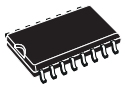
ST21S07A

SCSI TERMINATOR

- FULLY COMPLIANT WITH SCSI, SCSI-2 AND EMERGING SCSI-E STANDARDS
- PROVIDES ACTIVE TERMINATION FOR NINE SIGNAL LINES
- LOW DROPOUT (0.5V) VREGS:2.85V
- FACTORY TRIMMED TERMINATION 110Ω (±2%)
- POWER DOWN MODE ISOLATES TERMINATION RESISTORS FROM THE BUS
- FULLY SUPPORTS ACTIVELY NEGATED SCSI SIGNALS
- COMPATIBLE TO THE DS2107, DS2107A AND DS21S07
- ONBOARD THERMAL SHUTDOWN CIRCUITRY
- AVAILABLE IN SO-16L AND TSSOP20
- SCSI BUS HOT PLUG-COMPATIBLE



SOP

TSSOP

DESCRIPTION

The SCSI-2 and SCSI-3 standards recommend the use of active terminations at both ends of every cable segment in a SCSI system with a single-ended drivers and reveivers. The ST21S07A SCSI terminator, which is fully compliant with these standands, enables the designer to gain the benefits of active termination: greater immunity to voltages drop on the TERMPWR (TERMination PoWeR) line, enhanced high level noise immunity, intrinsic TERMPWR decouplig, and very low quiescent current consumption.

The ST21S07A integrates a regulator and nine precise switched 110Ω termination resistors into a monolithic IC. The ST21S07A can be electrically isolatesd from the SCSI bus without physical removal from the SCSI device.

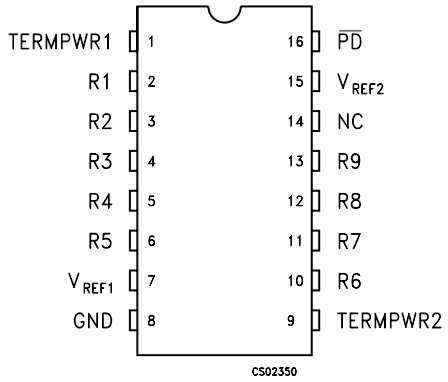
ORDERING CODES

Type	Temperature Range	Package	Comments
ST21S07ACW	0 to 70 °C	SO-16L (Tube)	49parts per tube / 25tube per box
ST21S07ACWR	0 to 70 °C	SO-16L (Tape & Reel)	1000 parts per reel
S21S07ACTR (*)	0 to 70 °C	TSSOP20 (Tape & Reel)	2500 parts per reel

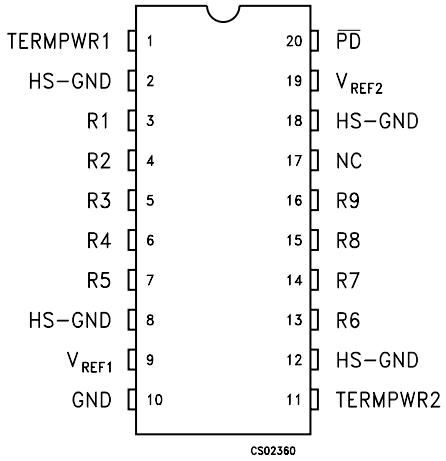
(*) Available on request

PIN CONFIGURATION

SO-16L



TSSOP20



PIN DESCRIPTION

PIN N° (TSSP20)	PIN N° (SO-16L)	SYMBOL	NAME AND FUNCTION
1	1	TERMPWR1	**Termination Power 1**: Should be connected to the SCSI TERMPWR line. Must be decoupled with either a 2.2µF or 4.7µF. See Fig. 2.
2		HS-GND	**Heat Sink Ground**: Internally connected to the mounting pad. Should be either grounded or electrically isolated from the other circuitry.
3	2	R1	**Signal Termination 1**: 110 Ω Termination
4	3	R2	**Signal Termination 2**: 110 Ω Termination
5	4	R3	**Signal Termination 3**: 110 Ω Termination
6	5	R4	**Signal Termination 4**: 110 Ω Termination
7	6	R5	**Signal Termination 5**: 110 Ω Termination
8		HS-GND	**Heat Sink Ground**: Internally connected to the mounting pad. Should be either grounded or electrically isolated from the other circuitry.
9	7	V_{REF1}	**Reference Voltage 1:** Must be external connected directly to the V_{REF2} pin. Must be decoupoled with 4.7µF capacitor as shown in Figure 2
10	8	GND	**Ground**: Signal groud: 0V
11	9	TERMPWR	**Termination Power21**: Should be connected to the SCSI TERMPWR line. Must be decoupled with either a 2.2µF or 4.7µF. See Fig. 2.
12		HS-GND	**Heat Sink Ground**: Internally connected to the mounting pad. Should be either grounded or electrically isolated from the other circuitry.
13	10	R6	**Signal Termination 6**: 110 Ω Termination
14	11	R7	**Signal Termination 7**: 110 Ω Termination
15	12	R8	**Signal Termination 8**: 110 Ω Termination
16	13	R9	**Signal Termination 9**: 110 Ω Termination
17	14	NC	**Not connected:** Do not connect any signal to this pin
18		HS-GND	**Heat Sink Ground**: Internally connected to the mounting pad. Should be either grounded or electrically isolated from the other circuitry.
19	15	V_{REF2}	**Reference Voltage 2:** Must be external connected directly to the V_{REF1} pin. Must be decoupoled with 4.7µF capacitor
20	16	$\overline{PD}$	**Power Down**: When tied low, the ST21S07A enters a power down mode. Contains an internal 60K pull-up. Strap low to deactivate the ST21S07A, leave open circuited to activate the ST21S07A

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{PIN}	Voltage on Any Pin Relative to Ground	-1 to 7	V
T_{stg}	Storage Temperature Range	-55 to +150	°C
T_{op}	Operating Junction Temperature Range	0 to +70	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{TP}	TERMPWR Voltage		4		5.5	V
V_{PDA}	$\overline{PD}$ Active		-0.3		0.8	V
V_{PDI}	$\overline{PD}$ Inactive		2		V_{TP}+0.3	V

DC CHARACTERISTICS (T_A = 0 to 70°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{TP}	TERMPWR Current	(note 1, 3) (note 1, 4)		 1.5	250 8	mA mA
I_{PD}	Power Down Current	(note 1, 2, 5)		70	150	µA
R_{TERM}	Termination Resistance	(note 1, 2)	108	110	112	Ω
T_{SD}	Die Thermal Shutdown	(note 1, 6)	150	170		°C
C_{PD}	Power Down TermniatioN Capacitance	(note 1, 2, 5, 6)		3	5	pF
H_{PD}	Power Down Hysteresis	(note 1)		280		mV
I_{IH}	Input Leackage High	(note 1, 8)	-1			µA
I_{IL}	Input Leackage Low	(note 1, 7)			1	µA

REGULATOR CHARACTERISTICS (T_A = 0 to 70°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{REF}	Output Voltage	(note 1, 2)	2.79	2.85	2.93	V
v_{DROP}	Drop-out Voltage	(note 3, 6)		0.3	0.75	V
LI_{REG}	Line Regulation	(note 1, 4)		0.25	2	%
LO_{REG}	Load Regulatio	(note 1, 2)		0.5	3	%
I_{LIM}	Current Limit	(note 1)		450		mA
I_{SINK}	Sink Current	(note 1)	200			mA
I_{OUT}	Output Current	(note9)			25.2	mA

Note 1: TERMPWR = 4V to 5.5V
Note2: Signal Lines = 0V to TERMPWR
Note3: All signal lines = 0V
Note 4: All signal lines open
Note 5: PD = 0V
Note 6: Guaranteed by design; not production tested
Note 7: R_1 through R_9 only
Note 8: R_1 through R_9 and $\overline{PD}$
Note 9: V_{SIGNAL} = 0.2V

FUNCTIONAL DESCRIPTION

The ST21S07A consists of a bandgap reference, buffer amplifier, and nine termination resistors Figure 1). The bandgap reference circuit produces a precise 1.25V level which is fed to a buffer amplifier. The buffer produce a 2.85V level and is capable of sourcing at least 24mA into each of the termination resistors when the signal line is low (active). When the driver for a given signal line turns off, the terminator will pull the signal line to 2.85V (quiescent state). To handle actively negated SCSI signals, the buffer can sink 200mA. When all lines settle in the quiescent state, the regulator will consume about 1.5mA. When the ST21S07A is put into power-down mode by bringing $\overline{PD}$ low, the power-down circuitry will turn off the transistors on each signal line. This will isolated the ST21S07A from the signal lines and effectively remove it from the circuit. The power-down pin ($\overline{PD}$) has an internal pull-up resistor.To place the ST21S07A into an active state, the $\overline{PD}$ pin should be left open circuited.

