



ZT3241F/ZT3243F

Low Power +3V to +5.5V, 3D/5R 1000kbps RS232 Transceivers



Features

- Meets or Exceeds the EIA/TIA-232F and CCITT V.28/V.24 Specifications for V_{CC} at +3.3V $\pm 10\%$ and +5V $\pm 10\%$ Operations
- Interoperable with EIA/TIA-232 and adheres to EIA/TIA-562 down to a +2.7V power source
- Low quiescent current – 0.5mA typ., 1mA max.
- Low shutdown current (where applicable) - 1 μ A typical, 10 μ A max.
- Guaranteed data rate 1000kbps
- Proprietary Switch-Capacitor Regulated Voltage Converters (patent pending)
- Proprietary AUTOGREEN Power Saving (patent pending)
- Latch-up Free
- ESD Protection for RS-232 I/O's
 - ±15kV Human Body Model (HBM)
 - ±15kV IEC1000-4-2 Air Gap Discharge
 - ±8kV IEC1000-4-2 Contact Discharge
- Pin and Function Compatible Replacements for MAX3245E, ICL3245, ISL4245E, and SP3243U
- Standard Data Rate at 250kbps Available on ZT3243E Series

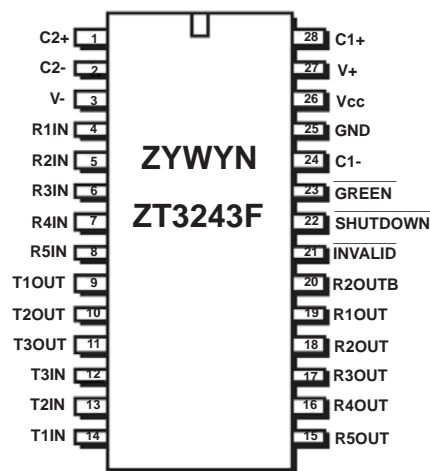
Applications

- Battery-Powered And Hand-Held Applications
- Notebooks, Subnotebooks, and Palmtops
- Industrial and Embedded PCs
- Data Cables for Cell Phones and PDAs
- Terminal Adapters and POS terminals
- Peripherals interface
- Routers and HUBs

General Description

The ZT3243F Series devices are 3V powered EIA/TIA-232 and V.28/V.24 communication interfaces with low power requirements. They consist of three line drivers, five line receivers and the proprietary switch-capacitor regulated voltage converters. These devices operate from a single 3V to 5.5V power supply at the guaranteed data rate of 1000k bits/sec with enhanced electrostatic discharge (ESD) protection in all RS232 I/O pins exceeding ± 15 kV IEC1000-4-2 Air Gap Discharge and ± 8 kV IEC1000-4-2 Contact Discharge.

The ZT3243F Series feature the AUTOGREEN (patent pending) proprietary function which automatically powers down the on-chip regulated voltage converters and driver circuits when an RS-232 cable is disconnected from the host interface or when a connected peripheral device is turned off.



28-pin SSOP/TSSOP/WSOIC

Product Selection Guide

| Part Number | Power Supply | RS232 Drivers | RS232 Receivers | Data Rate (kbps) | 15KV ESD IEC1000 4-2 | Receiver Enable | SHUTDOWN Enable | AUTOGREEN Function | Package Types | Pin-to-Pin Cross Reference |
|-------------|--------------|---------------|-----------------|------------------|----------------------|-----------------|-----------------|--------------------|--------------------------------------|--------------------------------------|
| ZT3241F | +3V to +5.5V | 3 | 5 | 1000 | RS232 I/O | YES | YES | NO | 28-SSOP, 28-TSSOP, 28-WSOIC | n/a |
| ZT3243F | +3V to +5.5V | 3 | 5 | 1000 | RS232 I/O | NO | YES | YES | 28-SSOP, 28-TSSOP, 28-WSOIC, 32-VQFN | MAX3245E, ICL3245, ISL4245E, SP3243U |



Absolute Maximum Ratings

These are stress ratings only and functional operation of the device at these ratings or any other above those indicated in the operation sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

| | |
|--|----------------|
| Power Supply, (V_{CC})..... | -0.3V to +6.0V |
| V+ | -0.3V to +7.0V |
| V- | +0.3V to -7.0V |
| V+ + V- | +13.0V |
| I_{CC} (DC V_{CC} or GND current)..... | ± 100 mA |

Input Voltages

| | |
|---------------------------------|----------------|
| TxIN, GREEN, SHUTDOWN, EN | -0.3V to +6.0V |
| RxIN..... | ± 25 V |

Output Voltages

| | |
|----------------------|----------------------------|
| TxOUT | ± 15 V |
| RxOUT, INVALID | -0.3V to (V_{CC} +0.3V) |

Short-Circuit Duration

| | |
|----------------------------|-----------------|
| TxOUT | Continuous |
| Operating Temperature..... | -40°C to +85°C |
| Storage Temperature..... | -65°C to +150°C |

Power Dissipation Per Package

| | |
|--|--------|
| 28-pin SSOP (derate 9.52mW/°C above +70°C)... | 762mW |
| 28-pin TSSOP (derate 13.20mW/°C above +70°C) | 1W |
| 28-pin WSOIC (derate 12.50mW/°C above +70°C) | 1W |
| 32-pin VQFN (derate 29.4mW/°C above +70°C). | 2352mW |

Storage Considerations

Storage in a low humidity environment is preferred. Large high density plastic packages are moisture sensitive and should be stored in Dry Vapor Barrier Bags. Prior to usage, the parts should remain bagged and stored below 40°C and 60%RH. If the parts are removed from the bag, they should be used within 168 hours or stored in an environment at or below 20%RH. If the above conditions cannot be followed, the parts should be baked for 12 hours at 125°C in order to remove moisture prior to soldering. Zywyn ships product in Dry Vapor Barrier Bags with a humidity indicator card and desiccant pack. The humidity indicator should be below 30%RH. The MSL of this product is 3.

The information furnished by Zywyn has been carefully reviewed for accuracy and reliability. Its application or use, however, is solely the responsibility of the user. No responsibility of the use of this information become part of the terms and conditions of any subsequent sales agreement with Zywyn. Specifications are subject to change without the responsibility for any infringement of patents or other rights of third parties which may result from its use. No license or proprietary rights are granted by implication or otherwise under any patent or patent rights of Zywyn Corporation.

Electrical Characteristics

Unless otherwise stated, $V_{CC} = +3.0V$ to $+5.0V$, $T_A = T_{min}$ to T_{max} , C_1 to $C_4 = 0.1\mu F$, typical values apply at $V_{CC} = +3.3V$ or $+5.0V$ and $T_A = 25^\circ C$.

| Parameter | Condition | Min | Typ | Max | Units |
|--|---|-----------------------------|-------------------------------|-------------------------------|---|
| TTL Logic Input TTL Logic Output RS-232 Input RS-232 Output Charge Pump Pin Power Pin | $T_1IN, T_2IN, T_3IN, \overline{GREEN}, \overline{SHUTDOWN}, \overline{EN}$ $R_1OUT, R_2OUT, R_3OUT, R_4OUT, R_5OUT, R_1OUTB, R_2OUTB, \overline{INVALID}$ $R_1IN, R_2IN, R_3IN, R_4IN, R_5IN$ T_1OUT, T_2OUT, T_3OUT C_1P, C_1N, C_2P, C_2N $V_{CC}, V_{GND}, V_{DD}, V_{SS}$ | | | | |
| Charge Pump Caps Temp $0^\circ C$ to $+70^\circ C$ Temp $-40^\circ C$ to $+85^\circ C$ V_{CC} Voltage Range | C_1P, C_1N, C_2P, C_2N Commercial Grade Industrial Grade $V_{CC} = +5.0V$ Supply $V_{CC} = +3.3V$ Supply | 0.1 0 -40 4.5 3 | 0.1 +25 +25 5 3.3 | 1 +70 +85 5.5 3.6 | μF $^\circ C$ $^\circ C$ V V |
| Supply Current | TTL Inputs = V_{CC}/GND , RS-232 Input = float, $V_{CC} = 3.3V$ | | 0.5 | 1 | mA |
| Supply Current, AUTOGREEN Disabled | $\overline{GREEN} = V_{CC}$; $\overline{SHUTDOWN} = V_{CC}$; $\overline{EN} = GND$ TTL Inputs = V_{CC}/GND , RS-232 Input = float, $V_{CC} = 3.3V$ | | 0.5 | 1 | mA |
| Supply Current, AUTOGREEN Enabled | $\overline{GREEN} = GND$; $\overline{SHUTDOWN} = V_{CC}$; $\overline{EN} = GND$ TTL Inputs = V_{CC}/GND , RS-232 Input = float, $V_{CC} = 3.3V$ | | 1 | 10 | μA |
| Supply Current, SHUTDOWN Enabled | $\overline{GREEN} = V_{CC}/GND$; $\overline{SHUTDOWN} = GND$; $\overline{EN} = V_{CC}$ TTL Inputs = V_{CC}/GND , RS-232 Inputs = float, $V_{CC} = 3.3V$ | | 1 | 10 | μA |
| TTL LOGIC Input Input Threshold Low Input Threshold High Input Threshold High Input Hysteresis Input Leakage Current | $V_{CC} = +5.0V$ Supply $V_{CC} = +3.3V$ Supply $V_{IN} = V_{CC}$ and GND, $TIN, \overline{EN}, \overline{GREEN}, \overline{SHUTDOWN}$ | 2.4 2 | 0.5 ± 0.01 | 0.8 ± 1 | V V V V μA |
| TTL LOGIC Output Output Voltage Low Output Voltage High Output Leakage Current | $I_{OUT} = 1.6mA$ $I_{OUT} = -1.0mA$ Receiver Outputs Disabled, $V_{OUT} = V_{CC}$ or GND, $\overline{SHUTDOWN} = GND, \overline{EN} = V_{CC}$ | $V_{CC}-0.6$ | $V_{CC}-0.1$ ± 0.05 | 0.4 ± 10 | V V μA |
| Receiver Input Input Voltage Range Input Threshold Low Input Threshold High Input Hysteresis Input Resistance | $T_A = T_{min} - T_{max}$ $T_A = 25^\circ C, V_{CC} = 5.0V$ $T_A = 25^\circ C, V_{CC} = 3.3V$ $T_A = 25^\circ C$ $T_A = 25^\circ C$ $V_{IN} = \pm 25V, T_A = 25^\circ C$ | -25 0.8 0.6 3 | 1.5 1.2 0.5 | 25 2.4 7 | V V V V k Ω |
| Transmitter Output Output Voltage Swing Output Resistance Output Short-Circuit Current Output Leakage Current | $R_L = 3k\Omega$, All Outputs are loaded $V_{CC} = V_{DD} = V_{SS} = GND, V_{OUT} = \pm 2V$ $V_{OUT} = GND$ Transmitter Disabled, $V_{OUT} = \pm 12V$ | ± 5 300 | ± 5 | ± 60 ± 25 | V Ω mA μA |
| Mouse Driving Ability Transmitter Output Voltage | $T_1IN=T_2IN=GND; T_3IN=V_{CC}; T_3OUT=3k\Omega; T_1OUT=T_2OUT=-2.5mA$ | ± 5 | | | V |

