42

Bipolar Pro Electron Series

12

알

T-03-01

20

0.7

250

5 5

ଷ

8

S

45

20

TO-92 (97)

BC337-16

20

0.7

100 500

8

8

흥

S

9

8

TO-92 (97)

BC337A

200

0.7

400

8 6 5 4

ଷ

5

Ŋ

45

20

TO-92 (97)

BC337-25

¥	н
	Series
	Electron
	polar Pro
	窗

Conditions No. O.		-		SCRE 22	37 J	.E	(Notes 1, 11) 11 T	(Notes 1, 11) 11 E	(Notes 1, 11) 11 F	(Notes 1, 11) 10	(Notes 1, 11) 10 C	(Notes 1, 11) 10	(Notes 1, 11) 10
	NF (dB) Cc					·	10 (N	10 (N	10 (N	<u>ک</u> 2	10 (R	10 (N	10 (N
	toff N (us) (d	-					<u>-</u>		_	-			
										I	Τ	03 - 01 	-
	fr (MHz) @ ^I C Min Max												
	C _{ob} (pF) Max									4.5	4.5	4.5	4.5
	Ic (mA)	500	200	200	1 A	4	100 100	100	5 5	5 6 2	5 5 2	5 10 2	5 6 4
	VBE(SAT) VBE(ON)* @ (V) Min Max									0.77*	0.77*	0.77*	0.55 0.70*
	VCE(SAT) (V) & Max	2.0	0.7	0.7	0.5	0.5	0.25	0.25	0.25	0.25 0.6	0.25	0.25	0.25
	V _{CE}	1	1	1	10 1	10	သ	5	5	5	5	5	c.
	ıc (mA)	100 500	100 500	100 500	5 500 1A	5 500 1A	N	0.01	0.01	2	2	~	8
	HFE hte @ 1 kHz* @ Min Max	009	250	250	375	375	800	0X	450	*006	260*	\$00°	006
=	Mi - H	00 49	5 4	100 40	60 85 60	85 60 85	5	110	500	125	125	240	420
ntinuec	S (CB	20	20	82	52	25	8	8	8	20	20	8	90
<u>လ</u>	lces* lcB0 (nA)	100	100	100	10 JuA	10 μА	15	15	5	9	10	2	55
Serie	VEBO	5	က	5	S	ro.	ဖ	9	9	9	9	9	വ
lron :	V CEO	20	8	20	20	82	8	59	59	45	45	45	45
Elect	VcES*	30*	30•	30.	25*	25*	8	88	8	SS.	99	ος •	ß
ır Pro	Case	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (94)	TO-92 (94)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)
Bipolar Pro Electron Series (Continued)	Type No.	BC338	BC338-16	BC338-25	BC368	BC369	BC546	BC546A	BC546B	BC547	BC547A	BC547B	BC547C

1	α
ı	☱
ı	Q
ŀ	9
ł	8
ł	=
ı	
ı	Ţ
ı	-
ı	0
l	
ŀ	<u></u>
l	æ
l	Q
l	=
ı	c,
ı	=
ı	_
ł	co
ı	Ä
ı	¥
ı	苯
ſ	10

IATL SE	MI COI	1D [DISCR	ETE	11	E D	650	1130	0037	
Process No.	10	01	5	٠ 1	10	10	10,	10	10	T-03-01
Test	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)
NF (dB) Max	10	9	10	10	4	4	4	ო	m	9
toff (ns) Max										
f _T l _C (MHz) @ (mA)		-								
Cob (pF) Max	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
lc (mA)	ㅎ 호 ~	5 5 4	5 6 4	100 2	100 2	5 6 4	5 6 4	5 g 2	5 5 4	00 00
VBE(SAT) VBE(ON)* @ (V) Min Max			1	0.55 0.70*	0.55 0.70*	0.55 0.70*	0.55 0.70*	0.55 0.70*	0.55 0.70*	
VCE(SAT) (V) & Max	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25 0.6	0.25 0.6	0.3
VCE (3)	5	5	5	2	2	r.	ro.	5	5	ιn
D (B)	N	N	~	~	~	~	α	2	2	N
HFE hte @ 1 KHz* Min Max	125 900*	125 260*	240 500*	450 900*	240 900*	240 500*	450 900*	240 900*	240 500*	75 475
3,5	8	8	8	8	20	20	20	45	δ	. 30
CES (nA)	5	10	우	10	10	10	10	10	01	5
VEBO (3)	c,	9	r,	5	5	5	ر	ري د	2	ι ω
V CEO	20	50	20	50	20	20	20	2	45	65
VCES*	8	e e	30	30	93	30	93	20	20	88
Type Case VCEO (V) (V) (rate (V) (N) (mA) (V) (Min Min Max	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	(97)
Type No.	BC548	BC548A	BC548B	BC548C	BC549	BC549B	BC549C	BC550	BC550B	BC556

