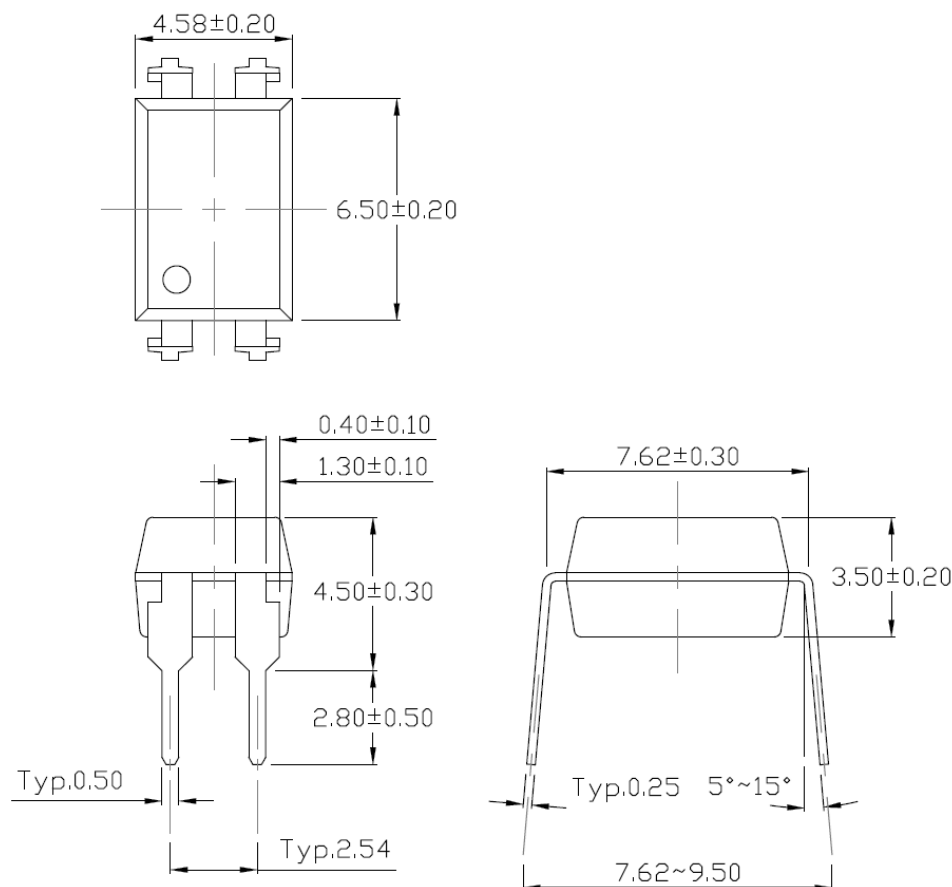
CT816D3 Series

DC Input 4-Pin DMC-Isolator®

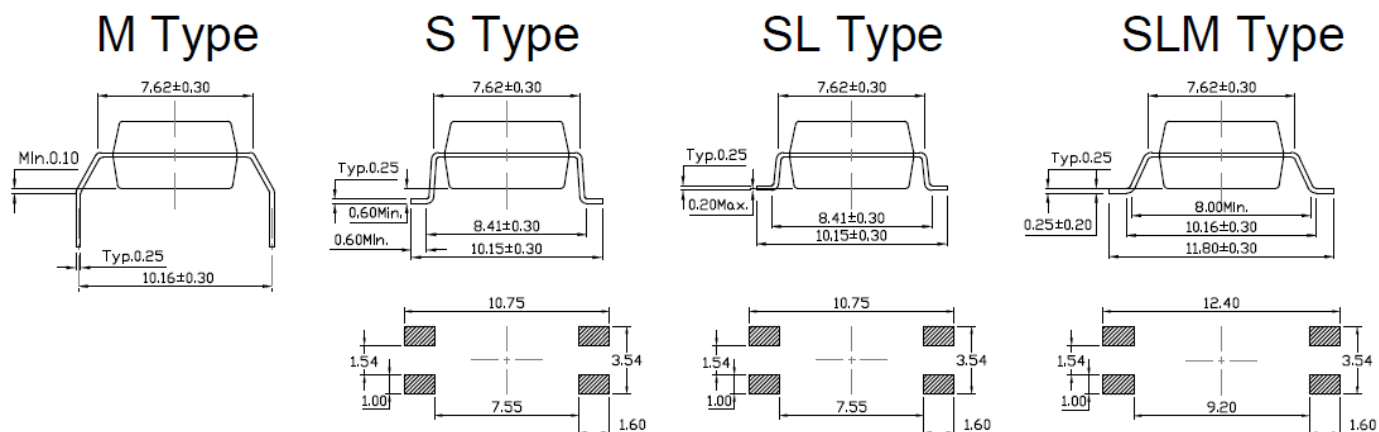
Phototransistor Optocoupler

Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



Forming Option *Dimensions in mm unless otherwise stated*





CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Marking Information



Note:

- CT : Denotes “CT Micro”
- 816 : Part Number
- D3 : CTR Rank
- V : VDE Safety Mark Option (Blank or V)
- Y : One Digit Year Code
- WW : Two Digit Work Week
- K : Manufacturing Code
- : Lead Frame Material Option
(Blank : Iron ; • : Copper)

Ordering Information

CT816D4 (V)(Y)(Z)-HG

- CT = Denotes “CT Micro”
- 816 = Part Number
- D3 = CTR Rank
- V = VDE Safety Mark Option (Blank or V)
- Y = Lead Form Option (S, SL, M, SLM or Blank)
- Z = Tape and Reel Option (Blank, T1 or T2)
- H = Lead Frame Option (H: Iron, Blank: Copper)
- G = Material Option (G: Halogen Free, Blank: Non-Halogen Free)

Option	Description	Quantity
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1500 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1500 Units/Reel
SLM(T1)	Surface Mount (Gullwing) Lead Forming– With Option 1 Taping	1500 Units/Reel
SLM(T2)	Surface Mount (Gullwing) Lead Forming – With Option 2 Taping	1500 Units/Reel