| Parameter | Condition | Min | Typ | Max | Units |
|--|---|------|----------|-----|------------|
| Timing Characteristics | | | | | |
| Maximum Data Rate | $R_L=3\sim 7k\Omega$, $C_L=250pF$; 1 DR/RC Switching, $T_A = 25^\circ C$ | 1000 | | | kbps |
| Transition-Region Slew Rate | $R_L=3\sim 7k\Omega$, $C_L=150pF\sim 250pF$; One Transmitter Switching, $T_A = 25^\circ C$, Measured from 3V to $-3V$ or $-3V$ to 3V | | 60 | | V/ μs |
| Transmitter Propagation t_{PLH} | $R_L=3k\Omega$, $C_L=150pF$; All loaded | | 2 | | μs |
| Transmitter Propagation t_{PHL} | $R_L=3k\Omega$, $C_L=150pF$; All loaded | | 2 | | μs |
| Transmitter Skew | $t_{PHL} - t_{PLH}$ | | 100 | | ns |
| Transmitter Output Enable Time | | | 400 | | ns |
| Transmitter Output Disable Time | | | 250 | | ns |
| Receiver Propagation t_{PLH} | $C_L=150pF$ | | 0.15 | | μs |
| Receiver Propagation t_{PHL} | $C_L=150pF$ | | 0.15 | | μs |
| Receiver Skew | $t_{PHL} - t_{PLH}$ | | 50 | | ns |
| Receiver Output Enable Time | | | 200 | | ns |
| Receiver Output Disable Time | | | 200 | | ns |
| AUTOGREEN Timing | | | | | |
| Receiver Input to INVALID Output High | | | | 1 | μs |
| Receiver Input to INVALID Output Low | | | | 30 | μs |
| Power Save Mode to Transmitter Enabled | | | 100 | | μs |
| ESD Tolerance | | | | | |
| ESD HBM | | | ± 15 | | kV |
| IEC 1000-4-2 Contact Discharge | | | ± 8 | | kV |
| IEC 1000-4-2 Air Gap Discharge | | | ± 15 | | kV |

Pin Descriptions

| Pin Numbers | | | Name | Description |
|------------------------------------|------------------------------------|------------------|------------------------------|--|
| ZT3241F | ZT3243F | | | |
| 28 Pins SSOP/ TSSOP WSOIC | 28 Pins SSOP/ TSSOP WSOIC | 32 Pins VQFN | | |
| 1 | 1 | 29 | C2+ | Positive terminal of the inverted voltage switch capacitor |
| 2 | 2 | 30 | C2- | Negative terminal of the inverted voltage switch capacitor |
| 3 | 3 | 31 | V- | Regulated -5.7V output generated by the voltage converter |
| 4 | 4 | 1 | R1IN | First RS232 receiver input |
| 5 | 5 | 2 | R2IN | Second RS232 receiver input |
| 6 | 6 | 3 | R3IN | Third RS232 receiver input |
| 7 | 7 | 4 | R4IN | Fourth RS232 receiver input |
| 8 | 8 | 5 | R5IN | Fifth RS232 receiver input |
| 9 | 9 | 6 | T1OUT | First RS232 transmitter output |
| 10 | 10 | 7 | T2OUT | Second RS232 transmitter output |
| 11 | 11 | 8 | T3OUT | Third RS232 transmitter output |
| - | - | 9, 16, 25, 32 | NC | No connect |
| 12 | 12 | 10 | T3IN | Third TTL/CMOS transmitter input |
| 13 | 13 | 11 | T2IN | Second TTL/CMOS transmitter input |
| 14 | 14 | 12 | T1IN | First TTL/CMOS transmitter input |
| 15 | 15 | 13 | R5OUT | Fifth RS232 receiver output |
| 16 | 16 | 14 | R4OUT | Fourth RS232 receiver output |
| 17 | 17 | 15 | R3OUT | Third RS232 receiver output |
| 18 | 18 | 17 | R2OUT | Second RS232 receiver output |
| 19 | 19 | 18 | R1OUT | First RS232 receiver output |
| 20 | 20 | 19 | R2OUTB | Second RS232 receiver non-inverting output. Always active. |
| - | 21 | 20 | $\overline{\text{INVALID}}$ | Output of a valid signal detection. INVALID is enabled high if a valid RS232 level is present on any receiver input line |
| 21 | - | | .R1OUTB | First RS232 receiver non-inverting output. Always active |
| 22 | 22 | 21 | $\overline{\text{SHUTDOWN}}$ | Shutdown control. A logic LOW to disable drivers and voltage converter |
| 23 | - | - | $\overline{\text{EN}}$ | Receiver Enable. Logic LOW for normal operation. Logic HIGH to force the receiver outputs into high impedance state |
| - | 23 | 22 | $\overline{\text{GREEN}}$ | A logic HIGH to override AUTOGREEN circuitry keeping transmitters on. (SHUTDOWN must be HIGH) |
| 24 | 24 | 23 | C1- | Negative terminal of the bootstrapped voltage switch capacitor |
| 25 | 25 | 24 | GND | Ground pin of the device |
| 26 | 26 | 26 | V _{CC} | +3V to +5.5V Supply Voltage |
| 27 | 27 | 27 | V+ | Regulated +5.4V output generated by the voltage converter |
| 28 | 28 | 28 | C1+ | Positive terminal of the bootstrapped voltage switch capacitor |

Circuit Description

Proprietary Switch-Capacitor Regulated Voltage Converter

Different from other suppliers, Zywyn uses a patent pending switch-capacitor voltage-controlled source and sink current generators design to provide powerful bipolar voltages to maintain compliant EIA/RS232 levels regardless of power supply fluctuations. The design consists of an internal regulated oscillator, a two phase clock cycling, regulated complementary MOS switches, fast switching diode and switch capacitors.

