QT-Brightek Optocoupler Series

4-PIN DC Input Phototransistor Optocoupler

Part No.: QT851

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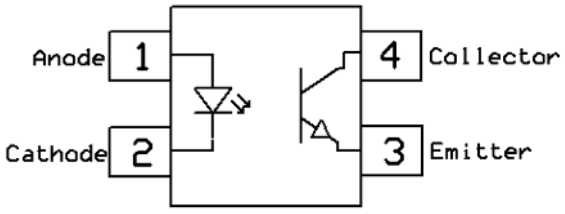
Introduction

Feature:

- High Isolation voltage between input and output (Viso = 5000V rms)
- Creepage distance ≥ 7.5mm (S/SL Type)
- Creepage distance ≥ 8.0mm (SLM Type)
- Operating Temperature up to 100 ºC
- 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.

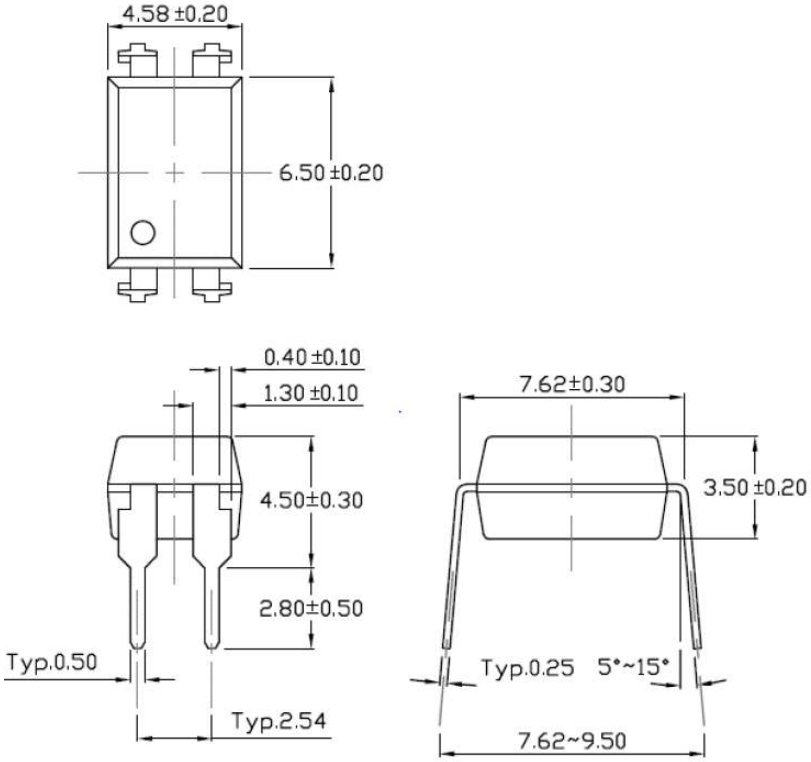
Schematic:



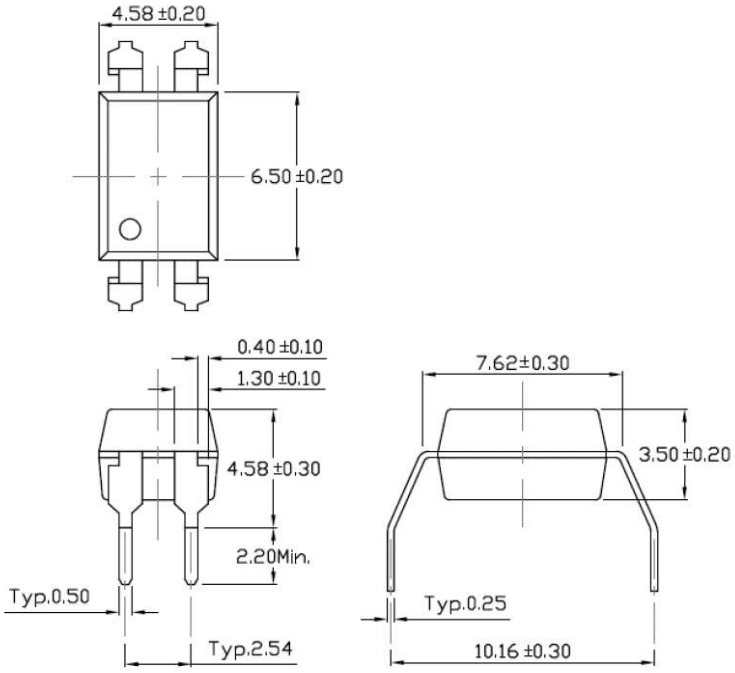
Certification & Compliance:

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

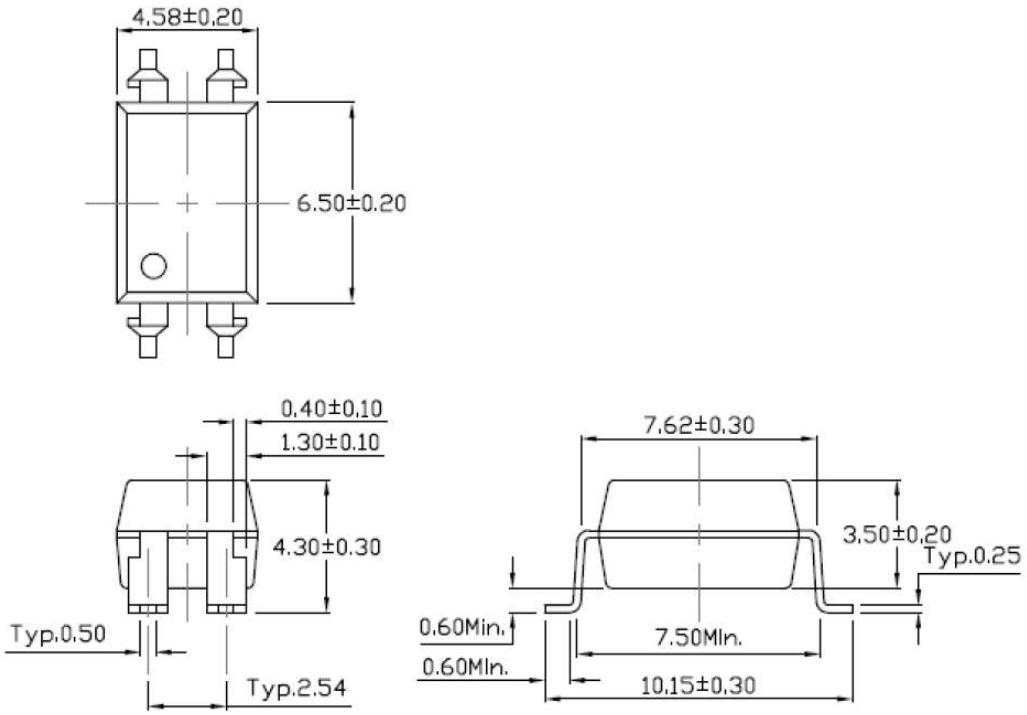
Dimension: (Dot location indicates pin 1)
4-Pin Dip (standard):



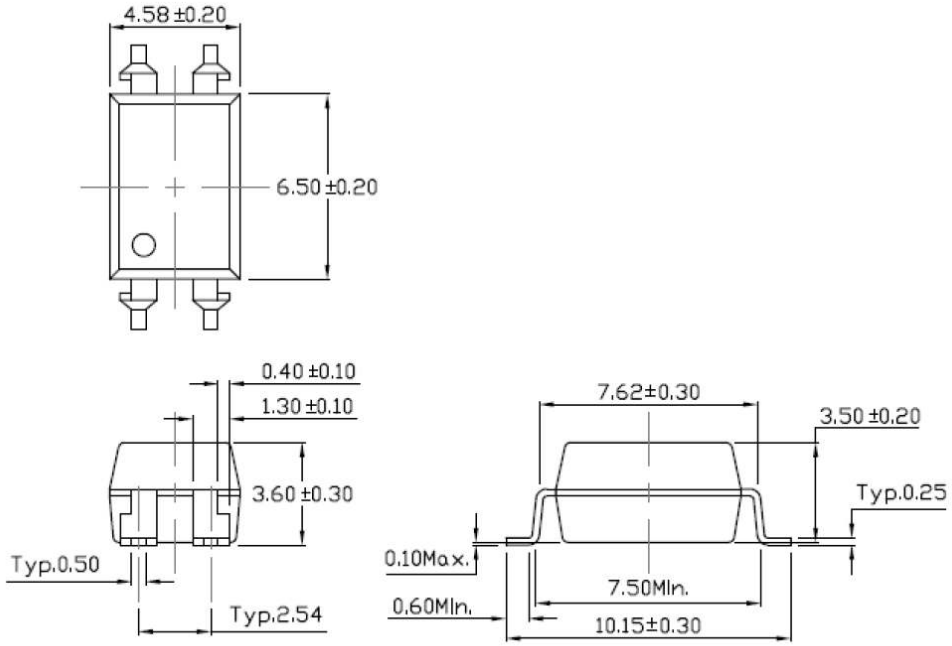
Gullwing (400mil) lead bend (Option M):



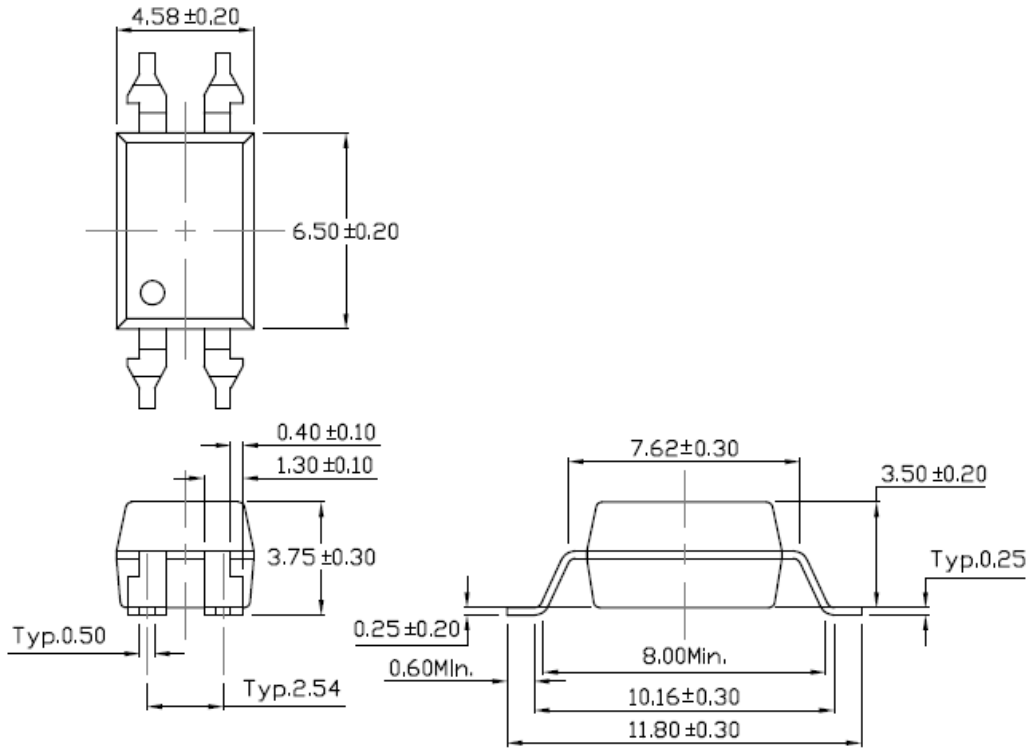
SMD lead bend (Option S):



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 (AC, 1 minute)	5000	V_{RMS}
T_{STG}	Storage Temperature	-55 ~ 150	ºC
T_{OPR}	Operating Temperature	-55 ~ 100	ºC
T_{SOL}	Lead Solder Temperature	260 for 10 sec	ºC
P_{TOT}	Total Power Dissipation	260	mW
EMITTER			
I_F	Continuous Forward Current	80	mA
I_{FP}	Peak Forward Current (≤ 1us, 300pps)	1	A
V_R	Reverse Voltage	6	V
P_D	Power Dissipation	150	mW
DETECTOR			
B_{VCEO}	Collector–Emitter Breakdown Voltage	350	V
B_{VECO}	Emitter-Collector Breakdown Voltage	7	V
I_C	Continuous Collector Current	100	mA
P_C	Collector Power Dissipation	300	mW

Electrical Characteristic (T_A=25 °C)

Emitter

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
V_F	Forward Voltage	I_F = 10mA	-	1.2	1.4	V
I_R	Reverse Current	V_R = 6V	-	-	10	μA
C_{IN}	Input Capacitance	f = 1MHz	-	30	-	pF

Detector

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
I_{CEO}	Collector-Emitter Dark current	V_{CE} =20V, I_F =0mA	-	-	100	nA
BV_{CEO}	Collector-Emitter breakdown voltage	I_C = 100 μA	350	-	-	V
BV_{ECO}	Emitter-Collector breakdown voltage	I_E = 100 μA	7	-	-	V

DC Transfer Characteristic

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
CTR	Current Transfer Ratio	I_F=5mA, V_{CE}=5V	50	-	600	%
$V_{CE(Sat)}$	Collector-Emitter saturation voltage	I_F=20mA, I_C= 1mA	-	-	0.4	V
R_{IO}	Isolation Resistance	V_{IO} =500V_{DC}	5X10^{10}	-	-	Ω
C_{IO}	Isolation Capacitance	f = 1MHz	-	0.5	1.0	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

