



# THE DATASHEET OF PS2501-4X





**PS2501-1, PS2501-2, PS2501-4**



**DESCRIPTION**

The PS2501-1, PS2501-2 and PS2501-4 series of optically coupled isolator consist of an infrared light emitting diode and an NPN silicon photo transistor in a space efficient Dual In Line Plastic Package.

**FEATURES**

- AC Isolation Voltage 5300V<sub>RMS</sub>
- CTR Selections Available
- Wide Operating Temperature Range -30°C to +100°C
- Lead Free and RoHS Compliant
- UL File E91231 Package Code "EE"
- VDE Approval Certificate No. 40028086

**APPLICATIONS**

- Computer Terminals
- Industrial System Controllers
- Measuring Instruments
- Signal Transmission between Systems of Different Potentials and Impedances

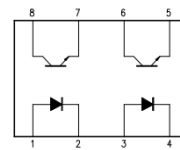
**ORDER INFORMATION**

- Add X after PN for VDE Approval
- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel  
(Available for PS2501-1SM and PS2501-2SM)

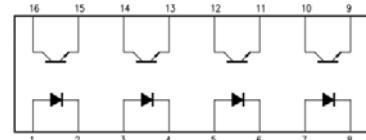
**PS2501-1**



**PS2501-2**



**PS2501-4**



**ABSOLUTE MAXIMUM RATINGS**

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

**Input**

Forward Current	50mA
Reverse Voltage	6V
Power dissipation	70mW

**Output**

Collector to Emitter Voltage BV <sub>CEO</sub>	80V
Emitter to Collector Voltage BV <sub>ECO</sub>	6V
Collector Current	50mA
Power Dissipation	150mW

**Total Package**

Operating Temperature	-30 to +100 °C
Storage Temperature	-55 to +125 °C
Total Power Dissipation (derate linearly 2.67mW/°C at >25°C)	200mW
Lead Soldering Temperature (10s)	260°C

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**PS2501-1, PS2501-2, PS2501-4**

**ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)**

**INPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	$V_F$	$I_F = 20\text{mA}$		1.2	1.4	V
Reverse Voltage	$V_R$	$I_R = 10\mu\text{A}$	6.0			V
Reverse Leakage	$I_R$	$V_R = 4\text{V}$			10	$\mu\text{A}$
Terminal Capacitance	$C_t$	$V = 0\text{V}, f = 1\text{KHz}$		30	250	pF

**OUTPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector—Emitter Breakdown Voltage	$BV_{CEO}$	$I_C = 1\text{mA}, I_F = 0\text{mA}$	80			V
Emitter—Collector Breakdown Voltage	$BV_{ECO}$	$I_E = 100\mu\text{A}, I_F = 0\text{mA}$	6			V
Collector-Emitter Dark Current	$I_{CEO}$	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$			100	nA

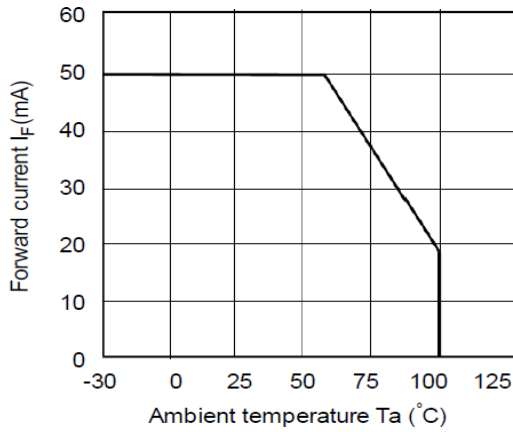
**COUPLED**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	CTR	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	80		600	%
		Optional CTR Grades				
		GR	100		300	
L (PS2501-1 only)	200		400			
Collector—Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 10\text{mA}, I_C = 2\text{mA}$			0.3	V
Input to Output Isolation Voltage	$V_{ISO}$	AC 1 minute, RH = 40 to 60% Note 1	5300			$V_{RMS}$
Input to Output Isolation Resistance	$R_{ISO}$	$V_{IO} = 500\text{V}$ Note 1	$5 \times 10^{10}$			$\Omega$
Output Rise Time	$t_r$	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$		4	18	$\mu\text{s}$
Output Fall Time	$t_f$	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$		3	18	$\mu\text{s}$

