

QT-Brightek Optocoupler Series

4-PIN AC Input Optocoupler

Part No.: Q814 Series

Product: Q814 Series	Date: July 13, 2018	Page 1 of 18
	Version# 2.0	

Table of Contents:

Introduction	3
Absolute Maximum Rating	6
Electrical Characteristic ($T_A=25\text{ }^\circ\text{C}$).....	7
DC Transfer Characteristic.....	7
AC Characteristic	7
Characteristic Curves.....	8
Solder Profile & Footprint.....	10
Packing & Labeling	13
Device Marking	16
Ordering Information	17
Revision History	18
Disclaimer	18

Introduction

Feature:

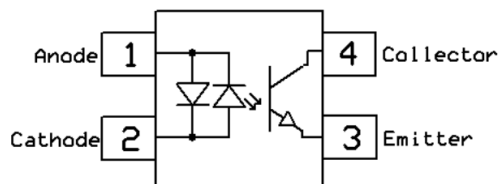
- High isolation voltage between input and output (Viso=5000V rms)
- External creepage distance $\geq 7.5\text{mm}$ (S/SL Type)
- External creepage distance $\geq 8.0\text{mm}$ (SLM Type)
- Operating Temperature up to $110\text{ }^\circ\text{C}$
- Available in Tube or Tape and reel
- Available with standard DIP-4, Gullwing lead bend, SMD lead bend, SMD low profile and SMD Gullwing options.

Certification & Compliance:

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

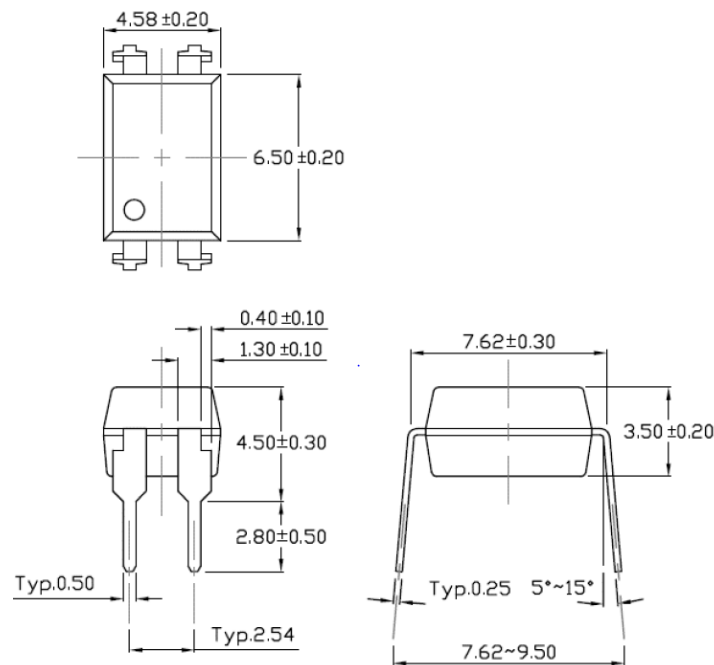


Schematic:

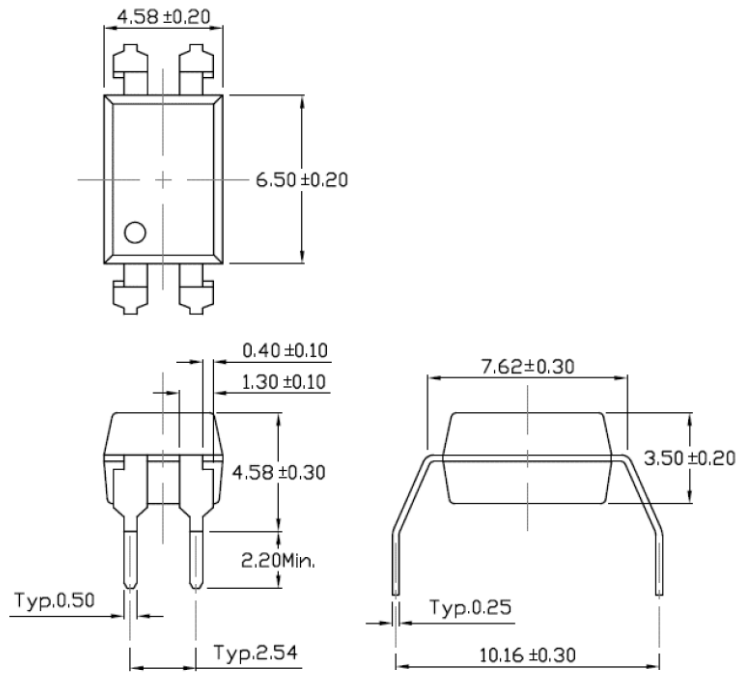


Dimension: (Dot location indicates pin 1)

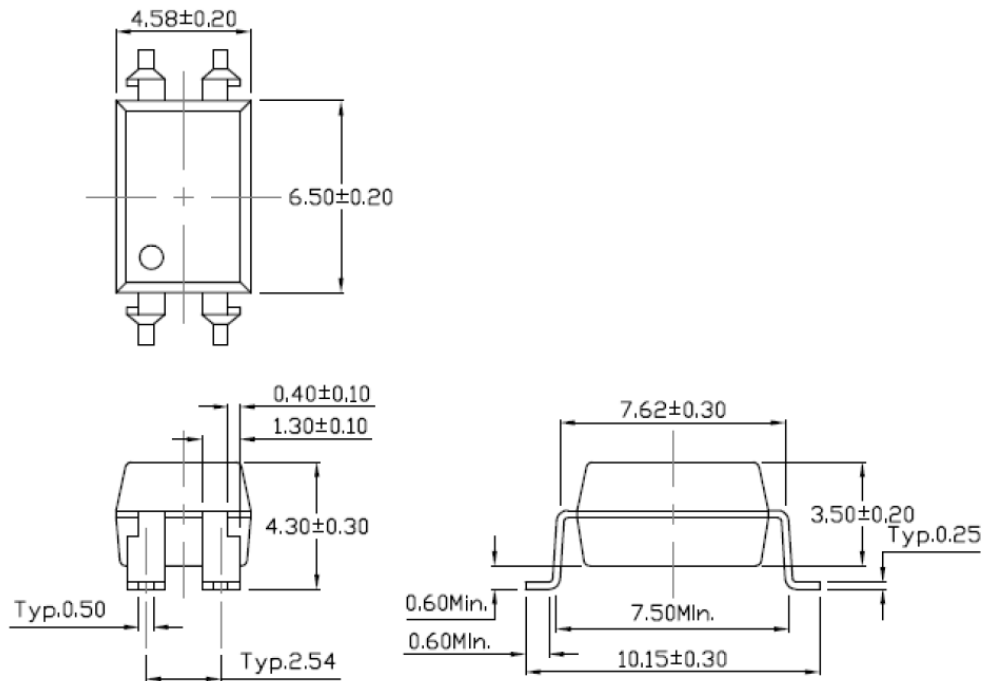
4-Pin DIP Through Hole (Standard):



