



# Obsolescence Notice

This product is obsolete.

This information is available for your convenience only.

For more information on Zarlink's obsolete products and replacement product lists, please visit [http://products.zarlink.com/obsolete\\_products/](http://products.zarlink.com/obsolete_products/)

# CT1487M/CT1589M

## MIL-STD-1553 LOW POWER SINGLE AND DUAL TRANSCEIVERS

### FEATURES

- Available in  $\pm 15V$  (CT1487M) and  $\pm 12V$  (CT1589M) versions
- AC interstage coupling prevents static burnout
- Receiver filtered to improve S/N ratio of system
- Dissipates only 1.3 watt total at 25% transmitting duty cycle (dual unit - 1.8 watts total). 100% duty cycle permissible at 125°C case temperature
- 20 mV typical output offset
- Meets MIL-STL-1553A/B
- Available to Standard Military Drawings (see Ordering Information)
- 24 pin double dip package or flat pack for single unit
- 36 pin double dip package or flat pack for dual unit
- TTL compatible

*Note: All data shown is for a single transceiver unless otherwise noted. Dual transceivers are two completely independent units in a common package.*

### GENERAL DESCRIPTION

The CT1487M/CT1589M family of single and dual transceivers is a second generation series incorporating monolithic bipolar devices for improved reliability and producibility. For thermal considerations, the drive stage transistors are "off" the bipolar array. Input/output signals are compatible with both MIL-STD-1553A and B systems.

### DETAILED DESCRIPTION

#### RECEIVER DESCRIPTION

The Receiver section accepts bi-phase differential data at the input and produces two TTL signals at the output. The outputs are RX DATA OUT and  $\overline{\text{RX DATA OUT}}$  and represent positive and negative excursions, respectively, of the input beyond a predetermined threshold. See Figure 2 for receiver logic waveforms.

The positive and negative thresholds are designed for optimum word error rate. The receiver begins to detect Data Bus signals (1 MHz, sinusoidal) that exceed 0.9 volt nominal peak-to-peak when used with the specified transformer. See Figure 4 for typical input/output connections.

If the RECEIVER STROBE input is LOW, the RX DATA OUT and  $\overline{\text{RX DATA OUT}}$  are inhibited. If unused, a 2K-ohm pullup to +5V is recommended.

Note: See ORDERING INFORMATION for units with inverted outputs. (Pg 7)