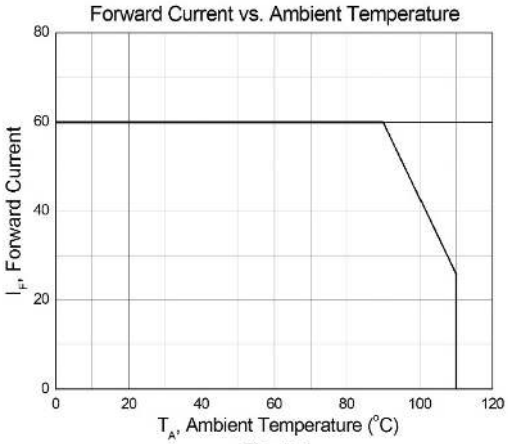


Figure 1

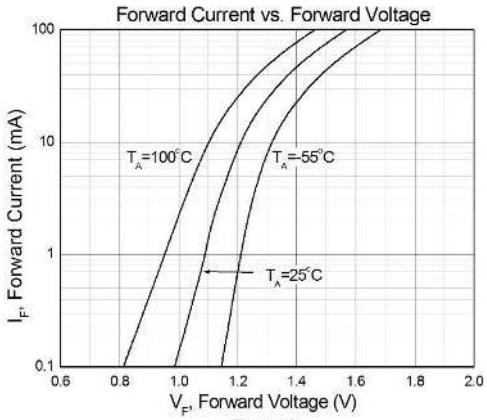


Figure 2

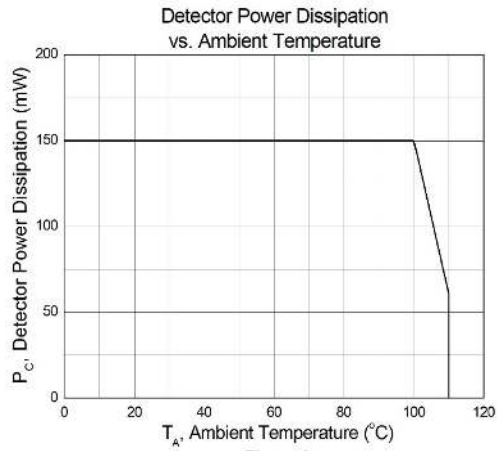


Figure 3

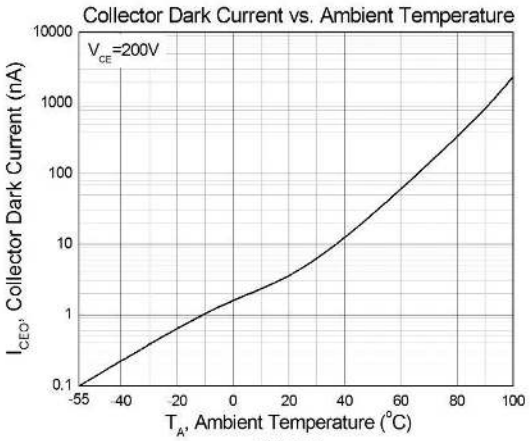


Figure 4

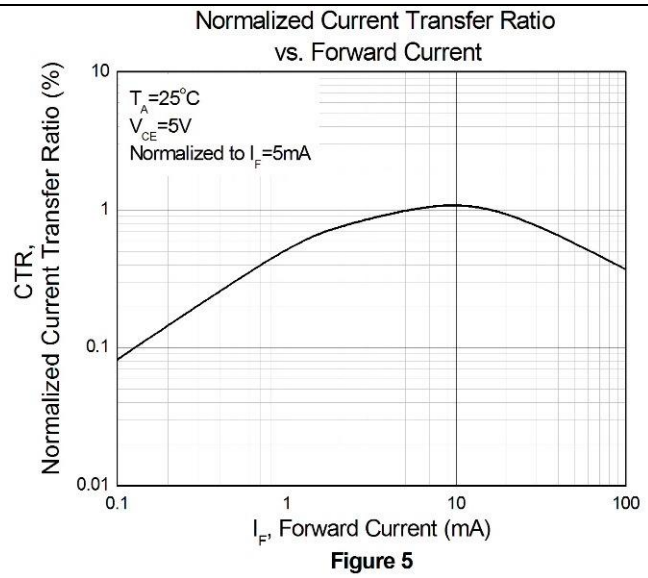


Figure 5

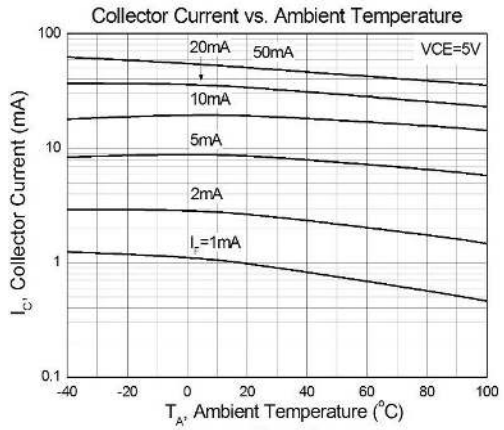


Figure 6

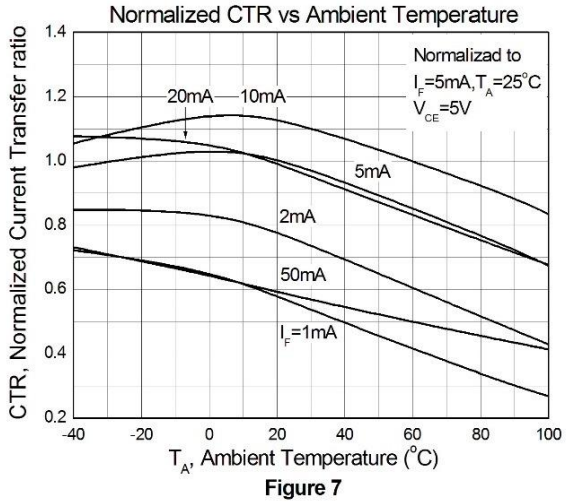


Figure 7

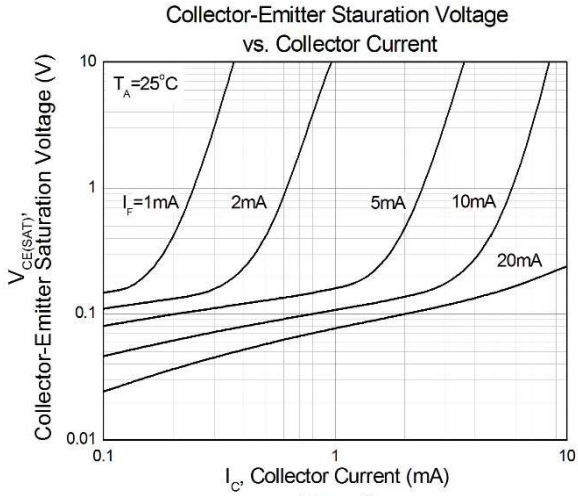


Figure 8

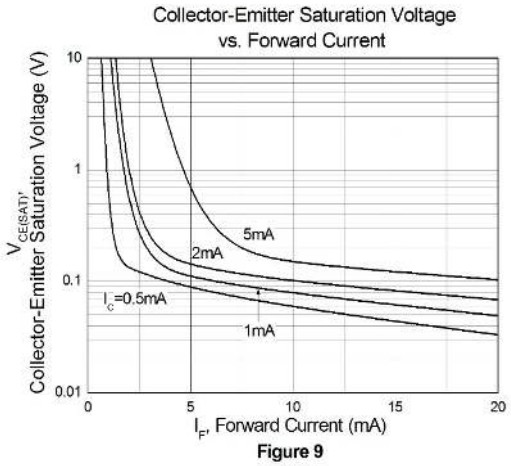


Figure 9

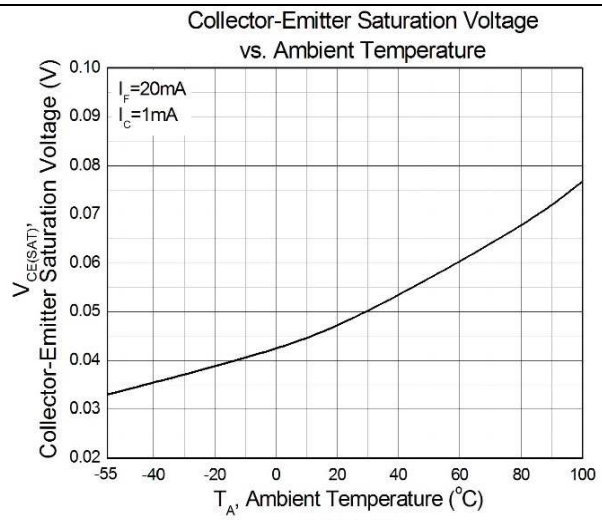


Figure 10

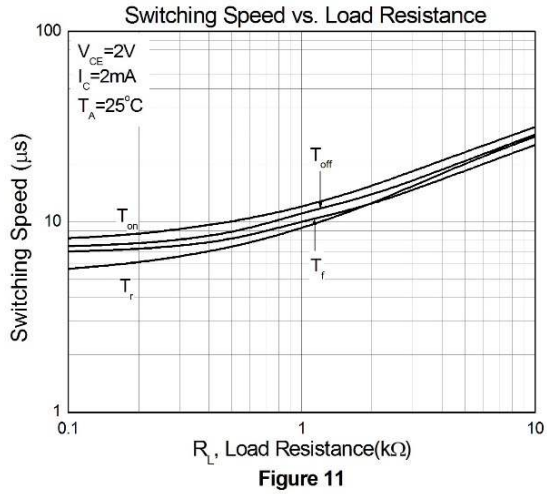
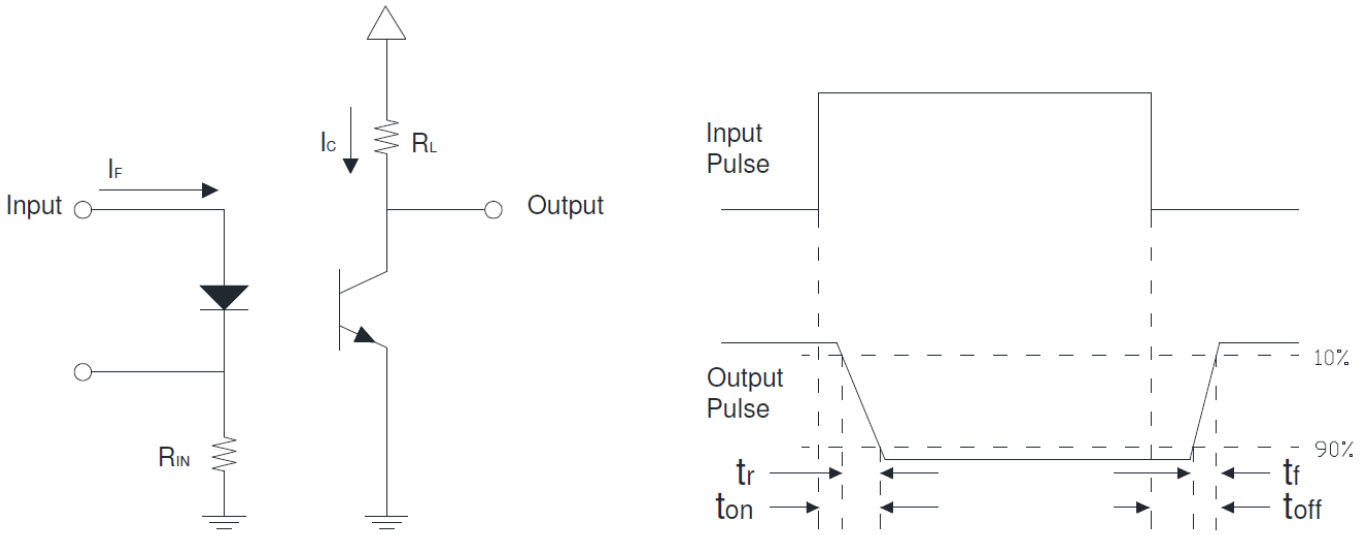


Figure 11

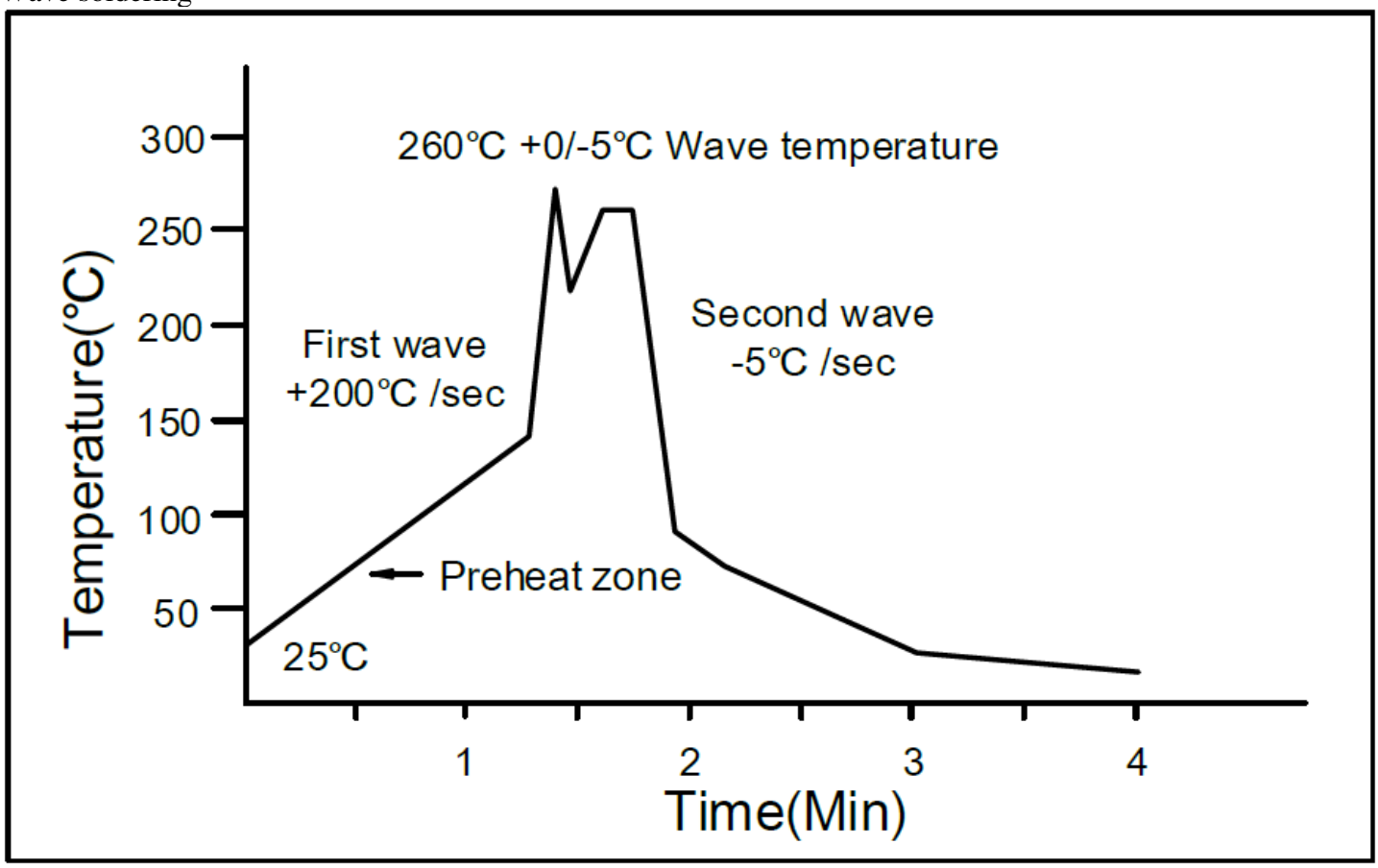
Test Circuit for Response Time



Switching Time Test Circuits

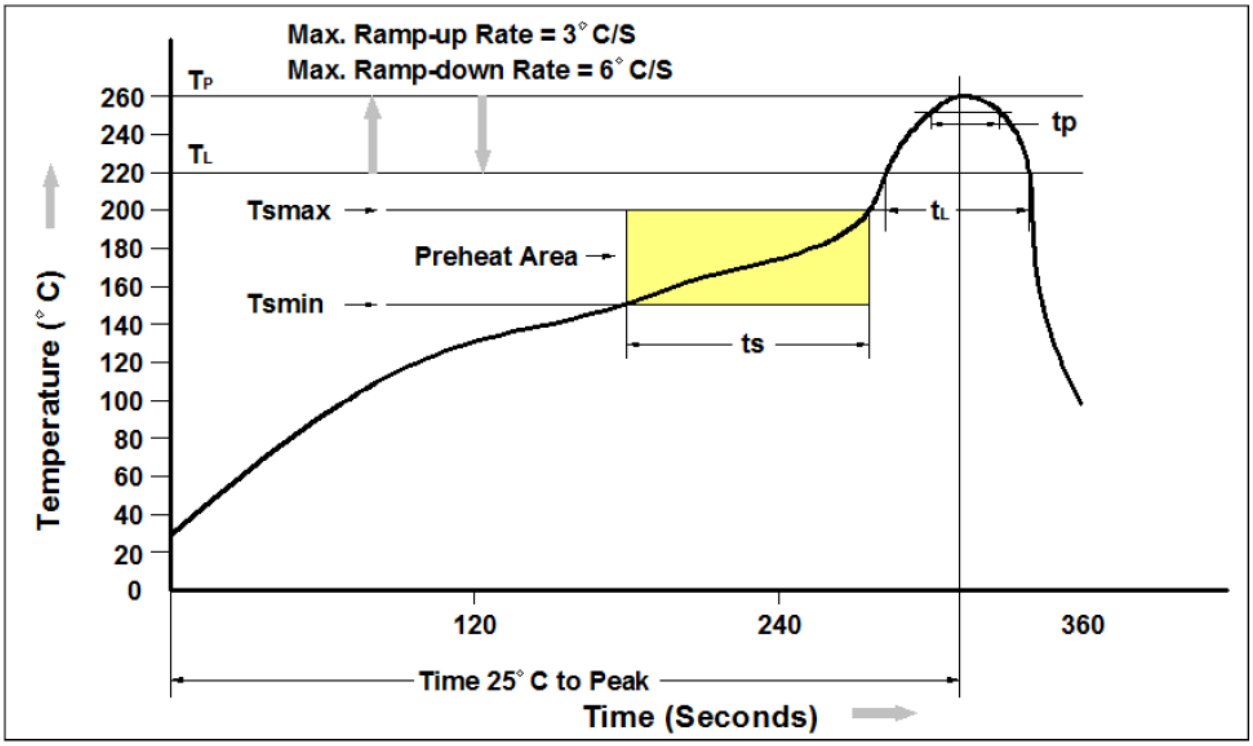
Solder Profile & Footprint

Wave soldering



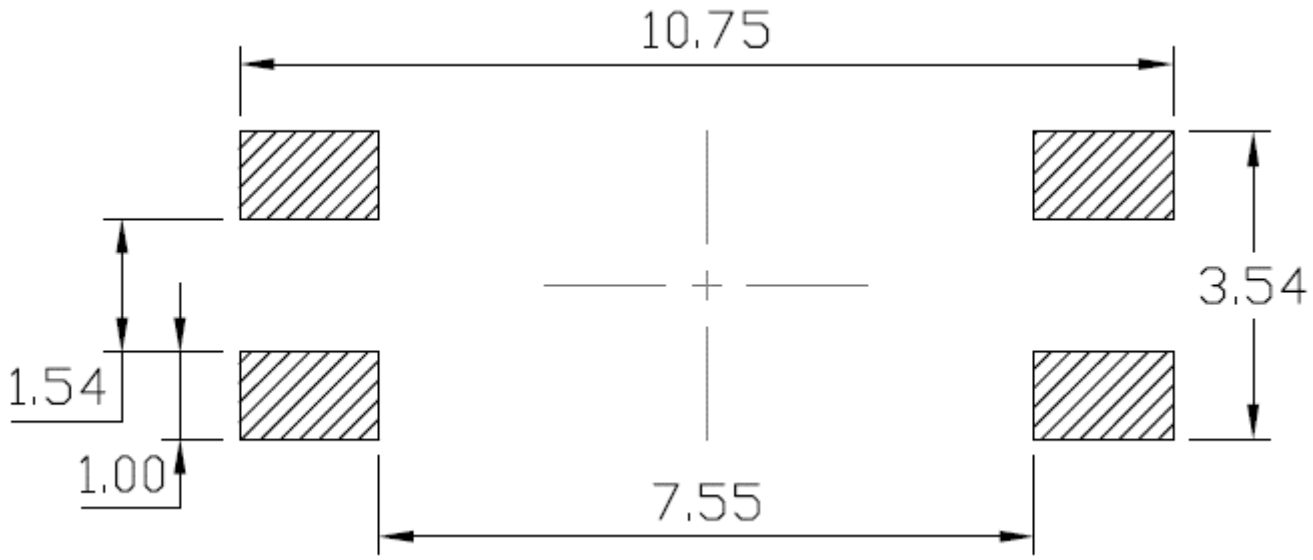
Temperature: 260 +0/-5 ºC
Time: 10 Sec
Preheat temperature: 25 to 140 ºC
Preheat time: 30 to 80 sec.

Reflow soldering



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150 ℃
Temperature Max. (Tsmax)	200 ℃
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Ramp-up Rate (t_L to t_P)	3 ℃/second max.
Liquidous Temperature (T_L)	217 ℃
Time (t_L) Maintained Above (T_L)	60 – 150 seconds
Peak Body Package Temperature	260 ℃ +0 ℃ / -5 ℃
Time (t_P) within 5 ℃ of 260 ℃	30 seconds
Ramp-down Rate (T_P to T_L)	6 ℃/second max
Time 25 ℃ to Peak Temperature	8 minutes max.

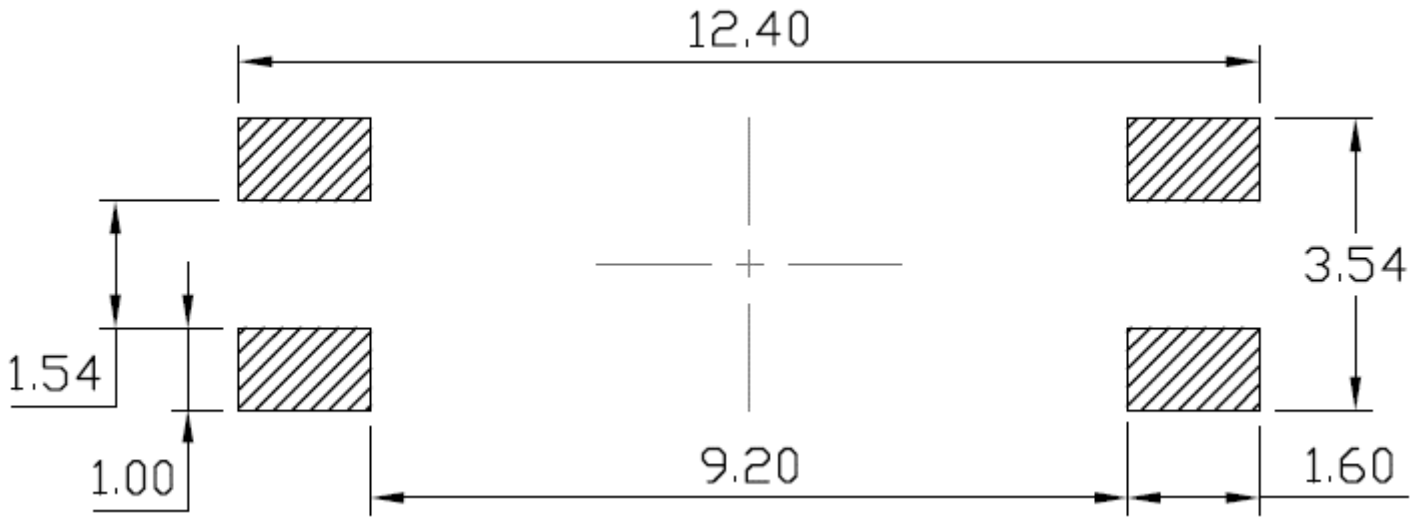
SMD lead bend (Option S) & SMD (Low Profile) bend (Option SL):



Recommended Solder Footprint for SMD Leadform

Units: mm tolerance: +/- 0.1mm

SMD (Gullwing) bend (Option SLM):

