



DC Input 4-Pin Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating Temperature range - 55 °C to 110 °C
- Low current operation guaranteed

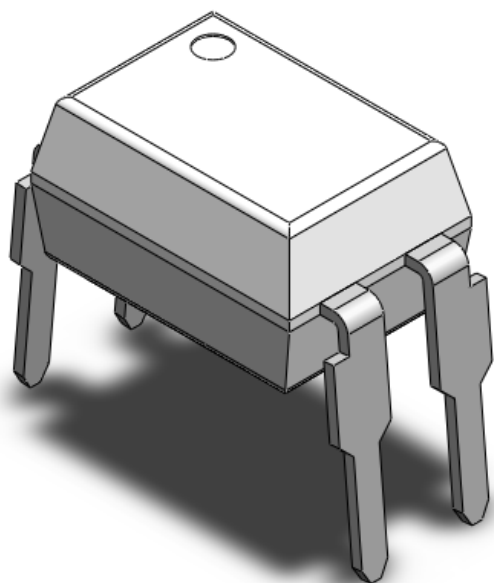
Applications

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

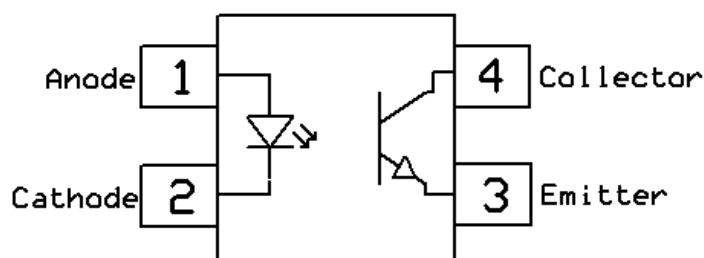
Description

The CT816D3 series consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead DIP package with bending options.

Package Outline



Schematic





DC Input 4-Pin Phototransistor Optocoupler

Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage	5000	V _{RMS}	
P _{TOT}	Total power dissipation	200	mW	
T _{OPR}	Operating temperature	-55 ~ +110	°C	
T _{STG}	Storage temperature	-55 ~ +150	°C	
T _{SOL}	Soldering temperature	260	°C	
Emitter				
I _F	Forward current	60	mA	
I _{F(TRANS)}	Peak transient current (≤1μs P.W,300pps)	1	A	
V _R	Reverse voltage	6	V	
P _D	Emitter power dissipation	100	mW	
Detector				
P _D	Detector power dissipation	150	mW	
B _{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B _{VECO}	Emitter-Collector Breakdown Voltage	6	V	
I _C	Collector Current	50	mA	



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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	$I_F=10\text{mA}$		1.24	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	$I_C = 100\mu\text{A}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 100\mu\text{A}$	6	-	-	V	
I_{CEO}	Collector-Emitter Dark Current	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$	-	-	100	nA	

Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	300	-	450	%	
		$I_F = 0.1\text{mA}, V_{CE} = 0.4\text{V}$	10	30	-		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}, I_C = 1\text{mA}$	-	0.1	0.2	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	$I_C = 2\text{mA}, V_{CE} = 2\text{V}, R_L = 100$	-	6	-	μs	
t_f	Fall Time		-	8	-		



Typical Characteristic Curves

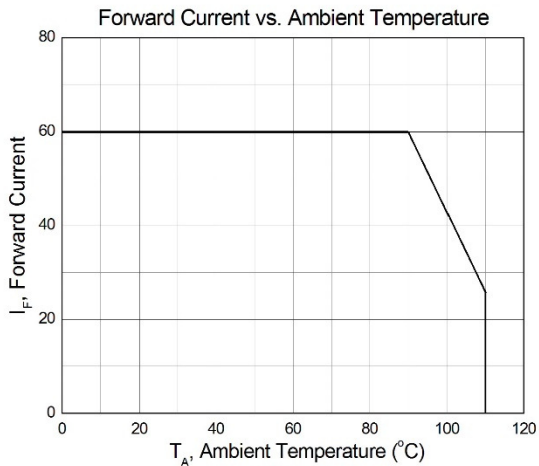


Figure 1

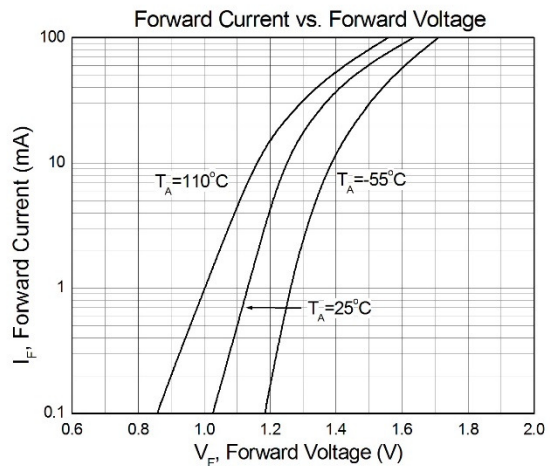


Figure 2

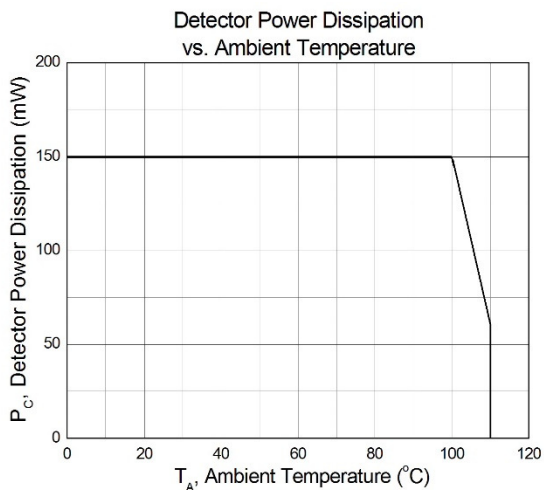


Figure 3

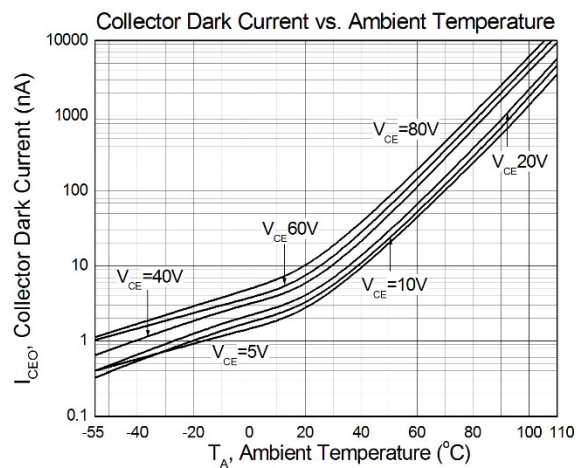


Figure 4

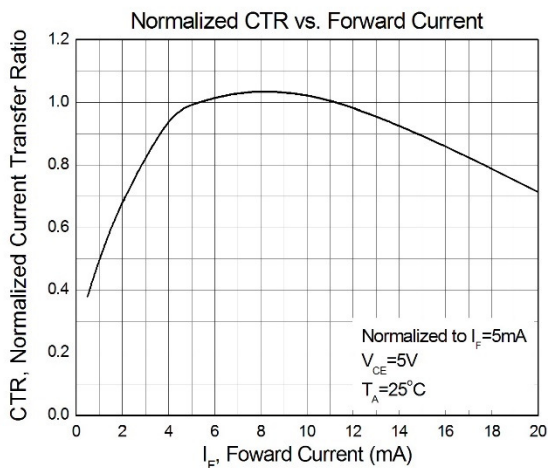


Figure 5

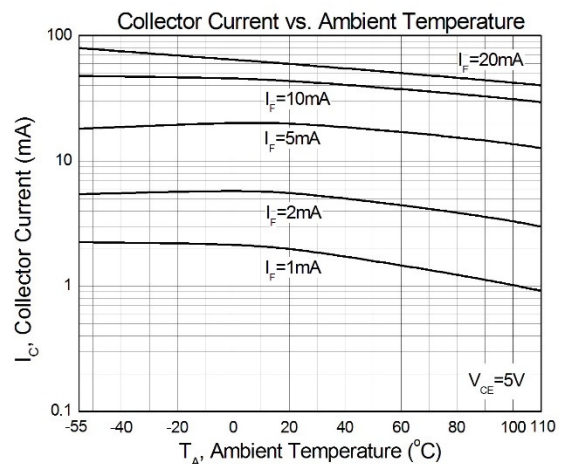


Figure 6



DC Input 4-Pin Phototransistor Optocoupler

