

CT 2542 / CT2543

Dual Redundant Remote Terminal

FOR MIL-STD-1553B

Features

- CT2542 Replaces DDC BUS-65142 and BUS-65144
- CT2543 Replaces DDC BUS-65143 and BUS-65145
- Functions as a Complete Remote Terminal Unit
- Supports 13 Mode Codes, Illegalization of Codes Allowed
- Transfers Data with DMA Type Handshaking
- Latched Outputs for Command Word and Word Count
- 14 Bit Built-In-Test Word Register
- 4 Error Flag Outputs
- Advanced Low Power VLSI Technology
- DESC SMD# 5962-89798 Approved



General Description

The CT2542 contains 2 transceivers, 2 encoder/decoders, bit processors and complete Remote Terminal (RT) logic. The device is constructed using Aeroflex advanced VLSI custom chip and hybrid technology. It functions as a complete dual redundant MIL-STD-1553B RT Unit supporting all 13 mode codes for dual redundant operation. The CT2542 is a pin-for-pin functional equivalent of the DDC BUS-65142/144 and performs parallel data transfers with a DMA type handshake. Multiple error flag outputs and host access to many of the RT Status Word bits are just some of the features that make this part ideal for many RT applications. The unit has an operating range of -55°C to + 125°C. Aeroflex is a MIL-PRF-38534 Certified Manufacturer. See "Ordering Information" (last sheet) for CT2543.

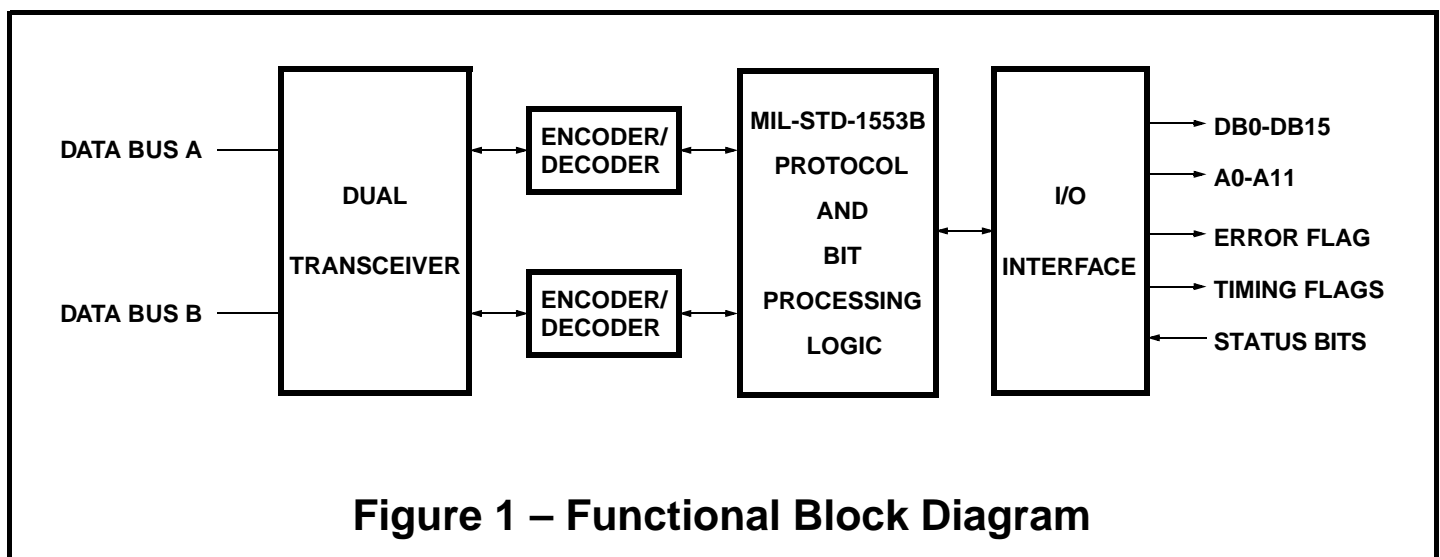


Figure 1 – Functional Block Diagram

Absolute Maximum Ratings

| Parameter | Limits | Units |
|--|---------------|-------|
| Power Supply Voltage (V _{EE}) | +0.3 to -18.0 | Volts |
| Power Supply Voltage (V _{CCL}) | -0.3 to +7.0 | Volts |
| Receiver Differential Input | ±20 (40Vp-p) | Volts |
| Receiver Input Voltage | ±15 | Volts |
| Driver Output Current | +200 | mA |
| Transmission Duty Cycle at T _C = 125°C | 100 | % |
| Operating Case Temperature Range (T _C) | -55 to +125 | °C |

Power and Thermal Data (Transceiver and Logic Section)

| Parameter/Conditions | Symbol | Min | Typ | Max | Units |
|--|------------------------|--------|-----|--------|--------------|
| Power Supply Voltage | V _{EE} | -14.25 | -15 | -15.75 | V |
| | V _{CCL} | 4.5 | 5 | 5.5 | V |
| Power Dissipation of most critical (hottest) device in hybrid during continuous transmission (100% Duty Cycle) | P _C | | 350 | | mW Note 1 |
| Thermal Resistance, most critical device | ∅ _{JC} | | 60 | | °C/W |
| Junction to case temperature rise of most critical device at 100% duty cycle | T _{JC} | | 60 | 80 | °C |
| Total supply current standby mode, or transmitting at less than 1% duty cycle (e.g. 20μs of transmission every 2ms or longer interval) | I _{CCL} | | | 50 | mA |
| | I _{EE} | | 50 | 70 | mA Note 2 |
| Total supply current transmitting at 1Mhz into a 35-ohm load at point A in Figure 2 | I _{EE} @ 50% | | | 175 | mA Note 3 |
| | I _{EE} @ 100% | | | 270 | mA Note 3 |

Note 1: Decreases linearly to zero at zero duty cycle.

Note 2: I_{CCL} limit does not change with mode of operation or duty cycle.

Note 3: Decreases linearly to applicable "standby" values at zero duty cycle.

Electrical Characteristics (Receiver Section)

| Parameter/Conditions | Symbol | Min | Typ | Max | Units |
|--|-----------|-----------|-----|-----|----------|
| Differential input impedance DC to 1MHz, Point B, Figure 2 | Z_{IN} | 2K | | | Ω |
| Differential voltage range | V_{DIR} | $\pm 20V$ | | | Vpeak |
| Input common mode voltage range | V_{ICR} | $\pm 10V$ | | | Vpeak |
| Common mode rejection ratio (from point A, Figure 2) | CMMR | 40 | | | dB |
| Threshold characteristics (Sine wave at 1MHz) Note: Threshold voltages refer to point A, Figure 2. | V_{th} | 0.6 | | 1.2 | Vp-p |

Electrical Characteristics (Transmitter Section)

| Parameter/Conditions | Symbol | Min | Typ | Max | Units |
|--|-----------|-----|----------|----------|----------|
| Differential output level at point B, Figure 2 (145 ohm load) | V_O | 24 | | 35 | Vp-p |
| Rise and Fall times (10% to 90% of p-p output) | T_r | 100 | | 300 | nS |
| Output offset at point A in Figure 2 (35-ohm load) 2.5us after mid-bit crossing of parity bit of last word of a 660us message | V_{OS} | | ± 20 | ± 90 | mV Vpeak |
| Differential output noise | V_{NOI} | | | 10 | mV pp |

Logic Characteristics

| Symbol | Parameter | Min | Typ | Max | Units | Conditions |
|----------|------------|-----|-----|------|---------|------------|
| V_{IH} | Input "1" | 2.4 | | | VDC | |
| V_{IL} | Input "0" | | | 0.7 | VDC | |
| I_{IL} | Input I | -80 | | -400 | μ A | Note 1A |
| I_{IH} | Input I | -40 | | -200 | μ A | Note 1B |
| I_{IL} | Input I | -20 | | +20 | μ A | Note 2A |
| I_{IH} | Input I | -20 | | +20 | μ A | Note 1B |
| I_{IL} | Input I | -20 | | -200 | μ A | Note 5 |
| I_{IH} | Input I | -40 | | -400 | μ A | |
| V_{OH} | Output "1" | 2.7 | | | VDC | Note 3A/4A |
| V_{OL} | Output "0" | | | 0.4 | VDC | Note 3B/4B |