www.ct-micro.com

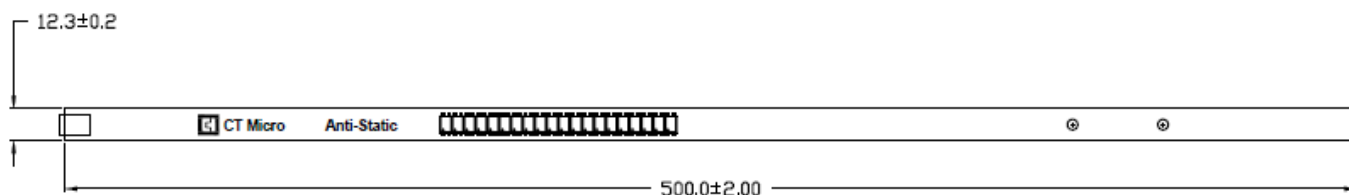
CT816D3 Series

DC Input 4-Pin DMC-Isolator®

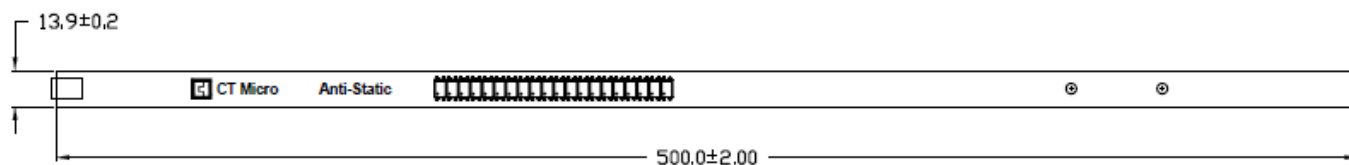
Phototransistor Optocoupler

Carrier Specifications *Dimensions in mm unless otherwise stated*

Tube Option Standard DIP

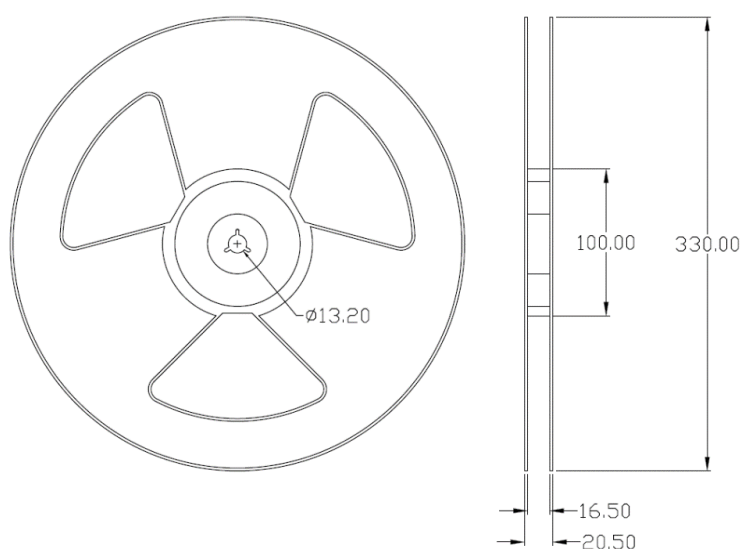


Tube Option M Type

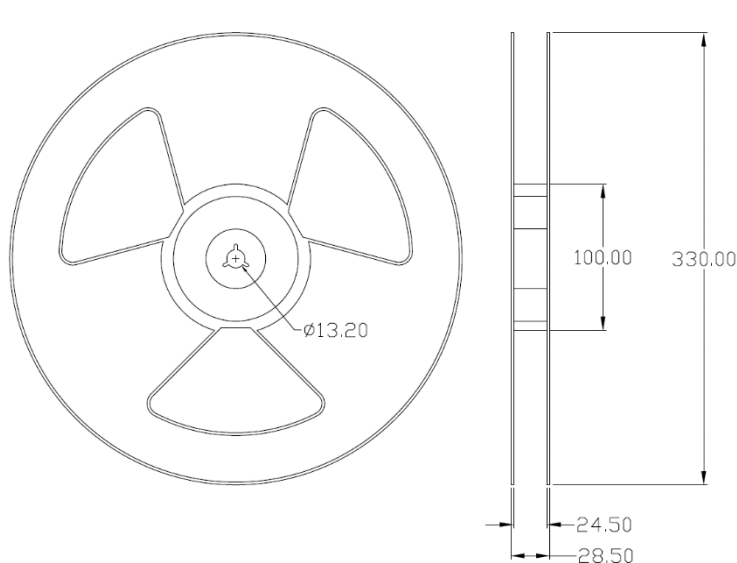


Reel Dimension *All dimensions are in mm, unless otherwise stated*

Option S(T1/T2) & SL(T1/T2)



Option SLM(T1/T2)





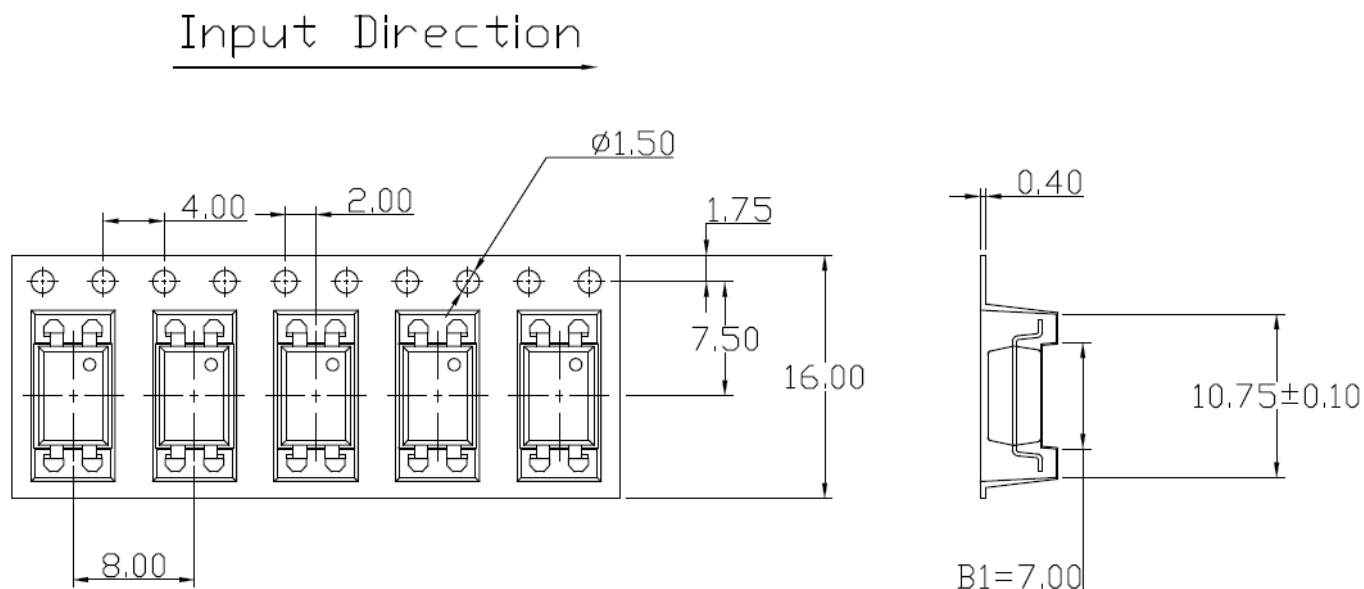
CT816D3 Series

DC Input 4-Pin DMC-Isolator®

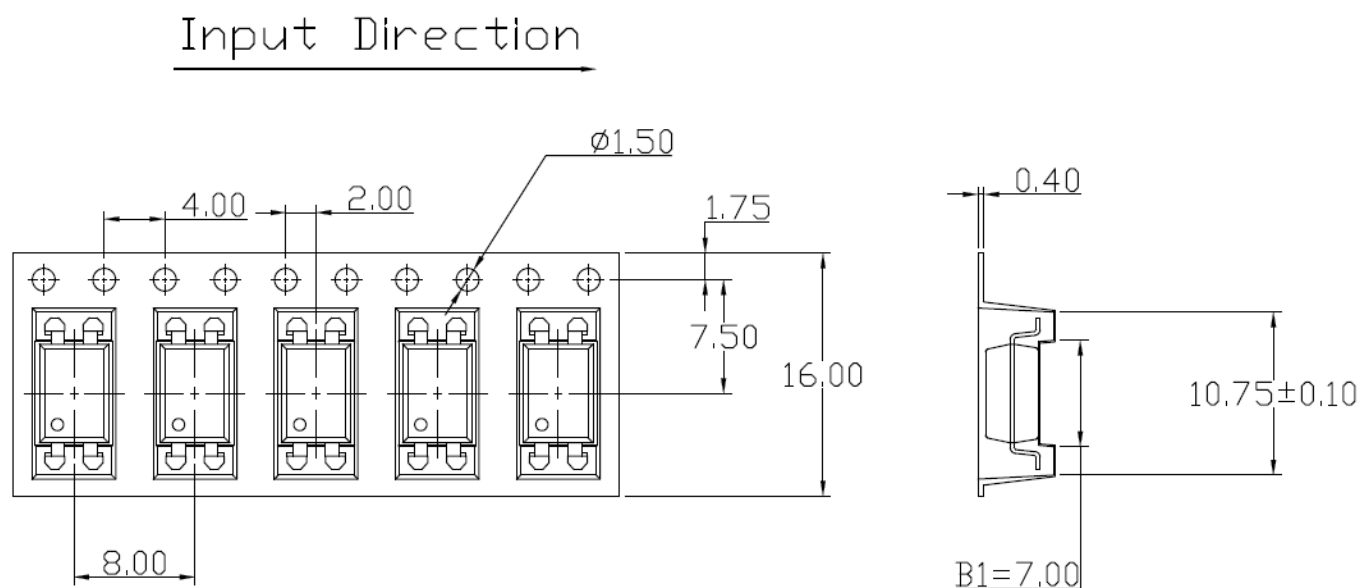
Phototransistor Optocoupler

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)



Option S(T2) & SL(T2)