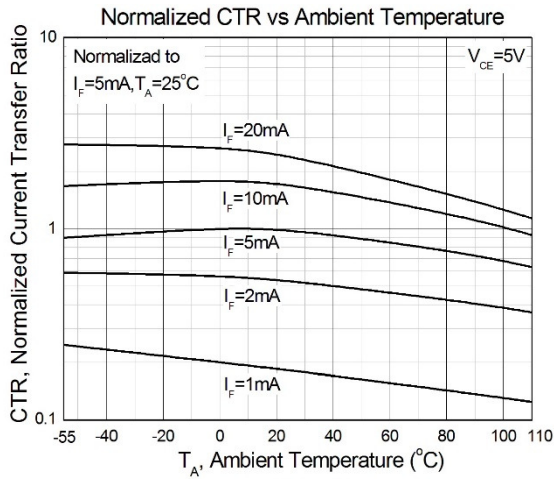


Figure 7

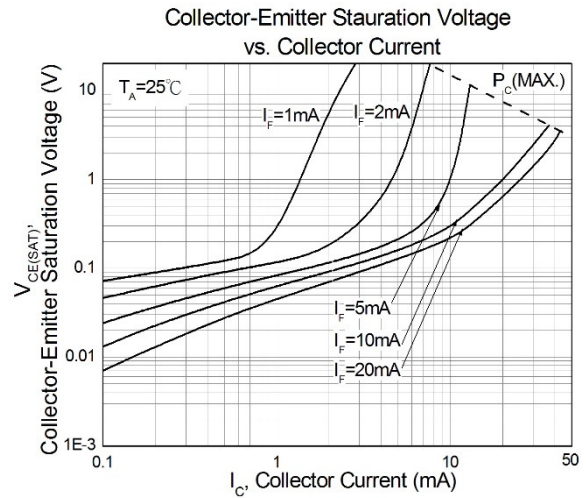


Figure 8

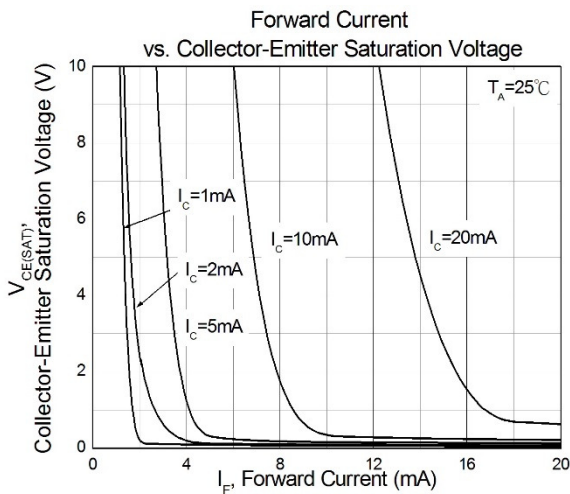


Figure 9

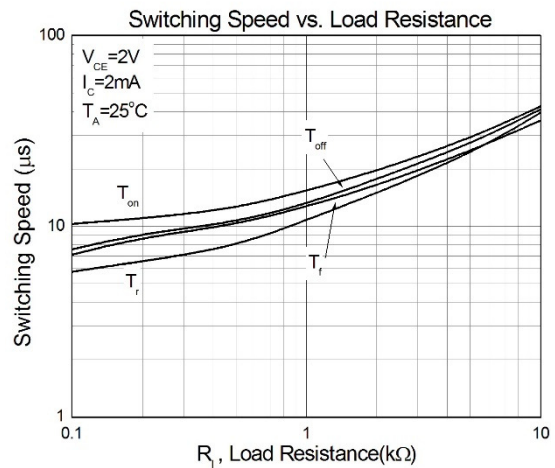


Figure 10

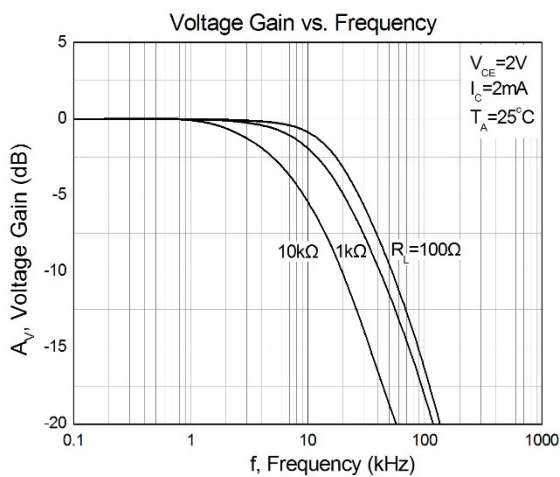


Figure 11



DC Input 4-Pin Phototransistor Optocoupler

Test Circuit

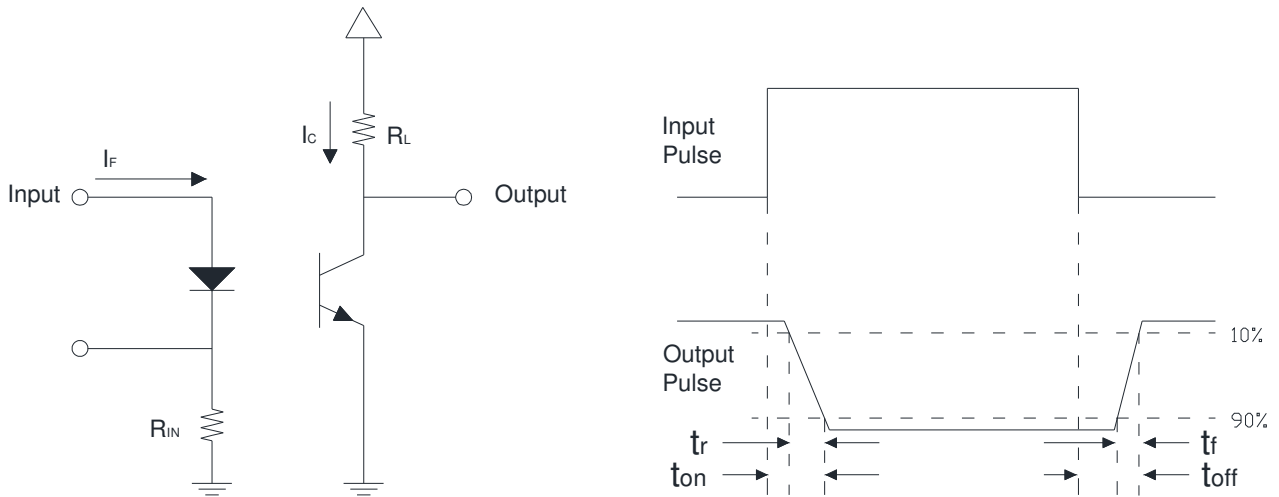
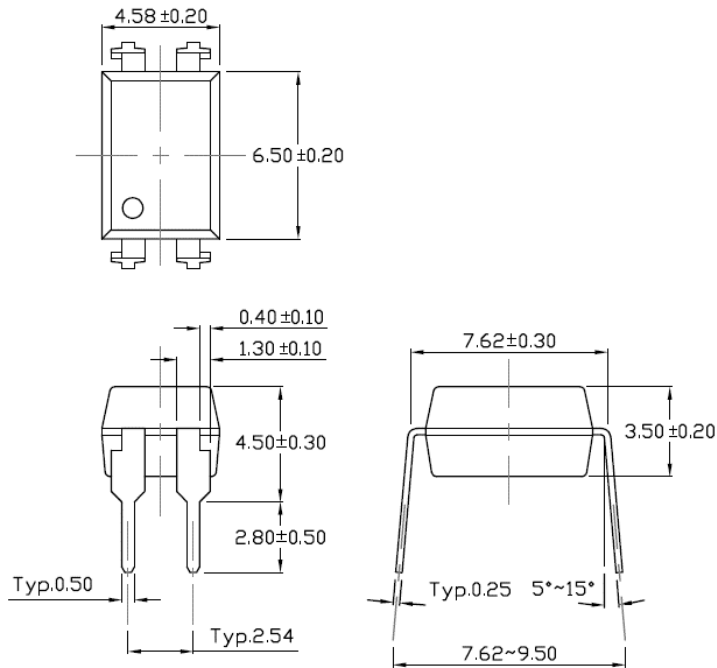


Figure 12: Switching Time Test Circuits

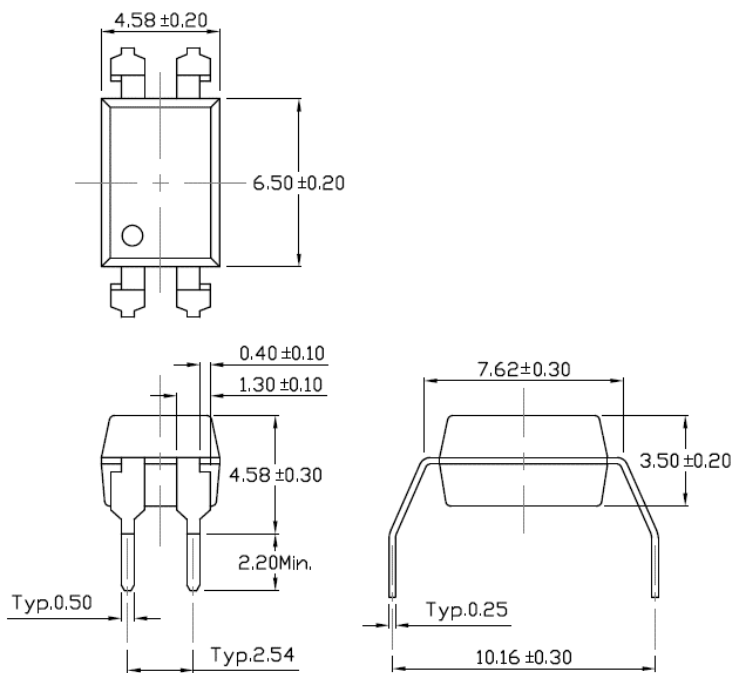


Package Dimension *Dimensions in mm unless otherwise stated*

Standard DIP – Through Hole

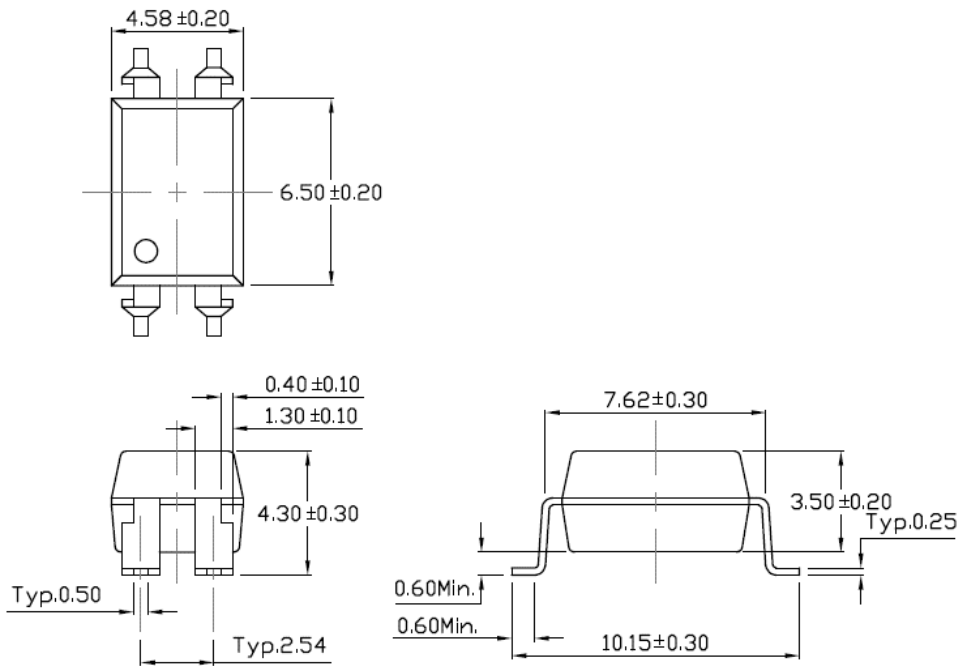


Gullwing (400mil) Lead Forming – Through Hole (M Type)

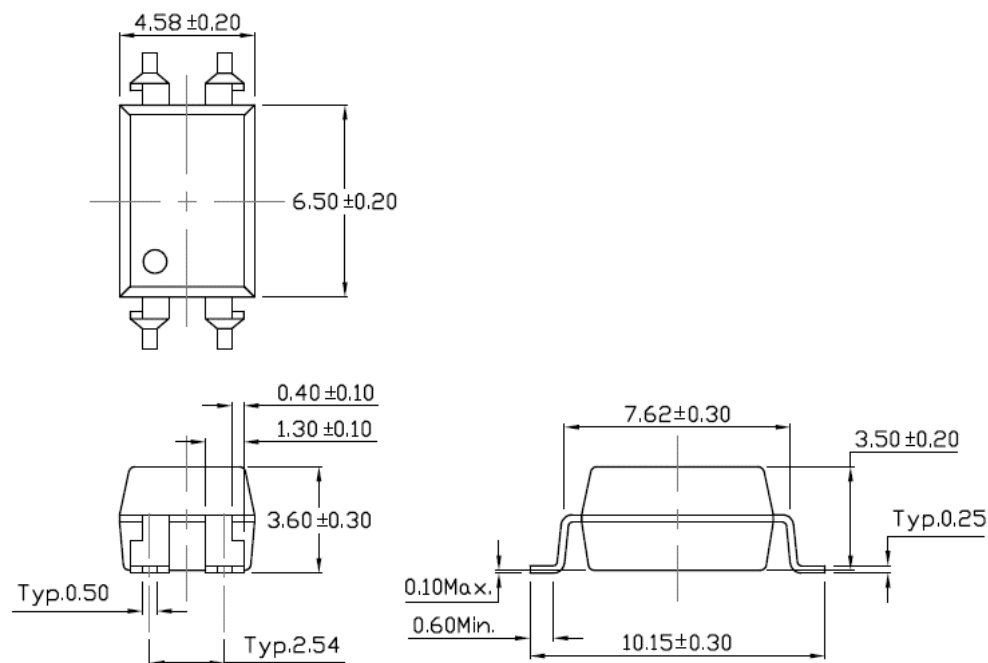




Surface Mount Lead Forming (S Type)



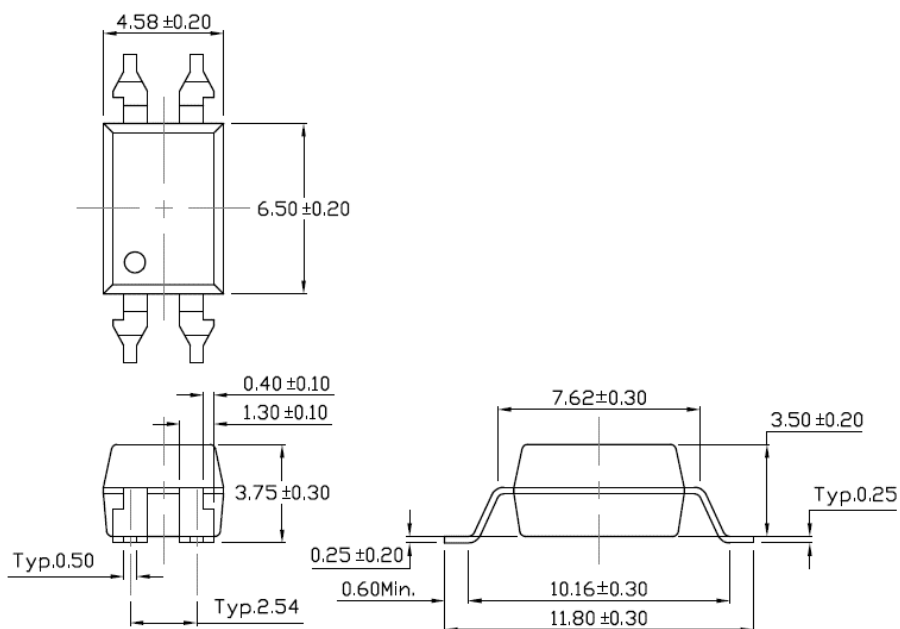
Surface Mount (Low Profile) Lead Forming (SL Type)





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Surface Mount (Gullwing) Lead Forming (SLM Type)

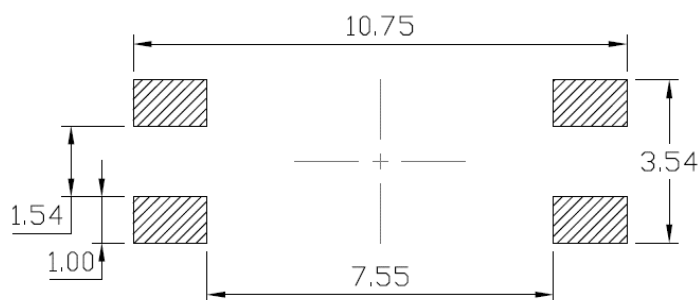




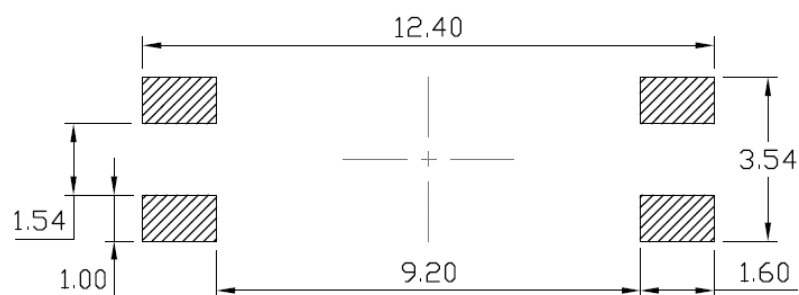
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Recommended Solder Mask *Dimensions in mm unless otherwise stated*

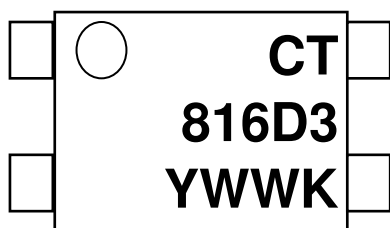
Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



Surface Mount (Gullwing) Lead Forming



Marking Information



Note:

- CT : Denotes "CT Micro"
- 816 : Part Number
- D3 : CTR Rank
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code

**DC Input 4-Pin Phototransistor Optocoupler****Ordering Information****CT816D3(Y)(Z)-HG**

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

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

H = Lead frame option (H: Iron, None: Copper)

G= Material option (G: Green, None: Non-green)

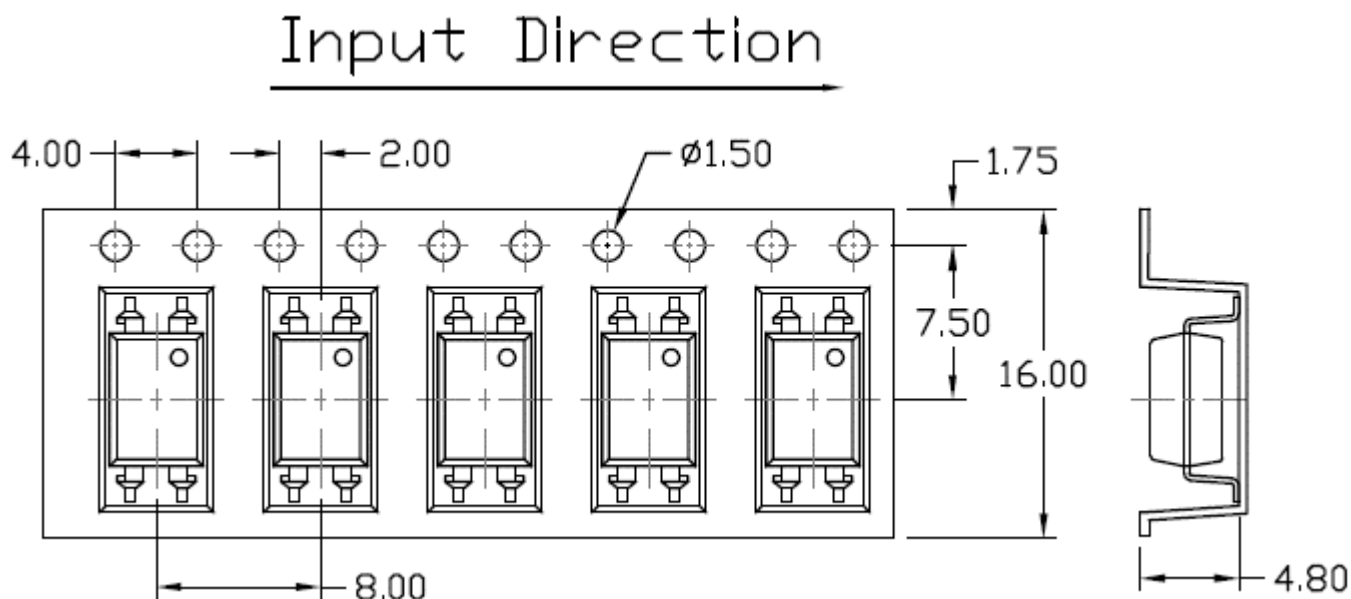
Option	Description	Quantity
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
S(T3)	Surface Mount Lead Forming – With Option 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



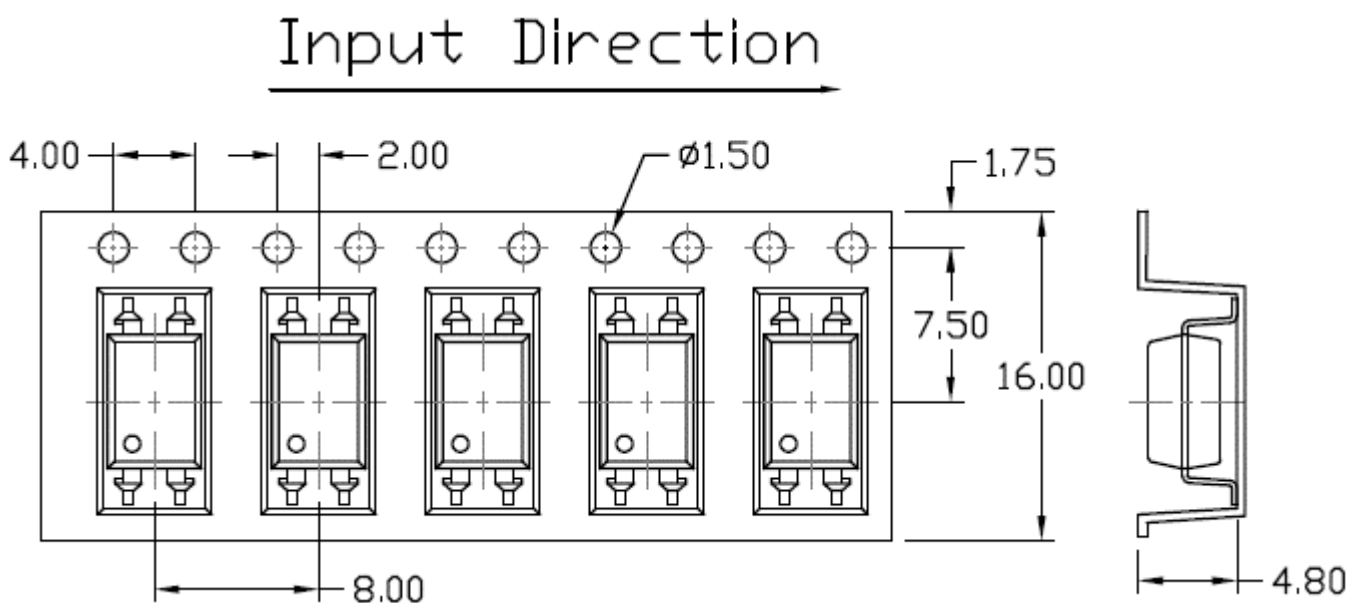
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option S(T1) & SL(T1)



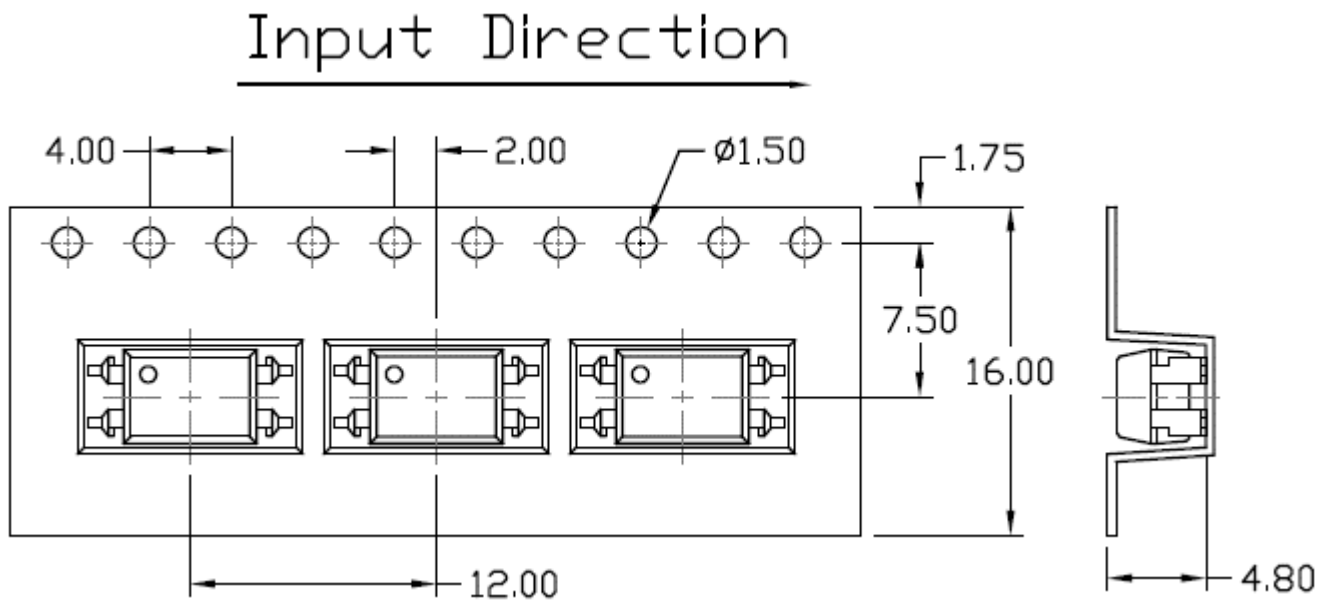
Option S(T2) & SL(T2)