The switch capacitor bi-directional current generators operate with Zywyn's proprietary smartly regulated complementary MOS switches and fast switching diode from its proprietary high voltage process technology. The efficiency of these bi-directional current generators is well over 70%. The switching frequency is generated by an internal oscillator and regulated by the current loads. The switch capacitor pump design delivers higher negative bucked voltage than the positive boosted voltage to achieve a balanced voltage controlled source and sink current generators resulting a balanced bipolar voltage supplies to the chip.

With its unique proprietary design technique, Zywyn's interface product series provide a better power efficient, stable and compliant EIA/RS232 levels with superior low power consumption.

Controlled Power-Down

The ZT3243F series products have a low-power shutdown mode controlled by the SHUTDOWN pin. During shutdown the driver output and the switch-capacitor regulated voltage converter are disabled with the supply current falls to less than 1 μ A.

The ZT3243F uses Zywyn's patent pending AUTOGREEN circuitry to set/reset latches, which enable the circuit shutdown function when a RS232 cable is disconnected or when the peripheral is turned off and reduce the power supply drain to a 1 μ A supply current. Otherwise, when a RS232 cable is connected or when the peripheral is turned on, the devices will automatically become active again.

ESD Immunity

Electro-Static Discharge (ESD) is an important factor when implementing a serial port into a system. In some applications, it is crucial that the ESD protection for the system must meet a certain tolerance level. Since RS232 transceiver devices are exposed to the outside world, there are many environmental factors that can effect the serial port and even subject it to transients that could potentially damage the transceiver itself.

The RS232 transceiver is usually routed from the serial port connector to the transceiver IC through the metal trace on the printed circuit board. This trace will have some small amount of resistance that will add some protection in terms of limiting transient current to the IC. However for added voltage protection, transient voltage suppressors (TVS) or transzorbs, which are back-to-back diode arrays clamp, are usually necessary to protect the serial port circuitry.

To further reduce cost within their system, more engineers are requiring higher ESD tolerances from the transceiver ICs themselves without having to add costly TVS circuitry. Zywyn's RS232 transceivers includes built-in transient voltage suppression where external ESD circuitry is not necessary to meet the MIL-STD-883, Method 3015, Human Body Model and the EN61000-4-2 Air/Contact Discharge tests.

The Human Body Model has been the generally accepted ESD testing method for semiconductors. This test is intended to simulate the human body's potential to store electrostatic energy and discharge it to an integrated circuit upon close proximity or contact. This method will test the IC's capability to withstand an ESD transient during normal handling such as in manufacturing areas where the ICs tend to be handled frequently.

EN61000-4-2 is used for testing ESD on equipment and systems. For system manufacturers, they must guarantee a certain amount of ESD protection since the system itself is exposed to the outside environment and human presence. EN61000-4-2 specifies that the system is required to withstand an amount of static electricity when ESD is applied to exposed metal points and surfaces of the equipment that are accessible to personnel during normal usage. The transceiver IC receives most of the ESD current when the ESD source is applied to the connector pins.

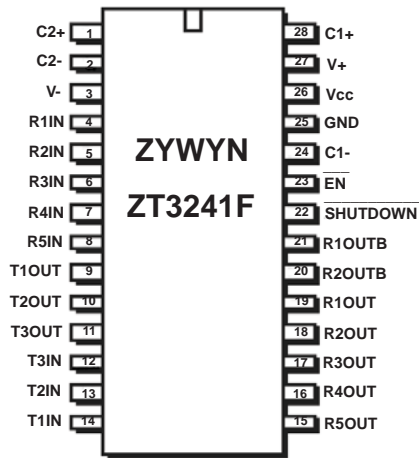
There are two methods within EN61000-4-2, the Air Discharge method and the Contact Discharge method. With the Air Discharge Method, an ESD voltage is applied to the equipment under test through air, which simulates an electrically charged person ready to connect a cable onto the rear of the system and the high energy potential on the person discharges through an arcing path to the rear panel of the system before he or she even touches the system. The Contact Discharge Method applies the ESD current directly to the EUT. This method was devised to reduce the unpredictability of the ESD arc. The discharge current rise time is constant since the energy is directly transferred without the air-gap arc inconsistencies.

Zywyn's RS232 transceivers meets and exceeds the minimum criteria for EN61000-4-2 with ± 15 kV for Air Gap Discharge and ± 8 kV for Contact Discharge.

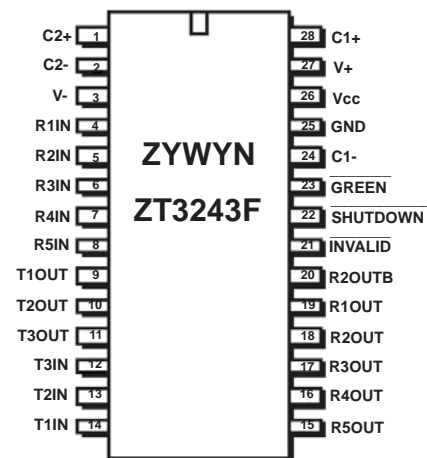
| Product | $\overline{\text{GREEN}}$ | Valid RC I/P | $\overline{\text{SHUTDOWN}}$ | $\overline{\text{EN}}$ | TxOUT | RxOUT | RxOUTB | $\overline{\text{INVALID}}$ |
|---------|---------------------------|--------------|------------------------------|------------------------|--------|--------|--------|-----------------------------|
| ZT3241F | n/a | n/a | 0 | 0 | Z | active | active | n/a |
| | | | 0 | 1 | Z | Z | active | |
| | | | 1 | 0 | active | active | active | |
| | | | 1 | 1 | active | Z | active | |
| ZT3243F | 0 | no | 1 | n/a | Z | active | active | 0 |
| | 0 | present | 1 | | active | active | active | 1 |
| | 1 | x | 1 | | active | active | active | x |
| | x | x | 0 | | Z | Z | active | x |

