

# SCSI active terminator

## BH9595FP-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.

### ●Application

PC and peripheral appliances, OA appliances, Disk drive appliances

### ●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)
    - SCSI active Terminators : 90mW
    - Conventional resistor terminators : 990mW
  - Power consumption (25% duty)
    - SCSI active Terminators : 614mW
    - Conventional resistor terminators : 15/190mW
- Significant reductions in power consumption are possible by using this terminator.
- 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 <sub>DD1</sub>	-0.3~+7.0	V
DC output current *1	I <sub>SLD</sub>	-30	mA
DC output current *2	I <sub>SLS</sub>	35	mA
Input voltage	V <sub>i</sub>	-0.3~(V <sub>DD1</sub> +0.3)	V
Power dissipation *3	P <sub>d</sub>	1.45	W
Operating temperature	T <sub>opr</sub>	0~+75	°C
Operating temperature	T <sub>stg</sub>	-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 90mm×50mm×1.6mm galass epoxy board

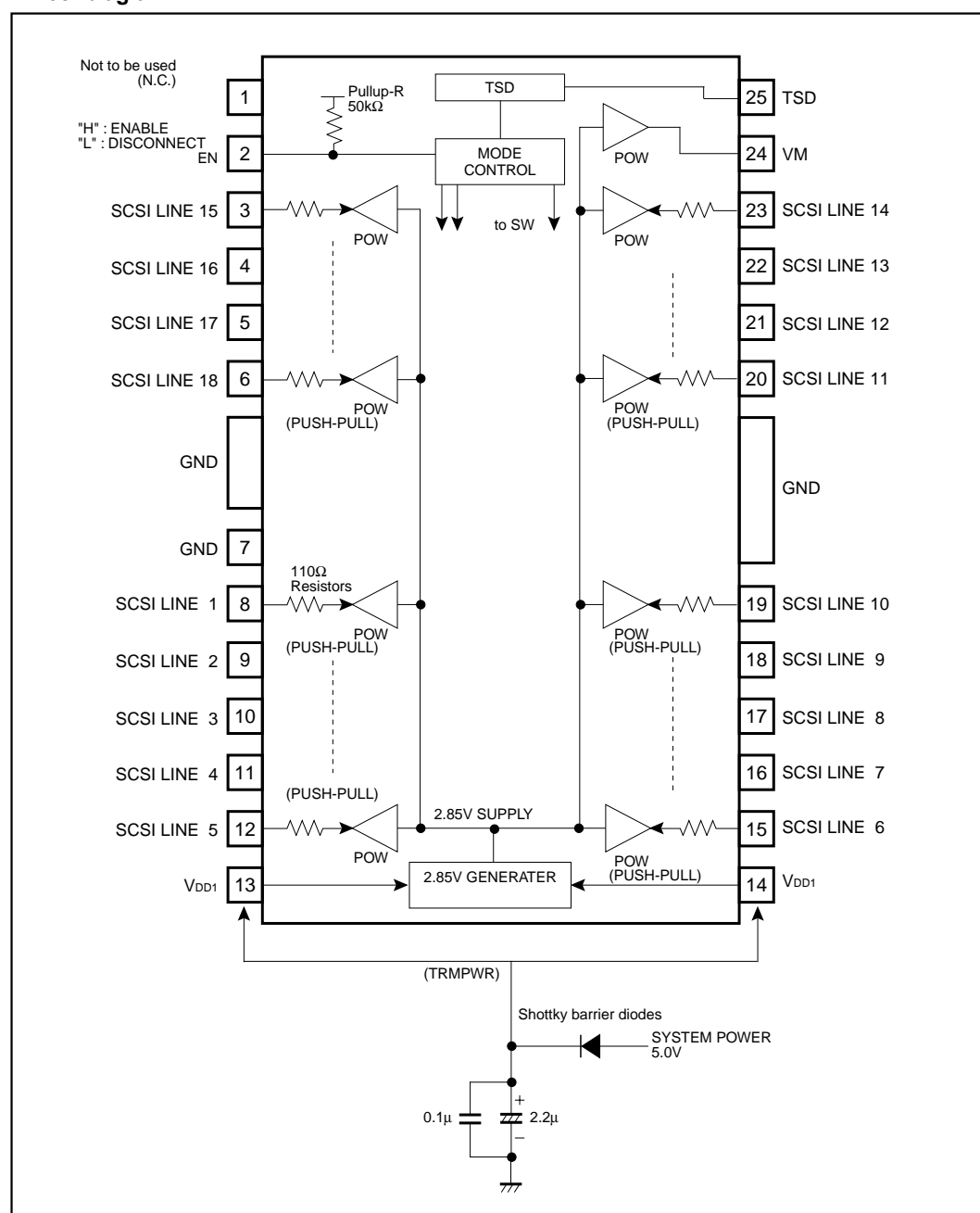
## Multimedia ICs

## ●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V <sub>DD1</sub>	4.0	4.5	5.5*	V
Inout voltage (High)	V <sub>IH</sub>	V <sub>DD1</sub> -0.6	—	V <sub>DD1</sub> +0.6	V
