

## **QT-Brightek Optocoupler Series**

**5-PIN 10 Mbit/s High Speed Logic Gate Optocoupler**

**Part No.: QTM600, 601, 611**



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## Introduction

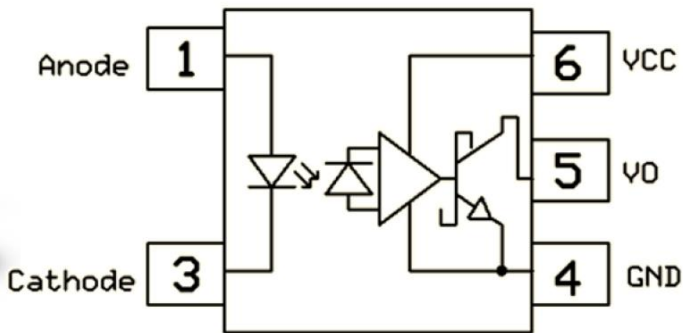
### Feature:

- High Speed 10Mbit/s
- High Isolation voltage between input and output (Viso = 3750V rms)
- Guaranteed CTR performance from 0 °C to 70 °C
- Mini-Flat package

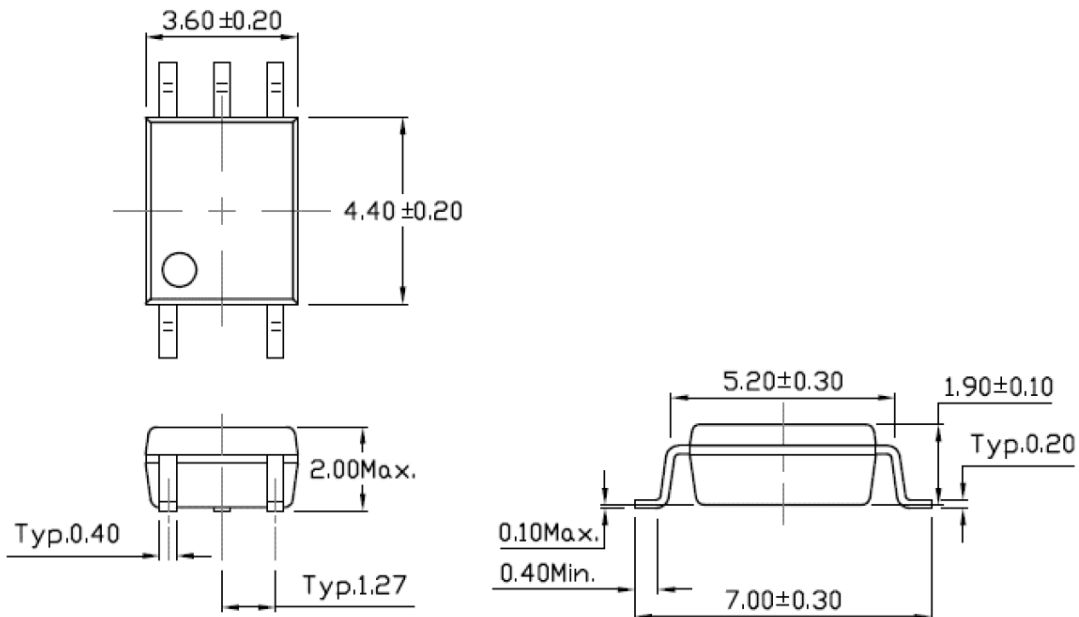
### Certification & Compliance:

- Pb free and RoHS Compliant
- UL recognized (File #E338132)
- cUL recognized (File #E338132)
- VDE (Pending Approval)

### Schematic:



### Dimension: (Dot location indicates pin 1)



All Dimensions are in mm

**Absolute Maximum Rating**

Symbol	Parameter	Rating	Units
V <sub>ISO</sub>	Isolation Voltage*	3750	V <sub>RMS</sub>
T <sub>STG</sub>	Storage Temperature	-55 ~ +150	°C
T <sub>OPR</sub>	Operating Temperature	-55 ~ +85	°C
T <sub>SOL</sub>	Lead Solder Temperature	260 for 10 sec	°C
<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
	Power Dissipation Derated above 100°C	-	mW/°C
<b>DETECTOR</b>			
P <sub>D</sub>	Power Dissipation	85	mW
I <sub>O(AVG)</sub>	Average Output current	50	mA
V <sub>O</sub>	Output voltage	7	V
V <sub>CC</sub>	Supply voltage	7	V

\*AC for 1 minute, RH =40~60%

## Electrical Characteristic (T<sub>A</sub>=25 °C)

(T<sub>A</sub>=0 to 70C unless specified otherwise)

### Emitter

Symbol	Characteristics	Device	Test Condition	Range			Unit
				Min	Typ	Max	
V <sub>F</sub>	Forward Voltage	-	I <sub>F</sub> = 10mA	-	1.4	1.6	V
V <sub>R</sub>	Reverse Voltage		I <sub>R</sub> = 5μA	5	-	-	V
ΔV <sub>F</sub> /ΔT <sub>A</sub>	Temperature coefficient of forward voltage		I <sub>F</sub> = 16mA	-	-1.6	-	mV/°C

