

QT-Brightek Optocoupler Series

RANDOM-PHASE TRIAC OPTOCOUPLER

Part No.: Q305X Series



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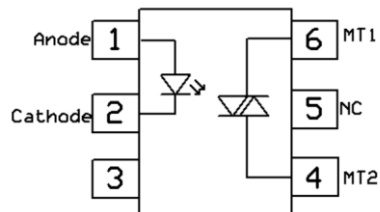
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Introduction

Feature:

- High isolation voltage between input and output (Viso=5000Vrms)
- Peak breakdown voltage: 600V
- Operating Temperature up to 100 °C
- Available in Tube or Tape and reel
- Available with standard DIP-6, Gullwing lead bend, SMD lead bend and SMD low profile

Schematic:

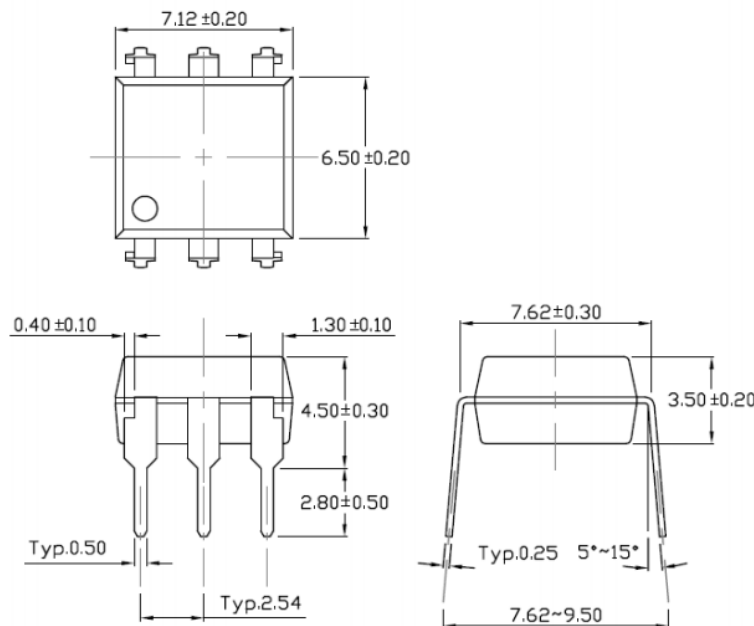


Certification & Compliance:

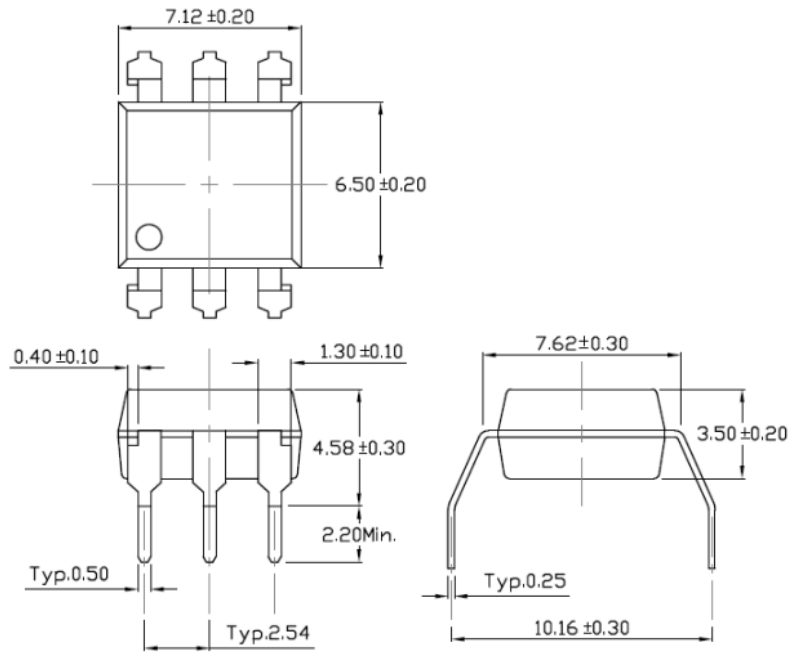
- Pb free and RoHS Compliant
- UL recognized (File # E338132)
- VDE recognized (File # 40030457)