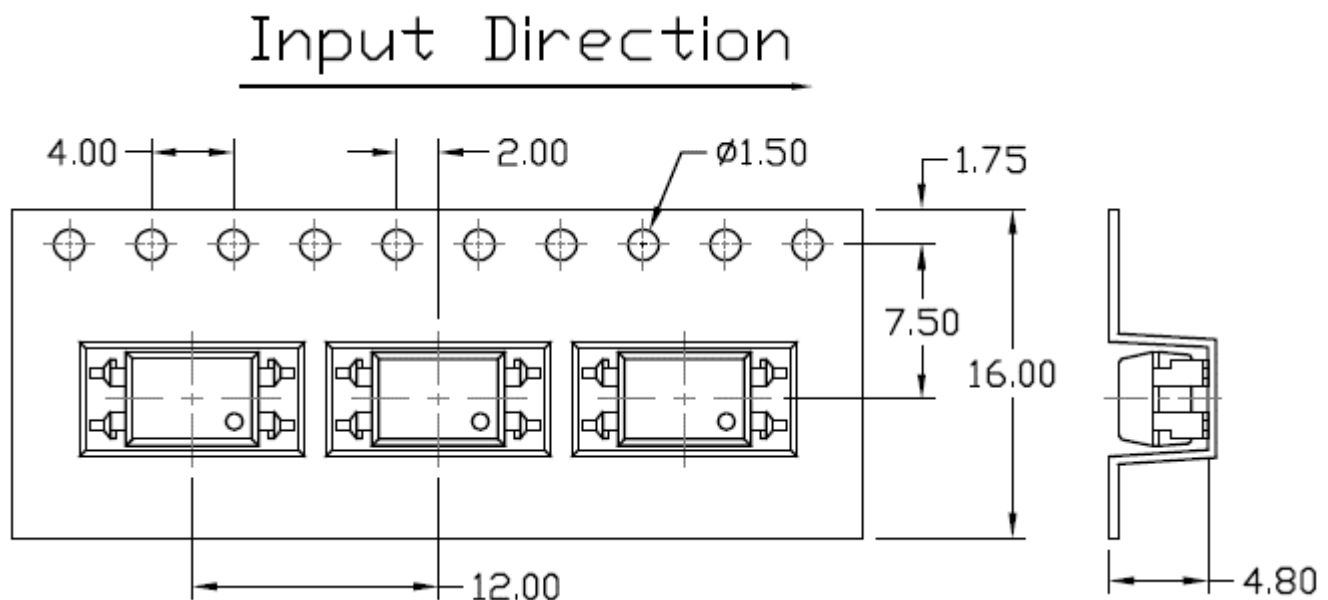


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Option S(T3) & SL(T3)



Option S(T4) & SL(T4)

