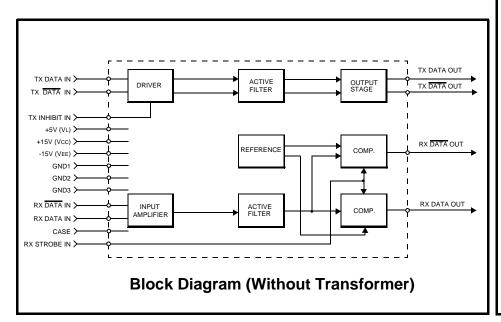
ACT 4487 SINGLE TRANSCEIVER FOR MIL-STD-1553/1760

CIRCUIT TECHNOLOGY www.aeroflex.com/act1.htm

Features

- +5 / ±15 Volt Supply Operation
- Low Power Dissipation
- Small Size & Light Weight
- Outstanding MIL-STD-1553 performance
- Radiation Hard Dielectric Isolation Monolithic Construction for Severe Environments
- Superior High Frequency Line Transient and Input Ripple Rejection
- Input and Output TTL Compatible Design
- Processed and Screened to MIL-STD-883 Specs
- MIL-PRF-38534 Compliant Devices Available



General Description

Aeroflex The Circuit Technology ACT 4487 is a next generation monolithic transceiver design which provide full compliance to MIL-STD-1553A/B and 1760 requirements in a small package with low power consumption.

The ACT 4487 series performs the front-end analog function of inputting and outputting data through a transformer to the MIL-STD-1553 data bus.

Design of this transceiver 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.

Transmitter:

The Transmitter section accepts bi-phase TTL data at the input and when coupled to the data bus with a 1.4:1 ratio transformer, isolated on the data bus side with two 52.5 Ohm fault isolation resistors, and loaded by 70 Ohm two terminations, the data bus signal is typically 7.5 Volts P-P at point A (See Figure 5). When both DATA and DATA inputs are held low or high, transmitter output becomes a high impedance and is "removed" from the line. In addition. overriding "INHIBIT"

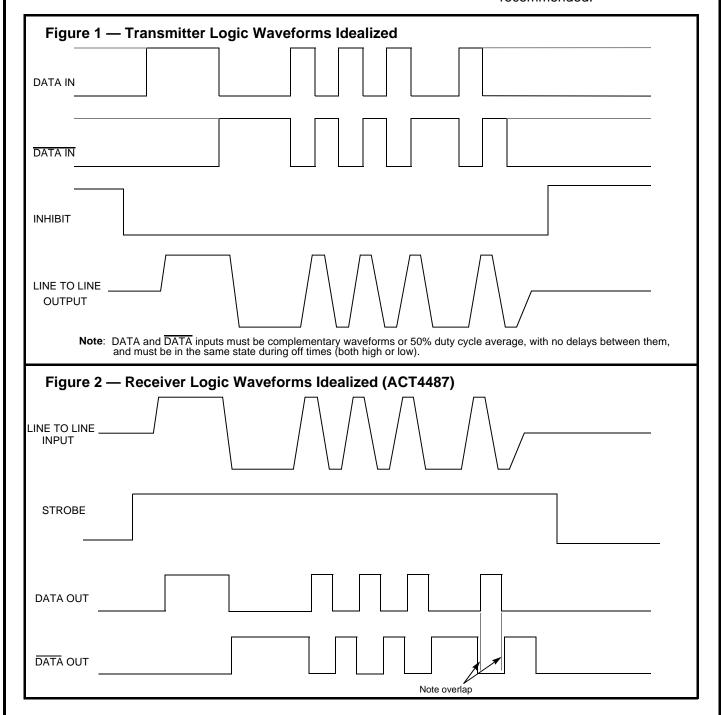
provides for the removal of the transmitter output from the line. A logic "1" signal applied to the "INHIBIT" takes priority over the condition of the data inputs and disables the transmitter (See Transmitter Logic Waveform, Figure 1). The Transmitter may be safely operated for an indefinite period with the bus (point A) short circuited at 100% duty cycle.

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 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, point A Figure 5, exceeding 1.20 Volts P-P and reject signals less than 0.6 Volts P-P when used with a transformer (See Figure 5 for transformer data and typical connection).

A low level at the RX Strobe input inhibits the DATA and DATA outputs. If unused, a 2K pull-up to +5 Volts is recommended.



Absolute Maximum Ratings						
Operating case temperature	-55°C to +125°C					
Storage case temperature	-65°C to +150°C					
Power supply voltage Vcc VEE VL	-0.3 V to +18 V +0.3 V to-18 V -0.3 V to +7.0 V					
Logic input voltage	-0.3 V to +5.5 V					
Receiver differential input	±40 VP-P					
Receiver input voltage (common mode)	±10 V					
Driver peak output current	300 mA					
Total package power dissipation over the full operating case temperature rise	2.5 Watts					
Maximum junction to case temperature	10°C					
Thermal resistance – junction to case	4°C/W					

Electrical Characteristics — Driver Section Input Characteristics, TX DATA IN or TX DATA IN (Notes 2 & 3 apply)

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Parameter	Condition	Symbol	Min	Тур	Max	Unit
"0" Input Current	$V_{IN} = 0.4 \text{ V}$	I _{ILD}		-0.1	-0.2	mA
"1" Input Current	V _{IN} = 2.7 V	l _{IHD}		1	40	μΑ
"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 V	l _{ILI}		-0.1	-0.2	mA
"1" Input Current	V _{IN} =2.7V	I _{IHI}		1.0	40	μΑ
"0" Input Voltage		V_{ILI}			0.7	V
"1" Input Voltage		\vee_{iHI}	2.0			V
Delay from TX inhibit, (0→1) to inhibited output	From mid pt inhibit to	t _{DXOFF}		175	225	nS
Delay from TX inhibit, (1→0) to active output	±1.2V pt B, See Figure 5	t _{DXON}		90	150	nS
Differential output noise, inhibit mode		V_{NOI}		2	10	mV _{P-P}
Differential output impedance (inhibited) Note 1 See Figure 5	Point B	Z _{OI}	2K			Ω
	Point C	Z _{OI}	1K			Ω

Output Characteristics

Differential output level, See Figure 5	Point A	Vo	6	7.5	9	V_{P-P}
Rise and fall times(10% to 90% at pt A output) See Figure 5	Point A	t _r	100	160	300	nS
Output offset, Figure 3, 2.5µS after midpoint crossing of the parity bit of the last word of a 660µS message See Figure 5	Point A	Vos			± 90	mV peak
Delay from 50% point of TX DATA or TX DATA input to zero crossing of differential signal. See Fig 5	Point A	t _{DXT}		100	200	nS

Electrical Characteristics — Receiver Section

Parameter	Condition	Symbol	Min	Тур	Max	Unit
Differential Receiver Input Voltage Range (See Figure 5, Point B)	TXFMR 1.4:1	V_{IDR}			40	V_{P-P}
Common Mode Rejection Ratio (Note 3)		CMRR	45			dB
"1" State – Rx Data or Rx Data Output	I _{OH} = -0.4 mA	V _{он}	2.5	3.7		V
"0" State - Rx Data or Rx Data Output	I _{OI} = 4 mA	V_{OL}		0.35	0.5	V
Delay (average) from Differential Input Zero Crossings to RX DATA and RX DATA Output 50% points		^t DXT		270	400	nS
Input Threshold Voltage (referred to the bus)	100KHz-1MHz	V_{TH}	0.60	0.75	1.20	V _{P-P}

Strobe Characteristics (Logic "0" Inhibits Output)

"0" Input Current	V _S =0.4V	I _{IL}		-0.1	-0.2	mA
"1" Input Current	V _S =2.7∨	I _{IH}		1	+40	μΑ
"0" Input Voltage		\vee_{IL}			0.7	V
"1" Input Voltage		V_{IH}	2.0			V
Strobe Delay (Turn-on or Turn-off)		t _{SD}		50	100	nS

Power Data

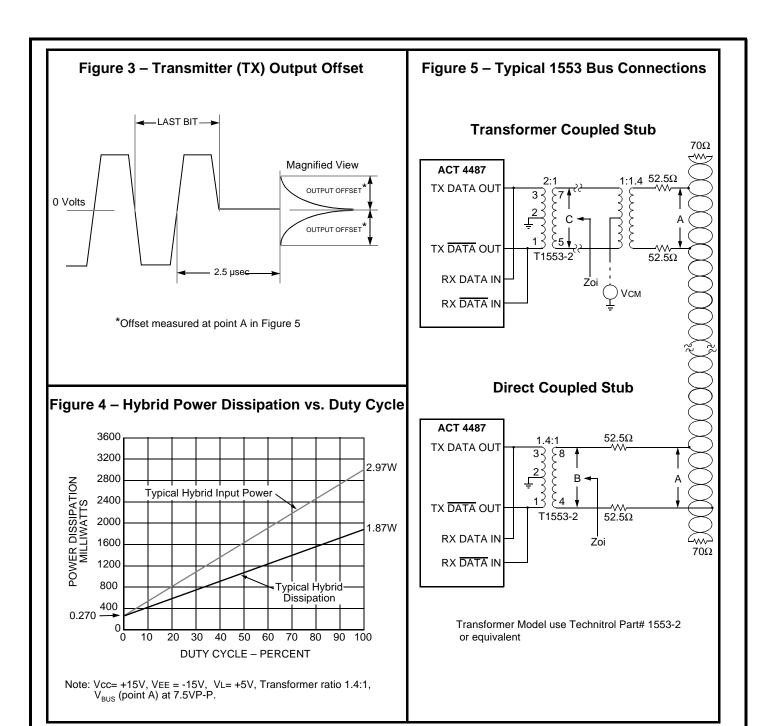
Power Supply Currents - Per Channel - See Figure 4

Transmitter Standby	I _{CC} I _{EE}	0 12	1 16	
Transmitter Standby	Ι _L	18	30	
	I _{CC}	45	50	
25% duty cycle	I _{EE}	12	20	
	IL	18	30	mA
	I _{CC}	90	100	
50% duty cycle	I _{EE}	12	20	
	Ι _L	18	30	
	I _{CC}	180	200	
100% duty cycle	I _{EE}	12	20	
	l _L	18	30	

Power Supply Voltages

±15V Operating Power Supply Voltage Range				+15.75 -15.75	· · · · · ·
+5V Operating Power Supply Voltage Range)	VL	+4.50	+5.00	+5.50	V

- Note 1. Power on or off, measured from 75KHz to 1MHz at point A and transformer self impedance of $3K\Omega$ minimum at 1MHz.
- Note 2: Power Supplies: ±15 Volts ±0.75 V & +5 Volts ±0.5 V, bypassed by 10 µF (Tantalum recommended) Capacitor minimum. All measurements & specifications apply over the temperature range of -55°C to +125°C (case temperature) unless otherwise specified.
- Note 3: When measured as shown per Figure 5 with \pm 10 Volt peak, line to ground, DC to 2MHz Note 4: Typical power is measured with V_{BUS} at point A = 7.5 $V_{\textbf{P-P}}$



Configurations and Ordering Information

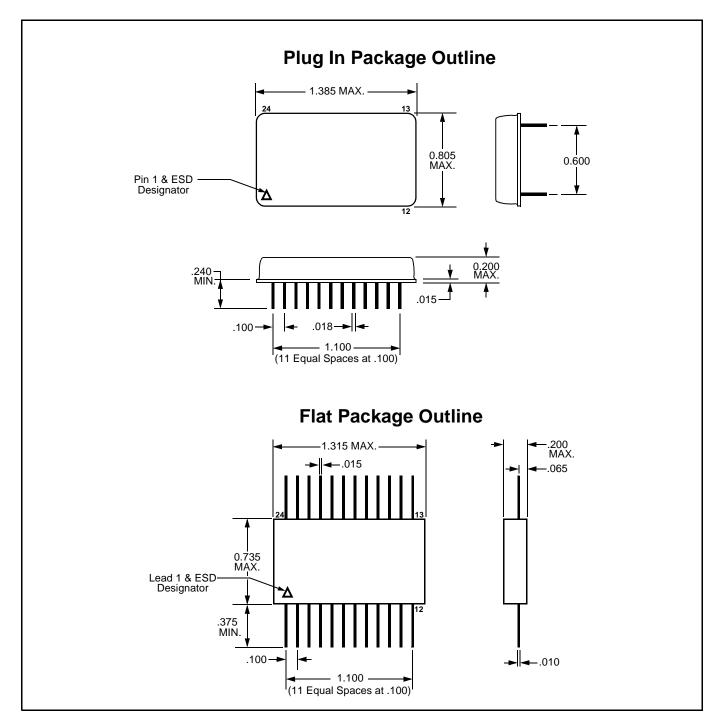
ACT Model # / Ordering Part #	Case Style	DESC Number	Rx Standby
ACT 4487	Plug In	TBA	Normally Low
ACT 4487-I	Plug In	TBA	Normally High
ACT 4487-F	Flat Package	TBA	Normally Low
ACT 4487-FI	Flat Package	ТВА	Normally High

Specifications subject to change without notice.

Figure 6 – Lead Numbers & Functions

ACT4487					
Pin #	Function				
1	TX DATA OUT				
2	TX DATA OUT				
3	GROUND				
4	NC				
5	NC				
6	NC				
7	RX DATA OUT				
8	STROBE				
9	GROUND				
10	RX DATA OUT				
11	NC				
12	NC				
13	Vcc				
14	NC				
15	RX DATA IN				
16	RX DATA IN				
17	NC				
18	CASE				
19	VEE				
20	+5 V				
21	TX INHIBIT				
22	TX DATA IN				
23	TX DATA IN				
24	NC				





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