CTM410

10Mbit/s 5-Pin Mini-Flat Logic Gate Optocoupler

Features

- High speed 10MBit/s
- High isolation voltage between input and output (Viso=3750 Vrms)
- Guaranteed performance from -40°C to 85°C
- Wide operating temperature range of -55°C to 125°C
- Halogen free Package
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

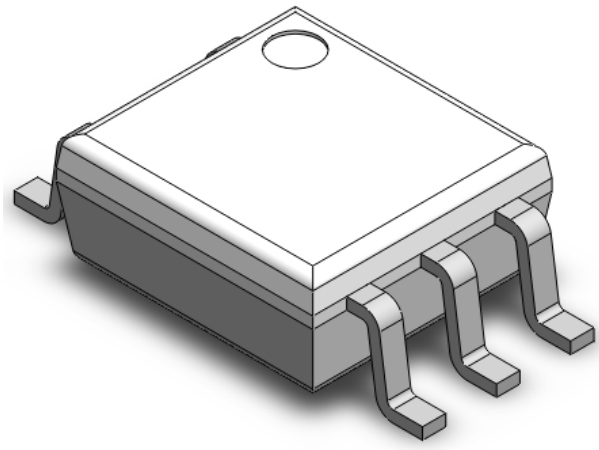
Description

The CTM410 optocouplers consist of an AlGaAS LED and high-speed photodetector with a strobable output. The switching parameters are guaranteed over the temperature range of -40°C to +85°C. A maximum input signal of 10mA will provide a minimum output sink current of 13mA (fan out of 8).

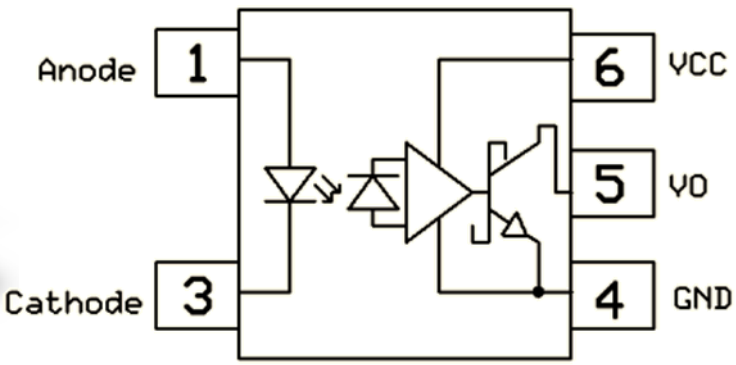
Applications

- Line receivers
- Telecommunication equipment
- High speed logic ground isolation
- Feedback loop in switch-mode power supplies
- Home appliances

Package Outline



Schematic



Note: Different bending options available. See package dimension.

Absolute Maximum Rating at 25°C

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{ISO}	Isolation voltage	3750	V_{RMS}	***1***
T_{OPR}	Operating temperature	-55 ~ + 125	°C	
T_{STG}	Storage temperature	-55 ~ +150	°C	
T_{SOL}	Soldering temperature	260	°C	***2***
Emitter				
I_F	Forward current	50	mA	
V_R	Reverse voltage	5	V	
P_D	Power dissipation	100	mW	
Detector				
P_D	Power dissipation	85	mW	
I_O	Average Output current	50	mA	
V_{CC}	Supply voltage	7	V	
V_O	Output voltage	7	V	

Notes

1. AC for 1 minute, RH = 40 ~ 60%.
2. For 10 second peak

Electrical Characteristics

Over recommended temperature (T_A =–40°C to +85°C) unless otherwise specified. All Typicals at T_A = 25°C.

Emitter Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
V_F	Forward voltage	I_F = 10mA	-	1.6	1.8	V	
V_R	Reverse Voltage	I_R = 5μA	5.0	-	-	V	
$\Delta V_F/\Delta T_A$	Temperature coefficient of forward voltage	I_F =10mA	-	-1.6	-	mV/°C	

Detector Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
I_{CCL}	Logic Low Supply Current	I_F=10mA, V_O=Open, V_{CC}=5V	-	9	13	mA	
I_{CCH}	Logic High Supply Current	I_F=0mA, V_O=Open, V_{CC}=5V	-	6	10	mA	
R_{IO}	Isolation Resistance	V_{IO}= 500V_{DC}	$5x10^{10}$	-	-	Ω	
C_{IO}	Isolation Capacitance	f= 1MHz	-	0.5	1.2	pF	

Transfer Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
I_{OH}	Logic High Output Current	I_F=250uA, V_O= 5.5V,		2	100	uA	
I_{FT}	Input Threshold Current	V_{CC}=5.5V, V_O=0.6V, I_O=13mA	-	2	5	mA	
V_{OL}	Logic Low Output Voltage	I_F=5mA, I_O=13mA, V_{CC}=5.5V	-	0.35	0.6	V	

Switching Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
T_{PHL}	Propagation Delay Time Logic High to Logic Low	C_L=15pF,R_L=350Ω	-	40	75	ns	
T_{PLH}	Propagation Delay Time Logic Low to Logic High		-	35	75	ns	
Tr	Output Rise Time		-	40	-	ns	
Tf	Output Fall Time		-	10	-	ns	
CM_H	Common Mode Transient Immunity at Logic High	I_F = 0mA , V_{OH}=2.0V, R_L=350Ω, TA=25°C, V_{CM}=1000Vp-p	10000	-	-	V/μs	
CM_L	Common Mode Transient Immunity at Logic Low	I_F = 7.5mA , V_{OL}=0.8V, R_L=350Ω, TA=25°C, V_{CM}=1000Vp-p	10000	-	-	V/μs	

Typical Characteristic Curves

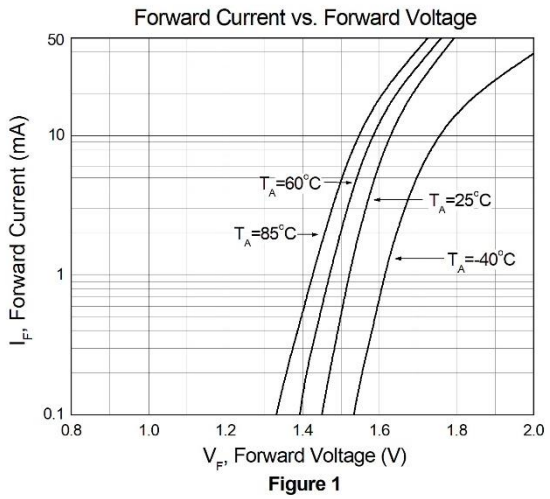


Figure 1

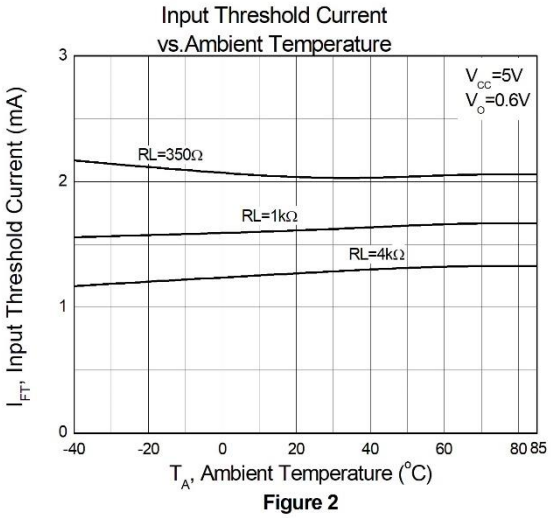


Figure 2

