



## CTS600, CTS601, CTS611

# SDIP-6 10Mbit/s High Speed Logic Gate Optocoupler

### Features

- High speed 10MBit/s
- High isolation voltage between input and output (Viso=5000 Vrms )
- Wide operating temperature range of -55°C to 125°C
- Wide operating voltage range of 3.3V to 5.5V
- Green Package
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

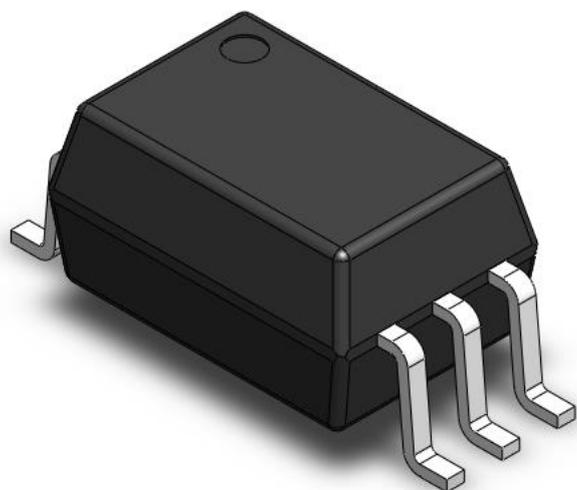
### Description

The CTS600, CTS601, and CTS611 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. A maximum input signal of 5mA will provide a minimum output sink current of 13mA.

### Applications

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

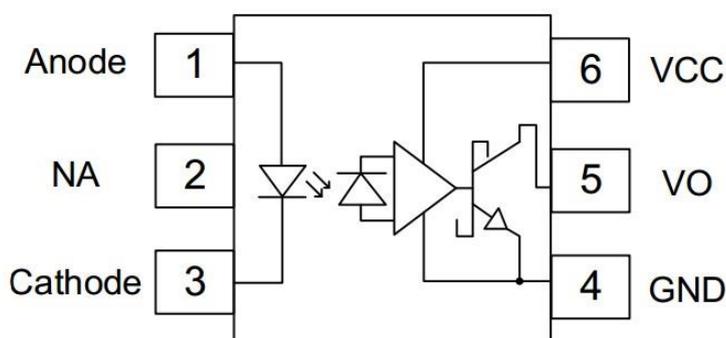
### Package Outline



Note:

Different bending options available. See package dimension.

### Schematic





# CTS600, CTS601, CTS611

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### Absolute Maximum Rating at 25°C

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
V <sub>ISO</sub>	Isolation voltage	5000	V <sub>RMS</sub>	<b>1</b>
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	<b>2</b>
<b>Emitter</b>				
I <sub>F</sub>	Forward current	50	mA	
V <sub>R</sub>	Reverse voltage	5	V	
fP <sub>D</sub>	Power dissipation	100	mW	
<b>Detector</b>				
P <sub>Df</sub>	Power dissipation	85	mW	
I <sub>O</sub>	Average Output current	50	mA	
V <sub>CC</sub>	Supply voltage	3~7	V	
V <sub>O</sub>	Output voltage	3~7	V	

#### Notes

1. AC for 1 minute, RH = 40 ~ 60%.
2. For reflow process



## Electrical Characteristics

$T_A = -40 - 110\text{ }^\circ\text{C}$  (unless otherwise specified). Typical values are measured at  $T_A = 25\text{ }^\circ\text{C}$  and  $V_{CC} = 3.3\text{V}$

### Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$V_F$	Forward voltage	$I_F = 10\text{mA}$	-	1.4	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	$I_F = 10\text{mA}, V_O = \text{Open}, V_{CC} = 3.3\text{V}$	-	6	13	mA	
		$I_F = 10\text{mA}, V_O = \text{Open}, V_{CC} = 5.5\text{V}$					
$I_{CCH}$	Logic High Supply Current	$I_F = 0\text{mA}, V_O = \text{Open}, V_{CC} = 3.3\text{V}$	-	5	10	mA	
		$I_F = 0\text{mA}, V_O = \text{Open}, V_{CC} = 5.5\text{V}$					
$R_{IO}$	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	$I_F = 250\mu\text{A}, V_O = 3.3\text{V}$		7	100	$\mu\text{A}$	
		$I_F = 250\mu\text{A}, V_O = 5.5\text{V}$					
$I_{FT}$	Input Threshold Current	$V_{CC} = 3.3\text{V}, V_O = 0.6\text{V}, I_O = 13\text{mA}$	-	1.5	5	mA	
		$V_{CC} = 5.5\text{V}, V_O = 0.6\text{V}, I_O = 13\text{mA}$					
$V_{OL}$	Logic Low Output Voltage	$I_F = 5\text{mA}, I_O = 13\text{mA}, V_{CC} = 3.3\text{V}$	-	0.3	0.6	V	
		$I_F = 5\text{mA}, I_O = 13\text{mA}, V_{CC} = 5.5\text{V}$					



**Switching Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
T <sub>PHL</sub>	Propagation Delay Time Logic High to Logic Low	C <sub>L</sub> =15pF, R <sub>L</sub> =350Ω, IF=7.5mA, V <sub>CC</sub> = 3.3V	-	20	75	ns	
		C <sub>L</sub> =15pF, R <sub>L</sub> =350Ω, IF=7.5mA, V <sub>CC</sub> = 5.5V		25	75		
T <sub>PLH</sub>	Propagation Delay Time Logic Low to Logic High	C <sub>L</sub> =15pF, R <sub>L</sub> =350Ω, IF=7.5mA, V <sub>CC</sub> = 3.3V	-	75	100	ns	
		C <sub>L</sub> =15pF, R <sub>L</sub> =350Ω, IF=7.5mA, V <sub>CC</sub> = 5.5V		60	75		
Tr	Output Rise Time	C <sub>L</sub> =15pF, R <sub>L</sub> =350Ω, IF=7.5mA, V <sub>CC</sub> = 5.5V	-	35	-	ns	
Tf	Output Fall Time	C <sub>L</sub> =15pF, R <sub>L</sub> =350Ω, IF=7.5mA, V <sub>CC</sub> = 5.5V	-	10	-	ns	
CMH	Common Mode Transient Immunity at Logic High	CTS600 IF = 5mA , VOH=2.0V, RL=350Ω, TA=25°C, VCM=10Vp-p	-	-	-	V/μs	
		CTS601 IF = 5mA , VOH=2.0V, RL=350Ω, TA=25°C, VCM=50Vp-p	5000	-	-		
		CTS611 IF = 5mA , VOH=2.0V, RL=350Ω, TA=25°C, VCM=1000Vp-p	20000	-	-		
CML	Common Mode Transient Immunity at Logic Low	CTS600 IF = 0mA , VOL=0.8V, RL=350Ω, TA=25°C, VCM=10Vp-p	-	-	-	V/μs	
		CTS601 IF = 0mA , VOL=0.8V, RL=350Ω, TA=25°C, VCM=50Vp-p	5000	-	-		
		CTS611 IF = 0mA , VOL=0.8V, RL=350Ω, TA=25°C, VCM=1000Vp-p	20000	-	-		