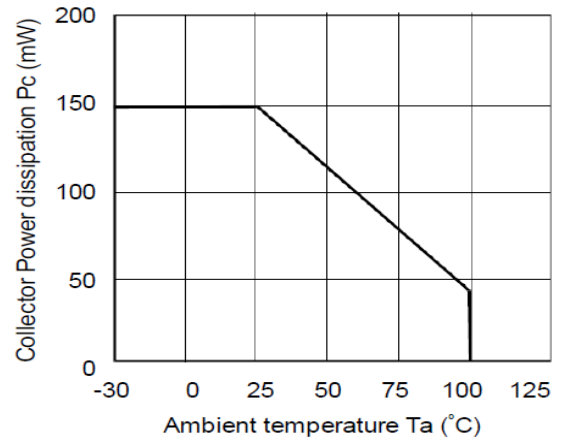
Note 1 : Measure with input leads shorted together and output leads shorted together.



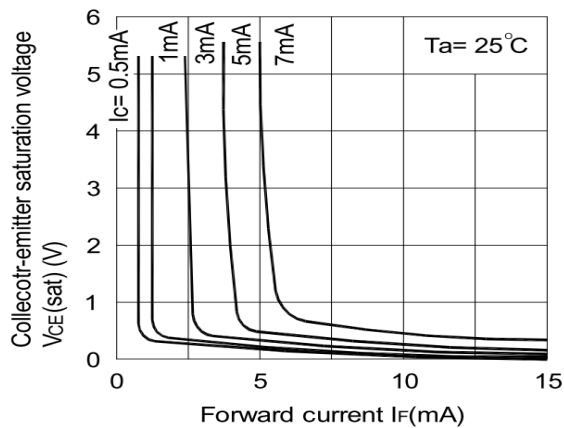
**PS2501-1, PS2501-2, PS2501-4**



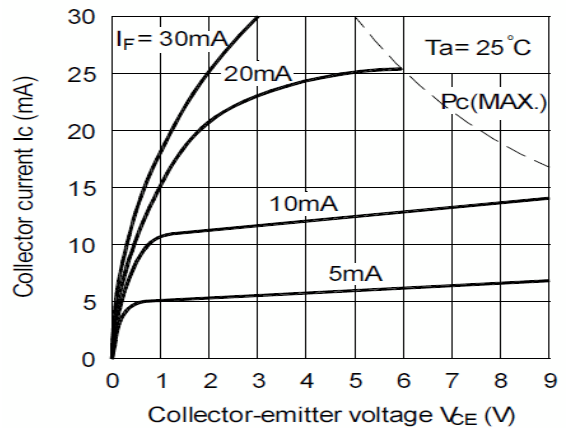
**Fig 1 Forward Current vs  $T_A$**



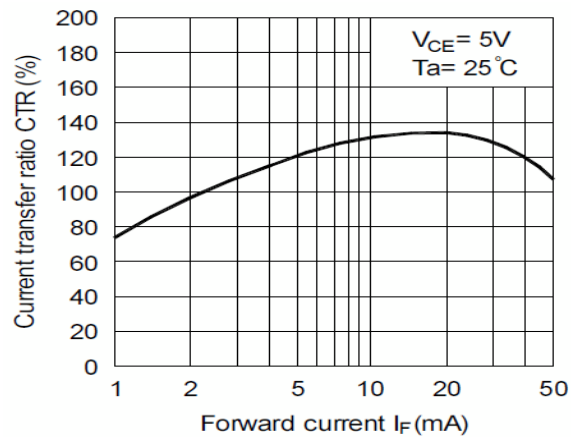
**Fig 2 Collector Power Dissipation vs  $T_A$**



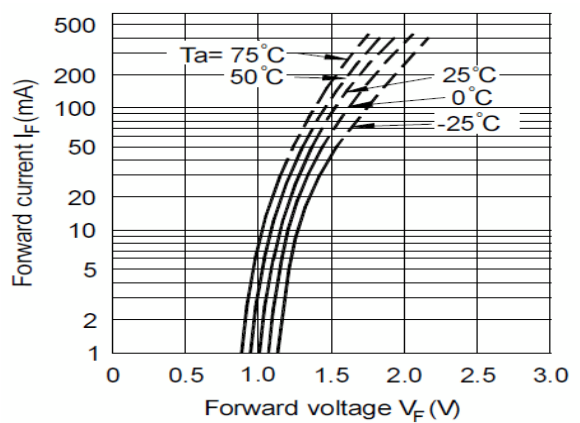
**Fig 3 Collector-emitter Saturation Voltage vs Forward Current**



**Fig 4 Collector Current vs Collector-emitter Voltage**



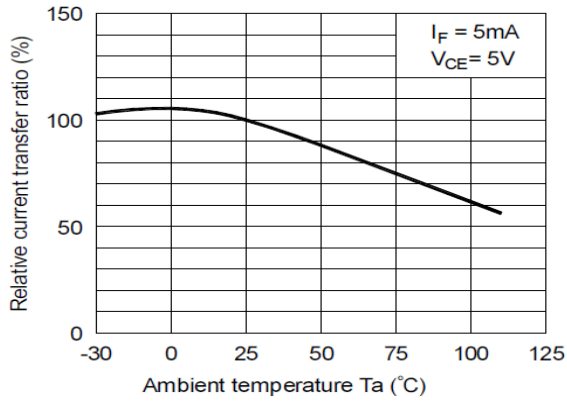
**Fig 5 Current Transfer Ratio vs Forward Current**



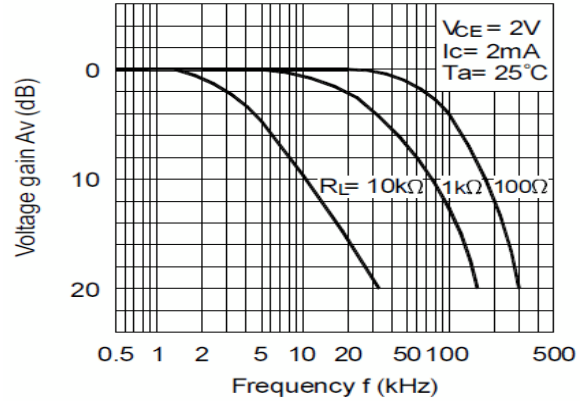
**Fig 6 Forward Current vs Forward Voltage**



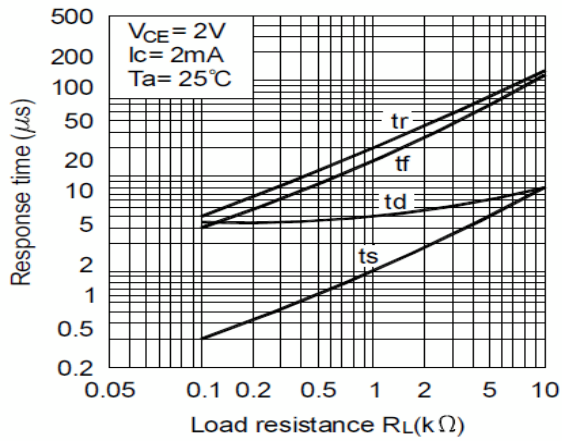
**PS2501-1, PS2501-2, PS2501-4**



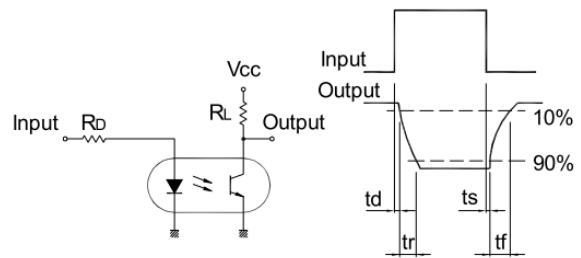
**Fig 7 Relative CTR vs  $T_A$**



**Fig 8 Frequency Response**



**Fig 9 Response Time vs Load Resistance**



**Response Time Test Circuit**



## PS2501-1, PS2501-2, PS2501-4

### ORDER INFORMATION

PS2501-1 (UL Approval)			
After PN	PN	Description	Packing quantity
None	PS2501-1, PS2501-1GR, PS2501-1L	Standard DIP4	100 pcs per tube
G	PS2501-1G, PS2501-1GRG, PS2501-1LG	10mm Lead Spacing	100 pcs per tube
SM	PS2501-1SM, PS2501-1GRSM, PS2501-1LSM	Surface Mount	100 pcs per tube
SMT&R	PS2501-1SMT&R, PS2501-1GRSMT&R, PS2501-1LSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

PS2501-2 (UL Approval)			
After PN	PN	Description	Packing quantity
None	PS2501-2, PS2501-2GR	Standard DIP8	50 pcs per tube
G	PS2501-2G, PS2501-2GRG	10mm Lead Spacing	50 pcs per tube
SM	PS2501-2SM, PS2501-2GRSM	Surface Mount	50 pcs per tube
SMT&R	PS2501-2SMT&R, PS2501-2GRSMT&R,	Surface Mount Tape & Reel	1000 pcs per reel

PS2501-4 (UL Approval)			
After PN	PN	Description	Packing quantity
None	PS2501-4, PS2501-4GR	Standard DIP16	25 pcs per tube
G	PS2501-4G, PS2501-4GRG	10mm Lead Spacing	25 pcs per tube
SM	PS2501-4SM, PS2501-4GRSM	Surface Mount	25 pcs per tube

CTR grade "L" available only for PS2501-1.



**PS2501-1, PS2501-2, PS2501-4**

**ORDER INFORMATION**

<b>PS2501-1X (UL and VDE Approvals)</b>			
<b>After PN</b>	<b>PN</b>	<b>Description</b>	<b>Packing quantity</b>
None	PS2501-1X, PS2501-1XGR, PS2501-1XL	Standard DIP4	100 pcs per tube
G	PS2501-1XG, PS2501-1XGRG, PS2501-1XLG	10mm Lead Spacing	100 pcs per tube
SM	PS2501-1XSM, PS2501-1XGRSM, PS2501-1XLSM	Surface Mount	100 pcs per tube
SMT&R	PS2501-1XSMT&R, PS2501-1XGRSMT&R, PS2501-1XLSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

<b>PS2501-2X (UL and VDE Approvals)</b>			
<b>After PN</b>	<b>PN</b>	<b>Description</b>	<b>Packing quantity</b>
None	PS2501-2X, PS2501-2XGR	Standard DIP8	50 pcs per tube
G	PS2501-2XG, PS2501-2XGRG	10mm Lead Spacing	50 pcs per tube
SM	PS2501-2XSM, PS2501-2XGRSM,	Surface Mount	50 pcs per tube
SMT&R	PS2501-2XSMT&R, PS2501-2XGRSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

<b>PS2501-4X (UL and VDE Approvals)</b>			
<b>After PN</b>	<b>PN</b>	<b>Description</b>	<b>Packing quantity</b>
None	PS2501-4X, PS2501-4XGR,	Standard DIP16	25 pcs per tube
G	PS2501-4XG, PS2501-4XGRG	10mm Lead Spacing	25 pcs per tube
SM	PS2501-4XSM, PS2501-4XGRSM	Surface Mount	25 pcs per tube

CTR grade "L" available only for PS2501-1.

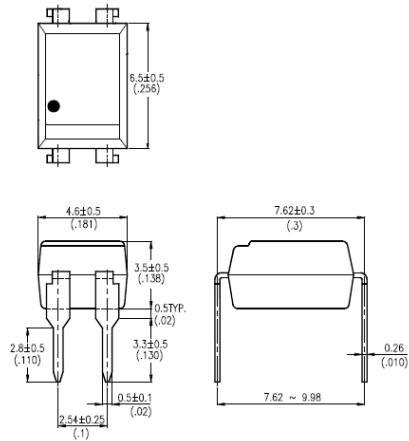


**PS2501-1, PS2501-2, PS2501-4**

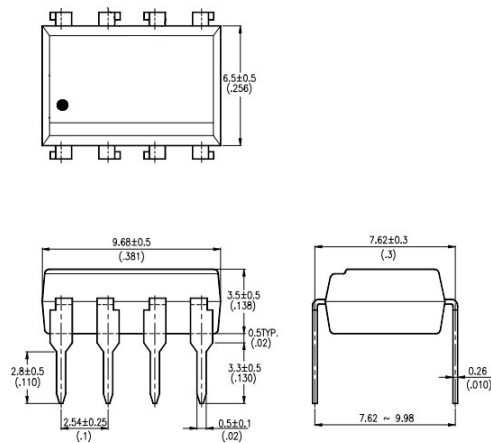
**PACKAGE DIMENSIONS in mm (inch)**

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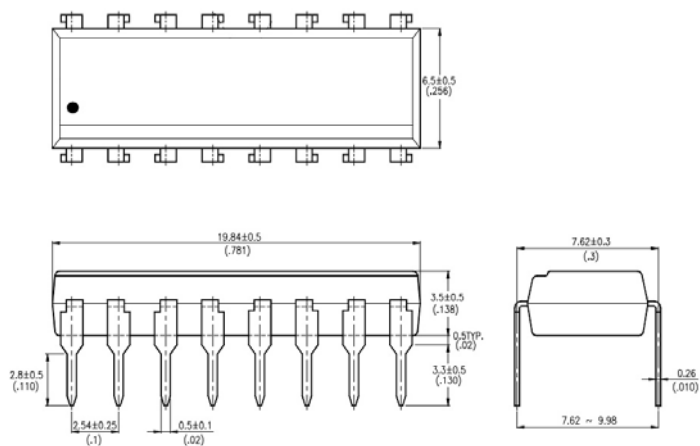
**PS2501-1**



**PS2501-2**



**PS2501-4**



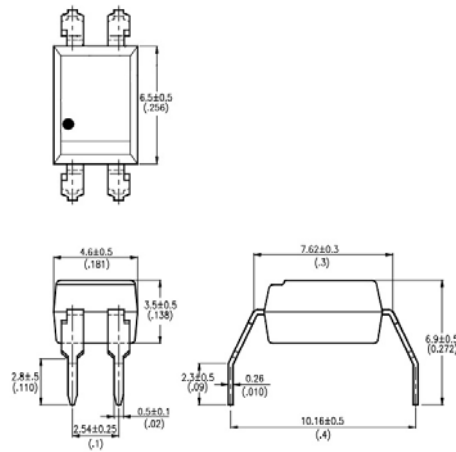


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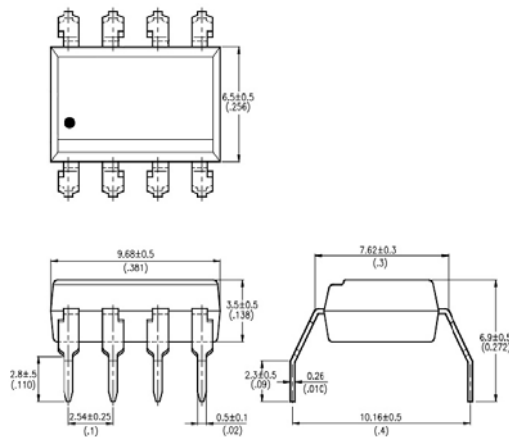
### PACKAGE DIMENSIONS in mm (inch)

