DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MJ13070-MJ13071

NPN SILICON POWER DARLINGTON 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	MJ13070	MJ13071	Unit
Collector emitter voltage	V_{CEO}	400	450	V
Collector emitter voltage	V_{CEV}	850	750	V
Emitter base voltage	V_{EBO}	6.0		V
Collector current-Continuous **Peak**	I_C I_{CM}	5.0 8.0		A
Base current **Peak**	I_B I_{BM}	2.0 4.0		A
Total power dissipation @ T_C = 25°C **Total power dissipation @ T_C = 100°C** **Derate above 25°C**	P_D	125 71.5 0.714		W W W/°C
Operating and storage temperature range	T_J, T_{stg}	-65 to +200		°C
Thermal resistance, junction to case	$R_{\Theta JC}$	1.4		°C/W

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector emitter sustaining voltage (I_C = 100mA, I_B = 0, V_{clamp} = Rated V_{CEO})	MJ13070 MJ13071	$V_{CEO(sus)}$	400 450	- -	Vdc
Collector cutoff current (V_{CEV} = Rated Value, $V_{BE(off)}$ = 1.5V) (V_{CEV} = Rated Value, $V_{BE(off)}$ = 1.5V, T_C = 100°C)		I_{CEV}	- -	0.5 2.5	mA
Collector cutoff current (V_{CEV} = Rated V_{CEV}, R_{BE} = 50Ω, T_C = 100°C)		I_{CER}	-	3.0	mA
Emitter cutoff current (V_{EB} = 6.0V, I_C = 0)		I_{EBO}	-	1.0	mA
ON CHARACTERISTICS (1)					
DC current gain (I_C = 3.0A, V_{CE} = 5.0V)		h_{FE}	8	-	-
Collector emitter saturation voltage (I_C = 3.0A, I_B = 600mA) (I_C = 5.0A, I_B = 1A) (I_C = 3.0A, I_B = 600mA, T_C = 100°C)		$V_{CE(sat)}$	- - -	1.0 3.0 2.0	V
Base-emitter saturation voltage (I_C = 3.0A, I_B = 600mA) (I_C = 3.0A, I_B = 600mA, T_C = 100°C)		$V_{BE(sat)}$	- -	1.5 1.5	V

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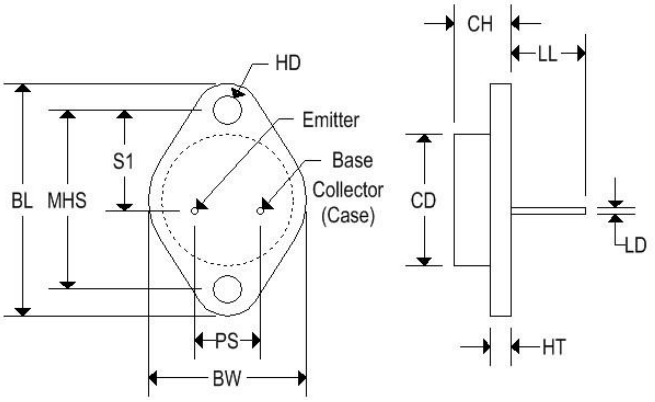
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Characteristic		Symbol	Min	Max	Unit
DYNAMIC CHARACTERISTICS					
Output capacitance (V_{CB} = 10V, I_E = 0, f_{test} = 100kHz)		C_{ob}	-	250	pF
SWITCHING CHARACTERISTICS					
RESISTIVE LOAD			**Min**	**Typ** / **Max**	
Delay time	(V_{CC} = 250V, I_C = 3.0A, I_{B1} = 400mA, $V_{BE(off)}$ = 5.0V, t_p = 30µs, duty cycle ≤ 2%)	t_d	-	0.03 / 0.05	µs
Rise time		t_r	-	0.10 / 0.40	
Storage time		t_s	-	0.40 / 1.50	
Fall time		t_f	-	0.175 / 0.50	
RESISTIVE LOAD			**Min**	**Typ** / **Max**	
Storage time	$I_{C(pk)}$ = 3.0A, I_{B1} = 0.4A, $V_{BE(off)}$ = 5.0V, $V_{CE(pk)}$ = 250V, T_J = 100°C	t_{sv}	-	0.70 / 2.0	µs
Crossover time		t_c	-	0.28 / 0.50	
Fall time		t_{fi}	-	0.15 / 0.30	
Storage time	$I_{C(pk)}$ = 3.0A, I_{B1} = 0.4A, $V_{BE(off)}$ = 5.0V, $V_{CE(pk)}$ = 250V, T_J = 25°C	t_{sv}	-	0.40 / -	µs
Crossover time		t_c	-	0.15 / -	
Fall time		t_{fi}	-	0.10 / -	

