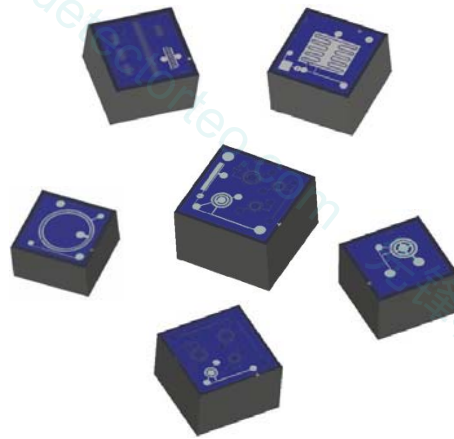


X-RAY

JFETs

N-Channel Ultra-low Noise JFETs Data Overview



Contents

• JFET Description	2
• JFET Packages	3
• JFET Drawings	4
• JFET Characteristics	5 - 6
• Noise Graphs	7



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MOXTEK

www.moxtek.com

N-Channel Ultra-low Noise JFETs

Data Overview

JFET Description

MOXTEK ultra low noise JFETs (MX JFETs) are used in a variety of applications including microanalysis, EDXRF, XRD. MOXTEK manufactures 3 and 4 pin N-channel JFETs. MX ultra low noise JFETs have a low leakage current, excellent transconductance (g_m) and input capacitance (C_{gs}). MOXTEK JFETs are available in Die and other packages (See “JFET Packages” section).

Features for Optimal Detector Resolution

Ultra low noise
Free of generation recombination noise
Excellent transconductance (g_m) and input capacitance (C_{gs})
Low leakage current

Benefits

High Low-Level Signal Amplification
High Speed Switching
Very high input impedance
Excellent gain and very low distortion

Applications

X-ray Detectors

- Si(Li) Detectors
- Si-PIN Detectors
- Silicon Drift Detectors (SDD)

Products Summary

JFET	$V_{gs(off)}$ typ(V)	BV_{gss} typ(V)	g_m typ(mS)	I_{dss} typ(mA)	C_{gs} typ(pF)
Test Conditions	$V_{sub}=0V$, $I_d=1nA$	$V_{ds}=0V$, $I_g=1\mu A$, $V_{sub}=0V$	$V_{ds}=4V$, $I_d=5mA$, 20°C	$V_{gs}=0V$	$V_{ds}=4V$, $I_d=5mA$
MX-11rc	2.5	25	5	20	0.7
MX-16	10	26	28	300	4
MX-120	9	27	16	64	1.7
MX-16rc	5.5	30	8	52	2.7
MX-20	10	26	8	29	0.9
MX-30	10	31	6	20	0.6
MX-40	9	27	4.5	12	0.4

JFET Ordering Information

Contact Moxtek TO-72 with can
Contact Moxtek Nailhead package
Contact Moxtek Teflon package

Please contact MOXTEK for price and delivery information. Custom packaging is available.

Standard Package Includes:

- JFET mounted on a nailhead, TO-72, or Teflon Package
- Each JFET is tested and guaranteed



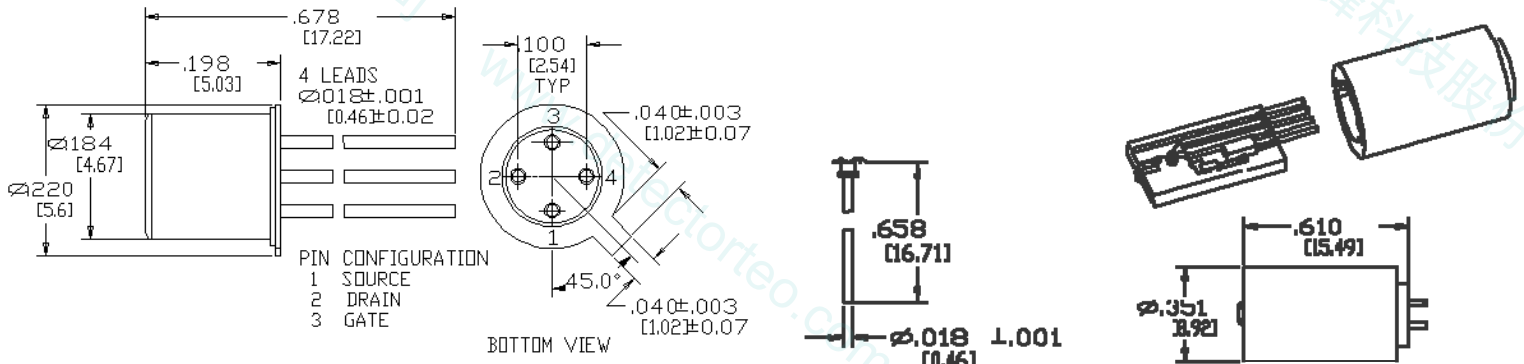
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N-Channel Ultra-low Noise JFETs

Data Overview

JFET Packages

MX-11rc JFET Packages

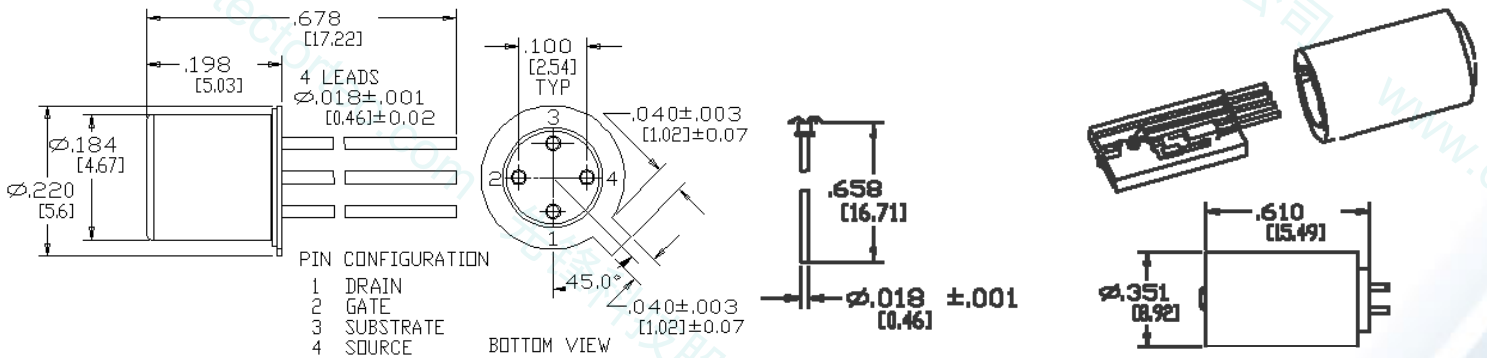


TO-72 PACKAGE WITH CAN
(Light Reset Package available)

NAILHEAD WITH
FLYING LEADS

TEFLON PACKAGE

MX-16, MX-16rc, MX-30, MX-40, MX-120 JFET Packages



TO-72 PACKAGE WITH CAN
(Light Reset Package available)

NAILHEAD WITH
FLYING LEADS

TEFLON PACKAGE



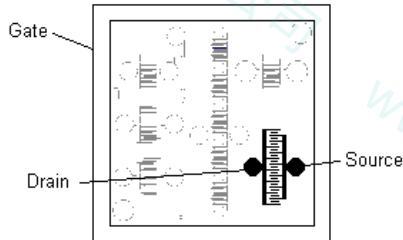
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N-Channel Ultra-low Noise JFETs

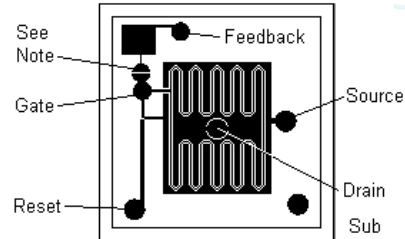
Data Overview

JFET Drawings

MX-11rc JFET

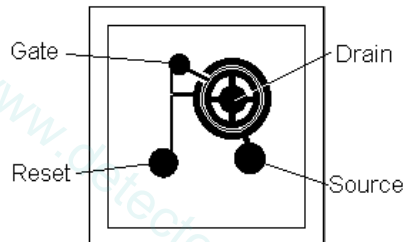


MX-16, MX-16rc JFET



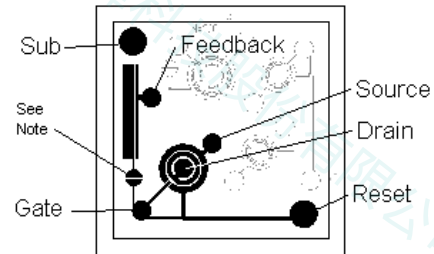
The bottom gate on this 4 terminal JFET is the substrate. Feedback capacitance = 0.5pF
Feedback and substrate pads are custom and are not generally bonded.

