

COMPLEMENTARY DUAL 40V HIGH PERFORMANCE TRANSISTOR

Features

- NPN Transistor
 - $V_{CE0} = 40$
 - $R_{SAT} = 195\text{ m}\Omega$
 - $I_C = 2.5A$
- PNP Transistor
 - $V_{CE0} = -40V$
 - $R_{SAT} = 350\text{ m}\Omega$
 - $I_C = -2A$
- Low Saturation Voltage (500mV max @ 1A)
- $I_C = 2.5A$ Continuous Collector Current
- h_{FE} characterized up to 2A

Mechanical Data

- Case: DFN3020B-8
- UL Flammability Rating 94V-0
- Terminals: Pre-Plated NiPdAu leadframe
- Nominal package height: 0.8mm
- Moisture Sensitivity: Level 1 per J-STD-020
- Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)

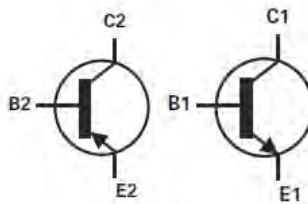
Applications

- DC – DC Converters
- Power switches
- Motor control
- LED Backlighting circuits

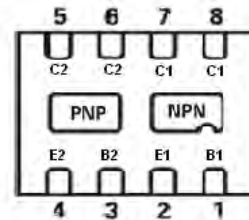
DFN3020B-8



TOP VIEW



Device Symbol



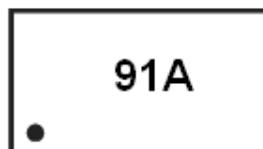
Pin Configuration

Ordering Information

Product	Status	Package	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC4591AMCTA	Active	DFN3020B-8	91A	7	8	3000

Notes: 1. No purposefully added lead. Halogen and Antimony Free.
2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>

Marking Information



91A = Product type Marking Code
Dot denotes Pin 1

Maximum Ratings

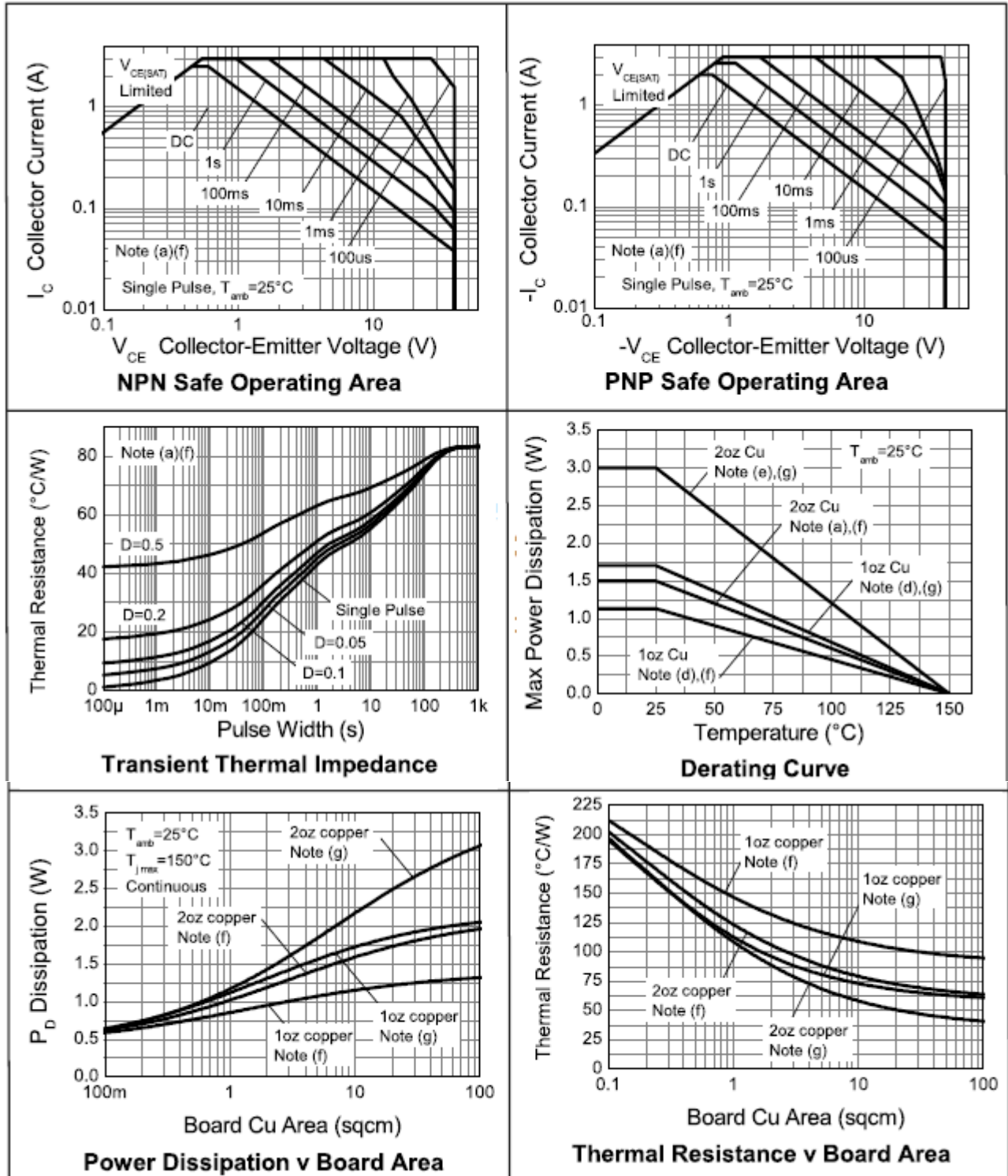
Parameter	Symbol	NPN	PNP	Unit
Collector-Base Voltage	V_{CBO}	40	-40	V
Collector-Emitter Voltage	V_{CEO}	40	-40	V
Emitter-Base Voltage	V_{EBO}	5	-5	V
Peak Pulse Current	I_{CM}	3	-3	A
Continuous Collector Current(a)(f)	I_C	2	-1.5	A
Continuous Collector Current(b)(f)	I_C	2.5	-2.0	A
Base Current	I_B	300		mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation at $T_A = 25^\circ\text{C}$ (a) (f)	P_D	1.5	W
Linear Derating Factor		12	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (b) (f)	P_D	2.45	W
Linear Derating Factor		19.6	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (c) (f)	P_D	1	W
Linear Derating Factor		8	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (d) (f)	P_D	1.13	W
Linear Derating Factor		9	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (d) (g)	P_D	1.7	W
Linear Derating Factor		13.6	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (e) (g)	P_D	3	W
Linear Derating Factor		24	mW/ $^\circ\text{C}$
Junction to Ambient (a) (f)	$R_{\theta JA}$	83.3	$^\circ\text{C}/\text{W}$
Junction to Ambient (b) (f)	$R_{\theta JA}$	51	$^\circ\text{C}/\text{W}$
Junction to Ambient (c) (f)	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction to Ambient (d) (f)	$R_{\theta JA}$	111	$^\circ\text{C}/\text{W}$
Junction to Ambient (d) (g)	$R_{\theta JA}$	73.5	$^\circ\text{C}/\text{W}$
Junction to Ambient (e) (g)	$R_{\theta JA}$	41.7	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
- For a dual device surface mounted on 8 sq cm single sided 2 oz copper on FR4 PCB, in still air conditions **with all exposed pads attached**. The copper area is split down the centre line into two separate areas with one half connected to each half of the dual device.
 - Measured at $t < 5$ secs for a dual device surface mounted on 8 sq cm single sided 2 oz copper on FR4 PCB, in still air conditions **with all exposed pads attached**. The copper area is split down the centre line into two separate areas with one half connected to each half of the dual device.
 - For a dual device surface mounted on 8 sq cm single sided 2 oz copper on FR4 PCB, in still air conditions **with minimal lead connections only**.
 - For a dual device surface mounted on 10 sq cm single sided 1 oz copper on FR4 PCB, in still air conditions **with all exposed pads attached**. The copper area is split down the centre line into two separate areas with one half connected to each half of the dual device.
 - For a dual device surface mounted on 85 sq cm single sided 2 oz copper on FR4 PCB, in still air conditions **with all exposed pads attached**. The copper area is split down the centre line into two separate areas with one half connected to each half of the dual device.
 - For a dual device with one active die.
 - For dual device with 2 active die running at equal power.

Thermal Characteristics and Derating information

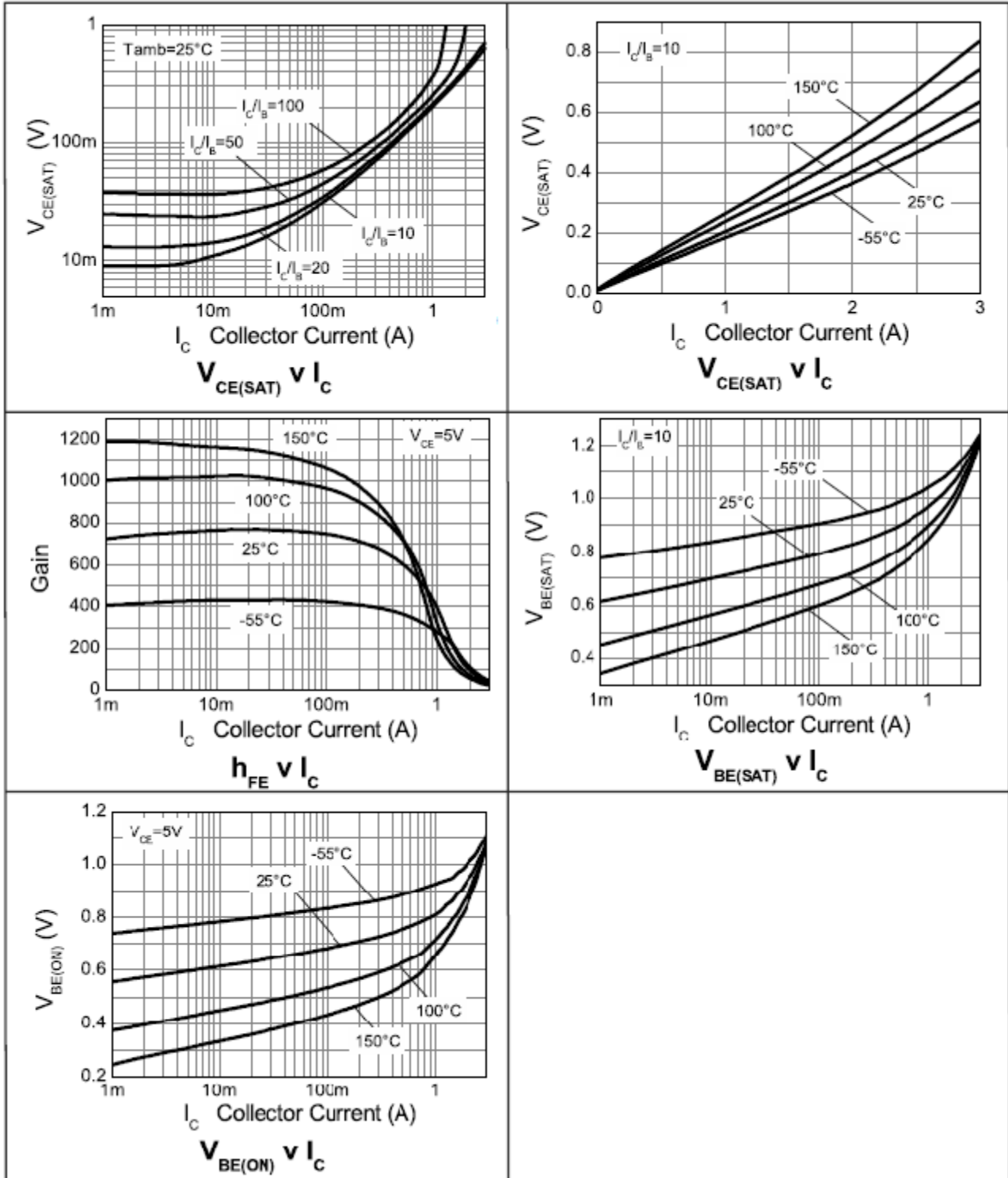


Electrical Characteristics, NPN Transistor (at $T_A = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	40	-	-	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 3)	$V_{(BR)CEO}$	40	-	-	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	-	-	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	-	-	100	nA	$V_{CB} = 30\text{V}$
Emitter Cutoff Current	I_{EBO}	-	-	100	nA	$V_{EB} = 4\text{V}$
Collector Emitter Cutoff Current	I_{CES}	-	-	100	nA	$V_{CE} = 30\text{V}$
Static Forward Current Transfer Ratio (Note 3)	h_{FE}	300 300 200 35	- - - -	- 900 - -	-	$I_C = 1\text{mA}, V_{CE} = 5\text{V}$ $I_C = 500\text{mA}, V_{CE} = 5\text{V}$ $I_C = 1\text{A}, V_{CE} = 5\text{V}$ $I_C = 2\text{A}, V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage (Note 3)	$V_{CE(sat)}$	- -	- -	300 500	mV	$I_C = 0.5\text{A}, I_B = 50\text{mA}$ $I_C = 1\text{A}, I_B = 100\text{mA}$
Base-Emitter Turn-On Voltage (Note 3)	$V_{BE(on)}$	-	-	1.0	V	$I_C = 1\text{A}, V_{CE} = 5\text{V}$
Base-Emitter Saturation Voltage (Note 3)	$V_{BE(sat)}$	-	-	1.1	V	$I_C = 1\text{A}, I_B = 100\text{mA}$
Output Capacitance	C_{obo}	-	-	10	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	f_T	150	-	-	MHz	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$

Notes: 3. Measured under pulsed conditions.

