

# Transistor, NPN TO-3

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## Description:

The MJ15024 powerbase power transistors designed for high power audio, disk head positioners and other linear applications.

## Features:

- High safe operating area (100% tested) - 2A at 80V
- High DC current gain -  $h_{FE} = 15$  (min.) at  $I_C = 8A$  DC
- Pb-free packages

## Maximum Ratings

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	250	V DC
Collector-Base Voltage	$V_{CBO}$	400	
Emitter-Base Voltage	$V_{EBO}$	5	
Collector-Emitter Voltage	$V_{CEX}$	400	A DC
Collector Current-Continuous -Peak (Note 1)	$I_C$	16 30	
Base Current-Continuous	$I_B$	5	
Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	250 1.43	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{Stg}$	-65 to +200	$^\circ C$

## Thermal Characteristics

Characteristic	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.70	$^\circ C/W$

Max. 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.

1. Pulse test: pulse width = 5ms, duty cycle  $\leq 10\%$ .

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

Characteristic	Symbol	Min.	Max.	Unit
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### Off Characteristics

Collector-Emitter Sustaining Voltage (Note 2) ( $I_C = 100\text{mA DC}$ , $I_B = 0$ )	$V_{EO(sus)}$	250	-	-
Collector Cut off Current ( $V_{CE} = 250\text{V DC}$ , $V_{BE(off)} = 1.5\text{V DC}$ )	$I_{CEX}$	-	250	$\mu\text{A DC}$
Collector Cut off Current ( $V_{CE} = 200\text{V DC}$ , $I_B = 0$ )	$I_{CEO}$	-	500	
Emitter Cut off Current ( $V_{CE} = 5\text{V DC}$ , $I_B = 0$ )	$I_{EBO}$	-	-	

### Second Breakdown

Second Breakdown Collector Current with Base Forward Biased ( $V_{CE} = 50\text{V DC}$ , $t = 0.5\text{s}$ (Non-repetitive)) ( $V_{CE} = 80\text{V DC}$ , $t = 0.5\text{s}$ (non-repetitive))	$I_{S/b}$	5 2	-	A DC
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### On Characteristic

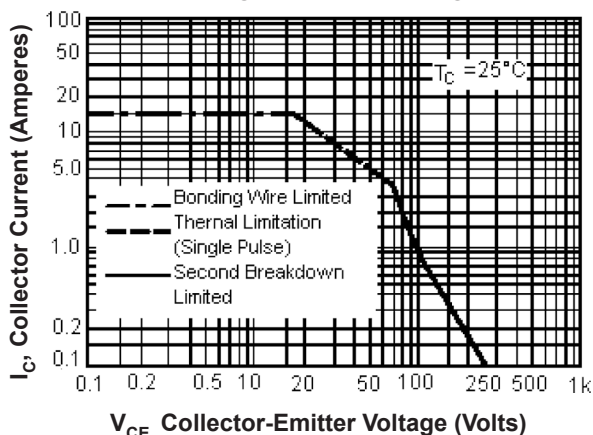
DC Current Gain ( $I_C = 8\text{A DC}$ , $V_{CE} = 4\text{V DC}$ ) ( $I_C = 16\text{A DC}$ , $V_{CE} = 4\text{V DC}$ )	$h_{FE}$	15 5	60 -	-
Collector-Emitter Saturation Voltage ( $I_C = 8\text{A DC}$ , $I_B = 0.8\text{A DC}$ ) ( $I_C = 16\text{A DC}$ , $I_B = 3.2\text{A DC}$ )	$V_{CE(sat)}$	-	1.4 4	V DC
Base-Emitter On Voltage ( $I_C = 8\text{A DC}$ , $V_{CE} = 4\text{V DC}$ )	$V_{BE(on)}$	-	2.2	

### Dynamic Characteristics

Current-Gain - Bandwidth Product ( $I_C = 1\text{A DC}$ , $V_{CE} = 10\text{V DC}$ , $f_{test} = 1\text{MHz}$ )	$f_T$	4	-	MHz
Output Capacitance ( $V_{CB} = 10\text{V DC}$ , $I_E = 0$ , $f_{test} = 1\text{MHz}$ )	$C_{ob}$	-	500	pF

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

### Active - Region Safe Operating Area



There are two limitation 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 curves indicate. The data is based on  $T_{J(PK)} = 200^\circ\text{C}$ ; TC is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values lon than the limitations imposed by second breakdown.

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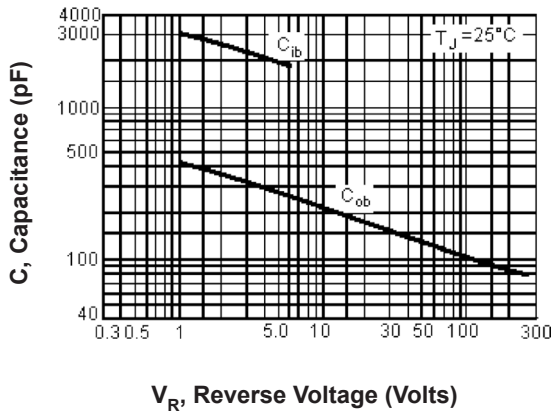
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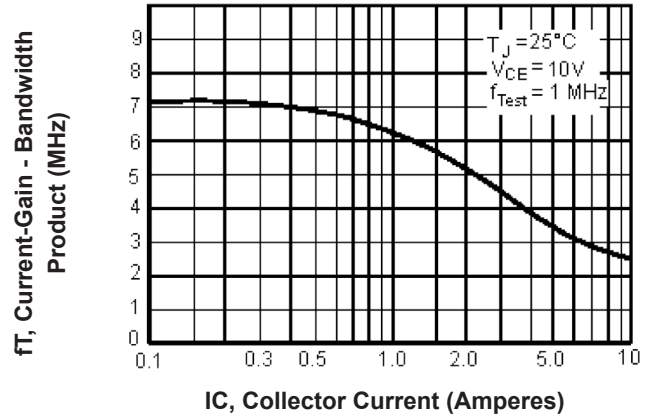
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## Typical Characteristics

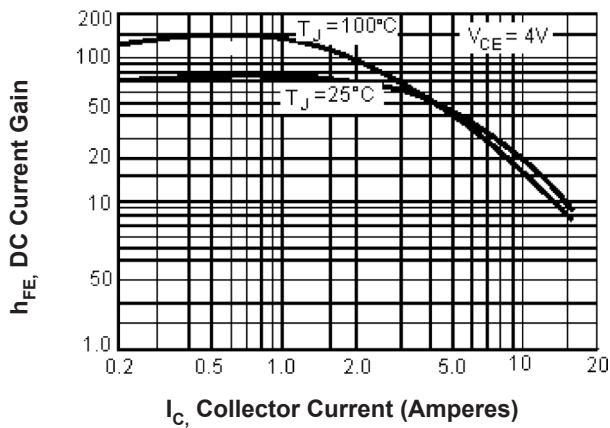
Capacitances



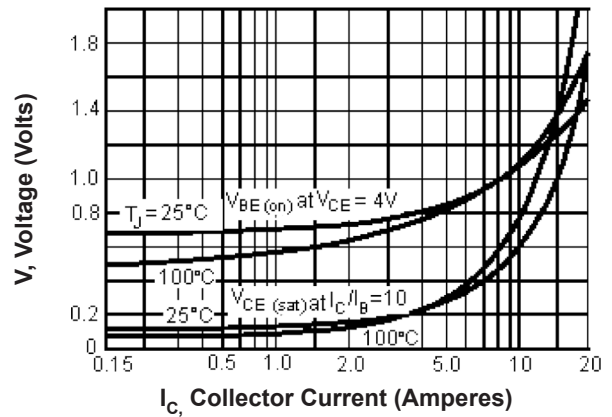
Current-Gain - Bandwidth Product



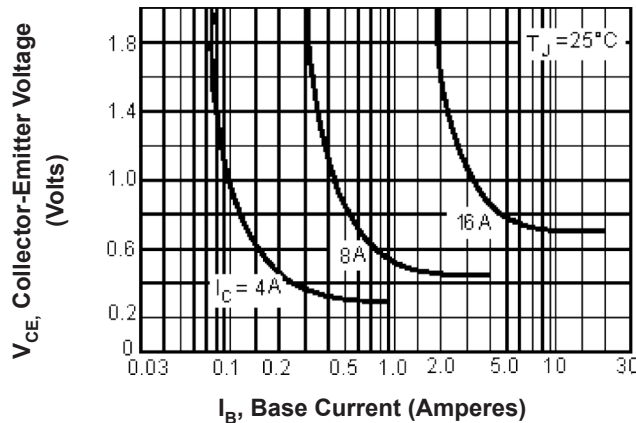
DC Current Gain



"On" Voltage



Collector Saturation Region

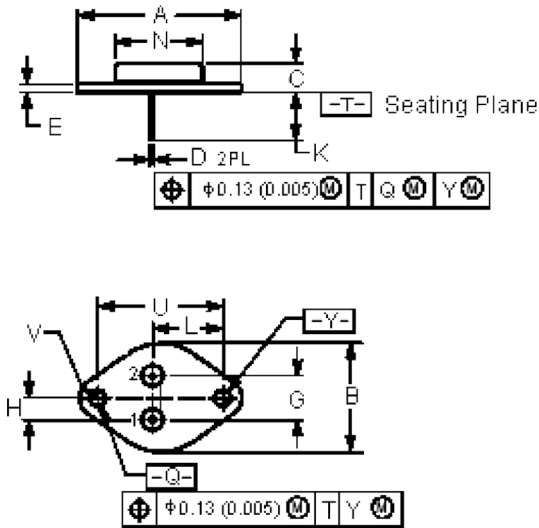


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## Dimensions:



Dimensions	Min.	Max.
A	1.55 (39.37)	Reference
B	-	1.05 (26.67)
C	0.25 (6.35)	0.335 (8.51)
D	0.038 (0.97)	0.043 (1.09)
E	0.055 (1.4)	0.07 (1.77)
G	0.43 (10.92) BSC	
H	0.215 (5.46) BSC	
K	0.44 (11.18)	0.48 (12.19)
L	0.665 (16.89) BSC	
N	-	0.83 (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)

## Pin Configuration

- Pin 1. Base
- 2. Emitter
- Collector (Case)

Dimensions : Inches (Millimetres)

## Part Number Table

Description	Part Number
Transistor, NPN, TO-3	MJ15024

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