

**TO-92 Plastic-Encapsulate Transistors****BC237/238/239** TRANSISTOR (NPN)**FEATURES**

Power dissipation

 P_{CM} : 0.35 W ($T_{amb}=25^{\circ}C$)

Collector current

 I_{CM} : 0.1 A

Collector-base voltage

 $V_{(BR)CBO}$: BC237 50V
BC238/239 30V

Operating and storage junction temperature range

 T_J, T_{stg} : $-55^{\circ}C$ to $+150^{\circ}C$ **TO-92**

1. COLLECTOR

2. BASE

3. EMITTER

**ELECTRICAL CHARACTERISTICS ($T_{amb}=25^{\circ}C$ unless otherwise specified)**

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu A, I_E=0$ BC237	50			V
		BC238/239	30			
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=2mA, I_B=0$ BC237	45			V
		BC238/239	25			
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=100\mu A, I_C=0$ BC237	6			V
		BC238/239	5			
Collector cut-off current	I_{CBO}	$V_{CB}=50V, I_E=0$ BC237			15	nA
		$V_{CB}=30V, I_E=0$ BC238/239				
Emitter cut-off current	I_{EBO}	$V_{EB}=5V, I_C=0$			15	nA
DC current gain	$h_{FE(1)}$	$V_{CE}=5V, I_C=10\mu A$ BC237A		90		
		BC237B/238B		150		
		BC237C/238C/239C		270		
	$h_{FE(2)}$	$V_{CE}=5V, I_C=2mA$ BC237	120		800	
		BC239	120		800	
		BC237A	120	170	220	
		BC237B/238B	200	290	460	
		BC237C/238C/239C	380	500	800	
	$h_{FE(3)}$	$V_{CE}=5V, I_C=100mA$ BC237A		120		
		BC237B/238B		180		
		BC237C/238C/239C		300		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=10mA, I_B=0.5mA$ BC237/238/239			0.2	V
		$I_C=100mA, I_B=5mA$ BC237/239			0.6	
		BC238			0.8	

Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=10mA, I_B=0.5mA$ $I_C=100mA, I_B=5mA$			0.83 1.05	V
Base-emitter voltage	V_{BE}	$V_{CE}=5V, I_C=0.1mA$ $V_{CE}=5V, I_C=2mA$ $V_{CE}=5V, I_C=100mA$	0.55	0.5 0.62 0.83	0.7	V
Transition frequency	f_T	$V_{CE}=3V, I_C=0.5mA, f=100MHz$ BC237 BC238 BC239 $V_{CE}=5V, I_C=10mA, f=100MHz$ BC237 BC238 BC239	 150 150 150	100 120 140 200 240 280		MHz
Collector output capacitance	C_{ob}	$V_{CB}=10V, I_E=0, f=1MHz$			4.5	pF
Emitter-base capacitance	C_{ib}	$V_{EB}=0.5V, I_C=0, f=1MHz$		8		Pf
Noise figure	NF	$V_{CE}=5V, I_C=0.2mA,$ $f=1kHz, R_s=2K\Omega$ BC239 $V_{CE}=5V, I_C=0.2mA,$ $f=1kHz, R_s=2K\Omega, \Delta f=200Hz$ BC237 BC238 BC239		2 2 2 2	4 10 10 4	dB