

## 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	MJ11013	MJ11015	Unit
Collector emitter voltage	$V_{CEO}$	90	120	V
Collector base voltage	$V_{CBO}$	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 @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ @ $T_C = 100^\circ\text{C}$	$P_D$	200		W
		1.15		W/ $^\circ\text{C}$
Operating and storage temperature range	$T_J, T_{stg}$	-55 to +200		$^\circ\text{C}$
Thermal resistance, junction to case	$R_{\theta JC}$	0.87		$^\circ\text{C}/\text{W}$
Maximum lead temperature for soldering purposes for $\leq 10\text{s}$	$T_L$	275		$^\circ\text{C}$

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

Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector emitter breakdown voltage <sup>(1)</sup> $I_C = 100\text{mA}, I_B = 0$	MJ11013 MJ11015	$V_{(BR)CEO}$	90 120	- -	V
Collector emitter leakage current $V_{CE} = 90\text{V}, R_{BE} = 1\text{k}\Omega$ $V_{CE} = 120\text{V}, R_{BE} = 1\text{k}\Omega$ $V_{CE} = 90\text{V}, R_{BE} = 1\text{k}\Omega, T_C = 150^\circ\text{C}$ $V_{CE} = 120\text{V}, R_{BE} = 1\text{k}\Omega, T_C = 150^\circ\text{C}$	MJ11013 MJ11015 MJ11013 MJ11015	$I_{CER}$	- - - -	1 1 5 5	mA
Emitter cutoff current $V_{BE} = 5\text{V}, I_C = 0$		$I_{EBO}$	-	5	mA
Collector emitter leakage current $V_{CE} = 50\text{V}, I_B = 0$		$I_{CEO}$	-	1	mA
<b>ON CHARACTERISTICS <sup>(1)</sup></b>					
DC current gain $I_C = 20\text{A}, V_{CE} = 5\text{V}$ $I_C = 30\text{A}, V_{CE} = 5\text{V}$		$h_{FE}$	1000 200	- -	-
Collector emitter saturation voltage $I_C = 20\text{A}, I_B = 200\text{mA}$ $I_C = 30\text{A}, I_B = 300\text{mA}$		$V_{CE(sat)}$	- -	3 4	V
Base emitter saturation voltage $I_C = 20\text{A}, I_B = 200\text{mA}$ $I_C = 30\text{A}, I_B = 300\text{mA}$		$V_{BE(sat)}$	- -	3.5 5	V
<b>DYNAMIC CHARACTERISTICS</b>					
Current gain bandwidth product $I_C = 10\text{A}, V_{CE} = 3\text{V}, f = 1\text{MHz}$		$h_{fe}$	4	-	MHz

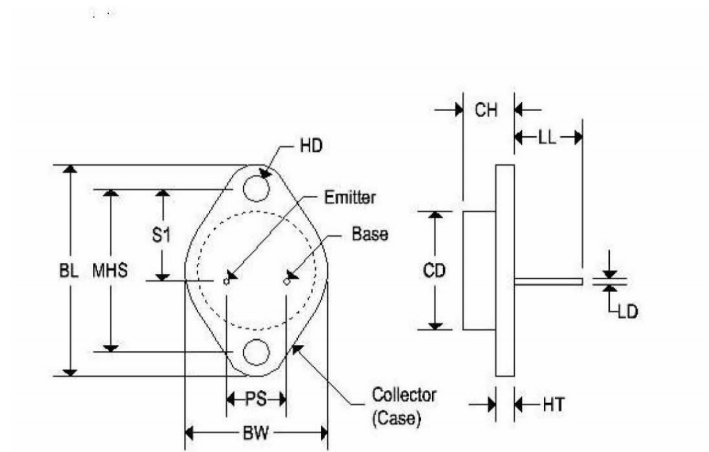
Note 1: Pulse test: Pulse width = 300 $\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