MX-20 JFET



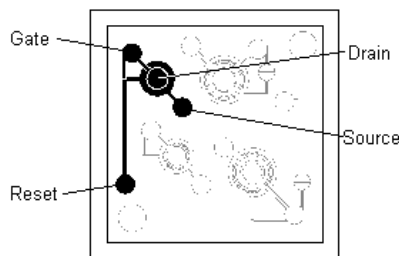
The bottom gate on this 4 terminal JFET is the substrate.

MX-30 JFET



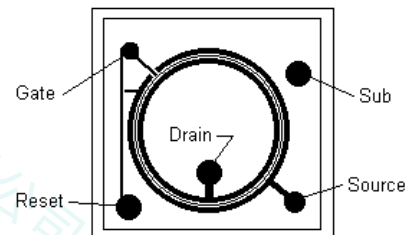
The bottom gate on this 4 terminal JFET is the substrate. Feedback capacitance = 0.5pF
Feedback and substrate pads are custom and are not generally bonded.

MX-40 JFET



The bottom gate on this 4 terminal JFET is the substrate.

MX-120 JFET



The bottom gate on this 4 terminal JFET is the substrate. Substrate pad is custom and is not generally bonded.



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N-Channel Ultra-low Noise JFETs

Data Overview

JFET Characteristics

Static Characteristics												
JFET	Gate-Source Breakdown Voltage			Gate-Source Cutoff Voltage			Drain Saturation Current			Reverse Leakage Current		
	Symbol: $V_{(BV)gss}$ Unit: V			Symbol: $V_{gs(off)}$ Unit: V			Symbol: I_{dss} Unit: mA			Symbol: I_{gss} Unit: pA		
	Test Conditions*: $V_{ds}=0V, I_g=1mA, V_{sub}=0V$			Test Conditions*: $V_{sub}=0V, I_d=1nA$			Test Conditions*: $V_{gs}=0V, V_{sub}=0V$			Test Conditions: $V_{gs} = -10V$		
	Temperature: 20°C			Temperature: 20°C			Temperature: 20°C			Temperature: 20°C		
	Typ	Min	Max	Typ	Min	Max	Typ	Min	Max	Typ	Min	Max
MX-11rc	25.0	23.0	25.0	2.4	2.1	2.6	11.0	10.0	13.0	0.7	0.8	0.6
MX-40	27.0	26.0	28.0	9.1	8.7	9.4	12.0	12.0	13.0	0.1	0.2	0.1
MX-30	31.0	30.0	34.0	9.9	8.9	11.6	20.0	18.0	23.0	0.1	0.2	0.0
MX-20	26.0	26.0	27.0	9.8	9.0	10.0	29.0	26.0	32.0	0.6	0.7	0.5
MX-16rc	31.0	28.0	32.0	5.4	4.3	5.9	52.0	44.0	58.0	4.0	8.4	2.8
MX-120	27.0	26.0	27.0	9.3	9.0	10.0	64.0	62.0	70.0	0.2	1.5	0.0
MX-16	26.0	25.0	26.0	9.4	8.9	9.8	299.0	290.0	315.0	0.4	0.6	0.3