#### G Form

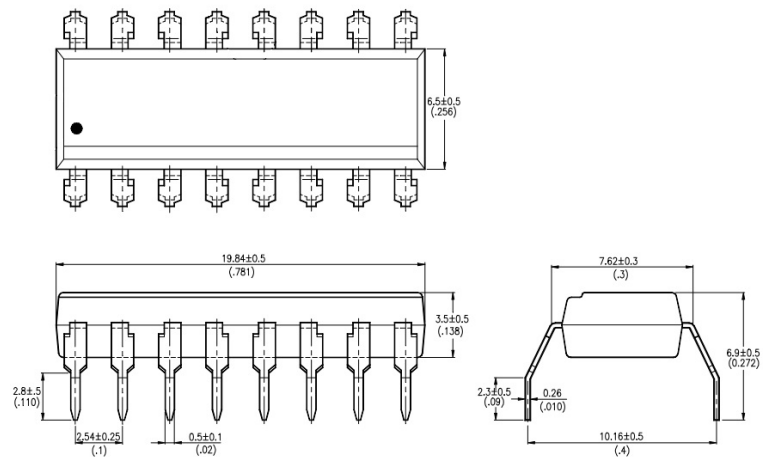
**PS2501-1G**



**PS2501-2G**



**PS2501-4G**



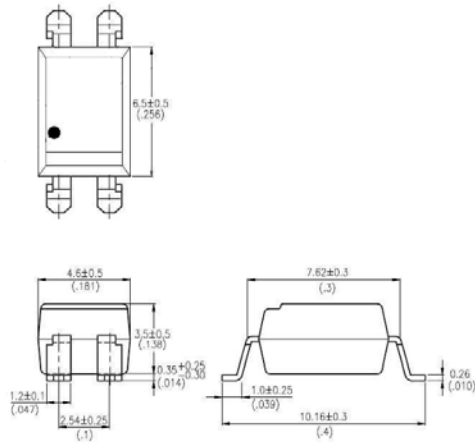


**PS2501-1, PS2501-2, PS2501-4**

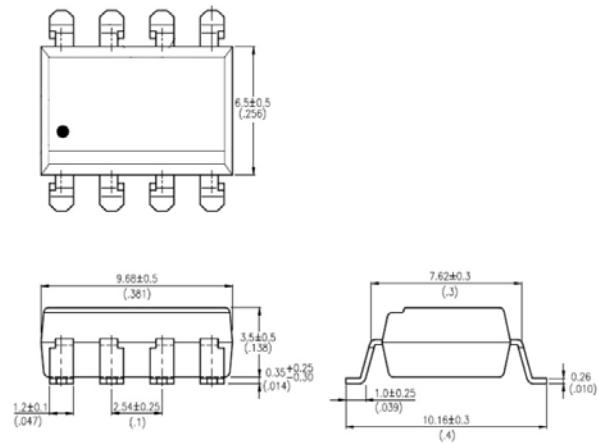
**PACKAGE DIMENSIONS in mm (inch)**

**SMD**

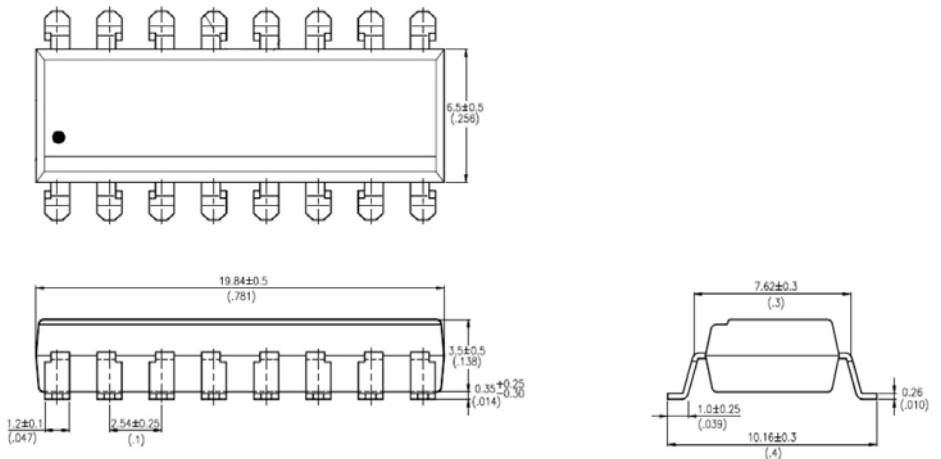
**PS2501-1SM**



**PS2501-2SM**



**PS2501-4SM**

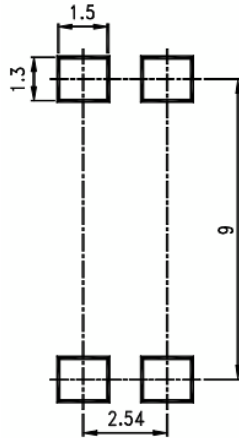




