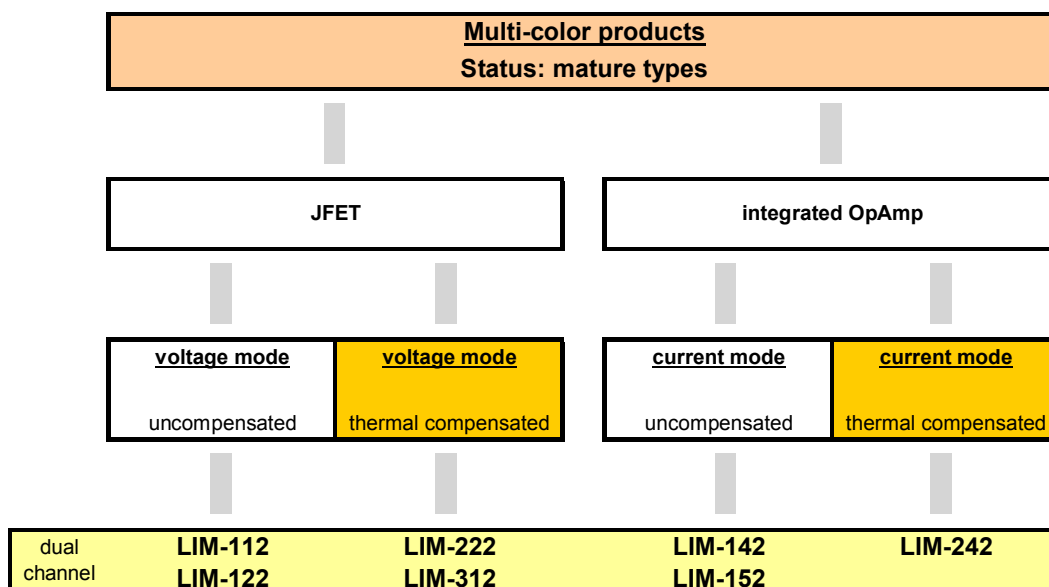
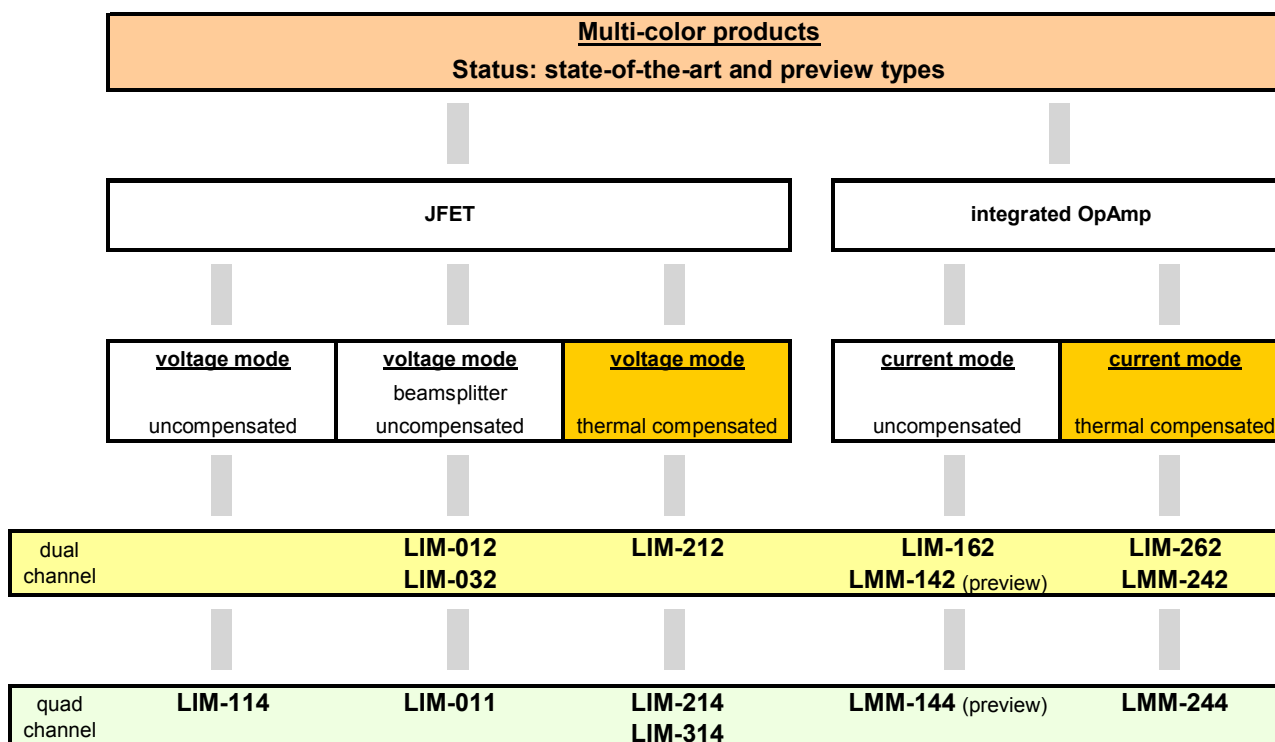


Pyroelectric and Multispectral Detectors

Multi-color Products / PyroMid®



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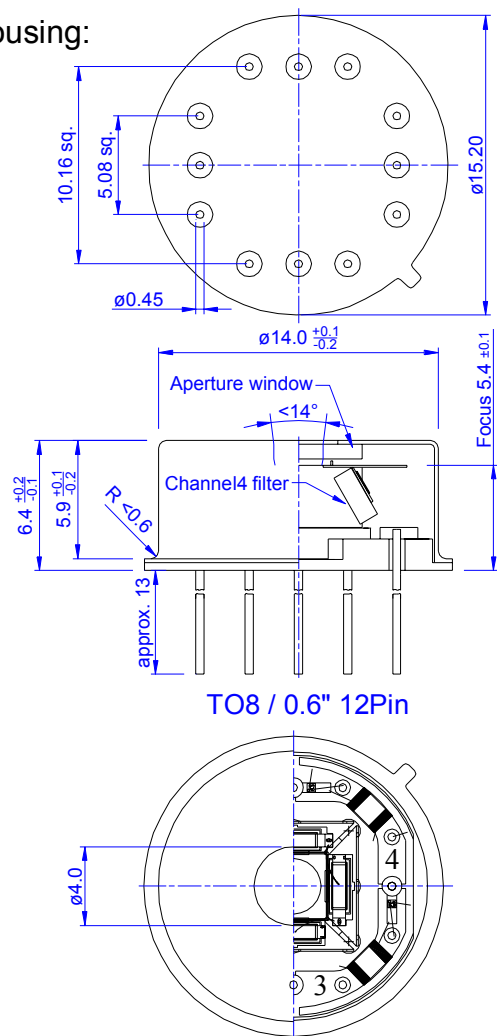
LIM-011-# LIM-012-#

