

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.

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	mA
		One Die	All Die Equal Power
Total Device Dissipation @ $T_A = 25^\circ\text{C}$	P_D		mW
MD7003,A,B		550	600
MD7003F,AF		350	400
MQ7003		400	600
Derate above 25°C			mW/ $^\circ\text{C}$
MD7003,A,B		3.14	3.42
MD7003F,AF		2.0	2.28
MQ7003		2.28	3.42
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	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/ $^\circ\text{C}$
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	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

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

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(2) ($I_C = 10\text{ mA}$, $I_E = 0$)	$V_{(BR)CEO}$	40	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	50	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	100	nA
ON CHARACTERISTICS					
DC Current Gain(2) ($I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ Vdc}$)	h_{FE}	40 50	350 350	— —	—

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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Emitter Saturation Voltage (I _C = 10 mAdc, I _B = 1.0 mAdc)	V _{CE(sat)}	—	0.25	0.35	Vdc
Base-Emitter Saturation Voltage (I _C = 10 mAdc, I _B = 1.0 mAdc)	V _{BE(sat)}	—	0.6	1.0	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product (I _C = 5.0 mAdc, V _{CE} = 20 Vdc, f = 100 MHz)	f _T	200	300	—	MHz
Output Capacitance (V _{CB} = 10 Vdc, I _E = 0, f = 100 kHz)	C _{obo}	—	3.0	6.0	pF
Input Capacitance (V _{BE} = 2.0 Vdc, I _C = 0, f = 100 kHz)	C _{ibo}	—	2.0	8.0	pF
Noise Figure (I _C = 100 μAdc, V _{CE} = 10 Vdc, R _S = 3.0 kohms, f = 10 Hz to 15.7 kHz)	NF	—	2.0	—	dB

MATCHING CHARACTERISTICS

DC Current Gain Ratio(3) (I _C = 100 μAdc, V _{CE} = 10 Vdc)	MD7003A,AF MD7003B	h _{FE1} /h _{FE2}	0.75 0.85	— —	1.0 1.0	—
Base-Emitter Voltage Differential (I _C = 100 μAdc, V _{CE} = 10 Vdc)	MD7003A,AF MD7003B	V _{BE1} - V _{BE2}	— —	— —	25 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.