

Features

NPN Transistor

- $BV_{CEO} > 20V$
- $I_c = 4.5A$ Continuous Collector Current
- Low Saturation Voltage (150mV max @ 1A)
- $R_{SAT} = 47m\Omega$ for a low equivalent On-Resistance

PNP Transistor

- $BV_{CEO} > -20V$
- $I_c = -3.5A$ Continuous Collector Current
- Low Saturation Voltage (-220mV max @ -1A)
- $R_{SAT} = 64m\Omega$ for a low equivalent On-Resistance
- h_{FE} characterized up to 6A for high current gain hold up
- Low profile 0.8mm high package for thin applications
- R_{eJA} efficient, 40% lower than SOT26
- 6mm² footprint, 50% smaller than TSOP6 and SOT26
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP capable (Note 4)

Mechanical Data

- Case: W-DFN3020-8 Type B
- Nominal package height: 0.8mm
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu, Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.013 grams (approximate)

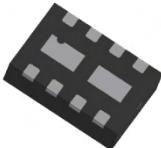
Applications

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

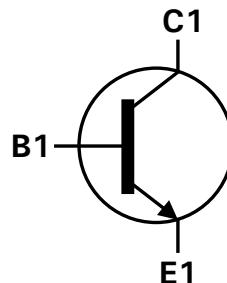
W-DFN3020-8
Type B



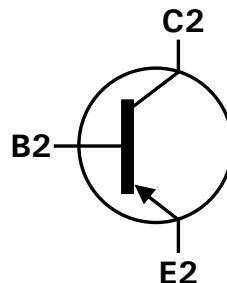
Top View



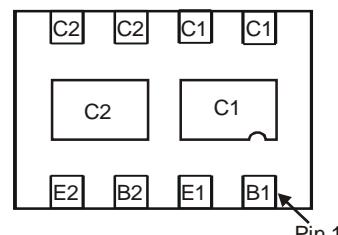
Bottom View



NPN Transistor



PNP Transistor



Bottom View
Pin-Out

Equivalent Circuit

Ordering Information (Note 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|------------|---------|--------------------|-----------------|-------------------|
| ZXT6718MCTA | AEC-Q101 | DB2 | 7 | 8 | 3,000 |
| ZXT6718MCQTA | Automotive | DB2 | 7 | 8 | 3,000 |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
 5. For packaging details, go to our website at <http://www.diodes.com>

Marking Information



DB2 = Product type marking code
Top view, dot denotes pin 1

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

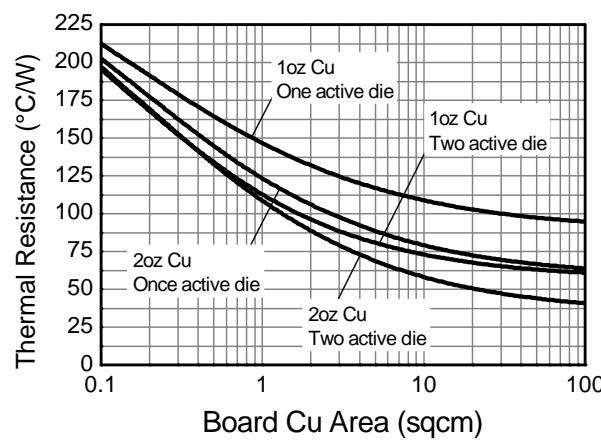
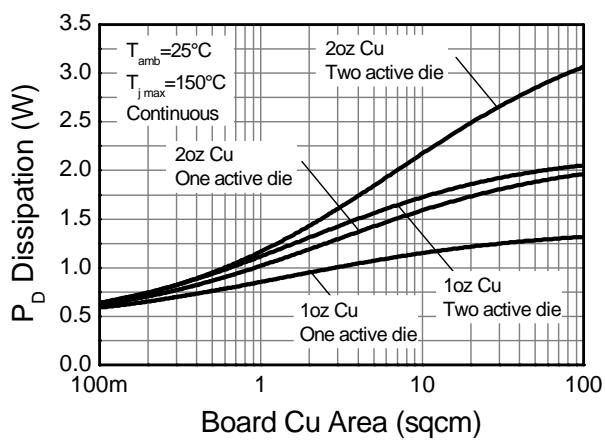
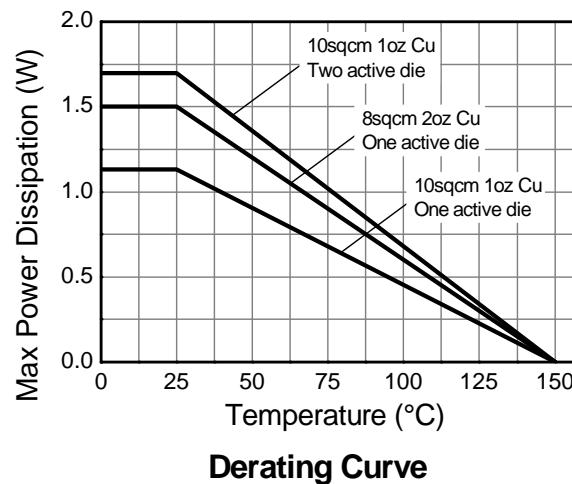
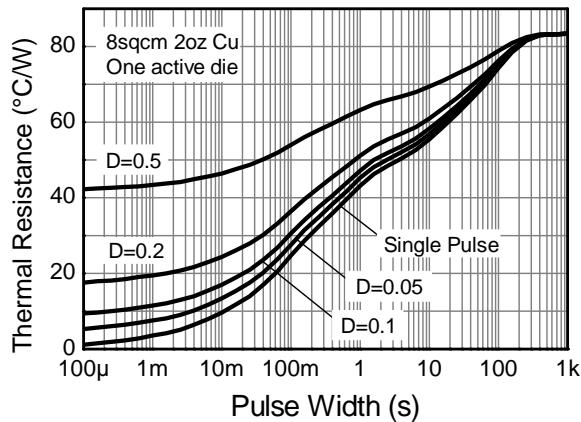
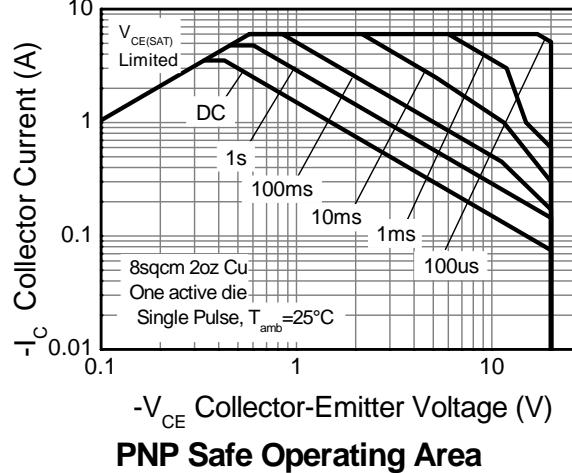
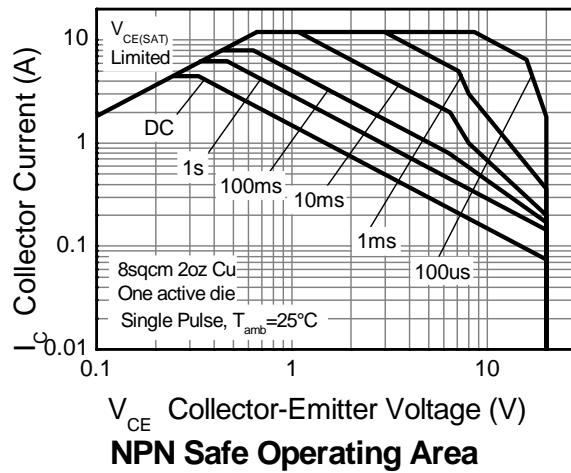
| Characteristic | Symbol | NPN | PNP | Unit |
|------------------------------|---------------|-------|-----|------|
| Collector-Base Voltage | V_{CBO} | 40 | -25 | V |
| Collector-Emitter Voltage | V_{CEO} | 20 | -20 | V |
| Emitter-Base Voltage | V_{EBO} | 7 | -7 | V |
| Peak Pulse Current | I_{CM} | 12 | -6 | A |
| Continuous Collector Current | (Notes 6 & 9) | I_C | 4.5 | -3.5 |
| Continuous Collector Current | (Notes 7 & 9) | | 5 | -3.8 |
| Base Current | I_B | | 1 | A |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | NPN | PNP | Unit |
|---------------------------------------------|-----------------|------|-------------|-----------|
| Power Dissipation Linear Derating Factor | P_D | 1.5 | | W 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} | 17.1 | -55 to +150 | °C |

- Notes:
6. 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.
 7. Same as note (6), except the device is measured at $t < 5$ sec.
 8. Same as note (6), except the device is surface mounted on 31mm x 31mm (10cm²) FR4 PCB with high coverage of single sided 1oz copper.
 9. For a dual device with one active die.
 10. For dual device with 2 active die running at equal power.
 11. Thermal resistance from junction to solder-point (on the exposed collector pads).

Thermal Characteristics and Derating Information

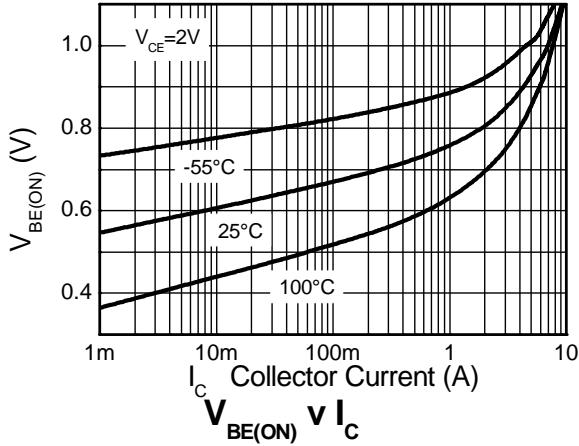
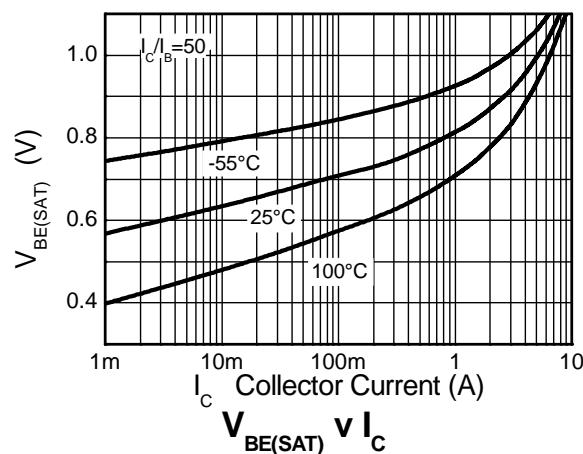
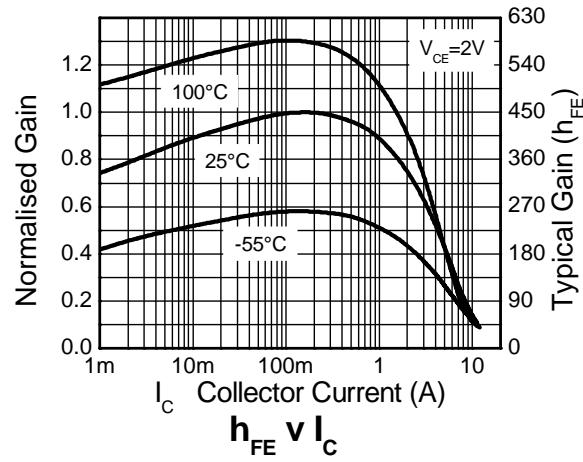
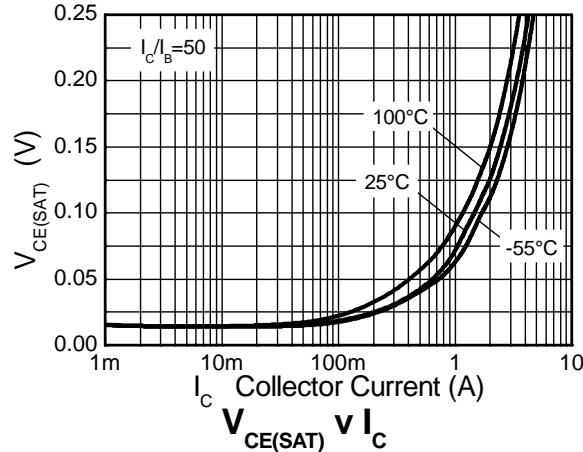
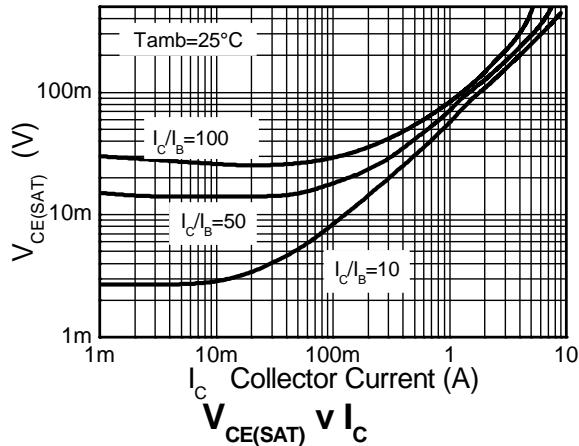


NPN - Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------------------|-----------------------------|-----|------|------|------|--------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV_{CBO} | 40 | 100 | - | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 12) | BV_{CEO} | 20 | 27 | - | V | $I_C = 10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 7 | 8.2 | - | V | $I_E = 100\mu\text{A}$ |
| Collector Cutoff Current | I_{CBO} | - | - | 100 | nA | $V_{\text{CB}} = 30\text{V}$ |
| Emitter Cutoff Current | I_{EBO} | - | - | 100 | nA | $V_{\text{EB}} = 6\text{V}$ |
| Collector Emitter Cutoff Current | I_{CES} | - | - | 100 | nA | $V_{\text{CE}} = 16\text{V}$ |
| Static Forward Current Transfer Ratio (Note 12) | h_{FE} | 200 | 400 | - | - | $I_C = 10\text{mA}, V_{\text{CE}} = 2\text{V}$ |
| | | 300 | 450 | - | - | $I_C = 200\text{mA}, V_{\text{CE}} = 2\text{V}$ |
| | | 200 | 360 | - | - | $I_C = 2\text{A}, V_{\text{CE}} = 2\text{V}$ |
| | | 100 | 180 | - | - | $I_C = 6\text{A}, V_{\text{CE}} = 2\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 12) | $V_{\text{CE}(\text{sat})}$ | - | 8 | 15 | mV | $I_C = 0.1\text{A}, I_B = 10\text{mA}$ |
| | | | 90 | 150 | | $I_C = 1\text{A}, I_B = 10\text{mA}$ |
| | | | 115 | 135 | | $I_C = 2\text{A}, I_B = 50\text{mA}$ |
| | | | 190 | 250 | | $I_C = 3\text{A}, I_B = 100\text{mA}$ |
| | | | 210 | 300 | | $I_C = 4.5\text{A}, I_B = 125\text{mA}$ |
| | | | | | | |
| Base-Emitter Turn-On Voltage (Note 12) | $V_{\text{BE}(\text{on})}$ | - | 0.88 | 0.97 | V | $I_C = 4.5\text{A}, V_{\text{CE}} = 2\text{V}$ |
| Base-Emitter Saturation Voltage (Note 12) | $V_{\text{BE}(\text{sat})}$ | - | 0.98 | 1.07 | V | $I_C = 4.5\text{A}, I_B = 125\text{mA}$ |
| Output Capacitance | C_{obo} | - | 23 | 30 | pF | $V_{\text{CB}} = 10\text{V}, f = 1\text{MHz}$ |
| Transition Frequency | f_T | 100 | 140 | - | MHz | $V_{\text{CE}} = 10\text{V}, I_C = 50\text{mA}, f = 100\text{MHz}$ |
| Turn-on Time | t_{on} | - | 170 | - | ns | $V_{\text{CC}} = 10\text{V}, I_C = 3\text{A}$ |
| Turn-off Time | t_{off} | - | 400 | - | ns | $I_{B1} = I_{B2} = 10\text{mA}$ |

