# Technical Specification
# for
# Optical Transmitter Module

## SDT8262-T_-Q_

| | | |
|---|---|---|
| ☐ 155.52Mb/s | ☑ 622.08Mb/s | ☐ other _____ |
| ☐ Short Haul Intermediate Reach | ☑ Long Haul Long Reach | ☐ other _____ |
| ☑ Single 5.0 V | ☐ Single 3.3 V | ☐ other _____ |
| ☐ 1.3 µm | ☑ 1.55 µm | ☐ other _____ |
| ☑ Transmitter | ☐ Receiver | ☐ Transceiver |
| | ( ☐ 2R / ☐ 3R ) | ( ☐ 2R / ☐ 3R ) |

SUMITOMO ELECTRIC

SUMITOMO Electric reserves the right to make changes in the specification described hereinafter without prior notice.

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#Safety Precaution Symbols This specification uses various picture symbols to prevent possible injury to operator or other persons or damage to properties for appropriate use of the product. The symbols and definitions are as shown below. Be sure to be familiar with these symbols before reading this specification.

| | |
|---|---|
| ⚠ Warning | Wrong operation without following this instruction may lead to human death or serious injury. |
| ⚠ Caution | Wrong operation without following this instruction may lead to human injury or property damage. |

Example of picture symbols
- ❗ indicates prohibition of actions. Action details are explained nearby.
- ⃠ indicates compulsory actions or instructions. Action details are explained near by.

# 1. General

SDT8262-T_-Q_ is a compact and high speed performance digital optical transmitter module ideally designed for versatile high speed network applications, including SDH STM-4 L-4.2 and SONET OC-12 LR-2, LR-3. This module also meets GR-253-CORE requirement and ITU-T G. 957 / G. 958 recommendation.

| | |
|---|---|
| * Data Rate | 622.08 Mbps, NRZ |
| * Duty Cycle | 50% |
| * Power Supply Voltage | Single +5.0V (or -5.0V) |
| * Electrical Interface | PECL (or ECL) |
| * Laser Diode | 1550nm InGaAsP / InP, DFB-LD |
| * Fiber Coupled Power | -3 ~ +2dBm |
| * Pin Configuration | 20 pin Dual in Line |
| * Connector Interface | SC / FC Optical Connector |

The features of SDT8262-T_-Q_ are listed below.

* Features
  - Low Power Consumption
  - Plastic Molded Package
  - Multi-sourced Footprint
  - Uncooled Laser with Automatic Power Control IC
  - Optical Output Shut-down ( Disable )
  - Laser Bias Current Monitor / Rear Facet Monitor
  - Class 1 Laser Product (IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11)

