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

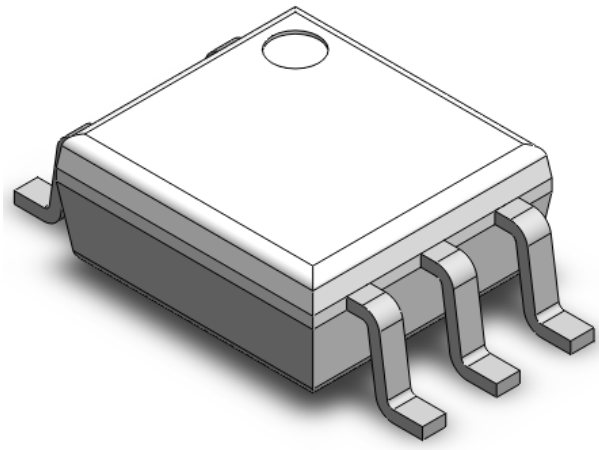
Description

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

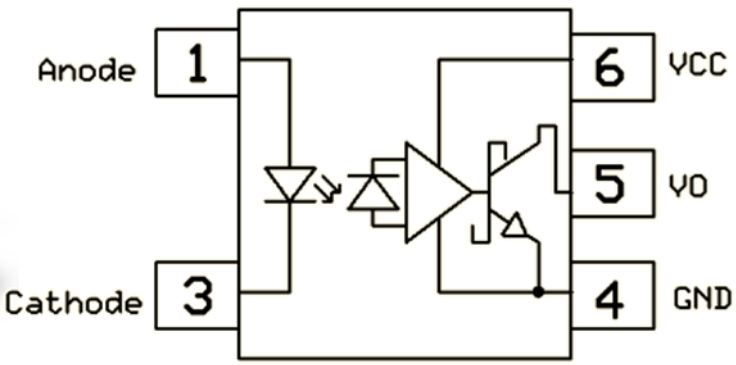
- Line receivers
- Telecommunication equipment
- High speed logic ground isolation
- Feedback loop in switch-mode power supplies
- Home appliances

Package Outline



Note: Different bending options available. See package dimension.

Schematic



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 (TA = –40°C to +85°C) unless otherwise specified. All Typicals at TA = 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	9	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	CTM600	I_F = 0mA , V_{OH}=2.0V, R_L=350Ω, TA=25°C, V_{CM}=10Vp-p	-	-	-	V/μs	
		CTM601	I_F = 0mA , V_{OH}=2.0V, R_L=350Ω, TA=25°C, V_{CM}=50Vp-p	5000	-	-		
		CTM611	I_F = 0mA , V_{OH}=2.0V, R_L=350Ω, TA=25°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=350Ω, TA=25°C, V_{CM}=10Vp-p	-	-	-	V/μs	
		CTM601	I_F = 7.5mA , V_{OL}=0.8V, R_L=350Ω, TA=25°C, V_{CM}=50Vp-p	5000	-	-		
		CTM611	I_F = 7.5mA , V_{OL}=0.8V, R_L=350Ω, TA=25°C, V_{CM}=1000Vp-p	20000	-	-		

Typical Characteristic Curves

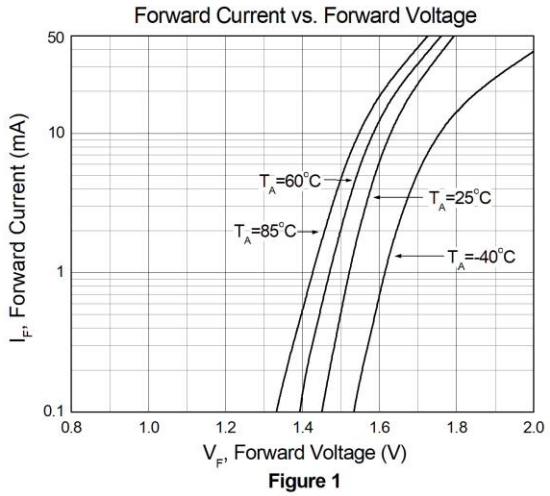


Figure 1

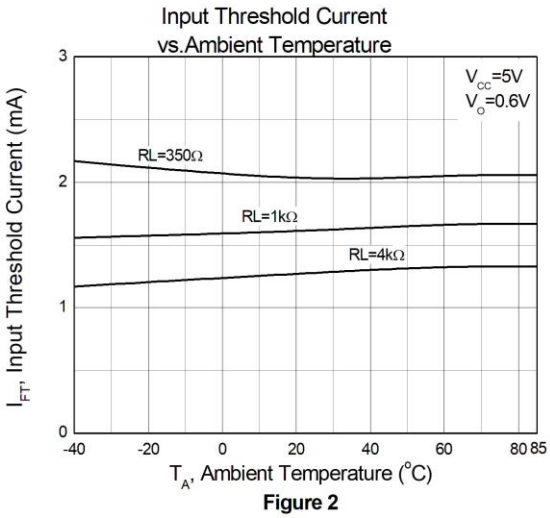


Figure 2

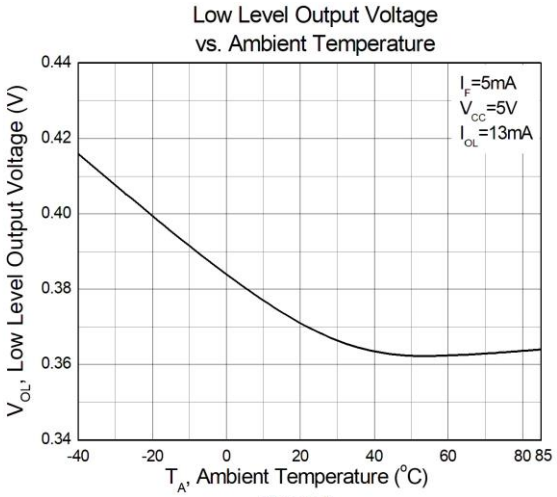


Figure 3

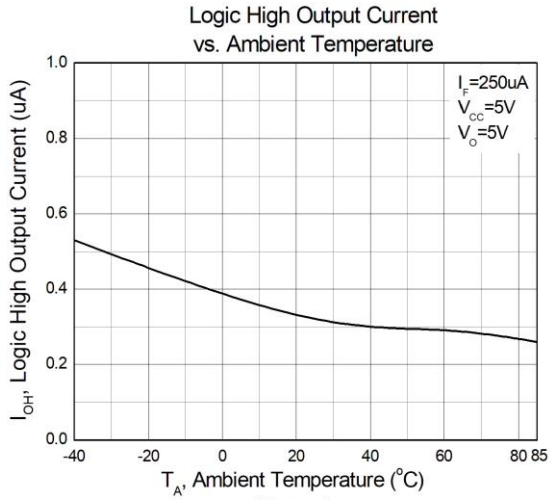


Figure 4

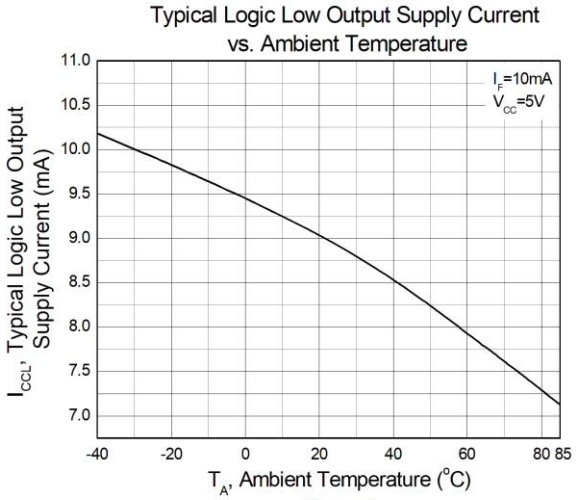


Figure 5

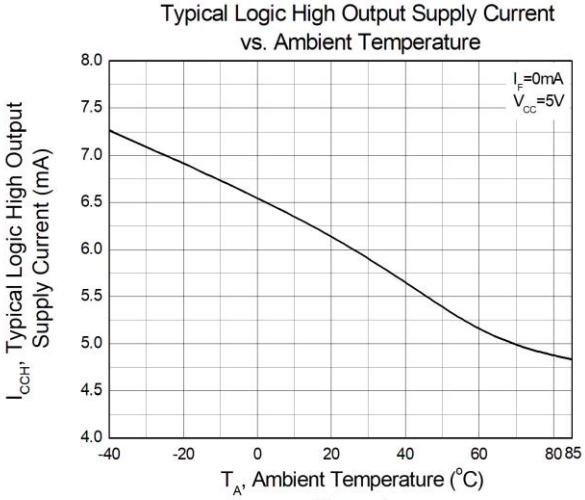
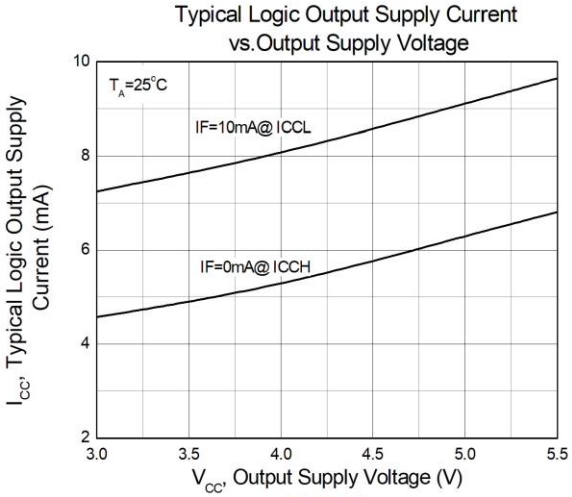


