

## General Description

The αRD1567 is low power CMOS dual transceiver designed to meet the requirements of MIL-STD-1553/1760 specifications.

The transmitter section of each channel takes complimentary CMOS/TTL digital input data and converts it to bi-phase Manchester encoded 1553 signals suitable for driving the bus isolation transformer. Separate transmitter inhibition control signals are provided for each transmitter.

The receiver section of each channel converts the 1553 bus bi-phase data to complimentary CMOS/TTL data suitable for inputting to a Manchester decoder. Each receiver has a separate enable input which can be used to force the output of the receiver to a logic 0. To minimize the package size for this function, the transmitter outputs are internally connected to the receiver inputs, so that only two pins are required for connection to each coupling transformer.

The αRD1567 have 5000V HBM built-in ESD protection.

Total Ionizing Dose (TID): 50 krad (Si).

Dose rate = 3.6 – 36 krad (Si)/h

SEE information:

No SEL was observed with LET of 62.5 MeV, Xenon heavy ion.

No SEFI was observed with LET of 62.5 MeV, Xenon heavy ion.

Single event transient (SET):

$\sigma_{\text{sat}} < 1.2 \cdot 10^{-5} \text{ cm}^2$  at LET = 62.5 MeV·cm<sup>2</sup>/mg, LET<sub>th</sub> > 20.4 MeV·cm<sup>2</sup>/mg.

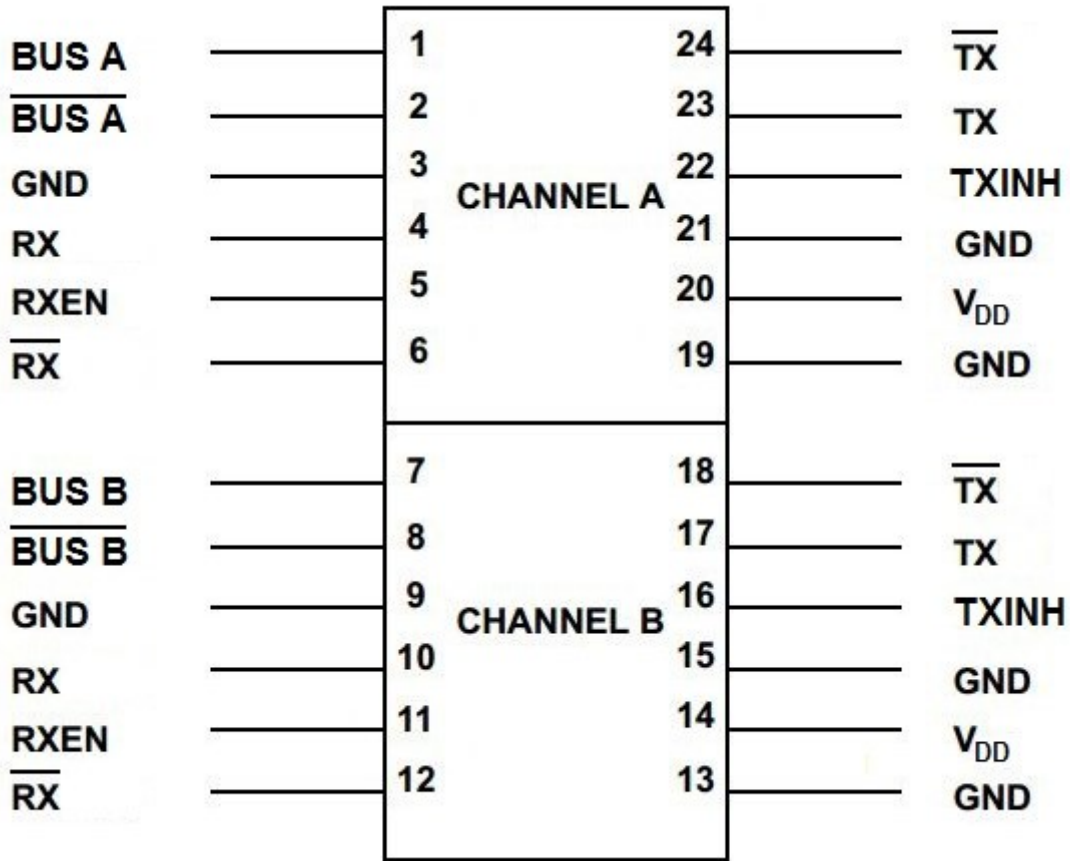
The heavy ion trials are performed on qualification lots only.

