



# CTM600, CTM601, CTM611

## 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
- Green Package
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

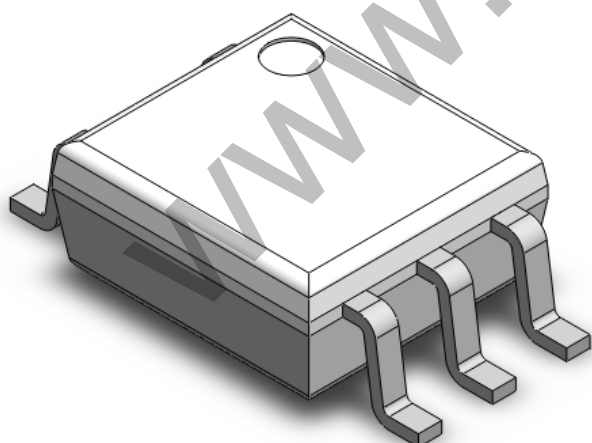
### Description

The CTM600, CTM601, and CTM611 optocouplers consist of an AlGaAs LED, optically coupled to a very high speed integrated photo-detector logic gate with a strobe able output. The output of the detect IC is a high speed logic gate integrated with a photo detector. The switching parameters are guaranteed over the temperature range of -40°C to +85°C. A maximum input signal of 5mA will provide a minimum output sink current of 13mA (fan out of 8).

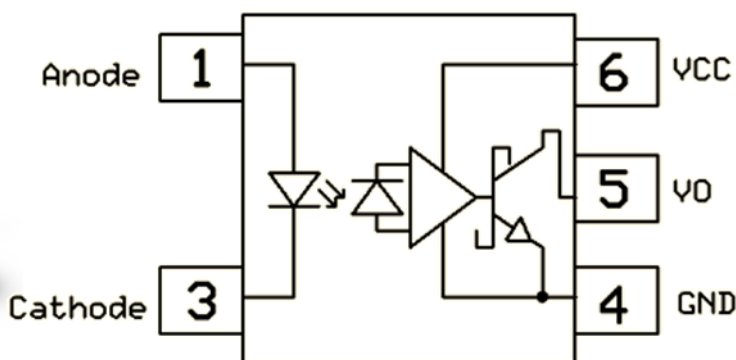
### Applications

- 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.



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### Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V <sub>ISO</sub>	Isolation voltage	3750	V <sub>RMS</sub>	1
T <sub>OPR</sub>	Operating temperature	-55 ~ +125	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	2
<b>Emitter</b>				
I <sub>F</sub>	Forward current	50	mA	
V <sub>R</sub>	Reverse voltage	5	V	
P <sub>D</sub>	Power dissipation	100	mW	
<b>Detector</b>				
P <sub>D</sub>	Power dissipation	85	mW	
I <sub>O</sub>	Average Output current	50	mA	
V <sub>CC</sub>	Supply voltage	7	V	
V <sub>O</sub>	Output voltage	7	V	

#### Notes

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



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### Electrical Characteristics

Over recommended temperature ( $T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ) unless otherwise specified. All Typicals at  $T_A = 25^{\circ}\text{C}$ .

#### Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$V_F$	Forward voltage	$I_F = 10\text{mA}$	-	1.6	1.8	V	
$V_R$	Reverse Voltage	$I_R = 5\mu\text{A}$	5.0	-	-	V	
$\Delta V_F/\Delta T_A$	Temperature coefficient of forward voltage	$I_F = 10\text{mA}$	-	-1.6	-	mV/ $^{\circ}\text{C}$	

#### Detector Characteristics

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

#### Transfer Characteristics

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



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### Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes	
$T_{PHL}$	Propagation Delay Time Logic High to Logic Low	$C_L=15pF, R_L=350\Omega$	-	40	75	ns		
$T_{PLH}$	Propagation Delay Time Logic Low to Logic High		-	35	75	ns		
$T_r$	Output Rise Time		-	40	-	ns		
$T_f$	Output Fall Time		-	10	-	ns		
$CM_H$	Common Mode Transient Immunity at Logic High	CTM600	$I_F = 0mA, V_{OH}=2.0V, R_L=350\Omega, T_A=25^\circ C, V_{CM}=10Vp-p$	-	-	-	V/ $\mu s$	
		CTM601	$I_F = 0mA, V_{OH}=2.0V, R_L=350\Omega, T_A=25^\circ C, V_{CM}=50Vp-p$	5000	-	-		
		CTM611	$I_F = 0mA, V_{OH}=2.0V, R_L=350\Omega, T_A=25^\circ C, V_{CM}=1000Vp-p$	20000	-	-		
$CM_L$	Common Mode Transient Immunity at Logic Low	CTM600	$I_F = 7.5mA, V_{OL}=0.8V, R_L=350\Omega, T_A=25^\circ C, V_{CM}=10Vp-p$	-	-	-	V/ $\mu s$	
		CTM601	$I_F = 7.5mA, V_{OL}=0.8V, R_L=350\Omega, T_A=25^\circ C, V_{CM}=50Vp-p$	5000	-	-		
		CTM611	$I_F = 7.5mA, V_{OL}=0.8V, R_L=350\Omega, T_A=25^\circ C, V_{CM}=1000Vp-p$	20000	-	-		



Typical Characteristic Curves

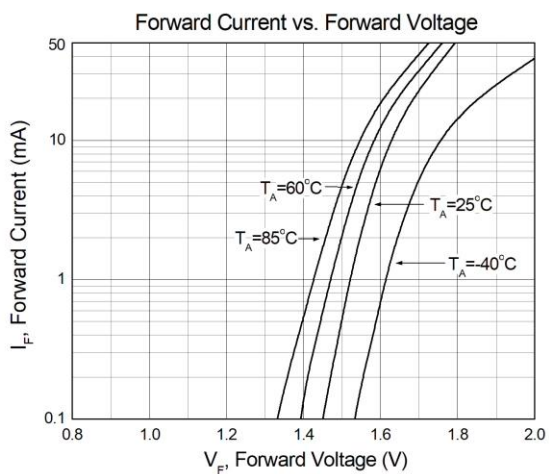


Figure 1

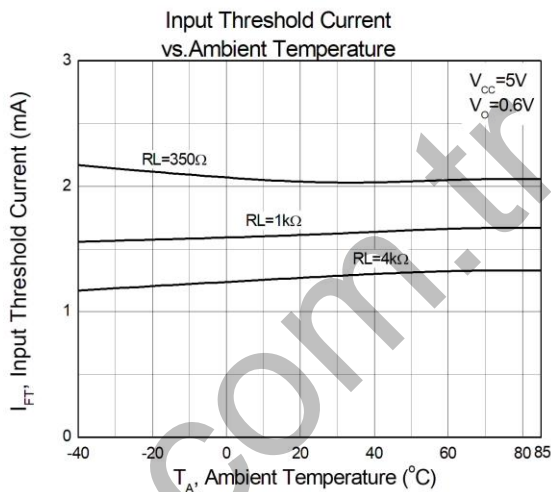


Figure 2

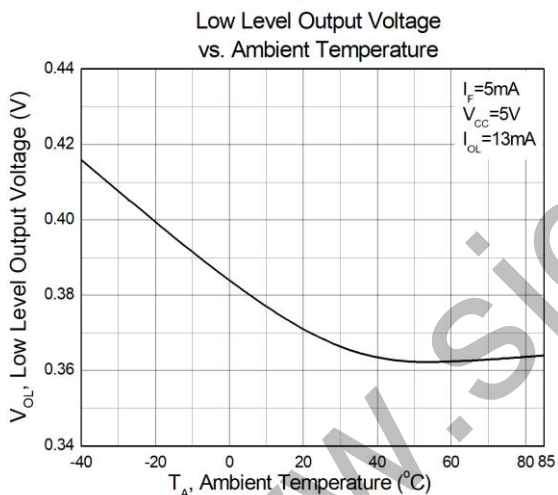


Figure 3

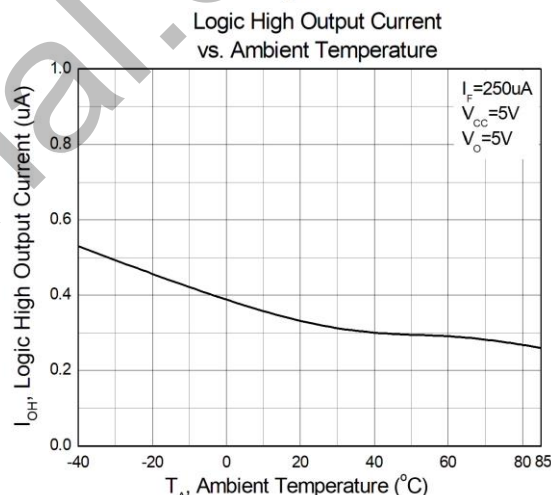


Figure 4

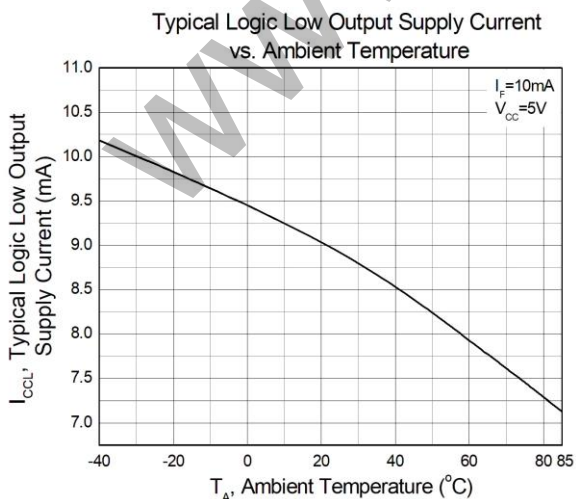


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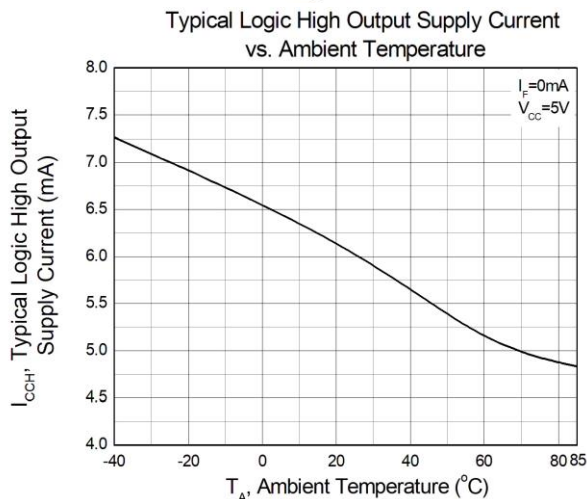


Figure 6



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

Typical Logic Output Supply Current vs. Output Supply Voltage

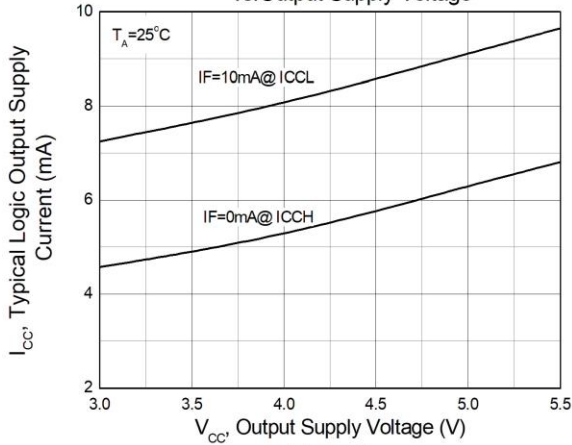


Figure 7

Propagation Delay vs. Ambient Temperature

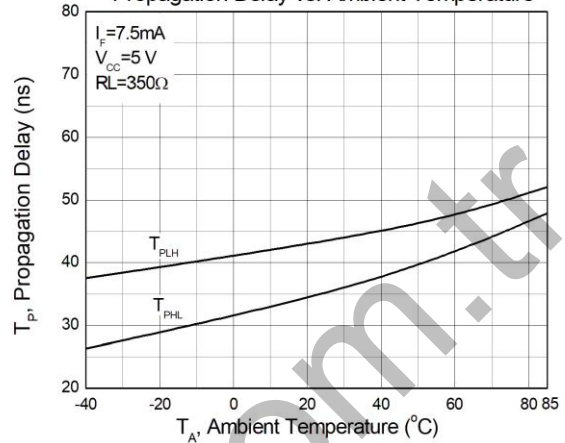


Figure 8

Pulse Width Distortion vs. Ambient Temperature

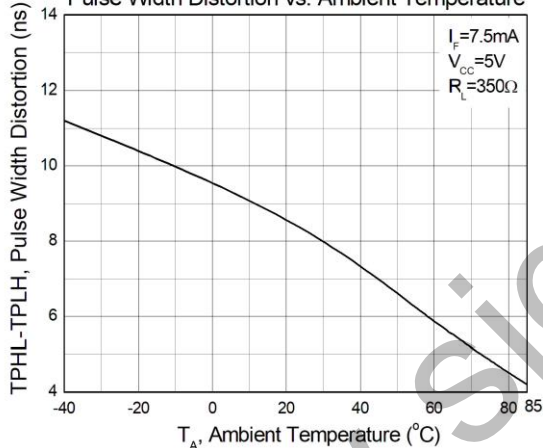


Figure 9

Rise And Fall Time vs. Ambient Temperature

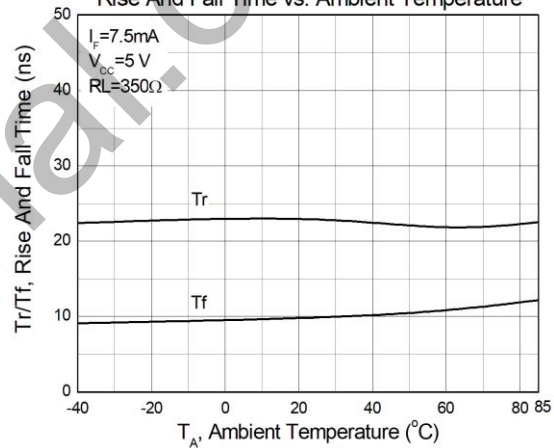


Figure 10

Pulse Width Distortion vs. Ambient Temperature

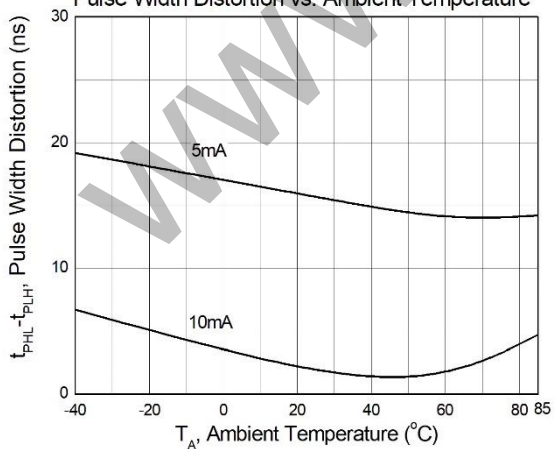


Figure 11



Test Circuits

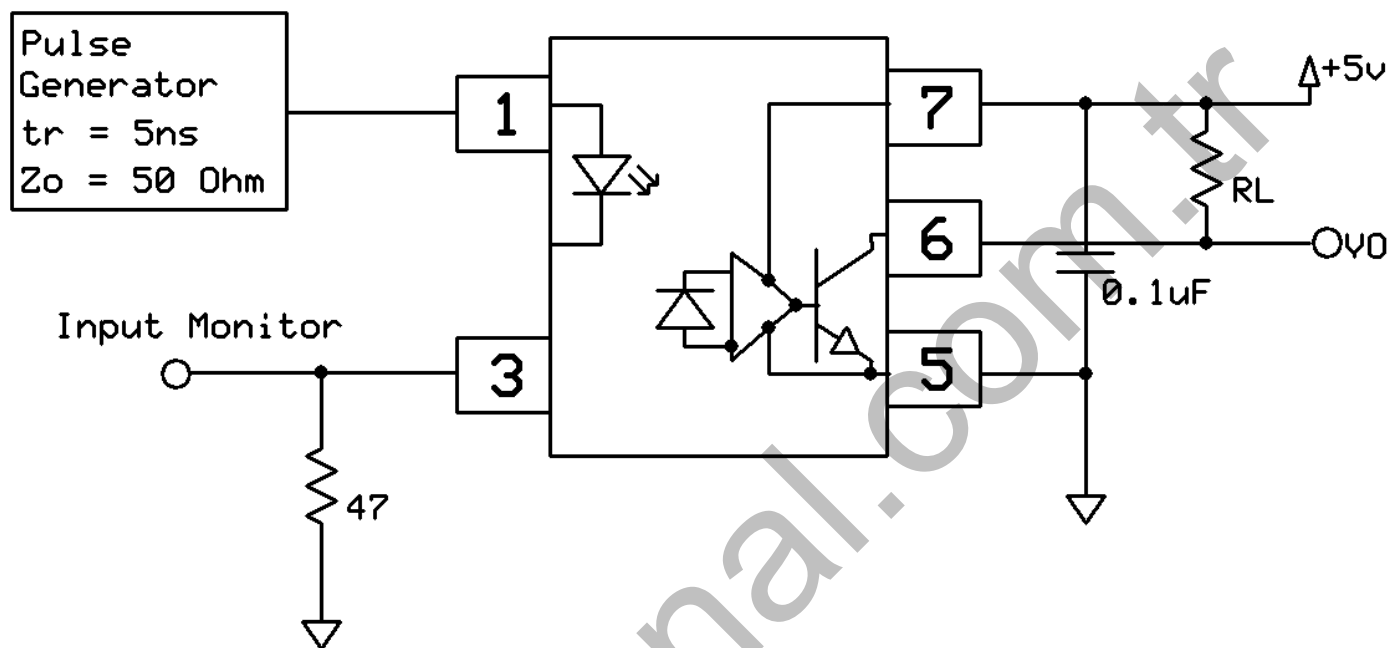


Figure 12

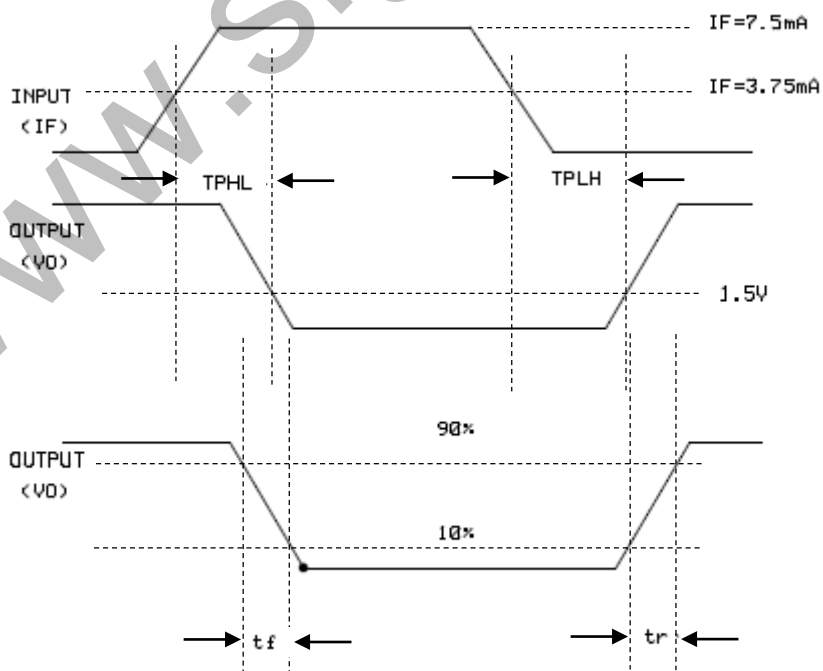


Figure 13



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### Test Circuits

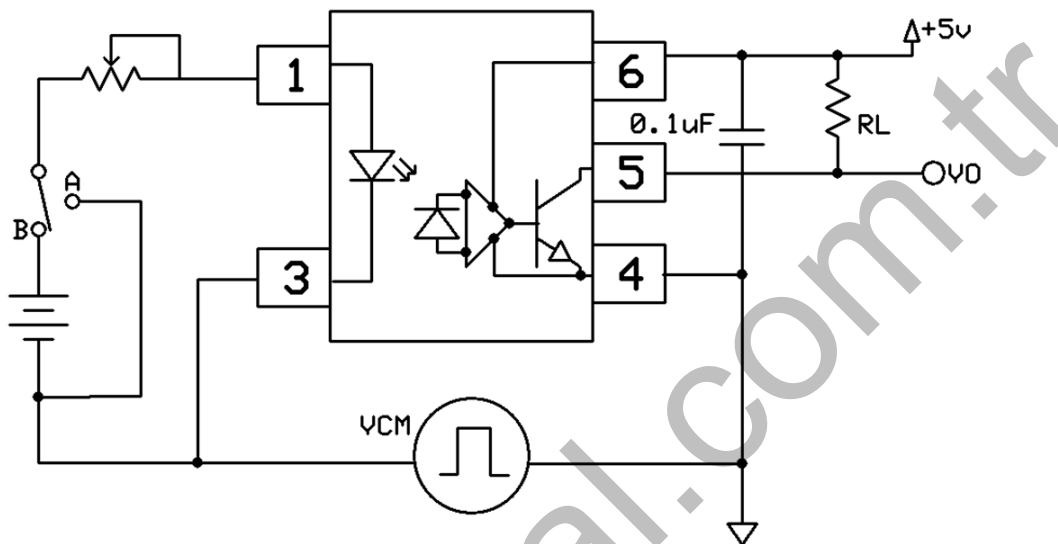


Figure 14

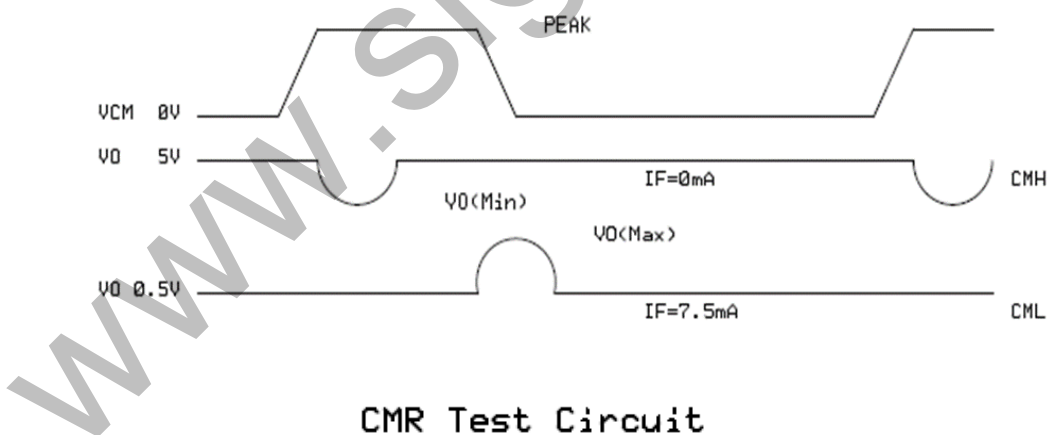


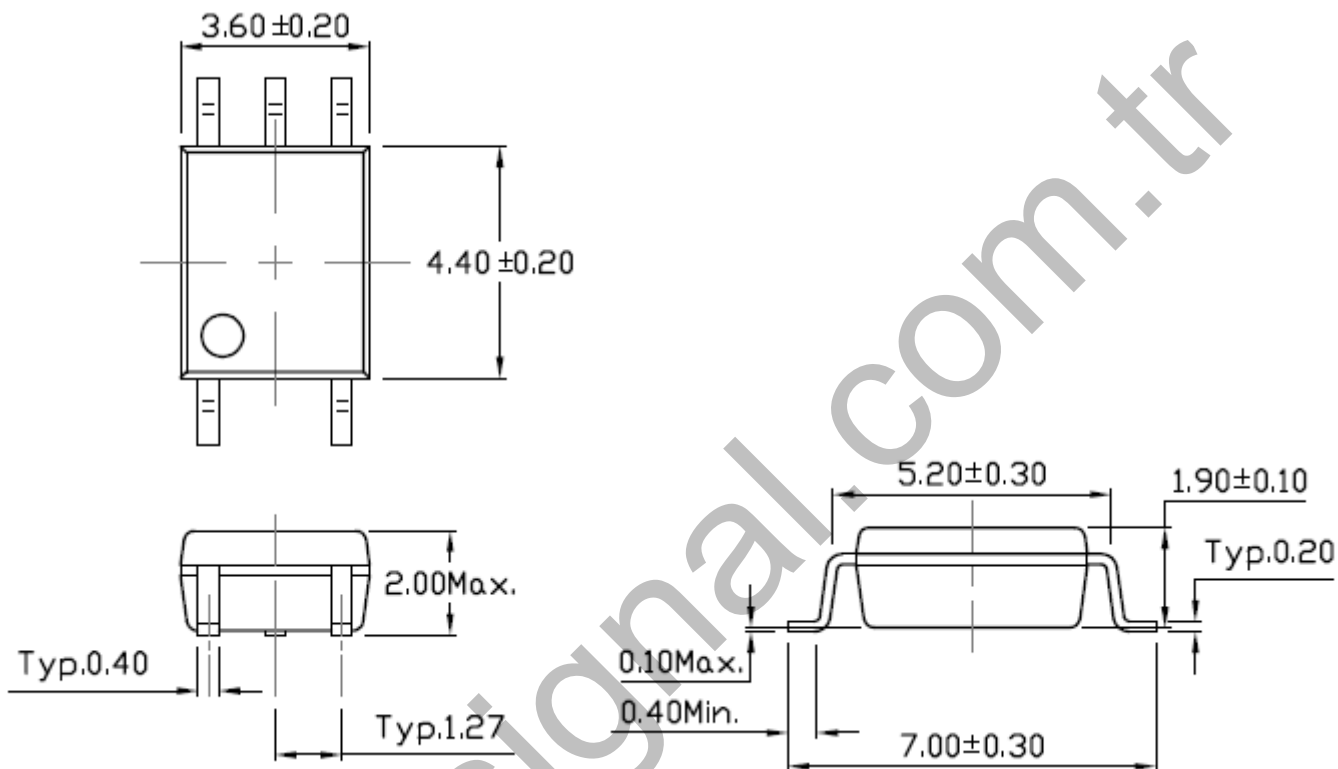
Figure 15



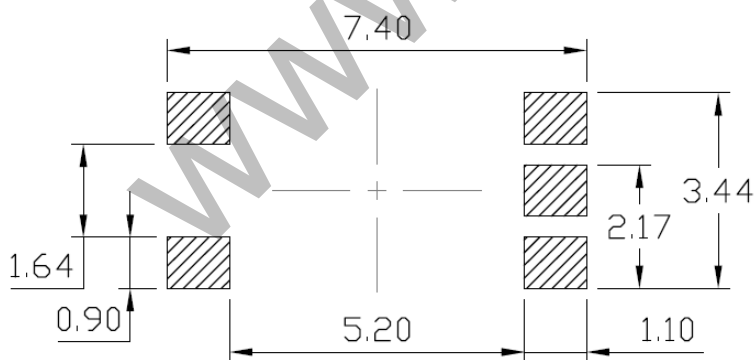
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## 10Mbit/s 5-Pin Mini-Flat Logic Gate Optocoupler

### Package Dimension *Dimensions in mm unless otherwise stated*



### Recommended Solder Mask *Dimensions in mm unless otherwise stated*





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

### Device Marking



- CT : Denotes “CT Micro”
- M600 : Product Number
- V : VDE Option
- Y : Fiscal Year
- WW : Work Week
- K : Production Code

### Ordering Information

CTM6XX(V)(Z)

X = Part No. (00, 01, or 11)

V = VDE option (V or none)

Z = Tape and reel option (T1 or 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

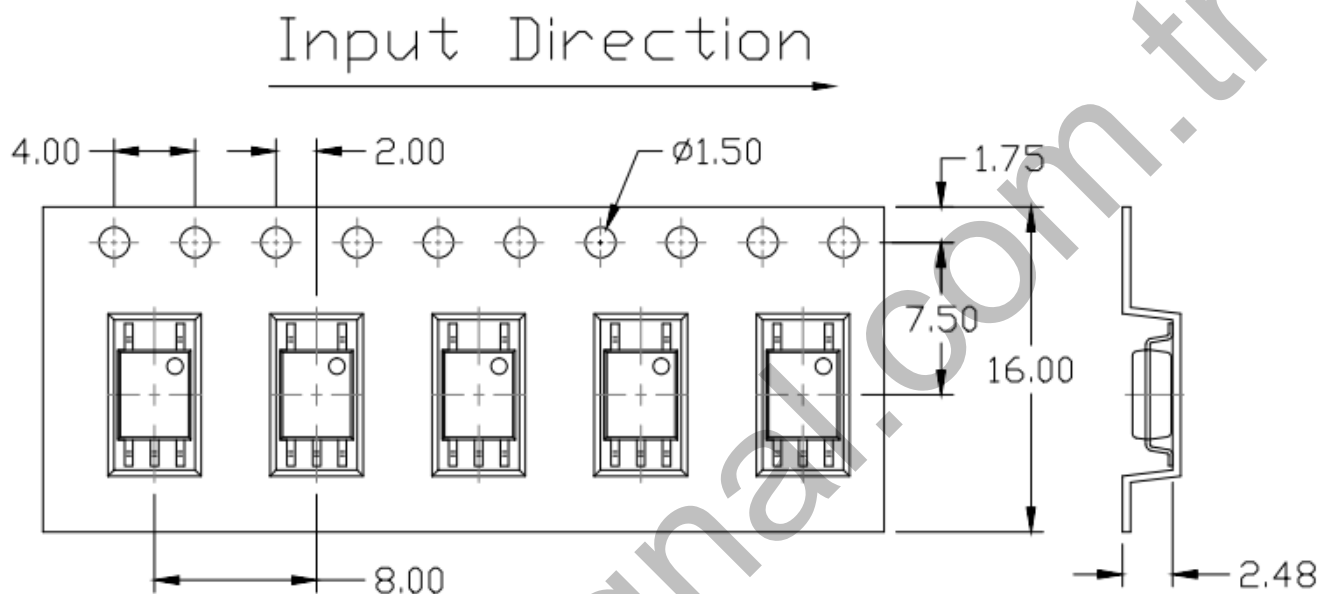


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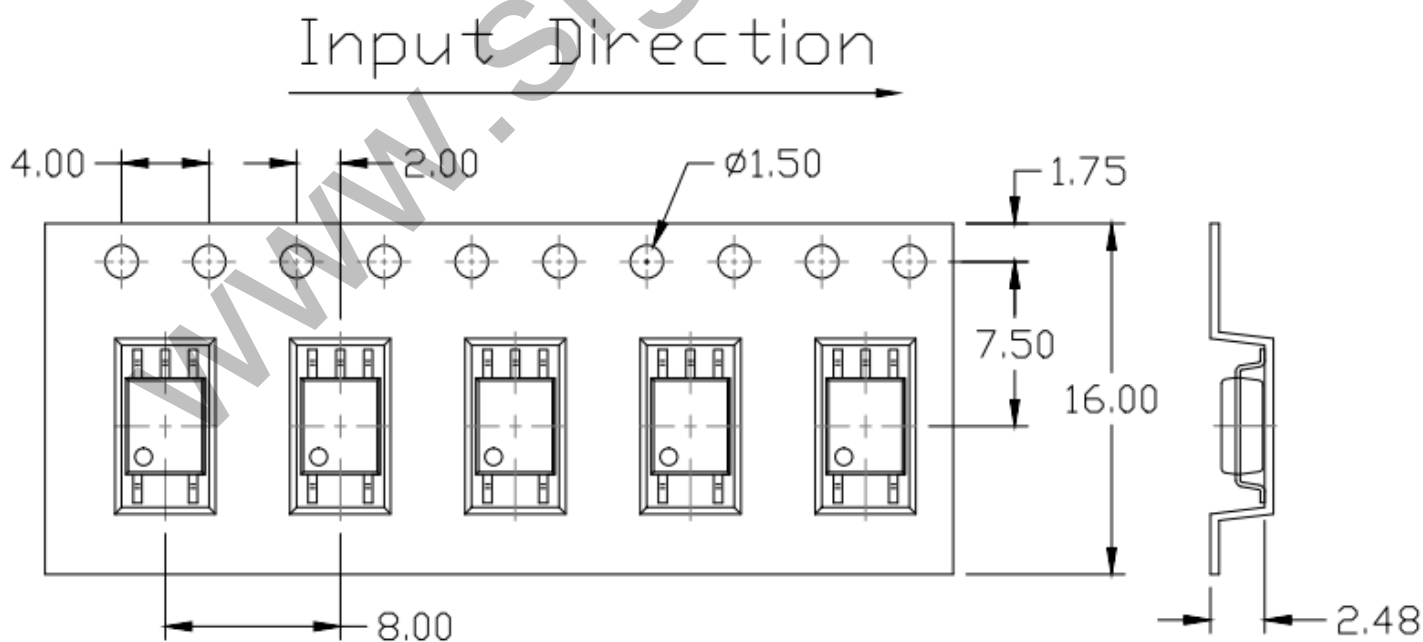
## 10Mbit/s 5-Pin Mini-Flat Logic Gate Optocoupler

### Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

#### Option T1

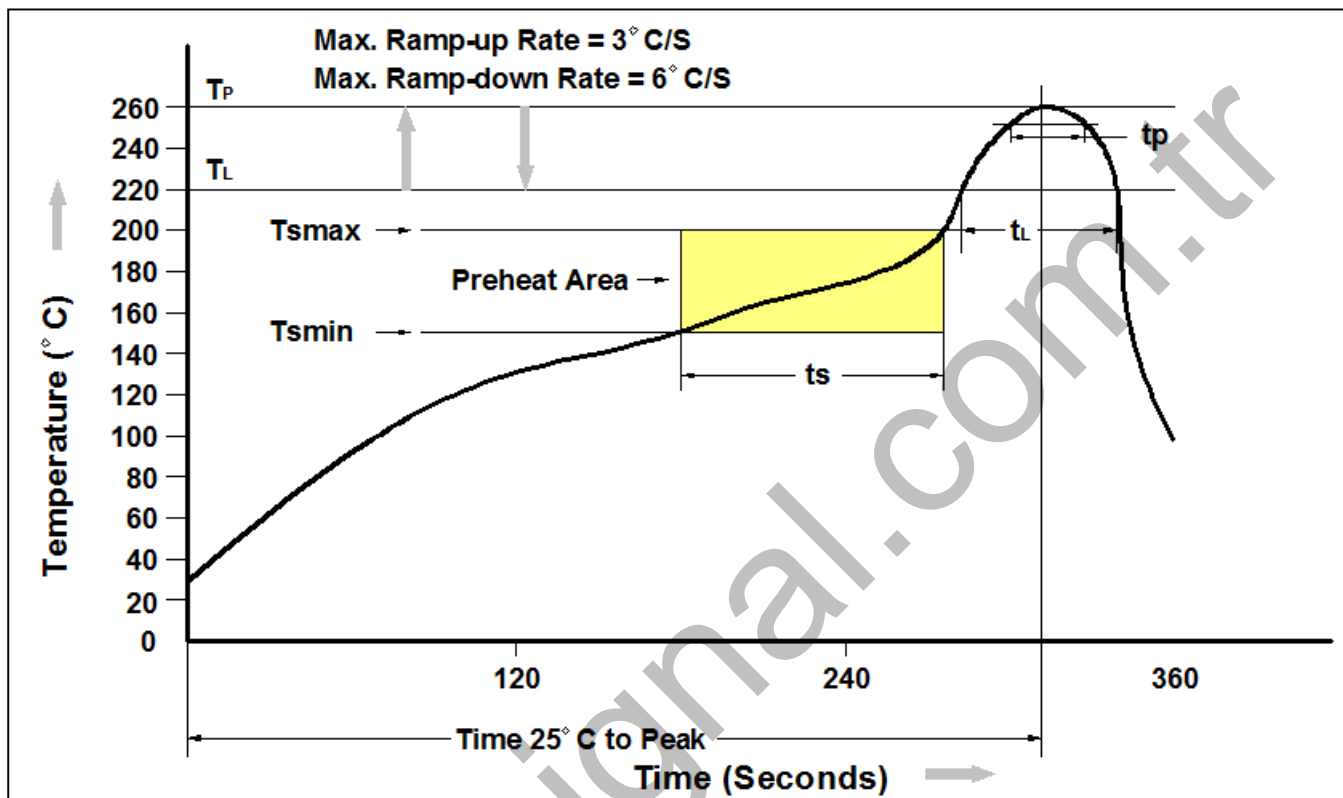


#### Option T2





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 (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.



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