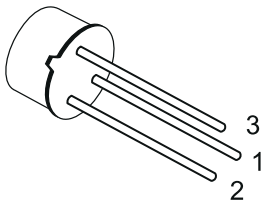
2N1893

SMALL SIGNAL NPN TRANSISTOR

- GENERAL PURPOSE HIGH VOLTAGE DEVICE

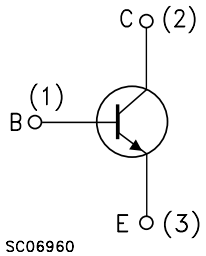
DESCRIPTION

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.



TO-39

INTERNAL SCHEMATIC DIAGRAM



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 $T_{amb} \leq 25\ ^oC$ at $T_C \leq 25\ ^oC$ at $T_C \leq 100\ ^oC$	0.8 3 1.7	W W W
T_{stg}	Storage Temperature	-65 to 175	^oC
T_j	Max. Operating Junction Temperature	175	^oC

THERMAL DATA

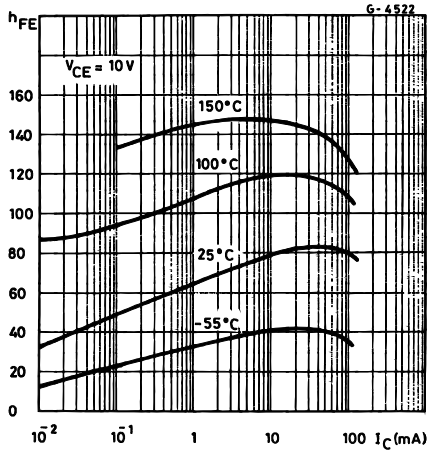
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	50	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	187.5	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

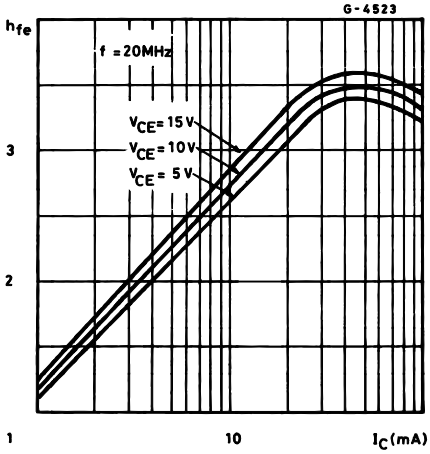
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current (I_E = 0)	V_{CB} = 90 V V_{CB} = 90 V T_C = 150 °C			10 15	nA µA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V			10	nA
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage (I_E = 0)	I_C = 100 µA	120			V
$V_{(BR)CER}$*	Collector-Emitter Breakdown Voltage (R_{BE} ≤ 10 Ω)	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 µA	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 °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 µs, duty cycle ≤ 1 %

DC Current Gain

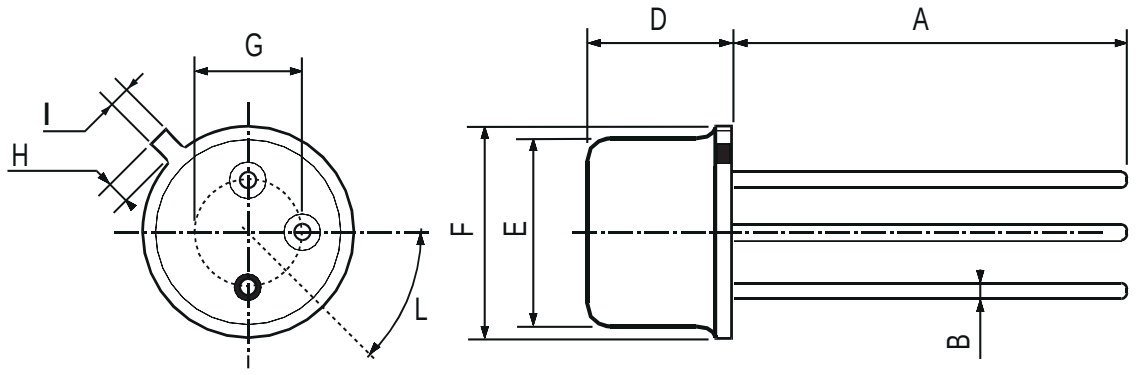


DC Current Gain



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^{o} (typ.)					



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