### Detector

Symbol	Characteristic	Device	Test Condition	Range			Unit
				Min	Typ	Max	
I <sub>CCL</sub>	Logic Low Supply Current	-	I <sub>F</sub> =10mA, V <sub>O</sub> =Open, V <sub>CC</sub> =5V	-	9	13	mA
I <sub>CCH</sub>	Logic High Supply Current	-	I <sub>F</sub> =0mA, V <sub>O</sub> =Open, V <sub>CC</sub> =5V	-	6	9	mA
R <sub>IO</sub>	Isolation Resistance		V <sub>IO</sub> =500V <sub>DC</sub>	5x10 <sup>10</sup>	-	-	Ω
C <sub>IO</sub>	Isolation Capacitance		f=1MHz	-	0.5	1.2	pF

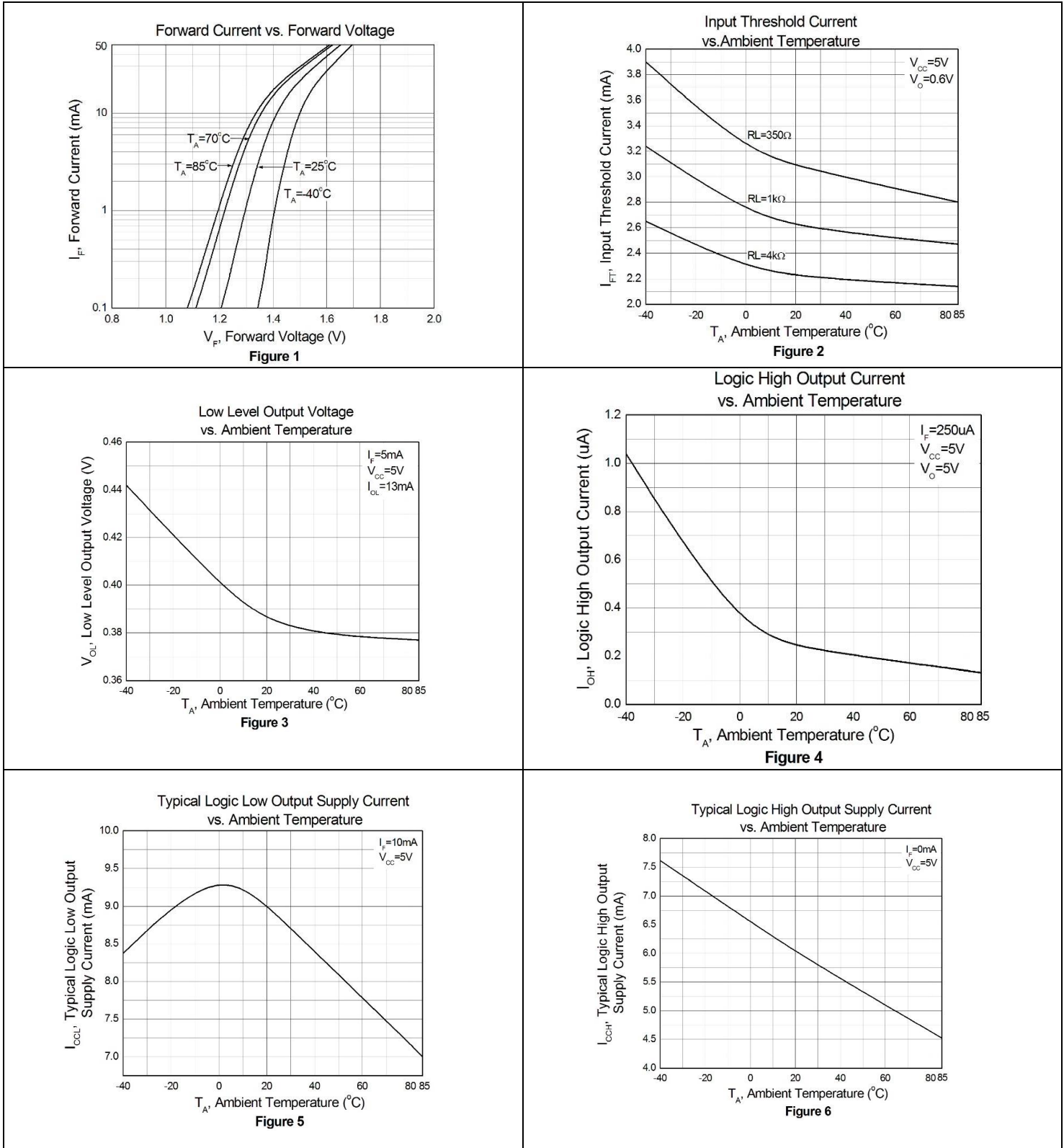
## Transfer Characteristics

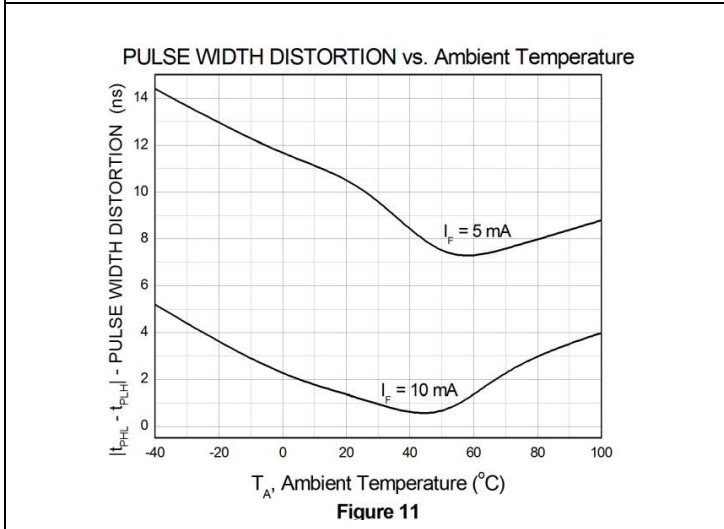
