



# ST60 High Temperature

Silicon Based Thermopile Detector **"PRELIMINARY"**

**Features:** : A single-channel silicon-based thermopile that will withstand operating temperatures of 225°C, with a small active area of 0.61mm x 0.61mm in a TO-5 package. The reduced height package functions as an internal aperture. Two thermistor options provide ambient package temperature measurement. Currently only available with 8-14um silicon window. Time constant of 18ms with Nitrogen encapsulation gas delivers a very low Temperature Coefficient of Responsivity of -0.4%/°C. This detector has a very short thermal shock response to ambient temperature change.

**Options:** **1)** ST60R version offers a low-cost (20% tolerance) poly-silicon resistor to be used as a PTC thermistor. **2)** Package hole size options precisely define active area for applications with FOV and/or spot size requirements. See *Thermopile Configuration Table* for more information.

**Applications:** Excellent for non-contact temperature measurement in extreme heat environments.

**Benefit:** Operating temperatures to 225°C with small active area size with medium output

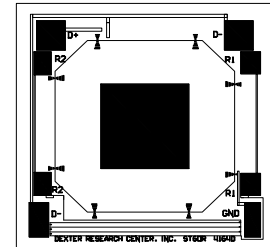
## Technical Specifications

Specifications apply at 23°C with 8-14um Silicon 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 <sup>2</sup>	
Number of Junctions		80				Per element.
Number of Channels		1				Per detector package.
Output Voltage	18.1	27.1	29.7	V <sub>s</sub>	μV	DC, H=330μW/cm <sup>2</sup> (3)
Signal-to-Noise Ratio	535	865	1095	SNR	√Hz	DC, SNR=V <sub>s</sub> /V <sub>n</sub>
Responsivity	14.7	22.1	24.2	ℜ	V/W	DC, ℜ=V <sub>s</sub> /HA (2)
Resistance	45	60	70	R	kΩ	Detector element
Temperature Coefficient of ℜ		-.04			%/°C	Best linear fit, 0° to 85°C (1)
Temperature Coefficient of R		.11			%/°C	Best fit, 0° to 85°C (1)
Noise Voltage	.27	.31	.34	V <sub>n</sub>	nV/√Hz	V <sub>n</sub> <sup>2</sup> =4kTR
Noise Equivalent Power	1.12	1.42	2.30	NEP	nW/√Hz	DC, NEP= V <sub>n</sub> HA/V <sub>s</sub> (2)
Detectivity	.27	.43	.54	D*	10 <sup>8</sup> cm√Hz/W	DC, D*=V <sub>s</sub> / V <sub>n</sub> H√A (2)
Time Constant		18		τ	ms	Chopped, -3dB point (1)
Field of View		48°/93°		FOV	Degrees	See Assembly Drawings for FOV Description.
Package Type		TO-5				Standard package hole size: ∅.059"
Operating Temperature	-50		225	T <sub>a</sub>	°C	With short durations to 250°C
<b>ST60R</b> Thermistor Option	24	30	36	R <sub>T</sub>	kΩ	PTC Poly-Silicon resistor on detector die.
<b>ST60R</b> Thermistor Temperature Coefficient of R	.107	.11	.113		%/°C	ΔR/(RΔT), Best fit, 0° to 85°C (1)

**General Specifications:** Flat spectral response from 8-14μm. 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 ≥ .5W/cm<sup>2</sup>

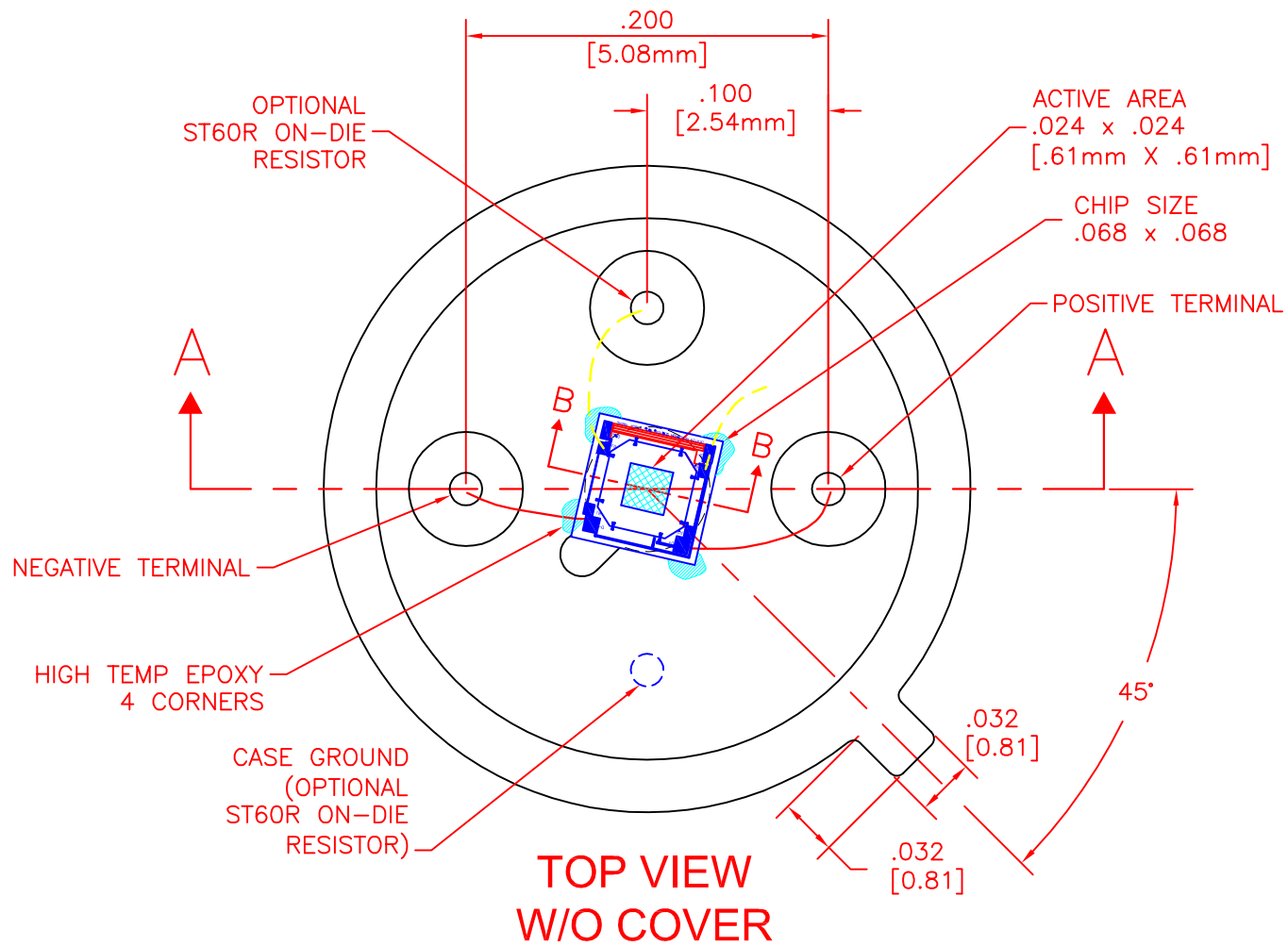
**Notes:** (1) Parameter is not 100% tested. 90% of all units meet these specifications. (2) A is detector area in cm<sup>2</sup>. (3) Test Conditions: 500K Blackbody source; Detector active surface 10cm from 0.6513cm Diameter Blackbody Aperture.

