

ACT4468D

Dual Transceivers for MIL-STD-1553

Features

- World's smallest and lowest standby power dual transceiver 0.3" x 1" packages
- Dual transceiver meets military data bus requirements, MIL-STD-1553 and MIL-STD-1760
- Low power dissipation at full output power
- Single +5V power supply
- Current source output
- Monolithic construction using dielectrically isolated(D.I.)
- Processed and screened to MIL-STD-883 specs
- DESC SMD# 5962-92061 Pending



General Description

The Aeroflex Circuit Technology Model ACT4468D is a next generation D.I. monolithic transceiver which provide full compliance with MIL-STD-1553/1760 and data bus requirements in the smallest packages with the lowest standby power consumption and one power supply operation.

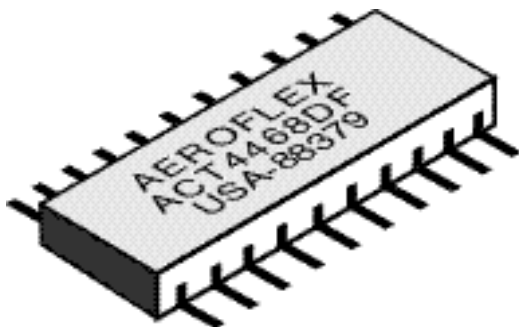
The dual channel Model ACT4468D perform the front-end analog function of inputting and outputting data through a transformer to a MIL-STD-1553/1760 data bus.

Design of these transceivers reflects particular attention to active filter performance. This results in low bit and word error rate with superior waveform purity and minimal zero crossover distortion. Efficient transmitter electrical and thermal design provides low internal power dissipation and heat rise at high as well as low duty cycles.

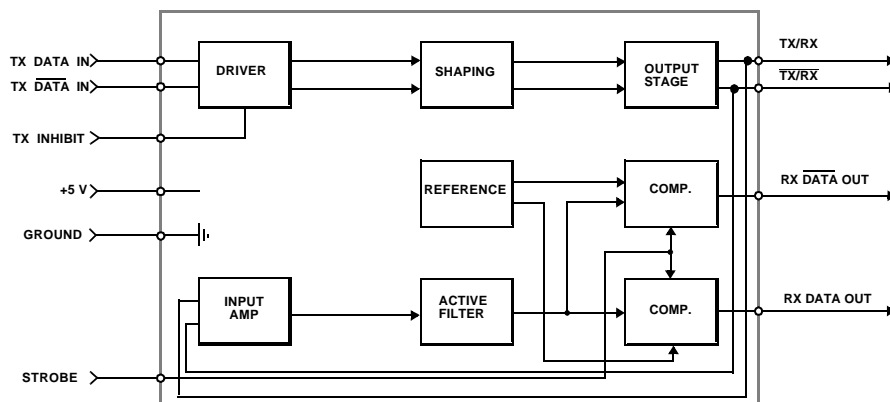
Each channel of the dual transceiver is completely separate from the other and fully independent. This includes power leads as well as signal lines. Hence, each channel may be connected to a different data bus with no interaction.

Transmitter:

The Transmitter section of the unit accepts bi-phase TTL data at the input and when coupled to the data bus with a 1:2.5 transformer, isolated on the data bus side with two 52.5 Ohm fault isolation resistors, and loaded by two 70 Ohm terminations plus additional receivers, the data bus signal produced is 7.5Volts nominal P-P at A-A'. (See Figure 5.) When both DATA and $\overline{\text{DATA}}$ inputs are held low or high, the transmitter output becomes



ACT4468D Dual Transceiver



Block Diagram (without Transformer), 1/2 of unit shown

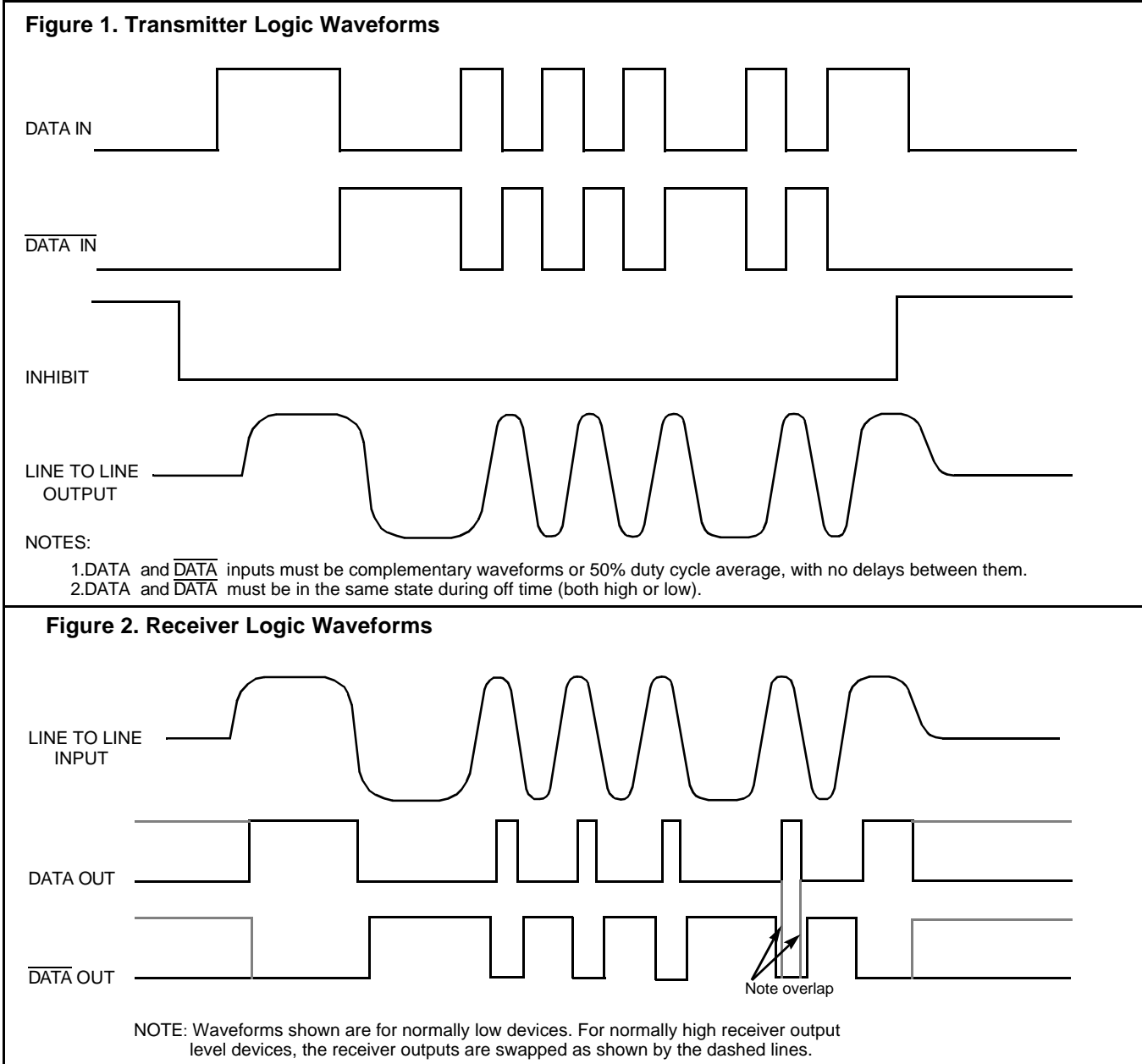
a high impedance and is "removed" from the line. In addition, an overriding "INHIBIT" input provides for the removal of the transmitter output from the line. A logic "1" applied to the "INHIBIT" takes priority over the condition of the data inputs and disables the transmitter. (See Transmitter Logic Waveform, Figure 1.)

The transceiver utilizes an active filter to suppress harmonics above 1MHz. The Transmitter may be safely operated at 100% duty cycle for an indefinite period into a short circuited 1553 bus.

Receiver:

The Receiver section accepts bi-phase differential data at the input and produces two TTL signals at the output. The outputs are DATA and $\overline{\text{DATA}}$, and represent positive and negative excursions of the input beyond a pre-determined threshold. (See Receiver Logic Waveform, Figure 2.)

The pre-set internal thresholds will detect data bus signals exceeding 1.150 Volts P-P and reject signals less than 0.6 volts P-P when used with a 1:2.5 turns ratio transformer. (See Figure 5 for transformer data and typical connection.)