The state of the s

9			[.	1		T-03	-01
Process No.	8	69	8	8	8	8	8	8	8	8
Test Conditions	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)
NF (dB) Max	5	10	9	10	9	10	9	9	10	4
toff (ns) Max										
e lc (mA)										
ft (MHz) (Min Max		,			·					
Cob (pF)										
lc (mA)	5 5	5 <u>5</u>	10 100 2	100 2	10 100 2	10 100 2	10 100 2	10 100 2	10 100 2	100 22
VBE(SAT) VBE(ON)*@ (V) Min Max			0.82*	0.82*	0.82*	0.82*	0.82*	0.82*	0.82*	0.82*
VBE VBE			9.0	0.6	0.6	9.0	9.0	9.0	9.0	9.0
VCE(SAT) (V) & Max	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3 0.65
3.6	rs.	ro.	r.	5	5	5	2	5	5	. 5
lc (mA)	2	2	8	8	N	~	જ	8	8	2
8	250	475	*006	260*	200	500*	. 560	500	•006	500
. 5	125	220	75	125	240	75	125	240	450	125
S, CB	90	8	82	20	20	20	20	20	20	8
Ices* ceo @ Vce cha (v)	15	15	100	901	90	90	5	5	5	<u>5</u>
VEBO (Y)	Ω.	5	3	5	5	5	5	က	w	ro
VCEO (3)	28	88	45	45	45	52	32	25	25	20
VCES*	8	8	20	20	92	30	30	98	90	25
Type Case VCES* VCEO VEEO No. Style (V) Min Min	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)
Type No.	BC556A	BC556B	BC557	BC557A	BC557B	BC558	BC558A	BC558B	BC558C	BC559

	6		l	l	1	İ	<u> </u>		 	 		 -
	Process No.	89	88	88	8	88	82	• 88	82 .	8 .	82 ·	29
	Test Conditions	(Note 1)	(Note 1)	(Note 1)	(Note 1)					T-0	3 - 01	
	NF (dB) Max	4	4	m	n							
	toff (ns) Max											
	[@] (mA)											
	f _T (MHz) Min Max											
	C _{ob} (pF) Max											
	lc (mA)	10 100 2	5 00 4	5 6 4	10 100 2	200	200	200	500	500	500	500
	VBE(SAT) VBE(ON)* @ (V) Min Max	0.82*	0.82*	0.82*	0.82*							
	VCE(SAT) (V) & Max	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.7
	VcE (V)	5	5	ည	r,	000	01 01 01	000	~ ~ ~	000	000	
	® lc (mA)	84	N	N	. ~	5 50 50 50	5 500 500	5 500 500	5 150 500	5 500 500	5 150 500	50 50
	HFE hte @ 1kHz* Min Max	500	•006	500	500	250	250	250	250	250	250	009
		240	450	125	240	8 4 8	8 4 8	8 4 8	8 4 8	8 4 8	8 4 8	<u></u> 6
ntinued	VCB	20	8	45	45		8		8		8	8
ies (Continued)	ices* Iceo _@ Vce (nA) (V) Max	100	6	001	100		92		100		100	100
	VEBO (V) Min	rð.	r.	c.	S	2	5	2	2	2	5	5
tron	VCEO (Y)	20	82	45	45	45	45	8	8	80	80	45
Elec	VCES* VCBO (V)	25	25	90	20	45	45	8	8	90	100	20•
Bipolar Pro Electron Ser	Case Style	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (94)	TO-92 (94)	TO-92 (94)	TO-92 (94)	TO-92 (94)	TO-92 (94)	TO-236 (49)
Bipo	Type No.	всезав	BC559C	BC560	BC560B	BC635	ВСЕЗЕ	BC637	BC638	BC639	BC640	BC807

_				 -			1		1	1	í	I	- 1	Ī	i	
	Process No.	29	29	29		67	29	29	57	51	5	12	i	l	12	
	Test													03-0		
	NF (dB) Max															
	toff (ns) Max															
	(mA)													:		
	ft (MHz) (Min Max															1
	Cob (PF)															
	(mA)	500	500	500	500	200	200	200	200	200	200	200	200	200	200	
	VBE(SAT) VBE(ON)* @ (V) Min Max											į				
	VCE(SAT) (V) & Max	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
	V _{CE}	1	1													
	اد (mA)	50 50	100 500	100 500	50 50 50	100 500	100 500	100 500	100	500	100 500	100 500	100 500	100 500	100 500	
	HFE hre 1kHz* Min Max	550	400	009	909	250	400	89	009	250	400	900	009	250	400	
	¥ + 5	<u></u> 충	6 6 6	250 40	충 충	<u>5</u> 8	6 6	\$ 59	ộ 8	₅ 8	160 40	250 40	00 40	5 4	9 6 6	
tinued)	چ چو	ଷ	ล	20	20	ଷ	ଷ	8	ଷ	8	8	20	20	8	ଷ	
S S	lces* lceo [®] \ (nA) (Max	9	100	100	100	ē	ş	ş	5	5	5	100	5	퉏	ğ	
erie	VEBO	ις	က	2	9	2	တ	2	က	ro.	ιo	ဌ	ဌ	G	က	
ron S	VCEO	45	45	45	25	25	52	52	52	52	52	52	22	52	52	
Electi	VCES* VCBO (V)	50.	50*	50*	30 •	30•	30.	30*	30*	30.	30.	30	30*	30*	30•	
Bipolar Pro Electron Series (Continued)	Case Style	TO-236 (49)	<u> </u>													
Bipola	Type No.	BC807-16	BC807-25	BC807-40	BC808	BC808-16	BC808-25	BC808-40	BC817	BC817-16	BC817-25	BC817-40	BC818	BC818-16	BC818-25	 -