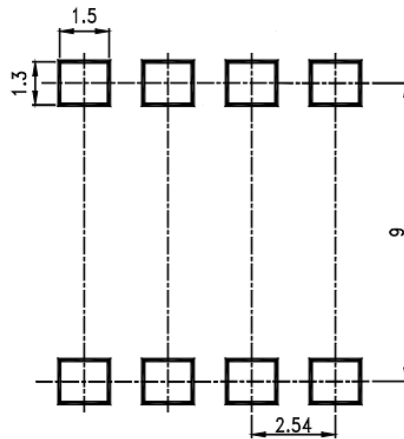
**PS2501-1, PS2501-2, PS2501-4**

**RECOMMENDED PAD LAYOUT FOR SMD (mm)**

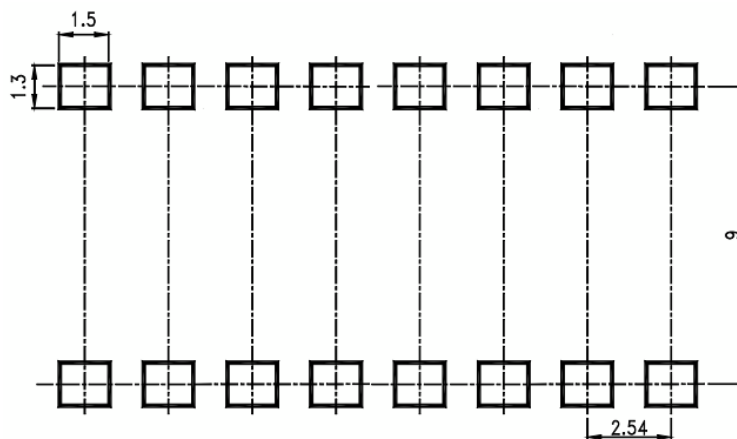
**PS2501-1SM**



**PS2501-2SM**



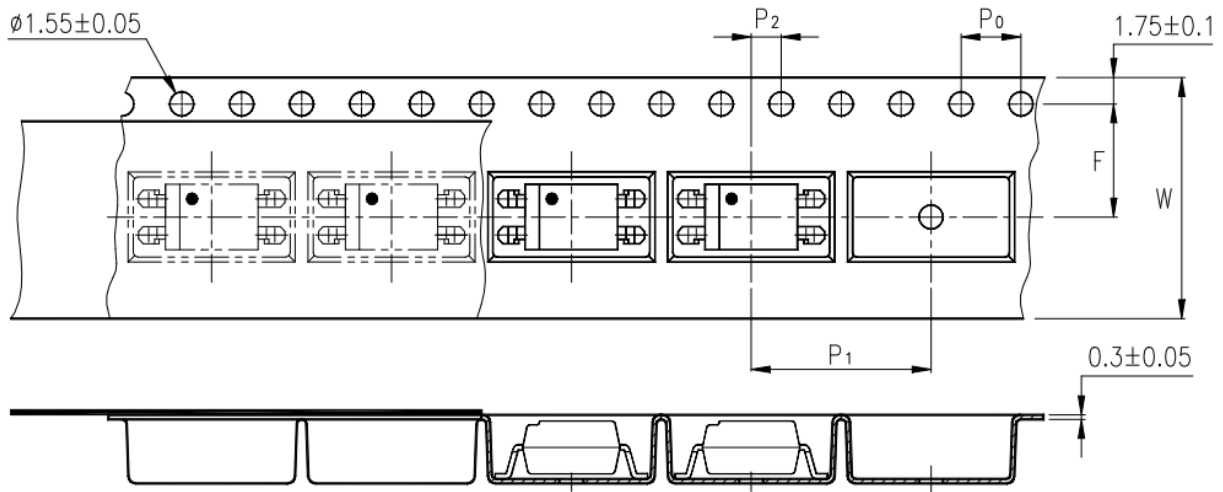
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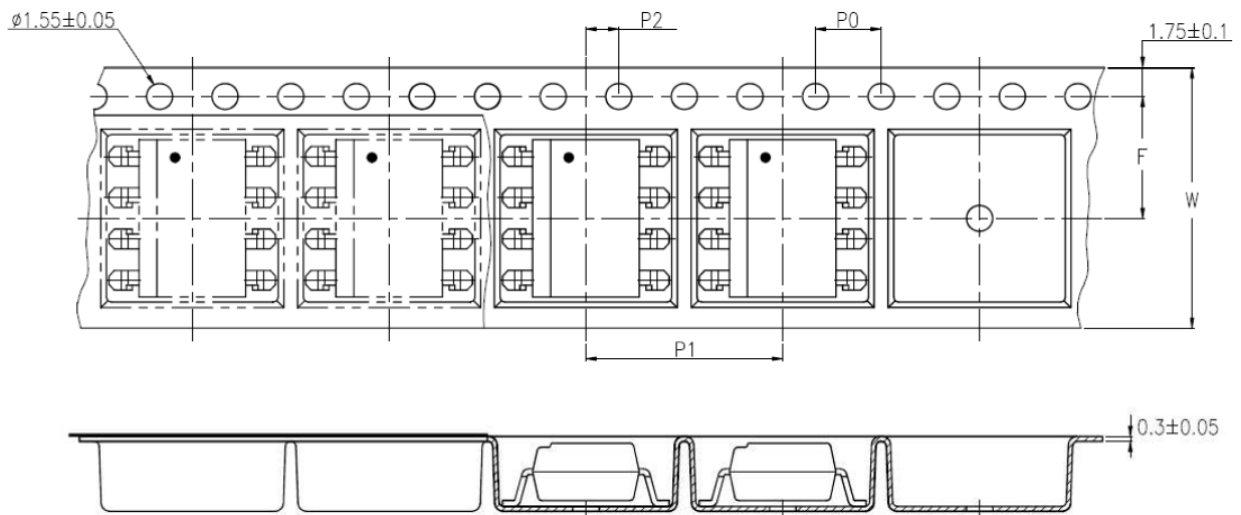