Typical Characteristic Curves

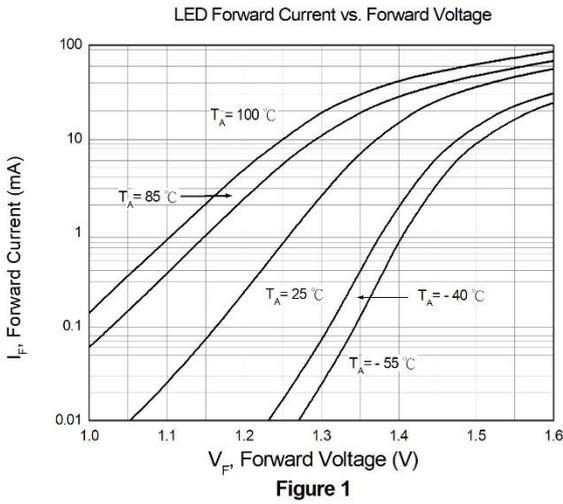


Figure 1

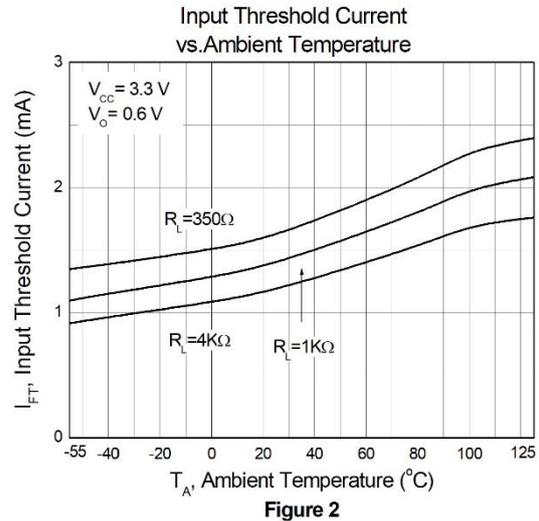


Figure 2

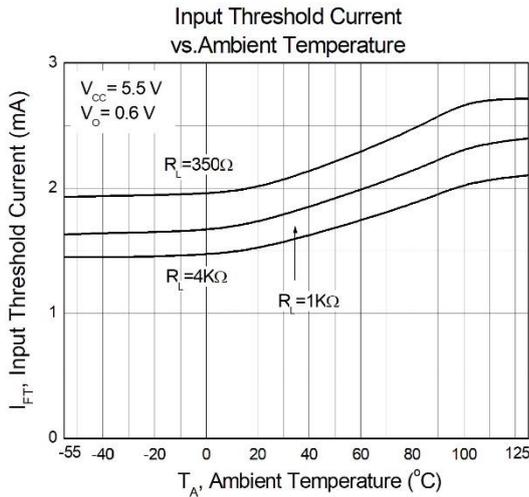


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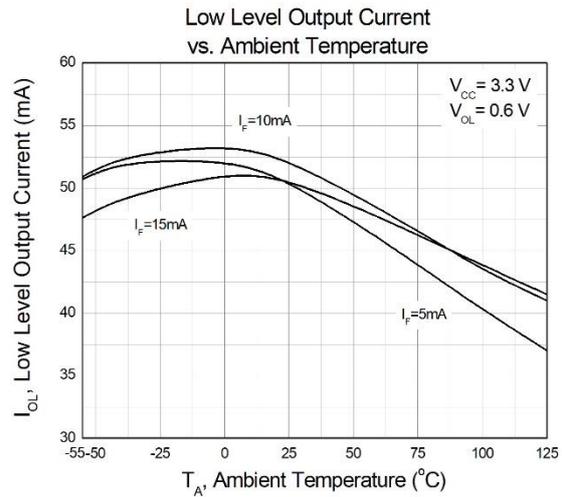


Figure 4

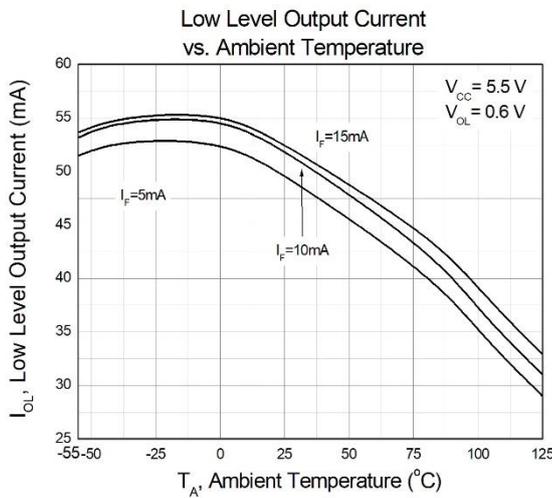


Figure 5

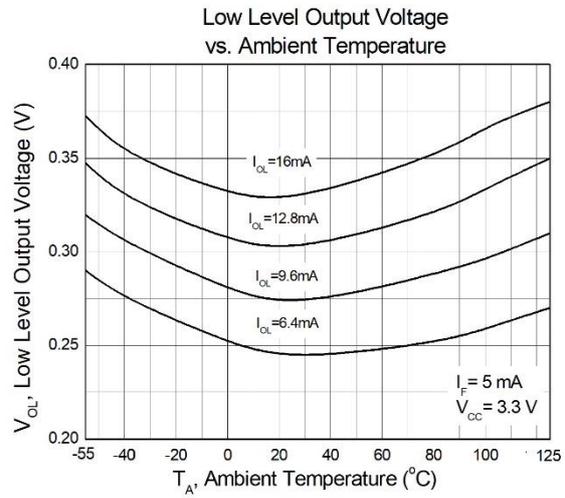
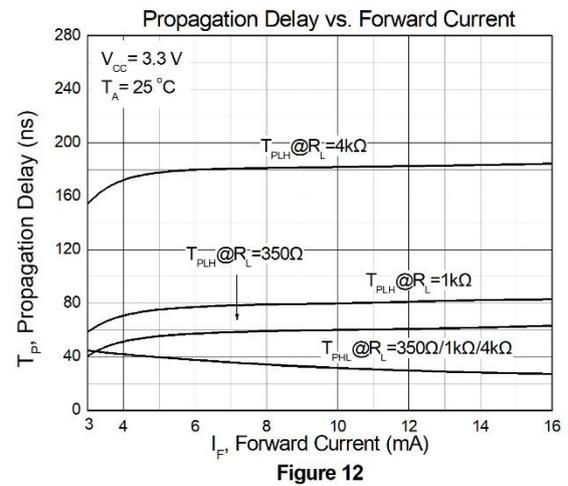
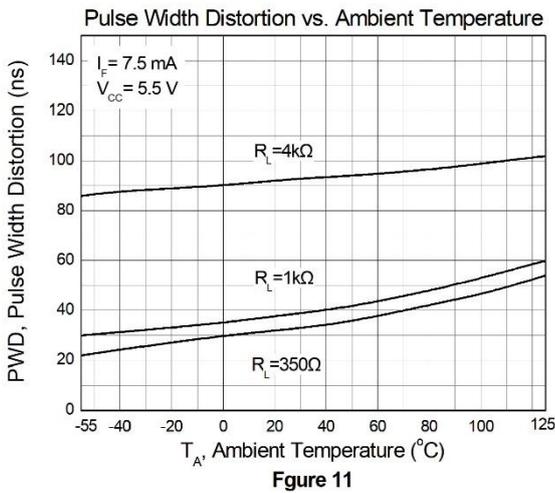
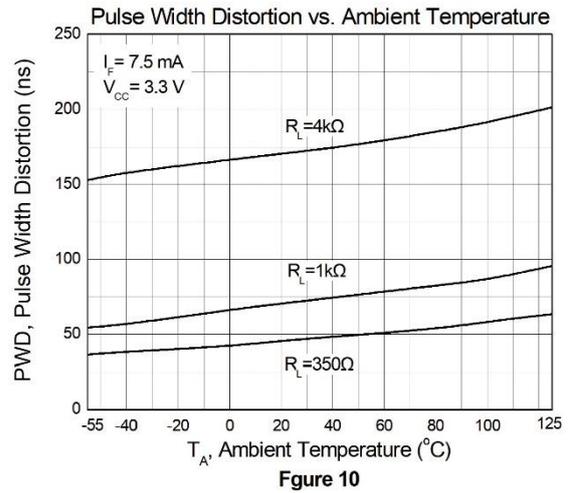
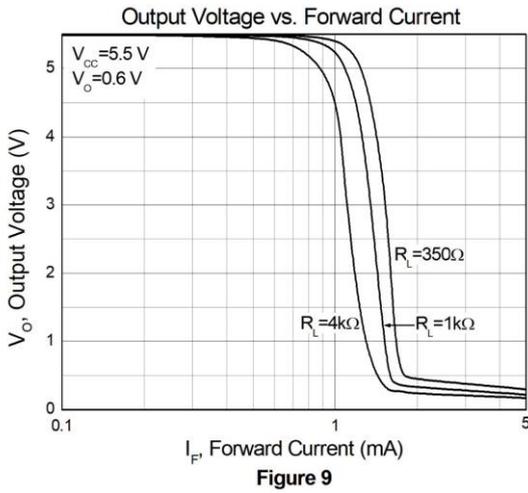
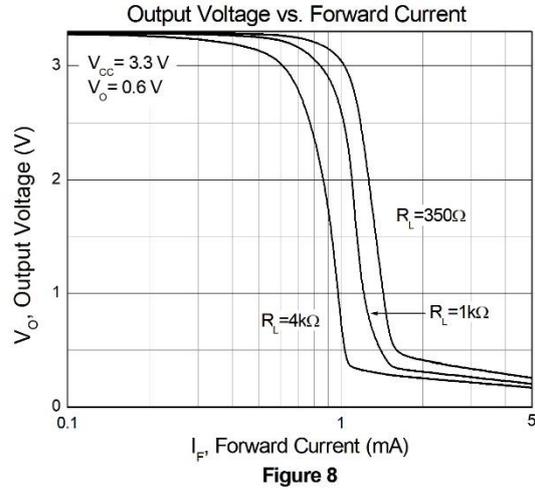
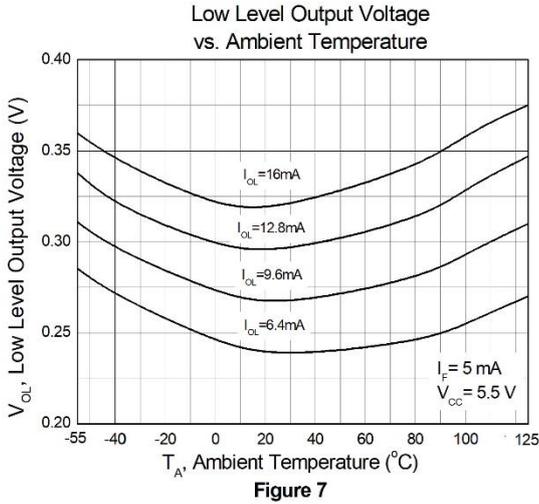


