



ST150 DUAL & ST150R DUAL

Silicon Based Thermopile Detector

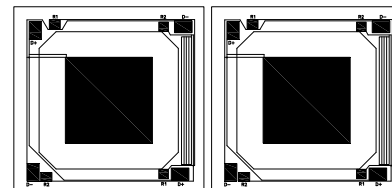
Features: A two-channel silicon-based thermopile detector in a TO-5 package. Each active area size is 1.5mm x 1.5mm. Affordable two-channel design with strong output and a very low Temperature Coefficient of Responsivity of $-0.04\%/^{\circ}\text{C}$.

Options: 1) See [Standard Windows and Filters](#) for list of optical filter options. 2)

ST150R Dual 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. See [Thermopile Configuration Table](#) for more options.

Application: Gas analysis for automotive emissions, environmental air quality, blood alcohol testing.

Benefits: Price and output with moderate signal-to-noise ratio.



Detector circuit overlay



ST150 Dual

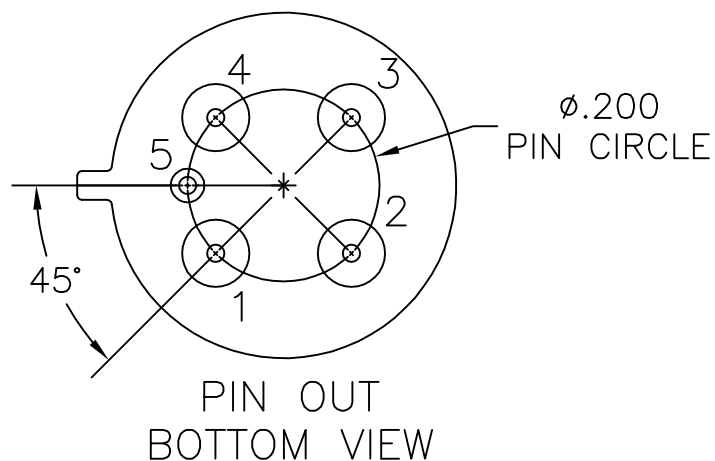
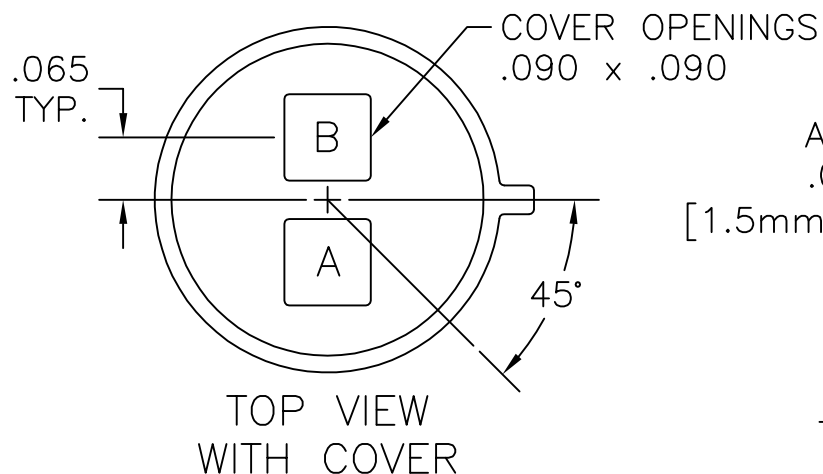
Technical Specifications

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		2				Per detector package.
Output Voltage	180	230	280	V _s	μV	DC, $H=330\mu\text{W}/\text{cm}^2$ (3)
Signal-to-Noise Ratio	4,063	5,990	8,946	SNR	$\sqrt{\text{Hz}}$	DC, $\text{SNR}=V_s/V_n$
Responsivity	24.2	31.0	37.7	\mathcal{R}	V/W	DC, $\mathcal{R}=V_s/HA$ (2)
Resistance	60	90	120	R	k Ω	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	38.4	44.3	V _n	nV/ $\sqrt{\text{Hz}}$	$V_n^2=4kTR$
Noise Equivalent Power	.83	1.24	1.83	NEP	nW/ $\sqrt{\text{Hz}}$	DC, $\text{NEP}=V_n HA/V_s$ (2)
Detectivity	.82	1.21	1.81	D*	10 ⁸ cm $\sqrt{\text{Hz}}/\text{W}$	DC, $D^*=V_s/V_n H\sqrt{A}$ (2)
Time Constant		38		\mathcal{T}	ms	Chopped, -3dB point (1)
Field of View		27°/99°		FOV	Degrees	See Assembly Drawings for FOV Description.
Package Type		TO-5,				Standard package hole size: (2) .090 X .090 sq. holes
Element Matching		5	10	\mathcal{M}	%	$\mathcal{M}= V_A-V_B /V_B$ (2)
Element Separation		3.30			mm	Center to Center
Operating Temperature	-50		100	T _a	°C	
ST150R Thermistor Option	55	75	95	R _T	k Ω	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)