## Ordering information

**Table 1.**

Part	Temp. range, °C	Package	Package drawing	Burn-In case temp, °C	Burn-In time, hrs
αRD1567	-55 to +125	24-lead CFP	Figure 4	+125	240

**Pin Function Description**



**Table 2.**

Description	Mnemonic	Pin No	
		Channel A	Channel B
MIL-STD-1533 bus positive signal	BUS	1	7
MIL-STD-1533 bus negative signal	$\overline{\text{BUS}}$	2	8
Ground	GND	3, 19, 21	9, 13, 15
Receiver output	RX	4	10
Receiver enable	RXEN	5	11
Receiver output inv	$\overline{\text{RX}}$	6	12
Pover Input	$V_{DD}$	20	14
Transmitter inhibition	TXINH	22	16
Transmitter input	TX	23	17
Transmitter input inv	$\overline{\text{TX}}$	24	18

## αRD1567

### Operating conditions and absolute maximum ratings

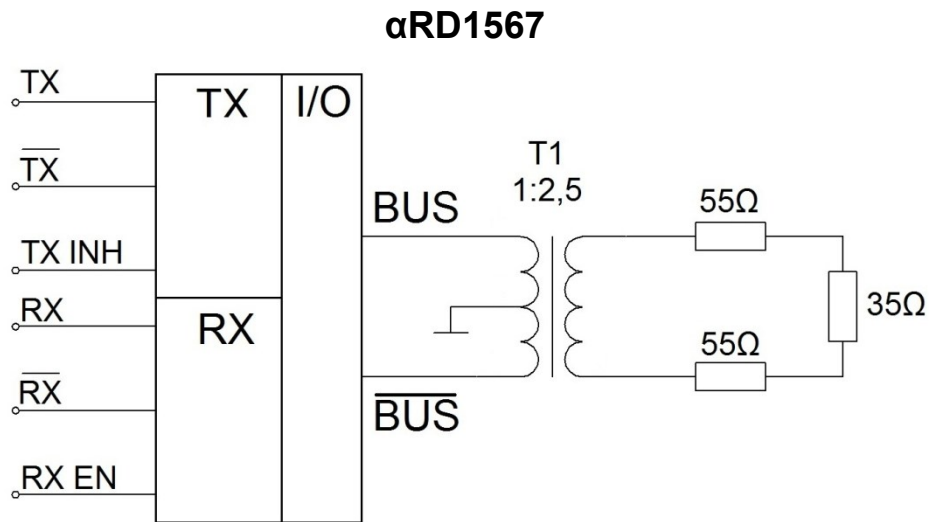
Table 3.

Characteristics, units	Symbol	Operating conditions		Absolute maximum ratings	
		min	max	min	max
Supply Voltage, V	$V_{DD}$	4,5	5,5	–	7
Logic Input voltage (high), V	$U_{IH}$	2	$V_{DD}$	–0,3	$V_{DD}$
Logic Input voltage (low), V	$U_{IL}$	0	0,8	–0,3	$V_{DD}$
Receiver differential voltage, V	$U_{IR}$	–	9	–	10
Peak output current, A	$I_{OUT}$	–	0,55	–	1
Power dissipation, W	$P_{TOT}$	–	0,95		1,1
Simultaneous transmission by both channels is not allowed. Stresses above absolute maximum ratings or outside recommended operating conditions may cause permanent damage to the device.					

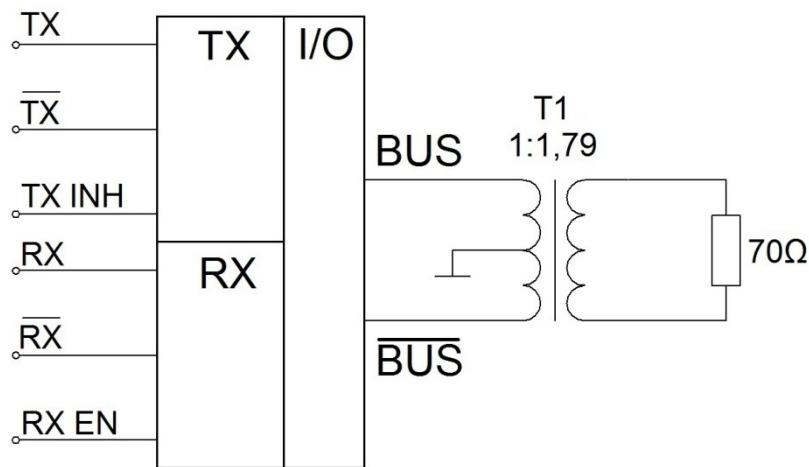
**Electrical characteristics within operating temperature range**

