Rev	Date	Modified by	Description
A0	2023		

Product Specifications

2.5Gb/s SFP 1550nm 120km Optical Transceiver Module

PN: ES5524-3LCD120

Features

- Up to 2.5Gb/s data links
- 1550nm DFB laser transmitter and APD photo-detector
- Up to 120km on 9/125μm SMF
- Hot-pluggable SFP footprint
- Duplex LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS-10 compliant and lead-free
- Support Digital Diagnostic Monitoring interface
- Single +3.3V power supply
- Compliant with SFF-8472
- Case operating temperature
  Commercial: 0 ~ +70°C
  Extended: -20 ~ +85°C
  Industrial: -40 ~ +85°C

Applications

- Switch to Switch Interface
- 1xFiber/2xFiber channel Application
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	T_S	-40	85	°C	
Power Supply Voltage	V_{CC}	-0.3	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	TH_d	0		dBm	

Recommended Operating Conditions and Power Supply Requirements

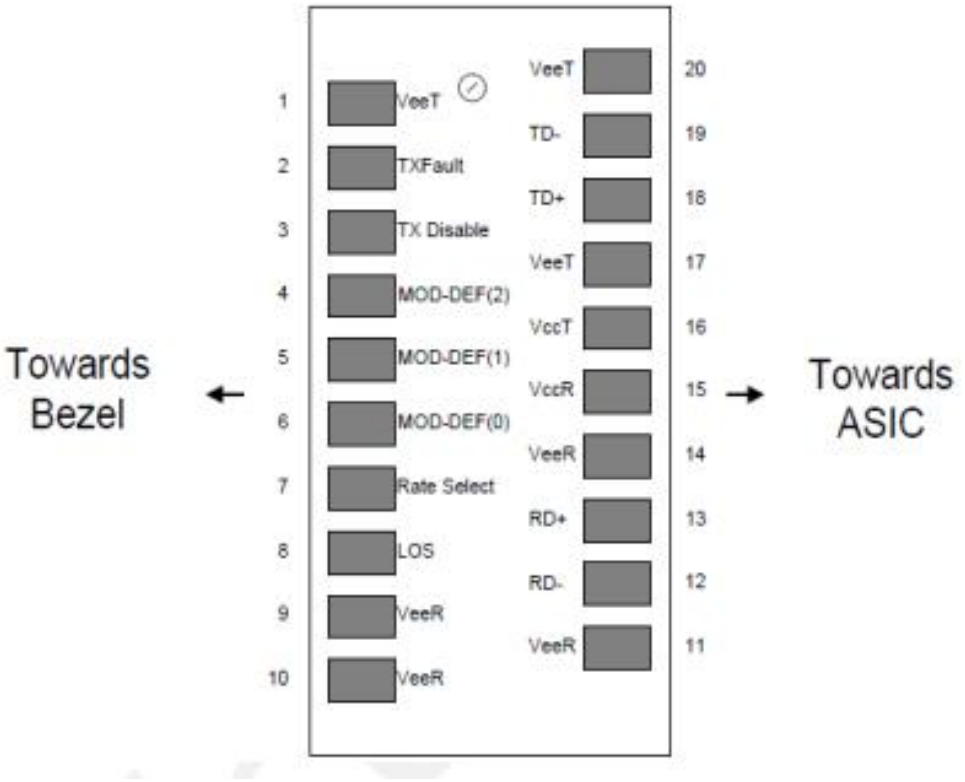
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T_{OP}	0		70	°C	commercial
		-20		85		extended
		-40		85		industrial
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Data Rate			2.5		Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			120	km	9/125um

Description

ES5524-3LCD120 Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser and the APD photo-detector .The module data link up to 120km in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Pin Assignment and Pin Description



PIN	Name	Name/Description	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TXFAULT	Transmitter Fault.	
3	TXDIS	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	VEER	Receiver Ground (Common with Transmitter Ground)	1
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATAout. AC Coupled	

13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.

2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

3. Should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF

(0) pulls line low to indicate module is plugged in.

4. This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:

1) Low (0 – 0.8V): Reduced Bandwidth 2) (>0.8, < 2.0V): Undefined

3) High (2.0 – 3.465V): Full Bandwidth

4) Open: Reduced Bandwidth

5) LOS is open collector output should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Specification of Transmitter Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Power Consumption	p			0.95	W	commercial
				1.00		Industrial

Supply Current	Icc			280	mA	commercial
				300		Industrial
Transmitter						
Single-ended Input Voltage Tolerance	V_{CC}	-0.3		4.0	V	
Differential Input Voltage Swing	Vin,pp	200		2400	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Transmit Disable Assert Time				5	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	Ven	Vee-0.3		0.8	V	
Receiver						
Differential Output Voltage Swing	Vout,pp	500		900	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	
Data output rise/fall time	Tr/Tf		100		ps	20% to 80%
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	
LOS De-assert Voltage	VlosL	Vee-0.3		0.8	V	

Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1530	1550	1570	nm	
Spectrum Bandwidth(RMS)	σ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	P_{AVG}	1		6	dBm	1
Optical Extinction Ratio	ER	8.2			dB	

Transmitter OFF Output Power	POff			-45	dBm	
Transmitter Eye Mask		Compliant with G.957(class 1 laser safety)				
Receiver						
Center Wavelength	λ_C	1270		1610	nm	
Receiver Sensitivity (Average Power)	Sen.			-30	dBm	2
Input Saturation Power (overload)	Psat	-10			dBm	
LOS Assert	LOSA	-41			dB	3
LOS De-assert	LOSD			-31	dBm	3
LOS Hysteresis	LOSH	0.5	2	6	dBm	

Notes:

1.Measure at 2^23-1 NRZ PRBS pattern

2.Measured with Light source 1550nm, ER=8.2dB; BER =<10^-12 @PRBS=2^23-1 NRZ

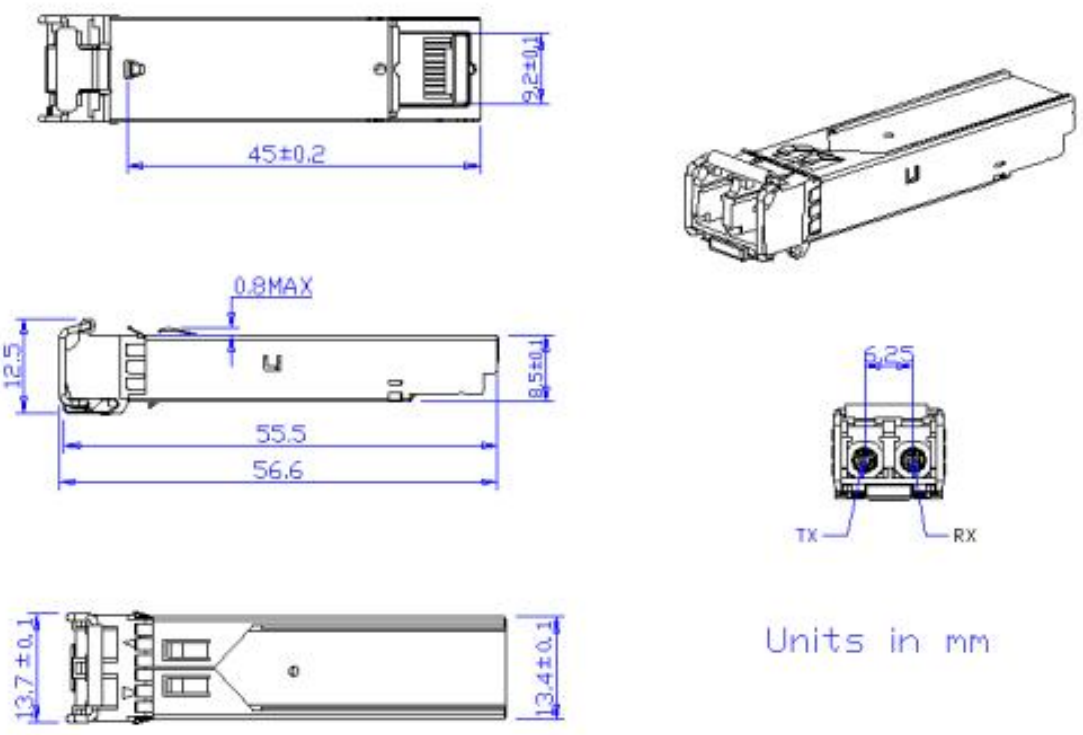
3.When LOS de-asserted, the RX data+/- output is High-level (fixed).

Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales staff.

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor	DMI _ Temp	-3	3	degC	Over operating temp
Supply voltage monitor	DMI _ VCC	-0.15	0.15	V	Full operating range
RX power monitor	DMI _ RX	-3	3	dB	
Bias current monitor	DMI _ bias	-10%	10%	mA	
TX power monitor	DMI _ TX	-3	3	dB	

Mechanical Specifications



Precautions

1. This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

2. Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

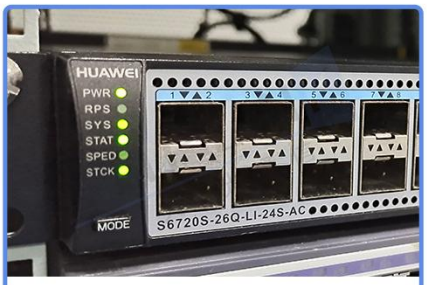
Ordering information

Part Number	Description
ES5524-3LCD120	2.5 SFP 1550nm 120KM LC DDM 0 to +70°C
ES5524-3LED120	2.5 SFP 1550nm 120KM LC DDM -20 to +85°C
ES5524-3LID120	2.5 SFP 1550nm 120KM LC DDM -40 to +85°C

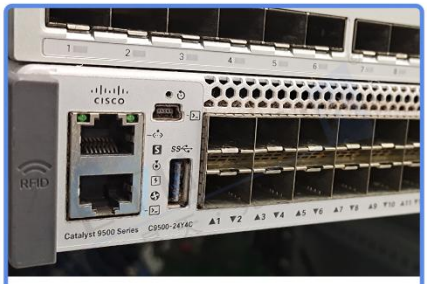
Compatibility Test

In order to ensure the product compatibility, our products will be tested on the switch before shipment. Our modules can compatible with many mainstream brand switches, such as Cisco, Juniper, Extreme, Brocade, IBM, H3C, HP, Huawei, D-Link, Mikrotik, ZTE, TP-Link...

Our test equipment: VOLKTEK MEN-4110, HP 2530-8G, CRS226-24G-25+RM, Catalyst 2960G Series, Catalyst 3850 XS 10G SFP+, Catalyst 3750-E Series, HUAWEI S5700Series, H3C S3100V2 Series, Juniper-EX4200, etc.



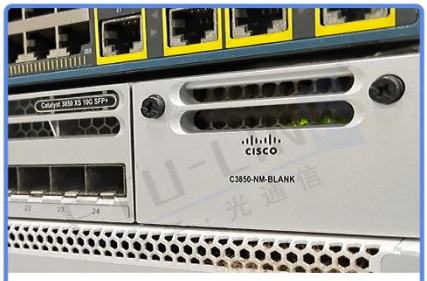
HUAWEI S6720S



CISCO Catalyst 9500

DELL S5048F

H3C S3100V2

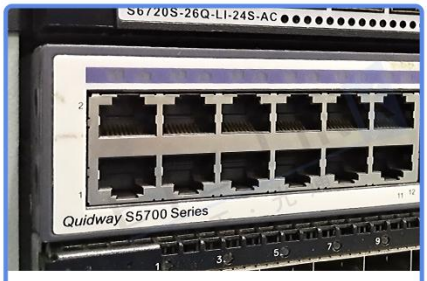


CISCO C3850

Aruba 2930F

Juniper EX 4200

HP J9264A

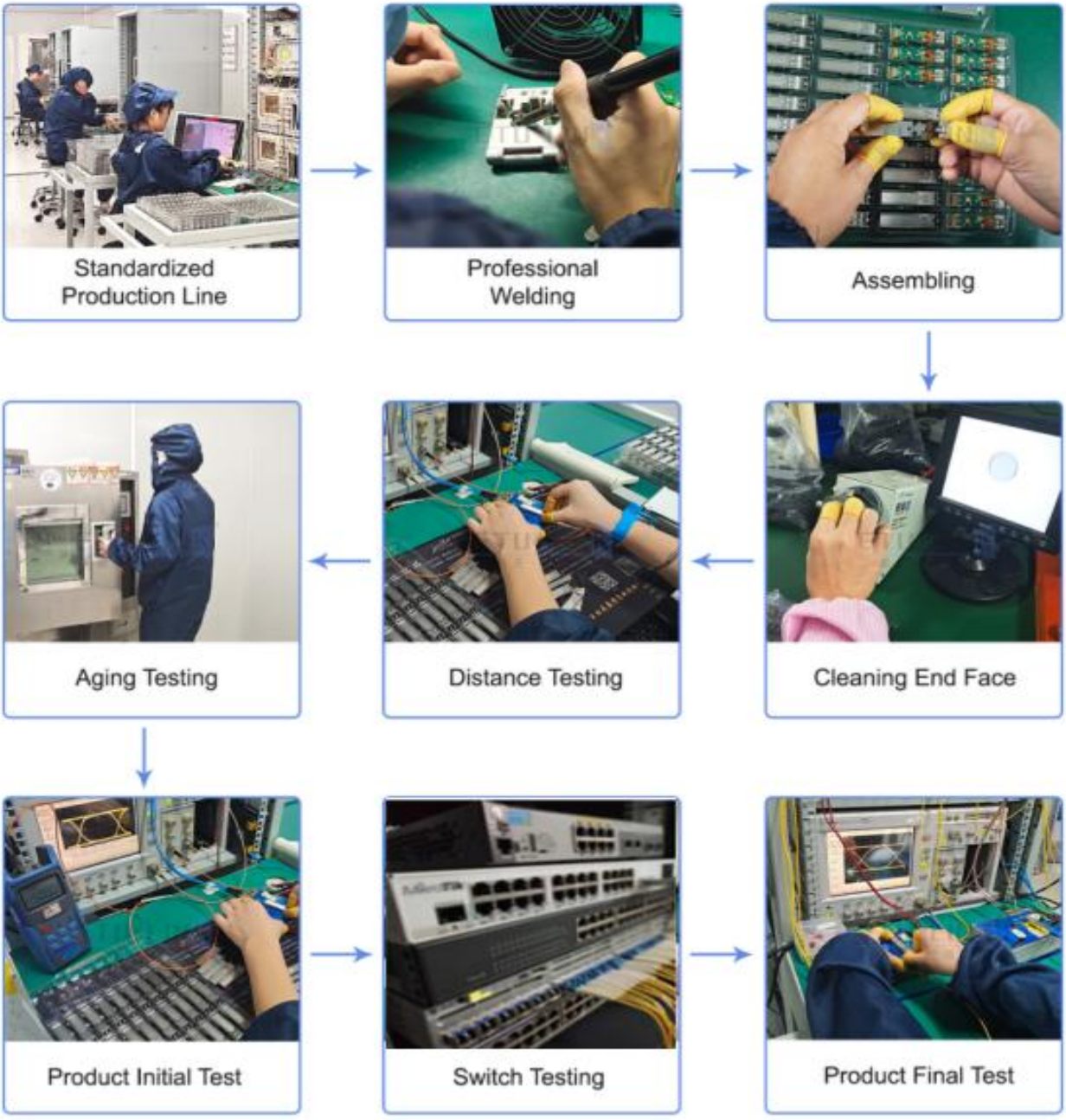


Quidway S5700

Product Production Process

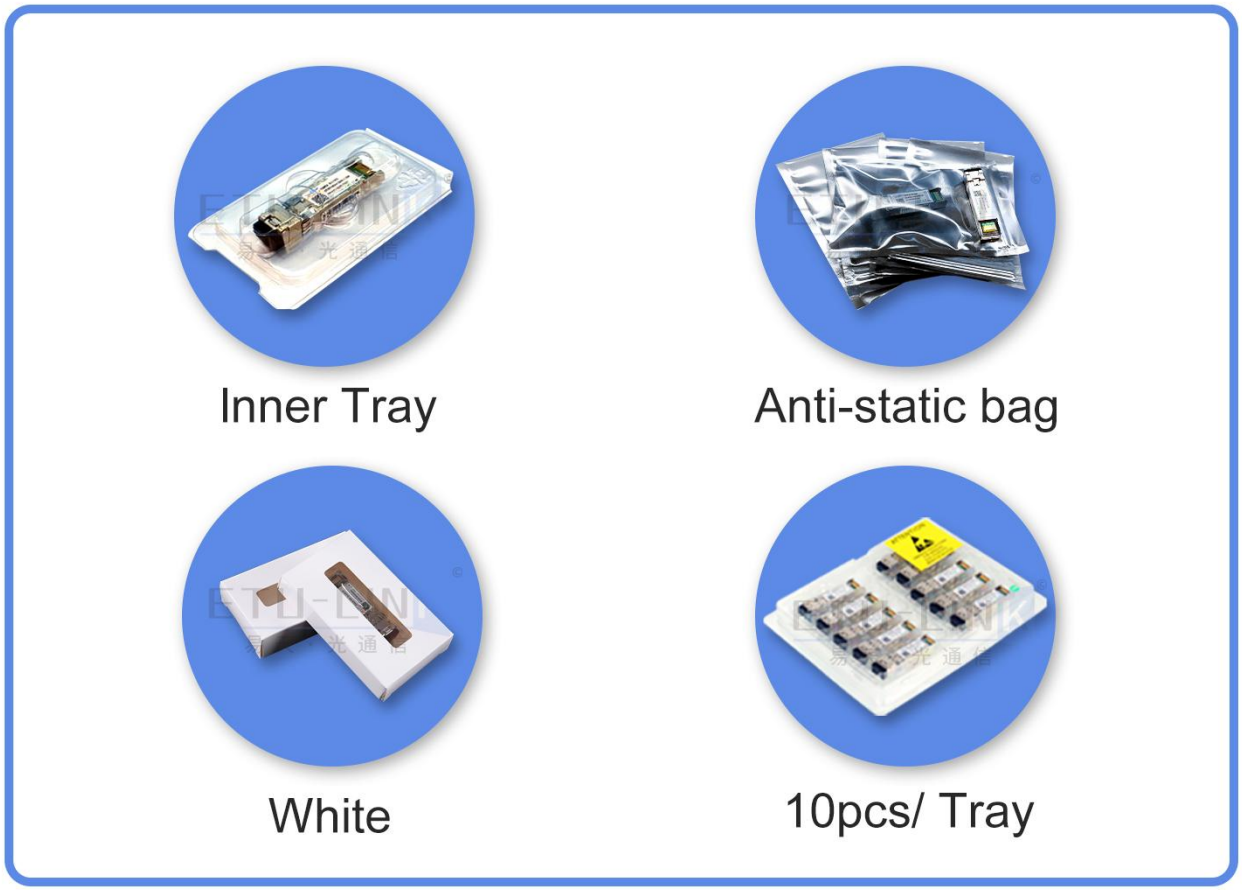
Quality Assurance

Continuous introduction of new equipment,
produced by strictstandards,strict quality inspection,
to guarantee the high quality,standard of each product.



Packaging

ETU-Link provides two kinds of packaging, 10pcs/Tray and individual package.



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