

NPN - MJ15022, MJ15024*

*MJ15024 is a Preferred Device

Silicon Power Transistors

The MJ15022 and MJ15024 are PowerBase power transistors designed for high power audio, disk head positioners and other linear applications.

Features

- High Safe Operating Area (100% Tested) – 2 A @ 80 V
- High DC Current Gain – $h_{FE} = 15$ (Min) @ $I_C = 8$ Adc

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage MJ15022 MJ15024	V_{CEO}	200 250	Vdc
Collector-Base Voltage MJ15022 MJ15024	V_{CBO}	350 400	Vdc
Emitter-Base Voltage	V_{EBO}	5	Vdc
Collector-Emitter Voltage	V_{CEX}	400	Vdc
Collector Current – Continuous – Peak (Note 1)	I_C	16 30	Adc
Base Current – Continuous	I_B	5	Adc
Total Device 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	$^\circ\text{C}$

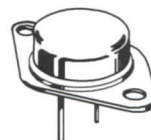
THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.70	$^\circ\text{C/W}$

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.

1. Pulse Test: Pulse Width = 5 ms, Duty Cycle $\leq 10\%$.

16 AMPERES
SILICON POWER TRANSISTORS
200 – 250 VOLTS, 250 WATTS



(TO-3)



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Quality Semi-Conductors

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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) ($I_C = 100\text{ mAdc}$, $I_B = 0$)	MJ15022 MJ15024	$V_{CEO(sus)}$	200 250	– –	–
Collector Cutoff Current ($V_{CE} = 200\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$) ($V_{CE} = 250\text{ Vdc}$, $V_{BE(off)} = 1.5\text{ Vdc}$)	MJ15022 MJ15024	I_{CEX}	– –	250 250	μAdc
Collector Cutoff Current ($V_{CE} = 150\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 200\text{ vdc}$, $I_B = 0$)	MJ15022 MJ15024	I_{CEO}	– –	500 500	μAdc
Emitter Cutoff Current ($V_{CE} = 5\text{ Vdc}$, $I_B = 0$)		I_{EBO}	–	500	μAdc

SECOND BREAKDOWN

Second Breakdown Collector Current with Base Forward Biased ($V_{CE} = 50\text{ Vdc}$, $t = 0.5\text{ s}$ (non-repetitive)) ($V_{CE} = 80\text{ Vdc}$, $t = 0.5\text{ s}$ (non-repetitive))	$I_{S/b}$	5 2	– –	Adc
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ON CHARACTERISTICS

DC Current Gain ($I_C = 8\text{ Adc}$, $V_{CE} = 4\text{ Vdc}$) ($I_C = 16\text{ Adc}$, $V_{CE} = 4\text{ Vdc}$)	h_{FE}	15 5	60 –	–
Collector-Emitter Saturation Voltage ($I_C = 8\text{ Adc}$, $I_B = 0.8\text{ Adc}$) ($I_C = 16\text{ Adc}$, $I_B = 3.2\text{ Adc}$)	$V_{CE(sat)}$	– –	1.4 4.0	Vdc
Base-Emitter On Voltage ($I_C = 8\text{ Adc}$, $V_{CE} = 4\text{ Vdc}$)	$V_{BE(on)}$	–	2.2	Vdc

DYNAMIC CHARACTERISTICS

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

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

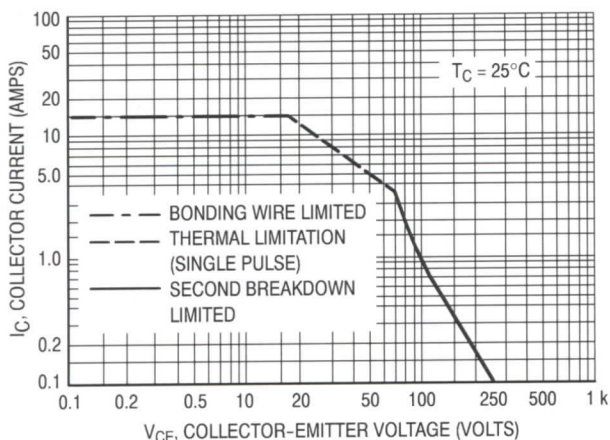


Figure 1. Active-Region Safe Operating Area

There are two limitations on the powerhandling 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 of Figure 1 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 lower than the limitations imposed by second breakdown.