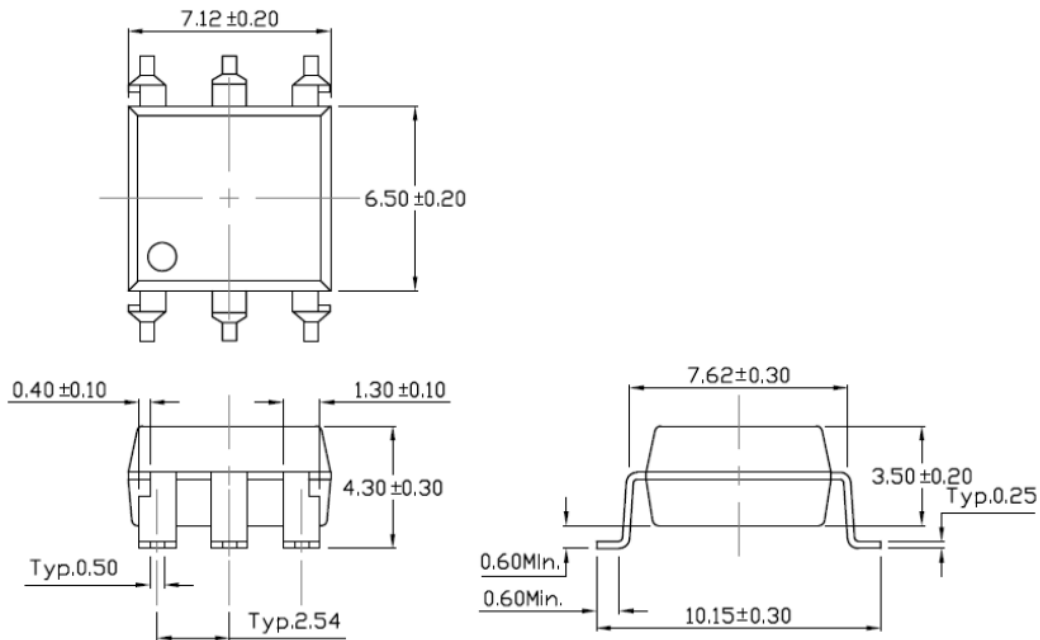
Dimension: (Dot location indicates pin 1) 6-Pin Dip (standard):



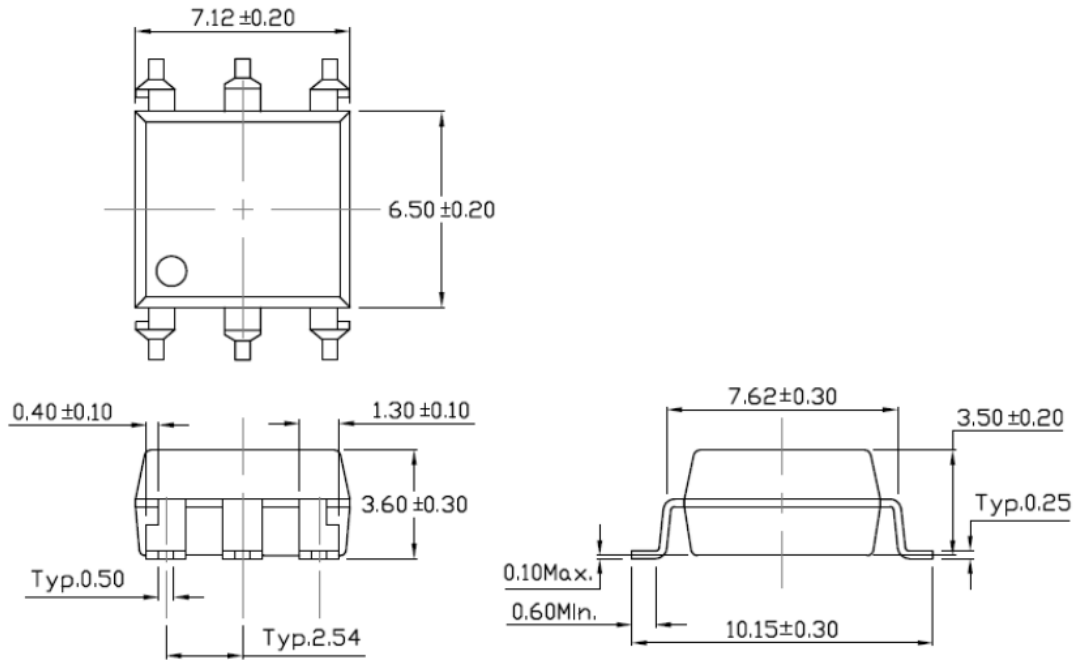
Wide lead bend (Option M):



