

NPN General Purpose Amplifier

TBCW60

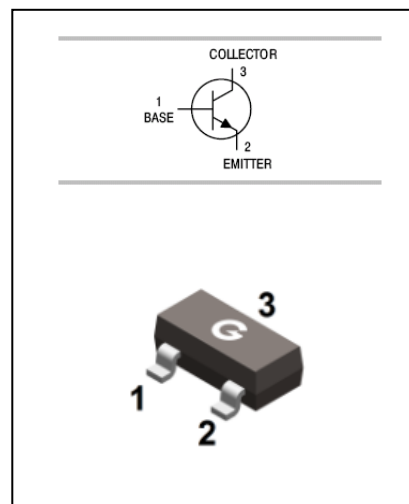
FEATURES

- Low current
- Low voltage
- Halogen free
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF

APPLICATIONS

- General purpose medium power amplifier
- Switching application



SOT-23

ORDERING INFORMATION

Type No.	Marking	Package Code
TBCW60A	AA	SOT-23
TBCW60B	AB	SOT-23
TBCW60C	AC	SOT-23
TBCW60D	AD	SOT-23

MAXIMUM RATING @ Ta=25°C unless otherwise specified

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	32	V
V_{CEO}	Collector-Emitter Voltage	32	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	DC Collector Current	100	mA
I_{CM}	Peak Collector Current	200	mA
I_{BM}	Peak base Current	200	mA
P_C	Collector Dissipation	330	mW
T_J	Junction Temperature	-55 to +150	°C
T_{STG}	Storage Temperature	-65 to +150	
$R_{\theta JA}$	Junction ambient	310	°C/W
$R_{\theta JS}$	Junction-soldering point	240	

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ELECTRICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=10\mu A, I_E=0$	32	-	-	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=10mA, I_B=0$	32	-	-	V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=1\mu A, I_C=0$	5	-	-	V
Collector cut-off current	I_{CBO}	$V_{CB}=32V, I_E=0$ $V_{CB}=32V, I_E=0, T_a=150^\circ C$	-	-	20	nA
Emitter cut-off current	I_{EBO}	$V_{EB}=4V, I_C=0$	-	-	20	nA
DC current gain	TBCW60A TBCW60B TBCW60C TBCW60D	h_{FE} $V_{CE}=5V, I_C=10\mu A$	20 20 40 100	140 200 300 460	- - - -	-
DC current gain	TBCW60A TBCW60B TBCW60C TBCW60D	h_{FE} $V_{CE}=5V, I_C=2mA$	120 180 250 380	170 250 350 500	220 310 460 630	-
DC current gain	TBCW60A TBCW60B TBCW60C TBCW60D	h_{FE} $V_{CE}=1V, I_C=50mA$	50 70 90 100	-	-	-
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=10mA, I_B=0.25mA$ $I_C=50mA, I_B=1.25mA$	- -	0.12 0.2	0.25 0.55	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C=10mA, I_B=0.25mA$ $I_C=50mA, I_B=1.25mA$	- -	0.7 0.83	0.85 1.05	V
Base-emitter voltage	$V_{BE(on)}$	$I_C=10\mu A, V_{CE}=5V$ $I_C=2mA, V_{CE}=5V$ $I_C=50mA, V_{CE}=1V$	- 0.55 -	0.52 0.65 0.78	- 0.75 -	V
Transition frequency	f_T	$V_{CE}=5V, I_C=20mA, f=100MHz$	-	250	-	MHz
Collector-base Capacitance	C_{cb}	$V_{CB}=10V, f=1MHz$	-	3	-	pF
Emitter-base Capacitance	C_{eb}	$V_{EB}=0.5V, f=1MHz$	-	8	-	

CLASSIFICATION OF h_{FE}

Rank	A	B	C	D
Marking	AA	AB	AC	AD
h_{FE}	120-220	180-310	250-460	380-630

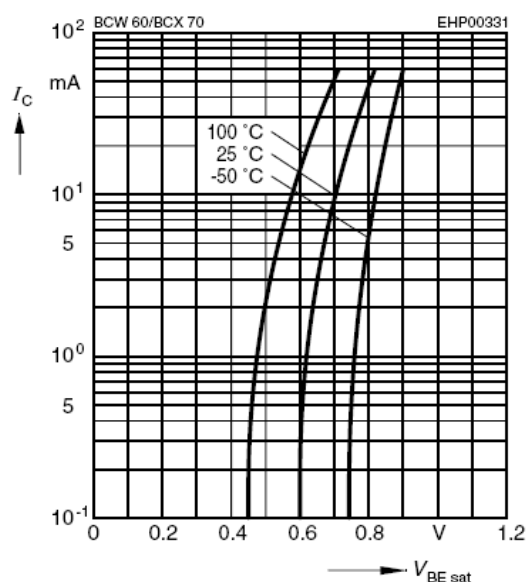
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TYPICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified

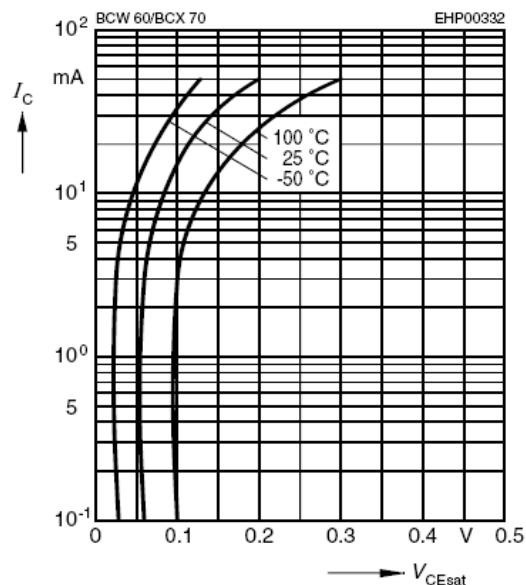
Base-emitter saturation voltage

$$I_C = f(V_{BEsat}), h_{FE} = 40$$



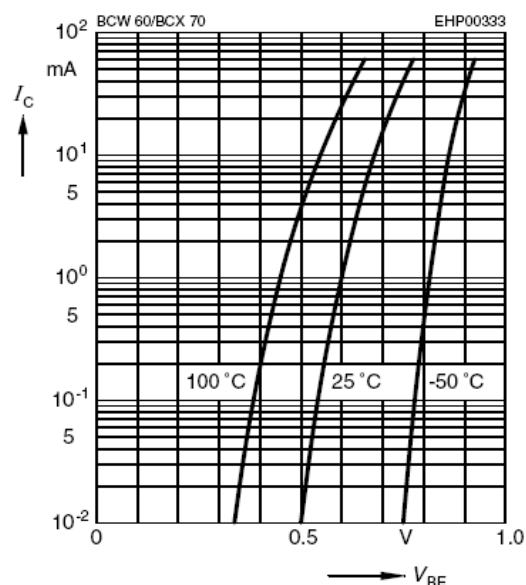
Collector-emitter saturation voltage

$$I_C = f(V_{CEsat}), h_{FE} = 40$$



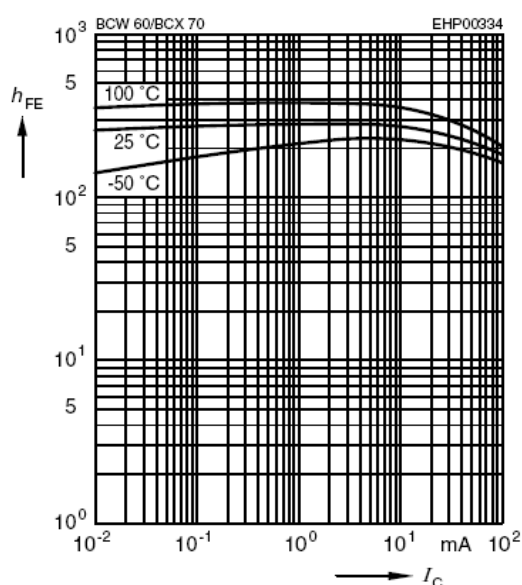
Collector current $I_C = f(V_{BE})$

$$V_{CE} = 5V$$



DC current gain $h_{FE} = f(I_C)$

$$V_{CE} = 5V$$

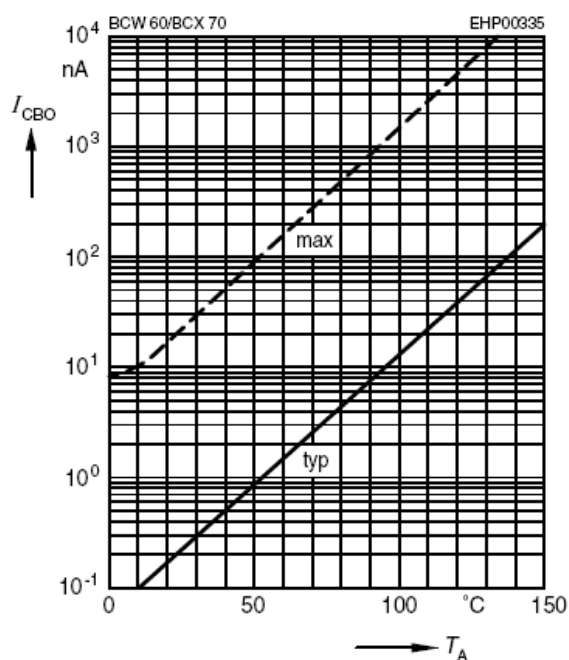


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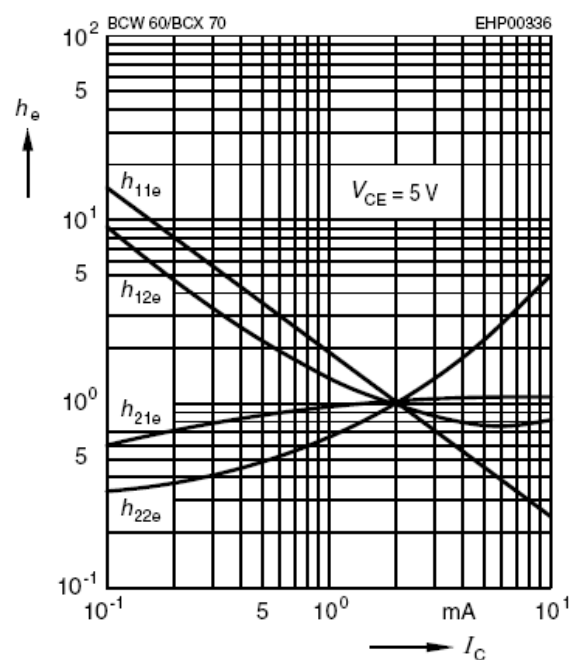
Collector cutoff current $I_{CBO} = f(T_A)$

$V_{CB} = V_{CEmax}$



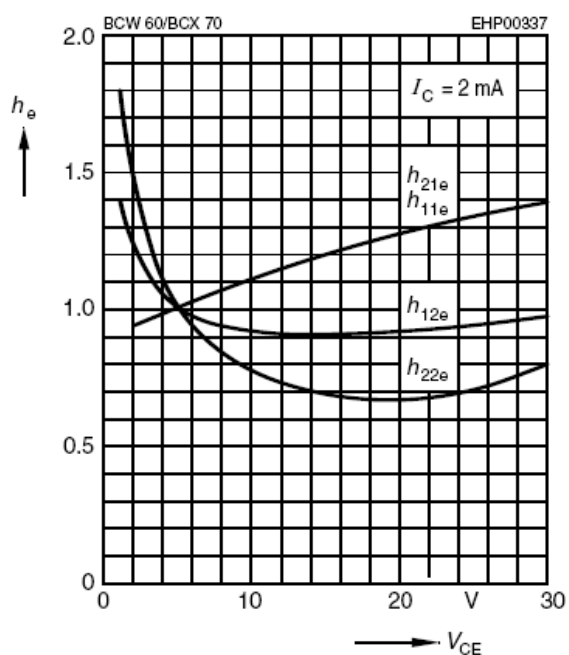
h parameter $h_e = f(I_C)$ normalized

$V_{CE} = 5V$



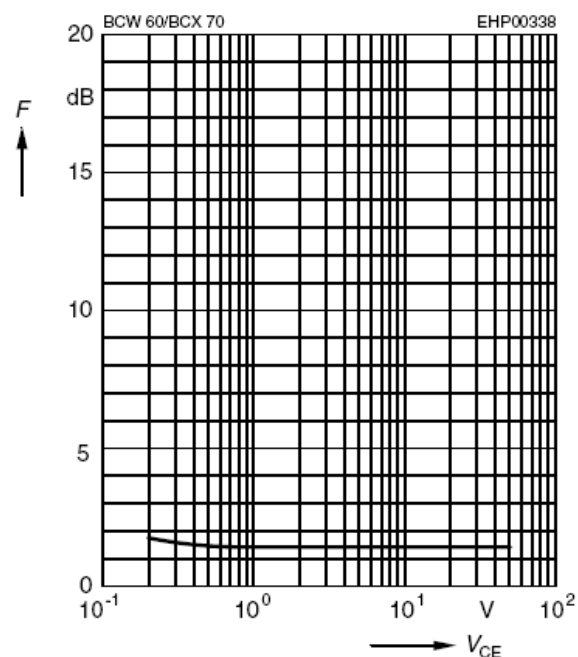
h parameter $h_e = f(V_{CE})$ normalized

$I_C = 2mA$



Noise figure $F = f(V_{CE})$

$I_C = 0.2mA, R_S = 2k\Omega, f = 1kHz$



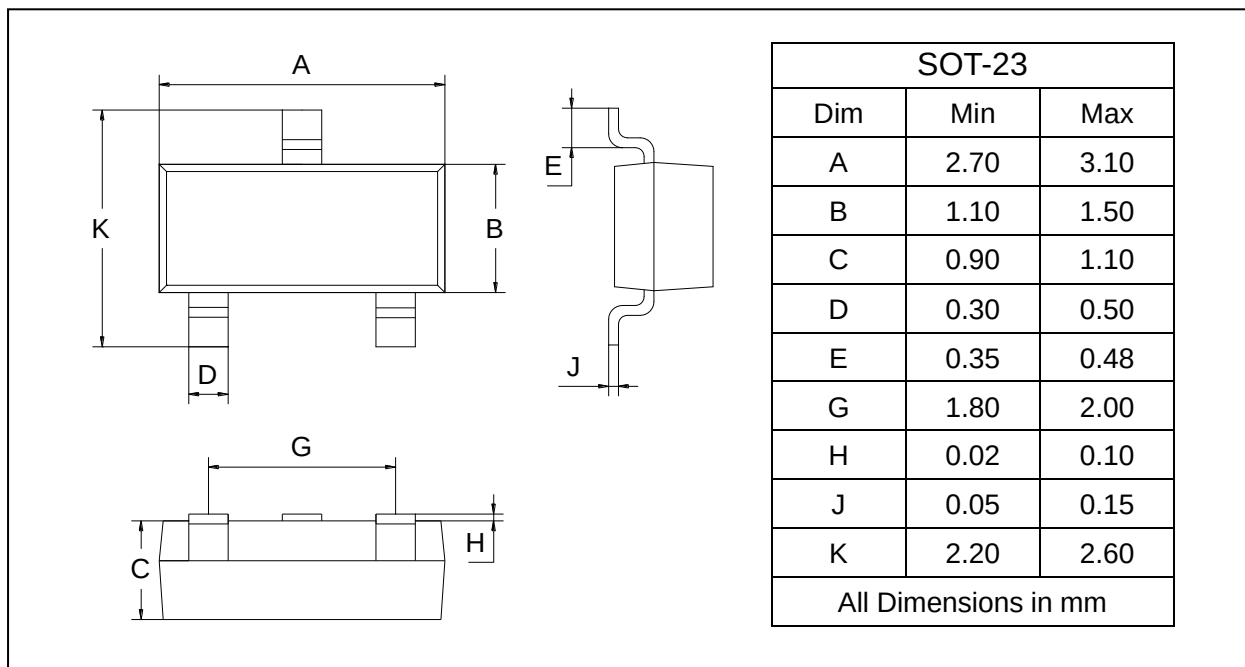
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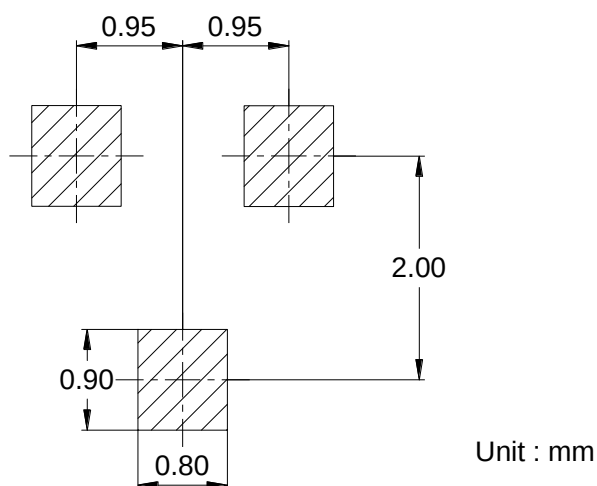
PACKAGE OUTLINE

Plastic surface mounted package

SOT-23



SOLDERING FOOTPRINT



PACKAGE INFORMATION

Device	Package	Shipping
TBCW60	SOT-23	3000 pcs / Tape & Reel