**Table 4.**

Parameter, units	Symbol	Condition	min	typ	max
Input Current, $\mu\text{A}$	$I_{IH}$	$V_{DD} = 5,5\text{V}$ $V_{IH} = V_{DD}$	–	0,04	10
	$I_{IL}$	$V_{DD} = 5,5\text{V}$ , $V_{IL} = 0$	–10	0,04	0
Supply Current, mA	$I_{CC}$	$V_{DD} = 5,5\text{V}$ , no transmission	–	7	24
	$I_{CC1}$	$V_{DD} = 5,5\text{V}$ , 50% duty cycle	–	250	352
	$I_{CC2}$	$V_{DD} = 5,5\text{V}$ , 100% duty cycle	–	450	600
<b>Receiver section</b>					
Output Voltage HI, V	$U_{OH}$	$V_{DD} = 4,5\text{V}$ , $I_{OH} = -0,4\text{ mA}$	2,7	4,3	–
Output Voltage LO, V	$U_{OL}$	$V_{DD} = 4,5\text{V}$ , $I_{OH} = 1\text{ mA}$	–	0,2	0,4
Threshold Voltage, V	$V_{TH}$	$V_{DD} = 5\text{V}$ , 1 MHz sine wave	0,28	0,56	1,2
Input Differential Resistance, kOhm	$R_i$	$V_{DD} = 4,5\text{V}$	20	63	–
Receive Delay, ns	$t_R$	$V_{DD} = 4,5\text{V}$	–	250	480
Receiver Enable Delay, ns	$t_{REN}$	$V_{DD} = 4,5\text{V}$	–	25	50
<b>Transmitter section</b>					
Output Voltage, V	$U_{O\ pp}$	$V_{DD} = 4,5\dots 5,5\text{V}$ , $R_L = 35\text{ Ohm}$ , fig. 1	6	7,0	9
		$V_{DD} = 4,5\dots 5,5\text{V}$ , $R_L = 70\text{ Ohm}$ , fig. 2	18	20,5	27
Transmitter Noise, mV	$U_{N\ pp}$	$V_{DD} = 4,5\dots 5,5\text{V}$	–	0,3	10
Output Dynamic Voltage Offset, mV	$U_{O\ DIN}$	$V_{DD} = 4,5\dots 5,5\text{V}$ , $R_L = 35\text{ Ohm}$ , fig. 1	–90	$\pm 50$	90
		$V_{DD} = 4,5\dots 5,5\text{V}$ , $R_L = 70\text{ Ohm}$ , fig. 2	–270	$\pm 150$	270
Output Differential Resistance, kOhm	$R_o$	$V_{DD} = 4,5\text{V}$ , no transmission	10	173	–
Transmission Delay, ns	$t_T$	$V_{DD} = 4,5\text{V}$	–	130	200
Transmitter Inhibition Delay, ns	$t_{THL\ INH}$	$V_{DD} = 4,5\text{V}$	–	70	120
	$t_{TLH\ INH}$	$V_{DD} = 4,5\text{V}$	–	130	190
Rise/Fall Time, ns	$t_F$	$V_{DD} = 4,5\dots 5,5\text{V}$	100	170	300



