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COMPLEMENTARY SILICON POWER TRANSISTORS

NPN MJ15003 **PNP** MJ15004

20 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
140 VOLTS
250 WATTS

The MJ15003 and MJ15004 are power base power transistors designed for high power audio, disk head positioners,linear amplifiers,switching regulators,and other linear applications.

FEATURES:

* High Power Dissipation
  P_D = 250 W (T_C = 25°C)
* High DC Current Gain and Low Saturation Voltage
  hFE = 25(Min) @ I_C = 5.0 A , V_{CE} = 2.0 V
* For Low Distortion Complementary Designs

MAXIMUM RATINGS

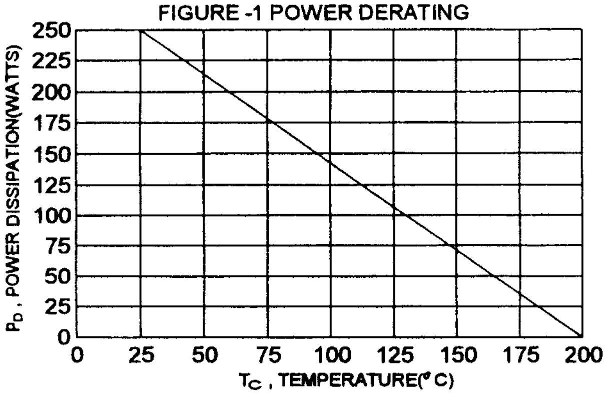
Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	$V_{CEO(SUS)}$	140	V
Collector-Base Voltage	V_{CBO}	140	V
Emitter-Base Voltage	V_{EBO}	5.0	V
Collector Current-Continuous Peak (1)	I_C I_{CM}	20 30	A
Base Current-Continuous Peak (1)	I_B I_{BM}	5.0 10	A
Total Power Dissipation @T_C=25°C Derate above 25°C	P_D	250 1.43	W W/°C
Operating and Storage Junction Temperature Range	T_J ,T_{STG}	-65 to +200	°C

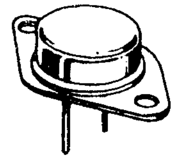
(1) Pulse Test: Pulse width = 5 ms , Duty Cycle < 10%

THERMAL CHARACTERISTICS

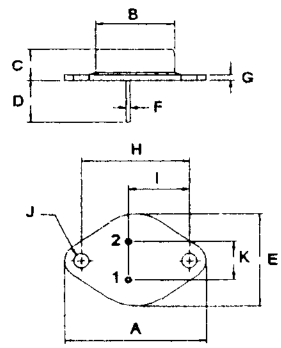
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	Rθjc	0.70	°C/W

FIGURE -1 POWER DERATING





TO-3



PIN 1.BASE
2.EMITTER
COLLECTOR(CASE)

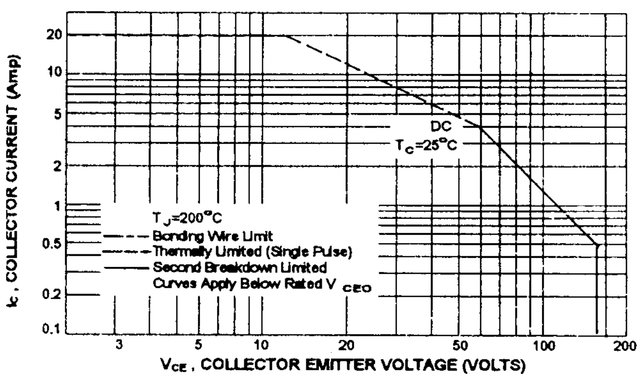
DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector - Emitter Sustaining Voltage (2) (I_C = 200 mA, I_B = 0)	$V_{CEO(SUS)}$	140		V
Collector Cutoff Current (V_{CE} = 140 V, I_B = 0)	I_{CEO}		250	uA
Collector Cutoff Current (V_{CE} = 140 V, $V_{BE(off)}$ = 1.5 V) (V_{CE} = 140 V, $V_{BE(off)}$ = 1.5 V ,T_C = 150°C)	I_{CEX}		100 2.0	uA mA
Emitter Cutoff Current (V_{EB} = 5.0 V, I_C = 0)	I_{EBO}		100	uA
ON CHARACTERISTICS (2)				
DC Current Gain (I_C = 5.0 A , V_{CE} = 2.0 V)	hFE	25	150	
Collector - Emitter Saturation Voltage (I_C = 5.0 A , I_B = 500 mA)	$V_{CE(sat)}$		1.0	V
Base - Emitter On Voltage (I_C = 5.0 A, V_{CE} = 2.0 V)	$V_{BE(on)}$		2.0	V
DYNAMIC CHARACTERISTICS				
Current Gain - Bandwidth Product (3) (I_C = 500 mA , V_{CE} = 10 V ,f = 0.5 MHz)	f_T	2.0		MHz
Output capacitance (V_{CB} = 4.0 V, I_E = 0, f = 1 MHz)	C_{ob}		1000	pF

(2) Pulse Test: Pulse width = 300 μs , Duty Cycle ≤ 2.0%
(3) $f_T = |h_{fe}| \cdot f_{test}$

FIG-2 FORWARD BIAS SAFE OPERATING AREA

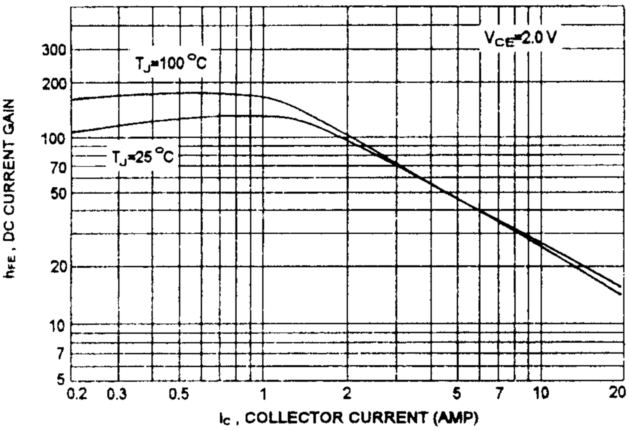


There are two limitation on the power handling ability of a transistor:average junction temperature and second breakdown safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation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

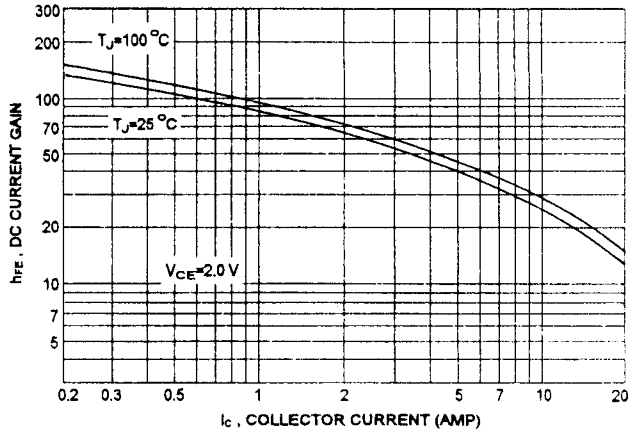
The data of FIG-2 is base on $T_{J(PK)}$=200 °C;T_C is variable depending on conditions.At high case temperatures , thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

DC CURRENT GAIN

MJ15003

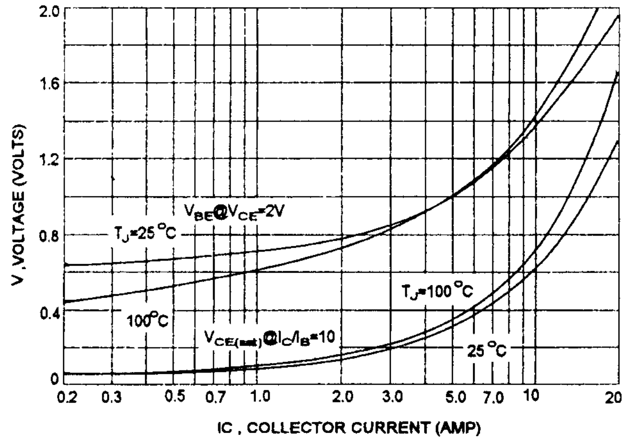


MJ15004

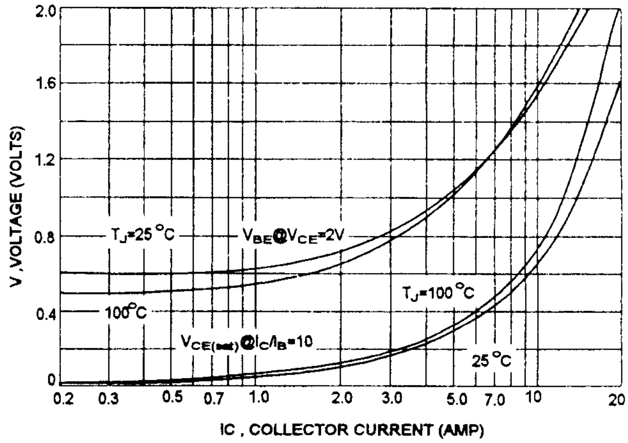


"ON" VOLTAGE

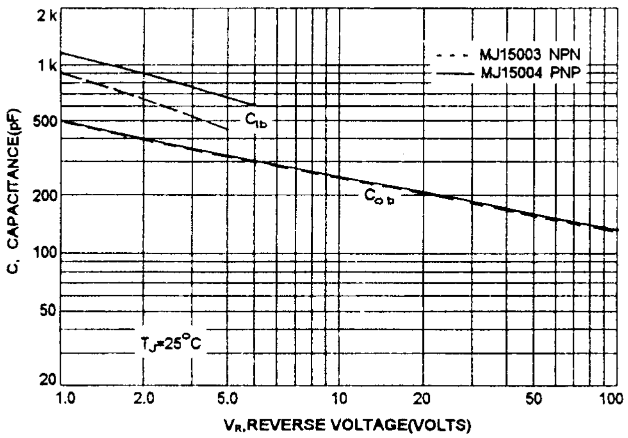
MJ15003



MJ15004



CAPACITANCES



CURRENT GAIN- BANDWIDTH PRODUCT