Figure 6



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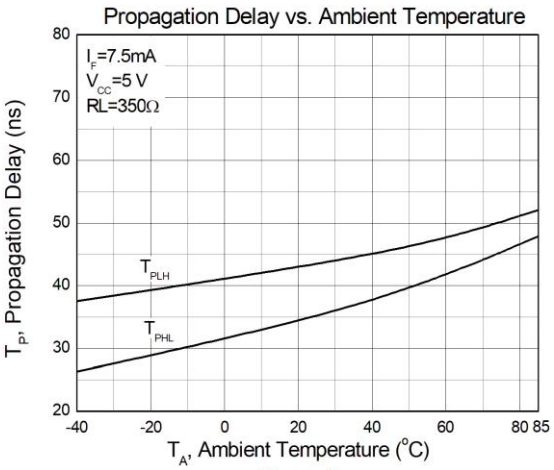


Figure 8

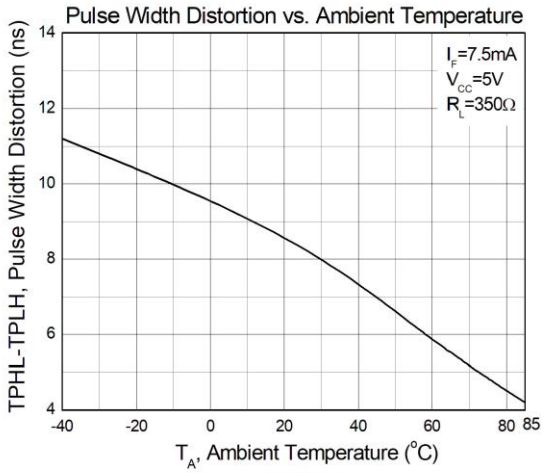


Figure 9

