DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MJ11012, MJ11014, MJ11016

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	MJ11012	MJ11014	MJ11016	Unit
Collector emitter voltage	V_{CEO}	60	90	120	V
Collector base voltage	V_{CBO}	60	90	120	V
Emitter base voltage	V_{EBO}	5			V
Collector current	I_C	30			A
Base current	I_B	1			A
Total device dissipation @ T_C = 25°C **Derate above 25°C @ T_C = 100° C**	P_D	200 1.15			W W/°C
Operating and storage temperature range	T_J, T_{stg}	-55 to +200			°C
Thermal resistance, junction to case	$R_{\Theta JC}$	0.87			°C/W
Maximum lead temperature for soldering purposes for ≤ 10s	T_L	275			°C

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector emitter breakdown voltage [1] I_C = 100mA, I_B = 0	MJ11012 MJ11014 MJ11016	$V_{(BR)CEO}$	60 90 120	- - -	V
Collector emitter leakage current V_{CE} = 60V, R_{BE} = 1kΩ V_{CE} = 90V, R_{BE} = 1kΩ V_{CE} = 120V, R_{BE} = 1kΩ V_{CE} = 60V, R_{BE} = 1kΩ, T_C = 150°C V_{CE} = 90V, R_{BE} = 1kΩ, T_C = 150°C V_{CE} = 120V, R_{BE} = 1kΩ, T_C = 150°C	 MJ11012 MJ11014 MJ11016 MJ11012 MJ11014 MJ11016	I_{CER}	 - - - - - -	 1 1 1 5 5 5	mA
Emitter cutoff current V_{BE} = 5V, I_C = 0		I_{EBO}	-	5	mA
Collector emitter leakage current V_{CE} = 50V, I_B = 0		I_{CEO}	-	1	mA
ON CHARACTERISTICS [1]					
DC current gain I_C = 20A, V_{CE} = 5V I_C = 30A, V_{CE} = 5V		h_{FE}	 1000 200	 - -	-
Collector emitter saturation voltage I_C = 20A, I_B = 200mA I_C = 30A, I_B = 300mA		$V_{CE(sat)}$	 - -	 3 4	V
Base emitter saturation voltage I_C = 20A, I_B = 200mA I_C = 30A, I_B = 300mA		$V_{BE(sat)}$	 - -	 3.5 5	V

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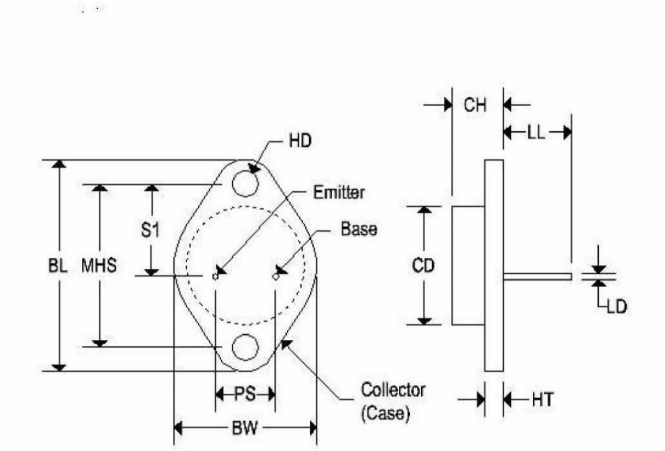
Characteristic	Symbol	Min	Max	Unit
DYNAMIC CHARACTERISTICS				
Current gain bandwidth product I_C = 10A, V_{CE} = 3V, f = 1MHz	h_{fe}	4	-	MHz

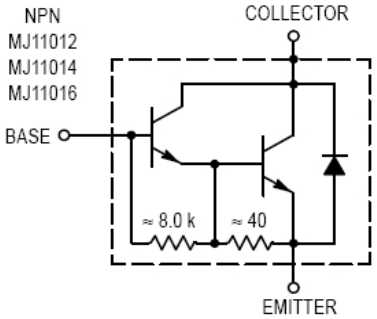
Note 1: Pulse test: Pulse width = 300µs, duty cycle ≤ 2.0%.

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



Darlington Circuit Schematic

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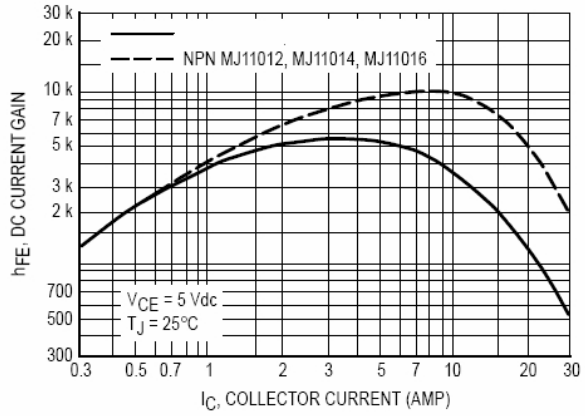
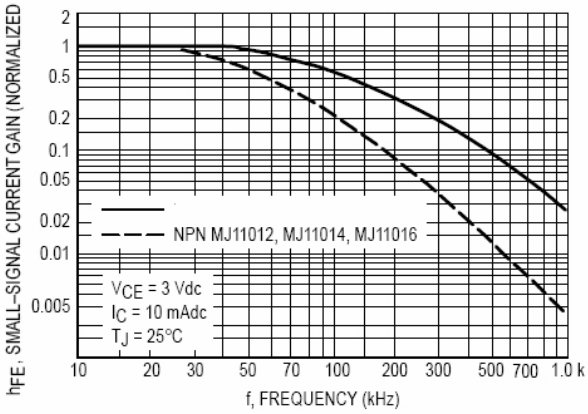
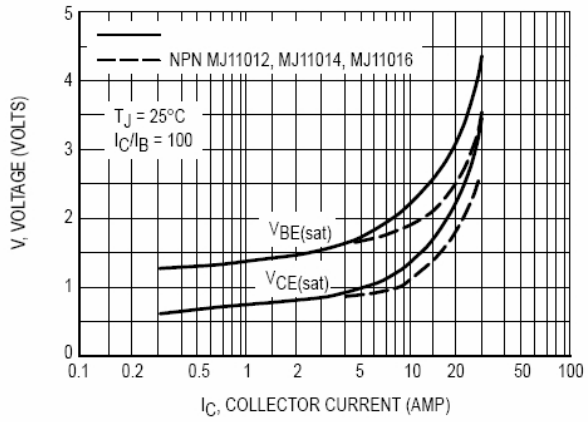


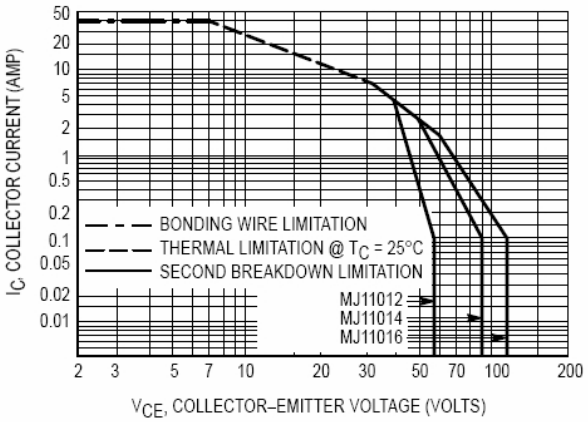
DC Current Gain



Small–Signal Current Gain



"On" Voltages



Active Region DC Safe Operating Area