APDI-55-3G-K

OVERVIEW
APDI-55-3G-K is the InGaAs avalanche photodiode coupled to an optical fiber and packaged into a hermetic case.

MAIN FEATURES
- Bandwidth 3 GHz
- Typical responsivity: 1.0 A/W at 1310 nm and M = 1
- Package types: coaxial with or without bracket, 14 pins DIL
- Low back reflection, return loss RL > 45 dB
- Low dark current typ. 3-5 nA

APPLICATIONS
- Optical fiber communication systems
- OTDR

ORDERING INFORMATION

APDI-55-3G-K - X - X - 7 - X - X - X

Optical matching
- R45: back reflection -45 dB (SM1 and SM3 fiber)
- R30: back reflection -30 dB (MM5 and MM6 fiber)
- RM: back reflection -30 dB, optical matching, +5% higher responsivity

Case type
- U: compact coaxial
- B: compact coaxial with double-sided bracket
- T: 14 pins DIL with thermal stabilization (TEC and thermistor)
- E: 14 pins DIL with thermal stabilization (TEC and thermistor)

Fiber type
- SM1: G.657.A1, furcation tubing Ø0.9 mm
- SM3: G.657.B3, furcation tubing Ø0.9 mm
- MM5: 50/125, OM2, furcation tubing Ø0.9 mm
- MM6: 62.5/125, OM1, furcation tubing Ø0.9 mm
- Other type: on request

Connector type
- FU: FC/UPC
- FA: FC/APC
- N: no connector
- Other type: on request

Fiber length
- 0.5: 500+/-50 mm
- 1.0: 1000+/-100 mm
- Other length: on request

Version 20.2
# PHOTODIODE

## APDI-55-3G-K

### ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse current</td>
<td>(I_R)</td>
<td>2 mA</td>
<td></td>
</tr>
<tr>
<td>Forward current</td>
<td>(I_F)</td>
<td>10 mA</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>(T_{op})</td>
<td>-40 ÷ +85 °C</td>
<td>Package U, B</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>(T_{op})</td>
<td>-40 ÷ +50 °C</td>
<td>Package T, E</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>(T_{stg})</td>
<td>-40 ÷ +85 °C</td>
<td></td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>(T_{sold})</td>
<td>260 °C</td>
<td>Max. 5 seconds</td>
</tr>
</tbody>
</table>

### ELECTRICAL-OPTICAL CHARACTERISTICS (\(T = 25^\circ C\))

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsivity</td>
<td>(R)</td>
<td>0.95</td>
<td>1.05</td>
<td>A/W</td>
<td>(\lambda = 1310 \text{ nm}, M = 1)</td>
</tr>
<tr>
<td></td>
<td>(R45, R30)</td>
<td>0.90</td>
<td>1.00</td>
<td></td>
<td>(\lambda = 1310 \text{ nm}, M = 1)</td>
</tr>
<tr>
<td>Multiplication coefficient (gain)</td>
<td>(M)</td>
<td>30</td>
<td>60</td>
<td></td>
<td>(\lambda = 1310 \text{ nm}, V_R = V(I_d = 20 \text{ nA}))</td>
</tr>
<tr>
<td>Return loss</td>
<td>(R45)</td>
<td>40</td>
<td>45</td>
<td>dB</td>
<td>SM1, SM3</td>
</tr>
<tr>
<td></td>
<td>(R30)</td>
<td>25</td>
<td>30</td>
<td></td>
<td>MM5, MM6</td>
</tr>
<tr>
<td></td>
<td>(RM)</td>
<td>25</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakdown voltage</td>
<td>(V_{BR})</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>(I_d = 100 \text{ µA})</td>
</tr>
<tr>
<td>Breakdown voltage</td>
<td>(\delta)</td>
<td>0.08</td>
<td>0.10</td>
<td>0.12</td>
<td>V/°C, (T = 25^\circ C)</td>
</tr>
<tr>
<td>temperature coefficient</td>
<td>(\Delta V_{BR}/\Delta T)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark current</td>
<td>(I_d)</td>
<td>4</td>
<td>10</td>
<td>nA</td>
<td>(V_R = 0.9 V_{BR})</td>
</tr>
<tr>
<td>Total capacitance</td>
<td>(C_t)</td>
<td>0.68</td>
<td>0.8</td>
<td>pF</td>
<td>(f = 1 \text{ MHz})</td>
</tr>
<tr>
<td>Chip capacitance</td>
<td>(C_{chip})</td>
<td>0.38</td>
<td>0.5</td>
<td>pF</td>
<td>(f = 1 \text{ MHz})</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>(BW)</td>
<td>3</td>
<td></td>
<td>GHz</td>
<td>(M = 10)</td>
</tr>
</tbody>
</table>