Absolute Maximum Ratings

Operating Case Temperature	-55°C to +125°C
Storage Case Temperature	-65°C to +150°C
Positive Power Supply Voltage	-0.3 V to +7.0 V
Receiver Differential Input	±10 V
Receiver Input Voltage (Common Mode)	±5 V
Driver Peak Output Current	650 mA
Total Package Power Dissipation over the Full Operating Case Temperature Rise	2 Watt (Note: Normal operation conditions require one transmitter on and the other off at any given time.)
Maximum Junction To Case Temperature Rise for the Hottest Device	10°C
Thermal Resistance, Junction to Bottom of Case	5°C/W

Electrical Characteristics – Driver Section

Input Characteristics, TX DATA in or TX $\overline{\text{DATA}}$ in

Parameter	Condition	Symbol	Min	Typ	Max	Unit
"0" Input Current	$V_{IN} = 0.4 \text{ V}$	I_{ILD}		-0.2	-0.4	mA
"1" Input Current	$V_{IN} = 2.7 \text{ V}$	I_{IHD}		1	40	μA
"0" Input Voltage		V_{IHD}			0.7	V
"1" Input Voltage		V_{IHD}	2.0			V

Inhibit Characteristics

"0" Input Current	$V_{IN}=0.4\text{V}$	I_{ILI}		-0.2	-0.4	mA
"1" Input Current	$V_{IN}=2.7\text{V}$	I_{IHI}		1.0	40	μA
"0" Input Voltage		V_{ILI}			0.7	V
"1" Input Voltage		V_{IHI}	2			V
Delay from TX inhibit,(0→1) to inhibited output		t_{DXOFF}		200	300	nS
Delay from TX inhibit, (1→0) to active output		t_{DXON}		80	150	nS
Differential Output Noise, inhibit mode		V_{NOI}		2	10	mV p-p
Differential Output Impedance (inhibited)	Note 1	Z_{OI}	2K			Ω

Output Characteristics

Differential output level	$R_L=35 \Omega$	V_o	6.5	7.5	8.0	V p-p
Rise And Fall Times(10% to 90% of p-p output)		t_r	100	170	300	nS
Output Offset at point A-A' on Fig 5., 2.5 μS after midpoint crossing of the parity bit of the last word of a 660 μS message	$R_L=35 \Omega$	V_{OS}			±90	mV peak
Delay from 50% point of TX DATA or TX $\overline{\text{DATA}}$ input to zero crossing of differential signal		t_{DTX}		100	150	nS

Note 1. Power ON/OFF, measured from 75KHz to 1MHz at Point A-A. See Figure 5

Electrical Characteristics – Receiver Section

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Differential Voltage Range, Figure 4 Point P-P'		V_{IDR}			20	V peak
Common Mode Rejection Ratio		CMRR	45			dB

Strobe Characteristics (Logic "0" inhibits output) if not used, a 1K pullup to 5 V is recommended

"0" Input Current	$V_S=0.4\text{ V}$	I_{IL}		-0.2	-0.4	mA
"1" Input Current	$V_S=2.7\text{V}$	I_{IH}		1	+40	μA
"0" Input Voltage		V_{IL}			0.7	V
"1" Input Voltage		V_{IH}	2.0			V
Strobe Delay (turn-on)		$t_{SD(ON)}$		40	100	nS
Strobe Delay (turn-off)		$t_{SD(OFF)}$		60	100	nS

Threshold Characteristics (Sinewave input)

Input Threshold Voltage(referred to the bus)	100KHz-1MHz	V_{TH}	0.60	0.8	1.15	V p-p
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Output Characteristics, RX DATA and RX $\overline{\text{DATA}}$

"1" State	$I_{OH}=-0.4\text{ mA}$	V_{OH}	2.5	3.7		V
"0" State	$I_{OL} = 4\text{ mA}$	V_{OL}		0.3	0.5	V
Delay, (average)from differential input zero crossings to RX DATA and RX $\overline{\text{DATA}}$ output 50% points		t_{DRX}		250	400	nS

Power Data

Maximum Currents, Per Channel (+5V)

Duty Cycle	Typ	Max
Transmitter Standby	20 mA	30 mA
25% duty cycle	155 mA	185 mA
50% duty cycle	290 mA	335 mA
100% duty cycle	560 mA	650 mA

Power Supply Voltage

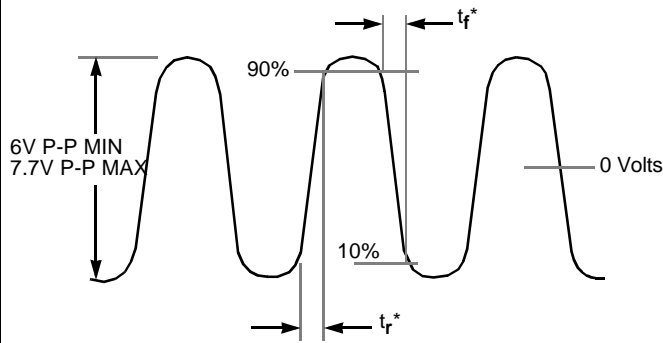
+V	4.75 to 5.5 Volts
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Note 2. $V_{cc}= 5\text{ volts} \pm 0.1\text{ V}$, for all measurements unless otherwise specified.