# MJ11013, MJ11015

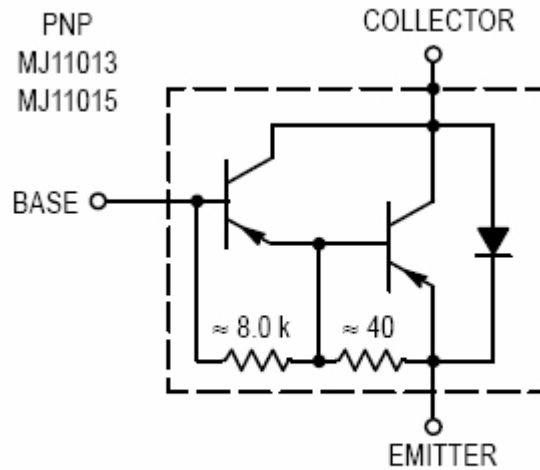
PNP SILICON POWER DARLINGTON TRANSISTORS

## MECHANICAL CHARACTERISTICS

Case	TO-3
Marking	Alpha-numeric
Polarity	See below



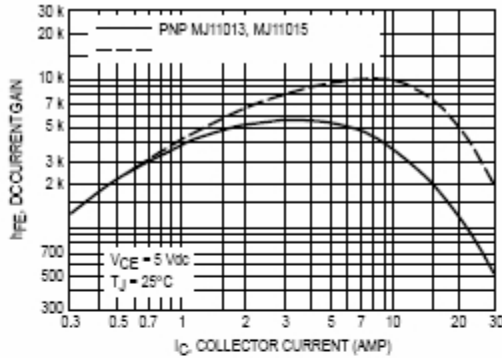
	TO-3			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.875	-	22.220
CH	0.250	0.380	6.860	9.650
HT	0.060	0.135	1.520	3.430
BW	-	1.050	-	26.670
HD	0.131	0.188	3.330	4.780
LD	0.038	0.043	0.970	1.090
LL	0.312	0.500	7.920	12.700
BL	1.550 REF		39.370 REF	
MHS	1.177	1.197	29.900	30.400
PS	0.420	0.440	10.670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



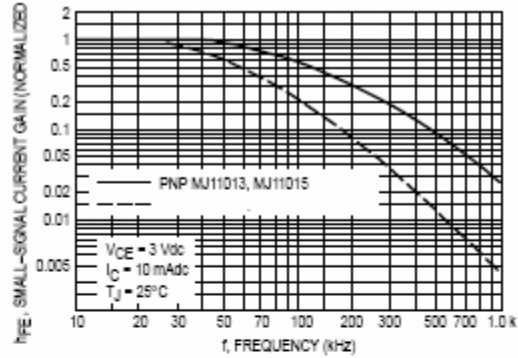
**Darlington Circuit Schematic**

# MJ11013, MJ11015

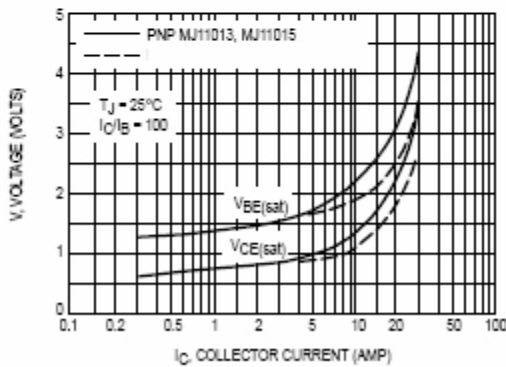
## PNP SILICON POWER DARLINGTON TRANSISTORS



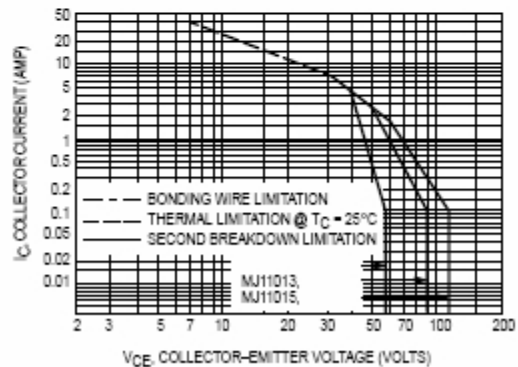
DC Current Gain



Small-Signal Current Gain



"On" Voltages



Active Region DC Safe Operating Area