

# GL05T to GL24T

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## **Vishay Semiconductors**

| ABSOLUTE MAXIMUM RATINGS GL05T |                       |   |                  |             |      |  |  |
|--------------------------------|-----------------------|---|------------------|-------------|------|--|--|
| PARAMETER                      | TEST                  | CONDITIONS                                      | SYMBOL           | VALUE       | UNIT |  |  |
| Peak pulse current             | 8/20 µs               | Pin 1-2 (pin 3 n.c.)                            | I <sub>PPM</sub> | 25          | А    |  |  |
| Peak pulse power               | 8/20 µs waveform      | Fin 1-2 (pin 3 n.c.)                            | P <sub>PP</sub>  | 300         | W    |  |  |
|                                | Contact discharge     | Contact discharge acc. IEC 61000-4-2; 10 pulses |                  | ± 8         | kV   |  |  |
| ESD immunity                   | Air discharge acc.    | IEC 61000-4-2; 10 pulses                        | V <sub>ESD</sub> | ± 15        | kV   |  |  |
| Blocking voltage               | I <sub>B</sub> = 1 μA | Pin 2-1 or pin 2-3                              | VB               | 70          | V    |  |  |
| Operating temperature          | Junction temperatu    | Junction temperature                            |                  | -55 to +150 | °C   |  |  |
| Storage temperature            |                       |   | T <sub>STG</sub> | -55 to +150 | °C   |  |  |

| ABSOLUTE MAXIMUM RATINGS GL12T |                       |   |                  |             |      |  |  |
|--------------------------------|-----------------------|---|------------------|-------------|------|--|--|
| PARAMETER                      | TEST                  | CONDITIONS                                      | SYMBOL           | VALUE       | UNIT |  |  |
| Peak pulse current             | 8/20 µs               | Pin 1-2 (pin 3 n.c.)                            | I <sub>PPM</sub> | 12          | А    |  |  |
| Peak pulse power               | 8/20 µs waveform      | Pin 1-2 (pin 3 n.c.)                            | P <sub>PP</sub>  | 300         | W    |  |  |
|                                | Contact discharge     | Contact discharge acc. IEC 61000-4-2; 10 pulses |                  | ± 8         | kV   |  |  |
| ESD immunity                   | Air discharge acc. I  | EC 61000-4-2; 10 pulses                         | V <sub>ESD</sub> | ± 15        | kV   |  |  |
| Blocking voltage               | I <sub>B</sub> = 1 μA | Pin 2-1 or pin 2-3                              | VB               | 70          | V    |  |  |
| Operating temperature          | Junction temperatu    | Junction temperature                            |                  | -55 to +150 | °C   |  |  |
| Storage temperature            |                       |   | T <sub>STG</sub> | -55 to +150 | °C   |  |  |

| ABSOLUTE MAXIMUM RATINGS GL15T |                       |   |                  |             |      |  |  |  |
|--------------------------------|-----------------------|---|------------------|-------------|------|--|--|--|
| PARAMETER                      | TEST                  | CONDITIONS                                      | SYMBOL           | VALUE       | UNIT |  |  |  |
| Peak pulse current             | 8/20 μs               | Pin 1-2 (pin 3 n.c.)                            | I <sub>PPM</sub> | 10          | A    |  |  |  |
| Peak pulse power               | 8/20 µs waveform      | Fin 1-2 (pin 3 n.c.)                            | P <sub>PP</sub>  | 300         | W    |  |  |  |
| ESD immunity                   | Contact discharge     | Contact discharge acc. IEC 61000-4-2; 10 pulses |                  | ± 8         | kV   |  |  |  |
| ESD immunity                   | Air discharge acc. I  | EC 61000-4-2; 10 pulses                         | V <sub>ESD</sub> | ± 15        | kV   |  |  |  |
| Blocking voltage               | I <sub>B</sub> = 1 μA | Pin 2-1 or pin 2-3                              | VB               | 70          | V    |  |  |  |
| Operating temperature          | Junction temperatu    | Junction temperature                            |                  | -55 to +150 | °C   |  |  |  |
| Storage temperature            |                       |   | T <sub>STG</sub> | -55 to +150 | °C   |  |  |  |

