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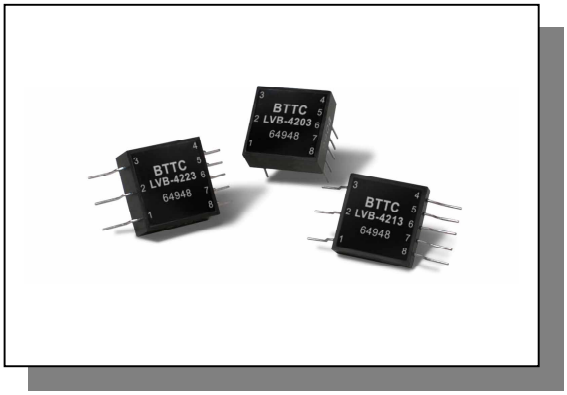
# LVB-4000 SERIES

# 3.3 VOLT PULSE TRANSFORMERS




## DESCRIPTION AND APPLICATIONS

The LVB-4000 Series transformers are 3.3 volt pulse transformers that comply with the MIL-STD-1553 Data Bus specification for applications employing 3.3 volt transceivers. These versatile Low Voltage Bus (LVB) pulse transformers meet all the electrical requirements of Manchester II serial bi-phase data transmission. Additionally, these transformers meet the demanding requirements of both mission critical military and high reliability commercial applications.

## *FEATURES*

- ***Built and Tested to MIL-PRF-21038***
  - ***M-Level Screening (standard)***
  - ***T-Level Screening (optional)***
- ***Surface Mount and Through-Hole Configurations***
- ***Available in Standard Low Profile Packages***
- ***Compatible with 3.3 Volt Transceivers such as Data Device Corporation's Mini-ACE™ Mark3***
- ***Up to +130°C Operating Temperature on Several Configurations***

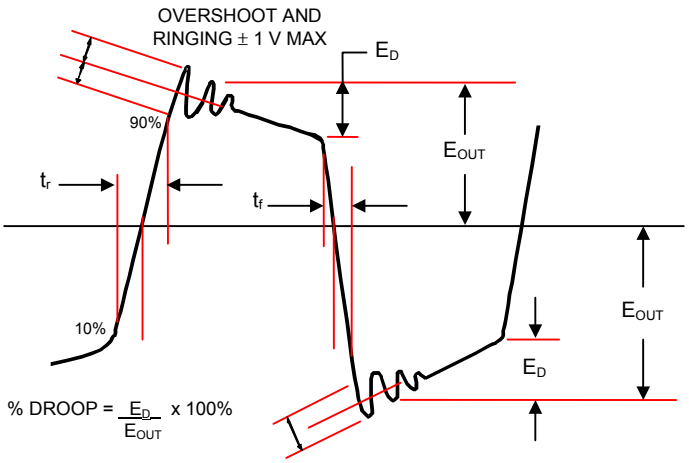
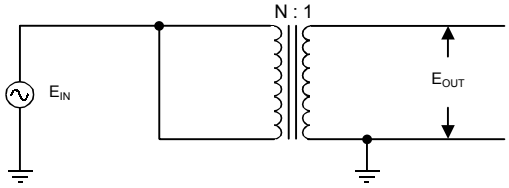


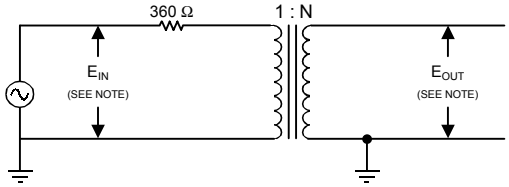

**FIGURE 1. WAVEFORM INTEGRITY**




$E_{IN}$ = 10 Vrms at 1 MHz

Calc: CMR = 20 log $\frac{E_{IN}}{E_{OUT}}$ (see note)

**FIGURE 2. CIRCUIT FOR COMMON MODE REJECTION**




$E_{IN}$ = 250 kHz square wave, 27.0 volts peak to peak with a rise and fall time of 90ns ±5ns.

Calc: Droop = $\frac{E_D}{E_{OUT}}$ x 100% (see figure 1 for $E_D$).

**FIGURE 3. CIRCUIT FOR WAVEFORM INTEGRITY**

Note: Input to be applied and output to be measured for all dash numbers are as shown. N represents highest turns winding in each test.

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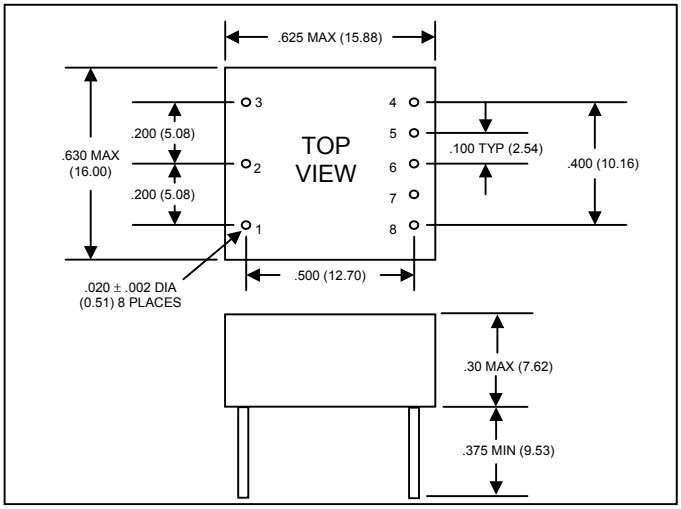
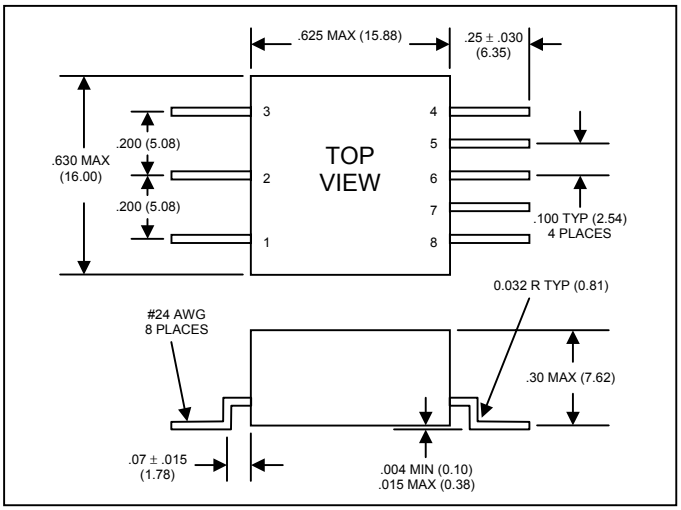
**TABLE 1. GENERAL SPECIFICATIONS**

| PARAMETER | UNIT | VALUE | REMARKS |
|---|---|---|---|
| Case | - | - | Flame Resistant, Diallyl Phthalate |
| Terminals | - | - | Solder dipped Copper Clad Steel, Solderable to MIL-STD-202, Method 208 |
| Weight | gm. | 5 max. | |
| Terminal Strength | lbs. | 2 | 2 pounds applied force, Method 211, MIL-STD-202, Test Condition A |
| Dielectric Withstanding Voltage | Vrms | 100 | Method 301, MIL-STD-202 |
| Life (expectancy "X") | Hrs. | 10,000 min. | In accordance with MIL-PRF-21038 |
| Insulation Resistance | MΩ | 1,000 min. | At 250 Vdc using method 302, test condition B, MIL-STD-202 |
| Pulse Width (output pulse) | μs | 2 | Tested using FIGURE 3 with resulting FIGURE 1 waveform |
| Overshoot | V | ± 1 max | Tested using FIGURE 3 with resulting FIGURE 1 waveform |
| Rise Time (output pulse) | ns | 250 max | Tested using FIGURE 3 with resulting FIGURE 1 waveform |
| Common-Mode Rejection | dB | 45 | Tested using FIGURE 2 |
| Operating Temperature Range | °C | - | See ELECTRICAL CHARACTERISTICS TABLE |
| Droop | % | ≤ 20 | Tested using FIGURE 3 with resulting FIGURE 1 waveform |
| DC Resistance | Ω | - | See ELECTRICAL CHARACTERISTICS TABLE |
| Input Impedance | Ω | - | See ELECTRICAL CHARACTERISTICS TABLE |

