



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 and fire detection/suppression in extreme heat environments.

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

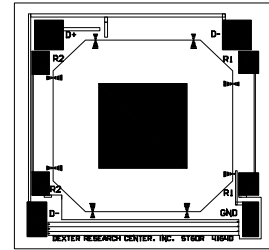
Technical Specifications

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 ²	
Number of Junctions	80					Per element.
Number of Channels	1					Per detector package.
Output Voltage	18.1	27.1	29.7	V _s	μV	DC, H=330μW/cm ² (3)
Signal-to-Noise Ratio	535	865	1095	SNR	√Hz	DC, SNR=V _s /V _n
Responsivity	14.7	22.1	24.2	ℜ	V/W	DC, ℜ=V _s /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 _n	nV/√Hz	V _n ² =4kTR
Noise Equivalent Power	1.12	1.42	2.30	NEP	nW/√Hz	DC, NEP= V _n HA/V _s (2)
Detectivity	.27	.43	.54	D*	10 ⁸ cm√Hz/W	DC, D*=V _s /V _n 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 _a	°C	With short durations to 250°C
ST60R Thermistor Option	24	30	36	R _T	kΩ	PTC Poly-Silicon resistor on detector die.
ST60R 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 10⁻⁶ to 0.1W/cm². Maximum incident radiance 0.1W/cm², damage threshold ≥ .5W/cm²

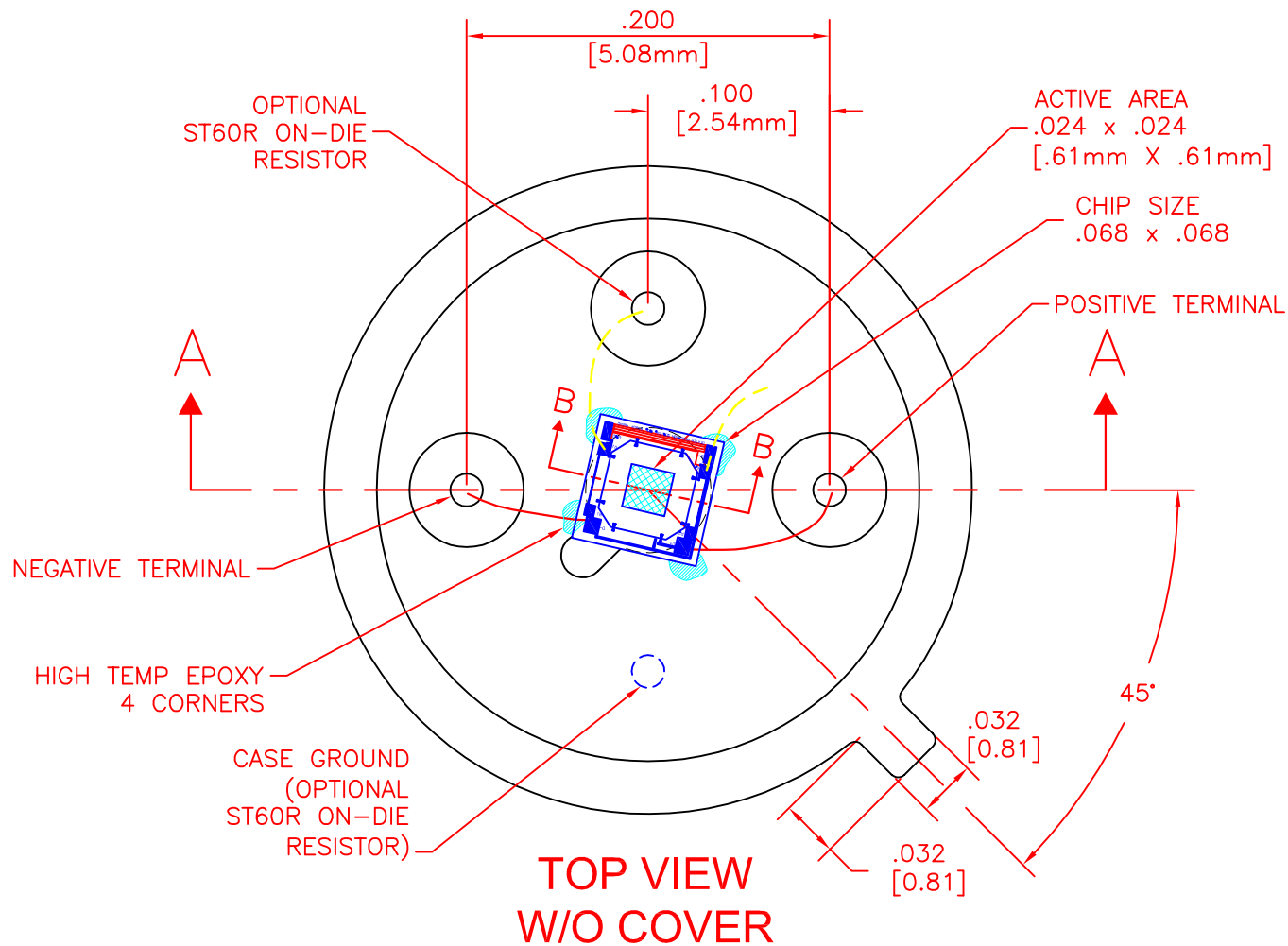
Notes: (1) Parameter is not 100% tested. 90% of all units meet these specifications. (2) A is detector area in cm². (3) Test Conditions: 500K Blackbody source; Detector active surface 10cm from 0.6513cm Diameter Blackbody Aperture.



