

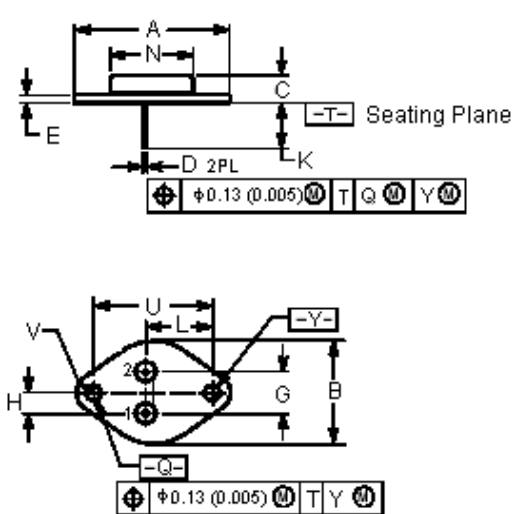


Complementary silicon power transistors.  
The MJ15004 powerBase™ power transistors designed for high power audio, disk head positioners and other linear applications.

**Features:**

- High safe operating area (100% tested) - 5.0A at 50V.
- For low distortion complementary designs.
- High DC current gain =  $h_{FE} = 25$  (minimum) at  $I_C = 5A$  dc.
- Pb-free packages.

(TO-3)

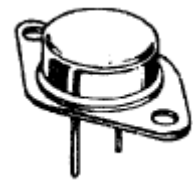


Style 1:  
Pin 1. Base  
2. Emitter  
Collector (Case)

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)

20 Ampere Darlington  
Power Transistors  
Complementary Silicon  
140 Volts, 250 Watts



(TO-3)  
Case 1-07  
Style 1

## Maximum Ratings

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	140	V dc
Collector-Base Voltage	$V_{CBO}$		
Emitter-Base Voltage	$V_{EBO}$	5	
Collector Current-Continuous	$I_C$	20	A dc
Base Current-Continuous	$I_B$	5	
Emitter Current-Continuous	$I_E$	25	
Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	250 1.43	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$

## Thermal Characteristics

Characteristics	Symbol	Maximum	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.70	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes 1/16 inches from Case for $\leq 10$ seconds	$T_L$	265	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

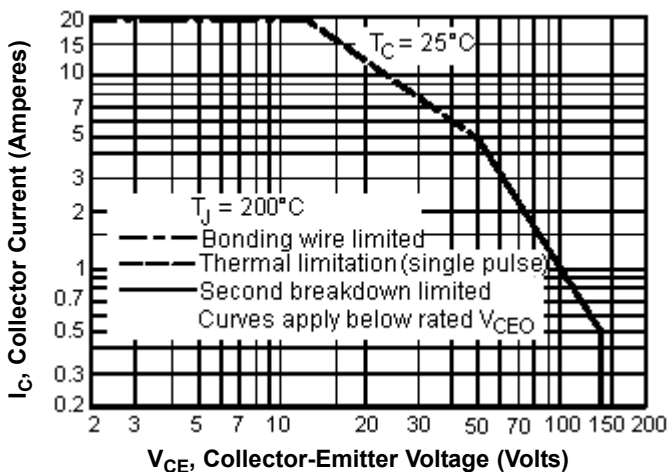
Characteristic	Symbol	Minimum	Maximum	Unit
<b>Off Characteristics</b>				
Collector-Emitter Sustaining Voltage (1) ( $I_C = 200\text{mA dc}$ , $I_B = 0$ )	$V_{CEO(sus)}$	140	-	V dc
Collector Cut off Current ( $V_{CE} = 140\text{V dc}$ , $V_{BE(off)} = 1.5\text{V dc}$ ) ( $V_{CE} = 140\text{V dc}$ , $V_{BE(off)} = 1.5\text{V dc}$ , $T_C = 150^\circ\text{C}$ )	$I_{CEX}$	-	100 2	$\mu\text{A dc}$ mA dc
Collector Cut off Current ( $V_{CE} = 140\text{V dc}$ , $I_B = 0$ )	$I_{CEO}$	-	250	$\mu\text{A dc}$
Emitter Cut off Current ( $V_{EB} = 5\text{V dc}$ , $I_C = 0$ )	$I_{EBO}$	-	100	

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

Second Breakdown				
Second Breakdown Collector Current with Base Forward Biased ( $V_{CE} = 50\text{V dc}$ , $t = 1\text{s}$ (non repetitive)) ( $V_{CE} = 100\text{V dc}$ , $t = 1\text{s}$ (non repetitive))	$I_{S/b}$	5.0 1.0	- -	A dc
On Characteristics				
DC Current Gain ( $I_C = 5\text{A dc}$ , $V_{CE} = 2\text{V dc}$ )	$h_{FE}$	25	150	-
Collector-Emitter Saturation Voltage ( $I_C = 5\text{A dc}$ , $I_B = 0.5\text{A dc}$ )	$V_{CE(sat)}$	-	1.0	V dc
Base-Emitter On Voltage ( $I_C = 5\text{A dc}$ , $V_{CE} = 2\text{V dc}$ )	$V_{BE(on)}$	-	2.0	
Dynamic Characteristics				
Current-Gain Bandwidth Product ( $I_C = 0.5\text{A dc}$ , $V_{CE} = 10\text{V dc}$ , $f_{test} = 0.5\text{MHz}$ )	$f_T$	2.0	-	MHz
Output Capacitance ( $V_{CB} = 10\text{V dc}$ , $I_E = 0$ , $f_{test} = 1\text{MHz}$ )	$C_{ob}$	-	1000	pF

1. Pulse Test: Pulse Width =  $300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

### Active Region DC Safe Operating Area



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate. The data is based on  $T_{J(pk)} = 200^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

### Part Number Table

Description	Part Number
Transistor, PNP, TO-3	MJ15004

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