



## SILICON POWER TRANSISTORS

The MJ15022 and MJ15024 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-  
 $h_{FE} = 15(\text{Min}) @ I_C = 8.0 \text{ A } V_{CE} = 4.0 \text{ V}$

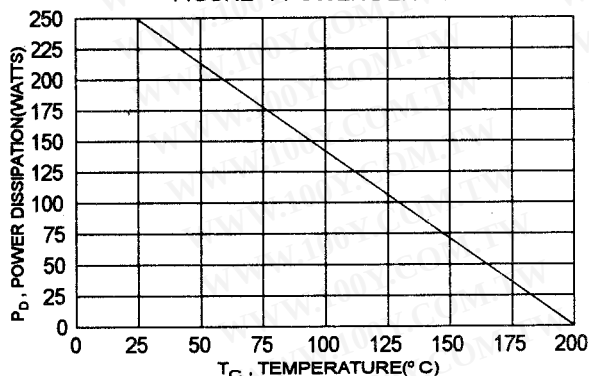
### MAXIMUM RATINGS

| Characteristic                                                                        | Symbol            | MJ15022     | MJ15024 | 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<br>- Peak                                              | $I_C$<br>$I_{CM}$ | 16<br>30    |         | A                        |
| Base Current-Continuous                                                               | $I_B$             | 5           |         | A                        |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$             | 250<br>1.43 |         | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                   | $T_J, T_{STG}$    | -65 to +200 |         | $^\circ\text{C}$         |

### THERMAL CHARACTERISTICS

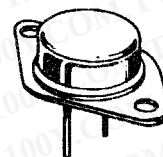
| Characteristic                      | Symbol          | Max | UNIT               |
|-------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 0.7 | $^\circ\text{C/W}$ |

FIGURE -1 POWER DERATING

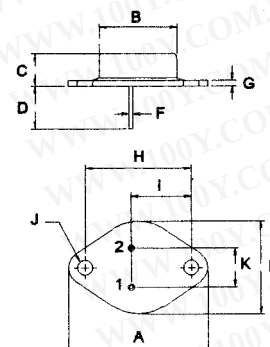


**NPN**  
**MJ15022**  
**MJ15024**

**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 |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

**OFF CHARACTERISTICS**

|                                                                                                                                                      |                    |               |            |               |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|------------|---------------|
| Collector-Emitter Sustaining Voltage(1)<br>( $I_C = 100\text{ mA}$ , $I_B = 0$ )                                                                     | MJ15022<br>MJ15024 | $V_{CE(sus)}$ | 200<br>250 | V             |
| Collector Cutoff Current<br>( $V_{CE} = 200\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ )<br>( $V_{CE} = 250\text{ V}$ , $V_{BE(off)} = 1.5\text{ V}$ ) | MJ15022<br>MJ15024 | $I_{CEX}$     | 250<br>250 | $\mu\text{A}$ |
| Collector Cutoff Current<br>( $V_{CE} = 150\text{ V}$ , $I_B = 0$ )<br>( $V_{CE} = 200\text{ V}$ , $I_B = 0$ )                                       | MJ15022<br>MJ15024 | $I_{CEO}$     | 500<br>500 | $\mu\text{A}$ |
| Emitter Cutoff Current<br>( $V_{EB} = 5.0\text{ V}$ , $I_B = 0$ )                                                                                    |                    | $I_{EBO}$     | 500        | $\mu\text{A}$ |

**ON CHARACTERISTICS (1)**

|                                                                                                                                           |               |         |            |   |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------|------------|---|
| DC Current Gain<br>( $I_C = 8.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )<br>( $I_C = 16\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )                | $h_{FE}$      | 15<br>5 | 60         |   |
| Collector-Emitter Saturation Voltage<br>( $I_C = 8.0\text{ A}$ , $I_B = 0.8\text{ A}$ )<br>( $I_C = 16\text{ A}$ , $I_B = 3.2\text{ A}$ ) | $V_{CE(sat)}$ |         | 1.4<br>4.0 | V |
| Base-Emitter On Voltage<br>( $I_C = 8.0\text{ A}$ , $V_{CE} = 4.0\text{ V}$ )                                                             | $V_{BE(on)}$  |         | 2.2        | V |

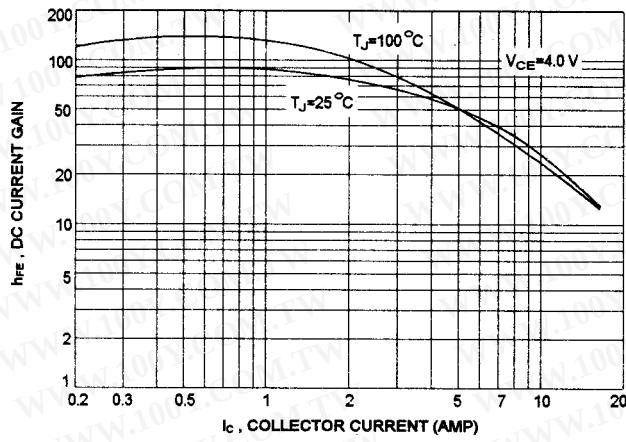
**DYNAMIC CHARACTERISTICS**

|                                                                                                                |          |     |     |     |
|----------------------------------------------------------------------------------------------------------------|----------|-----|-----|-----|
| Current-Gain-Bandwidth Product (2)<br>( $I_C = 1.0\text{ A}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ ) | $f_T$    | 4.0 |     | MHz |
| Output Capacitance<br>( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                            | $C_{ob}$ |     | 500 | pF  |

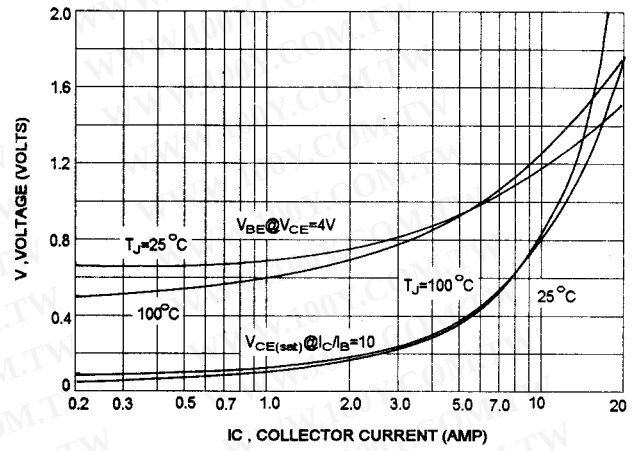
(1) Pulse Test: Pulse width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

(2)  $f_T = |h_{fe}| \cdot f_{test}$

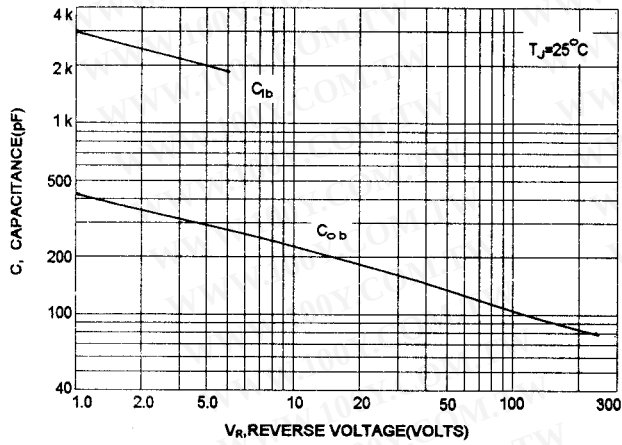
DC CURRENT GAIN



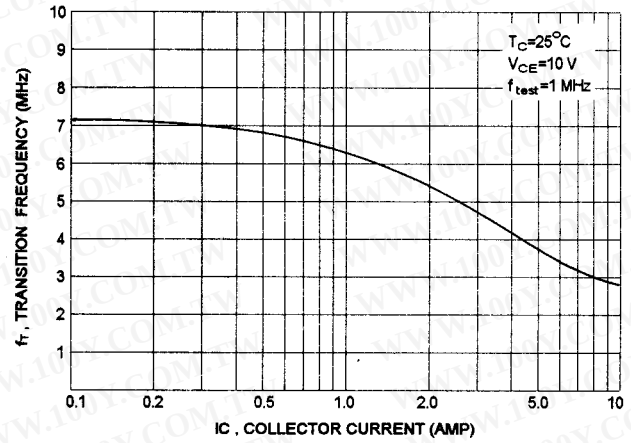
"ON" VOLTAGE



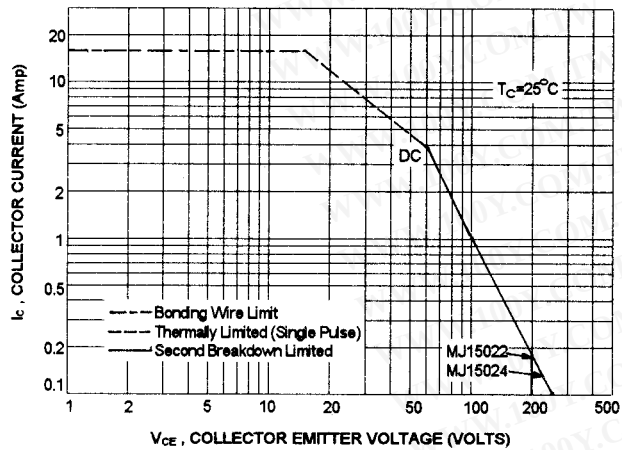
CAPACITANCES



CURRENT GAIN- BANDWIDTH PRODUCT



ACTIVE-REGION SAFE OPERATING AREA



COLLECTOR SATURATION REGION

