

## SFP Transceivers

### 1-Gb/s Multimode Modules

258-SFPA1G041K5 SFP Transceiver Module, SFP, 1Gb/s, LC, 850nm, 500m, DDM

#### CHARACTERISTICS

Applications:	1.25-Gb/s 1000BASE-SX Ethernet; 1.0625-Gb/s Fibre Channel, dual-rate.
Performance:	data transmission rate: 1.0625 Gb/s (Fibre Channel, 1GFC (Gen 1), FC-PI-2 Rev. 7.0); 1.25 Gb/s (Gigabit Ethernet, IEEE 802.3);
	bit error rate: $10^{-12}$ max;
	transmission distance, 50- $\mu$ m MM: 550 m max (1.25-Gb/s Ethernet); 300 m max (1.0625-Gb/s Fibre Channel);
	transmission distance, 62.5- $\mu$ m MM: 300 m max (1.25-Gb/s Ethernet); 150 m max (1.0625-Gb/s Fibre Channel).
General construction:	format: SFP footprint;
	light source: 850-nm oxide VCSEL;
	plugging: hot-pluggable;
	connector type: duplex LC;
	encasing: metal, EMI-screening;
Electrical:	power supply: single.
	supply voltage <sup>1</sup> (Vcc): 3.0 V–3.6 V;
	limit supply voltage: min: -0.5 V; max: 4.0 V;
	supply current: 150 mA–240 mA.
	TRANSMITTER:
	input differential impedance <sup>2</sup> : 100 Ohm;
	single-ended data input swing <sup>3</sup> : 250 mV–1200 mV;
	transmit disable voltage <sup>4</sup> : 2 V–Vcc;
	transmit enable voltage: Vee–Vee+0.8 V.
	RECEIVER:
	single-ended data output swing <sup>5</sup> : min: 250 mV; typ: 450 mV; max: 550 mV;
	data output rise and fall time <sup>6</sup> : 175 ps max;
	mask margin: 45 %;
	LOS fault <sup>7</sup> : min: 2 V; max: VccHOST;
	LOS normal <sup>7</sup> : min: Vee; max: Vee+0.5 V;
power supply rejection <sup>8</sup> : 100 mVpp min;	
deterministic jitter contribution <sup>9</sup> : 51.7 ps max;	
total jitter contribution <sup>10</sup> : typ: <65 ps; max: 122.4 ps.	
Optical:	TRANSMITTER:
	output optical power <sup>11</sup> : -9 dBm–-3 dBm;
	optical wavelength: 830 nm–860 nm;
	spectral width: 0.85 nm max;
	optical modulation amplitude <sup>12</sup> : 156 $\mu$ W min @ 1.0625 Gb/s;
	optical rise/fall time <sup>13</sup> : typ: 100 ps; max: 150 ps;
	relative intensity noise: -120 dB/Hz;
	deterministic jitter contribution <sup>14</sup> : typ: 20 ps; max: 56.5 ps;
	total jitter contribution <sup>15</sup> : typ: <65 ps; max: 119 ps;
	extinction ratio: 9 dB min @ 1.25 Gb/s;
	mask margin: 45 % typ.
	RECEIVER:
	receiver sensitivity: -20 dBm <sup>16</sup> max @ 1.0625 Gb/s; -20 dBm <sup>17</sup> max @ 1.25 Gb/s;
	stressed receiver sensitivity: 0.055 mW <sup>18</sup> min @ 1.0625 Gb/s; -13.5 dBm <sup>19</sup> max @ 1.25 Gb/s;
	average receiver power: 0 dBm max;
electrical 3-dB cutoff frequency: 1500 MHz max;	
optical center wavelength: 770 nm–860 nm;	
optical return loss: 12 dB min;	
LOS de-assert: -20 dBm max;	
LOS assert: -30 dBm min;	
LOS Hysteresis: 0.5 dB min.	
Environmental:	case operating temperature: 0 °C–70 °C (32 °F–158 °F); storage temperature: -40 °C–85 °C (-40 °F–185 °F); operating humidity: 85 % RH max, non-condensing.
Mechanical:	dimensions comply with the SFP Multi-Source Agreement (MSA) specifications.
Compliance:	IEEE Std 802.3, Clause 38, PMD Type 1000BASE-SX; Fibre Channel Physical Interface Specification (FC-PI-2 Rev. 7.0); European Directive 2002/95/EC (RoHS).
Compatibility:	Cisco Systems tagged.



- <sup>1</sup> Maximum pull-up voltage – 5.5 V.
- <sup>2</sup> Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
- <sup>3</sup> <600 mV recommended for best EMI performance.
- <sup>4</sup> Or open circuit.
- <sup>5</sup> Into 100-Ohm differential termination.
- <sup>6</sup> 20 %–80 %.
- <sup>7</sup> LOS is an open collector output. Should be pulled up with 4.7 kOhm–10.0 kOhm on the host board. Normal operation is logic 0; loss of signal is logic 1.
- <sup>8</sup> Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz–15 MHz up to specified value applied through the recommended power supply filtering network.
- <sup>9</sup> Typical peak-to-peak jitter (6<sup>th</sup>RMS[width of jitter]).
- <sup>10</sup> Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and  $\Delta$  DJ.
- <sup>11</sup> Class 1 Laser Safety per FDA/CDRH, IEC, and EN60825-1 laser safety standards.
- <sup>12</sup> Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
- <sup>13</sup> Unfiltered, 20 %–80 %. Complies with FC 1x and 2x eye mask when filtered.
- <sup>14</sup> Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and  $\Delta$  DJ.
- <sup>15</sup> If measured with TJ-free data input signal.
- <sup>16</sup> Specifications are for 50- $\mu$ m or 62.5- $\mu$ m optical fiber.
- <sup>17</sup> As measured with 9-dB extinction ratio.
- <sup>18</sup> Measured with conformance signals defined in FC-PI-2 Rev. 7.0 specifications.
- <sup>19</sup> Measured with conformance signals defined in IEEE 802.3 specifications.

