



DC Input 4-Pin Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- External Creepage $\geq 7.5\text{mm}$ (S/SL Type)
- External Creepage $\geq 8.0\text{mm}$ (SLM Type)
- Operating temperature range - 55 °C to 100 °C
- Regulatory Approvals
 - UL - UL1577 (E364000)
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898
 - IEC60065, IEC60950

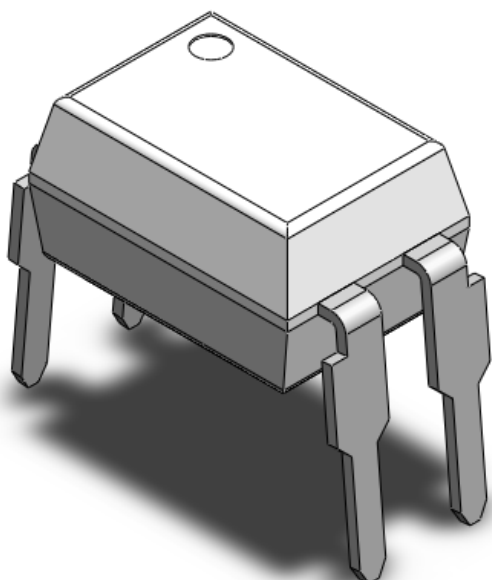
Description

The CT851 series consists of a high power transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead DIP package different lead forming options.

Applications

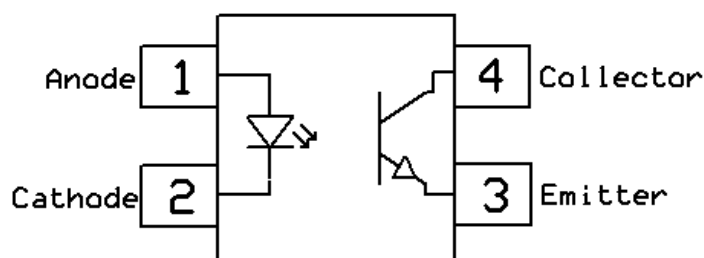
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

Package Outline



Note: Different lead forming options available. See package dimension.

Schematic



**Absolute Maximum Rating at 25°C**

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage	5000	V _{RMS}	
P _{TOT}	Total power dissipation	260	mW	
T _{OPR}	Operating temperature	-55 ~ +100	°C	
T _{STG}	Storage temperature	-55 ~ +150	°C	
T _{SOL}	Soldering temperature	260	°C	
Emitter				
I _F	Forward current	80	mA	
I _{F(TRANS)}	Peak transient current (≤1μs P.W,300pps)	1	A	
V _R	Reverse voltage	6	V	
P _D	Emitter power dissipation	150	mW	
Detector				
P _D	Detector power dissipation	300	mW	
B _{VCEO}	Collector-Emitter Breakdown Voltage	350	V	
B _{VECO}	Emitter-Collector Breakdown Voltage	7	V	
I _C	Collector Current	100	mA	



CT851 Series

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Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Emitter Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_F	Forward voltage	$I_F = 10\text{mA}$	-	1.2	1.4	V	
I_R	Reverse Current	$V_R = 6\text{V}$	-	-	5	μA	
C_{IN}	Input Capacitance	$f = 1\text{MHz}$	-	30	-	pF	

Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 0.1\text{mA}$	350	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 0.1\text{mA}$	7	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 200\text{V}$, $I_F = 0\text{mA}$	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	$I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$	50	-	600	%	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}$, $I_C = 1\text{mA}$	-	-	0.4	V	
R_{IO}	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	5×10^{10}	-	-	Ω	
C_{IO}	Isolation Capacitance	$f = 1\text{MHz}$	-	0.5	1	pF	

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
t_r	Rise Time	$I_C = 2\text{mA}$, $V_{CE} = 2\text{V}$, $R_L = 100\Omega$	-	6	-	μs	
t_f	Fall Time		-	8	-		



Typical Characteristic Curves

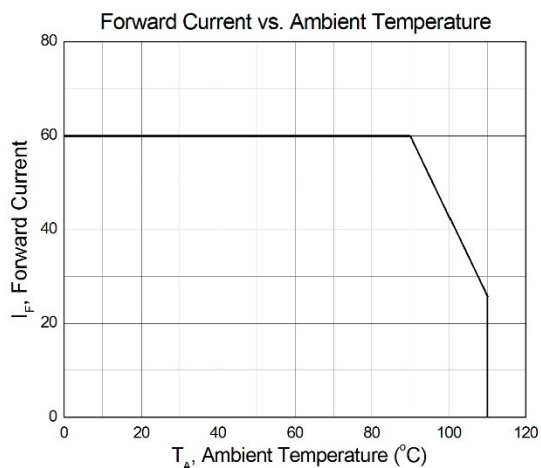


Figure 1

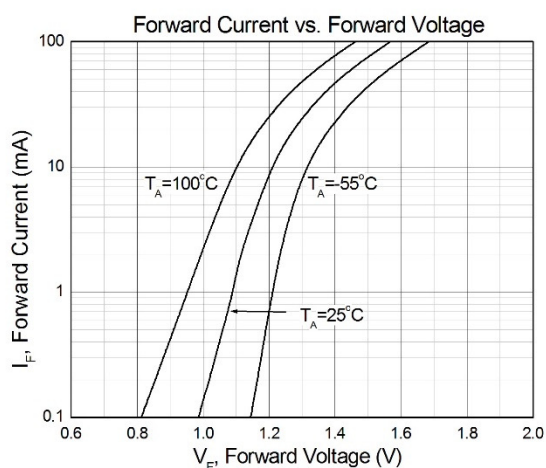


Figure 2

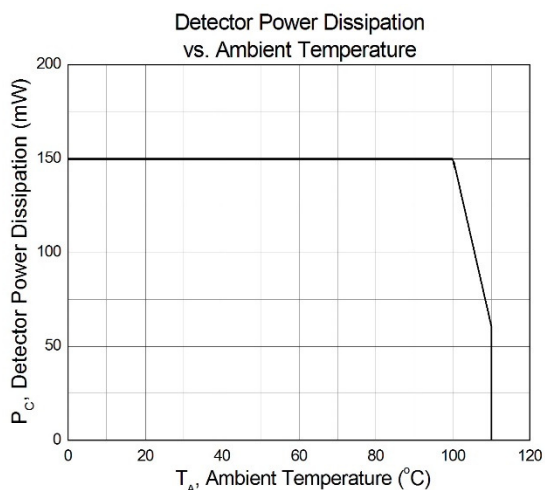


Figure 3

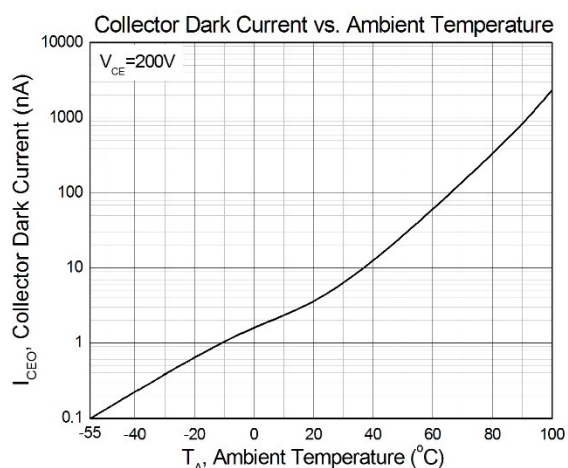


Figure 4

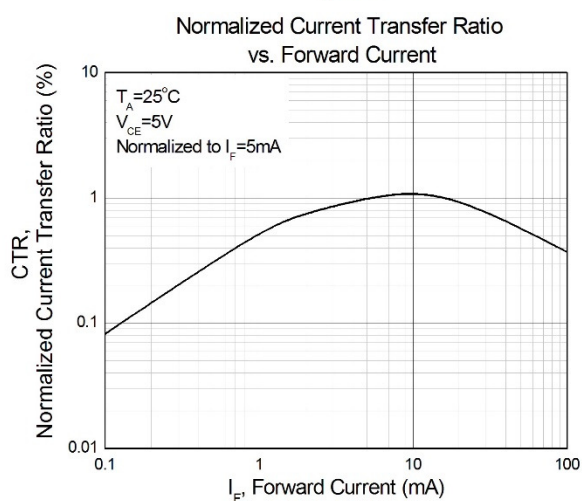


Figure 5

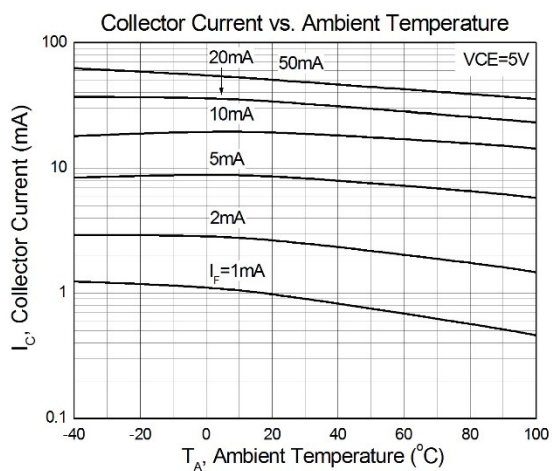


Figure 6



DC Input 4-Pin Phototransistor Optocoupler

