

**DUAL 20V PNP LOW SATURATION SWITCHING TRANSISTOR**

**Features and Benefits**

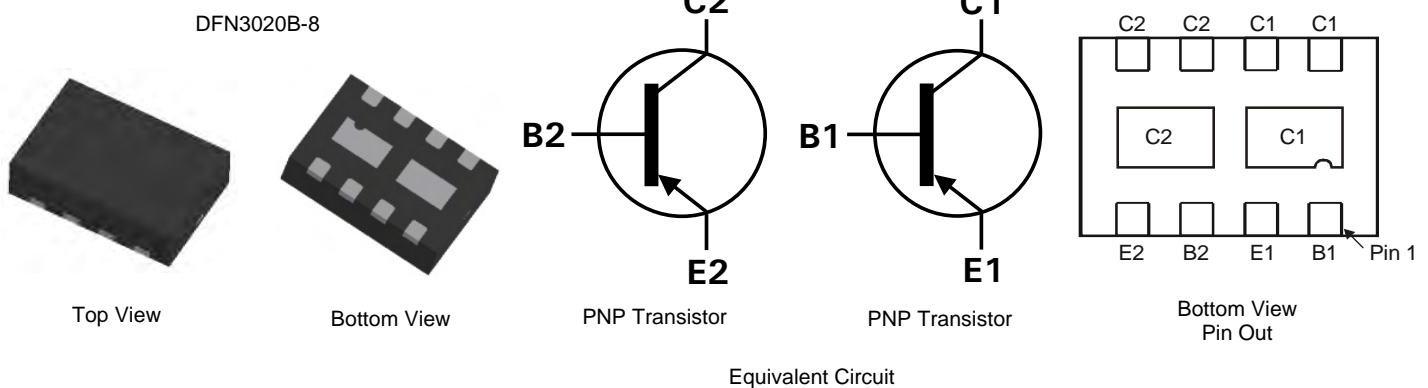
- $BV_{CEO} > -20V$ ;
- $I_C = -3.5A$  Continuous Collector Current
- $R_{SAT} = 64\ m\Omega$  for Low Equivalent On Resistance
- Low Saturation Voltage ( $-220mV$  @  $-1A$ )
- $hFE$  characterized up to  $-6A$  for high current gain holds up
- Dual NPN saving footprint and component count
- Low profile 0.8mm high package for thin applications
- $R_{\theta JA}$  efficient, 40% lower than SOT26
- $6mm^2$  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.
- 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**

- Battery charging circuits
- Load disconnect switches
- DC-DC converters
- Motor drive
- LED backlighting circuits
- Portable applications



**Ordering Information** (Note 3)

| Product     | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| ZXTD718MCTA | D22     | 7                  | 8               | 3,000             |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
  3. For Packaging Details, go to our website at <http://www.diodes.com>.

**Marking Information**



D22 = Product type Marking Code  
Top view, dot denotes Pin 1

**Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

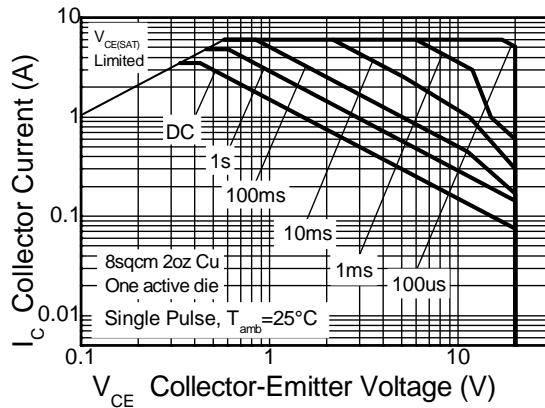
| Parameter                                    | Symbol    | Limit | Unit |
|--|-----------|-------|------|
| Collector-Base Voltage                       | $V_{CBO}$ | -25   | V    |
| Collector-Emitter Voltage                    | $V_{CEO}$ | -20   |      |
| Emitter-Base Voltage                         | $V_{EBO}$ | -7    |      |
| Peak Pulse Current                           | $I_{CM}$  | -6    | A    |
| Continuous Collector Current (Notes 4 and 7) | $I_C$     | -3.5  |      |
| Base Current                                 | $I_B$     | -1    |      |