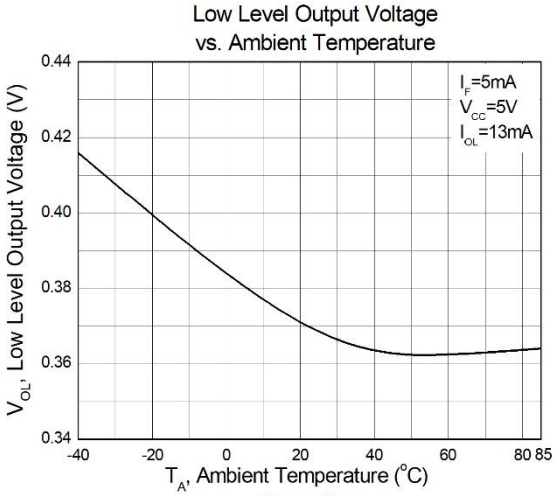


Figure 3

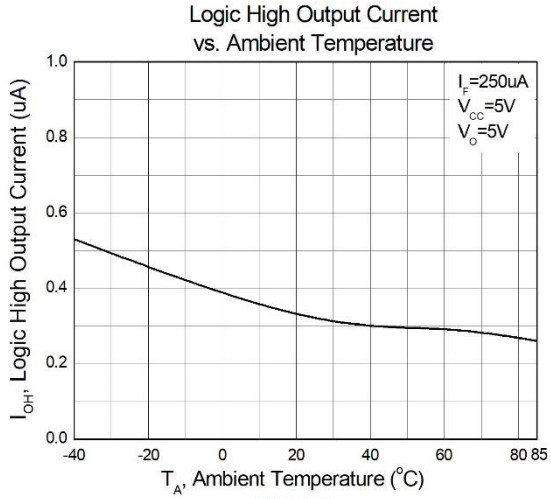


Figure 4

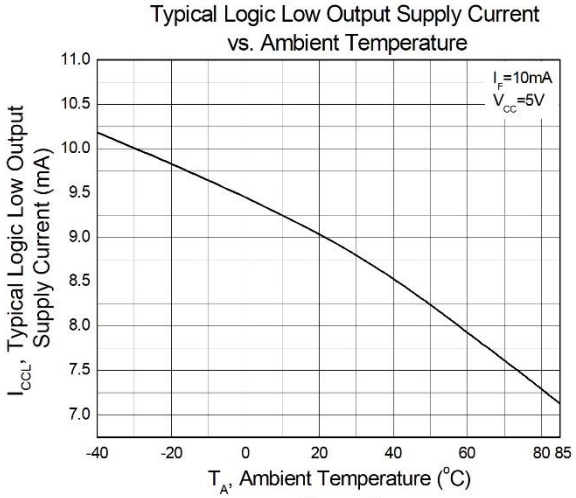


Figure 5

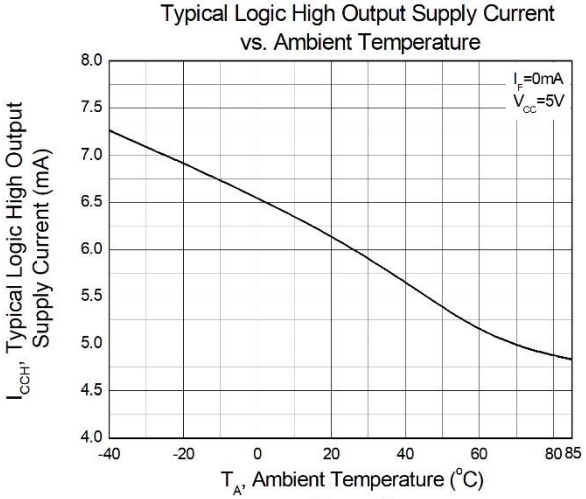


Figure 6

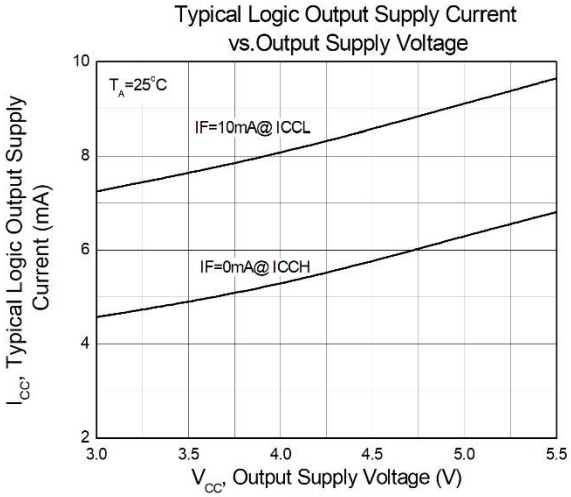


Figure 7

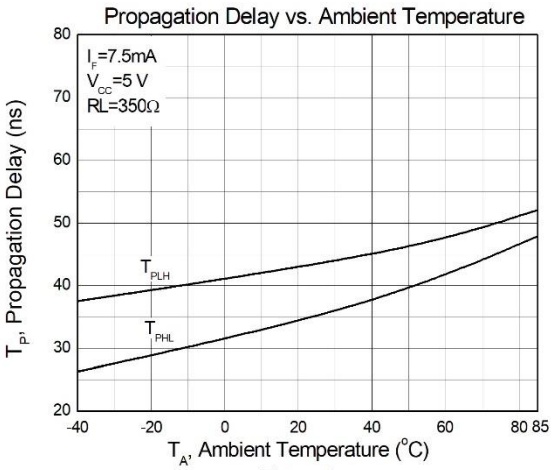


Figure 8

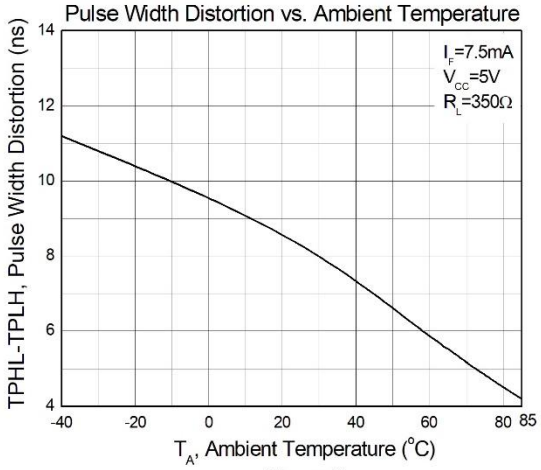


