DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MJ15003 NPN, MJ15004 PNP

COMPLEMENTARY SILICON POWER 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	MJ15003	MJ15004	Units
Collector-emitter voltage	$V_{CEO(SUS)}$	140		V
Collector-base voltage	V_{CBO}	140		V
Emitter base voltage	V_{EBO}	5.0		V
Collector current – continuous	I_C	20		A
Collector current – peak (1)	I_{CM}	30		A
Base current – continuous	I_B	5.0		A
Base current – peak (1)	I_{BM}	10		A
Total power dissipation T_C = 25°C **Derate above 25°C**	P_{tot}	250 1.43		W W/°C
Operating junction and storage temperature range	T_J, T_{stg}	-65 to +200		°C
Thermal resistance, junction to case	$R_{\Theta JC}$	0.70		°C/W

Note 1: Pulse duration = 5ms, duty cycle ≤ 10%.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise specified)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-emitter sustaining voltage (2) (I_B = 0, I_C = 200mA)	$V_{CEO(sus)}$	140	-	V
Collector cutoff current (V_{CE} = 140V, I_B = 0)	I_{CEO}	-	250	µA
Collector cutoff current (V_{CE} = 140V, $V_{BE(off)}$ = 1.5V) (V_{CE} = 140V, $V_{BE(off)}$ = 1.5V, T_C = 150°C)	I_{CEX}	- -	100 2.0	µA mA
Emitter cutoff current (V_{CE} = 5V, I_C = 0)	I_{EBO}	-	100	µA
ON CHARACTERISTICS (2)				
DC current gain (I_C = 5A, V_{CE} = 2V)	h_{FE}	25	150	-
Collector emitter saturation voltage (I_C = 5A, I_B = 500mA)	$V_{CE(sat)}$	-	1.0	V
Base emitter on voltage (I_C = 5A, V_{CE} = 2V)	$V_{BE(ON)}$	-	2.0	V

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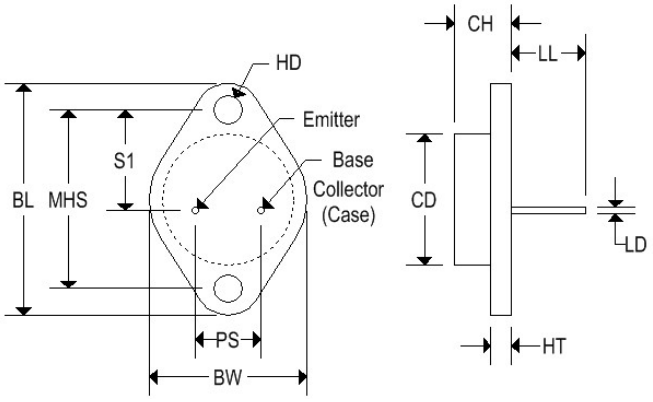
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise specified)

Characteristic	Symbol	Min	Max	Unit
DYNAMIC CHARACTERISTICS				
Current gain – bandwidth product [3] (I_C = 500mA, V_{CE} = 10V, f = 0.5MHz)	f_T	2.0	-	MHz
Output capacitance (V_{CB} = 4V, I_E = 0, f_{test} = 1MHz)	C_{ob}	-	1000	pF

Note 2: Pulse test: pulse width = 300µs, duty cycle ≤ 2%.
Note 3: $f_T = |h_{fe}| \circ f_{test}$.

MECHANICAL CHARACTERISTICS

Case	TO-3
Marking	Alpha-numeric
Pin out	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

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FIGURE -1 POWER DERATING

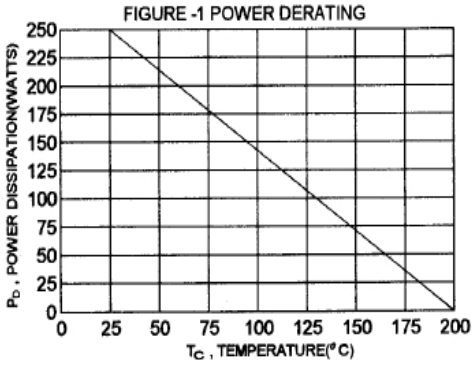
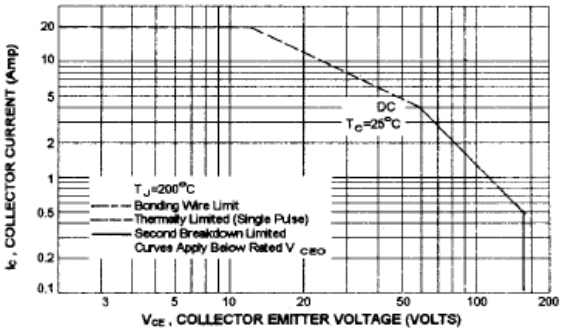
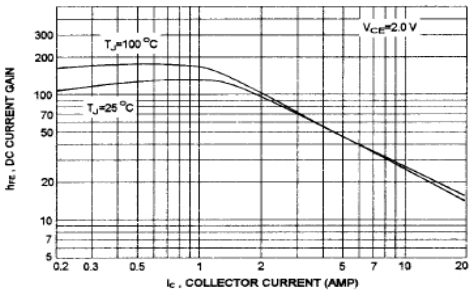


FIG-2 FORWARD BIAS SAFE OPERATING AREA

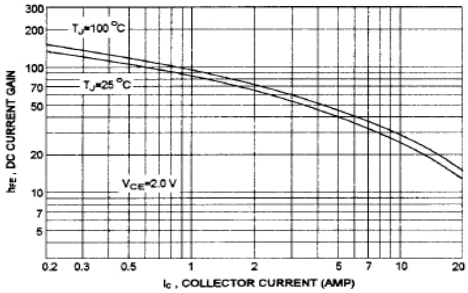


DC CURRENT GAIN

MJ15003

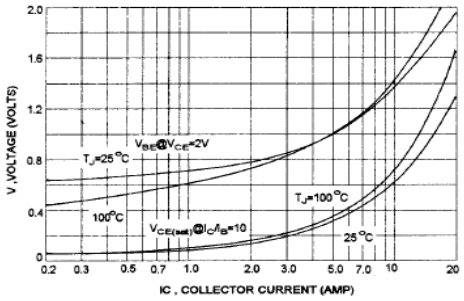


MJ15004

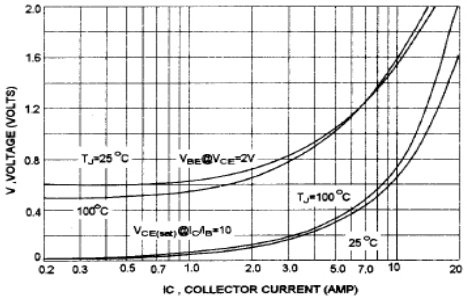


"ON" VOLTAGE

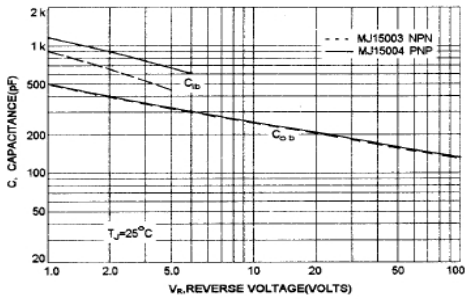
MJ15003



MJ15004



CAPACITANCES



CURRENT GAIN- BANDWIDTH PRODUCT