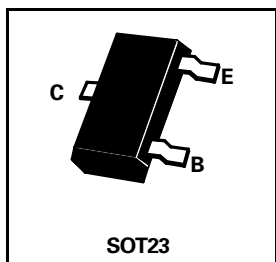


# SOT23 NPN SILICON PLANAR GENERAL PURPOSE TRANSISTORS

BC846	BC847
BC848	BC849
BC850	

ISSUE 6 - JANUARY 1997

PARTMARKING DETAILS		COMPLEMENTARY TYPES	
BC846A-Z1A	BC848B-1K	BC846	BC856
BC846B-1B	BC848C-Z1L	BC847	BC857
BC847A-Z1E	BC849B-2B	BC848	BC858
BC847B-1F	BC849C-2C	BC849	BC859
BC847C-1GZ	BC850B-2FZ	BC850	BC860
BC848A-1JZ	BC850C-Z2G		



## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	BC846	BC847	BC848	BC849	BC850	UNIT
Collector-Base Voltage	$V_{CBO}$	80	50	30	30	50	V
Collector-Emitter Voltage	$V_{CES}$	80	50	30	30	50	V
Collector-Emitter Voltage	$V_{CEO}$	65	45	30	30	45	V
Emitter-Base Voltage	$V_{EBO}$	6		5			V
Continuous Collector Current	$I_C$	100					mA
Peak Collector Current	$I_{CM}$	200					mA
Peak Base Current	$I_{BM}$	200					mA
Peak Emitter Current	$I_{EM}$	200					mA
Power Dissipation at $T_{amb}=25^{\circ}C$	$P_{tot}$	330					mW
Operating and Storage Temperature Range	$T_j; T_{stg}$	-55 to +150					$^{\circ}C$

## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}C$ unless otherwise stated).

PARAMETER	SYMBOL	BC846	BC847	BC848	BC849	BC850	UNIT	CONDITIONS.
Collector Cut-Off Current	$I_{CBO}$	Max	15				nA	$V_{CB} = 30V$
		Max	5				$\mu A$	$V_{CB} = 30V$ $T_{amb} = 150^{\circ}C$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	Typ	90				mV	$I_C = 10mA,$ $I_B = 0.5mA$
		Max.	250				mV	$I_C = 100mA,$ $I_B = 5mA$
		Typ	200				mV	$I_C = 100mA,$ $I_B = 5mA$
		Max.	600				mV	$I_C = 10mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	Typ	700				mV	$I_C = 10mA,$ $I_B = 0.5mA$
		Typ	900				mV	$I_C = 100mA,$ $I_B = 5mA$
Base-Emitter Voltage	$V_{BE}$	Min	580				mV	$I_C = 2mA$
		Typ	660				mV	$V_{CE} = 5V$
		Max	700				mV	
		Max	770				mV	$I_C = 10mA$ $V_{CE} = 5V$

\* Collector-Emitter Saturation Voltage at  $I_C = 10mA$  for the characteristics going through the operating point  $I_C = 11mA, V_{CE} = 1V$  at constant base current.

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### ELECTRICAL CHARACTERISTICS (Continued)