Dual and Quad channel pyroelectric PyroMid®
detectors with beamsplitter

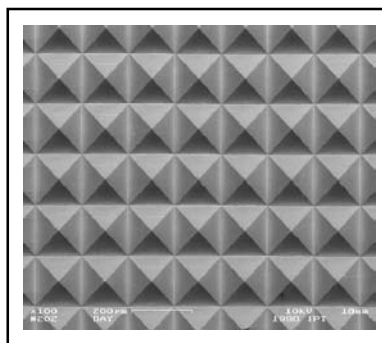
Description: LIM-011-# [# = extension code]
quad color, TO8, with micro pyramid beamsplitter; for voltage mode

LIM-012-# [# = extension code]
dual color, TO8, with micro V-groove beamsplitter; for voltage mode

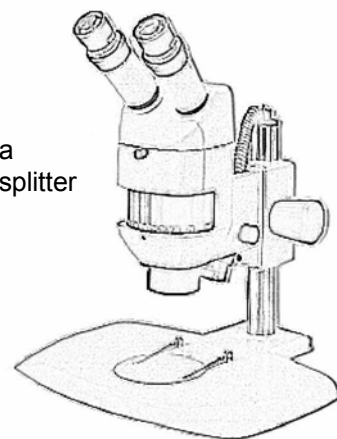
Housing:



More than 25 micro V-grooves (100µm pitch) or 200 micro pyramids (pitch 150µm) divide the incident radiation into two (LIM-012) or four (LIM-011) spectral channels (patented). Measuring errors by an asymmetrical illumination of the aperture are reduced considerably.



SEM photograph of a
micro pyramid beamsplitter



Multi-color Products

Selection guide:

Type	Spectral channels	Pin compatible with detectors without beamsplitter (buttonhole design)	Status
LIM-011	4	LIM-114, LIM-214, LIM-314	state-of-the-art
LIM-012	2	LIM-112, LIM-212, LIM-312	state-of-the-art

PyroMid® is a registered trademark of InfraTec GmbH
PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

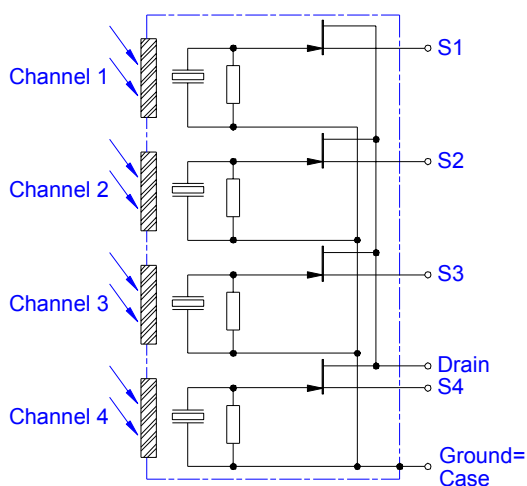
LIM-011-#

LIM-012-#

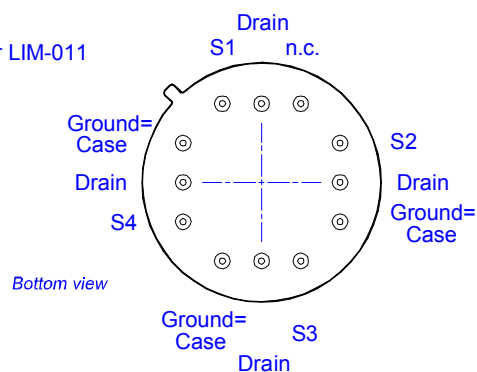
Dual and Quad channel pyroelectric PyroMid®
detectors with beamsplitter

Aperture size	ø 2.5 mm
Element size / type	1.3x2.2 mm ² lithium tantalate with black layer
Beamsplitter	array of micropyramids
Electrical time constant	standard = 5 s
Thermal time constant	100 ms
Polarity	positive signal by positive flux change
Responsivity [LIM-011/ LIM-012] {aperture ø2.5, 500K, 10Hz, 25°C, without window}	> 70 V/W / > 150 V/W
Noise density {single element, 10Hz, BW 1Hz, 25°C}	< 200 nV/Hz ^{1/2}
Detectivity [LIM-011/ LIM-012] {aperture ø2.5, 500K, 10Hz, 1Hz, 25°C, without window}	>1.0*10 ⁸ cmHz ^{1/2} /W / >1.7*10 ⁸ cmHz ^{1/2} /W
Offset voltage {U _D =9V, I _{Dopt} =10-100µA}	0.4 - 1.5 V
U _{DSmax}	18 V
Operating / Storage temperature	-25 ... +85°C
Aperture window	CaF ₂ 0.4mm thick, customized window upon request.
Channel filters	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:



Channels 2 and 4 only for LIM-011



Please note: The current between case and the "case"- pin should never exceed 10 mA!

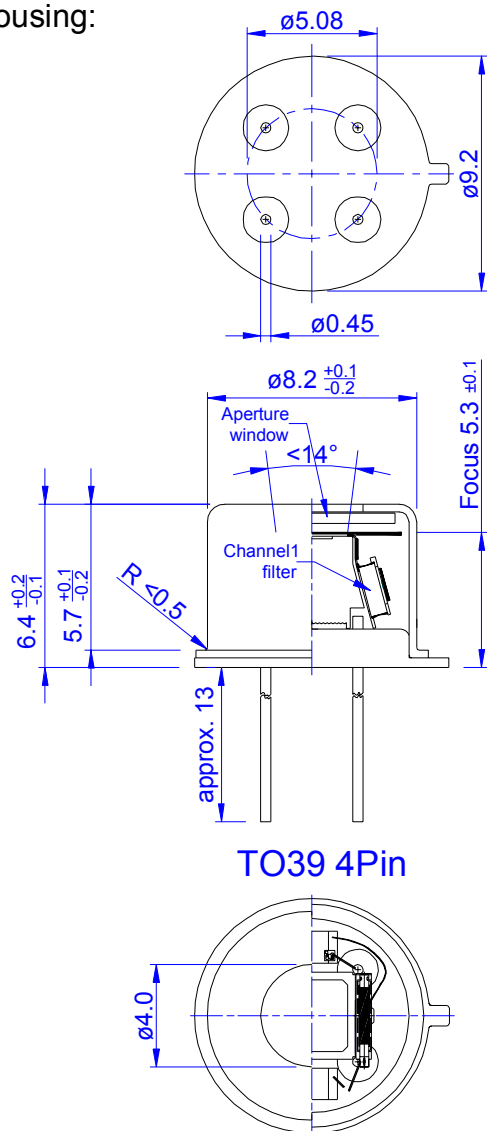
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LIM-032-#

