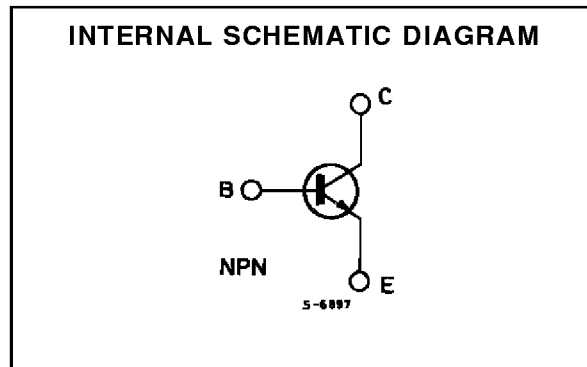
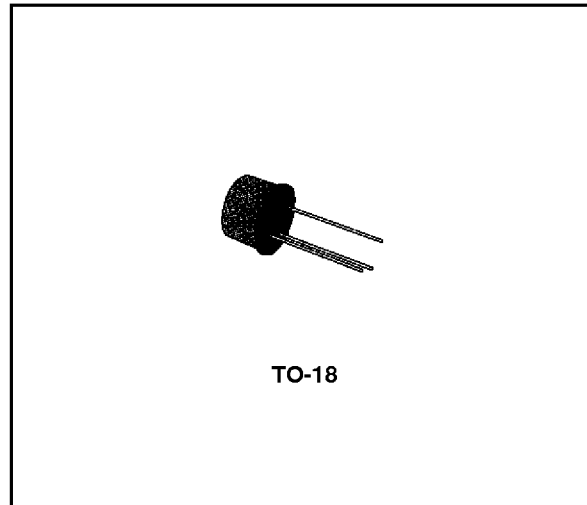


**HIGH SPEED SATURATED SWITCHES**
**DESCRIPTION**

The 2N3014 is a silicon planar epitaxial NPN transistor in Jedec TO-18 metal case intended for high speed low saturation switching application up to 300 mA.


**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	40	V
$V_{CES}$	Collector-emitter Voltage ( $V_{BE} = 0$ )	40	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	20	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	5	V
$I_C$	Collector Current	200	mA
$I_C$	Collector Peak Current ( $t < 10 \mu s$ )	500	mA
$P_{tot}$	Total Dissipation at $T_{amb} < 25 \text{ }^\circ\text{C}$	360	mW
	at $T_{case} < 25 \text{ }^\circ\text{C}$	1200	mW
	at $T_{case} < 100 \text{ }^\circ\text{C}$	680	mW
$T_{stg}$	Storage Temperature	- 55 to 200	$^\circ\text{C}$
$T_j$	Maximum Operating Junction Temperature	200	$^\circ\text{C}$

## THERMAL DATA

			Value	Unit
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	146	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	486	°C/W

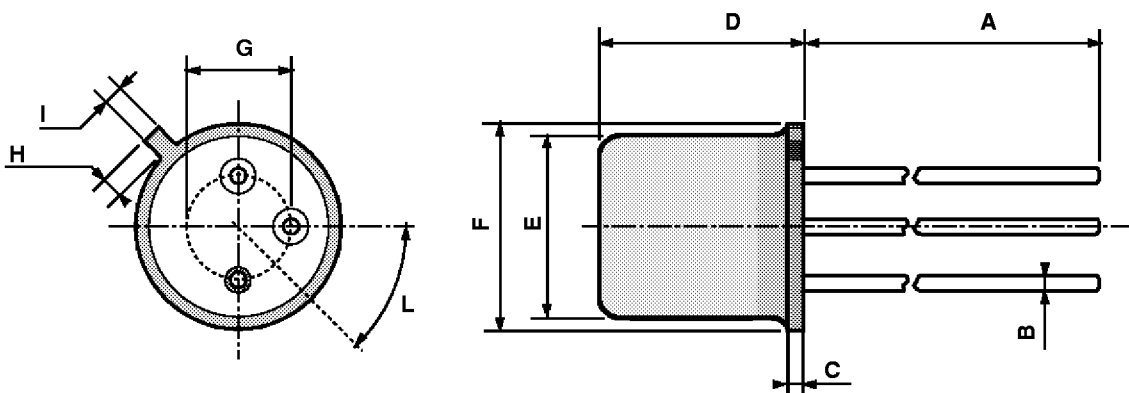
ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ °C}$  unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cutoff Current ( $V_{BE} = 0$ )	$V_{CE} = 20\text{ V}$ $V_{CE} = 20\text{ V}$ $T_{amb} = 125\text{ °C}$			300 40	nA $\mu\text{A}$
$V_{(BR)CBO}$	Collector-base Breakdown Voltage	$I_C = 100\text{ }\mu\text{A}$ $I_E = 0$	40			V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage	$I_C = 10\text{ A}$ $I_B = 0$	20			V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage	$I_E = 100\text{ }\mu\text{A}$ $I_C = 0$	5			V
$h_{FE}^*$	DC Current Gain	$V_{CE} = 0.4\text{ V}$ $I_C = 10\text{ mA}$ $V_{CE} = 0.4\text{ V}$ $I_C = 30\text{ mA}$ $V_{CE} = 1\text{ V}$ $I_C = 100\text{ mA}$ $V_{CE} = 0.4\text{ V}$ $I_C = 30\text{ mA}$ $T_{amb} = -55\text{ °C}$	25 30 25 12		120	
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 10\text{ mA}$ $I_B = 1\text{ mA}$ $I_C = 30\text{ mA}$ $I_B = 3\text{ mA}$ $I_C = 100\text{ mA}$ $I_B = 10\text{ mA}$ $I_C = 30\text{ mA}$ $I_B = 3\text{ mA}$ $T_{amb} = 125\text{ °C}$			0.18 0.18 0.35 0.25	V V V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 10\text{ mA}$ $I_B = 1\text{ mA}$ $I_C = 30\text{ mA}$ $I_B = 3\text{ mA}$ $I_C = 100\text{ mA}$ $I_B = 10\text{ mA}$	0.70 0.75		0.80 0.95 1.20	V V V
$f_T$	Transition Frequency	$V_{CE} = 10\text{ V}$ $I_C = 30\text{ mA}$ $f = 100\text{ MHz}$	350			MHz
$C_{CBO}$	Collector-base Capacitance	$V_{CB} = 5\text{ V}$ ; $I_E = 0$ $f = 1\text{ MHz}$			5	pF
$C_{EBO}$	Emitter-base Capacitance	$V_{EB} = 0.5\text{ V}$ ; $I_C = 0$ $f = 1\text{ MHz}$			8	pF
$t_{on}$	Turn-on Time	$V_{CC} = 2\text{ V}$ $I_C = 30\text{ mA}$ $I_{B1} = 3\text{ mA}$			16	ns
$t_{off}$	Turn-off Time	$V_{CC} = 2\text{ V}$ $I_C = 30\text{ mA}$ $I_{B1} = -I_{B2} = 3\text{ mA}$			25	ns
$t_s$	Storage Time	$V_{CC} = 10\text{ V}$ $I_C = 10\text{ mA}$ $I_{B1} = -I_{B2} = 10\text{ mA}$			18	ns

\* Pulsed : pulse duration = 300  $\mu\text{s}$ , duty cycle = 1.5 %.

## TO-18 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45°			45°		



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