



ST150 & ST150R With Diffractive Lens

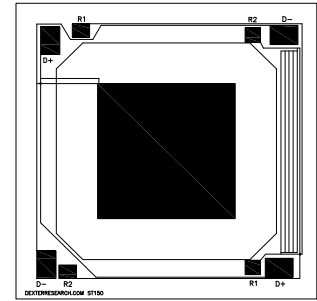
Silicon Based Thermopile Detector

Features: A single-channel silicon-based thermopile with integrated diffractive lens and internal baffle that delivers a very low Temperature Coefficient of Responsivity of $-0.04\%/^{\circ}\text{C}$ 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 $30\text{k}\Omega$ 5% NTC chip thermistor provides ambient package temperature measurement. See [Thermistor Options](#) p/n: DC-4005. See [Thermopile Configuration Table](#) for more options.

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

Benefit: High output, narrow FOV, and low cost with larger $1.5\text{mm} \times 1.5\text{mm}$ active area.



Detector circuit overlay



ST150

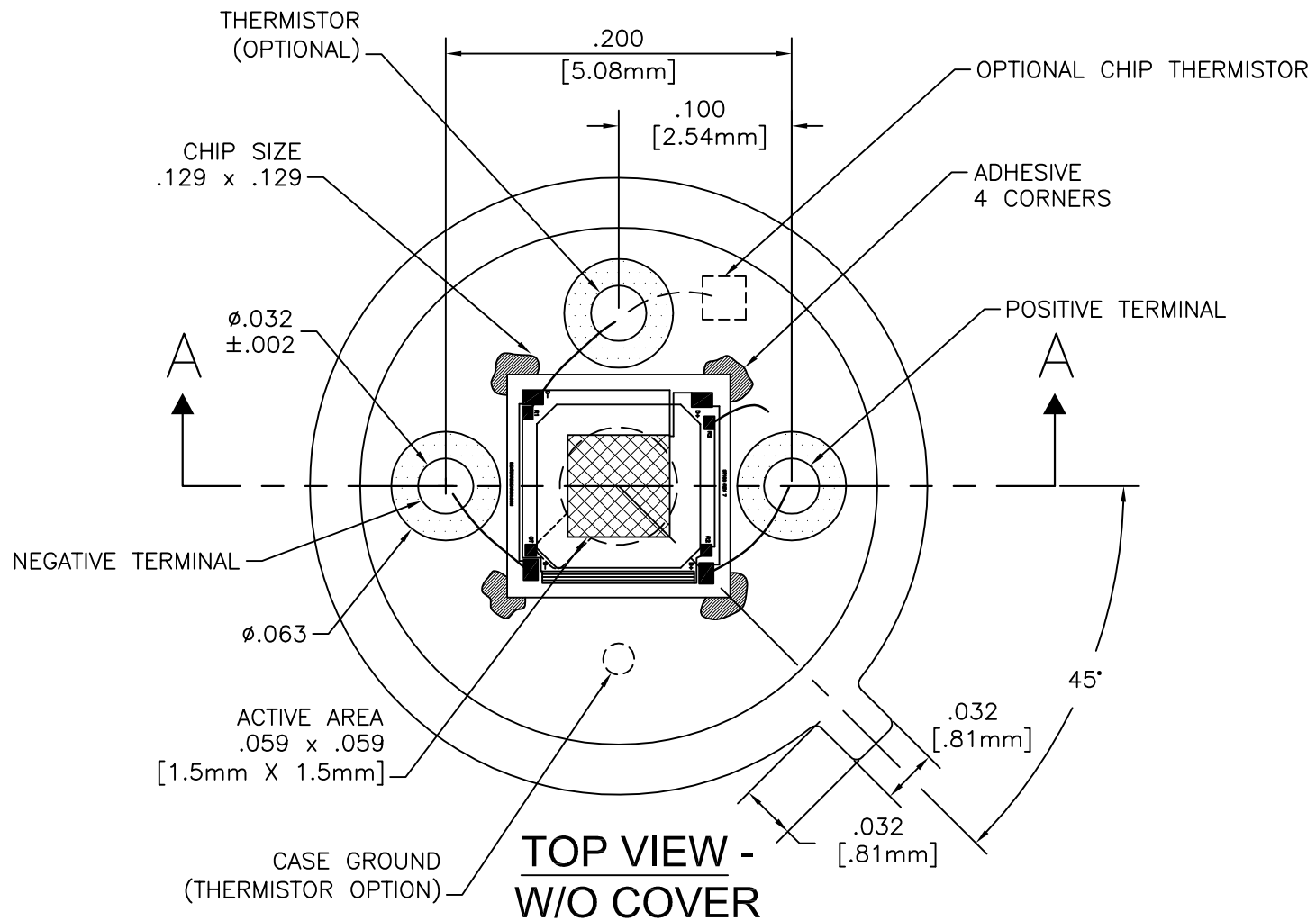
Technical Specifications

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, $H=330\mu\text{W}/\text{cm}^2$ (3)
Signal-to-Noise Ratio	6,250	9,286	12,780	SNR	$\sqrt{\text{Hz}}$	DC, $\text{SNR}=V_s/V_n$
Responsivity	32.3	43.8	53.9	\mathcal{R}	V/W	DC, $\mathcal{R}=V_s/\text{HA}$ (2)
Resistance	60	90	120	R	$\text{k}\Omega$	Detector element
Temperature Coefficient of \mathcal{R}		-.04			$\%/^{\circ}\text{C}$	Best linear fit, 0° to 85°C (1)
Temperature Coefficient of R		.11			$\%/^{\circ}\text{C}$	Best fit, 0° to 85°C (1)
Noise Voltage	31.3	35.0	38.4	V_n	$\text{nV}/\sqrt{\text{Hz}}$	$V_n^2=4\text{kTR}$
Noise Equivalent Power	.58	.80	1.19	NEP	$\text{nW}/\sqrt{\text{Hz}}$	DC, $\text{NEP}=V_n \text{HA}/V_s$ (2)
Detectivity	1.26	1.87	2.58	D^*	$10^8\text{cm}\sqrt{\text{Hz}}/\text{W}$	DC, $D^*=V_s/V_n \text{H}/\text{A}$ (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: $\varnothing.150"$
Operating Temperature	-50		100	T_a	$^{\circ}\text{C}$	Short durations to 125°C possible
ST150R Thermistor Option	55	75	95	R_T	$\text{k}\Omega$	PTC Poly-Silicon resistor on detector die.
ST150R Thermistor Temperature Coefficient of R	.107	.11	.113		$\%/^{\circ}\text{C}$	$\Delta R/(R\Delta T)$, Best fit, 0° to 85°C (1)

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

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.

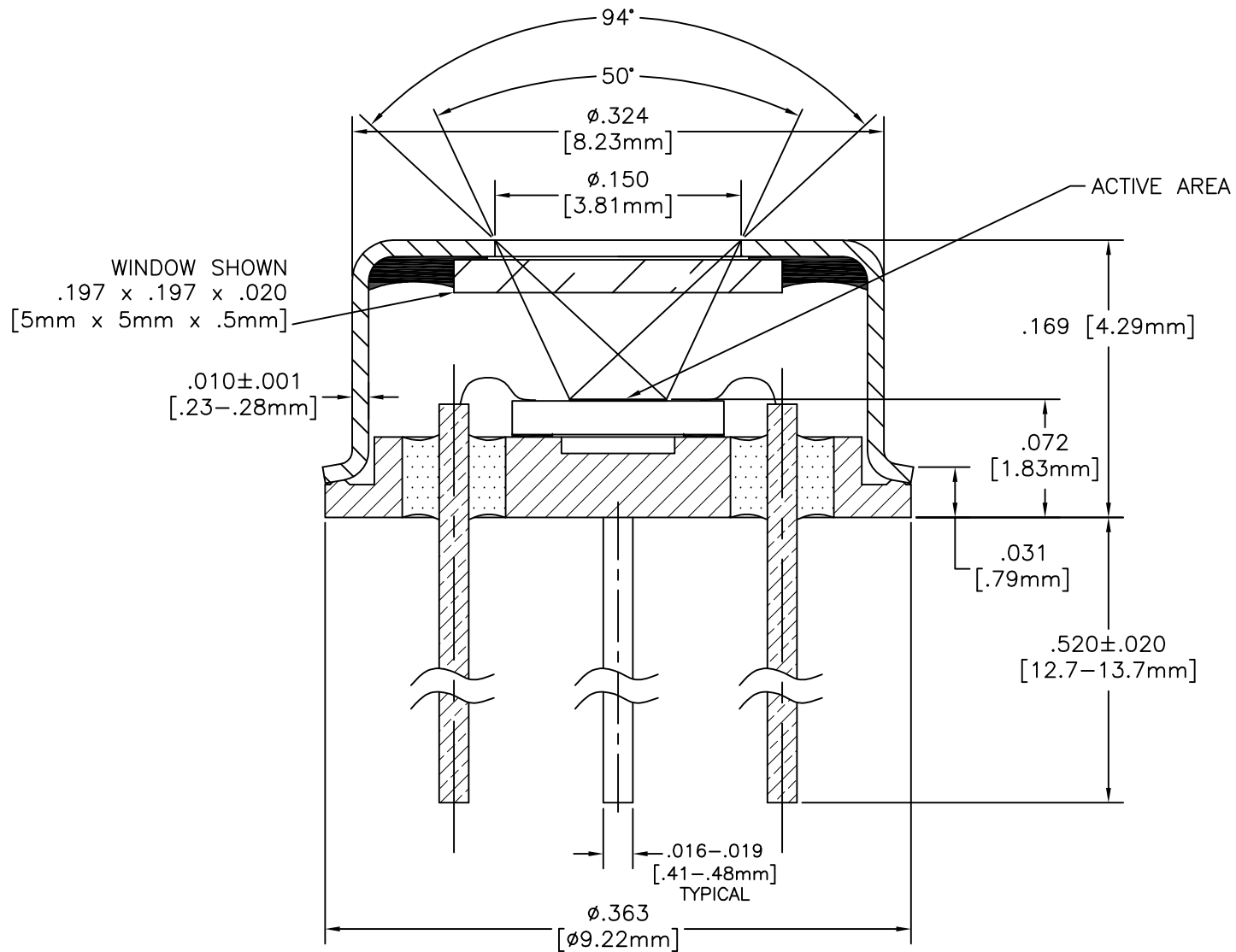


UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:

FRACTIONS	DECIMALS	ANGLES
±	.XX ± .01	±
	.XXX ± .005	

APPROVALS	DATE
DRAWN: DLJ	8/23/16
CHECKED:	
ENGINEERED:	
APPROVED:	

DEXTER RESEARCH CENTER, Inc.			
7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090			
ASSEMBLY, ST150/ST150R, TO-5 RW, TOP VIEW			
SIZE: A	SCALE: 10" = 1"	DWG. NO. 1017.3	REV. PAGE: D 2 OF 2
DRC PART NO.		MATERIAL:	FINISH:



SECTION A-A

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.

TOLERANCES ARE:

FRACTIONS	DECIMALS	ANGLES
±	.XX ± .01	±
	.XXX ± .005	

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

DEXTER RESEARCH CENTER, Inc.

7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090

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:	