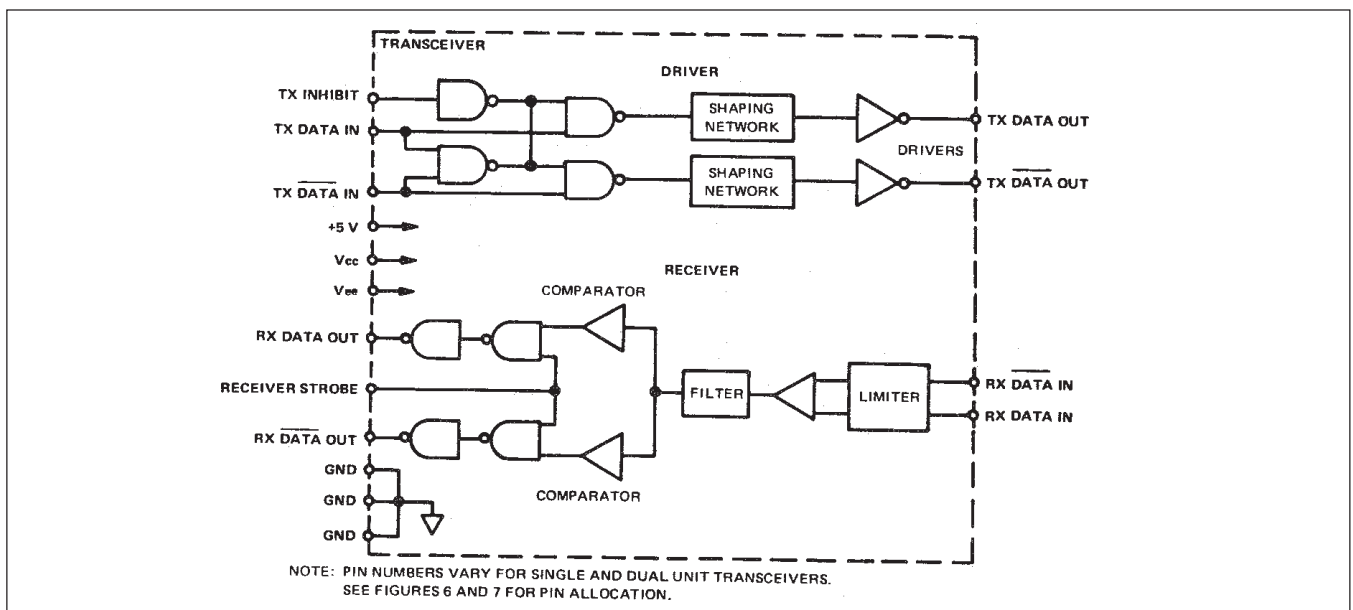


Figure 1: Functional Diagram, CT1487M

# CT1487M/CT1589M

## DRIVER DESCRIPTION

The Driver section accepts complementary TTL data at the input. When coupled to the Data Bus with the specified transformer (isolated on the Data Bus side with 55-ohm fault isolation resistors and loaded by two 70-ohm terminations plus additional receivers), the Data Bus signal produced is 6.8 volts nominal peak-to-peak (at point A, Figure 4).

When both TX DATA IN and TX DATA IN inputs are both held LOW or held HIGH, the driver output becomes a high impedance and is removed from the line. In addition, an overriding TX INHIBIT input takes priority over the condition of the data inputs and disables the driver. See Figure 3 for the driver logic waveforms.

TX DATA IN and TX DATA IN inputs must be complementary waveforms of 50% average duty cycle and with less than 15 ns skew between them.

## CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS	CT1487	CT1589
Power supply voltage ( $V_{cc}$ )	-0.3 to +18.0V	-0.3 to + 18.0V
Power supply voltage ( $V_{ee}$ )	+0.3 to -18.0V	+0.3 to -18.0V
Power supply voltage ( $V_{ccl}$ )	-0.3 to +7.0V	-0.3 to +7.0V
Logic input voltage (RECEIVER STROBE, INHIBIT, TX <u>DATA IN</u> , TX DATA IN)	-0.3 to +5.5V	-0.3 to +5.5V
Receiver differential input (RX DATA IN, RX <u>DATA IN</u> )	$\pm 20$ V (40 V p-p)	$\pm 20$ V (40 V p-p)
Receiver input voltage (RX DATA IN or RX <u>DATA IN</u> )	$\pm 15$ V	$\pm 15$ V
Driver output current (TX DATA OUT or TD <u>DATA OUT</u> )	+200 mA	+300 mA
Transmission duty cycle at $T_c = 125^\circ\text{C}$ Operating case temperature range ( $T_c$ )	100% -55 to +125°C	100% -55 to +125°C

## POWER AND THERMAL DATA, TOTAL HYBRID (DRIVER AND RECEIVER)

PARAMETER/CONDITION	SYMBOL	CT1487M				CT1589M				UNIT						
		MIN	TYP	MAX		MIN	TYP	MAX								
Power supply voltages	$V_{cc}$ $V_{ee}$ $V_{ccl}$	14.25 -14.25 4.5	15 -15 5	15.75 -15.75 5.5		11.4 -11.4 4.5	12 -12 5	12.6 -12.6 5.5	V V V							
Power dissipation of most critical (hottest) device in hybrid during continuous transmission (100% duty cycle)	$P_c$	Note 1	350	500		Note1	350	500	mW							
Thermal resistance, most critical device	$\theta_{jc}$			50				50	°C/W							
Junction to case temperature rise of most critical device at 100% duty cycle transmission	$T_{jc}$			25				25	°C							
Total supply current "standby" mode, or transmitting at less than 1% duty cycle (e.g. 20 $\mu\text{s}$ of transmission every 2ms or longer interval)	$I_{cc}$ $I_{ee}$ $I_{ccl}$	Note 2 Note 2	S*	D*	S*	D*		S*	D*	S*	D*	mA mA mA				
			15	30	22	44		15	30	22	44					
			25	50	35	70	Note 2	25	50	35	70					
Total supply current transmitting at 1MHz into a 35-ohm load at point A in Figure 4	DUTY CYCLE	$I_{cc}$	Note 3	55	70	75	100	Note 3	70	85	95	120	mA mA			
				25%	$I_{cc25}$	Note 3	185	200	235	260	Note 3	224		240	290	315
				100%	$I_{cc100}$	Note 3	185	200	235	260	Note 3	224		240	290	315

\* S = single unit, D = dual unit (one unit transmitting)

- Notes: 1. Decreases linearly to zero at zero duty cycle.  
2.  $I_{ee}$  and  $I_{ccl}$  limits do not change with mode of operation or duty cycle.  
3. Decreases linearly to applicable "standby" value at zero duty cycle.

