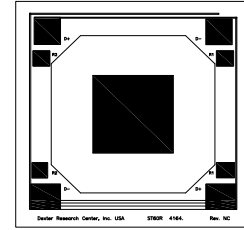




## ST60 TO-18 & ST60R TO-18

### 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 small TO-18 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.



Detector circuit overlay

**Options:** 1) See [Standard Windows and Filters](#) for list of optical filter options. 2) **ST60R TO-18** version offers a low-cost (20% tolerance) poly-silicon resistor to be used as a PTC thermistor. 3) Internal  $30\text{k}\Omega$  5% NTC chip thermistor provides ambient package temperature measurement. See [Thermistor Options](#) p/n: DC-4005. See [Thermopile Configuration Table](#) for more options.

**Applications:** Excellent for non-contact temperature, horizon sensor, tympanic ear thermometer, infant thermometer applications.

**Benefit:** High output, small active area, fast time constant in a small package.



ST60 TO-18

### Technical Specifications

Specifications apply at  $23^{\circ}\text{C}$  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	$\text{mm}^2$	
Number of Junctions	80					Per element.
Number of Channels	1					Per detector package.
Output Voltage	65	85	95	$V_s$	$\mu\text{V}$	DC, $H=330\mu\text{W}/\text{cm}^2$ (3)
Signal-to-Noise Ratio	1,994	2,834	3,502	SNR	$\sqrt{\text{Hz}}$	DC, $\text{SNR}=V_s/V_n$
Responsivity	52.9	69.2	77.4	$\mathcal{R}$	$\text{V}/\text{W}$	DC, $\mathcal{R}=V_s/HA$ (2)
Resistance	45	55	65	R	$\text{k}\Omega$	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	.105				$\%/^{\circ}\text{C}$	Best fit, $0^{\circ}$ to $85^{\circ}\text{C}$ (1)
Noise Voltage	27.1	30.0	32.6	$V_n$	$\text{nV}/\sqrt{\text{Hz}}$	$V_n^2=4\text{kTR}$
Noise Equivalent Power	.35	.43	.62	NEP	$\text{nW}/\sqrt{\text{Hz}}$	DC, $\text{NEP}=V_n HA/V_s$ (2)
Detectivity	.99	1.41	1.74	$D^*$	$10^8\text{cm}\sqrt{\text{Hz}}/\text{W}$	DC, $D^*=V_s/V_n H\sqrt{A}$ (2)
Time Constant	18			$\mathcal{T}$	ms	Chopped, -3dB point (1)
Field of View	$40^{\circ}/69^{\circ}$			FOV	Degrees	See Assembly Drawings for FOV Description.
Package Type	TO-18					Standard package hole size: $\varnothing.080''$
Operating Temperature	-50		100	$T_a$	$^{\circ}\text{C}$	
<b>ST60R</b> Thermistor Option	24	28	34	$R_T$	$\text{k}\Omega$	PTC Poly-Silicon resistor on detector die.
<b>ST60R</b> Thermistor Temperature Coefficient of R	.100	.105	.110		$\%/^{\circ}\text{C}$	$\Delta R/(R\Delta T)$ , 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  $10^{-6}$  to  $0.1\text{W}/\text{cm}^2$ . Maximum incident radiance  $0.1\text{W}/\text{cm}^2$ , 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  $\text{cm}^2$ . (3) Test Conditions: 500K Blackbody source; Detector active surface 10cm from  $0.6513\text{cm}$  Diameter Blackbody Aperture.