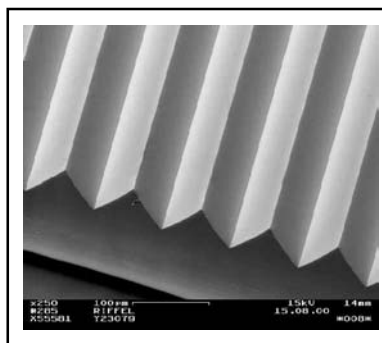
Dual channel pyroelectric PyroMid® detector
with beamsplitter, small size

Description: LIM-032-# [# = extension code]
dual color, TO39, with micro V-groove beamsplitter; for voltage mode

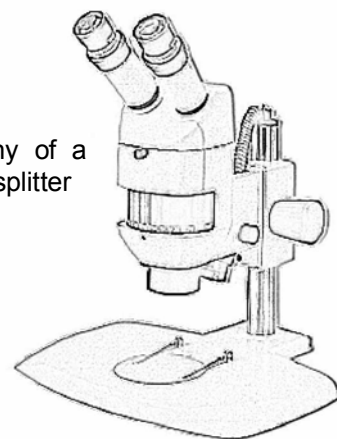
Housing:



More than 25 micro V-grooves (100µm pitch) divide the incident radiation into two spectral channels (patented). Measuring errors by an asymmetrical illumination of the aperture are reduced considerably.



SEM photograph of a
V-grooves beamsplitter



Multi-color Products

Selection guide:

Type	Spectral channels	Pin compatible with detectors without beamsplitter (buttonhole design)	Status
LIM-032	2	LIM-122, LIM-222	state-of-the-art

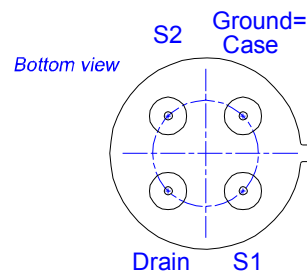
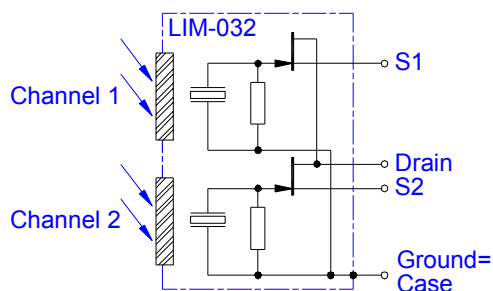
PyroMid® is a registered trademark of InfraTec GmbH
PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

LIM-032-#

Dual channel pyroelectric PyroMid® detector
with beamsplitter, small size

Aperture size	2.8 mm sq.
Element size / type	1.3x2.2mm ² lithium tantalate with black layer
Beamsplitter	array of micropyramids
Electrical time constant	standard = 5 s
Thermal time constant	100 ms
Polarity	positive signal by positive flux change
Responsivity {aperture 2.8 sq., 500K, 10Hz, 25°C, without window}	> 110 V/W
Noise density {single element, 10Hz, BW 1Hz, 25°C}	< 200 nV/Hz ^{1/2}
Detectivity {aperture 2.8 sq., 500K, 10Hz, 1Hz, 25°C, without window}	> 1.5*10 ⁸ cmHz ^{1/2} /W
Offset voltage {U _D =9V, I _{Dopt} =10-100µA}	0.4 - 1.5 V
U _{DSmax}	18 V
Operating / Storage temperature	-25 ... +85 °C
Aperture window	CaF ₂ 0.4mm thick, customized window upon request.
Channel filters	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:



Please note: The current between case and the "case"- pin should never exceed 10 mA!

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LIM-112-#

LIM-212-# / LIM-312-#

Dual channel pyroelectric PyroMid® detector
buttonhole design

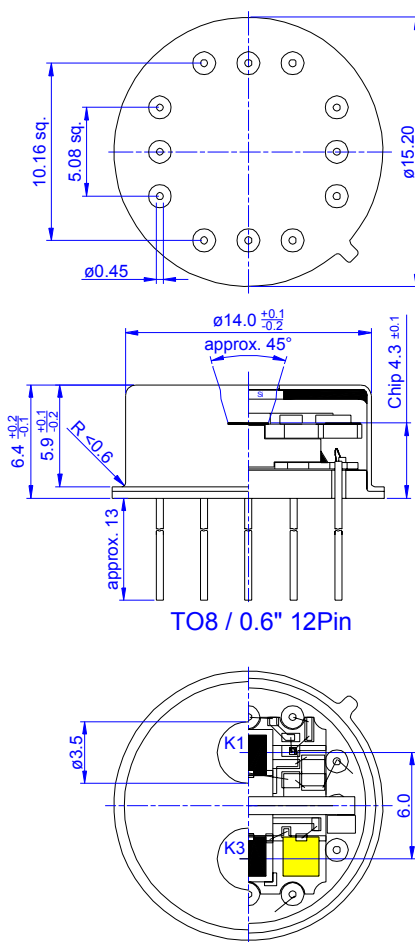
Description:

LIM-112-# [# = extension code]
dual color, TO8; for voltage mode

LIM-212-# [# = extension code]
dual color, TO8, thermal compensated; for voltage mode

LIM-312-# [# = extension code]
dual color, TO8, thermal compensated; for voltage mode

Housing:



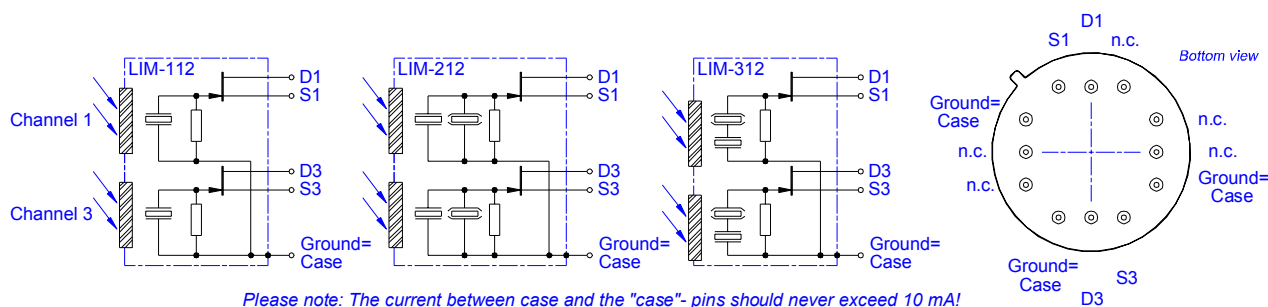
Selection guide:

Type	Thermal compensation	Responsivity related to LIM-112	Detectivity related to LIM-112	Status
LIM-112	no	100%	100%	mature
LIM-212	improved	50%	60%	state-of-the-art
LIM-312	standard	100%	55%	mature

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PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

