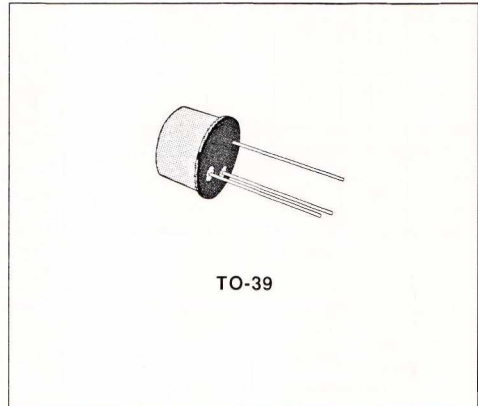


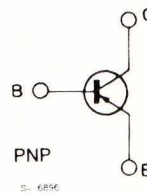
## GENERAL PURPOSE AMPLIFIERS AND SWITCHES

### DESCRIPTION

The 2N4030, 2N4031, 2N4032, and 2N4033 are silicon planar epitaxial PNP transistors in Jedec TO-39 metal case primarily intended for large signal, low noise industrial applications.



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		2N4030 2N4032	2N4031 2N4033	
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	- 60	- 80	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	- 60	- 80	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	- 5		V
$I_C$	Collector Current	- 1		A
$P_{tot}$	Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$ at $T_{case} \leq 25^\circ\text{C}$	0.8		W
		4		W
$T_{stg}, T_j$	Storage and Junction Temperature	- 65 to 200		$^\circ\text{C}$

**THERMAL DATA**

$R_{th(j-case)}$	Thermal Resistance Junction-case	Max	44	$^{\circ}C/W$
$R_{th(j-amb)}$	Thermal Resistance Junction-ambient	Max	218	$^{\circ}C/W$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	For <b>2N4030</b> and <b>2N4032</b> $V_{CB} = -50V$ $V_{CB} = -50V$ $T_{amb} = 150^{\circ}C$ For <b>2N4031</b> and <b>2N4033</b> $V_{CB} = -60V$ $V_{CB} = -60V$ $T_{amb} = 150^{\circ}C$			-50 -50 -50 -50	nA $\mu A$ nA $\mu A$
$V_{(BR)CBO}$	Collector-base Breakdown Voltage ( $I_E = 0$ )	$I_C = -10\mu A$ For <b>2N4030</b> and <b>2N4032</b> For <b>2N4031</b> and <b>2N4033</b>	-60 -80			V V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ( $I_B = 0$ )	$I_C = -10\mu A$ For <b>2N4030</b> and <b>2N4032</b> For <b>2N4031</b> and <b>2N4033</b>	-60 -80			V V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage ( $I_C = 0$ )	$I_E = -10\mu A$	-5			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = -150\text{ mA}$ $I_B = -15\text{ mA}$ $I_C = -500\text{ mA}$ $I_B = -50\text{ mA}$ $I_C = -1\text{ A}$ $I_B = -100\text{ mA}$ For <b>2N4030</b> and <b>2N4032</b>			-0.15 -0.5 -1	V V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = -150\text{ mA}$ $I_B = -15\text{ mA}$ $I_C = -500\text{ mA}$ $I_B = -50\text{ mA}$ $I_C = -1\text{ A}$ $I_B = -100\text{ mA}$ For <b>2N4030</b> and <b>2N4032</b>			-0.9 -1.1 -1.2	V V V
$h_{FE}^*$	DC Current Gain	$I_C = -100\mu A$ $V_{CE} = -5V$ For <b>2N4030</b> and <b>2N4031</b> For <b>2N4032</b> and <b>2N4033</b> $I_C = -100\text{ mA}$ $V_{CE} = -5V$ For <b>2N4030</b> and <b>2N4031</b> For <b>2N4032</b> and <b>2N4033</b> $I_C = -500\text{ mA}$ $V_{CE} = -5V$ For <b>2N4030</b> and <b>2N4031</b> For <b>2N4032</b> and <b>2N4033</b> $I_C = -1\text{ A}$ $V_{CE} = -5V$ For <b>2N4030</b> For <b>2N4031</b> For <b>2N4032</b> For <b>2N4033</b> $I_C = -100\text{ mA}$ $V_{CE} = -5V$ $T_{amb} = -55^{\circ}C$ For <b>2N4030</b> and <b>2N4031</b> For <b>2N4032</b> and <b>2N4033</b>	30 75 40 100 25 70 15 10 40 25 15 40		120 300	