Notes: 12. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

NPN - Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

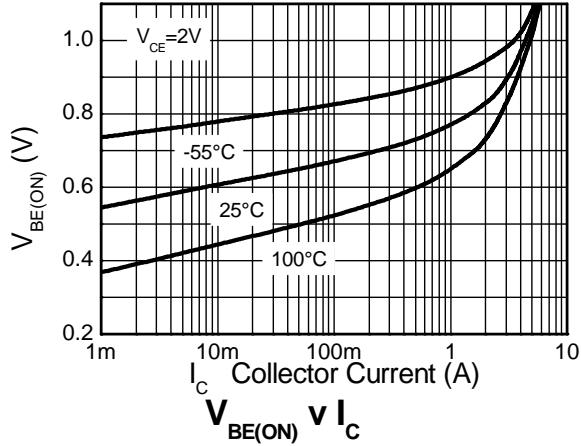
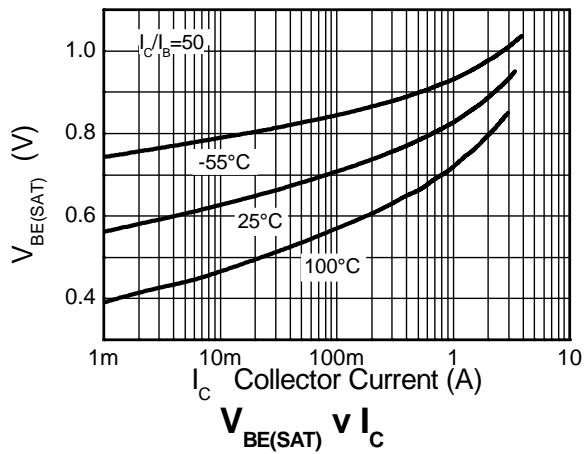
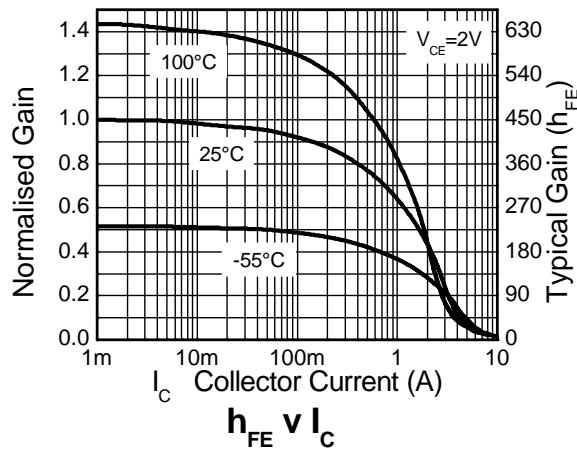
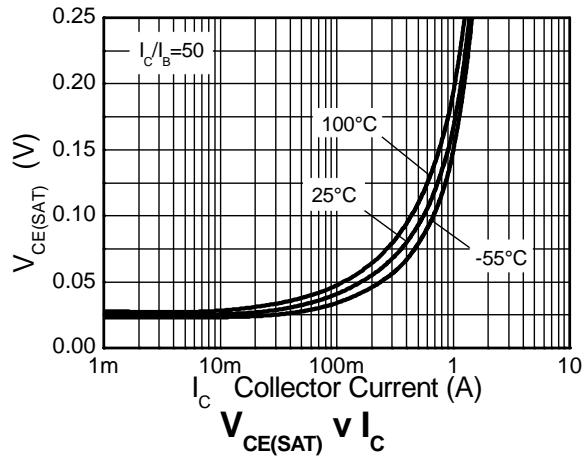
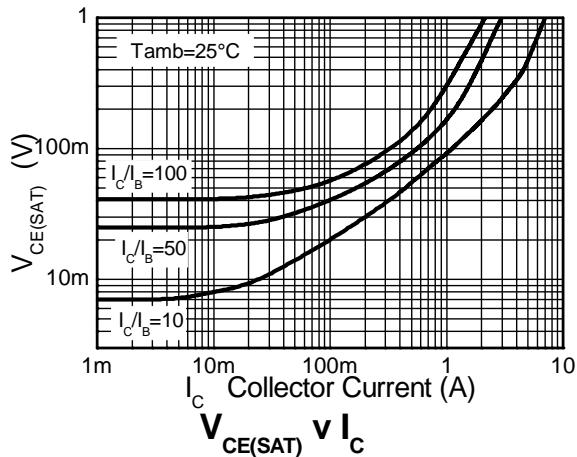