Dynamic Characteristics									
JFET	Transconductance			Transconductance			Gate-Source Capacitance		
	Symbol: g_m Unit: mS			Symbol: g_m Unit: mS			Symbol: C_{gs} Unit: pF		
	Test Conditions**: $V_{ds}=4V, I_d=5mA, V_{gs}=0V$			Test Conditions**: $V_{ds}=4V, I_d=5mA, V_{gs}=0V$			Test Conditions**: $I_d=5mA, V_{ds}=4V, V_{gs}=0V$		
	Temperature: 20°C			Temperature: -100°C			Temperature: 20°C		
	Typ	Min	Max	Typ	Min	Max	Typ	Min	Max
MX-11rc	5.4	5.3	5.7	7.8	7.6	8.3	0.7	0.7	0.7
MX-40	4.5	4.3	4.7	5.7	5.4	5.9	0.4	0.4	0.4
MX-30	6.2	6.0	6.4	8.2	7.9	8.5	0.6	0.5	0.6
MX-20	8.0	7.7	8.3	10.7	10.4	11.0	0.9	0.8	1.0
MX-16rc	8.3	8.0	8.5	11.0	10.6	11.3	2.7	2.6	3.0
MX-120	16.6	15.7	17.3	23.2	22.7	24.1	1.7	1.6	1.9
MX-16	28.4	27.5	30.4	40.3	38.8	42.8	4.0	3.8	4.2

* V_{sub} bias condition doesn't apply to the MX-11rc JFET
 ** V_{gs} bias condition doesn't apply to the MX-11rc JFET



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N-Channel Ultra-low Noise JFETs

Data Overview

Noise Characteristics																				
JFET	Equivalent Voltage Noise																			
	Symbol: $\sqrt{\bar{e}_n^2}$ Unit: nV/ $\sqrt{\text{Hz}}$			Symbol: $\sqrt{\bar{e}_n^2}$ Unit: nV/ $\sqrt{\text{Hz}}$			Symbol: $\sqrt{\bar{e}_n^2}$ Unit: nV/ $\sqrt{\text{Hz}}$			Symbol: $\sqrt{\bar{e}_n^2}$ Unit: nV/ $\sqrt{\text{Hz}}$			Symbol: $\sqrt{\bar{e}_n^2}$ Unit: nV/ $\sqrt{\text{Hz}}$			Symbol: $\sqrt{\bar{e}_n^2}$ Unit: nV/ $\sqrt{\text{Hz}}$				
	Test Conditions : $V_{ds}=4V, I_d=5mA, V_{gs}=0V$			Test Conditions : $V_{ds}=4V, I_d=5mA, V_{gs}=0V$			Test Conditions : $V_{ds}=4V, I_d=5mA, V_{gs}=0V$			Test Conditions : $V_{ds}=4V, I_d=5mA, V_{gs}=0V$			Test Conditions : $V_{ds}=4V, I_d=5mA, V_{gs}=0V$			Test Conditions : $V_{ds}=4V, I_d=5mA, V_{gs}=0V$				
	Temperature: 20°C			Temperature: 20°C			Temperature: 20°C			Temperature: -100°C			Temperature: -100°C			Temperature: -100°C				
	Frequency: 1 kHz			Frequency: 10 kHz			Frequency: 100 kHz			Frequency: 1 kHz			Frequency: 10 kHz			Frequency: 100 kHz				
	Typ	Min	Max	Typ	Min	Max	Typ	Min	Max	Typ	Min	Max	Typ	Min	Max	Typ	Min	Max	Typ	Min
MX-11rc	2.8	2.5	3.1	2.2	2	2.4	2.1	2.0	2.2	2.3	1.9	2.7	1.6	1.5	1.8	1.5	1.4	1.6		
MX-40	3.3	3.1	3.5	2.7	2.6	2.7	2.6	2.5	2.7	3.0	2.8	3.2	2.1	2.1	2.2	2.1	2.0	2.1		
MX-30	2.4	2.3	2.5	2.0	2.0	2.2	2.0	1.9	2.1	2.2	2.1	2.4	1.7	1.6	1.7	1.6	1.5	1.7		
MX-16rc	1.9	1.9	2.0	1.6	1.6	1.7	1.6	1.5	1.6	1.7	1.6	1.8	1.3	1.3	1.3	1.2	1.2	1.3		
MX-20	1.8	1.7	1.9	1.6	1.5	1.7	1.6	1.5	1.7	1.6	1.5	1.7	1.3	1.2	1.3	1.2	1.2	1.3		
MX-120	1.2	1.2	1.3	1.0	1.0	1.1	1.0	1.0	1.1	1.2	1.1	1.4	0.8	0.8	1.1	0.8	0.7	0.9		
MX-16	1.0	1.0	1.2	0.8	0.8	0.8	0.8	0.8	0.7	0.9	0.9	1.0	0.6	0.6	0.6	0.6	0.5	0.6		