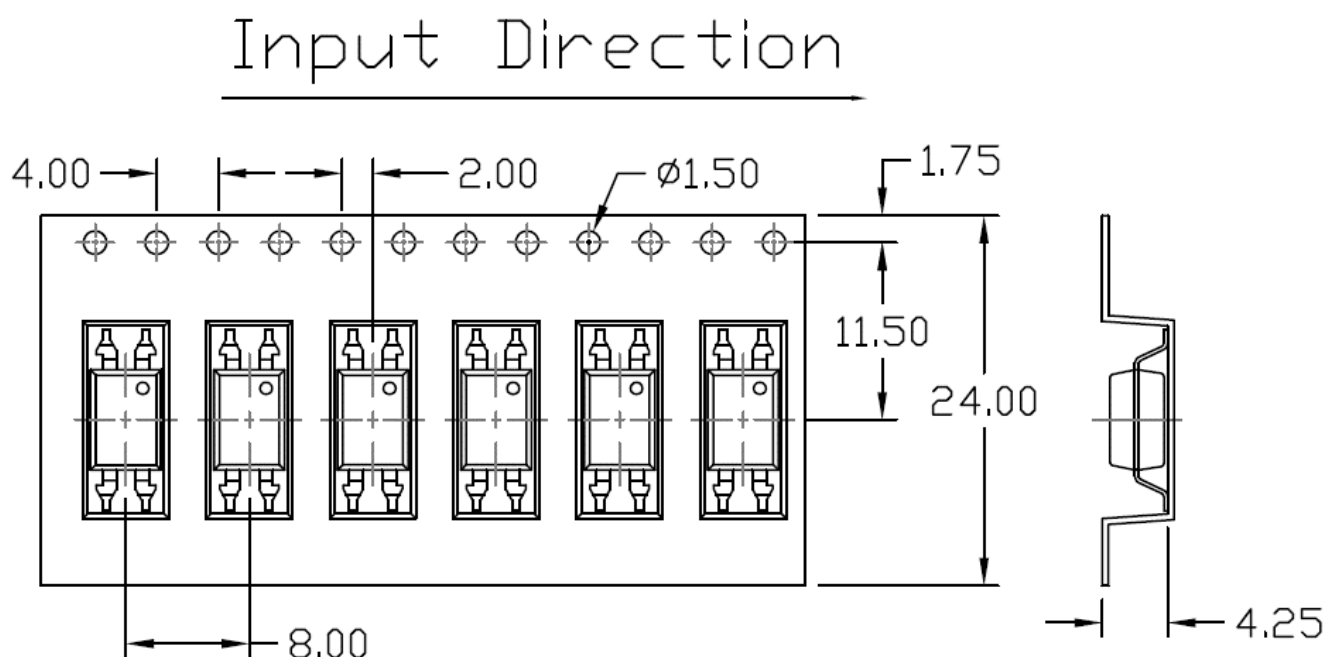


CT816D3 Series

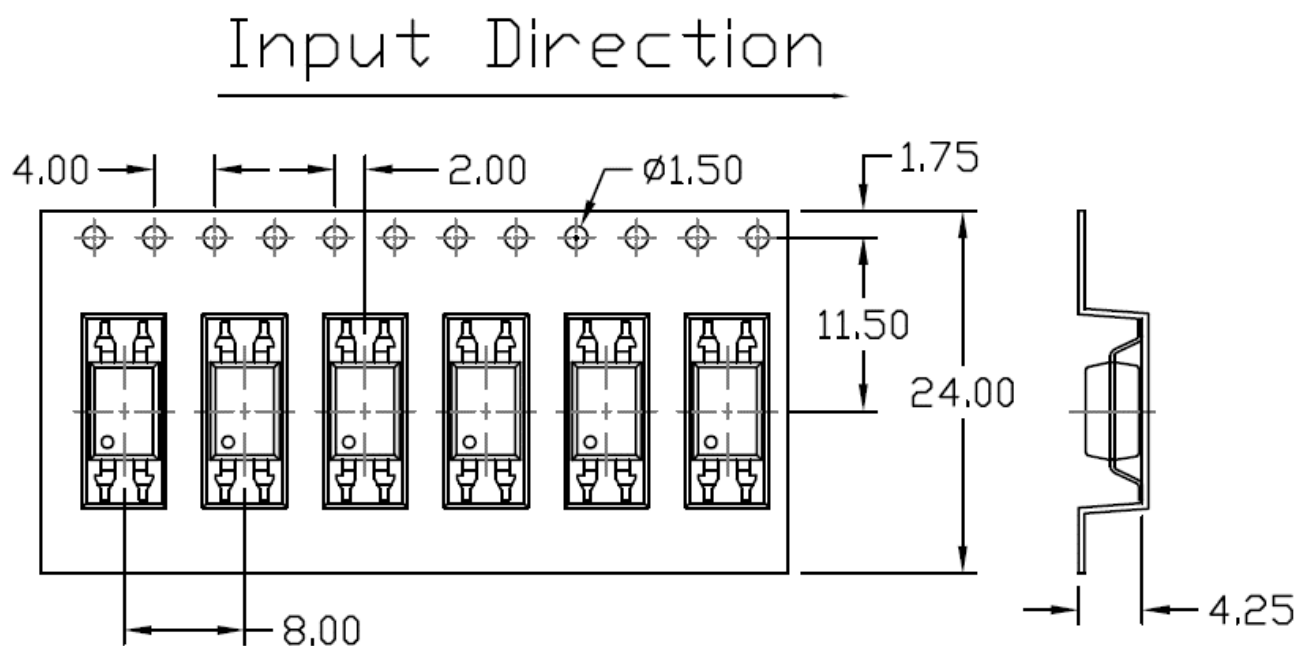
DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Option SLM(T1)



Option SLM(T2)