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_{OPR}	Operating Temperature	-55 ~ +100	°C
T_{STG}	Storage Temperature	-55 ~ +150	°C
T_{SOL}	Lead Solder Temperature	260 for 10 sec	°C
EMITTER			
I_F	Continuous Forward Current	60	mA
I_{FP}	Peak Forward Current ($\leq 1\mu s$, P.W, 300pps)	1	A
V_R	Reverse Voltage	6	V
P_D	Power Dissipation	100	mW
DETECTOR			
P_D	Power Dissipation	300	mW
V_{DRM}	Off-state Output Terminal Voltage	600	V
I_{TSM}	Peak Repetitive Surge Current	1	A

Electrical Characteristic ($T_A=25^\circ C$)

Emitter

Symbol	Characteristic	Test Condition	Range			Unit
			Min.	Typ.	Max.	
V_F	Forward Voltage	$I_F=10mA$	-	-	1.5	V
I_R	Reverse Current	$V_R=6V$	-	-	5	μA
C_{IN}	Input Capacitance	$f=1MHz$	-	45	-	pF

Detector

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
I_{DRM}	Peak Blocking Current	$V_{DRM}=\text{Rated } V_{DRM}, I_F=0mA$	-	-	100	nA
V_{TM}	Peak On-state Voltage	$I_{TM}=100mA, I_F=\text{Rated } I_{FT}$	-	-	2.5	V
dv/dt	Critical Rate of Rise Off-State Voltage	$V_{PEAK}=600V$	1000	-	-	V/ μs

Transfer Characteristic

Symbol	Characteristic	Device	Test Condition	Range			Unit
				Min	Typ	Max	
I_{FT}	LED Trigger Current	Q3051	Main terminal voltage = 3V, $I_{TM}=100mA$	-	-	15	mA
		Q3052		-	-	10	
		Q3053		-	-	5	
I_H	Holding Current			-	250	-	μA
R_{IO}	Isolation Resistance		$V_{IO}=500V_{DC}$	1×10^{11}	-	-	Ω
C_{IO}	Isolation Capacitance		f=1MHz	-	0.25	-	pF

Characteristic Curves

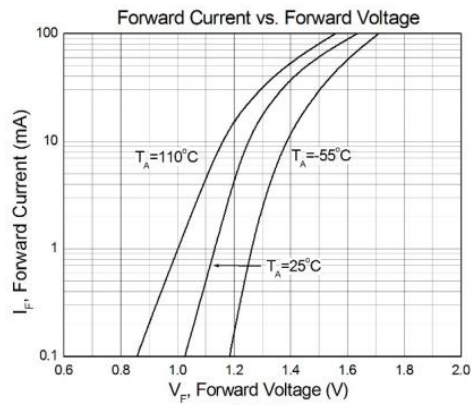


Figure 1

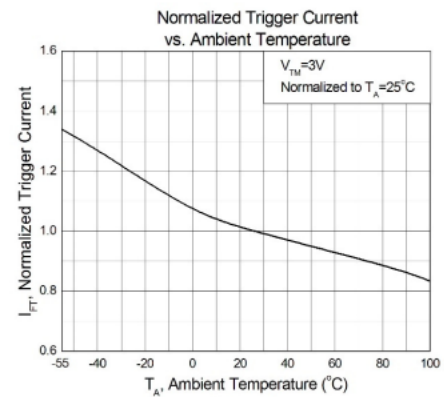


Figure 2

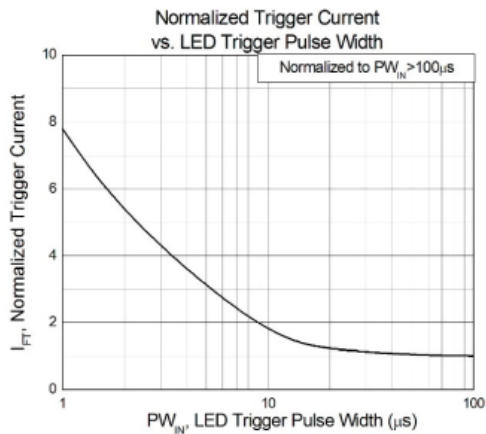


Figure 3

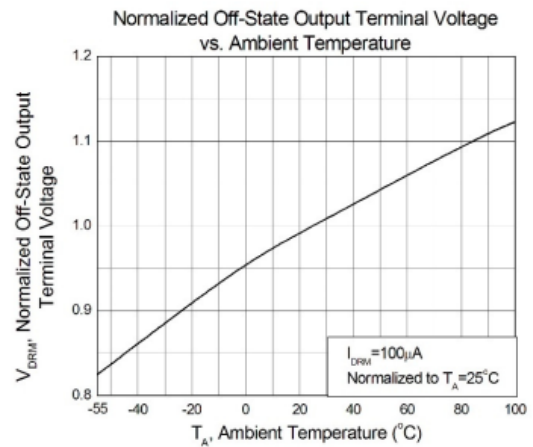


Figure 4