**Figure 1 – Test circuit, direct coupling to MIL-STD-1553 BUS  $\Omega$**



**Figure 2 – Test circuit, transformer coupling to MIL-STD-1553 BUS**

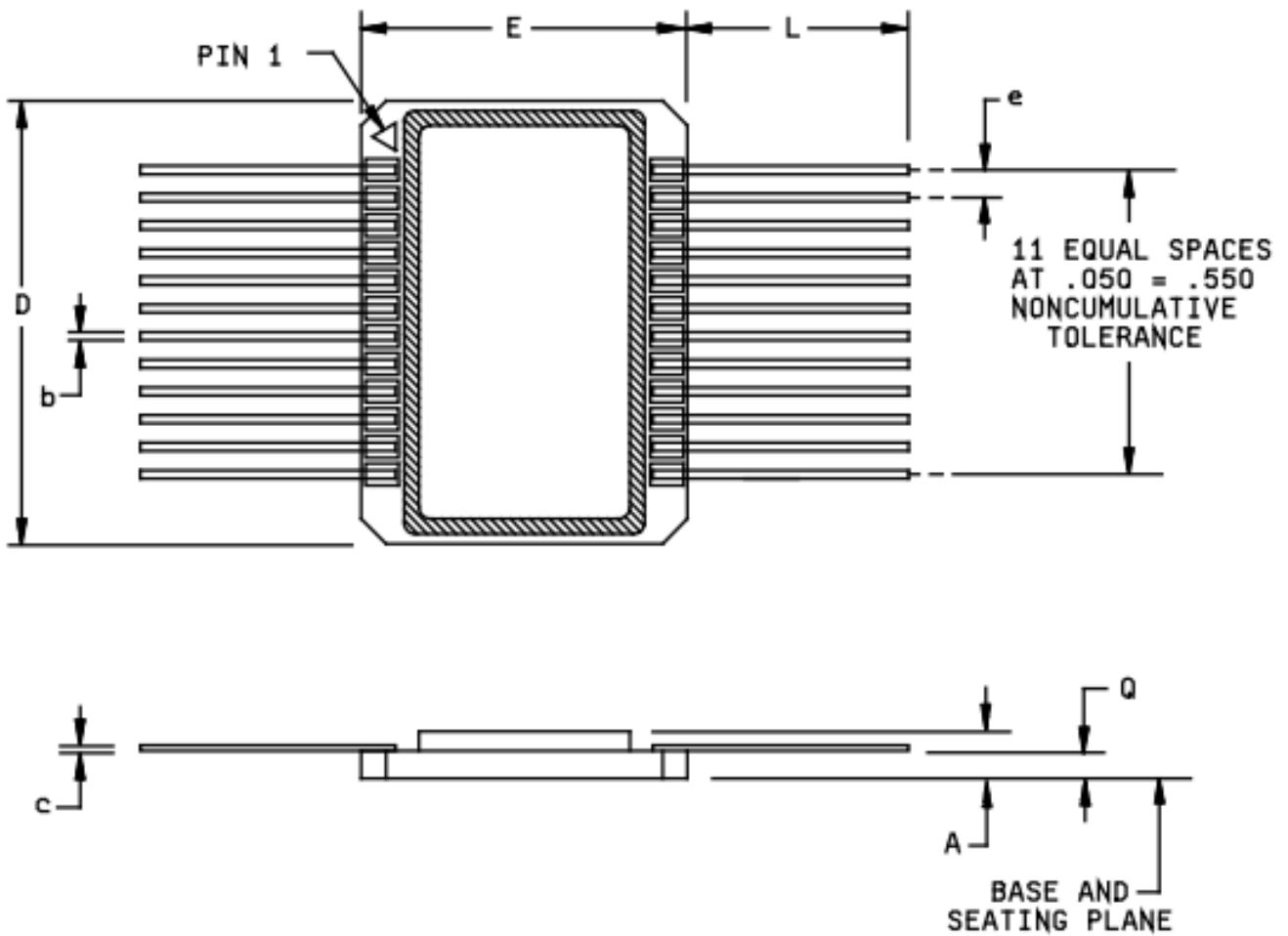
### Recommended thermal protection

Package should be mounted to or contact a heat removal rail located in the printed circuit board. To ensure proper heat transfer between the package and the heat removal rail, use a thermally conductive material between the package and the heat removal rail.

### Layout

To minimize Output Dynamic Voltage Offset, layout differences between BUS and  $\overline{\text{BUS}}$  lines and between TX and  $\overline{\text{TX}}$  lines should be minimal.

Physical Dimensions



Dimension	Inches	
	Min	Max
A		.095
b		.018
c	.007	.013
D		.810
E	.580	.600
e	.045	.055
L	.400	
Q	.060	.080

Figure 4 – CFP-24 package dimensions

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