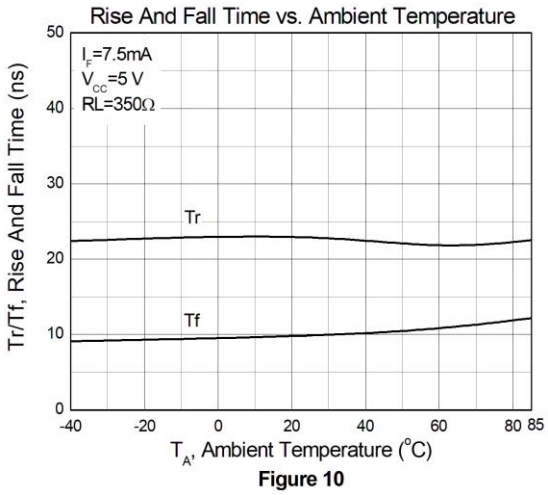


Figure 10

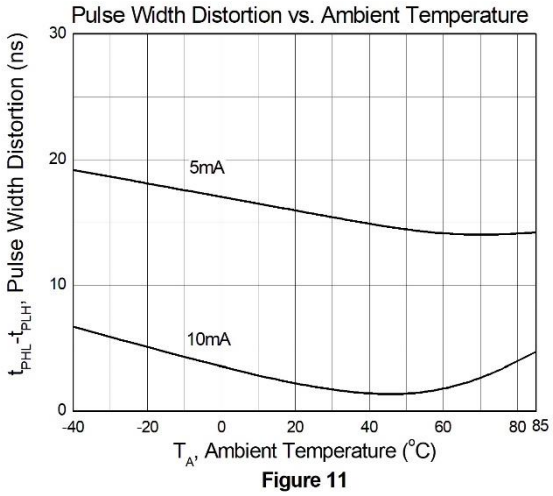


Figure 11

Test Circuits

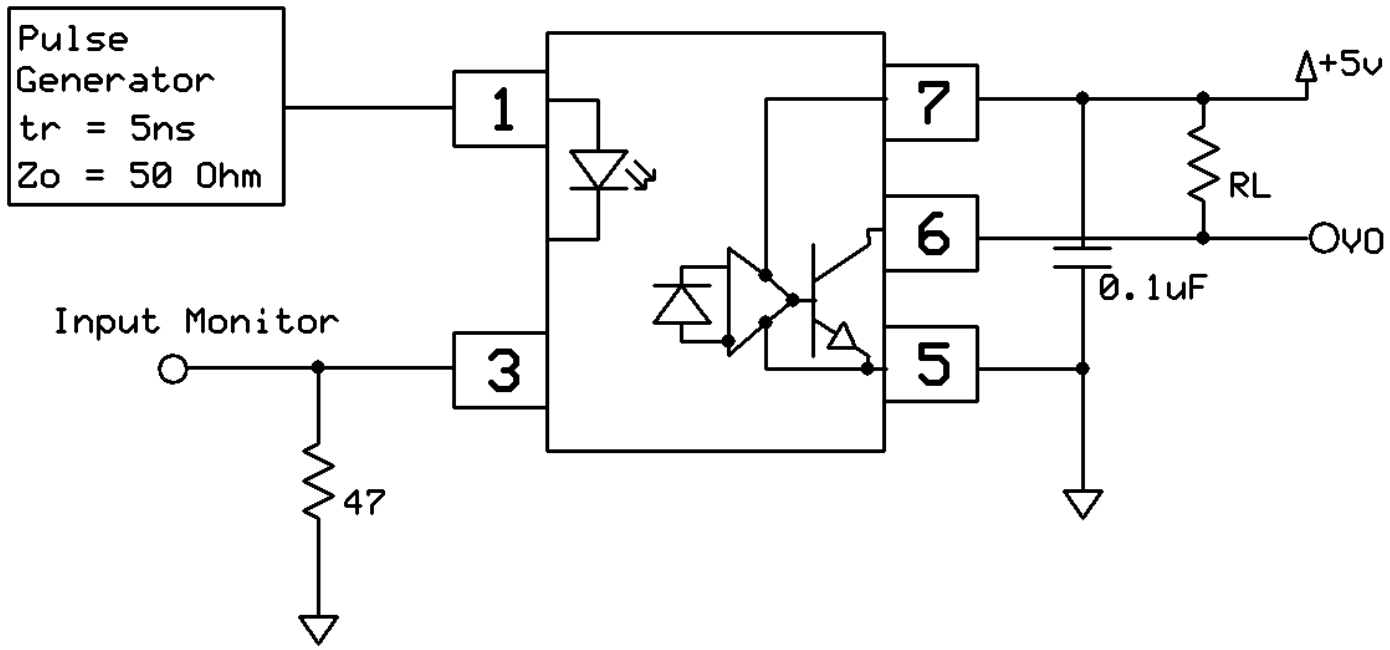