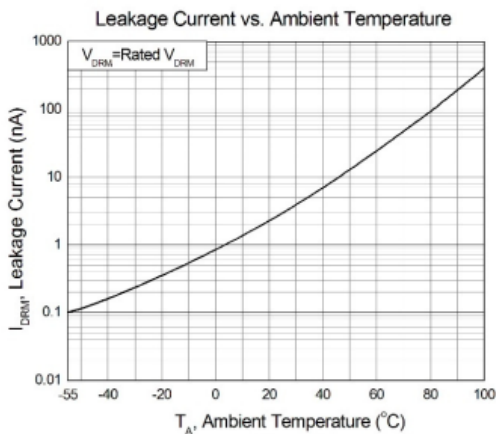


Figure 5

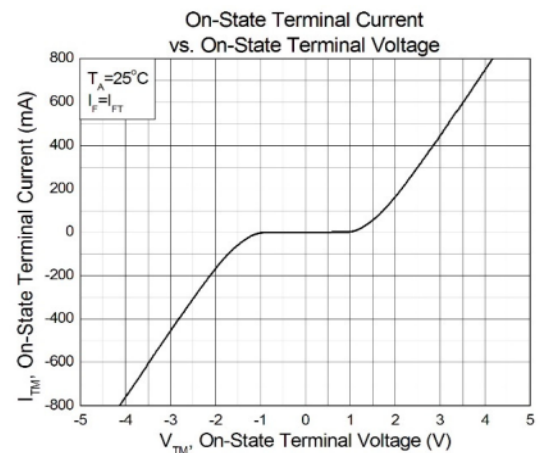
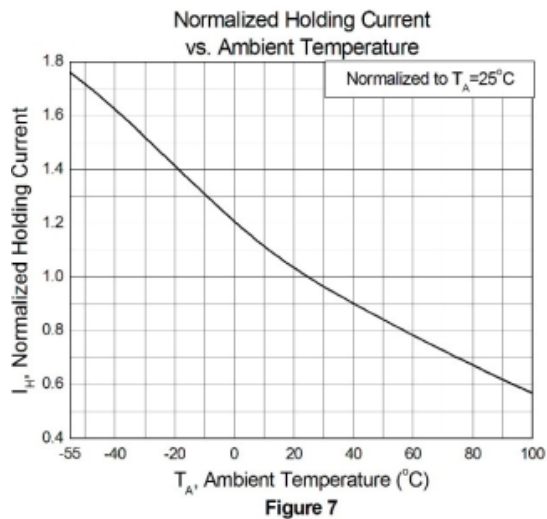
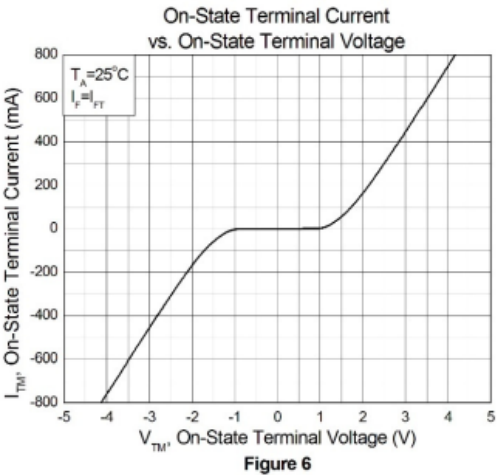
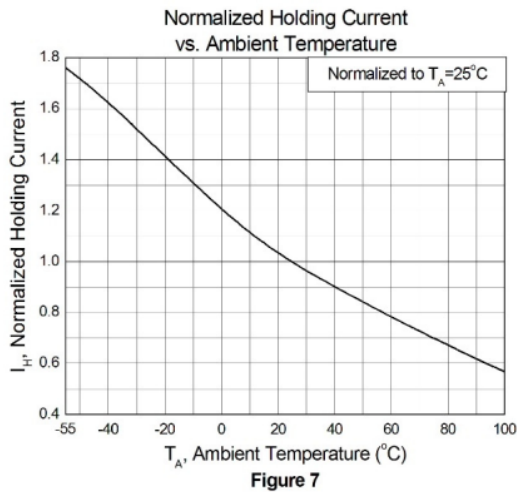
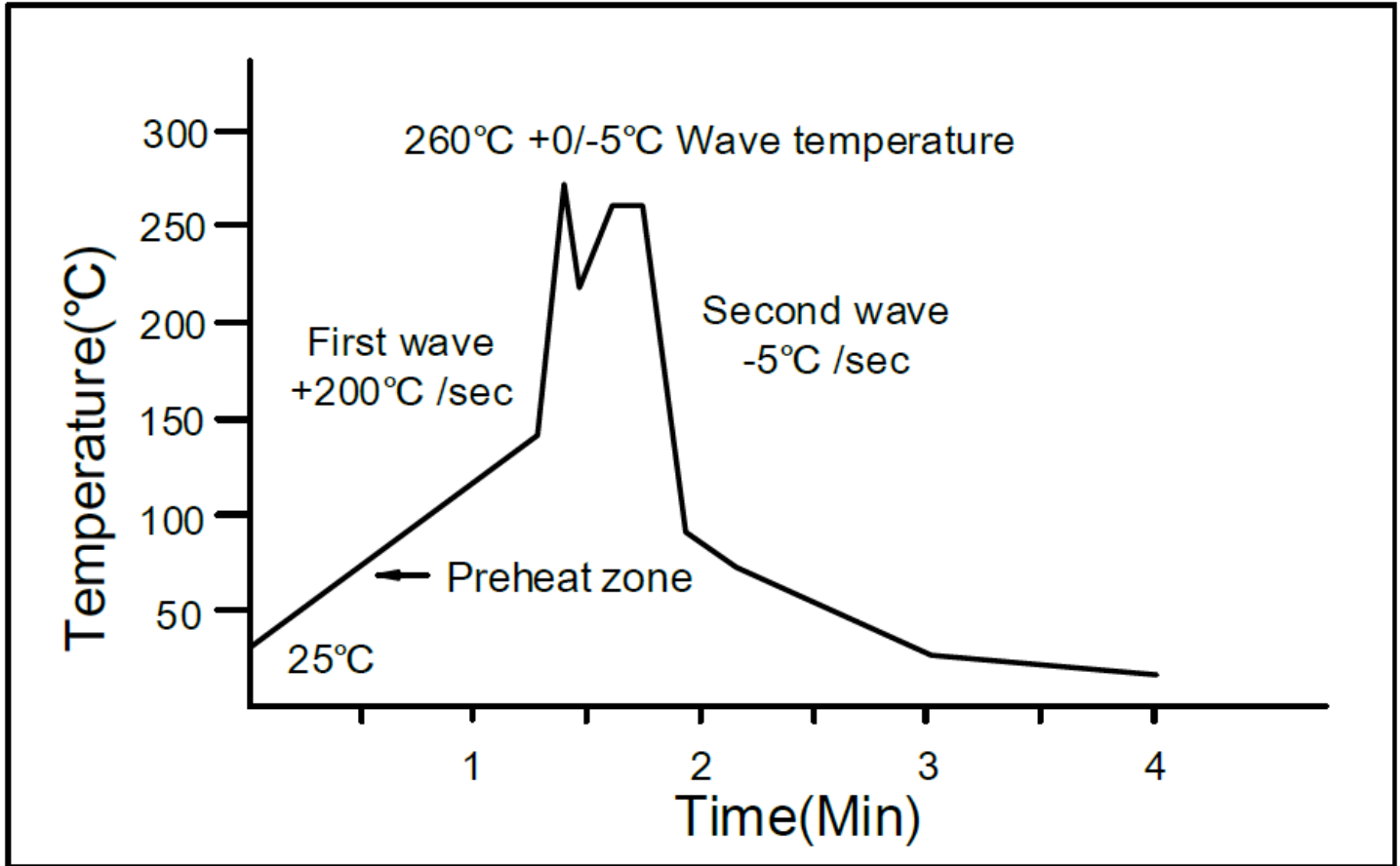