# 2. Block Diagram

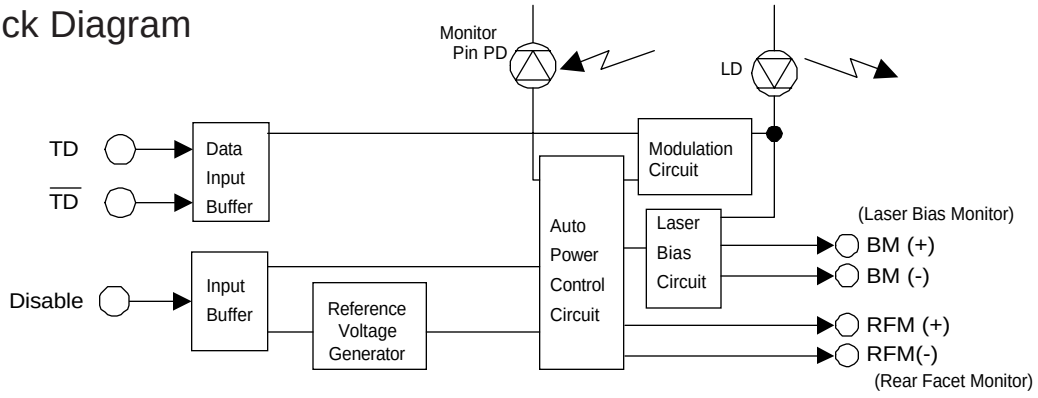



Figure 1. Block Diagram

# 3. Package Dimension

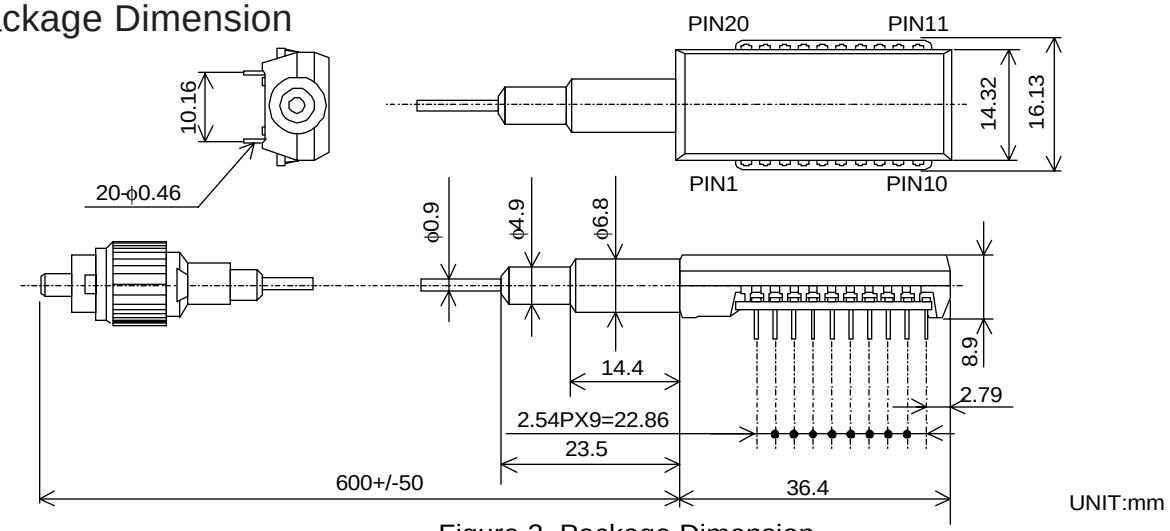



Figure 2. Package Dimension

## ⚠Caution

Do not disassemble this product. Otherwise, failure, electrical shock overheating or fire may occur.
Handle the lead pin carefully. Use assisting tools or prospective aids as required. A lead pin may injure skin or human body

## 4. Pin Assignment

| Function | Symbol | No. | | No. | Symbol | Function |
|---|---|---|---|---|---|---|
| Non Connection* | NC | 1 | | 20 | NC | Non Connection* |
| LD Bias Current Monitor (Refer to Fig. 3) | BM (+) | 2 | | 19 | RFM (+) | Rear Facet Current Monitor (Refer to Fig.3) |
| Non Connection* | NC | 3 | | 18 | Vcc | Power Supply (+)** |
| LD Bias Current Monitor (Refer to Fig. 3) | BM (-) | 4 | | 17 | RFM (-) | Rear Facet Current Monitor (Refer to Fig.3) |
| Power Supply (-)** | Vee | 5 | | 16 | TD | Differential Data Input (Positive) |
| Power Supply (+)** | Vcc | 6 | | 15 | $\overline{TD}$ | Differential Data Input (Negative) |
| LD Disable Input (Refer to Section 9) | Disable | 7 | | 14 | Vee | Power Supply (-)** |
| Power Supply (+)** | Vcc | 8 | | 13 | NC | Non Connection* |
| Power Supply (+)** | Vcc | 9 | | 12 | Vcc | Power Supply (+)** |
| Non Connection. | NC | 10 | | 11 | NC | Non Connection* |

*NC pins are not connected to the internal circuit, and should be left open for additional functions in the future.
**When single +5V would be supplied, please connect Vcc to +5V and Vee to GND.
Else when single -5V would be supplied, please connect Vcc to GND and Vee to -5V.