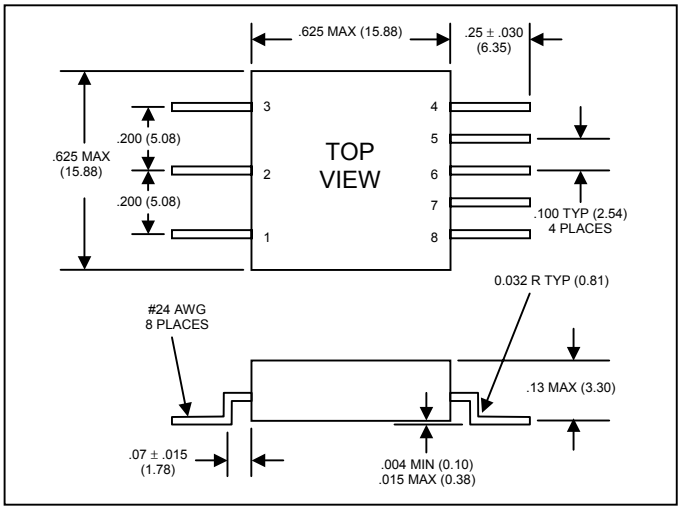
## CONFIGURATIONS




LVB-4203, LVB-4103



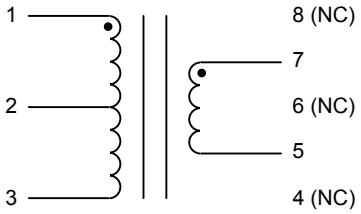

LVB-4223, LVB-4123



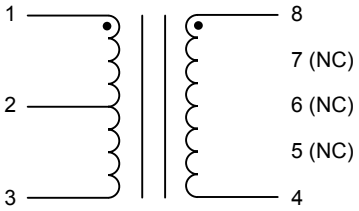

LVB-4213, LVB-4113

NOTES:
(1) Dimensions are in inches (mm).
(2) Tolerance (unless specified otherwise):
.xx is ± .010 inches.
.xxx is ± .005 inches.

## CIRCUIT DIAGRAMS




LVB-4203, LVB-4213, LVB-4223
(Transformer Coupled Design)




LVB-4103, LVB-4113, LVB-4123
(Direct Coupled Design)

**TABLE 2. ELECTRICAL CHARACTERISTICS**

| BETA P/N | PIN #S | TURNS RATIO ± 3% | DC RESISTANCE Ω (MAX) | INPUT IMPEDANCE Ω (MIN) | OPERATING TEMPERATURE (°C) |
|---|---|---|---|---|---|
| LVB-4203 | 1-3 : 5-7 | 1 : 2.70 | (1-3) 0.25<br>(5-7) 2.0 | (5-7)<br>2,000 | -55 to +130 |
| LVB-4103 | 1-3 : 4-8 | 1 : 3.75 | (1-3) 0.25<br>(4-8) 3.0 | (4-8)<br>4,000 | -55 to +130 |
| LVB-4213 | 1-3 : 5-7 | 1 : 2.70 | (1-3) 0.35<br>(5-7) 2.0 | (5-7)<br>2,000 | -55 to +85 |
| LVB-4113 | 1-3 : 4-8 | 1 : 3.75 | (1-3) 0.35<br>(4-8) 3.0 | (4-8)<br>4,000 | -55 to +85 |
| LVB-4223 | 1-3 : 5-7 | 1 : 2.70 | (1-3) 0.25<br>(5-7) 2.0 | (5-7)<br>2,000 | -55 to +130 |
| LVB-4123 | 1-3 : 4-8 | 1 : 3.75 | (1-3) 0.25<br>(4-8) 3.0 | (4-8)<br>4,000 | -55 to +130 |

NOTES:

1) These transformers have a Level 6 rating per IPC-9503, and must be processed accordingly. To ensure product integrity and maintain the **product warranty**, all **surface mount** transformers listed in this data sheet require a 24 hour bake at +125°C prior to any solder reflow processing. Baked transformers must be reflowed within 24 hours. J-STD-033 preconditioning (dry-pack) can be provided by BETA upon request.

2) By providing surface mount parts that have been dried per IPC-9503 (Moisture Sensitivity Classification for Non-IC components) and Dry-Packed in accordance with J-STD-033 (Standard for handling, packing, shipping and use of Moisture/Reflow sensitive surface mount devices), Beta has significantly reduced the possibility of moisture sensitivity/reflow induced "Pop-corning" or Bulging during customer's reflow soldering process. Experiments performed by Beta and data provided by manufacturers of similar devices indicate that post reflow visual/mechanical anomalies can be reduced by more than 90%. Since customer reflow profiles and CCA density can vary, Beta recommends that the customer verify solder process compatibility and yield assessment of these devices.

The information in this data sheet is believed to be accurate; however, no responsibility is assumed by Beta Transformer Technology Corporation for its use, and no license or rights are granted by implication or otherwise in connection therewith.
Specifications are subject to change without notice.

Visit our web site at **www.bttc-beta.com** for the latest information.

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