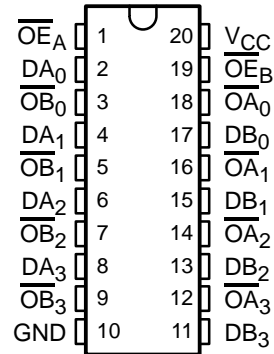


CY54FCT240T, CY74FCT240T 8-BIT BUFFERS/LINE DRIVERS WITH 3-STATE OUTPUTS

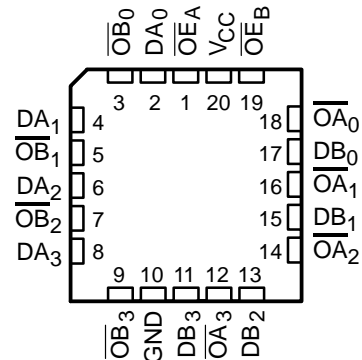
SCCS017A – MAY 1994 – REVISED OCTOBER 2001

- Function, Pinout, and Drive Compatible With FCT and F Logic
- Reduced V_{OH} (Typically = 3.3 V) Versions of Equivalent FCT Functions
- Edge-Rate Control Circuitry for Significantly Improved Noise Characteristics
- I_{off} Supports Partial-Power-Down Mode Operation
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)
- Matched Rise and Fall Times
- Fully Compatible With TTL Input and Output Logic Levels
- CY54FCT240T
 - 48-mA Output Sink Current
 - 12-mA Output Source Current
- CY74FCT240T
 - 64-mA Output Sink Current
 - 32-mA Output Source Current
- 3-State Outputs

CY54FCT240T . . . D PACKAGE
CY74FCT240T . . . Q OR SO PACKAGE
(TOP VIEW)



CY54FCT240T . . . L PACKAGE
(TOP VIEW)



description

The 'FCT240T devices are octal buffers and line drivers designed to be employed as memory address drivers, clock drivers, and bus-oriented transmitters/receivers. These devices provide speed and drive capabilities equivalent to their fastest bipolar logic counterparts, while reducing power consumption. The input and output voltage levels allow direct interface with TTL, NMOS, and CMOS devices without external components.

These devices are fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

CY54FCT240T, CY74FCT240T
8-BIT BUFFERS/LINE DRIVERS
WITH 3-STATE OUTPUTS

SCCS017A – MAY 1994 – REVISED OCTOBER 2001

ORDERING INFORMATION

| T _A | PACKAGE† | | SPEED (ns) | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|----------------|---------------|---------------|-----------------|-----------------------|------------------|
| -40°C to 85°C | SOIC – SO | Tube | 4.3 | CY74FCT240CTSOC | FCT240C |
| | | Tape and reel | 4.3 | CY74FCT240CTSUCT | |
| | QSOP – Q | Tape and reel | 4.3 | CY74FCT240CTQCT | FCT240C |
| | SOIC – SO | Tube | 4.8 | CY74FCT240ATSOC | FCT240A |
| | | Tape and reel | 4.8 | CY74FCT240ATSUCT | |
| | QSOP – Q | Tape and reel | 4.8 | CY74FCT240ATQCT | FCT240A |
| | SOIC – SO | Tube | 8 | CY74FCT240TSOC | FCT240 |
| Tape and reel | | 8 | CY74FCT240TSUCT | | |
| QSOP – Q | Tape and reel | 8 | CY74FCT240TQCT | FCT240 | |
| -55°C to 125°C | CDIP – D | Tube | 4.7 | CY54FCT240CTDMB | |
| | CDIP – D | Tube | 5.1 | CY54FCT240ATDMB | |
| | LCC – L | Tube | 5.1 | CY54FCT240ATLMB | |
| | CDIP – D | Tube | 9 | CY54FCT240TDMB | |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