NPN Characteristics

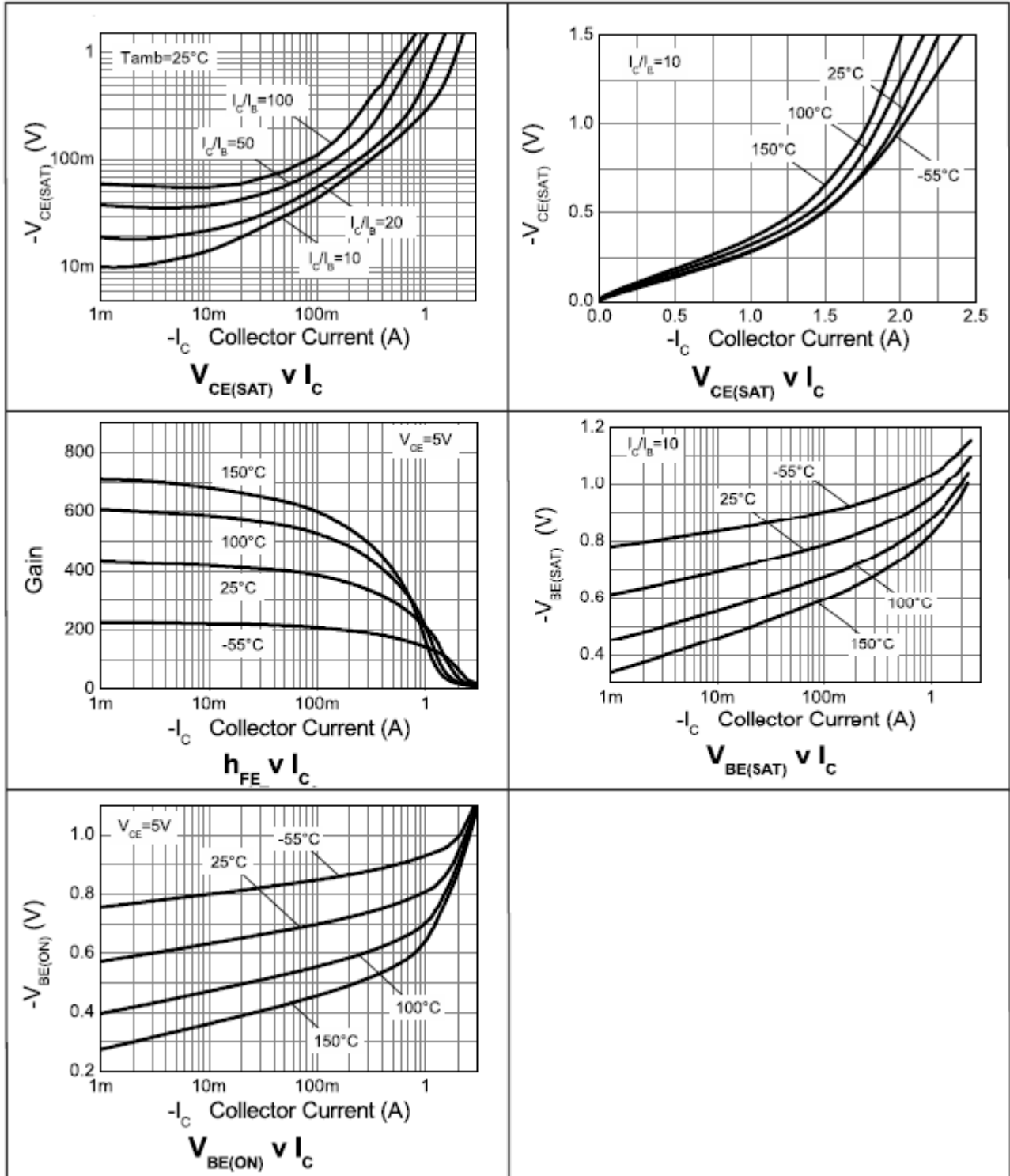


Electrical Characteristics, PNP Transistor @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	-	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 4)	$V_{(BR)CEO}$	-40	-	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	-	-	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	$V_{CB} = -30\text{V}$
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	$V_{EB} = -4\text{V}$
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	$V_{CE} = -30\text{V}$
Static Forward Current Transfer Ratio (Note 4)	h_{FE}	300	-	-	-	$I_C = -1\text{mA}, V_{CE} = -5\text{V}$
		300	-	800		$I_C = -100\text{mA}, V_{CE} = -5\text{V}$
		250	-	-		$I_C = -500\text{mA}, V_{CE} = -5\text{V}$
		160	-	-		$I_C = -1\text{A}, V_{CE} = -5\text{V}$
		30	-	-		$I_C = -2\text{A}, V_{CE} = -5\text{V}$
Collector-Emitter Saturation Voltage (Note 4)	$V_{CE(sat)}$	-	-	-200	mV	$I_C = -0.1\text{A}, I_B = -1\text{mA}$
