

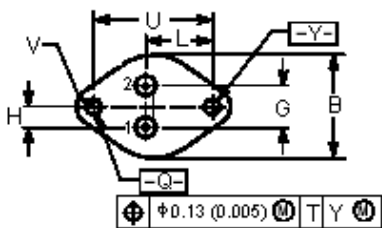
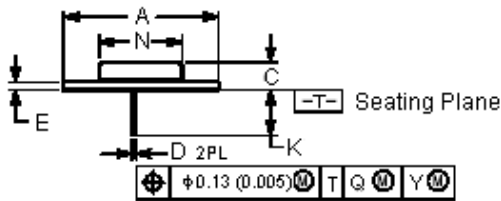


High-current complementary silicon transistors.  
 For use output devices in complementary general purpose amplifier applications.

**Features:**

- High DC current gain -  $h_{FE} = 1000$  (minimum) at  $I_C - 20A$  dc.
- Monolithic construction with built-in base emitter shunt resistor.
- Junction temperature to  $+200^{\circ}C$ .

(TO-3)

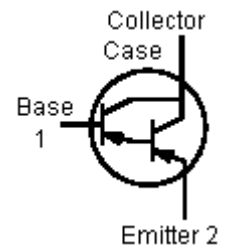


Style 1:  
 Pin 1. Base  
 2. Emitter  
 Collector (Case)

Dimensions	Minimum	Maximum
A	1.550 (39.37) Reference	
B	-	1.050 (26.67)
C	0.250 (6.35)	0.335 (8.51)
D	0.038 (0.97)	0.043 (1.09)
E	0.055 (1.40)	0.070 (1.77)
G	0.430 (10.92) BSC	
H	0.215 (5.46) BSC	
K	0.440 (11.18)	0.480 (12.19)
L	0.665 (16.89) BSC	
N	-	0.830 (21.08)
Q	0.151 (3.84)	0.165 (4.19)
U	1.187 (30.15) BSC	
V	0.131 (3.33)	0.188 (4.77)

Dimensions : Inches (Millimetres)

30 Ampere Darlington  
 Power Transistors  
 Complementary Silicon  
 60 - 120 Volts, 200 Watts



(TO-3)  
 Case 1-07  
 Style 1

## Maximum Ratings

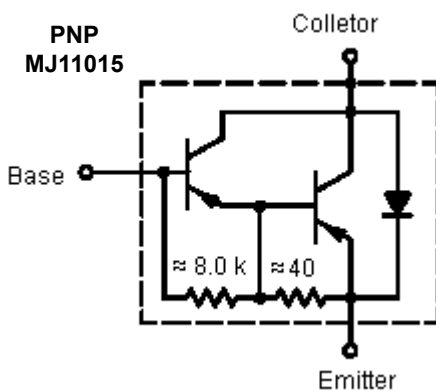
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	120	V dc
Collector-Base Voltage	$V_{CB}$		
Emitter-Base Voltage	$V_{EB}$	5	
Collector Current	$I_C$	30	A dc
Base Current	$I_B$	1	
Total Device Dissipation at $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ at $TC = 100^\circ\text{C}$	$P_D$	200 1.15	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +200	$^\circ\text{C}$

## Thermal Characteristics

Characteristics	Symbol	Maximum	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.17	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes for $\leq 10$ Seconds	$T_L$	275	$^\circ\text{C}$

Stresses exceeding maximum ratings may damage the device. Maximum ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to stresses above the recommended operating conditions may affect device reliability.

### Darlington Circuit Schematic

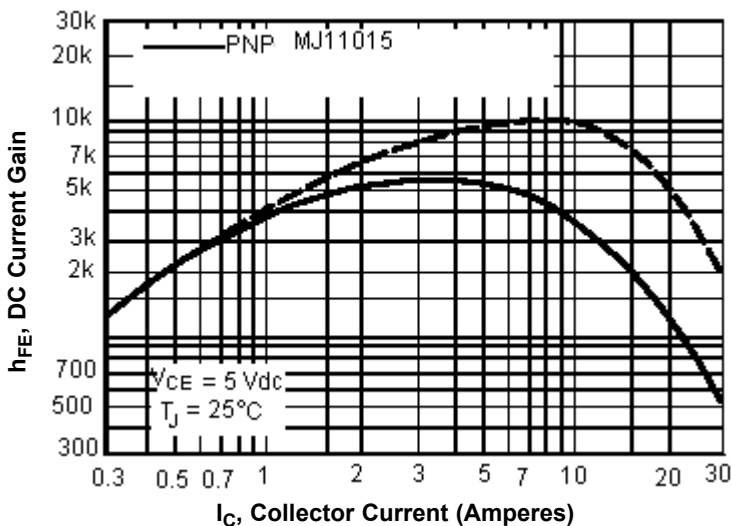


## Electrical Characteristics ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

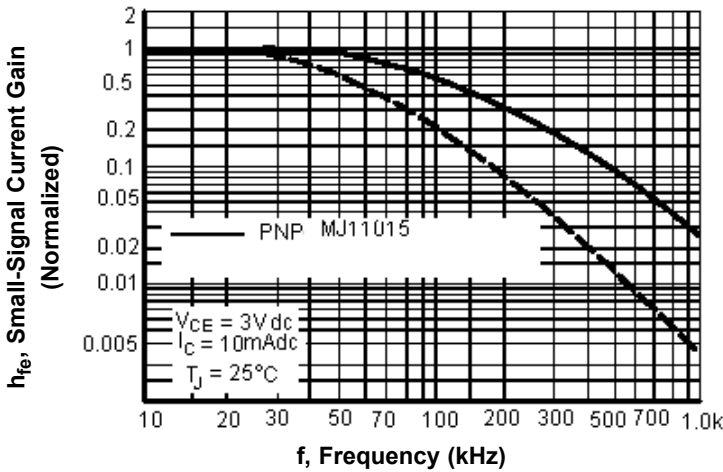
Characteristic	Symbol	Minimum	Maximum	Unit
<b>Off Characteristics</b>				
Collector-Emitter Breakdown Voltage (1) ( $I_C = 100\text{mA dc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	120	-	V dc
Collector-Emitter Leakage Current ( $V_{CE} = 120\text{V dc}$ , $R_{BE} = 1\text{k}\Omega$ ) ( $V_{CE} = 120\text{V dc}$ , $R_{BE} = 1\text{k}\Omega$ , $T_C = 150^\circ\text{C}$ )	$I_{CER}$	-	1 5	mA dc
Emitter Cut off Current ( $V_{BE} = 5.0\text{V dc}$ , $I_C = 0$ )	$I_{EBO}$	-	5	
Collector-Emitter Leakage Current ( $V_{CE} = 5.0\text{V dc}$ , $I_B = 0$ )	$I_{CEO}$	-	1	
<b>On Characteristics (1)</b>				
DC Current Gain ( $I_C = 20\text{A dc}$ , $V_{CE} = 5\text{V dc}$ ) ( $I_C = 30\text{A dc}$ , $V_{CE} = 5\text{V dc}$ )	$h_{FE}$	1000 200	- -	-
Collector-Emitter Saturation Voltage ( $I_C = 20\text{A dc}$ , $I_B = 200\text{mA dc}$ ) ( $I_C = 30\text{A dc}$ , $I_B = 300\text{mA dc}$ )	$V_{CE(sat)}$	-	3 4	V dc
Base-Emitter Saturation Voltage ( $I_C = 20\text{A dc}$ , $I_B = 200\text{mA dc}$ ) ( $I_C = 30\text{A dc}$ , $I_B = 300\text{mA dc}$ )	$V_{BE(sat)}$	-	3.5 5	
<b>Dynamic Characteristics</b>				
Current-Gain Bandwidth Product ( $I_C = 10\text{A}$ , $V_{CE} = 3\text{V dc}$ , $f = 1\text{MHz}$ )	$h_{fe}$	4	-	MHz

(1) Pulse Test: Pulse Width =  $300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

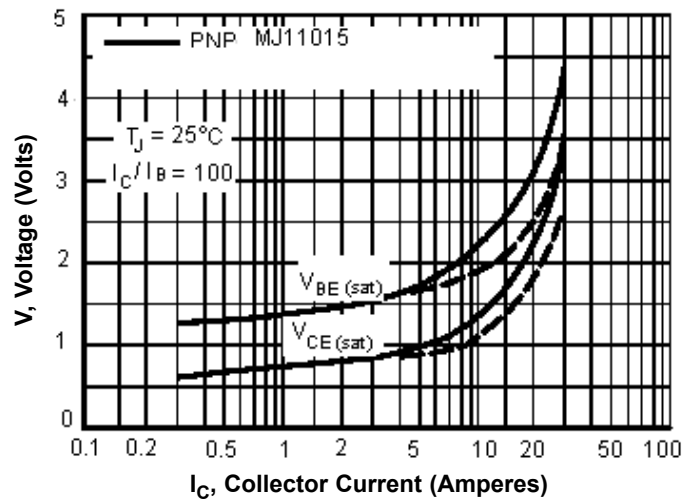
DC Current Gain (1)



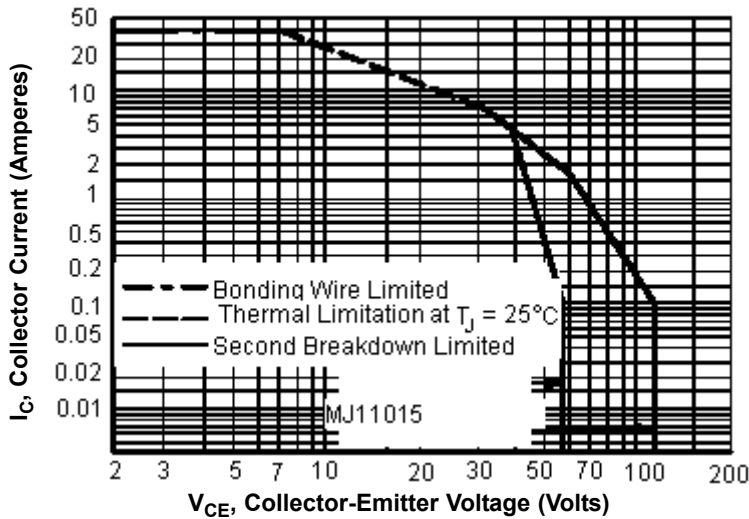
Small-Signal Current Gain



“On” Voltage (1)



Active Region DC Safe Operating Area



There are two limitations on the power handling ability of a transistor average junction temperature and secondary breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operations e.g., the transistor must not be subjected to greater dissipation than the curves indicate. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.

## Part Number Table

Description	Part Number
Darlington Transistor, TO-3	MJ11015

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