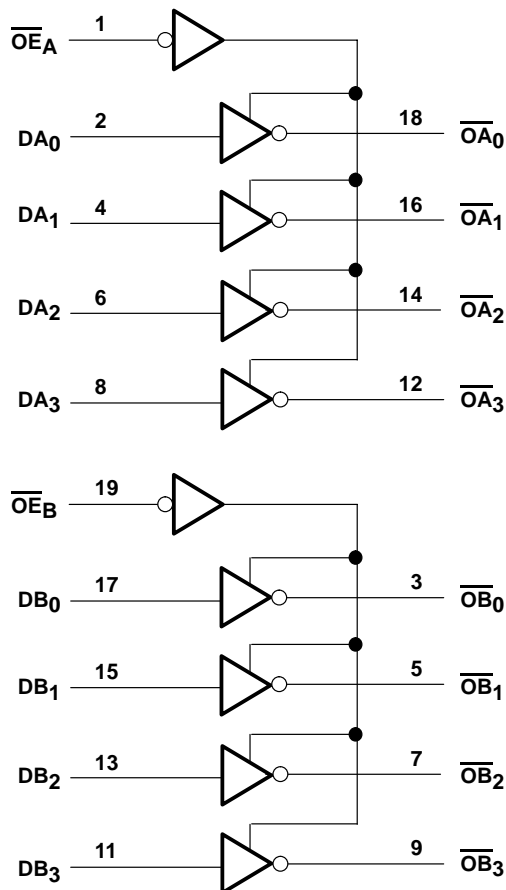
FUNCTION TABLE

| INPUTS | | | OUTPUT |
|-------------------|-------------------|---|----------------|
| \overline{OE}_A | \overline{OE}_B | D | \overline{O} |
| L | L | L | H |
| L | L | H | L |
| H | H | X | Z |

H = High logic level, L = Low logic level,
X = Don't care, Z = High-impedance state



logic diagram (positive logic)



absolute maximum rating over operating free-air temperature range (unless otherwise noted)†

| | |
|--|----------------|
| Supply voltage range to ground potential | -0.5 V to 7 V |
| DC input voltage range | -0.5 V to 7 V |
| DC output voltage range | -0.5 V to 7 V |
| DC output current (maximum sink current/pin) | 120 mA |
| Package thermal impedance, θ_{JA} (see Note 1): Q package | 68°C/W |
| SO package | 58°C/W |
| Ambient temperature range with power applied, T_A | -65°C to 135°C |
| Storage temperature range, T_{Stg} | -65°C to 150°C |

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

CY54FCT240T, CY74FCT240T
8-BIT BUFFERS/LINE DRIVERS
WITH 3-STATE OUTPUTS

SCCS017A – MAY 1994 – REVISED OCTOBER 2001

recommended operating conditions (see Note 2)

| | CY54FCT240T | | | CY74FCT240T | | | UNIT |
|---|-------------|-----|-----|-------------|-----|------|------|
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| V _{CC} Supply voltage | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| V _{IH} High-level input voltage | 2 | | | 2 | | | V |
| V _{IL} Low-level input voltage | | | 0.8 | | | 0.8 | V |
| I _{OH} High-level output current | | | -12 | | | -32 | mA |
| I _{OL} Low-level output current | | | 48 | | | 64 | mA |
| T _A Operating free-air temperature | -55 | | 125 | -40 | | 85 | °C |

NOTE 2: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.