## 5. Absolute Maximum Ratings

| Parameter | Symbol | min. | Max | Unit | Note |
|---|---|---|---|---|---|
| Storage Case Temperature | Ts | -40 | 85 | °C | 1 |
| Operating Case Temperature | Tc | 0 | 70 | °C | 1, 2 |
| | | -40 | 85 | °C | 1, 3 |
| Supply Voltage | Vcc-Vee | 0.0 | 7.0 | V | 4 |
| Input Voltage | Vi | Vee | Vcc+0.5 | V | 5 |
| Lead Soldering (Temperature) | | | 260 | °C | 6 |
| (Time) | | | 10 | sec. | |

Note 1. No condensation allowed. 2. SDT8262-T_-QN 3. SDT8262-T_-QW 4. Vcc>Vee, Vcc=+5.0V, Vee=GND
5. TD, $\overline{TD}$, Disable 6. Measured on lead pin at 2mm (0.079in.) off the package bottom

## 6. Electrical Interface

( Unless otherwise specified, Vcc-Vee = 4.75 to 5.25 V and all operating temperature shall apply. )

| Parameter | | Symbol | min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|
| Supply Voltage | | Vcc-Vee | 4.75 | 5.00 | 5.25 | V | |
| Supply Current | | Idtx | | 90 | 200 | mA | 1, 2, 3 |
| Input Voltage | High | Vih | Vcc-1.17 | | Vcc-0.73 | V | 4, 5 |
| TD, $\overline{TD}$ | Low | Vil | Vcc-1.95 | | Vcc-1.45 | | |
| Input Current | High | Iih | -10 | | 150 | µA | 4, 5 |
| TD, $\overline{TD}$ | Low | Iil | -10 | | 10 | | |
| Signal Input Rise / Fall Time | | | | | 0.5 | nsec. | 6 |
| Disable Input Voltage | | Vdi | Vee+2.0 | | Vcc | V | 7 |
| Disable Input Current | | Idi | -10 | | 200 | µA | |
| LD Bias Monitor Voltage | | Vbm | 0.01 | | 0.50 | V | 5, 8 |
| Rear Facet Monitor Voltage | | Vrfm | 0.01 | | 0.20 | V | 5, 8 |

Note 1. Input bias current is not included. 2. 50% duty cycle data 3. 622.08Mbps 4. Vcc-Vee=5.0V 5. Tc=25°C 6. 20~80% 7. The transmitter is enabled as default state and requires an external voltage only to disable. (Refer to Section 9. Relation between Disable Input Voltage and Optical Output Power ) 8. The Laser Bias and Rear Facet Monitor currents are calculated as ratios of the corresponding voltages to their current-sensing resistors, 10Ω and 200Ω, respectively (See Figure 3). Upon measuring or utilzing these values, please use a device whose impedance is high enough (>1MΩ) compared with those resistors.

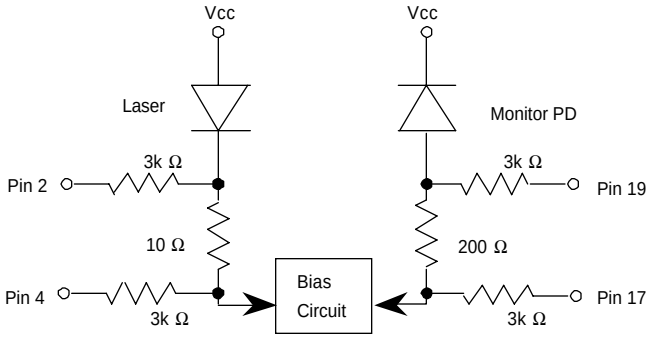



Figure 3 Monitor Circuit Schematic Diagram

### ⚠ Caution

Do not store the product in the area where temperature exceeds the maximum rating, where there is too much moisture or dampness, where there is acid gas or corrosive gas, or other extreme conditions. Otherwise, failure, overheating or fire may occur.

### ⚠ Warning

Use the product with the rated voltage described in the specification. If the voltage exceeds the maximum rating, overheating or fire may occur.

# 7. Optical Interface

( Unless otherwise specified, Vcc-Vee = 4.75 to 5.25 V and all operating temperature shall apply. )

| Parameter | Symbol | min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Average Output Power | Po | - 3.0 | | 2.0 | dBm | 1 |
| Extinction Ratio | Er | 10.0 | | | dB | 1 |
| Center Wavelength | λc | 1480 | | 1580 | nm | |
| Spectral Width (RMS) | Δλ | | | 1.0 | nm | |
| Side Mode Suppresion Ratio | Rs | 30.0 | | | dB | |
| Eye Mask for Optical Output | Refer to Figure 4 | | | | | |

Note 1. Measured at 622.08Mbps PRBS2^23- 1, 50% duty cycle data

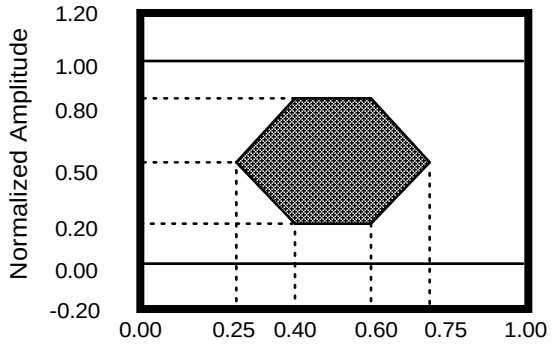



Figure 4. Optical Pulse Mask with Fourth Order Bessel-Thomson Filter Specified in ITU-T G.9

**⚠ Warning**

Do not look at the laser beam projection area (e.g. end of optical connector) with naked eyes or through optical equipment while the power is supplied to this product. Otherwise, your eyes may be injured.

# 8. Relation between Input Signal and Optical Output Signal

Relation between Input Signal and Optical Output Signa

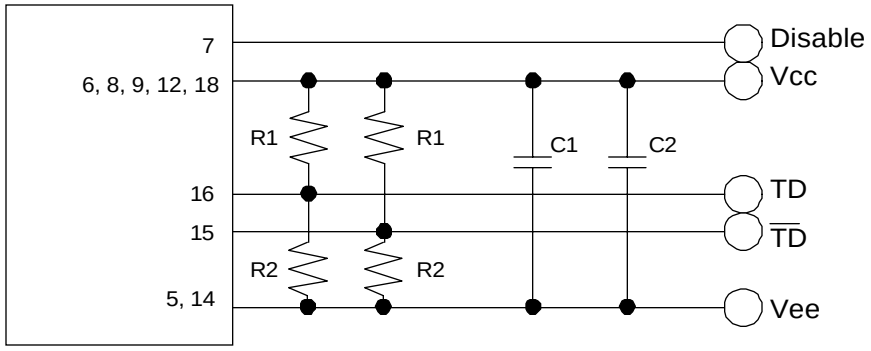
| Input Signal | | Optical Output Signal |
|---|---|---|
| TD | $\overline{TD}$ | |
| High | Low | ON (High) |
| Low | High | OFF (Low) |
| High | High | Undefined |
| Low | Low | Undefined |

Relation between Disable Input Voltage and Optical Output Power

| Disable Input Voltage | Optical Output Power |
|---|---|
| "L" (Vee ~ Vee+0.4V) | Enabled |
| "H" (Vee+2.0 ~ Vcc) | Disabled (<-45dBm) |

Note. Enabled for no Disable input (pin 7 opened)

# 9. Recommended User Interface




C1 = 0.022μF (Ceramic Chip Capacitor)

C2 = 1μF / 25V (Tantalum Electrolytic or Aluminum Electrolytic Capacitor)

R1 = 82Ω (≥ 1/8 W), R2 = 130Ω (≥ 1/8 W)

Note : 1. Termination resistors (R1, R2) should be located as close to the module as possible.

2. 50Ω impedance lines are recommended for TD and $\overline{TD}$.

3. Please refer to Figure 3 for Pin 2, 4, 17, 19.

Figure 5. Recommended User Interface

## 10. Fiber Pigtail Specification

| Parameter | min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|
| Mode Field Diameter | | 9.5 | | μm | |
| Cladding Diameter | | 125 | | μm | |
| Outer Diameter | | 0.9 | | mm | |
| Optical Fiber Tensile Break Strength | | | 9.8 | N | 1 |
| Bend Radius | 30 | | | mm | |

Note 1. Strength between receiver body and optical fiber should be less then 9.8 N

## 11. Reliability Test

| Bellcore TA-NWT-000983 Issue 2, December 1993 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Heading | Test | Reference | Condition | Sampling | | | SEI Result | |
| | | | | LTPD | SS | C | SS | F/C |
| Mechanical Integrity | Mechanical Shock | MIL-STD-883 Method 2002 | Condition B<br>5 times/axis | | | | | |
| | | | 500G, 1.0 ms | 20% | 11 | 0 | --- | --- |
| | | | 1,500G, 0.5ms | 20% | 11 | 0 | 11 | 0 |
| | Vibration | MIL-STD-883 Method 2007 | Condition A<br>20 G<br>20-2,000 Hz<br>4 min/cycle; 4 cycles/axis | 20% | 11 | 0 | 11 | 0 |
| | Thermal Shock | MIL-STD-883 Method 1011 | ΔT=100°C | 20% | 11 | 0 | 11 | 0 |
| | Solderability | MIL-STD-883 Method 2003 | (steam aging not required) | 20% | 11 | 0 | 11 | 0 |
| | Fiber Pull | | 1 Kg; 3 times;5sec. | 20% | 11 | 0 | --- | --- |
| | | | 2 Kg; 3 times; 5sec. | 20% | 11 | 0 | --- | --- |
| Endurance | Accel. Aging (High Temp.) | (R)-453 Section 5.18 | +85C; rated power<br>>5,000hrs. | --- | 25 | --- | 25 | 0 |
| | | | >10,000hrs. | --- | 10 | --- | --- | --- |
| | High Temp. Storage | --------- | max. storage T (T=85°C)<br>>2,000 | 20% | 11 | 0 | --- | --- |
| | Low Temp. Storage | --------- | min. storage T (T=-40°C)<br>>2,000 | 20% | 11 | 0 | 11 | 0 |
| | Temperature Cycling | Section 5.20 | - 40°C to +85°C<br>400 times pass/fail | 20% | 11 | 0 | --- | --- |
| | | | 500 times for info. | --- | 11 | --- | --- | --- |
| | | | 500 times pass/fail | 20% | 11 | 0 | 11 | 0 |
| | | | 1000 times for info. | --- | 11 | --- | 11 | 0 |
| | Damp Heat (if using epoxy) | MIL-STD-202 M103 or IEC 68-2-3 | 40°C , 95%, 56days | 20% | 11 | 0 | 11 | 0 |
| | | | or 85°C /85%RH 2,000hrs. | 20% | 11 | 0 | --- | --- |
| | Cyclic Moisture Resistance | Section 5.23 | ---------- | 20% | 11 | 0 | 11 | 0 |
| Special Tests | Internal Moisture | MIL-STD-883 Method 1018 | < 5,000 ppm water vapor | 20% | 11 | 0 | 11 | 0 |
| | Flammability | TR357:Sec. 4.4.2.5 | ---------- | ---- | ---- | --- | ---- | OK |
| | ESD Threshold | Section 5.22 | ---------- | ---- | 6 | --- | 6 | 0 |

## 12. Laser Safety

This product uses a semiconductor laser system and is a laser class 1 product acc. FDA, complies with 21CFR 1040. 10 and 1040.11. Also this product is a laser class 1 product acc. IEC 825-1.

## 13. Other Precaution

Under such a strong vibration environment as in automobile, the performance and reliability are not guaranteed.

The governmental approval is required to export this product to other countries. To dispose of these components, the appropriate procedure should be taken to prevent illegal exportation.

This module must be handled, used and disposed of according to your company's safe working practice.

**⚠ Warning**

- Be sure to carry out correct soldering for connection to peripheral circuits in order to prevent contact failure or short-circuit. Otherwise, a strong laser beam may cause eye injury, overheating or fire.
- Do not put this product or components of this product into your mouth. This product contaions material harmful to health.

**⚠ Caution**

- Be sure to turn the power off when you touch this product connected to the printed circuit boards. Otherwise, electric shock may occur.
- Dispose this product or equipment including this product properly as an industrial waste according to the regulations.

## 14. Ordering Information

| Connector type | Operating Temperature Range | |
|---|---|---|
| | 0 ~ 70°C | -40 ~ 85°C |
| FC / PC | SDT8262-TD-QN | SDT8262-TD-QW |
| SC | SDT8262-TC-QN | SDT8262-TC-QW |

## 15. For More Information

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