

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

	BCY 58	BCY 59
Continuous Power Dissipation @ $T_A=25^{\circ}\text{C}$, P_{max}	390mW	390mW
Continuous Power Dissipation @ $T_C=45^{\circ}\text{C}$, P_{max}	1W	1W
Maximum Collector Junction Temperature, T_j	200 $^{\circ}\text{C}$	200 $^{\circ}\text{C}$
Storage Temperature Range, T_{stg}	-65 $^{\circ}\text{C}$ to +200 $^{\circ}\text{C}$	-65 $^{\circ}\text{C}$ to +200 $^{\circ}\text{C}$
Soldering Temperature (10 sec. time limit)	260 $^{\circ}\text{C}$	260 $^{\circ}\text{C}$
Continuous Collector Current, I_C max	200mA	200mA
Continuous Base Current, I_B max	50mA	50mA
Collector-Emitter Voltage, V_{CES}	32V	45V
Collector-Emitter Voltage, V_{CEO}	32V	45V
Emitter-Base Voltage, V_{EBO}	7V	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_{CES}	32			45			V	$I_C=10\mu\text{A}$ $I_B=0$
Collector-Emitter Break-down Voltage	LV_{CEO}	32			45			V	$I_C=2\text{mA}$ $I_B=0$
Emitter-Base Breakdown Voltage	BV_{EBO}	7			7			V	$I_E=1\mu\text{A}$ $I_C=0$
Collector-Emitter Cutoff Current	I_{CES}			10				nA	$V_{\text{CE}}=32\text{V}$ $I_B=0$
Collector-Emitter Cutoff Current	I_{CES}					10		nA	$V_{\text{CE}}=45\text{V}$ $I_B=0$
Collector-Emitter Cutoff Current	I_{CES}			10				μA	$V_{\text{CE}}=32\text{V}$ $I_B=0$ $T_A=150^{\circ}\text{C}$

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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	uA	$V_{CE}=45V$ $T_A=150^\circ C$ $I_B=0$
Collector-Emitter Cutoff Current	I_{CEV}			20				uA	$V_{CE}=32V$ $T_A=100^\circ C$ $V_{BE}=0.2V$
Collector-Emitter Cutoff Current	I_{CEV}						20	uA	$V_{CE}=45V$ $T_A=100^\circ C$ $V_{BE}=0.2V$
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	$V_{CE}=5V$ $I_C=10uA$
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	$V_{CE}=5V$ $f=100MHz$ $I_C=10mA$
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	$V_{CE}=5V$ $R_g=2Kohm$ $I_C=0.2mA$ $f=1KHz$ $BW=200Hz$

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

GROUP TEST CONDITIONS		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	

TYPICAL TWO PRRT 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		