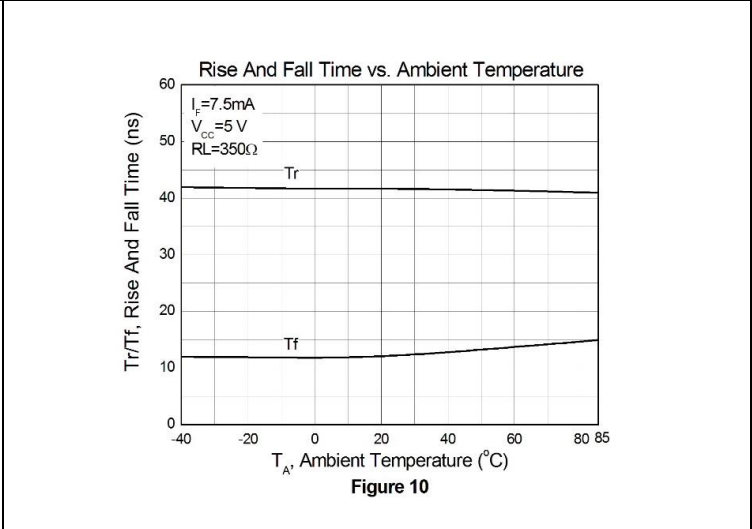
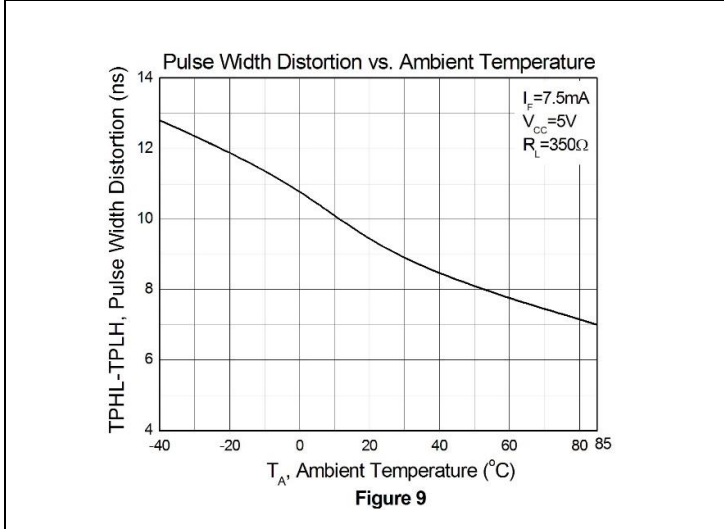
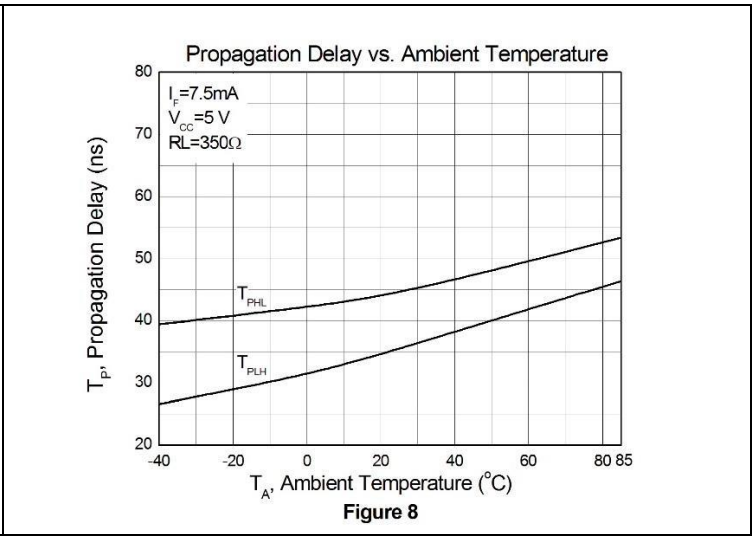
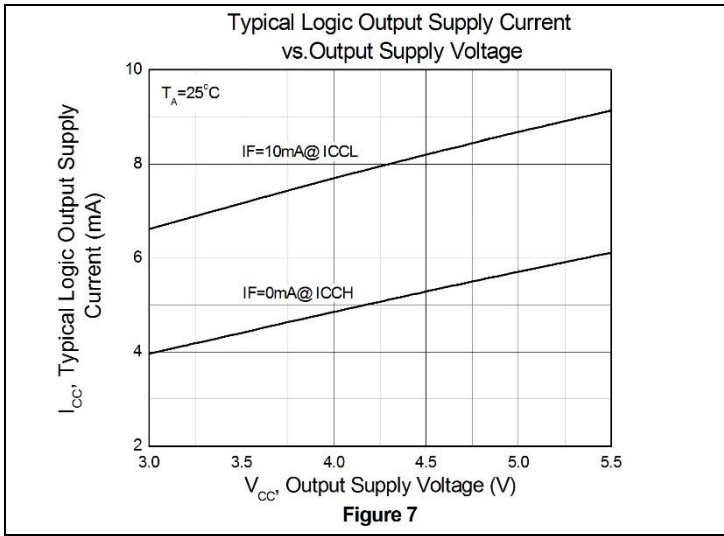
Symbol	Characteristic	Device	Test Condition	Range			Unit
				Min	Typ	Max	
I <sub>OH</sub>	Logic High Output Current		I <sub>F</sub> =250μA, V <sub>O</sub> =5.5V	-	2	100	μA
I <sub>FT</sub>	Input Threshold Current		I <sub>F</sub> =13mA, V <sub>O</sub> =0.6V, V <sub>CC</sub> =5.5V	-	3.3	5	mA
V <sub>OL</sub>	Logic Low Output Voltage		I <sub>F</sub> =5mA, I <sub>O</sub> =13mA, V <sub>CC</sub> =5.5V	-	0.35	0.6	V

