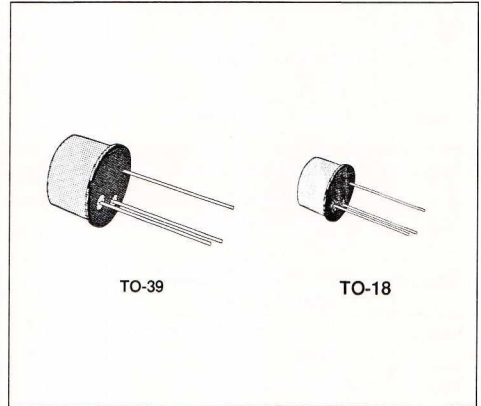


## HIGH-SPEED SWITCHES

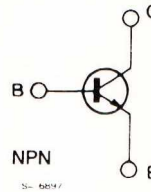
### DESCRIPTION

The 2N2218, 2N2219, 2N2221 and 2N2222 are silicon planar epitaxial NPN transistors in Jedec TO-39 (for 2N2218 and 2N2219) and in Jedec TO-18 (for 2N2221 and 2N2222) metal cases. They are designed for high-speed switching applications at collector currents up to 500 mA, and feature useful current gain over a wide range of collector current, low leakage currents and low saturation voltages.

☞ 2N2218/2N2219 approved to CECC 50002-100, 2N2221/2N2222 approved to CECC 50002-101 available on request.



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	60	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	30	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	5	V
$I_C$	Collector Current	0.8	A
$P_{Tot}$	Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$ for 2N2218 and 2N2219 for 2N2221 and 2N2222 at $T_{case} \leq 25^\circ\text{C}$ for 2N2218 and 2N2219 for 2N2221 and 2N2222	0.8	W
		0.5	W
		3	W
		1.8	W
$T_{stg}$	Storage Temperature	- 65 to 200	$^\circ\text{C}$
$T_j$	Junction Temperature	175	$^\circ\text{C}$

**THERMAL DATA**

			<b>2N2218 2N2219</b>	<b>2N2221 2N2222</b>
R <sub>th j-case</sub>	Thermal Resistance Junction-case	Max	50 °C/W	83.3 °C/W
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient	Max	187.5 °C/W	300 °C/W

**ELECTRICAL CHARACTERISTICS** (T<sub>amb</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cutoff Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = 50 V V <sub>CB</sub> = 50 V      T <sub>amb</sub> = 150 °C			10 10	nA μA
I <sub>EBO</sub>	Emitter Cutoff Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 3 V			10	nA
V <sub>(BR)CBO</sub>	Collector-base Breakdown Voltage (I <sub>E</sub> = 0)	I <sub>C</sub> = 10 μA	60			V
V <sub>(BR)CEO*</sub>	Collector-emitter Breakdown Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 10 mA	30			V
V <sub>(BR)EBO</sub>	Emitter-base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 10 μA	5			V
V <sub>CE(sat)*</sub>	Collector-emitter Saturation Voltage	I <sub>C</sub> = 150 mA    I <sub>B</sub> = 15 mA I <sub>C</sub> = 500 mA    I <sub>B</sub> = 50 mA			0.4 1.6	V V
V <sub>BE(sat)*</sub>	Base-emitter Saturation Voltage	I <sub>C</sub> = 150 mA    I <sub>B</sub> = 15 mA I <sub>C</sub> = 500 mA    I <sub>B</sub> = 50 mA			1.3 2.6	V V
h <sub>FE*</sub>	DC Current Gain	for <b>2N2218</b> and <b>2N2221</b> I <sub>C</sub> = 0.1 mA    V <sub>CE</sub> = 10 V I <sub>C</sub> = 1 mA       V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA      V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA    V <sub>CE</sub> = 10 V I <sub>C</sub> = 500 mA    V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA    V <sub>CE</sub> = 1 V for <b>2N2219</b> and <b>2N2222</b> I <sub>C</sub> = 0.1 mA    V <sub>CE</sub> = 10 V I <sub>C</sub> = 1 mA       V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA      V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA    V <sub>CE</sub> = 10 V I <sub>C</sub> = 500 mA    V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA    V <sub>CE</sub> = 1 V	20 25 35 40 20 20		120     300	
f <sub>T</sub>	Transition Frequency	I <sub>C</sub> = 20 mA f = 100 MHz    V <sub>CE</sub> = 20 V	250			MHz
C <sub>CBO</sub>	Collector-base Capacitance	I <sub>E</sub> = 0 f = 100 kHz    V <sub>CB</sub> = 10 V			8	pF
R <sub>e(hie)</sub>	Real Part of Input Impedance	I <sub>C</sub> = 20 mA f = 300 MHz    V <sub>CE</sub> = 20 V			60	Ω

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