

T-27-27

MAXIMUM RATINGS

Rating	Symbol	MD6003	MD6001,F MD6002,F	Unit
		MD6003F	MQ6001,2	
Collector-Emitter Voltage	V _{CEO}	30		Vdc
Collector-Base Voltage	V _{CBO}	50	60	Vdc
Emitter-Base Voltage	V _{EBO}	5.0		Vdc
Collector Current — Continuous	I _C	500		mAdc
		One Die	All Die Equal Power	
Total Device Dissipation @ T _A = 25°C MD6001,2,3 MD6001F,2F MQ6001 Derate above 25°C MD6001,2,3 MD6001F,2F MQ6001	P _D	575	625	mW
		350	400	
		400	600	
		3.29	3.57	mW/°C
		2.0	2.28	
		2.28	3.42	
Total Device Dissipation @ T _C = 25°C MD6001,2,3 MD6001F,2F MQ6001 Derate above 25°C MD6001,2,3 MD6001F,2F MQ6001	P _D	1.8	2.5	Watts
		1.0	2.0	
		0.9	3.6	
		10.3	14.3	mW/°C
		5.71	11.4	
		5.13	20.5	
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 MD6001,2,3 MD6001F,2F MQ6001	R _{θJC}	97	70	°C/W
		175	87.5	
		195	48.8	
Thermal Resistance, Junction to Ambient MD6001,2,3 MD6001F,2F MQ6001	R _{θJA} (1)	304	280	°C
		500	438	
		438	292	
		Junction to Ambient	Junction to Case	
Coupling Factor MD6001,2,3 MD6001F,2F MQ6001 (Q1-Q2) (Q1-Q3 or Q1-Q4)		84	44	%
		75	0	
		57	0	
		55	0	

(1) R_{θJA} is measured with the device soldered into a typical printed circuit board.

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

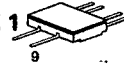
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(2) (I _C = 10 mAdc, I _B = 0)	V _{(BR)CEO}	30	—	—	Vdc
Collector-Base Breakdown Voltage (I _C = 10 μAdc, I _E = 0) MD6003 MD6001,F, MD6002,F, MQ6001, MQ6002	V _{(BR)CBO}	50	—	—	Vdc
		60	—	—	
Emitter-Base Breakdown Voltage (I _E = 10 μAdc, I _C = 0)	V _{(BR)EBO}	5.0	—	—	Vdc
Base Cutoff Current (V _{CE} = 30 Vdc, V _{BE} = 3.0 Vdc) (V _{CE} = 50 Vdc, V _{EB} = 3.0 Vdc)	I _{BEV}	—	—	50	nAdc
		—	—	30	

MD6001, F MD6002, F
MD6003, MQ6001

MD6001,
MD6002, MD6003
CASE 654-07, STYLE 5
DUAL



MD6001F, MD6002F
CASE 610A-04, STYLE 1
DUAL

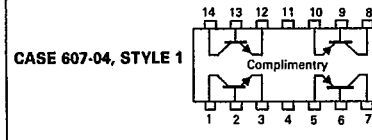
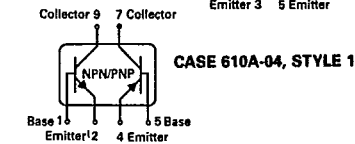
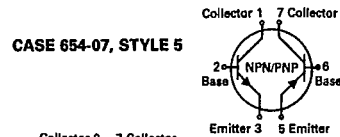


MQ6001
CASE 607-04, STYLE 1
QUAD



COMPLEMENTARY
GENERAL PURPOSE
TRANSISTORS
NPN/PNP SILICON

PIN CONNECTION DIAGRAMS



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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector Cutoff Current (V _{CE} = 30 Vdc, V _{BE(off)} = 3.0 Vdc) (V _{CE} = 50 Vdc, V _{BE(off)} = 3.0 Vdc) (V _{CE} = 50 Vdc, V _{BE(off)} = 3.0 Vdc, T _A = 150°C)	MD6003 MD6001,F,2,F, MQ6001 MD6001,F,2,F, MQ6001	—	—	30 20 30	nAdc nAdc μAdc
Collector Cutoff Current (V _{CB} = 40 Vdc, I _E = 0)	MD6003,F	—	—	100	nA

