Data sheet	
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BDS933/935/937/939/941

NPN silicon epitaxial base power transistors

DESCRIPTION

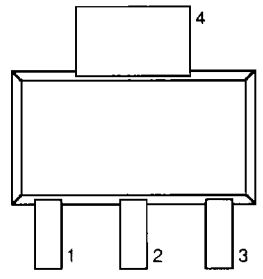
NPN silicon epitaxial base transistors in a miniature SMD envelope (SOT223) intended for general purpose and switching applications. PNP complements are BDS934/936/938/940/942.

PINNING - SOT223

PIN	DESCRIPTION
1	base
2	collector
3	emitter
4	collector

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BDS933		-	45	V
	BDS935		-	60	V
	BDS937		-	100	V
	BDS939		-	120	V
	BDS941		-	140	V
V_{CEO}	collector-emitter voltage	open base			
	BDS933		-	45	V
	BDS935		-	60	V
	BDS937		-	80	V
	BDS939		-	100	V
	BDS941		-	120	V
I_C	collector current	average value	-	3	A
I_{CM}	collector current	peak value	-	6	A
P_{tot}	total power dissipation	T_{tab} = 25 °C	-	8	W
		note 1	-	1.5	W
T_j	junction temperature		-	150	°C
h_{FE}	DC current gain	I_C = 150 mA; V_{CE} = 2 V;	40	250	
h_{FE}	DC current gain	I_C = 1 A; V_{CE} = 2 V;	25	-	
f_T	transition frequency	I_C = 250 mA; V_{CE} = 10 V	3	-	MHz



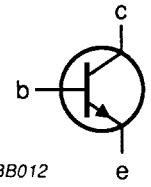


Fig.1 Pin configuration.

Note

1. Mounted on PCB

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LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BDS933		-	45	V
	BDS935		-	60	V
	BDS937		-	100	V
	BDS939		-	120	V
	BDS941		-	140	V
V_{CEO}	collector-emitter voltage	open base			
	BDS933		-	45	V
	BDS935		-	60	V
	BDS937		-	80	V
	BDS939		-	100	V
	BDS941		-	120	V
V_{EBO}	emitter-base voltage	open collector	-	5	V
I_C	collector current	average value	-	3	A
I_{CM}	collector current	peak value	-	6	A
I_B	base current		-	0.5	A
P_{tot}	total power dissipation	T_{tab} = 25 °C	-	8	W
T_{stg}	storage temperature range		–65	+150	°C
T_j	junction temperature		-	150	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	CONDITIONS	NOM.	UNIT
$R_{th\ j\text{-}t}$	from junction to tab		15.5	K/W
$R_{th\ j\text{-}a}$	from junction to ambient	on PCB	83.3	K/W

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CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	I_E = 0; $V_{CB} = V_{CBO\ max}$	-	-	50	µA
I_{CBO}	collector cut-off current	I_E = 0; $V_{CB} = V_{CBO\ max}$; T_j = 150 °C	-	-	1	mA
I_{CEO}	collector cut-off current	I_B = 0; $V_{CE} = V_{CEO\ max}$	-	-	0.1	mA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = 5 V	-	-	0.2	mA
V_{BE}	base-emitter voltage	I_C = 1 A; V_{CE} = 2 V; note 1	-	-	1.0	V
$V_{CE\ sat}$	collector-emitter saturation voltage	I_C = 1 A; I_B = 0.1 A	-	-	0.5	V
h_{FE}	DC current gain	I_C = 150 mA; V_{CE} = 2 V note 1	40	-	250	
h_{FE}	DC current gain	I_C = 1 A; V_{CE} = 2 V; note 1	25	-	-	
f_T	transition frequency	f = 1 MHz; I_C = 250 mA; V_{CE} = 10 V	3	-	-	MHz
t_{on}	switching times turn-on time	$I_{C\ on}$ = 1 A; $I_{B\ on} = -I_{B\ off}$ = 0.1 A	-	0.4	1	µs
t_{off}	switching times turn-off time		-	1.5	3	µs