Figure 12

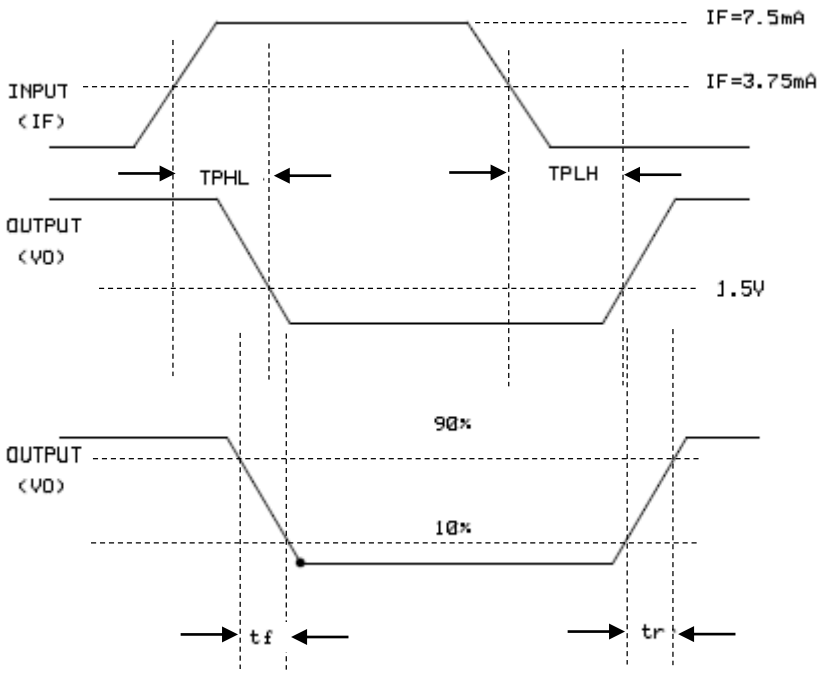


Figure 13

Test Circuits

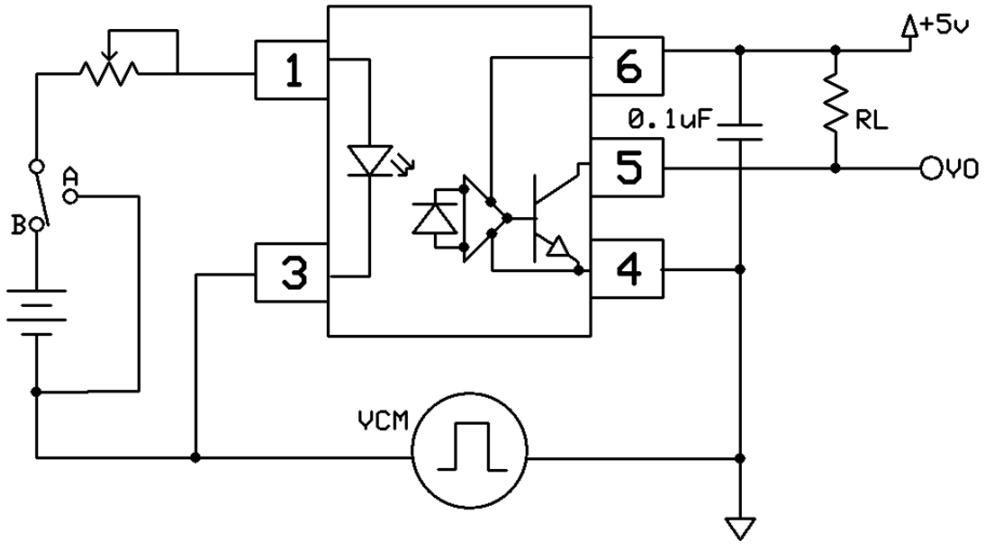
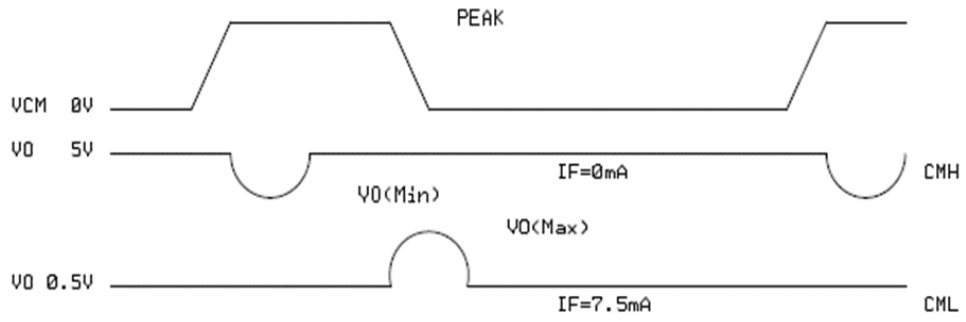


