

## Replace discontinued Toshiba 2SK170 with LSK170

### The 2SK170 / LSK170 is a 1nV/ $\sqrt{\text{Hz}}$ low capacitance JFET

Optimized to provide low noise at both high and low frequency with a narrow range of  $I_{DSS}$  and low capacitance. The 2SK170 / LSK170's low noise to capacitance ratio and narrow range of low value  $I_{DSS}$  provide solutions for low noise applications which cannot tolerate high values of capacitance or wide ranges of  $I_{DSS}$ .

The narrow ranges of  $I_{DSS}$  binning with the 2SK170 / LSK170 promote ease of design tolerancing, particularly in low voltage applications. The 2SK170 / LSK170 is ideal for portable battery operated applications, and features high  $BV_{DSS}$  for maximum linear headroom in high transient program content amplifiers. The 2SK170 / LSK170 series has a uniquely linear  $V_{GS}$  transfer function for a stability that is highly desirable, particularly for audio front-end preamplifiers.

#### 2SK170 / LSK170 Applications:

- Audio – Amps, effects boxes, microphones
- Instrumentation – Input stages
- Acoustic Sensors – Sonobuoys
- Military – Antisubmarine, personnel + vehicle detectors, sonar, radiation detectors...

#### FEATURES

ULTRA LOW NOISE ( $f = 1\text{kHz}$ )	$e_n = 0.9\text{nV} / \sqrt{\text{Hz}}$ (typ)
HIGH BREAKDOWN VOLTAGE	$BV_{GSS} = 40\text{V}$ max
HIGH GAIN	$Y_{fs} = 22\text{mS}$ (typ)
HIGH INPUT IMPEDANCE	$I_G = -500\text{pA}$ max
LOW CAPACITANCE	22pF max

#### IMPROVED SECOND SOURCE REPLACEMENT FOR 2SK170

#### ABSOLUTE MAXIMUM RATINGS<sup>1</sup> @ 25°C (unless otherwise noted)

#### Maximum Temperatures

Storage Temperature	-65°C to +150°C
Operating Junction Temperature	-55°C to +135°C

#### Maximum Power Dissipation

Continuous Power Dissipation @ +125°C	400mW
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#### Maximum Currents

Gate Forward Current	$I_{G(F)} = 10\text{mA}$
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#### Maximum Voltages

Gate to Source	$V_{GSS} = 40\text{V}$
Gate to Drain	$V_{GDS} = 40\text{V}$

#### FOR EQUIVALENT DUAL VERSION, SEE LSK389

[www.micross.com/pdf/LSM\\_LSK389A\\_SOIC.pdf](http://www.micross.com/pdf/LSM_LSK389A_SOIC.pdf)

#### ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise noted)

SYMBOL	CHARACTERISTICS	MIN.	TYP.	MAX.	UNITS	CONDITIONS	
$BV_{GSS}$	Gate to Source Breakdown Voltage	40	--	--	V	$V_{DS} = 0, I_D = 100\mu\text{A}$	
$V_{GS(OFF)}$	Gate to Source Pinch-off Voltage	0.2	--	2	V	$V_{DS} = 10\text{V}, I_D = 1\text{nA}$	
$V_{GS}$	Gate to Source Operating Voltage	--	0.5	--	V	$V_{DS} = 10\text{V}, I_D = 1\text{mA}$	
$I_{DSS}$	Drain to Source Saturation Current	2SK170A / LSK170A	2.6	--	6.5	mA	$V_{DG} = 10\text{V}, V_{GS} = 0\text{V}$
		2SK170B / LSK170B	6	--	12		
		2SK170C / LSK170C	10	--	20		
$I_G$	Gate Operating Current	--	--	0.5	nA	$V_{DG} = 10\text{V}, I_D = 1\text{mA}$	
$I_{GSS}$	Gate to Source Leakage Current	--	--	1	nA	$V_{DG} = 10\text{V}, V_{DS} = 0$	
$Y_{fss}$	Full Conduction Transconductance	--	22	--	mS	$V_{GD} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{kHz}$	
$Y_{fs}$	Typical Conduction Transconductance	--	10	--	mS	$V_{GD} = 15\text{V}, I_D = 1\text{mA}$	
$e_n$	Noise Voltage	--	0.9	1.9	nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}, I_D = 2\text{mA}, f = 1\text{kHz}, \text{NBW} = 1\text{Hz}$	
$e_n$	Noise Voltage	--	2.5	4	nV/ $\sqrt{\text{Hz}}$	$V_{DS} = 10\text{V}, I_D = 2\text{mA}, f = 10\text{Hz}, \text{NBW} = 1\text{Hz}$	
$C_{ISS}$	Common Source Input Capacitance	--	20	--	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	
$C_{RSS}$	Common Source Reverse Transfer Capacitance	--	5	--	pF	$V_{DS} = 15\text{V}, I_D = 500\mu\text{A}$	

#### Notes:

- Absolute Maximum ratings are limiting values above which serviceability may be impaired



#### Available Packages:

LSK170 in TO-92

LSK170 available as bare die

Please contact Micross for full package and die dimensions:

Email: [chipcomponents@micross.com](mailto:chipcomponents@micross.com)

Web: [www.micross.com/distribution.aspx](http://www.micross.com/distribution.aspx)

TO-92 (Top View)

