

DUAL 15V NPN & 12V PNP LOW SATURATION TRANSISTOR COMBINATION

Features

NPN Transistor

- $BV_{CEO} > 15V$
- $I_C = 4.5A$ Continuous Collector Current
- Low Saturation Voltage (100mV max @ 1A)
- $R_{SAT} = 45m\Omega$ for a low equivalent On-Resistance

PNP Transistor

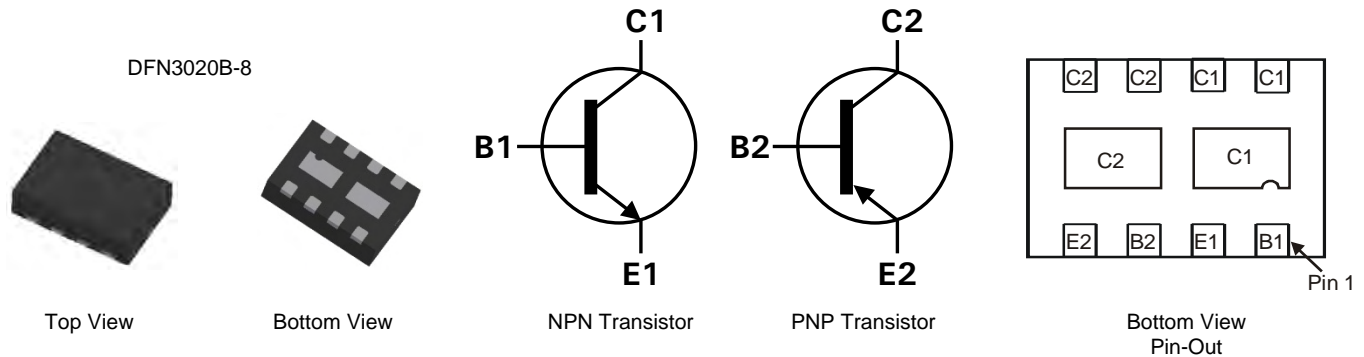
- $BV_{CEO} > -12V$
- $I_C = -4A$ Continuous Collector Current
- Low Saturation Voltage (-140mV max @ -1A)
- $R_{SAT} = 60m\Omega$ for a low equivalent On-Resistance
- h_{FE} characterized up to 12A for high current gain hold up
- Low profile 0.8mm high package for thin applications
- $R_{\theta JA}$ efficient, 40% lower than SOT26
- 6mm² footprint, 50% smaller than TSOP6 and SOT26
- **Lead-Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: DFN3020B-8
- Case material: Molded Plastic. "Green" Molding Compound.
- Terminals: Pre-Plated NiPdAu leadframe.
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.013 grams (approximate)

Applications

- DC – DC Converters
- Charging circuits
- Power switches
- Motor control
- LED Backlighting circuits
- Portable applications



Ordering Information

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTC6717MCTA	DA1	7	8	3000

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

Marking Information

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DA1 = Product type Marking Code
Dot denotes Pin 1

Maximum Ratings @T_A = 25°C unless otherwise specified

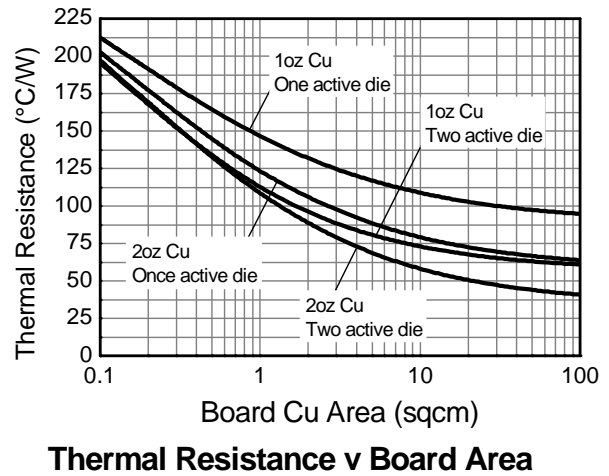
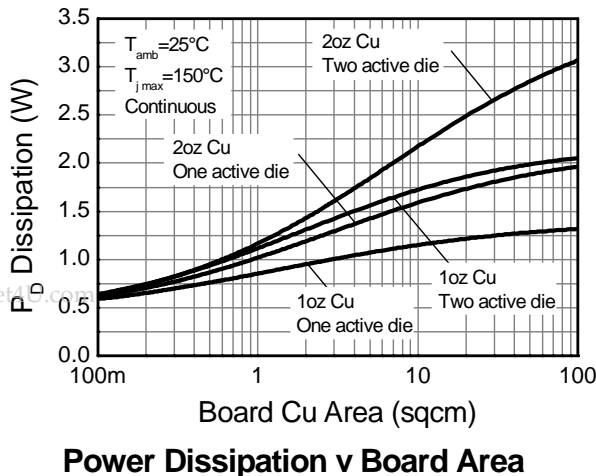
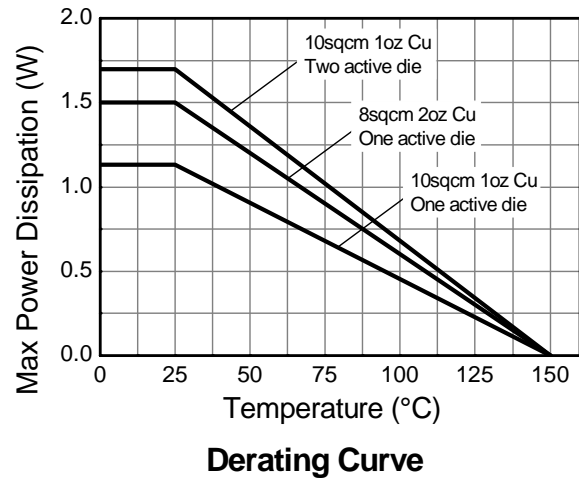
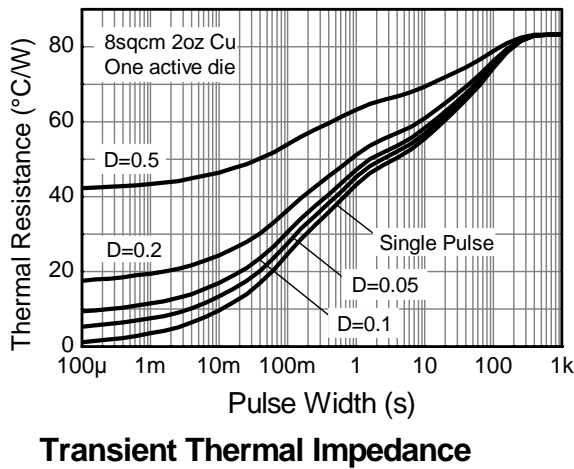
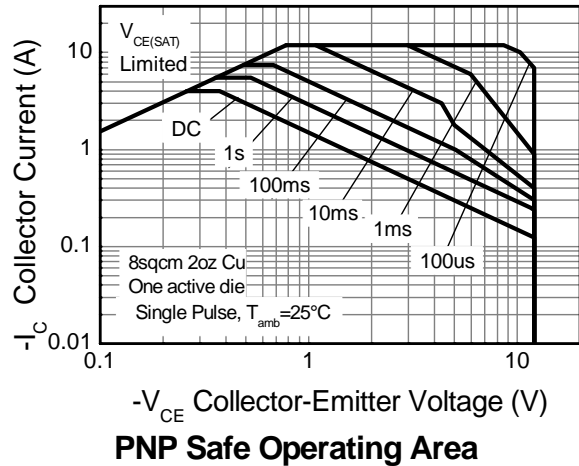
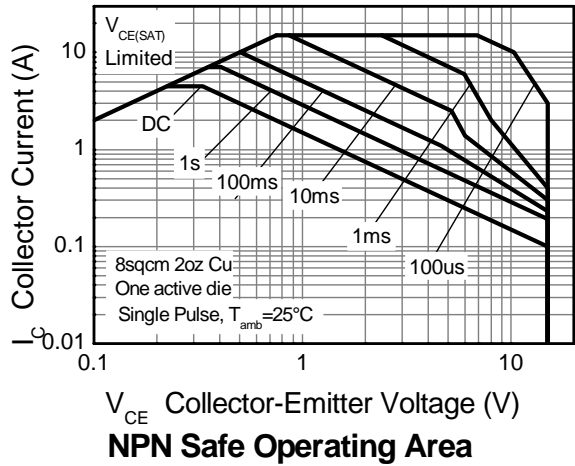
Characteristic	Symbol	NPN	PNP	Unit	
Collector-Base Voltage	V _{CBO}	40	-20	V	
Collector-Emitter Voltage	V _{CEO}	15	-12	V	
Emitter-Base Voltage	V _{EBO}	7	-7	V	
Peak Pulse Current	I _{CM}	15	-12	A	
Continuous Collector Current	(Notes 3 & 6)	I _C	4.5	-4	A
	(Notes 4 & 6)		5		
Base Current	I _B	1		A	

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	NPN	PNP	Unit
Power Dissipation Linear Derating Factor	(Notes 3 & 6)	P _D	1.5	W mW/°C
	(Notes 4 & 6)		12	
	(Notes 5 & 6)		2.45	
	(Notes 5 & 7)		19.6	
	(Notes 5 & 7)		1.13	
Thermal Resistance, Junction to Ambient	(Notes 3 & 6)	R _{θJA}	8	°C/W
	(Notes 4 & 6)		1.7	
	(Notes 5 & 6)		13.6	
	(Notes 5 & 7)		83.3	
Thermal Resistance, Junction to Lead	(Notes 5 & 7)	R _{θJL}	51.0	°C/W
	(Notes 6 & 8)		111	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150		°C

- Notes:
3. For a dual device surface mounted on 28mm x 28mm (8cm²) FR4 PCB with high coverage of single sided 2 oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed collector pads connected to each half.
 4. Same as note (3), except the device is measured at t < 5 sec.
 5. Same as note (3), except the device is surface mounted on 31mm x 31mm (10cm²) FR4 PCB with high coverage of single sided 1oz copper.
 6. For a dual device with one active die.
 7. For dual device with 2 active die running at equal power.
 8. Thermal resistance from junction to solder-point (at the end of the collector lead).

Thermal Characteristics



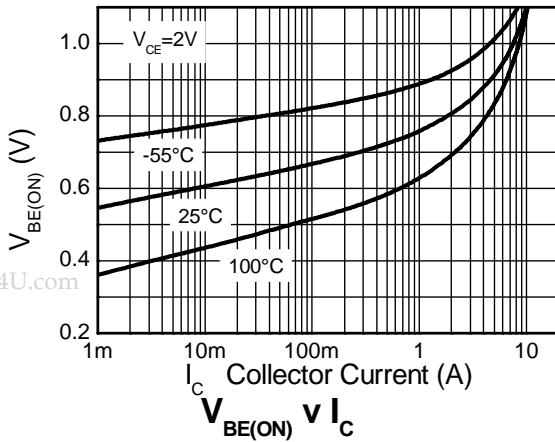
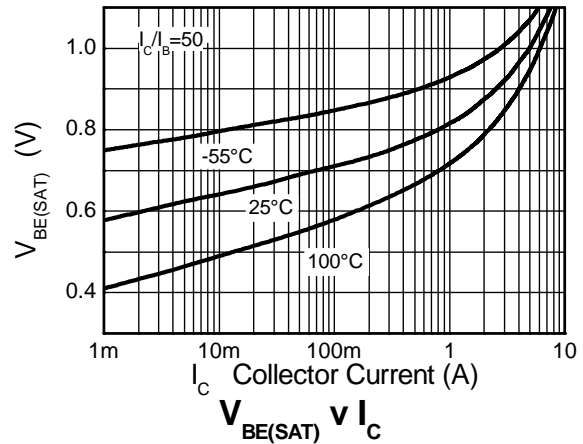
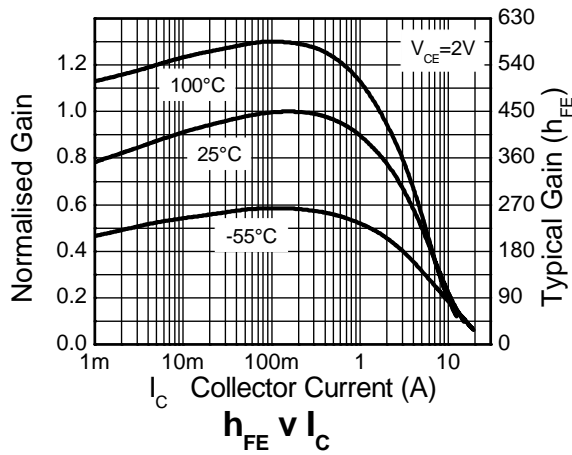
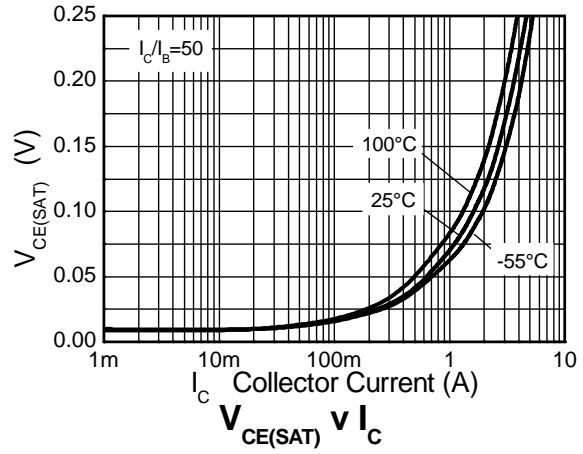
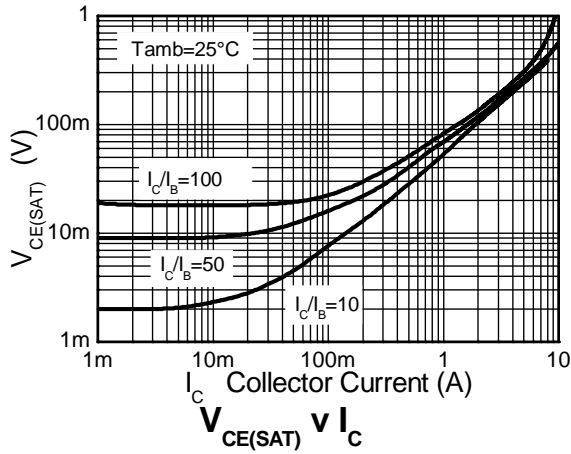
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NPN - Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	40	70	-	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	15	18	-	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	8.2	-	V	I _E = 100μA
Collector Cutoff Current	I _{CBO}	-	-	100	nA	V _{CB} = 30V
Emitter Cutoff Current	I _{EBO}	-	-	100	nA	V _{EB} = 6V
Collector Emitter Cutoff Current	I _{CES}	-	-	100	nA	V _{CE} = 12V
Static Forward Current Transfer Ratio (Note 9)	h _{FE}	200 300 200 150 -	415 450 320 240 80	- - - - -	-	I _C = 10mA, V _{CE} = 2V I _C = 200mA, V _{CE} = 2V I _C = 3A, V _{CE} = 2V I _C = 5A, V _{CE} = 2V I _C = 12A, V _{CE} = 2V
Collector-Emitter Saturation Voltage (Note 9)	V _{CE(sat)}	-	8 70 165 240 200	14 100 200 310 -	mV	I _C = 0.1A, I _B = 10mA I _C = 1A, I _B = 10mA I _C = 3A, I _B = 50mA I _C = 4.5A, I _B = 50mA I _C = 4.5A, I _B = 100mA
Base-Emitter Turn-On Voltage (Note 9)	V _{BE(on)}	-	0.88	0.96	V	I _C = 4.5A, V _{CE} = 2V
Base-Emitter Saturation Voltage (Note 9)	V _{BE(sat)}	-	0.94	1.05	V	I _C = 4.5A, I _B = 50mA
Output Capacitance	C _{obo}	-	30	40	pF	V _{CB} = 10V, f = 1MHz
Transition Frequency	f _T	80	120	-	MHz	V _{CE} = 10V, I _C = 50mA, f = 100MHz
Turn-on Time	t _{on}	-	120	-	ns	V _{CC} = 10V, I _C = 1A
Turn-off Time	t _{off}	-	160	-	ns	I _{B1} = I _{B2} = 10mA

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

NPN – Typical Electrical Characteristics



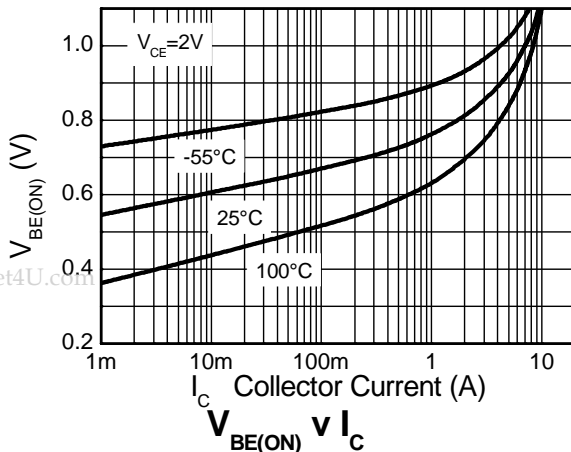
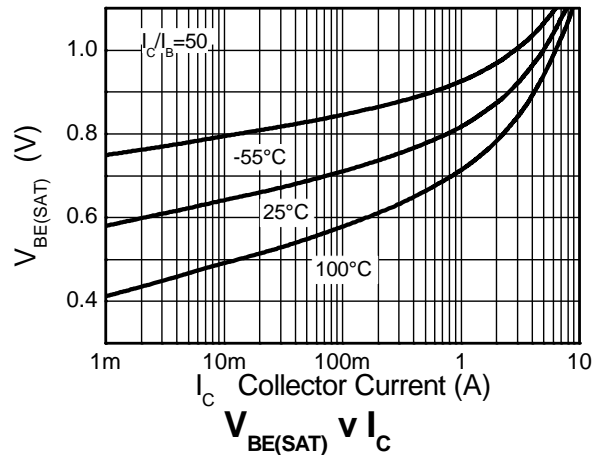
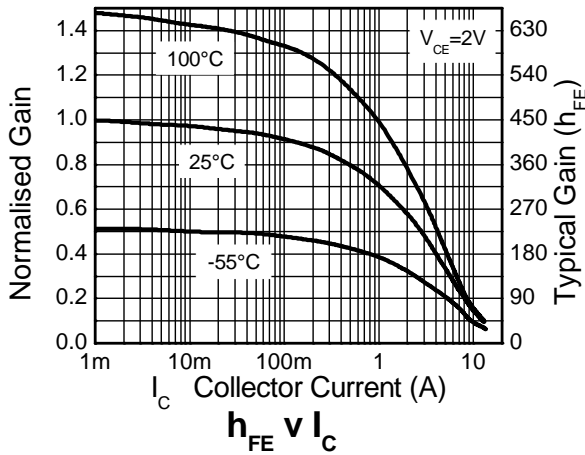
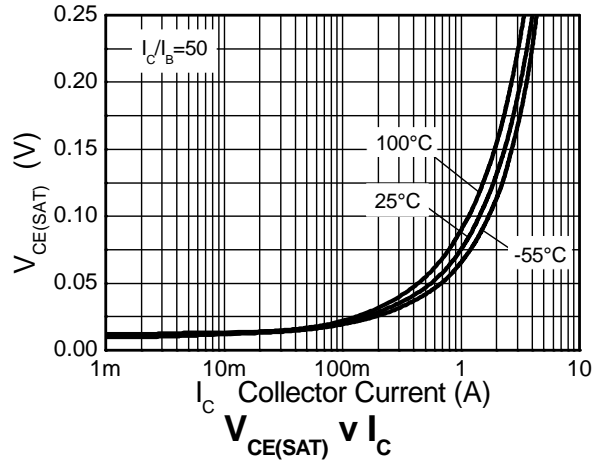
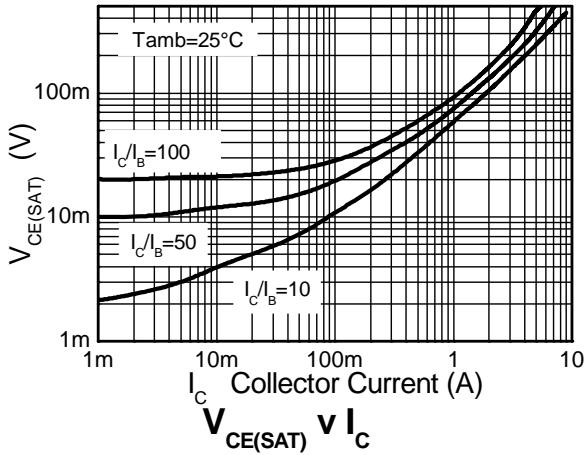
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PNP - Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-20	-35	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	-12	-25	-	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.5	-	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	$V_{CB} = -16\text{V}$
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	$V_{EB} = -6\text{V}$
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	$V_{CES} = -10\text{V}$
Static Forward Current Transfer Ratio (Note 10)	h_{FE}	300	475	-	-	$I_C = -10\text{mA}, V_{CE} = -2\text{V}$
		300	450	-		$I_C = -100\text{mA}, V_{CE} = -2\text{V}$
		180	275	-		$I_C = -2.5\text{A}, V_{CE} = -2\text{V}$
		60	100	-		$I_C = -8\text{A}, V_{CE} = -2\text{V}$
		45	70	-		$I_C = -10\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	-	-10	-17	mV	$I_C = -0.1\text{A}, I_B = -10\text{mA}$