## ELECTRICAL CHARACTERISTICS, RECEIVER SECTION (See Figure 2)

PARAMETER/CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
<b>INPUT CHARACTERISTICS</b>					
Differential input impedance DC to 1MHz	$Z_{in}$	9 K			ohms
Differential voltage range	$V_{idr}$	$\pm 20V$			$V_{peak}$
Input common mode voltage range	$V_{icr}$	$\pm 10V$			$V_{peak}$
Common mode rejection ratio (from point A, Figure 4)	CMRR	40			dB
STROBE characteristics (Logic "0" inhibits output)					
"0" input current ( $v_s = 0.4 V$ )	$I_{il}$			-1	mA
"1" input current ( $V_s = 2.7 V$ )	$I_{ih}$			40	$\mu A$
"0" input voltage	$V_{il}$			0.7	V
"1" input voltage	$V_{ih}$	2			V
Threshold characteristics (sine wave at 1MHz) NOTE: Threshold voltages refer to point A, Figure 4.	$V_{th1}$	0.8		1.1	$V_{p-p}$
Filter characteristics (sine wave input)	2 MHz	$V_{th2}$	1.5	8	$V_{p-p}$
	3 MHz	$V_{th3}$	5		$V_{p-p}$
<b>OUTPUT CHARACTERISTICS</b>					
"1" state ( $I_{source} = 400 \mu A$ )	$V_{oh}$	2.5	3.4		
"0" state ( $I_{sink} = 4 mA$ ) NOTE: With receiver input below threshold both RX DATA OUT and RX <u>DATA</u> OUT remain in "0" state.	$V_{oh}$			0.5	
Delay (average) from differential input zero crossings to RX DATA OUT and RX <u>DATA</u> OUT output 50% points	$t_{DRX}$		340	450	ns

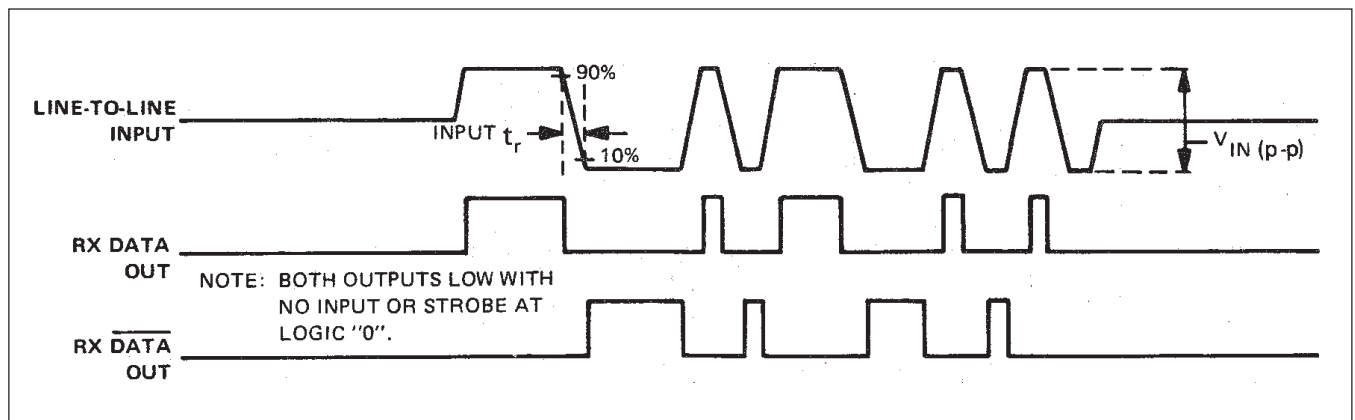


Figure 2: Receiver Logic Waveforms (for Inverted Data Output, see Ordering Information)

# CT1487M/CT1589M

## ELECTRICAL CHARACTERISTICS, DRIVER SECTION (See Figure 3)

PARAMETER/CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
<b>INPUT CHARACTERISTICS</b>					
"0" input current ( $V_{in} = 0.4 \text{ V}$ )	$I_{il}$			-1	mA
"1" input current ( $V_{in} = 2.7 \text{ V}$ )	$I_{ih}$			80	$\mu\text{A}$
"0" input voltage	$V_{il}$			0.7	V
"1" input voltage	$V_{ih}$	2			V
Delay from TX INHIBIT (0 $\rightarrow$ 1) to inhibited output impedance	$t_{DXOFF}$		150	225	ns
Delay from TX INHIBIT (1 $\rightarrow$ 0) to active output impedance	$t_{DXON}$		100	150	ns
Differential output noise	$V_{noi}$			10	$\text{mV}_{p-p}$
Differential output impedance (inhibited) at 1 MHz	$Z_{oi}$	8K			ohms
<b>OUTPUT CHARACTERISTICS</b>					
Differential output level at point B, Figure 4 (145-ohm load)	$V_o$	26	28	35	$V_{p-p}$
Rise and fall times (10%–90% of p-p output)	$t_r$	100	160	300	ns
Output offset at point A in Figure 4 (35-ohm load) 2.5 $\mu\text{s}$ after mid-bit crossing of parity bit of last word of a 660 $\mu\text{s}$ message	$V_{os}$		$\pm 20$	$\pm 75$	mV peak
Delay from 50% point of TX DATA IN or TX DATA IN to zero crossing of differential output	$t_{DTX}$		100	200	ns

