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#### INTRODUCTION

#### Description

TE Connectivity's (TE) Sliver passive copper cable assembly is a robust and flexible cabling solution for internal interconnects. Due to the lower loss characteristics of copper cable, Sliver cabling reduces overall power requirements and extends the reach for high data rate signals inside networking equipment. TE's Sliver cable solution lowers overall costs by eliminating re-timers required to compensate for lossy PCB traces as well as more costly, lower loss PCB laminates.

Sliver cable assemblies are offered in fine gage 33AWG low loss primary pairs and flat ribbon cable. The Sliver connector design is scalable in 4x increments and is available in straight and right angle plug configurations to mate with right angle and vertical board mount connectors. These connector styles offer a broad range of cable to board mating flexibility.

Sliver cables are designed for applications in the data center, networking and telecommunications markets that use Ethernet, PCIe, InfiniBand, SAS and other signal protocols. Sliver cables and connectors are compatible with all types and speeds of microprocessors, and enable many interconnection configurations such as chip-to-chip, chip-to-front/rear panel, chip-to-backplane and a vertical card edge option.

#### **Features and Benefits**

- · Compatible with many different industry standards and protocols
- Supports speeds from 12G to 25Gbps per channel
- Enables less expensive PCB material and electronics, with higher channel performance
- · Optimized construction to minimize insertion loss and cross talk
- Supports all types and speeds of microprocessors
- High density 0.6mm contact pitch
- Connector designed to be scalable from 4x to 20x
- · Active press to release stainless steel latch
- 33AWG low loss 25GHz primary pairs or 12GHz flat ribbon cable
- · RoHS compliant

#### **Product Applications**

- Switches, servers and routers
- Data Center networks
- Storage area networks
- High performance computing
- · Telecommunication and wireless infrastructure

#### **Industry Standards**

- 10G / 25G Ethernet
- PCIe Gen 3 / Gen 4
- QPI Intel QuickPath Interconnect
- SAS 3.0 / 4.0
- InfiniBand QDR / FDR / EDR
- SATA

#### **Technical Documents**

Product Specification 108-32115 Sliver Cable Assembly

#### **PART NUMBERS**

**Table 1. Part Number Selection Guide** 

			50 position		74 position		
Part Description	Data Rate	Impedance	Bulk Cable	0.5 Meter	1 Meter	0.5 Meter	1 Meter
Straight Cable Plugs	25G	85	Discrete pairs	2821742-1	2821742-2	2821376-1	2821376-2
Right Angle Cable Plugs	25G	85	Discrete pairs	2821743-1	2821743-2	2821745-1	2821745-2
Straight-to-Right Angle Plugs	25G	85	Discrete pairs	2821744-1	2821744-2	2821746-1	2821746-2
Straight Cable Plugs	25G	100	Discrete pairs	2821750-1	2821750-2	2821756-1	2821756-2
Right Angle Cable Plugs	25G	100	Discrete pairs	2821751-1	2821751-2	2821757-1	2821757-2
Straight-to-Right Angle Plugs	25G	100	Discrete pairs	2821752-1	2821752-2	2821758-1	2821758-2
Straight Cable Plugs	12G	85	Ribbon	2820397-1	2820397-2	2820396-1	2820396-2
Right Angle Cable Plugs	12G	85	Ribbon	2820399-1	2820399-2	2821385-1	2821385-2
Straight-to-Right Angle Plugs	12G	85	Ribbon	2821638-1	2821638-2	2821639-1	2821639-2
Straight Cable Plugs	12G	100	Ribbon	2821747-1	2821747-2	2821753-1	2821753-2
Right Angle Cable Plugs	12G	100	Ribbon	2821748-1	2821748-2	2821754-1	2821754-2
Straight-to-Right Angle Plugs	12G	100	Ribbon	2821749-1	2821749-2	2821755-1	2821755-2

<sup>\*</sup>Discrete pairs are optional for 12G platform

Contact TE for customized lengths

#### **PRODUCT SPECIFICATIONS**

**Table 2. Material Specifications** 

PCB	Halogen Free low loss laminate	
. 32	IPC Class 3	
Contact	30µin min hard Gold plated contact pads	
Connector housing	Polycarbonate (Lexan)	
Active latch	Stainless steel	
	Silver plated copper conductor	
Discrete Cable	Fluoropolymer dielectric	
District Gabie	Metallic tape pair shield	
	Polyester tape jacket	
	Silver plated copper conductor	
Laminated Cable	Tinned copper drain wire	
Laminated Capie	Al-mylar pair shield	
	PET Outer Wrapping	