Figure 6



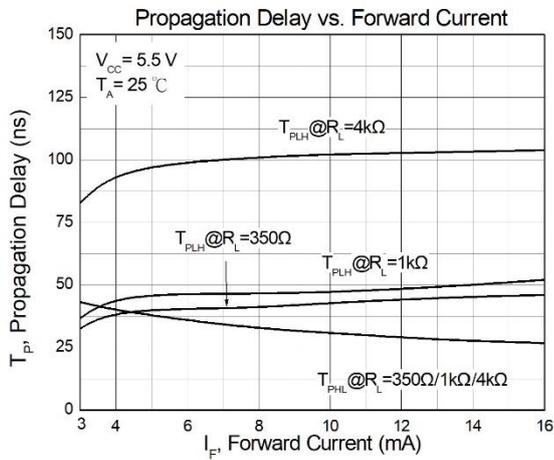


Figure 13

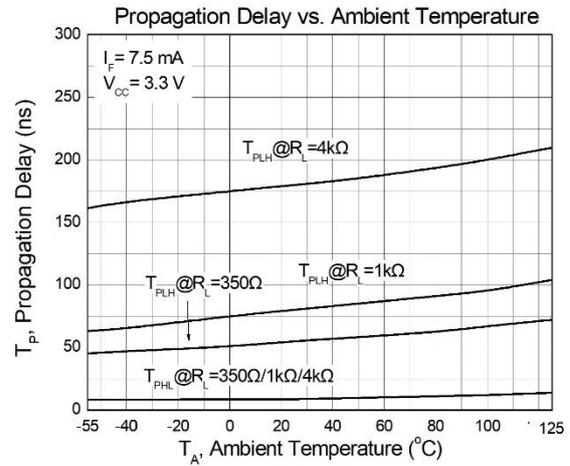


Figure 14

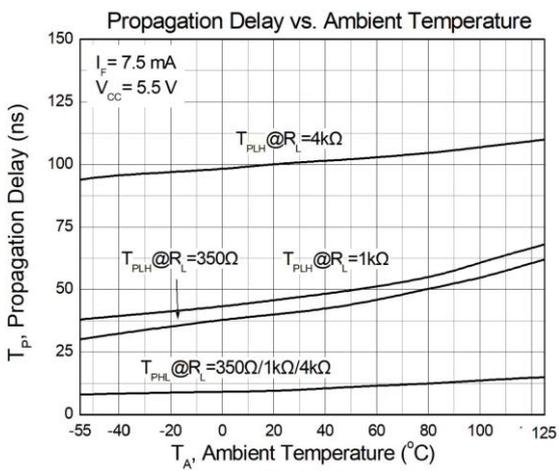


Figure 15



### Test Circuits

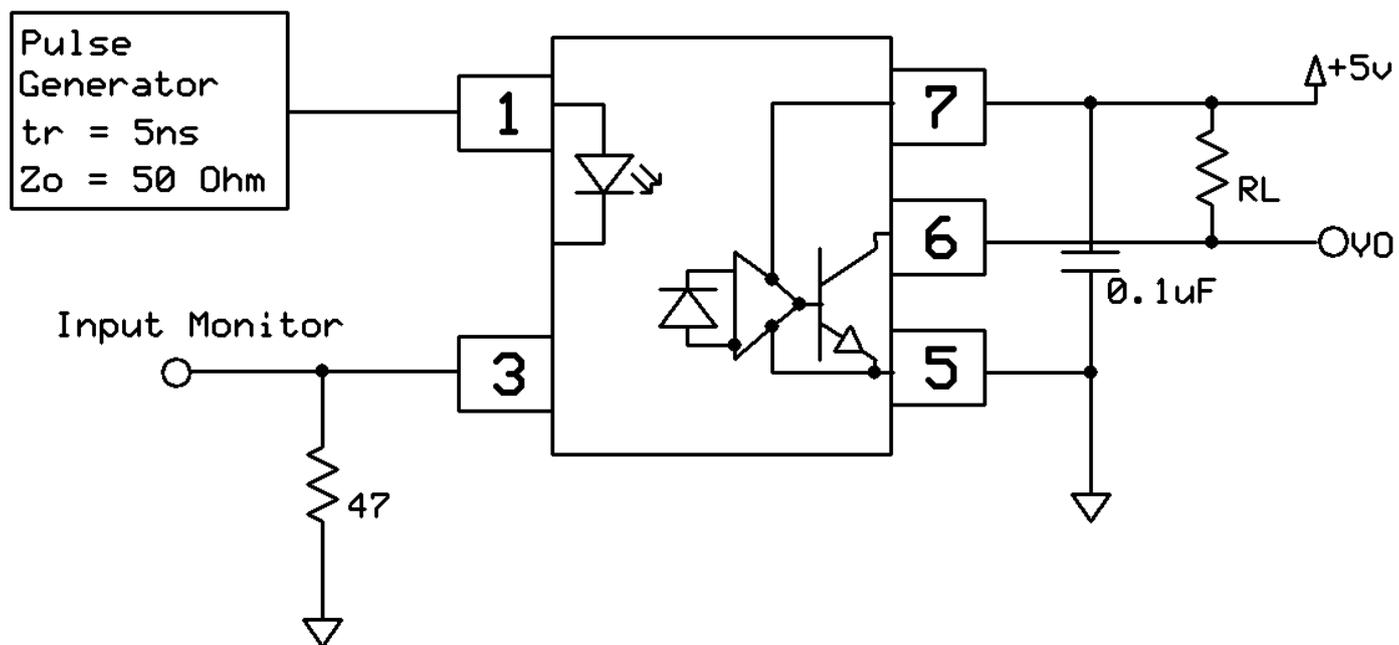


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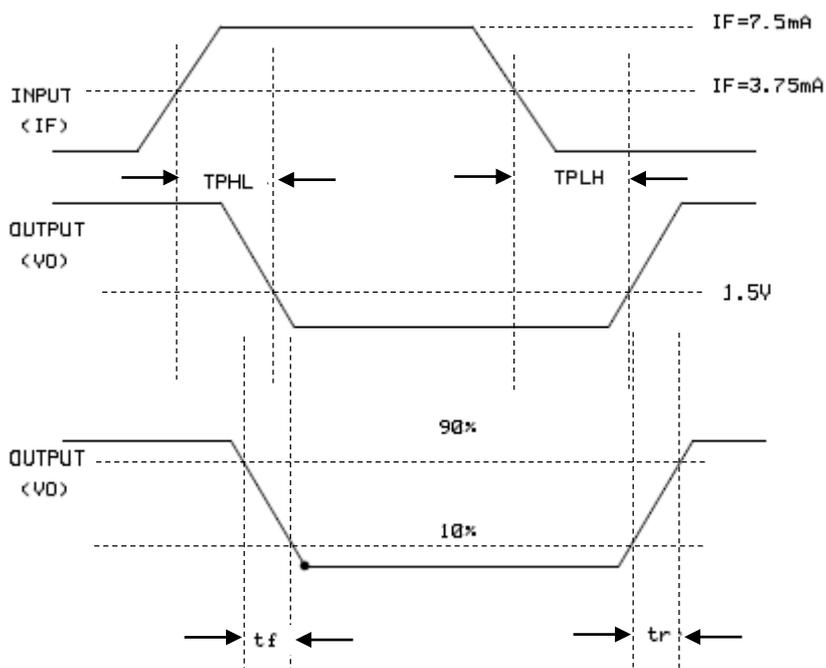


