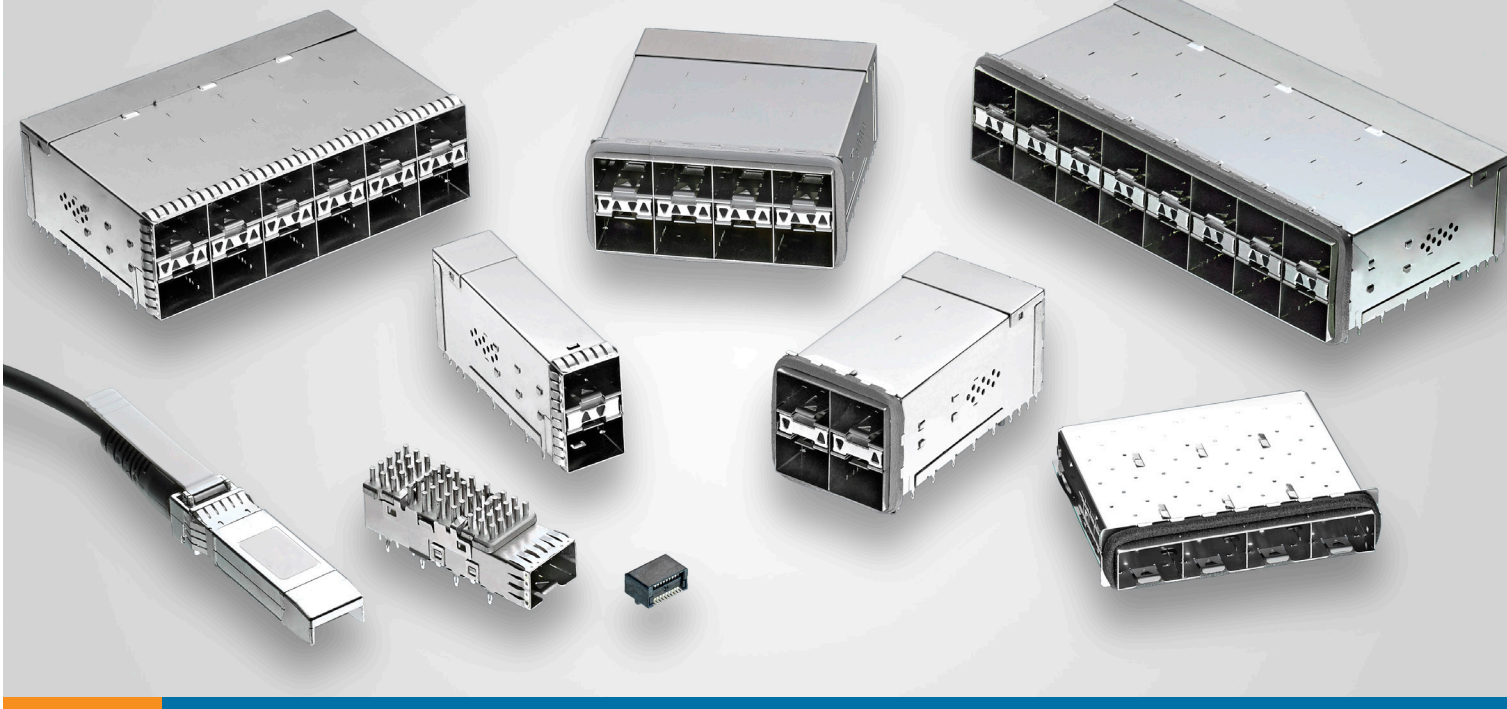




## zSFP+ PLUGGABLE I/O INTERCONNECT

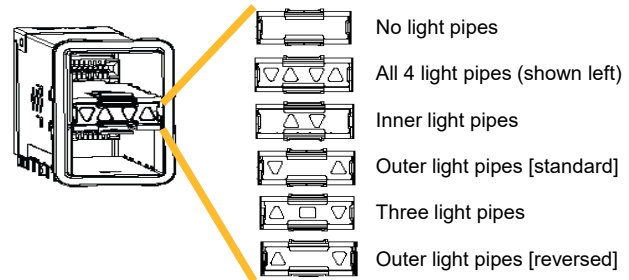
The zSFP+ interconnect is currently one of the fastest single-channel I/O connectors on the market today, transferring data at 28 Gbps NRZ and 56 Gbps PAM-4. Through a design that is backward-compatible to SFP/SFP+ products, the interconnect is hotswappable with existing SFP+ connectors for fast system upgrades of 28-56 Gbps. Alternatively, users can design-in the zSFP+ connector for 10-16 Gbps data rates, establishing a progressive path to higher speeds—an upgradeability that can result in longterm cost savings as this would eliminate the need to fully redesign for higher performance.

The zSFP+ interconnect is compliant to SFF-8402 and has been adopted for Fibre Channel 32G (28.05 Gbps line rate). The entire product family is offered as a dual source option with Molex. LLC.

### FEATURES

- Data rates: Up to 28 Gbps NRZ and 56 Gbps PAM-4, 10
- Gbps Ethernet and 16 Gbps Fibre Channel
- Surface-mount connector design for single high 1xN cages
- Press-fit 1xN cages and stacked assemblies (connector and cage) for one-step, easy PCB placement
- Coupled, narrow-edged, blanked- and formed-contact beam geometry and insert molding for superior signal integrity, mechanical and electrical performance
- Backwards-compatibility: Shares same mating interface and cage dimensions with the SFP+ connector (connector/single high cages are also PCB footprint-compatible)
- Elastomeric gasket or spring finger options for EMI containment
- Single high cages (1xN) for design flexibility; accommodates belly-to-belly applications for increased density and PCB space savings; available in 1x1, 1x2, 1x3, 1x4 or 1x6 port configurations
- Stacked assemblies offered in 2x1, 2x2, 2x4, 2x6, 2x8 or 2x12 port
- Heat sinks, LEDs and plating choices offered
- Additional light pipe configurations available

Light pipe options include:



### APPLICATIONS

- **Telecommunications:** Cellular infrastructure, central office uplink equipment, optical transport equipment, switches/routers, access equipment (CMTS, PON, DSL, etc)
- **Data Center:** Data center switches and routers, servers, storage
- **Medical:** Medical diagnostic equipment
- **Networking:** Network interface, switches, routers
- **Test and Measurement Equipment**

## 20-Pin Surface-Mount Connector

### Electrical

- Voltage (max.): 120V AC
- Current (max.): 0.5A
- Dielectric Withstanding Voltage: 300V AC between contacts



### Mechanical

- Mating Force: 25N
- Unmating Force: 11.5N
- Durability (min.): 250 cycles

### Physical

- High-temperature thermoplastic housing (glass-filled, UL 94V-0 black)
- High-performance copper alloy contacts
- Plating:
  - Nickel underplating; Tin plating on solder tail area; Gold plating on mating area
  - Plating options: 15 and 30µ" Gold or Palladium Nickel
- Operating Temperature: -40 to +85°C



Follow IEEE802.3 cd (including trace)

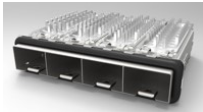
## zSFP+ Pluggable I/O Interconnect

| Connector P/N | Description                      |
|---------------|----------------------------------|
| 2170088-1     | 30μ" in Au or Au Flash Over PdNi |
| 2170088-2     | 15μ" in Au or Au Flash Over PdNi |



Follow IEEE802.3 cd ( including trace)

### Cages with Elastomeric Gaskets



| EMI Suppression | Light Pipe Option | 1X1        | 1X2       | 1X4       | 1X6       | 1X8   |
|-----------------|-------------------|------------|-----------|-----------|-----------|-------|
| EMI gasket      | No                | 2198709-1* | 2198720-1 | 2198722-1 | 2198724-1 | TBD** |
|                 | Yes               | 2198708-1* | 2198719-1 | 2198721-1 | 2198723-1 | TBD** |

### Cages with EMI Springs



| EMI Suppression    | Light Pipe Option | Heat Sink Option | 1X1                          | 1X2       | 1x3       | 1X4       | 1X6       | 1X8                    |
|--------------------|-------------------|------------------|------------------------------|-----------|-----------|-----------|-----------|------------------------|
| EMI Spring Fingers | No                | No               | 2274001-1<br>2291579-1 (PCI) | 2227728-1 | 2349050-1 | 2227730-1 | 2227732-1 | 2304921-1<br>2295325-6 |
|                    | Yes               | No               | 2274000-1                    | 2227727-1 | TBD**     | 2227729-1 | 2227731-1 | TBD**                  |
|                    | Yes               | Yes              | TBD*                         | TBD**     | TBD**     | 2304342-X | 2293156-X | 2294408-X              |

### zSFP+ 3 Row Belly-to-Belly Application



| Configuration | 1X2       | 1x4       |
|---------------|-----------|-----------|
| Part Number   | 2317010-1 | 2300275-1 |

\*Tooling in process \*\*Not yet tooled, but planned

## Ganged 1xN Cages

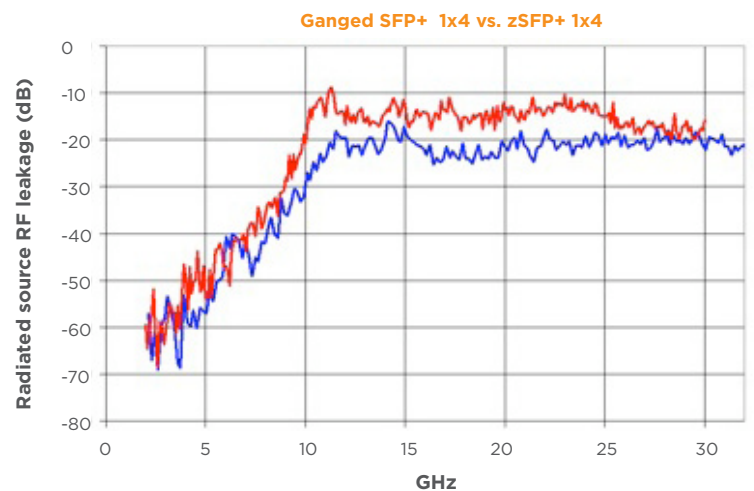
### Mechanical

- Transceiver insertion force (max.): 34 N without heat sink and clip; 45.37 N with heat sink and clip
- Transceiver extraction force (max.): 12.5 N without heat sink and clip; 14.36 N with heat sink and clip
- SFP+ module to surface-mount connector and zSFP+ cage.
- Cage press fit insertion force (max.): 44.5 N for single port cage, 54.3 N for ganged cage
- Cage press fit extraction force (min.): 8.9 N for single port and ganged cages
- Durability (min.): 100 cycles

### Physical

- Cage material: Nickel Silver
- PCB thickness (min.): 1.50mm in single sided applications; 2.25mm (EMI springs) or 3.0mm (elastomeric gasket) in belly-to-belly applications
- Operating Temperature: -40 to +85°C