Table 1: ZT3243F Output Control Truth Table

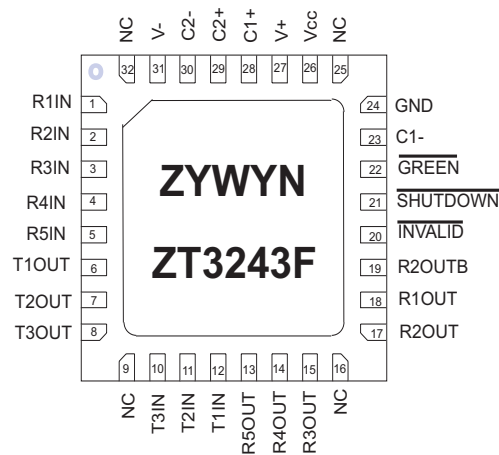
Pin Configuration



28-Pin SSOP/TSSOP/WSOIC

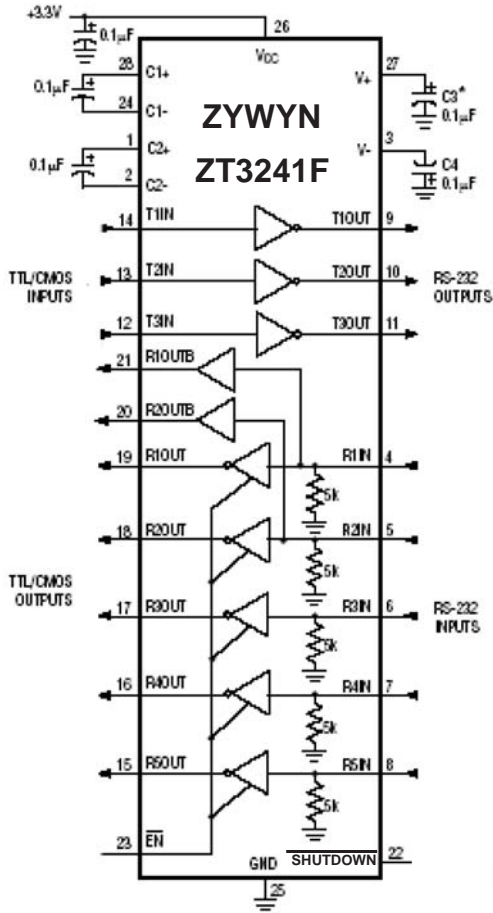


28-Pin SSOP/TSSOP/WSOIC

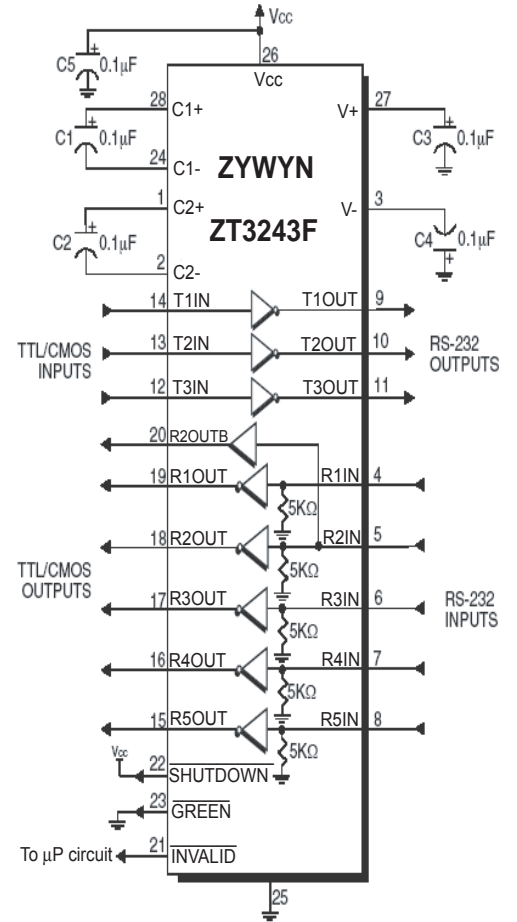


32-Pin VQFN

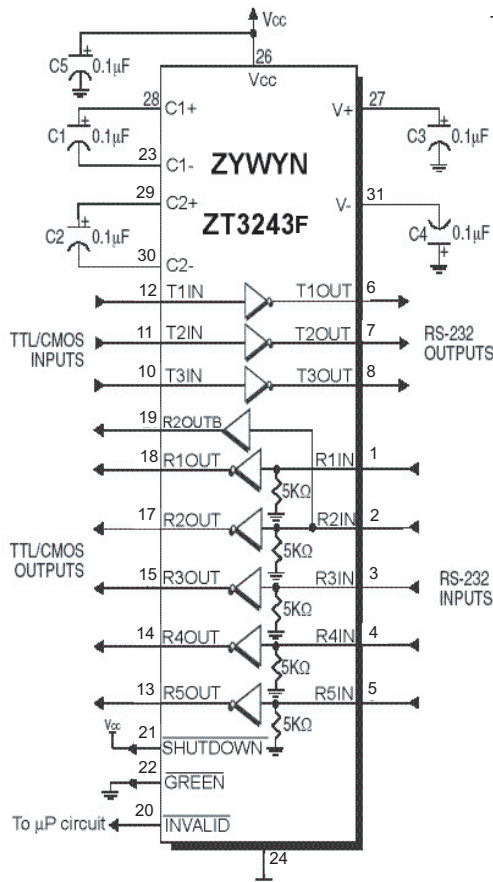
Typical Application Circuits



ZT3241F
SSOP, wSOIC



ZT3243F
SSOP, wSOIC, TSSOP



ZT3243F
VQFN

Package Information

NOTE :

1. CONTROLLING DIMENSION : mm
2. LEAD FRAME MATERIAL : COPPER 194
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, TIE BAR BURRS AND GATE BURRS. MOLD FLASH, TIE BAR BURRS AND GATE BURRS SHALL NOT EXCEED 0.006*[0.15mm] PER END DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH, INTERLEAD FLASH SHALL NOT EXCEED 0.010*[0.25mm] PER SIDE.
4. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.003*[0.08mm] TOTAL IN EXCESS OF THE "b" DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD TO BE 0.0028*[0.07mm]
5. TOLERANCE : ±0.010*[0.25mm] UNLESS OTHERWISE SPECIFIED.
6. OTHERWISE DIMENSION FOLLOW ACCEPTABLE SPEC.
7. REFERENCE DOCUMENT : JEDEC SPEC MO-150

| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---------|---------------------------|-------|-------|----------------------|--------|--------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | — | — | 2.00 | — | — | 0.079 |
| A1 | 0.05 | — | — | 0.002 | — | — |
| A2 | — | 1.75 | — | — | 0.069 | — |
| b | 0.22 | 0.30 | 0.38 | 0.0086 | 0.012 | 0.015 |
| C | 0.13 | 0.15 | 0.20 | 0.0051 | 0.006 | 0.0079 |
| D | 10.08 | 10.20 | 10.34 | 0.397 | 0.402 | 0.407 |
| E | 7.40 | 7.80 | 8.20 | 0.291 | 0.307 | 0.323 |
| E1 | 5.00 | 5.30 | 5.60 | 0.197 | 0.209 | 0.220 |
| e | — | 0.65 | — | — | 0.0256 | — |
| L | 0.56 | 0.75 | 0.97 | 0.022 | 0.030 | 0.037 |
| phi | — | 4" | 8" | — | 4" | 8" |
| y | — | — | 0.076 | — | — | 0.003 |

28-pin SSOP

| | | |
|-------------------------------|--------------|----------------------------------|
| CUSTOMER : | | ZYWYN CORPORATION |
| APPROVED BY | DATE | TITLE: |
| DRAW BY: <i>Ming-ica Chen</i> | 10/11/98 | 28L (209") BODY .025" LEAD PITCH |
| CHECK BY: <i>Leo Chen</i> | 11/01/99 | SMALL OUTLINE PACKAGE DRAWING |
| APPROVAL: <i>Paul Lee</i> | 11/01/99 | DWG. NO. PO-SSOP-011 |
| APPROVAL: <i>Jack Fu</i> | 11/01/99 | REV. 0 |
| UNIT : mm | SCALE : 10/1 | SHEET 1 OF 1 |

BOTTOM E-PIN INDENT #0.125 NOTE 6

NOTE :

