

6367254 MOTOROLA SC (XSTRS/R F)

96D 82435 D  
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**MAXIMUM RATINGS**

Rating	Symbol	MD2218,A,F MD2219,A,F MQ2218,A	MD2218AF MD2219AF	Unit
		One Die	All Die Equal Power	
Collector-Emitter Voltage	V <sub>CEO</sub>	30	40	V <sub>dc</sub>
Collector-Base Voltage	V <sub>CBO</sub>	60	75	V <sub>dc</sub>
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	6.0	V <sub>dc</sub>
Collector Current — Continuous	I <sub>C</sub>	500		mAdc
<b>Total Device Dissipation</b>				
@ T <sub>A</sub> = 25°C				mW
MD2218,A, MD2219,A		575	625	mW/°C
MD2218F,AF, MD2219F,AF		350	400	
MQ2218,A, MQ2219,A		400	600	
Derate above 25°C				
MD2218,A, MD2219,A		3.29	3.67	mW/°C
MD2218F,AF, MD2219F,AF		2.0	2.28	
MQ2218,A, MQ2219,A		2.28	3.42	
<b>Total Device Dissipation</b>				
@ T <sub>C</sub> = 25°C				Watts
MD2218,A, MD2219,A		1.8	2.5	mW/°C
MD2218F,AF, MD2219F,AF		1.0	2.0	
MQ2218,A, MQ2219,A		0.9	3.6	
Derate above 25°C				
MD2218,A, MD2219,A		10.3	14.3	mW/°C
MD2218F,AF, MD2219F,AF		5.71	11.4	
MQ2218,A, MQ2219,A		5.13	20.5	
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to +200		°C

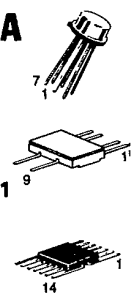
**MD2218,A,F,AF**  
**MD2219,A,AF**  
**MQ2218,A**  
**MQ2219,A**

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 <sub>θJC</sub>	MD2218,A, MD2219,A	97	70
		MD2218F,AF, MD2219F,AF	175	87.5
		MQ2218,A, MQ2219,A	195	48.8
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub> (1)	MD2218,A, MD2219,A	304	280
		MD2218,F,AF, MD2219,AF	500	438
		MQ2218,A, MQ2219,A	438	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<sub>θJA</sub> is measured with the device soldered into a typical printed circuit board.

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted.)**

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage(2) (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>				V <sub>dc</sub>
		MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A	30	—	—
		MD2218AF, MD2219AF	40	—	—
Collector-Base Breakdown Voltage (I <sub>C</sub> = 10 μAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>				V <sub>dc</sub>
		MD2218,A,F, MD2219,A, MQ2218,A, MD2219,A	60	—	—
		MD2218AF, MD2219AF	75	—	—

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

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

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

**ON CHARACTERISTICS(2)**

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

**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 ( $V_{EB} = 0.5 \text{ Vdc}$ , $I_C = 0$ , $f = 100 \text{ kHz}$ )	$C_{ibo}$				pF
MD2218,A,F, MD2219,A, MQ2218,A, MQ2219,A		—	15	20	
MD2218AF, MD2219AF		—	18	25	

MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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

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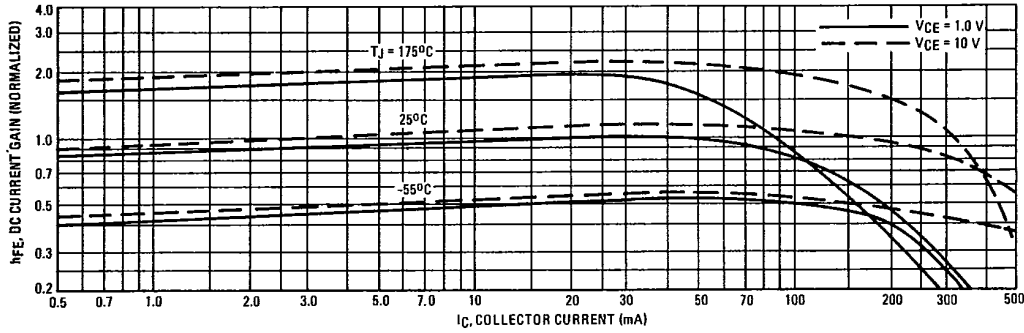
**ELECTRICAL CHARACTERISTICS** (continued) ( $T_A = 25^\circ\text{C}$  unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	$t_d$	—	—	20	$\mu\text{s}$
Rise Time				$t_r$	—
Storage Time	$t_s$	—	—	280	$\mu\text{s}$
Fall Time				$t_f$	—

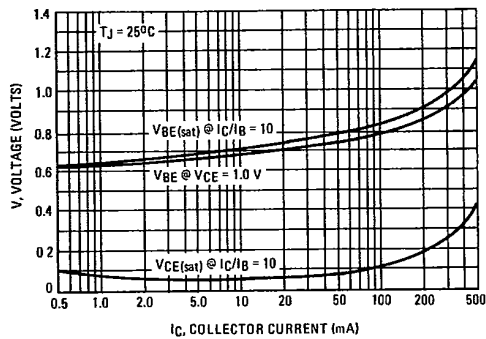
(2) Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



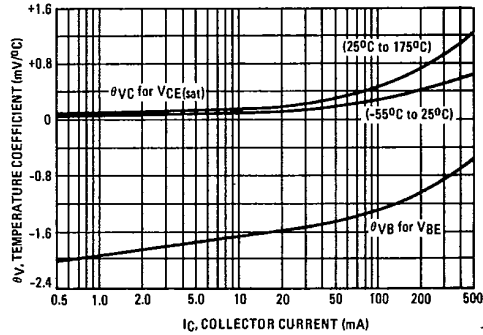
**FIGURE 1 — NORMALIZED DC CURRENT GAIN**



**FIGURE 2 — "ON" VOLTAGES**



**FIGURE 3 — TEMPERATURE COEFFICIENTS**



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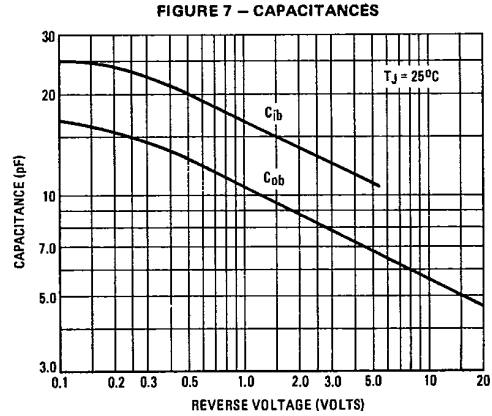
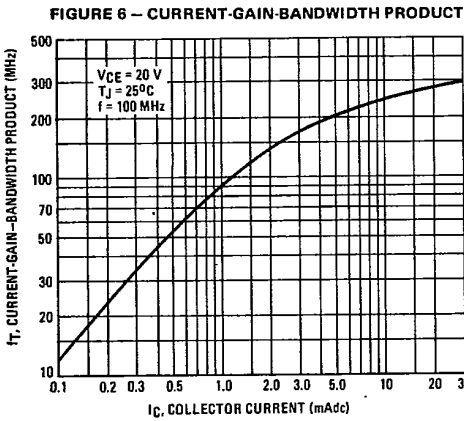
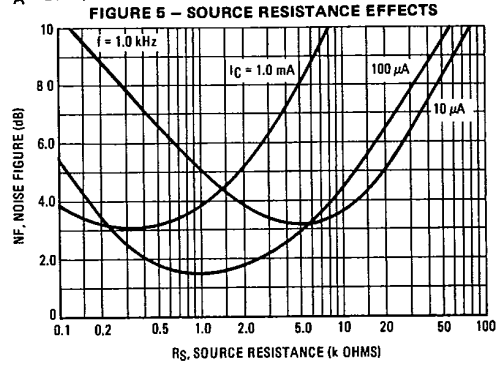
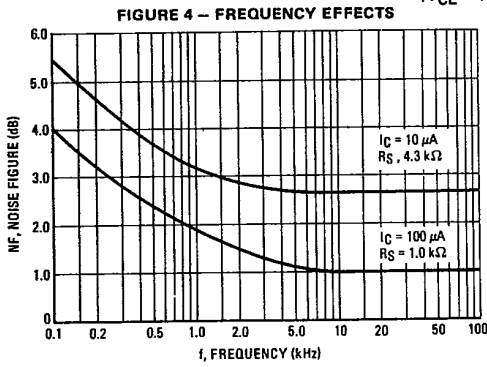
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MD2218,A,F,AF, MD2219,A,AF, MQ2218,A, MQ2219,A

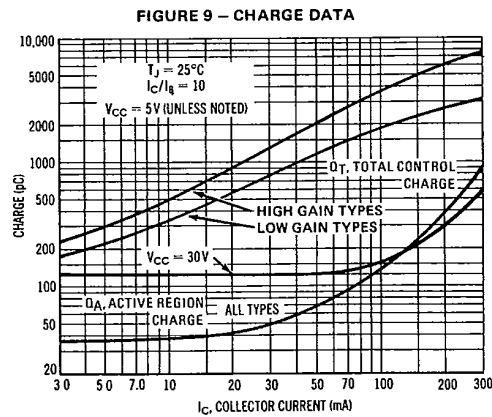
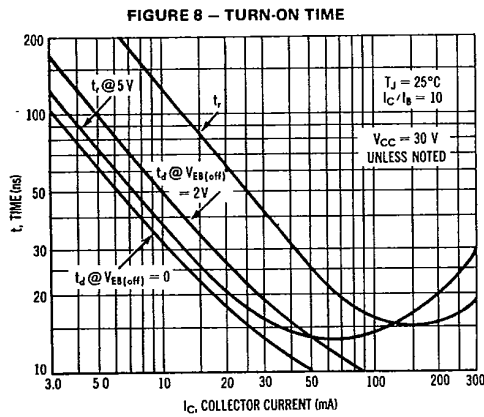
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**NOISE FIGURE**  
( $V_{CE} = 10 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$ )



**SWITCHING TIME CHARACTERISTICS**



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

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FIGURE 10 - TURN-OFF BEHAVIOR

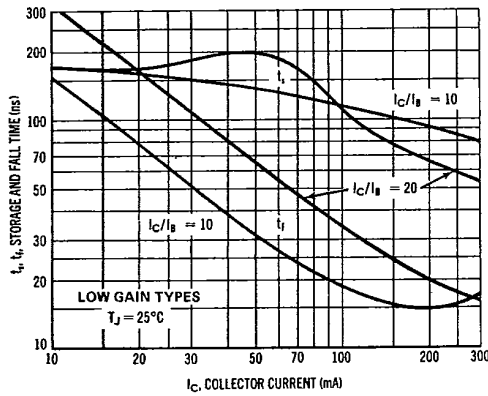


FIGURE 11 - DELAY AND RISE TIME EQUIVALENT TEST CIRCUIT

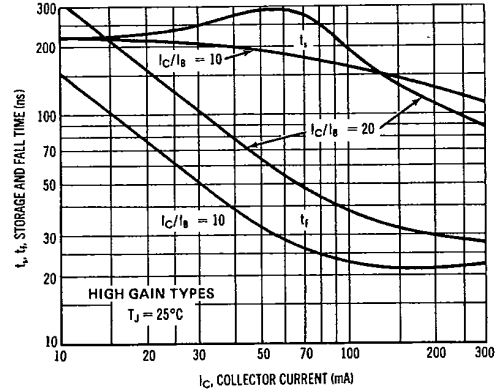
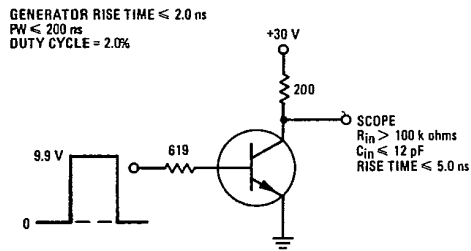
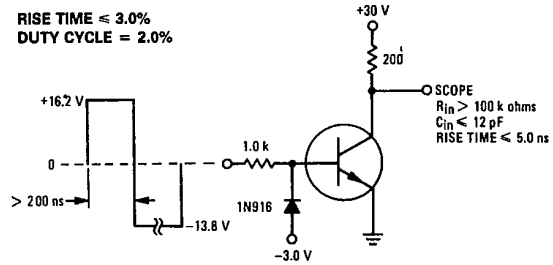


FIGURE 12 - STORAGE TIME AND FALL TIME EQUIVALENT TEST CIRCUIT



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