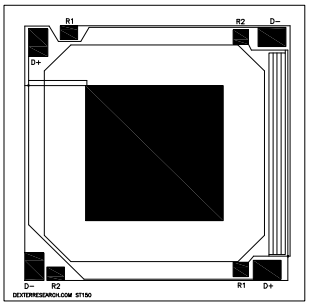
DeXter RESEARCH CENTER

*We're Everywhere It Matters…*

# ST150 & ST150R
## With Diffractive Lens

Silicon Based Thermopile Detector




Detector circuit overlay

**Features:** A single-channel silicon-based thermopile with integrated diffractive lens and internal baffle that delivers a very low Temperature Coefficient of Responsivity of -0.04%/°C with a high output voltage, 19.5° FOV and a quick time constant of 38ms. This Low-cost detector comes in a TO-5 package and has a very short thermal shock response to ambient temperature change.

**Options: 1) ST150R** version offers a low-cost (20% tolerance) poly-silicon resistor to be used as a PTC thermistor. **2)** Internal 30kΩ 5% NTC chip thermistor provides ambient package temperature measurement. *See* Thermistor Options p/n: DC-4005. See Thermopile Configuration Table for more options.

ST150

**Applications:** Excellent for 19.5° FOV non-contact temperature measurement.

**Benefit:** High output, narrow FOV, and low cost with larger 1.5mm x 1.5mm active area.

## Technical Specifications

Specifications apply at 23°C with AR coated Diffractive Lens (P/N: DC-6132) and Nitrogen encapsulating gas

| Parameter | Min | Typical | Max | Symbol | Units | Comments |
|---|---|---|---|---|---|---|
| Active Area size | | 1.5 x 1.5 | | AA | mm | Hot junction size, per element. |
| Element Area | | 2.25 | | A | $mm^2$ | |
| Number of Junctions | | 120 | | | | Per element. |
| Number of Channels | | 1 | | | | Per detector package. |
| Output Voltage | 240 | 325 | 400 | $V_s$ | µV | DC, H=330µW/$cm^2$ (3) |
| Signal-to-Noise Ratio | 6,250 | 9,286 | 12,780 | SNR | √Hz | DC, SNR=$V_s/V_n$ |
| Responsivity | 32.3 | 43.8 | 53.9 | ℜ | V/W | DC, ℜ=$V_s$/HA (2) |
| Resistance | 60 | 90 | 120 | R | kΩ | Detector element |
| Temperature Coefficient of ℜ | | -.04 | | | %/°C | Best linear fit, 0° to 85°C (1) |
| Temperature Coefficient of R | | .11 | | | %/°C | Best fit, 0° to 85°C (1) |
| Noise Voltage | 31.3 | 35.0 | 38.4 | $V_n$ | nV/√Hz | $V_n{}^2$=4kTR |
| Noise Equivalent Power | .58 | .80 | 1.19 | NEP | nW/√Hz | DC, NEP= $V_n$ HA/$V_s$ (2) |
| Detectivity | 1.26 | 1.87 | 2.58 | D* | $10^8$cm√Hz/W | DC, D*=$V_s$/ $V_n$ H√A (2) |
| Time Constant | | 38 | | $\mathcal{T}$ | ms | Chopped, -3dB point (1) |
| Field of View | | 19.5° | | FOV | Degrees | See Assembly Drawings for FOV Description. |
| Package Type | | TO-5 with Lens | | | | Package hole size: ∅.150" |
| Operating Temperature | -50 | | 100 | $T_a$ | °C | Short durations to 125°C possible |
| **ST150R** Thermistor Option | 55 | 75 | 95 | $R_T$ | kΩ | PTC Poly-Silicon resistor on detector die. |
| **ST150R** Thermistor Temperature Coefficient of R | .107 | .11 | .113 | | %/°C | ΔR/(RΔT), Best fit, 0° to 85°C (1) |

General Specifications: Flat spectral response from 100nm to > 100µm. Linear signal output from $10^{-6}$ to 0.1W/$cm^2$. Maximum incident radiance 0.1W/$cm^2$, damage threshold ≥ .5W/$cm^2$

Notes: **(1)** Parameter is not 100% tested. 90% of all units meet these specifications. **(2)** A is detector area in $cm^2$. **(3)** Test Conditions: 500K Blackbody source; Detector active surface 10cm from 0.6513cm Diameter Blackbody Aperture.



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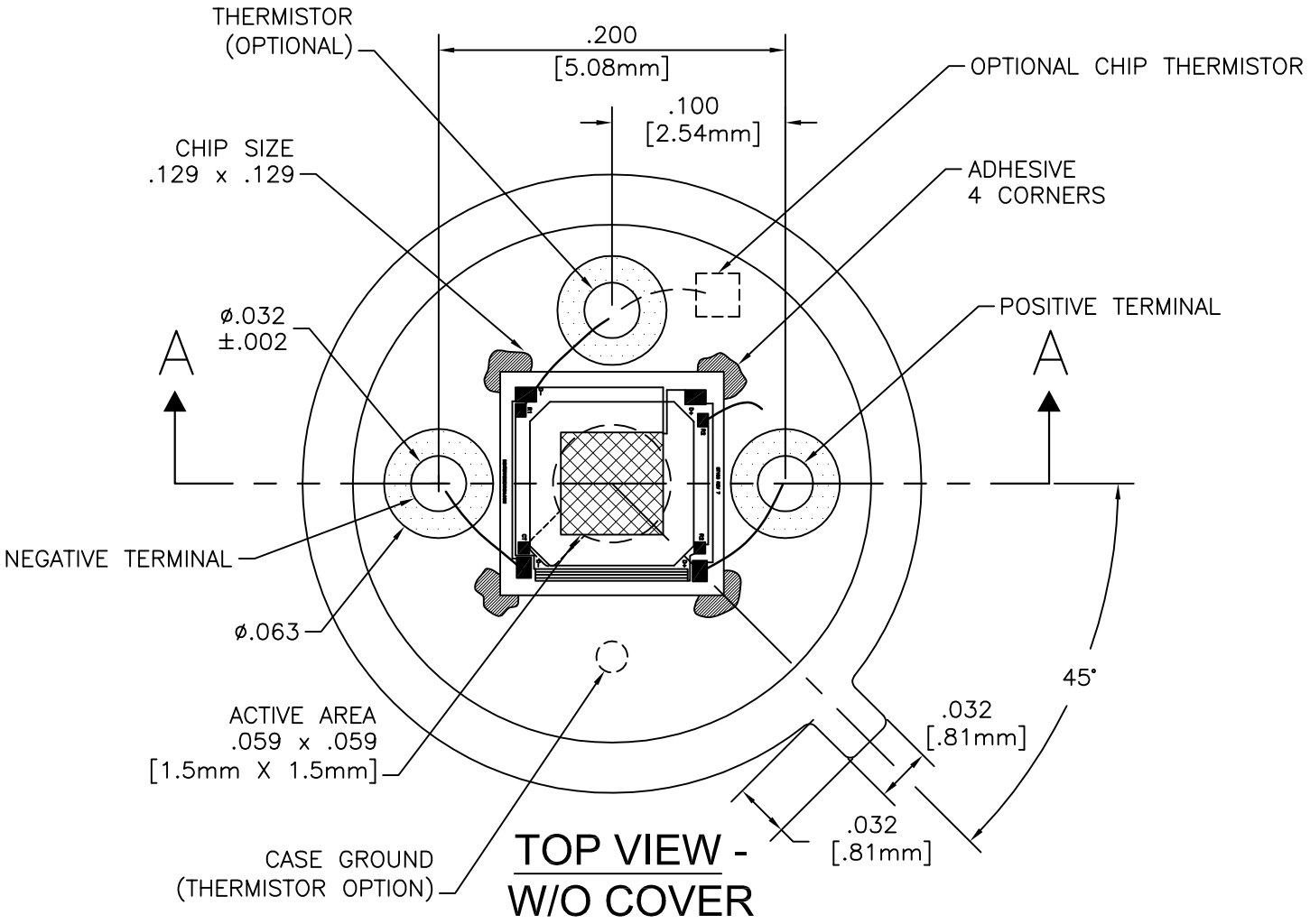


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|---|---|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS ± DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± | | DEXTER RESEARCH CENTER, Inc. 7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090 | | | |
| APPROVALS | DATE | ASSEMBLY, ST150/ST150R, TO-5 RW, TOP VIEW | | | |
| DRAWN: DLJ | 8/23/16 | SIZE: A | SCALE: 10" = 1" | DWG. NO. 1017.3 | REV. D | PAGE: 2 OF 2 |
| CHECKED: | | DRC PART NO. | MATERIAL: | FINISH: | |
| ENGINEERED: | | | | | |
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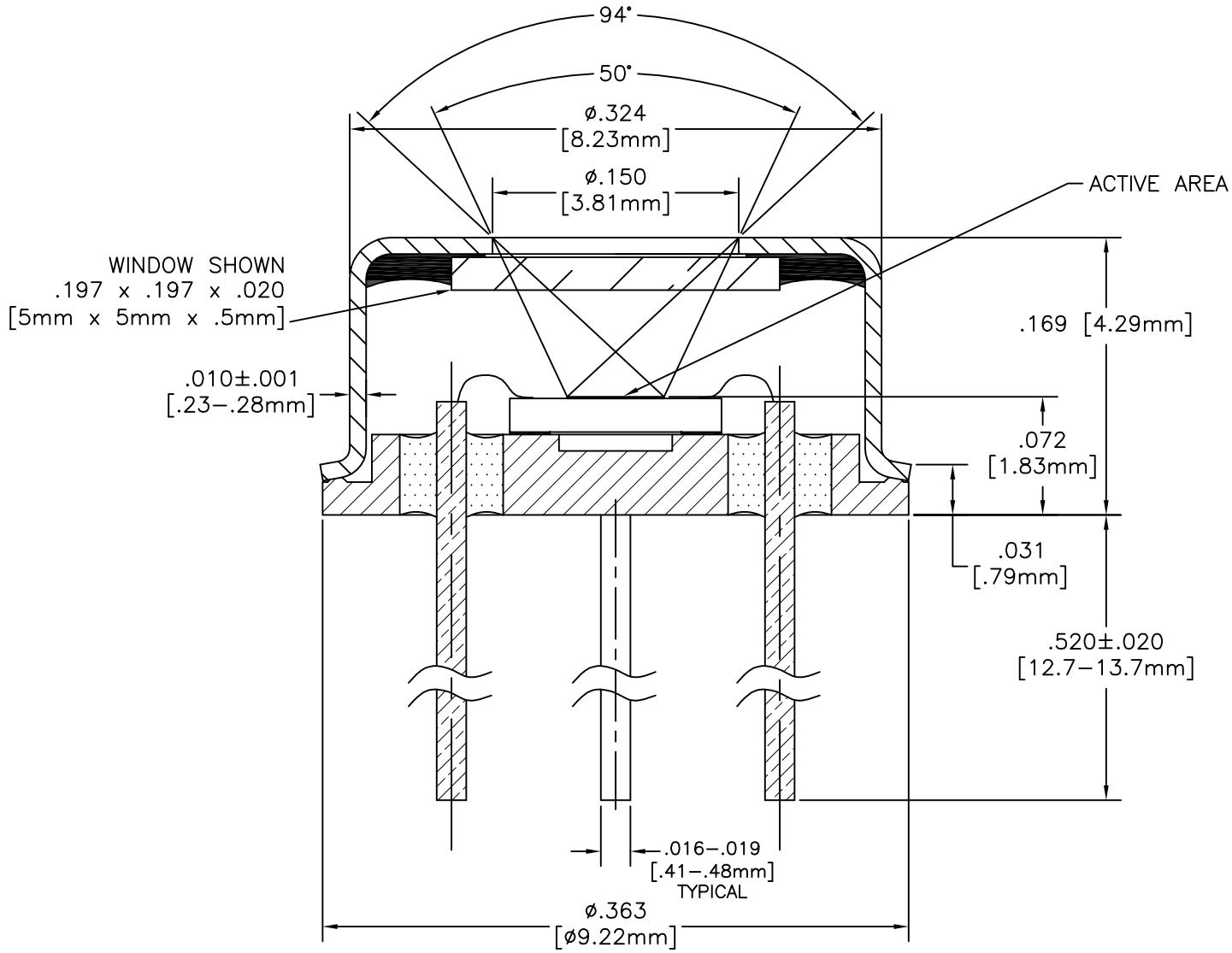


SECTION A–A

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .01 .XXX ± .005 ANGLES ±

| APPROVALS | DATE |
|---|---|
| DRAWN: DLJ | 2/27/13 |
| CHECKED: | |
| ENGINEERED: | |
| APPROVED: | |

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ASSEMBLY, ST150/ST150R,
TO-5 RW, CROSS SECTION

| SIZE: | SCALE: | DWG. NO. | REV. | PAGE: |
|---|---|---|---|---|
| A | 10" = 1" | 1017.1 | F | 1 OF 2 |

| DRC PART NO. | MATERIAL: | FINISH: |
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| | | |