**PS2501-1, PS2501-2, PS2501-4**

**TAPE AND REEL PACKAGING**



**PS2501-1SMT&R**



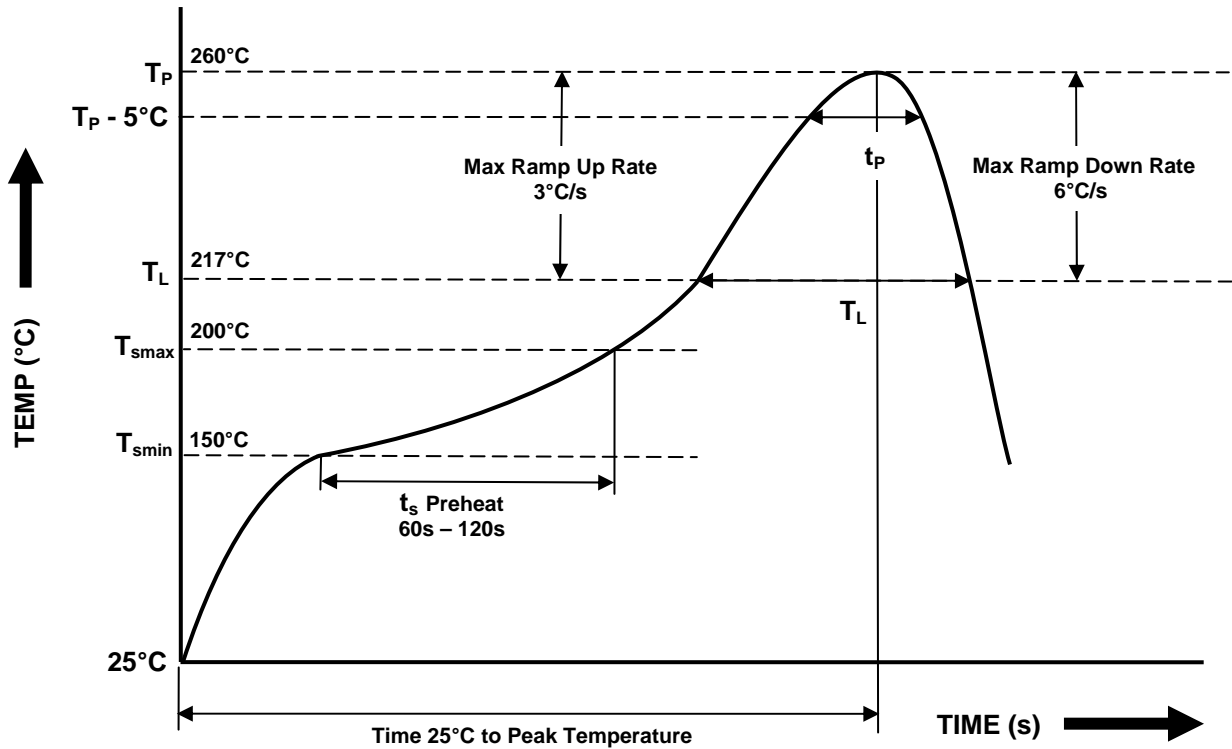
**PS2501-2SMT&R**

Description	Symbol	Dimensions in mm ( inches )
Tape wide	W	$16 \pm 0.3$ ( .63 )
Pitch of sprocket holes	$P_0$	$4 \pm 0.1$ ( .15 )
Distance of compartment	F	$7.5 \pm 0.1$ ( .295 )
Distance of compartment to compartment	$P_1$	$2 \pm 0.1$ ( .079 )
Distance of compartment to compartment	$P_2$	$12 \pm 0.1$ ( .472 )



**PS2501-1, PS2501-2, PS2501-4**

**IR REFLOW SOLDERING TEMPERATURE PROFILE FOR SMD  
(One Time Reflow Soldering is Recommended)**



Profile Details	Conditions
<b>Preheat</b> - Min Temperature ( $T_{SMIN}$ ) - Max Temperature ( $T_{SMAX}$ ) - Time $T_{SMIN}$ to $T_{SMAX}$ ( $t_s$ )	150°C 200°C 60s - 120s
<b>Soldering Zone</b> - Peak Temperature ( $T_P$ ) - Time at Peak Temperature - Liquidous Temperature ( $T_L$ ) - Time within 5°C of Actual Peak Temperature ( $T_P - 5^\circ C$ ) - Time maintained above $T_L$ ( $t_L$ ) - Ramp Up Rate ( $T_L$ to $T_P$ ) - Ramp Down Rate ( $T_P$ to $T_L$ )	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate ( $T_{smax}$ to $T_P$ )	3°C/s max
Time 25°C to Peak Temperature	8 minutes max



**ISOCOM**  
COMPONENTS

## PS2501-1, PS2501-2, PS2501-4

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