Note 1 For INPUT pins 12,13,14,15, 53, 54, 55.
VCC= 5.5V
A. @ $V_{IL} = 0.4V$
B. @ $V_{IH} = 2.4V$

Note 2 All remaining INPUTS other than in Note 1.
VCC= 5.5V
A. @ $V_{IL} = 0.4V$
B. @ $V_{IH} = 2.4V$

Note 3 For OUTPUT pins 4 through 11 and 43 through 50.
A. @ VCC = 4.5V and $I_{OH} = 2mA$
B. @ VCC = 4.5V and $I_{OL} = 4mA$

Note 4 All remaining OUTPUTS other than in Note 3.
A. @ VCC = 4.5V and $I_{OH} = 1mA$
B. @ VCC = 4.5V and $I_{OL} = 2mA$

Note 5 For INPUT pins 4-11, 43-50.
VCC= 5.5V
A. @ $V_{IL} = 0.4V$
B. @ $V_{IH} = 2.4V$

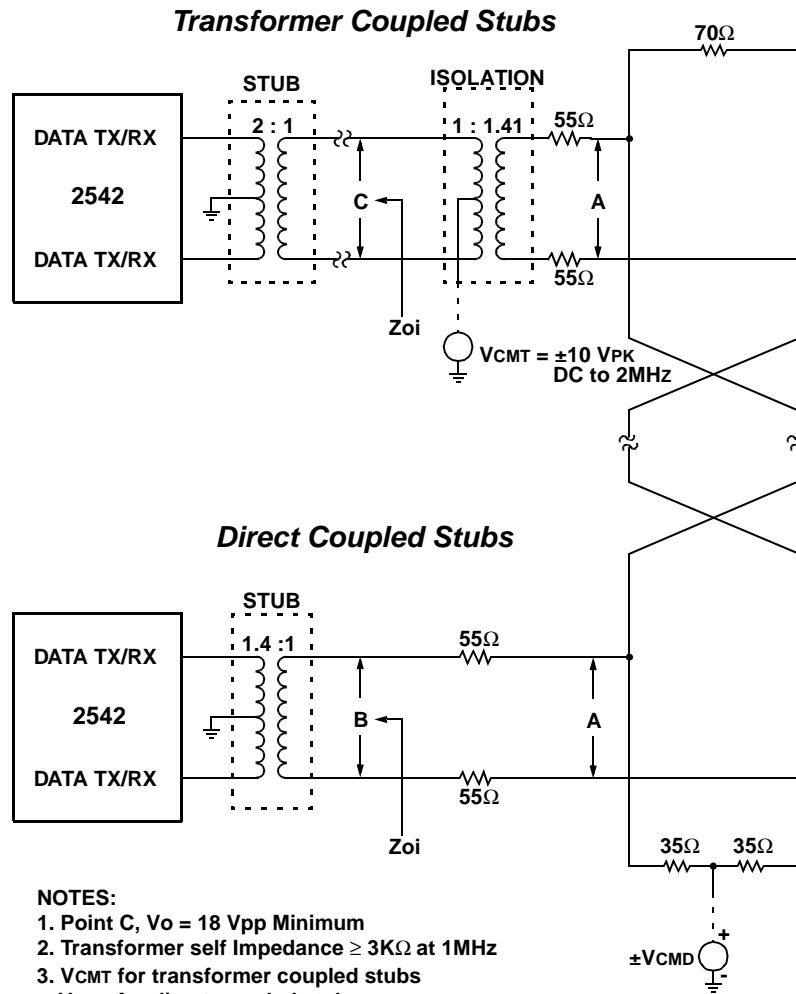


Figure 2 – Typical Bus Coupling

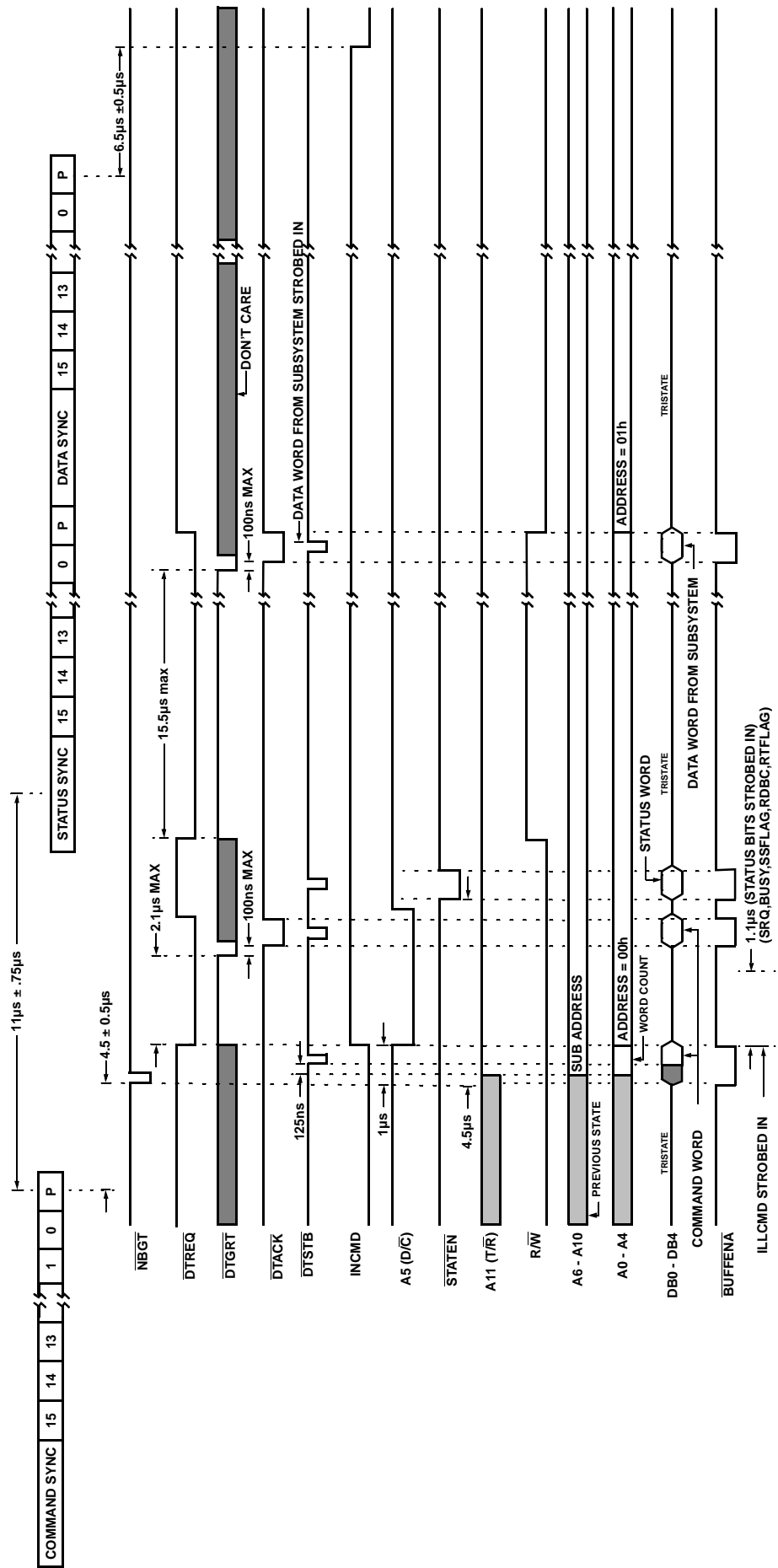


Figure 3 – Timing Diagram, Transmit One Word

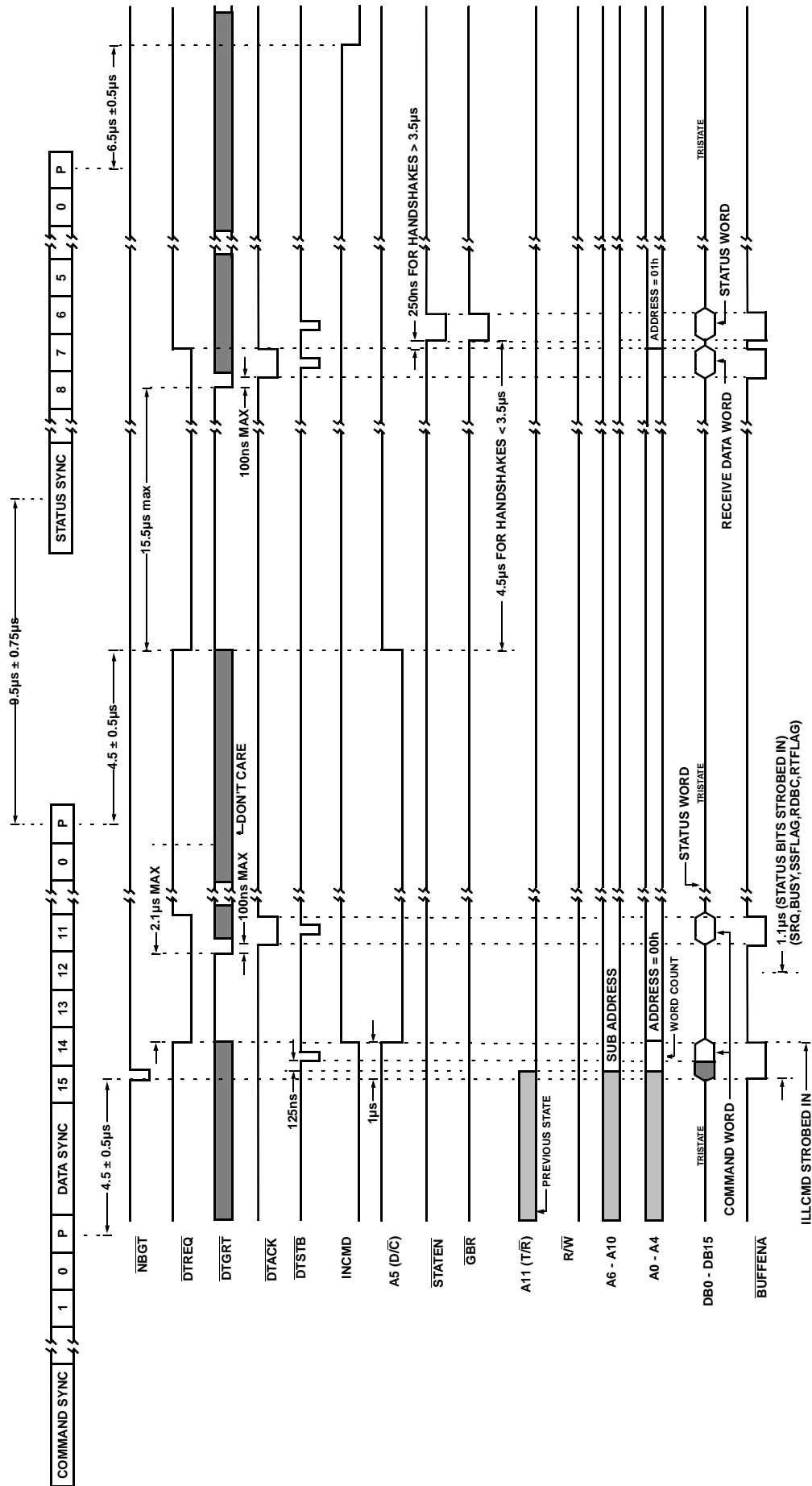


Figure 4 – Timing Diagram, Receive One Word

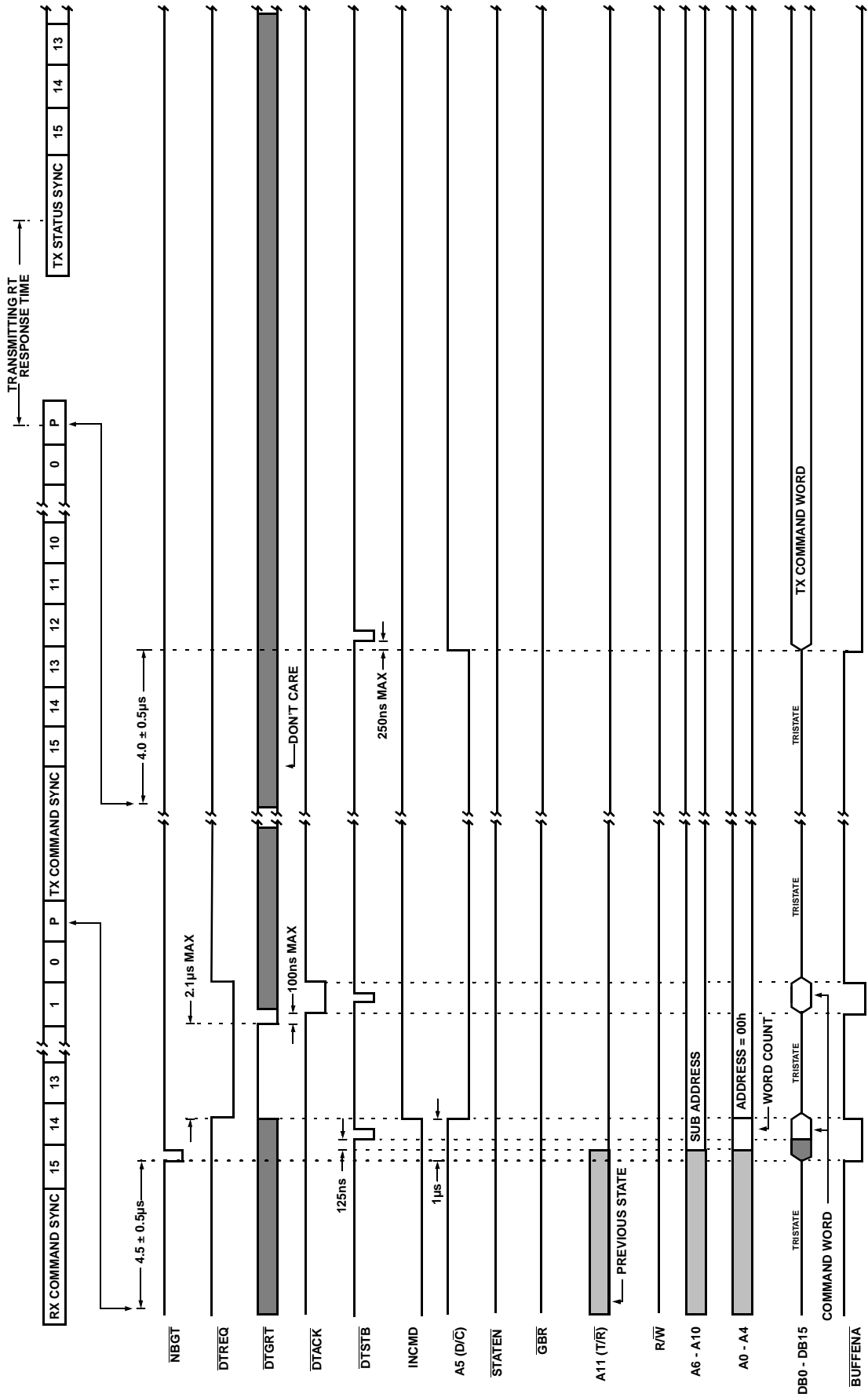


Figure 5 – Timing Diagram, RT to RT Receive One Word (Part A)

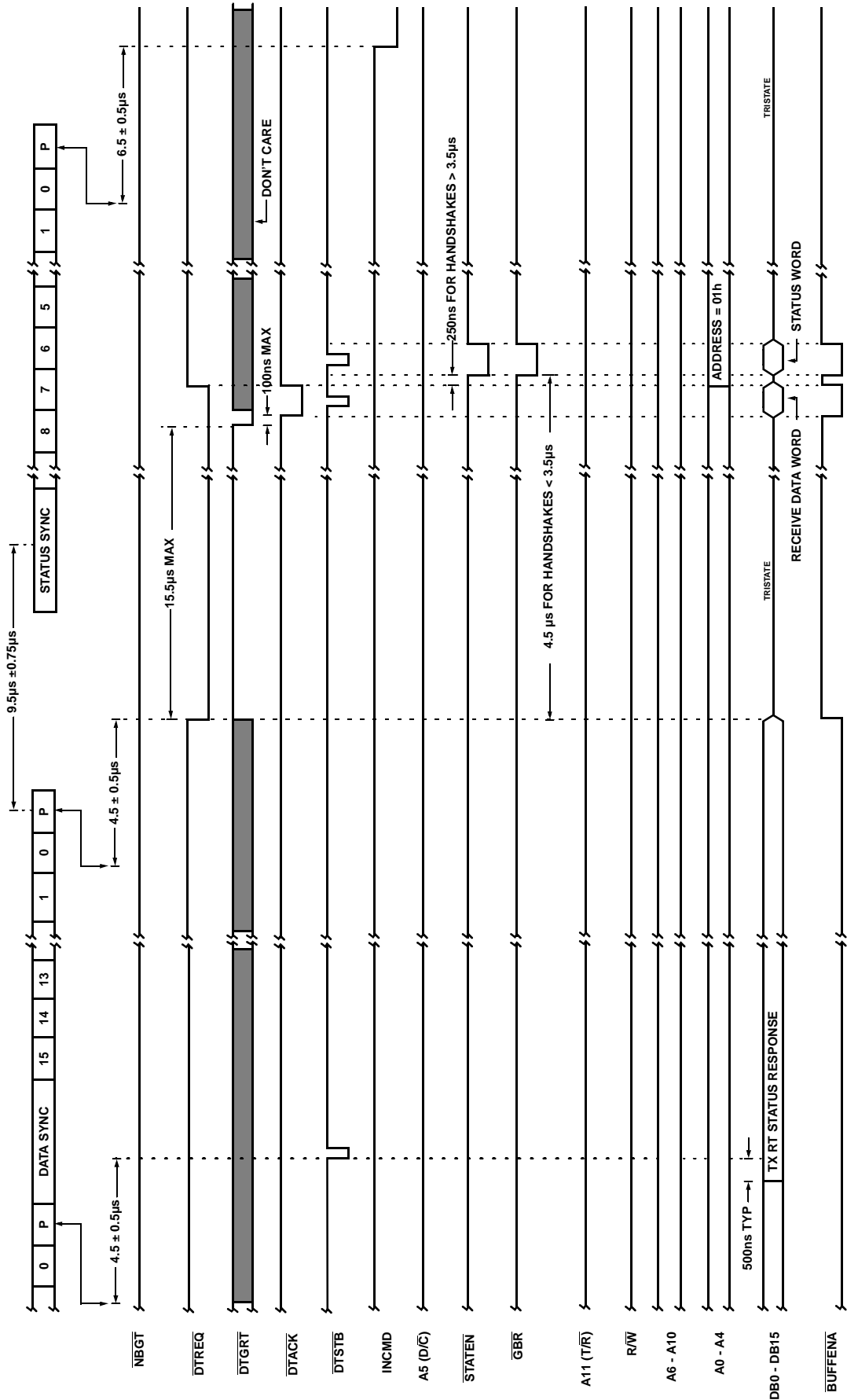
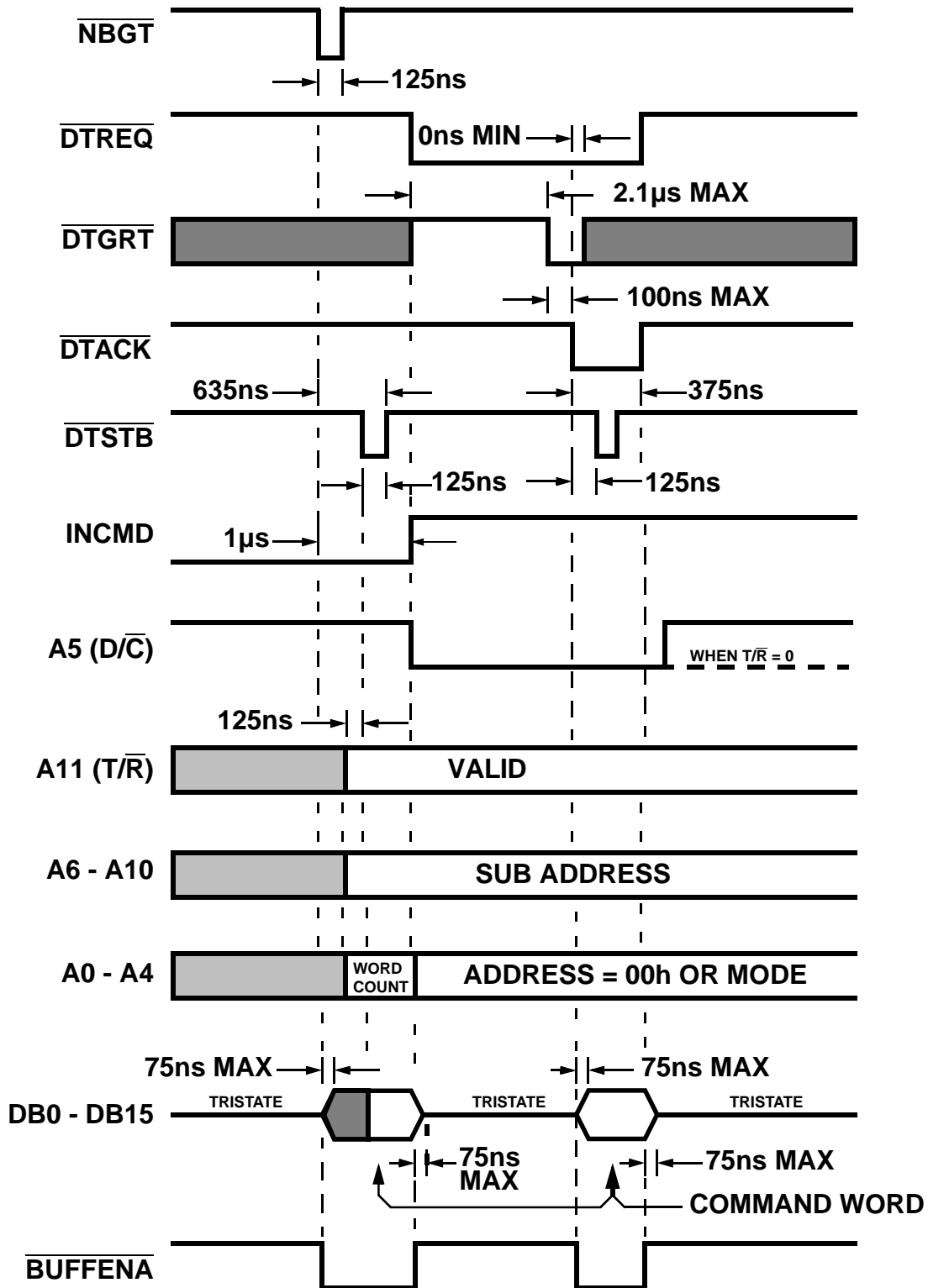
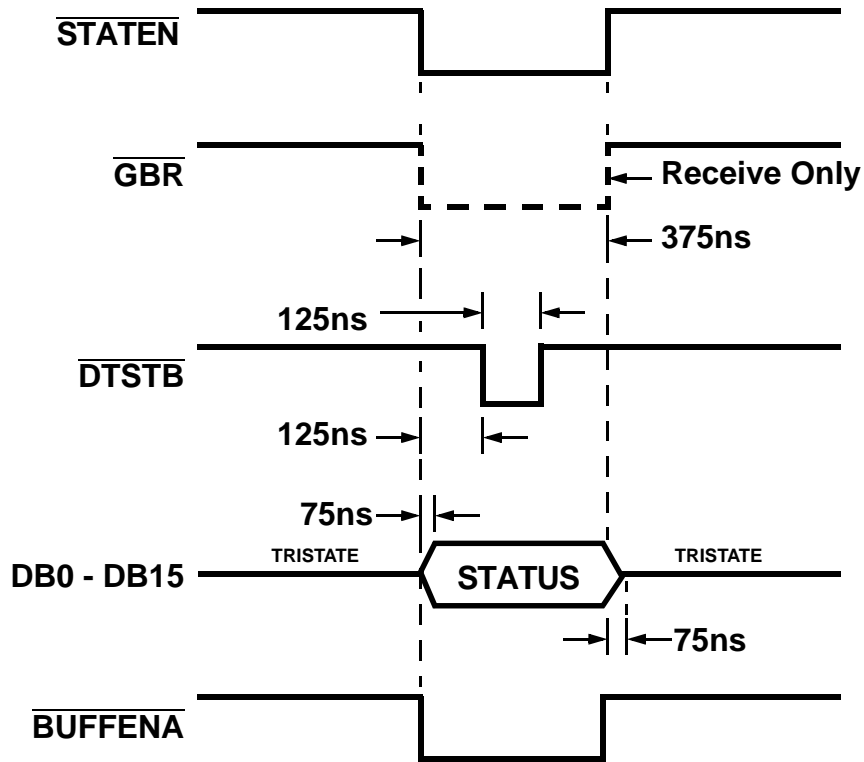


Figure 5 – Timing Diagram, RT to RT Receive One Word (Part B)



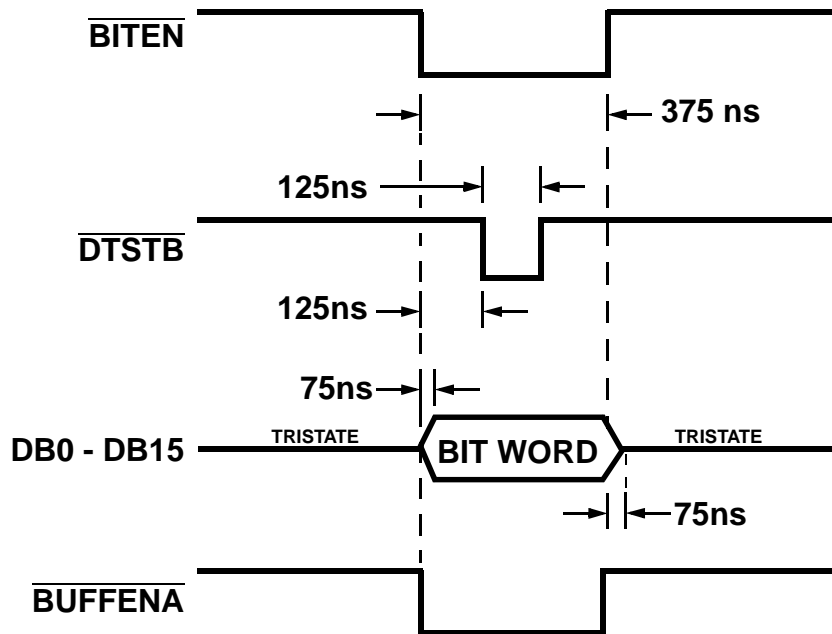
NOTE:
1. R/W = LOGIC 0

Figure 6 – TIMING DIAGRAM, COMMAND WORD TRANSFER



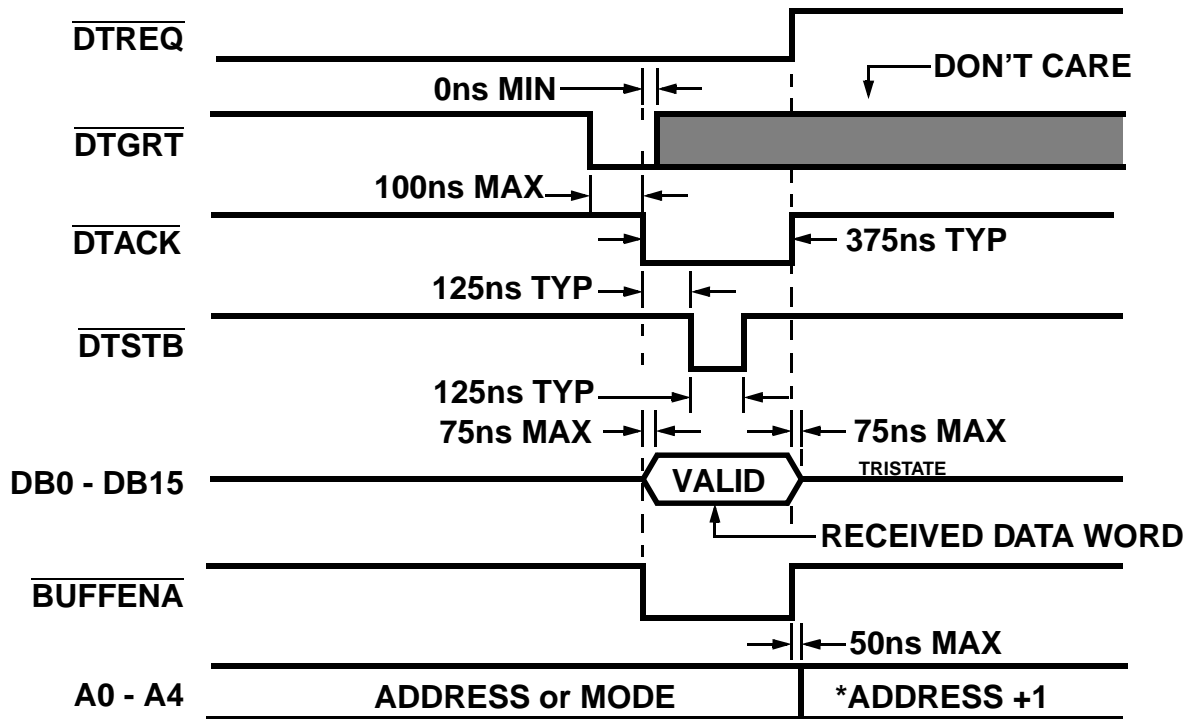
NOTE:
 1. R/W = LOGIC 0

Figure 7 – Timing Diagram, Status Word Transfer



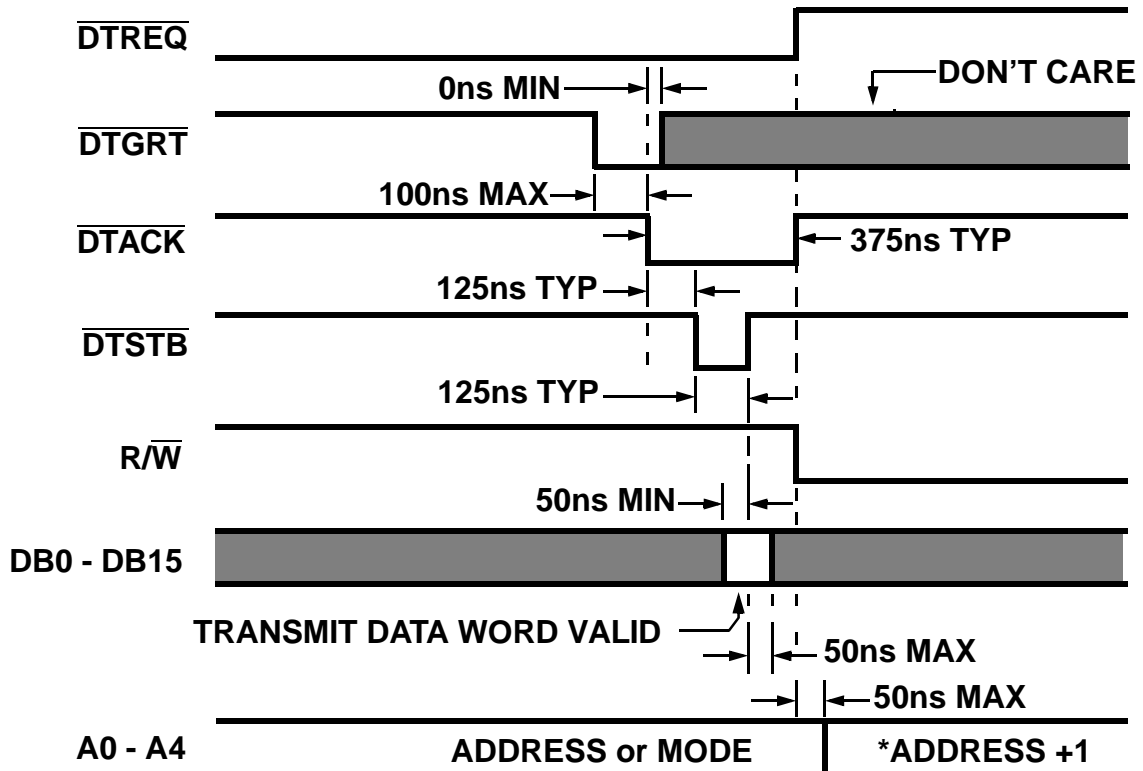
NOTE:
 1. R/W = LOGIC 0

Figure 8 – Timing Diagram, Bit Word Transfer



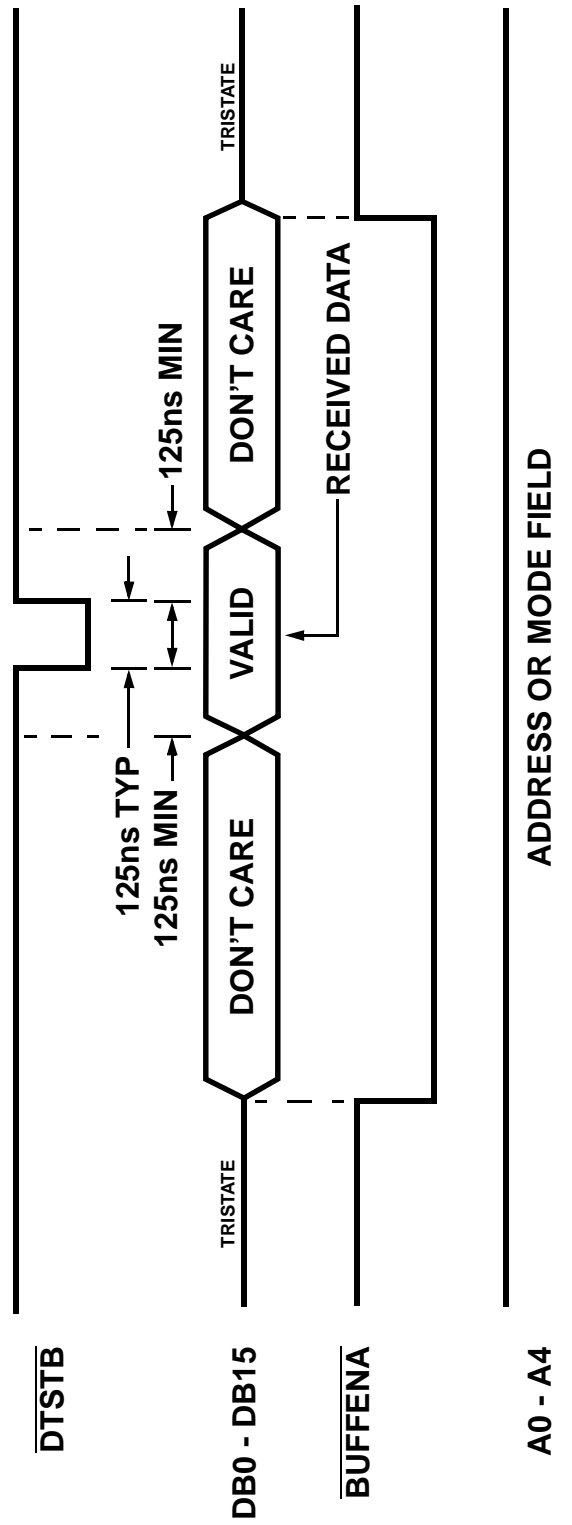