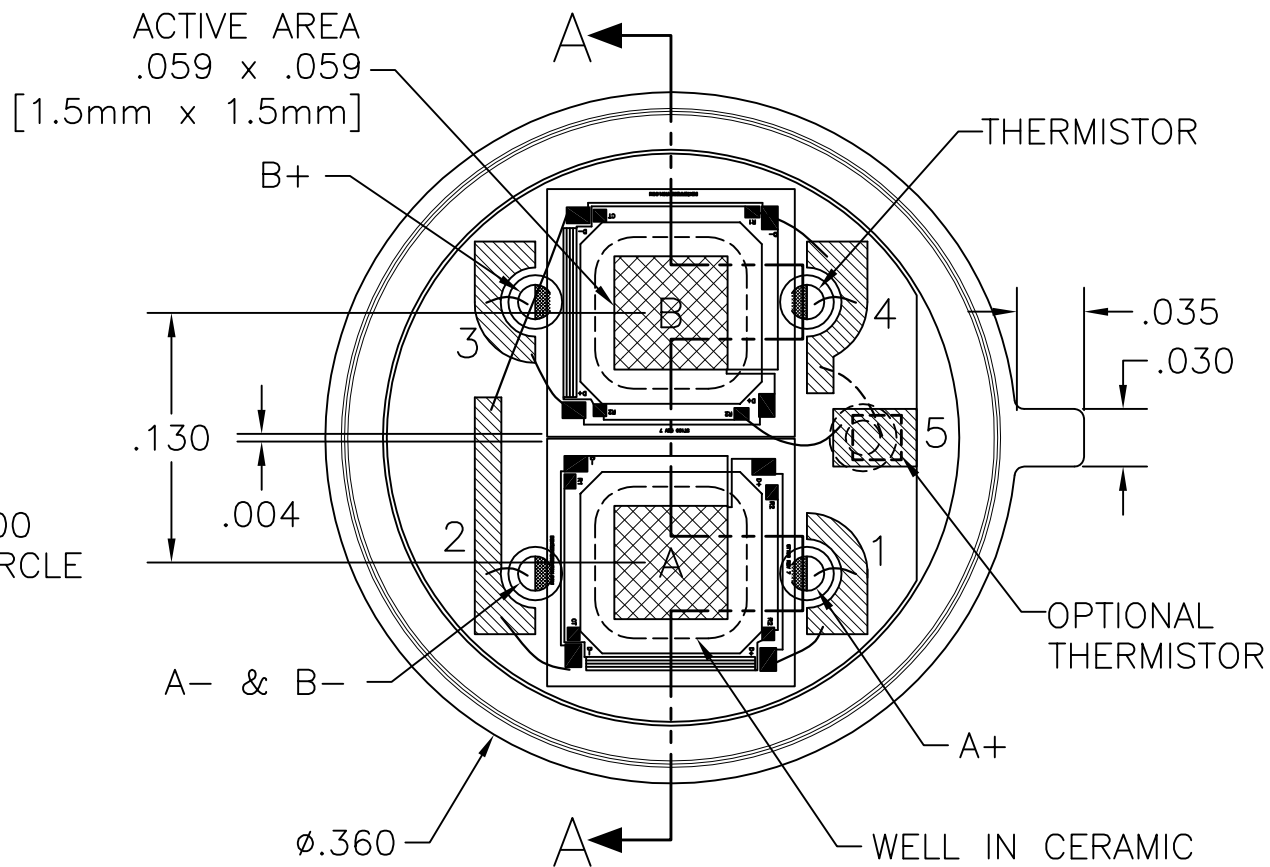
General Specifications: Flat spectral response from 100nm to > 100 μm . Linear signal output from 10⁻⁶ to 0.1W/cm². Maximum incident radiance 0.1W/cm², damage threshold $\geq .5\text{W}/\text{cm}^2$

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



PIN	ELEMENT	DESCRIPTION	P/N
1	A+		
2	DETECTOR COMMON (A- & B-)		
3	B+		
4	RESISTOR "ST150R"* OR THERMISTOR		
5	CASE GROUND, RESISTOR "ST150R"* OR THERMISTOR		

* DETECTOR DIE POLY-SILICON RESISTOR
NOTE: POSTS GROUND FOR DETECTOR DIE CLEARANCE



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:	
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ENGINEERED:	
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APPROVED:	
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DEXTER RESEARCH CENTER, Inc.

