# MD7003,A,B,F,AF
# MQ7003

## MD7003,A,B
## CASE 654-07, STYLE 1

## MD7003F,AF
## CASE 610A-04, STYLE 1

## MQ7003
## CASE 607-04, STYLE 1

## DUAL
## AMPLIFIER TRANSISTOR

**PNP SILICON**

Refer to 2N3810 for curves.

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### MAXIMUM RATINGS

| Rating | Symbol | Value | | Unit |
|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 40 | | Vdc |
| Collector-Base Voltage | $V_{CBO}$ | 50 | | Vdc |
| Emitter-Base Voltage | $V_{EBO}$ | 5.0 | | Vdc |
| Collector Current — Continuous | $I_C$ | 50 | | mAdc |
| | | **One Die** | **All Die Equal Power** | |
| Total Device Dissipation @ $T_A$ = 25°C | $P_D$ | | | mW |
|   MD7003,A,B | | 550 | 600 | |
|   MD7003F,AF | | 350 | 400 | |
|   MQ7003 | | 400 | 600 | |
| Derate above 25°C | | | | mW/°C |
|   MD7003,A,B | | 3.14 | 3.42 | |
|   MD7003F,AF | | 2.0 | 2.28 | |
|   MQ7003 | | 2.28 | 3.42 | |
| Total Device Dissipation @ $T_C$ = 25°C | $P_D$ | | | Watts |
|   MD7003,A,B | | 1.4 | 2.0 | |
|   MD7003F,AF | | 0.7 | 1.4 | |
|   MQ7003 | | 0.7 | 2.8 | |
| Derate above 25°C | | | | mW/°C |
|   MD7003,A,B | | 8.0 | 11.4 | |
|   MD7003F,AF | | 4.0 | 8.0 | |
|   MQ7003 | | 4.0 | 16 | |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −65 to +200 | | °C |

### THERMAL CHARACTERISTICS

| Characteristic | Symbol | One Die | All Die Equal Power | Unit |
|---|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | | | °C/W |
|   MD7003,A,B | | 125 | 87.5 | |
|   MD7003F,AF | | 250 | 125 | |
|   MQ7003 | | 250 | 62.6 | |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$(1) | | | °C/W |
|   MD7003,A,B | | 319 | 292 | |
|   MD7003F,AF | | 500 | 438 | |
|   MQ7003 | | 438 | 292 | |
| | | **Junction to Ambient** | **Junction to Case** | |
| Coupling Factor | | | | % |
|   MD7003,A,B | | 83 | 40 | |
|   MD7003F,AF | | 75 | 0 | |
|   MQ7003 (Q1-Q2) | | 57 | 0 | |
|   (Q1-Q3 or Q1-Q4) | | 55 | 0 | |

(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

### ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector-Emitter Breakdown Voltage(2) ($I_C$ = 10 mAdc, $I_B$ = 0) | $V_{(BR)CEO}$ | 40 | — | — | Vdc |
| Collector-Base Breakdown Voltage ($I_C$ = 10 μAdc, $I_E$ = 0) | $V_{(BR)CBO}$ | 50 | — | — | Vdc |
| Emitter-Base Breakdown Voltage ($I_E$ = 10 μAdc, $I_C$ = 0) | $V_{(BR)EBO}$ | 5.0 | — | — | Vdc |
| Collector Cutoff Current ($V_{CB}$ = 30 Vdc, $I_E$ = 0) | $I_{CBO}$ | — | — | 100 | nAdc |
| **ON CHARACTERISTICS** | | | | | |
| DC Current Gain(2) ($I_C$ = 100 μAdc, $V_{CE}$ = 10 Vdc) ($I_C$ = 10 mAdc, $V_{CE}$ = 10 Vdc) | $h_{FE}$ | 40<br>50 | 350<br>350 | —<br>— | — |

**ELECTRICAL CHARACTERISTICS** (continued) ($T_A$ = 25°C unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Collector-Emitter Saturation Voltage<br>($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | $V_{CE(sat)}$ | — | 0.25 | 0.35 | Vdc |
| Base-Emitter Saturation Voltage<br>($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | $V_{BE(sat)}$ | — | 0.6 | 1.0 | Vdc |
| **SMALL-SIGNAL CHARACTERISTICS** | | | | | |
| Current-Gain — Bandwidth Product<br>($I_C$ = 5.0 mAdc, $V_{CE}$ = 20 Vdc, f = 100 MHz) | $f_T$ | 200 | 300 | — | MHz |
| Output Capacitance<br>($V_{CB}$ = 10 Vdc, $I_E$ = 0, f = 100 kHz) | $C_{obo}$ | — | 3.0 | 6.0 | pF |
| Input Capacitance<br>($V_{BE}$ = 2.0 Vdc, $I_C$ = 0, f = 100 kHz) | $C_{ibo}$ | — | 2.0 | 8.0 | pF |
| Noise Figure<br>($I_C$ = 100 μAdc, $V_{CE}$ = 10 Vdc, $R_S$ = 3.0 kohms,<br>f = 10 Hz to 15.7 kHz) | NF | — | 2.0 | — | dB |
| **MATCHING CHARACTERISTICS** | | | | | |
| DC Current Gain Ratio(3)<br>($I_C$ = 100 μAdc, $V_{CE}$ = 10 Vdc)     MD7003A,AF<br>                                      MD7003B | $h_{FE1}/h_{FE2}$ | 0.75<br>0.85 | —<br>— | 1.0<br>1.0 | — |
| Base-Emitter Voltage Differential<br>($I_C$ = 100 μAdc, $V_{CE}$ = 10 Vdc)     MD7003A,AF<br>                                      MD7003B | $|V_{BE1}-V_{BE2}|$ | —<br>— | —<br>— | 25<br>15 | mV |

(2) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
(3) The lowest $h_{FE}$ reading is taken as $h_{FE1}$ for this ratio.

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