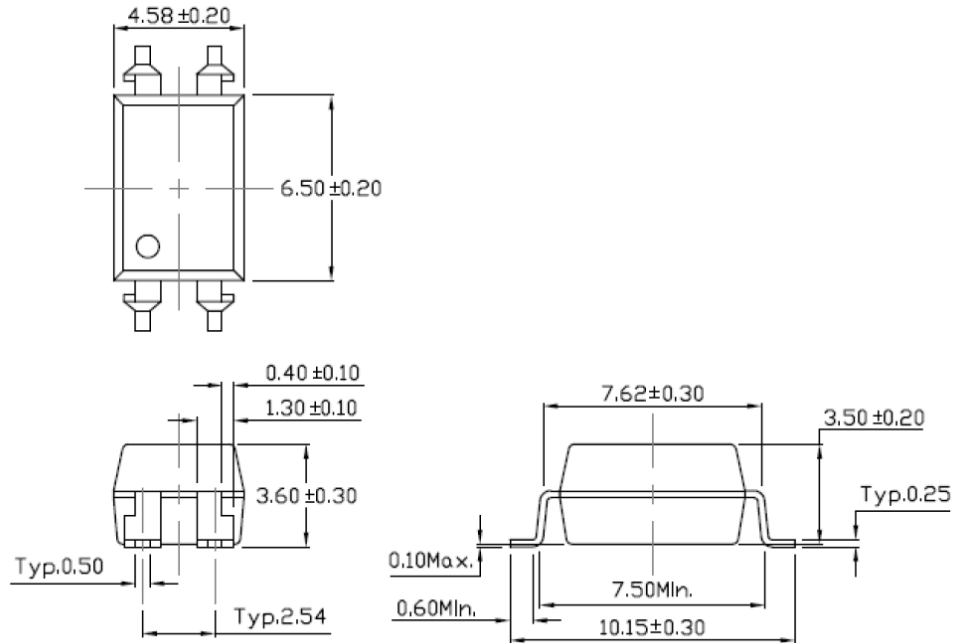
Gullwing (400mil) Lead Bend Through Hole (Option M):



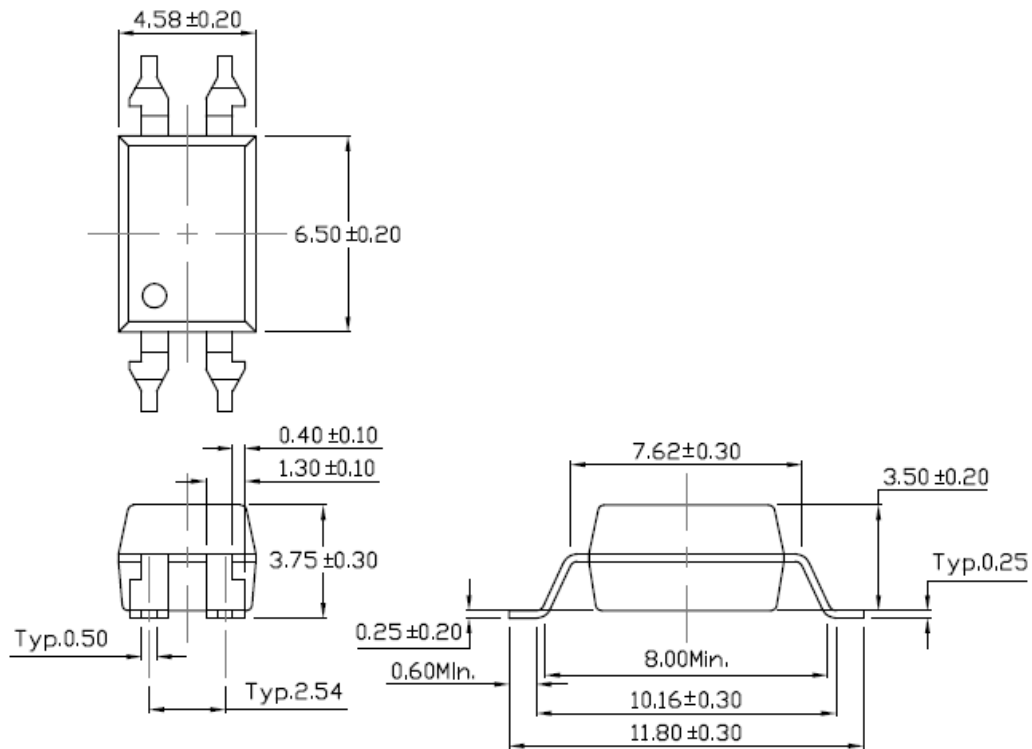
SMD Lead Bend (Option S):



SMD (Low Profile) Bend (Option SL):



SMD (Gullwing) Bend (Option SLM):



All Dimensions are in mm

Absolute Maximum Rating

Symbol	Parameter	Rating	Units
V _{ISO}	Isolation Voltage	5000	V _{RMS}
T _{STG}	Storage Temperature	-55 ~ +150	°C
T _{OPR}	Operating Temperature	-55 ~ +110	°C
T _{SOL}	Lead Solder Temperature	260 for 10 sec	°C
P _{TOT}	Total Power Dissipation	200	mW
EMITTER			
I _F	Continuous Forward Current	±60	mA
I _{FP}	Peak Forward Current (≤1us, P.W, 300pps)	1	A
P _D	Power Dissipation	100	mW
DETECTOR			
B _{VCEO}	Collector–Emitter Voltage	80	V
B _{VECO}	Emitter-Collector Voltage	6	V
I _C	Continuous Collector Current	50	mA
P _D	Detector Power Dissipation	150	mW

Electrical Characteristic (T_A=25 °C)

Emitter

Symbol	Characteristic	Device	Test Condition	Range			Unit
				Min	Typ	Max	
V _F	Forward Voltage	Q814	I _F = ±10mA	-	1.24	1.4	V
C _{IN}	Input Capacitance		f=1MHz	-	30	-	pF

Detector

Symbol	Characteristic	Device	Test Condition	Range			Unit
				Min	Typ	Max	
I _{CEO}	Collector-Emitter Dark current	Q814	V _{CE} = 20V, I _F = 0mA	-	-	100	nA
B _{VCEO}	Collector-Emitter Breakdown Voltage		I _C = 100 μA	80	-	-	V
B _{VECO}	Emitter-Collector Breakdown voltage		I _E = 100 μA	6	-	-	V

DC Transfer Characteristic

Symbol	Characteristic	Device	Bin	Test Condition	Range			Unit
					Min	Typ	Max	
CTR	Current Transfer Ratio	Q814	-	I _F = ±1mA, V _{CE} = 5V	20	-	300	%
			A		50	-	150	
			B		100	-	300	
	CTR Symmetry			I _F = ±1mA, V _{CE} = 5V	0.7	-	1.3	
V _{CE(SAT)}	Collector-Emitter Saturation Voltage			I _F = ±20mA, I _C = 1mA	-	0.04	0.2	V
R _{IO}	Isolation Resistance			V _{IO} = 500V _{DC}	5X10 ¹⁰	-	-	Ω
C _{IO}	Isolation Capacitance			f = 1MHz	-	0.5	1	pF

AC Characteristic

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
t _r	Rise Time	V _{CE} = 2V, I _C = 2mA, R _L = 100Ω	-	6	-	μs
t _f	Fall Time		-	8	-	