Solderability spec (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)

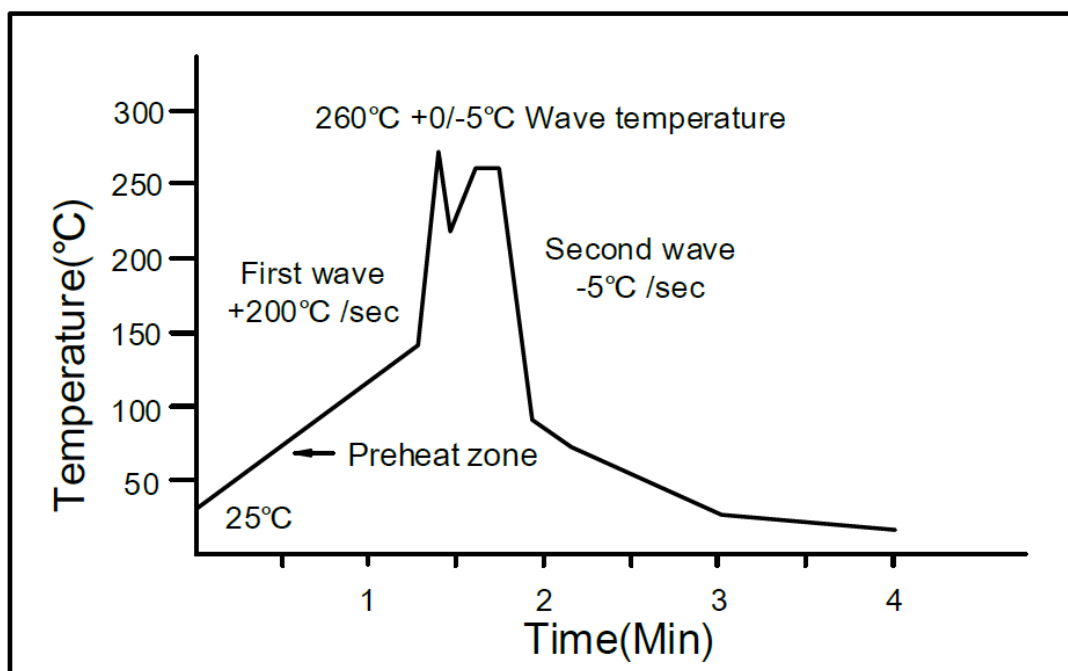
One time soldering is recommended within the condition of temperature.