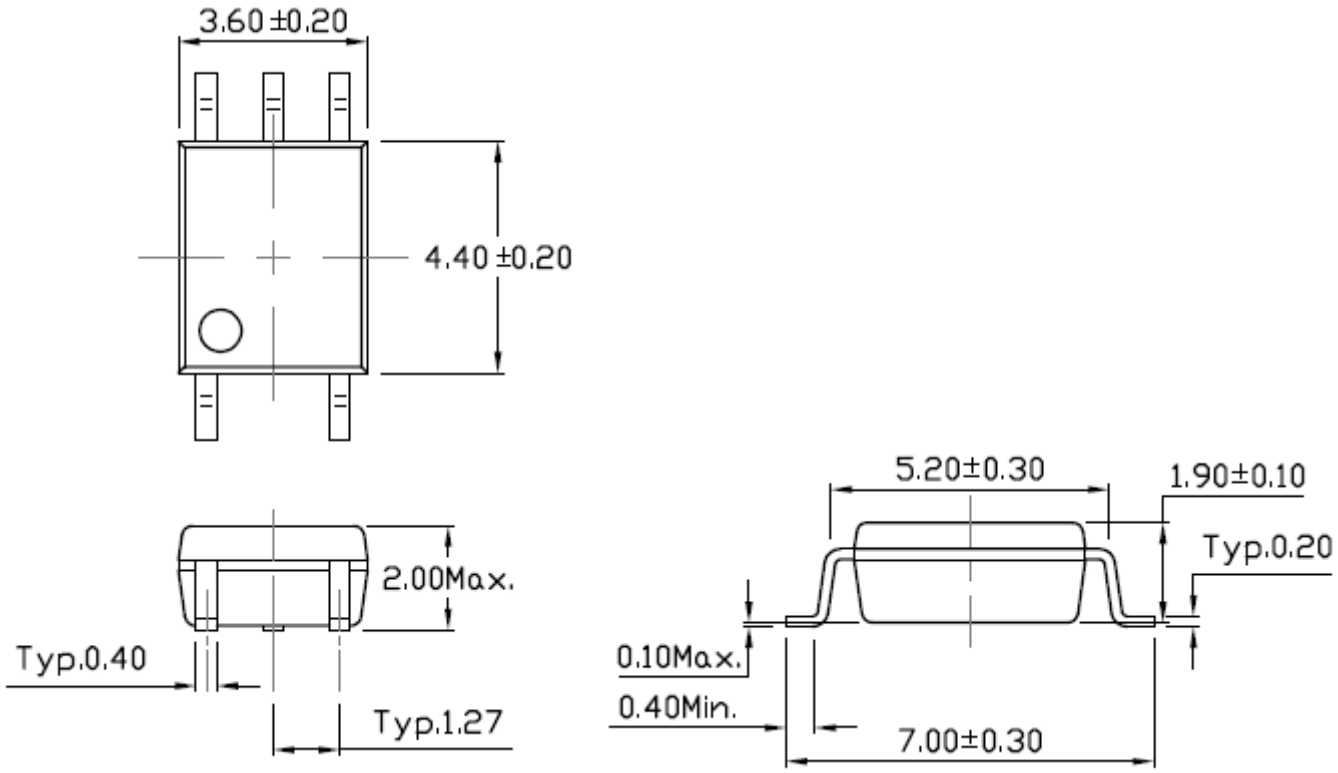
Figure 14



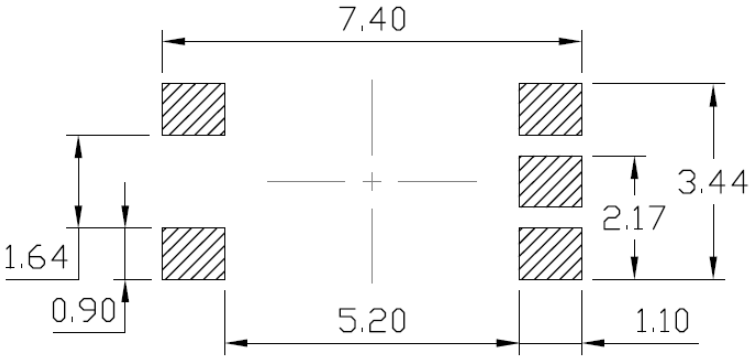
CMR Test Circuit

Figure 15

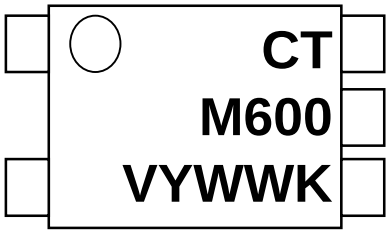
Package Dimension *Dimensions in mm unless otherwise stated*



