

Transistor, PNP TO-3



Description:

Silicon power transistors.

The MJ15023 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}	200	V DC
Collector-Base Voltage	V_{CBO}	350	
Emitter-Base Voltage	V_{EBO}	5	
Collector-Emitter Voltage	I_{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	$R_{\theta JC}$	0.7	$^\circ C/W$

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) ($I_C = 100\text{mA DC}$, $I_B = 0$)	$V_{CEO(sus)}$	200	-	-
Collector Cut off Current ($V_{CE} = 200\text{V DC}$, $V_{BE(off)} = 1.5\text{V DC}$)	I_{CEX}	-	250	$\mu\text{A DC}$
Collector Cut off Current ($V_{CE} = 150\text{V DC}$, $I_B = 0$)	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

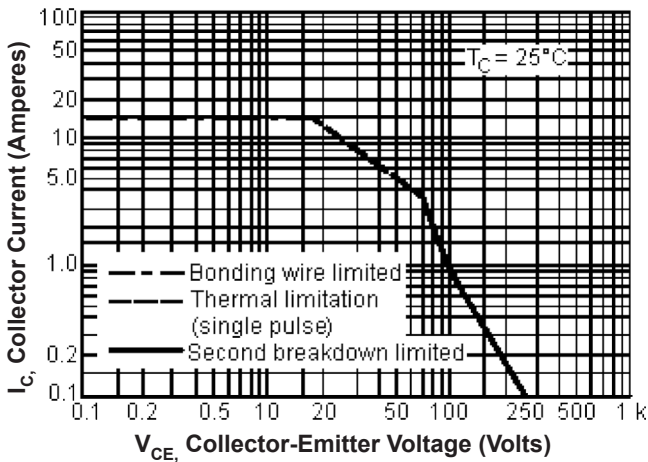
Current-Gain Bandwidth Product ($I_C = 1\text{A DC}$, $V_{CE} = 10\text{V DC}$, $f_{test} = 1\text{MHz}$)	f_T	4	-	MHz
Output Capacitance ($V_{CB} = 10\text{V DC}$, $I_E = 0$, $f_{test} = 1\text{MHz}$)	C_{OB}	-	600	pF

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

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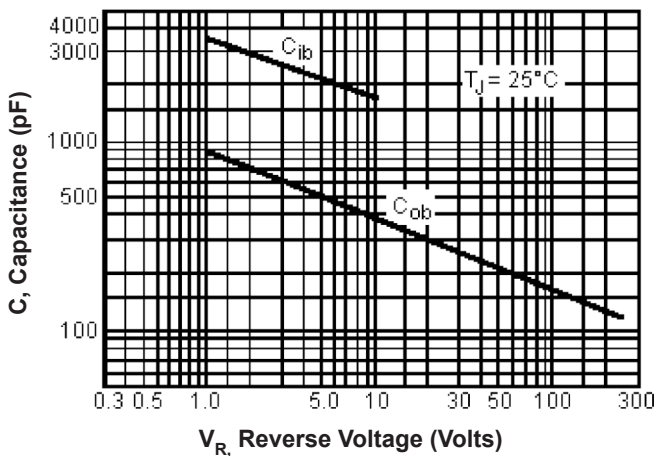
Active Region DC Safe Operating Area



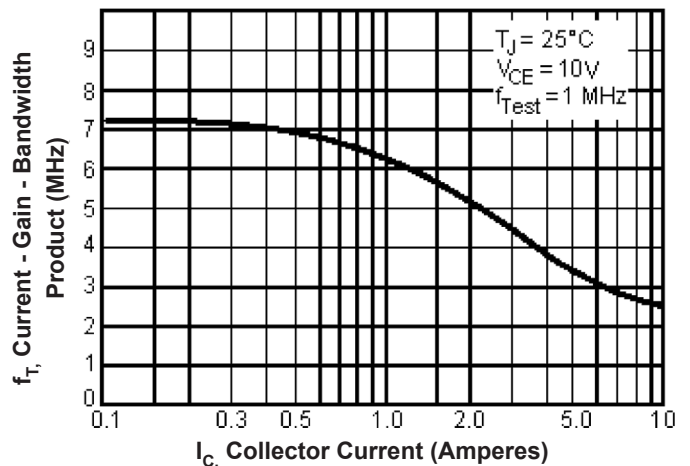
There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation 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.

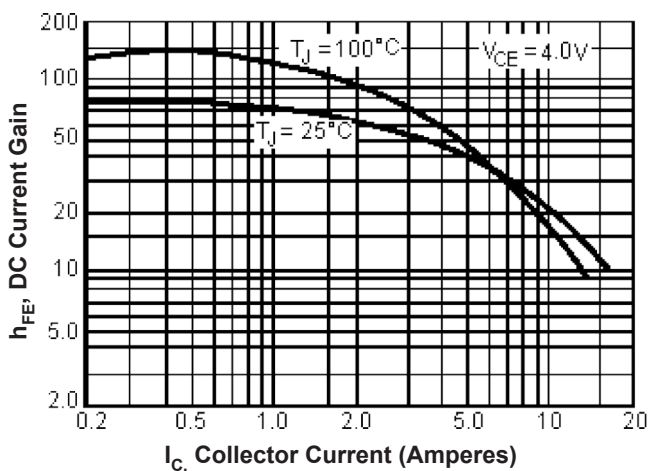
Capacitances



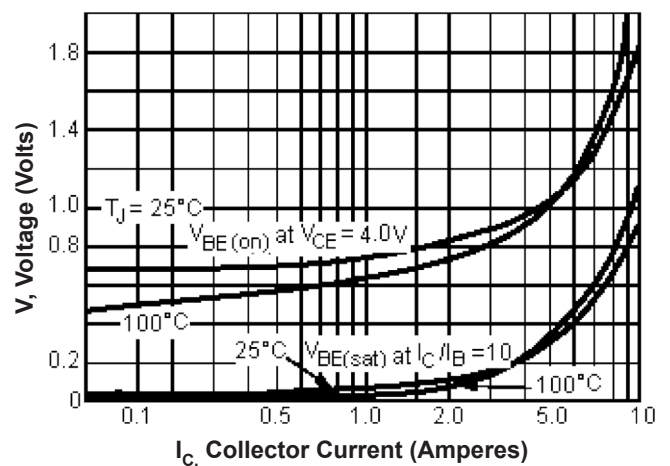
Current - Gain - Bandwidth Product



DC Current Gain



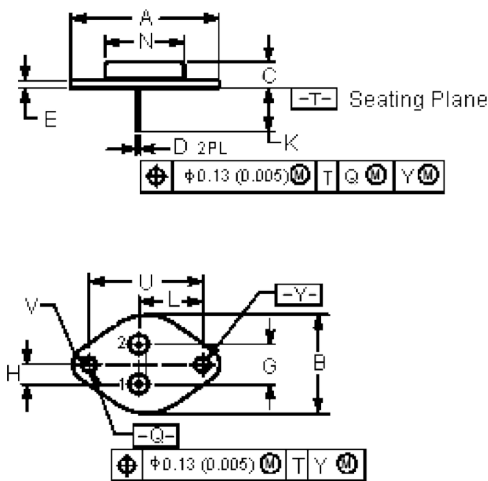
"On" Voltages



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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)

Dimensions : Inches (Millimetres)

Pin Configuration

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

Part Number Table

Description	Part Number
Transistor, PNP, TO-3	MJ15023

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