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QT-Brightek Optocoupler Series

**RANDOM-PHASE High Power TRIAC
OPTOCOUPLER**

Part No.: QTTX213 series

Product: QTTX213 series	Date: February 02, 2018	Page 1 of 16
	Version# 1.0	



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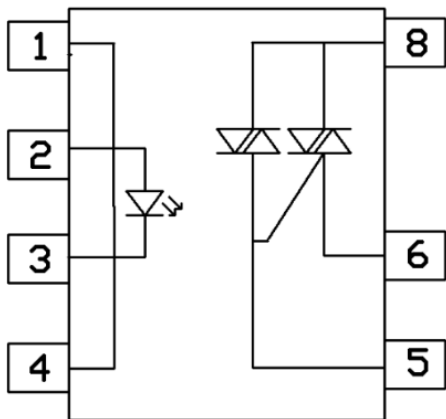
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Introduction

Feature:

- High Isolation voltage between input and output (Viso = 5000V rms)
- Peak Breakdown Voltage – 600V
- Peak Current Load – 0.3A, 0.6A, 0.9A and 1.2A

Schematic:



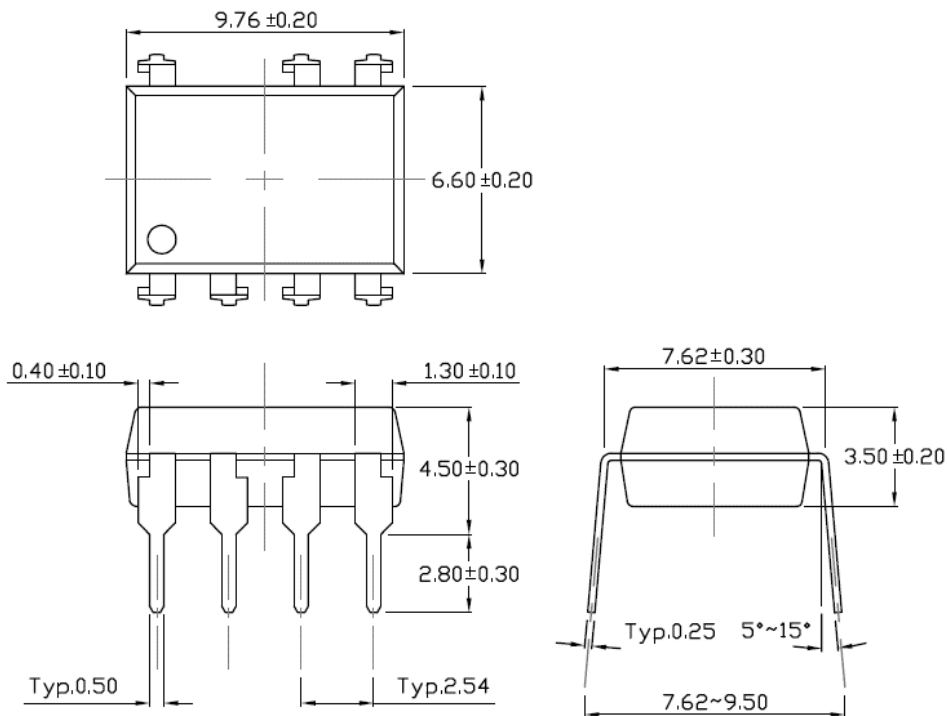
Certification & Compliance:

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

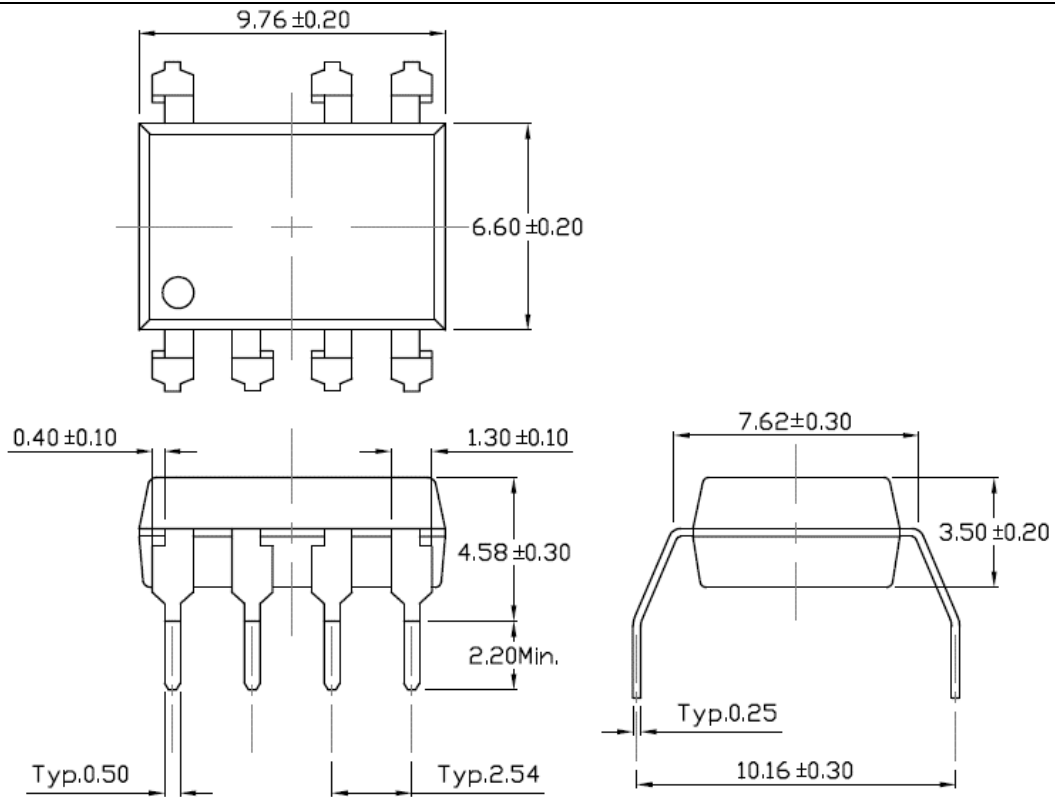


Dimension: (Dot location indicates pin 1)

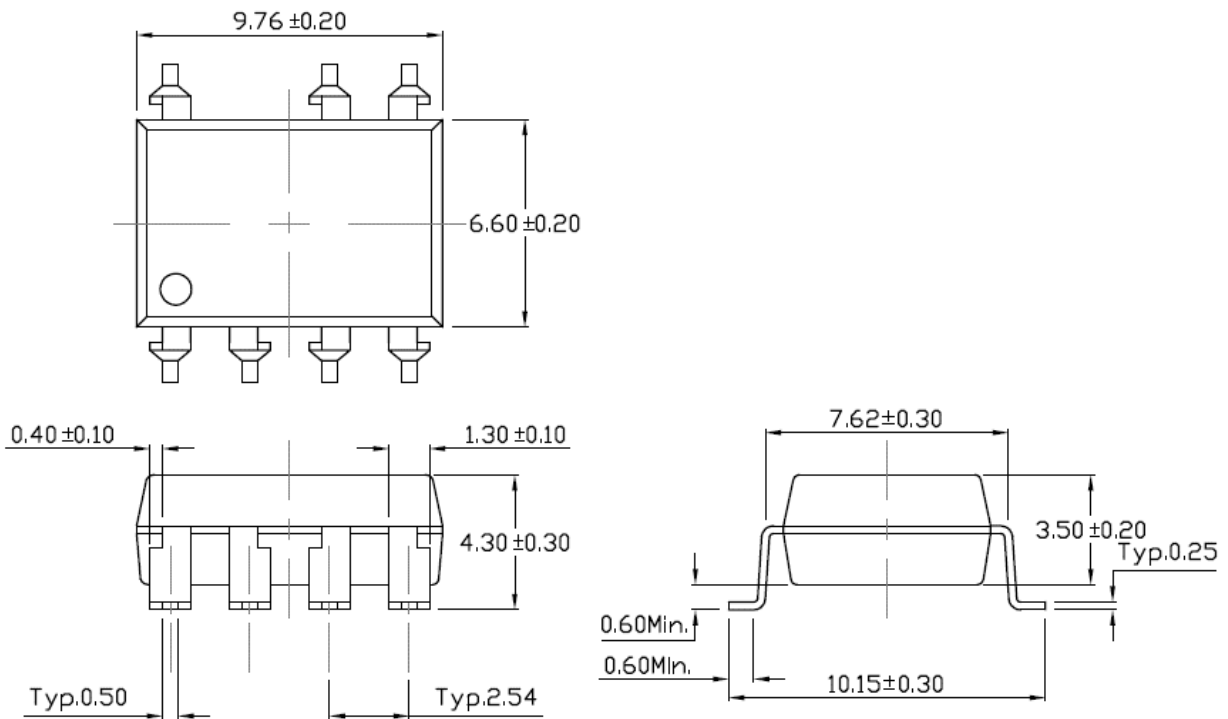
7-Pin Dip (standard):