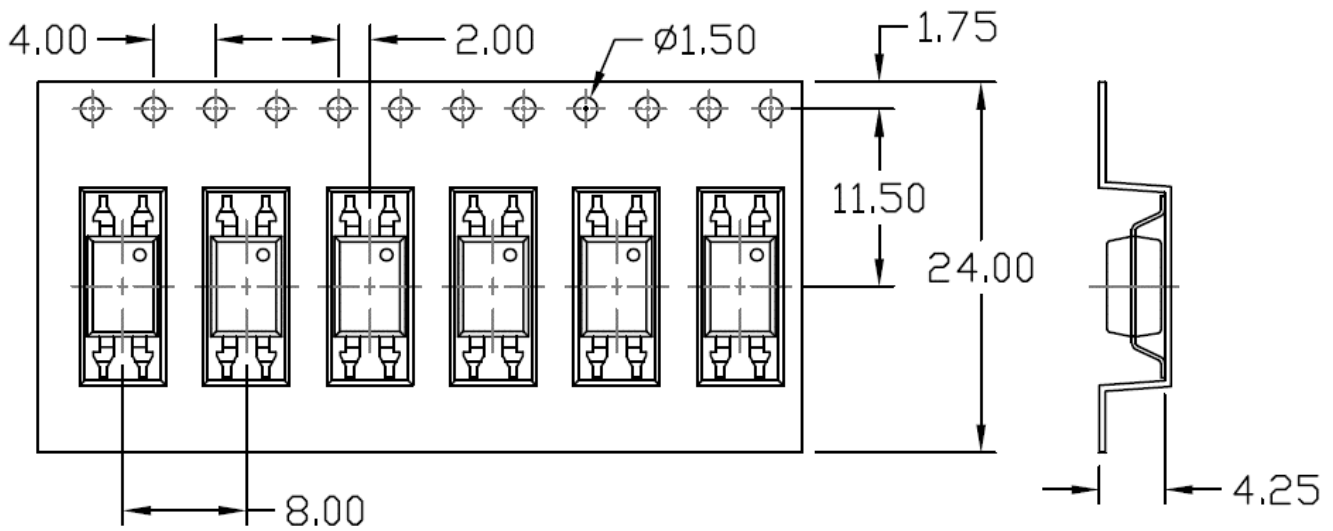




DC Input 4-Pin Phototransistor Optocoupler

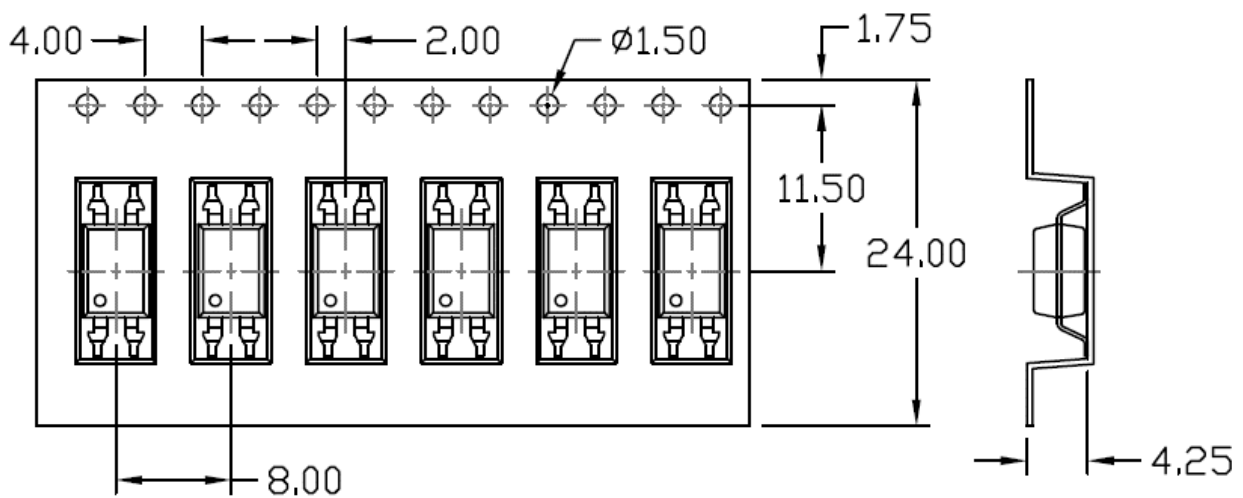
Option SLM(T1)

Input Direction



Option SLM(T2)

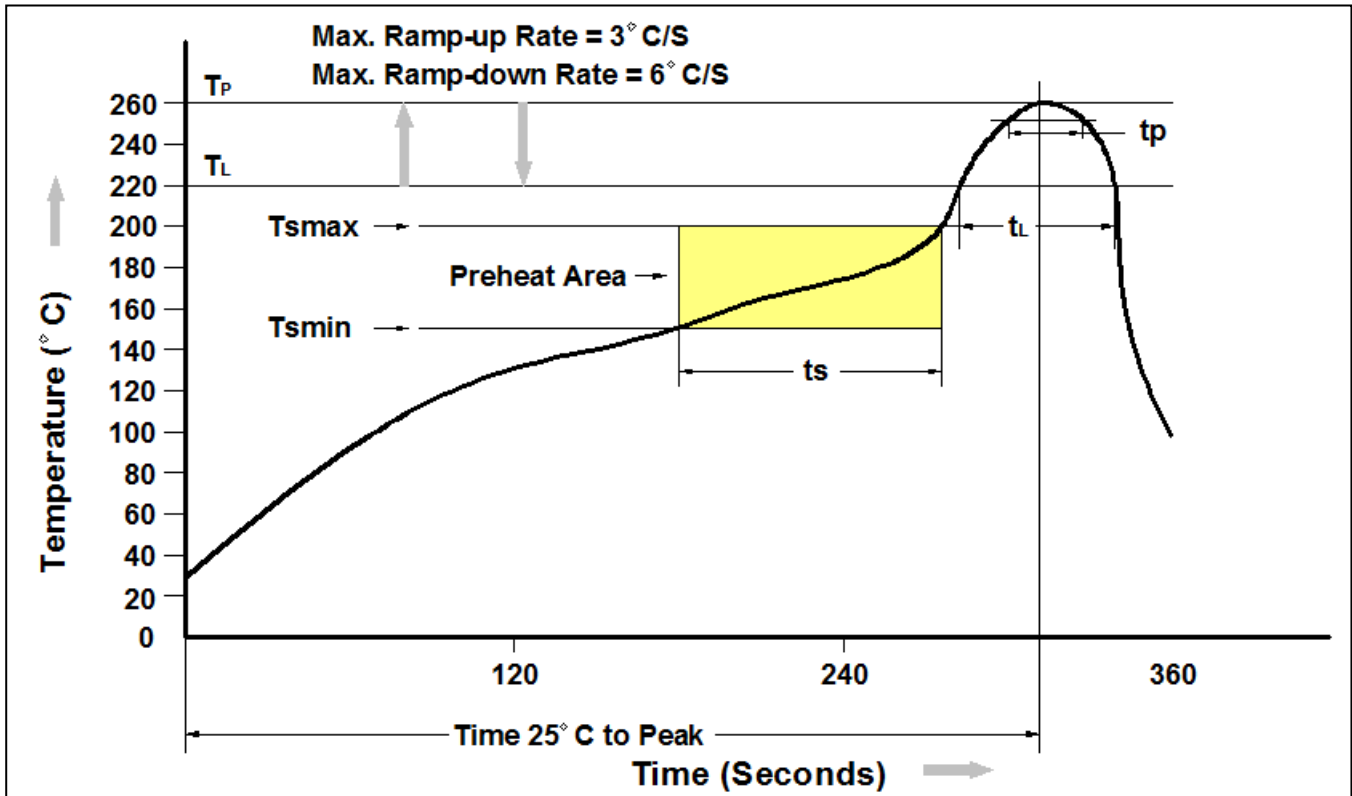
Input Direction





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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 (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.



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