Note 3. Specifications apply over the case temperature range of -55°C to $+125^{\circ}\text{C}$ unless otherwise specified.

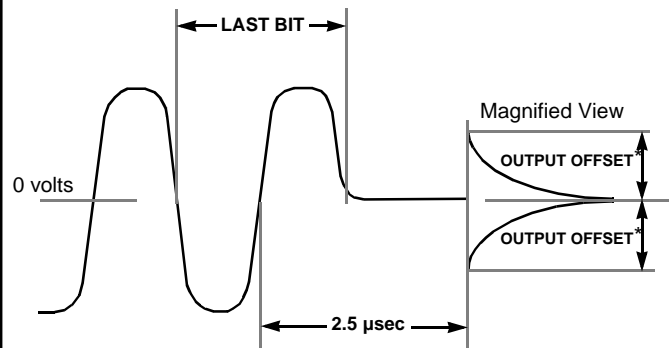
Note 4. All typical values are measured at $+25^{\circ}\text{C}$

Figure 3 – Transmitter (TX) Output Waveform



* Rise and fall times measured at point A-A' in Fig 5

Figure 4 – Transmitter (TX) Output Offset



*Offset measured at point A-A' in Fig 5

Figure 5 – Typical Transformer Connection

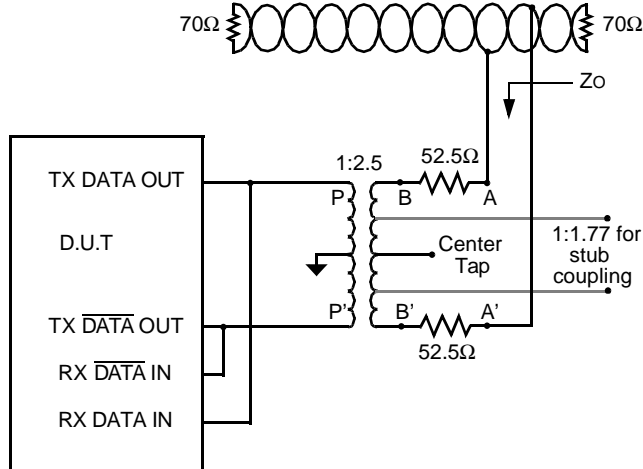
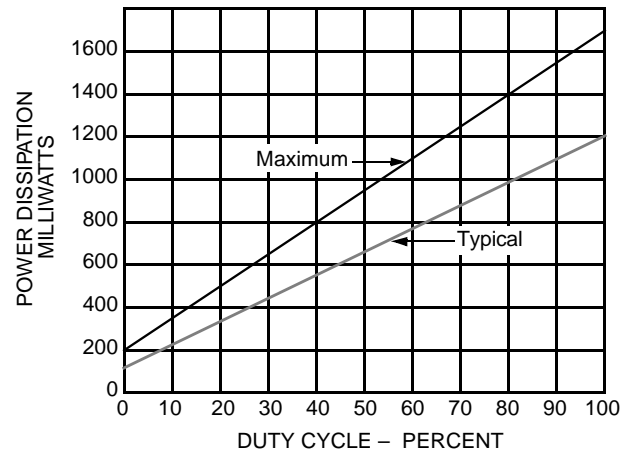


Figure 6 – Power Dissipation vs. Duty Cycle (Total hybrid with one channel transmitting and the other not powered)