- NOTES: A0 - A4
1. R/W = Logic 0
 2. (*) = Non-Mode Only
 3. BUFFENA = DTACK

Figure 9 – Timing Diagram, Data to Subsystem



- NOTES: A0 - A4
1. (*) = Non-Mode Only
 2. Word Count for Mode Code
 3. BUFFENA = Don't Care

Figure 10 – Timing Diagram, Data from Subsystem

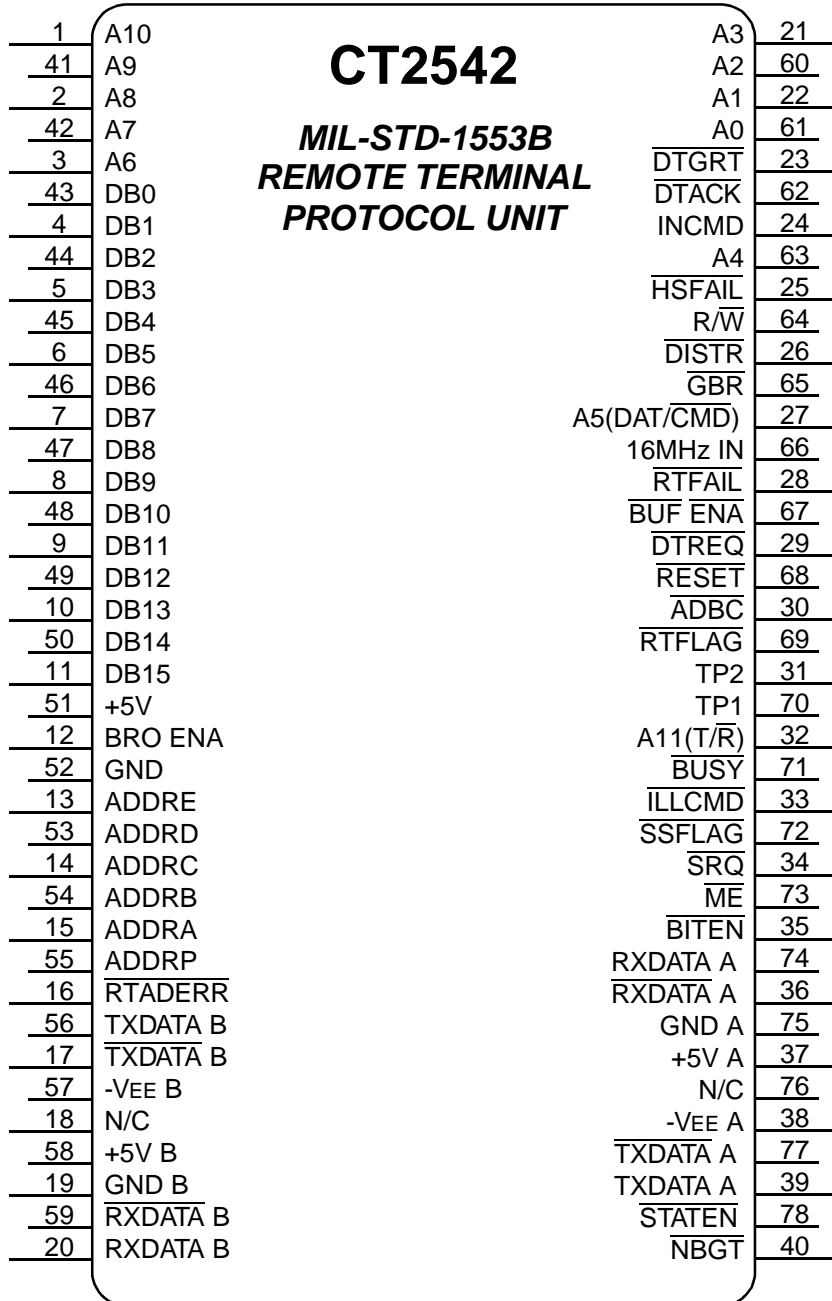


NOTES:

1. $\overline{R/W} = \text{LOGIC 0}$
2. $\text{DTGRT} = \text{DTREQ} = \text{LOGIC 1}$
3. $\text{INCMMD} = \text{DAT/CMD ARE LOGIC 1}$

Figure 11 – Timing Diagram, Data Transfers to Subsystem (No Handshake)

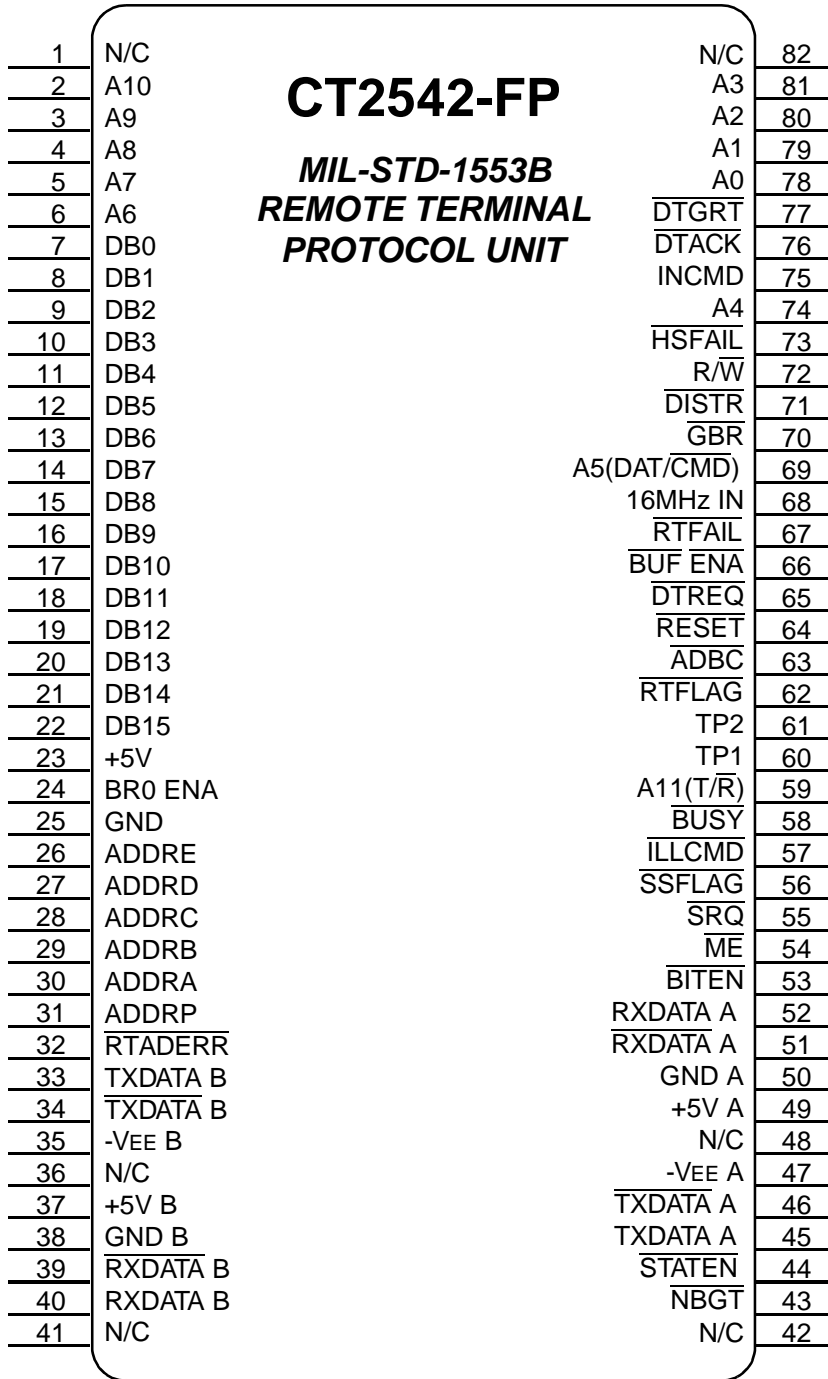
CT2542 Pin Out Description (DDIP)



| Pin # | Function | Pin # | Function |
|-------|--------------|-------|----------|
| 1 | A10 | 40 | NBGT |
| 2 | A8 | 41 | A9 |
| 3 | A6 | 42 | A7 |
| 4 | DB1 | 43 | DB0 |
| 5 | DB3 | 44 | DB2 |
| 6 | DB5 | 45 | DB4 |
| 7 | DB7 | 46 | DB6 |
| 8 | DB9 | 47 | DB8 |
| 9 | DB11 | 48 | DB10 |
| 10 | DB13 | 49 | DB12 |
| 11 | DB15 | 50 | DB14 |
| 12 | BRO ENA | 51 | +5V |
| 13 | ADDRE | 52 | GND |
| 14 | ADDRC | 53 | ADDRD |
| 15 | ADDRA | 54 | ADDRB |
| 16 | RTADERR | 55 | ADDRP |
| 17 | TXDATA B | 56 | TXDATA B |
| 18 | N/C | 57 | -VEE B |
| 19 | GND B | 58 | +5V B |
| 20 | RXDATA B | 59 | RXDATA B |
| 21 | A3 | 60 | A2 |
| 22 | A1 | 61 | A0 |
| 23 | DTGRT | 62 | DTACK |
| 24 | INCMD | 63 | A4 |
| 25 | HSFAIL | 64 | R/W |
| 26 | DTSTR | 65 | GBR |
| 27 | A5 (DAT/CMD) | 66 | 16MHz IN |
| 28 | RTFAIL | 67 | BUF ENA |
| 29 | DTREQ | 68 | RESET |
| 30 | ADBC | 69 | RTFLAG |
| 31 | TP2 (NC) | 70 | TP1 (NC) |
| 32 | A11 (T/R) | 71 | BUSY |
| 33 | ILLCMD | 72 | SSFLAG |
| 34 | SRQ | 73 | ME |
| 35 | BITEN | 74 | RXDATA A |
| 36 | RXDATA A | 75 | GND A |
| 37 | +5V A | 76 | N/C |
| 38 | -VEE A | 77 | TXDATA A |
| 39 | TXDATA A | 78 | STATEN |

Figure 12 – DDIP Pin Connection Diagram, CT2542 and Pinout Table

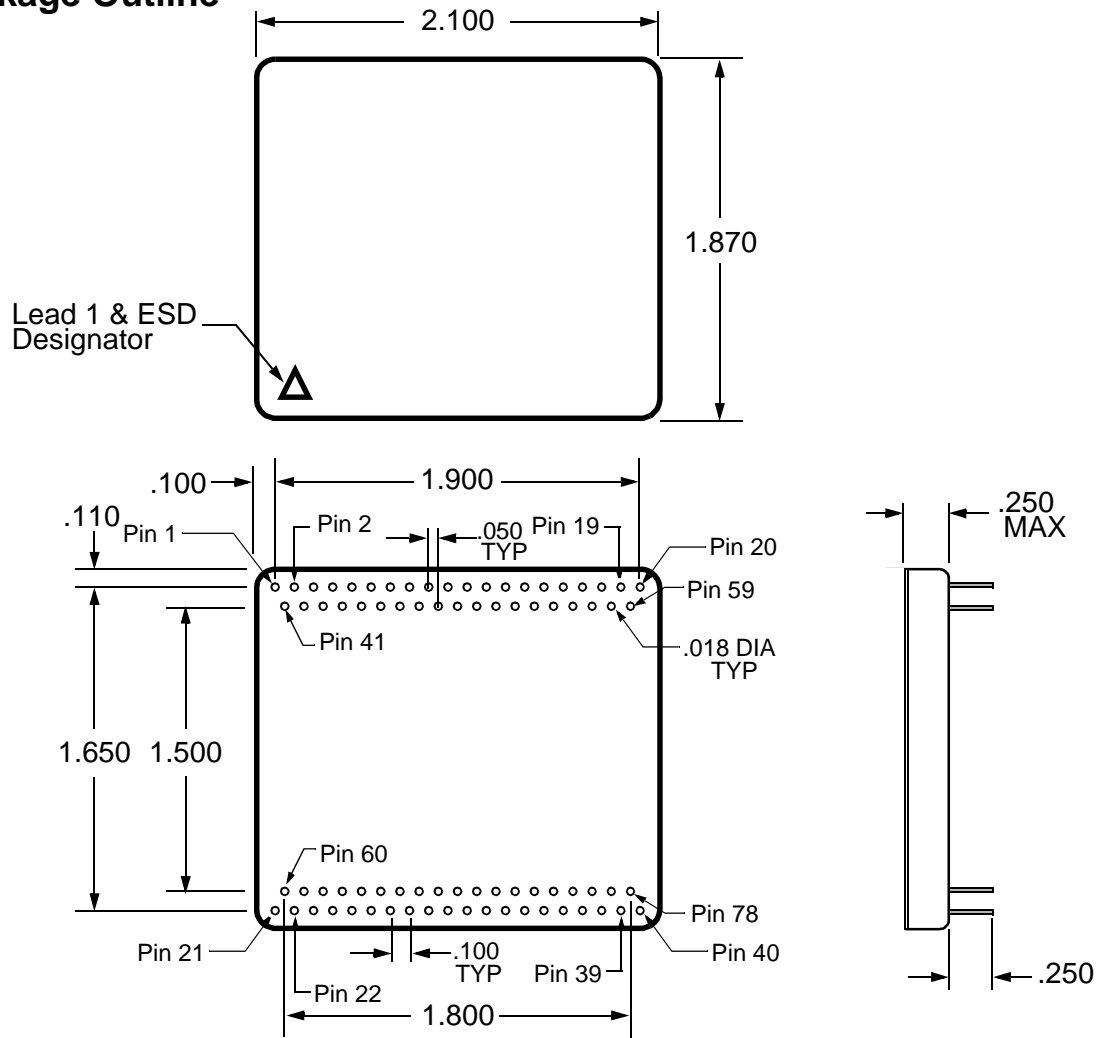
CT2542 Pin Out Description (FP)



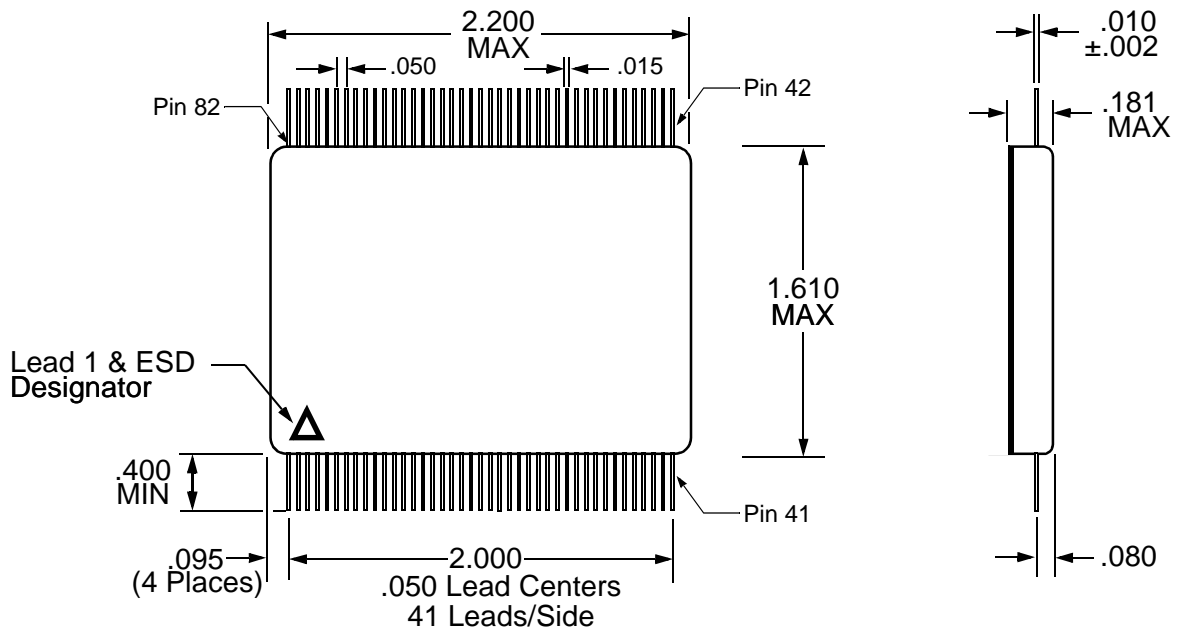
| Pin # | Function | Pin # | Function |
|-------|----------|-------|--------------|
| 1 | NC | 42 | NC |
| 2 | A10 | 43 | NBGT |
| 3 | A9 | 44 | STATEN |
| 4 | A8 | 45 | TXDATA A |
| 5 | A7 | 46 | TXDATA A |
| 6 | A6 | 47 | VEE A |
| 7 | DB0 | 48 | N/C |
| 8 | DB1 | 49 | +5V A |
| 9 | DB2 | 50 | GND A |
| 10 | DB3 | 51 | RXDATA A |
| 11 | DB4 | 52 | RXDATA A |
| 12 | DB5 | 53 | BITEN |
| 13 | DB6 | 54 | ME |
| 14 | DB7 | 55 | SRQ |
| 15 | DB8 | 56 | SSFLAG |
| 16 | DB9 | 57 | ILLCMD |
| 17 | DB10 | 58 | BUSY |
| 18 | DB11 | 59 | A11 (T/R) |
| 19 | DB12 | 60 | TP1 |
| 20 | DB13 | 61 | TP2 |
| 21 | DB14 | 62 | RTFLAG |
| 22 | DB15 | 63 | ADBC |
| 23 | +5V | 64 | RESET |
| 24 | BRO ENA | 65 | DTREQ |
| 25 | GND | 66 | BUF ENA |
| 26 | ADDRE | 67 | RTFAIL |
| 27 | ADDRD | 68 | 16MHz IN |
| 28 | ADDRC | 69 | A5 (DAT/CMD) |
| 29 | ADDRB | 70 | GBR |
| 30 | ADDRA | 71 | DTSTR |
| 31 | ADDRP | 72 | R/W |
| 32 | RTADERR | 73 | HSFAIL |
| 33 | TXDATA B | 74 | A4 |
| 34 | TXDATA B | 75 | INCMD |
| 35 | -VEE B | 76 | DTACK |
| 36 | +15V B | 77 | DTGRT |
| 37 | N/C | 78 | A0 |
| 38 | GND B | 79 | A1 |
| 39 | RXDATA B | 80 | A2 |
| 40 | RXDATA B | 81 | A3 |
| 41 | NC | 82 | NC |

Figure 13 – Flat package Pin Connection Diagram, CT2542 and Pinout Table

Plug In Package Outline



Flat Package Outline





Ordering Information

| Model Number | Screening | Power Supplies | DESC SMD # | Package |
|---------------|---|----------------|----------------|--------------|
| CT2542 | Military Temperature, -55°C to +125°C, Screened to the individual test methods of MIL-STD-883 | +5V & -15V | - | Plug in |
| CT2542-FP | | | - | Flat Package |
| CT2542-701 | Industrial Temperature, -40°C to +85°C, No Burn-in | | - | Plug in |
| CT2542-FP-701 | | | - | Flat Package |
| CT2542 | - | | 5962-8979803XA | Plug in |
| CT2542 | - | | 5962-8979803XC | Plug in |
| CT2542-FP | - | | 5962-8979803YA | Flat Package |
| CT2542-FP | - | | 5962-8979803YC | Flat Package |
| CT2543 | Military Temperature, -55°C to +125°C, Screened to the individual test methods of MIL-STD-883 | +5V & -12V | - | Plug in |
| CT2543-FP | | | - | Flat Package |
| CT2543-701 | Industrial Temperature, -40°C to +85°C, No Burn-in | | - | Plug in |
| CT2543-FP-701 | | | - | Flat Package |
| CT2543 | - | | 5962-8979804XA | Plug in |
| CT2543 | - | | 5962-8979804XC | Plug in |
| CT2543-FP | - | | 5962-8979804YA | Flat Package |
| CT2543-FP | - | | 5962-8979804YC | Flat Package |

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

Specifications subject to change without notice.