	Process No.	12	F		Ę.		Ę		-		9		0.	•	9		9		9		9		
ļ				-		-		\dashv						_		_		•	T-0	3-0			
	Test		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		
	NF (dB) Max		5		2		9		5		9		9		우		2		우		6	_	
	toff (ns) Max																						
	e lc x (mA)								-														
	ft (MHz) Min Max																						
	C _{ob} (pF) Max																						
	lc (mA)	500	10	9	5	100	10	100	10	100	0	92	9	100	5	100	2	100	10	100	9	100	
	VBE(SAT) VBE(ON)* @ (V) (V) Min Max																					•	
	VCE(SAT) (V) & Max	2.0	0.25	9.0	0.25	9.0	0.25	9.0	0.25	9.0	0.25	9.0	0.25	9.0	0.25	9.0	0.25	9	0.25	9	0.25	9	
	V _{CE}		5	2	က	S	5	5	5	5	2	5	5	5	5	5	5	2	5	5	5	5	
	[©] اد (mA)	500 500	0.01	8	0.01	7	0.01	0	0.01	2	0.01	2	0.01	2	0.01	7	0.01	2	0.01	2	0.01	8	
	E b @ z* @ Max	009		900		220		450		800		220		450		800		220		450		88	
	H _{FE} h _{te} 1 kHz* Min Max	250 40	110		110		200		110		110		200		110		110		200		420		
(penu	V _{CB}	20	30		30		30		30		30		30	·	30		30		30		30		
(Conti	lces* lcBo _@ V (nA) (1 00	15		15		15		5		15		15		15		15		15		15		
eries	VEBO (V) Min	2	9		9		9		9		9		9		2		5		5		5		
ron S	VCEO (V) Min	82	65		99		89		45		45		45		30		30		30		30		
Electi	VCES* VCBO (V) Min	30*	80		08		80		20		90		90		30		30		တ္တ		30		
Bipolar Pro Electron Series (Continued)	Case Style	TO-236 (49)	TO-236 (49)		TO-236	<u> </u>	TO-236 (49)		TO-236	<u> </u>	TO-236	(49)	TO-236	(8 4)	TO-236	2	TO-236	Ē	TO-236	()	TO-236	(43)	
Bipola	Type No.	BC818-40	BC846		BC846-A		BC846-B		BC847	7.1	BC847-A		BC847-B		BC848		BC848-A		BC848-B		BC848-C		

JENI C				<u> </u>														 -		_
Process No.	10		9		01		9		9		69		69		69		8 T-(, -80	æ 01	
Test	(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)	
NF (dB) Max	4		4		4		6				5		5		2		2		5	
toff (ns) Max																				
ပ် (A m)														Ì						
f _T l _C (MHz) @ (mA) Min Max																				
Cob (pF)																				
lc (mA)	5	100	10	5	2	100	10	100	10	100	5	19	9	Ş	우	100	10	100	10	100
VBE(SAT) VBE(ON) ® (V)	THE STATE OF THE S																			
VCE(SAT) (V) & Max	0.25	9	0.25	9.0	0.25	9.0	0.25	9.0	0.25	9	6.0	0.65	0.3	0.65	0.3	0.65	0.3	0.65	0.3	0.65
SK	5	5	5	5	ıçı	ro	ഹ	2	5	2	5		5		2		32		ည	
B Ic (mA)	0.01	Ø	0.01	2	0.01	œ	0.01	N ₃	0.01	N	7		8		8		8		8	
HFE hto @	200	800		450		800	i	800		450	475		520		475		475		520	
	8 8		200		420		82		8		75		125		220		75		125	
lces* tceo @ Vce (nA) (V)	8		8		ၕ		မွ		ଞ		8		೫		೫		8		೫	
ces (nA)	15 15		15		15		15	_	15		15		5		5		15		15	
VEBO	5	-	5		5		2		S		2		5		2		2		သ	
VCEO	8		99		e		45		45		65		99		99		45		45	
VCES*	8 8		93	····	90		20	-	22	. '	8		8		8		20		50	
Case	TO-236	(49)	TO-236	(49)	TO-236	(4 9)	TO-236	<u>6</u>	╚	(49)	TO-236	<u>6</u>	 -		TO-236	(49)	TO-236	(4 9	TO-236	
Type No.	BC849		BC849B		BC849C		BC850		BC850-B		BC856		BC856-A		BC856-B		BC857		BC857-A	

ļ 1	ا ما				ŀ		<u>I</u>		1				•					l		
	Process No.	8		88		8		8 1		88	88	88	88	89		88		8 T-0	8 3-01	9
	Test	(Note 1)		(Note 1)		(Note 1)		(Note 1)		(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)		(Note 1)		(Note 1)	(Note 1)	(Note 1)
	NF (dB) Max	10		10		2		9		4	4	4	4	ε		ε		4	4	4
	toff (ns) Max							-									÷			
	(mA)																			
	f _T (MHz) (Min Max																			
	Cob (pF)																			
	e lc (mA)	10	100	5	8	5 5	3	5	28	100	100	100	100	10	100	0	5	5	9	10
	VBE(SAT) VBE(ON) (V) Min Max																			
	VCE(SAT) (V) & Max	6.0	0.65	6.0	0.65	0.3	0.65	0.3	0.65	0.65	99'0	0.65	99'0	6.0	0.65	6.0	0.65	0.3	0.25	0.3
	V _{CE}	2		5		co		5		5	5	5	5	5		S		ro ro	ro ro	5
	(mA)	8		~		8		N		2	8	8	ત	2		8		0.01	0.01	0.01
	HFE hte 1kHz* ⁽ Min Max	475		800		475		800		800	250	475	800	800		475		780 780	450	200
6		220		75		220		420		220	125	520	420	220		220		120	82	215
ntinuec	« VcB	99		30		30		30		30	30	30	30	99		8		32	32	20
ries (Continued)	ICES* ICBO [®] (nA) Max	15		15		5		5		15	15	15	15	15		15		5	92	100
Serie	VEBO (V)	9		2		2		ഹ		2	5	c)	5	5		5		ري د	S	2
ron (VCEO (V)	45		30		30		8		30	30	30	30	45		45		32	32	45
Elect	VCES* VCBO (V)	20		30		90		90		30	30	30	30	09		90		32	32	20
Bipolar Pro Electron Sei	Case Style	TO-236	<u> </u>	TO-236 (49)		TO-236 (49)		TO-236 (49)		TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	10-236	£	TO-236	₹	TO-236 (49)	TO-236 (49)	TO-236 (49)
Bipol	Type No.	BC857-B		BC858		BC858-B		BC858-C		BC859	BC859-A	BC859-B	BC859-C	BC860		BC860-B		BCF29	BCF30	BCF32

Bipolar Pro Electron Series Process No. ý ^{__} 2 9 9 F 89 8 9 2 8 유 9 5 Ξ Test Conditions (Note 1) 유 NF (dB) 2 9 5 유 9 2 유 9 4 T-03-01 toff (ns) Max f_T lc (MHz) @ (mA) Min Max 9 8 52 8 42 Cob Max Max VBE(SAT)
VBE(ON)* @ IC
(V) (mA)
Min Max 200 유 훙 9 은 유 5 오 유 ည 2 5 9.0 9.0 VCE(SAT) (V) & Max 0.3 6. 0.3 0.3 0.1 0.3 35 **6---**S - 5 വവ 2 Ŋ 5 က က က 2 2 2 2 വവ ၁ <u>န</u> 0.01 2 2 0.01 2 2 2 - 6 8 ~ 6 형 0.01 200 20 ଥି ଏ 2. c 5 8. 800 420 280 20 22 22 450 8 8 4,000 10,000 20,000 4,000 10,000 20,000 110 215 200 8 35 200 8 215 120 Bipolar Pro Electron Series (Continued) 35 32 32 32 32 32 32 32 8 8 ೪ 32 8 lces* lcBo @\ (nA) 8 8 8 ᅙ 8 9 5 5 8 8 ᅙ ଷ୍ଟ ଷ ន្ត M S P ល 5 5 ı, Ŋ S ស Ŋ Ŋ ß ည N SEO 엃 32 32 32 32 45 8 8 8 32 8 ₹ 8 8 VCES. **8** 5 8 8 8 8 32 8 32 32 32 တ္တ 20 TO-236 (49) Case Style BCW33 BCW65 BCW60 BCW30 BCW31 BCW32 BCW61

BCW29

BCV72

BCV71

BCF70

	Process No.	10	10	8	.82-	88	8	0	. 88	29		12	5
	Test Conditions	(Note 1)	(Note 1)	(Note 1)	(Note 1)		(Note 1)	(Note 1)	(Note 1)		Т-	-03-0 <u>1</u>	
	NF (dB) Max	01	9	5	은	우	5	5	5				
	toff (ns) Max	1111								·	_		
	[©] lc x (mA)	8	20										
	f _T (MHz) @ Min Max	100	100										
	C _{ob} (pF)	52	72			-							
	lc (mA)	200	200	10	9	10	10	10	10	200	200	200	200
	VBE(SAT) VBE(ON)* @ (V) Min Max	2.0	2.0			٠						1.2	1.2
	VCE(SAT) (V) & Max			0.3	0.3	0.25	0.25	0.25	0.3	0.62	0.62	0.62	0.62
Ì	V _{CE}	10 1 1	10 1 1	5	5	2	5	5	2				
	® Ic (mA) ×	0.1 10 500	0.1 100 500	2	2	N	2	2	2	100 300 500	100 300 500	100 300 500	100 300 500
	HFE hte 1kHz* Min Max	250	250	260	200	220	450	800	260	900	900	900	009
Ð	-	35 100 35	35 20 35 35	120	215	110	200	420	120	00 07 04	§ 5 8	100 70 40	5 6 4
ontinue	S CB	45	45	20	20	20	50	20	20	20	20	50	20
es (c	Ices* Iceo _@ (nA) Max	20.	\$0.	100	5	5	<u>5</u>	100	100	100	100	100	<u>8</u>
Seri	VEBO (Y)	က	က	S.	c,	2	ຜ	2	2	ιo	တ	υn.	ro.
tron	VcEo Min	45	45	45	45	45	45	45	99	45	25	45	52
o Elec	VCES. VCBO (V)	75	75	20	9	20	20	20	8	•09•	30•	•0•	30*
Bipolar Pro Electron Series (Continued)	Case Style	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)
Bipc	Type No.	ВСМ66	ВСМ68	BCW69	BCW70	BCW71	BCW72	BCW81	BCW89	BCX17	BCX18	BCX19	BCX20

Process No. 유 우 은 9 9 55 ~ 9 유 T-03-01 (Notes 3 & 4) Test Conditions (Note 5) (Note 5) (Note 5) (dB) 9 9 9 9 8 800 8 8 88 8 Toff (ns) 8 8 f_T l_C (MHz) @ (mA) Min Max. 9 9 우 2 9 우 9 9 52 125 125 125 52 125 52 125 Cob (pF) VBE(SAT)
VBE(ON) @ IC
(V) (mA) 9 용 충 6 VCE(SAT)
(Y) &
Max 0.5 0.5 0.5 38 5 5 - -HFE hre @ lc ∵ 1kHz* @mA) 630 1000 630 1000 310 630 1000 310 8 83 83 83 82 Bipolar Pro Electron Series (Continued) 3 Š 32 32 32 8 엉 CES. (1A) 69 Max (1A) 9 9 2 9 유 ¥3€ ¥3 SE 4 **4** 45 32 32 잃 32 32 VCBO TO-92 (97) Case BCX58-10 BCX59-8 BCX58-7 BCX58-8 BCX59 동 BCX58

7-16

	Process No.	10	10	10	₫ ~	10	88	89	89	89	 8 -03-01	
	Test	(Note 5)	(Note 5)	(Notes 17, 19)	(Notes 17, 19)	(Notes 17, 19)	(Notes 17, 19)	(Notes 17, 19)	(Notes 17, 19)	(Note 1)	(Note 1)	,
	NF (dB) Max			9	9	9	9	9	9	9	ဖ	
	t _{off} (ns) Max	800	800	800	800	800	88	800	800			
	f _T (MHz) @ ^I C Win Max (mA)	10	10	10	5	10	6	01	10	10	10	
	f _T (MHz) (Min Max	125	125	125	125	125	125	125	125	200	200	
	C _{ob} (pF) Max			4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
	lc (mA)	100	100	50	ß	90	55	92	50	100	100	
	VBE(SAT) VBE(ON) @ (V) Min Max	1.0	1.0	1.05	1.05	1.05	1.05	1.05	1.05	1.0	1.0	
				0.7	0.7	0.7	0.7	0.7	0.7			
	VCE(SAT) (V) & Max	0.5	0.5	0.55	0.55	0.55	0.55	0.55	0.55	0.6	0.6	
	V _{CE}	ro ro − −	ωω - -	ω -	დ - დ	ი - ი	ი –	ი - ი	თ - თ	æ	2	
	Ic (mA)	0.0 2 5 5 0 5	0.01 100 100	20 20	2 50 0.01	2 50 0.01	20 05	2 50 0.01	2 50 0.01	2 5 100	2 t 0 0 1 0 0 1	
	HFE hte @ 1 kHz* Min Max	460 630	630 1000	220	310	460	220	310	460	630 1000	220	
	H h 1k	550 160 60	100 380 240 60	120 60	180 70 20	250 90 40	120 60	180 75 80	250 . 90 40	120 80 40	02 08 04	
tinued)	νς _®			35	32	32	જ્ઞ	32	32			
es (Continued)	Ices* Iceo@Vce (nA) (V) Max			8	50	20	20	20	20			
	VEBO (V) Min	2	7	5	5	5	5	5	9	5	2	
ron S	VCEO (V)	45	45	45	45	45	45	45	45	32	32	
Electi	V _{CES} * V _{CBO} (V) Min			45	45	45	45	45	45			
ır Pro	Case Style	TO-92 (97)	TO-92 (97)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-92 (97)	TO-92 (97)	
Bipolar Pro Electron Seri	Type No.	BCX59-9	BCX59-10	BCX70G	всх70н	BCX70J	BCX71G	всх71н	BCX71J	BCX78	BCX78-7	
						7-17						

Process No.	89	89	8	88	88	8	ෂ T-03-01	88	88
Test	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Notes 5 & 6)
NF (dB) Max	9	9	9	g	ဖ	ဖ	ဖ	ဖ	9
toff (ns) Max									420
J. (AE)	10	10	10	9	5	9	10	0	200
fT (MHz) @ Min Max	200	200	200	200	200	500	200	200	20
Cob (pF) Max	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	8
اد (a ه)	5	100	100	100	100	100	100	100	₹
VBE(SAT) VBE(ON)* (V) Min Max	0.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2*
VCE(SAT) (V) & Max	9.0	9.0	9.0	9.0	0.6	0.6	0.6	0.6	0.7
3 C	2 2	29-1-	5 1	w	သ			23	2 -
LC (m/A)	0.0 2 0 0 100 100 100 100 100 100 100 100 100	0.0 2 0 0 100	0.01 100 100	001 2	8	10 100 2	5 to 2 6 6 6 7 6 6 7 6 9 6 9 6 9 6 9 9 9 9 9 9	5 5 6 9	50 50 50
HFE he @ 1kHz* @	310	460	630 1000	1000	220	310	630	1000	6
H A Y	85 120 55 55	550 160 60 60	5 8 8 8	8 4 5	120	120 45 30 180	§ 8 4 8	45 % 55 % 8 55 %	8 9
Type Case VCBO (Y) (Y) (N) (MA) (NA) (V) MEn Min (MA) (V)									100 45
N S N	က	S.	ro	c,	s	ro.	ro.	c c	
E 3 C	8	8	8	54	45	र्	र्	र्	45
S CES.									8
Case	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-92 (97)	TO-237 (91)
Type No.	BCX78-8	BCX78-9	BCX78-10	всх79	BCX79-7	BCX79-8	BCX79-9	BCX79-10	BD370A

ΑT	L SEMI	CON	ID	DIS	CRE	TE	1	16	D	65	011	30 (1031	7167	? В		
	Process No.	92	78	78	78	78	148	78	78	78	82	78	38	38	38	38	
	Test	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)								
	NF (dB) Max	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
	toff (ns) Max	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	
	lc (mA)	200	200	200	200	200	200	200	200	200	200	200	200	500	200	200	
	f† (MHz) @ Min Max														T	-03-	01
		90	20	ន	20	20	9	ß	25	22	8	SS.	20	ಜ	95	20	
	C _{ob} (pF) Max	96	8	8	8	30	30	e		8	98	8	ၕ	မွ		30	
	e lc (mA)	1	₹	₹	1¥	4	1 A	₹	4	‡	4	₹	¥.	¥	4	1A	
	VBE(SAT) VBE(ON)* (V) Min Max	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	
	VCE(SAT) (V) & Max	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
	VcE (?)	2	2	2 -	2	2	2	2 -	2 -	2 -	2	2	2	2 -	2 1	2	
	[@] lc (mA) ×	500 100	500 100	5 5 5	500 100	500 100	500 100	8 5 5	00° 50° 50° 50° 50° 50° 50° 50° 50° 50°	5 5 5	05 05 05	500 100	500 100	8 5 5	500	500 100	
	HFE hto 1 kHz* In Max	9	250	9	400	160		§	400	5	160	250	400	5	<u>8</u>	400	
	H A P	83 83	85 5	25 55	25	88	25 100	8 형	8 9	8 8	88	8 g	8 8	% 8	8 8	55 64	
(penu	o VcB	45	45	45	89	8	89	8	8	80	80	80	88	8	80	45	
Cont	lces* lcBo _@ (nA) Max	100	100	5	100	100	100	6	5	100	100	100	100	5	100	100	
eries	VEBO																
S uo	VCEO 33	45	45	3	99	90	60	8	8	8	8	8	100	§	100	45	
lectr	VCES* VCBO (V)	80	8	8	88	80	80	8	8	8	8	8	88	8	8	88	
Pro E	Case Style	TO-237 (91)	TO-237 (91)	TO-237 (91)	TO-237 (91)	TO-237 (91)	TO-237 (91)	TO-237 (91)	TO-237 (91)								
Bipolar Pro Electron Series (Continued)	Type No.	BD370A-10	BD370A-16	BD370A-25	BD370B	BD370B-10	BD370B-16	BD370B-25	BD370C	BD370C-6	BD370C-10	BD370C-16	BD370D	BD370D-6	BD370D-10	BD371A	

NΑ	IL SE	טאנ	DI	SCK	C C											
	Process No.	78	78	78	78	28	478	78	78	82	82	g f	e 6	2	79	38
	Test Conditions	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)
	NF (dB) Max	9	9	9	9	9	9	9	9	9	9	9	9	و	9	ဖ
	torr (ns) (420	62	420	82	420	420	420	420	420	420	420	420	420	420	420
	lc (mA)	88	, 002	500	200	8	200	200	88	200	200	88	8	800	200	200
	(9)												'	•	T-0	3-01
	fr (MHz) Min Max	20	50	50	20	20	20	20	52	20	20	20	20	8	SS	90
	Cob (pF)	30	30	8	8	8	99	8	8	30	8	8	8		99	8
	2 (4	4	≰	4	≰	≰	₹	4	₹	4	4	≰	₹.	4	₹
	VBE(SAT) VBE(ON)* @ (V) (Win Max		1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	12*	12•	12.	12*	12*	12*
	VCE(SAT) (V) & Max	0.7	7.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	3 5	2 -	2	2	2	1	2	2 +	2 -	2	2 -	N -	2 -	2 -	2 -	1
	် မြို့	50 50	55 50 50	500 100	8 5 5	500 100	500 100	50 50 50	500 100	500 100	500 100	500 100	8 5 5	100	8 5	100
	8	9	250	004	§	160	250	6	400	100	160	250	64	9	8	400
	HE has	8 82	8 S	25 56	% 4	श्र छ	න් දි	સ્ટ <u>ક</u>	8 8	% 4	श्र छ	25 100	8 8	8 8	8 8	₹ \$
(per	38	45	45	45	8	8	8	8	8	8	8	100	5	5	5	\$
S (Continued)	ces (nA)	8	5	5	5	8	8	<u>6</u>	ᅙ	호	8	9	5	5	5	8
37.	E 3 C	5	5	45	8	8	8	8	80	88	8	100	100	100	8	55
Pottre	S C BO	8	8	8	8	8	8	8	8	8	8	88	80	88	8	8.
Pro F	Case	TO-237	TO-237 (99)	TO-237 (90)	TO-237 (90)	TO-237 (90)	10-237	TO-237 (90)	TO-237 (90)	10-237	TO-237 (90)	TO-237 (90)	TO-237 (90)	TO-237 (90)	10-237	TO-237 (90)
Binolar Pro Flectron Serie	Type No.	BD372A-10	BD372A-16	BD372A-25	BD372B	BD372B-10	BD372B-16	BD372B-25	BD372C	BD372C-6	BD372C-10	BD372C-16	BD372D	BD372D-6	BD372D-10	BD373A

NAT	F 2FW1	CUN	υ ——	ס ד ס	CKE	16								171	<u> </u>	- -
	Process No.	88	88	38	38	88	88	38	38	88	88	88	8	88	8	47
	Test	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Notes 5 & 6)	(Note 7)
ļ	NF (dB) Max	9	9	9	9	9	9	9	9	9	9	9	g	9	9	3.5
	toff (ns) Max	420	420	420	420	420	420	420	420	420	420	420	420	420	420	
ļ	n (m A)	82	500	200	200	200	200	88	200	200	200	200	500	200	200	-
	(e) (ı	·	T-0	3-01
	ft (MHz) (Min Max	20	20	50	50	20	20	20	20	20	20	20	50	20	20	
	Cob (PF)	8	30	30	30	8	8	8	8	30	30	30	90	8	90	0.34
	C (mA)	4	14	1A	1.4	4	4	Ţ.	¥.	4	4F	4 Y	1A	4	¥.	-
	VBE(SAT) VBE(ON)* @ (V) Min Max	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	1.2*	12*	1.2	1.2*	1.2*	0.65 0.74
	VCE(SAT) (V) & Max	2.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
	V _{CE}	2 +	2 -	2 T	2 -	2	2 ~	2 -	2	2	a -	1	1	2 -	2	10 7
	© lc (mA)	500 100	8 5 5	8 5	500 100	500 100	500	8 5 5	500	500 100	500 100	500 100	500 100	500	500 100	- 5
	HFE hto 1 kHz*	6	550	6	400	160	250	9	. 400	100	160	250	400	100	160	225
	A T T T	8 8	왕 호	8 5	3 5 5	83 83	25 100	8 5	8 6	8 8	25 63	100 100	22 4	25 4	8 8	- 6 6
(penu	S.C.	45	55	45	8	80	8	8	8	8	80	8	100	100	5	ล
S (Continued)	lces* lcBo @ (nA)	इ	5	5	5	9	100	5	5	6	100	ş	100	100	5	8
eries	VEBO (YEBO									į						4
S uc	VcEo (3)	45	45	45	8	8	8	8	88	80	80	8	ş	5	6. 0.	4
lectro	VCES*	8	8	8	8	8	08	88	8	8	8	8	8	8	8	40
Pro E	Case Style	10-237	TO-237 (90)	TO-92 (98)												
Bipolar Pro Electron Serie	Type No.	BD373A-10	BD373A-16	BD373A-25	BD373B	BD373B-10	BD373B-16	BD373B-25	BD373C	BD373C-6	BD373C-10	BD373C-16	Вра7ар	BD373D-6	BD373D-10	BF240

	ATL SE		OND		130	RET		ш ш	_ <i>D</i>			1 1777
	Process No.	47	49	49	42	47	47	75	49	49	- 61	65
	Test	(Note 7)		-				(Note 7)				T-03-01
	NF (dB) Max	3.5						6				
	toff (ns) Max											
	e lc x (mA)	1									20	82
	f _T (MHz) @ Min Max			-							250	300
	C _{ob} (pF) Max	0.34									8	ω
	lc (mA)	-									150	150
	VBE(SAT) VBE(ON)* @ (V) (V) Min Max	0.74									1.3	1.2
	VBE(SAT) VBE(ON) (V) Min May	0.65										9.0
	VCE(SAT) (V) & Max										0.4	1.0
	V _{CE}	10 7	10	10	10	10	10	10	10	10	5 5 5 5 - 5	5 5 5 5 - 5
	H _{FE} h _{fe} l _C 1 kHz* (mA) Min Max	12	-	-	1	-	-	-	1	1	0.1 10 150 150 500	0.1 15 150 500
	H _{FE} h _{fe} 1 kHz* Min Max	125	220	250		220	125		125	225	300	300
(pe	<u></u> .	35	65	32	52	99	35	52	35	65	35 50 75 100 30	
Continu	lces* lcBo @ VcB (nA) (V) Max	20			20	20	20	20	20	25	50	8
ies (100			20	100	100	50	100	100	98	6
Ser I	VEBO (V) Min	4	5	9	4	4	4	4	9	2	2	ω
ctror	VcEO (V) Min	40	20	20	30	40	40	20	30	30	30	4
o Elec	VCES* VCBO (V)	40	30	30	30	40	40	0E	0E	30	09	22
Bipolar Pro Electron Series (Continued)	Case Style	TO-92 (98)	TO-92 (98)	TO-92 (98)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-92 (97)	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)
Bipc	Type No.	BF241	BF494	BF495	BF536	BF840	BF841	BF936	BFS18	BFS19	BSR13	BSR14

7-

Bip	Bipolar Pro Electron Se	o Ele	ctron	Seri	ries (Continued)	Intinue	æ														
Type No.	Case Style	VCES*	VCEO (V)	VEBO (Y)	lces* lceo @ \ (nA) Max	Sc	HFE hte 1 kHz* Min Max	(a)	lc Vc (mA) (V	Vce (y)	VCE(SAT) (V) & Max	VBE(SAT) VBE(ON) (V) Min Max) • [@] (mA) ax	Cob (pF) Max		f _T (MHz) @ Min Max	, Ic (mA)	toff (ns) Max	NF (dB) Max	Test Conditions	Process No.
BSR15	TO-236 (49)	89	40	5	20	20	35 50	0 '-	0.1 10	10 10	0.4	+	1.3 150	8	200		20	9		(Note 9)	8
	,									0 0	9.1	ci	2.6 500	0			***	••			
							30	300	500 10												
BSR16	_	09	09	5	5	20	75	0		10	0.4	7	1.3 150	8	200	_	20	9		(Note 9)	8
	(49						<u> </u>	-	- 2		1.6	ď	2.6 500								•
								300		5 5											
BSR17	-	8	8	9	5 µA	8	ឧ	0	- ·	_	0.2	0.65 0.85	35 10		520		20	250		(Note 5)	ន
	<u>4</u>							150	- 6												
							98		50 50		8	50	0.95 50								
RSB18	TO-236	8	8	۳	5 u.A	8	8	°		+		0.65 0.85			200		8	98		(Note 5)	99
				,	Ļ		8	, *	-											,	•
								150	·- `												
							5 5 5	., 	8 S		0.3	ő	0.95 50								
BSR19	-	160	140	9	901	901	8 8			IC 1	0.15	-	1.0 10	9 0	100	300	10		10	(Note 16)	16
	₹						8 8	250 5	2 62	ດທ	0.25	-	1.2 50	_							
BSR20	TO-236	55	120	5	5	5	30				0.2	1	1.0	10 6	100	400	10		8	(Note 16)	16
	<u>6</u>						송 송 -	180	5 5 2 4	ນເນ	0.5	- -	1.0 50								
BSS38	-	120	100	5	200	8	8		4	_	0.7	*	4 3		8		4	1000		(Notes 17, 18)	16
						1				+	9.0								1		
BSS63	TO-236 (49)	110	<u>5</u>	9	5	8	88	(4	55 55 1 1		0.25	o	0.9 25		S.		25		Γ-03		74
BSS64	TO-236 (49)	120	8	ဟ	9	8	8	-	5		0.15 0.2	-	1.2 4 50		9		4	0001	3-01	(Note 5)	91
																			l I		