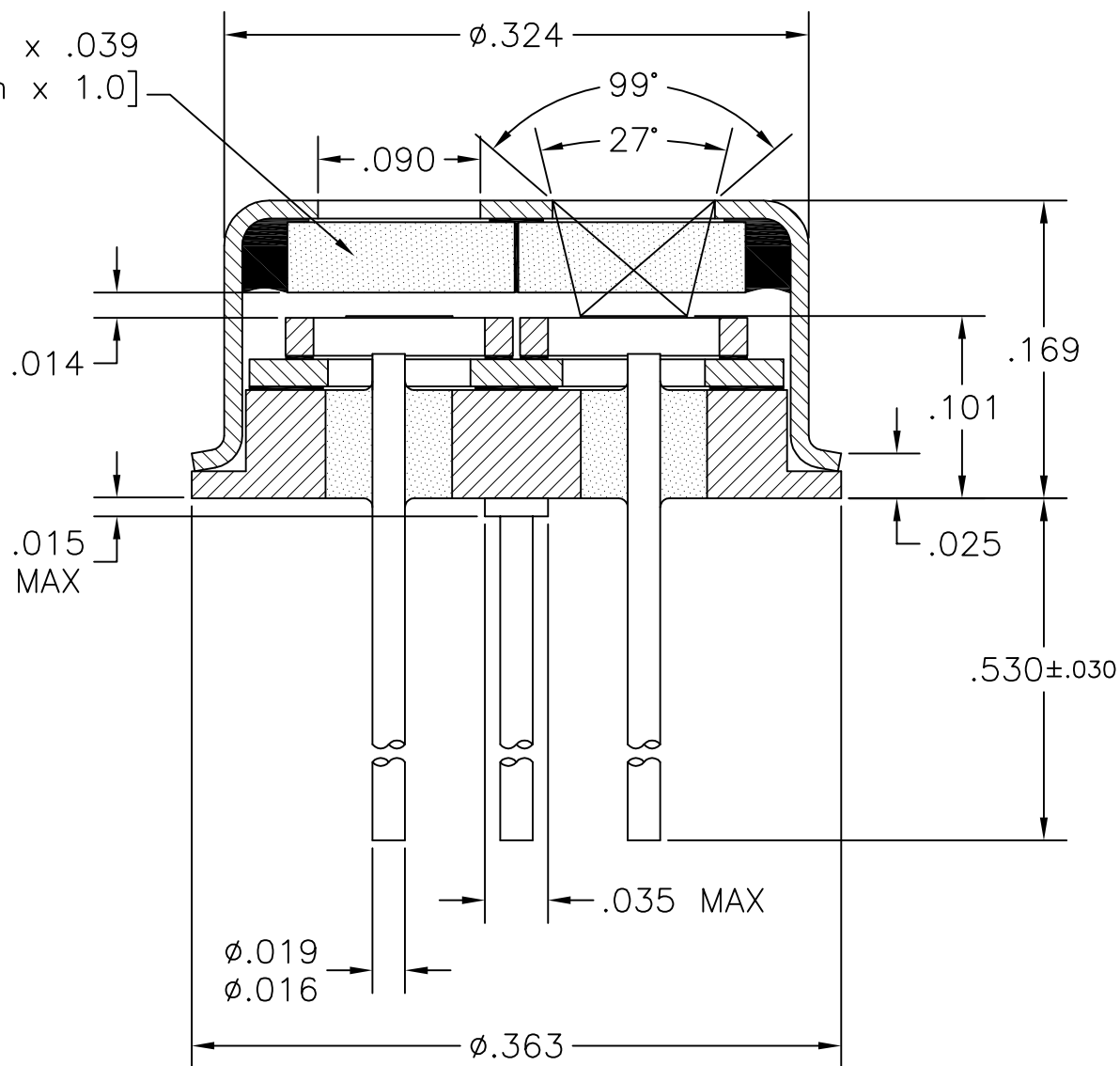
7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090

ASSEMBLY, ST150/ST150R DUAL
TO-5, TOP VIEW

SIZE:	SCALE:	DWG. NO.	REV.	PAGE:
A	10" = 1"	1117.1	C	1 OF 2

DRC PART NO.	MATERIAL:	FINISH:
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FILTER .126 x .126 x .039
[3.2mm x 3.2mm x 1.0]



UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE:	
FRACTIONS	DECIMALS
\pm	$.XX \pm .01$
	$.XXX \pm .005$
APPROVALS	DATE
DRAWN: DLJ	12/16/10
CHECKED:	
ENGINEERED:	
APPROVED:	

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

SIZE: A	SCALE: 10" = 1"	DWG. NO. 1117.2	REV. B	PAGE: 2 OF 2
DRC PART NO.		MATERIAL:	FINISH:	