

SILICON POWER TRANSISTORS

The MJ15023 and MJ15025 are power base power transistors designed for high power audio, disk head positioners and other linear applications.

FEATURES

- * High Safe Operating Area
- * High DC Current Gain-
 $h_{FE} = 15(\text{Min}) @ I_C = 8.0 \text{ A } V_{CE} = 4.0 \text{ V}$

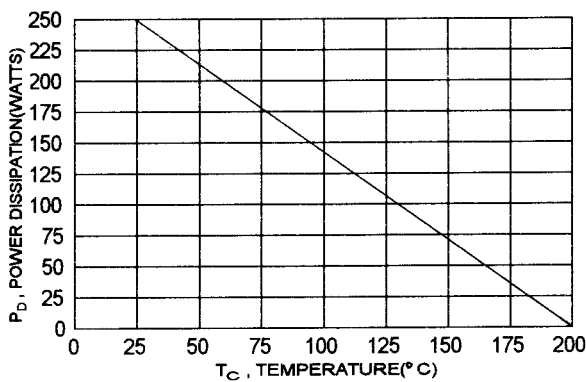
MAXIMUM RATINGS

Characteristic	Symbol	MJ15023	MJ15025	Unit
Collector-Emitter Voltage	V_{CEO}	200	250	V
Collector-Base Voltage	V_{CBO}	350	400	V
Emitter-Base Voltage	V_{EBO}	5.0		V
Collector-Emitter Voltage	V_{CEX}	400		V
Collector Current - Continuous - Peak	I_C I_{CM}	16 30		A
Base Current-Continuous	I_B	5		A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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

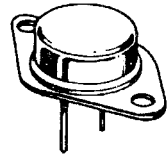
Characteristic	Symbol	Max	UNIT
Thermal Resistance Junction to Case	$R_{\theta jc}$	0.7	$^\circ\text{C}/\text{W}$

FIGURE -1 POWER DERATING

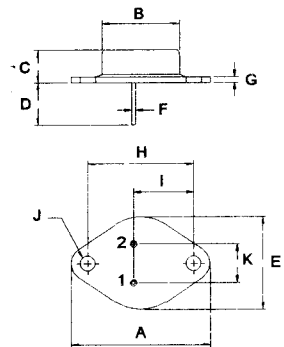


PNP
MJ15023
MJ15025

16 AMPERE
SILICON POWER
TRANSISTORS
200 - 250 VOLTS
250 WATTS



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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage(1) ($I_C = 100\text{ mA}$, $I_B = 0$)	MJ15023 MJ15025	$V_{CE(sus)}$	200 250	V
Collector Cutoff Current ($V_{CE} = 200\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$) ($V_{CE} = 250\text{ V}$, $V_{BE(off)} = 1.5\text{ V}$)	MJ15023 MJ15025	I_{CEX}	250 250	μA
Collector Cutoff Current ($V_{CE} = 150\text{ V}$, $I_B = 0$) ($V_{CE} = 200\text{ V}$, $I_B = 0$)	MJ15023 MJ15025	I_{CEO}	500 500	μA
Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}$, $I_B = 0$)		I_{EBO}	500	μA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 8.0\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 16\text{ A}$, $V_{CE} = 4.0\text{ V}$)		h_{FE}	15 5.0	60
Collector-Emitter Saturation Voltage ($I_C = 8.0\text{ A}$, $I_B = 0.8\text{ A}$) ($I_C = 16\text{ A}$, $I_B = 3.2\text{ A}$)		$V_{CE(sat)}$	1.4 4.0	V
Base-Emitter On Voltage ($I_C = 8.0\text{ A}$, $V_{CE} = 4.0\text{ V}$)		$V_{BE(on)}$	2.2	V

DYNAMIC CHARACTERISTICS

Current-Gain-Bandwidth Product (2) ($I_C = 1.0\text{ A}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ MHz}$)		f_T	4.0	MHz
Output Capacitance ($V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 1.0\text{ MHz}$)		C_{ob}	600	pF