Characteristic Curves

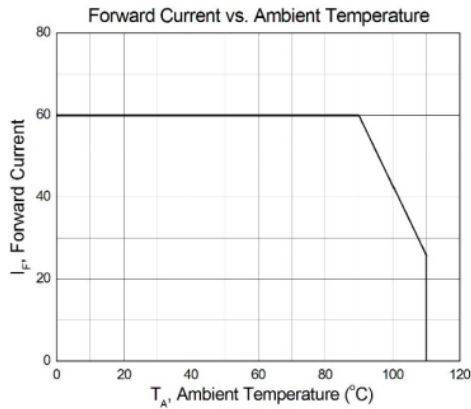


Figure 1

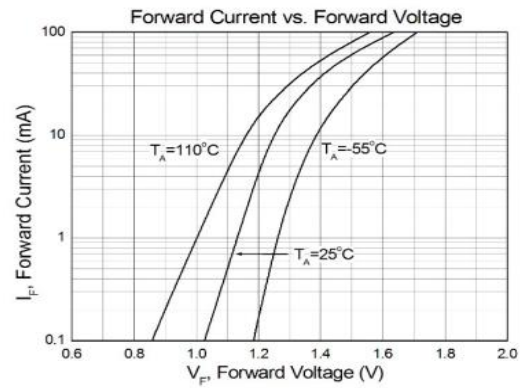


Figure 2

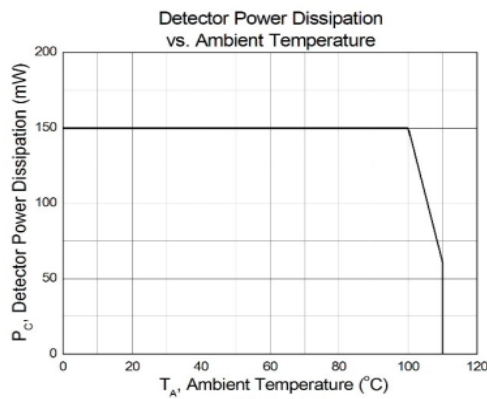


Figure 3

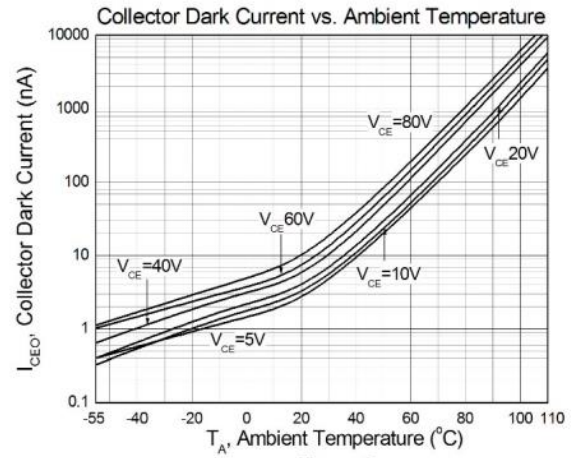


Figure 4

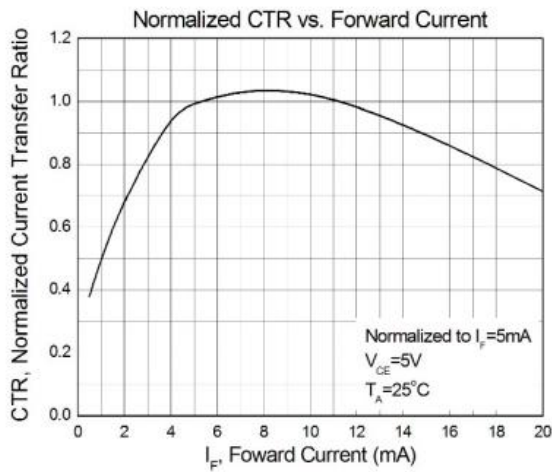


Figure 5

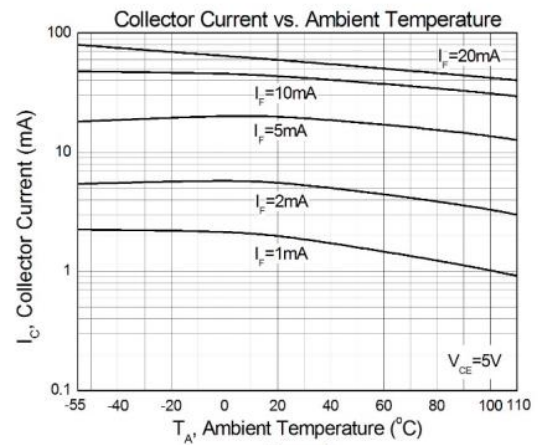


Figure 6

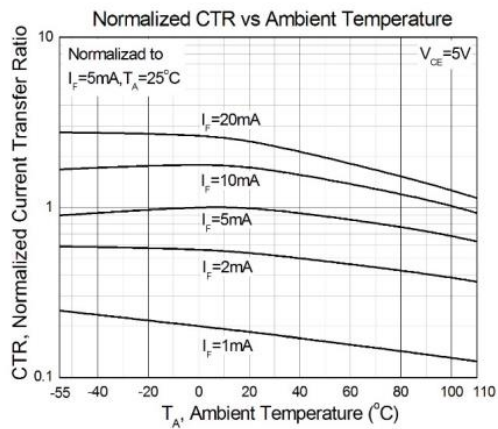


Figure 7

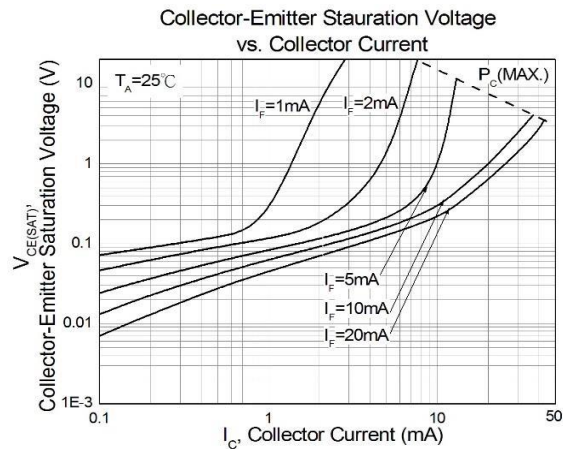


Figure 8

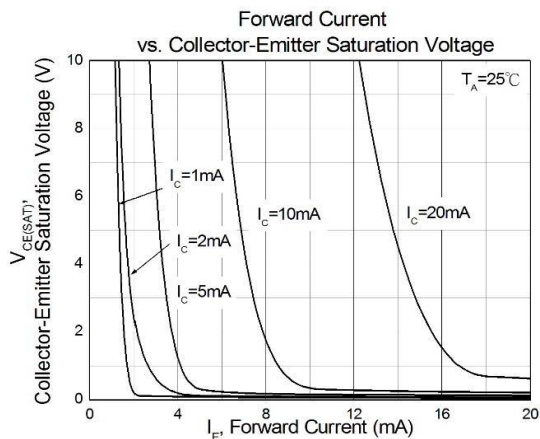


Figure 9

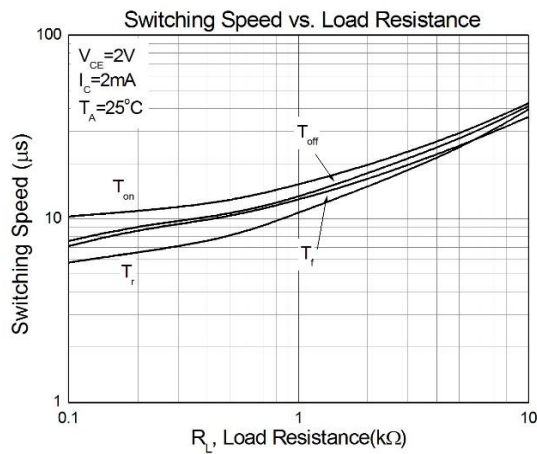


Figure 10

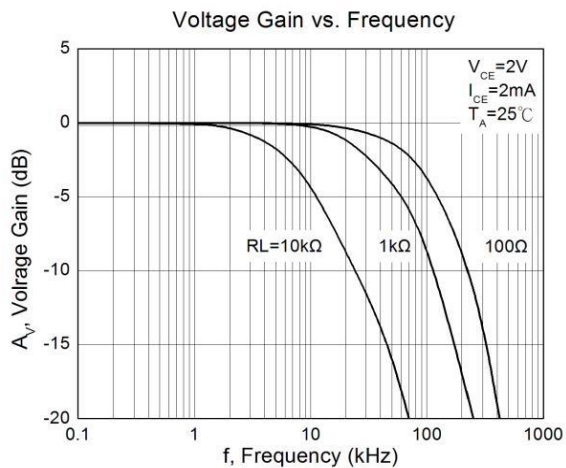
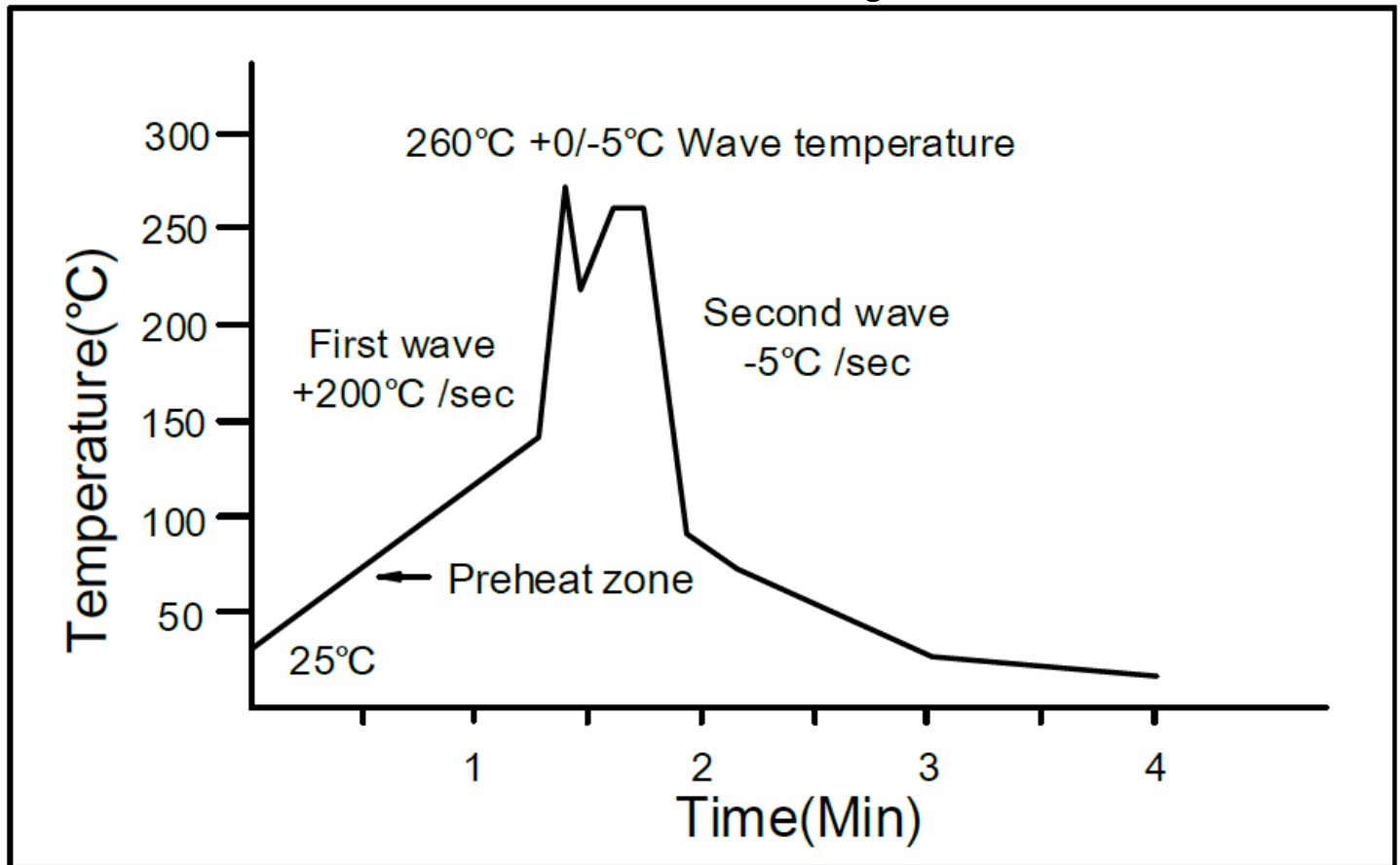


Figure 11

Solder Profile & Footprint**Recommended Wave Soldering Profile**

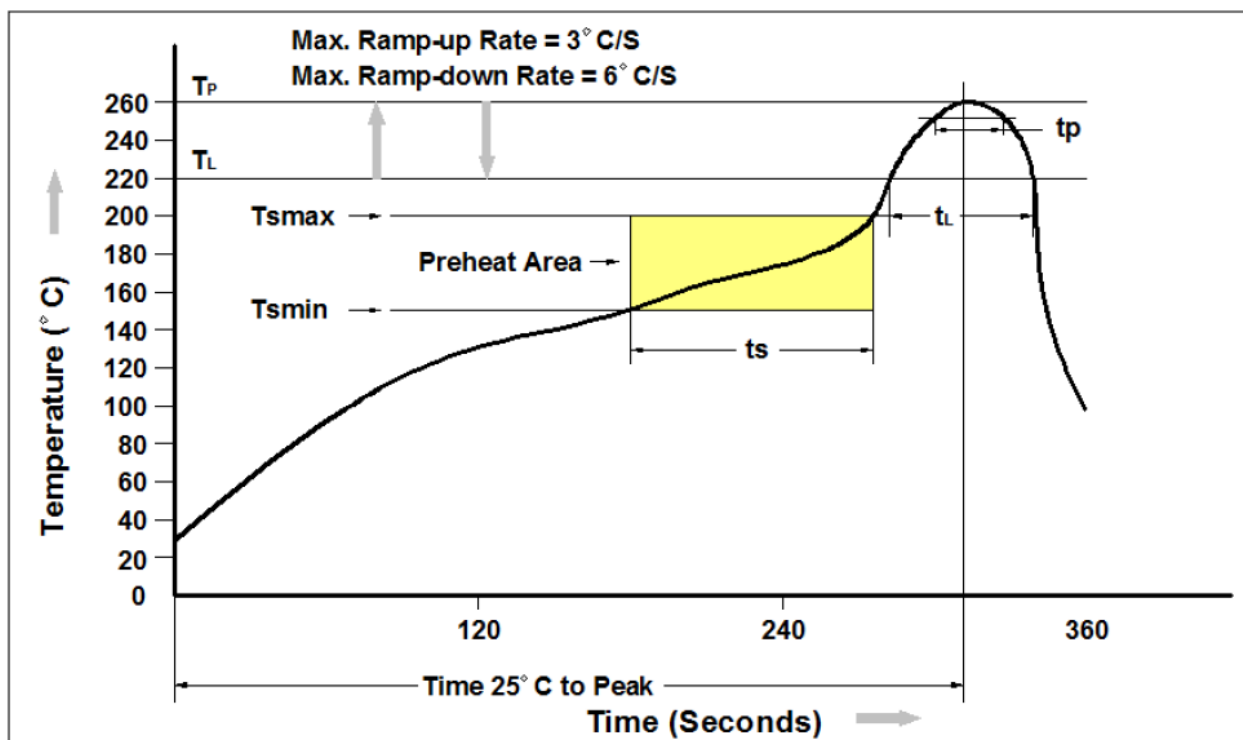
Temperature: 260 +0/-5 °C

Time: 10 Sec

Preheat temperature: 25 to 140 °C

Preheat time: 30 to 80 sec.

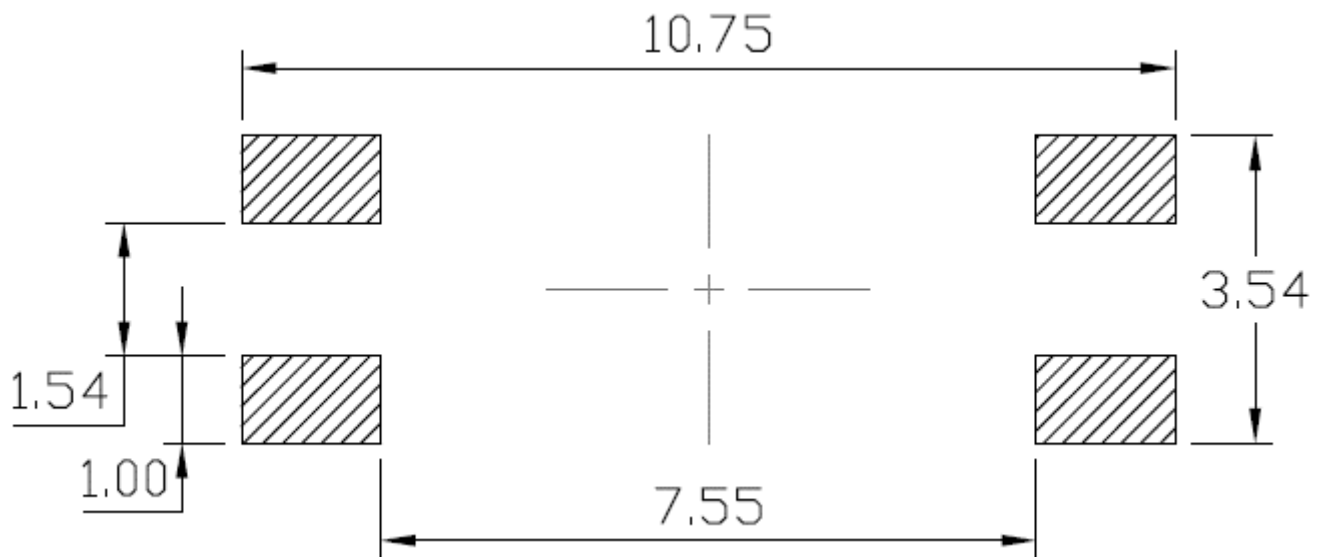
Recommended Reflow Soldering Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T Amin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (T Amin 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.

SMD Lead Bend (Option S) & SMD Low Profile Bend (Option SL):

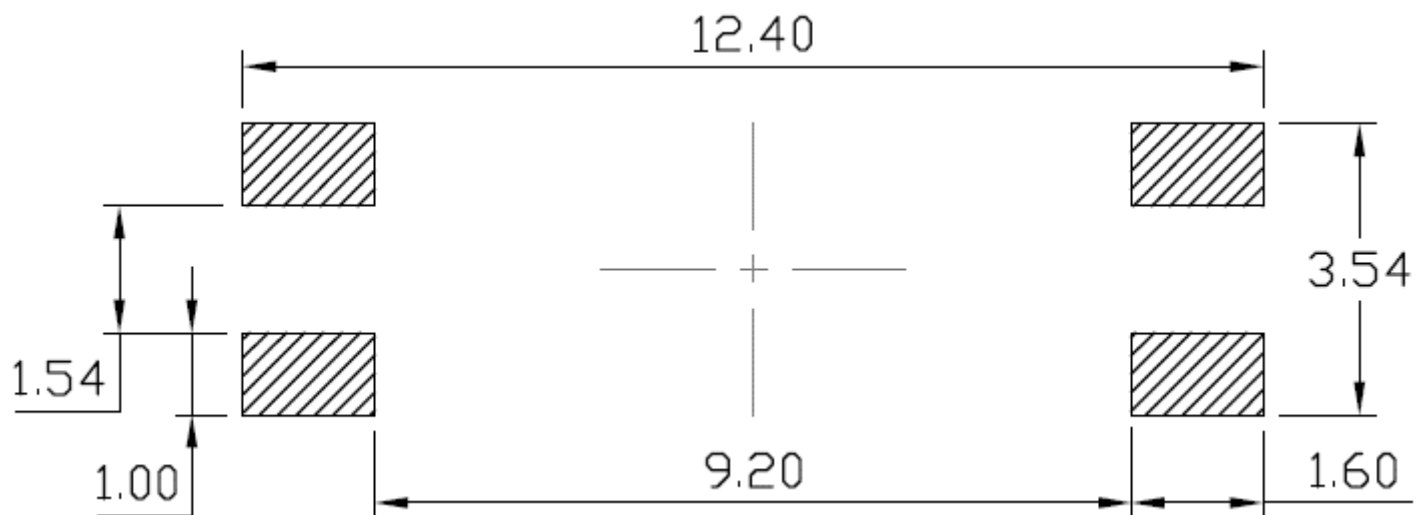
Recommended Solder Footprint for SMD



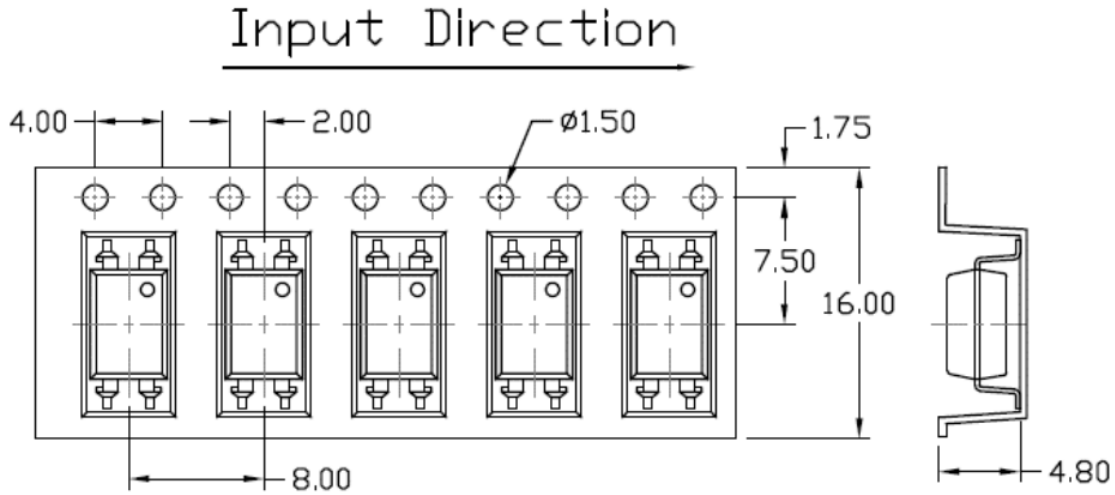
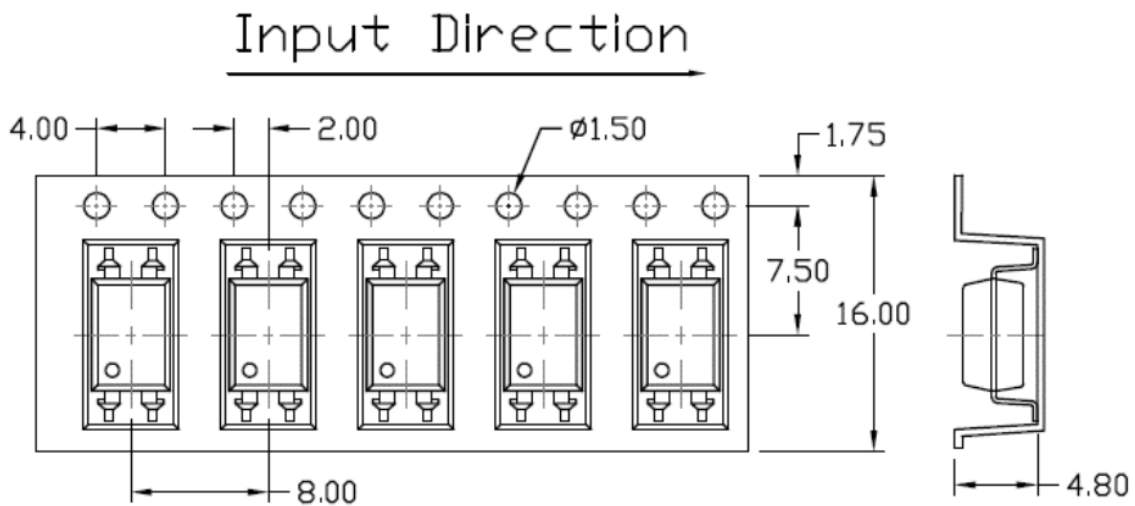
Units: mm

SMD (Gullwing) Bend (Option SLM):

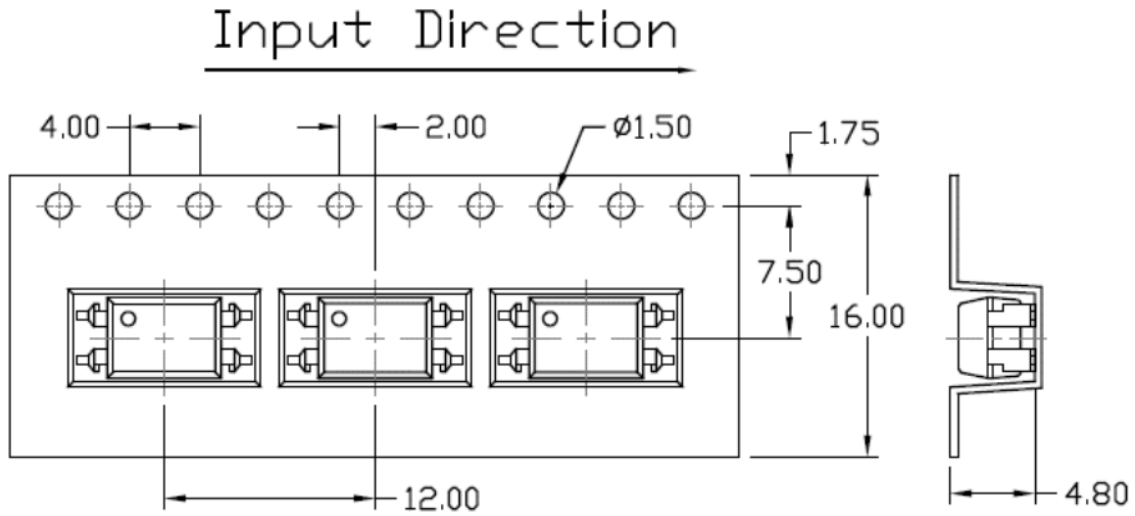
Recommended Solder Footprint for SMD



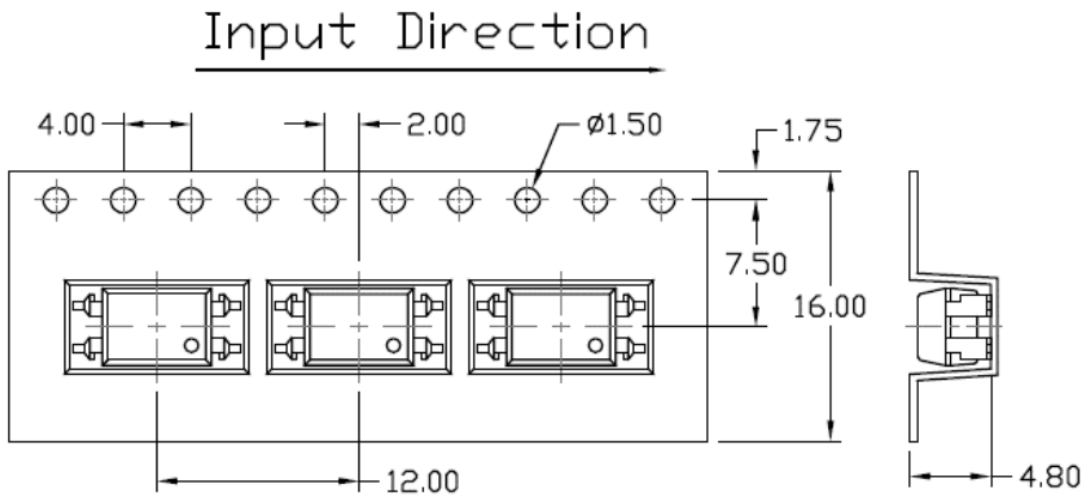
Units: mm

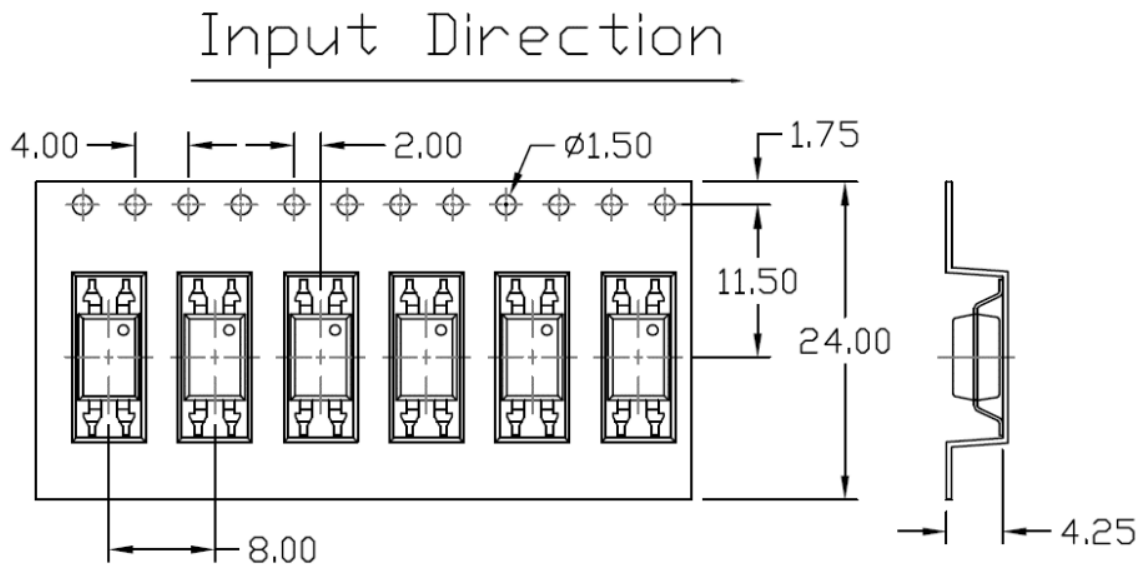
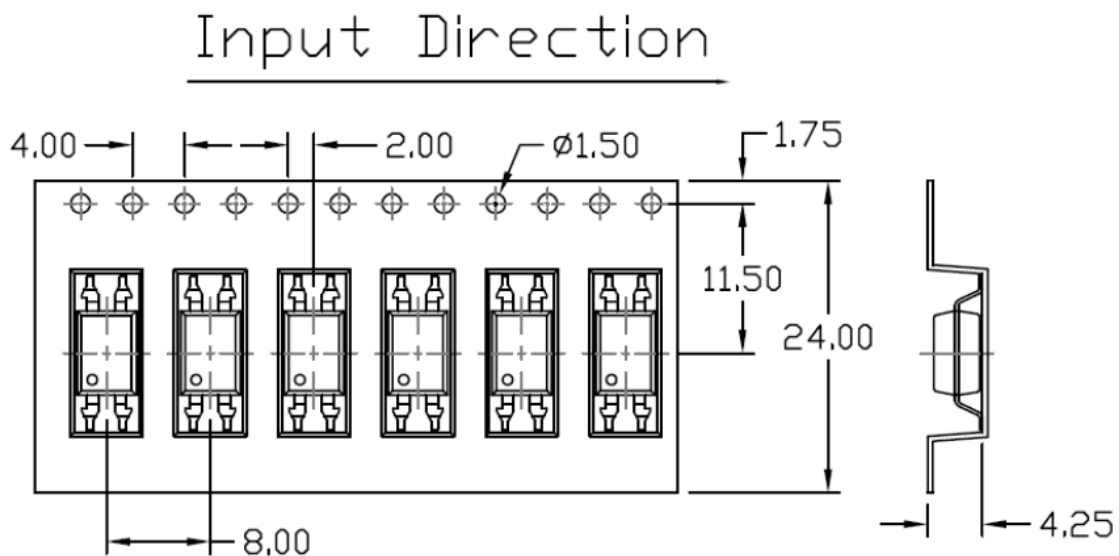
Packing & Labeling**ST & SLT Options****Option 1: ST1 & SLT1****Option 2: ST2 & SLT2**

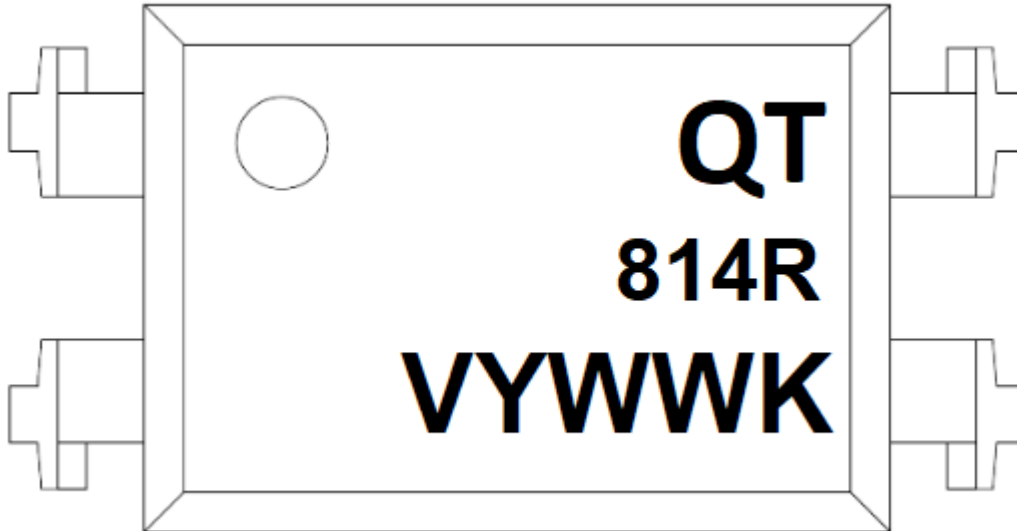
Option 3: ST3 & SLT3



Option 4: ST4 & SLT4



SLM Option**Option 1: SLMT1****Option 2: SLMT2**

Device Marking**Example**

QT = QT-Brightek Corporation

814 = Part Number

R = CTR Rank

V = VDE Option

Y = Year

WW = Week

K = Manufacturing code

Product: Q814 Series	Date: July 13, 2018	Page 16 of 18
	Version# 2.0	

Ordering Information

Q814XVYZ

X = Part number (X=A, B or None)

V = VDE option (V or None)

Y = Lead form option (S, SL, M, SLM or none)

Z=Tape and reel option (T1, T2, T3, T4 or none)

Option	Description	Quantity
None	Standard 4-Pin DIP	100 pcs/tube
M	Gullwing Lead Bend	100 pcs/tube
ST1	Surface Mount Lead Forming – with Option 1 Taping	1500 pcs/ reel
ST2	Surface Mount Lead Forming – with Option 2 Taping	1500 pcs/ reel
ST3	Surface Mount Lead Forming – with Option 3 Taping	1000 pcs/ reel
ST4	Surface Mount Lead Forming – with Option 4 Taping	1000 pcs/ reel
SLT1	SMD (Low Profile) Lead Forming – with Option 1 Taping	1500 pcs/ reel
SLT2	SMD (Low Profile) Lead Forming – with Option 2 Taping	1500 pcs/ reel
SLT3	SMD (Low Profile) Lead Forming – with Option 3 Taping	1000 pcs/ reel
SLT4	SMD (Low Profile) Lead Forming – with Option 4 Taping	1000 pcs/ reel
SLMT1	SMD (Gullwing) Lead Forming – with Option 1 Taping	1500 pcs/ reel
SLMT2	SMD (Gullwing) Lead Forming – with Option 2 Taping	1500 pcs/ reel

Revision History

Description:	Revision #	Revision Date
Initial release of Q814	1.0	4/22/2010
Add binning option	1.1	6/23/2010
Feature, certification & compliance and ordering information updates	1.2	02/01/2011
Add CTR (100-300%)	1.3	07/09/2012
Update Spec, taping option and nomenclature	2.0	07/13/2018

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.