Ganged SFP+ 1x4 —  
Ganged zSFP+ 1x4 —



## Stacked 2xN Assemblies

### Electrical

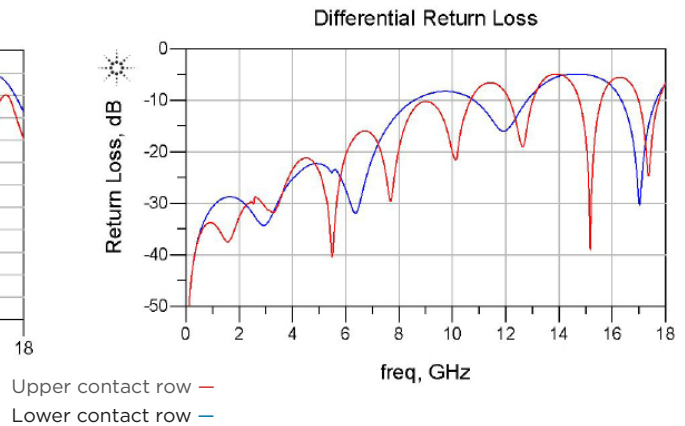
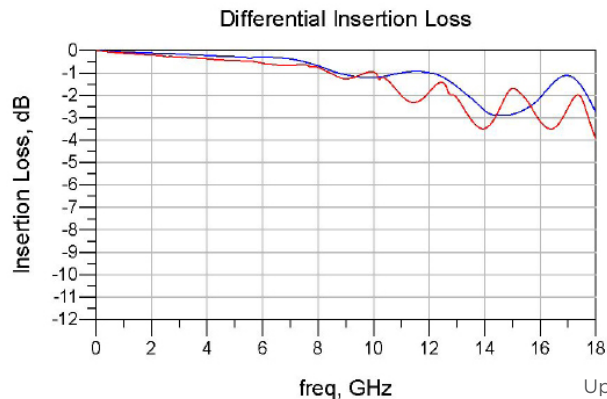
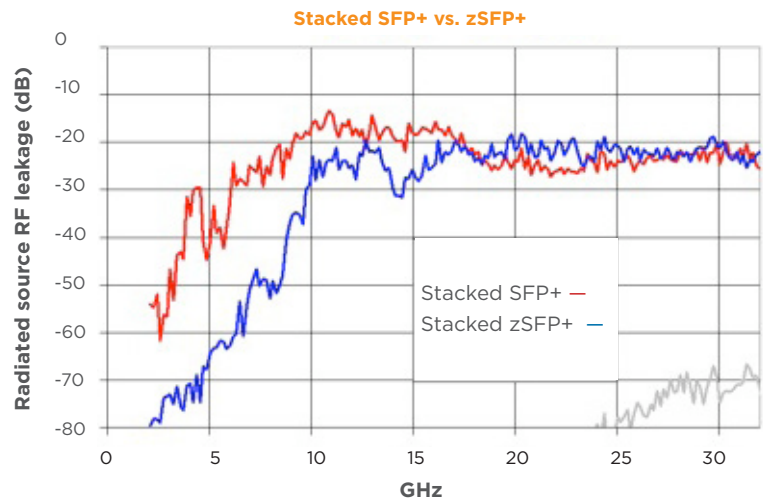
- Voltage (max.): 120V AC
- Current (max.): 0.5A
- Dielectric Withstanding Voltage: 300V AC between contacts

### Mechanical

- Durability (min.): 100 cycles

### Physical

- Cage material: Nickel Silver
  - High-temperature thermoplastic housing (glass-filled, UL 94V-0 black)
  - High-performance copper alloy contacts
  - Plating: Nickel underplating; Tin plating on solder tail area; 30µ" Gold plating on mating area
- PCB thickness (min.): 1.57mm
- Operating Temperature: -40 to +85°C



## zSFP+ Stacked Interconnects SFP28 PN list

| EMI Suppression    | Performance        | Light Pipe Configuration | 2x1         | 2x2         | 2x4         | 2x6         | 2x8         | 2x12                   |
|--------------------|--------------------|--------------------------|-------------|-------------|-------------|-------------|-------------|------------------------|
|                    |                    |                          | 2198318-(x) | 2198325-(x) | 2180324-(x) | 2198339-(x) | 2198346-(x) | 2288172-(x)            |
| EMI gasket         | Standard           | None                     | 2198318-1   | 2198325-1   | 2180324-1   | 2198339-1   | 2198346-1   | 2288172-1              |
|                    |                    | All 4                    | 2198318-2   | 2198325-2   | 2180324-2   | 2198339-2   | 2198346-2   | 2288172-2              |
|                    |                    | Inner                    | 2198318-3   | 2198325-3   | 2180324-3   | 2198339-3   | 2198346-3   | 2288172-3              |
|                    |                    | Outer                    | 2198318-4   | 2198325-4   | 2180324-4   | 2198339-4   | 2198346-4   | 2288172-4              |
|                    |                    | 3                        | 1-2198318-7 | 1-2198325-7 | 1-2180324-7 | 1-2198339-7 | 1-2198346-7 | 1-2288172-7            |
|                    |                    | Outer (reversed)         | 1-2198318-8 | 1-2198325-8 | 1-2180324-8 | 1-2198339-8 | 1-2198346-8 | 1-2288172-8            |
|                    | Thermally Enhanced | Multiple                 | --          | --          | 3-2180324-0 | --          | --          | 2227838-8              |
| EMI spring fingers | Standard           | None                     | 2198318-5   | 2198325-5   | 2180324-5   | 2198339-5   | 2198346-5   | 2288172-5              |
|                    |                    | All 4                    | 2198318-6   | 2198325-6   | 2180324-6   | 2198339-6   | 2198346-6   | 2288172-6              |
|                    |                    | Inner                    | 2198318-7   | 2198325-7   | 2180324-7   | 2198339-7   | 2198346-7   | 2288172-7              |
|                    |                    | Outer                    | 2198318-8   | 2198325-8   | 2180324-8   | 2198339-8   | 2198346-8   | 2288172-8              |
|                    |                    | 3                        | 1-2198318-9 | 1-2198325-9 | 1-2180324-9 | 1-2198339-9 | 1-2198346-9 | 1-2288172-9            |
|                    |                    | Outer (reversed)         | 2-2198318-0 | 2-2198325-0 | 2-2180324-0 | 2-2198339-0 | 2-2198346-0 | 2-2288172-0            |
|                    | Thermally Enhanced | Multiple                 | --          | --          | 3-2180324-1 | 2291491-1   | --          | 2227838-7<br>2301210-2 |

## zSFP+ Pluggable I/O Interconnect

### zSFP+ Stacked Interconnects SFP56 PN list

| Tooled             | NOT YET TOOLED, BUT PLANNED       |                              |             |             |             |             |             |             |
|--------------------|-----------------------------------|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| EMI Suppression    | Performance                       | Light Pipe                   | 2x1         | 2x2         | 2x4         | 2x6         | 2x8         | 2x12        |
| EMI gasket         | Standard                          | NONE                         | 2349202-1   | 2343522-1   | 2339978-1   | 2347721-1   | 2340033-1   | 2349201-1   |
|                    |                                   | INNER/OUTER                  | 2349202-2   | 234522-2    | 2339978-2   | 2347721-2   | 2340033-2   | 2349201-2   |
|                    |                                   | INNER                        | 2349202-3   | 2343522-3   | 2339978-3   | 2347721-3   | 2340033-3   | 2349201-3   |
|                    |                                   | OUTER                        | 2349202-4   | 2343522-4   | 2339978-4   | 2347721-4   | 2340033-4   | 2349201-4   |
|                    |                                   | CENTER/<br>REVERSED<br>OUTER | 1-2349202-7 | 1-2343522-7 | 1-239978-7  | 1-2347721-7 | 1-2340033-7 | 1-2288172-7 |
|                    |                                   | REVERSED<br>OUTER            | 1-2349202-8 | 1-2343522-8 | 1-2339978-8 | 1-2347721-8 | 1-2340033-8 | 1-2349201-7 |
|                    | Airflow Enhanced                  | NONE                         |             |             | 3-2339978-0 | 3-2347721-0 | 3-2340033-0 | 1-2349201-8 |
|                    |                                   | INNER                        | --          | --          |             |             | 3-2340033-2 |             |
| EMI spring fingers | Standard                          | NONE                         | 2349202-5   | 234522-5    | 2339978-5   | 2347721-5   | 2340033-5   | 2349201-5   |
|                    |                                   | INNER/OUTER                  | 2349202-6   | 2343522-6   | 2339978-6   | 2347721-6   | 2340033-6   | 2349201-6   |
|                    |                                   | INNER                        | 2349202-7   | 2343522-7   | 2339978-7   | 2347721-7   | 2340033-7   | 2349201-7   |
|                    |                                   | OUTER                        | 2349202-8   | 2343522-8   | 2339978-8   | 2347721-8   | 2340033-8   | 2349201-8   |
|                    |                                   | CENTER/<br>REVERSED<br>OUTER | 1-2349202-9 | 1-2343522-9 | 12339978-9  | 1-2347721-9 | 1-2340033-9 | 1-2349201-9 |
|                    |                                   | REVERSED<br>OUTER            | 2-2349202-0 | 2-2343522-0 | 2-2339978-0 | 2-2347721-0 | 2-2340033-0 | 2-2349201-0 |
|                    |                                   | REVERSED<br>INNER            |             |             | --          | 2-2347721-1 | --          | --          |
|                    | Airflow Enhanced                  | NONE                         | -           | 3-2343522-3 | 3-2339978-1 | 3-2347721-1 | 3-2340033-1 | 2-2349201-1 |
|                    |                                   | CENTER/<br>REVERSED<br>OUTER | -           | -           | 3-2339978-2 | -           | -           | -           |
|                    |                                   | OUTER                        | -           | -           | 3-2339978-3 | -           | -           | -           |
|                    |                                   | REVERSED<br>OUTER            | -           | -           | -           | -           | -           | -           |
|                    | Airflow Enhanced & Insulator Tape | NONE                         | -           | -           | 3-2339978-4 | -           | 3-2340033-3 | 2-2349201-2 |
|                    | Top Cage Heatsink Opening         | NONE                         | -           | -           | -           | -           | 4-2340033-0 | -           |

### zSFP+ Stacked Belly-to-Belly

| Configuration | 2x4       | 2x12      |
|---------------|-----------|-----------|
| Part Number   | 2357514-1 | 2357518-1 |



### SFP28 Direct Attach Copper Cable Assemblies

TE's SFP28 passive copper cable assembly features two differential copper pairs, providing one data transmission channel at speeds up to 28Gbps per channel that meets 25G Ethernet performance requirements. SFP28 is designed for applications in the data center, networking and telecommunications markets that require a high speed, reliable cable assembly,

Offered in a broad range of wire gages – from 26AWG through 33AWG – this next generation copper cable assembly features low insertion loss and low cross talk. TE's SFP28 assemblies share the same mating interface with SFP+ form factors, making it backward compatible with existing SFP+ I/O ports. SFP28 can be used with legacy 10G Ethernet and 16G Fibre Channel applications with substantial signal integrity margin.

In addition to SFP28 straight cables, TE offers break out assemblies with a 100G QSFP28 module on one end breaking out to four SFP28 modules on the opposite end of the assembly. In-line SI based production testing ensures that each cable assembly meets the electrical performance requirements of the applicable industry standard specification.

#### Features and Benefits

- Compatible with IEEE 802.3by and Fibre Channel industry standards
- Supports single lane data rate up to 28 Gbps
- Optimized construction to minimize insertion loss and cross talk
- Customized cable braid termination limits EMI radiation
- Backward compatible with existing SFP+ form factor connectors and cages
- Pull-to-release latch design
- 30AWG through 32AWG cable
- Straight and breakout cable assembly configurations available
- Customizable EEPROM mapping for cable signature
- RoHS compliant

#### Industry Standards

- 25G Ethernet (IEEE 802.3by)
- Fibre Channel
- SFF-8402 SFP+ 1X 28Gb/s Pluggable Transceiver Solution (SFP28)
- SFF-8665 QSFP+ 28G 4X Pluggable Transceiver Solution (QSFP28)



SFP28 to SFP28 Straight Cable Assembly



QSFP28 to 4x SFP28 Breakout Cable Assembly

#### SFP28 Part Number Detail

| Base Part Number | Description                          | AWG | Dash to Length (meters) |    |     |     |     |    |    |
|------------------|--------------------------------------|-----|-------------------------|----|-----|-----|-----|----|----|
|                  |                                      |     | 0.5                     | 1  | 1.5 | 2   | 3   | 4  | 5  |
| 2821262          | SFP28 to SFP28 Straight Assembly     | 33  | -1                      | -2 | -3  | -4  |     |    |    |
| 2821222          |                                      | 30  | -5                      | -3 |     | -2  | -1  |    |    |
| 2821223          |                                      | 28  |                         |    |     | -2  | -1  | -3 |    |
| 2821224          |                                      | 26  |                         |    |     |     | -1  | -2 | -3 |
| 2821033          | QSFP28 to 4x SFP28 Breakout Assembly | 33  |                         | -8 |     |     |     |    |    |
|                  |                                      | 30  |                         | -1 |     | -10 | -2  |    |    |
|                  |                                      | 28  |                         |    |     |     | -4  |    |    |
|                  |                                      | 26  |                         |    |     |     | -12 | -5 | -3 |

Contact your TE Representative for customized lengths.

## For More Information

[te.com/products/zsfp+](http://te.com/products/zsfp+)

## TE Technical Support Center

|                   |                       |
|-------------------|-----------------------|
| USA:              | +1 (800) 522-6752     |
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| Latin/S. America: | +54 (0) 11-4733-2200  |
| Germany:          | +49 (0) 6251-133-1999 |
| UK:               | +44 (0) 800-267666    |
| France:           | +33 (0) 1-3420-8686   |
| Netherlands:      | +31 (0) 73-6246-999   |
| China:            | +86 (0) 400-820-6015  |

Part numbers in this brochure are RoHS Compliant\*, unless marked otherwise.

\*as defined [www.te.com/leadfree](http://www.te.com/leadfree)

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