PNP - Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------------------|-----------------------------|-----|-------|-------|------|----------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV_{CBO} | -25 | -35 | - | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 12) | 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 | $V_{\text{CB}} = -20\text{V}$ |
| Emitter Cutoff Current | I_{EBO} | - | - | -100 | nA | $V_{\text{EB}} = -6\text{V}$ |
| Collector Emitter Cutoff Current | I_{CES} | - | - | -100 | nA | $V_{\text{CES}} = -16\text{V}$ |
| Static Forward Current Transfer Ratio (Note 12) | h_{FE} | 300 | 475 | - | | $I_C = -10\text{mA}, V_{\text{CE}} = -2\text{V}$ |
| | | 300 | 450 | - | | $I_C = -100\text{mA}, V_{\text{CE}} = -2\text{V}$ |
| | | 150 | 230 | - | | $I_C = -2\text{A}, V_{\text{CE}} = -2\text{V}$ |
| | | 15 | 30 | - | | $I_C = -6\text{A}, V_{\text{CE}} = -2\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 12) | $V_{\text{CE}(\text{sat})}$ | - | -19 | -30 | | $I_C = -0.1\text{A}, I_B = -10\text{mA}$ |
| | | - | -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 12) | $V_{\text{BE}(\text{on})}$ | - | -0.87 | -0.95 | V | $I_C = -3.5\text{A}, V_{\text{CE}} = -2\text{V}$ |
| Base-Emitter Saturation Voltage (Note 12) | $V_{\text{BE}(\text{sat})}$ | - | -1.01 | -1.12 | V | $I_C = -3.5\text{A}, I_B = -350\text{mA}$ |
| Output Capacitance | C_{obo} | - | 21 | 30 | pF | $V_{\text{CB}} = -10\text{V}, f = 1\text{MHz}$ |
| Transition Frequency | f_T | 150 | 180 | - | MHz | $V_{\text{CE}} = -10\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$ |
| Turn-on Time | t_{on} | - | 40 | - | ns | $V_{\text{CC}} = -10\text{V}, I_C = -1\text{A}$ |
| Turn-off Time | t_{off} | - | 670 | - | ns | $I_{B1} = I_{B2} = -10\text{mA}$ |

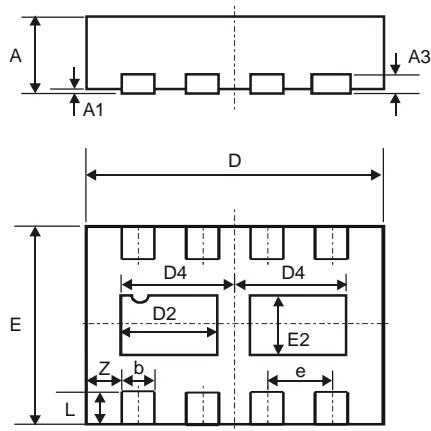
Notes: 12. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

PNP - Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

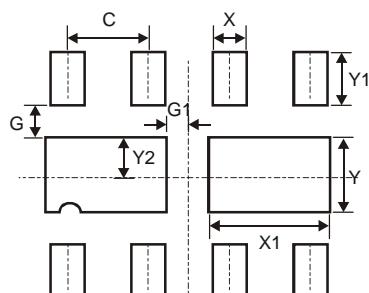


| W-DFN3020-8 Type B | | | |
|-----------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.77 | 0.83 | 0.80 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | - | - | 0.15 |
| b | 0.25 | 0.35 | 0.30 |
| D | 2.95 | 3.075 | 3.00 |
| D2 | 0.82 | 1.02 | 0.92 |
| D4 | 1.01 | 1.21 | 1.11 |
| e | - | - | 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

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| 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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