

2N5302-2N5303

NPN HIGH POWER SILICON TRANSISTORS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	2N5302	2N5303	Unit
Collector emitter voltage	V_{CEV}	60	80	V
Collector base voltage	V_{CBO}	60	80	V
Emitter base voltage	V_{EBO}	5.0		V
Collector current	I_C	30	20	A
Base current	I_B	7.5		A
Total power dissipation @ $T_A = 25^\circ\text{C}$ ⁽¹⁾	P_T	5.0		W
Total power dissipation @ $T_C = 100^\circ\text{C}$ ⁽²⁾	P_T	115		W/ $^\circ\text{C}$
Operating & storage junction temperature range	T_J, T_{stg}	-65 – 200		$^\circ\text{C}$
Maximum thermal resistance junction to case	$R_{\theta JC}$	0.875		$^\circ\text{C}/\text{W}$

1) Derate linearly 28.57 mW/ $^\circ\text{C}$ for $T_A = 25^\circ\text{C}$

2) Derate linearly 1.14 W/ $^\circ\text{C}$ for $T_C = 100^\circ\text{C}$

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

Parameter		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector emitter breakdown current $I_C = 200\text{mA}, I_B = 0$	2N5302 2N5303	$V_{(BR)CEO}$	60 80	- -	V
Collector emitter cutoff current $V_{CE} = 60\text{V}, I_B = 0$ $V_{CE} = 80\text{V}, I_B = 0$	2N5302 2N5303	I_{CEO}	- -	10 10	μA
Emitter base cutoff current $V_{EB} = 5.0\text{V}, I_C = 0$		I_{EBO}	-	5.0	μA
Collector emitter cutoff current $V_{BE} = 1.5\text{V}, V_{CE} = 60\text{V}$ $V_{BE} = 1.5\text{V}, V_{CE} = 80\text{V}$	2N5302 2N5303	I_{CEX}	- -	5.0 5.0	μA
Collector emitter cutoff current $V_{CE} = 60\text{V}$ $V_{CE} = 80\text{V}$	2N5302 2N5303	I_{CBO}	- -	5.0 5.0	μA
ON CHARACTERISTICS					
Forward current transfer ratio $I_C = 1.0\text{A}, V_{CE} = 2.0\text{V}$ $I_C = 15\text{A}, V_{CE} = 2.0\text{V}$ $I_C = 10\text{A}, V_{CE} = 2.0\text{V}$ $I_C = 30\text{A}, V_{CE} = 4.0\text{V}$ $I_C = 20\text{A}, V_{CE} = 4.0\text{V}$	All types 2N5302 2N5303 2N5302 2N5303	h_{FE}	40 15 15 5.0 5.0	- 60 60 - -	-

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

Parameter		Symbol	Min	Max	Unit
Base emitter saturation voltage $I_C = 10\text{A}, I_B = 1.0\text{A}$ $I_C = 15\text{A}, I_B = 1.5\text{A}$ $I_C = 15\text{A}, I_B = 1.5\text{A}$ $I_C = 20\text{A}, I_B = 2.0\text{A}$ $I_C = 20\text{A}, I_B = 4.0\text{A}$	All types 2N5302 2N5303 2N5302 2N5303	h_{FE}	- - - - -	1.7 1.8 2.0 2.5 2.5	V
Base emitter non-saturation voltage $V_{CE} = 2.0\text{V}, I_C = 15\text{A}$ $V_{CE} = 2.0\text{V}, I_C = 10\text{A}$ $V_{CE} = 4.0\text{V}, I_C = 30\text{A}$ $V_{CE} = 4.0\text{V}, I_C = 20\text{A}$	2N5302 2N5303 2N5302 2N5303	h_{FE}	- - - -	1.8 1.5 3.0 2.5	V
Collector emitter saturation voltage $I_C = 10\text{A}, I_B = 1.0\text{A}$ $I_C = 10\text{A}, I_B = 1.0\text{A}$ $I_C = 15\text{A}, I_B = 1.5\text{A}$ $I_C = 15\text{A}, I_B = 1.5\text{A}$ $I_C = 20\text{A}, I_B = 2.0\text{A}$ $I_C = 20\text{A}, I_B = 4.0\text{A}$ $I_C = 30\text{A}, I_B = 6.0\text{A}$	2N5302 2N5303 2N5302 2N5303 2N5302 2N5303 2N5302	$V_{CE(sat)}$	- - - - - - -	0.75 1.0 1.0 1.5 2.0 2.0 3.0	V
DYNAMIC CHARACTERISTICS					
Magnitude of small signal short circuit forward current transfer ratio $I_C = 1.0\text{A}, V_{CE} = 10\text{V}, f = 1.0\text{MHz}$		$ h_{fe} $	2.0	40	-
Output capacitance $V_{CB} = 10\text{V}, I_E = 0, 100\text{kHz} \leq f \leq 1.0\text{MHz}$		C_{obo}	-	800	pF
SWITCHING CHARACTERISTICS					
Delay time	$V_{CC} = 30\text{V}, I_C = 10\text{A}, I_B = 1.0\text{A}$	t_d	-	0.2	μs
Rise time		t_r	-	0.9	μs
Storage time		t_s	-	2.0	μs
Fall time		t_f	-	1.0	μs
SAFE OPERATING AREA					
DC Tests: $TC = 25^\circ, 1 \text{ cycle}, t \geq 1.0\text{s}$					
Test 1 $V_{CE} = 6.67\text{V}, I_C = 30\text{A}$ $V_{CE} = 10\text{V}, I_C = 20\text{A}$	2N5302 2N5303				
Test 2 $V_{CE} = 20\text{V}, I_C = 10\text{A}$	2N5302, 2N5303				
Test 3 $V_{CE} = 40\text{V}, I_C = 3.0\text{A}$	2N5302, 2N5303				
Test 4 $V_{CE} = 50\text{V}, I_C = 600\text{mA}$ $V_{CE} = 60\text{V}, I_C = 600\text{mA}$	2N5302 2N5303				

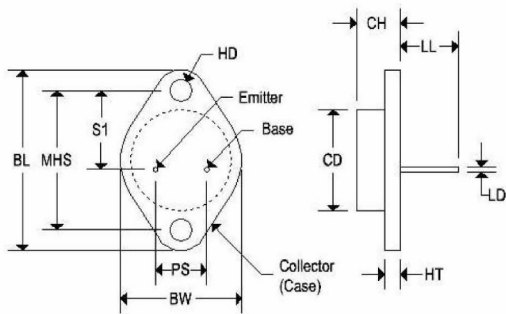
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Clamped switching: $T_A = 25^\circ$, $V_{CE} = 15V$	
Clamp voltage: 60V, $I_C = 30A$	2N5302
Clamp voltage: 80V, $I_C = 20A$	2N5303

MECHANICAL CHARACTERISTICS

Case	TO-3
Marking	Alpha numeric
Polarity	See below



	TO-3			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.875	-	22.220
CH	0.250	0.380	6.860	9.650
HT	0.060	0.135	1.520	3.430
BW	-	1.050	-	26.670
HD	0.131	0.188	3.330	4.780
LD	0.038	0.043	0.970	1.090
LL	0.312	0.500	7.920	12.700
BL	1.550 REF		39.370 REF	
MHS	1.177	1.197	29.900	30.400
PS	0.420	0.440	10.670	11.180
S1	0.655	0.675	16.640	17.150