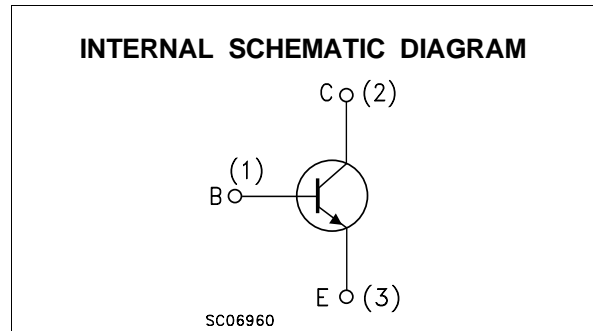
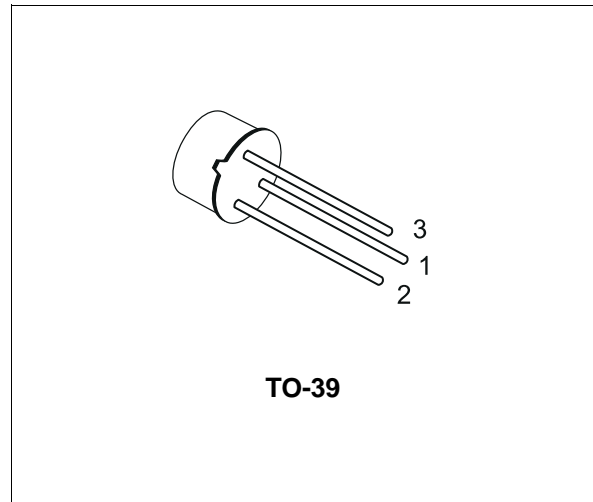


## SMALL SIGNAL NPN TRANSISTOR

- GENERAL PURPOSE HIGH VOLTAGE DEVICE

### DESCRIPTION

The 2N1893 is a Silicon Planar Epitaxial NPN transistor in Jedec TO-39 metal case, designed for use in high-performance amplifier, oscillator and switching circuits. It provides greater voltage swings in oscillator and amplifier circuits and more protection in inductive switching circuits due to its 120 V collector-to-base voltage rating.



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	120	V
$V_{CER}$	Collector-Emitter Voltage ( $R_{BE} \leq 10\Omega$ )	100	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	80	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	0.5	A
$P_{tot}$	Total Dissipation at $T_{amb} \leq 25^\circ\text{C}$	0.8	W
	at $T_C \leq 25^\circ\text{C}$	3	W
	at $T_C \leq 100^\circ\text{C}$	1.7	W
$T_{stg}$	Storage Temperature	-65 to 175	$^\circ\text{C}$
$T_j$	Max. Operating Junction Temperature	175	$^\circ\text{C}$

## THERMAL DATA

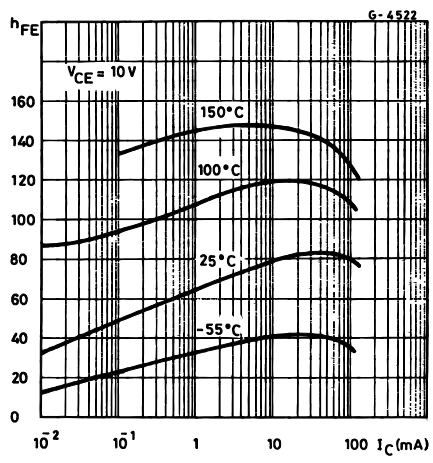
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	50	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	187.5	$^{\circ}C/W$