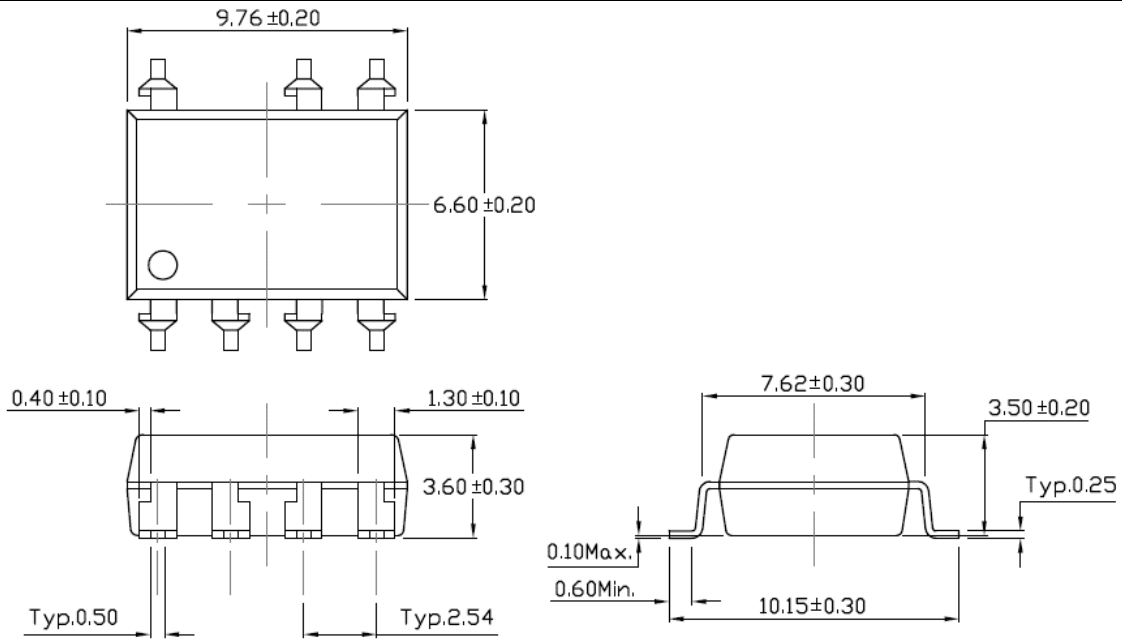
Gullwing (400mil) lead bend (Option M):



SMD lead bend (Option S):



SMD (Low Profile) bend (Option SL):



All Dimensions are in mm

Absolute Maximum Rating

Symbol	Parameter	Rating	Units	
V _{ISO}	Isolation Voltage*	5000	V _{RMS}	
T _{STG}	Storage Temperature	-55 ~ 125	°C	
T _{OPR}	Operating Temperature	-55 ~ 85	°C	
T _{SOL}	Soldering Temperature	260 for 10 sec	°C	
EMITTER				
I _F	Continuous Forward Current	50	mA	
I _{FP}	Peak Forward Current (≤ 1us, 300pps)	1	A	
V _R	Reverse Voltage	6	V	
P _D	Power Dissipation	75	mW	
DETECTOR				
P _{OUT}	Power Dissipation	800	mW	
P _T	Total Power Dissipation	850	mW	
I _{T(RMS)}	Continuous Current Load	QTT0223	0.3	A
		QTT1223	0.6	
		QTT2223	0.9	
		QTT3223	1.2	
I _{TSM}	Peak Current Load	QTT0223	3	A
		QTT1223	6	
		QTT2223	9	
		QTT3223	12	
V _{DRM}	Off-state Output Terminal Voltage	600	V	
I _{TSM}	Peak Repetitive Surge Current	1	A	

Electrical Characteristic (T_A=25 °C)

Emitter

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
V _F	Forward Voltage	I _F = 10mA	-	-	1.3	V
I _R	Reverse Current	V _R = 6V	-	-	5	μA
C _{IN}	Input Capacitance	f = 1kHz	-	45	-	pF

Detector

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
I _{DRM}	Peak Blocking Current	V _{DRM} = Rated V _{DRM} , I _F = 0mA	-	-	100	μA
V _{INH}	Inhibit Voltage	I _F = Rated I _{FT}	-	-	50	V
V _{TM}	Peak on-state voltage	I _{TM} = 100mA peak, I _F = Rated I _{FT}	-	-	2.5	V
dv/dt	Critical Rate of Rise off-state voltage	V _{PEAK} = Rated V _{DRM} , I _F = 0 (refer to test circuit for dv/dt)	200	-	-	V/ μs

Transfer Characteristic

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
I _{FT}	LED Trigger Current	Main terminal voltage = 3V	-	-	10	mA
I _H	Holding Current		-	-	25	mA
R _{IO}	Isolation Resistance	V _{IO} = 500V _{DC}	1x10 ¹¹	-	-	Ω
C _{IO}	Isolation Capacitance	F = 1MHz	-	0.25	-	pF

Characteristic Curves

QTTX213

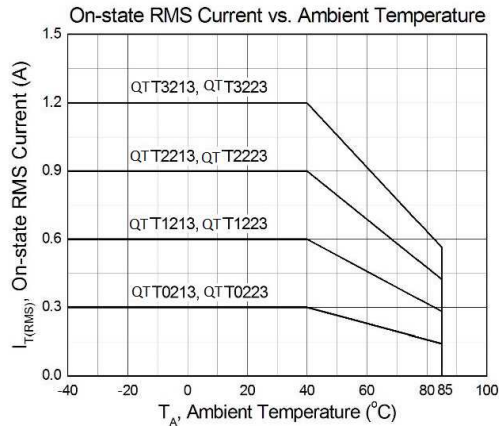


Figure 1

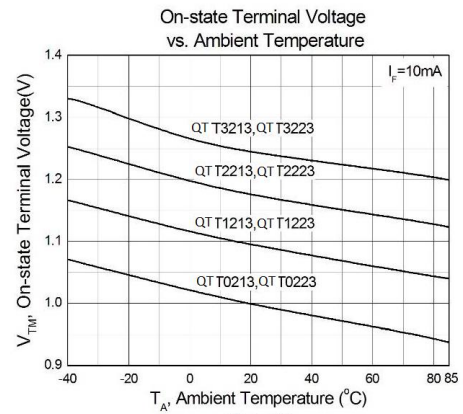


Figure 2

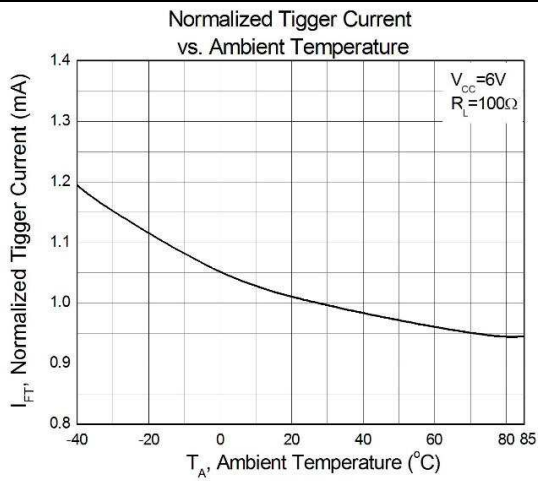


Figure 3

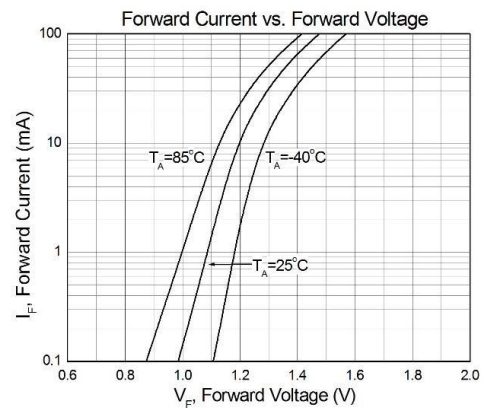