| ABSOLUTE MAXIMUM RATINGS GL24T |                       |   |                  |             |      |  |  |
|--------------------------------|-----------------------|---|------------------|-------------|------|--|--|
| PARAMETER                      | TEST                  | CONDITIONS                                      | SYMBOL           | VALUE       | UNIT |  |  |
| Peak pulse current             | 8/20 µs               | Pin 1-2 (pin 3 n.c.)                            | I <sub>PPM</sub> | 5           | A    |  |  |
| Peak pulse power               | 8/20 µs waveform      | Fin 1-2 (pin 3 n.c.)                            | P <sub>PP</sub>  | 300         | W    |  |  |
|                                | Contact discharge     | Contact discharge acc. IEC 61000-4-2; 10 pulses |                  | ± 8         | kV   |  |  |
| ESD immunity                   | Air discharge acc. I  | EC 61000-4-2; 10 pulses                         | V <sub>ESD</sub> | ± 15        | kV   |  |  |
| Blocking voltage               | I <sub>B</sub> = 1 μA | Pin 2-1 or pin 2-3                              | V <sub>B</sub>   | 70          | V    |  |  |
| Operating temperature          | Junction temperatu    | Junction temperature                            |                  | -55 to +150 | °C   |  |  |
| Storage temperature            |                       |   | T <sub>STG</sub> | -55 to +150 | °C   |  |  |

The GLxxT contains an avalanche diode (pin 3-1) and a switching diode (pin 3-2). With pin 1 connected to the signal or data line and pin 2 connected to ground both diodes are in series (pin 3 remains unconnected). The big and robust avalanche diode, driven in reverse direction, provides the working range  $V_{RWM}$  of 5 V, 12 V, 15 V or 24 V. Due to its size the capacitance of the avalanche diode is in the range of typ. 260 pF (GL05T) and 65 pF (GL24T). The small switching diode in series has a low capacitance of just 2.5 pF (typ.). As both diodes are in series (with pin 3 not connected) the total capacitance of both diodes measured between pin 1 and 2 is as low as the capacitance of the switching diode.

Before the GLxxT can provide this low capacitance the big capacitance of the avalanche diode has to be charged up with the first signal or data pulses. This is usually no problem for digital signals like USB or other data ports.

With the GLxxT a signal or data line can be protected against positive transients only. For negative transients another GLxxT can be used to provide a back path for the negative transients as well.

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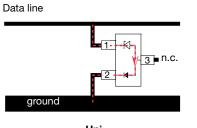
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## Not for New Designs

GL05T to GL24T

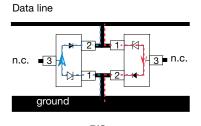
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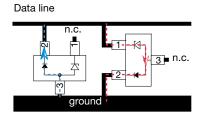


SHAY

Uni Unidirectional clamping performance for positive transients only.



BiSy Bidirectional and Symmetrical clamping performance for positive and negative transients.



BiAs Bidirectional and Asymmetrical clamping performance for positive and negative transients.

### ELECTRICAL CHARACTERISTICS GL05T (T<sub>amb</sub> = 25 °C unless otherwise specified)

| pin 1 to pin 2; pin 3 not | connected                              |                      |      |      |      |       |
|---------------------------|--|----------------------|------|------|------|-------|
| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 5    | V     |
| Reverse voltage           | at I <sub>R</sub> = 20 μA              | V <sub>R</sub>       | 5    | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 5 V                | I <sub>R</sub>       | -    | -    | 20   | μA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 6.9  | 7.5  | 8.0  | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> = 1 A               | V <sub>C</sub>       | -    | -    | 9.8  | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> = 5 A               | v <sup>C</sup>       | -    | -    | 11   | V     |
| Capacitance               | at $V_R = 0 V$ ; f = 1 MHz             | CD                   | -    | 2.5  | 5    | pF    |

### **ELECTRICAL CHARACTERISTICS GL12T** ( $T_{amb} = 25$ °C unless otherwise specified)

| pin 1 to pin 2; pin 3 not | connected                              |                      |      |      |      |       |
|---------------------------|--|----------------------|------|------|------|-------|
| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 12   | V     |
| Reverse voltage           | at I <sub>R</sub> = 1 μA               | V <sub>R</sub>       | 12   | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 12 V               | I <sub>R</sub>       | -    | -    | 1    | μA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 13.3 | 14.3 | 17.2 | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> = 1 A               | V <sub>C</sub>       | -    | -    | 19   | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> = 5 A               | v <sub>C</sub>       | -    | -    | 24   | V     |
| Capacitance               | at $V_R = 0 V$ ; f = 1 MHz             | CD                   | -    | 2.5  | 5    | pF    |