Inout voltage (Low)	V <sub>IL</sub>	-0.3	—	0.8	V
SCSI Line voltage	V <sub>SLX</sub>	-0.3	—	V <sub>DD1</sub> +0.3	V

\* Transient 6V

## ●Block diagram



## Multimedia ICs

## ●Pin descriptions

Pin No.	Pin name	Pin description
1	(N.C.) Not to be used	
2	EN	Enable pin
3	SCSI Line 15	SCSI Terminator node
4	SCSI Line 16	SCSI Terminator node
5	SCSI Line 17	SCSI Terminator node
6	SCSI Line 18	SCSI Terminator node
- -	GND	GND
7	GND	GND
8	SCSI Line 1	SCSI Terminator node
9	SCSI Line 2	SCSI Terminator node
10	SCSI Line 3	SCSI Terminator node
11	SCSI Line 4	SCSI Terminator node
12	SCSI Line 5	SCSI Terminator node
13	V <sub>DD1</sub>	Terminator power-supply pin (TO/FROM)
14	V <sub>DD1</sub>	Terminator power-supply pin (TO/FROM)
15	SCSI Line 6	SCSI Terminator node
16	SCSI Line 7	SCSI Terminator node
17	SCSI Line 8	SCSI Terminator node
18	SCSI Line 9	SCSI Terminator node
19	SCSI Line 10	SCSI Terminator node
- -	GND	GND
20	SCSI Line 11	SCSI Terminator node
21	SCSI Line 12	SCSI Terminator node
22	SCSI Line 13	SCSI Terminator node
23	SCSI Line 14	SCSI Terminator node
24	VM	2.85V node
25	TSD	Thermal shutdown output

Pin Assignment Table (HSOP-25)