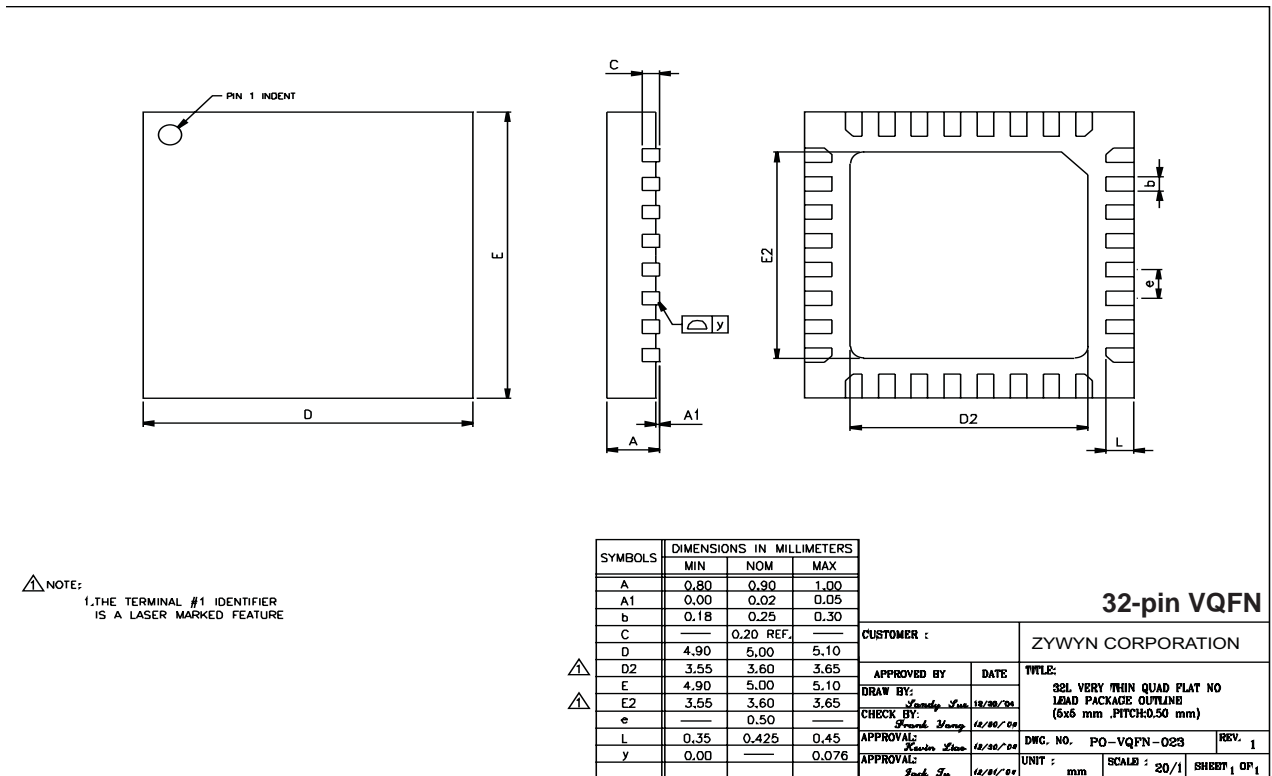
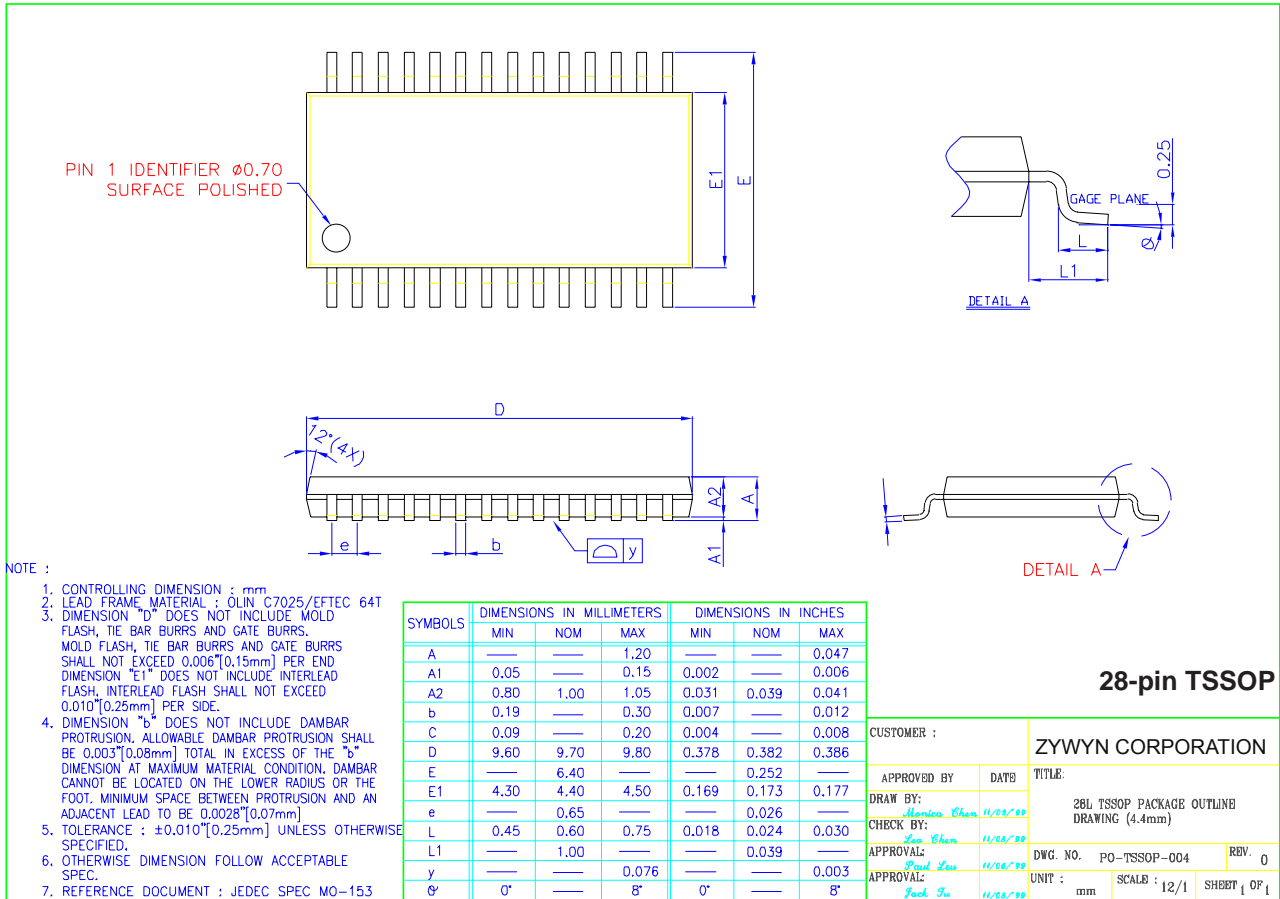
1. CONTROLLING DIMENSION : INCH
2. LEAD FRAME MATERIAL : COPPER 194
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, TIE BAR BURRS AND GATE BURRS. MOLD FLASH, TIE BAR BURRS AND GATE BURRS SHALL NOT EXCEED 0.006*[0.15mm] PER END DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH, INTERLEAD FLASH SHALL NOT EXCEED 0.010*[0.25mm] PER SIDE.
4. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.003*[0.08mm] TOTAL IN EXCESS OF THE "b" DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD TO BE 0.0028*[0.07mm]
5. TOLERANCE : ±0.010*[0.25mm] UNLESS OTHERWISE SPECIFIED.
6. OTHERWISE DIMENSION FOLLOW ACCEPTABLE SPEC.
7. REFERENCE DOCUMENT : JEDEC SPEC MS-013
8. BOTTOM E-PIN INDENT IN MARKED AS BELOW :

| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---------|---------------------------|-------|-------|----------------------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 2.36 | 2.49 | 2.64 | 0.093 | 0.098 | 0.104 |
| A1 | 0.10 | — | 0.30 | 0.004 | — | 0.012 |
| A2 | — | 2.34 | — | — | 0.092 | — |
| b | 0.33 | 0.41 | 0.51 | 0.013 | 0.016 | 0.020 |
| C | 0.23 | 0.25 | 0.30 | 0.009 | 0.010 | 0.012 |
| D | 17.70 | 17.91 | 18.11 | 0.697 | 0.705 | 0.713 |
| E | 10.01 | 10.31 | 10.64 | 0.394 | 0.406 | 0.419 |
| E1 | 7.39 | 7.49 | 7.59 | 0.291 | 0.295 | 0.299 |
| e | — | 1.27 | — | — | 0.050 | — |
| L | 0.38 | 0.81 | 1.27 | 0.015 | 0.032 | 0.050 |
| y | — | — | 0.076 | — | — | 0.003 |
| phi | 0" | — | 8" | 0" | — | 8" |








28-pin wSOIC

| | | |
|-------------------------------|-------------|-----------------------------|
| CUSTOMER : | | ZYWYN CORPORATION |
| APPROVED BY | DATE | TITLE: |
| DRAW BY: <i>Ming-ica Chen</i> | 10/28/98 | 28L WIDE BODY SMALL OUTLINE |
| CHECK BY: <i>Leo Chen</i> | 11/01/99 | PACKAGE DRAWING |
| APPROVAL: <i>Paul Lee</i> | 11/02/99 | DWG. NO. PO-SOP-008 |
| APPROVAL: <i>Jack Fu</i> | 11/02/99 | REV. 0 |
| UNIT : INCH | SCALE : 6/1 | SHEET 1 OF 1 |

Package Information



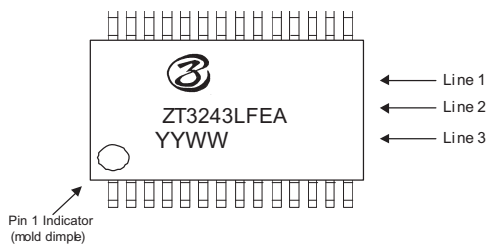
Ordering Information

| Part Number | Temperature Range | Package Type |
|-------------|-------------------|--|
| ZT3241LFEA | -40°C to +85°C | 28-pin SSOP  |
| ZT3241LFET | -40°C to +85°C | 28-pin WSOIC  |
| ZT3241LFEY | -40°C to +85°C | 28-pin TSSOP  |
| ZT3243LFEA | -40°C to +85°C | 28-pin SSOP  |
| ZT3243LFET | -40°C to +85°C | 28-pin WSOIC  |
| ZT3243LFEY | -40°C to +85°C | 28-pin TSSOP  |
| ZT3243LFEQ | -40°C to +85°C | 32-pin VQFN  |

Please contact the factory for pricing, availability on Tape-and-Reel options.

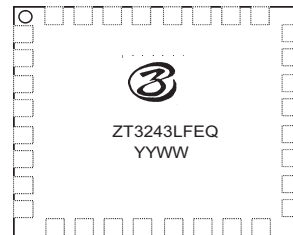
Part Marking Information

TOPSIDE MARKING:



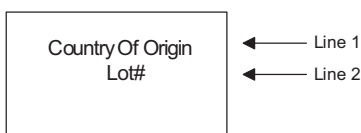
Line 1: Zywyn (logo)
 Line 2: Zywyn Part Number "ZT3243LFEA"
 Line 3: Date Code: (Last 2 digits of Prod. Year & Prod. Work Week)

TOPSIDE MARKING:



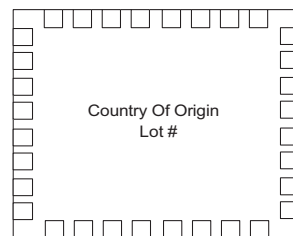
Line 1: Zywyn (logo)
 Line 2: Zywyn Part Number "ZT3243LFEQ"
 Line 3: Date Code: (Last 2 digits of Prod. Year & Prod. Work Week)

BOTTOMSIDE MARKING:



Line 1: Country of Origin (optional if Country of Origin is in Ejector Pin)
 Line 2: Lot Number

BOTTOMSIDE MARKING:



Line 1: Country of Origin (optional if Country of Origin is in Ejector Pin)
 Line 2: Lot Number

Zywyn Corporation

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