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

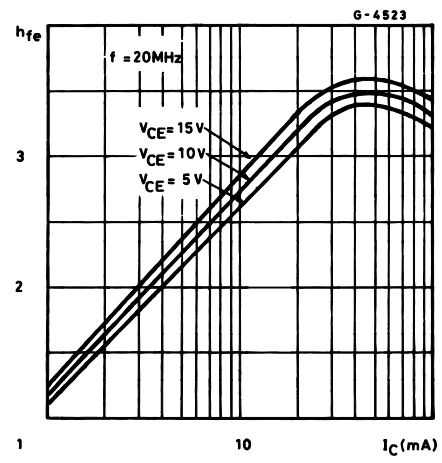
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cut-off Current ( $I_E = 0$ )	$V_{CB} = 90 V$ $V_{CB} = 90 V$ $T_C = 150^{\circ}C$			10 15	nA $\mu A$
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5 V$			10	nA
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_E = 0$ )	$I_C = 100 \mu A$	120			V
$V_{(BR)CER}^*$	Collector-Emitter Breakdown Voltage ( $R_{BE} \leq 10 \Omega$ )	$I_C = 10 mA$	100			V
$V_{(BR)CEO}^*$	Collector-Emitter Breakdown Voltage ( $I_B = 0$ )	$I_C = 10 mA$	80			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_C = 0$ )	$I_E = 100 \mu A$	7			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 50 mA$ $I_B = 5 mA$ $I_C = 150 mA$ $I_B = 15 mA$			1.2 5	V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 50 mA$ $I_B = 5 mA$ $I_C = 150 mA$ $I_B = 15 mA$		0.82 0.96	0.9 1.3	V V
$h_{FE}^*$	DC Current Gain	$I_C = 0.1 mA$ $V_{CE} = 10 V$ $I_C = 10 mA$ $V_{CE} = 10 V$ $I_C = 150 mA$ $V_{CE} = 10 V$ $I_C = 10 mA$ $V_{CE} = 10 V$ $T_C = -55^{\circ}C$	20 35 40 20	50 80 80 40	120	
$h_{fe}^*$	Small Signal Current Gain	$I_C = 1 mA$ $V_{CE} = 5 V$ $f = 1KHz$ $I_C = 5 mA$ $V_{CE} = 10 V$ $f = 1KHz$	30 45	70 85	150	
$f_T$	Transition Frequency	$I_C = 50 mA$ $V_{CE} = 10 V$ $f = 20MHz$	50	70		MHz
$C_{CBO}$	Collector-Base Capacitance	$I_E = 0$ $V_{CB} = 10 V$ $f = 1MHz$		13	15	pF
$C_{EBO}$	Emitter-Base Capacitance	$I_C = 0$ $V_{EB} = 0.5 V$ $f = 1MHz$		55	85	pF

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle  $\leq 1\%$

DC Current Gain

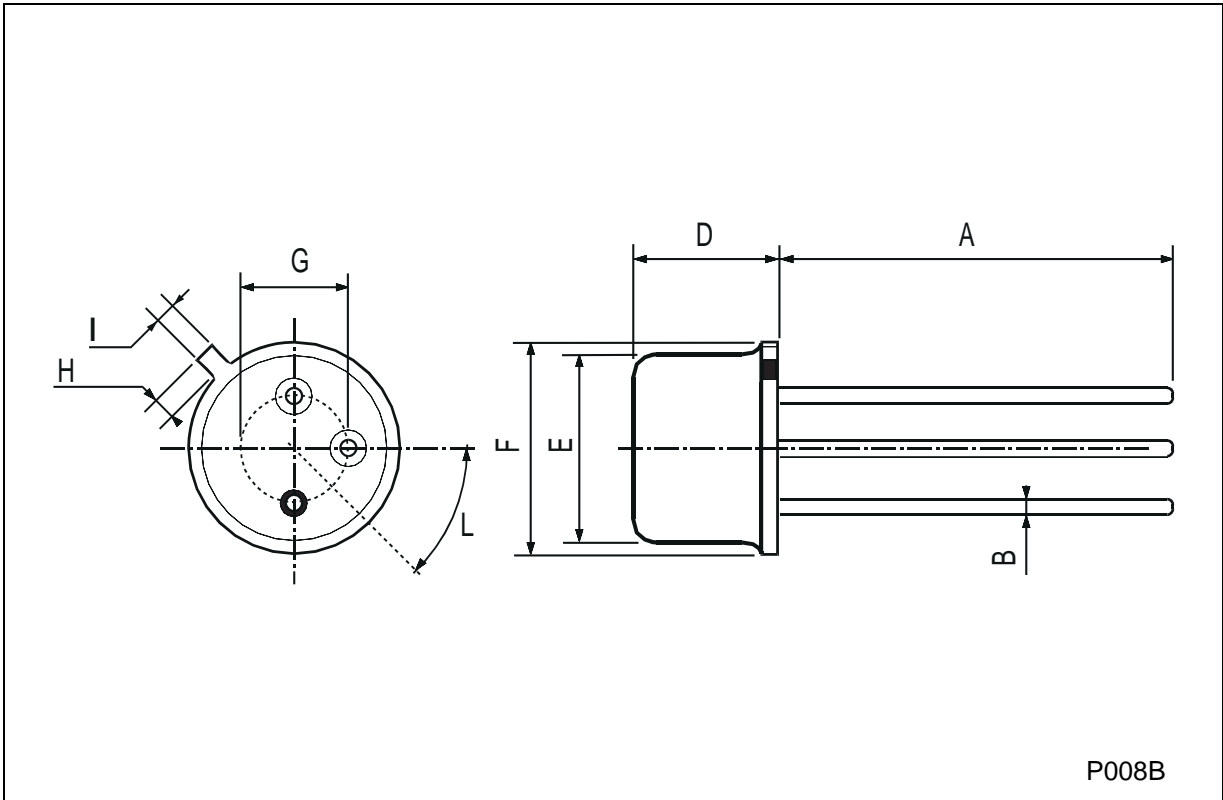


DC Current Gain



**TO-39 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45° (typ.)					



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