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

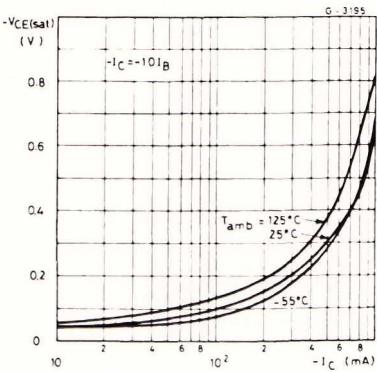
\*\* See test circuit.

ELECTRICAL CHARACTERISTICS (continued)

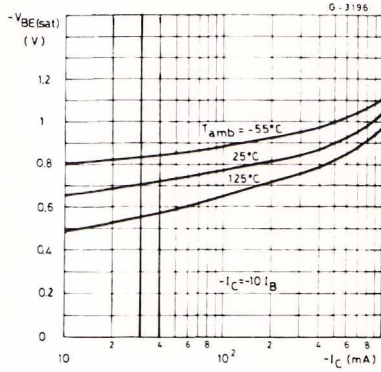
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$f_T$	Transition Frequency	$I_C = -50 \text{ mA}$ $V_{CE} = -10 \text{ V}$ $f = 100 \text{ MHz}$ For <b>2N4030</b> and <b>2N4031</b> For <b>2N4032</b> and <b>2N4033</b>	100		400	MHz
$C_{EBO}$	Emitter-base Capacitance	$I_C = 0$ $V_{EB} = -0.5 \text{ V}$ $f = 1 \text{ MHz}$			110	pF
$C_{CBO}$	Collector-base Capacitance	$I_E = 0$ $V_{CB} = -10 \text{ V}$ $f = 1 \text{ MHz}$			20	pF
$t_s^{**}$	Storage Time	$I_C = -500 \text{ mA}$ $V_{CC} = -30 \text{ V}$ $I_{B1} = -I_{B2} = -50 \text{ mA}$			350	ns
$t_f^{**}$	Fall Time	$I_C = -500 \text{ mA}$ $V_{CC} = -30 \text{ V}$ $I_{B1} = -I_{B2} = -50 \text{ mA}$			50	ns
$t_{on}^{**}$	Turn-on Time	$I_C = -500 \text{ mA}$ $V_{CC} = -30 \text{ V}$ $I_{B1} = -I_{B2} = -50 \text{ mA}$			100	ns

\* Pulsed : pulse duration = 300 ms. duty cycle = 1 %.  
\*\* See test circuit.

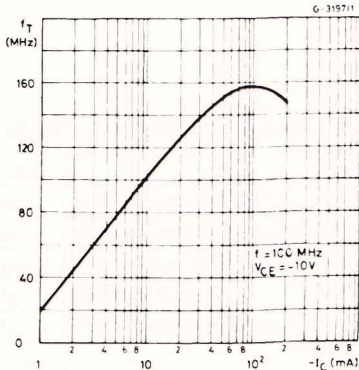
Collector-emitter Saturation Voltage.



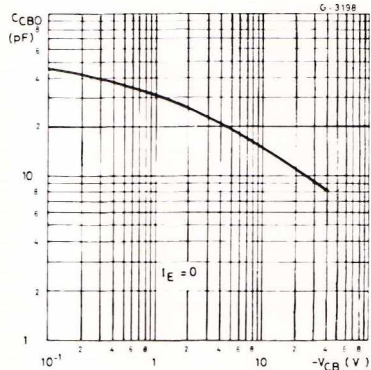
Base-emitter Saturation Voltage.



Transition Frequency.



Collector-base Capacitance.



Test Circuit for  $t_{on}$ ,  $t_s$ ,  $t_f$ .