Recommended Solder Mask *Dimensions in mm unless otherwise stated*



Device Marking



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

Ordering Information

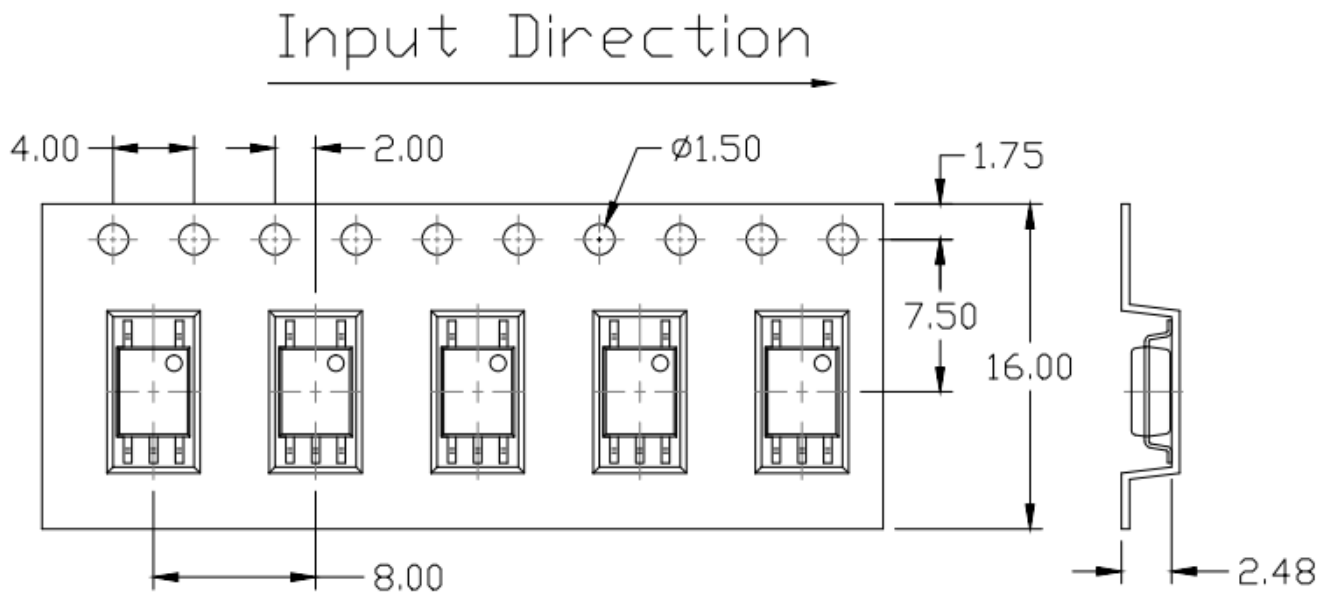
CTM6XX(V)(Z)

X = Part No. (00, 01, or 11)
V = VDE option (V or none)
Z = Tape and reel option (T1 or T2)

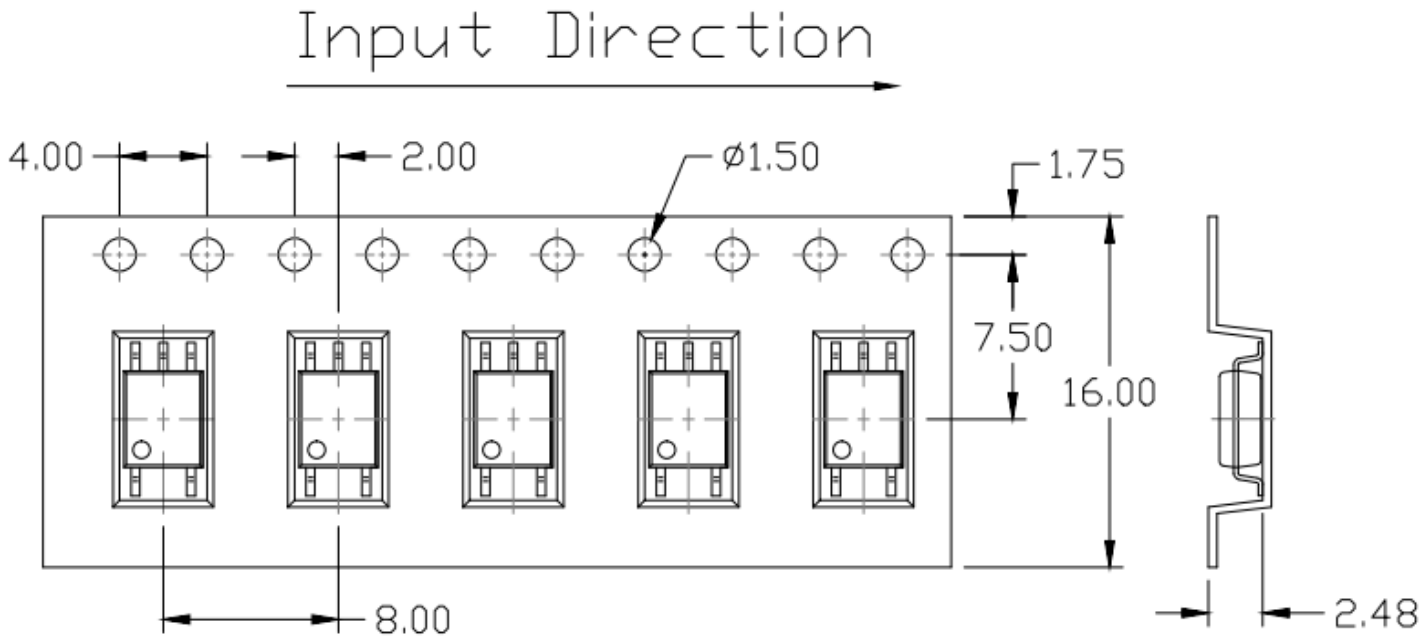
Option	*Description*	*Quantity*
T1	Surface Mount Lead Forming – With Option 1 Taping	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000 Units/Reel