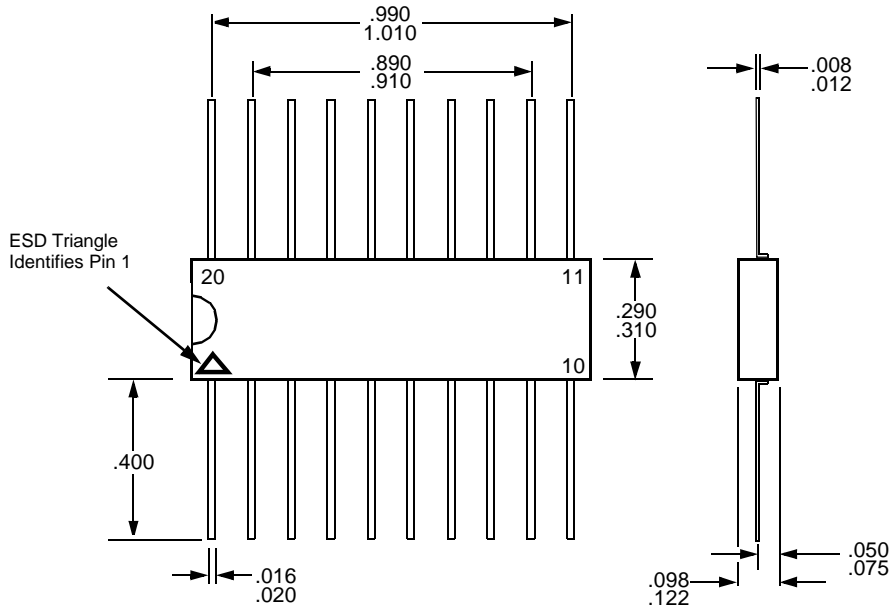
Note: $V_{CC} = 5$ Volts, V_{bus} (pt A-A') at 7.5 Volts P-P

Configurations and Ordering Information

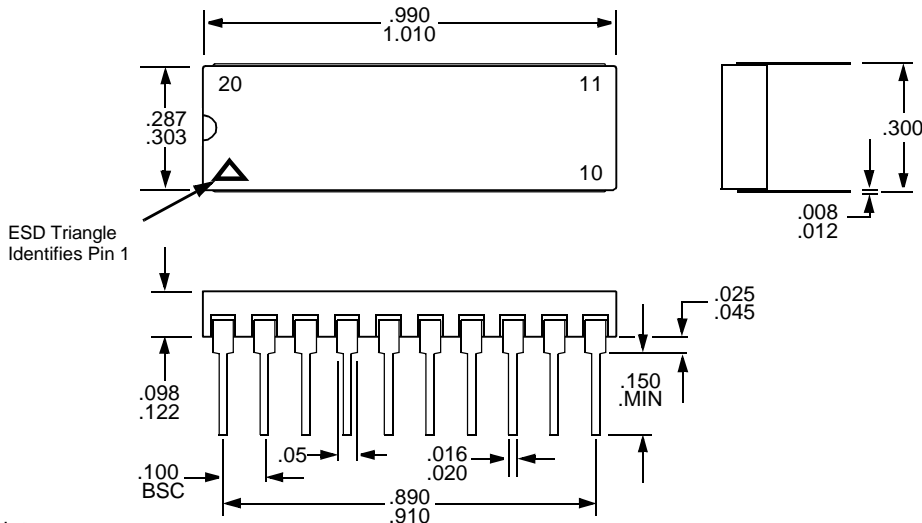
Model No.	DESC No.	Receiver Data level	Case	Configuration
ACT4468D	5962-92061(Pending)	Normally Low	DIP Package	Dual
ACT4468DF	5962-92061(Pending)	Normally Low	Flat Package	Dual
ACT4468DI	5962-92061(Pending)	Normally High	DIP Package	Dual
ACT4468DFI	5962-92061(Pending)	Normally High	Flat Package	Dual

Package Outline Drawings

"FLAT Package"



"DIP Package"



Notes

1. Dimensions shown are in inches

Pin #'s & Functions	
1	+5Vdc A
2	TX/RX A
3	$\overline{\text{TX/RX}}$ A
4	STROBE A
5	GROUND A
6	+5Vdc B
7	TX/RX B
8	$\overline{\text{TX/RX}}$ B
9	STROBE B
10	GROUND B
11	RX $\overline{\text{DATA}}$ OUT B
12	RX DATA OUT B
13	TX INHIBIT B
14	TX DATA IN B
15	TX DATA IN B
16	RX $\overline{\text{DATA}}$ OUT A
17	RX DATA OUT A
18	TX INHIBIT A
19	TX DATA IN A
20	TX $\overline{\text{DATA}}$ IN A

Specifications subject to change without notice.

Aeroflex Circuit Technology
35 South Service Road
Plainview New York 11803

Telephone: (516) 694-6700
FAX: (516) 694-6715
Toll Free Inquiries: 1-(800)THE-1553