N	ATL S	MIC	OND	D	ISC	RE	TE,		ŀ	lΕ	D		P 2	501	73	0	0037173	3
	Process No.	19	19	æ	8	2	_	-₹					•				T-03-01	
	Test					(Note 18)		(Note 1)										
	NF (dB) Max					_												
	toff (ns) Max					18		18										
	(mA)	20	20	20	50	10												
	f _T (MHz) (Min Max	200	200	200	200	400												
	C _{ob} (pF)	9	9	8	8													
	LC (mA)	150 500	150 500	150 500	150 500	10	50	10	5									
	VBE(SAT) VBE(ON)* @ (V) Min Max					7 0.85		7 0.85	1.2					ㅂ				
						0.7		0.7			15 KHz.			15.7 kH	al.			-
	VCE(SAT) (V) & Max	0.4 1.6	0.4 1.6	0.4 1.6	0.4 1.6	0.3	0.4	0.25	0.4		Note 11: $ c/l_B = 20$. Note 12: $ c = 200 \mu A$, $V_{CE} = 5V$, $f = 30 \text{Hz}$ to 15 kHz.			Note 16: $ _C=250~\mu\text{A}$, $ _{\text{QE}}=5\text{V}$, $ _f=10~\text{Hz}$ to 15.7 kHz. Note 17: $ _C=15~\text{mA}$, $ _B^1= _B^2=1~\text{mA}$.	Note 18: I _C /I _B = 3.3. Note 19: I _{CE} = 200 µA, V _{CE} = 5V, f = 200 Hz.			·
	VcE 3	10	10	10	10			1			5V, f	-		= 5V, f: lg ² = 1	= 5V,1			
	(mA)	150	150	150	55	- 5	20 23	- \$	2 23		 I.A. Vo≘		g 8	Note 16: $I_C = 250 \mu$ A, $V_{CE} = 50$, $f = 10$ Note 17: $I_C = 15 \text{mA}$, $I_B{}^1 = I_B{}^2 = 1 \text{mA}$.	3. JuA, V _{CS}			
	HFE hte 1 kHz*	120	300	120	ဓ္တ	5	32	8	200		Note 11: Ic/Ig = 20. Note 12: Ic = 200 µ	Note 13: I _C /I _B = 40.	Note 14: ${}^{(c)}$ / ${}^{(g)} = 1000$. Note 15: ${}^{(c)}$ / ${}^{(g)} = 33$.	7 = 250 ≡ 15 m	Note 18: l _C /l _B = 3.3. Note 19: l _{CE} = 200 μ	ł		
~		4	5	8	5	£ ₹	} 		ჵ ჯ		36 11: 년 3 12: 년	ote 13: Ic	ote 14: 5	ote 16: k	ote 18: k			
(Continued)	S V CB	25	જ	β	ଜ	9		12			žž	ž:	ŽŽ	žž	ŽŽ			
	ICES* ICBO ® V (nA) (우	5	우	5	호		5										
Serie	VEBO (V)	တ	so.	သ	သ	3					= 5 mA.	;	= 10 mA. 1 mA.		15 mA.			
ton	VcEo (Y)	4	4	\$	\$	12		4			1 kHz	1 KHz	. 18 = 18 = 18 = 18 = 18 = 18 = 18 = 18	. 1 KHz 200 MHz	KHz = 13 ² =	WB.		·.
Eleci	VCES* VCBO (V)	9	8	8	8	82					= 5V, f = ;	= 2V, f =	: = 10V, lg = 3V, lg¹	= 5V, f = 10V, f =	= 5V, f = 1 = 6V, lg	= 5V, f		
Bipolar Pro Electron Series	Case Style	TO-236 (49)	TO-236 (49)	TO-236 (49)	TO-236 (49)	10-236	£	TO-236	(48)	DITIONS	200 JuA, VCR 100 mA, VCR	200 µA, VC	100 mA, V _C 10 mA, V _{CC}	100 µA, VCE 1	1 mA, VCE -	10 µA, VC		
Bipol	Type No.	BSS79-B	BSS79-C	BSS80-B	BSS80-C	BSV52		BSX39		TEST CONDITIONS:	Note 1: $ C = 200 \mu A$, $ V_{CE} = 5V$, $ f = 1 kFt$. Note 2: $ C = 100 mA$, $ V_{CE} = 20V$, $ g = g = 5 mA$.	Note 3: Ic = 200 µA, VCE = 2V, f = 1 kHz.	Note 4: $ C = 100 \text{ mA}$, $ V_{CC} = 100$, $ g = g^2 = 10 \text{ mA}$. Note 5: $ C = 10 \text{ mA}$, $ V_{CC} = 30$, $ g = g^2 = 1 \text{ mA}$.	Note 6: IC = 100 µA, VCE = 5V, f = 1 kHz Note 7: IC = 1 mA, VCE = 10V, f = 200 MHz.	Note 8: $ _{C} = 1 \text{ mA}$, $ _{CE} = 5\text{ V}$, $ _{I} = 1 \text{ kHz}$ Note 8: $ _{C} = 150 \text{ mA}$, $ _{VCC} = 6\text{ V}$, $ _{R}^{1} = _{R}^{2} = 15 \text{ mA}$.	Note 10: Ic = 10 µA, VcE = 5V, f = WB.		