CY54FCT240T, CY74FCT240T
8-BIT BUFFERS/LINE DRIVERS
WITH 3-STATE OUTPUTS

SCCS017A – MAY 1994 – REVISED OCTOBER 2001

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | CY54FCT240T | | CY74FCT240T | | UNIT | |
|--------------------|--|--------------------------|------|-------------|------|------|------------|
| | | MIN | TYP† | MAX | MIN | | TYP† |
| V _{IK} | V _{CC} = 4.5 V, I _{IN} = -18 mA | -0.7 | | -1.2 | | | V |
| | V _{CC} = 4.75 V, I _{IN} = -18 mA | | | | -0.7 | -1.2 | |
| V _{OH} | V _{CC} = 4.5 V, I _{OH} = -12 mA | 2.4 | | 3.3 | | | V |
| | V _{CC} = 4.75 V | | | | 2 | | |
| | | I _{OH} = -32 mA | | | | 2.4 | |
| V _{OL} | V _{CC} = 4.5 V, I _{OL} = 48 mA | | 0.3 | 0.55 | | | V |
| | V _{CC} = 4.75 V, I _{OL} = 64 mA | | | | 0.3 | 0.55 | |
| V _{hys} | All inputs | | 0.2 | | 0.2 | | V |
| I _I | V _{CC} = 5.5 V, V _{IN} = V _{CC} | | | 5 | | | μA |
| | V _{CC} = 5.25 V, V _{IN} = V _{CC} | | | | | 5 | |
| I _{IH} | V _{CC} = 5.5 V, V _{IN} = 2.7 V | | | ±1 | | | μA |
| | V _{CC} = 5.25 V, V _{IN} = 2.7 V | | | | | ±1 | |
| I _{IL} | V _{CC} = 5.5 V, V _{IN} = 0.5 V | | | ±1 | | | μA |
| | V _{CC} = 5.25 V, V _{IN} = 0.5 V | | | | | ±1 | |
| I _{OZH} | V _{CC} = 5.5 V, V _{OUT} = 2.7 V | | | 10 | | | μA |
| | V _{CC} = 5.25 V, V _{OUT} = 2.7 V | | | | | 10 | |
| I _{OZL} | V _{CC} = 5.5 V, V _{OUT} = 0.5 V | | | -10 | | | μA |
| | V _{CC} = 5.25 V, V _{OUT} = 0.5 V | | | | | -10 | |
| I _{OS} ‡ | V _{CC} = 5.5 V, V _{OUT} = 0 V | -60 | -120 | -225 | | | mA |
| | V _{CC} = 5.25 V, V _{OUT} = 0 V | | | | -60 | -120 | |
| I _{off} | V _{CC} = 0 V, V _{OUT} = 4.5 V | | | ±1 | | ±1 | μA |
| I _{CC} | V _{CC} = 5.5 V, V _{IN} ≤ 0.2 V, V _{IN} ≥ V _{CC} - 0.2 V | | 0.1 | 0.2 | | | mA |
| | V _{CC} = 5.25 V, V _{IN} ≤ 0.2 V, V _{IN} ≥ V _{CC} - 0.2 V | | | | 0.1 | 0.2 | |
| ΔI _{CC} | V _{CC} = 5.5 V, V _{IN} = 3.4 V§, f ₁ = 0, Outputs open | | 0.5 | 2 | | | mA |
| | V _{CC} = 5.25 V, V _{IN} = 3.4 V§, f ₁ = 0, Outputs open | | | | 0.5 | 2 | |
| I _{CCD} ¶ | V _{CC} = 5.5 V, One input switching at 50% duty cycle, Outputs open, $\overline{OE}_A = \overline{OE}_B = \text{GND}$, V _{IN} ≤ 0.2 V or V _{IN} ≥ V _{CC} - 0.2 V | | 0.06 | 0.12 | | | mA/ MHz |
| | V _{CC} = 5.25 V, One input switching at 50% duty cycle, Outputs open, $\overline{OE}_A = \overline{OE}_B = \text{GND}$, V _{IN} ≤ 0.2 V or V _{IN} ≥ V _{CC} - 0.2 V | | | | 0.06 | 0.12 | |

† Typical values are at V_{CC} = 5 V, T_A = 25°C.

‡ Not more than one output should be shorted at a time. Duration of short should not exceed one second. The use of high-speed test apparatus and/or sample-and-hold techniques are preferable to minimize internal chip heating and more accurately reflect operational values. Otherwise, prolonged shorting of a high output can raise the chip temperature well above normal and cause invalid readings in other parametric tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

§ Per TTL-driven input (V_{IN} = 3.4 V); all other inputs at V_{CC} or GND

¶ This parameter is derived for use in total power-supply calculations.



CY54FCT240T, CY74FCT240T
8-BIT BUFFERS/LINE DRIVERS
WITH 3-STATE OUTPUTS

SCCS017A – MAY 1994 – REVISED OCTOBER 2001

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted) (continued)

| PARAMETER | TEST CONDITIONS | | CY54FCT240T | | CY74FCT240T | | UNIT | |
|------------------|--|---|---|------|-------------|-----|------|------|
| | | | MIN | TYP† | MAX | MIN | | TYP† |
| I _C # | V _{CC} = 5.5 V, Outputs open, $\overline{OE}_A = \overline{OE}_B = \text{GND}$ | One bit switching at f ₁ = 10 MHz at 50% duty cycle | V _{IN} ≤ 0.2 V or V _{IN} ≥ V _{CC} – 0.2 V | 0.7 | 1.4 | | mA | |
| | | | V _{IN} = 3.4 V or GND | 1 | 2.4 | | | |
| | | Eight bits switching at f ₁ = 2.5 MHz at 50% duty cycle | V _{IN} = 0.2 V or V _{IN} ≥ V _{CC} – 0.2 V | 1.3 | 2.6 | | | |
| | | | V _{IN} = 3.4 V or GND | 3.3 | 10.6 | | | |
| | V _{CC} = 5.25 V, Outputs open, $\overline{OE}_A = \overline{OE}_B = \text{GND}$ | One bit switching at f ₁ = 10 MHz at 50% duty cycle | V _{IN} ≤ 0.2 V or V _{IN} ≥ V _{CC} – 0.2 V | | | 0.7 | | 1.4 |
| | | | V _{IN} = 3.4 V or GND | | | 1 | | 2.4 |
| | | Eight bits switching at f ₁ = 2.5 MHz at 50% duty cycle | V _{IN} = 0.2 V or V _{IN} ≥ V _{CC} – 0.2 V | | | 1.3 | 2.6 | |
| | | | V _{IN} = 3.4 V or GND | | | 3.3 | 10.6 | |
| C _i | | | | 5 | 10 | 5 | 10 | pF |
| C _o | | | | 9 | 12 | 9 | 12 | pF |

† Typical values are at V_{CC} = 5 V, T_A = 25°C.

I_C = I_{CC} + ΔI_{CC} × D_H × N_T + I_{CCD} (f₀/2 + f₁ × N₁)

Where:

I_C = Total supply current

I_{CC} = Power-supply current with CMOS input levels

ΔI_{CC} = Power-supply current for a TTL high input (V_{IN} = 3.4 V)

D_H = Duty cycle for TTL inputs high

N_T = Number of TTL inputs at D_H

I_{CCD} = Dynamic current caused by an input transition pair (HLH or LHL)

f₀ = Clock frequency for registered devices, otherwise zero

f₁ = Input signal frequency

N₁ = Number of inputs changing at f₁

All currents are in milliamperes and all frequencies are in megahertz.

|| Values for these conditions are examples of the I_{CC} formula.



CY54FCT240T, CY74FCT240T
8-BIT BUFFERS/LINE DRIVERS
WITH 3-STATE OUTPUTS

SCCS017A – MAY 1994 – REVISED OCTOBER 2001

switching characteristics over operating free-air temperature range (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | CY54FCT240T | | CY54FCT240AT | | CY54FCT240CT | | UNIT |
|------------------|-----------------|-------------|-------------|------|--------------|-----|--------------|-----|------|
| | | | MIN | MAX | MIN | MAX | MIN | MAX | |
| t _{PLH} | D | \bar{O} | 1.5 | 9 | 1.5 | 5.1 | 1.5 | 4.7 | ns |
| t _{PHL} | | | 1.5 | 9 | 1.5 | 5.1 | 1.5 | 4.7 | |
| t _{PZH} | \overline{OE} | \bar{O} | 1.5 | 10.5 | 1.5 | 6.5 | 1.5 | 5.7 | ns |
| t _{PZL} | | | 1.5 | 10.5 | 1.5 | 6.5 | 1.5 | 5.7 | |
| t _{PHZ} | \overline{OE} | \bar{O} | 1.5 | 10 | 1.5 | 5.9 | 1.5 | 4.6 | ns |
| t _{PLZ} | | | 1.5 | 10 | 1.5 | 5.9 | 1.5 | 4.6 | |

switching characteristics over operating free-air temperature range (see Figure 1)

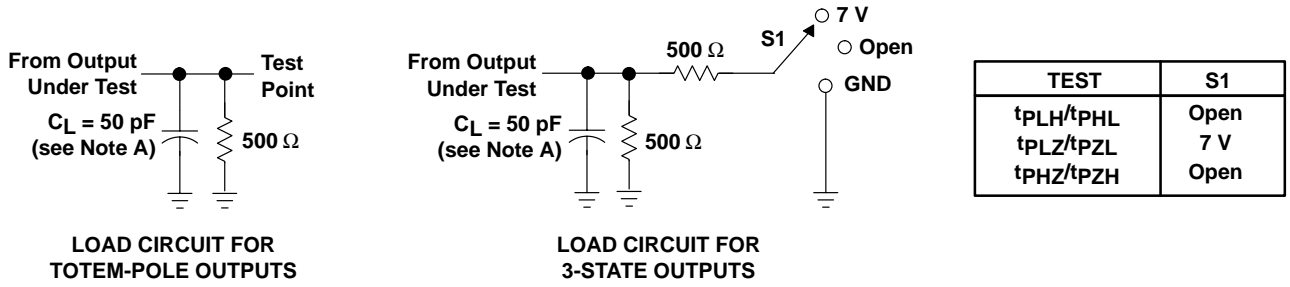
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | CY74FCT240T | | CY74FCT240AT | | CY74FCT240CT | | UNIT |
|------------------|-----------------|-------------|-------------|-----|--------------|-----|--------------|-----|------|
| | | | MIN | MAX | MIN | MAX | MIN | MAX | |
| t _{PLH} | D | \bar{O} | 1.5 | 8 | 1.5 | 4.8 | 1.5 | 4.3 | ns |
| t _{PHL} | | | 1.5 | 8 | 1.5 | 4.8 | 1.5 | 4.3 | |
| t _{PZH} | \overline{OE} | \bar{O} | 1.5 | 10 | 1.5 | 6.2 | 1.5 | 5 | ns |
| t _{PZL} | | | 1.5 | 10 | 1.5 | 6.2 | 1.5 | 5 | |
| t _{PHZ} | \overline{OE} | \bar{O} | 1.5 | 9.5 | 1.5 | 5.6 | 1.5 | 4.5 | ns |
| t _{PLZ} | | | 1.5 | 9.5 | 1.5 | 5.6 | 1.5 | 4.5 | |



CY54FCT240T, CY74FCT240T
8-BIT BUFFERS/LINE DRIVERS
WITH 3-STATE OUTPUTS

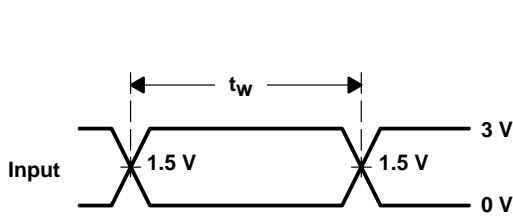
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PARAMETER MEASUREMENT INFORMATION