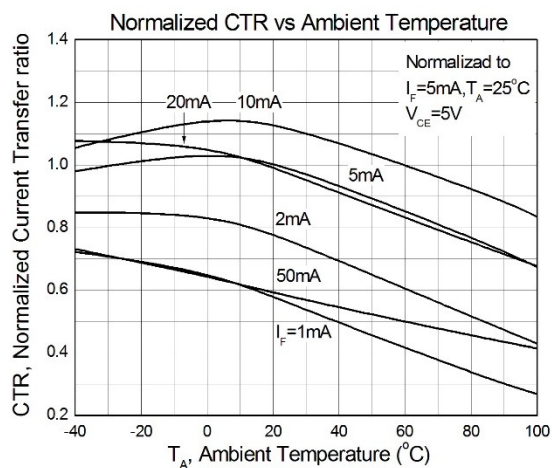


Figure 7

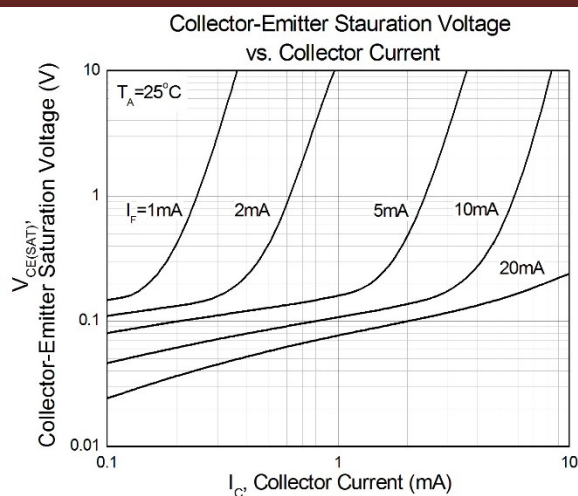


Figure 8

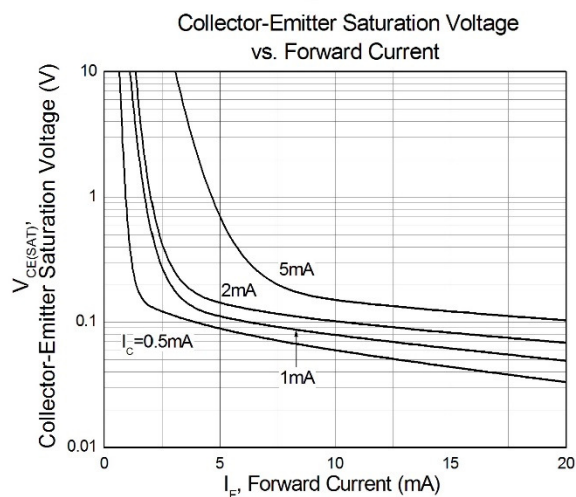


Figure 9

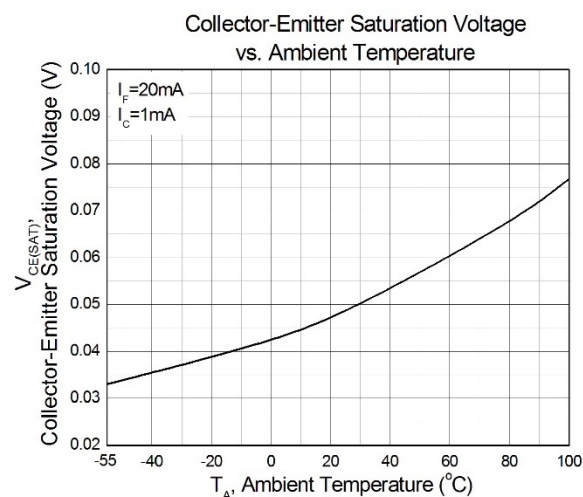


Figure 10

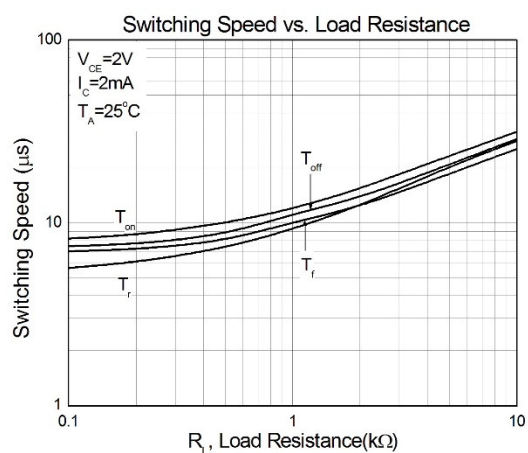


Figure 11



Test Circuit

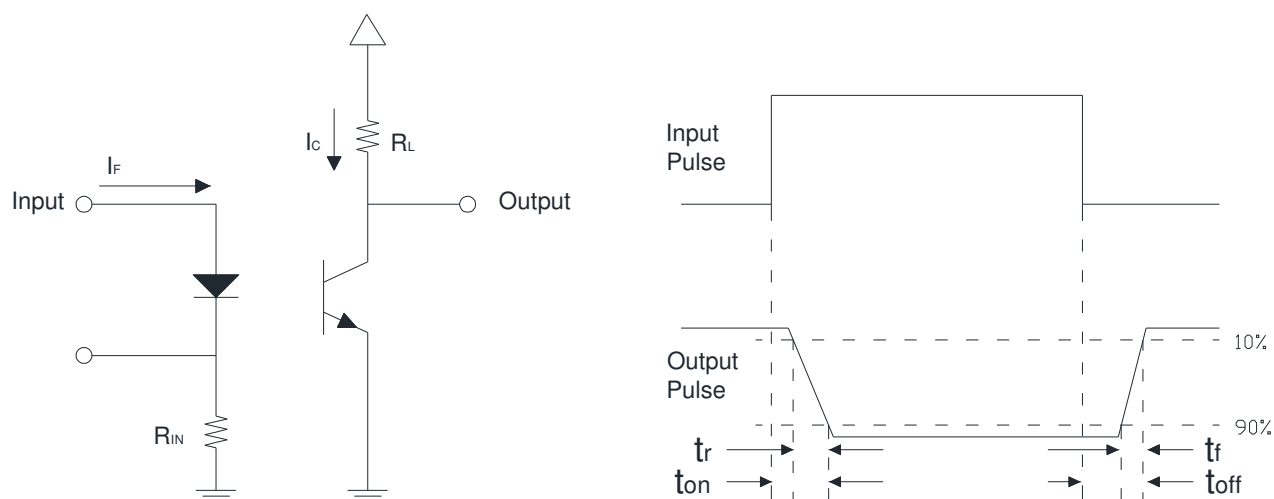
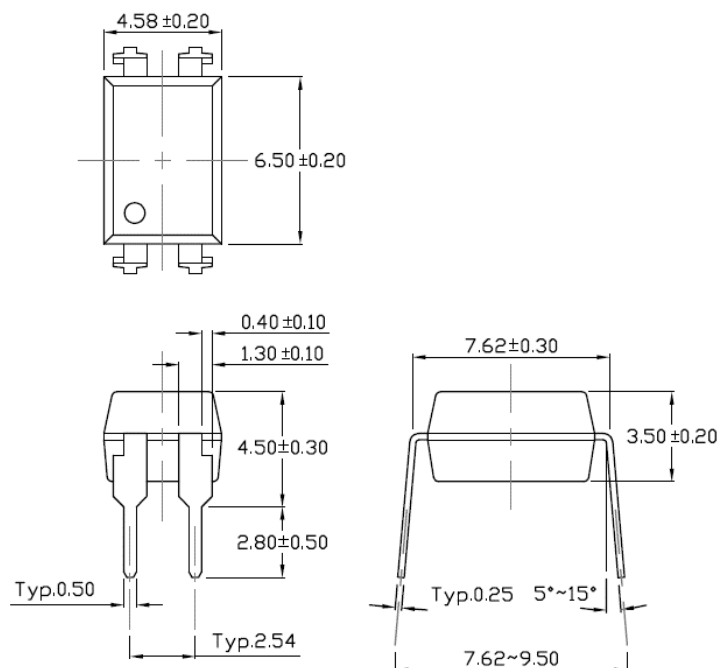


Figure 12: Switching Time Test Circuits

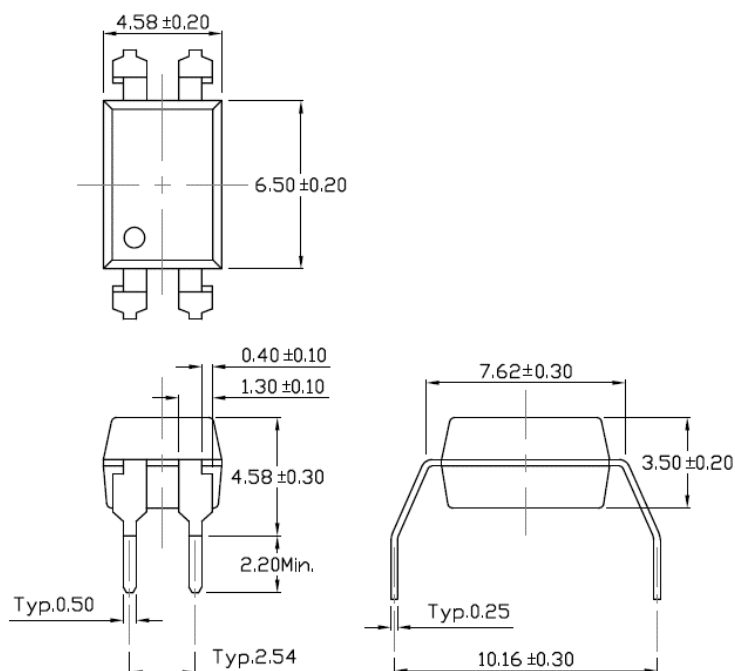


Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole



Gullwing (400mil) Lead Forming – Through Hole (M Type)

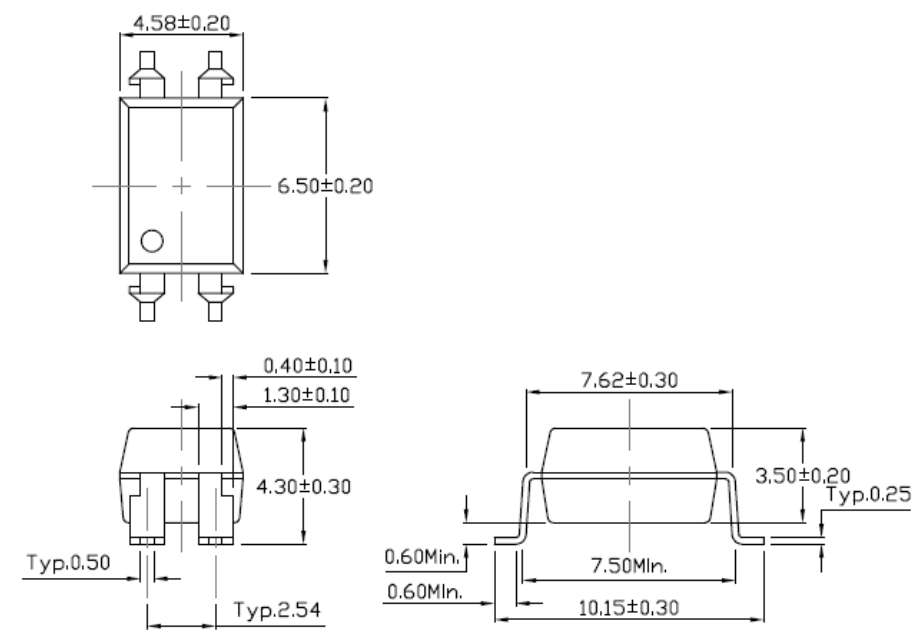




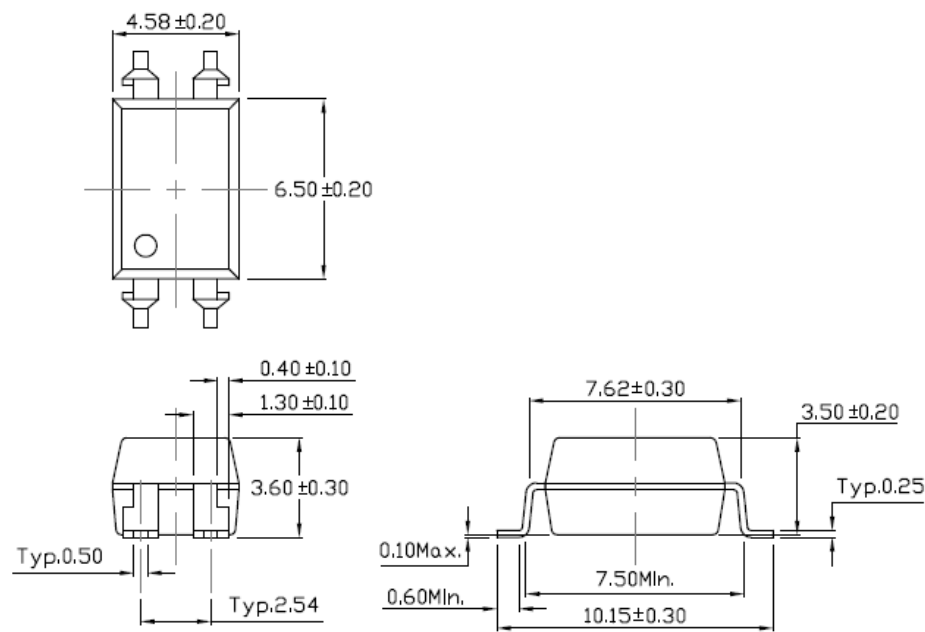
CT851 Series

DC Input 4-Pin Phototransistor Optocoupler

Surface Mount Lead Forming (S Type)

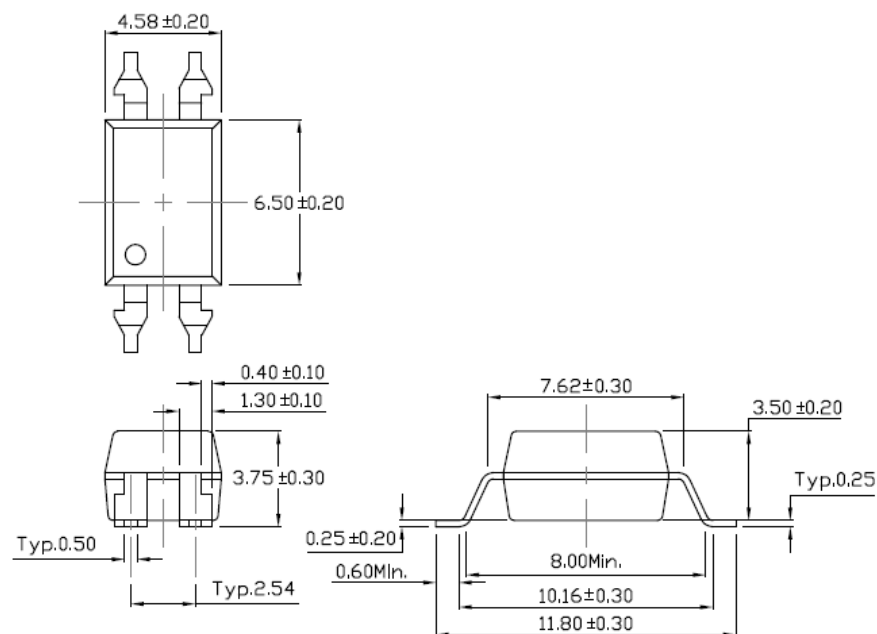


Surface Mount (Low Profile) Lead Forming (SL Type)





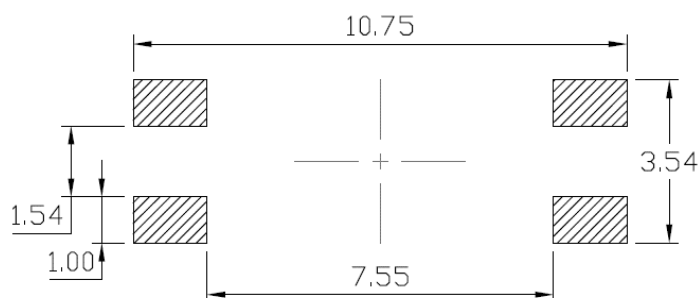
Surface Mount (Gullwing) Lead Forming (SLM Type)



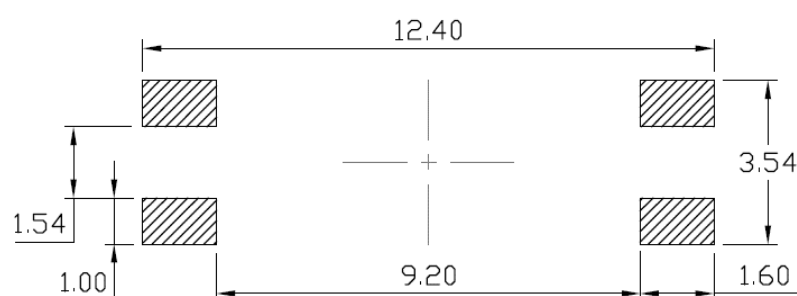


Recommended Solder Mask Dimensions in mm unless otherwise stated

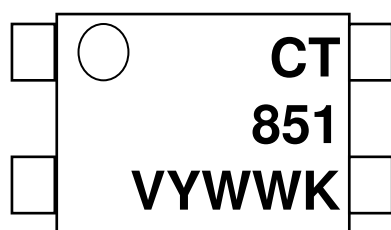
Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



Surface Mount (Gullwing) Lead Forming



Marking Information



Note:

- CT : Denotes "CT Micro"
- 851 : Part Number
- V : VDE Option
- R : CTR Rank
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code



Ordering Information**CT851(V)(Y)(Z)**

V = VDE Option (V or None)

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

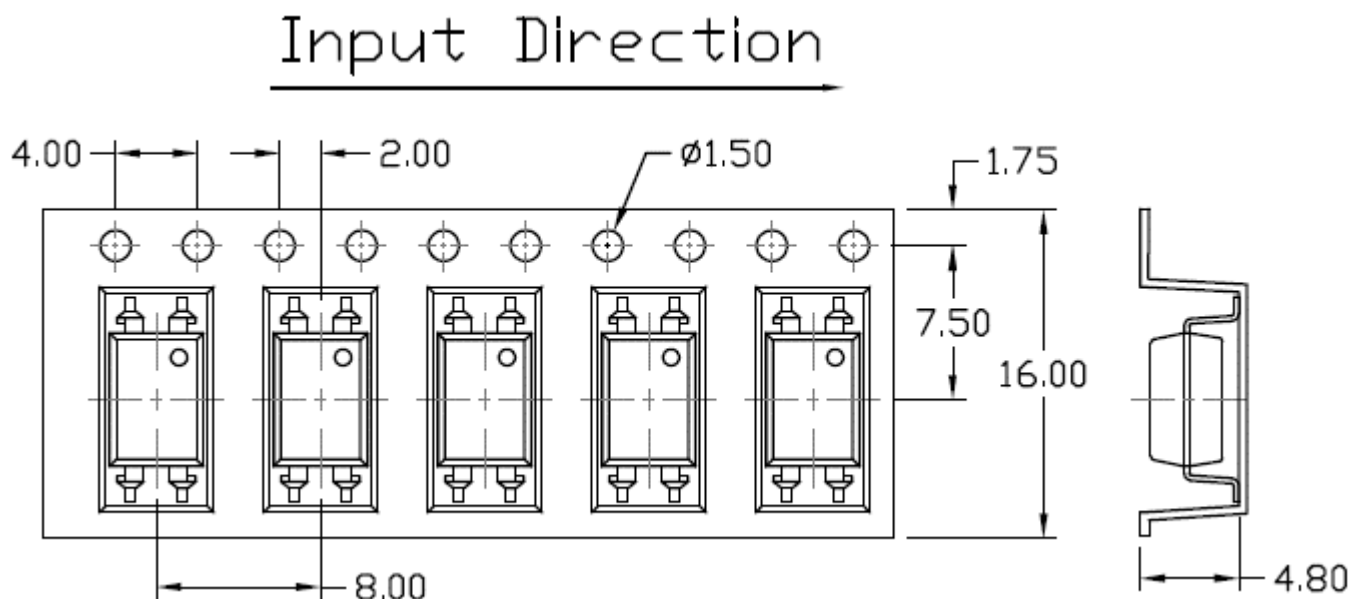
Z = Tape and reel option (T1, T2, T3, T4 or none)

<i>Option</i>	<i>Description</i>	<i>Quantity</i>
None	Standard 4 Pin Dip	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
S(T3)	Surface Mount Lead Forming – With Option 3 Taping	1000 Units/Reel
S(T4)	Surface Mount Lead Forming – With Option 4 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1500 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T3)	Surface Mount (Low Profile) Lead Forming– With Option 3 Taping	1000 Units/Reel
SL(T4)	Surface Mount (Low Profile) Lead Forming – With Option 4 Taping	1000 Units/Reel
SLM(T1)	Surface Mount (Gullwing) Lead Forming– With Option 1 Taping	1500 Units/Reel
SLM(T2)	Surface Mount (Gullwing) Lead Forming – With Option 2 Taping	1500 Units/Reel

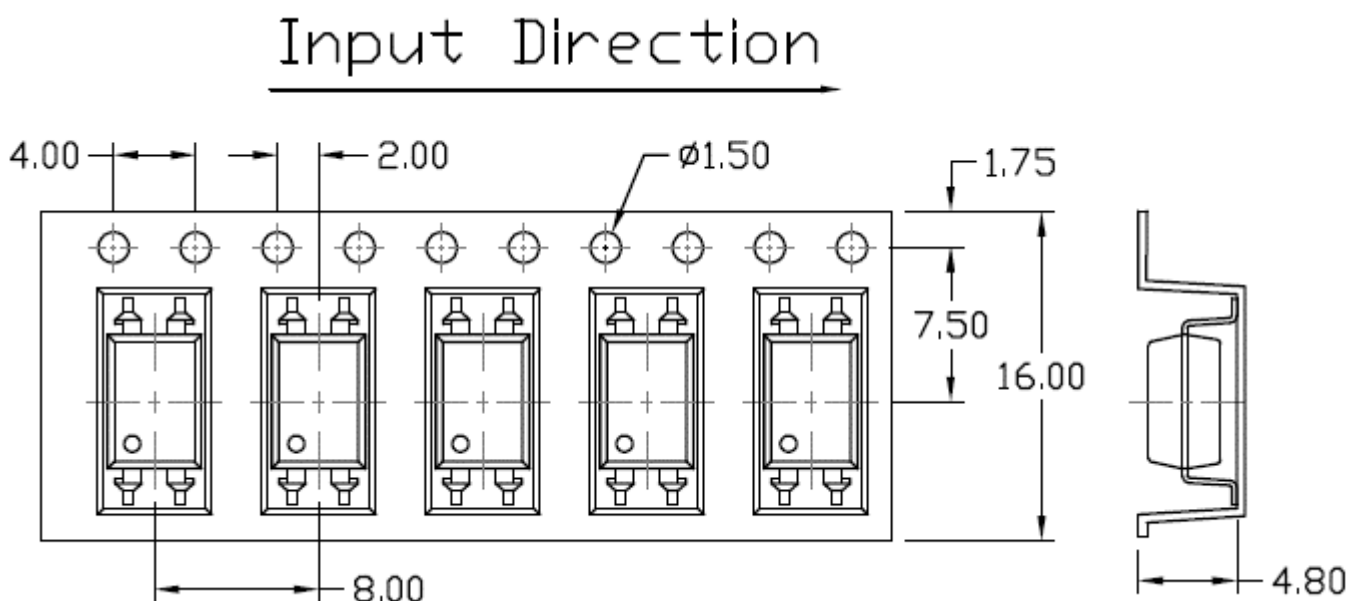


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)