Figure 9

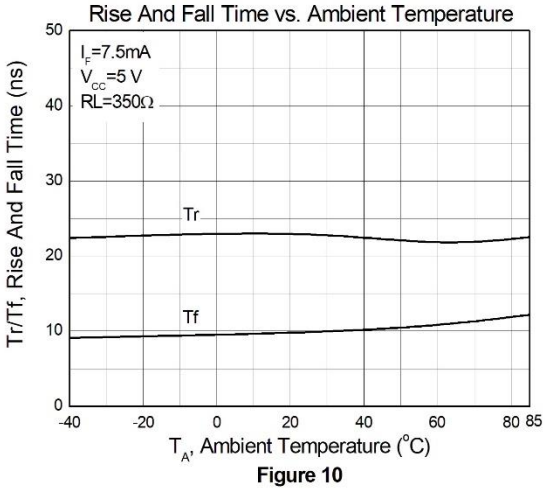


Figure 10

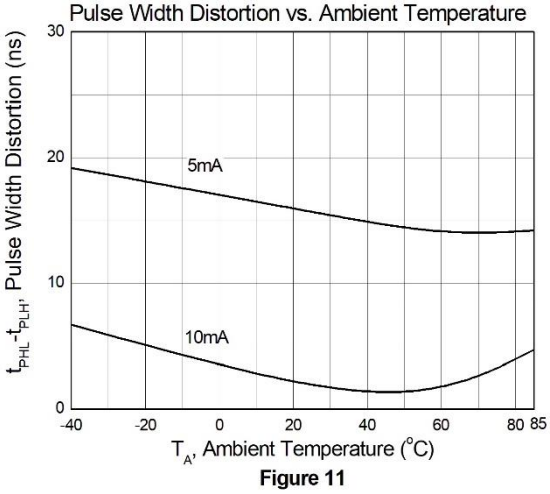


Figure 11

Test Circuits

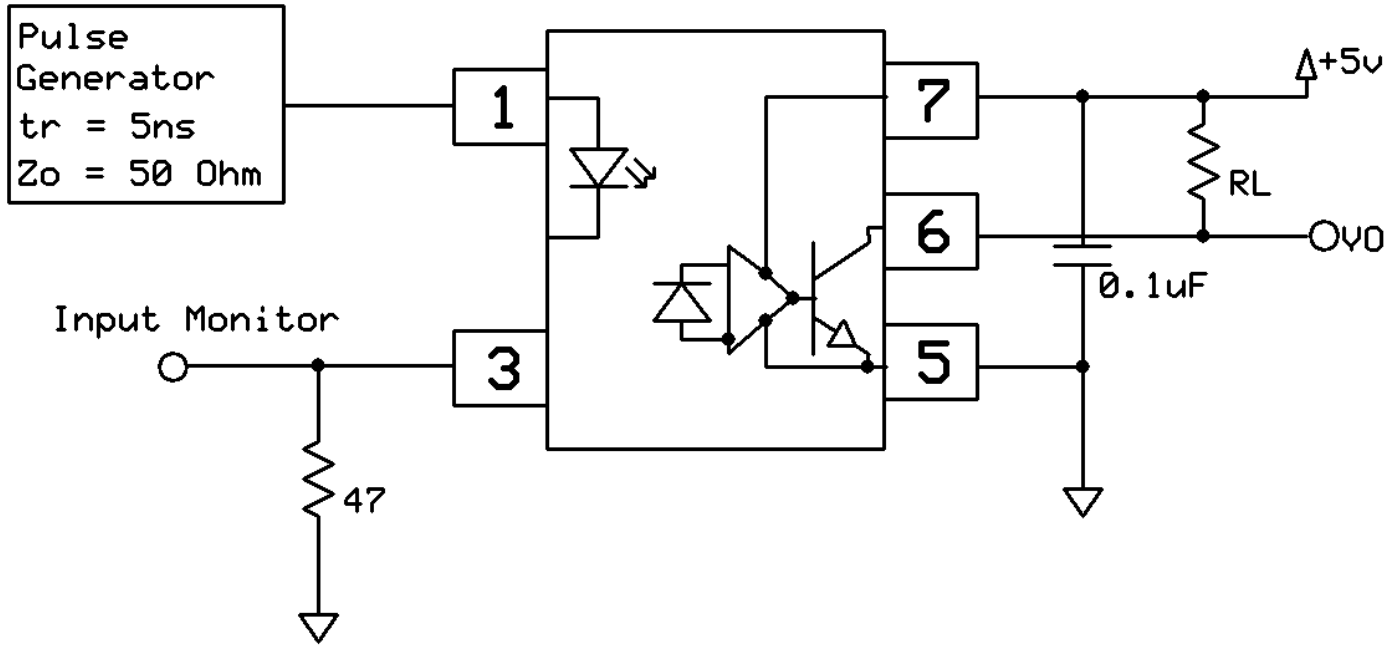


Figure 12

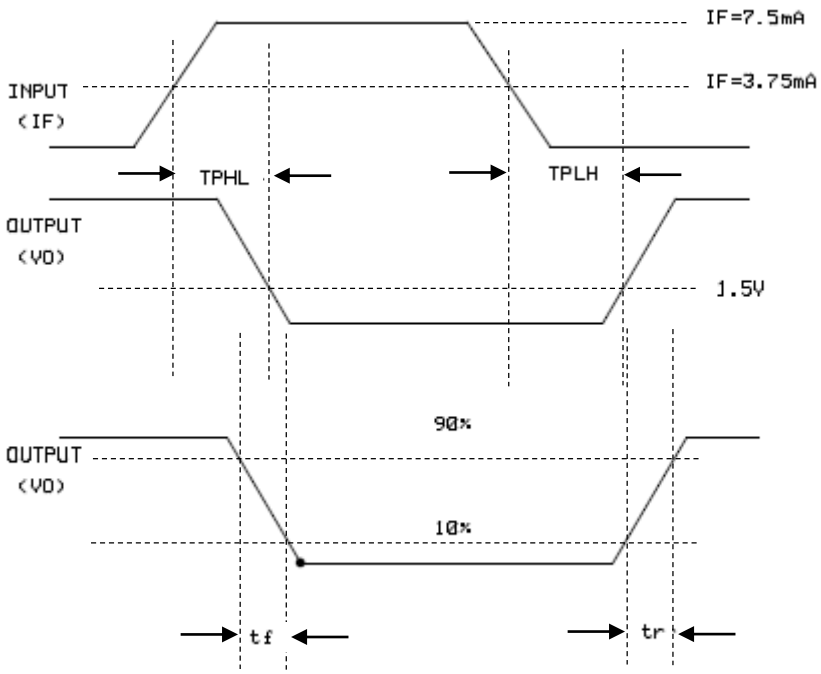


Figure 13

Test Circuits

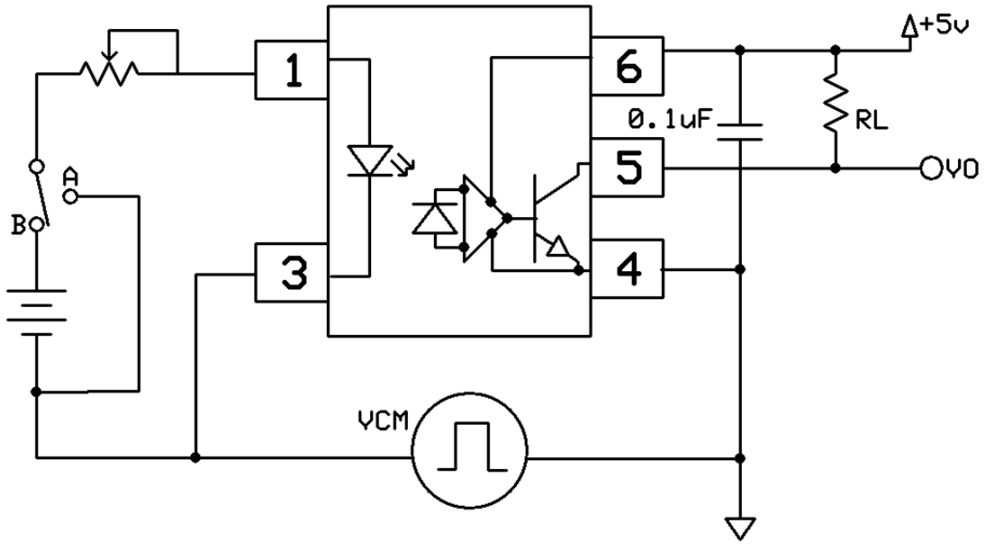
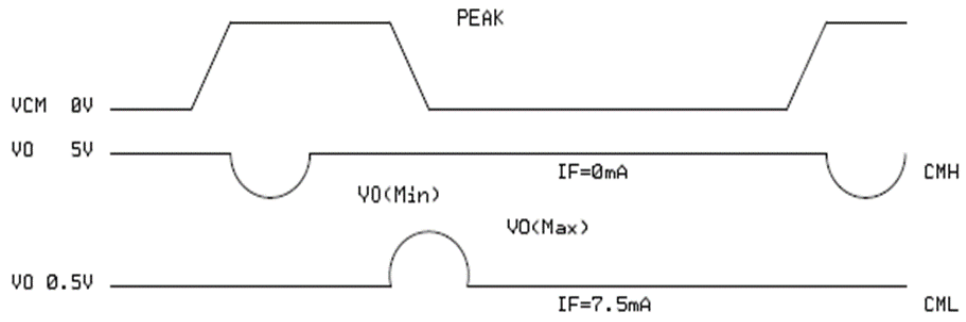


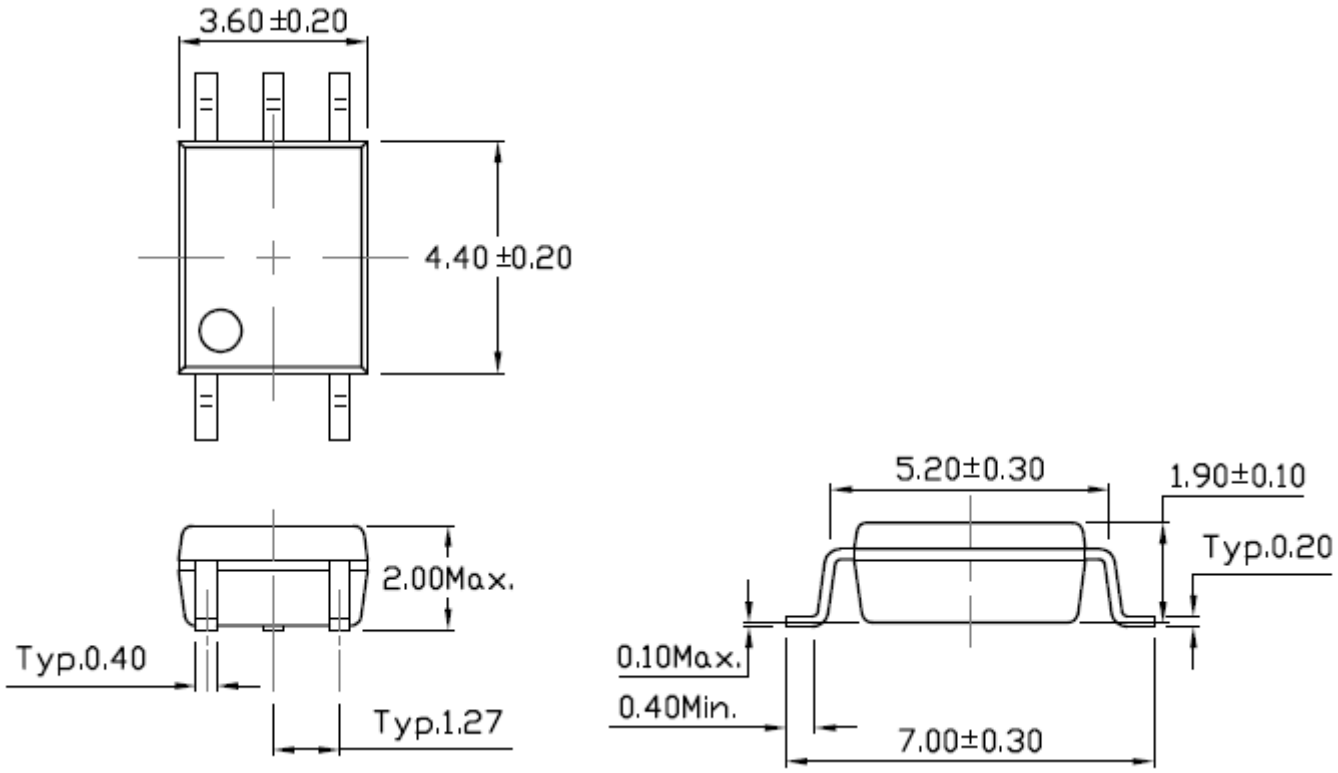
Figure 14



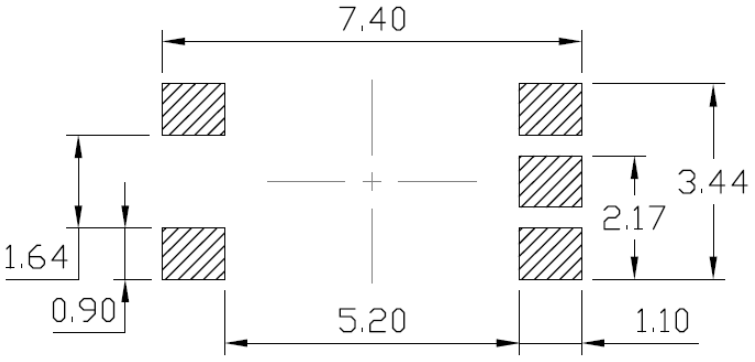
CMR Test Circuit

Figure 15

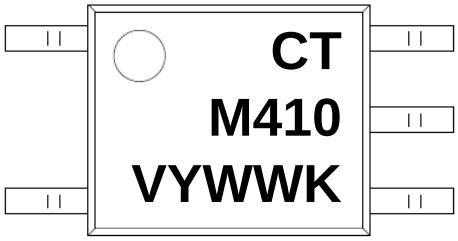
Package Dimension *Dimensions in mm unless otherwise stated*



Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Device Marking



Note:

CT : Denotes “CT Micro”
M410 : Product Number
V : VDE Option (V or none)
Y : Fiscal Year
WW : Work Week
K : Production Code