Figure 12



# CTS600, CTS601, CTS611 SDIP-6 10Mbit/s High Speed Logic Gate Optocoupler

## Test Circuits

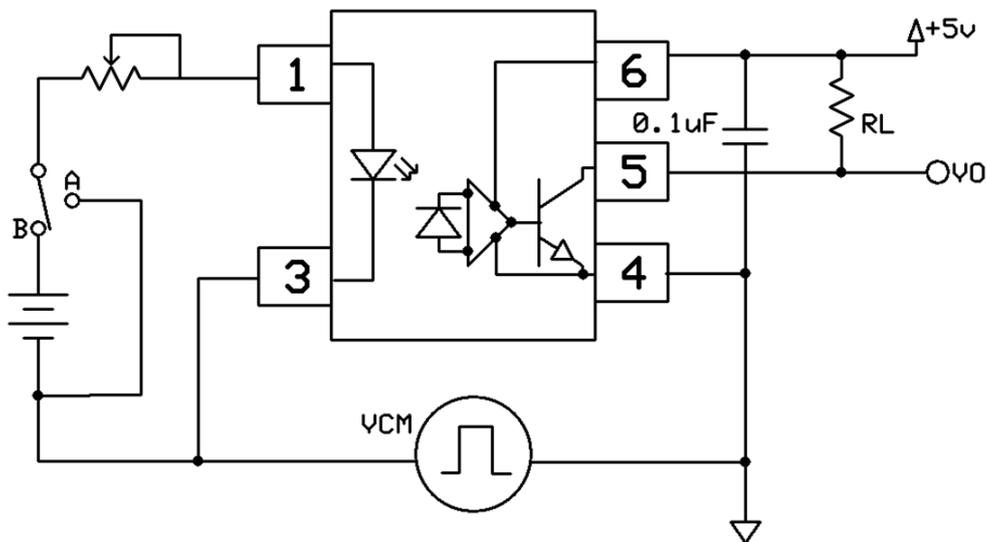
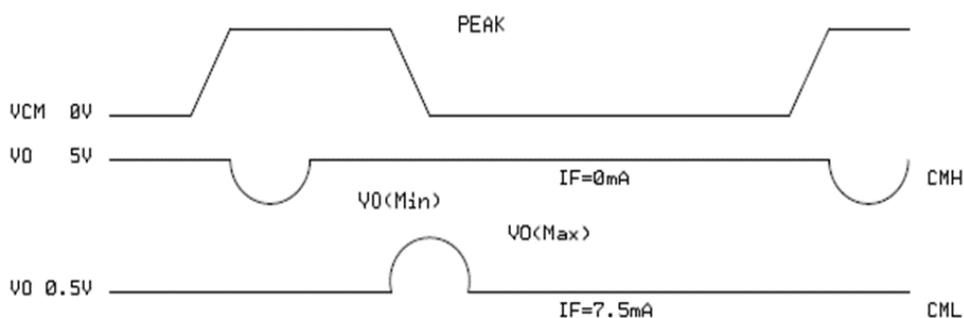


