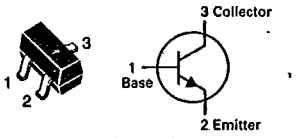
BCW60AL, BL, CL, DL

T-27-09

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



GENERAL PURPOSE TRANSISTORS
NPN SILICON

2

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°C Derate above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate,** T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°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

Refer to MPS3904 for graphs.

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 2.0 mAdc, I_E = 0)		$V_{(BR)CEO}$	32	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 1.0 μAdc, I_C = 0)		$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current		I_{CES}			
(V_{CE} = 32 Vdc)			—	20	nAdc
(V_{CE} = 32 Vdc, T_A = 150°C)			—	20	μAdc
Emitter Cutoff Current (V_{EB} = 4.0 Vdc, I_C = 0)		I_{EBO}	—	20	nAdc
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			—
(I_C = 10 μAdc, V_{CE} = 5.0 Vdc)	BCW60AL		20	—	
	BCW60BL		30	—	
	BCW60CL		40	—	
	BCW60DL		100	—	
(I_C = 2.0 mAdc, V_{CE} = 5.0 Vdc)	BCW60AL		120	220	
	BCW60BL		175	310	
	BCW60CL		250	460	
	BCW60DL		380	630	
(I_C = 50 mAdc, V_{CE} = 1.0 Vdc)	BCW60AL		60	—	
	BCW60BL		70	—	
	BCW60CL		90	—	
	BCW60DL		100	—	
AC Current Gain		h_{fe}			—
(I_C = 2.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)	BCW60AL		125	250	
	BCW60BL		175	350	
	BCW60CL		250	500	
	BCW60DL		350	700	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 1.25 mAdc)			—	0.55	
(I_C = 10 mAdc, I_B = 0.25 mAdc)			—	0.35	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 1.25 mAdc)			0.7	1.05	
(I_C = 50 mAdc, I_B = 0.25 mAdc)			0.6	0.85	
Base-Emitter On Voltage (I_C = 2.0 mAdc, V_{CE} = 5.0 Vdc)		$V_{BE(on)}$	0.6	0.75	Vdc

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

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