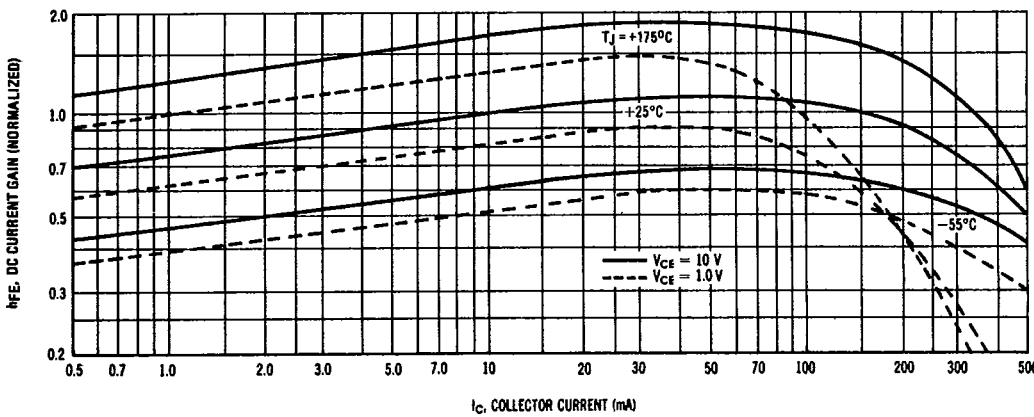
ON CHARACTERISTICS(2)

DC Current Gain (I _C = 0.1 mAdc, V _{CE} = 10 Vdc)	MD6001,F, MQ6001 MD6002,F	h _{FE}	20 35	80 70	— —	—
(I _C = 1.0 mAdc, V _{CE} = 10 Vdc)	MD6001,F, MQ6001 MD6003 MQ6002,F		25 40 50	90 70 100	— — —	
(I _C = 10 mAdc, V _{CE} = 10 Vdc)	MD6001,F, MQ6001 MD6002,F		35 75	70 110	— —	
(I _C = 150 mAdc, V _{CE} = 10 Vdc)	MD6001,F, MQ6001 MD6003 MD6002,F		40 70 100	— 110 200	120 — 300	
(I _C = 300 mAdc, V _{CE} = 10 Vdc)	MD6001,F, MQ6001 All Other Devices		20 30	— 90	— —	
(I _C = 150 mAdc, V _{CE} = 10 Vdc)	MD6001,F, MQ6001 MD6002,F		20 50	80 —	— —	
Collector-Emitter Saturation Voltage (I _C = 150 mAdc, I _B = 15 mAdc) (I _C = 300 mAdc, I _B = 30 mAdc)	All Devices MD6001, MD6002,F, MQ6001	V _{CE(sat)}	— —	0.3 0.59	0.4 1.4	Vdc
Base-Emitter Saturation Voltage (I _C = 150 mAdc, I _B = 15 mAdc) (I _C = 300 mAdc, I _B = 30 mAdc)	All Devices MD6001, MD6002,F, MQ6001	V _{BE(sat)}	— —	1.02 1.25	1.3 2.0	Vdc

(2) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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FIGURE 1 - DC CURRENT GAIN



