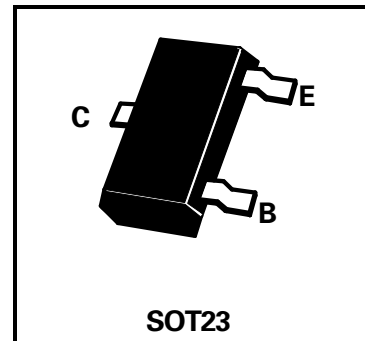


# SOT23 PNP SILICON PLANAR GENERAL PURPOSE TRANSISTORS

ISSUE 6 - APRIL 1997

BC856	BC857
BC858	BC859
BC860	

PARTMARKING DETAILS		COMPLEMENTARY TYPES	
BC856A-3A	BC858C-3L	BC856	BC846
BC856B-Z3B	BC859A-Z4A	BC857	BC847
BC857A-Z3E	BC859B-4B	BC858	BC848
BC857B-3F	BC859C-Z4C	BC859	BC849
BC857C-3G	BC860A-Z4E	BC860	BC850
BC858A-3J	BC860B-4F		
BC858B-3K	BC860C-4GZ		



## ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	BC856	BC857	BC858	BC859	BC860	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	$V_{EBO}$	-5					V
Continuous Collector Current	$I_C$	-100					mA
Peak Pulse Current	$I_{EM}$	-200					mA
Base Current	$I_{BM}$	-200					mA
Base 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	BC856	BC857	BC858	BC859	BC860	UNIT	CONDITIONS.	
Collector Cut-Off Current	$I_{CBO}$	Max	-15				nA	$V_{CB} = -30V$	
		Max	-4				$\mu A$	$V_{CB} = -30V$ $T_{amb}=150^{\circ}C$	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	Typ	-75	-75	-75	-75	-75	mV	$I_C=-10mA,$ $I_B=0.5mA$
		Max.	-300	-300	-300	-250	-250		
		Typ	-250					mV	$I_C=-100mA,$ $I_B=5mA$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	Typ	-700				mV	$I_C=-10mA,$ $I_B=0.5mA$	
		Typ	-850				mV	$I_C=-100mA,$ $I_B=5mA$	
Base-Emitter Voltage	$V_{BE}$	Min	-600	-600	-600	-580	-580	mV	$I_C=2mA$ $V_{CE}=5V$
		Typ	-650	-650	-650	-650	-650		
		Max	-750	-750	-750	-750	-750		
		Max	-820					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		BC856	BC857	BC858	BC859	BC860	UNIT	CONDITIONS.	
Noise Figure	N	Typ	2	2	2	1	1	dB	$V_{CB} = -5V$ , $I_C = 200\mu A$ , $R_G = 2k\Omega$ , $f = 1kHz$ , $\Delta f = 200Hz$	
		Max	10	10	10	4	4	dB		
		Typ	-	-	-	1.2	1	dB	$V_{CB} = -5V$ , $I_C = 200\mu A$ , $R_G = 2k\Omega$ , $f = 30Hz$ to $15kHz$ at -3dB points	
		Max	-	-	-	4	3	dB		
Equivalent Noise Voltage	$e_n$	Max	-	-	-	110	110	nV	$V_{CB} = -5V$ , $I_C = 200\mu A$ , $R_G = 2k\Omega$ , $f = 10Hz$ to $50Hz$ at -3dB points	
Dynamic Characteristics	Group VI	Min	0.4	0.4	0.4	-	-	k $\Omega$	$V_{CE} = -5V$ $I_C = 2mA$ $f = 1kHz$	
		Typ	1.2	1.2	1.2	-	-	k $\Omega$		
		Max	2.2	2.2	2.2	-	-	k $\Omega$		
		Group A	Min	1.6						k $\Omega$
			Typ	2.7						k $\Omega$
			Max	4.5						k $\Omega$
	Group B	Min	3.2					k $\Omega$		
		Typ	4.5					k $\Omega$		
		Max	8.5					k $\Omega$		
	Group C	Min	-	-	6	6	6	k $\Omega$		
		Typ	-	-	8.7	8.7	8.7	k $\Omega$		
		Max	-	-	15	15	15	k $\Omega$		
Group VI	$h_{re}$	Typ	2.5	2.5	2.5	-	-	$\times 10^{-4}$		
		Group A	Typ	1.5	1.5	1.5	1.5	1.5	$\times 10^{-4}$	
		Group B	Typ	2	2	2	2	2	$\times 10^{-4}$	
		Group C	Typ	2	2	3	3	3	$\times 10^{-4}$	
Group VI	$h_{fe}$	Min	75	75	75	-	-			
		Typ	110	110	110	-	-			
		Max	150	150	150	-	-			
		Group A	Min	125						
			Typ	220						
			Max	260						
	Group B	Min	240							
		Typ	330							
		Max	500							
	Group C	Min	-	450	450	450	450			
		Typ	-	600	600	600	600			
		Max	-	900	900	900	900			
Group VI	$h_{oe}$	Typ	20	20	20	-	-	$\mu s$		
		Max	40	40	40	-	-	$\mu s$		
	Group A	Typ	18					$\mu s$		
		Max	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	$\mu s$		

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### ELECTRICAL CHARACTERISTICS (Continued)

PARAMETER	SYMBOL	BC856	BC857	BC858	BC859	BC860	UNIT	CONDITIONS.			
Static Forward Current Ratio	Group VI	$h_{FE}$	Min	75	75	75	–	–	$I_C = -2\text{mA}$ , $V_{CE} = -5\text{V}$		
		Typ	110	110	110	–	–				
		Max	150	150	150	–	–				
	Group A	$h_{FE}$	Typ	90	90	90	–	–	$I_C = 0.01\text{mA}$ , $V_{CE} = -5\text{V}$		
			Min	125					$I_C = -2\text{mA}$ , $V_{CE} = -5\text{V}$		
			Typ	180							
	Max	250									
	Group B	$h_{FE}$	Typ	120	120	120	–	–	$I_C = -100\text{mA}$ , $V_{CE} = -5\text{V}$		
			Group C	$h_{FE}$	Typ	150					$I_C = 0.01\text{mA}$ , $V_{CE} = -5\text{V}$
					Min	220					$I_C = -2\text{mA}$ , $V_{CE} = -5\text{V}$
	Typ	290									
	Max	475									
Group C	$h_{FE}$	Typ.	–	270	270	270	270	$I_C = 0.01\text{mA}$ , $V_{CE} = -5\text{V}$			
		Min	–	420	420	420	420	$I_C = -2\text{mA}$ , $V_{CE} = -5\text{V}$			
		Typ	–	500	500	500	500				
Max	–	800	800	800	800						
Transition Frequency	$f_T$	Typ	–	–	400	–	–	$I_C = -100\text{mA}$ , $V_{CE} = -5\text{V}$			
		Typ	150	150	150	300	300	MHz $I_C = -10\text{mA}$ , $V_{CE} = -5\text{V}$ $f = 100\text{MHz}$			
		Typ	–	–	400	–	–				
Collector-Base Capacitance	$C_{obo}$	Typ	4.5				pF		$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$		

Spice parameter data is available upon request for these devices