



ST120 TO-5

Silicon Based Thermopile Detector

Features: A single-channel silicon-based thermopile provides lowest cost solutions in a small active area of 1.2mm x 1.2mm in a TO-5 package. Time constant of 25ms with Nitrogen encapsulation gas. Delivers a very low Temperature Coefficient of Responsivity of $-0.04\%/^{\circ}\text{C}$. 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)** Internal $30\text{k}\Omega$ 5% NTC chip thermistor provides ambient package temperature measurement. See [Thermistor Options](#) p/n: DC-4005. **3)** 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 suppression, non-contact temperature, and horizon sensor.

Benefit: Low cost with high output.

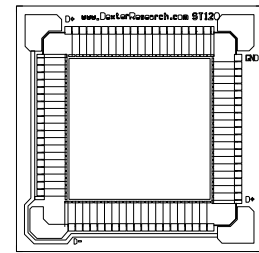
Technical Specifications

Specifications apply at 23°C with KBr Window and Nitrogen encapsulating gas

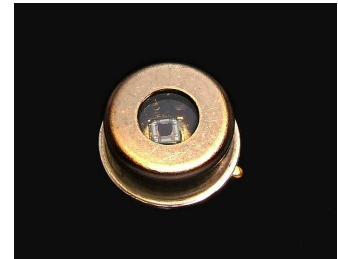
Parameter	Min	Typical	Max	Symbol	Units	Comments
Active Area size		1.2 x 1.2		AA	mm	Hot junction size, per element.
Element Area		1.44		A	mm^2	
Number of Junctions		80				Per element.
Number of Channels		1				Per detector package.
Output Voltage	150	190	230	V_s	μV	DC, $H=330\mu\text{W}/\text{cm}^2$ (3)
Signal-to-Noise Ratio	3,459	4,953	6,359	SNR	$\sqrt{\text{Hz}}$	DC, $\text{SNR}=V_s/V_n$
Responsivity	31.6	37.9	48.4	\mathcal{R}	V/W	DC, $\mathcal{R}=V_s/HA$ (2)
Resistance	80	90	115	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		.02			$\%/^{\circ}\text{C}$	Best fit, 0° to 85°C (1)
Noise Voltage	36.2	37.4	43.4	V_n	$\text{nV}/\sqrt{\text{Hz}}$	$V_n^2=4\text{kTR}$
Noise Equivalent Power	.75	1.04	1.37	NEP	$\text{nW}/\sqrt{\text{Hz}}$	DC, $\text{NEP}=V_n H A V_s$ (2)
Detectivity	.87	1.15	1.61	D^*	$10^8\text{cm}\sqrt{\text{Hz}}/\text{W}$	DC, $D^*=V_s/V_n H\sqrt{A}$ (2)
Time Constant		25		τ	ms	Chopped, -3dB point (1)
Field of View		$61^{\circ}/97^{\circ}$		FOV	Degrees	See Assembly Drawings for FOV Description.
Package Type		TO-5				Standard package hole size: $\varnothing.150''$
Operating Temperature	-50		125	T_a	$^{\circ}\text{C}$	

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 $\geq .5\text{W}/\text{cm}^2$