* V_{gs} bias condition doesn't apply to the MX-11rc JFET

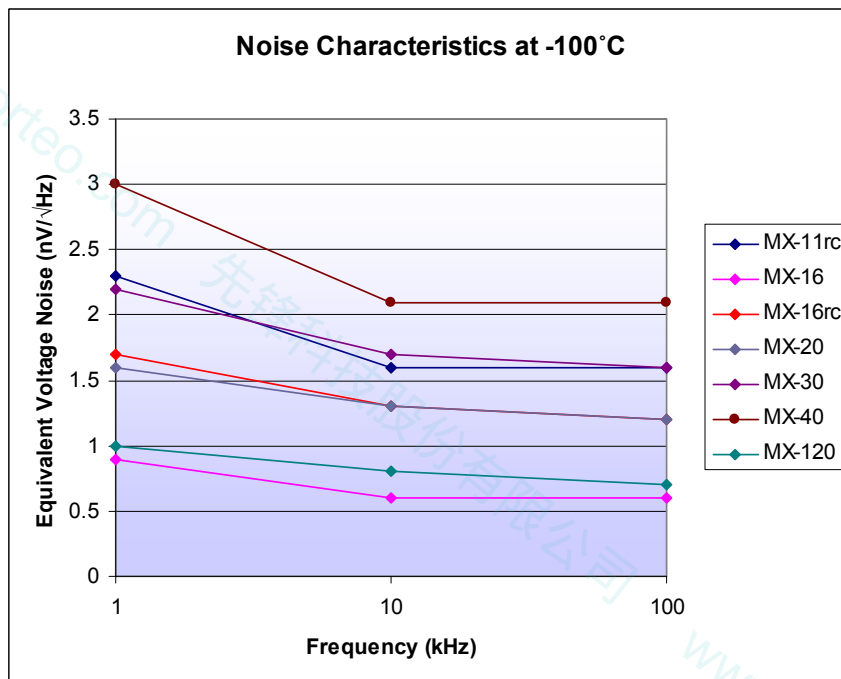
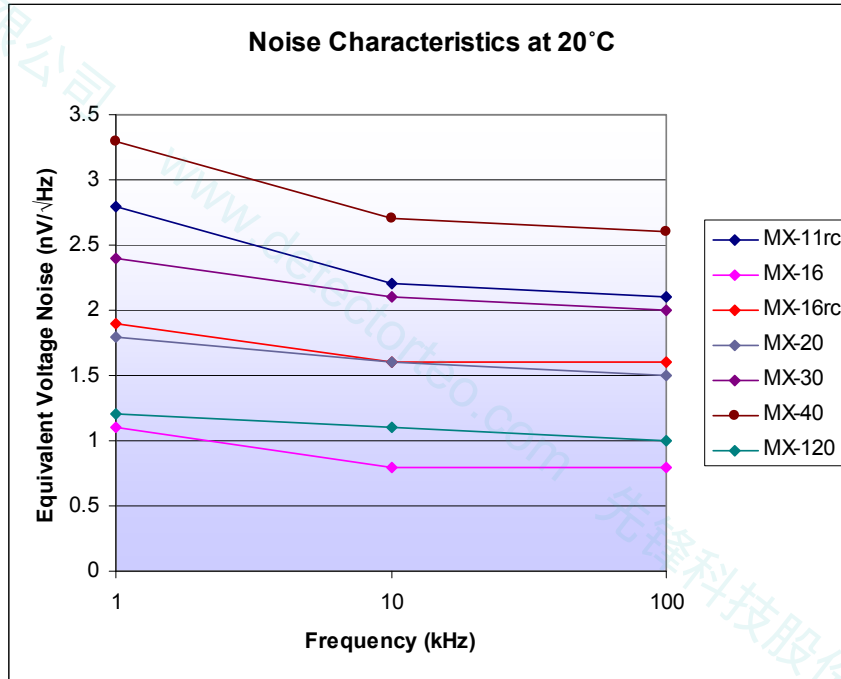


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N-Channel Ultra-low Noise JFETs

Data Overview

Noise Graphs



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