Note 1: Pulse test: pulse width = 5ms, duty cycle ≤ 2%.
Note 2: $\beta_f = I_C/I_B$

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

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FIGURE 1 — DC CURRENT GAIN

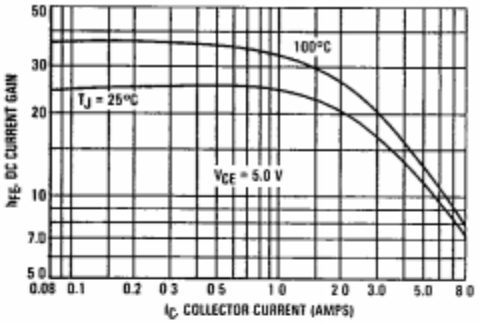

FIGURE 2 — COLLECTOR SATURATION REGION

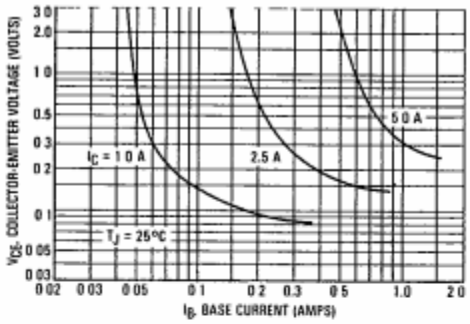

FIGURE 3 — COLLECTOR-EMITTER SATURATION VOLTAGE

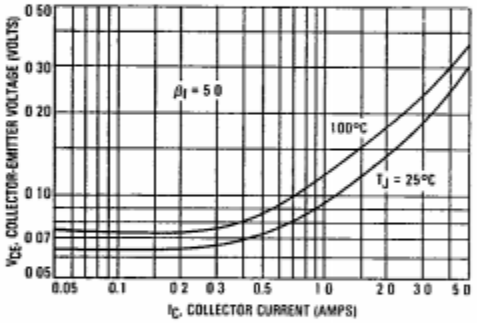

FIGURE 4 — BASE-EMITTER VOLTAGE

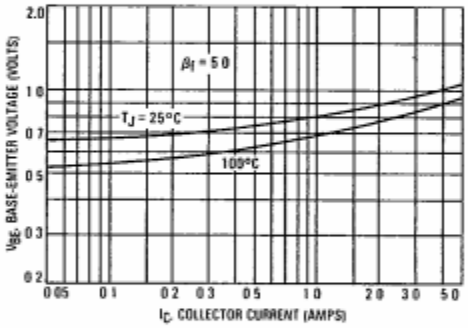

FIGURE 5 — COLLECTOR CUTOFF REGION

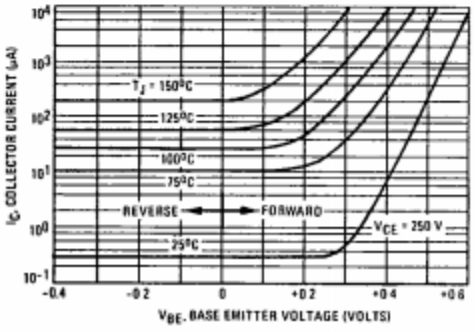

FIGURE 6 — CAPACITANCE

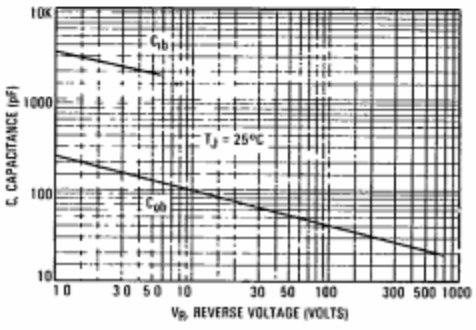

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FIGURE 7 — INDUCTIVE SWITCHING MEASUREMENTS

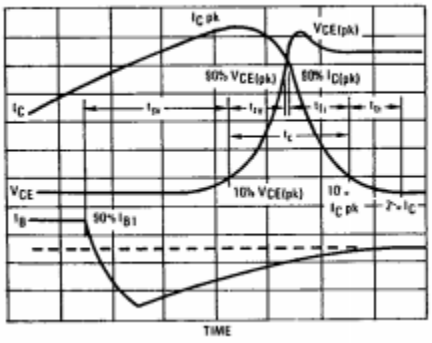

FIGURE 8 — PEAK REVERSE CURRENT

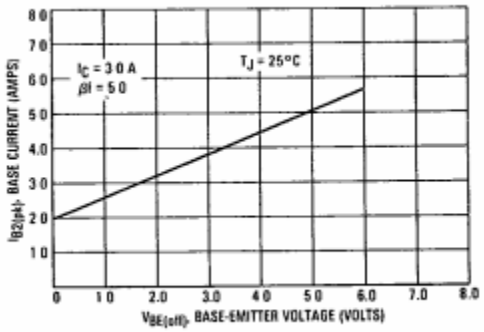

FIGURE 9 — STORAGE TIME

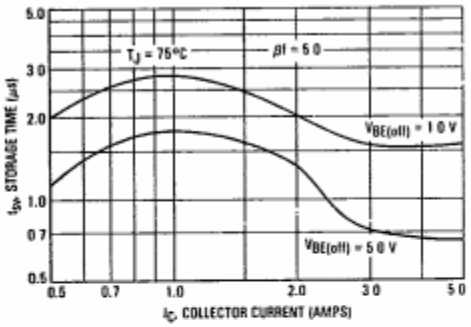

FIGURE 10 — CROSSOVER AND FALL TIMES

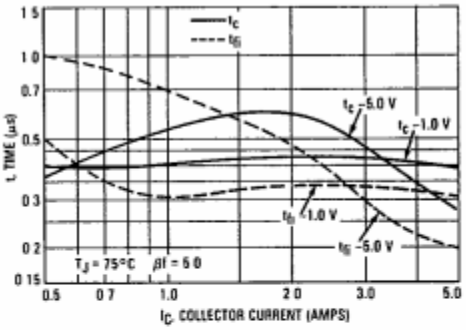

FIGURE 11 — THERMAL RESPONSE

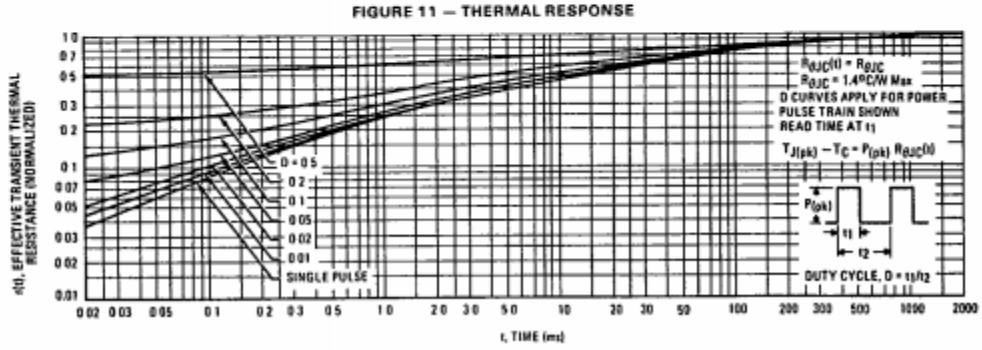

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FIGURE 12 — MAXIMUM RATED FORWARD BIAS SAFE OPERATING AREA

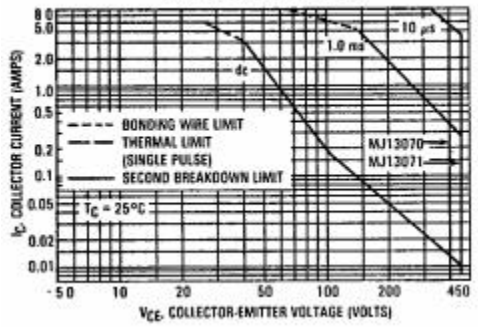

FIGURE 13 — MAXIMUM RATED REVERSE BIAS SAFE OPERATING AREA

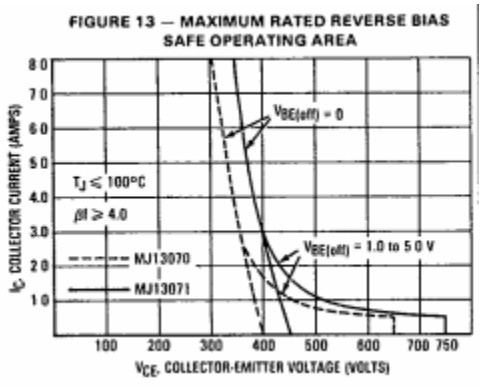

FIGURE 14 — POWER DERATING