**Switching Characteristics** (TA=25°C, Vcc=5V)

Symbol	Characteristic	Device	Test Condition	Range			Unit
				Min	Typ	Max	
T <sub>PHL</sub>	Propagation Delay Time Logic High to Logic Low		C <sub>L</sub> =15pF, R <sub>L</sub> =350Ω,	-	40	75	ns
T <sub>PLH</sub>	Propagation Delay Time Logic Low to Logic High			-	35	75	
Tr	Output Rise Time			-	40	-	
Tf	Output Fall Time			-	10	-	
CM <sub>H</sub>	Common Mode Transient Immunity at Logic High	QTM600	I <sub>F</sub> = 7.5mA, V <sub>OH</sub> =2.0V, R <sub>L</sub> =350Ω, T <sub>A</sub> =25°C, V <sub>CM</sub> =10Vp-p	-	-	-	V/μs
		QTM601	I <sub>F</sub> = 7.5mA, V <sub>OH</sub> =2.0V, R <sub>L</sub> =350Ω, T <sub>A</sub> =25°C, V <sub>CM</sub> =50Vp-p	5000	-	-	
		QTM611	I <sub>F</sub> = 7.5mA, V <sub>OH</sub> =2.0V, R <sub>L</sub> =350Ω, T <sub>A</sub> =25°C, V <sub>CM</sub> =1000Vp-p	20000	-	-	
CM <sub>L</sub>	Common Mode Transient Immunity at Logic Low	QTM600	I <sub>F</sub> = 0mA, V <sub>OL</sub> = 0.8V, R <sub>L</sub> =350Ω, T <sub>A</sub> =25°C, V <sub>CM</sub> =10Vp-p	-	-	-	
		QTM601	I <sub>F</sub> = 0mA, V <sub>OL</sub> = 0.8V, R <sub>L</sub> =350Ω, T <sub>A</sub> =25°C, V <sub>CM</sub> =50Vp-p	5000	-	-	
		QTM611	I <sub>F</sub> = 0mA, V <sub>OL</sub> = 0.8V, R <sub>L</sub> =350Ω, T <sub>A</sub> =25°C, V <sub>CM</sub> =1000Vp-p	20000	-	-	

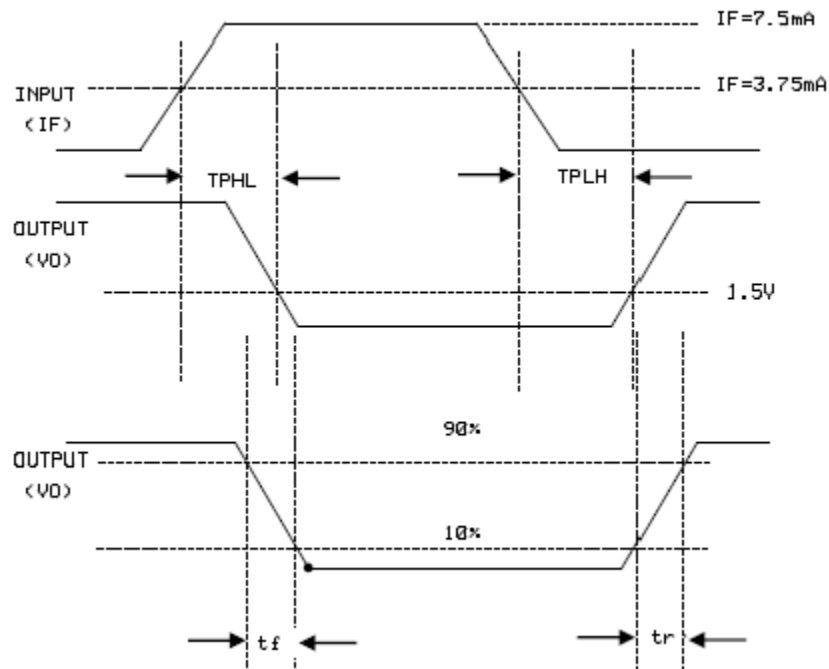
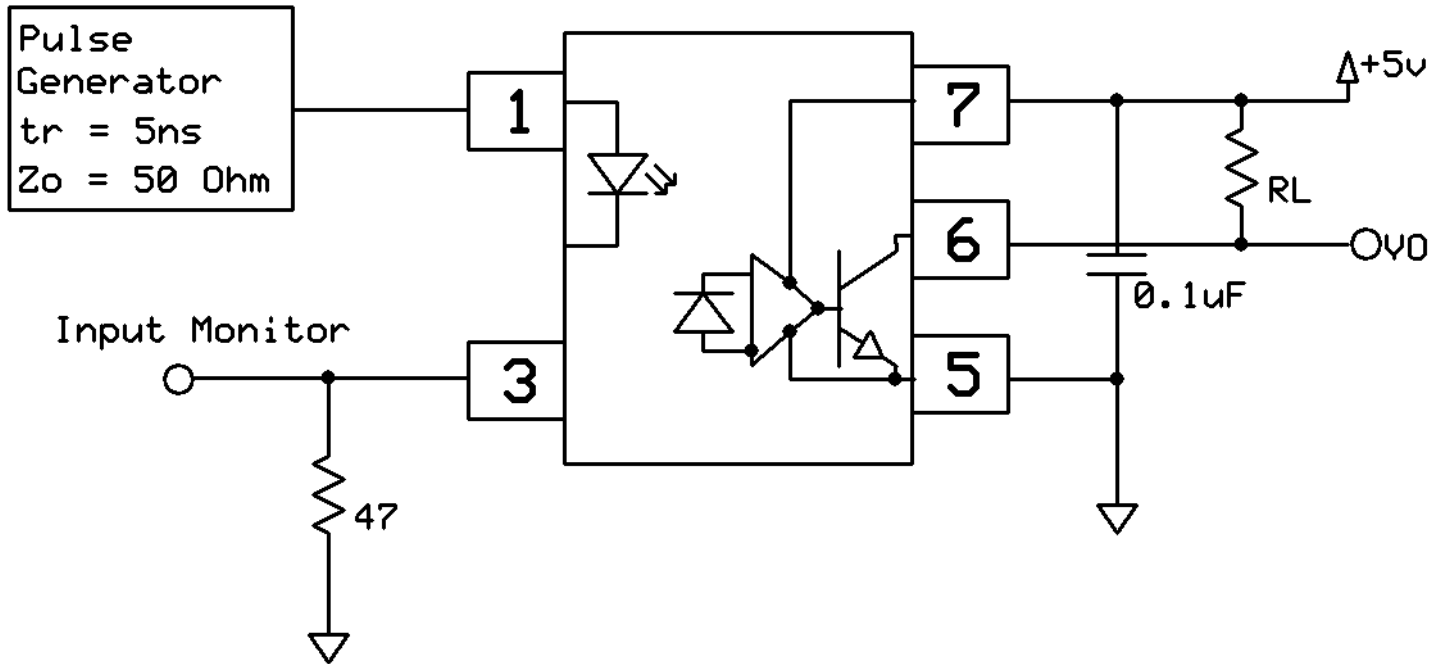
## Characteristic Curves

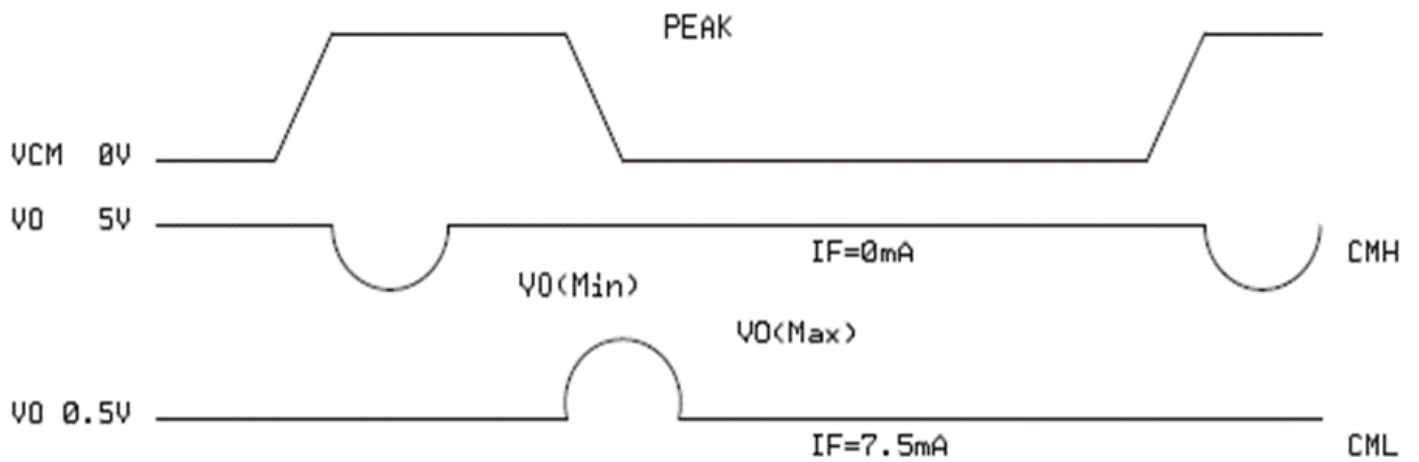
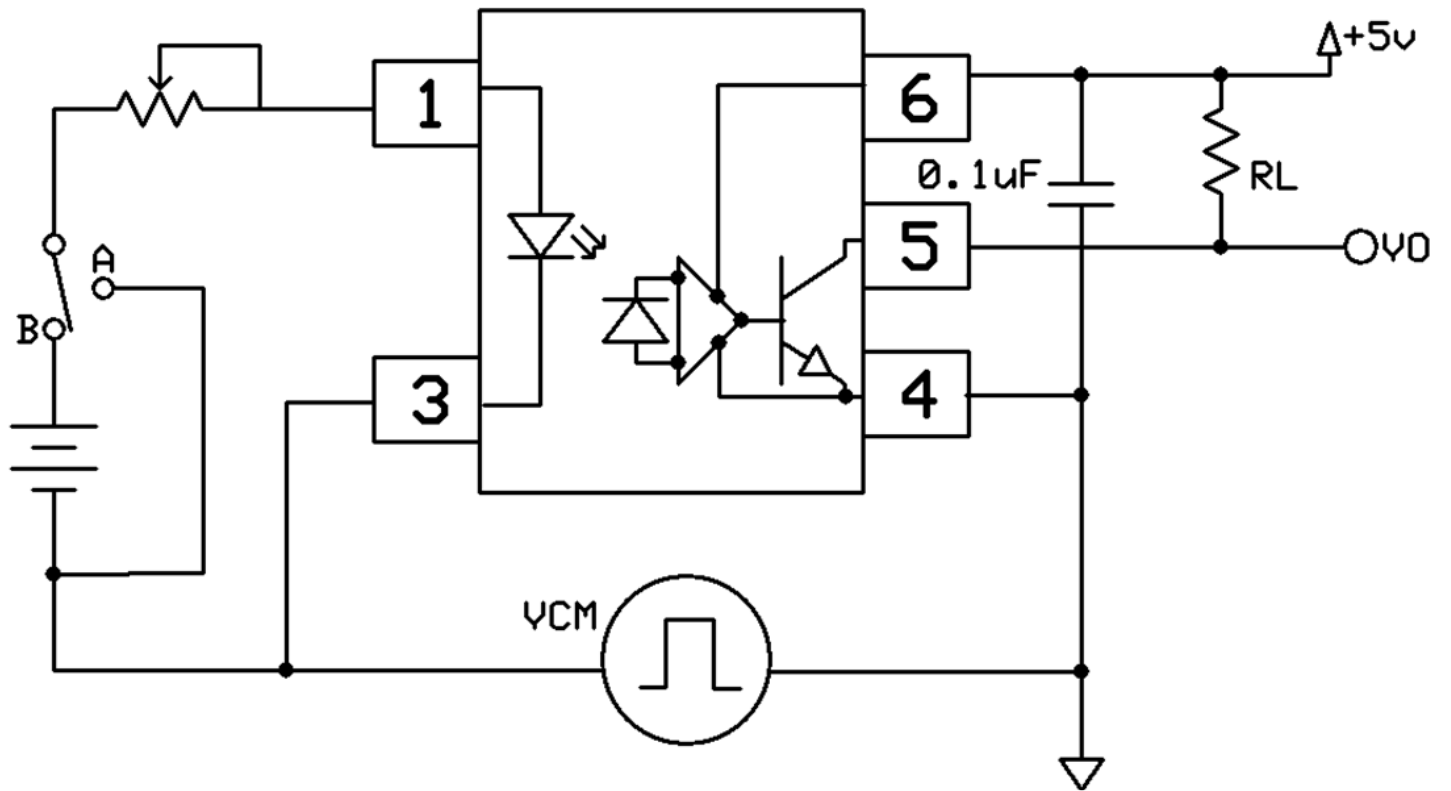