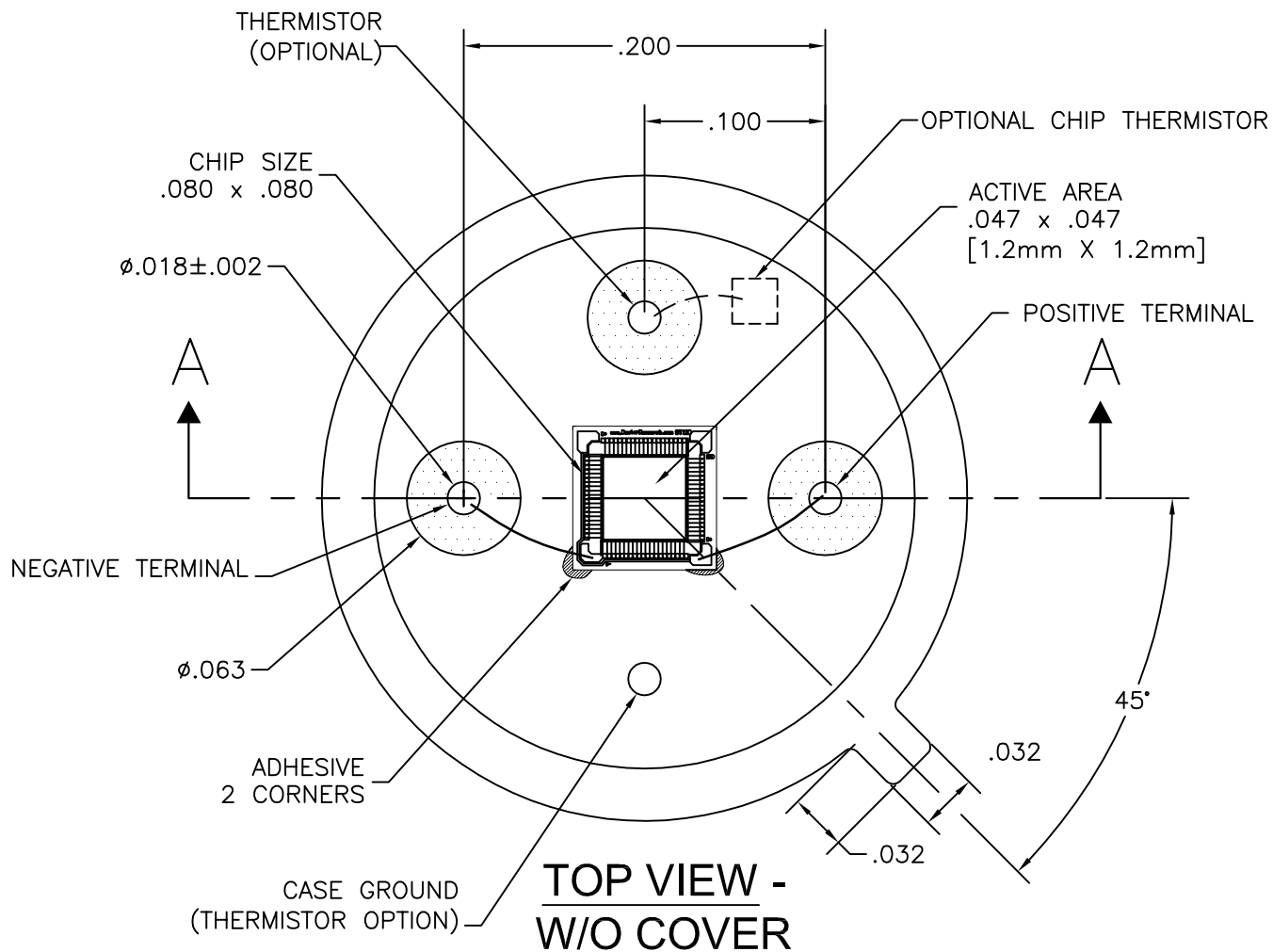
Notes: (1) Parameter is not 100% tested. 90% of all units meet these specifications. (2) A is detector area in cm^2 . (3) Test Conditions: 500K Blackbody source; Detector active surface 10cm from 0.6513cm Diameter Blackbody Aperture.



