

# MICRO ELECTRONICS

**BCY 58**  
**BCY 59**

## GENERAL DESCRIPTION :

The BCY 58 and BCY 59 are NPN silicon planar epitaxial transistor. It features low saturation voltage and high gain. It is intended for use as audio frequency amplifier, magnetic core driver and general purpose industrial applications.

## MECHANICAL OUTLINE

TO-18



CBE

## ABSOLUTE MAXIMUM RATINGS :

Continuous Power Dissipation @  $T_A = 25^\circ\text{C}$ ,  $P_{\text{max}}$   
Continuous Power Dissipation @  $T_C = 45^\circ\text{C}$ ,  $P_{\text{max}}$   
Maximum Collector Junction Temperature,  $T_j$   
Storage Temperature Range,  $T_{\text{stg}}$   
Soldering Temperature (10 sec. time limit)  
Continuous Collector Current,  $I_{C \text{ max}}$   
Continuous Base Current,  $I_{B \text{ max}}$   
Collector-Emitter Voltage,  $V_{\text{CES}}$   
Collector-Emitter Voltage,  $V_{\text{CEO}}$   
Emitter-Base Voltage,  $V_{\text{EBO}}$

## BCY 58

390mW  
1W  
200°C  
-65°C to +200°C  
260°C  
200mA  
50mA  
32V  
32V  
7V

## BCY 59

390mW  
1W  
200°C  
-65°C to +200°C  
260°C  
200mA  
50mA  
45V  
45V  
7V

## ELECTRICAL CHARACTERISTICS @ $T_A = 25^\circ\text{C}$ (unless otherwise stated) :

PARAMETER	SYMBOL	BCY 58			BCY 59			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX		
Collector-Emitter Break-down Voltage	$BV_{\text{CES}}$	32			45			V	$I_C = 10\mu\text{A}$ $I_B = 0$
Collector-Emitter Break-down Voltage	$LV_{\text{CEO}}$	32			45			V	$I_C = 2\text{mA}$ $I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{\text{EBO}}$	7			7			V	$I_E = 1\mu\text{A}$ $I_C = 0$
Collector-Emitter Cutoff Current	$I_{\text{CES}}$			10				nA	$V_{\text{CE}} = 32\text{V}$ $I_B = 0$
Collector-Emitter Cutoff Current	$I_{\text{CES}}$						10	nA	$V_{\text{CE}} = 45\text{V}$ $I_B = 0$
Collector-Emitter Cutoff Current	$I_{\text{CES}}$			10				uA	$V_{\text{CE}} = 32\text{V}$ $I_B = 0$ $T_A = 150^\circ\text{C}$

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PARAMETER	SYMBOL	BCY 58			BCY 59			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX		
Collector-Emitter Cutoff Current	$I_{CES}$						10	$\mu A$	$V_{CE}=45V$ $I_B=0$ $T_A=150^\circ C$
Collector-Emitter Cutoff Current	$I_{CEV}$			20				$\mu A$	$V_{CE}=32V$ $V_{BE}=0.2V$ $T_A=100^\circ C$
Collector-Emitter Cutoff Current	$I_{CEV}$						20	$\mu A$	$V_{CE}=45V$ $V_{BE}=0.2V$ $T_A=100^\circ C$
Emitter-Base Cutoff Current	$I_{EBO}$			10			10	nA	$V_{EB}=5V$ $I_C=0$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		0.1	0.35				V	$I_C=10mA$ $I_B=0.25mA$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$					0.7		V	$I_C=100mA$ $I_B=2.5mA$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.6	0.7	0.85	0.6	0.7	0.85	V	$I_C=10mA$ $I_B=0.25mA$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.75	0.9	1.2	0.75	0.9	1.2	V	$I_C=100mA$ $I_B=2.5mA$
Base-Emitter Voltage	$V_{BE}$		0.5			0.5		V	$V_{CE}=5V$ $I_C=10\mu A$
Base-Emitter Voltage	$V_{BE}$	0.55	0.6	0.7	0.55	0.6	0.7	V	$V_{CE}=5V$ $I_C=2mA$
Base-Emitter Voltage	$V_{BE}$		0.7			0.7		V	$V_{CE}=1V$ $I_C=10mA$
Base-Emitter Voltage	$V_{BE}$		0.75			0.75		V	$V_{CE}=1V$ $I_C=100mA$
D.C. Current Gain	$h_{FE}$	120		630	120		630		$V_{CE}=5V$ $I_C=2mA$
D.C. Current Gain	$h_{FE}$	80		1000	80		1000		$V_{CE}=1V$ $I_C=10mA$
Transition Frequency	$f_T$	120	250		120	250		MHz	$V_{CE}=5V$ $I_C=10mA$ $f=100MHz$
Collector-Base Capacitance	$C_{CB}$			6			6	pF	$V_{CB}=10V$ $f=1MHz$
Emitter-Base Capacitance	$C_{EB}$			15			15	pF	$V_{EB}=0.5V$ $f=1MHz$
Noise Figure	N.F.		2	6		2	6	db	$V_{CE}=5V$ $I_C=0.2mA$ $R_g=2K\Omega$ $f=1KHz$ $BW=200Hz$

D.C. CURRENT GROUPINGS :      BCY58/59 -7      BCY58/59 -8      BCY58/59 -9      BCY58/59-10

TEST CONDITIONS	GROUP	BCY 58A BCY 59A		BCY 58B BCY 59B		BCY 58C BCY 59C		BCY 58D BCY 59D	
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
$V_{CE}=5V$ $I_C=10\mu A$				20		40		100	
$V_{CE}=5V$ $I_C=2mA$		120	220	180	310	250	460	380	630
$V_{CE}=1V$ $I_C=10mA$		80		120	400	160	630	240	1000
$V_{CE}=1V$ $I_C=100mA$		40		45		60		60	

SWITCHING CHARACTERISTICS :

PARAMETER	SYMBOL	TYP	MAX	UNIT	TEST CONDITIONS
Delay Time	$t_d$	35		ns	$I_C=10mA$ $I_B=1mA$
Rise Time	$t_r$	50		ns	$I_{BM}=1mA$ $R_1=5K\Omega$
Turn-On Time	$t_{on}$	85	150	ns	$R_2=5K\Omega$ $R_L=990\Omega$
Storage Time	$t_s$	400		ns	$V_{BB}=3.6V$
Fall Time	$t_f$	80		ns	
Turn-off Time	$t_{off}$	480	800	ns	
Delay Time	$t_d$	5		ns	$I_C=100mA$ $I_B=10mA$
Rise Time	$t_r$	50		ns	$I_{BM}=10mA$ $V_{BB}=5V$
Turn-On Time	$t_{on}$	55	150	ns	$R_1=500\Omega$ $R_2=700\Omega$
Storage Time	$t_s$	250		ns	$R_L=98\Omega$
Fall Time	$t_f$	200		ns	
Turn-off Time	$t_{off}$	450	800	ns	

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TYPICAL TWO PART CHARACTERISTICS (h parameter) @  $V_{CE}=5V$   $I_C=2mA$   $f=1KHz$  :

PARAMETER	TYPE	A (-7)			B (-8)			C (-9)			D (-10)			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
$h_{fe}$		125	200	250	175	260	350	250	330	500	350	520	700	
$h_{ie}$		1.6	2.7	4.5	2.5	3.6	6	3.2	4.5	8.5	4.5	7.5	12	Kohm
$h_{oe}$			18	30		24	50		30	60		50	100	umhos
$h_{re}$			1.5			2			2			3		