

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	32	V
Collector-Base Voltage	V_{CBO}	32	V
Emitter-Base Voltage	V_{EBO}	5.0	V
Collector Current — Continuous	I_C	100	mAdc

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/ $^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate,** $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300	mW
		2.4	mW/ $^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

*FR-5 = 1.0 x 0.75 x 0.062 in.

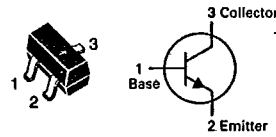
**Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

DEVICE MARKING

BCW60AL = AA; BCW60BL = AB; BCW60CL = AC; BCW60DL = AD

MOTOROLA SC XSTRS/R F

BCW60AL, BL, CL, DL T-27-09

CASE 318-03, STYLE 6
SOT-23 (TO-236AB)GENERAL PURPOSE
TRANSISTORS
NPN SILICON

Refer to MPS3904 for graphs.

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

Characteristic	Symbol	Min	Max	Unit
Collector-Emitter Breakdown Voltage ($I_C = 2.0 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CEO}$	32	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 1.0 \mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current ($V_{CE} = 32 \text{ Vdc}$) ($V_{CE} = 32 \text{ Vdc}$, $T_A = 150^\circ\text{C}$)	I_{CES}	—	20	nAdc μAdc
Emitter Cutoff Current ($V_{EB} = 4.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	20	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 10 \mu\text{Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	BCW60AL BCW60BL BCW60CL BCW60DL	h_{FE}	20 30 40 100	—	—
($I_C = 2.0 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)	BCW60AL BCW60BL BCW60CL BCW60DL		120 175 250 380	220 310 460 630	
($I_C = 50 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$)	BCW60AL BCW60BL BCW60CL BCW60DL		60 70 90 100	— — — —	
AC Current Gain ($I_C = 2.0 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	BCW60AL BCW60BL BCW60CL BCW60DL	h_{fe}	125 175 250 350	250 350 500 700	—
Collector-Emitter Saturation Voltage ($I_C = 50 \text{ mAdc}$, $I_B = 1.25 \text{ mAdc}$) ($I_C = 10 \text{ mAdc}$, $I_B = 0.25 \text{ mAdc}$)		$V_{CE(sat)}$	— —	0.55 0.35	Vdc
Base-Emitter Saturation Voltage ($I_C = 50 \text{ mAdc}$, $I_B = 1.25 \text{ mAdc}$) ($I_C = 50 \text{ mAdc}$, $I_B = 0.25 \text{ mAdc}$)		$V_{BE(sat)}$	0.7 0.6	1.05 0.85	Vdc
Base-Emitter On Voltage ($I_C = 2.0 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)		$V_{BE(on)}$	0.6	0.75	Vdc

MOTOROLA SMALL-SIGNAL TRANSISTORS, FETs AND DIODES

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

Characteristic	Symbol	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain — Bandwidth Product ($I_C = 10\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	f_T	125	—	MHz
Output Capacitance ($V_{CE} = 10\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	—	4.5	pF
Noise Figure ($I_C = 0.2\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$)	NF	—	6.0	dB
SWITCHING CHARACTERISTICS				
Turn-On Time ($I_C = 10\text{ mAdc}$, $I_{B1} = 1.0\text{ mAdc}$)	t_{on}	—	150	ns
Turn-Off Time ($I_{B2} = 1.0\text{ mAdc}$, $V_{BB} = 3.6\text{ Vdc}$, $R_1 = R_2 = 5.0\text{ k}\Omega$, $R_L = 990\text{ }\Omega$)	t_{off}	—	800	ns