Figure 6



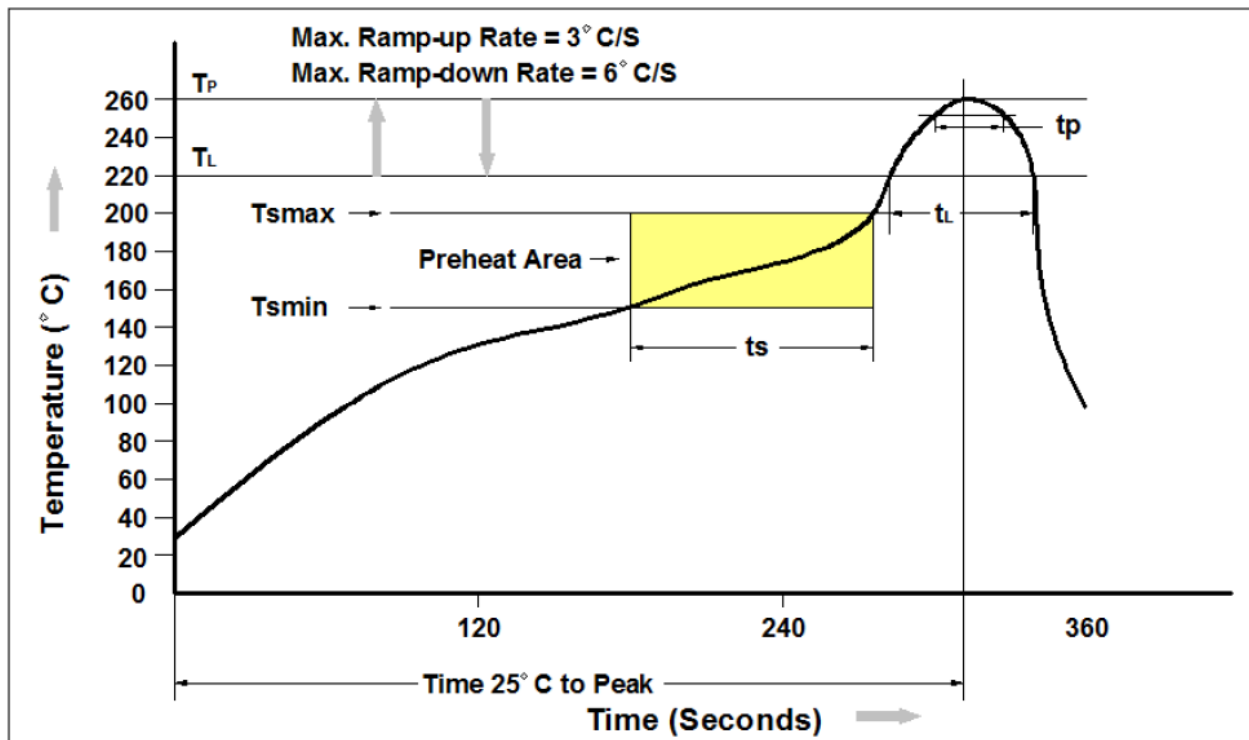
Solder Profile & Footprint

Recommended Wave Soldering Profile



Temperature: 260 +0/-5 °C
 Time: 10 Sec
 Preheat temperature: 25 to 140 °C
 Preheat time: 30 to 80 sec.

