



Transformers

Transformers: Board Layout

Q. Other than the rules concerning no planes above or below the transformers, as well as the 1553 analog signals going to and from them, what other considerations are there regarding the placement of 1553 transformers?

A. It is advantageous for the 1553 transformers to be located as close as possible to the connector(s) where the 1553 signals leave the board.

It is desirable that the connections from the transformer primaries (Mini-ACE™ side) center taps to your 5V RETURN (presumably the ground plane) to be as thick as possible, since these will be conducting large currents when transmitting, up to about 600 to 800 mA. The traces from the Mini-ACE™ Tx/Rx-A(B) pins to the transformer will need to conduct the same current, but at 50% duty cycle, or in the range of 250 to 300 mA, when transmitting. The traces from the transformer secondary to the 1553 stub will conduct up to about 200 to 250 mA.

Transformers: ESD

Q. What is the effect of the BUS-29854 isolation transformer on a 1553 terminal's ESD immunity?

A. The transformer **improves** the ESD immunity of the overall 1553 terminal. By definition, a 1553 BC or RT terminal consists of both the analog/digital circuitry (e.g., the BU-61582X2) **and** the isolation transformers.

A MIL-STD-1553 coupling transformer is required to exhibit a minimum common mode rejection ratio of 45 dB at 1 MHz. Since the isolation transformers that comprise part of the 1553 terminals are similarly constructed (in some cases, they're the same transformer), they will generally have the same common mode rejection characteristics.

Assuming that the ESD disturbance is applied between one of the 1553 stub (or bus) conductors and ground (which is generally the case), the transformers' common mode rejection will, in effect, increase the ESD immunity of the overall terminal.

Q. The Mini-ACE™ data sheet mentions transformers B-3226 (through-hole) and B-3227 (SMT) on sheet 4. We've been using the double-stacked TST-9007. Are all of these correct? Are there any new, smaller, shorter or perhaps surface-mount transformers?

A. For Mini-ACE™ and Enhanced Mini-ACE™, all of the transformers that you list have the correct turns ratios of 1:2.5 direct-coupled, or 1:1.79 transformer (stub)-coupled. The B-3226 is a single through-hole transformer, 0.63 X 0.63, with a max height of 0.250". B-3227 is also a 0.63 X 0.63 single surface mount transformer, but with a max height of 0.275". TST-9007 is a dual transformer, 0.625 X 0.625, max height of 0.280".

Beta Transformer Technology Corporation (BTTC), a subsidiary of DDC, manufactures transformers in a variety of mechanical configurations with the required turns ratio. The table below provides a listing of many of these. For additional information, contact BTTC at 631-244-7393 or www.btcc-beta.com.

BTTC Transformers for Use with Mini-ACE™ (Plus) and Enhanced Mini-ACE™	
Transformer Configuration	BTTC Part No.
Single epoxy transformer, through-hole, 0.625 X 0.625, 0.250" max height	B-3226
Single epoxy transformer, flat pack, 0.625" X 0.625", 0.275" max height	B-3231
Single epoxy transformer, surface mount, 0.625" X 0.625", 0.275" max height	B-3227
Single epoxy transformer, flat pack, 0.625" X 0.625", 0.150" max height	LPB-5014
Single epoxy transformer, surface mount, 0.625" X 0.625", 0.150" max height	LPB-5015
Dual epoxy transformer, twin stacked, 0.625" X 0.625", 0.280" max height	TST-9007
Dual epoxy transformer, twin stacked, surface mount, 0.625" X 0.625", 0.280" max height	TST-9017
Dual epoxy transformer, twin stacked, flat pack, 0.625" X 0.625", 0.280" max height	TST-9027
Dual epoxy transformer, side by side, through-hole, 0.930" X 0.630", 0.155 max height	TLP-1205
Dual epoxy transformer, side by side, flat pack, 0.930" X 0.630", 0.155 max height	TLP-1105

height	
Dual epoxy transformer, side by side, surface mount, 0.930" X 0.630", 0.155 max height	TLP-1005
Single epoxy transformer, twin stacked, flat pack, 0.750" X 0.750", 0.130" max height	SLP-8024
Single epoxy transformer, twin stacked, surface mount, 0.750" X 0.750", 0.130" max height	SLP-8007
Single metal transformer, flat pack, 0.630" X 0.630", 0.175" max height	HLP-6014
Single metal transformer, surface mount, 0.630" X 0.630", 0.175" max height	HLP-6015

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