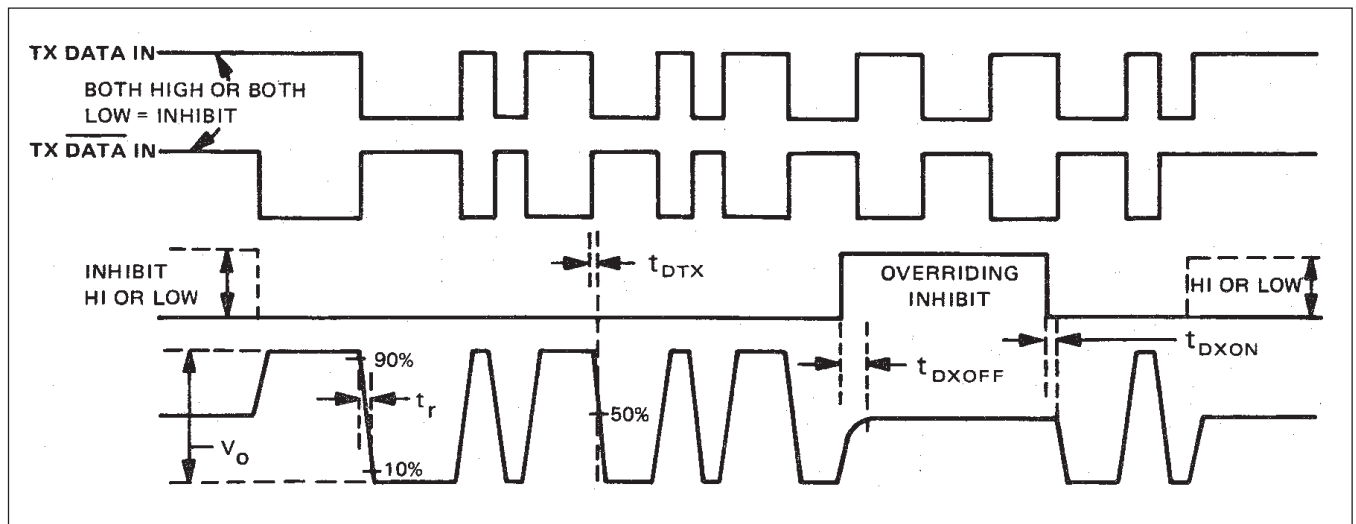


Figure 3: Driver Logic Waveforms

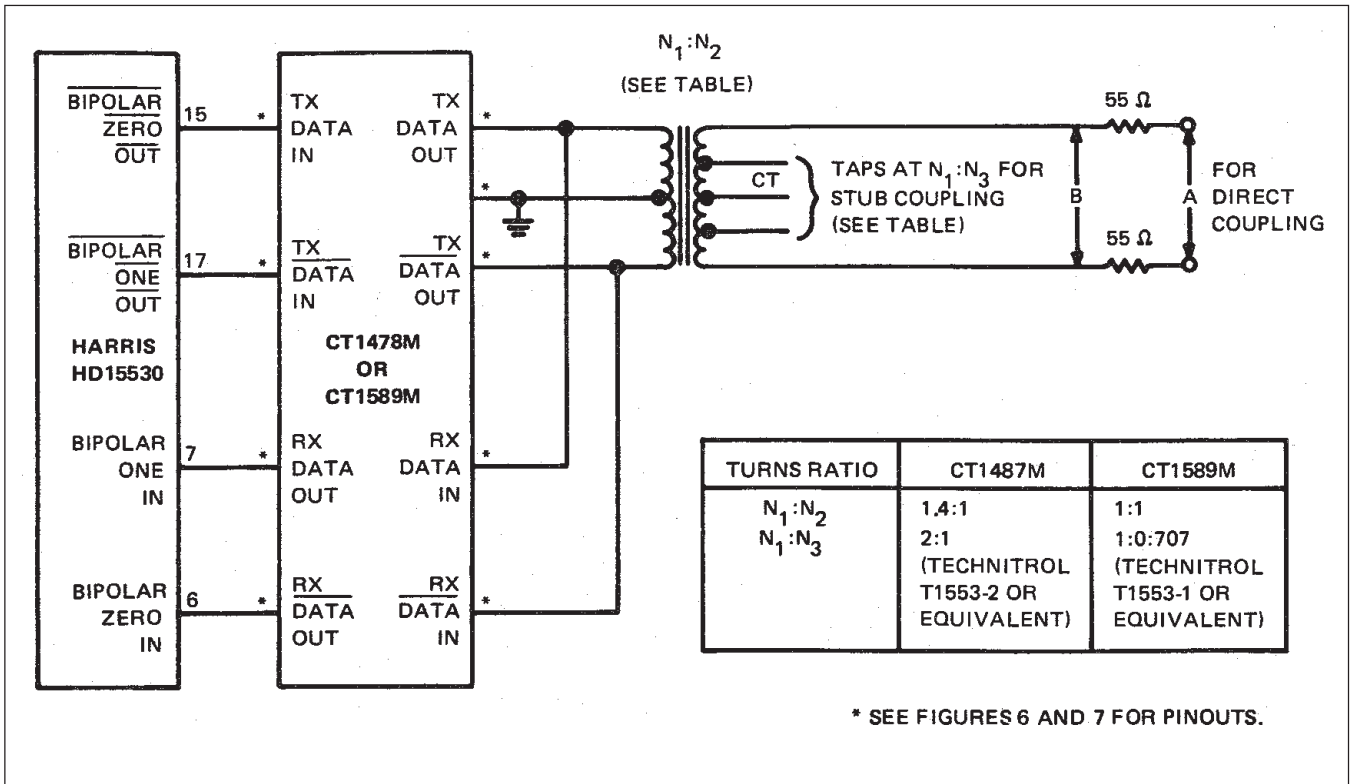


Figure 4: Typical Input/Output Connections

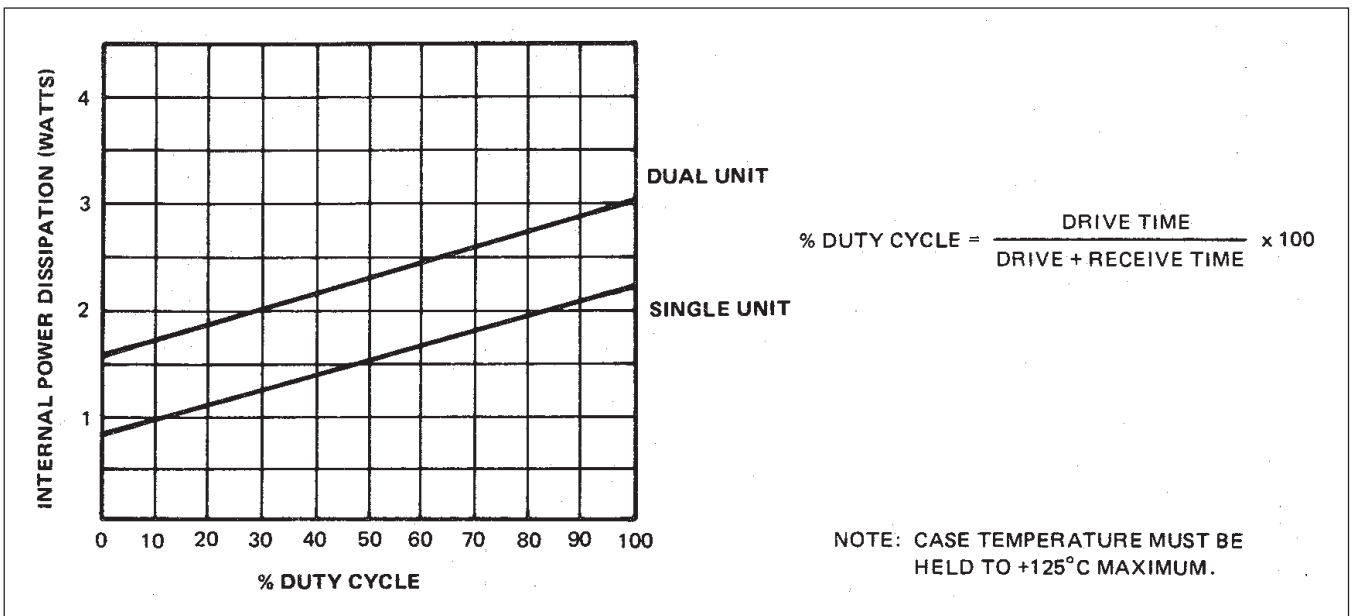


Figure 5: Typical Internal Power Dissipation (Total Hybrid)

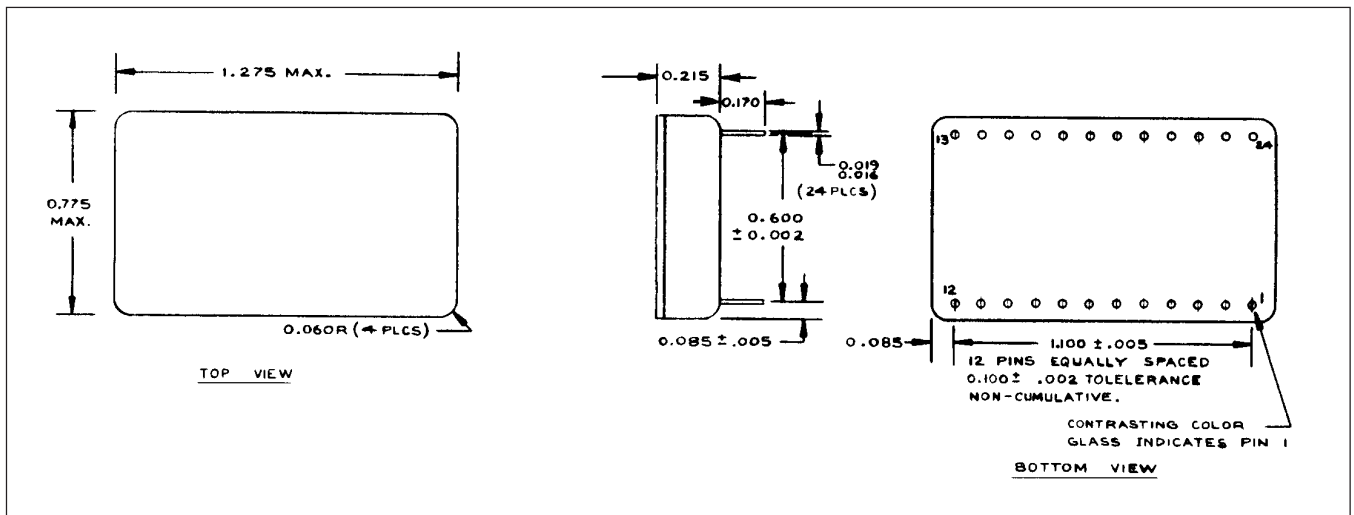


Figure 6: Mechanical Outline for the "MP" Package

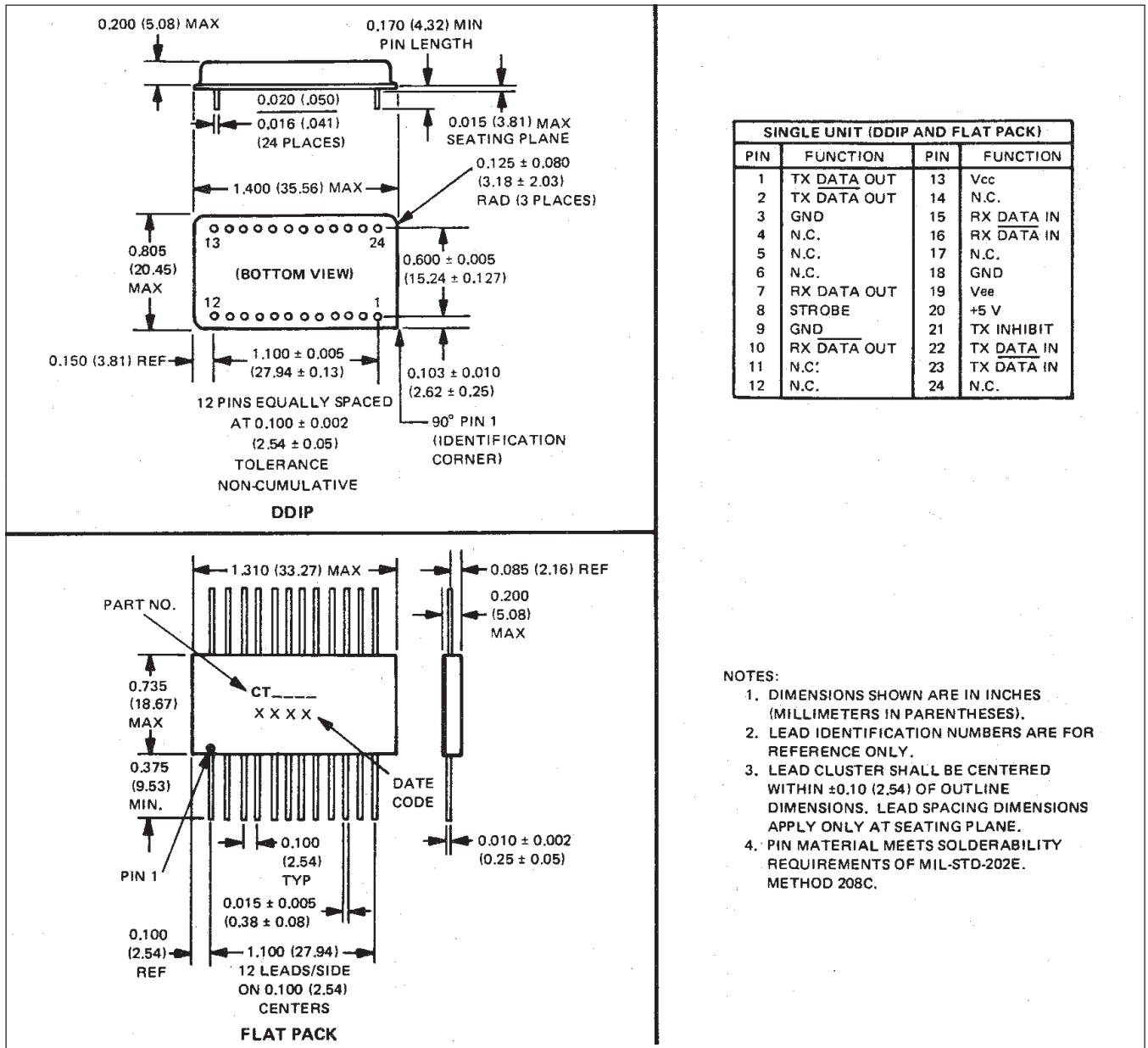


Figure 7: Mechanical Outline and Pinouts (Single Unit)

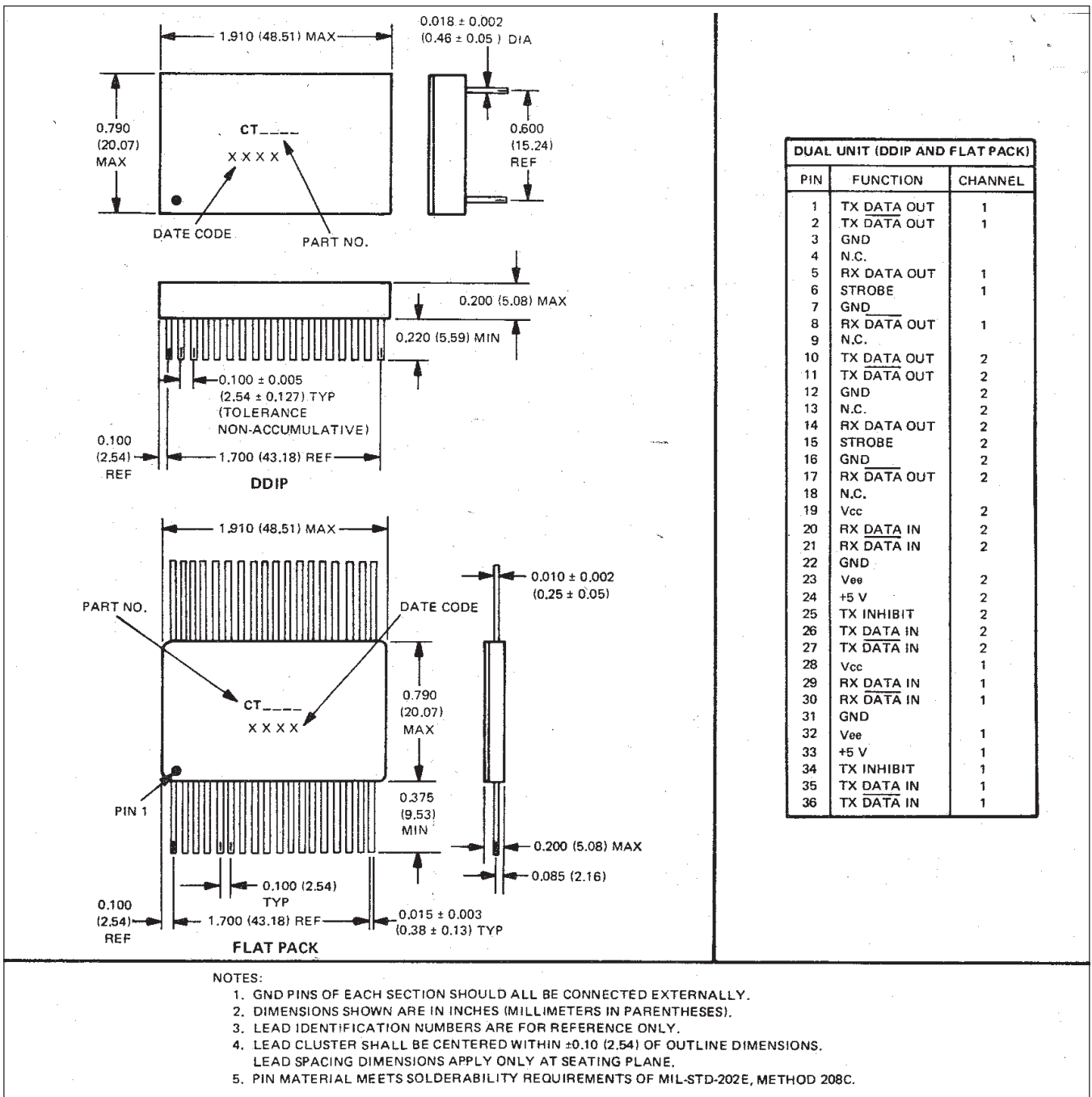


Figure 8: Mechanical Outline and Pinouts (Dual Unit)

# CT1487M/CT1589M

## ORDERING INFORMATION

Some of these devices are available to Standard Military Drawings. Contact Customer Services at one of the addresses below for more information.

“Inverted Receiver Data Output” refers to the logic state of RX DATA OUT and RX DATA OUT when the bus is quiet. All part numbers with the “I” suffix produce logic “1” at the receiver outputs for quiet bus.

CT1487M	–	±15 V Single Unit Plug-in Package	CT1589M	–	±12 V Single Unit Plug-in Package
CT1487MP	–	±15 V Single Unit Plug-in Package	CT1589MP	–	±12 V Single Unit Plug-in Package
CT1487MFP	–	±15 V Single Unit Flat Pack	CT1589MFP	–	±12 V Single Unit Flat Pack
CT1487MI	–	±15 V Single Unit Plug-in Package, Inverted Receiver Data Outputs	CT1589MI	–	±12 V Single Unit Plug-in Package, Inverted Receiver Data Outputs
CT1487MIFP	–	±15 V Single Unit Flat Pack, Inverted Receiver Data Outputs	CT1589MIFP	–	±12 V Single Unit Flat Pack, Inverted Receiver Data Outputs
CT1487D	–	±15 V Dual Unit Plug-in Package	CT1589D	–	±12 V Dual Unit Plug-in Package
CT1487DI	–	±15 V Dual Unit Plug-in Package, Inverted Receiver Data Outputs	CT1589DI	–	±12 V Dual Unit Plug-in Package, Inverted Receiver Data Outputs
CT1487DFP	–	±15 V Dual Unit Flat Pack	CT1589DFP	–	±12 V Dual Unit Flat Pack
CT1487DIFP	–	±15 V Dual Unit Flat Pack, Inverted Receiver Data Outputs	CT1589DIFP	–	±12 V Dual Unit Flat Pack, Inverted Receiver Data Outputs



### HEADQUARTERS OPERATIONS

#### GEC PLESSEY SEMICONDUCTORS

Cheney Manor, Swindon,  
Wiltshire, SN2 2QW, United Kingdom.  
Tel: (0793) 518000  
Fax: (0793) 518411

#### GEC PLESSEY SEMICONDUCTORS

P.O. Box 660017,  
1500 Green Hills Road, Scotts Valley,  
California 95067-0017,  
United States of America.  
Tel: (408) 438 2900  
Fax: (408) 438 5576

### CUSTOMER SERVICE CENTRES

- **FRANCE & BENELUX** Les Ulis Cedex Tel: (1) 64 46 23 45 Fax: (1) 64 46 06 07
- **GERMANY** Munich Tel: (089) 3609 06-0 Fax: (089) 3609 06-55
- **ITALY** Milan Tel: (02) 66040867 Fax: (02) 66040993
- **JAPAN** Tokyo Tel: (03) 5276-5501 Fax: (03) 5276-5510
- **NORTH AMERICA** Scotts Valley, USA Tel: (408) 438 2900 Fax: (408) 438 7023
- **SOUTH EAST ASIA** Singapore Tel: (65) 3827708 Fax: (65) 3828872
- **SWEDEN** Stockholm Tel: 46 8 702 97 70 Fax: 46 8 640 47 36
- **TAIWAN, ROC** Taipei Tel: 886 2 5461260 Fax: 886 2 7190260
- **UK, EIRE, DENMARK, FINLAND & NORWAY** Swindon, UK Tel: (0793) 518510  
Fax: (0793) 518582

These are supported by Agents and Distributors in major countries world-wide.

© GEC Plessey Semiconductors 1991 Publication No. 3122-1.2 October 1991

TECHNICAL DOCUMENTATION - NOT FOR RESALE. PRINTED IN UNITED KINGDOM.

This publication is issued to provide information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. The Company reserves the right to alter without prior knowledge the specification, design or price of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to the Company's conditions of sale, which are available on request.