

FEATURES

- Available as High Reliability, JANTX level by adding “-HR” suffix.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding “-PBF” suffix.

MAXIMUM RATINGS

Rating	Symbol	All devices		Unit
Collector emitter voltage	V_{CEO}	80		V
Collector base voltage	V_{CBO}	120		V
Emitter base voltage	V_{EBO}	7.0		V
Collector emitter voltage (RBE = 10 Ω)	V_{CER}	100		V
Collector current	I_C	500		mA
Rating	Symbol	2N720A	2N1893(S)	Unit
Total power dissipation @ $T_A = 25^\circ\text{C}$ ⁽¹⁾ @ $T_C = 25^\circ\text{C}$ ⁽²⁾	P_T	0.5	0.8	W
		1.8	3.0	
Operating junction and storage temperature range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$
Thermal resistance junction to case	R_{th-jc}	97	58	$^\circ\text{C}/\text{W}$

Note 1: Derate linearly 2.86mW/ $^\circ\text{C}$ for 2N720A, 4.57mW/ $^\circ\text{C}$ for 2N1893(S), $T_A > 25^\circ\text{C}$.

Note 2: Derate linearly 10.3mW/ $^\circ\text{C}$ for 2N720A, 17.2mW/ $^\circ\text{C}$ for 2N1893(S), $T_C > 25^\circ\text{C}$.

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

Characteristic	Test Conditions	Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector emitter breakdown voltage	$I_C = 30\text{mA}$	$V_{(BR)CEO}$	80	-	V
Collector emitter breakdown voltage	$I_C = 10\text{mA}, R_{BE} = 10\Omega$	$V_{(BR)CER}$	100	-	V
Collector base cutoff current	$V_{CB} = 120\text{V}$ $V_{CB} = 90\text{V}$	I_{CBO}	-	10	μA
			-	10	nA
Emitter base cutoff current	$V_{EB} = 7\text{V}$ $V_{EB} = 5\text{V}$	I_{EBO}	-	10	μA
			-	10	nA
ON CHARACTERISTICS⁽³⁾					
Forward current transfer ratio	$I_C = 0.1\text{mA}, V_{CE} = 10\text{V}$ $I_C = 10\text{mA}, V_{CE} = 10\text{V}$ $I_C = 150\text{mA}, V_{CE} = 10\text{V}$	h_{FE}	20	-	-
			35	-	-
			40	120	-
Collector emitter saturation voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$	$V_{CE(sat)}$	-	5.0	V
Base emitter voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$	$V_{BE(sat)}$	-	1.3	V
DYNAMIC CHARACTERISTICS					
Magnitude of common emitter small signal short circuit forward current transfer ratio	$I_C = 50\text{mA}, V_{CE} = 10\text{V}, f = 20\text{MHz}$	$ h_{fe} $	3.0	10	-
Small signal short circuit forward current transfer ratio	$V_{CE} = 5.0\text{V}, I_C = 1.0\text{mA}$ $V_{CE} = 10\text{V}, I_C = 5.0\text{mA}, f = 1.0\text{kHz}$	h_{fe}	35	-	-
			45	100	-
Small signal short circuit input impedance	$V_{CB} = 10\text{V}, I_C = 5\text{mA}$	h_{ib}	4	8	Ω
Small signal short circuit output impedance	$V_{CB} = 10\text{V}, I_C = 5\text{mA}$	h_{ob}	-	0.5	$\mu\Omega$

2N720A, 2N1893S

SILICON NPN TRANSISTORS

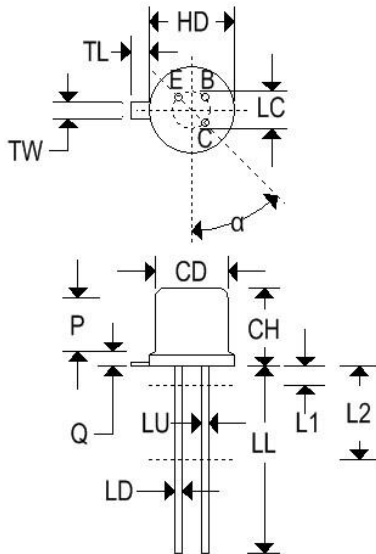
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Test Conditions	Symbol	Min	Max	Unit
Output capacitance	$V_{CB} = 10\text{V}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1\text{MHz}$	C_{obo}	2	15	pF
Turn-on time + turn off time		$t_{on}+t_{off}$	--	30	pF

Note 3: Pulse test: Pulse width = $300\mu\text{s}$, duty cycle $\leq 2.0\%$.

MECHANICAL CHARACTERISTICS

Case	TO-18 (2N720A)
Marking	Alpha-numeric
Polarity	See below



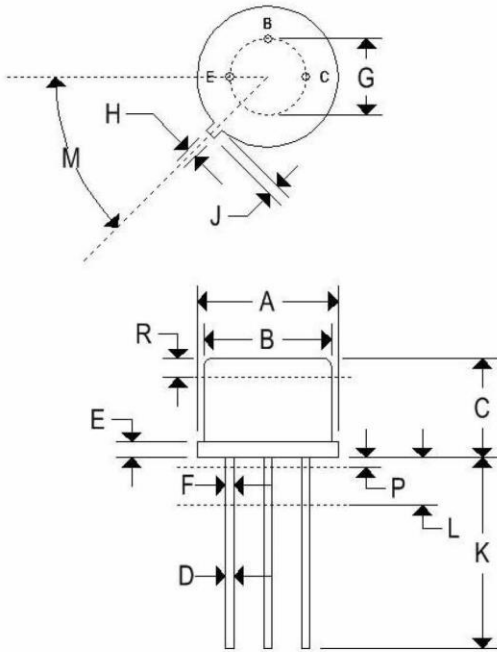
Dim	TO-18			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	0.178	0.195	4.520	4.950
CH	0.170	0.210	4.320	5.330
HD	0.209	0.230	5.310	5.840
LC	0.100 TP		2.540 TP	
LD	0.016	0.021	0.410	0.530
LL	0.500	0.750	12.700	19.050
LU	0.016	0.019	0.410	0.480
L1	-	0.050	-	1.270
L2	0.250	-	6.350	-
P	0.100	-	2.540	-
Q	-	0.040	-	1.020
TL	0.028	0.048	0.710	1.220
TW	0.036	0.046	0.910	1.170
r	-	0.010	-	0.025
α	45°TP		45°TP	

2N720A, 2N1893S

SILICON NPN TRANSISTORS

MECHANICAL CHARACTERISTICS

Case	TO-39 (2N1893S)
Marking	Alpha-numeric
Polarity	See below



	TO-39			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.350	0.370	8.890	9.400
B	0.315	0.335	8.000	8.510
C	0.240	0.260	6.10	6.60
D	0.016	0.021	0.406	0.533
E	0.009	0.125	0.2269	3.180
F	0.016	0.019	0.406	0.533
G	0.190	0.210	4.830	5.33
H	0.028	0.034	0.711	0.864
J	0.029	0.040	0.737	1.020
K	0.500	-	12.700	-
L	0.250	-	6.350	-
M	45° NOM		45° NOM	
P	-	0.050	-	1.270
Q	90° NOM		90° NOM	
R	0.100	-	2.540	-