**Thermal Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

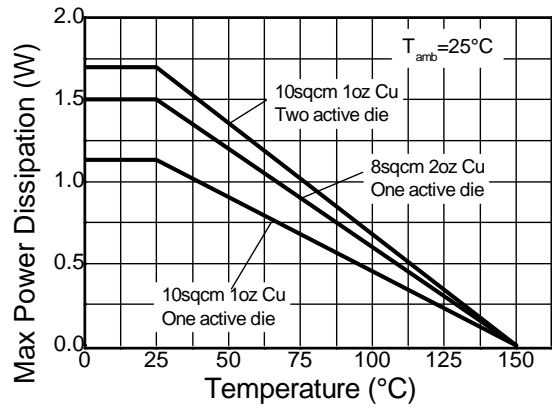
| Characteristic                              | Symbol          | Value       | Unit       |
|---|-----------------|-------------|------------|
| Power Dissipation<br>Linear Derating Factor | $P_D$           | 1.5         | W<br>mW/°C |
|   |                 | 12          |            |
|   |                 | 2.45        |            |
|   |                 | 19.6        |            |
|   |                 | 1.13        |            |
| Thermal Resistance, Junction to Ambient     | $R_{\theta JA}$ | 8           | °C/W       |
|   |                 | 1.7         |            |
|   |                 | 13.6        |            |
|   |                 | 83.3        |            |
| Thermal Resistance, Junction to Lead        | $R_{\theta JL}$ | 51.0        | °C/W       |
|   |                 | 111         |            |
|   |                 | 73.5        |            |
| Operating and Storage Temperature Range     | $T_J, T_{STG}$  | -55 to +150 | °C         |

- Notes:
4. For a dual device surface mounted on 28mm x 28mm (8cm<sup>2</sup>) 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.
  5. Same as note (4), except the device is measured at  $t < 5$  sec.
  6. Same as note (4), except the device is surface mounted on 31mm x 31mm (10cm<sup>2</sup>) FR4 PCB with high coverage of single sided 1oz copper.
  7. For a dual device with one active die.
  8. For dual device with 2 active die running at equal power.
  9. Thermal resistance from junction to solder-point (at the end of the collector lead).