		-	-	-350		$I_C = -0.5\text{A}, I_B = -20\text{mA}$
		-	-	-500		$I_C = -1\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-On Voltage(Note 4)	$V_{BE(on)}$	-	-	-1.0	V	$I_C = -1\text{A}, V_{CE} = -5\text{V}$
Base-Emitter Saturation Voltage(Note 4)	$V_{BE(sat)}$	-	-	-1.1	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Output Capacitance	C_{obo}	-	-	10	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	f_T	150	-	-	MHz	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$

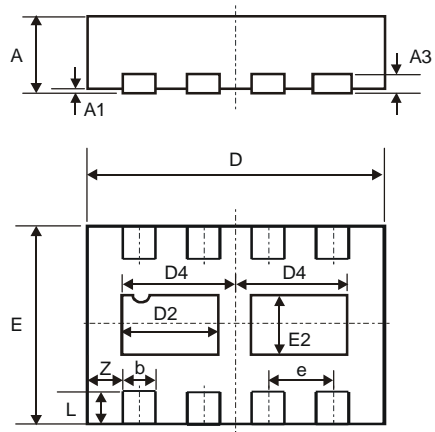
Notes: 4. Measured under pulsed conditions.

PNP Characteristics



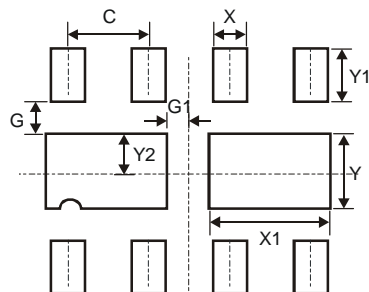
ZXTC4591AMC

Package Outline Dimensions



DFN3020B-8			
Dim	Min	Max	Typ
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.650
G	0.285
G1	0.090
X	0.400
X1	1.120
Y	0.730
Y1	0.500
Y2	0.365

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