

Transistor

NPN, TO-3



Description:

Complementary silicon power transistors.

The MJ15003 power transistors designed for high power audio, disk head positioners and other linear applications.

Features:

- High safe operating area (100% tested) - 5A at 50V
- For low distortion complementary designs
- High DC current gain - $hFE = 25$ (minimum) at $I_C = 5A$ DC
- Pb-free package

Maximum Ratings (Note 1)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	140	V DC
Collector-Base Voltage	V_{CBO}		
Emitter-Base Voltage	V_{EBO}		
Collector Current - Continuous	I_C	20	A DC
Base Current - Continuous	I_B	5	
Emitter Current - Continuous	I_E	25	
Total Device 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	$^\circ C$

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Thermal Characteristics

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.7	$^{\circ}C/W$
Maximum Lead Temperature for Soldering Purpose 1/6 inches from Case for ≤ 10 Seconds	T_L	265	$^{\circ}C$

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 ($T_c = 25^{\circ}C$ unless otherwise noted)

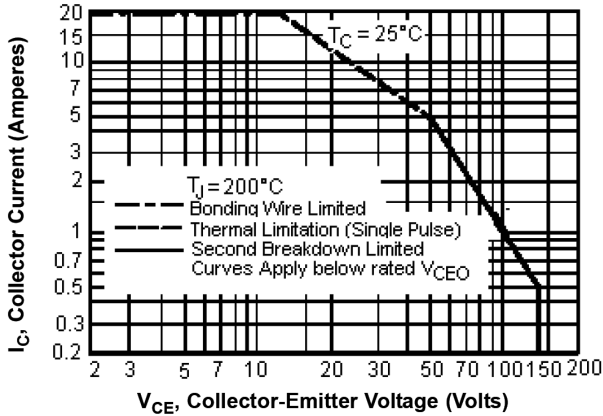
Characteristic	Symbol	Min.	Max.	Unit
Off Characteristics				
Collector-Emitter Sustaining Voltage (Note 1) ($I_C = 200mA$ DC, $I_B = 0$)	$V_{EO(sus)}$	140	-	V DC
Collector Cut off Current ($V_{CE} = 140V$ DC, $V_{BE(off)} = 1.5V$ DC) ($V_{CE} = 140V$ DC, $V_{BE(off)} = 1.5V$ DC, $T_C = 150^{\circ}C$)	I_{CEX}	-	100 2	μA DC mA DC
Collector Cut off Current ($V_{CE} = 140V$ DC, $I_B = 0$)	I_{CEO}	-	250	μA DC
Emitter Cut off Current ($V_{EB} = 5V$ dc $I_C = 0$)	I_{EBO}	-	100	
Second Breakdown				
Second Breakdown Collector Current with Base Forward Biased ($V_{CE} = 50V$ DC, $t = 1s$ (non repetitive)) ($V_{CE} = 100V$ DC, $t = 1s$ (non repetitive))	$I_{S/b}$	5 1	-	A DC
On Characteristic				
DC Current Gain ($I_C = 5A$ DC, $V_{CE} = 2V$ DC)	h_{FE}	25	150	-
Collector-Emitter Saturation Voltage ($I_C = 5A$ DC, $I_B = 0.5A$ DC)	$V_{CE(sat)}$	-	1	V DC
Base-Emitter On Voltage ($I_C = 5A$ DC, $V_{CE} = 2V$ DC)	$V_{BE(on)}$	-	2	
Dynamic Characteristics				
Current-Gain - Bandwidth Product ($I_C = 0.5A$ DC, $V_{CE} = 10V$ DC, $f_{test} = 0.5MHz$)	f_T	2	-	MHz
Output Capacitance ($V_{CB} = 10V$ DC, $I_E = 0$, $f_{test} = 1MHz$)	C_{ob}	-	1,000	pF

1. Pulse Test : Pulse Width = 300 μs , Duty Cycle $\leq 2\%$.

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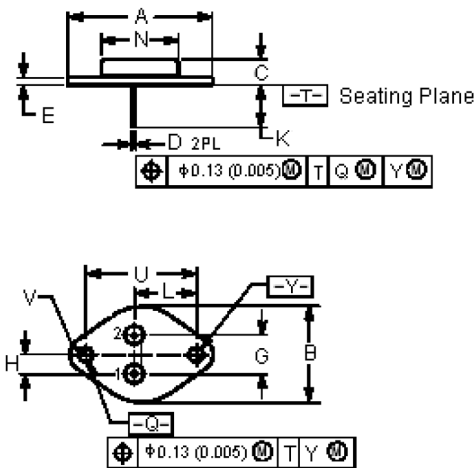


Active - Region Safe Operating Area



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 $T_J (P_K) = 200^\circ\text{C}$; T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values.

(TO-3)



Dimensions	Minimum	Maximum
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 : Millimetres

Style 1:

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

Part Number Table

Description	Part Number
Transistor, NPN, TO-3	MJ15003

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