

6367254 MOTOROLA SC (XSTRS/R F)

96D 81964 D

T-31-15

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	15	Vdc
Collector-Base Voltage	V _{CBO}	25	Vdc

THERMAL CHARACTERISTICS

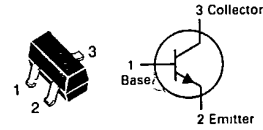
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board,* T _A = 25°C Derate above 25°C	P _D	225	mW
Thermal Resistance Junction to Ambient	R _{θJA}	556	°C/mW
Total Device Dissipation Alumina Substrate,** T _A = 25°C Derate above 25°C	P _D	300	mW
Thermal Resistance Junction to Ambient	R _{θJA}	417	°C/mW
Junction and Storage Temperature	T _J , T _{stg}	150	°C

*FR-5 = 1.0 x 0.75 x 0.62 in.
**Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

DEVICE MARKING

BFS17 = E1

BFS17
CASE 318-02/03, STYLE 6
SOT-23 (TO-236AA/AB)



RF TRANSISTOR
NPN SILICON

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (I _C = 10 mA)	V _{(BR)CEO}	15	—	Vdc
Collector-Base Breakdown Voltage (I _C = 100 μA)	V _{(BR)CBO}	25	—	Vdc
Collector Cutoff Current (V _{CE} = 10 V)	I _{CEO}	—	25	nA
Collector Cutoff Current (V _{CB} = 10 V)	I _{CBO}	—	25	nA
Emitter Cutoff Current (V _{EB} = 4.0 V)	I _{EBO}	—	100	μA
ON CHARACTERISTICS				
DC Current Gain (I _C = 2.0 mA, V _{CE} = 1.0 V) (I _C = 25 mA, V _{CE} = 1.0 V)	h _{FE}	20 20	150 —	—
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 1.0 mA)	V _{CE(sat)}	—	0.4	V
Base-Emitter Saturation Voltage (I _C = 10 mA, I _B = 1.0 mA)	V _{BE(sat)}	—	1.0	V
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain — Bandwidth Product (I _C = 2.0 mA, V _{CE} = 5.0 V, f = 500 MHz) (I _C = 25 mA, V _{CE} = 5.0 V, f = 500 MHz)	f _T	1.0 1.3*	—	GHz
Output Capacitance (V _{CB} = 10 V, f = 1.0 MHz)	CCB	—	1.0*	pF
Noise Figure (I _C = 2.0 mA, V _{CE} = 5.0 V, R _S = 50 Ω, f = 30 MHz)	NF	—	5.0*	dB

*Typ

6367254 MOTOROLA SC (XSTRS/R F)

96D 81965

D
T-35-25

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MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	$\pm V_{DS}$	40	V
Drain-Gate Voltage	V_{DG}	40	V
Gate-Source Voltage	V_{GS}	40	V
Forward Gate Current	$I_{G(f)}$	50	mA

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board,* $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225	mW
		1.8	mW/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	556	°C/mW
Total Device Dissipation Alumina Substrate,** $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300	mW
		2.4	mW/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	°C/mW
Junction and Storage Temperature	T_J, T_{stg}	150	°C

*FR-5 = 1.0 x 0.75 x 0.62 in.
**Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

DEVICE MARKING

BSR56 = M4; BSR57 = M5; BSR58 = M6

**BSR56
BSR57
BSR58**

CASE 318-02/03, STYLE 10
SOT-23 (TO-236AA/AB)

**JFET
SWITCHING
TRANSISTOR**

N-CHANNEL

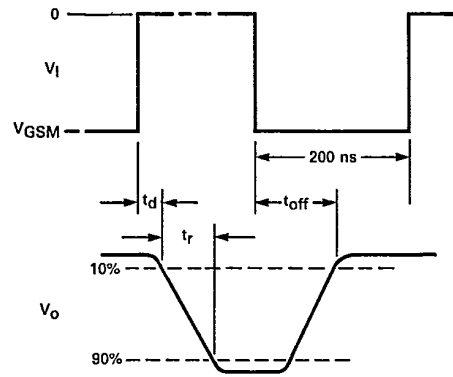
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Gate-Source Breakdown Voltage ($I_G = 1.0 \mu\text{A}$, $V_{DS} = 0$)	$V_{(BR)GSS}$	40	—	Vdc
Gate-Reverse Current ($V_{DS} = 0 \text{ V}$, $V_{GS} = 20 \text{ V}$)	I_{GSS}	—	1.0	nA
Gate-Source Cutoff Voltage ($V_{DS} = 15 \text{ V}$, $I_D = 0.5 \text{ nA}$)	$V_{GS(off)}$	BSR56 4.0 BSR57 2.0 BSR58 0.8	10 6.0 4.0	V
ON CHARACTERISTICS				
Zero-Gate Voltage Drain ($V_{DS} = 15 \text{ V}$, $V_{GS} = 0$)	I_{DSS}	BSR56 50 BSR57 20 BSR58 8.0	— 100 80	mA
Drain-Source On Voltage ($I_D = 20 \text{ mA}$, $V_{GS} = 0$) ($I_D = 10 \text{ mA}$, $V_{GS} = 0$) ($I_D = 5.0 \text{ mA}$, $V_{GS} = 0$)	$V_{DS(on)}$	BSR56 — BSR57 — BSR58 —	0.75 0.5 0.4	Vdc
Static Drain-Source On Resistance ($I_D = 0 \text{ mAdc}$, $V_{GS} = 0$, $f = 1.0 \text{ kHz}$)	$r_{DS(on)}$	BSR56 — BSR57 — BSR58 —	25 40 60	Ohms
SWITCHING CHARACTERISTICS				
Delay Time: $V_{DD} = 10 \text{ V}$; $V_{GS} = 0$ ($V_{GSM} = 10 \text{ V}$, $I_D = 20 \text{ mA}$) ($V_{GSM} = 6.0 \text{ V}$, $I_D = 10 \text{ mA}$) ($V_{GSM} = 4.0 \text{ V}$, $I_D = 5.0 \text{ mA}$)	t_d	BSR56 — BSR57 — BSR58 —	6.0 6.0 10	ns
Rise Time: $V_{DD} = 10 \text{ V}$; $V_{GS} = 0$ ($V_{GSM} = 10 \text{ V}$, $I_D = 20 \text{ mA}$) ($V_{GSM} = 6.0 \text{ V}$, $I_D = 10 \text{ mA}$) ($V_{GSM} = 4.0 \text{ V}$, $I_D = 5.0 \text{ mA}$)	t_r	BSR56 — BSR57 — BSR58 —	3.0 4.0 10	ns
Turn-Off Time: $V_{DD} = 10 \text{ V}$; $V_{GS} = 0$ ($V_{GSM} = 10 \text{ V}$, $I_D = 20 \text{ mA}$) ($V_{GSM} = 6.0 \text{ V}$, $I_D = 10 \text{ mA}$) ($V_{GSM} = 4.0 \text{ V}$, $I_D = 5.0 \text{ mA}$)	t_{off}	BSR56 — BSR57 — BSR58 —	25 50 100	ns

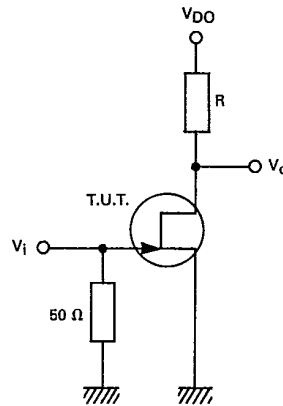
6367254 MOTOROLA SC (XSTRS/R F)
BSR56, BSR57, BSR58

96D 81966 D

T-35-25



SWITCHING TIMES WAVEFORMS



BSR56; R = 464 Ω
BSR57; R = 953 Ω
BSR58; R = 1910 Ω

Pulse Generator

$t_r = t_f \leq 1.0$ ns
 $\delta = 0.02$
 $Z_o = 50$ Ω

Oscilloscope

$t_r \leq 0.75$ ns
 $R_i \geq 1$ M Ω
 $C_i \leq 2.5$ pF

6367254 MOTOROLA SC (XSTRS/R F)

96D 81967 D

T-37-11

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	100	Vdc
Collector-Emitter Voltage R _{BE} = 10 kΩ	V _{CER}	110	Vdc
Collector Current — Continuous	I _C	100	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board,* T _A = 25°C Derate above 25°C	P _D	225	mW
		1.8	mW/°C
Thermal Resistance Junction to Ambient	R _{θJA}	556	°C/mW
Total Device Dissipation Alumina Substrate,** T _A = 25°C Derate above 25°C	P _D	300	mW
		2.4	mW/°C
Thermal Resistance Junction to Ambient	R _{θJA}	417	°C/mW
Junction and Storage Temperature	T _J , T _{stg}	150	°C

*FR-5 = 1.0 x 0.75 x 0.62 in.

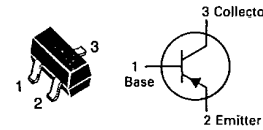
**Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

DEVICE MARKING

BSS63 = T1

BSS63

CASE 318-02/03, STYLE 6
SOT-23 (TO-236AA/AB)



HIGH VOLTAGE TRANSISTOR

PNP SILICON

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I _C = 100 μAdc)	V _{(BR)CEO}	100	—	—	Vdc
Collector-Emitter Breakdown Voltage (I _C = 10 μAdc, I _E = 0, R _{BE} = 10 kΩ)	V _{(BR)CER}	110	—	—	Vdc
Collector-Base Breakdown Voltage (I _C = 10 μAdc, I _E = 0)	V _{(BR)CBO}	110	—	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 10 μAdc)	V _{(BR)EBO}	6.0	—	—	Vdc
Collector Cutoff Current (V _{CB} = 90 Vdc, I _E = 0)	I _{CBO}	—	—	100	nAdc
Collector Cutoff Current (V _{CE} = 110 Vdc, R _{BE} = 10 kΩ)	I _{CER}	—	—	10	μAdc
Emitter Cutoff Current (V _{EB} = 6.0 Vdc, I _C = 0)	I _{EBO}	—	—	200	nAdc
ON CHARACTERISTICS					
DC Current Gain (I _C = 10 mAdc, V _{CE} = 1.0 Vdc) (I _C = 25 mAdc, V _{CE} = 1.0 Vdc)	h _{FE}	30 30	— —	— —	—
Collector-Emitter Saturation Voltage (I _C = 25 mAdc, I _B = 2.5 mAdc)	V _{CE(sat)}	—	—	250	mVdc
Base-Emitter Saturation Voltage (I _C = 25 mAdc, I _B = 2.5 mAdc)	V _{BE(sat)}	—	—	900	mVdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I _C = 25 mAdc, V _{CE} = 5.0 Vdc, f = 35 MHz)	f _T	50	95	—	MHz
Case Capacitance (I _E = I _C = 0, V _{CB} = 10 Vdc)	C _C	—	—	5.0	pF

6367254 MOTOROLA SC (XSTRS/R F)

96D 81968 D

T-35-07

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	80	V _{dc}
Collector-Base Voltage	V _{CBO}	120	V _{dc}
Emitter-Base Voltage	V _{EBO}	5.0	V _{dc}
Collector Current — Continuous	I _C	100	mA

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board,* T _A = 25°C Derate above 25°C	P _D	225	mW
Thermal Resistance Junction to Ambient	R _{θJA}	556	°C/mW
Total Device Dissipation Alumina Substrate,** T _A = 25°C Derate above 25°C	P _D	300	mW
Thermal Resistance Junction to Ambient	R _{θJA}	417	°C/mW
Junction and Storage Temperature	T _J , T _{stg}	150	°C

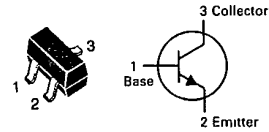
*FR-5 = 1.0 x 0.75 x 0.62 in.

**Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

DEVICE MARKING

BSS64 = AM

BSS64

CASE 318-03, STYLE 6
SOT-23 (TO-236AA/AB)

DRIVER TRANSISTOR

NPN SILICON

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (I _C = 4.0 mA)	V _{(BR)CEO}	80	—	V _{dc}
Collector-Base Breakdown Voltage (I _C = 100 μA)	V _{(BR)CBO}	120	—	V _{dc}
Emitter-Base Breakdown Voltage (I _E = 100 μA)	V _{(BR)EBO}	5.0	—	V _{dc}
Collector Cutoff Current (V _{CE} = 90 V) (T _A = 150°C)	I _{CBO}	—	0.1 500	μA
Emitter Cutoff Current (V _{BE} = 4.0 V)	I _{EBO}	—	200	nA
ON CHARACTERISTICS				
DC Current Gain (V _{CE} = 1.0 V, I _C = 10 mA)	h _{FE}	20	—	—
Collector-Emitter Saturation Voltage (I _C = 4.0 mA, I _B = 400 μA) (I _C = 50 mA, I _B = 15 mA)	V _{CE(sat)}	—	0.15 0.2	V _{dc}
Forward Base-Emitter Voltage	V _{BE(sat)}	—	—	—
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain — Bandwidth Product (I _C = 4.0 mA, V _{CE} = 10 V, f = 35 MHz)	f _T	60	—	MHz
Output Capacitance (V _{CE} = 10 V, f = 1.0 MHz)	C _{ob}	—	5.0	pF