PARAMETER	SYMBOL	BC846	BC847	BC848	BC849	BC850	UNIT	CONDITIONS.		
Static Forward Current Ratio	Group VI	$h_{FE}$	Min	75	75	75	–	–	$I_C=2mA, V_{CE}=5V$	
			Typ	110	110	110	–	–		
			Max	150	150	150	–	–		
	Group A	$h_{FE}$	Typ	90	90	90	–	–	$I_C=0.01mA, V_{CE}=5V$	
			Min	110	110	110	–	–	$I_C=2mA, V_{CE}=5V$	
			Typ	180	180	180	–	–		
	Group B	$h_{FE}$	Max	220	220	220	–	–	$I_C=100mA, V_{CE}=5V$	
			Typ	120	120	120	–	–		
			Typ	150						$I_C=0.01mA, V_{CE}=5V$
Group C	$h_{FE}$	Min	200					$I_C=2mA, V_{CE}=5V$		
		Typ	290					$I_C=100mA, V_{CE}=5V$		
		Max	450							
Group C	$h_{FE}$	Typ	200	200	200	–	–	$I_C=100mA, V_{CE}=5V$		
		Group C	$h_{FE}$	Typ.	–	270	270	270	270	$I_C=0.01mA, V_{CE}=5V$
				Min	–	420	420	420	420	$I_C=2mA, V_{CE}=5V$
			Typ	–	800	800	800	800		
			Max	–	500	500	500	500		
			Typ	–	–	400	–	–	$I_C=100mA, V_{CE}=5V$	
Transition Frequency	$f_T$	Typ	300					MHz	$I_C=10mA, V_{CE}=5V, f=100MHz$	
Collector-Base Capacitance	$C_{obo}$	Typ	2.5					pF	$V_{CB}=10V, f=1MHz$	
		Max	4.5					pF		
Emitter-Base Capacitance	$C_{ib0}$	Typ	9					pF	$V_{EB}=0.5V, f=1MHz$	
Noise Figure	N	Typ	2	2	2	1.2	1	dB	$V_{CE}=5V, I_C=200\mu A, R_C=2k\Omega, f=1kHz, \Delta f=200Hz$	
		Max	10	10	10	4	4			
		Typ	–	–	–	1.2	1	dB	$V_{CE}=5V, I_C=200\mu A, R_C=2k\Omega, f=30Hz$ to 15kHz at -3dB points	
		Max	–	–	–	4	3			
Equivalent Noise Voltage	$e_n$	Max.	–	–	–	110	110	nV	$V_{CE}=5V, I_C=200\mu A, R_C=2k\Omega, f=10Hz$ to 50Hz at -3dB points	

Spice parameter data is available upon request for this device

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### ELECTRICAL CHARACTERISTICS (Continued)

PARAMETER	SYMBOL	BC846	BC847	BC848	BC849	BC850	UNIT	CONDITIONS.	
Dynamic Characteristics Group VI	$h_{ie}$	Min	0.4	0.4	0.4	–	–	k $\Omega$	
		Typ	1.2	1.2	1.2	–	–	k $\Omega$	
		Max	2.2	2.2	2.2	–	–	k $\Omega$	
	Group A	Min	1.6	1.6	1.6	–	–	k $\Omega$	
		Typ	2.7	2.7	2.7	–	–	k $\Omega$	
Max		4.5	4.5	4.5	–	–	k $\Omega$		
Group B	Min					3.2	k $\Omega$		
						4.5	k $\Omega$		
Group C	Max					8.5	k $\Omega$		
		Min	–	–	6	6	6	k $\Omega$	
		Typ	–	–	8.7	8.7	8.7	k $\Omega$	
		Max	–	–	15	15	15	k $\Omega$	
Group VI Group A Group B Group C	$h_{re}$	Typ	2.5	2.5	2.5	–	–	x10 <sup>-4</sup>	
		Typ	1.5	1.5	1.5	–	–	x10 <sup>-4</sup>	
		Typ	2	2	2	2	2	x10 <sup>-4</sup>	
		Typ	–	–	3	3	3	x10 <sup>-4</sup>	
Group VI Group A Group B Group C	$h_{fe}$	Min	75	75	75	–	–		
		Typ	110	110	110	–	–		
		Max	150	150	150	–	–		
		Group A	Min	125	125	125	–	–	
			Typ	220	220	220	–	–	
Max	260		260	260	–	–			
Group B	Min					240			
						330			
Group C	Max					500			
		Min	–	450	450	450	450		
		Typ	–	600	600	600	600		
		Max	–	900	900	900	900		
Group VI Group A Group B Group C	$h_{oe}$	Typ	20	20	20	–	–	$\mu$ s	
		Max	40	40	40	–	–	$\mu$ s	
		Group A	Typ	18	18	18	–	–	$\mu$ s
			Max	30	30	30	–	–	$\mu$ s
		Group B	Typ	30					$\mu$ s
Max	60					$\mu$ s			
Group C	Typ	–	–	60	60	60	$\mu$ s		
	Max	–	–	110	110	110	$\mu$ s		

$V_{CE}=5V$   
 $I_C=2mA$