Note

1. Measured under pulse conditions: t_p < 300 µs, duty cycle < 2%.

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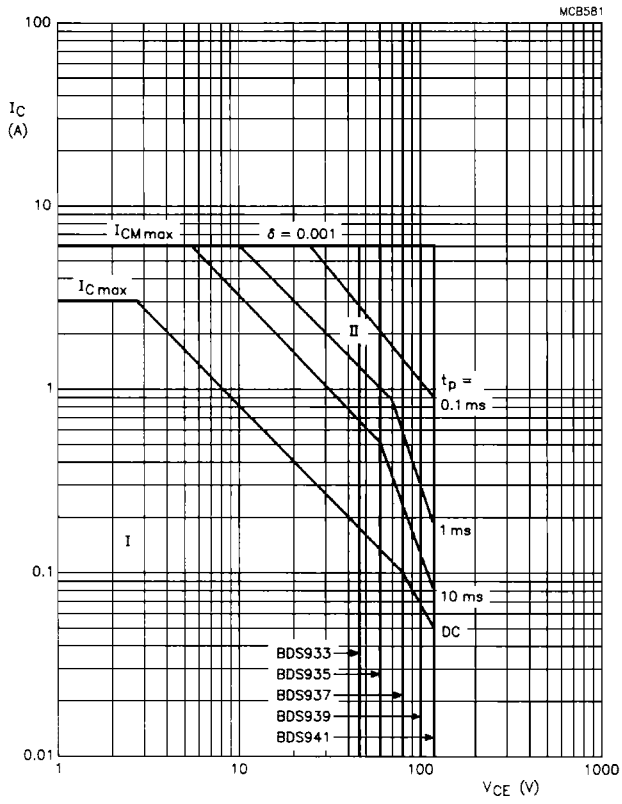

I. Region of permissible DC operation.
II. Permissible extension for repetitive pulse operation.

Fig.2 Safe operating area; T_{tab} = 25 °C.

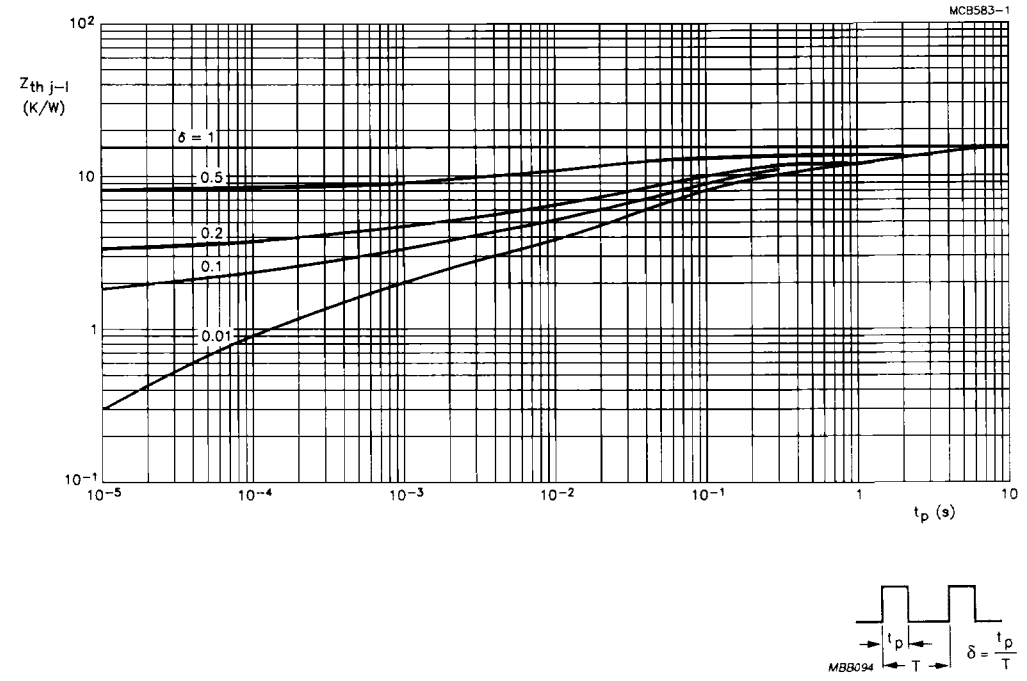

Fig.3 Pulse power rating chart.

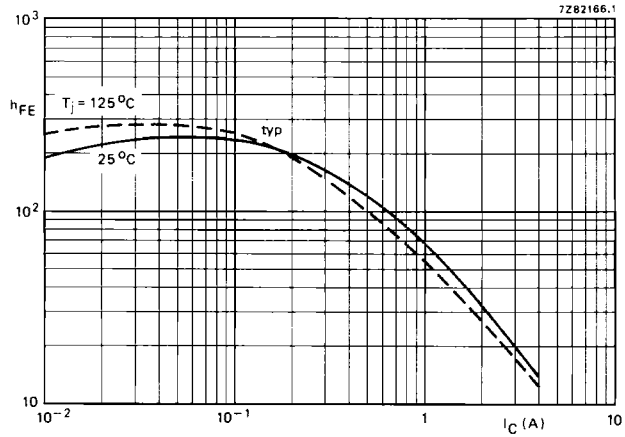

Fig.4 Typical DC current gain; V_{CE} = 2 V.