MD6001, F, MD6002, F, MD6003, MQ6001

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FIGURE 2 - "ON" VOLTAGES

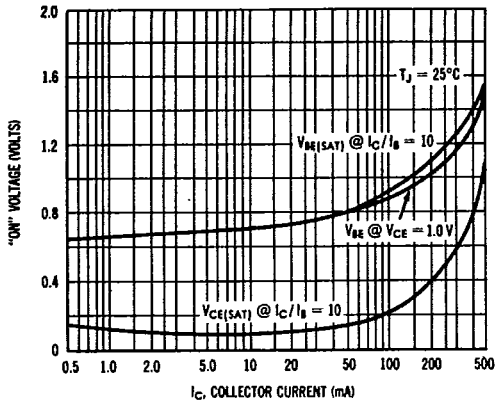
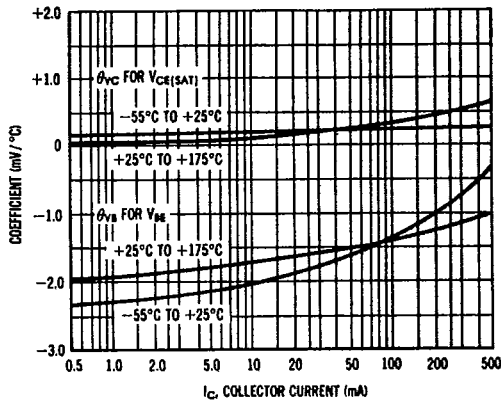


FIGURE 3 - TEMPERATURE COEFFICIENTS



NOISE FIGURE
 $V_{CE} = 10 \text{ V}$, $T_A = 25^\circ\text{C}$

FIGURE 4 - FREQUENCY EFFECTS

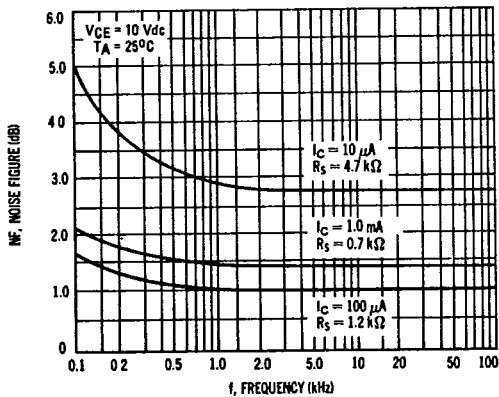


FIGURE 5 - SOURCE RESISTANCE EFFECTS

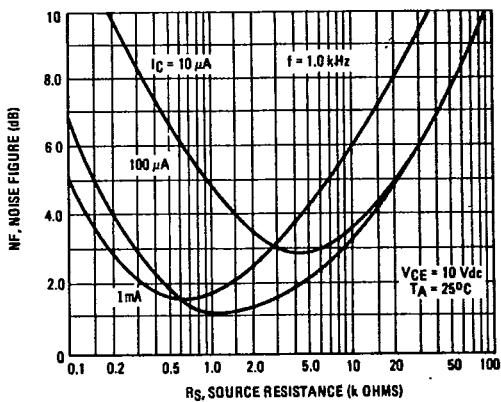


FIGURE 6 - CURRENT-GAIN BANDWIDTH PRODUCT

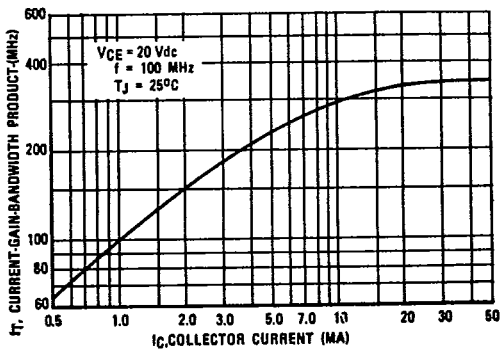
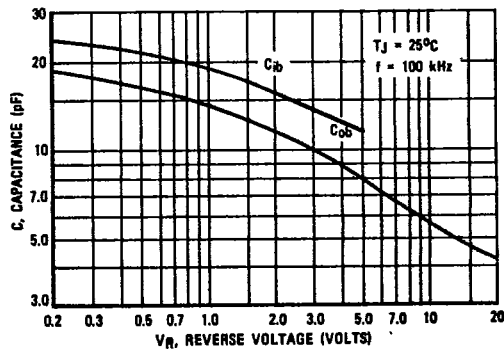