		-	-100	-140		$I_C = -1\text{A}, I_B = -10\text{mA}$
		-	-100	-150		$I_C = -1.5\text{A}, I_B = -50\text{mA}$
		-	-195	-300		$I_C = -3\text{A}, I_B = -50\text{mA}$
		-	-240	-310		$I_C = -4\text{A}, I_B = -150\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	-	-0.87	-0.96	V	$I_C = -4\text{A}, V_{CE} = -2\text{V}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	-	-0.97	-1.07	V	$I_C = -4\text{A}, I_B = -150\text{mA}$
Output Capacitance	C_{obo}	-	21	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	f_T	100	110	-	MHz	$V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Turn-on Time	t_{on}	-	70	-	ns	$V_{CC} = -6\text{V}, I_C = -2\text{A}$
Turn-off Time	t_{off}	-	130	-	ns	$I_{B1} = I_{B2} = -50\text{mA}$

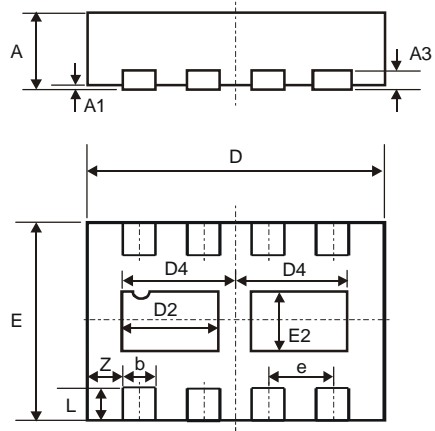
Notes: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

PNP – Typical Electrical Characteristics



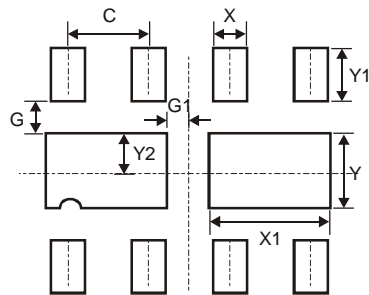
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Package Outline Dimensions



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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