

SCSI active terminator

BH9595FP-Y / BH9596FP-Y

These SCSI active terminators, developed as a substitute for conventional discrete terminators, maintain good consistency between VM level (2.85V) and GND level (0V) and between VM level and VDD level, and have extremely low power consumption, dropping to a maximum of 90 milliwatts at standby (compared to the maximum of 990 milliwatts used by conventional resistance terminators). These SCSI active terminators electrically control SCSI lines, connecting and disengaging the terminating resistor by electrically controlling the enable pin. (The enable pin is enabled at the HIGH level and switched to the High-Z state by the LOW level in the BH9595 and by the HIGH level in the BH9596, completely disconnecting the SCSI line from the SCSI terminator.)

These SCSI active terminators allow for the configuration of flexible, energy-saving SCSI networks, and are ideal for notebook computers, hard disk drives and a wide range of other products with SCSI capabilities.

●Applications

Compact disk drives, optical disk drives, CD-ROM drives, tape drives, personal computers (including laptop computers and notebook computers), workstations, mainframes, laser printers, plotters

●Features

- 1) Internal 2.85V power supply and push-pull operation, for good consistency at all signal levels.
- 2) Enable pin for terminator enabling and disconnecting, facilitating SCSI network construction.
- 3) Low power consumption, ideal for energy-saving systems.
Power consumption during standby : 90mW (compared to 990mW for conventional resistor terminators)Power consumption at 25% duty : 614mW (compared to 1,360mW for convention resistor terminators)Significant reductions in power consumption are possible.
- 4) Wide operating range.
TERM power : 4.0 ~ 5.5V (Transient : 6.0V)
- 5) Thin, microminiature design, ideal for space-saving applications.
Package body size : 13.6 × 5.4 × 1.9mm
- 6) Active termination of 18-line SCSI.
- 7) Internal thermal shutdown circuit.
- 8) Compatibility with SCSI-I and SCSI-II.

●Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|-----------------------|------------------|----------------------------------|------|
| Power supply voltage | V _{DD1} | - 0.3 ~ + 7.0 | V |
| DC Output current *1 | I _{SLD} | - 30 | mA |
| DC Output current *2 | I _{SLS} | 35 | mA |
| Input voltage | V _i | - 0.6 ~ (V _{DD1} + 0.6) | V |
| Power dissipation *3 | P _d | 1.45 | W |
| Operating temperature | T _{opr} | 0 ~ + 75 | °C |
| Storage temperature | T _{stg} | - 55 ~ + 125 | °C |

*1 Drain Current (from Module to SCSI Line) / Line

*2 Sink Current (from SCSI Line to Module) / Line

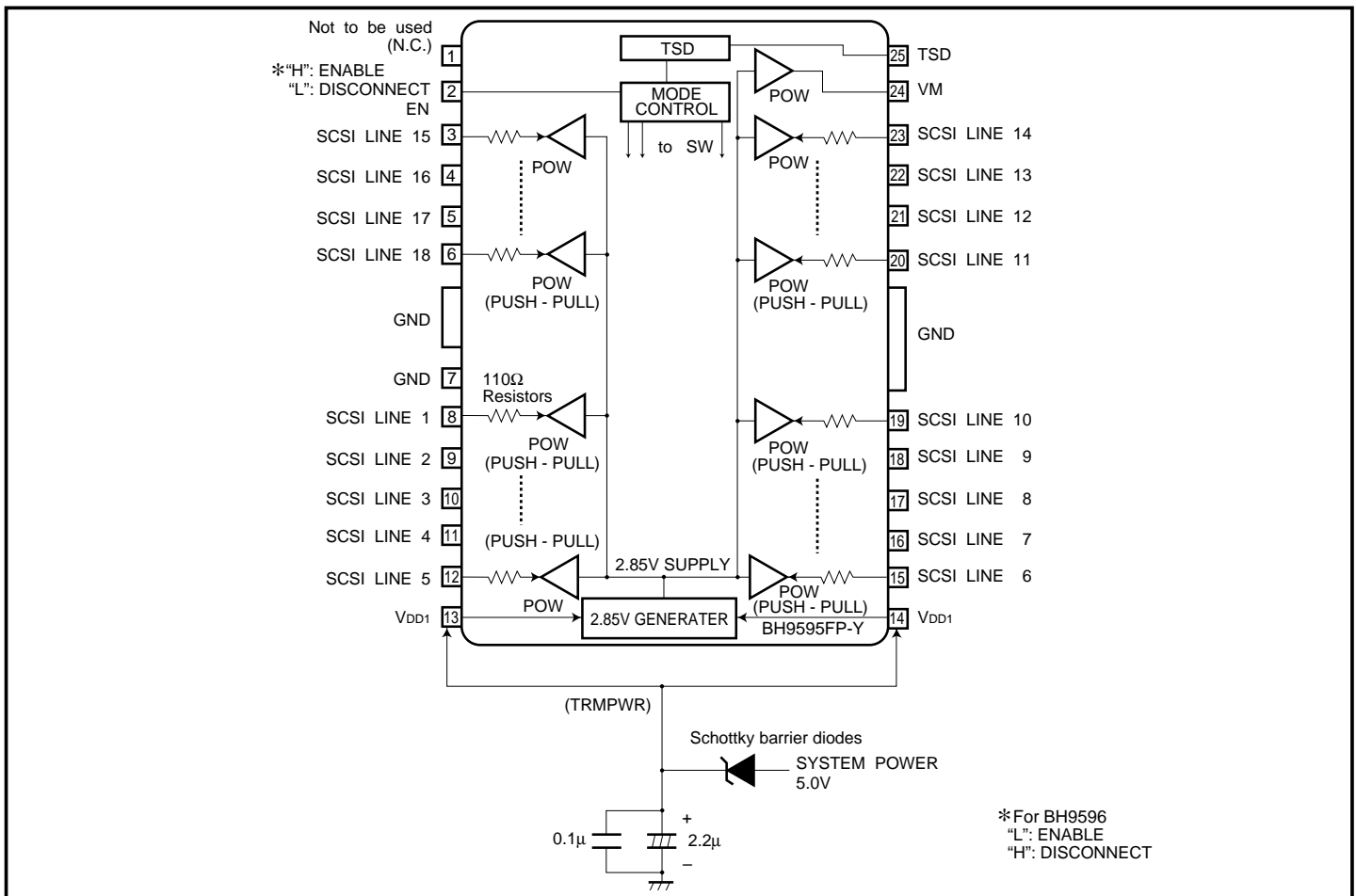
*3 When mounted to a 90 × 50 × 1.6 mm glass epoxy board

●Recommended operating conditions (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|----------------------|------------------|------------------------|------|------------------------|------|
| Power supply voltage | V _{DD1} | 4.0 | 4.5 | 5.5* | V |
| Input voltage | V _{IH} | V _{DD1} - 0.6 | — | V _{DD1} + 0.6 | V |
| Input voltage | V _{IL} | - 0.3 | — | 0.8 | V |
| SCSI Line voltage | V _{SLX} | - 0.3 | — | V _{DD1} + 0.3 | V |

* Transient 6V

●Block diagram



●Pin descriptions

| Pin No. | Pin name |
|---------|-----------------------|
| 1 | (N.C.) Not to be used |
| 2 | EN (Output enable) |
| 3 | SCSI Line 15 |
| 4 | SCSI Line 16 |
| 5 | SCSI Line 17 |
| 6 | SCSI Line 18 |
| — | GND |
| 7 | GND |
| 8 | SCSI Line 1 |
| 9 | SCSI Line 2 |
| 10 | SCSI Line 3 |
| 11 | SCSI Line 4 |
| 12 | SCSI Line 5 |
| 13 | V _{DD1} |

| Pin No. | Pin name |
|---------|-------------------------|
| 14 | V _{DD1} |
| 15 | SCSI Line 6 |
| 16 | SCSI Line 7 |
| 17 | SCSI Line 8 |
| 18 | SCSI Line 9 |
| 19 | SCSI Line 10 |
| — | GND |
| 20 | SCSI Line 11 |
| 21 | SCSI Line 12 |
| 22 | SCSI Line 13 |
| 23 | SCSI Line 14 |
| 24 | VM |
| 25 | TSD (TSD signal output) |

●Electrical characteristics

DC characteristics (unless otherwise noted, Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|----------------------------|--------------------|-------|------|-------|------|---|
| Input leakage current | I _{IL} | 50 | 110 | 200 | μA | V _i = GND, V _{DD1} = 5.5V |
| | I _{IH} | - 1 | — | 1 | μA | V _i = V _{DD1} , V _{DD1} = 5.5V |
| SCSI line leakage current | I _{SLZ} | - 1 | — | 1 | μA | EN = ENABLE*4, V _{DD1} = 5.5V |
| SCSI line short current *1 | I _{SLD} | 15 | 25 | 30 | mA | EN = DISABLE*5, SCSI Line = GND, 4.0 ≤ V _{DD1} ≤ 5.5V |
| SCSI line short current *2 | I _{SLS} | 7 | 20 | 30 | mA | EN = DISABLE*5, SCSI Line = V _{DD1} , 4.0 ≤ V _{DD1} ≤ 5.5V |
| VM voltage | V _M | 2.700 | 2.85 | 3.000 | V | 4.0 ≤ V _{DD1} ≤ 5.5V |
| Standby current *1 | I _{DDSTB} | — | 1.0 | 2.0 | mA | EN = ENABLE*4, 4.0V ≤ V _{DD1} ≤ 5.5V |
| SCSI total sink current | I _{SLS} | 300 | — | 550 | mA | EN = DISABLE*5, 18 SCSI Line = GND, 4.0 ≤ V _{DD1} ≤ 5.5V |
| SCSI total drain current | I _{SLD} | 300 | — | 550 | mA | EN = DISABLE*5, 18 SCSI Line = V _{DD1} , 4.0 ≤ V _{DD1} ≤ 5.5V |
| SCSI equivalent resistance | R _{SL} | 105 | — | 115 | Ω | EN = DISABLE*5, SCSI Line: V _{DD1} = 4.7V |
| Pin capacity *3 | PC | — | 5.0 | 6.0 | pF | EN = ENABLE*4 |

*1 Drain Current (from Module to SCSI Line) / Line

*2 Sink Current (from SCSI Line to Module) / Line

*3 Guaranteed performance

*4 BH9595FP-Y: EN = GND, BH9596FP-Y: EN = V_{DD1}

*5 BH9595FP-Y: EN = V_{DD1}, BH9596FP-Y: EN = GND

Transient characteristics (unless otherwise noted, Ta = 25°C)

| Parameter | Symbol | Min. | Max. | Unit | Conditions |
|---|-------------------|-------|------|---------|---|
| Load Transient Voltage 2.85V→GND | ΔVM_{TD1} | - 100 | 100 | mV | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: 2.85V→GND Level |
| Load Transient 1 / 10 decay Time 2.85V→GND | τ_{TD1} | — | 100 | μ s | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: 2.85V→GND Level |
| Load Transient Voltage GND→2.85V | ΔVM_{TD2} | - 100 | 100 | mV | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: GND→2.85V Level |
| Load Transient 1 / 10 decay Time GND→2.85V | τ_{TD2} | — | 100 | μ s | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: GND→2.85V Level |
| Load Transient Voltage 2.85V→V _{DD1} | ΔVM_{TS1} | - 100 | 100 | mV | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: 2.85V→V _{DD1} Level |
| Load Transient Voltage 2.85V→V _{DD1} | τ_{TS1} | — | 100 | μ s | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: 2.85V→V _{DD1} Level |
| Load Transient Voltage V _{DD1} →2.85V | ΔVM_{TS2} | - 100 | 100 | mV | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: V _{DD1} →2.85V Level |
| Load Transient Voltage V _{DD1} →2.85V | τ_{TS2} | — | 100 | μ s | EN = DISABLE*, 4.0 \leq V _{DD1} \leq 5.5V All SCSI Lines: V _{DD1} →2.85V Level |

* BH9595FP-Y: EN = V_{DD1}, BH9596FP-Y: GND

The transient characteristics are guaranteed design values.

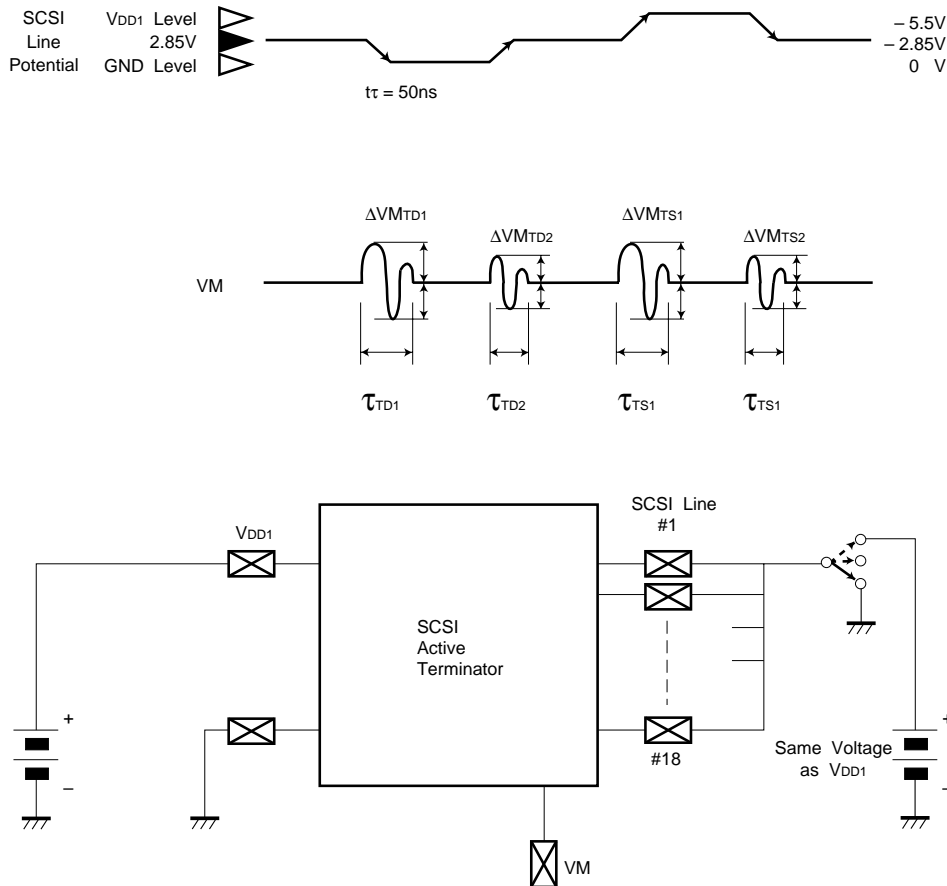


Fig. 1 Measurement of transient characteristics

●Application example

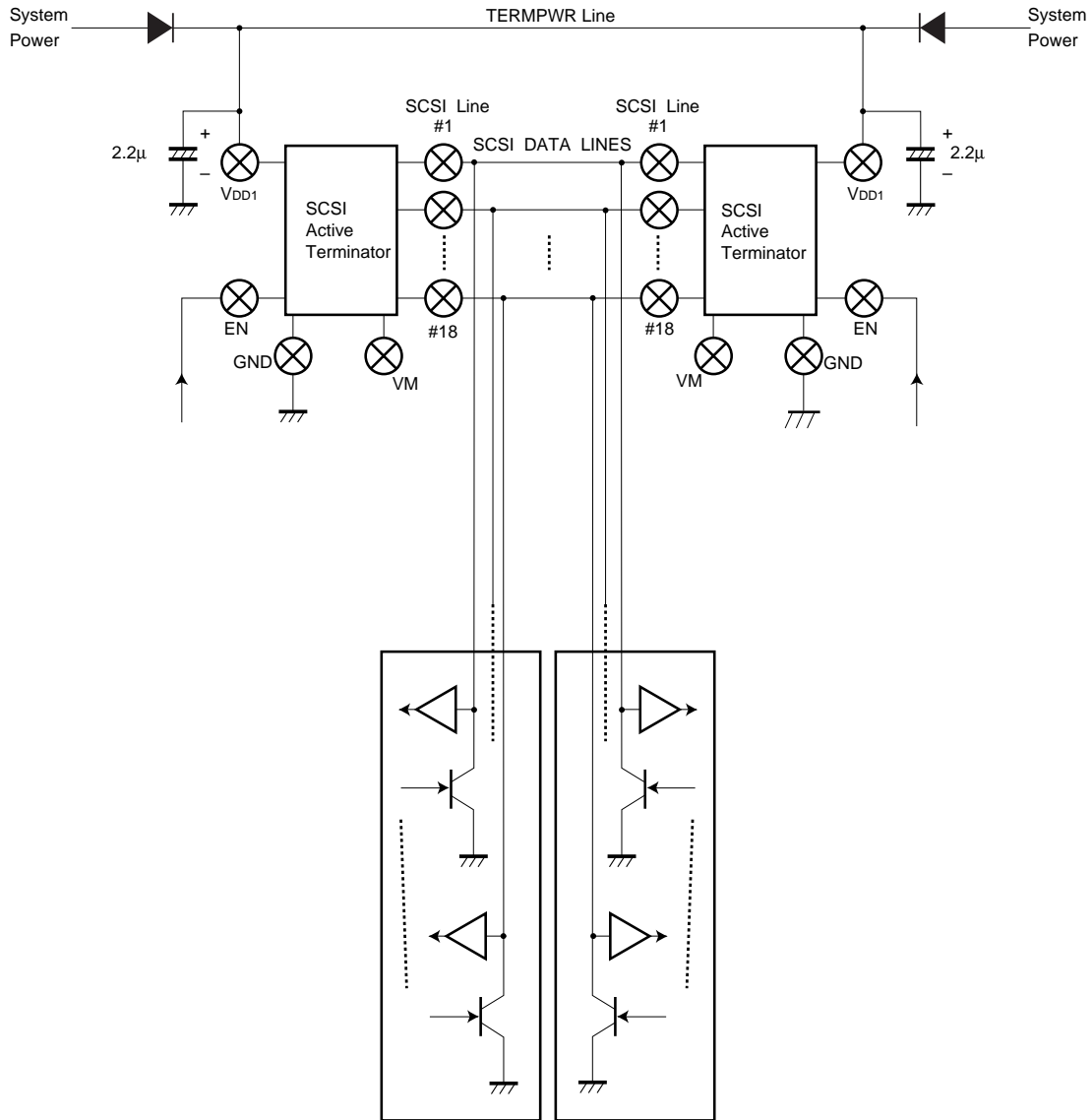


Fig. 2

●Mode selection table

| Mode | BH9595FP - Y | BH9596FP - Y |
|---------|--------------|--------------|
| Disable | L | H |
| Enable | H | L |

●Thermal shutdown

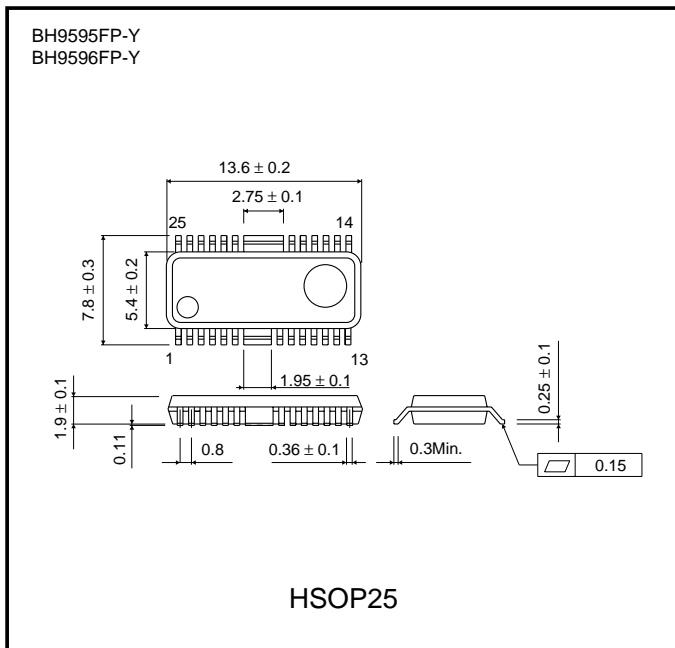
- (1) All outputs are opened at 175°C (typically).
- (2) Temperature hysteresis is approximately 20°C.
- (3) Thermal shutdown output table

| Conditions | Level |
|------------|--------|
| Normal | “Low” |
| Shutdown | “High” |

●Operation notes

- (1) This terminator's operational range includes harmonic frequencies. Mount to minimize ground impedance.
- (2) Connect the V_{DD1} pin (TERMPWR) to a grounded 2.2μF bypass capacitor.

●External dimensions (Units: mm)



●Thermal reduction curve

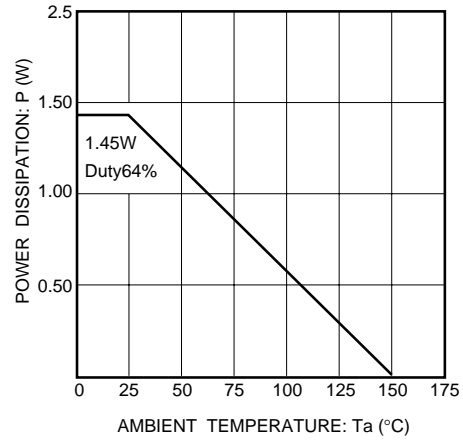


Fig. 3

- *1 When mounted on a 90 × 50 × 1.6 (mm) glass epoxy board.
- *2 Reduced by 11.6mW for each increase in Ta of 1°C over 25°C.
- *3 Can withstand continuous use of 64% duty, at 25°C.