Table 3. Electrical/Mechanical Specifications - Discrete Primary Pair Cable Assembly

Impedance	100Ω
impedance	85Ω
Data Rate	25Gbps per channel
Within Pair Skew	100 ohm = 7 ps/m
Within Fall Skew	85 ohm = 10 ps/m
Rated Voltage	30V
Rated Current	0.5A per pin
Durability	250 mating cycles
Mating Force	50 pos = 10N
Mating Force	74 pos = 15N

#### Table 4. Electrical/Mechanical Specifications – Laminated Ribbon Cable Assembly

Impedance	100Ω
impodunoc	85Ω
Data Rate	12Gbps per channel
Within Pair Skew	10ps/m
Rated Voltage	30V
Rated Current	0.5A per pin
Durability	250 mating cycles
Moting Force	50 pos = 10N
Mating Force	74 pos = 15N

#### **Table 5. Environmental Specifications**

Storage Temperature	-40° to 80°C
Operating Temperature 0° to 80°C	
Flammability Rating	CL2 (Discrete Pair)
Flaminability Kating	VW-1 (Ribbon Cable)
Safety Certificates	RoHS compliant

**Table 6. Discrete Primary Pair Cable Specifications** 

Bend Radius	4.5mm (good way bend)	
Cable Dimensions 33AWG 85Ω	Thickness = .64 mm	
Cable Differsions 33AWG 6312	Width per pair = 1.09 mm	
	5 GHz = 5.2 dB/m	
Attenuation 33AWG 85Ω	12.89 GHz = 8.6 dB/m	
	20 GHz = 11.4 dB/m	
	25 GHz = 13.8 dB/m	
Cable Dimensions 33AWG 100Ω	Thickness = .71 mm	
Cable Differsions 33AWG 10012	Width per pair = 1.24 mm	
	5 GHz = 4.3 dB/m	
Attenuation 33AWG 100Ω	12.89 GHz = 7.4 dB/m	
	20 GHz = 9.9 dB/m	
	25 GHz = 11.9 dB/m	

**Table 7. Laminated Ribbon Cable Specifications** 

Bend Radius	3mm
	Thickness = 0.65 mm
Cable Dimensions 33AWG 85Ω	Width 8 pair = 13.97mm
	Width 12 pair = 21.17mm
	5 GHz = 5.4dB/m
Attenuation 33AWG 85Ω	7 GHz = 6.7dB/m
	10 GHz = 9.1dB/m
	Thickness = 0.75 mm
Cable Dimensions 33AWG 100Ω	Width 8 pair = 13.97mm
	Width 12 pair = 21.17mm
	5 GHz = 5.4dB/m
Attenuation 33AWG 100Ω	7 GHz = 6.7dB/m
	10 GHz = 9.1dB/m

## **PIN CONFIGURATIONS**

#### **Sliver 50 Position**

1-1	P 1	-1.	P 2
	্ৰ	GND	25
2412	2	$\triangleleft$	24
PAJR 1	3	$\triangleleft$	23
18	4	GND	22
PAIR 2	5	$\triangleleft$	21
raik Z	6	<b>←</b> ⊳	20
39	7	GND	19
DA1D 2	8	$\rightarrow$	18
PAIR 3	9	$\leftarrow$	17
7.5 V3	10	GND	16
PAIR 4	11	$\leftarrow$	15
FAIR 4	12	$\rightarrow$	14
- 30	13	GND	13
PAIR 5	1.4	$\rightarrow$	12
WIN 2	15	$\forall$	11
- 32	16	GND	10
PAIR 6	17	$\leftarrow$	9
AIR 0	18	$\leftarrow$	8
- CS	19	GND	7
PAIR 7	20	$\triangleleft$	6
AIR (	21	$\forall$	5
33	22	GND	4
PAIR 8	23	$\triangleleft$	3
АЛК О	24	$\triangleleft$	2
35	25	GND	31

