



ST60 TO-5 & ST60R TO-5

Silicon Based Thermopile Detector

Features: A single-channel silicon-based thermopile provides lowest cost solutions in a small active area of 0.61mm x 0.61mm in a TO-5 package. Time constant of 18ms 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) **ST60R TO-5** 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 non-contact temperature, fire suppression, horizon sensor, and gas analysis.

Benefit: Low cost and small active area size with medium output.

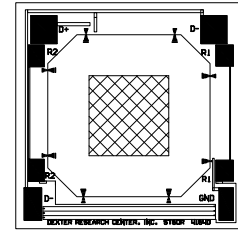
Technical Specifications

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

Parameter	Min	Typical	Max	Symbol	Units	Comments
Active Area size		.61 x .61		AA	mm	Hot junction size, per element.
Element Area		.37		A	mm ²	
Number of Junctions		80				Per element.
Number of Channels		1				Per detector package.
Output Voltage	80	110	130	V _s	μV	DC, H=330 $\mu\text{W}/\text{cm}^2$ (3)
Signal-to-Noise Ratio	2,365	3,513	4,792	SNR	$\sqrt{\text{Hz}}$	DC, SNR=V _s /V _n
Responsivity	65.2	89.7	105.9	\mathcal{R}	V/W	DC, $\mathcal{R}=V_s/HA$ (2)
Resistance	45	60	70	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		.11			%/ $^{\circ}\text{C}$	Best fit, 0 $^{\circ}$ to 85 $^{\circ}\text{C}$ (1)
Noise Voltage	27.1	31.3	33.8	V _n	nV/ $\sqrt{\text{Hz}}$	V _n ² =4kTR
Noise Equivalent Power	.26	.35	.52	NEP	nW/ $\sqrt{\text{Hz}}$	DC, NEP= V _n HA/V _s (2)
Detectivity	1.17	1.75	2.38	D*	10 ⁸ cm $\sqrt{\text{Hz}}/\text{W}$	DC, D* ² =V _s /V _n H \sqrt{A} (2)
Time Constant		18		τ	ms	Chopped, -3dB point (1)
Field of View		72 $^{\circ}$ /90 $^{\circ}$		FOV	Degrees	See Assembly Drawings for FOV Description.
Package Type		TO-5				Standard package hole size: \varnothing .150"
Operating Temperature	-50		100	T _a	$^{\circ}\text{C}$	
ST60R Thermistor Option	24	30	36	R _T	k Ω	PTC Poly-Silicon resistor on detector die.
ST60R Thermistor Temperature Coefficient of R	.107	.11	.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

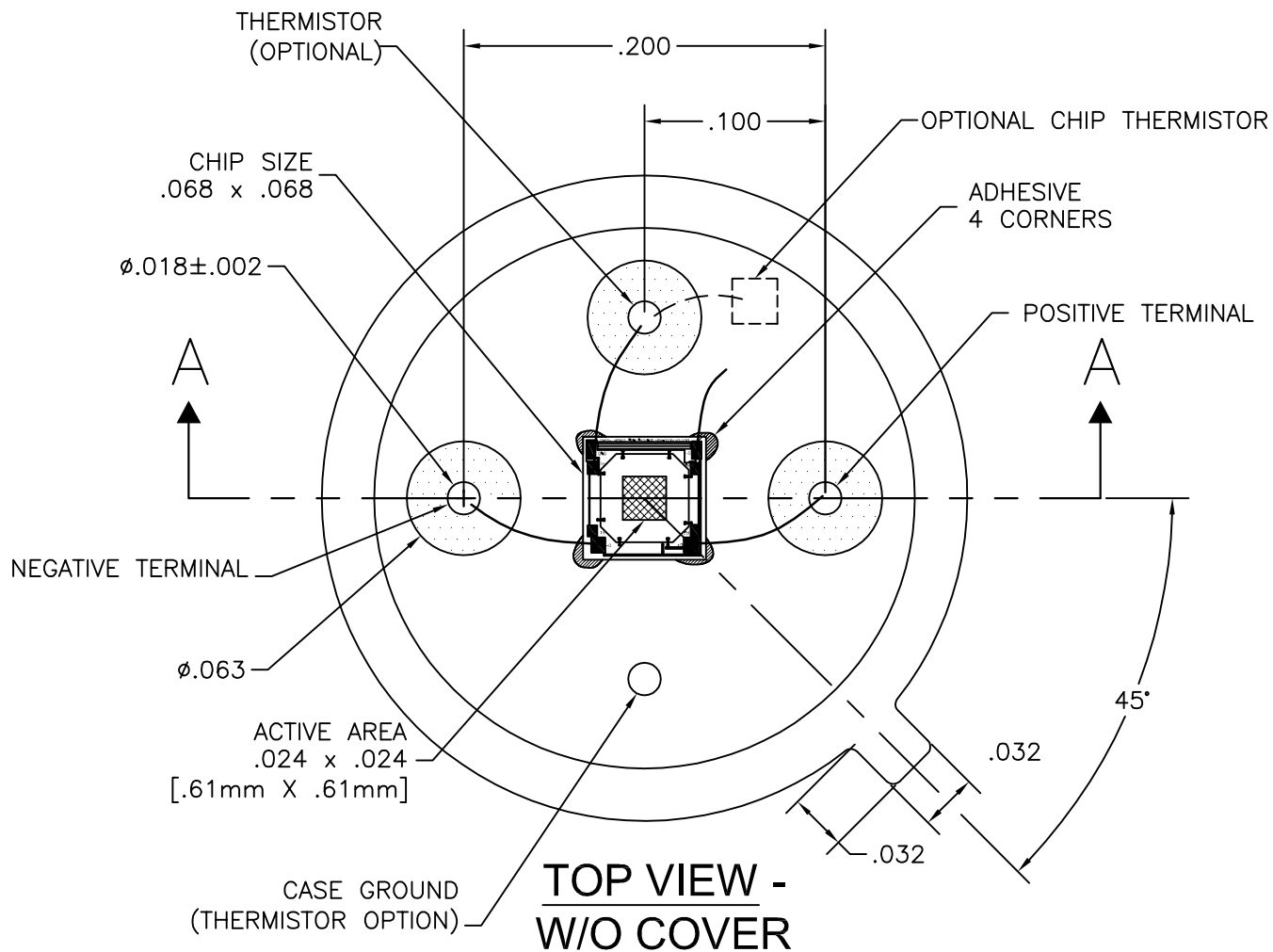
Notes: (1) Parameter is not 100% tested. 90% of all units meet these specifications. (2) A is detector area in cm². (3) Test Conditions: 500K Blackbody source; Detector active surface 10cm from 0.6513cm Diameter Blackbody Aperture.



Detector circuit overlay



ST60 TO-5

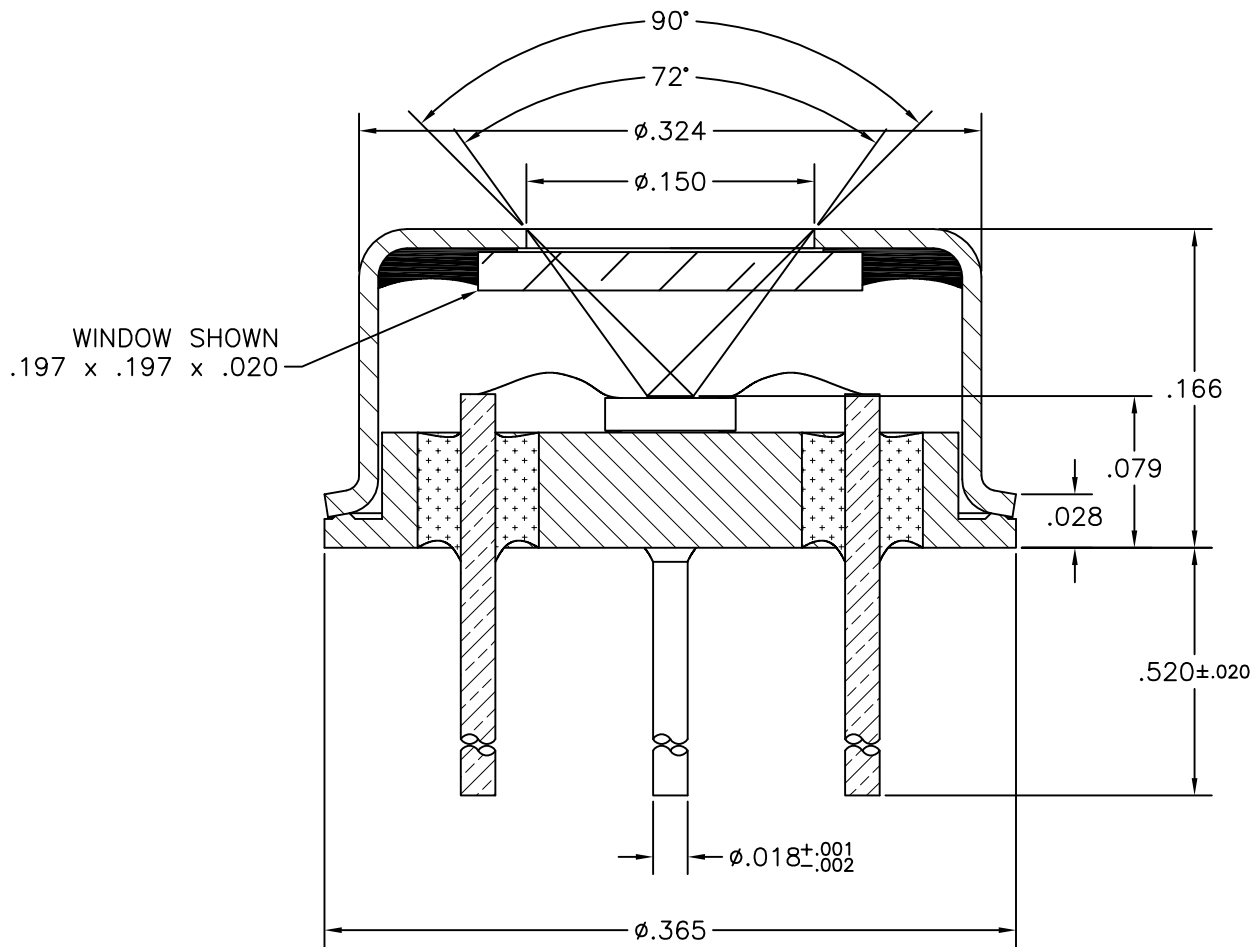


UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:

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

APPROVALS	DATE
DRAWN: DLJ	3/12/13
CHECKED:	
ENGINEERED:	
APPROVED:	

DEXTER RESEARCH CENTER, Inc.			
7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090			
ASSEMBLY, ST60, TO-5 RW, NO WELL HEADER, TOP VIEW			
SIZE: A	SCALE: 10" = 1"	DWG. NO. 1392.1	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 .XX ± .01 .XXX ± .005
APPROVALS	DATE
DRAWN: DLJ	5/22/13
CHECKED:	
ENGINEERED:	
APPROVED:	

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ASSEMBLY, ST60, TO-5 RW, NO WELL HEADER, CROSS SECTION			
SIZE: A	SCALE:	DWG. NO. 1392.2	REV. PAGE: B 2 OF 2
DRC PART NO.		MATERIAL:	FINISH: