

# **QT-Brightek Optocoupler Series**

## **4-PIN High Power Photodarlington Optocoupler**

**Part No.: QT852**

Product: QT852	Date: February 12, 2018	Page 1 of 18
	Version# 1.0	

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## Introduction

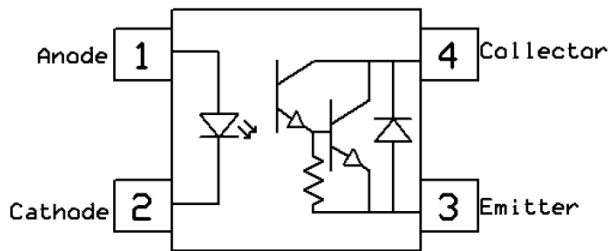
### Feature:

- High Isolation voltage between input and output (Viso = 5000V rms)
- Operating Temperature up to 100 °C
- Available in Tube or Tape and reel
- Available with standard DIP-4, Gullwing lead bend, SMD lead bend, and SMD low profile options.

### Certification & Compliance:

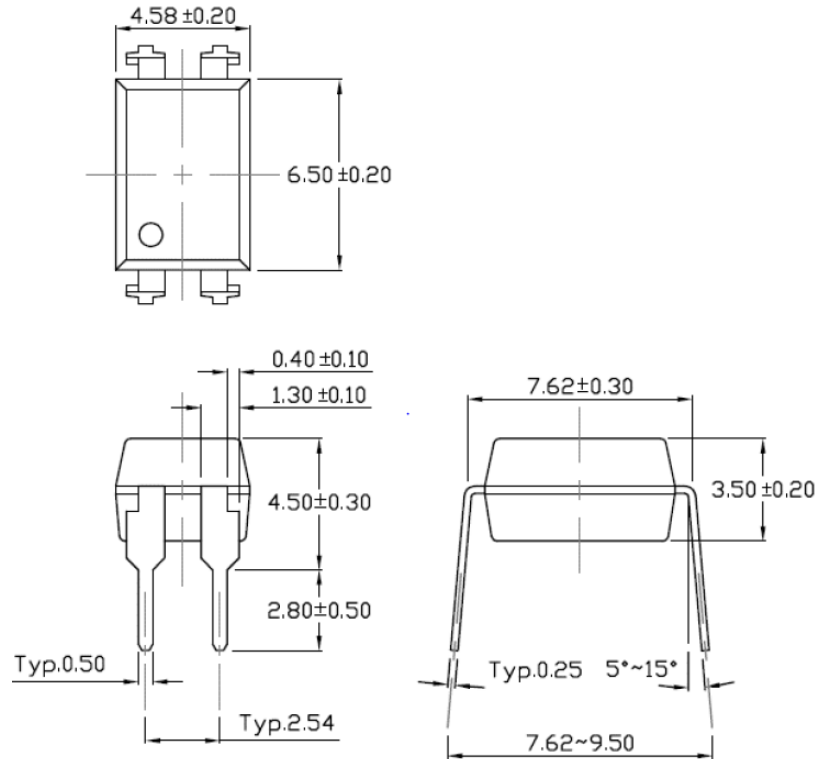
- Pb free and RoHS Compliant
- UL recognized (File #E338132)
- cUL recognized (File #E338132)
- VDE (Pending Approval)

### Schematic:

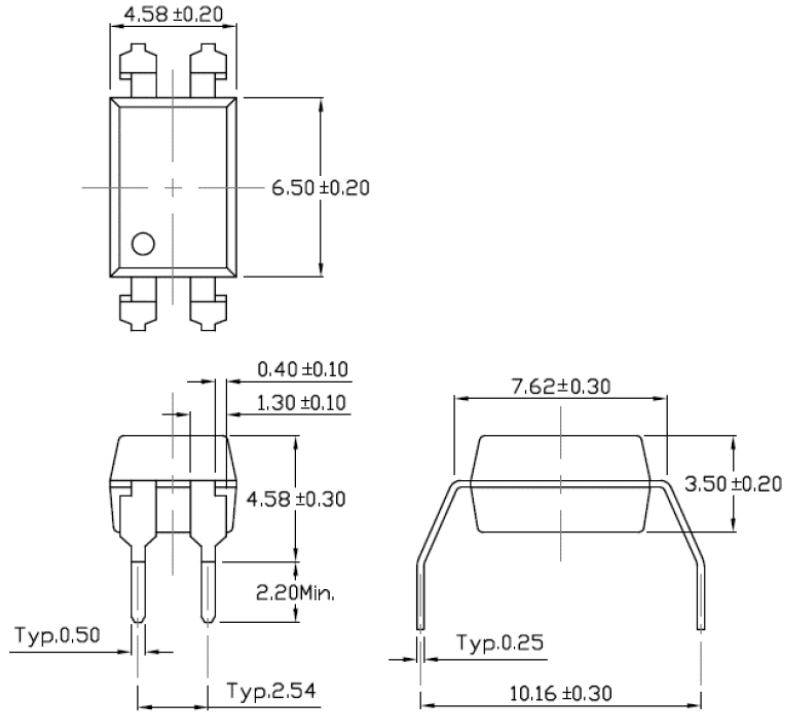


### Dimension: (Dot location indicates pin 1)

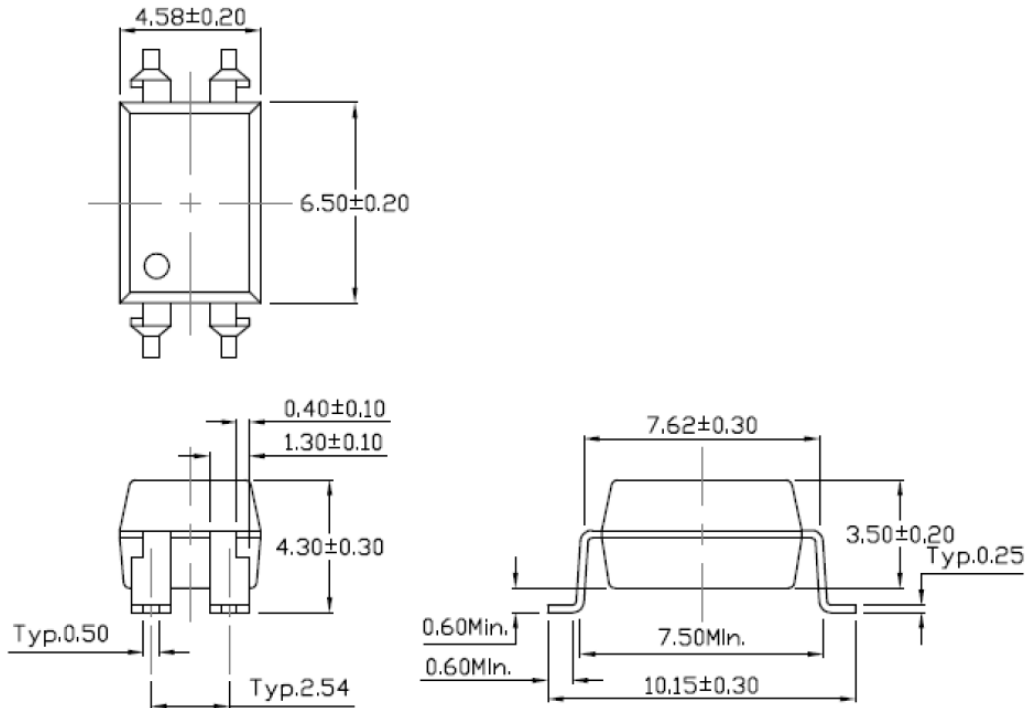
#### 4-Pin Dip (standard):



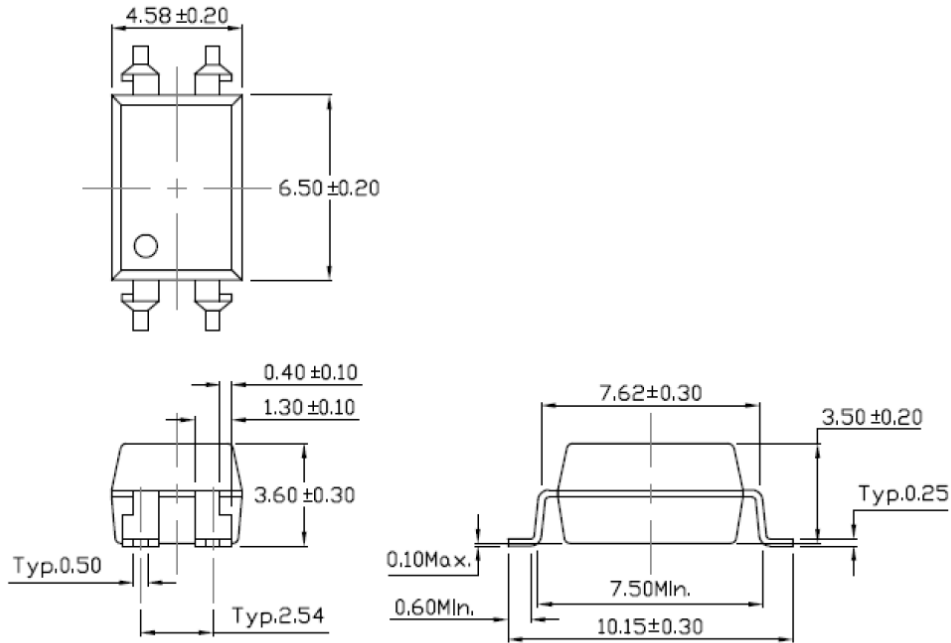
**Gullwing (400mil) lead bend (Option M):**



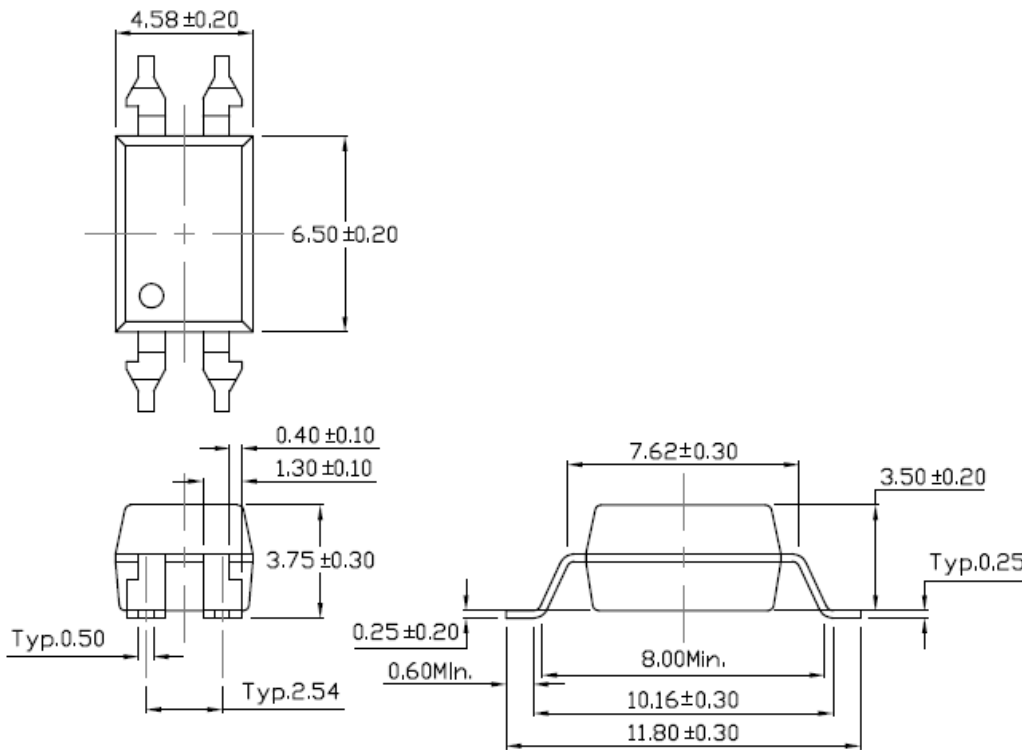
**SMD lead bend (Option S):**



**SMD (Low Profile) bend (Option SL):**



**SMD (Gullwing) bend (Option SLM):**



All Dimensions are in mm

**Absolute Maximum Rating**

Symbol	Parameter	Rating	Units
V <sub>ISO</sub>	Isolation voltage	5000	V <sub>RMS</sub>
T <sub>STG</sub>	Storage Temperature	-55 ~ 150	°C
T <sub>OPR</sub>	Operating Temperature	-55 ~ 100	°C
T <sub>SOL</sub>	Lead Solder Temperature	260 for 10 sec	°C
<b>EMITTER</b>			
I <sub>F</sub>	Continuous Forward Current	80	mA
I <sub>FP</sub>	Peak Forward Current (≤ 1us, 300pps)	1	A
V <sub>R</sub>	Reverse Voltage	6	V
P <sub>D</sub>	Power Dissipation	150	mW
<b>DETECTOR</b>			
B <sub>VCEO</sub>	Collector–Emitter Breakdown Voltage	350	V
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	0.1	V
I <sub>C</sub>	Continuous Collector Current	150	mA
P <sub>D</sub>	Power Dissipation	300	mW

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

### Emitter

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
V <sub>F</sub>	Forward Voltage	I <sub>F</sub> = 10mA	-	1.2	1.4	V
I <sub>R</sub>	Reverse Current	V <sub>R</sub> = 5V	-	-	5	μA
C <sub>IN</sub>	Input Capacitance	f = 1MHz	-	45	-	pF

### Detector

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
I <sub>CEO</sub>	Collector-Emitter Dark current	V <sub>CE</sub> = 200V, I <sub>F</sub> = 0mA	-	-	100	nA
B <sub>VCEO</sub>	Collector-Emitter breakdown voltage	I <sub>C</sub> = 100 μA	350	-	-	V
B <sub>VECO</sub>	Emitter-Collector breakdown voltage	I <sub>E</sub> = 100 μA	0.1	-	-	V

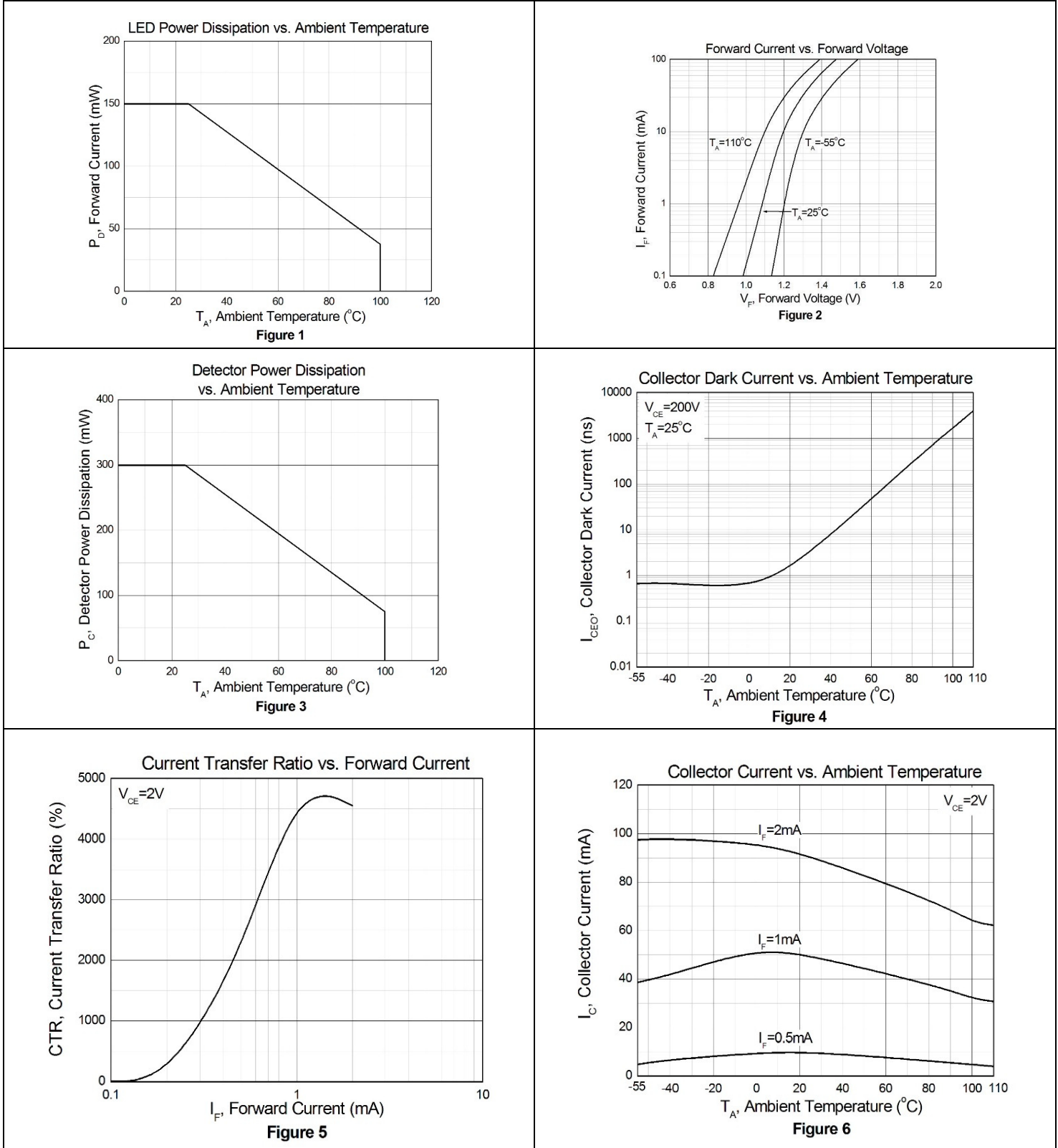
## DC Transfer Characteristic

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
CTR	Current Transfer Ratio	I <sub>F</sub> = 1mA, V <sub>CE</sub> = 2V	1000	-	15000	%
V <sub>CE(Sat)</sub>	Collector-Emitter saturation voltage	I <sub>F</sub> = 20mA, I <sub>C</sub> = 100mA	-	-	1.2	V
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	-	0.6	-	pF