Detector circuit overlay



ST120 TO-5



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

FRACCTIONS	DECIMALS	ANGLES
\pm	.XX \pm .01	\pm
	.XXX \pm .005	

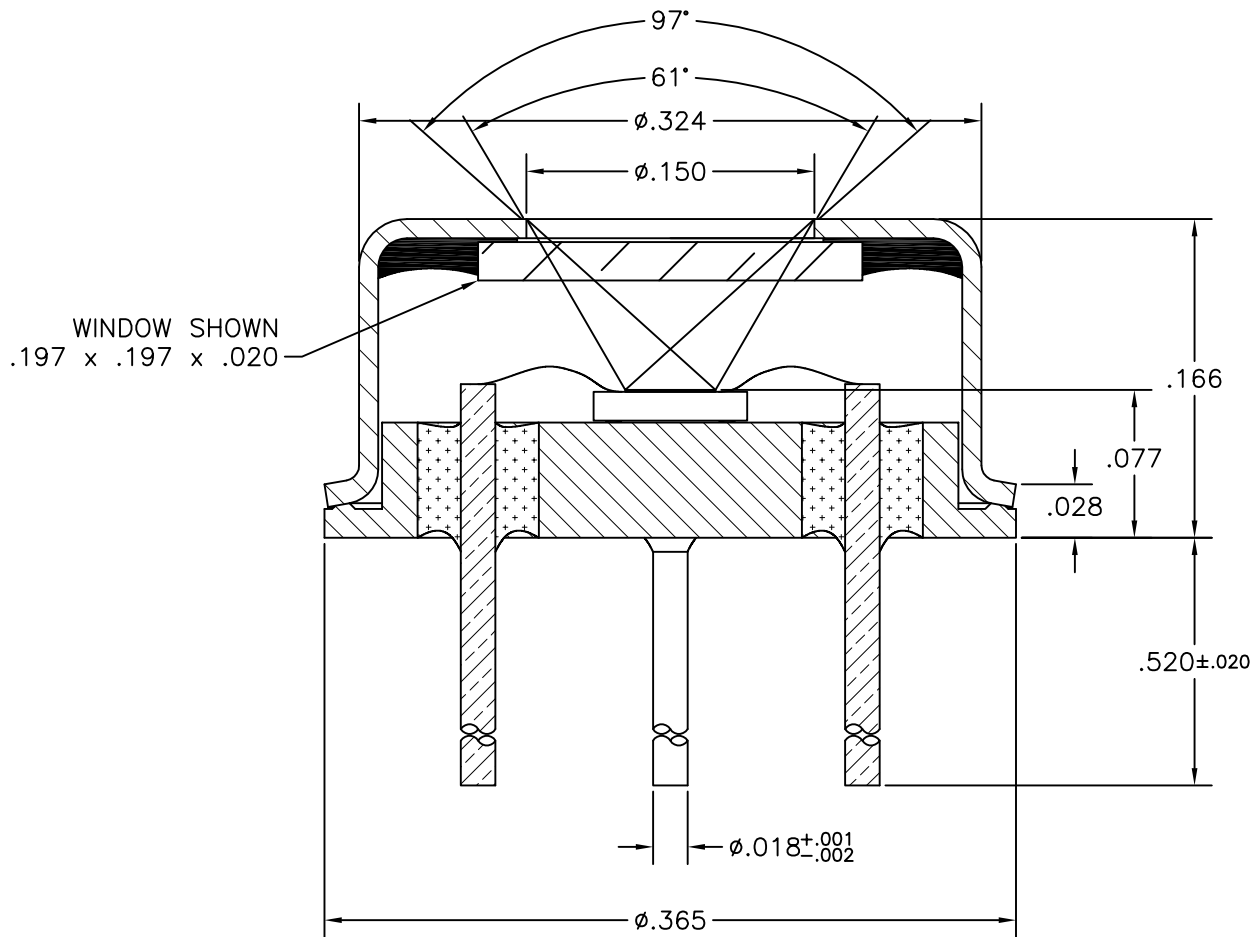
APPROVALS	DATE
DRAWN: DLJ	5/21/13
CHECKED:	
ENGINEERED:	
APPROVED:	

DEXTER RESEARCH CENTER, Inc.

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

ASSEMBLY, ST120, TO-5 RW,
NO WELL HEADER, TOP VIEW

SIZE: A	SCALE: 10" = 1"	DWG. NO. 1397.1	REV. NC	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:
FRACTIONS DECIMALS ANGLES
± .XX ± .01 ±
 .XXX ± .005

APPROVALS	DATE
DRAWN: DLJ	5/21/13
CHECKED:	
ENGINEERED:	
APPROVED:	

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7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090			
ASSEMBLY, ST120, TO-5 RW, NO WELL HEADER, CROSS SECTION			
SIZE: A	SCALE:	DWG. NO. 1397.2	REV. PAGE: NC 2 OF 2
DRC PART NO.		MATERIAL:	FINISH: