

6367254 MOTOROLA SC (XSTRS/R F)

96D 82435 D
T-29-27

MAXIMUM RATINGS

Rating	Symbol	MD2218,A,F	MD2218AF	Unit
		MD2219,A,F	MD2219AF	
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	P _D	MD2218,A, MD2219,A	625	mW
		MD2218F,AF, MD2219F,AF	400	
		MQ2218,A, MQ2219,A	600	
		Derate above 25°C		
Total Device Dissipation @ T _C = 25°C	P _D	MD2218,A, MD2219,A	2.5	Watts
		MD2218F,AF, MD2219F,AF	2.0	
		MQ2218,A, MQ2219,A	3.6	
		Derate above 25°C		
		One Die	All Die Equal Power	
Total Device Dissipation @ T _A = 25°C	P _D	MD2218,A, MD2219,A	625	mW
		MD2218F,AF, MD2219F,AF	400	
		MQ2218,A, MQ2219,A	600	
		Derate above 25°C		
Total Device Dissipation @ T _C = 25°C	P _D	MD2218,A, MD2219,A	2.5	mW
		MD2218F,AF, MD2219F,AF	2.0	
		MQ2218,A, MQ2219,A	3.6	
		Derate above 25°C		
		One Die	All Die Equal Power	
Total Device Dissipation @ T _A = 25°C	P _D	MD2218,A, MD2219,A	625	mW
		MD2218F,AF, MD2219F,AF	400	
		MQ2218,A, MQ2219,A	600	
		Derate above 25°C		
Total Device Dissipation @ T _C = 25°C	P _D	MD2218,A, MD2219,A	2.5	Watts
		MD2218F,AF, MD2219F,AF	2.0	
		MQ2218,A, MQ2219,A	3.6	
		Derate above 25°C		
		One Die	All Die Equal Power	
Total Device Dissipation @ T _A = 25°C	P _D	MD2218,A, MD2219,A	625	mW
		MD2218F,AF, MD2219F,AF	400	
		MQ2218,A, MQ2219,A	600	
		Derate above 25°C		
Total Device Dissipation @ T _C = 25°C	P _D	MD2218,A, MD2219,A	2.5	Watts
		MD2218F,AF, MD2219F,AF	2.0	
		MQ2218,A, MQ2219,A	3.6	
		Derate above 25°C		
Operating and Storage Junction Temperature Range		T _J , T _{stg}	-65 to +200	°C

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	R _{θJC}	MD2218,A, MD2219,A	70	°C/W	
		MD2218F,AF, MD2219F,AF	87.5		
		MQ2218,A, MQ2219,A	48.8		
Thermal Resistance, Junction to Ambient	R _{θJA} (1)	MD2218,A, MD2219,A	280	°C/W	
		MD2218,F,AF, MD2219,AF	438		
		MQ2218,A, MQ2219,A	292		
Coupling Factors		Junction to Ambient	Junction to Case	%	
		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_{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}				V _{dc}
		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}				V _{dc}
		MD2218,A,F, MD2219,A, MQ2218,A, MD2219,A	60	—	
		MD2218AF, MD2219AF	75	—	—

6367254 MOTOROLA SC (XSTRS/R F)
 MD2218,A,F,AF, MD2219,A,AF, MQ2218,A, MQ2219,A

96D 82436 D

T-29-27

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

Characteristic	Symbol	Min	Typ	Max	Unit
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$				Vdc
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		5.0	—	—	
MD2218AF, MD2219AF		6.0	—	—	
Collector Cutoff Current ($V_{CE} = 60 \text{ Vdc}$, $V_{EB(off)} = 3.0 \text{ Vdc}$)	I_{CEV}				nAdc
MD2218,F, MD2219,F, MQ2218,A, MD2218A,AF, MD2219A,AF, MQ2219,A		20 15	— —	— —	
Base Cutoff Current ($V_{CE} = 50 \text{ Vdc}$, $V_{EB(off)} = 3.0 \text{ Vdc}$)	I_{BL}	30	—	—	nAdc

ON CHARACTERISTICS(2)

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

SMALL-SIGNAL CHARACTERISTICS

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

MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

5

6367254 MOTOROLA SC (XSTRS/R F)
 MD2218,A,F,AF, MD2219,A,AF, MQ2218,A, MQ2219,A

96D 82437 D

T-29-27

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

Characteristic	Symbol	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS					
Delay Time	t_d	—	—	20	μs
Rise Time				t_r	—
Storage Time	t_s	—	—	280	μs
Fall Time				t_f	—

(2) Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.



FIGURE 1 — NORMALIZED DC CURRENT GAIN

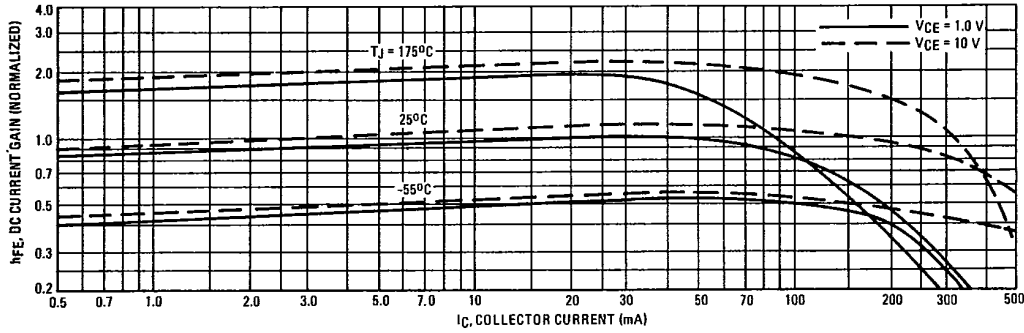


FIGURE 2 — "ON" VOLTAGES

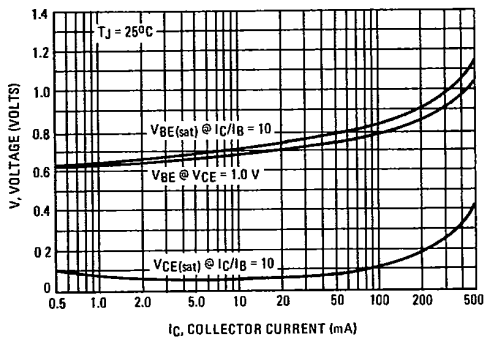
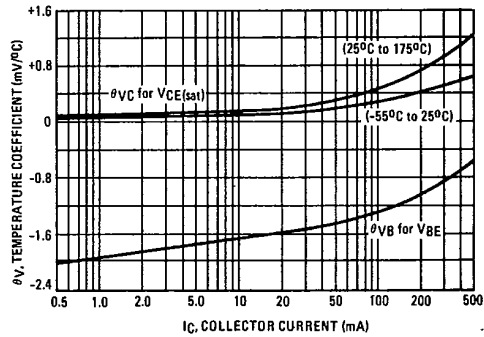


FIGURE 3 — TEMPERATURE COEFFICIENTS



6367254 MOTOROLA SC (XSTRS/R F)

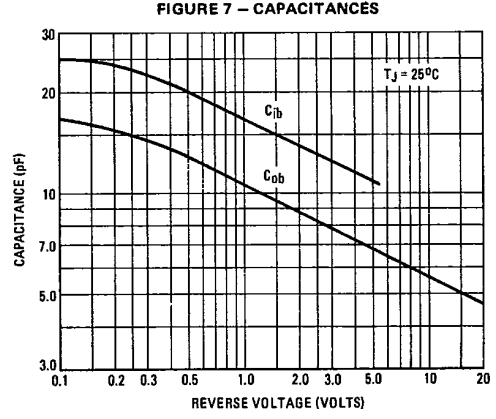
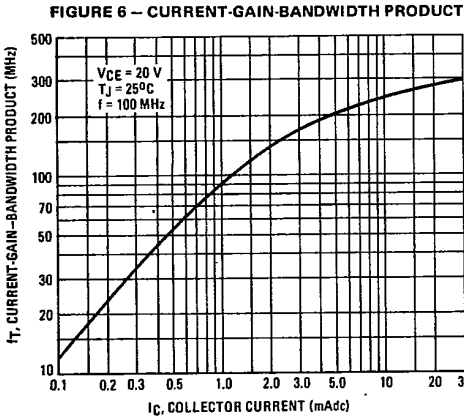
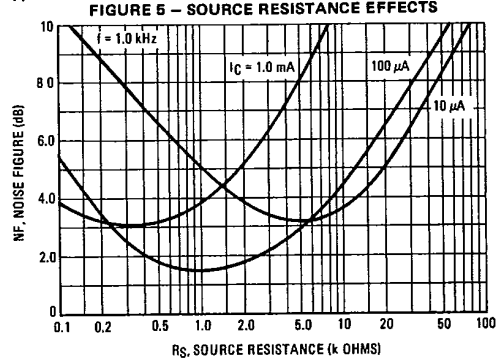
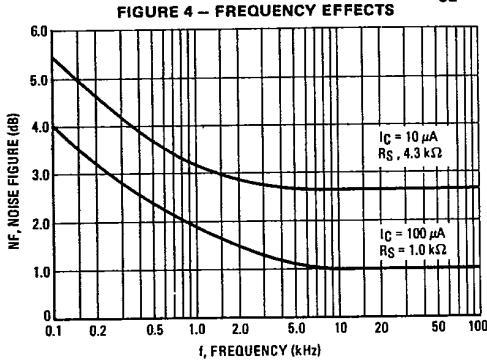
96D 82438 D

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

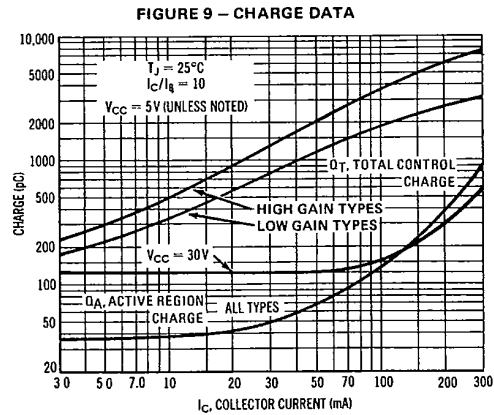
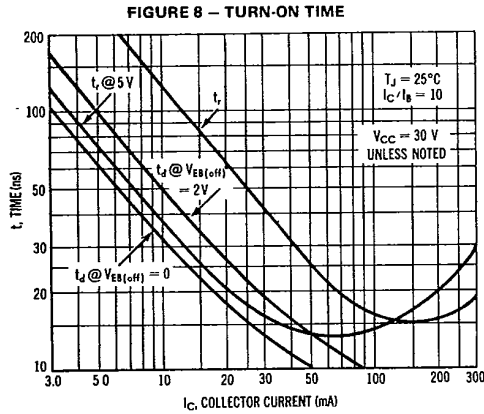
T-29-27

5

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



SWITCHING TIME CHARACTERISTICS



6367254 MOTOROLA SC (XSTRS/R F)

96D 82439 D

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

T-29-27

FIGURE 10 - TURN-OFF BEHAVIOR

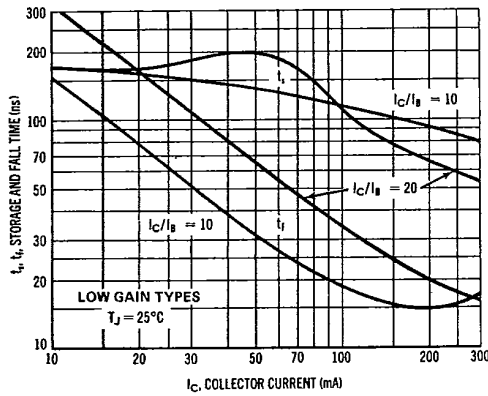


FIGURE 11 - DELAY AND RISE TIME EQUIVALENT TEST CIRCUIT

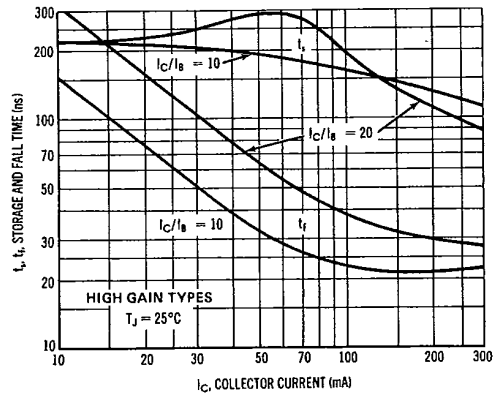
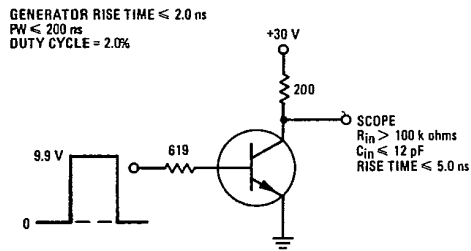
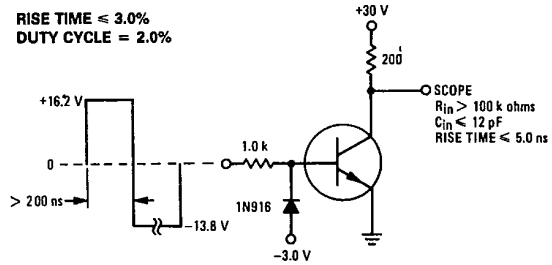


FIGURE 12 - STORAGE TIME AND FALL TIME EQUIVALENT TEST CIRCUIT



5