

## NPN BCY58 – BCY59

### SILICON PLANAR EPITAXIAL TRANSISTORS

The BCY58 and BCY59 are NPN transistors mounted in TO-18 metal package with the collector connected to the case .

They are designed for use in audio drive and low-noise input stages.

Compliance to RoHS.

#### ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings		Value	Unit	
$V_{CEO}$	Collector-Emitter Voltage(1)		BCY59	45	V
			BCY58	32	
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )		BCY59	45	V
			BCY58	32	
$V_{EBO}$	Emitter-Base Voltage		BCY59	7	V
			BCY58	7	
$I_C$	Collector Current		BCY59	200	mA
			BCY58		
$I_B$	Base Current		BCY59	50	mA
			BCY58		
$P_D$	Total Power Dissipation	@ $T_{amb} = 45^\circ$	BCY59	0.39	mW
			BCY58		
$P_D$	Total Power Dissipation	@ $T_{case} = 45^\circ$	BCY59	1	Watts
			BCY58		
$T_J$	Junction Temperature		BCY59	200	$^\circ\text{C}$
			BCY58		
$T_{Stg}$	Storage Temperature range		BCY59	-65 to +150	$^\circ\text{C}$
			BCY58		

(1) Applicable up to  $I_C = 500\text{mA}$

#### THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
$R_{thJ-a}$	Thermal Resistance, Junction to mounting base	450	$^\circ\text{C/W}$
$R_{thJ-c}$	Thermal Resistance, Junction to ambient in free air	150	$^\circ\text{C/W}$

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### ELECTRICAL CHARACTERISTICS

T<sub>j</sub>=25°C unless otherwise specific

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit
I <sub>CES</sub>	Collector Cutoff Current	V <sub>CB</sub> =45 V V <sub>BE</sub> =0V	-	-	10	nA
		BCY59				
I <sub>CES</sub>	Collector Cutoff Current	V <sub>CB</sub> =32 V V <sub>B</sub> =0V	-	-	10	μA
		BCY58				
I <sub>CEO</sub>	Emitter Cutoff Current	V <sub>CB</sub> =45 V V <sub>BE</sub> =0V, T <sub>amb</sub> =150°C	-	-	10	nA
		BCY59				
I <sub>CEO</sub>	Emitter Cutoff Current	V <sub>CB</sub> =32 V, V <sub>BE</sub> =0 T <sub>amb</sub> =150°C	-	-	10	μA
		BCY58				
I <sub>EBO</sub>	Emitter Cutoff Current	V <sub>BE</sub> =5.0 V I <sub>C</sub> =0	-	-	10	nA
V <sub>CEO</sub>	Collector Emitter Breakdown Voltage	I <sub>C</sub> =2 mA, I <sub>B</sub> =0	45	-	-	V
V <sub>CEO</sub>	Collector Emitter Breakdown Voltage	I <sub>C</sub> =2 mA, I <sub>B</sub> =0	32	-	-	V
V <sub>EBO</sub>	Emitter Base Breakdown Voltage	I <sub>E</sub> =1μA, I <sub>C</sub> =0	7	-	-	V
V <sub>EBO</sub>	Emitter Base Breakdown Voltage	I <sub>E</sub> =1μA, I <sub>C</sub> =0	7	-	-	V
V <sub>CE(SAT)</sub>	Collector-Emitter saturation Voltage	I <sub>C</sub> =10 mA I <sub>B</sub> =0.25 mA	-	0.12	0.25	V
		I <sub>C</sub> =100 mA I <sub>B</sub> =2.5 mA	-	0.4	0.8	
V <sub>BE(SAT)</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> =10 mA I <sub>B</sub> =0.25 mA	0.6	0.7	0.85	V
		I <sub>C</sub> =100 mA I <sub>B</sub> =2.5 mA	0.7	0.85	1.2	
V <sub>BE</sub>	Base-Emitter Voltage	I <sub>C</sub> =10 μA, V <sub>CE</sub> =5 V	-	0.5	-	V
		V <sub>CE</sub> =V <sub>CE max</sub> I <sub>C</sub> =20 μA, T <sub>j</sub> =100°C	0.2	-	-	
		I <sub>C</sub> =2 mA, V <sub>CE</sub> =5 V	0.55	-	0.7	
		I <sub>C</sub> =10 mA, V <sub>CE</sub> =1 V	-	0.7	-	
I <sub>C</sub> =100 mA, V <sub>CE</sub> =1 V	-	0.76	-			
				BCY59		

Symbol	Ratings	Test Condition(s)	BCY59VII	BCY59VIII	BCY59IX	BCY59X
			BCY58VII	BCY58VIII	BCY58IX	BCY58X
h <sub>FE</sub>	DC Current Gain	I <sub>C</sub> =10 μA, V <sub>CE</sub> =5 V	-	>20	>40	>60
			Typ.20	Typ.95	Typ.190	Typ.300
		I <sub>C</sub> =2 mA, V <sub>CE</sub> =5 V	>120	>180	>250	>380
			<220	<310	<460	<630
		I <sub>C</sub> =10 mA, V <sub>CE</sub> =1 V	>80	>120	>160	>240
-	<400		<630	<1000		
I <sub>C</sub> =100 mA, V <sub>CE</sub> =1V	>40	>45	>60	>60		
	>125	>175	>250	>350		
h <sub>fe</sub>	Small-Signal Current Gain	I <sub>C</sub> =2 mA, V <sub>CE</sub> =5 V, f = 1kHz	<250	<350	<500	<700
			<250	<350	<500	<700

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### ELECTRICAL CHARACTERISTICS

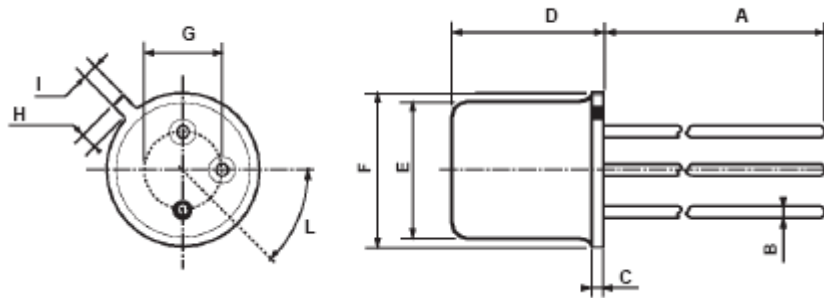
T<sub>j</sub>=25°C unless otherwise specified

Symbol	Ratings	Test Condition(s)	Min	Typ	Mx	Unit		
f <sub>T</sub>	Transition frequency	I <sub>C</sub> =10 mA, V <sub>CE</sub> =5 V f = 100MHz	BCY59	150	-	-	MHz	
			BCY58					
F	Noise figure , RS=2kΩ	I <sub>C</sub> =200 μA, V <sub>CE</sub> =5 V f = 1kHz, B =200Hz	BCY59	-	2	6	db	
			BCY58					
t <sub>d</sub>	Delay time	I <sub>C</sub> =10 mA , I <sub>B</sub> =1 mA -I <sub>BM</sub> =1 mA, V <sub>BB</sub> =3.6 V R1= R2 = 5kΩ R <sub>L</sub> = 990 Ω	BCY59	-	35	-	ns	
t <sub>r</sub>	Rise time		BCY58					
t <sub>on</sub>	Turn on time		BCY59	-	85	150		ns
t <sub>s</sub>	Storage time		BCY59	-	400	-		ns
t <sub>f</sub>	Fall time		BCY59	-	80	-		ns
t <sub>off</sub>	Turn off time		BCY59	-	480	800		ns
t <sub>d</sub>	Delay time	I <sub>C</sub> =100 mA , I <sub>B</sub> =10 mA -I <sub>BM</sub> =10 mA, V <sub>BB</sub> =5 V R1 = 500Ω , R1 = 700Ω R <sub>L</sub> = 990 Ω	BCY59	-	5	-	ns	
t <sub>r</sub>	Rise time		BCY58					
t <sub>on</sub>	Turn on time		BCY59	-	55	150		ns
t <sub>s</sub>	Storage time		BCY59	-	250	-		ns
t <sub>f</sub>	Fall time		BCY59	-	200	-		ns
t <sub>off</sub>	Turn off time		BCY59	-	450	800		ns
C <sub>C</sub>	Collector capacitance	I <sub>E</sub> = I <sub>e</sub> = 0 , V <sub>CB</sub> =10 V f = 1MHz	BCY59	-	-	5	pF	
			BCY58					
C <sub>E</sub>	Emitter capacitance	I <sub>C</sub> = I <sub>c</sub> = 0 , V <sub>EB</sub> =0.5 V f = 1MHz	BCY59	-	-	15	pF	
			BCY58					

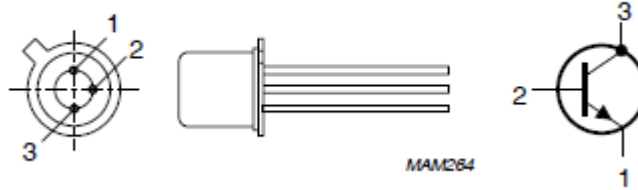
## NPN BCY58 – BCY59

### MECHANICAL DATA CASE TO-18

DIMENSIONS (mm)		
	min	max
A	12.7	-
B	-	0.49
C	0.9	-
D	-	5.3
E	-	4.9
F	-	5.8
G	2.54	-
H	-	1.2
I	-	1.16
L	45°	-



Pin 1 :	emitter
Pin 2 :	base
Pin 3 :	Collector
Case :	Collector



Revised September 2012

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