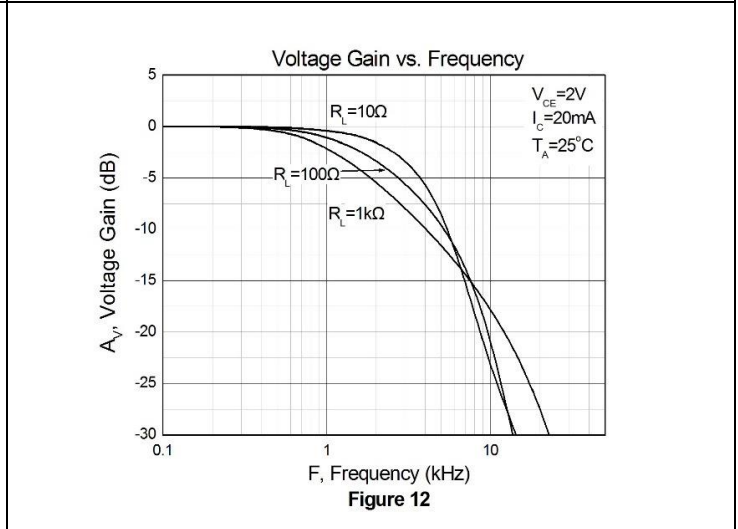
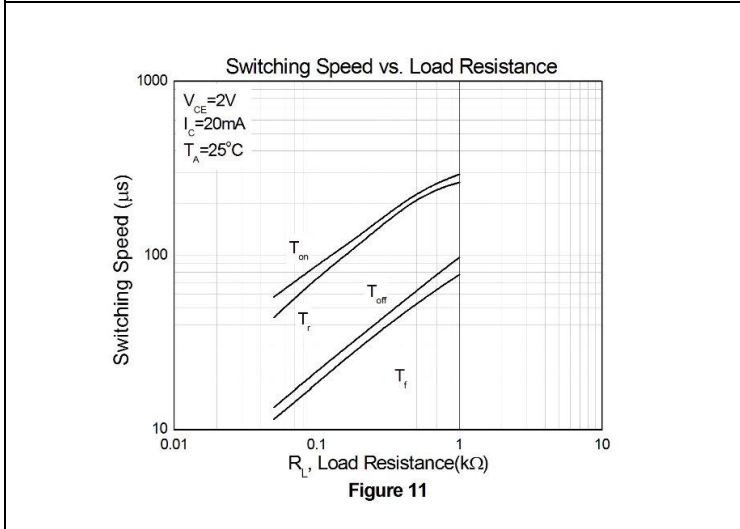
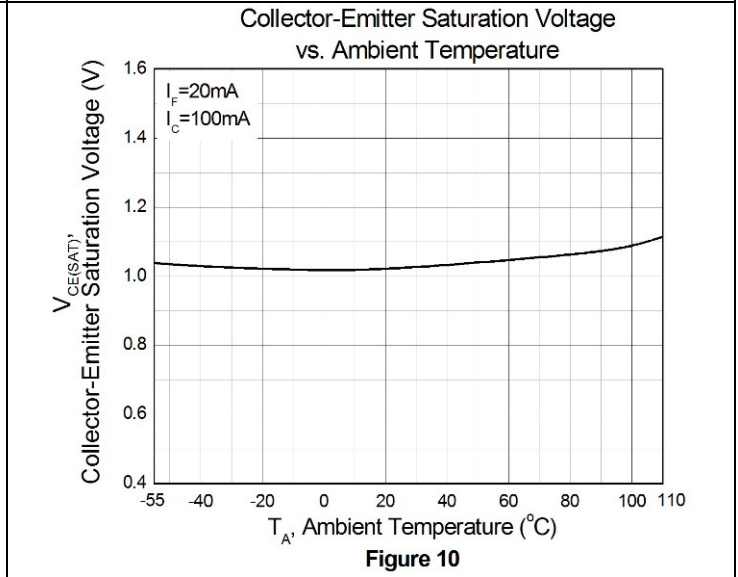
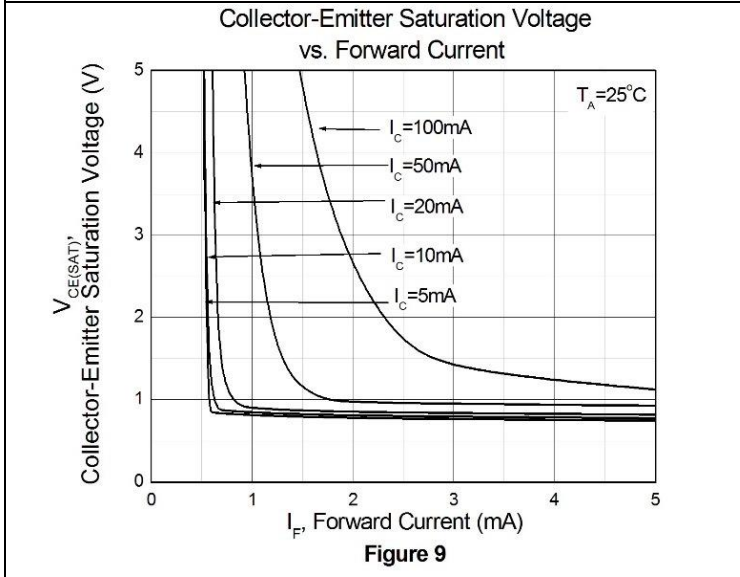
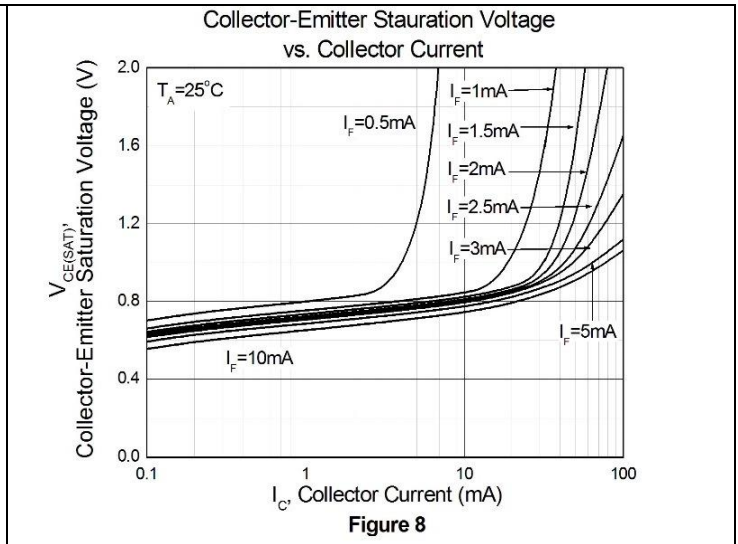
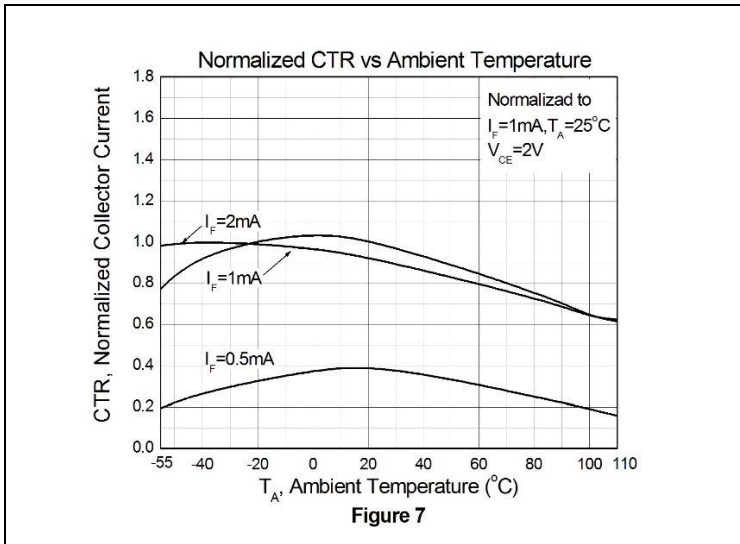
## AC Characteristic

Symbol	Characteristic	Test Condition	Range			Unit
			Min	Typ	Max	
t <sub>r</sub>	Rise time	V <sub>CE</sub> = 2V, I <sub>C</sub> = 2mA, R <sub>L</sub> = 100Ω	-	-	250	μs
t <sub>f</sub>	Fall time		-	-	95	

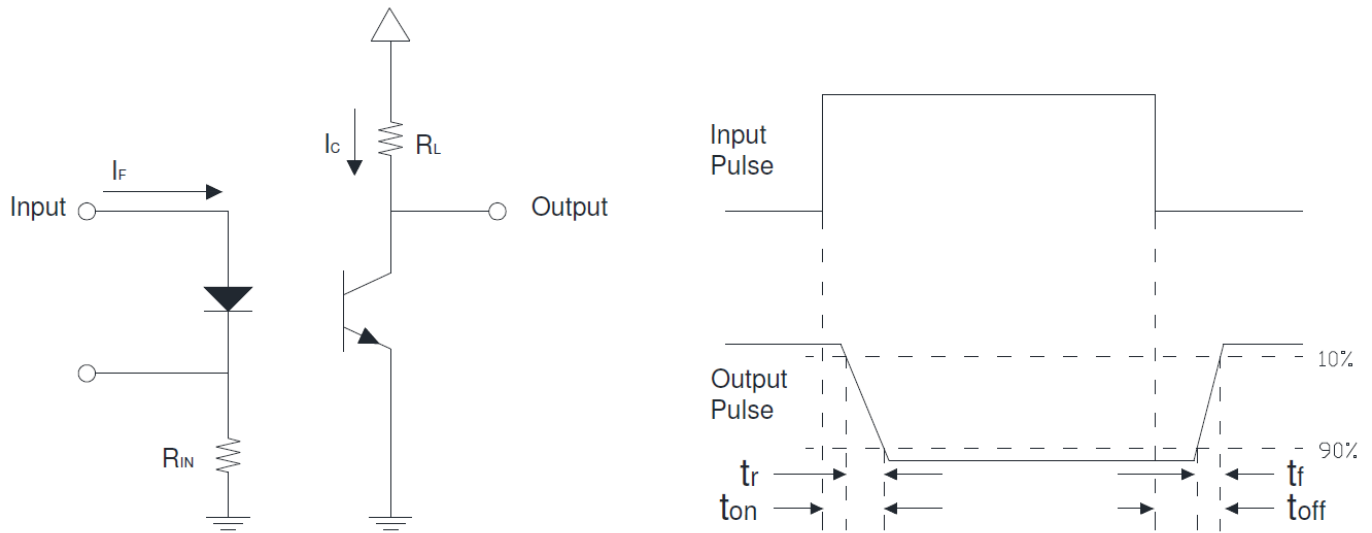
## Characteristic Curves







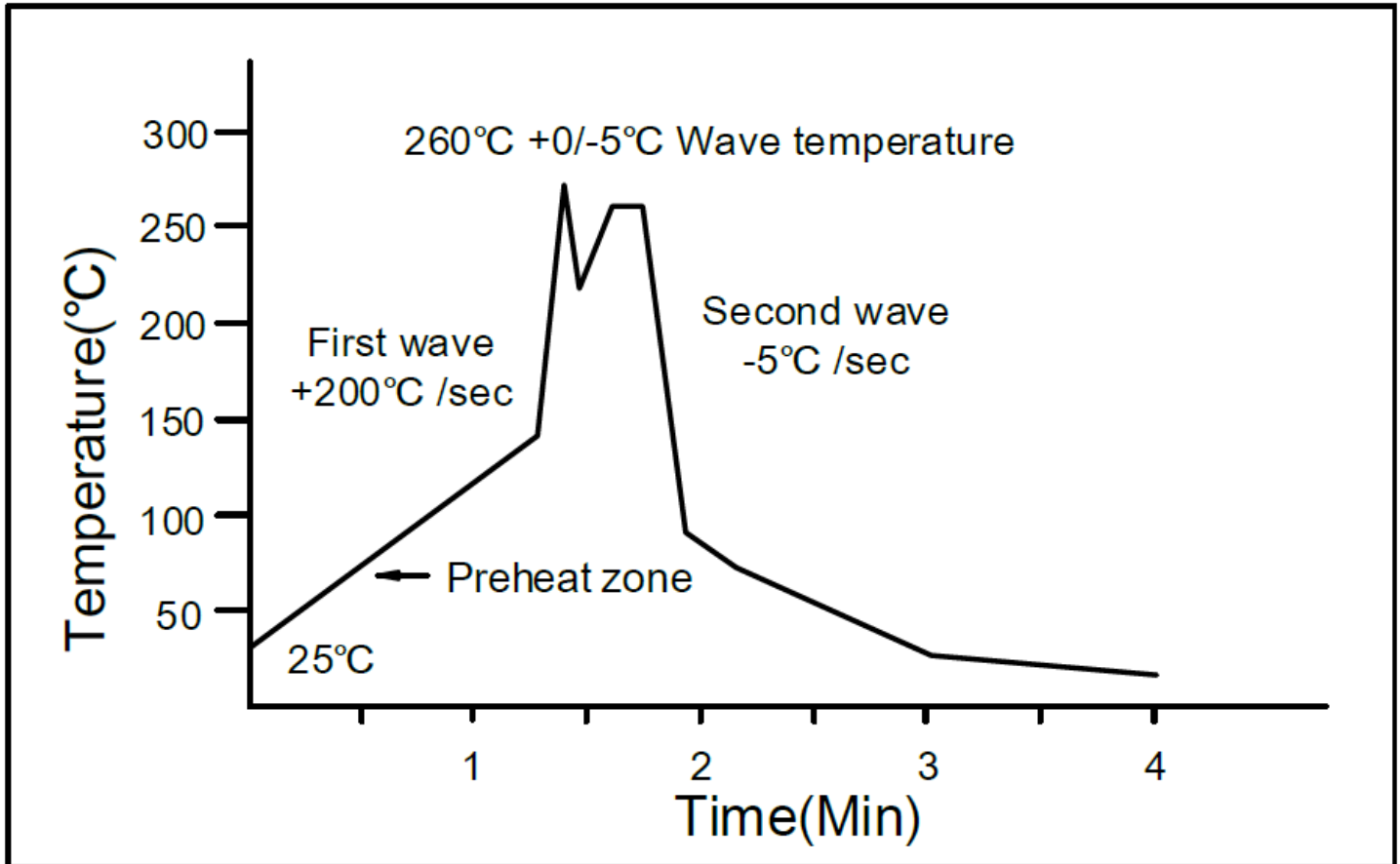
## Test Circuit for Response Time



**Switching Time Test Circuits**

## Solder Profile & Footprint

Wave soldering



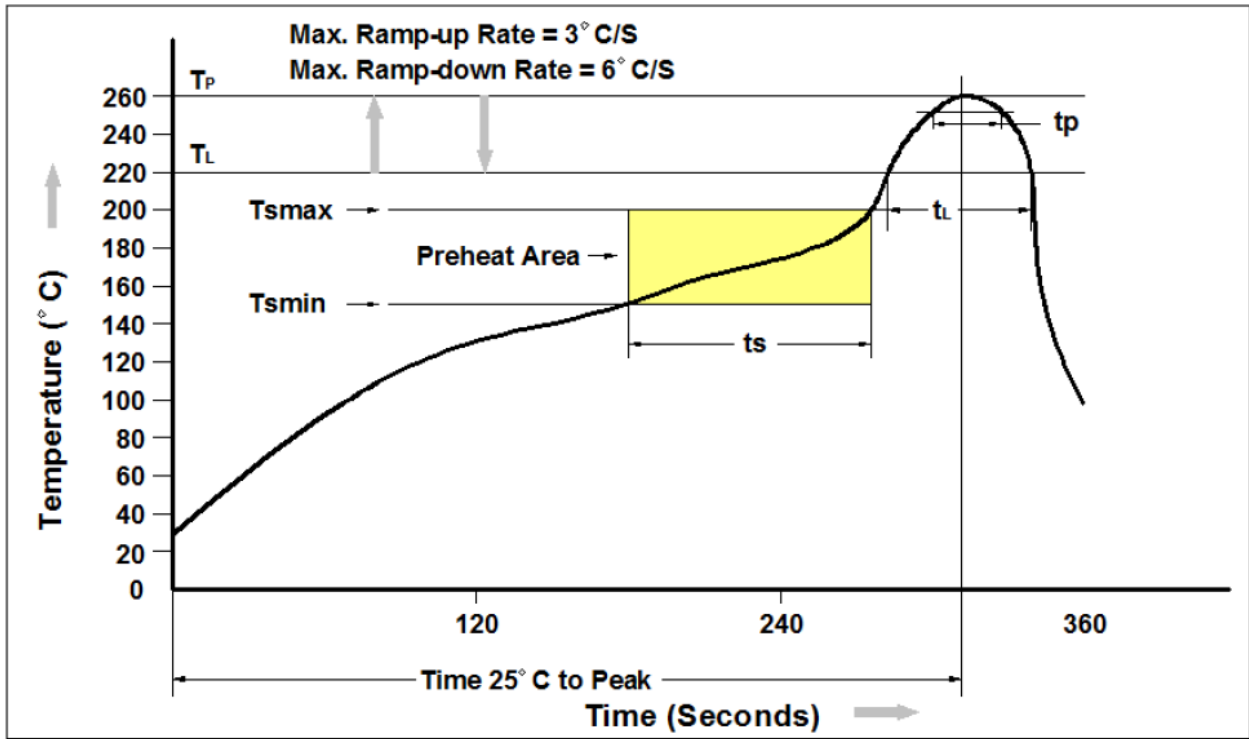
Temperature: 260 +0/-5 °C

Time: 10 Sec

Preheat temperature: 25 to 140 °C

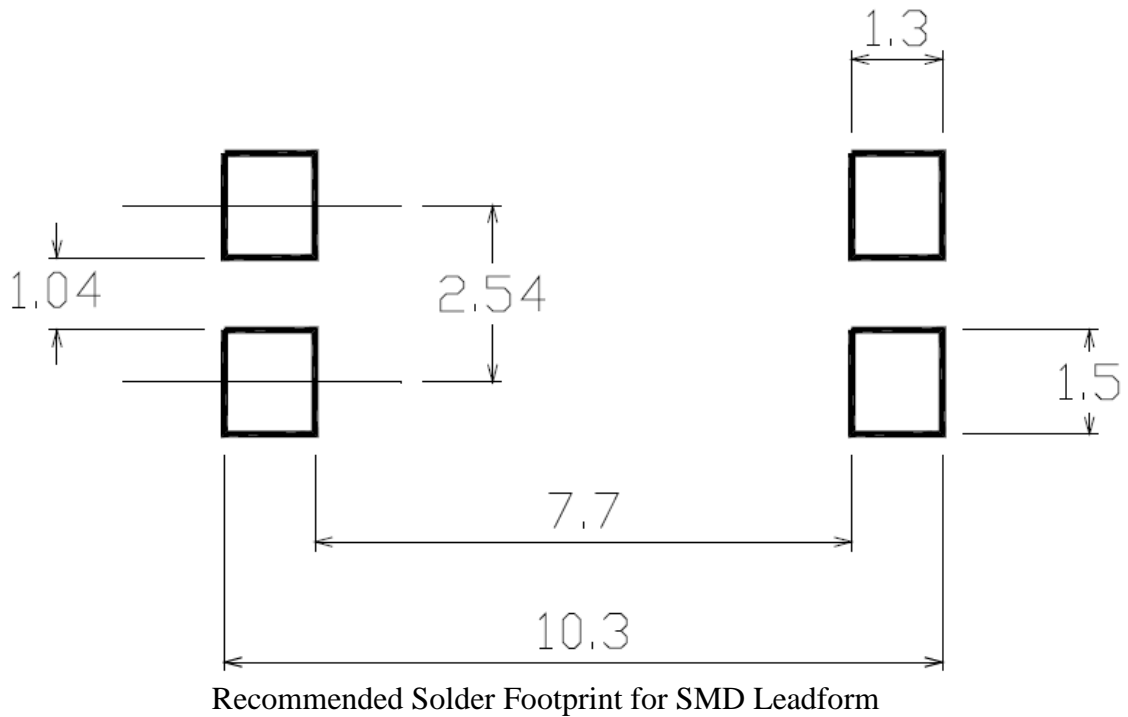
Preheat time: 30 to 80 sec.

Reflow soldering



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <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.

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

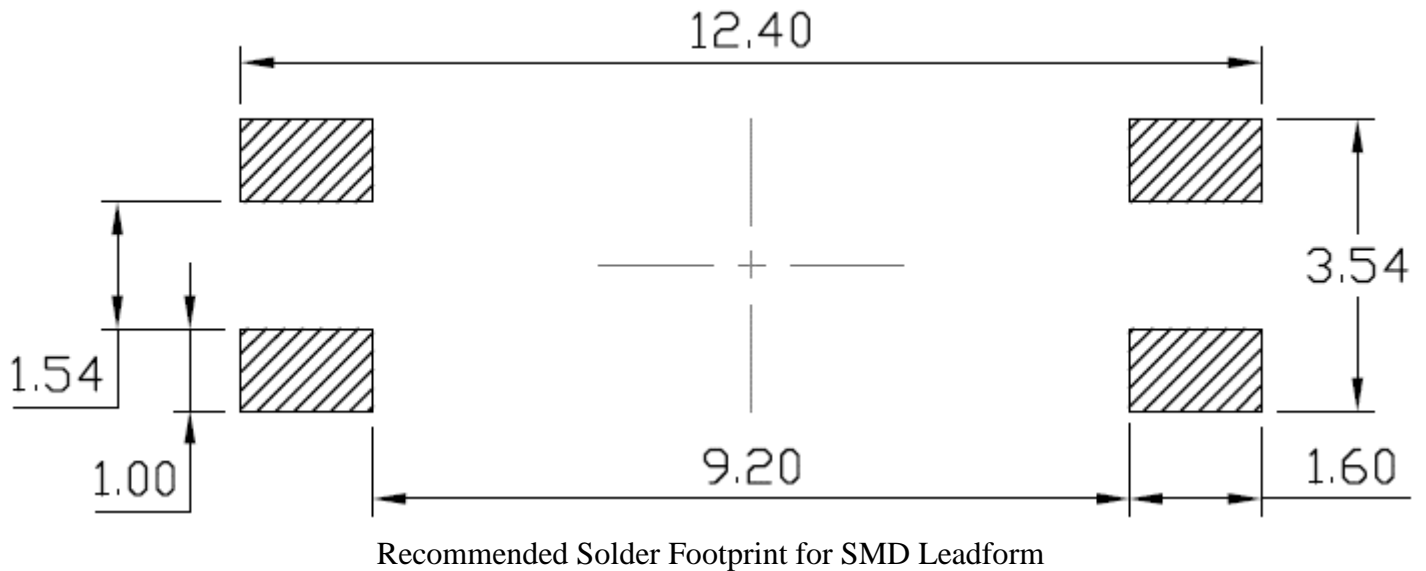


Recommended Solder Footprint for SMD Leadform

Units: mm

tolerance: +/- 0.1mm

**SMD (Gullwing) bend (Option SLM):**



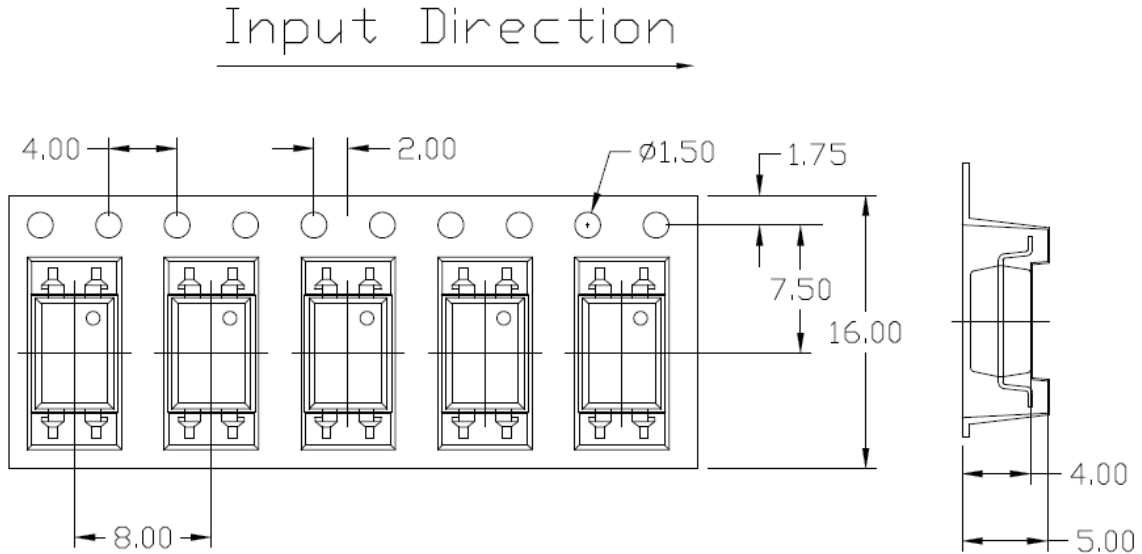
Recommended Solder Footprint for SMD Leadform

Units: mm

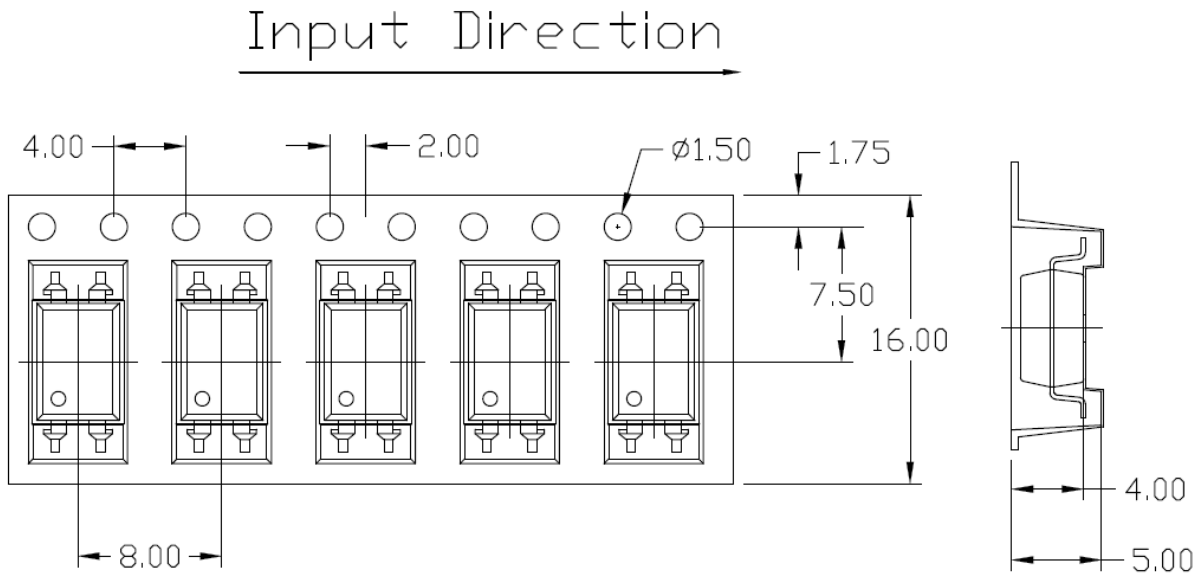
tolerance: +/- 0.1mm

## Packing & Labeling

### Option S(T1) & SL(T1)

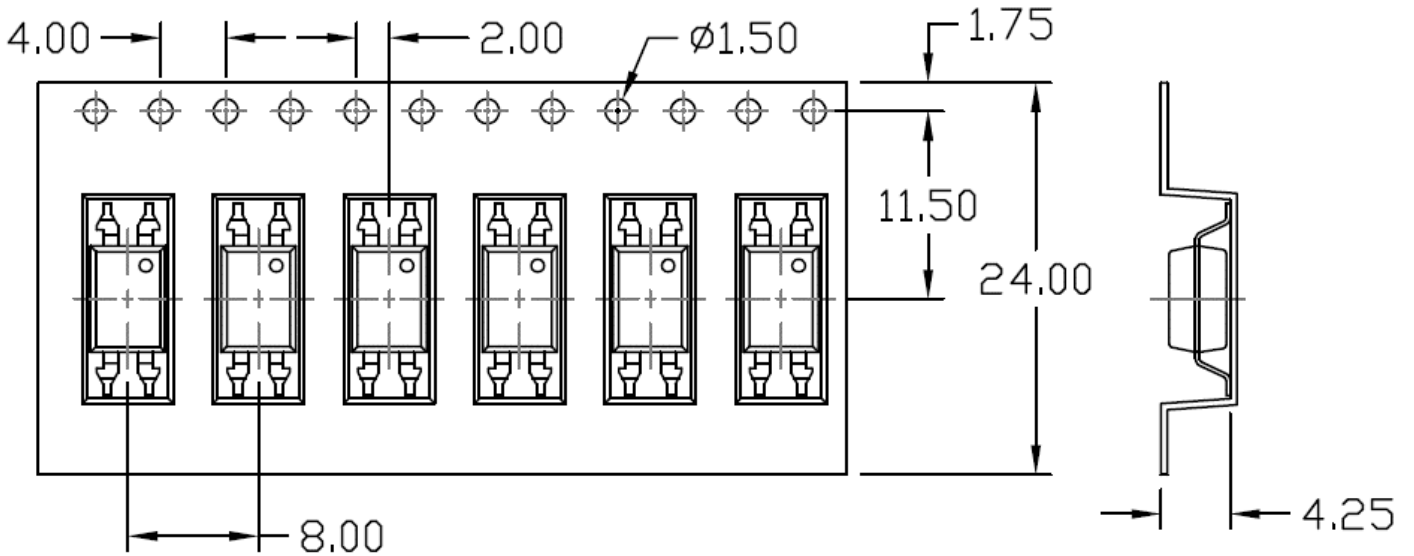


### Option S(T2) & SL(T2)



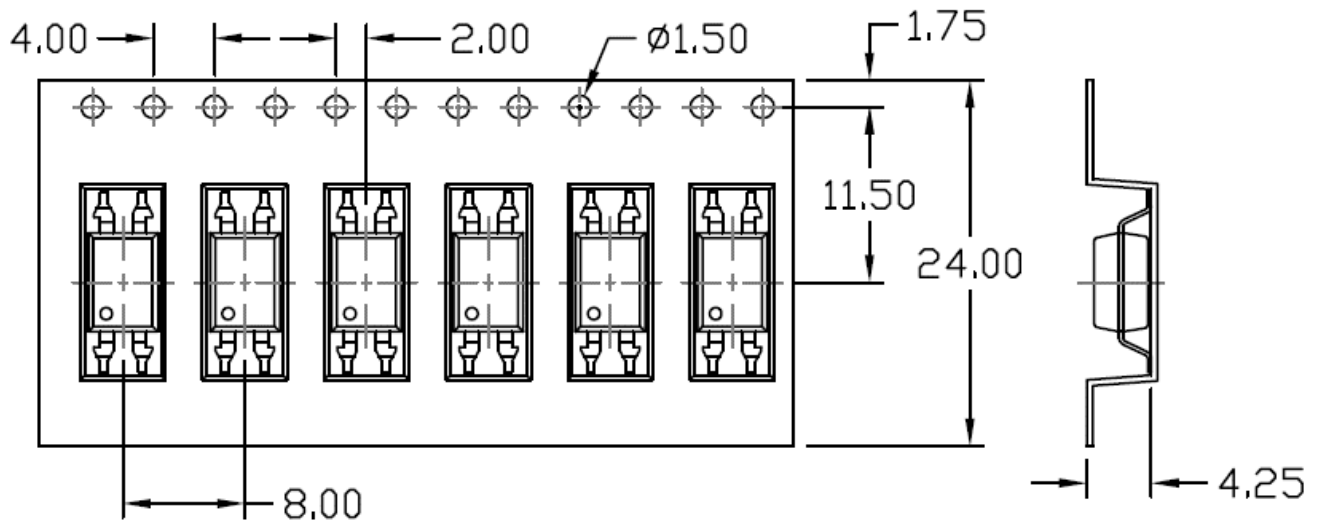
## Option SLM(T1)

Input Direction

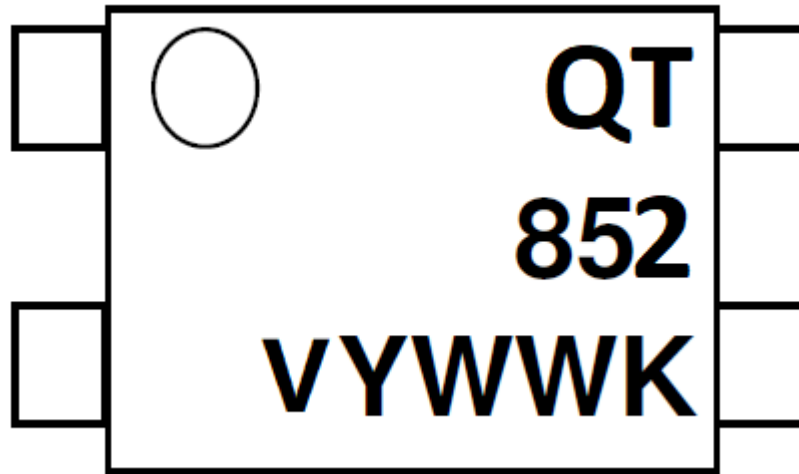


## Option SLM(T2)

Input Direction



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**Device Marking**

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



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**Ordering Information**

QT852(V)(Y)(Z)

V = VDE option (V or None)

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

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
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
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 QT852	1.0	02/12/2018

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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.