## Multimedia ICs

## ● Input / output circuits

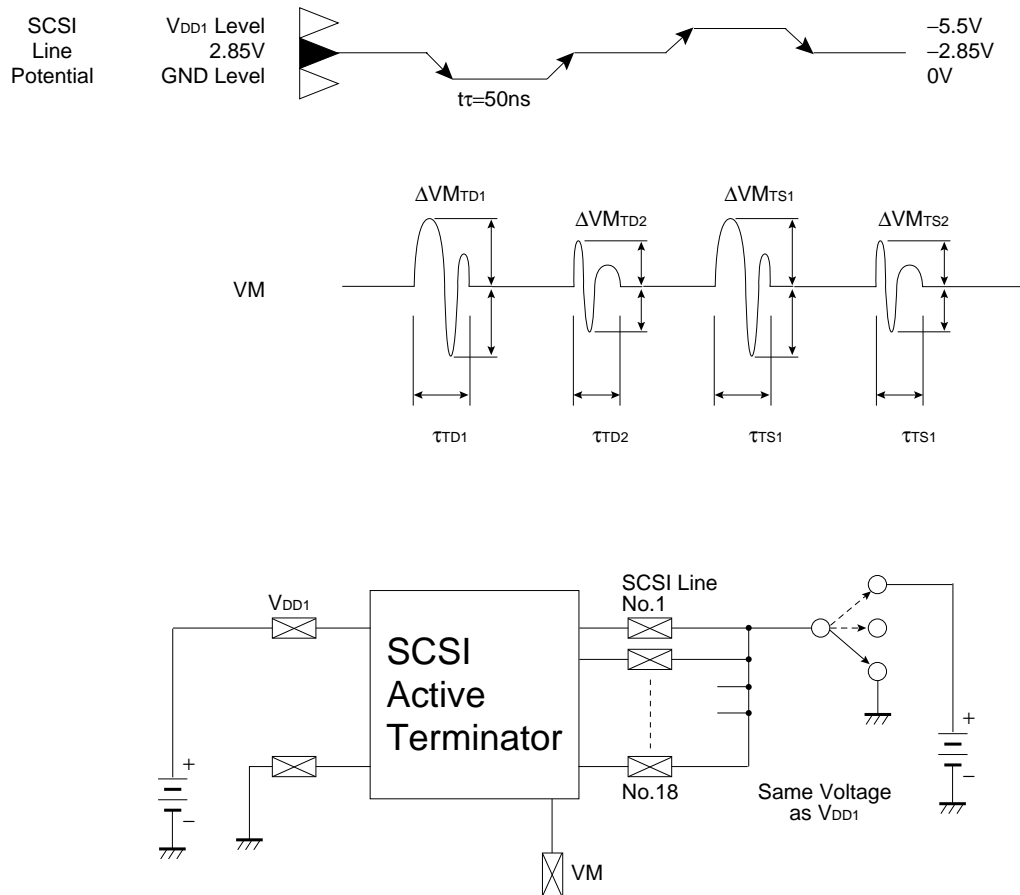


Fig.1

## Multimedia ICs

## ●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
<< DC characteristics >>						
Input leakage current	I <sub>IL</sub>	50	110	200	μA	V <sub>i</sub> =GND V <sub>DD1</sub> =5.5V
	I <sub>IH</sub>	-1	-	1	μA	V <sub>i</sub> =V <sub>DD1</sub> V <sub>DD1</sub> =5.5V
SCSI line leakage current	I <sub>SLZ</sub>	-1	-	1	μA	EN=GND V <sub>DD1</sub> =5.5V
SCSI line short current *1	I <sub>SLSS</sub>	15	25	30	mA	EN=V <sub>DD1</sub> , SCSI Line=GND, 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V
SCSI line short current *2	I <sub>SLSD</sub>	7	20	30	mA	EN=V <sub>DD1</sub> , SCSI Line=V <sub>DD1</sub> , 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V
VM voltage	V <sub>M</sub>	2.700	2.85	3.000	V	4.0 ≤ V <sub>DD1</sub> ≤ 5.5V
Standby current *1	I <sub>DDSTB</sub>	-	1.0	2.0	mA	EN=GND, 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V
SCSI total sink current	I <sub>SLS</sub>	300	-	550	mA	EN=V <sub>DD1</sub> , 18 SCSI Line=GND, 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V
SCSI total drain current	I <sub>SLD</sub>	300	-	550	mA	EN=V <sub>DD1</sub> , 18 SCSI Line=V <sub>DD1</sub> , 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V
SCSI equivalent resistance	R <sub>SL</sub>	105	-	115	Ω	EN=V <sub>DD1</sub> , SCSI Line : V <sub>DD1</sub> =4.7V
Pin capacity *3	PC		5.0	6.0	pF	EN=GND
<< Transient characteristics >>						
Load transient voltage 2.85V → GND	ΔV <sub>M</sub> TD1	-100	-	+100	mV	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : 2.85V→GND Level
Load transient 1/10 decay time 2.85V → GND	τ <sub>TD1</sub>	-	-	+100	μs	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : 2.85V→GND Level
Load transient voltage GND → 2.85V	ΔV <sub>M</sub> TD2	-100	-	+100	mV	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : GND→2.85V Level
Load transient 1/10 decay time GND → 2.85V	τ <sub>TD2</sub>	-	-	+100	μs	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : GND→2.85V Level
Load transient voltage 2.85V → V <sub>DD1</sub>	ΔV <sub>M</sub> TS1	-100	-	+100	mV	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : 2.85V→V <sub>DD1</sub> Level
Load transient 1/10 decay time 2.85V → V <sub>DD1</sub>	τ <sub>TS1</sub>	-	-	+100	μs	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : 2.85V→V <sub>DD1</sub> Level
Load transient voltage V <sub>DD1</sub> → 2.85V	ΔV <sub>M</sub> TS2	-100	-	+100	mV	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : V <sub>DD1</sub> →2.85V Level
Load transient 1/10 decay time V <sub>DD1</sub> → 2.85V	τ <sub>TS2</sub>	-	-	+100	μs	EN=V <sub>DD1</sub> 4.0 ≤ V <sub>DD1</sub> ≤ 5.5V All SCSI Lines : V <sub>DD1</sub> →2.85V Level

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

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

\*3 The transient characteristics are guaranteed design values.

