



## ST150 QUAD & ST150R QUAD

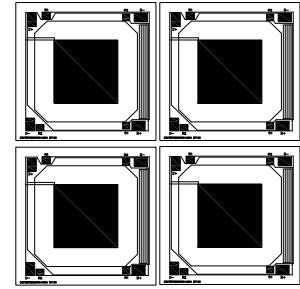
Silicon Based Thermopile Detector

**Features:** A four-channel silicon-based thermopile detector in a TO-8 package. Each active area size is 1.5mm x 1.5mm. Affordable four-channel design with strong output and 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.

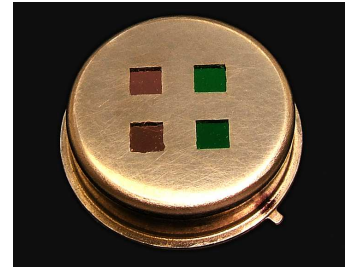
**Options:** 1) See [Standard Windows and Filters](#) for list of optical filter options. 2) **ST150R Quad** version offers a low-cost (20% tolerance) poly-silicon resistor to be used as a PTC thermistor. 3) Internal 30k $\Omega$  5% NTC chip thermistor provides ambient package temperature measurement. See [Thermistor Options](#) p/n: DC-4005. See [Thermopile Configuration Table](#) for more options.

**Applications:** Gas analysis for automotive exhaust and laser targeting.

**Benefits:** Low price and reasonably high output with moderate signal-to-noise ratio.



Detector circuit overlay



ST150 Quad

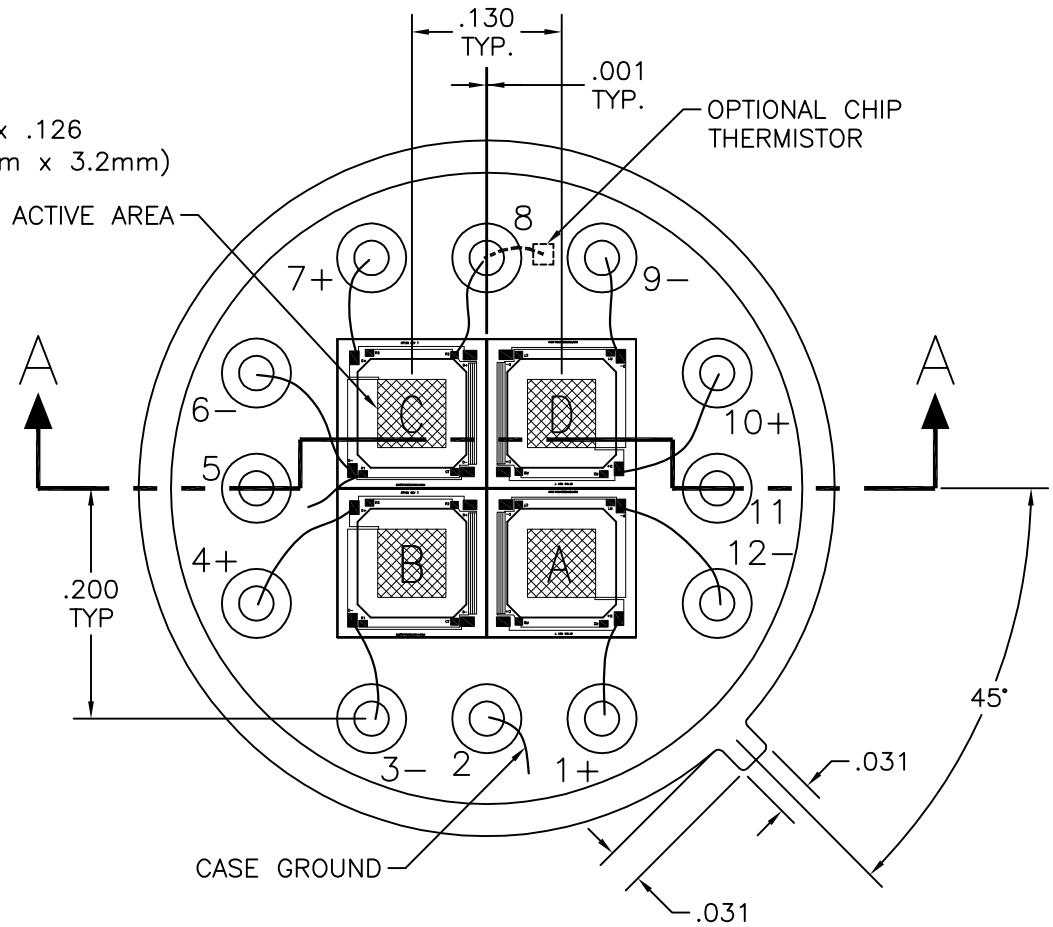
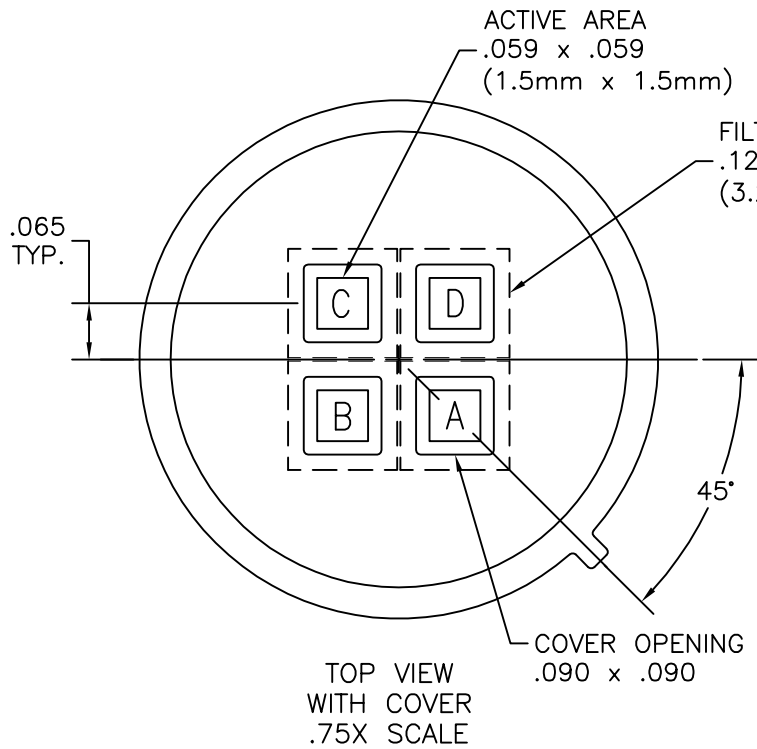
### Technical Specifications