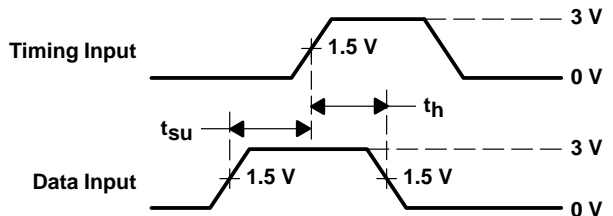


LOAD CIRCUIT FOR TOTEM-POLE OUTPUTS

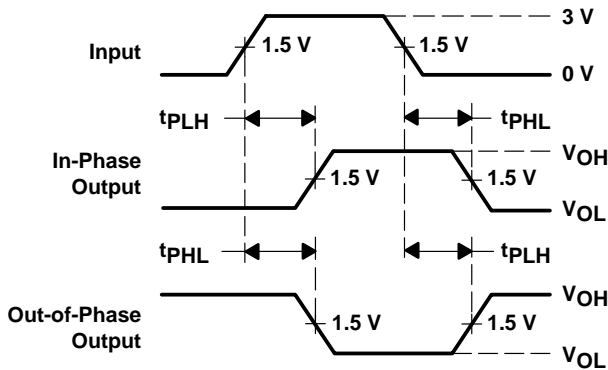
LOAD CIRCUIT FOR 3-STATE OUTPUTS



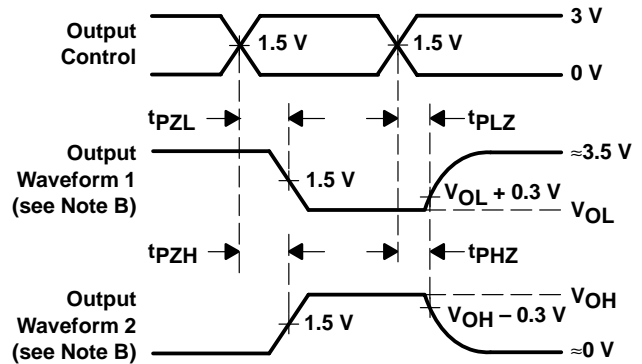
VOLTAGE WAVEFORMS PULSE DURATION



VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES LOW- AND HIGH-LEVEL ENABLING

- NOTES: A. C_L includes probe and jig capacitance.
 B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|--------------------|-----------------------|---------------|-----------------|------|-------------|----------------------------|------------------|------------------------------|
| 5962-9220301M2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-9220301MRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 5962-9220301MSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| 5962-9220302M2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-9220302MRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 5962-9220302MSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| 5962-9220303M2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-9220303MRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 5962-9220303MSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| 5962-9221301MRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 5962-9221303M2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-9221303MRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 5962-9221305MRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| CY54FCT240ATDMB | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| CY54FCT240ATLMB | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| CY54FCT244ATDMB | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| CY54FCT244ATLMB | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| CY54FCT244ATW | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| CY54FCT244CTDMB | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| CY54FCT244CTW | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| CY54FCT244TDMB | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| CY54FCT244TLMB | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| CY54FCT244TW | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| CY74FCT240ATQCT | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT240ATQCTE4 | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT240ATQCTG4 | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT240ATSOC | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240ATSOCE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240ATSOCG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240ATSOCT | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240ATSOCTE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240ATSOCTG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240CTSOCT | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240CTSOCTE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|--------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| CY74FCT240CTSOCTG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240TQCT | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT240TQCTE4 | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT240TQCTG4 | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT240TSOC | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240TSOCE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240TSOCG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240TSOCT | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240TSOCTE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT240TSOCTG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244ATPC | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| CY74FCT244ATPCE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| CY74FCT244ATQCT | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244ATQCTE4 | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244ATQCTG4 | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244ATSOC | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244ATSOCE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244ATSOCG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244ATSOCT | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244ATSOCTE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244ATSOCTG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244CTQCT | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244CTQCTE4 | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244CTQCTG4 | ACTIVE | SSOP/QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244CTSOC | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244CTSOCE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|--------------------|-----------------------|---------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| CY74FCT244CTSOCG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244CTSOCT | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244CTSOCTG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244DTQCT | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244DTQCTE4 | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244DTQCTG4 | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244DTSOC | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244DTSOCE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244DTSOCG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244DTSOCT | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244DTSOCTE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244DTSOCTG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244TQCT | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244TQCTG4 | ACTIVE | SSOP/ QSOP | DBQ | 20 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| CY74FCT244TSOC | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244TSOCE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244TSOCG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244TSOCT | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244TSOCTE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| CY74FCT244TSOCTG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered

at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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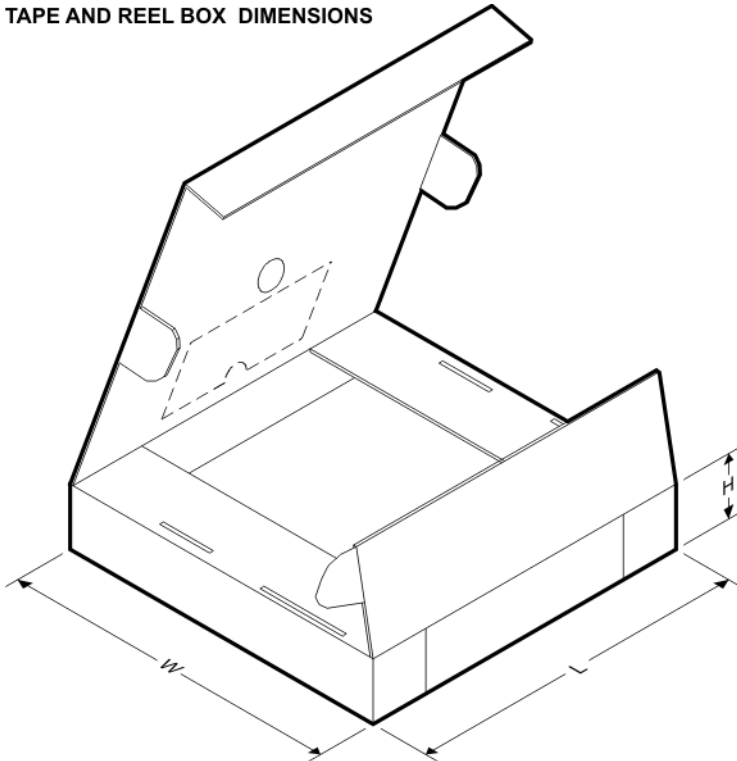
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TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CY74FCT240ATQCT | SSOP/QSOP | DBQ | 20 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| CY74FCT240ATSOCT | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| CY74FCT240CTSOCT | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| CY74FCT240TQCT | SSOP/QSOP | DBQ | 20 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| CY74FCT240TSOCT | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| CY74FCT244ATQCT | SSOP/QSOP | DBQ | 20 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| CY74FCT244ATSOCT | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| CY74FCT244CTQCT | SSOP/QSOP | DBQ | 20 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| CY74FCT244CTSOCT | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| CY74FCT244DTQCT | SSOP/QSOP | DBQ | 20 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| CY74FCT244DTSOCT | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| CY74FCT244TQCT | SSOP/QSOP | DBQ | 20 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| CY74FCT244TSOCT | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |

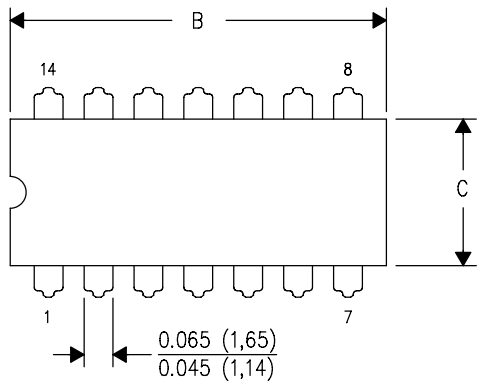
TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