Ordering Information

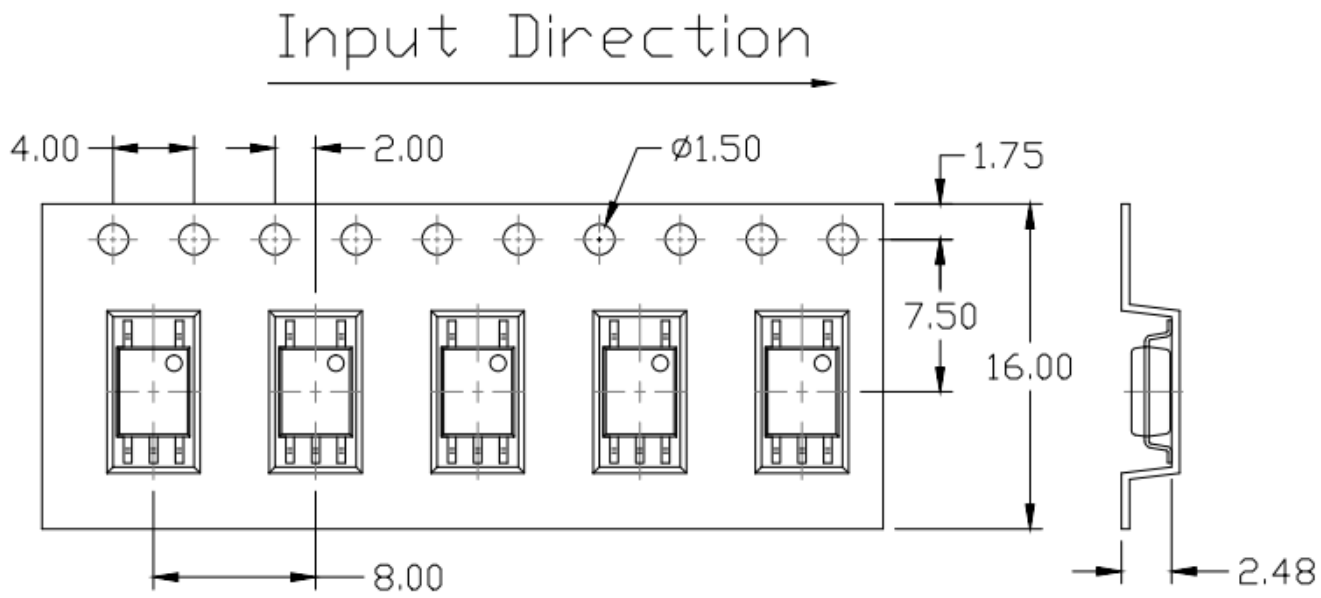
CTM410(V)(Y)

CT : Denotes “CT Micro”
M410 : Part Number
V : VDE Safety Option (V or none)
Y : Tape and reel option (T1or T2)

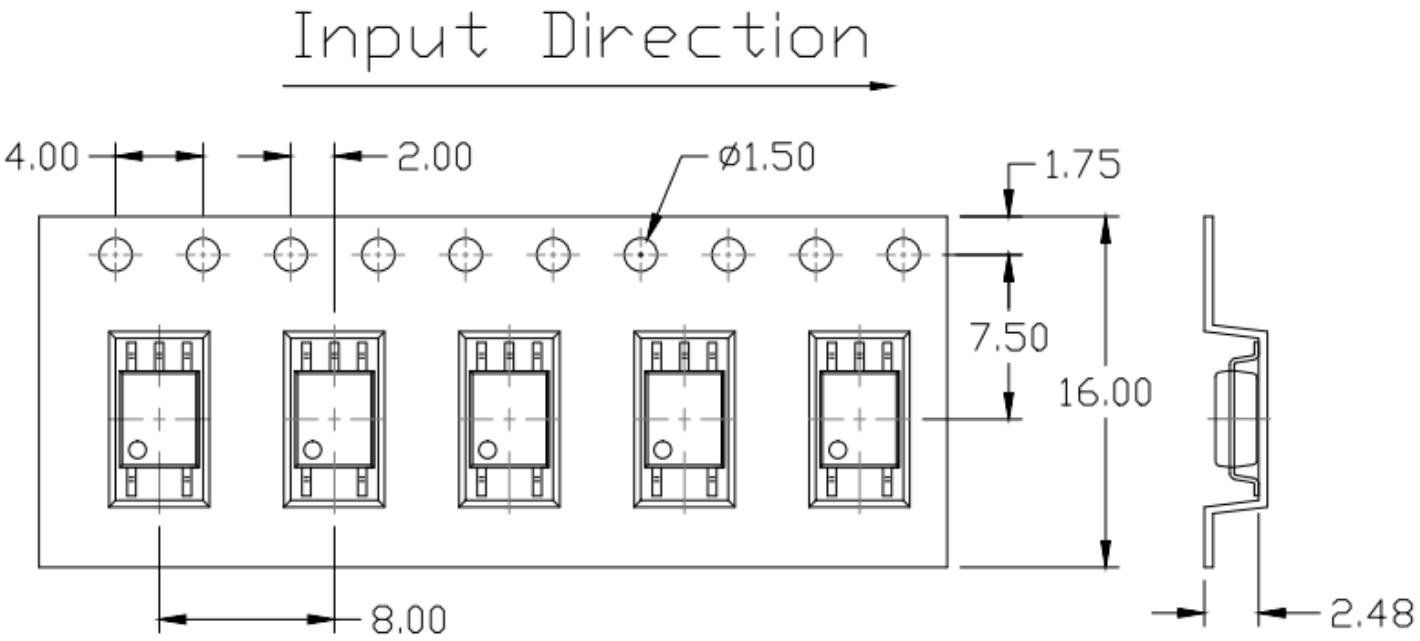
Option	*Description*	*Quantity*
T1	Surface Mount Lead Forming – With Option 1 Taping	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000 Units/Reel

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

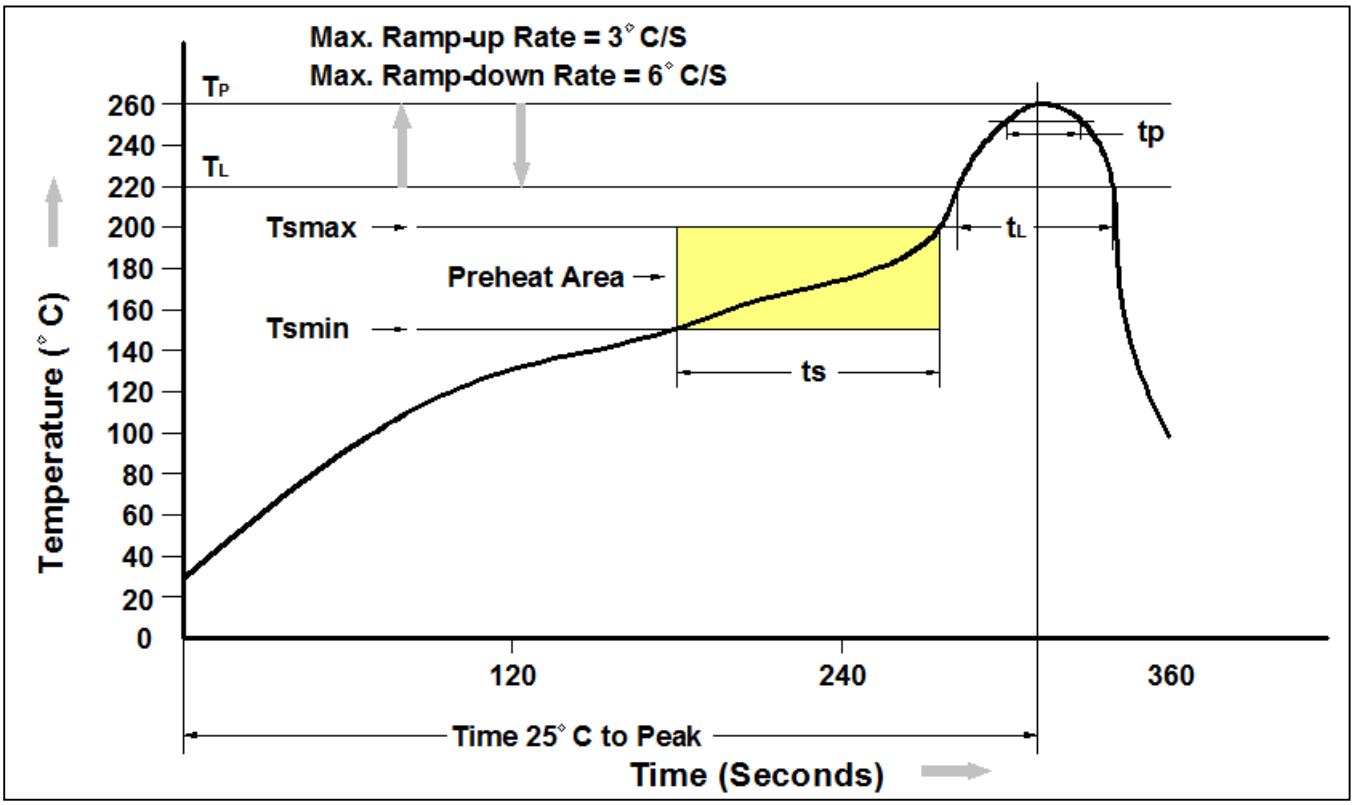
Option T1



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.

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.

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.*