

MAXIMUM RATINGS

Rating	Symbol	MD2218,A,F MD2219,A,F MQ2218,A MQ2219,A	MD2218AF MD2219AF	Unit
Collector-Emitter Voltage	V _{CEO}	30	40	V _{dc}
Collector-Base Voltage	V _{CBO}	60	75	V _{dc}
Emitter-Base Voltage	V _{EBO}	5.0	6.0	V _{dc}
Collector Current — Continuous	I _C	500		mAdc
		One Die	All Die Equal Power	
Total Device Dissipation @ T _A = 25°C MD2218,A, MD2219,A MD2218F,AF, MD2219F,AF MQ2218,A, MQ2219,A Derate above 25°C MD2218,A, MD2219,A MD2218F,AF, MD2219F,AF MQ2218,A, MQ2219,A	P _D	575 350 400 3.29 2.0 2.28	625 400 600 3.57 2.28 3.42	mW mW/°C
Total Device Dissipation @ T _C = 25°C MD2218,A, MD2219,A MD2218F,AF, MD2219F,AF MQ2218,A, MQ2219,A Derate above 25°C MD2218,A, MD2219,A MD2218F,AF, MD2219F,AF MQ2218,A, MQ2219,A	P _D	1.8 1.0 0.9 10.3 5.71 5.13	2.5 2.0 3.6 14.3 11.4 20.5	Watts mW/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	- 65 to +200		°C

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**MD2218,A,F,AF
MD2219,A,AF
MQ2218,A
MQ2219,A**

MD2218,A
MD2219,A
CASE 654-07, STYLE 1

MD2218F,AF
MD2219,AF
CASE 610A-04, STYLE 1

MQ2218,A
MQ2219,A
CASE 607-04, STYLE 1

**DUAL
AMPLIFIER TRANSISTOR**
NPN SILICON



THERMAL CHARACTERISTICS

Characteristic	Symbol	One Die	All Die Equal Power	Unit
Thermal Resistance, Junction to Case MD2218,A, MD2219,A MD2218F,AF, MD2219F,AF MQ2218,A, MQ2219,A	R _{θJC}	97 175 195	70 87.5 48.8	°C/W
Thermal Resistance, Junction to Ambient MD2218,A, MD2219,A MD2218F,AF, MD2219F,AF MQ2218,A, MQ2219,A	R _{θJA} (1)	304 500 438	280 438 292	°C/W
		Junction to Ambient	Junction to Case	
Coupling Factors MD2218,A, MD2219,A MD2218F,AF, MD2219F,AF MQ2218,A, MQ2219,A (Q1-Q2) (Q1-Q3 or Q1-Q4)		84 75 57 55	44 0 0 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
Collector-Emitter Breakdown Voltage(2) (I _C = 10 mAdc, I _B = 0) MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A MD2218AF, MD2219AF	V _{(BR)CEO}	30 40	— —	— —	V _{dc}
Collector-Base Breakdown Voltage (I _C = 10 μAdc, I _E = 0) MD2218,A,F, MD2219,A, MQ2218,A, MD2219,A MD2218AF, MD2219AF	V _{(BR)CBO}	60 75	— —	— —	V _{dc}

MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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

Characteristic	Symbol	Min	Typ	Max	Unit
Emitter-Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{Adc}$, $I_C = 0$) MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A MD2218AF, MD2219AF	$V_{(BR)EBO}$	5.0 6.0	— —	— —	Vdc
Collector Cutoff Current ($V_{CE} = 50\text{ Vdc}$, $V_{EB(off)} = 3.0\text{ Vdc}$) MD2218,F, MD2219,F, MQ2218,A MD2218A,AF, MD2219A,AF, MQ2219,A	I_{CEV}	20 15	— —	— —	nAdc
Base Cutoff Current ($V_{CE} = 50\text{ Vdc}$, $V_{EB(off)} = 3.0\text{ Vdc}$)	I_{BL}	30	—	—	nAdc

ON CHARACTERISTICS(2)

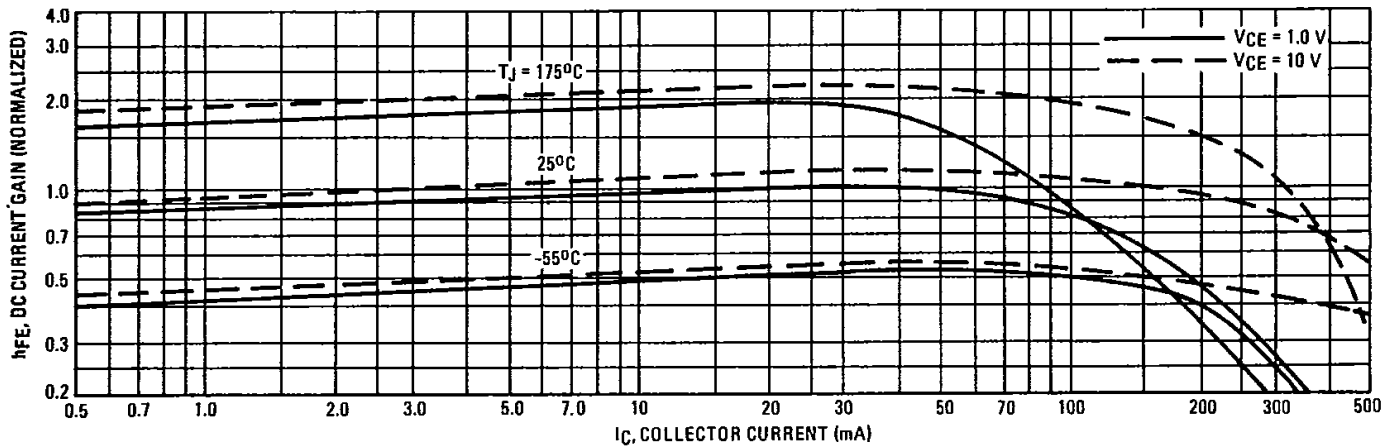
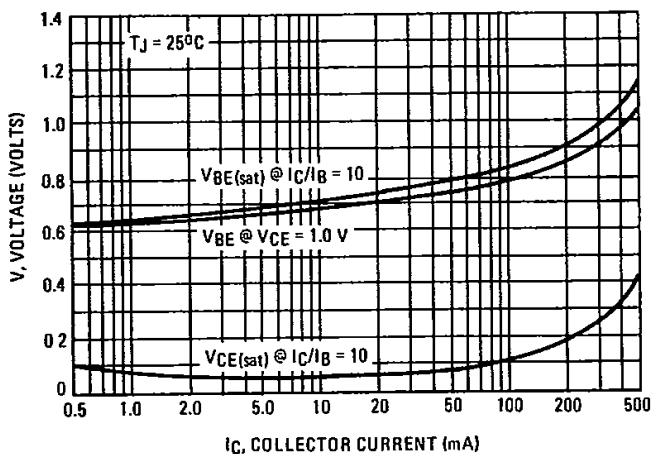
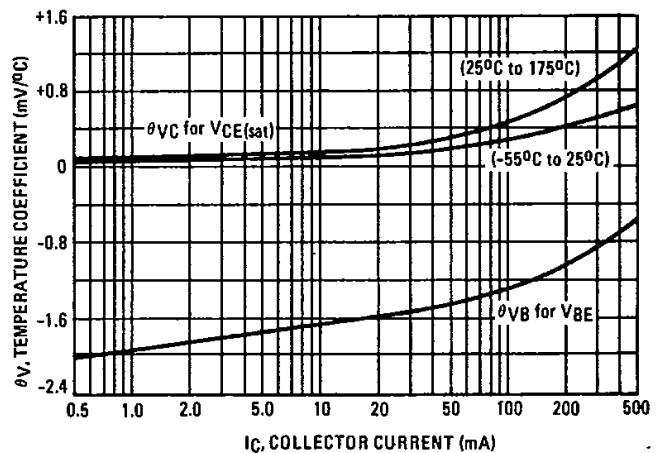
DC Current Gain ($I_C = 0.1\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) MD2218,A,F,AF, MQ2218,A MD2219,A,AF, MQ2219,A	h_{FE}	20 35	50 45	— —	—
($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) MD2218,A,F,AF, MQ2218,A MD2219,A,AF, MQ2219,A		25 50	55 55	— —	
($I_C = 10\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) MD2218,A,F,AF, MQ2218,A MD2219,A,AF, MQ2219,A		35 75	65 85	— —	
($I_C = 150\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) MD2218,A,F,AF, MQ2218,A MD2219,A,AF, MQ2219,A		20 50	65 65	— —	
($I_C = 150\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) MD2218,AF,AF, MQ2218,A MD2219,A,AF, MQ2219,A		40 100	30 120	120 300	
($I_C = 300\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) MD2218,A, MQ2218,A MD2219,A, MQ2219,A		25 30	75 75	— —	
Collector-Emitter Saturation Voltage ($I_C = 150\text{ mAdc}$, $I_B = 15\text{ mAdc}$) MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A MD2218AF, MD2219AF	$V_{CE(sat)}$	— —	0.2 —	0.4 0.3	Vdc
($I_C = 300\text{ mAdc}$, $I_B = 30\text{ mAdc}$) MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A MD2218AF, MD2219AF		— —	0.35 —	1.2 0.9	
Base-Emitter Saturation Voltage ($I_C = 150\text{ mAdc}$, $I_B = 15\text{ mAdc}$) MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A MD2218AF, MD2219AF	$V_{BE(sat)}$	0.6 0.6	0.95 1.0	1.3 1.2	Vdc
($I_C = 300\text{ mAdc}$, $I_B = 30\text{ mAdc}$)MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A MD2218AF, MD2219AF		— —	— —	2.0 1.8	

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 20\text{ mAdc}$, $V_{CE} = 20\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	200	250	—	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 100\text{ kHz}$)	C_{obo}	—	3.5	8.0	pF
Input Capacitance ($V_{EB} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 100\text{ kHz}$) MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A MD2218AF, MD2219AF	C_{ibo}	— —	15 18	20 25	pF

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

Characteristic		Symbol	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS						
Delay Time	(VCC = 30 Vdc, IC = 150 mAdc, VBE(off) = 0.5 Vdc, IB1 = 15 mAdc) MD2218,F, MD2219 MD2218A,AF, MD2219A,AF	td	—	—	20 15	μs
Rise Time	MD2218,F, MD2219 MD2218A,AF, MD2219A,AF	tr	—	—	40 30	μs
Storage Time	(VCC = 30 Vdc, IC = 150 mAdc, IB1 = IB2 = 15 mAdc) MD2218,F, MD2219 MD2218A,AF, MD2219A,AF	ts	—	—	280 250	μs
Fall Time	MD2218,F, MD2219 MD2218A,AF, MD2219A,AF	tf	—	—	70 60	μs

(2) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.**FIGURE 1 – NORMALIZED DC CURRENT GAIN****FIGURE 2 – “ON” VOLTAGES****FIGURE 3 – TEMPERATURE COEFFICIENTS**

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

FIGURE 4 – FREQUENCY EFFECTS

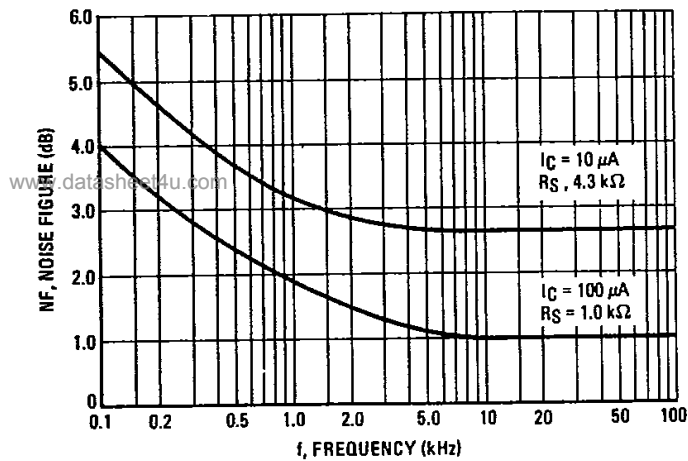


FIGURE 5 – SOURCE RESISTANCE EFFECTS

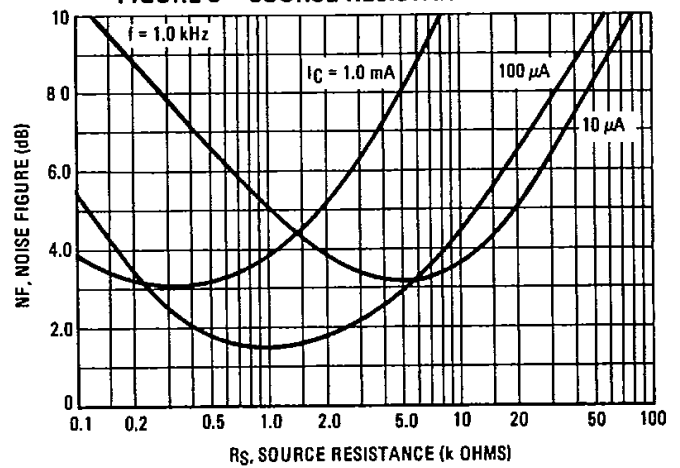


FIGURE 6 – CURRENT-GAIN-BANDWIDTH PRODUCT

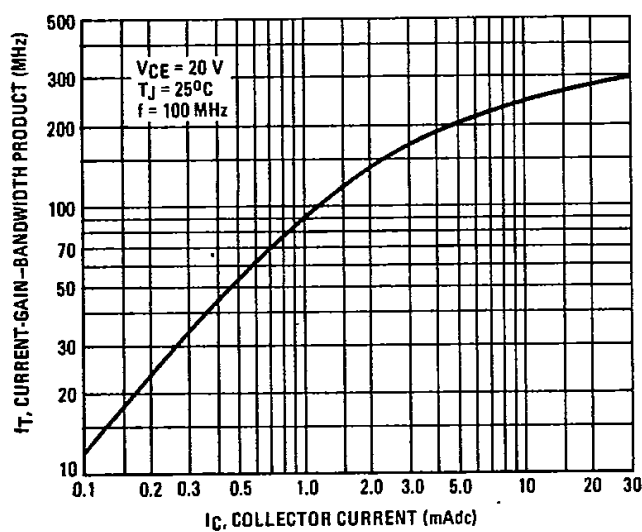
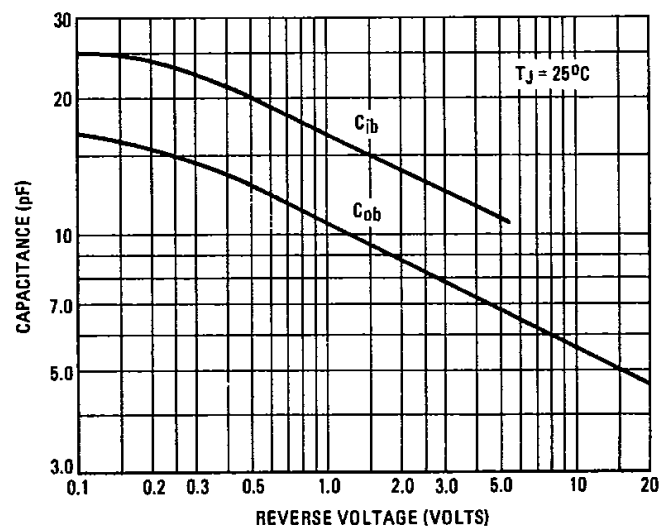


FIGURE 7 – CAPACITANCES



SWITCHING TIME CHARACTERISTICS

FIGURE 8 – TURN-ON TIME

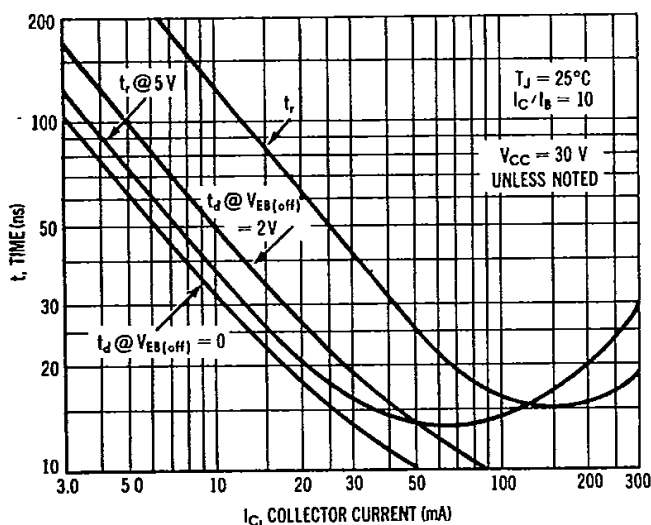


FIGURE 9 – CHARGE DATA

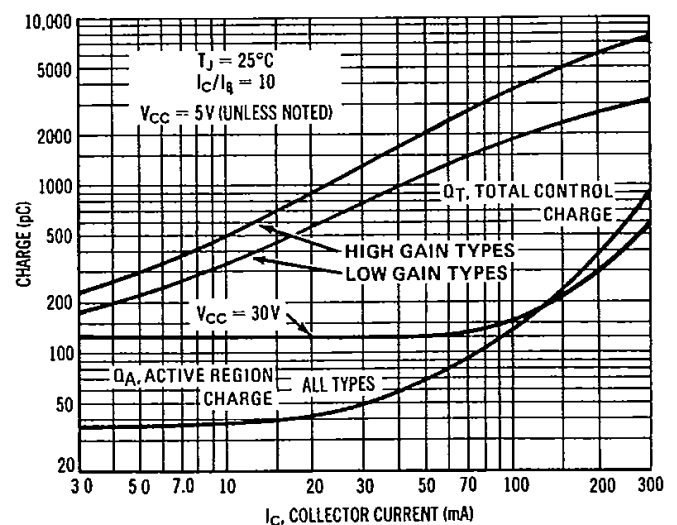


FIGURE 10 – TURN-OFF BEHAVIOR

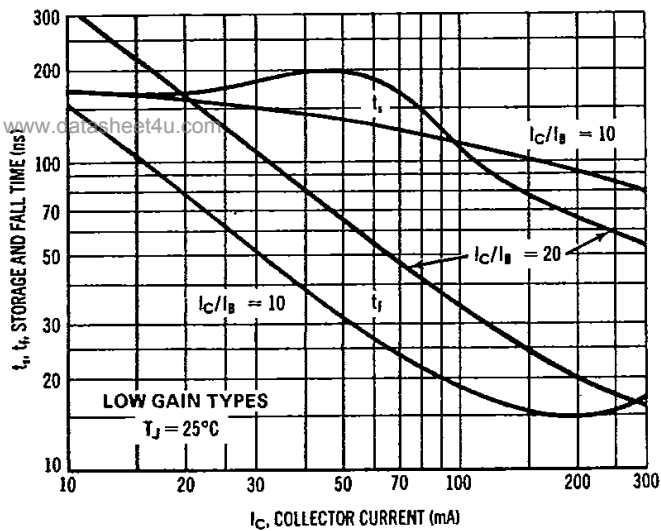


FIGURE 11 – DELAY AND RISE TIME EQUIVALENT TEST CIRCUIT

GENERATOR RISE TIME ≤ 2.0 ns
PW ≤ 200 ns
DUTY CYCLE = 2.0%

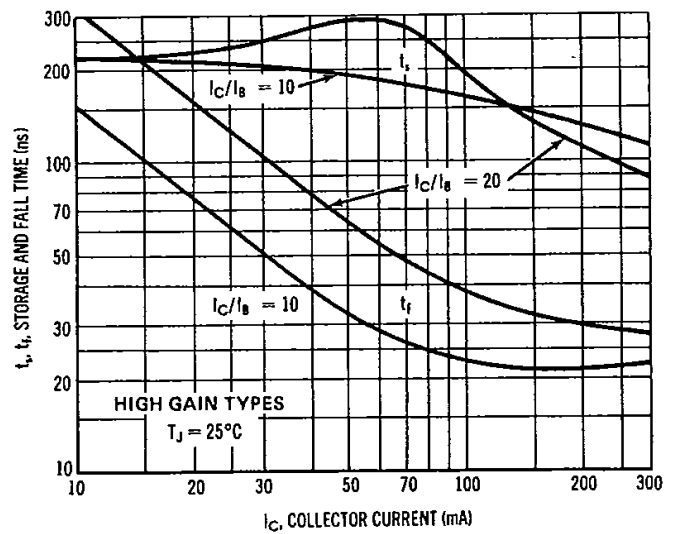
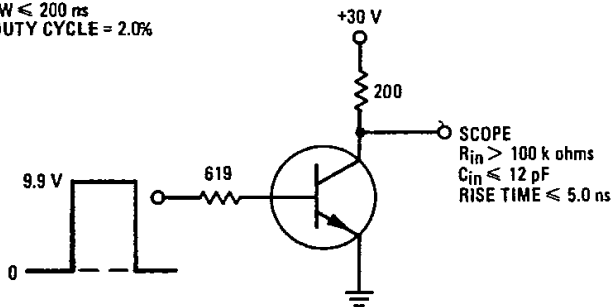


FIGURE 12 – STORAGE TIME AND FALL TIME EQUIVALENT TEST CIRCUIT

RISE TIME $\leq 3.0\%$
DUTY CYCLE = 2.0%