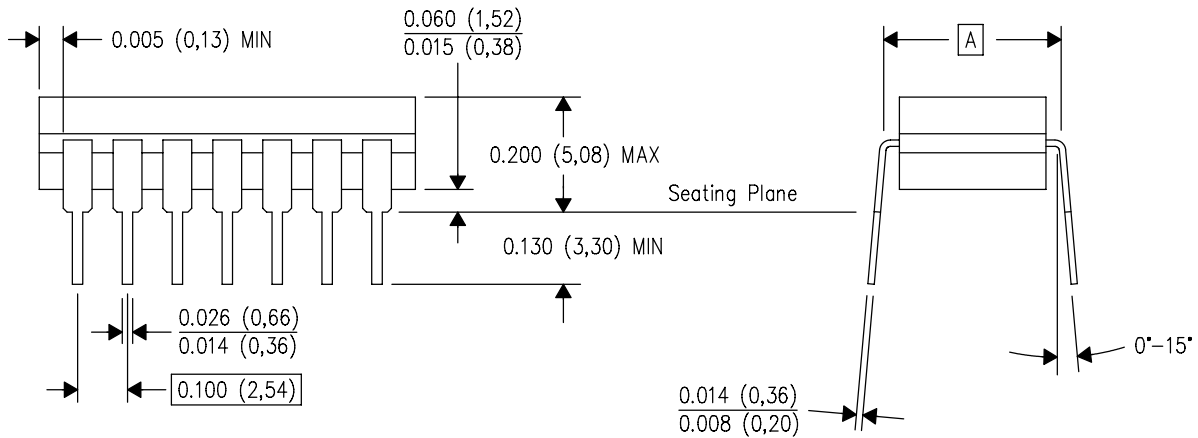
| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CY74FCT240ATQCT | SSOP/QSOP | DBQ | 20 | 2500 | 346.0 | 346.0 | 33.0 |
| CY74FCT240ATSOCT | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| CY74FCT240CTSOCT | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| CY74FCT240TQCT | SSOP/QSOP | DBQ | 20 | 2500 | 346.0 | 346.0 | 33.0 |
| CY74FCT240TSOCT | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| CY74FCT244ATQCT | SSOP/QSOP | DBQ | 20 | 2500 | 346.0 | 346.0 | 33.0 |
| CY74FCT244ATSOCT | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| CY74FCT244CTQCT | SSOP/QSOP | DBQ | 20 | 2500 | 346.0 | 346.0 | 33.0 |
| CY74FCT244CTSOCT | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| CY74FCT244DTQCT | SSOP/QSOP | DBQ | 20 | 2500 | 346.0 | 346.0 | 33.0 |
| CY74FCT244DTSOCT | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| CY74FCT244TQCT | SSOP/QSOP | DBQ | 20 | 2500 | 346.0 | 346.0 | 33.0 |
| CY74FCT244TSOCT | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |

J (R-GDIP-T**) 14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---------------|------------------------|------------------------|------------------------|------------------------|
| A | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC |
| B MAX | 0.785 (19,94) | .840 (21,34) | 0.960 (24,38) | 1.060 (26,92) |
| B MIN | — | — | — | — |
| C MAX | 0.300 (7,62) | 0.300 (7,62) | 0.310 (7,87) | 0.300 (7,62) |
| C MIN | 0.245 (6,22) | 0.245 (6,22) | 0.220 (5,59) | 0.245 (6,22) |



4040083/F 03/03

- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package is hermetically sealed with a ceramic lid using glass frit.
 - Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
 - Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



4040180-4/D 07/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within Mil-Std 1835 GDFP2-F20

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



| NO. OF TERMINALS ** | A | | B | |
|---------------------|------------------|------------------|------------------|------------------|
| | MIN | MAX | MIN | MAX |
| 20 | 0.342 (8,69) | 0.358 (9,09) | 0.307 (7,80) | 0.358 (9,09) |
| 28 | 0.442 (11,23) | 0.458 (11,63) | 0.406 (10,31) | 0.458 (11,63) |
| 44 | 0.640 (16,26) | 0.660 (16,76) | 0.495 (12,58) | 0.560 (14,22) |
| 52 | 0.740 (18,78) | 0.761 (19,32) | 0.495 (12,58) | 0.560 (14,22) |
| 68 | 0.938 (23,83) | 0.962 (24,43) | 0.850 (21,6) | 0.858 (21,8) |
| 84 | 1.141 (28,99) | 1.165 (29,59) | 1.047 (26,6) | 1.063 (27,0) |



4040140/D 01/11

- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a metal lid.
 - Falls within JEDEC MS-004

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - The 20 pin end lead shoulder width is a vendor option, either half or full width.

DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
 - This drawing is subject to change without notice.
 - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - Falls within JEDEC MS-013 variation AC.

DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Refer to IPC7351 for alternate board design.
 - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525
 - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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