Detector die layout



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UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.

TOLERANCES ARE:

FRACTIONS	DECIMALS	ANGLES
±	.XX ± .01	±
	.XXX ± .005	

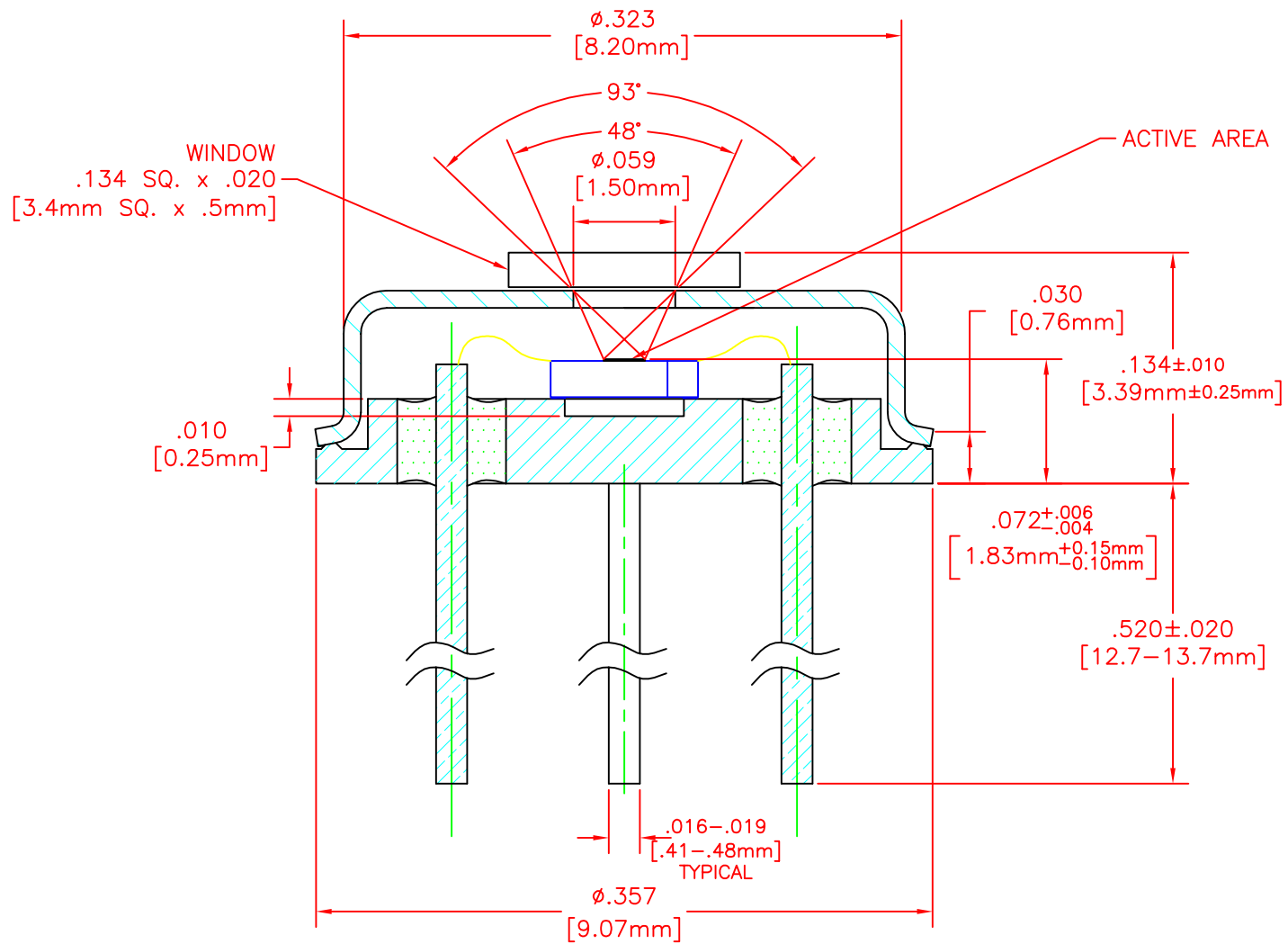
APPROVALS	DATE
DRAWN: DLJ	3/29/11
CHECKED:	
ENGINEERED:	
APPROVED:	

DEXTER RESEARCH CENTER, Inc.

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ASSEMBLY, ST60 HIGH TEMPERATURE
 Ø.059 HOLE, TOP VIEW

SIZE:	SCALE:	DWG. NO.	REV.	PAGE:
A	10" = 1"	1363.1	NC	1 OF 2
DRC PART NO.		MATERIAL:	FINISH:	



SECTION A-A

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.

TOLERANCES ARE:
 FRACTIONS ± .XX ± .01
 DECIMALS ± .XXX ± .005
 ANGLES ±

APPROVALS	DATE
DRAWN: DLJ	3/25/11
CHECKED:	
ENGINEERED:	
APPROVED:	

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ASSEMBLY, ST60 HIGH TEMPERATURE
 $\phi.059$ HOLE, CROSS SECTION

SIZE: A	SCALE: 10" = 1"	DWG. NO. 1363.2	REV. NC	PAGE: 2 OF 2
DRC PART NO.		MATERIAL:		FINISH: