Rochester Electronics

Datasheet

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

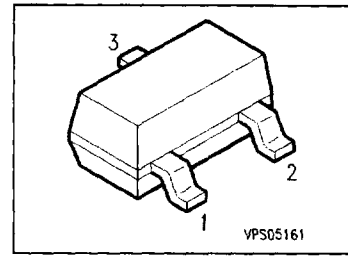
Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

NPN Silicon AF Transistors

BCW 60
BCX 70

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Low noise between 30 Hz and 15 kHz
- Complementary types: BCW 61, BCX 71 (PNP)



Type	Marking	Ordering Code (tape and reel)	Pin Configuration 1	2	3	Package[1]
BCW 60 A	AAs	Q62702-C1517	B	E	C	SOT-23
BCW 60 B	ABs	Q62702-C1497				
BCW 60 C	ACs	Q62702-C1476				
BCW 60 D	ADs	Q62702-C1477				
BCW 60 FF	AFs	Q62702-C1529				
BCW 60 FN	ANs	Q62702-C1567				
BCX 70 G	AGs	Q62702-C1539				
BCX 70 H	AHs	Q62702-C1481				
BCX 70 J	AJs	Q62702-C1552				
BCX 70 K	AKs	Q62702-C1571				

[1] For detailed information see chapter Package Outlines.

Maximum Ratings

Parameter	Symbol	Values			Unit
		BCW 60	BCW 60 FF	BCX 70	
Collector-emitter voltage	V_{CEO}	32	32	45	V
Collector-base voltage	V_{CBO}	32	32	45	
Emitter-base voltage	V_{EBO}	5			
Collector current	I_C	100			mA
Peak collector current	I_{CM}	200			
Peak base current	I_{BM}	200			
Total power dissipation, T_S = 71 °C	P_{tot}	330			mW
Junction temperature	T_j	150			°C
Storage temperature range	T_{stg}	– 65 ... + 150			

Thermal Resistance

Junction - ambient[1)]	$R_{th\ JA}$	≤ 310	K/W
Junction - soldering point	$R_{th\ JS}$	≤ 240	

1) Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm² Cu.

Electrical Characteristics
at T_A = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage	$V_{(BR)CEO}$				V
I_C = 10 mA BCW 60, BCW 60 FF		32	–	–	
BCX 70		45	–	–	
Collector-base breakdown voltage	$V_{(BR)CBO}$				
I_C = 10 µA BCW 60, BCW 60 FF		32	–	–	
BCX 70		45	–	–	
Emitter-base breakdown voltage	$V_{(BR)EBO}$	5	–	–	
I_E = 1 µA					
Collector cutoff current	I_{CBO}				
V_{CB} = 32 V BCW 60, BCW 60 FF		–	–	20	nA
V_{CB} = 45 V BCX 70		–	–	20	nA
V_{CB} = 32 V, T_A = 150 °C BCW 60, BCW 60 FF		–	–	20	µA
V_{CB} = 45 V, T_A = 150 °C BCX 70		–	–	20	µA
Emitter cutoff current	I_{EBO}	–	–	20	nA
V_{EB} = 4 V					
DC current gain [1]	h_{FE}				–
I_C = 10 µA, V_{CE} = 5 V					
BCW 60 A, BCX 70 G		20	140	–	
BCW 60 B, BCX 70 H		20	200	–	
BCW 60 FF, BCW 60 C, BCX 70 J		40	300	–	
BCW 60 FN, BCW 60 D, BCX 70 K		100	460	–	
I_C = 2 mA, V_{CE} = 5 V					
BCW 60 A, BCX 70 G		120	170	220	
BCW 60 B, BCX 70 H		180	250	310	
BCW 60 FF, BCW 60 C, BCX 70 J		250	350	460	
BCW 60 FN, BCW 60 D, BCX 70 K		380	500	630	
I_C = 50 mA, V_{CE} = 1 V					
BCW 60 A, BCX 70 G		50	–	–	
BCW 60 B, BCX 70 H		70	–	–	
BCW 60 FF, BCW 60 C, BCX 70 J		90	–	–	
BCW 60 FN, BCW 60 D, BCX 70 K		100	–	–	

[1] Pulse test: $t \leq 300$ µs, $D \leq 2$ %.

Electrical Characteristics
at T_A = 25 °C, unless otherwise specified.

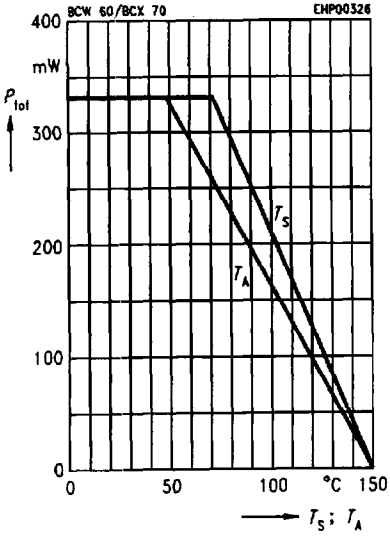
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter saturation voltage[1]	V_{CEsat}				V
I_C = 10 mA, I_B = 0.25 mA		–	0.12	0.25	
I_C = 50 mA, I_B = 1.25 mA		–	0.20	0.55	
Base-emitter saturation voltage[1]	V_{BEsat}				
I_C = 10 mA, I_B = 0.25 mA		–	0.70	0.85	
I_C = 50 mA, I_B = 1.25 mA		–	0.83	1.05	
Base-emitter voltage	$V_{BE\,(on)}$				
I_C = 10 µA, V_{CE} = 5 V		–	0.52	–	
I_C = 2 mA, V_{CE} = 5 V		0.55	0.65	0.75	
I_C = 50 mA, V_{CE} = 1 V [1]		–	0.78	–	
AC characteristics					
Transition frequency	f_t	–	250	–	MHz
I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz					
Output capacitance	C_{obo}	–	3	–	pF
V_{CB} = 10 V, f = 1 MHz					
Input capacitance	C_{ibo}	–	8	–	
V_{EB} = 0.5 V, f = 1 MHz					
Short-circuit input impedance	h_{11e}				kΩ
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz					
BCW 60 A, BCX 70 G		–	2.7	–	
BCW 60 B, BCX 70 H		–	3.6	–	
BCW 60 FF, BCW 60 C, BCX 70 J		–	4.5	–	
BCW 60 FN, BCW 60 D, BCX 70 K		–	7.5	–	
Open-circuit reverse voltage transfer ratio	h_{12e}				10^{-4}
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz					
BCW 60 A, BCX 70 G		–	1.5	–	
BCW 60 B, BCX 70 H		–	2.0	–	
BCW 60 FF, BCW 60 C, BCX 70 J		–	2.0	–	
BCW 60 FN, BCW 60 D, BCX 70 K			3.0		

[1] Pulse test: $t \leq 300$ µs, $D \leq 2$ %.

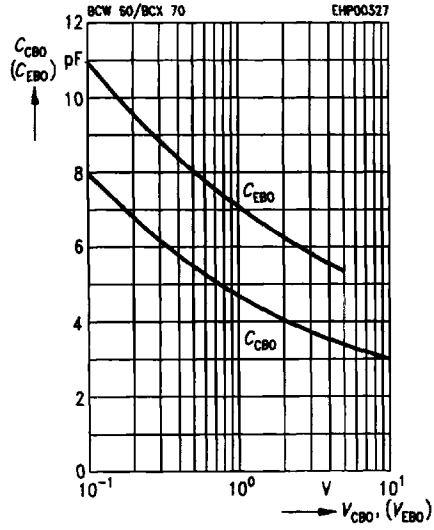
Electrical Characteristics
at T_A = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics					
Short-circuit forward current transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{21e}				–
BCW 60 A, BCX 70 G		–	200	–	
BCW 60 B, BCX 70 H		–	260	–	
BCW 60 FF, BCW 60 C, BCX 70 J		–	330	–	
BCW 60 FN, BCW 60 D, BCX 70 K		–	520	–	
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{22e}				µS
BCW 60 A, BCX 70 G		–	18	–	
BCW 60 B, BCX 70 H		–	24	–	
BCW 60 FF, BCW 60 C, BCX 70 J		–	30	–	
BCW 60 FN, BCW 60 D, BCX 70 K		–	50	–	
Noise figure I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ f = 1 kHz, Δf = 200 Hz	F				dB
BCW 60 A to BCX 70 K		–	2	–	
BCW 60 FF, BCW 60 FN		–	1	2	
Equivalent noise voltage I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ f = 10 Hz ... 50 Hz	V_n	–	–	0.135	µV
BCW 60 FF, BCW 60 FN					

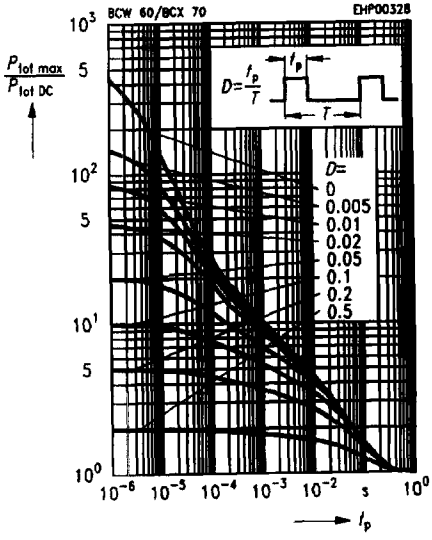
Total power dissipation $P_{tot} = f(T_A^*; T_S)$
* Package mounted on epoxy



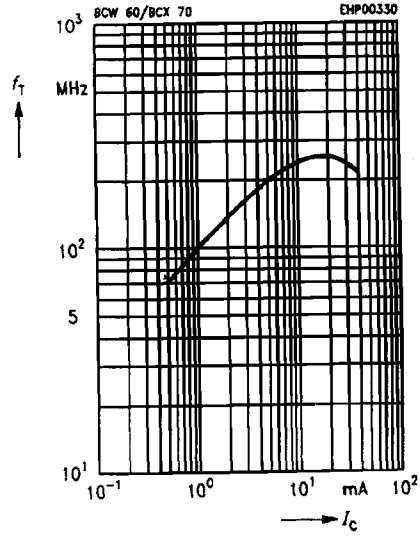
Collector-base capacitance $C_{CBO} = f(V_{CBO})$
Emitter-base capacitance $C_{EBO} = f(V_{EBO})$



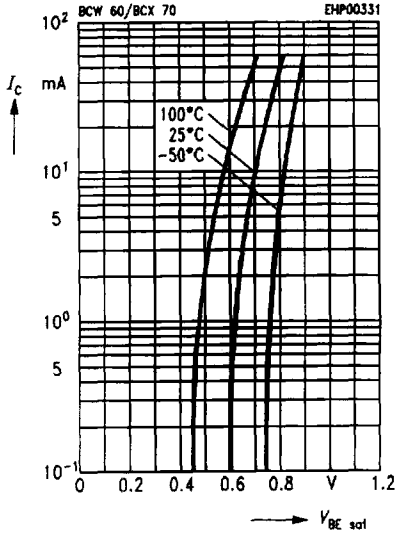
Permissible pulse load $P_{tot\,max}/P_{tot\,DC} = f(t_p)$



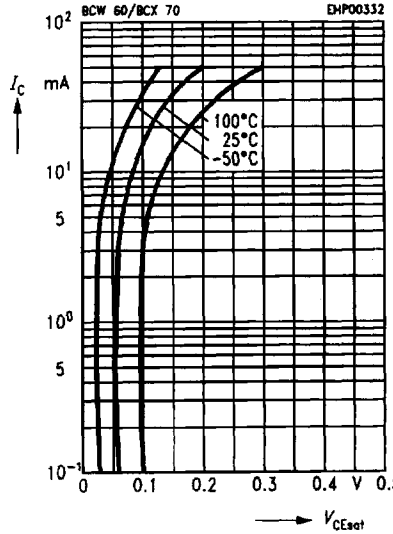
Transition frequency $f_T = f(I_C)$
$V_{CE} = 5$ V



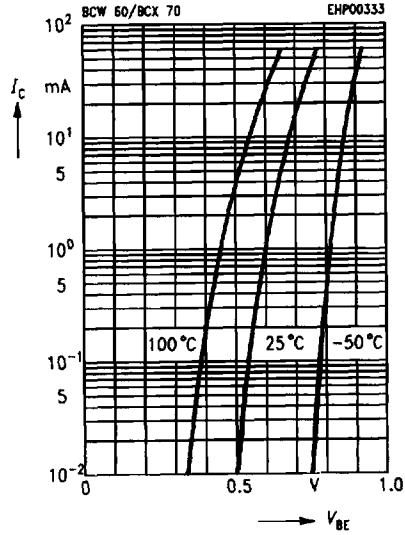
Base-emitter saturation voltage
$I_C = f(V_{BEsat})$
$h_{FE} = 40$



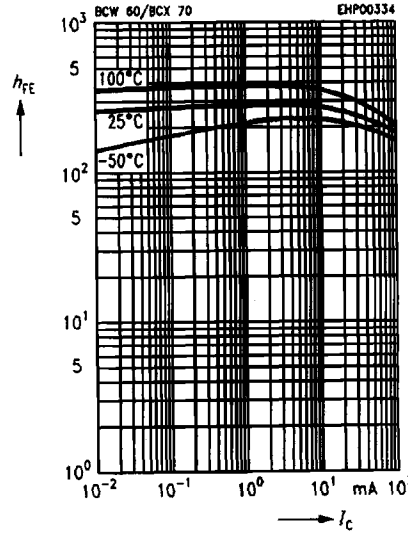
Collector-emitter saturation voltage
$I_C = f(V_{CEsat})$
$h_{FE} = 40$



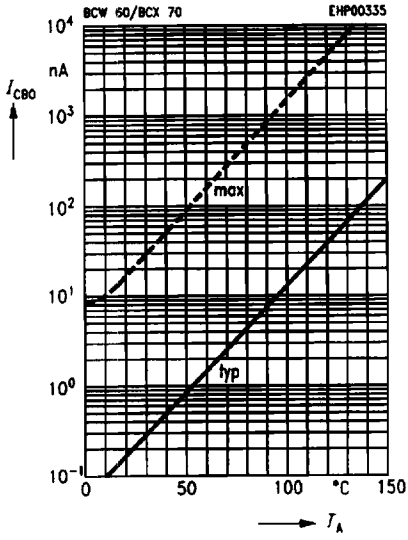
Collector current $I_C = f(V_{BE})$
$V_{CE} = 5$ V



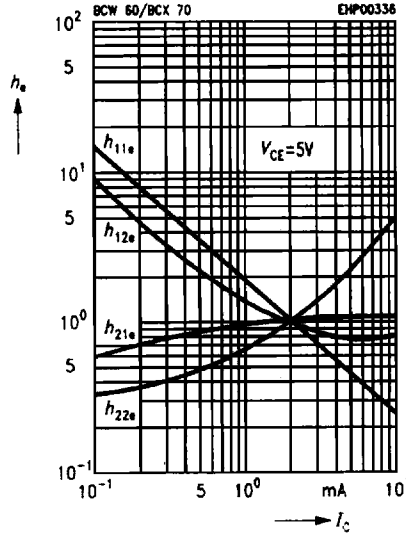
DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 5$ V



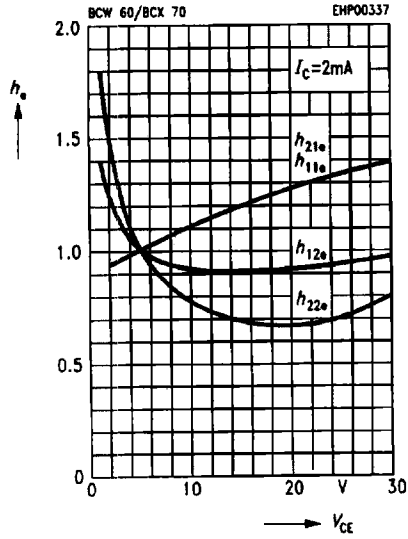
Collector cutoff current $I_{CBO} = f(T_A)$



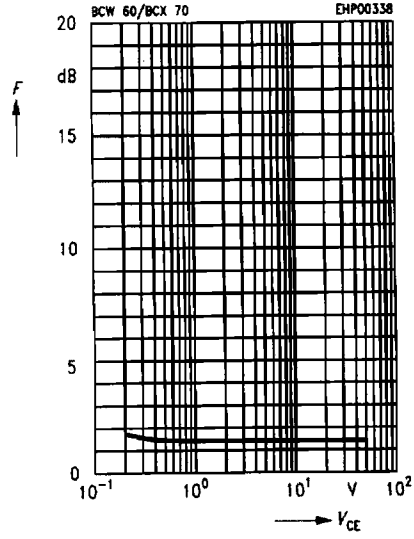
h parameter $h_e = f(I_C)$
$V_{CE} = 5$ V



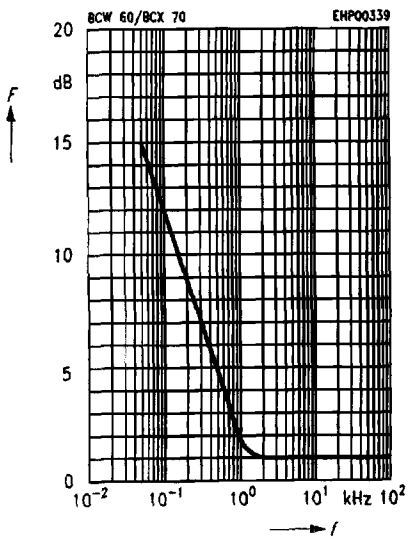
h parameter $h_e = f(V_{CE})$
$I_C = 2$ mA



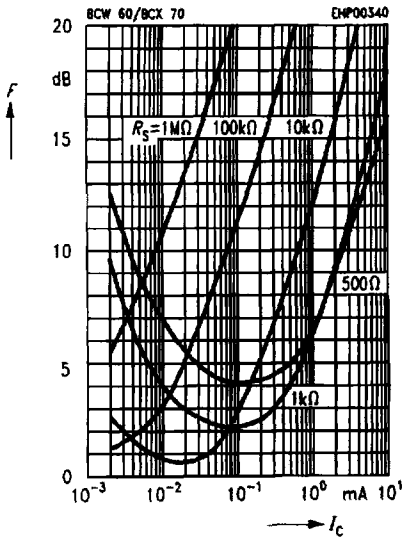
Noise figure $F = f(V_{CE})$
$I_C = 0.2$ mA, $R_S = 2$ kΩ, $f = 1$ kHz



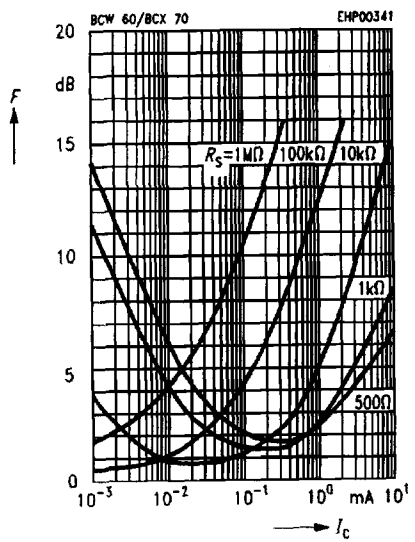
Noise figure $F = f(f)$
I_C = 0.2 mA, R_S = 2 kΩ, V_{CE} = 5 V



Noise figure $F = f(I_C)$
V_{CE} = 5 V, f = 120 Hz



Noise figure $F = f(I_C)$
V_{CE} = 5 V, f = 1 kHz



Noise figure $F = f(I_C)$
V_{CE} = 5 V, f = 10 kHz