LIM-112-#**LIM-212-# / LIM-312-#**Dual channel pyroelectric PyroMid® detector
buttonhole design

Aperture size	ø 9.5 mm, single channel ø 3.5 mm
Element type	2x2 mm ² lithium tantalate with black layer
Electrical time constant [LIM-112 / -212 / -312]	standard = 5 s / 5 s / 2.5 s
Thermal time constant	100 ms
Polarity	positive signal by positive flux change
Responsivity [LIM-112 / -212 / -312] {single element, 500K, 10Hz, 25°C, without window}	> 300 V/W / > 150 V/W / > 300 V/W
Noise density [LIM-112 / -212 / -312] {single element, 10Hz, BW 1Hz, 25°C}	< 150 nV/Hz ^{1/2} / < 130 nV/Hz ^{1/2} / < 280 nV/Hz ^{1/2}
Detectivity [LIM-112 / -212 / -312] {single element, 500K, 10Hz, 1Hz, 25°C, without window}	>4.0*10 ⁸ cmHz ^{1/2} /W / >2.4*10 ⁸ cmHz ^{1/2} /W / >2.2*10 ⁸ cmHz ^{1/2} /W
Offset voltage {U _D =9V, I _{Dopt} =10-100µA}	0.4 - 1.5 V
U _{DSmax}	18 V
Operating / Storage temperature	-25 ... +85°C
Window cap	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:

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LIM-114-#

Quad channel pyroelectric PyroMid® detector
buttonhole design

LIM-214-# / LIM-314-#

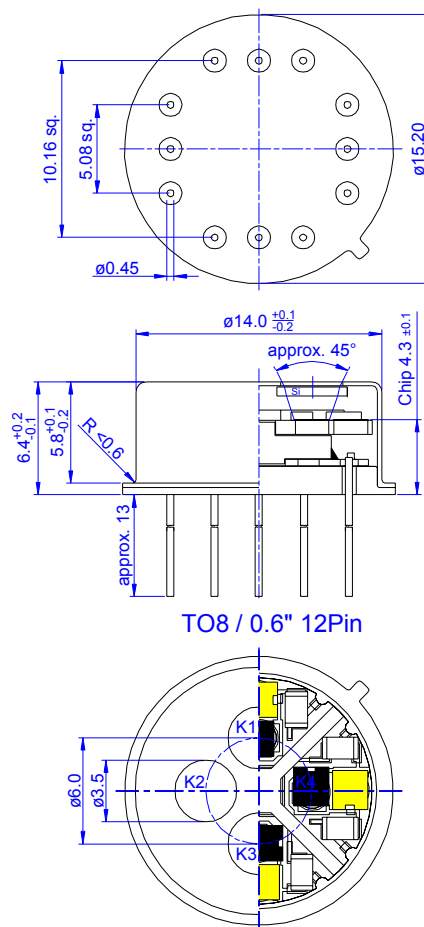
Description:

LIM-114-# [# = extension code]
quad color, TO8; for voltage mode

LIM-214-# [# = extension code]
quad color, TO8, thermal compensated; for voltage mode

LIM-314-# [# = extension code]
quad color, TO8, thermal compensated; for voltage mode

Housing:



TO8 / 0.6" 12Pin

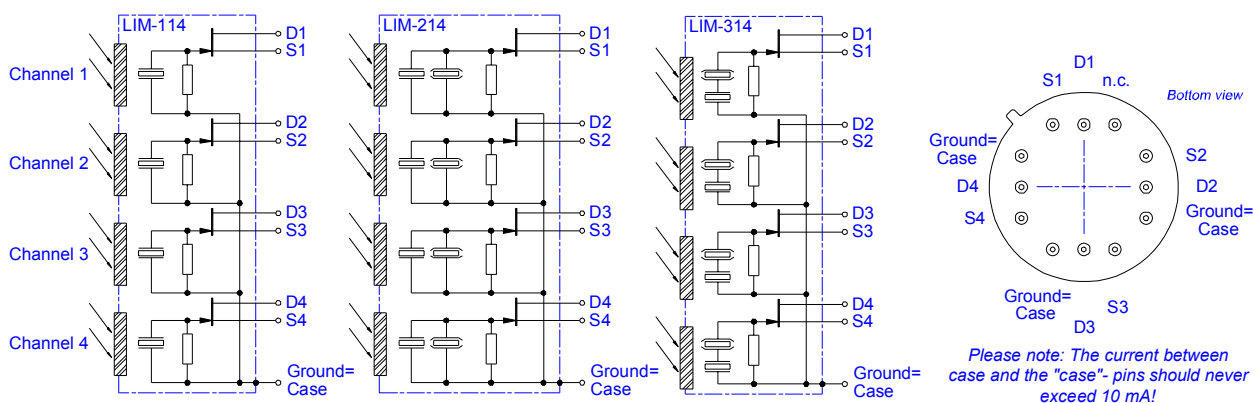
Selection guide:

Type	Thermal compensation	Responsivity related to LIM-114	Detectivity related to LIM-114	Status
LIM-114	no	100%	100%	state-of-the-art
LIM-214	improved	50%	60%	state-of-the-art
LIM-314	standard	100%	55%	state-of-the-art

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PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

LIM-114-#**LIM-214-# / LIM-314-#**Quad channel pyroelectric PyroMid® detector
buttonhole design

Aperture size	ø 9.5 mm, single channel ø 3.5 mm
Element type	2x2 mm ² lithium tantalate with black layer
Electrical time constant [LIM-114 / -214 / -314]	standard = 5 s / 5 s / 2.5 s
Thermal time constant	100 ms
Polarity	positive signal by positive flux change
Responsivity [LIM-114 / -214 / -314] {single element, 500K, 10Hz, 25°C, without window}	> 300 V/W / > 150 V/W / > 300 V/W
Noise density [LIM-114 / -214 / -314] {single element, 10Hz, BW 1Hz, 25°C}	< 150 nV/Hz ^{1/2} / < 130 nV/Hz ^{1/2} / < 280 nV/Hz ^{1/2}
Detectivity [LIM-114 / -214 / -314] {single element, 500K, 10Hz, 1Hz, 25°C, without window}	>4.0*10 ⁸ cmHz ^{1/2} /W / >2.4*10 ⁸ cmHz ^{1/2} /W / >2.2*10 ⁸ cmHz ^{1/2} /W
Offset voltage {U _D =9V, I _{Dopt} =10-100µA}	0.4 - 1.5 V
U _{DSmax}	18 V
Operating / Storage temperature	-25 ... +85°C
Window cap	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:

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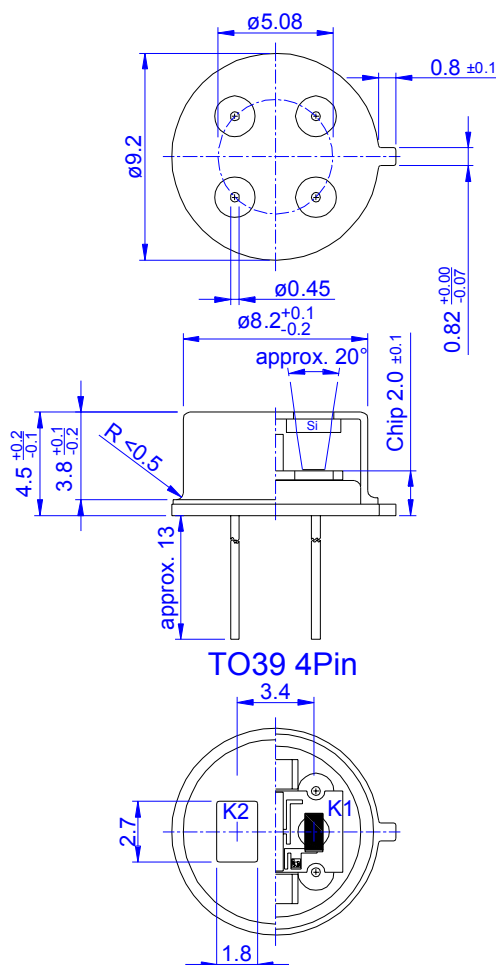
LIM-122-# LIM-222-#

Dual channel pyroelectric PyroMid® detectors
buttonhole design, small size

Description: LIM-122-# [# = extension code]
dual color, TO39; for voltage mode

LIM-222-# [# = extension code]
dual color, TO39, thermal compensated; for voltage mode

Housing:



Selection guide:

Type	Thermal compensation	Responsivity related to LIM-122	Rectivity related to LIM-122	Status
LIM-122	no	100%	100%	mature
LIM-222	improved	50%	55%	mature

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PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

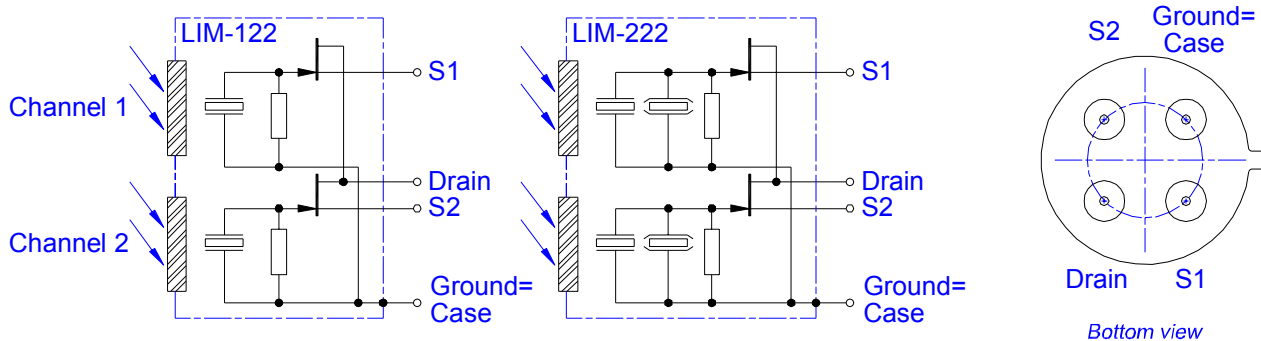
LIM-122-#

LIM-222-#

Dual channel pyroelectric PyroMid® detectors
buttonhole design, small size

Aperture size	ø 6 mm, single channel 2.7x1.8 mm ²
Element type	1x2 mm ² lithium tantalate with black layer
Electrical time constant [LIM-122 / -222]	standard = 3 s / 6 s
Thermal time constant	100 ms
Polarity	positive signal by positive flux change
Responsivity [LIM-122 / -222] {single element, 500K, 10Hz, 25°C, without window}	> 550 V/W / > 270 V/W
Noise density [LIM-122 / -222] {single element, 10Hz, BW 1Hz, 25°C}	< 280 nV/Hz ^{1/2} / < 150 nV/Hz ^{1/2}
Detectivity [LIM-122 / -222] {single element, 500K, 10Hz, 1Hz, 25°C, without window}	>3.0*10 ⁸ cmHz ^{1/2} /W / >1.6*10 ⁸ cmHz ^{1/2} /W
Offset voltage {U _D =9V, I _{Dopt} =10-100µA}	0.4 - 1.5 V
U _{DSmax}	18 V
Operating / Storage temperature	-25 ... +85°C
Window cap	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:



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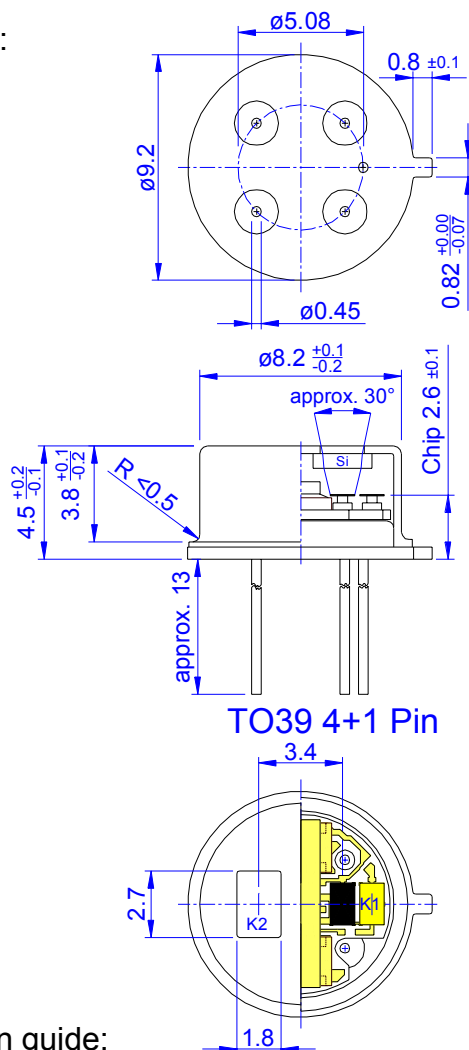
LIM-162-# LIM-262-#

Dual channel pyroelectric PyroMid® detectors
CMOS preamplifier, 5V battery operation