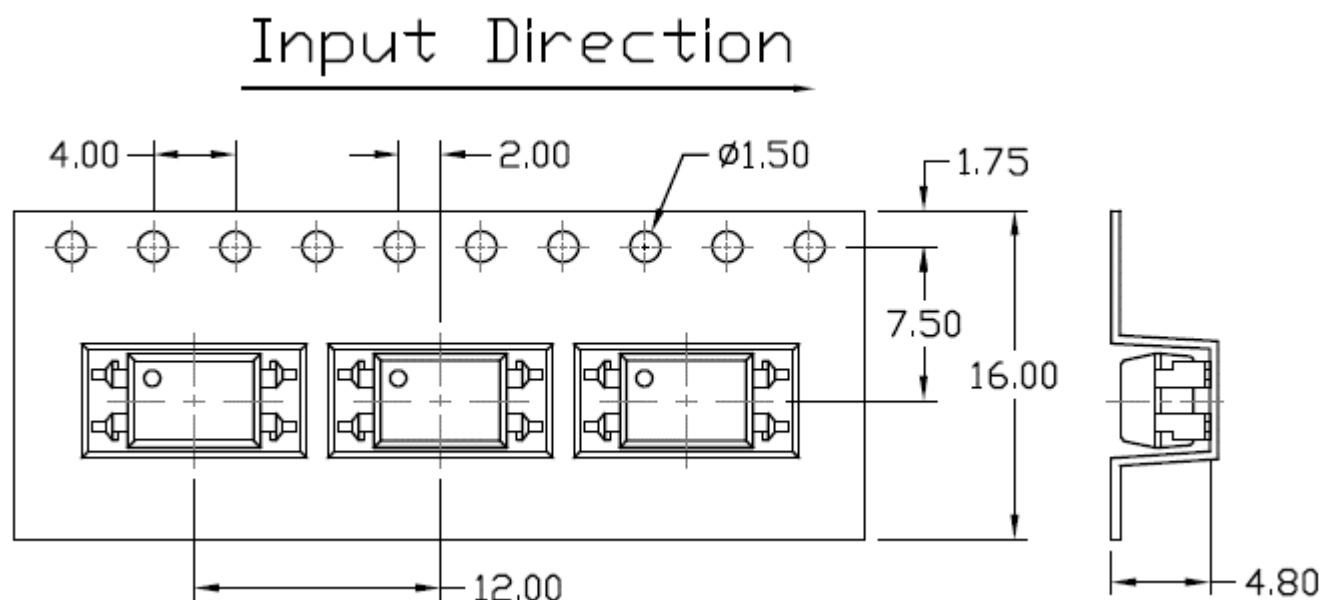


Option S(T2) & SL(T2)

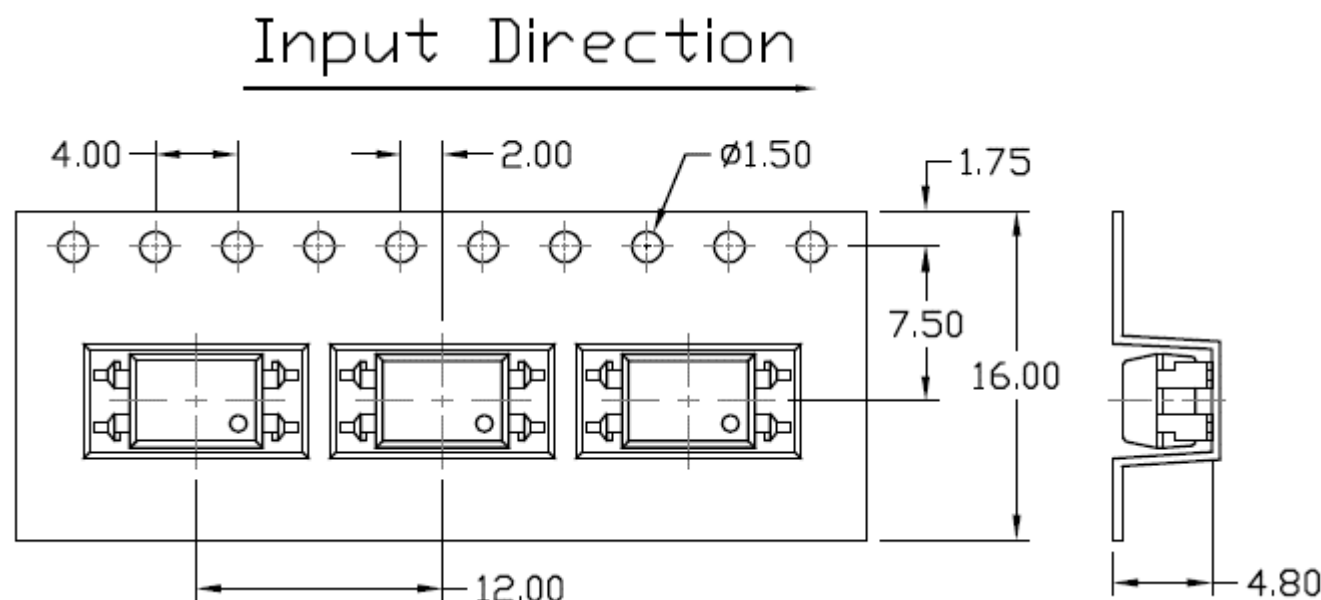




Option S(T3) & SL(T3)



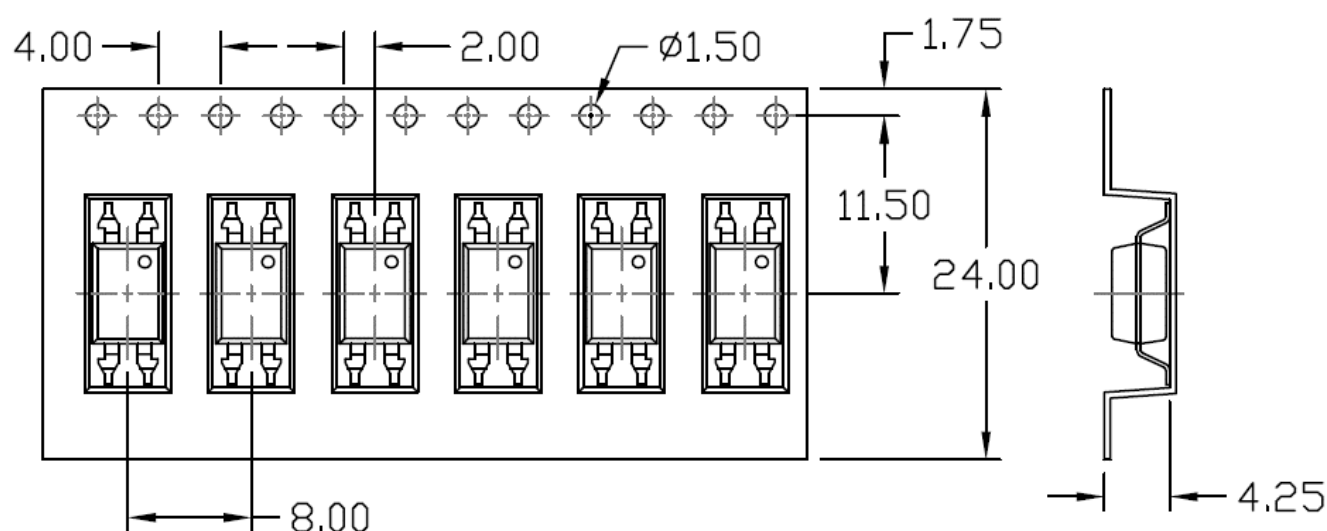
Option S(T4) & SL(T4)