Figure 4

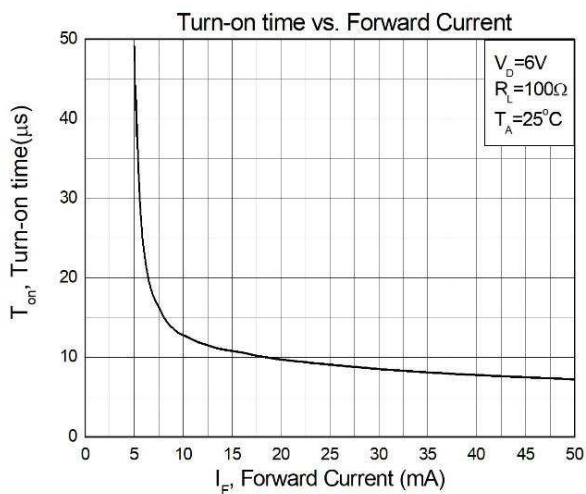


Figure 5

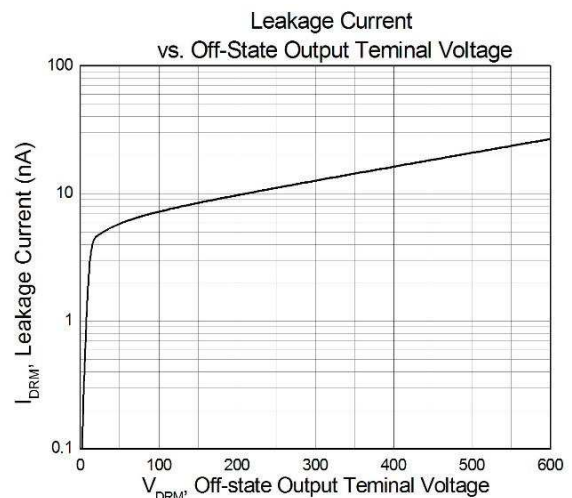
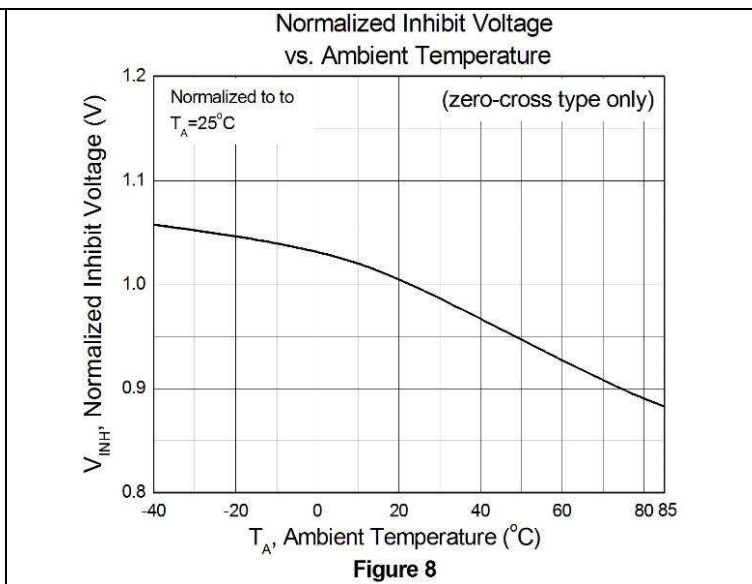
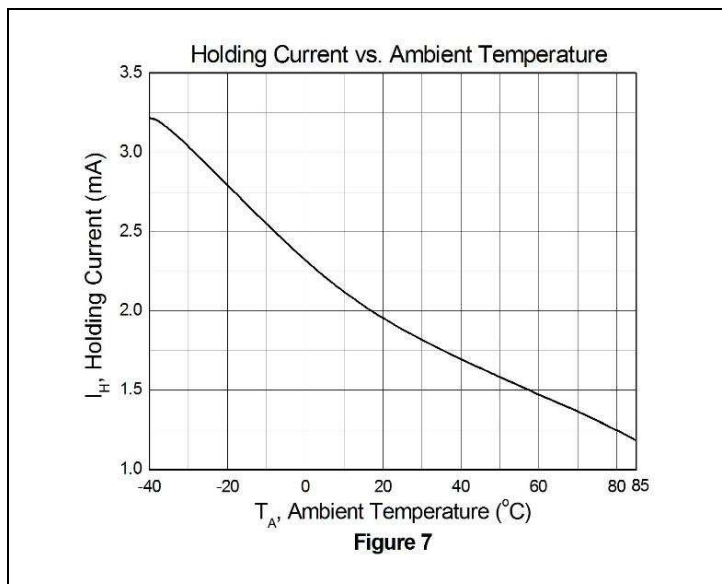
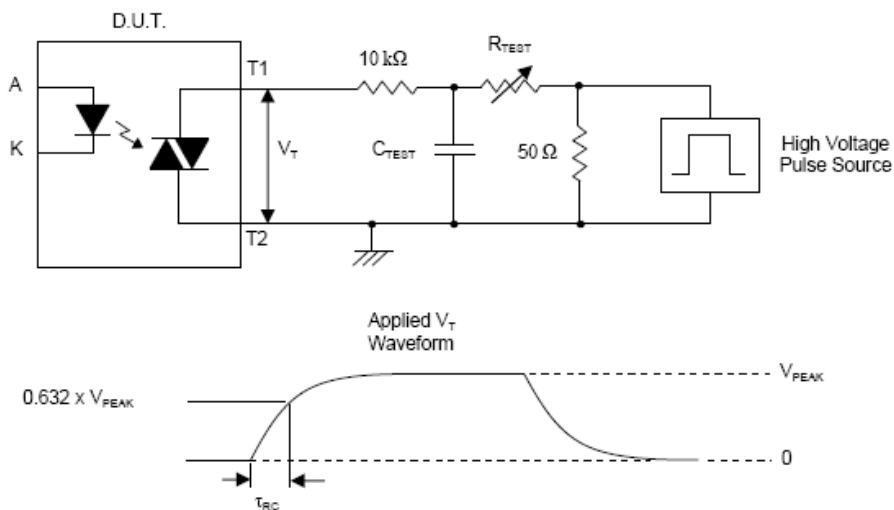


Figure 6



Test Circuit for static dv/dt

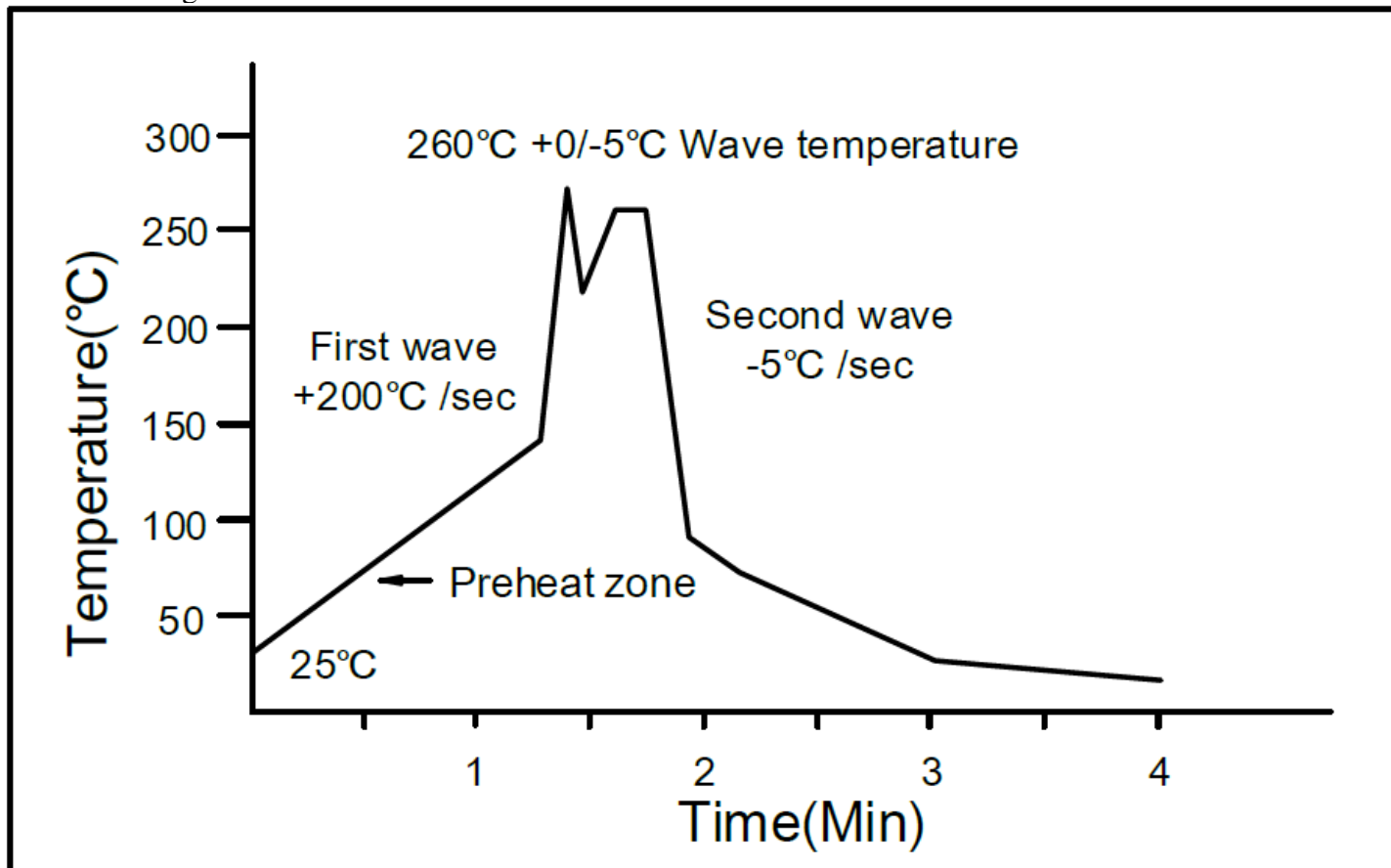


The high voltage pulse is set to the required V_{PEAK} value and applied to the D.U.T. output side through the RC circuit above. LED current is not applied. The waveform V_T is monitored using a x100 scope probe. By varying R_{TEST} , the dv/dt (slope) is increased, until the D.U.T. is observed to trigger (waveform collapses). The dv/dt is then decreased until the D.U.T. stops triggering. At this point, τ_{RC} is recorded and the dv/dt calculated.