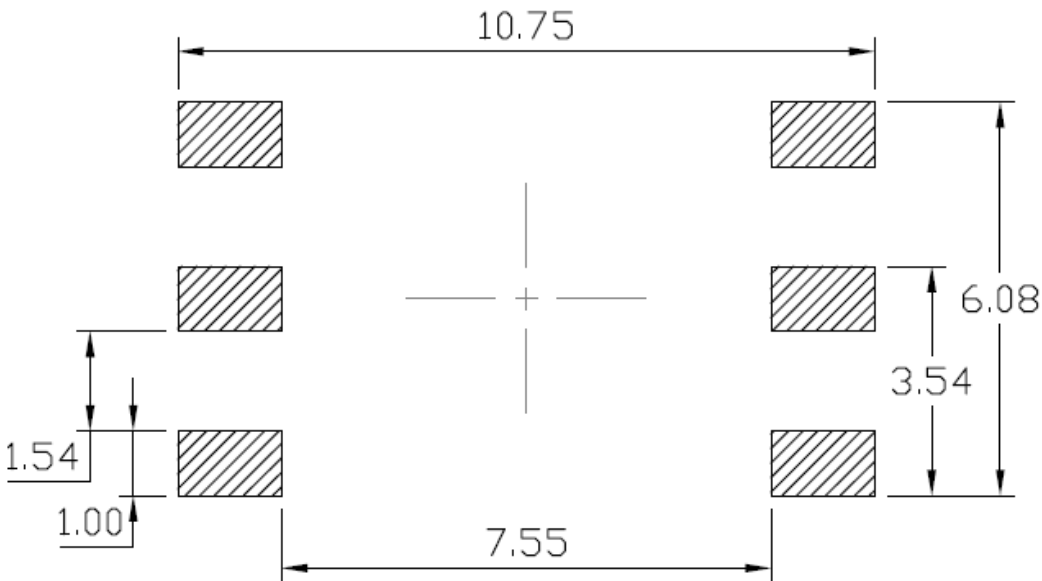
Recommended Reflow Soldering Profile



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.

Solder Profile & Footprint

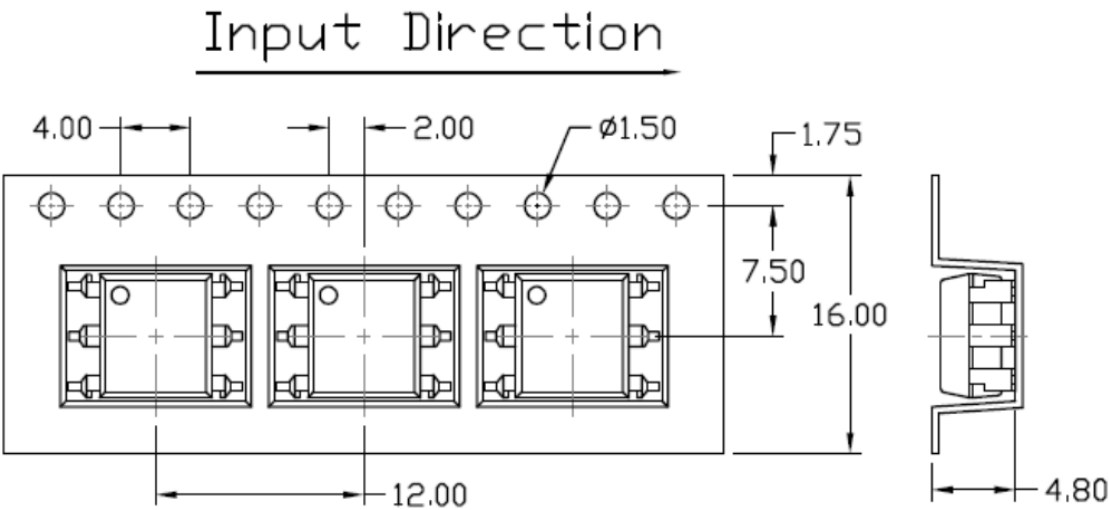
Recommended Solder Pattern for SMD



Units: mm

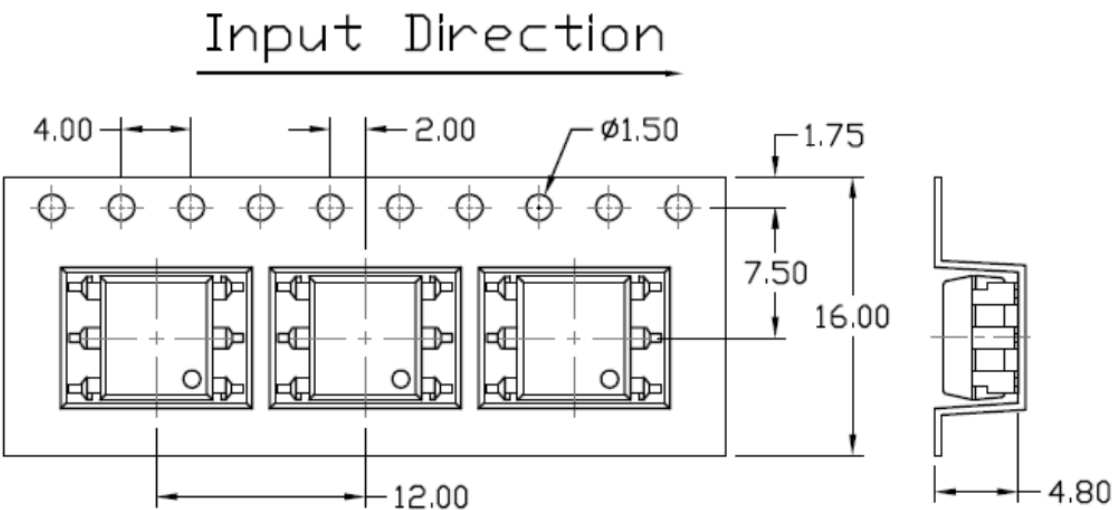
Packing & Labeling

Option 1: ST1 & SLT1



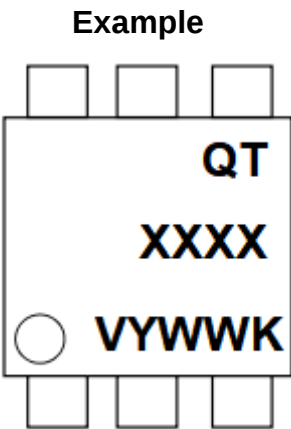
Unit: mm

Option 2: ST2 & SLT2



Unit: mm

Device Marking



QT = QT-Brightek Corporation
XXXX = Part Number (3051, 3052, 3053)
V = VDE Option
Y = Year
WW = Week
K = Manufacturing code

Ordering Information

Q305XVYZ

X = Part number (X=1, 2, 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 6-Pin DIP	50 units/tube
M	Gullwing Lead Bend	50 units/tube
ST1	Surface Mount Lead Forming – with Option 1 Taping	1000 pcs/ reel
ST2	Surface Mount Lead Forming – with Option 2 Taping	1000 pcs/ reel
SLT1	SMD (Low Profile) Lead Forming – with Option 1 Taping	1000 pcs/ reel
SLT2	SMD (Low Profile) Lead Forming – with Option 2 Taping	1000 pcs/ reel



Revision History

Description:	Revision #	Revision Date
Initial of Q301X /Q302X/Q305X series	1.0	4/22/2010
Feature, Certification & Compliance, and ordering information updates	1.1	02/01/2011
Update format and packing spec	1.2	02/19/2014
Update specs, format, and packing method, and part number	2.0	03/16/2018

Disclaimer

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
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.