

# Linear Systems replaces discontinued Toshiba 2SK170 with LSK170

The 2SK170 / LSK170 is an Ultra Low Noise Single N-Channel JFET

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

The narrow ranges of IDSS 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 BVDSS for maximum linear headroom in high transient program content amplifiers. The 2SK170 / LSK170 series has a uniquely linear VGS transfer function for a stability that is highly desirable, particularly for audio front-end preamplifiers.

### 2SK170 / LSK170 Applications:

Audio amplifiers and preamps, discrete low-noise operational amplifiers, battery-operated audio preamps, guitar pickups, effects pedals, microphones, audio mixer consoles, acoustic sensors, sonobuoys, hydrophones, chemical and radiation detectors, instrumentation amplifiers, accelerometers, CT scanners input stages, oscilloscope input stages, electrometers and vibrations detectors.

Surface mount SOT23 available (not offered by Toshiba 2SK170)  
Improved pin for pin replacement for Toshiba 2SK170  
Improved functional replacement for Interfet IF1320, IF1330, IF1331, and IF4500

### FEATURES

ULTRA LOW NOISE ( $f = 1\text{kHz}$ )	$e_n = 0.9\text{nV}/\sqrt{\text{Hz}}$
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 stated)

#### Maximum Temperatures

Storage Temperature	-65 to +150 °C
Operating Junction Temperature	-55 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	$V_{GDS} = 40\text{V}$

#### Available Packages:

2SK170 / LSK170 in TO-92  
2SK170 / LSK170 in SOT-23  
2SK170 / LSK170 available as bare die



Please contact Micross for package and die dimensions  
Email: [chipcomponents@micross.com](mailto:chipcomponents@micross.com) Tel: +441603 788967

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

SYMBOL	CHARACTERISTIC	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	LSK170A	2.6	6.5	mA	$V_{DG} = 10\text{V}, V_{GS} = 0$
		LSK170B	6	12		
		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	$V_{GD} = 10\text{V}, V_{GS} = 0, f = 1\text{kHz}$
$Y_{fs}$	Typical Conduction Transconductance		10		mS	$V_{DG} = 15\text{V}, I_D = 1\text{mA}$
$e_n$	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	$V_{DS} = 15\text{V}, I_D = 500\mu\text{A}$
$C_{RSS}$	Common Source Reverse Transfer Cap.		5		pF	

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