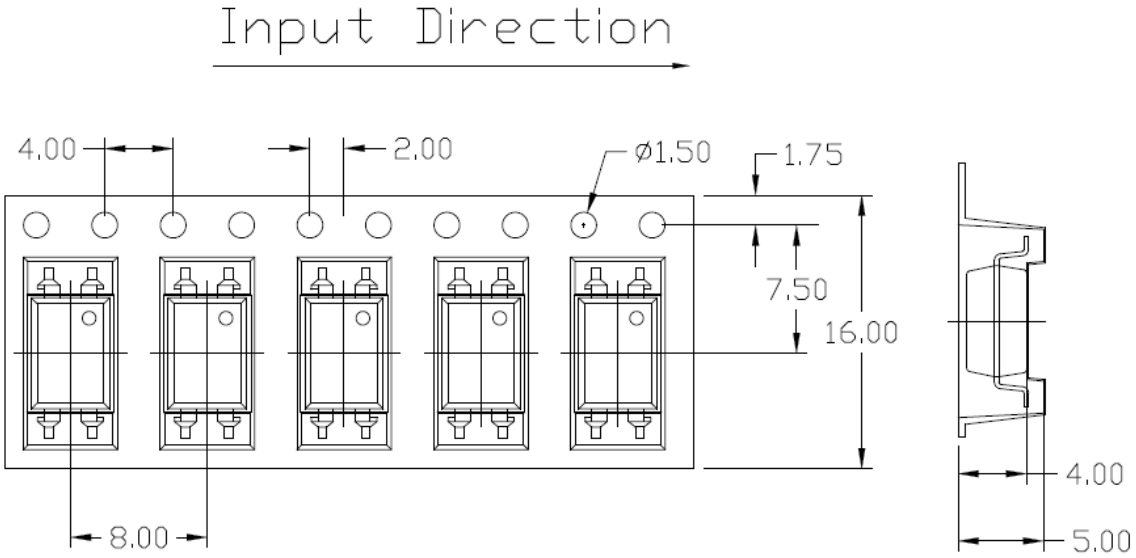


Recommended Solder Footprint for SMD Leadform

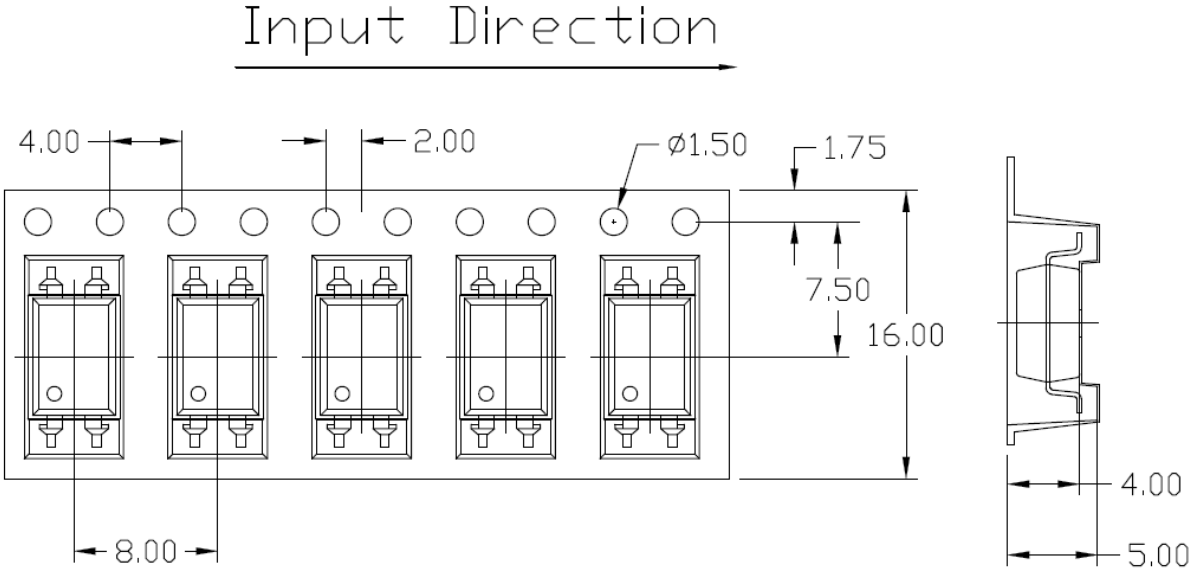
Units: mm tolerance: +/- 0.1mm

Packing & Labeling

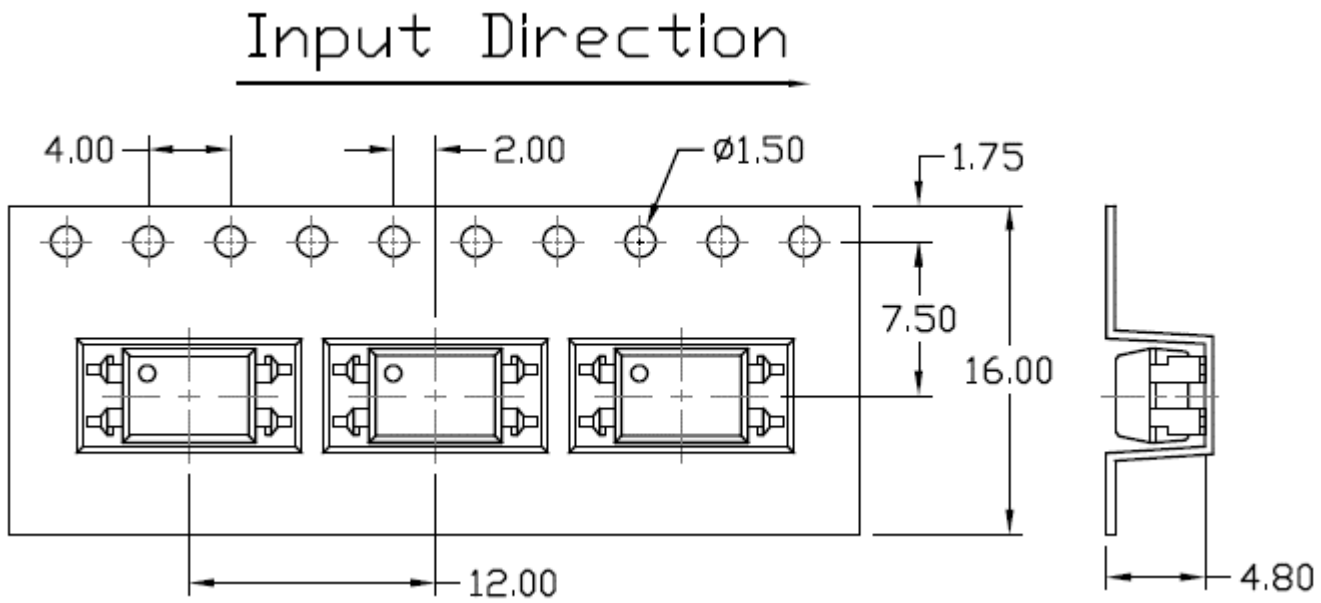
Option S(T1) & SL(T1)



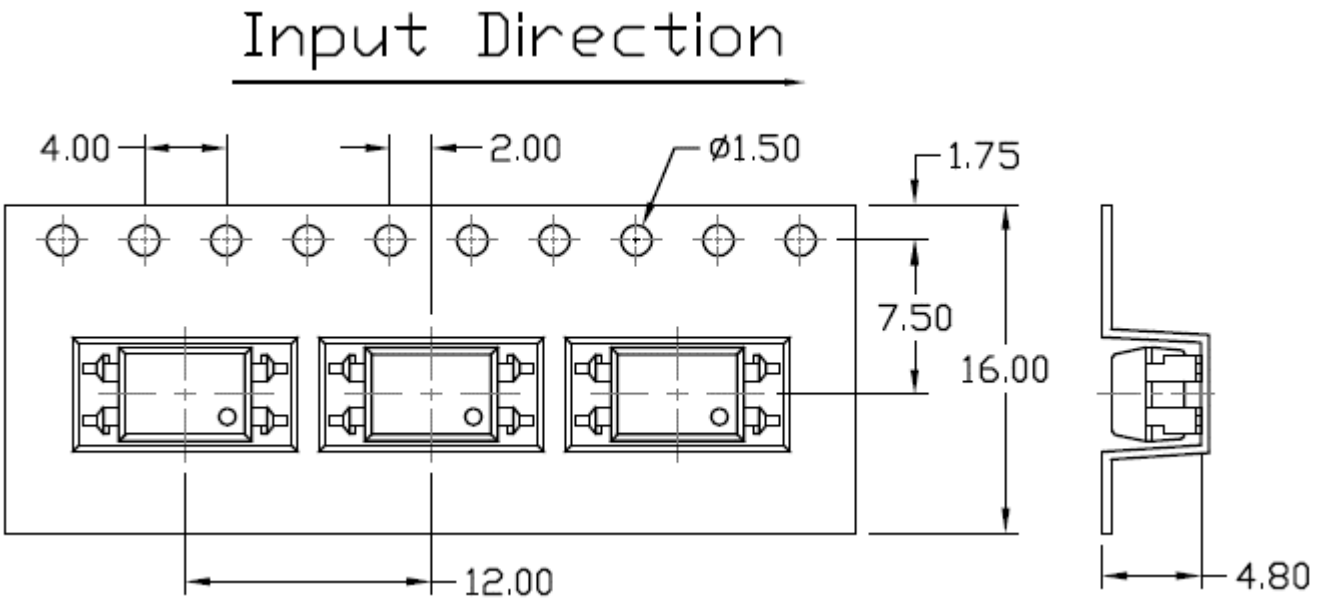
Option S(T2) & SL(T2)



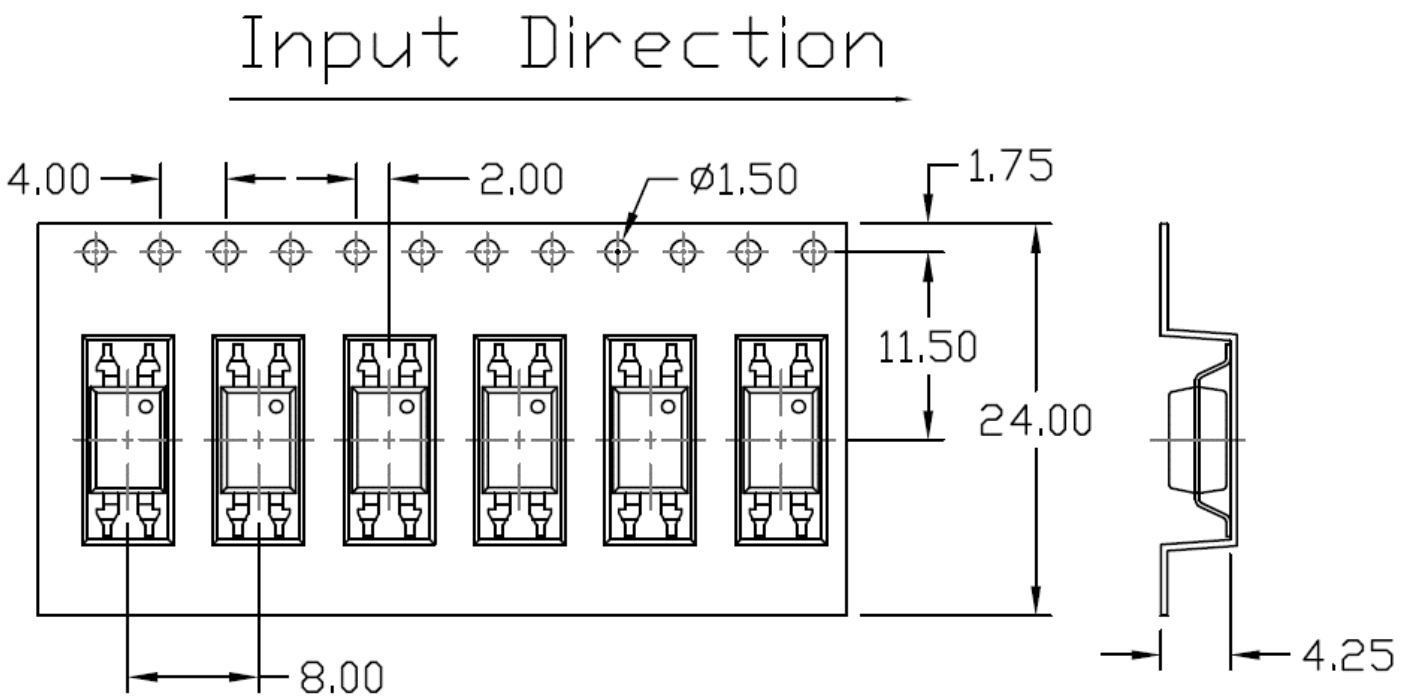
Option S(T3) & SL(T3)



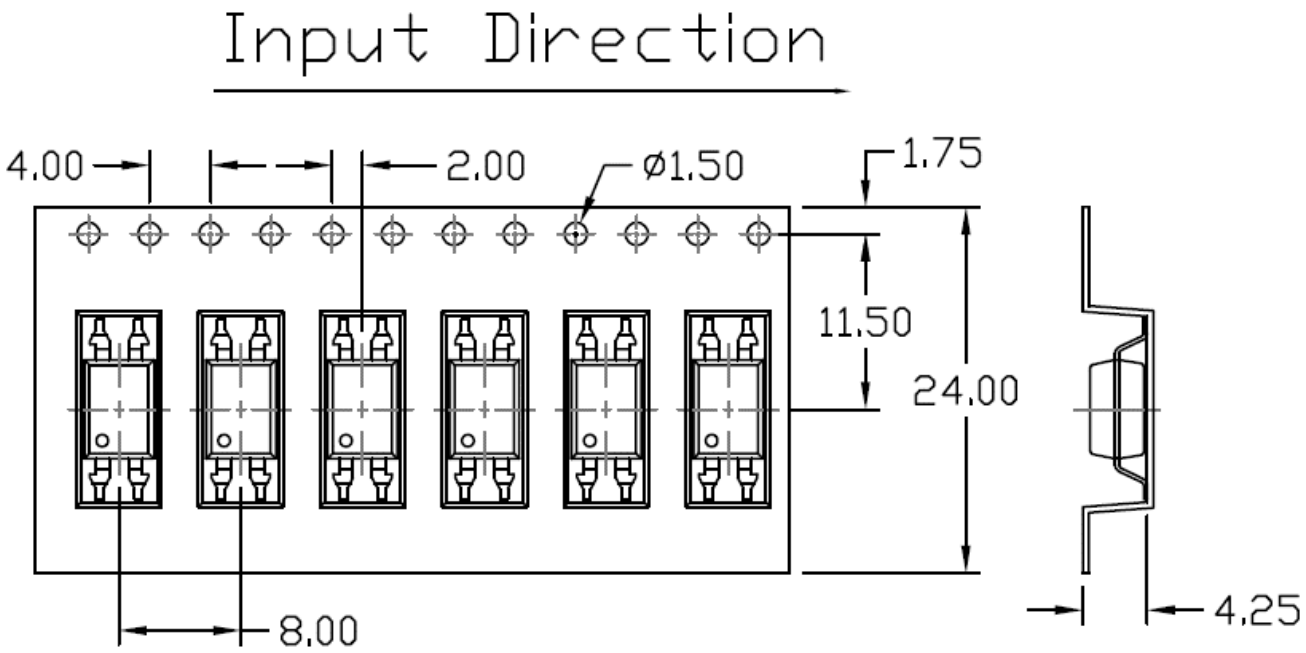
Option S(T4) & SL(T4)



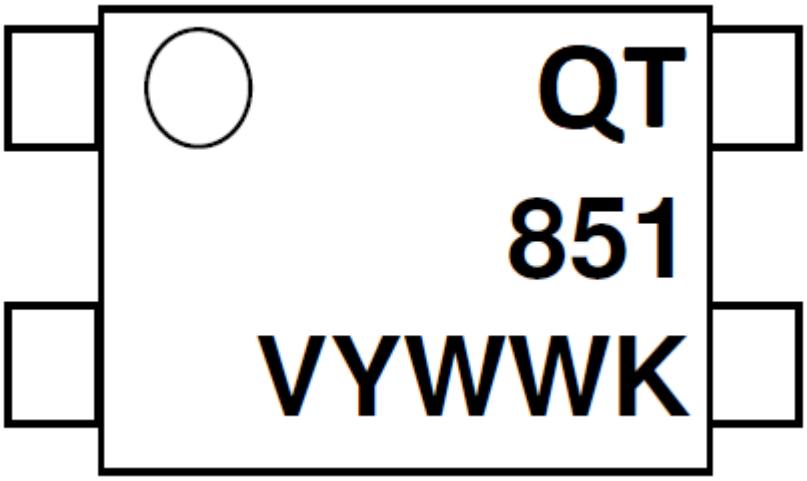
Option SLM(T1)



Option SLM(T2)



Device Marking



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

Ordering Information

QT851(V)(Y)(Z)
V = VDE option (V or None)
Y = Lead form option (S, SL, M, SLM)
Z=Tape and reel option (T1, T2, T3, T4 or none)

Option	Description	Quantity
None	Standard 4-Pin DIP	100 Units/Tube
M	Gullwing	100 Units/Tube
S(T1)	Surface Mount Lead Forming – with Option 1 Taping	1500 pcs/ reel
S(T2)	Surface Mount Lead Forming – with Option 2 Taping	1500 pcs/ reel
S(T3)	Surface Mount Lead Forming – with Option 3 Taping	1000 pcs/ reel
S(T4)	Surface Mount Lead Forming – with Option 4 Taping	1000 pcs/ reel
SL(T1)	SMD (Low Profile) Lead Forming – with Option 1 Taping	1500 pcs/ reel
SL(T2)	SMD (Low Profile) Lead Forming – with Option 2 Taping	1500 pcs/ reel
SL(T3)	SMD (Low Profile) Lead Forming – with Option 3 Taping	1000 pcs/ reel
SL(T4)	SMD (Low Profile) Lead Forming – with Option 4 Taping	1000 pcs/ reel
SLM(T1)	SMD (Gullwing) Lead Forming – with Option 1 Taping	1500 pcs/ reel
SLM(T2)	SMD (Gullwing) Lead Forming – with Option 2 Taping	1500 pcs/ reel

Revision History

Description:	Revision #	Revision Date
Initial release of QT851	1.0	02/12/2018

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.