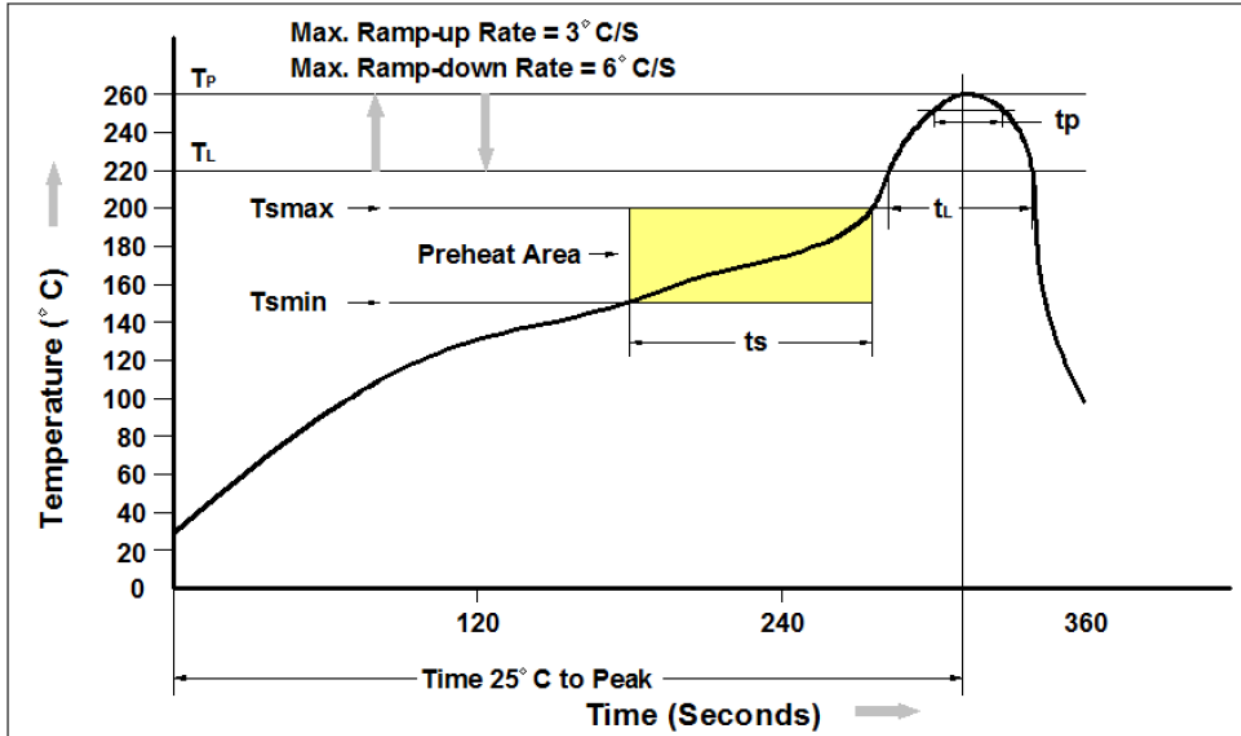
## Test Circuits



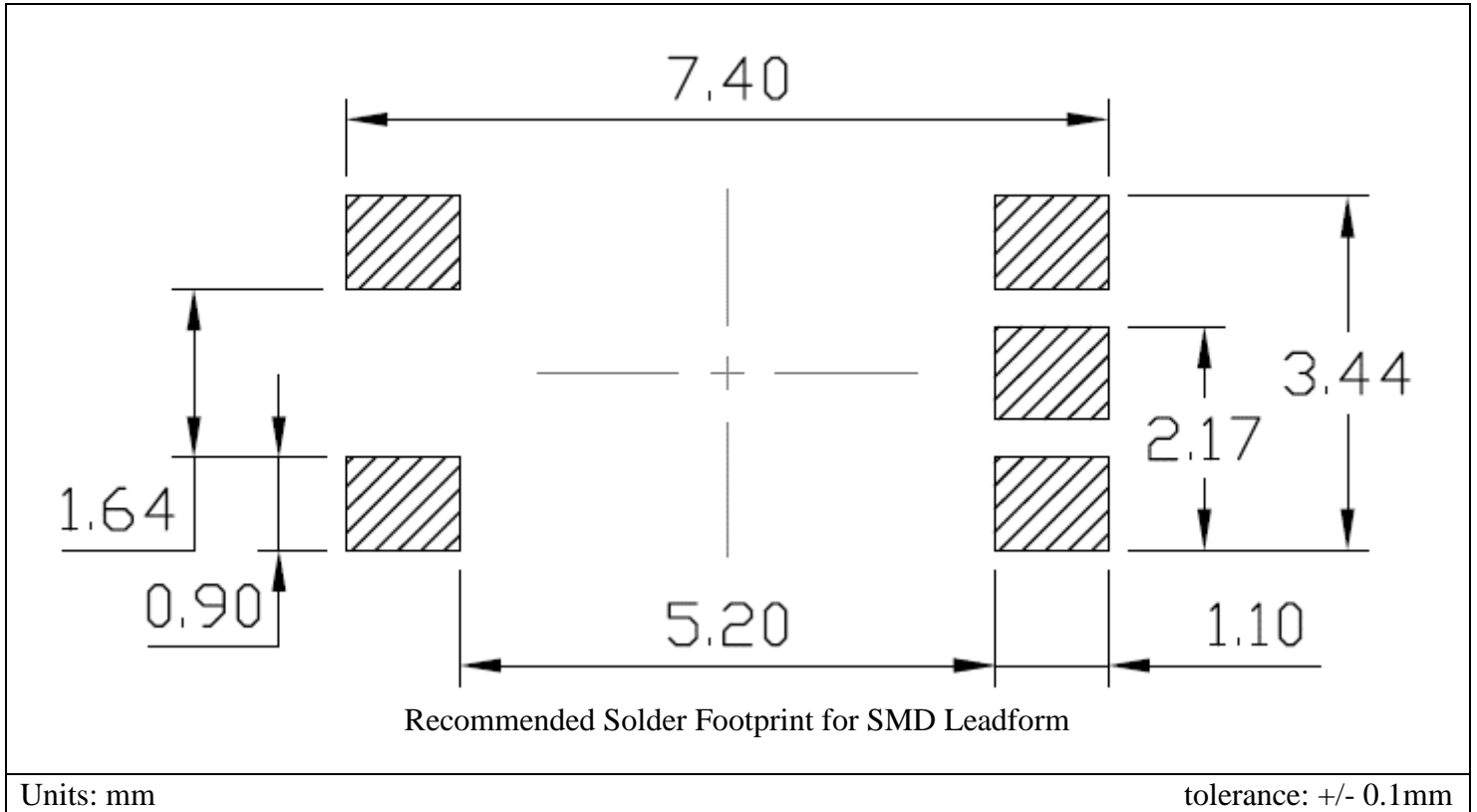


CMR Test Circuit

## Solder Profile & Footprint



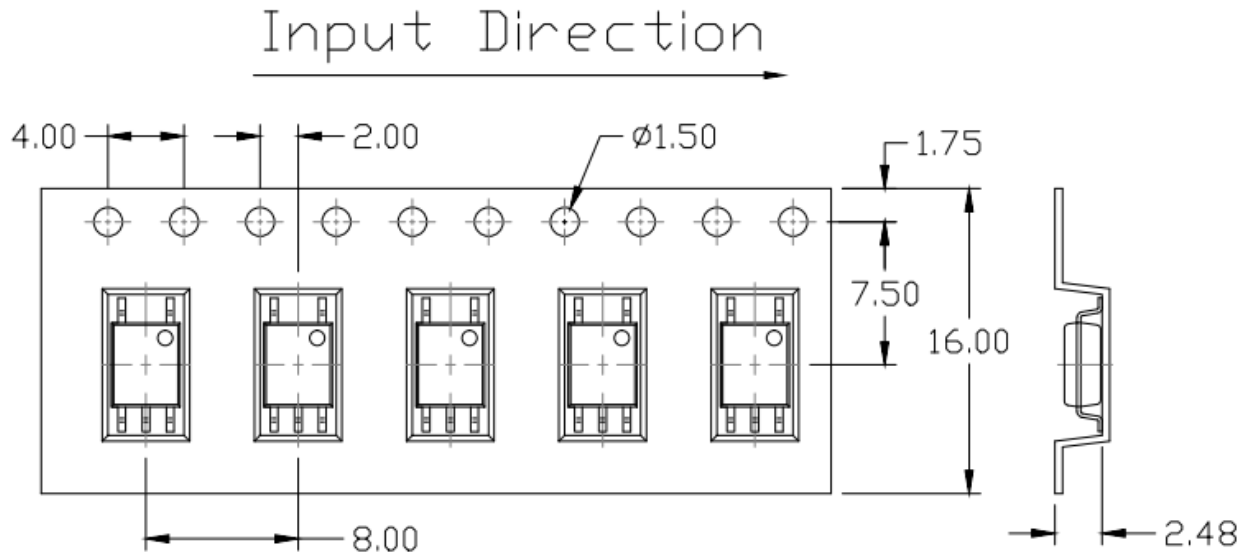
Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



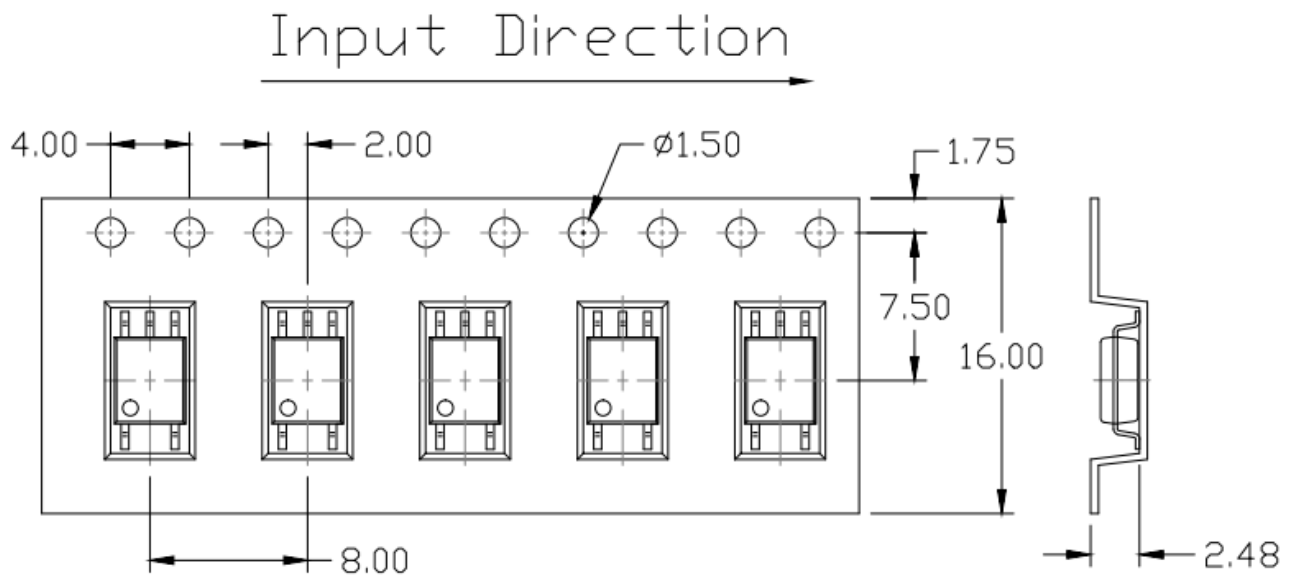
## Packing & Labeling

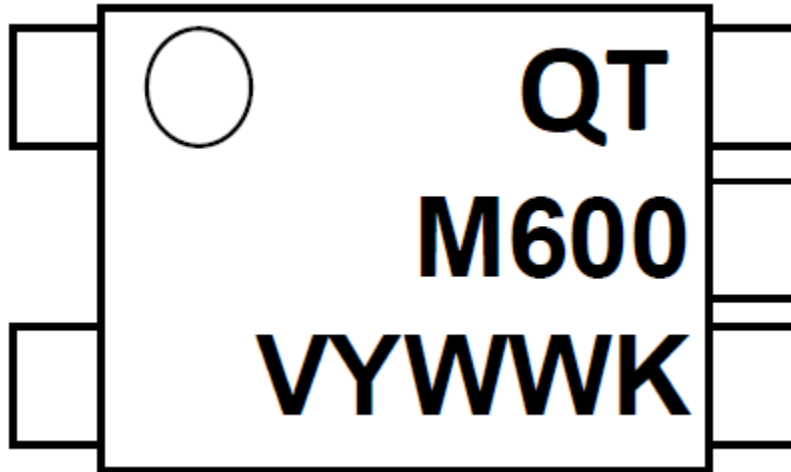
### Tape Dimension:

#### Option T1



#### Option T2



**Device Marking**

QT = QT-Brightek Corporation  
 M= Mini-Flat Package  
 600 = part number  
 Y = Year  
 WW = Week  
 V = VDE Option  
 K= Manufacturing code

**Ordering Information**

QTM6XX(V)(Z)  
 XX = Part number (X=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 pcs/ reel
T2	Surface Mount Lead Forming – with Option 2 Taping	3000 pcs/ reel



## Revision History

Description:	Revision #	Revision Date
Initial release of QTM600_601_611	1.0	02/12/2018

## Disclaimer

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