



ST150 & ST150R

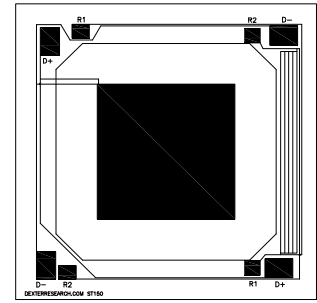
Silicon Based Thermopile Detector

Features: A single-channel silicon-based thermopile that delivers a very low Temperature Coefficient of Responsivity of $-0.04\%/^{\circ}\text{C}$ with a high output voltage and a quick time constant of 42ms. This Low-cost detector comes in a TO-5 package. This detector has a very short thermal shock response to ambient temperature change.

Options: 1) See [Standard Windows and Filters](#) for list of optical filter options. 2) **ST150R** version offers a low-cost (20% tolerance) poly-silicon resistor to be used as a PTC thermistor. 3) Internal 30k Ω 5% NTC chip thermistor provides ambient package temperature measurement. See [Thermistor Options](#) p/n: DC-4005. 4) Internal aperture precisely defines active area for applications with FOV and/or spot size requirements. See [Aperture Options](#) for available sizes. See [Thermopile Configuration Table](#) for more options.

Applications: Excellent for gas analysis, fire detection, and non-contact temperature measurement.

Benefit: High output and low cost with larger 1.5mm x 1.5mm active area.