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

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: $350 \pm 10^{\circ}\text{C}$

Time: 5 sec max.

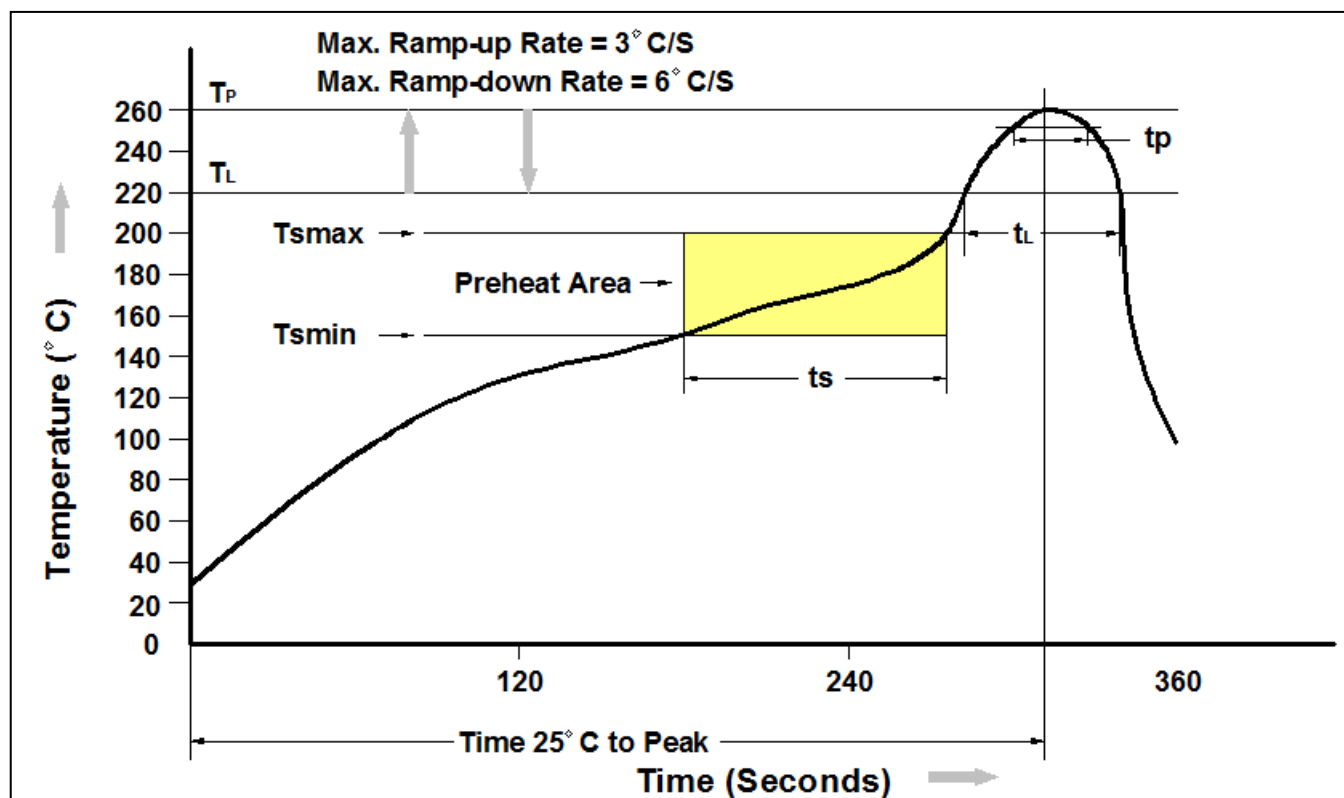


CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

Reflow Profile (Follow the JEDEC standard J-STD-020)



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.



CT816D3 Series

DC Input 4-Pin DMC-Isolator®

Phototransistor Optocoupler

DISCLAIMER

DMC-Isolator® IS A TRADEMARK OF CT MICRO INTERNATIONAL CORPORATION AND/OR ITS SUBSIDIARIES. CT MICRO OWNS THE RIGHTS TO A NUMBER OF PATENTS, TRADEMARKS, COPYRIGHTS AND OTHER INTELLECTUAL PROPERTY.

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.*