FIGURE 7 - CAPACITANCE



MOTOROLA SMALL-SIGNAL TRANSISTORS, FETs AND DIODES

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FIGURE 8 - TURN ON TIME

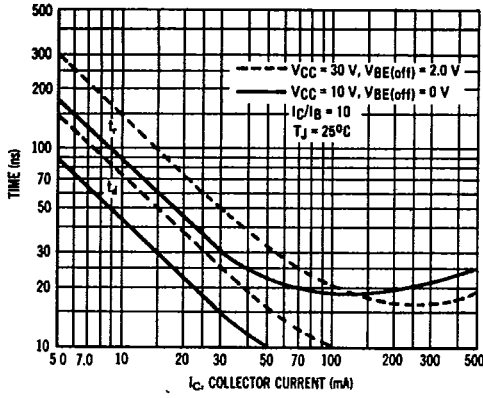
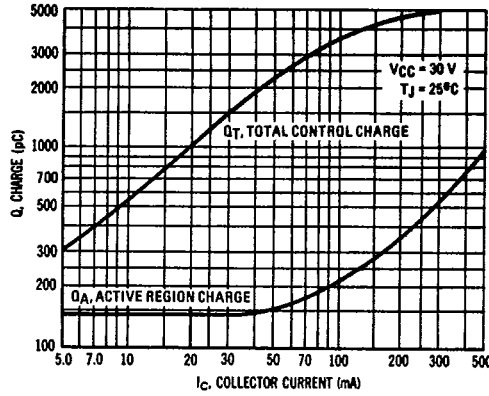


FIGURE 9 - CHARGE DATA



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FIGURE 10 - STORAGE TIME

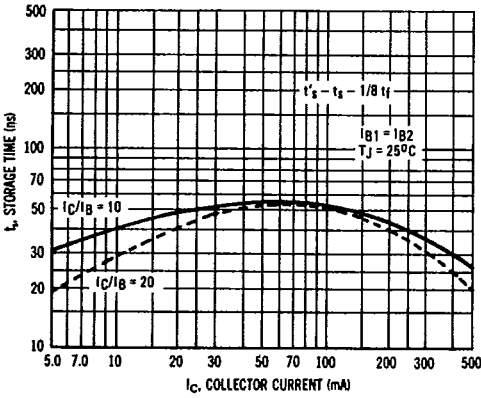


FIGURE 11 - FALL TIME

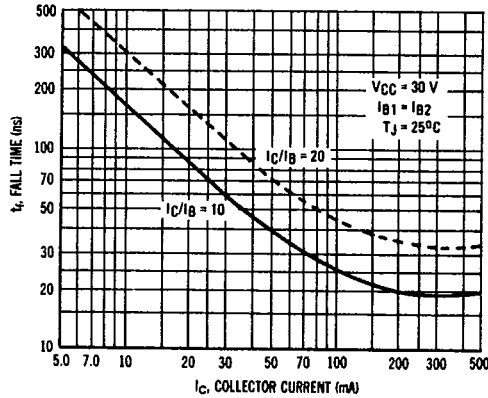


FIGURE 12 - DELAY AND RISE TIME TEST CIRCUIT

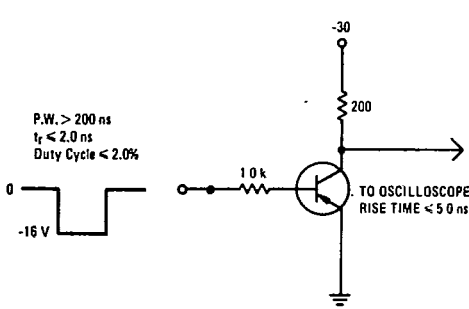


FIGURE 13 - STORAGE AND FALL TIME TEST CIRCUIT