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PHOTODIODE

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CHARACTERISTICS (T = 25 °C)

[Graphs showing current, multiplication factor, and capacitance versus reverse voltage.]
PHOTODIODE

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PACKAGE TYPE AND ELECTRICAL PINOUT

PACKAGE U

SIDE VIEW

BACK VIEW

PINOUT

Connector FC/UPC, FC/APC, no connector, or by request
Fiber length 500+/−50, 1000+/−100, or by request

PACKAGE B

SIDE VIEW

BACK VIEW

PINOUT

Connector FC/UPC, FC/APC, no connector, or by request
Fiber length 500+/−50, 1000+/−100, or by request

PACKAGE T

PINOUT #5, #7

TEC: I_m=0.7 A, U_m=3.9 V, Q_m=1.4 W, AC, R=4.7 Ohm, ΔT_m=72 K
Thermistor:
R_t=10^6(3600/(1/T[K]-1/298)) kOhm
PHOTODIODE

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PACKAGE TYPE AND ELECTRICAL PINOUT

PINOUT #5, #7
1. TEC Anode
2. -
3. -
4. -
5. PD Case
6. -
7. PD Cathode
8. PD Anode
9. -
10. -
11. Thermistor
12. Thermistor
13. -
14. TEC Cathode

TEC: $I_{\text{IN}} = 0.7\, \text{A}$, $U_{\text{IN}} = 3.9\, \text{V}$, $Q_{\text{IN}} = 1.4\, \text{W}$
$ACR = 4.7\, \text{Ohm}$, $\Delta T_{\text{MAX}} = 72\, \text{K}$

Thermistor:
$R_t = 10^4 \times \exp{(3600 \times (1/T[K] - 1/298))}$ kOhm
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APDI-55-3G-K

Characteristics, data, materials and structures specified in this datasheet are subject to change without notice. Please refer to the latest specification before use of the products.

Safety and handling cautions
1. Avoid smashing and burning of the module. Avoid storing and using the module in conditions where water, organic solvents or aggressive acids or bases may contact the module or where there is a possibility of exposure to corrosive gases, explosive gases, dust, salinity or other harsh conditions. The module should be disposed as special industrial waste.
2. Exceeding absolute maximal ratings even for a short time can cause permanent damage of the module.
3. The module is sensitive to and can be broken by ESD (static electricity).

Conflict Minerals Policy Statement
LasersCom LLC achieves business objectives and customer needs with social responsibility. We do not support or contribute to the violence and human rights violations associated with the mining of conflict minerals coming from Conflict Regions according to US "Dodd-Frank Act". When possible, our suppliers’ conflict mineral statements are reviewed. We do not directly purchase Conflict Minerals from any source and do not knowingly procure any parts and products containing Conflict Minerals from Conflict Regions.

RoHS Compliance Statement
Restriction of Hazardous Substances (RoHS) directive (Directive 2011/65/EC amended with Directive (EU) 2015/863) is the directive aimed at reducing the harmful environmental impact of waste electrical equipment by restricting the use of known dangerous substances. Based on information received from our supply sources, LasersCom LLC hereby states that the banned substances listed in the RoHS directive are not found in the parts and materials used above the threshold level listed other than exceptions approved by the European Commission.

REACH Compliance Statement
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is a European Union regulation 1907/2006/EC that addresses the production and use of chemical substances, and their potential impacts on human health and the environment. Based on information received from our supply sources, LasersCom LLC hereby states compliance of the parts and materials used in manufacturing to REACH regulation. LasersCom LLC does not manufacture or import any substances or preparations as defined under REACH.