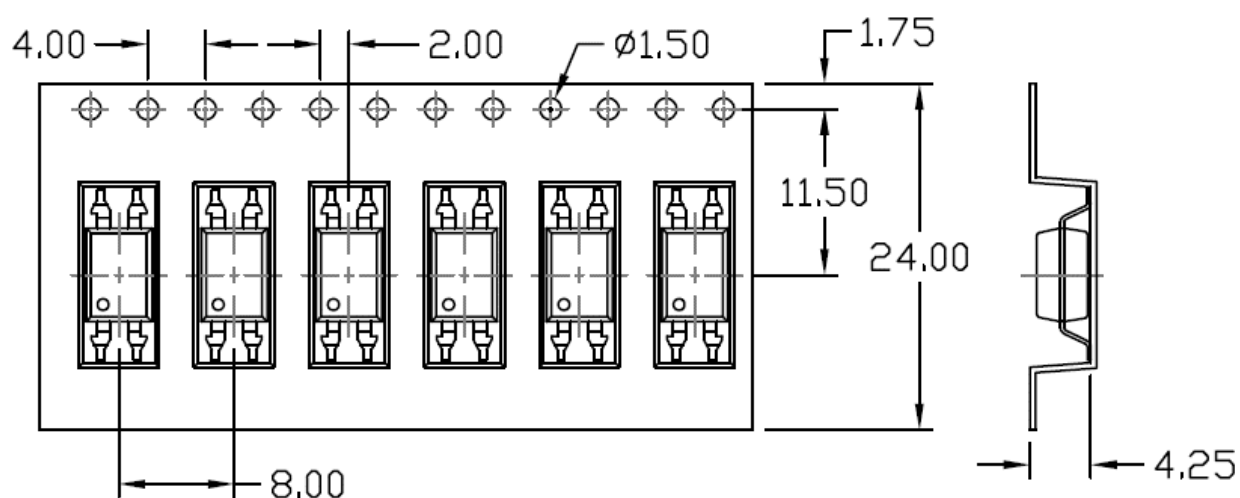
Option SLM(T1)

Input Direction



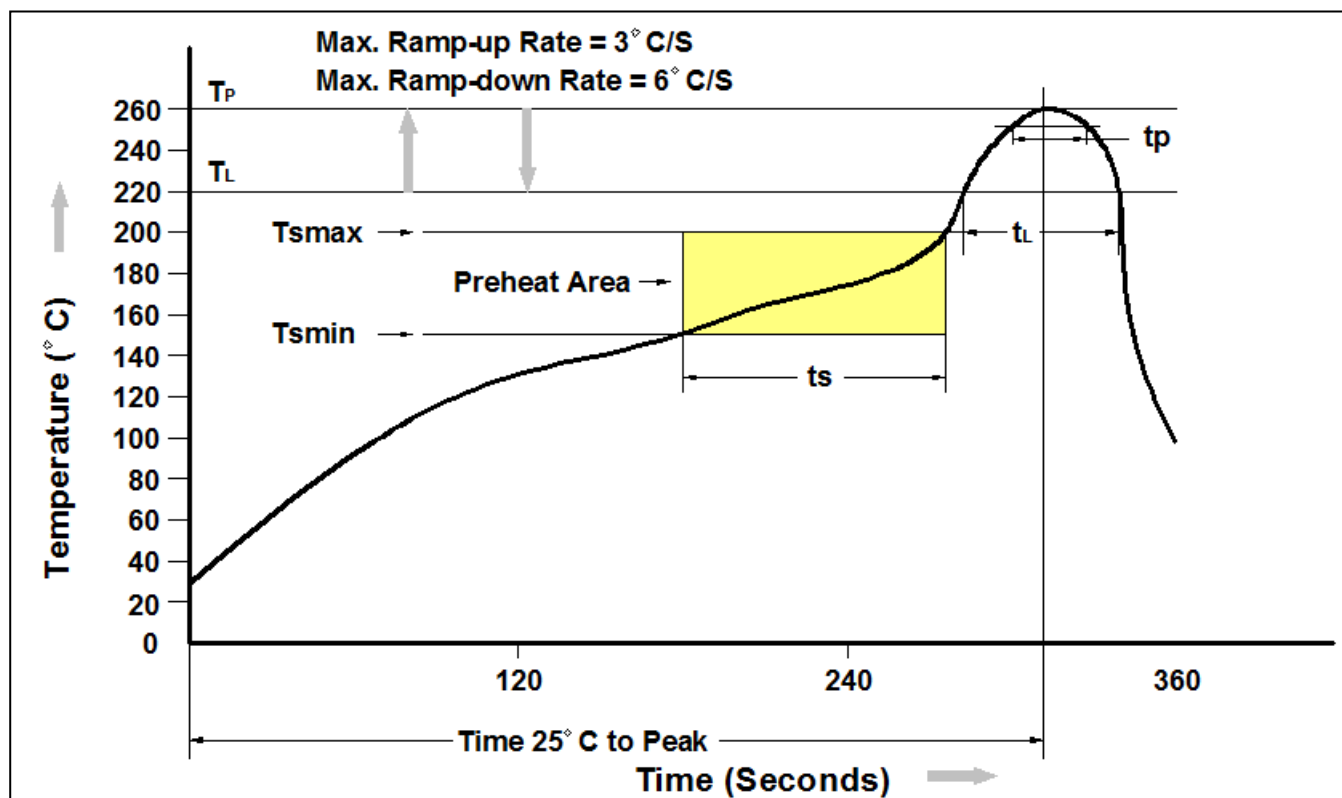
Option SLM(T2)

Input Direction





Reflow Profile



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



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