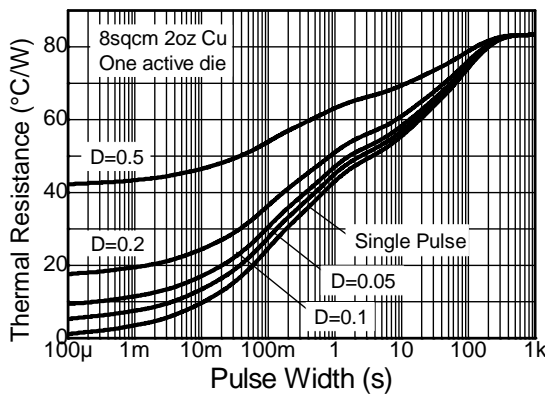
**Thermal Characteristics**



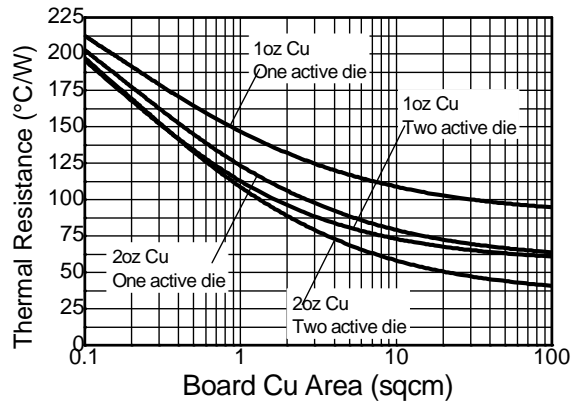
**Safe Operating Area**



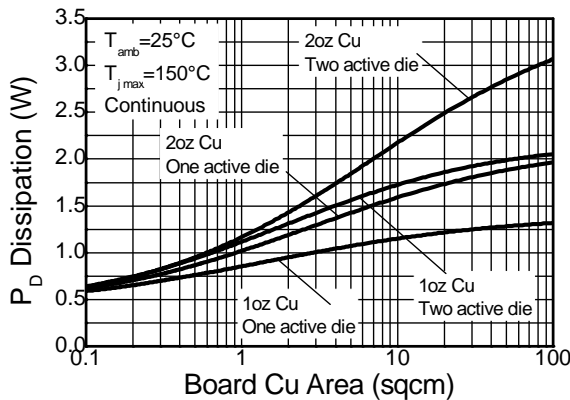
**Derating Curve**



**Transient Thermal Impedance**



**Thermal Resistance v Board Area**



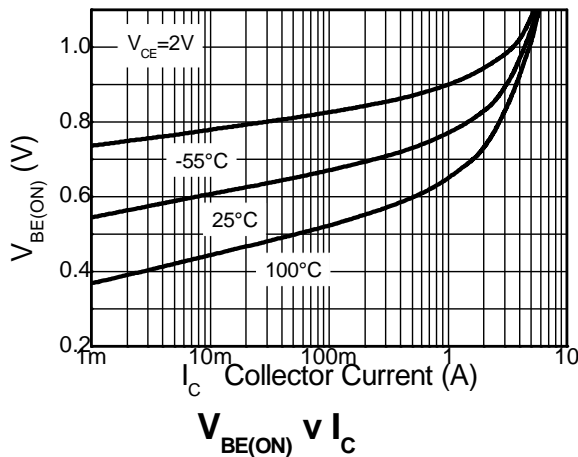
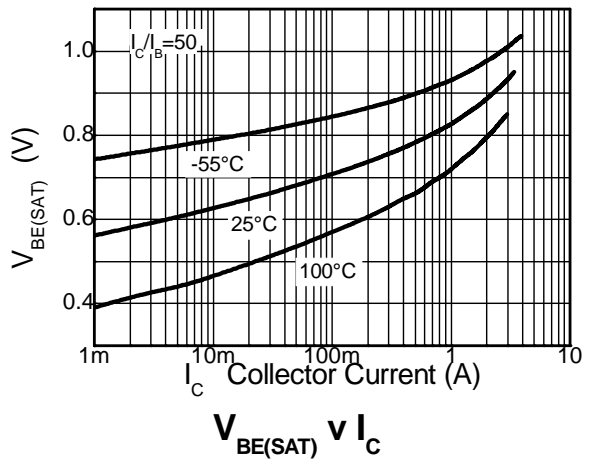
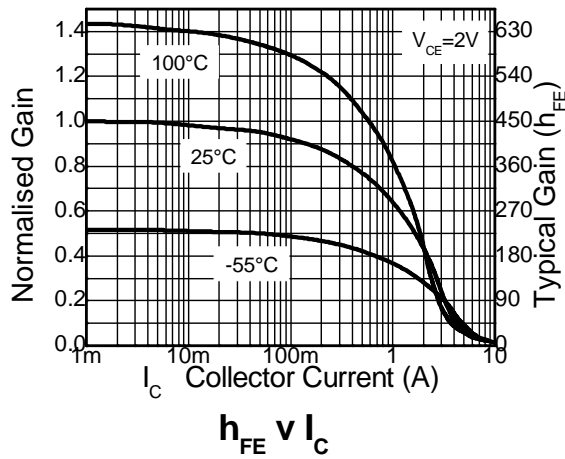
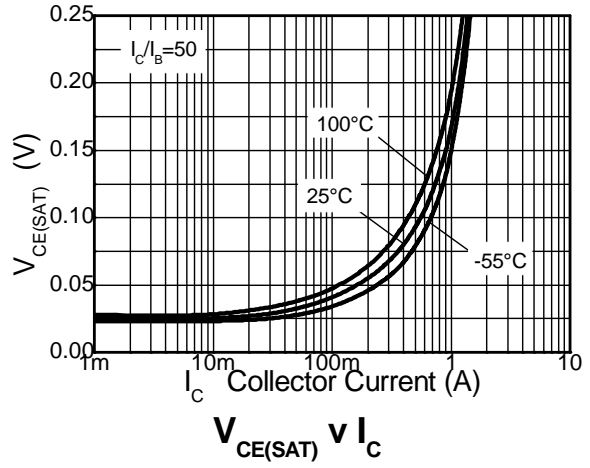
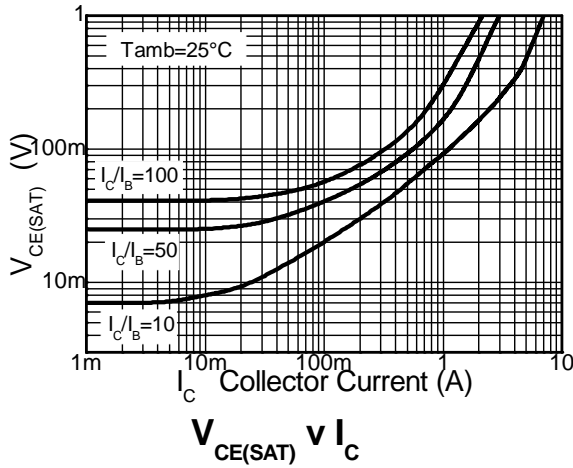
**Power Dissipation v Board Area**

