

BCW60B,235 Datasheet



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DiGi Electronics Part Number	BCW60B,235-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	BCW60B,235
Description	TRANS NPN 32V 0.1A TO236AB
Detailed Description	Bipolar (BJT) Transistor NPN 32 V 100 mA 250MHz 2 50 mW Surface Mount TO-236AB



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

BCW60B,235

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

32 V

Current - Collector Cutoff (Max):

20nA (ICBO)

Power - Max:

250 mW

Operating Temperature:

150°C (TJ)

Qualification:

AEC-Q101

Package / Case:

TO-236-3, SC-59, SOT-23-3

Base Product Number:

BCW60

Manufacturer:

Nexperia USA Inc.

Product Status:

Active

Current - Collector (Ic) (Max):

100 mA

Vce Saturation (Max) @ Ib, Ic:

550mV @ 1.25mA, 50mA

DC Current Gain (hFE) (Min) @ Ic, Vce:

180 @ 2mA, 5V

Frequency - Transition:

250MHz

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

TO-236AB

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

Moisture Sensitivity Level (MSL):

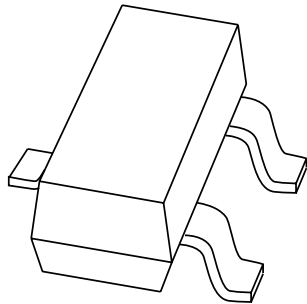
1 (Unlimited)

ECCN:

EAR99

DISCRETE SEMICONDUCTORS

DATA SHEET



BCW60 series NPN general purpose transistors

Product data sheet
Supersedes data of 1997 Mar 10

1999 Apr 22

NPN general purpose transistors

BCW60 series

FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 32 V).

APPLICATIONS

- General purpose switching and amplification.

DESCRIPTION

NPN transistor in a SOT23 plastic package.
PNP complements: BCW61 series.

MARKING

TYPE NUMBER	MARKING CODE ⁽¹⁾
BCW60B	AB*
BCW60C	AC*
BCW60D	AD*

Note

- * = p : Made in Hong Kong.
* = t : Made in Malaysia.

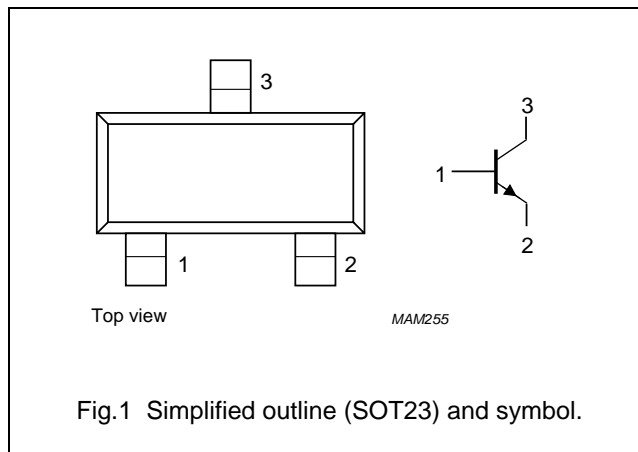
LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	32	V
V_{CEO}	collector-emitter voltage	open base	–	32	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)		–	100	mA
I_{CM}	peak collector current		–	200	mA
I_{BM}	peak base current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



NPN general purpose transistors

BCW60 series

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	500	K/W

Note

1. Transistor mounted on an FR4 printed-circuit board.

CHARACTERISTICS

$T_{amb} = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT	
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = 32\text{ V}$	–	–	20	nA	
		$I_E = 0; V_{CB} = 32\text{ V}; T_{amb} = 150\text{ °C}$	–	–	20	μA	
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 4\text{ V}$	–	–	20	nA	
h_{FE}	DC current gain	$I_C = 10\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$	BCW60B	20	–	–	
			BCW60C	40	–	–	
			BCW60D	100	–	–	
	DC current gain	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	BCW60B	180	–	310	
			BCW60C	250	–	460	
			BCW60D	380	–	630	
	DC current gain	$I_C = 50\text{ mA}; V_{CE} = 1\text{ V}$	BCW60B	70	–	–	
			BCW60C	90	–	–	
			BCW60D	100	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.25\text{ mA}$	50	–	350	mV	
		$I_C = 50\text{ mA}; I_B = 1.25\text{ mA}$	100	–	550	mV	
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.25\text{ mA}$	600	–	850	mV	
		$I_C = 50\text{ mA}; I_B = 1.25\text{ mA}$	0.7	–	1.05	V	
V_{BE}	base-emitter voltage	$I_C = 10\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$	–	520	–	mV	
		$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	550	650	750	mV	
		$I_C = 50\text{ mA}; V_{CE} = 1\text{ V}$	–	780	–	mV	
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	1.7	–	pF	
C_e	emitter capacitance	$I_C = i_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	11	–	pF	
f_T	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}; \text{note 1}$	100	250	–	MHz	
F	noise figure	$I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; R_S = 2\text{ k}\Omega; f = 1\text{ kHz}; B = 200\text{ Hz}$	–	2	6	dB	

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.

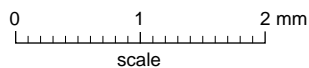
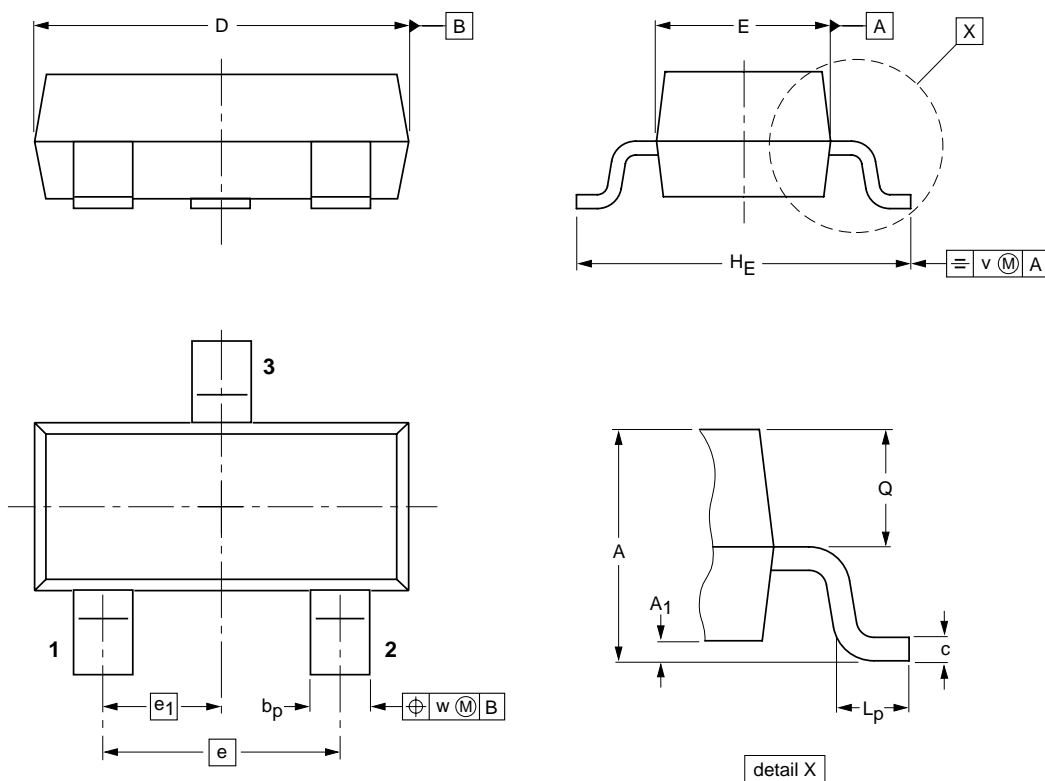
NPN general purpose transistors

BCW60 series

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max.	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				97-02-28 99-09-13

NPN general purpose transistors

BCW60 series

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

For additional information please visit: <http://www.nxp.com>

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