Figure 13



CMR Test Circuit

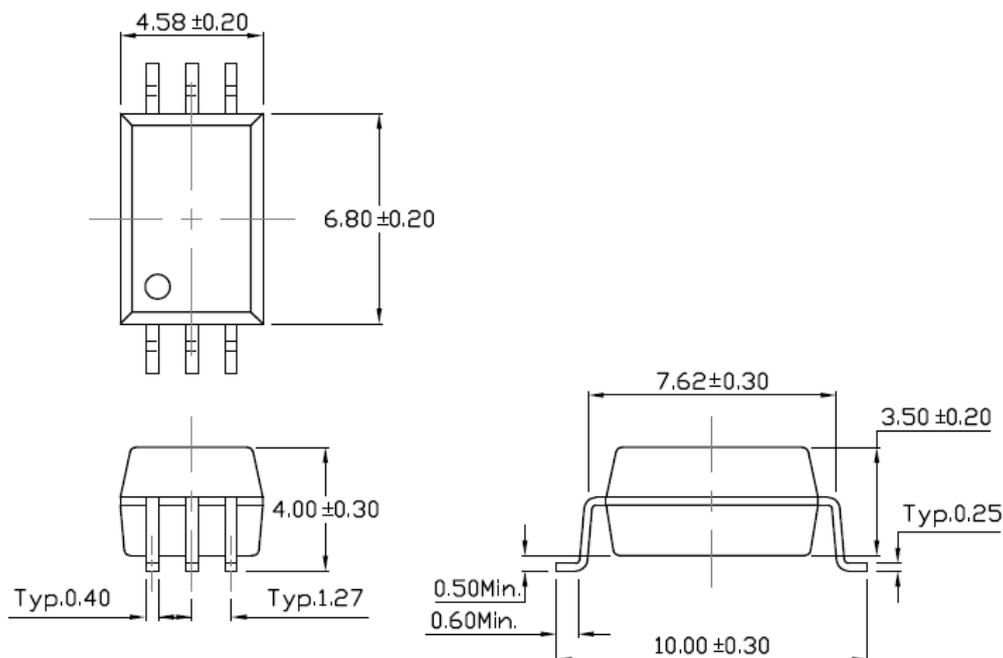
Figure 14



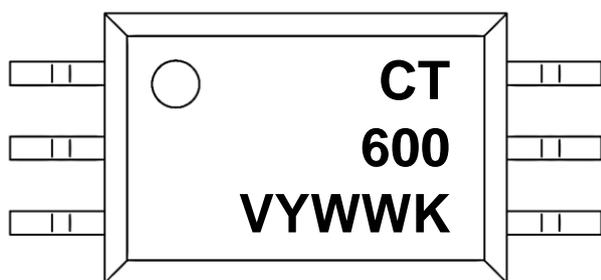
# CTS600, CTS601, CTS611

## SDIP-6 10Mbit/s High Speed Logic Gate Optocoupler

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



### Device Marking



CT	: Denotes "CT Micro"
600	: Product Number
V	: VDE safety mark Option
Y	: Fiscal Year
WW	: Work Week
K	: Production Code

### Ordering Information

CTS6XX(V)(Y)(Z)

- XX = Part No. (00, 01, or 11)
- V = VDE safety mark option (V or none)
- Y = Lead form option (M or none)
- Z = Tape and reel option (T1 or T2)