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

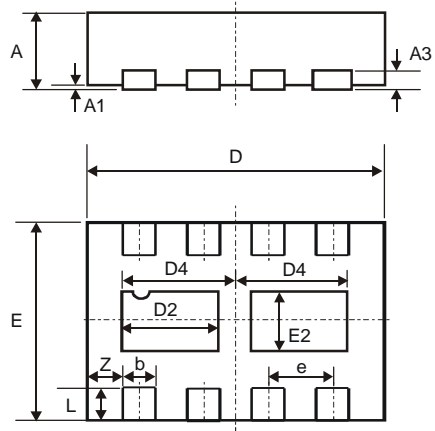
| Characteristic                                  | Symbol        | Min | Typ   | Max   | Unit | Test Condition  |
|---|---------------|-----|-------|-------|------|---|
| Collector-Base Breakdown Voltage                | $BV_{CBO}$    | -25 | -35   | -     | V    | $I_C = -100\mu\text{A}$                                       |
| Collector-Emitter Breakdown Voltage (Note 10)   | $BV_{CEO}$    | -20 | -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   | $V_{CB} = -20\text{V}$  |
| Emitter Cutoff Current                          | $I_{EBO}$     | -   | -     | -100  | nA   | $V_{EB} = -6\text{V}$   |
| Collector Emitter Cutoff Current                | $I_{CES}$     | -   | -     | -100  | nA   | $V_{CES} = -16\text{V}$                                       |
| Static Forward Current Transfer Ratio (Note 10) | $h_{FE}$      | 300 | 475   | -     | -    | $I_C = -10\text{mA}, V_{CE} = -2\text{V}$                     |
|   |               | 300 | 450   | -     |      | $I_C = -100\text{mA}, V_{CE} = -2\text{V}$                    |
|   |               | 150 | 230   | -     |      | $I_C = -2\text{A}, V_{CE} = -2\text{V}$                       |
|   |               | 15  | 30    | -     |      | $I_C = -6\text{A}, V_{CE} = -2\text{V}$                       |
| Collector-Emitter Saturation Voltage (Note 10)  | $V_{CE(sat)}$ | -   | -19   | -30   | mV   | $I_C = -0.1\text{A}, I_B = -10\text{mA}$                      |
|   |               | -   | -170  | -220  |      | $I_C = -1\text{A}, I_B = -20\text{mA}$                        |
|   |               | -   | -190  | -250  |      | $I_C = -1.5\text{A}, I_B = -50\text{mA}$                      |
|   |               | -   | -240  | -350  |      | $I_C = -2.5\text{A}, I_B = -150\text{mA}$                     |
|   |               | -   | -225  | -300  |      | $I_C = -3.5\text{A}, I_B = -350\text{mA}$                     |
| Base-Emitter Turn-On Voltage (Note 10)          | $V_{BE(on)}$  | -   | -0.87 | -0.95 | V    | $I_C = -3.5\text{A}, V_{CE} = -2\text{V}$                     |
| Base-Emitter Saturation Voltage (Note 10)       | $V_{BE(sat)}$ | -   | -1.01 | -1.12 | V    | $I_C = -3.5\text{A}, I_B = -350\text{mA}$                     |
| Output Capacitance                              | $C_{obo}$     | -   | 21    | 30    | pF   | $V_{CB} = 10\text{V}, f = 1\text{MHz}$                        |
| Transition Frequency                            | $f_T$         | 150 | 180   | -     | MHz  | $V_{CE} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$ |
| Turn-On Time                                    | $t_{on}$      | -   | 40    | -     | ns   | $V_{CC} = -10\text{V}, I_C = 1\text{A}$                       |
| Turn-Off Time                                   | $t_{off}$     | -   | 670   | -     | ns   | $I_{B1} = I_{B2} = 20\text{mA}$                               |

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

**Typical Electrical Characteristics**

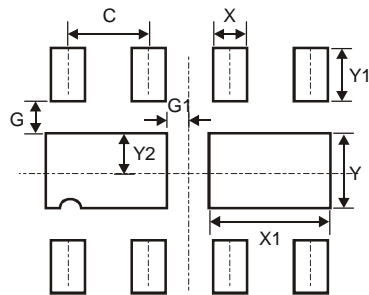


**Package Outline Dimensions**



| 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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