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 <sup>2</sup>	
Number of Junctions	120					Per element.
Number of Channels	4					Per detector package.
Output Voltage	180	230	280	V <sub>s</sub>	$\mu\text{V}$	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, SNR=V <sub>s</sub> /V <sub>n</sub>
Responsivity	24.2	31.0	37.7	$\mathcal{R}$	V/W	DC, $\mathcal{R}=V_s/HA$ (2)
Resistance	60	90	120	R	k $\Omega$	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	31.3	38.4	44.3	V <sub>n</sub>	nV/ $\sqrt{\text{Hz}}$	V <sub>n</sub> <sup>2</sup> =4kTR
Noise Equivalent Power	.83	1.24	1.83	NEP	nW/ $\sqrt{\text{Hz}}$	DC, NEP= V <sub>n</sub> HA/V <sub>s</sub> (2)
Detectivity	.82	1.21	1.81	D*	10 <sup>8</sup> cm $\sqrt{\text{Hz}}/\text{W}$	DC, D*=V <sub>s</sub> /V <sub>n</sub> H $\sqrt{A}$ (2)
Time Constant		38		$\mathcal{T}$	ms	Chopped, -3dB point (1)
Field of View	27 $^{\circ}$ /99 $^{\circ}$			FOV	Degrees	See Assembly Drawings for FOV Description.
Package Type	TO-8					Standard package hole size: (4) .090 X .090 sq. holes
Element Matching	10	15	25	$\mathcal{M}$	%	$\mathcal{M}= V_A-V_B /V_B$ (2)
Element Separation		3.30			mm	Center to Center
Operating Temperature	-50		100	T <sub>a</sub>	$^{\circ}\text{C}$	
<b>ST150R</b> Thermistor Option	55	75	95	R <sub>T</sub>	k $\Omega$	PTC Poly-Silicon resistor on detector die.
<b>ST150R</b> 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 $\mu\text{m}$ . Linear signal output from 10<sup>-6</sup> to 0.1W/cm<sup>2</sup>. Maximum incident radiance 0.1W/cm<sup>2</sup>, damage threshold  $\geq$  .5W/cm<sup>2</sup>