$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

Solder Profile & Footprint

Wave soldering



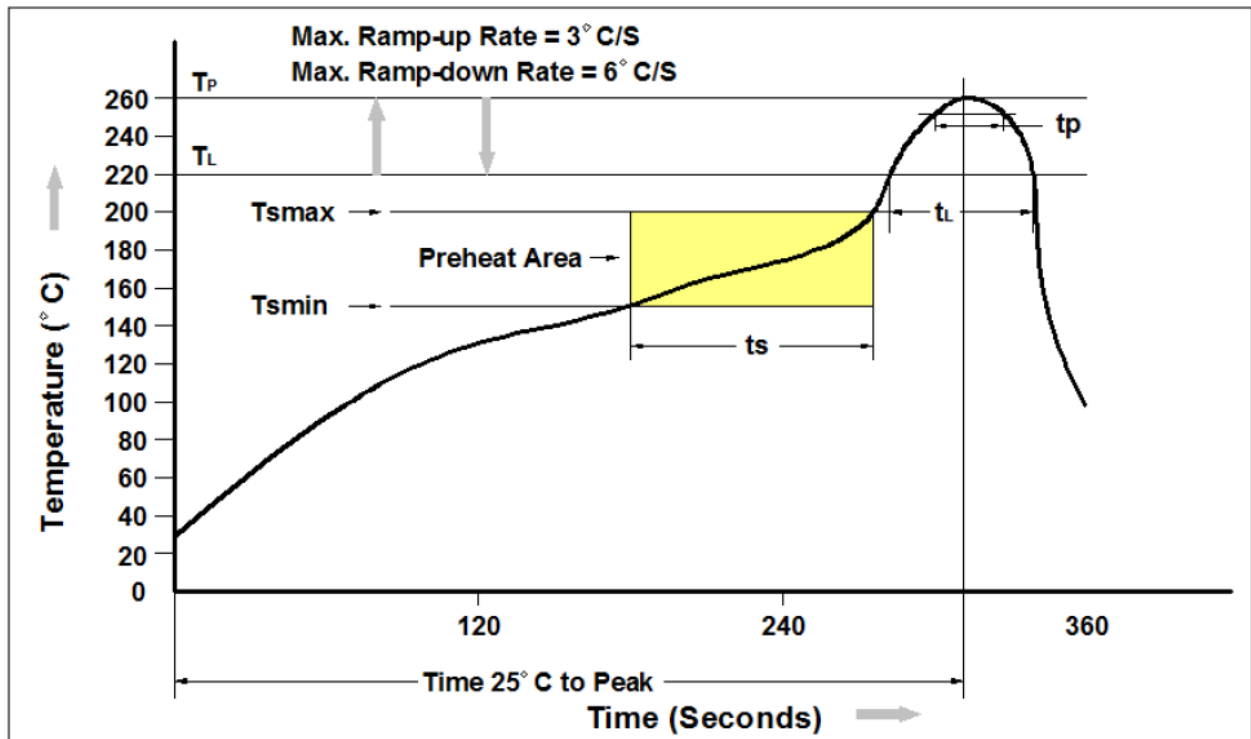
Temperature: 260 +0/-5 °C

Time: 10 Sec

Preheat temperature: 25 to 140 °C

Preheat time: 30 to 80 sec.

Reflow soldering



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150 °C
Temperature Max. (T _{smax})	200 °C
Time (t _s) from (T _{smin} to T _{smax})	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.