## ●Application example

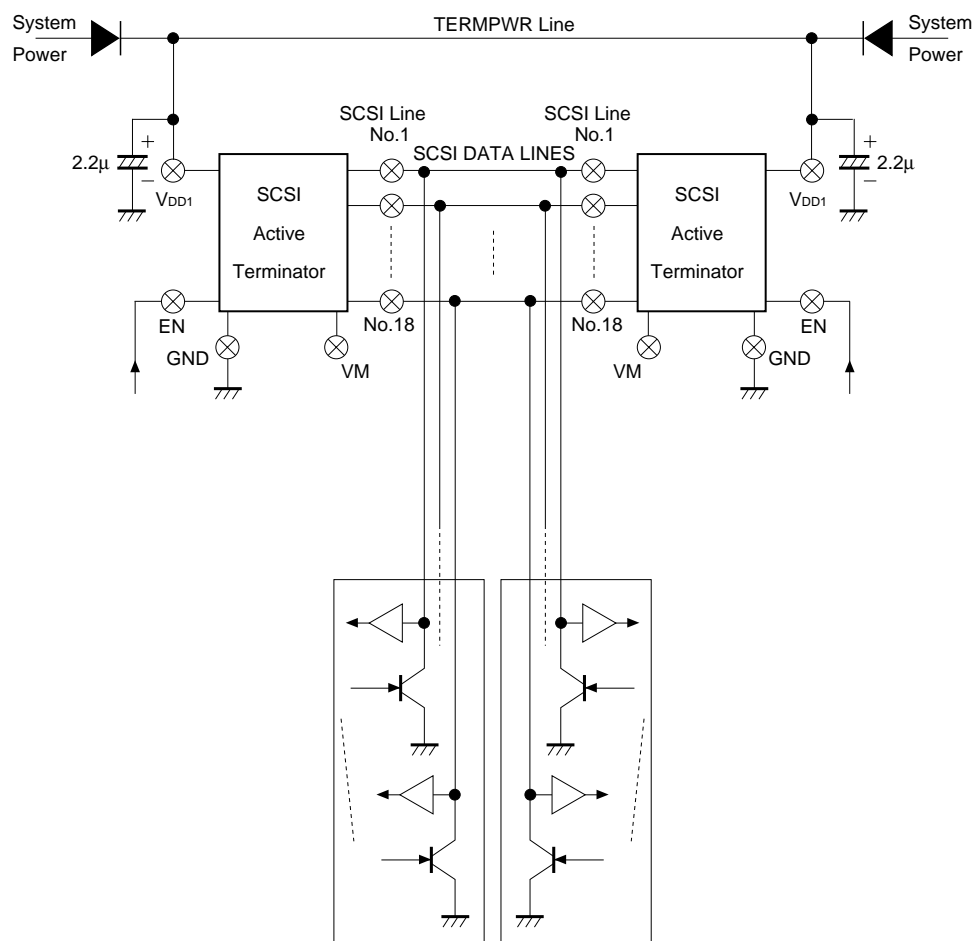


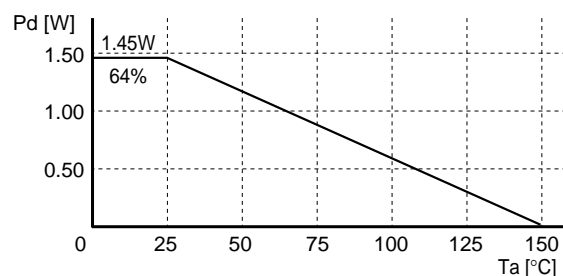
Fig.2

## Multimedia ICs

## ●Operation notes

## 1. Requirement of mounting design

## (1) Thermal reduction curve



\* When mounted on a 90×50×1.6 (mm) glass epoxy board.  
 \* Reduced by 11.6mW for each increase in Ta OF 1°C over Ta=25°C.

Fig.3

1) Can withstand continuous use 64% duty, at 25°C.

## (2) Electrical characteristics

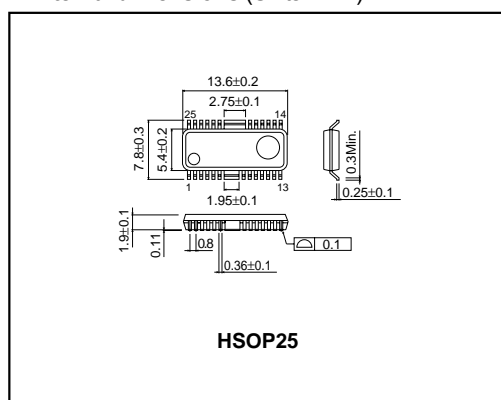
- 1) Please note to make grand impedance as low as possible because this terminator can operate in even high-frequency range.
  - 2) Please connect the 2.2μF by-pass capacitor between V<sub>DD1</sub> pin (TERMPWR) and GND.
  - 3) Capacitor is not necessary for VM pin.
  - 4) PULL UP-R (50kΩ) is incorporated in EN pin.
- Refer to the application circuit.

## 2. Protection circuit

## (1) Thermal shutdown

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

## ●External dimensions (Units : mm)



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