	P1		P2
	26	GND	50
DATE	27	$\forall -$	49
PAIR 9	28	$\triangleleft$ — $\triangleright$	48
	29	GND	47
0.4.7.01.0	30	$\triangleleft$ — $\triangleright$	46
PAIR 10	31	<>	45
	32	GND	44
14.TO 11	33	$\forall$	43
PAIR II	34	$\leftarrow$	42
	35	GND	41
DATE 12	36	$\triangleleft$ — $\triangleright$	40
PAIR 12	37	$\triangleleft$ — $\triangleright$	39
	38	GND	38
DATE 13	39	$\forall$ — $\Diamond$	37
PAIR 13	40	$\triangleleft$ — $\triangleright$	36
	41	GND	35
PAIR 14	42	$\triangleleft$ — $\triangleright$	34
PAIK 14	43	$\Diamond$	33
	44	GND	32
PAIR 15	45	<>	31
PAIK 13	46	$\triangleleft$	30
	47	GND	29
DATE 16	48	$\triangleleft$ — $\triangleright$	28
PAIR 16	49	$\triangleleft$ — $\triangleright$	27
	50	GND	26

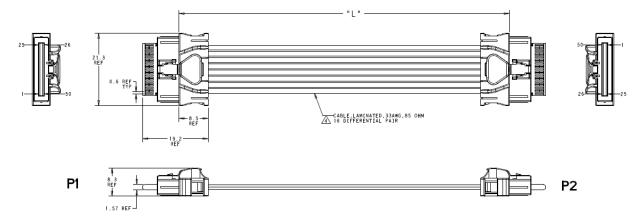
#### **Sliver 74 Position**

0	P 1	33	P2
	1	GND	37
DATE	2	$\triangleleft \longrightarrow \triangleright$	36
PAIR 1	3	$\triangleleft$ — $\triangleright$	35
	4	GND	34
DATE 2	5	$\triangleleft$ — $\triangleright$	33
PAIR 2	6	$\triangleleft$ — $\triangleright$	32
13	7	GND	31
24.7.0.2	8	$\triangleleft$ — $\triangleright$	30
PAIR 3	9	<>	29
	10	GND	28
	11	<>	27
PAIR 4	12	<>	26
	13	GND	25
	14	$\triangleleft$	24
PAIR 5	15	$\triangleleft \rightarrow$	23
	16	GND	22
	17	$\triangleleft \rightarrow$	21
PAIR 6	18	$\Diamond$	20
	19	GND	19
	20	<>	18
PAIR 7	21	$\triangleleft - \triangleright$	17
	22	GND	16
	23	$\Diamond$	15
PAIR 8	24	<>	14
	25	GND	13
	26	$\triangleleft \rightarrow$	12
AIR 9	27	$\triangleleft \rightarrow$	- 11
	28	GND	10
	29	4—▷	9
A]R 10	30	<>	8
	31	GND	7
	32	< → >	6
A1R 11	33	$\triangleleft \rightarrow$	5
0.	34	GND	4
410.40	35	<>	3
A]R 12	36	4→>	2
	37	GND	1

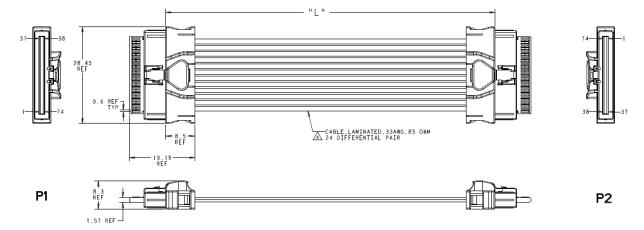
	P1		P 2
	38	GND	74
DATE 12	39	$\triangleleft$ — $\triangleright$	73
PAIR 13	40	$\Diamond - \Diamond$	72
	41	GND	71
DATE 14	42	$\triangleleft \longrightarrow \triangleright$	70
PAIR 14	43	$\Diamond$	69
1	44	GND	68
DATE 15	45	$\Diamond$	67
PAIR 15	46	$\Diamond$	66
	47	GND	65
DATE LC	48	$\triangleleft \longrightarrow \triangleright$	64
PAIR 16	49	$\leftarrow$	63
	50	GND	62
DATE 17	51	< →	61
PAIR 17	52	$\leftarrow$	60
1	53	GND	59
PAIR 18	54	$\triangleleft \rightarrow$	58
TAIR TO	55	$\Diamond - \Diamond$	57
	56	GND	56
DATE IA	57	$\Diamond$	55
PAIR 19	58	$\leftarrow$	54
	59	GND	53
DATE 20	60	$\Diamond \!$	52
PAIR 20	61	$\Diamond$	51
1	62	GND	50
PAIR 21	63	$\Diamond$	49
AIR ZI	64	$\Diamond$	48
100	65	GND	47
DATE 22	66	$\Diamond \rightarrow$	46
PAIR 22	67	$\leftarrow$	45
1	68	GND	44
PAIR 23	69	< →	43
LHIE 53	70	$\leftarrow$	42
97	71	GND	41
PAIR 24	72	$\Diamond$	40
FAIR 24	73	$\leftarrow$	39
	7.4	GND	38

#### SLIVER CABLE ASSEMBLY MECHANICAL SCHEMATICS

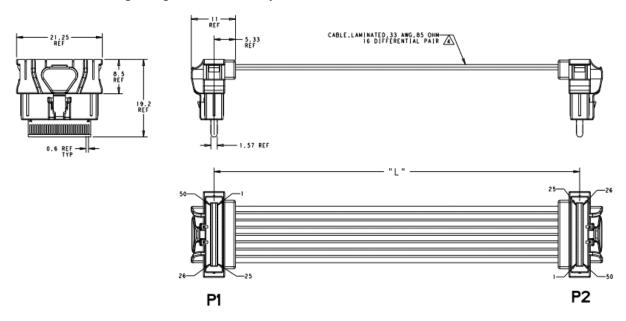
#### Sliver 50 Position Straight Cable Assembly



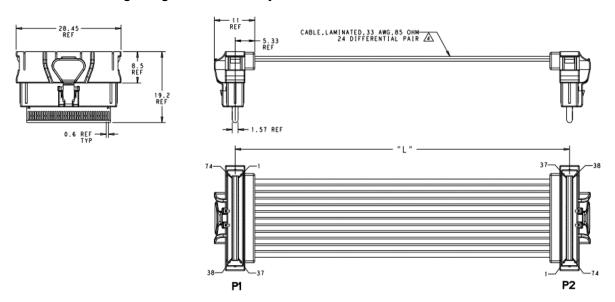
### Sliver 74 Position Straight Cable Assembly



### Sliver 50 Position Right Angle Cable Assembly

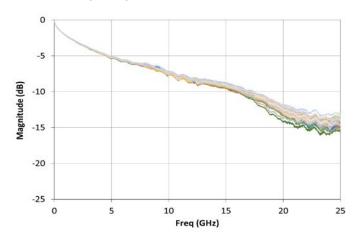


#### Sliver 74 Position Right Angle Cable Assembly

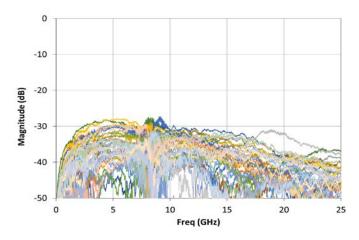


#### SIGNAL INTEGRITY PERFORMANCE

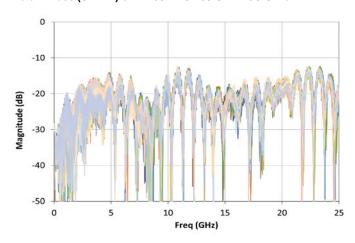
Insertion Loss (SDD21) of 1m 33AWG 100 Ohm 25G Sliver



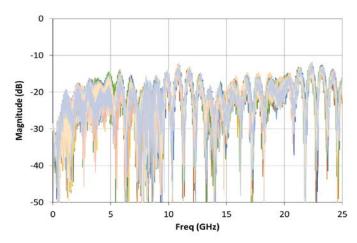
#### Mode Conversion (SCD21) of 1m 33AWG 100 Ohm 25G Sliver



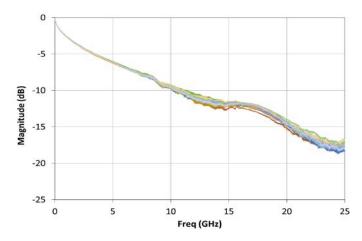
#### Return Loss (SDD11) of 1m 33AWG 100 Ohm 25G Sliver



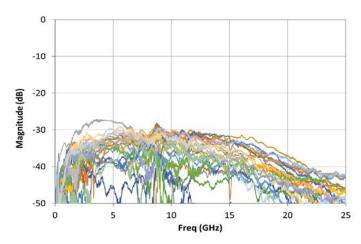
## Return Loss (SDD22) of 1m 33AWG 100 Ohm 25G Sliver



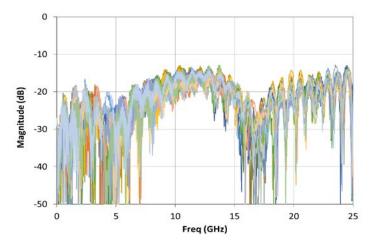
#### Insertion Loss (SDD21) of 1m 33AWG 85 Ohm 25G Sliver



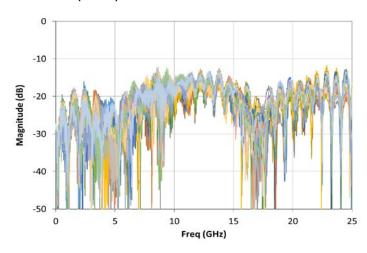
#### Mode Conversion (SCD21) of 1m 33AWG 85 Ohm 25G Sliver



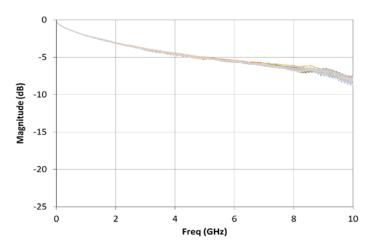
## Return Loss (SDD11) of 1m 33AWG 85 Ohm 25G Sliver



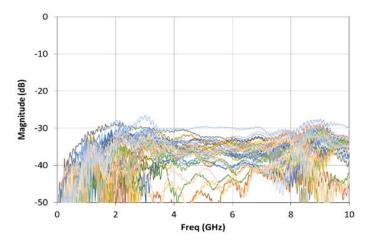
#### Return Loss (SDD22) of 1m 33AWG 85 Ohm 25G Sliver



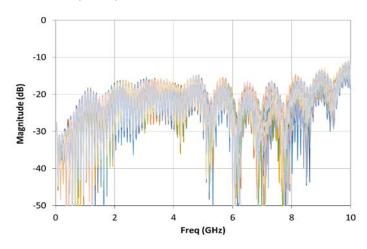
#### Insertion Loss (SDD21) of 1m 33AWG 100 Ohm 12G Sliver



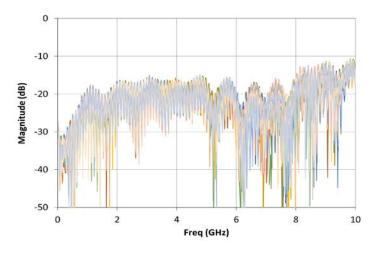
## Mode Conversion (SCD21) of 1m 33AWG 100 Ohm 12G Sliver



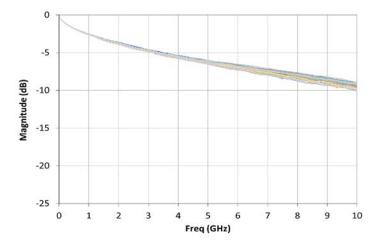
## Return Loss (SDD11) of 1m 33AWG 100 Ohm 12G Sliver



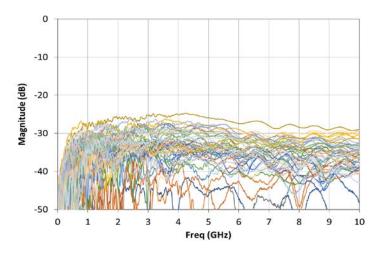
#### Return Loss (SDD22) of 1m 33AWG 100 Ohm 12G Sliver



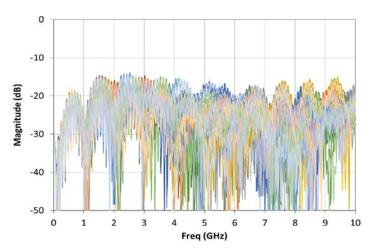
#### Insertion Loss (SDD21) of 1m 33AWG 85 Ohm 12G Sliver



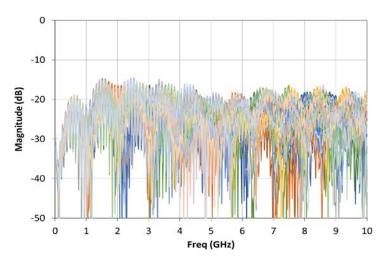
#### Mode Conversion (SCD21) of 1m 33AWG 85 Ohm 12G Sliver



#### Return Loss (SDD11) of 1m 33AWG 85 Ohm 12G Sliver



#### Return Loss (SDD22) of 1m 33AWG 85 Ohm 12G Sliver



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