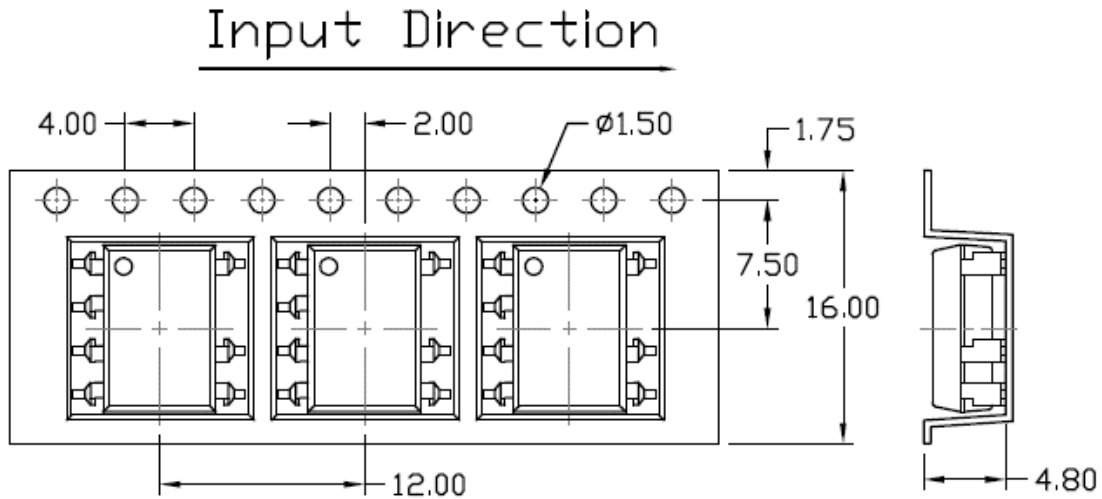
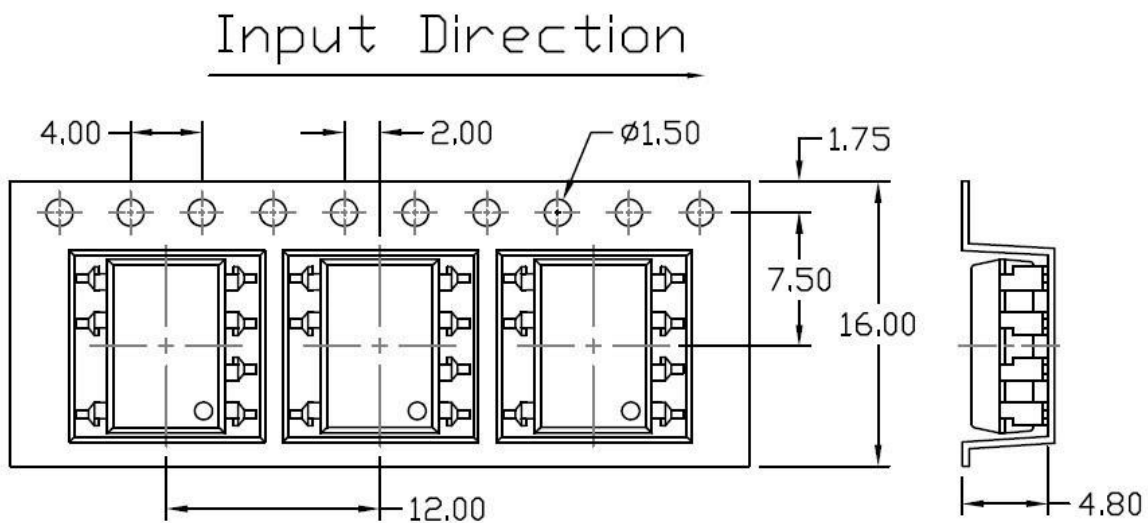
Recommended Solder Footprint for SMD Leadform

Units: mm

tolerance: +/- 0.1mm

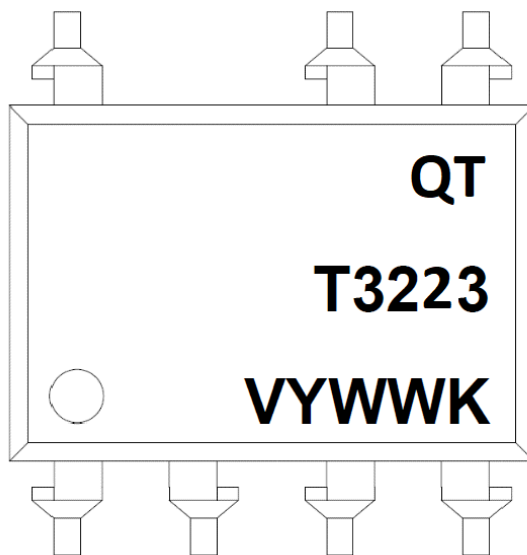
Packing & Labeling

Tape Dimension:

Option S(T1) & SL(T1)**Option S(T2) & SL(T2)**

Unit: mm

Device Marking:



QT = QT-Brightek Corporation
 T3223 = part number
 Y = Year
 WW = Week
 V = VDE Option
 K= Manufacturing code

Ordering Information

QTTX223 (V)(Y)(Z)
 TX223 = Part number (X=0, 1, 2, or 3)
 V = VDE option (V or None)
 Y = Lead form option (S, SL, M or none)
 Z = Tape and reel option (T1 or T2 or none)

Option	Description	Quantity
None	Standard 8-Pin DIP	40 Units/Tube
M	Gullwing	40 Units/Tube
S(T1)	Surface Mount Lead Forming – with Option 1 Taping	1000 pcs/ reel
S(T2)	Surface Mount Lead Forming – with Option 2 Taping	1000 pcs/ reel
SL(T1)	SMD (Low Profile) Lead Forming – with Option 1 Taping	1000 pcs/ reel
SL(T2)	SMD (Low Profile) Lead Forming – with Option 2 Taping	1000 pcs/ reel



Revision History

Description:	Revision #	Revision Date
Initial of QTTX223 series	1.0	02/02/2018

Disclaimer

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2. A critical component in 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.

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