

**DUAL 50V NPN & 40V PNP LOW SATURATION TRANSISTOR COMBINATION**

**Features**

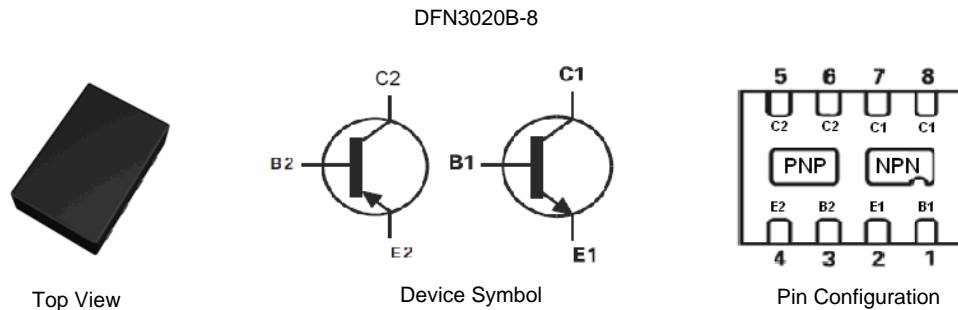
- NPN Transistor
  - $V_{CE0} = 50V$
  - $R_{SAT} = 68\ m\Omega$
  - $I_C = 4A$
- PNP Transistor
  - $V_{CE0} = -40V$
  - $R_{SAT} = 104\ m\Omega$
  - $I_C = -3A$
- $I_C = 4A$  Continuous Collector Current
- Low Saturation Voltage (100mV max @ 1A -- NPN)
- $h_{FE}$  characterized up to 6A
- **Lead, Halogen, and Antimony Free/RoHS Compliant (Note 1)**
- **"Green" Devices (Note 2)**

**Mechanical Data**

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

**Applications**

- DC – DC Converters
- Charging circuits
- Power switches
- Motor control
- CCFL Backlighting circuits



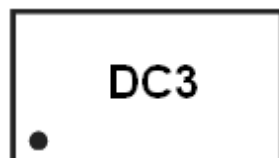
**Ordering Information**

Product	Status	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC6719MCTA	Active	DC3	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**

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DC3 = Product type Marking Code  
Dot denotes Pin 1

## Maximum Ratings

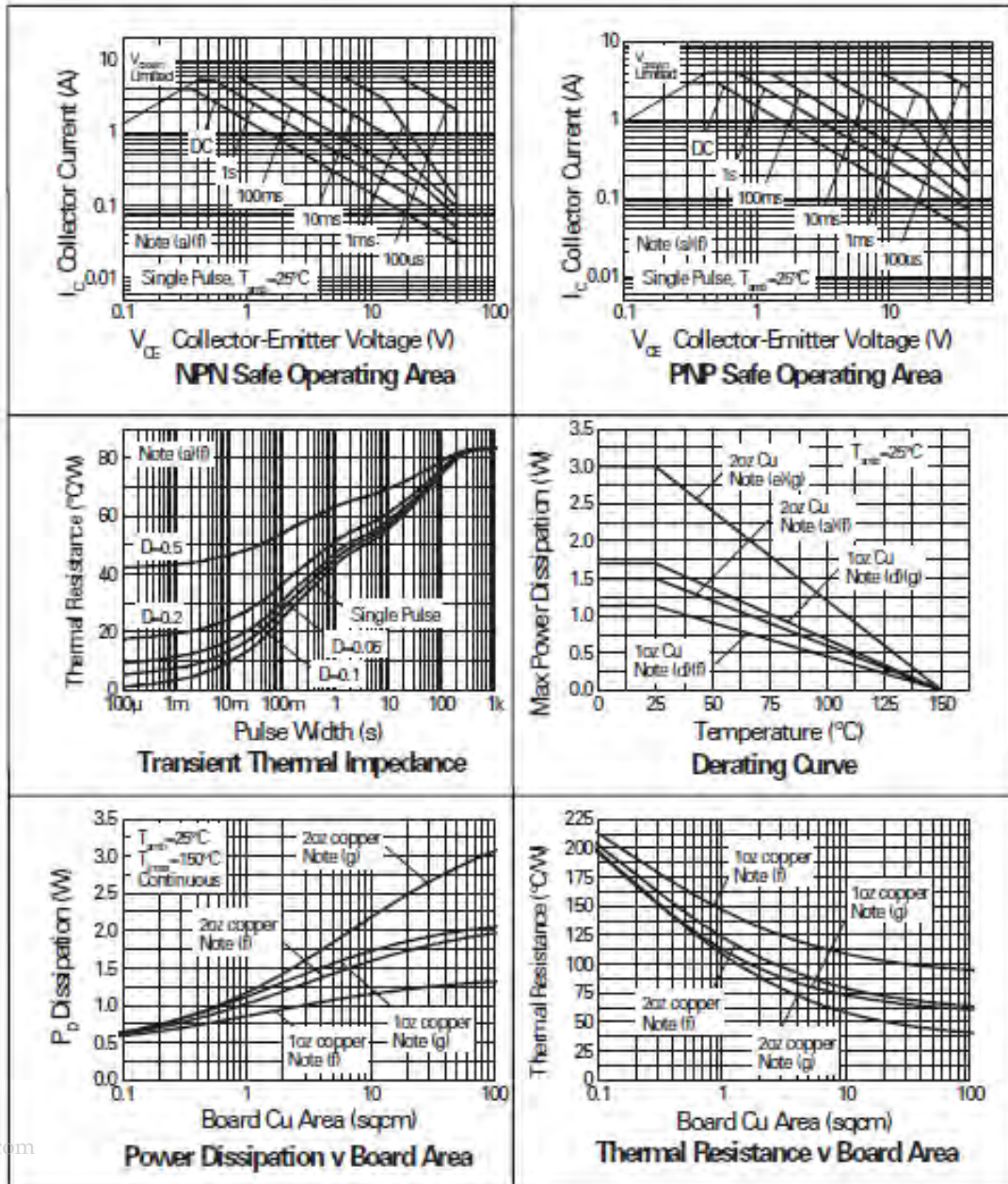
Parameter	Symbol	NPN	PNP	Unit
Collector-Base Voltage	$V_{CBO}$	100	-50	V
Collector-Emitter Voltage	$V_{CEO}$	50	-40	V
Emitter-Base Voltage	$V_{EBO}$	7.5	-7.5	V
Peak Pulse Current	$I_{CM}$	6	-4	A
Continuous Collector Current (a) (f)	$I_C$	4	-3	A
Base Current	$I_B$		1	A

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation at $T_A = 25^\circ\text{C}$ (a) (f)		1.5	W
Linear Derating Factor	$P_D$	12	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (b) (f)		2.45	W
Linear Derating Factor	$P_D$	19.6	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (c) (f)		1	W
Linear Derating Factor	$P_D$	8	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (d) (f)		1.13	W
Linear Derating Factor	$P_D$	9	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (d) (g)		1.7	W
Linear Derating Factor	$P_D$	13.6	mW/ $^\circ\text{C}$
Power Dissipation at $T_A = 25^\circ\text{C}$ (e) (g)		3	W
Linear Derating Factor	$P_D$	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	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-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**



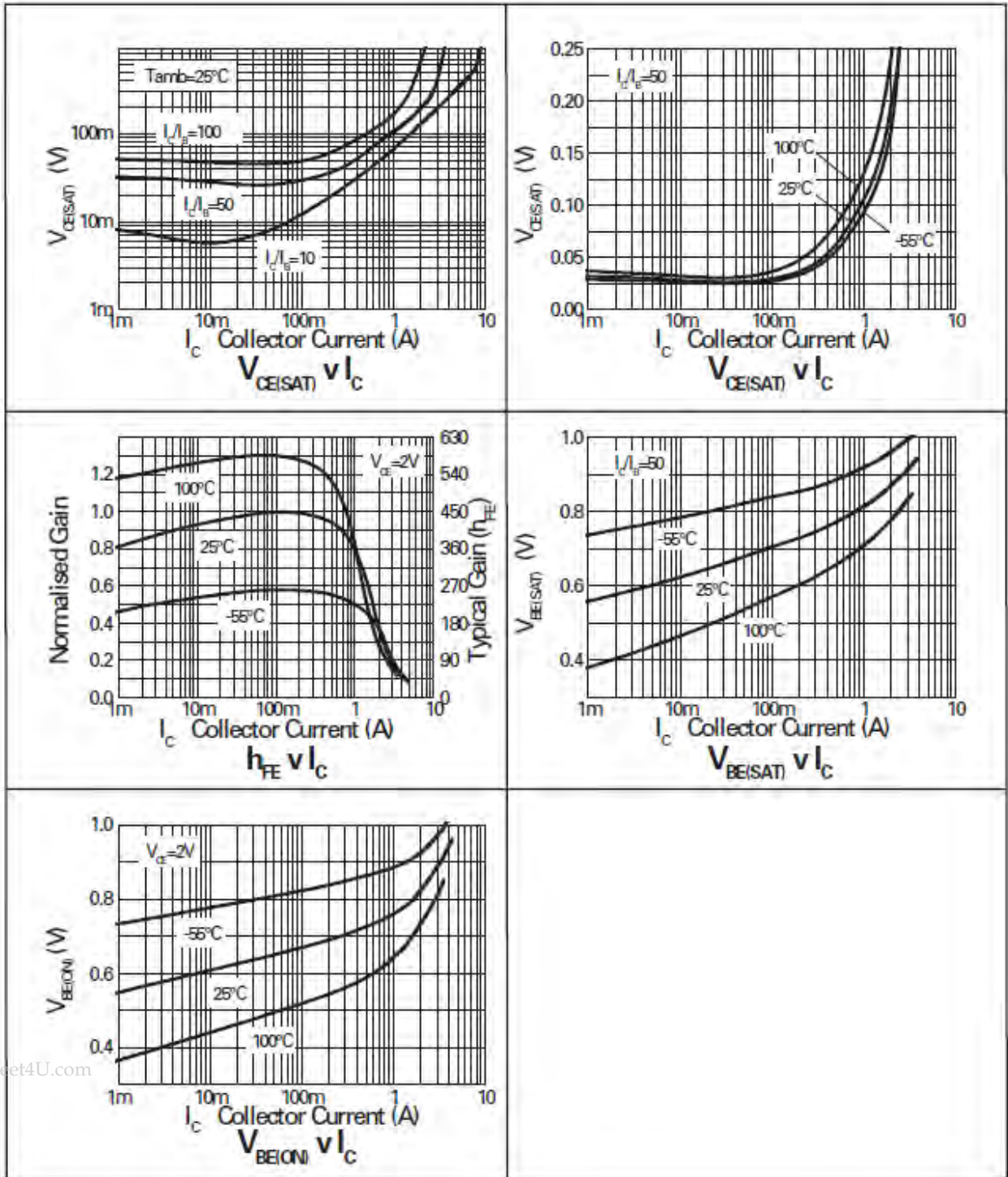
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**Electrical Characteristics, NPN Transistor** (at  $T_A = 25^\circ\text{C}$  unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	100	190	-	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 3)	$V_{(BR)CEO}$	50	65	-	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	7.5	8.2	-	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	-	-	25	nA	$V_{CB} = 80\text{V}$
Emitter Cutoff Current	$I_{EBO}$	-	-	25	nA	$V_{EB} = 6\text{V}$
Collector Emitter Cutoff Current	$I_{CES}$	-	-	25	nA	$V_{CES} = 40\text{V}$
Static Forward Current Transfer Ratio (Note 3)	$h_{FE}$	200 300 200 100 -	400 450 400 225 40	- - - - -	-	$I_C = 10\text{mA}, V_{CE} = 2\text{V}$ $I_C = 200\text{mA}, V_{CE} = 2\text{V}$ $I_C = 1\text{A}, V_{CE} = 2\text{V}$ $I_C = 2\text{A}, V_{CE} = 2\text{V}$ $I_C = 6\text{A}, V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 3)	$V_{CE(sat)}$	- - - - -	10 70 145 115 225 270	20 100 200 220 300 320	mV	$I_C = 0.1\text{A}, I_B = 10\text{mA}$ $I_C = 1\text{A}, I_B = 5\text{mA}$ $I_C = 1\text{A}, I_B = 10\text{mA}$ $I_C = 2\text{A}, I_B = 50\text{mA}$ $I_C = 3\text{A}, I_B = 100\text{mA}$ $I_C = 4\text{A}, I_B = 200\text{mA}$
Base-Emitter Turn-On Voltage (Note 3)	$V_{BE(on)}$	-	0.94	1.00	V	$I_C = 4\text{A}, V_{CE} = 2\text{V}$
Base-Emitter Saturation Voltage (Note 3)	$V_{BE(sat)}$	-	1.00	1.05	V	$I_C = 4\text{A}, I_B = 200\text{mA}$
Output Capacitance	$C_{obo}$	-	12	20	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Transition Frequency	$f_T$	100	165	-	MHz	$V_{CE} = 10\text{V}, I_C = 50\text{mA}, f = 100\text{MHz}$
Turn-on Time	$t_{on}$	-	170	-	ns	$V_{CC} = 10\text{V}, I_C = 1\text{A}$
Turn-off Time	$t_{off}$	-	750	-	ns	$I_{B1} = I_{B2} = 10\text{mA}$

Notes: 3. Measured under pulsed conditions.

**NPN Characteristics**



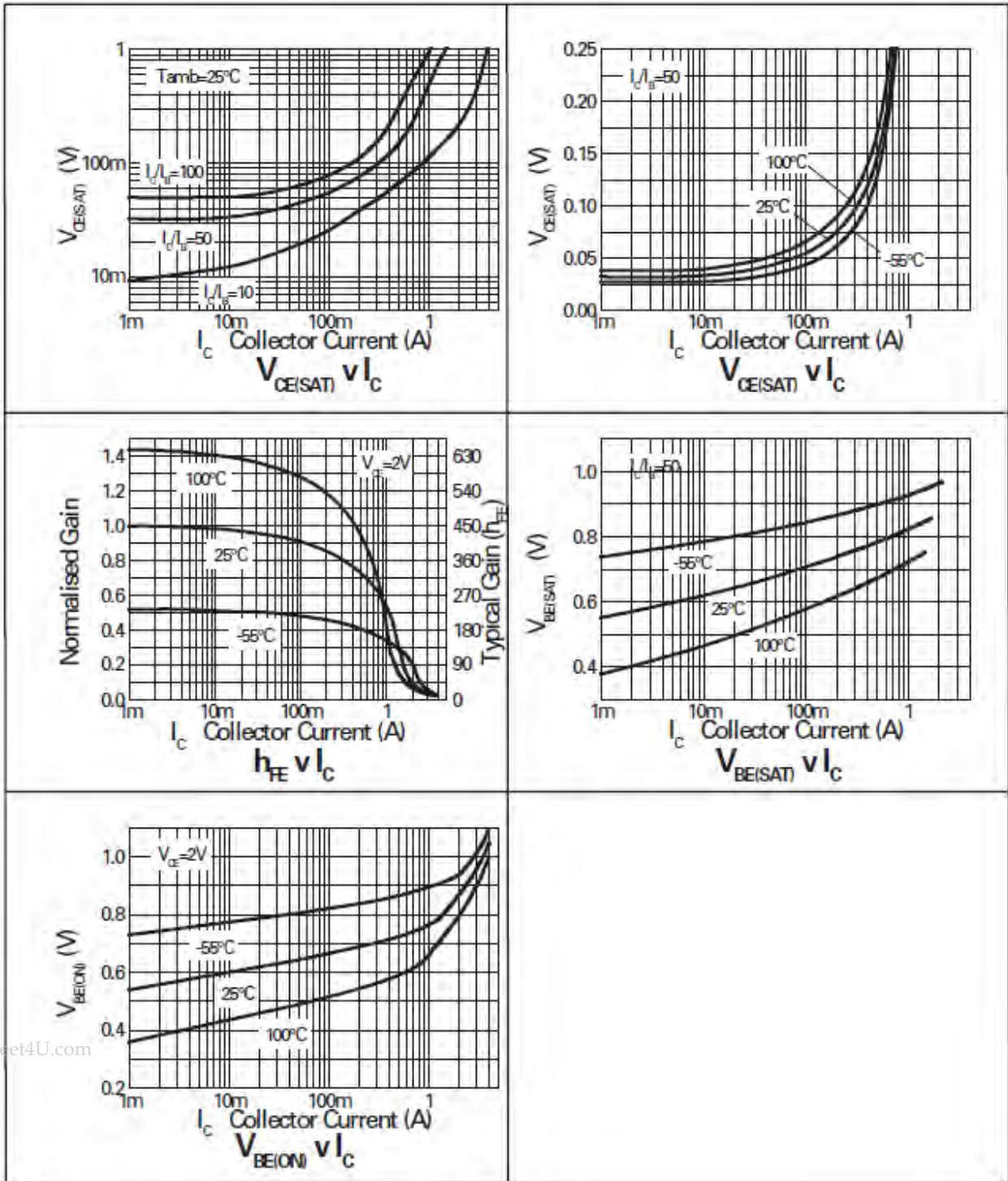
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**Electrical Characteristics, PNP Transistor** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	-50	-80	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 4)	V <sub>(BR)CEO</sub>	-40	-70	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	-7.5	-8.5	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	-	-25	nA	V <sub>CB</sub> = -40V
Emitter Cutoff Current	I <sub>EBO</sub>	-	-	-25	nA	V <sub>EB</sub> = -6V
Collector Emitter Cutoff Current	I <sub>CES</sub>	-	-	-25	nA	V <sub>CES</sub> = -32V
Static Forward Current Transfer Ratio (Note 4)	h <sub>FE</sub>	300 300 180 60 12	480 450 290 130 22	- - - - -	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -2V I <sub>C</sub> = -100mA, V <sub>CE</sub> = -2V I <sub>C</sub> = -1A, V <sub>CE</sub> = -2V I <sub>C</sub> = -1.5A, V <sub>CE</sub> = -2V I <sub>C</sub> = -3A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Note 4)	V <sub>CE(sat)</sub>	- - - - -	-25 -150 -195 -210 -260	-40 -220 -300 -300 -370	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA I <sub>C</sub> = -1.5A, I <sub>B</sub> = -100mA I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA I <sub>C</sub> = -2.5A, I <sub>B</sub> = -250mA
Base-Emitter Turn-On Voltage (Note 4)	V <sub>BE(on)</sub>	-	-0.89	-0.95	V	I <sub>C</sub> = -2.5A, V <sub>CE</sub> = -2V
Base-Emitter Saturation Voltage (Note 4)	V <sub>BE(sat)</sub>	-	-0.97	-1.05	V	I <sub>C</sub> = -2.5A, I <sub>B</sub> = -250mA
Output Capacitance	C <sub>obo</sub>	-	19	25	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	150	190	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz
Turn-on Time	t <sub>on</sub>	-	40	-	ns	V <sub>CC</sub> = -15V, I <sub>C</sub> = -0.75A
Turn-off Time	t <sub>off</sub>	-	435	-	ns	I <sub>B1</sub> = I <sub>B2</sub> = -10mA

Notes: 4. Measured under pulsed conditions.

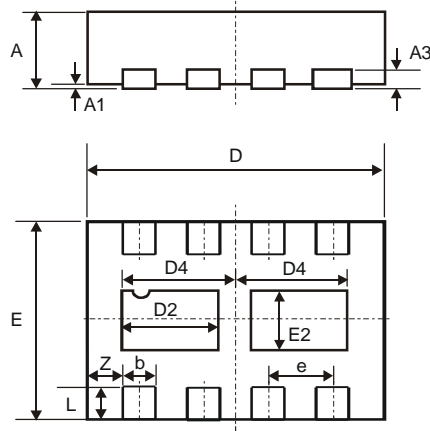
**PNP Characteristics**



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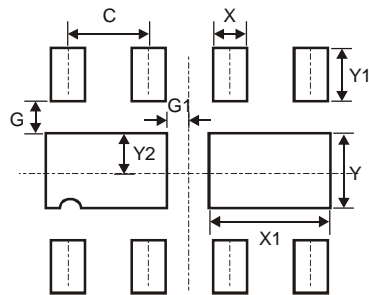
**ZXTC6719MC**

**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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