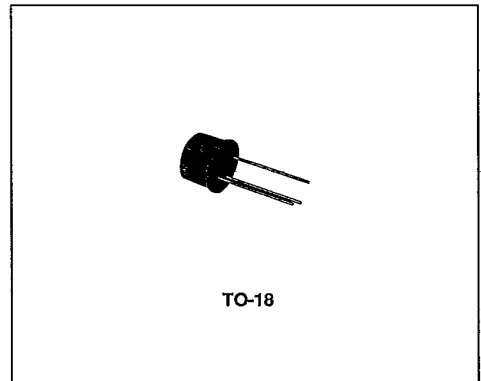
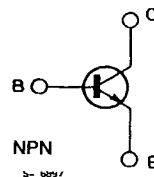

 LOW-LEVEL, LOW-NOISE AMPLIFIERS

DESCRIPTION

The 2N930 is a silicon planar epitaxial NPN transistor in Jedec TO-18 metal case, designed for use in high performance, low-level, low-noise amplifier applications.

**INTERNAL SCHEMATIC DIAGRAM****ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage ($I_E = 0$)	45	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)	45	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	5	V
I_C	Collector Current	30	mA
P_{tot}	Total Power Dissipation at $T_{amb} = 25\text{ }^\circ\text{C}$ at $T_{case} = 25\text{ }^\circ\text{C}$	0.3	W
		0.6	W
T_{stg}, T_j	Storage and Junction Temperature	- 55 to 200	$^\circ\text{C}$

THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	292	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	583	$^{\circ}C/W$

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\ ^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = 45\ V$			10	nA
I_{CES}	Collector Cutoff Current ($V_{BE} = 0$)	$V_{CE} = 45\ V$ $V_{CE} = 45\ V$ $T_{amb} = 150\ ^{\circ}C$			10 10	nA μA
I_{CEO}	Collector Cutoff Current ($I_B = 0$)	$V_{CE} = 5\ V$			2	nA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5\ V$			10	nA
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10\ mA$	45			V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage ($I_C = 0$)	$I_E = 10\ nA$	5			V
$V_{CE(sat)}^*$	Collector-emitter Sustaining Voltage	$I_C = 10\ mA$ $I_B = 0.5\ mA$			1	V
V_{BE}^*	Base-emitter Voltage	$I_C = 10\ mA$ $I_B = 0.5\ mA$	0.6		1	V
h_{FE}^*	DC Current Gain	$I_C = 10\ \mu A$ $V_{CE} = 5\ V$ $I_C = 0.5\ mA$ $V_{CE} = 5\ V$ $I_C = 10\ mA$ $V_{CE} = 5\ V$ $I_C = 10\ \mu A$ $V_{CE} = 5\ V$ $T_{amb} = -55\ ^{\circ}C$	100 150		300 600	— — — —
h_{fe}	Small Signal Current Gain	$I_C = 1\ mA$ $V_{CE} = 5\ V$ $f = 1\ kHz$	150		600	—
f_T	Transition Frequency	$I_C = 0.5\ mA$ $V_{CE} = 5\ V$ $f = 30\ MHz$	30			MHz
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 5\ V$ $f = 1\ MHz$			8	pF
NF	Noise Figure	$I_C = 10\ \mu A$ $V_{CE} = 5\ V$ $f = 1\ kHz$ $R_g = 10\ k\Omega$			3	dB

* Pulsed : pulse duration = 300 μs , duty cycle = 1%