To ensure proper operation, both the TERMPWR1 and TERMPWR2 pins must be connected to the SCSI bus TREMPWR line and both the VREF1 and VREF2 pins must be tied together externally. Each ST21S07A requires a 4.7µF capacitor connected between the VREF pins and ground. Figure 2 details a typical SCSI bus configuration. In an 8-bit wide SCSI bus arrangement ("A" Cable), two ST21S07A's would be needed at each end of the SCSI cable in order to terminate the 18 active signal lines. In a 16-bit SCSI bus arrangement ("P" Cable), three ST21S07A's would be need at each end of the SCSI cable in order to terminate the 27 active signal lines.

Figure 1 : Block Diagram

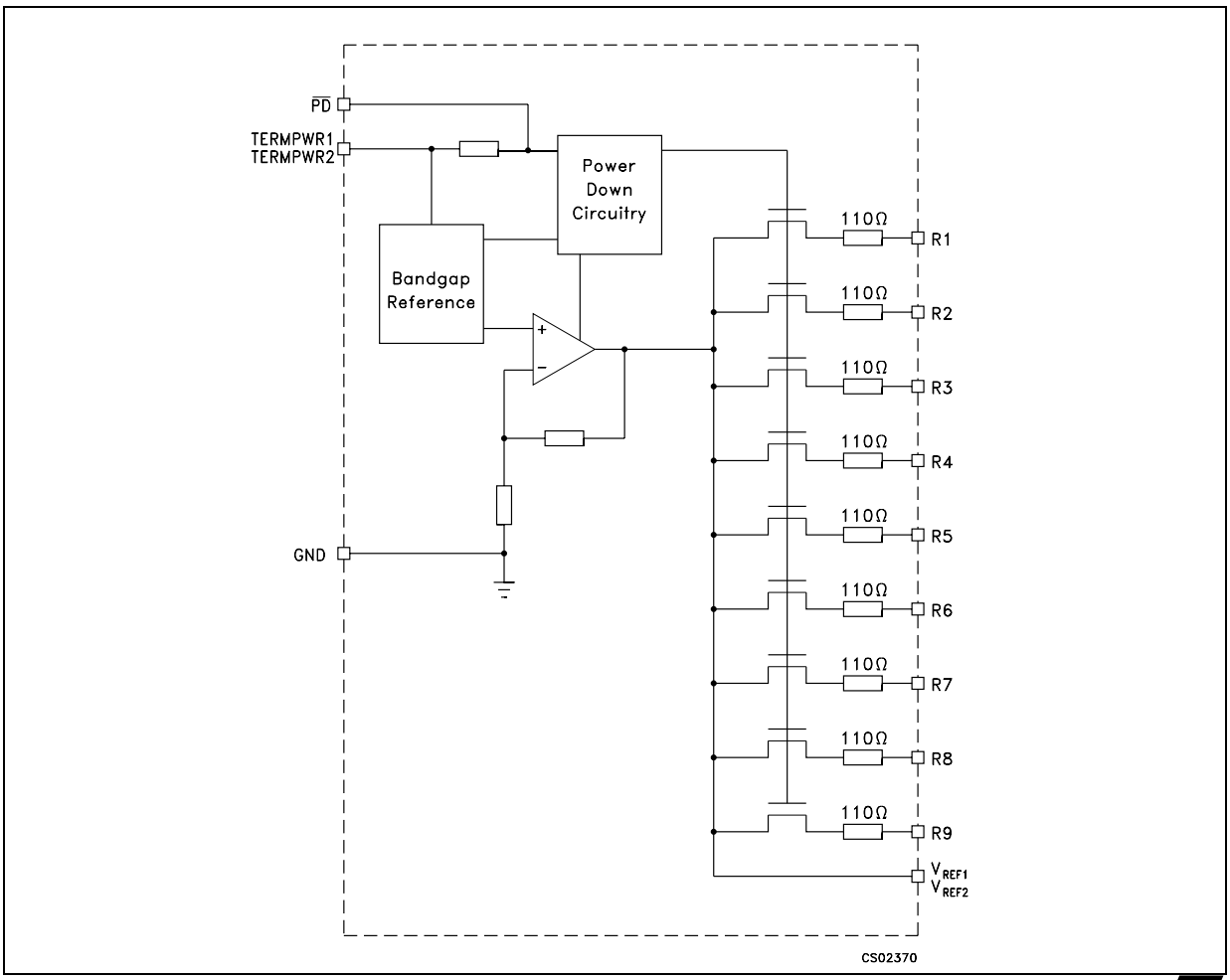
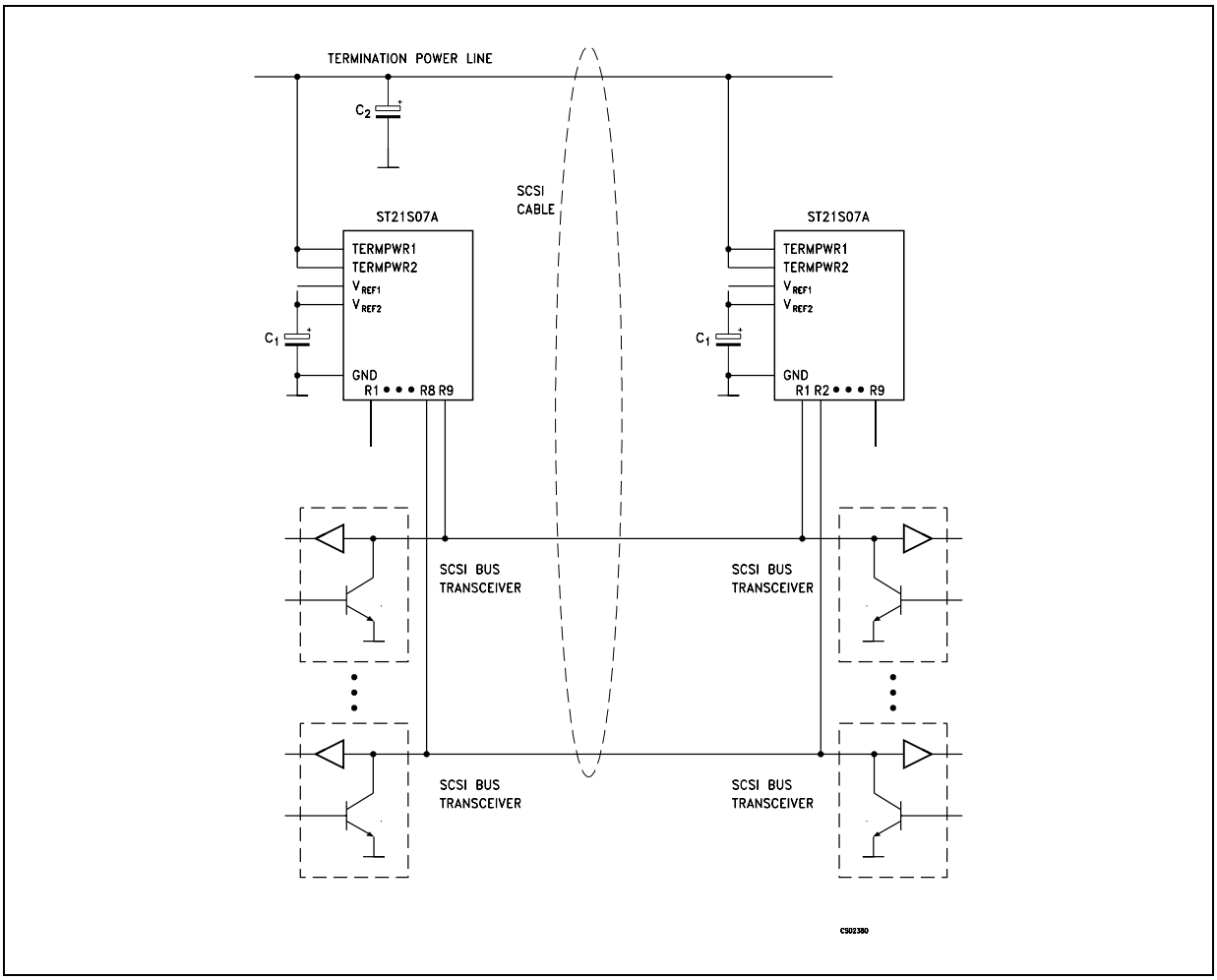


