

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	MJ10013	MJ10014	Unit
Collector emitter voltage	V_{CEV}	650	700	V
Collector emitter voltage	$V_{CEO(sus)}$	550	600	V
Emitter base voltage	V_{EBO}	8.0		V
Collector current-Continuous	I_C	10		A
-Peak	I_{CM}	15		A
Base current	I_B	7.0		A
Total power dissipation @ $T_C = 25^\circ\text{C}$	P_D	175		W
Total power dissipation @ $T_C = 100^\circ\text{C}$		100		W
Derate above 25°C		1.0		W/ $^\circ\text{C}$
Operating and storage temperature range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$
Thermal resistance, junction to case	$R_{\theta JC}$	1.0		$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector emitter sustaining voltage ($I_C = 100\text{mA}$, $I_B = 0$, $V_{clamp} = \text{Rated } V_{CEO}$)	MJ10013 MJ10014	$V_{CEO(sus)}$	550 600	- - V
Collector cutoff current ($V_{CE} = \text{Rated } V_{CEV}$, $R_{BE} = 50\Omega$, $T_C = 100^\circ\text{C}$)		I_{CER}	-	5.0 mA
Collector cutoff current ($V_{CEV} = \text{Rated } V_{CEV}$, $V_{BE(off)} = 1.5\text{V}$) ($V_{CEV} = \text{Rated } V_{CEV}$, $V_{BE(off)} = 1.5\text{V}$, $T_C = 150^\circ\text{C}$)		I_{CEV}	- -	0.3 5.0 mA
Emitter cutoff current ($V_{EB} = 2.0\text{V}$, $I_C = 0$)		I_{EBO}	-	175 mA
ON CHARACTERISTICS ⁽¹⁾				
DC current gain ($I_C = 5.0\text{A}$, $V_{CE} = 5.0\text{V}$) ($I_C = 10\text{A}$, $V_{CE} = 5.0\text{V}$)		h_{FE}	20 10	500 250 -
Collector emitter saturation voltage ($I_C = 10\text{A}$, $I_B = 2.0\text{A}$) ($I_C = 10\text{A}$, $I_B = 2.0\text{mA}$, $T_C = 100^\circ\text{C}$)		$V_{CE(sat)}$	- -	2.5 2.6 V
Base-emitter saturation voltage ($I_C = 10\text{A}$, $I_B = 2.0\text{A}$) ($I_C = 10\text{A}$, $I_B = 2.0\text{A}$, $T_C = 100^\circ\text{C}$)		$V_{BE(sat)}$	- -	3.0 3.0 V
Diode forward voltage ($I_F = 10\text{A}$)		V_f	-	5.0 V

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

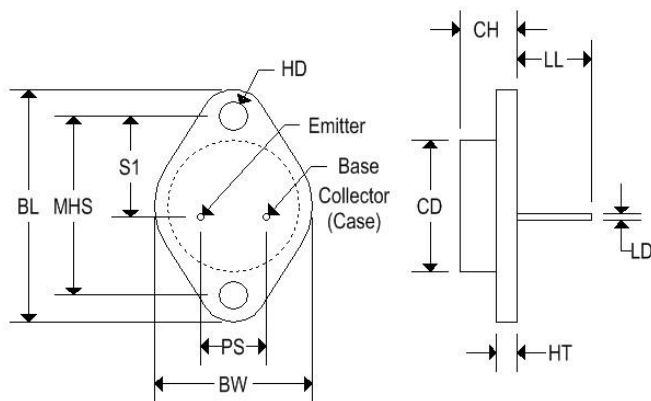
Characteristic	Symbol	Min	Max	Unit	
DYNAMIC CHARACTERISTICS					
Small signal current gain ⁽²⁾ ($I_C = 1.0\text{A}$, $V_{CE} = 10\text{V}$, $f_{\text{test}} = 1\text{MHz}$)	$ h_{fe} $	10	-	-	
Output capacitance ($V_{CB} = 10\text{V}$, $I_E = 0$, $f_{\text{test}} = 100\text{kHz}$)	C_{ob}	100	-	pF	
SWITCHING CHARACTERISTICS					
Delay time	$(V_{CC} = 250\text{V}$, $I_C = 10\text{A}$, $I_{B1} = 400\text{mA}$, $V_{BE(\text{off})} = 5.0\text{V}$, $t_p = 50\mu\text{s}$, duty cycle $\leq 2\%$)	t_d	-	0.2	μs
Rise time		t_r	-	2.0	
Storage time		t_s	-	4.0	
Fall time		t_f	-	1.0	

Note 1: Pulse test: pulse width = 5ms, duty cycle $\leq 2\%$.

Note 2: $f_T = |h_{fe}| * f_{\text{test}}$

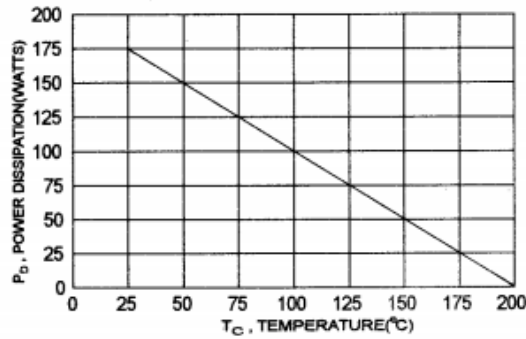
MECHANICAL CHARACTERISTICS

Case	TO-3
Marking	Alpha-numeric
Polarity	See below

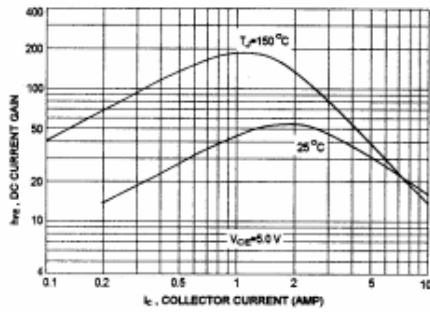


	TO-3			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.875	-	22.220
CH	0.250	0.380	6.860	9.650
HT	0.060	0.135	1.520	3.430
BW	-	1.050	-	26.670
HD	0.131	0.188	3.330	4.780
LD	0.038	0.043	0.970	1.090
LL	0.312	0.500	7.920	12.700
BL	1.550 REF		39.370 REF	
MHS	1.177	1.197	29.900	30.400
PS	0.420	0.440	10.670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

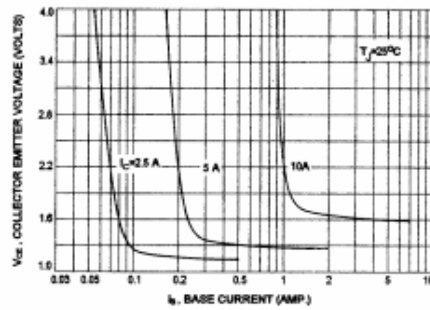
FIGURE -1 POWER DERATING



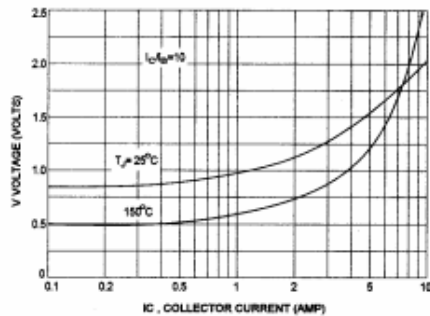
DC CURRENT GAIN



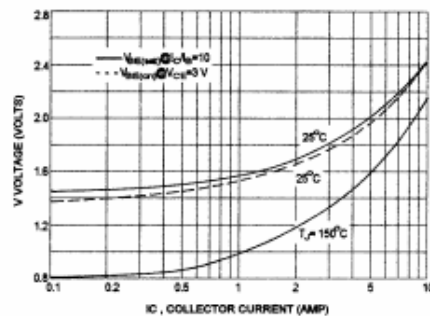
COLLECTOR SATURATION REGION



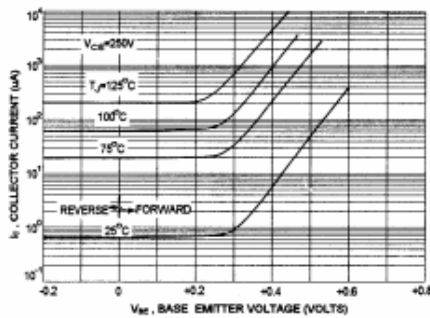
COLLECTOR EMITTER SATURATION VOLTAGE



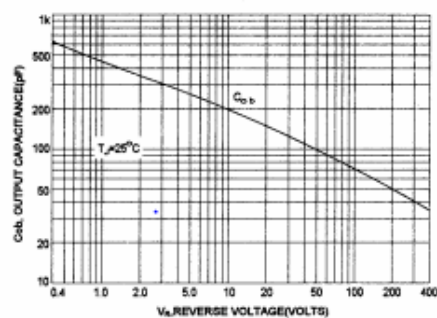
BASE EMITTER VOLTAGE



COLLECTOR CUT-OFF REGION



OUTPUT CAPACITANCES



MJ10013-MJ10014

NPN SILICON POWER DARLINGTON TRANSISTORS