# **ELECTRICAL CHARACTERISTICS GL15T** (T<sub>amb</sub> = 25 °C unless otherwise specified) pin 1 to pin 2; pin 3 not connected

| pin 1 to pin 2, pin 0 not | oonnooted                              |                      |      |      |      |       |
|---------------------------|--|----------------------|------|------|------|-------|
| PARAMETER                 | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |
| Protection paths          | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |
| Reverse stand-off voltage | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 15   | V     |
| Reverse voltage           | at I <sub>R</sub> = 1 μA               | V <sub>R</sub>       | 15   | -    | -    | V     |
| Reverse current           | at V <sub>R</sub> = 15 V               | I <sub>R</sub>       | -    | -    | 1    | μA    |
| Reverse breakdown voltage | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 16.7 | 17.7 | 22   | V     |
| Povorso clamping voltago  | at I <sub>PP</sub> = 1 A               | V <sub>C</sub>       | -    | -    | 24   | V     |
| Reverse clamping voltage  | at I <sub>PP</sub> = 5 A               | vc                   | -    | -    | 33   | V     |
| Capacitance               | at $V_R = 0$ V; f = 1 MHz              | CD                   | -    | 2.5  | 5    | pF    |

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# GL05T to GL24T

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| <b>ELECTRICAL CHARACTERISTICS GL24T</b> (T <sub>amb</sub> = 25 °C unless otherwise specified) pin 1 to pin 2; pin 3 not connected |  |                      |      |      |      |       |  |  |
|---|--|----------------------|------|------|------|-------|--|--|
| PARAMETER   | TEST CONDITIONS/REMARKS                | SYMBOL               | MIN. | TYP. | MAX. | UNIT  |  |  |
| Protection paths  | Number of lines which can be protected | N <sub>channel</sub> | -    | -    | 1    | lines |  |  |
| Reverse stand-off voltage   | Max. reverse working voltage           | V <sub>RWM</sub>     | -    | -    | 24   | V     |  |  |
| Reverse voltage   | at I <sub>R</sub> = 1 μA               | V <sub>R</sub>       | 24   | -    | -    | V     |  |  |
| Reverse current   | at V <sub>R</sub> = 24 V               | I <sub>R</sub>       | -    | -    | 1    | μA    |  |  |
| Reverse breakdown voltage   | at I <sub>R</sub> = 1 mA               | V <sub>BR</sub>      | 26.7 | 28.2 | 33   | V     |  |  |
| Powerse elemping veltage  | at I <sub>PP</sub> = 1 A               | V                    | -    | -    | 43   | V     |  |  |
| Reverse clamping voltage  | at I <sub>PP</sub> = 5 A               | V <sub>C</sub>       | -    | -    | 55   | V     |  |  |
| Capacitance   | at $V_R = 0 V$ ; f = 1 MHz             | CD                   | -    | 2.5  | 5    | pF    |  |  |

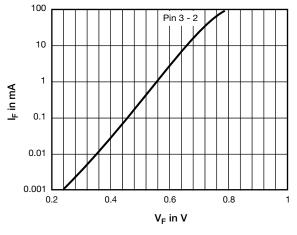


Fig. 1 - Typical Forward Current  $I_{\text{F}}$  vs. Forward Voltage  $V_{\text{F}}$ 

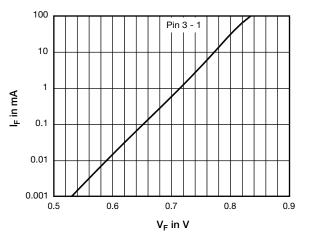


Fig. 2 - Typical Forward Current  $I_{\text{F}}$  vs. Forward Voltage  $V_{\text{F}}$ 

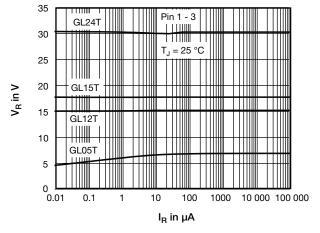


Fig. 3 - Typical Reverse Voltage  $V_{\mathsf{R}}$  vs. Reverse Current  $\mathsf{I}_{\mathsf{R}}$ 

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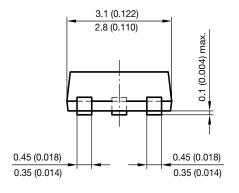


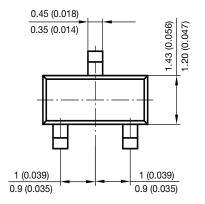
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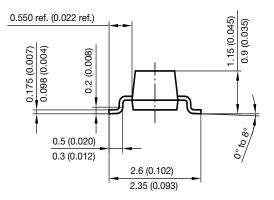
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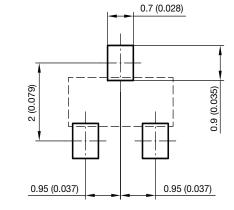
#### PACKAGE DIMENSIONS in millimeters (inches): SOT-23





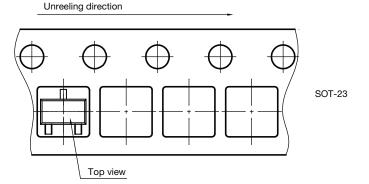


Foot print recommendation:



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Orientation in carrier tape SOT-23 S8-V-3929.01-006 (4) 04.02.2010 22607



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