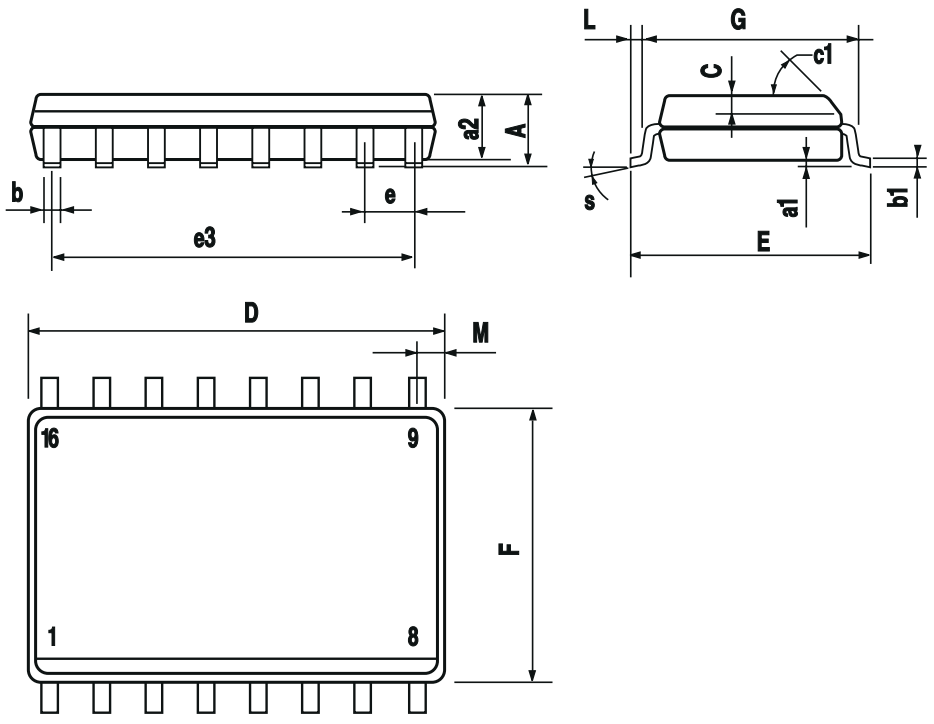
Figure 2 : Typical Scsi Bus Configuraion



NOTES:
1) C_1 = 4.7µF tantalium C_2 = 2.2µF tantalium or 4.7mF aluminum
2) If the ST21S07A is to be embedded into a peripheral that will act as a target on a SCSI bus, it is that recommended TERMPWR be derived from the SCSI cable, not generated locally. In this configuration, if a power failure occurs in the peripheral, it will not affect the bus.
3) A high frequency bypass capacitor (0.1µF recommended) can be added in parallel to C1 for applications using fast rise/fall time drivers.

SO16L MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.1		0.2	0.004		0.008
a2			2.45			0.096
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.012
C		0.5			0.020	
c1	45 (typ.)					
D	10.1		10.5	0.397		0.413
E	10.0		10.65	0.3.93		0.419
e		1.27			0.050	
e3		8.89			0.350	
F	7.4		7.6	0.291		0.300
L	0.5		1.27	0.020		0.050
M			0.75			0.029
S	8 (max.)					



P013I

TSSOP20 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.1			0.433
A1	0.05	0.10	0.15	0.002	0.004	0.006
A2	0.85	0.9	0.95	0.335	0.354	0.374
b	0.19		0.30	0.0075		0.0118
c	0.09		0.2	0.0035		0.0079
D	6.4	6.5	6.6	0.252	0.256	0.260
E	6.25	6.4	6.5	0.246	0.252	0.256
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0^o	4^o	8^o	0^o	4^o	8^o
L	0.50	0.60	0.70	0.020	0.024	0.028