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

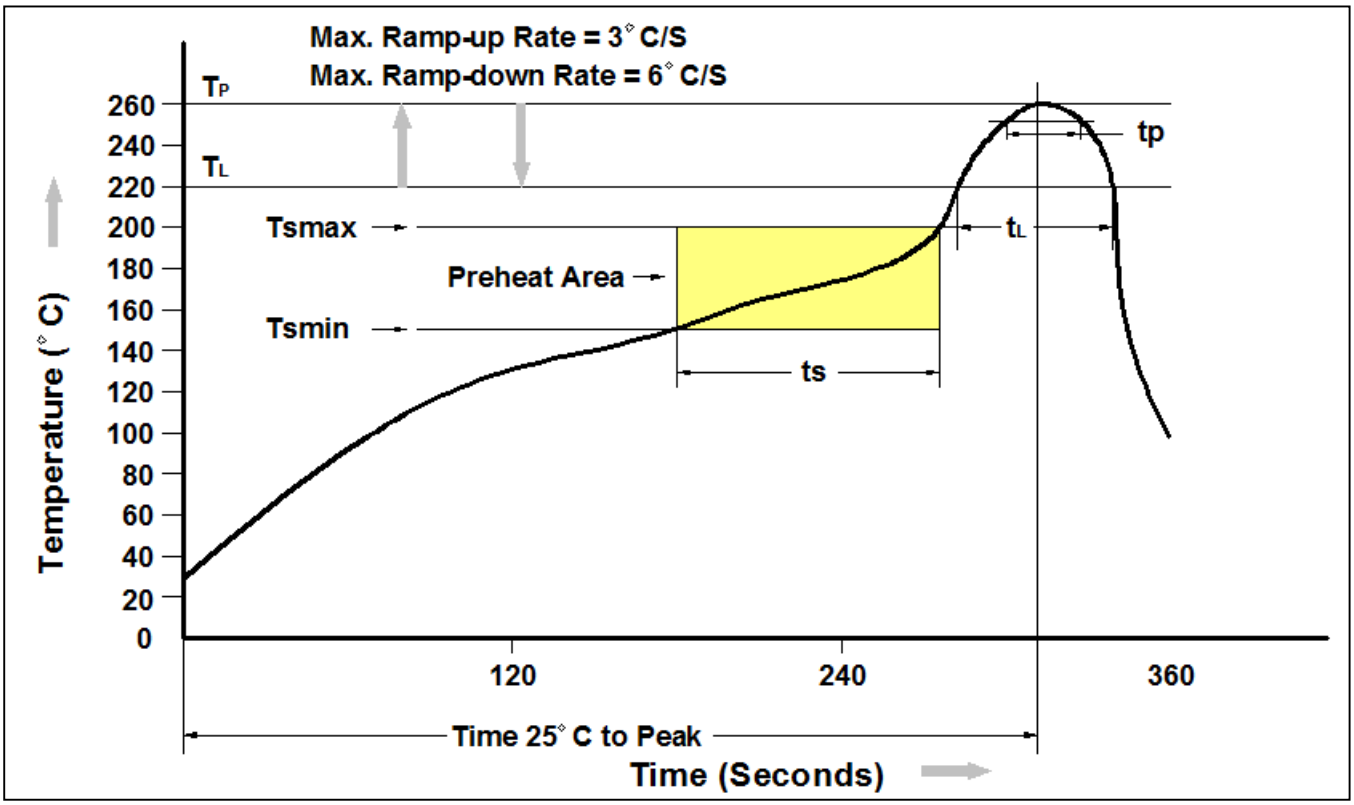
Option T1



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.

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