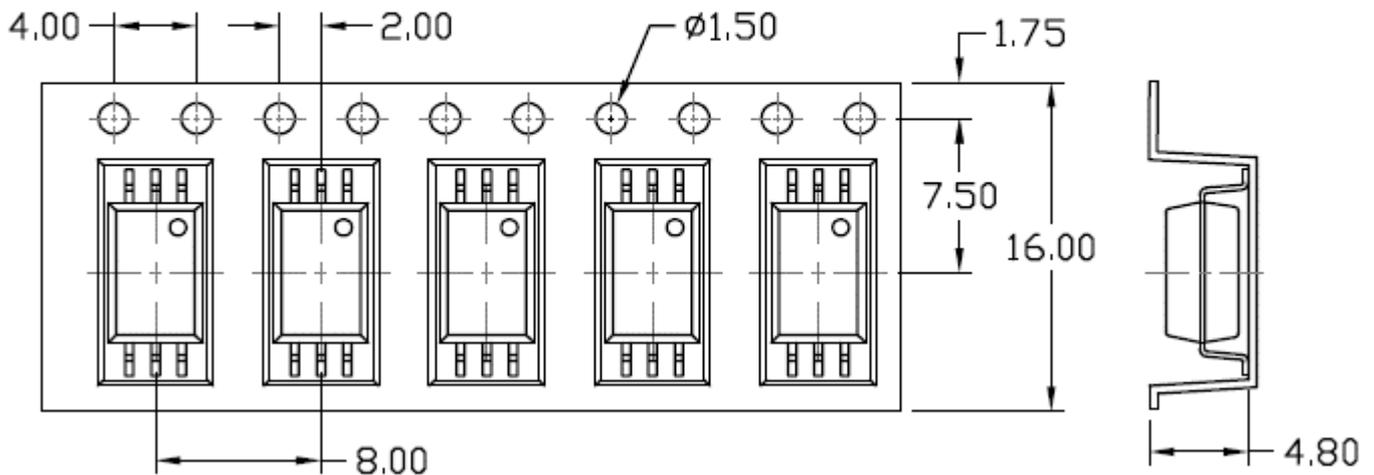
CTS600, CTS601, CTS611

## SDIP-6 10Mbit/s High Speed Logic Gate Optocoupler

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

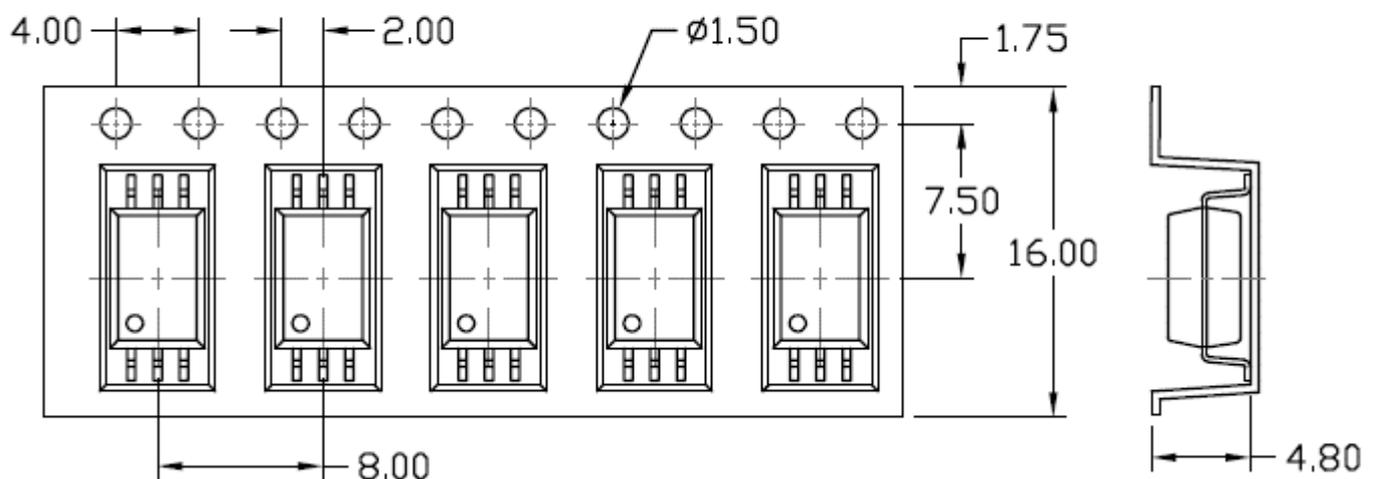
#### Option T1

Input Direction →



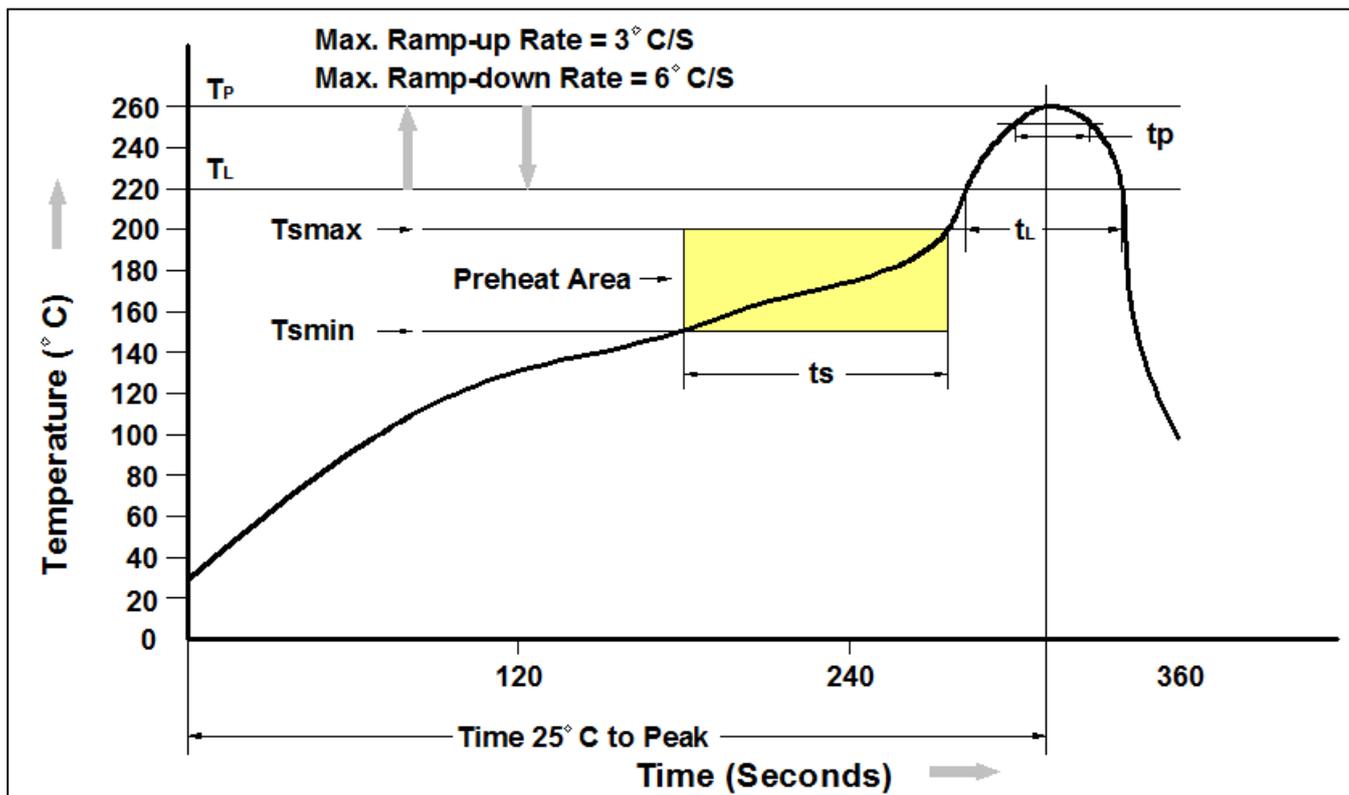
#### Option T2

Input Direction →





### 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.



# CTS600, CTS601, CTS611

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