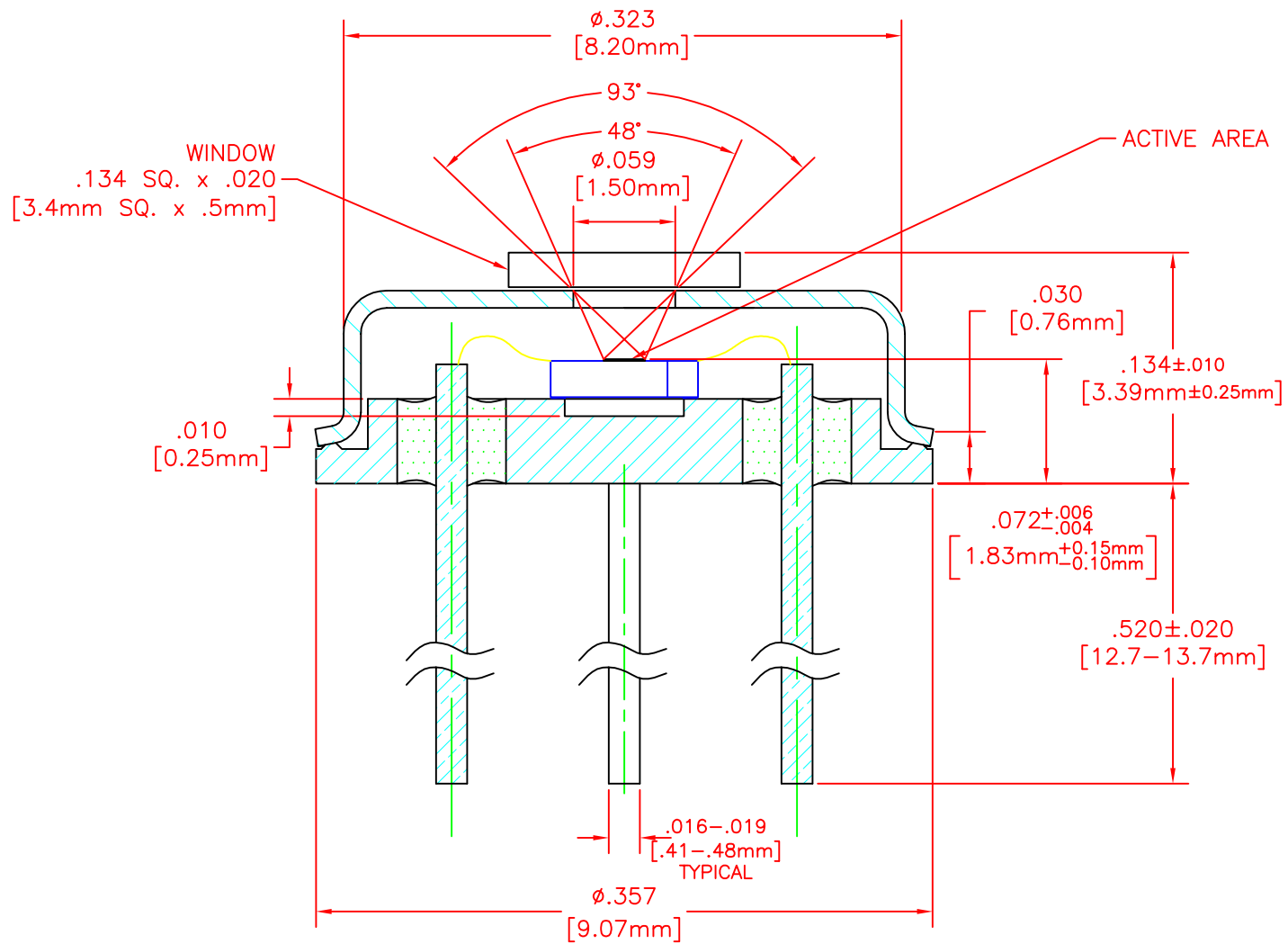


Detector die layout



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SECTION A-A