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

FIG-2 DC CURRENT GAIN

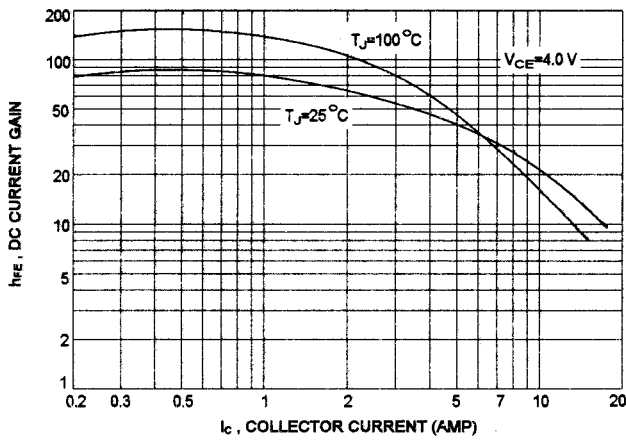


FIG-3 "ON" VOLTAGE

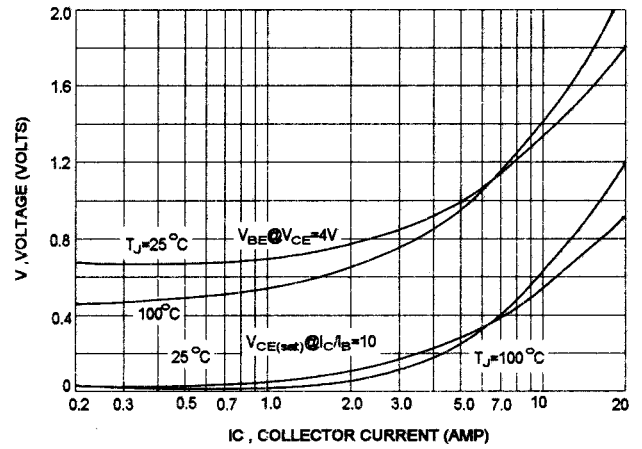


FIG-4 CAPACITANCES

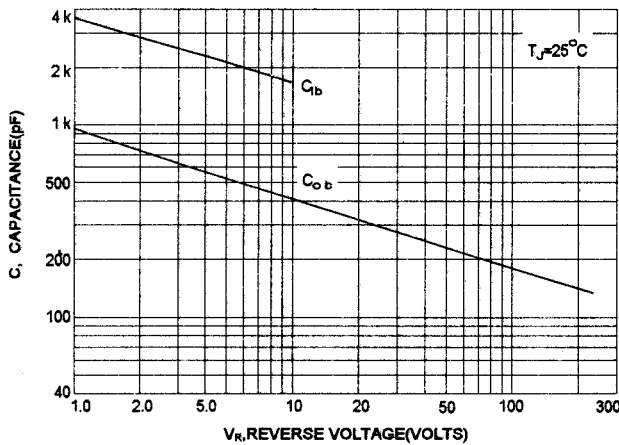


FIG-5 CURRENT GAIN- BANDWIDTH PRODUCT

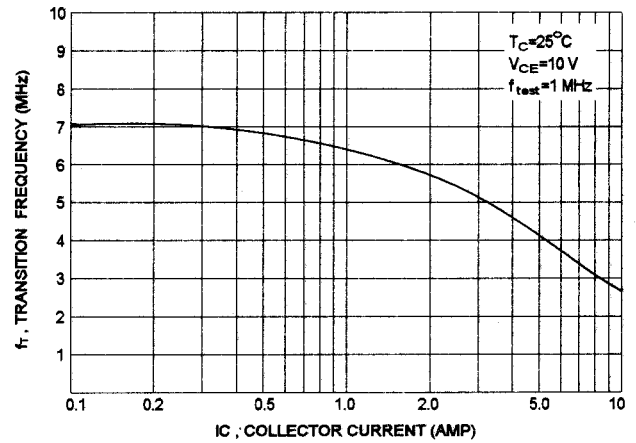
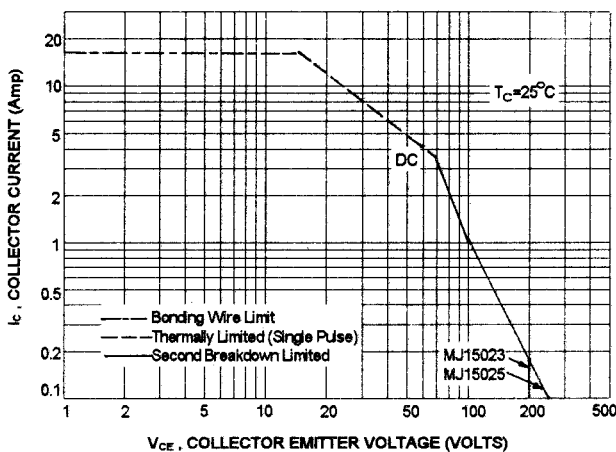


FIG-6 ACTIVE-REGION SAFE OPERATING AREA



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 of FIG-6 is base on $T_{J(PK)}=200^\circ\text{C}$; 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.