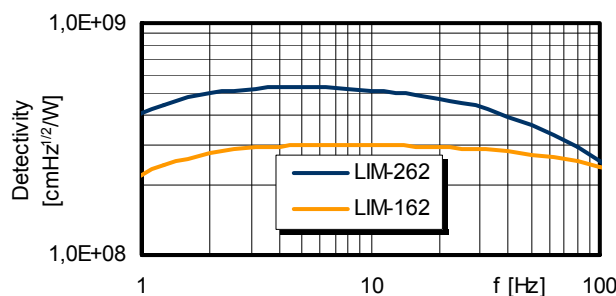
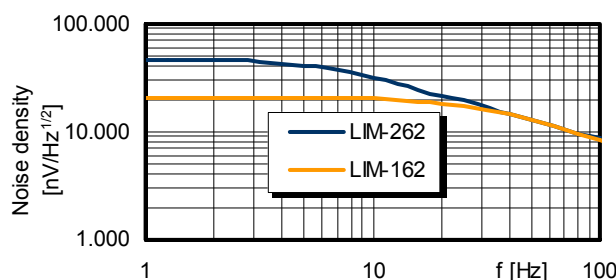
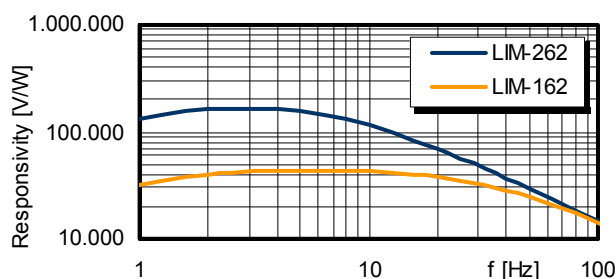
Description: LIM-162-# [# = extension code]
dual color, TO39; for current mode, with micro power OpAmp;
feedback R 24GOhm $\pm 10\%$ // C 0.25 ± 0.1 pF

LIM-262-# [# = extension code]
dual color, TO39, thermal compensated; for current mode, with micro power OpAmp;
feedback R 100GOhm $\pm 20\%$ // C 0.25 ± 0.1 pF

Housing:



Frequency response:



Selection guide:

Type	Gain	Thermal compensation	Recommended operation modes	Status
LIM-162	high	no	chopping mode: frequency 1 ... 100 Hz puls mode: puls length >50ms	state-of-the-art
LIM-262	very high	yes		state-of-the-art

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PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

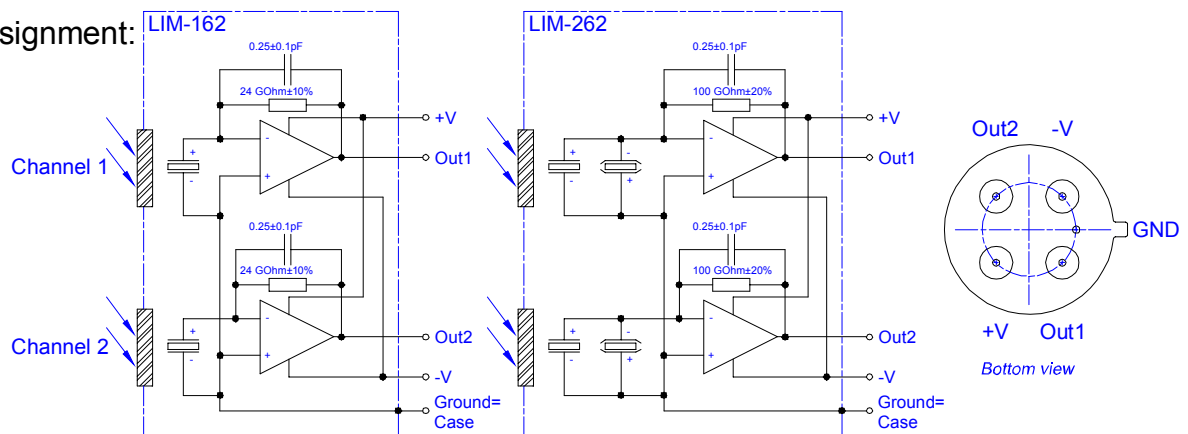
LIM-162-#

LIM-262-#

Dual channel pyroelectric PyroMid® detectors
CMOS preamplifier, 5V battery operation

Aperture size	ø 6 mm, single channel 2.7x1.8 mm ²
Element type	1.0x1.8 mm ² lithium tantalate with black layer
Feedback resistor [LIM-162 / -262]	24 GOhm ±10% / 100 GOhm ±20%
Feedback capacitor	0.25 ±0.1 pF
Electrical time constant [LIM-162 / -262]	6 ms / 25 ms
Thermal time constant	160 ms
Polarity	negative signal by positive IR flux change
Responsivity [LIM-162 / -262] {500K, 10Hz, 25°C, without window}	> 35 kV/W / >90 kV/W typical 45 kV/W / 125 kV/W
Noise density [LIM-162 / -262] {10Hz, BW 1Hz, 25°C}	< 24 µV/Hz ^{1/2} / < 40 µV/Hz ^{1/2} typical 20 µV/Hz ^{1/2} / 36 µV/Hz ^{1/2}
Detectivity [LIM-162 / -262] {500K, 10Hz, 1Hz, 25°C, without window}	> 2.0*10 ⁸ cmHz ^{1/2} /W / 3.0*10 ⁸ cmHz ^{1/2} /W typical 3.0*10 ⁸ cmHz ^{1/2} /W / 4.6*10 ⁸ cmHz ^{1/2} /W
CMOS operational amplifier	OpAmp2 (for characteristics see application note)
Maximum supply voltage V ⁺ - V ⁻	16 V
Operating supply voltage V ⁺ / V ⁻	+2.2 ... 8.0 V / -2.2 ... -8.0 V
Recommended supply voltage	V ⁺ = +5 V; V ⁻ = -5 V
Supply current {output load 1MOhm}	< 150 µA
Offset voltage {25°C; output load 1MOhm}	-3 mV ... +3 mV
Optimal output load	330 kOhm
Absolute maximum output current	± 0.4 mA
Operating / Storage temperature	-25 ... +85°C
Window cap	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:



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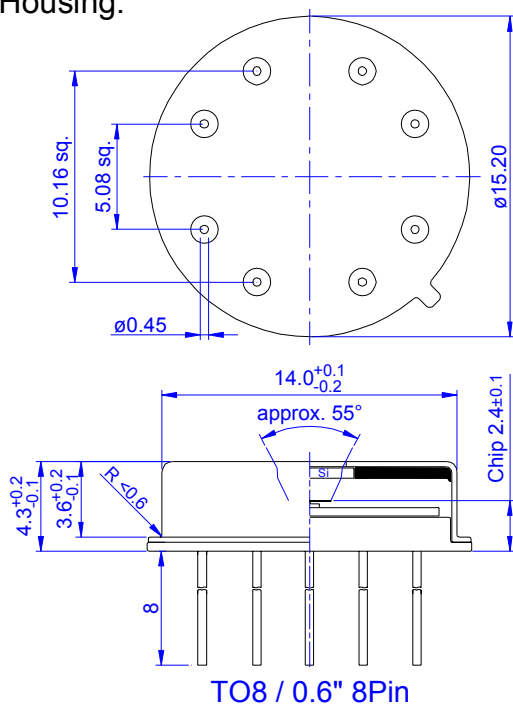
LMM-242-#

Dual channel pyroelectric PyroMid® detector
CMOS preamplifier - ultra low microphonic effect

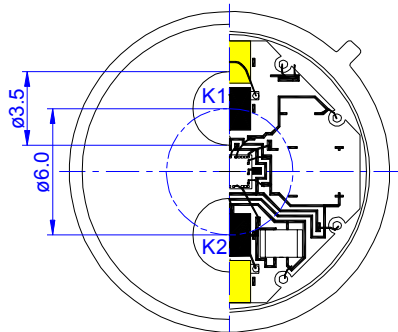
Description: LMM-242-# [# = extension code]

dual color, TO8, thermal compensated, ultra low microphonic effect; for current mode, with micro power OpAmp; feedback R 100GOhm $\pm 20\%$ // C 0.20 ± 0.1 pF

Housing:

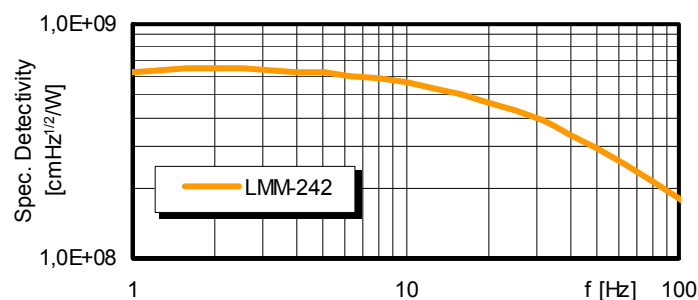
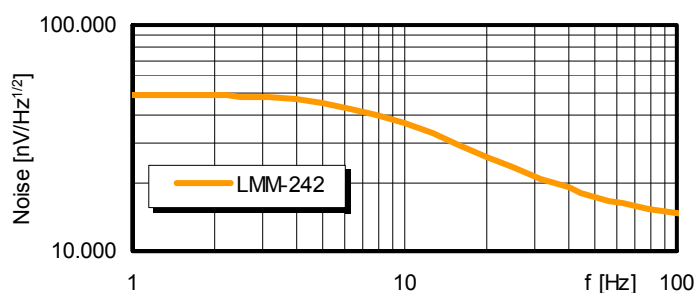
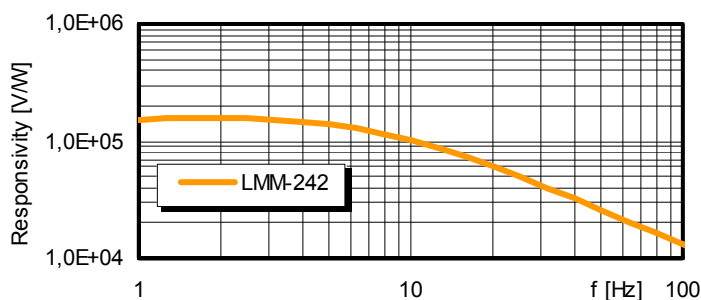


TO8 / 0.6" 8Pin



Package is isolated from detector circuit

Frequency response LMM-242:



Selection guide: LMM-242 is the performance upgrade of LIM-212 (not pin compatible!)

	Signal voltage @ 10Hz	Acceleration response	EMV resistance	Volume of housing	Status
LMM-242	650 times higher	reduced to 5%	++	1/3 smaller	state-of-the-art

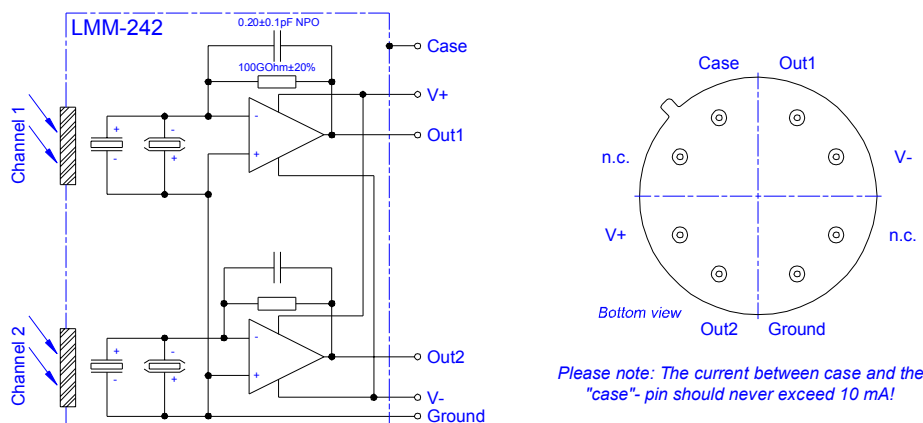
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PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

LMM-242-#

Dual channel pyroelectric PyroMid® detector
CMOS preamplifier - ultra low microphonic effect

Aperture size	ø 9.5 mm, single channel ø 3.5 mm
Element type	2.0x2.0 mm ² lithium tantalate with black layer
Feedback resistor	100 GOhm ±20%
Feedback capacitor	0.20±0.1 pF
Electrical time constant	20 ms
Thermal time constant	150 ms
Polarity	negative signal by positive IR flux change
Potential of detector case	selectable potential between V ⁻ and V ⁺ voltage {EMC requires low-impedance coupling}
Responsivity {500K, 10Hz, 25°C, without window}	> 100,000 V/W
Noise density {10Hz, BW 1Hz, 25°C}	< 55 µV/Hz ^{1/2}
Detectivity {500K, 10Hz, BW 1Hz, 25°C, without window}	> 3.8*10 ⁸ cmHz ^{1/2} /W
Acceleration response {5 ... 200Hz}; g=9,81m/s ²	typical 300 µV/g
CMOS operational amplifier	OpAmp2 (for characteristics see application note)
Maximum supply voltage V ⁺ - V ⁻	16 V
Operating supply voltage V ⁺ / V ⁻	+2.2 ... +8.0 V / -2.2 ... -8.0 V
Recommended supply voltage	V ⁺ = +5 V; V ⁻ = -5 V
Supply current {output load 1MOhm}	< 150 µA
Offset voltage {25°C; output load 1MOhm}	-3 mV ... +3 mV
Output load limited by open-loop gain of OpAmp	> 330 kOhm
Absolute maximum output current	± 0.4 mA
Operating / Storage temperature	-25 ... +85°C
Window cap	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:



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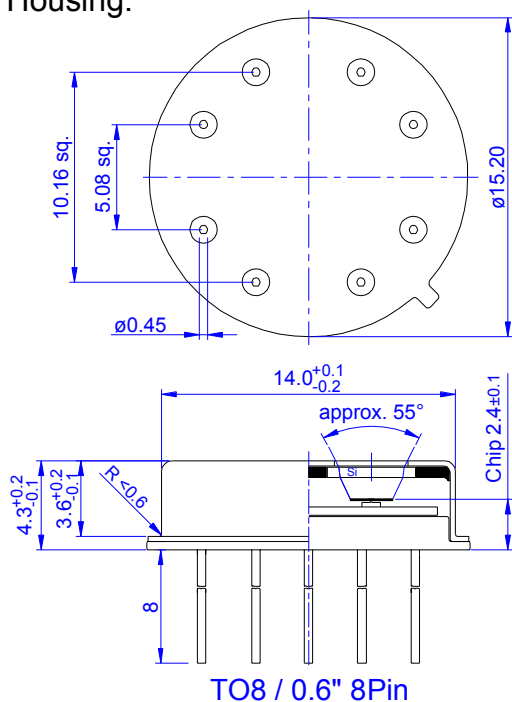
LMM-244-#

Quad channel pyroelectric PyroMid® detector
CMOS preamplifier - ultra low microphonic effect

Description: LMM-244-# [# = extension code]

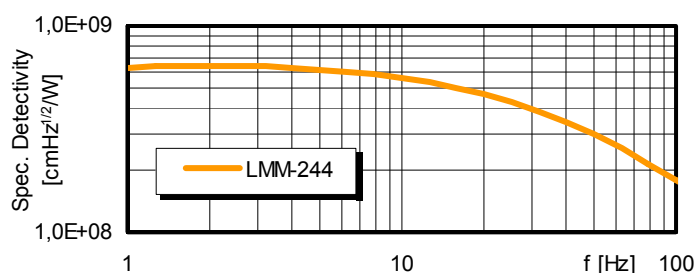
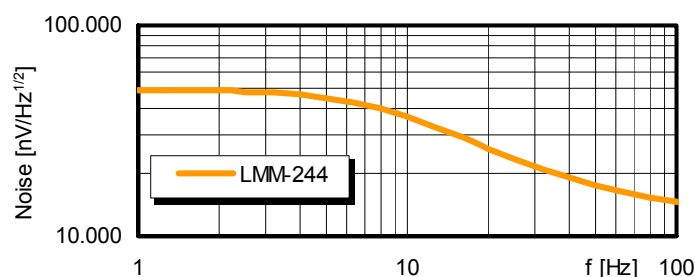
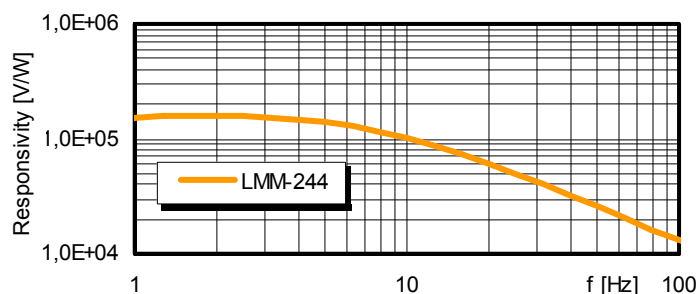
quad color, TO8, thermal compensated, ultra low microphonic effect; for current mode, with micro power OpAmp; feedback R 100GOhm $\pm 20\%$ // C 0.20 ± 0.1 pF

Housing:



Package is isolated from detector circuit

Frequency response LMM-244:



Multi-color Products

Selection guide: LMM-244 is the performance upgrade of LIM-214 and LIM-314 (not pin compatible!)

	Signal voltage @ 10Hz	Acceleration response	EMV resistance	Volume of housing	Status
LMM-244	650 times higher	reduced to 5%	++	1/3 smaller	state-of-the-art

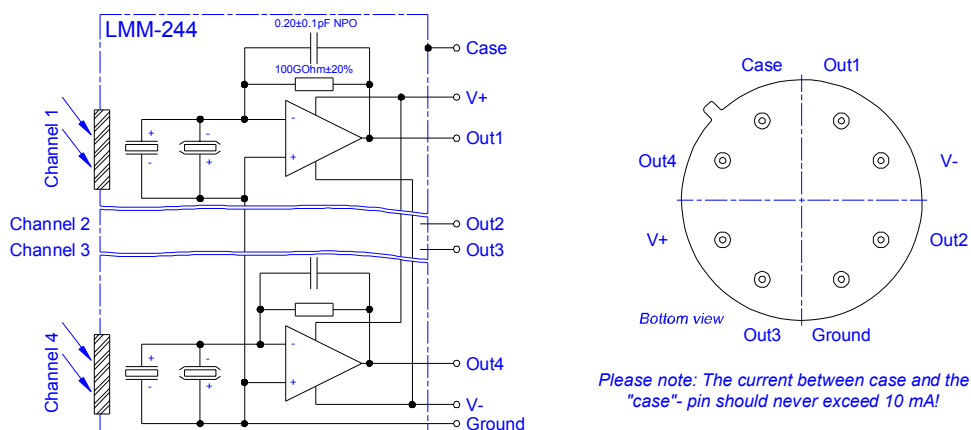
PyroMid® is a registered trademark of InfraTec GmbH
PyroMid® detectors are State-of-the-art, cost effective, multicolor detectors for virtually any infrared application.

LMM-244-#

Quad channel pyroelectric PyroMid® detector
CMOS preamplifier - ultra low microphonic effect

Aperture size	ø 9.5 mm, single channel ø 3.5 mm
Element type	2.0x2.0 mm ² lithium tantalate with black layer
Feedback resistor	100 GOhm ±20%
Feedback capacitor	0.20±0.1 pF
Electrical time constant	20 ms
Thermal time constant	150 ms
Polarity	negative signal by positive IR flux change
Potential of detector case	selectable potential between V ⁻ and V ⁺ voltage {EMC requires low-impedance coupling}
Responsivity {500K, 10Hz, 25°C, without window}	> 100,000 V/W
Noise density {10Hz, BW 1Hz, 25°C}	< 55 µV/Hz ^{1/2}
Detectivity {500K, 10Hz, BW 1Hz, 25°C, without window}	> 3.8*10 ⁸ cmHz ^{1/2} /W
Acceleration response {5 ... 200Hz}; g=9,81m/s ²	typical 300 µV/g
CMOS operational amplifier	OpAmp2 (for characteristics see application note)
Maximum supply voltage V ⁺ - V ⁻	16 V
Operating supply voltage V ⁺ / V ⁻	+2.2 ... +8.0 V / -2.2 ... -8.0 V
Recommended supply voltage	V ⁺ = +5 V; V ⁻ = -5 V
Supply current {output load 1MOhm}	< 300 µA
Offset voltage {25°C; output load 1MOhm}	-3 mV ... +3 mV
Output load limited by open-loop gain of OpAmp	> 330 kOhm
Absolute maximum output current	± 0.4 mA
Operating / Storage temperature	-25 ... +85°C
Window cap	Combinations of all InfraTec standard narrow band pass filters are available. Customized filters upon request.

Pin assignment:

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