Detector circuit overlay



ST150

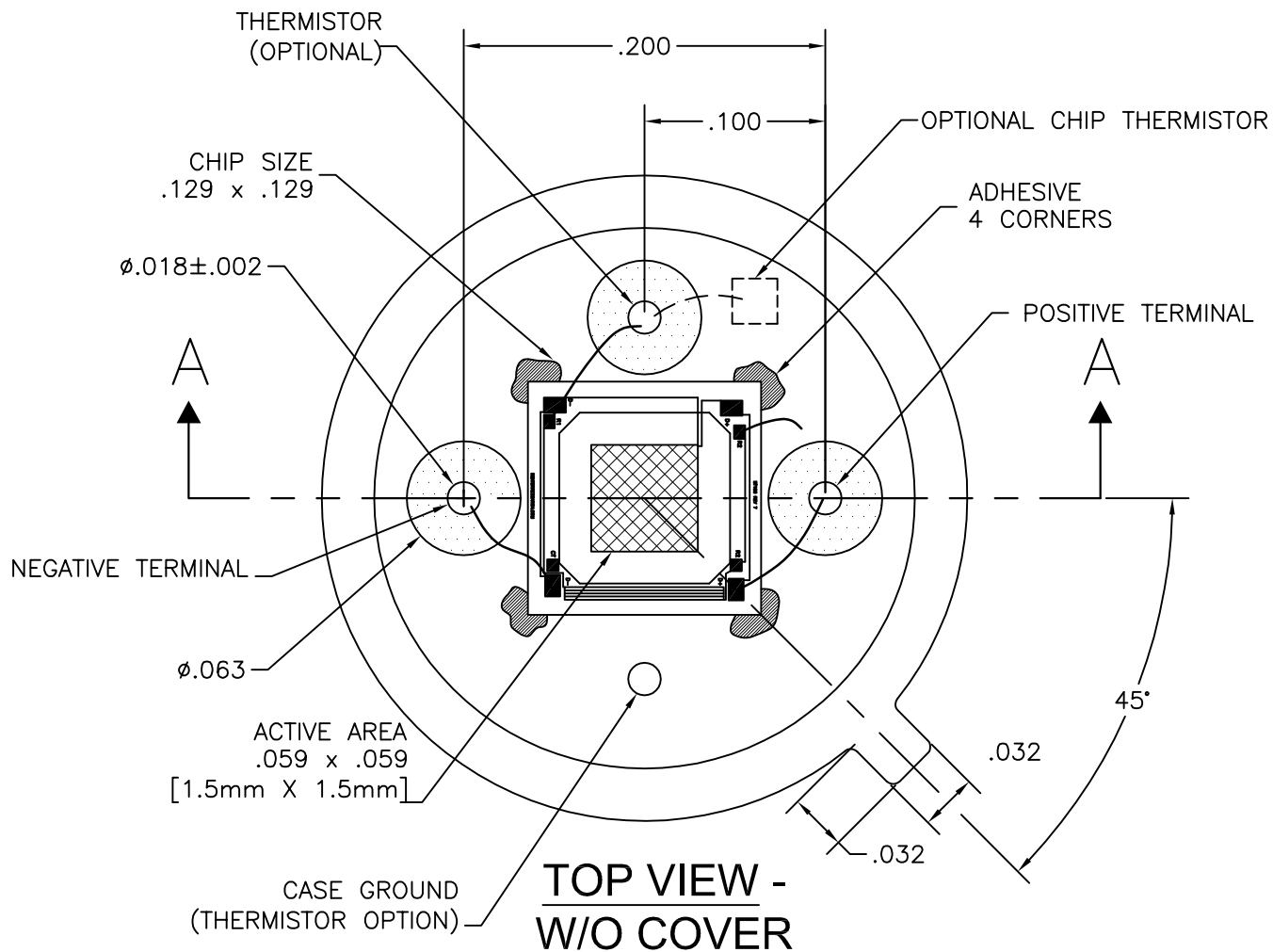
Technical Specifications

Specifications apply at 23°C with KBr Window 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	250	285	320	V _s	μV	DC, H=330 $\mu\text{W}/\text{cm}^2$ (3)
Signal-to-Noise Ratio	6185	8196	9,819	SNR	$\sqrt{\text{Hz}}$	DC, SNR=V _s /V _n
Responsivity	33.7	38.4	43.1	\mathcal{R}	V/W	DC, $\mathcal{R}=V_s/HA$ (2)
Resistance	65	74	100	R	k Ω	Detector element
Temperature Coefficient of \mathcal{R}	-.04				%/ $^{\circ}\text{C}$	Best linear fit, 0 $^{\circ}$ to 85 $^{\circ}\text{C}$ (1)
Temperature Coefficient of R	.086				%/ $^{\circ}\text{C}$	Best fit, 0 $^{\circ}$ to 85 $^{\circ}\text{C}$ (1)
Noise Voltage	32.6	34.8	40.4	V _n	nV/ $\sqrt{\text{Hz}}$	V _n ² =4kTR
Noise Equivalent Power	0.76	0.90	1.20	NEP	nW/ $\sqrt{\text{Hz}}$	DC, NEP= V _n HA/V _s (2)
Detectivity	1.25	1.66	1.99	D*	10 ⁸ cm $\sqrt{\text{Hz}}/\text{W}$	DC, D*=V _s /V _n H \sqrt{A} (2)
Time Constant	42			τ	ms	Chopped, -3dB point (1)
Field of View	57 $^{\circ}$ /103 $^{\circ}$			FOV	Degrees	See Assembly Drawings for FOV Description.
Package Type	TO-5,					Standard package hole size: \varnothing .150"
Operating Temperature	-50		100	T _a	$^{\circ}\text{C}$	Short durations to 125 $^{\circ}\text{C}$ possible
ST150R Thermistor Option	50	62	80	R _T	k Ω	PTC Poly-Silicon resistor on detector die.
ST150R Thermistor Temperature Coefficient of R	.107	.086	.113		%/ $^{\circ}\text{C}$	$\Delta R/(R\Delta T)$, Best fit, 0 $^{\circ}$ to 85 $^{\circ}\text{C}$ (1)

General Specifications: Flat spectral response from 100nm to > 100 μm . Linear signal output from 10⁻⁶ to 0.1W/cm². Maximum incident radiance 0.1W/cm², damage threshold \geq .5W/cm²

Notes: (1) Parameter is not 100% tested. 90% of all units meet these specifications. (2) A is detector area in cm². (3) Test Conditions: 500K Blackbody source; Detector active surface 10cm from 0.6513cm Diameter Blackbody Aperture.

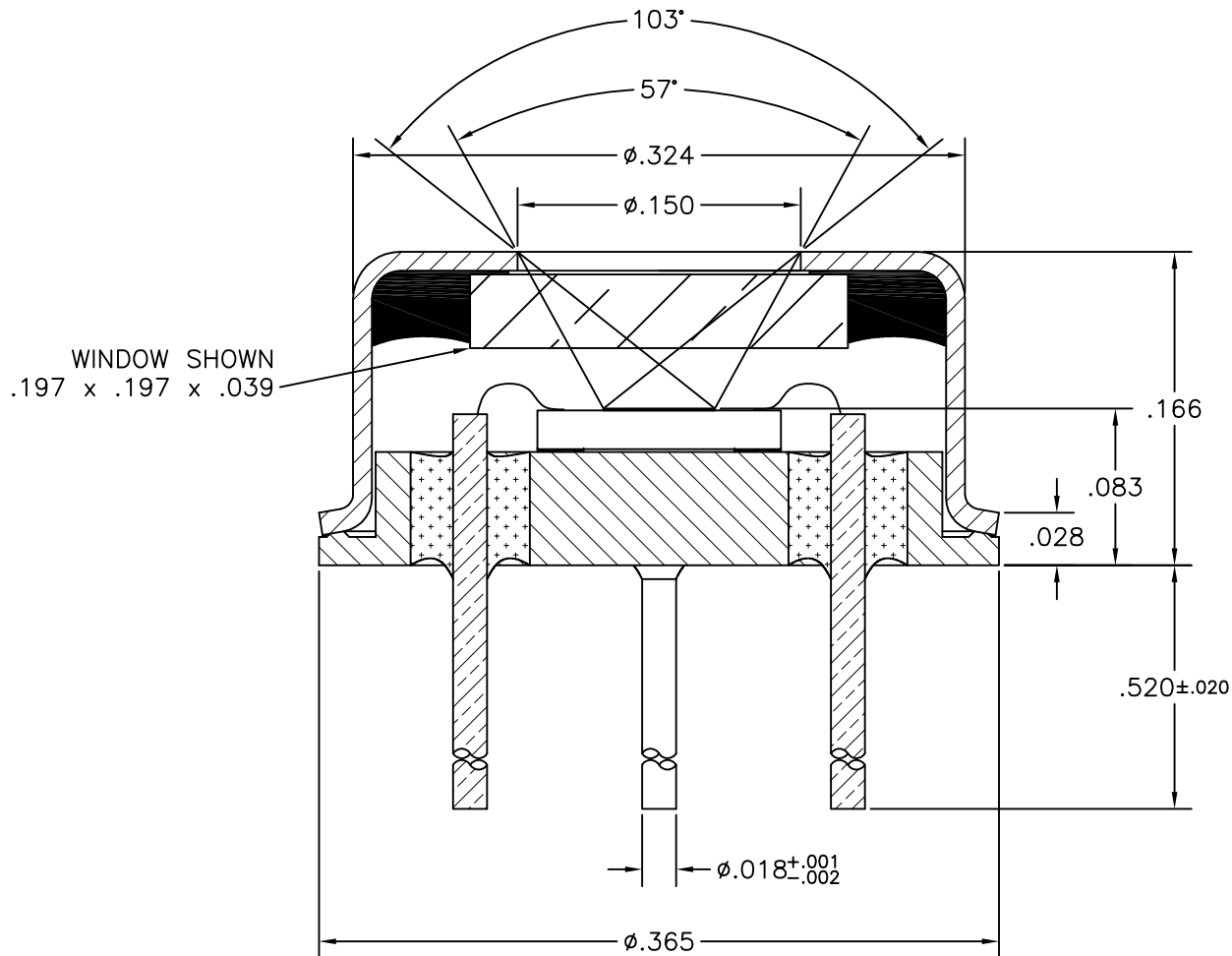


UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:

FRACTIONS	DECIMALS	ANGLES
\pm	.XX ± .01	\pm
	.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, TO-5 RW, NO WELL HEADER, TOP VIEW			
SIZE: A	SCALE: 10" = 1"	DWG. NO. 1387.1	REV. A
			PAGE: 1 OF 2
DRC PART NO.		MATERIAL:	FINISH:



SECTION A-A

NOTE: SOME ITEMS NOT SHOWN FOR CLARITY

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE:	
FRACCTIONS ±	DECIMALS .XX ± .01 .XXX ± .005
APPROVALS	DATE
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APPROVED:	

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ASSEMBLY, ST150, TO-5 RW, NO WELL HEADER, CROSS SECTION			
SIZE: A	SCALE:	DWG. NO. 1387.2	REV. PAGE: B 2 OF 2
DRC PART NO.		MATERIAL:	FINISH: