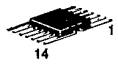
MD2218,A,F,AF
MD2219,A,AF
MQ2218,A
MQ2219,A

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

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MAXIMUM RATINGS

Rating	Symbol	MD2218,A,F MD2219,A,F MQ2218,A MQ2219,A	MD2218AF MD2219AF	Unit
Collector-Emitter Voltage	V_{CEO}	30	40	Vdc
Collector-Base Voltage	V_{CBO}	60	75	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	6.0	Vdc
Collector Current — Continuous	I_C	500		mAdc
		One Die	All Die Equal Power	
Total Device Dissipation @ T_A = 25°C	P_D			mW
MD2218,A, MD2219,A		575	625	
MD2218F,AF, MD2219F,AF		350	400	
MQ2218,A, MQ2219,A		400	600	mW/°C
Derate above 25°C				
MD2218,A, MD2219,A		3.29	3.57	
MD2218F,AF, MD2219F,AF		2.0	2.28	
MQ2218,A, MQ2219,A		2.28	3.42	
Total Device Dissipation @ T_C = 25°C	P_D			Watts
MD2218,A, MD2219,A		1.8	2.5	
MD2218F,AF, MD2219F,AF		1.0	2.0	
MQ2218,A, MQ2219,A		0.9	3.6	mW/°C
Derate above 25°C				
MD2218,A, MD2219,A		10.3	14.3	
MD2218F,AF, MD2219F,AF		5.71	11.4	
MQ2218,A, MQ2219,A		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	$R_{\theta JC}$			°C/W
MD2218,A, MD2219,A		97	70	
MD2218F,AF, MD2219,AF		175	87.5	
MQ2218,A, MQ2219,A		195	48.8	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$(1)			°C/W
MD2218,A, MD2219,A		304	280	
MD2218,F,AF, MD2219,AF		500	438	
MQ2218,A, MQ2219,A		438	292	
		Junction to Ambient	Junction to Case	
Coupling Factors				%
MD2218,A, MD2219,A		84	44	
MD2218F,AF, MD2219,AF		75	0	
MQ2218,A, MQ2219,A (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)	$V_{(BR)CEO}$				Vdc
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		30	—	—	
MD2218AF, MD2219AF		40	—	—	
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$				Vdc
MD2218,A,F, MD2219,A, MQ2218,A, MD2219,A		60	—	—	
MD2218AF, MD2219AF		75	—	—	

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$				Vdc
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		5.0	—	—	
MD2218AF, MD2219AF		6.0	—	—	
Collector Cutoff Current (V_{CE} = 50 Vdc, $V_{EB(off)}$ = 3.0 Vdc)	I_{CEV}				nAdc
MD2218,F, MD2219,F, MQ2218,A		20	—	—	
MD2218A,AF, MD2219A,AF, MQ2219,A		15	—	—	
Base Cutoff Current (V_{CE} = 50 Vdc, $V_{EB(off)}$ = 3.0 Vdc)	I_{BL}	30	—	—	nAdc
ON CHARACTERISTICS(2)					
DC Current Gain (I_C = 0.1 mAdc, V_{CE} = 10 Vdc)	h_{FE}				—
MD2218,A,F,AF, MQ2218,A		20	50	—	
MD2219,A,AF, MQ2219,A		35	45	—	
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc)					
MD2218,A,F,AF, MQ2218,A		25	55	—	
MD2219,A,AF, MQ2219,A		50	55	—	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)					
MD2218,A,F,AF, MQ2218,A		35	65	—	
MD2219,A,AF, MQ2219,A		75	85	—	
(I_C = 150 mAdc, V_{CE} = 1.0 Vdc)					
MD2218,A,F,AF, MQ2218,A		20	65	—	
MD2219,A,AF, MQ2219,A		50	65	—	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)					
MD2218,AF,AF, MQ2218,A		40	30	120	
MD2219,A,AF, MQ2219,A		100	120	300	
(I_C = 300 mAdc, V_{CE} = 10 Vdc)					
MD2218,A, MQ2218,A		25	75	—	
MD2219,A, MQ2219,A		30	75	—	
Collector-Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc)	$V_{CE(sat)}$				Vdc
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		—	0.2	0.4	
MD2218AF, MD2219AF		—	—	0.3	
(I_C = 300 mAdc, I_B = 30 mAdc)					
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		—	0.35	1.2	
MD2218AF, MD2219AF		—	—	0.9	
Base-Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc)	$V_{BE(sat)}$				Vdc
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		0.6	0.95	1.3	
MD2218AF, MD2219AF		0.6	1.0	1.2	
(I_C = 300 mAdc, I_B = 30 mAdc) MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		—	—	2.0	
MD2218AF, MD2219AF		—	—	1.8	
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 20 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	f_T	200	250	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)	C_{obo}	—	3.5	8.0	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 100 kHz)	C_{ibo}				pF
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		—	15	20	
MD2218AF, MD2219AF		—	18	25	

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

Characteristic		Symbol	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS						
Delay Time	(V_{CC} = 30 Vdc, I_C = 150 mAdc, $V_{BE(off)}$ = 0.5 Vdc, I_{B1} = 15 mAdc) MD2218,F, MD2219	t_d	—	—	20	μs
	MD2218A,AF, MD2219A,AF		—	—	15	
Rise Time	MD2218,F, MD2219	t_r	—	—	40	μs
	MD2218A,AF, MD2219A,AF		—	—	30	
Storage Time	(V_{CC} = 30 Vdc, I_C = 150 mAdc, I_{B1} = I_{B2} = 15 mAdc) MD2218,F, MD2219	t_s	—	—	280	μs
	MD2218A,AF, MD2219A,AF		—	—	250	
Fall Time	MD2218,F, MD2219	t_f	—	—	70	μs
	MD2218A,AF, MD2219A,AF		—	—	60	

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

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FIGURE 1 – NORMALIZED DC CURRENT GAIN

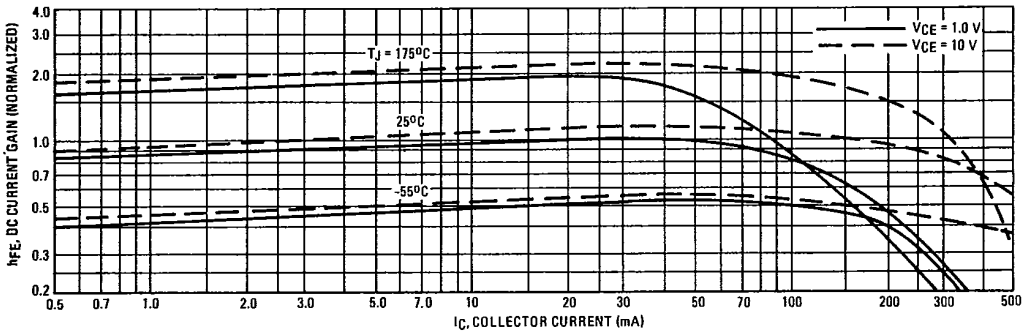


FIGURE 2 – "ON" VOLTAGES

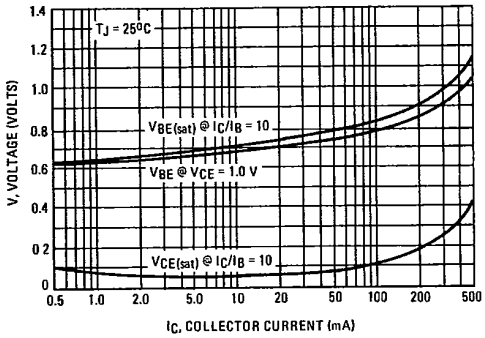
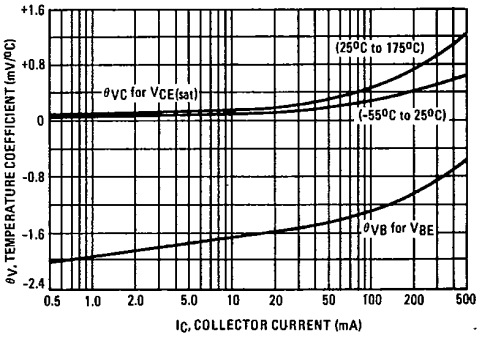


FIGURE 3 – TEMPERATURE COEFFICIENTS



NOISE FIGURE

(V_{CE} = 10 Vdc, T_A = 25°C)

FIGURE 4 – FREQUENCY EFFECTS

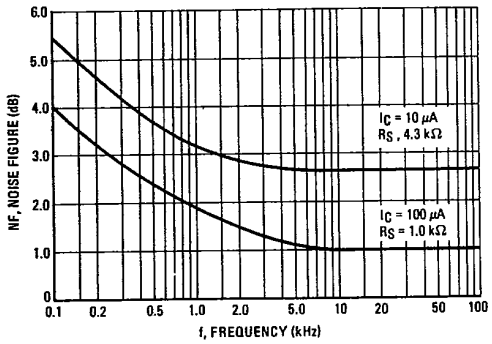


FIGURE 5 – SOURCE RESISTANCE EFFECTS

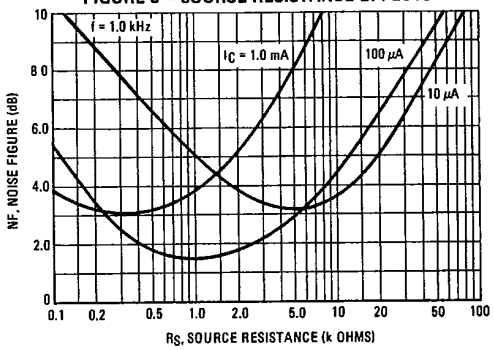


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FIGURE 6 – CURRENT-GAIN-BANDWIDTH PRODUCT

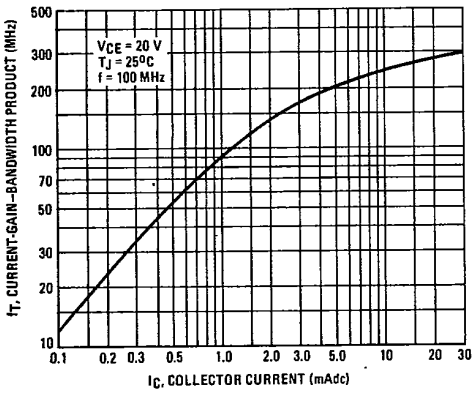
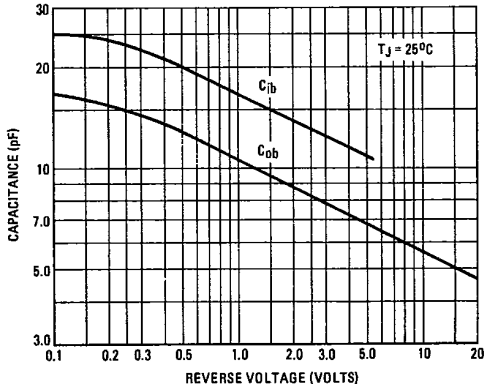


FIGURE 7 – CAPACITANCES



SWITCHING TIME CHARACTERISTICS

FIGURE 8 – TURN-ON TIME

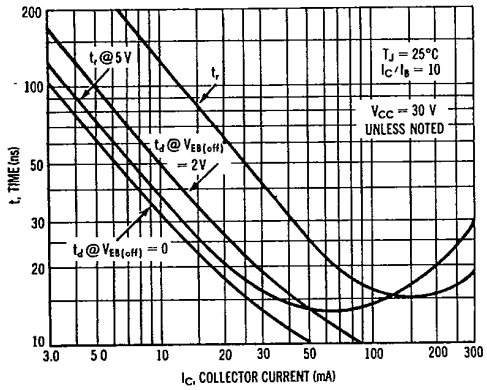


FIGURE 9 – CHARGE DATA

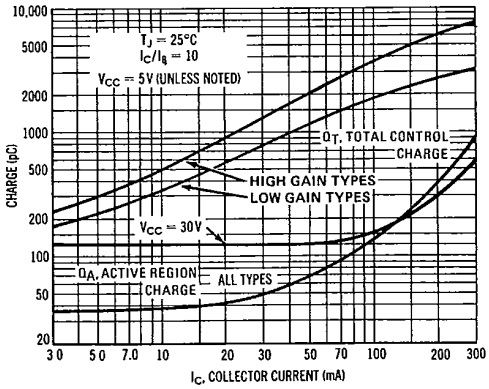


FIGURE 10 – TURN-OFF BEHAVIOR

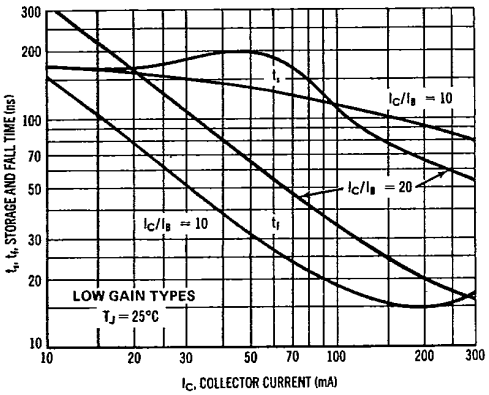
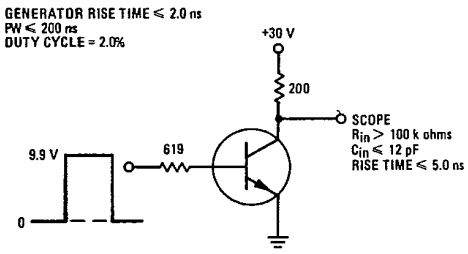


FIGURE 11 – DELAY AND RISE TIME EQUIVALENT TEST CIRCUIT



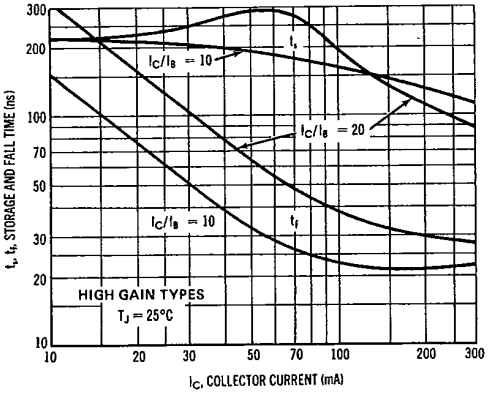


FIGURE 12 – STORAGE TIME AND FALL TIME EQUIVALENT TEST CIRCUIT