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



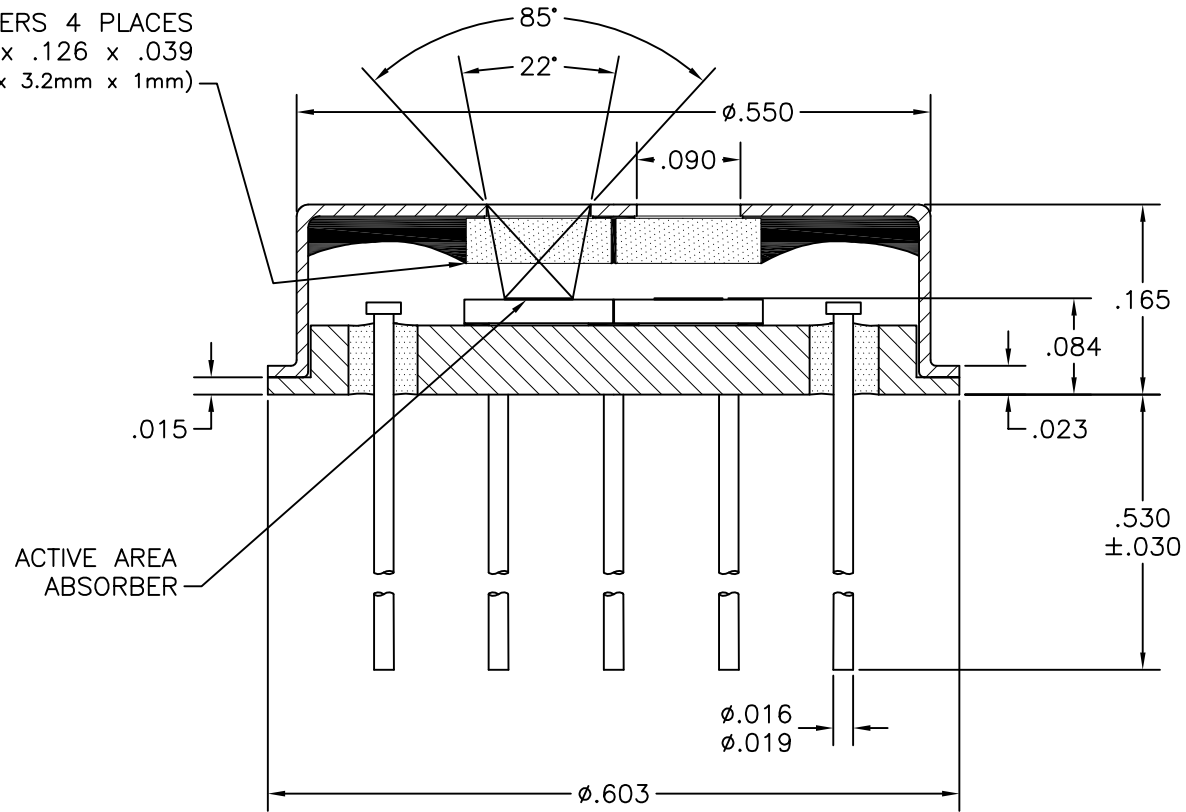
TOP VIEW  
WITHOUT COVER

PIN	ELEMENT	DESCRIPTION	P/N
12	A-		
1	A+		
3	B-		
4	B+		
5	NO CONNECTION		
6	C-		
7	C+		
9	D-		
10	D+		
11	NO CONNECTION		
2	CASE GROUND, RESISTOR "ST150R"* OR THERMISTOR		
8	RESISTOR "ST150R"* OR THERMISTOR		

NOTE: SOME ITEMS NOT SHOWN FOR CLARITY  
\* DETECTOR DIE POLY-SILICON RESISTOR

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES. TOLERANCES ARE:		DEXTER RESEARCH CENTER, Inc.			
FRACTIONS ±	DECIMALS .XX ± .01 .XXX ± .003	ANGLES ±	7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090		
APPROVALS	DATE	ASSEMBLY, ST150/ST150R QUAD TO-8, TOP VIEW			
DRAWN: DLJ	8/23/16	SIZE: A	SCALE: 6" : 1"	DWG. NO. 1082.1	REV. E
CHECKED:		DRC PART NO.	MATERIAL:	FINISH:	PAGE: 1 OF 2
ENGINEERED:					
APPROVED:					

FILTERS 4 PLACES  
 .126 x .126 x .039  
 (3.2mm x 3.2mm x 1mm)



ACTIVE AREA  
 ABSORBER

SECTION A-A

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.		DEXTER RESEARCH CENTER, Inc.			
TOLERANCES ARE:		7300 Huron River Dr., Dexter, MI 48130, ph. 734-426-3921 fax 734-426-5090			
FRACTIONS ±	DECIMALS .XX ± .01 .XXX ± .005	ANGLES ±			
APPROVALS	DATE				
DRAWN: DLJ	12/16/10	ASSEMBLY, ST150/ST150R QUAD, T0-8, CROSS SECTION			
CHECKED:		SIZE: <b>A</b>	SCALE: 6" : 1"	DWG. NO. 1082.2	REV. C
ENGINEERED:		DRC PART NO.		MATERIAL:	PAGE: 2 OF 2
APPROVED:					FINISH: