Lead-free Green

**ZXTPS717MC**

# 12V PNP LOW SATURATION TRANSISTOR AND 40V, 1A SCHOTTKY DIODE COMBINATION DUAL

## Features

- PNP Transistor
  - $V_{CEO}$ = -12V
  - $R_{SAT}$ = 65mΩ
  - $I_C$ = -4A
- Schottky Diode
  - $V_R$ = 40V
  - $V_F$ = 500mv (@1A)
  - $I_C$ = 1A
- $I_C$ = -4A Continuous Collector Current
- Low Saturation Voltage (-140mV @ 1A)
- $h_{FE}$ characterized up to -10A
- Low $V_F$, fast switching Schottky
- **Lead, Halogen, and Antimony Free/RoHS Compliant (Note 1)**
- **"Green" Devices (Note 2)**

## Mechanical Data

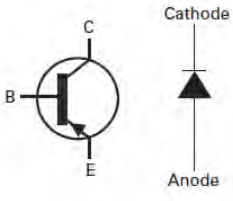
- Case: DFN3020B-8
- Terminals: Pre-Plated NiPdAu leadframe
- Nominal package height: 0.8mm
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (approximate)

## Applications

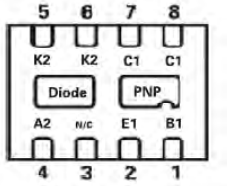
- DC – DC Converters
- Charging circuits
- Mobile phones
- Motor control

DFN3020B-8

Top View




Device symbol



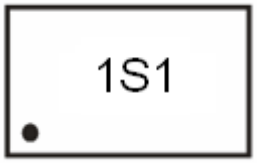

Pin Configuration

## Ordering Information

| Product | Status | Package | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|---|---|---|
| ZXTPS717MCTA | Active | DFN3020B-8 | 1S1 | 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 https://www.diodes.com

## Marking Information




1S1 = Product type Marking Code
Dot Denotes Pin 1

## Maximum Ratings, Transistor

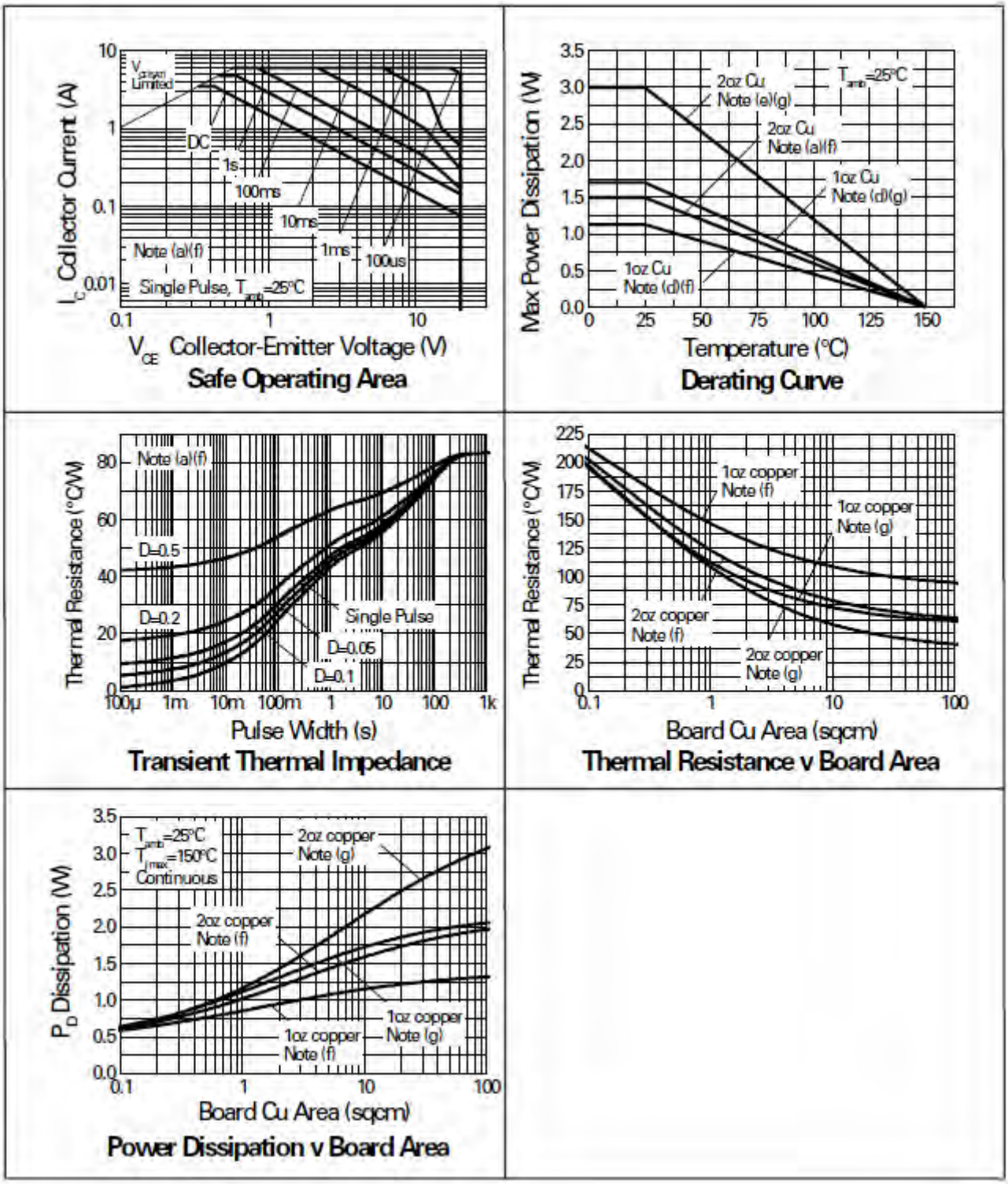
| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -20 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -12 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -7.5 | V |
| Peak Pulse Current | $I_{CM}$ | -12 | A |
| Continuous Collector Current (Notes a and f) | $I_C$ | -4 | A |
| Continuous Collector Current (Notes b and f) | $I_C$ | -4.4 | A |
| Base Current | $I_B$ | 1 | A |

## Thermal Characteristics, Transistor

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation at $T_A$ = 25°C (Notes a and f)<br>Linear Derating Factor | $P_D$ | 1.5<br>12 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes b and f)<br>Linear Derating Factor | $P_D$ | 2.45<br>19.6 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes c and f)<br>Linear Derating Factor | $P_D$ | 1<br>8 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes d and f)<br>Linear Derating Factor | $P_D$ | 1.13<br>9 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes d and g)<br>Linear Derating Factor | $P_D$ | 1.7<br>13.6 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes e and g)<br>Linear Derating Factor | $P_D$ | 3<br>24 | W<br>mW/°C |
| Junction to Ambient (Notes a and f) | $R_{\theta JA}$ | 83 | °C/W |
| Junction to Ambient (Notes b and f) | $R_{\theta JA}$ | 51 | °C/W |
| Junction to Ambient (Notes c and f) | $R_{\theta JA}$ | 125 | °C/W |
| Junction to Ambient (Notes d and f) | $R_{\theta JA}$ | 111 | °C/W |
| Junction to Ambient (Notes d and g) | $R_{\theta JA}$ | 73.5 | °C/W |
| Junction to Ambient (Notes e and g) | $R_{\theta JA}$ | 41.7 | °C/W |
| Junction Temperature | $T_J$ | 150 | °C |
| Operating and Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |

Notes:
a. 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.
b. 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.
c. 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.**
d. 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.
e. 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.
f. For a dual device with one active die.
g. For dual device with 2 active die running at equal power.

## Thermal Characteristics and Derating information, Transistor



## Maximum Ratings, Schottky Diode

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Continuous Reverse Voltage | $V_R$ | 40 | V |
| Forward Voltage @ $I_F$ = 1000mA (typ) | $V_F$ | 425 | mV |
| Forward Current | $I_F$ | 1850 | mA |
| Average Peak Forward Current D=50% | $I_{FAV}$ | 3 | A |
| Non Repetitive Forward Current t≤ 100µs<br>t≤ 10ms | $I_{FSM}$ | 12<br>7 | A<br>A |

## Thermal Characteristics, Schottky Diode

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation at $T_A$ = 25°C (Notes a and f)<br>Linear Derating Factor | $P_D$ | 1.2<br>12 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes b and f)<br>Linear Derating Factor | $P_D$ | 2<br>20 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes c and f)<br>Linear Derating Factor | $P_D$ | 0.8<br>8 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes d and f)<br>Linear Derating Factor | $P_D$ | 0.9<br>9 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes d and g)<br>Linear Derating Factor | $P_D$ | 1.36<br>13.6 | W<br>mW/°C |
| Power Dissipation at $T_A$ = 25°C (Notes e and g)<br>Linear Derating Factor | $P_D$ | 2.4<br>24 | W<br>mW/°C |
| Junction to Ambient (Notes a and f) | $R_{\theta JA}$ | 83 | °C/W |
| Junction to Ambient (Notes b and f) | $R_{\theta JA}$ | 51 | °C/W |
| Junction to Ambient (Notes c and f) | $R_{\theta JA}$ | 125 | °C/W |
| Junction to Ambient (Notes d and f) | $R_{\theta JA}$ | 111 | °C/W |
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| Junction to Ambient (Notes e and g) | $R_{\theta JA}$ | 41.7 | °C/W |
| Junction Temperature | $T_J$ | 125 | °C |
| Operating and Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |

Notes:
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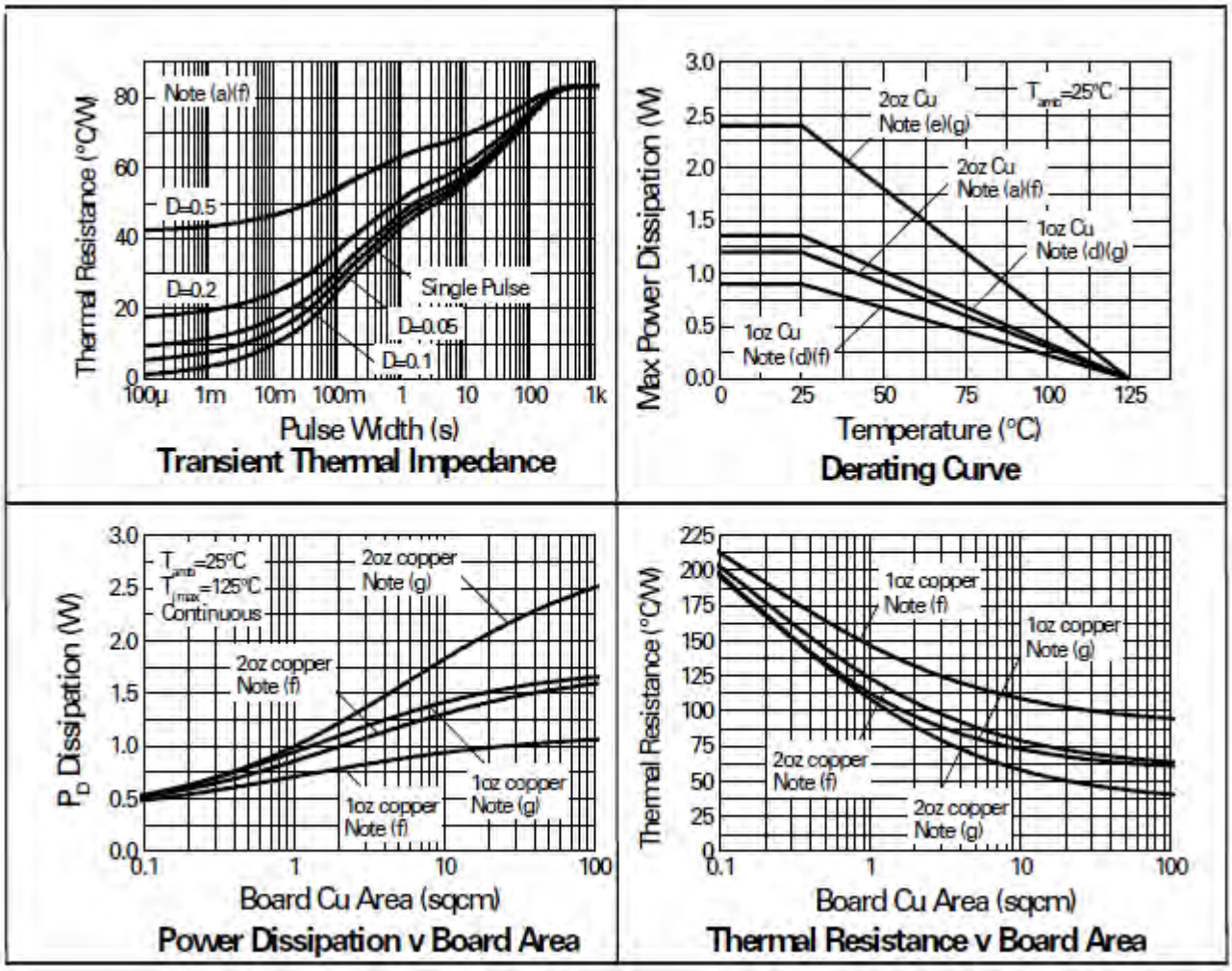
## Thermal Characteristics and Derating information, Schottky Diode



## Electrical Characteristics, Transistor @$T_A$ = 25°C unless otherwise specified

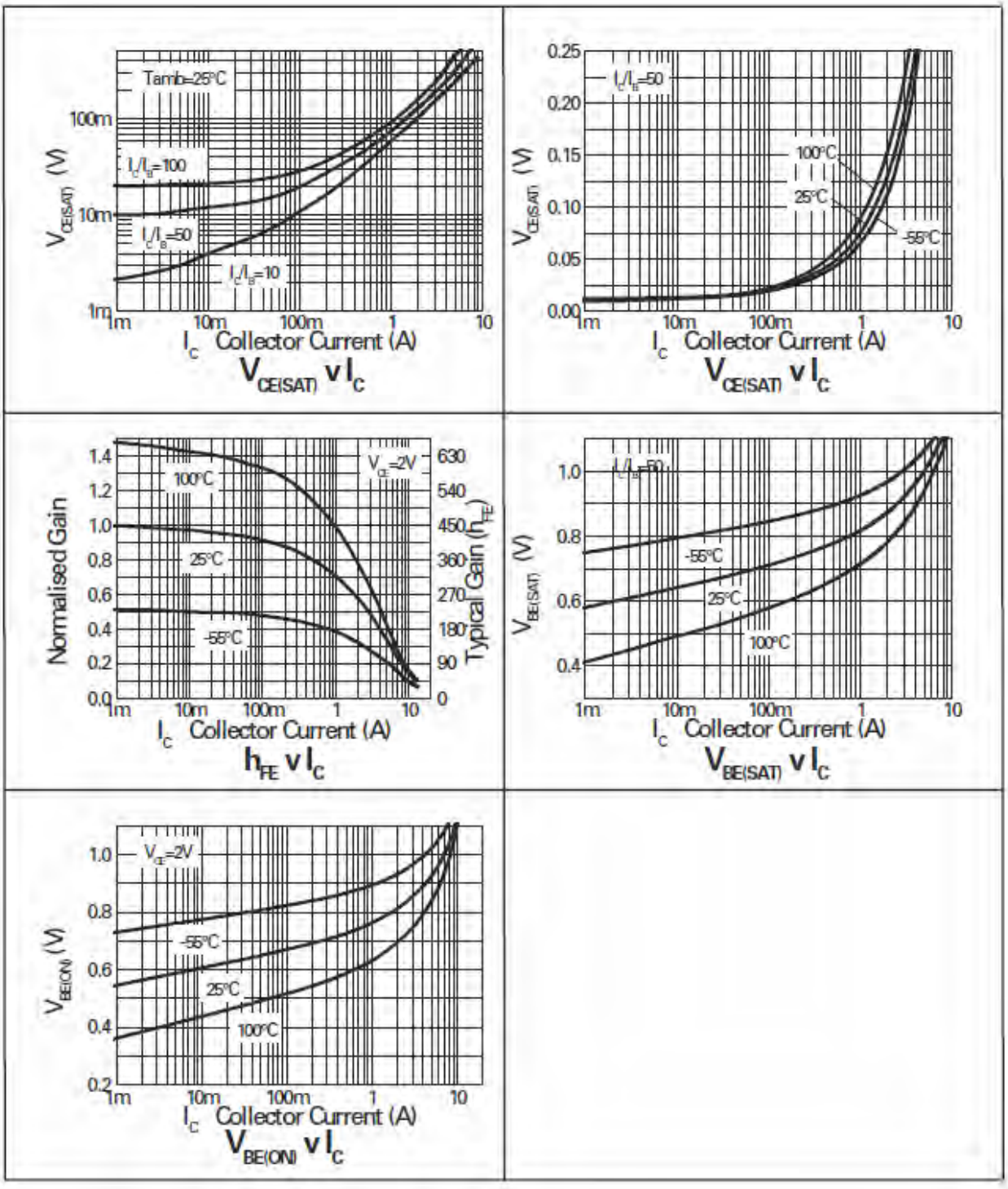
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -20 | -35 | - | V | $I_C$ = -100µA |
| Collector-Emitter Breakdown Voltage (Note 3) | $V_{(BR)CEO}$ | -12 | -25 | - | V | $I_C$ = -10mA |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -7.5 | -8.5 | - | V | $I_E$ = -100µA |
| Collector Cutoff Current | $I_{CBO}$ | - | - | -25 | nA | $V_{CB}$ = -16V |
| Emitter Cutoff Current | $I_{EBO}$ | - | - | -25 | nA | $V_{EB}$ = -6V |
| Collector Emitter Cutoff Current | $I_{CES}$ | - | - | -25 | nA | $V_{CES}$ = -10V |
| Static Forward Current Transfer Ratio (Note 3) | $h_{FE}$ | 300<br>300<br>180<br>60<br>45 | 475<br>450<br>275<br>100<br>70 | -<br>-<br>-<br>-<br>- | - | $I_C$ = -10mA, $V_{CE}$ = -2V<br>$I_C$ = -100mA, $V_{CE}$ = -2V<br>$I_C$ = -2.5A, $V_{CE}$ = -2V<br>$I_C$ = -8A, $V_{CE}$ = -2V<br>$I_C$ = -10A, $V_{CE}$ = -2V |
| Collector-Emitter Saturation Voltage (Note 3) | $V_{CE(sat)}$ | -<br>-<br>-<br>-<br>- | -10<br>-100<br>-100<br>-195<br>-240 | -17<br>-140<br>-150<br>-300<br>-300 | mV | $I_C$ = -0.1A, $I_B$ = -10mA<br>$I_C$ = -1A, $I_B$ = -10mA<br>$I_C$ = -1.5A, $I_B$ = -50mA<br>$I_C$ = -3A, $I_B$ = -50mA<br>$I_C$ = -4A, $I_B$= -150mA |
| Base-Emitter Turn-On Voltage (Note 3) | $V_{BE(on)}$ | - | -0.87 | -0.95 | V | $I_C$ = -4A, $V_{CE}$ = -2V |
| Base-Emitter Saturation Voltage (Note 3) | $V_{BE(sat)}$ | - | -0.97 | -1.05 | V | $I_C$= -4A, $I_B$ = -150mA |
| Output Capacitance | $C_{obo}$ | - | 21 | 30 | pF | $V_{CB}$ = -10V, f = 1MHz |
| Transition Frequency | $f_T$ | 100 | 110 | - | MHz | $V_{CE}$ = -10V, $I_C$ = -50mA, f = 100MHz |
| Turn-on Time | $t_{on}$ | - | 70 | - | ns | $V_{CC}$ = -6V, $I_C$ = -2A |
| Turn-off Time | $t_{off}$ | - | 130 | - | ns | $I_{B1}$ = $I_{B2}$ = -50mA |

## Electrical Characteristics, Schottky Diode @$T_A$ = 25°C unless otherwise specified

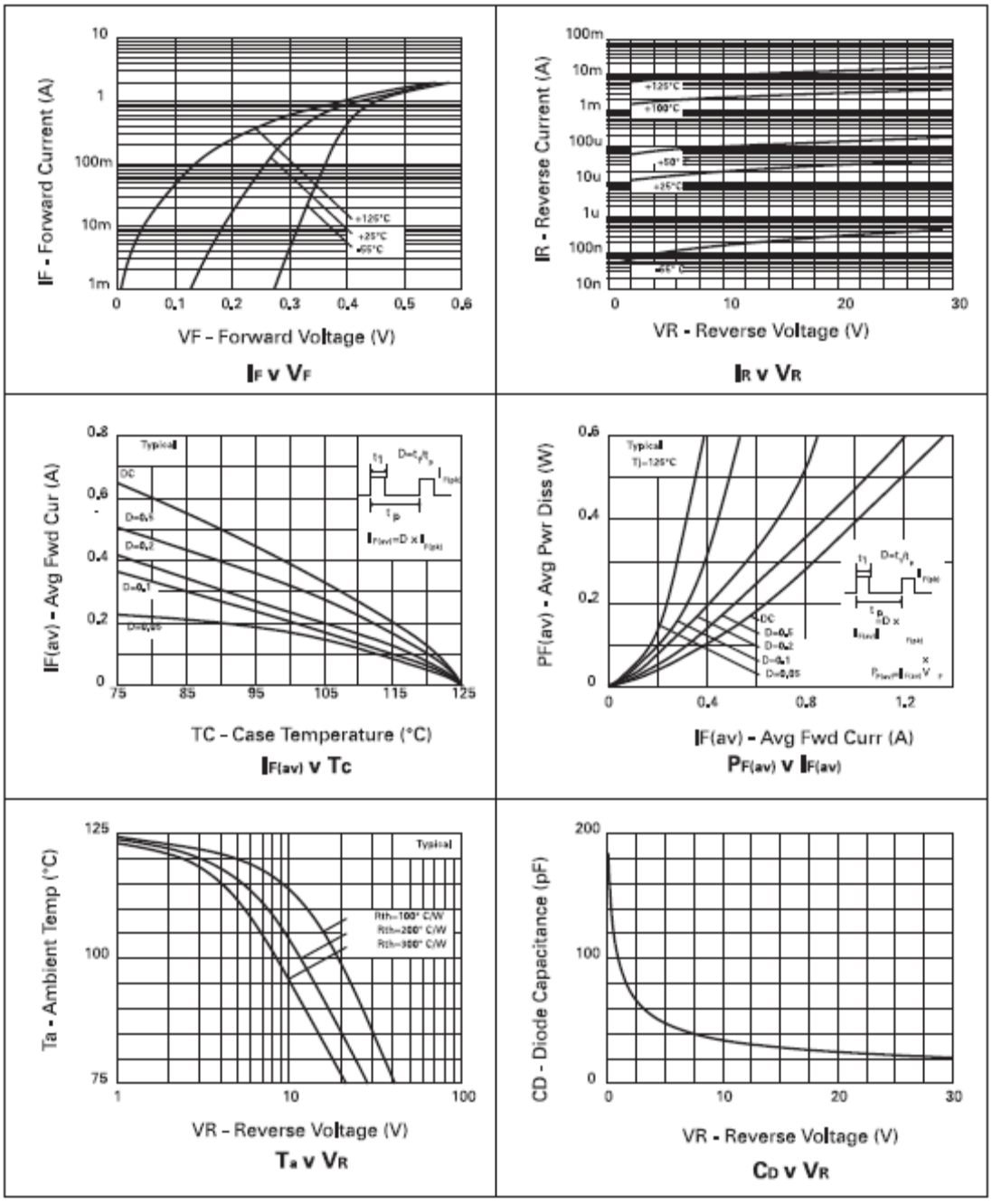
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage | $V_{(BR)R}$ | 40 | 60 | - | V | $I_R$ = -300µA |
| Forward Voltage (Note 3) | $V_F$ | -<br>-<br>-<br>-<br>-<br>-<br>-<br>- | 240<br>265<br>305<br>355<br>390<br>425<br>495<br>420 | 270<br>290<br>340<br>400<br>450<br>500<br>600<br>- | mV | $I_F$ = 50mA<br>$I_F$ = 100mA<br>$I_F$ = 250mA<br>$I_F$ = 500mA<br>$I_F$ = 750mA<br>$I_F$ = 1000mA<br>$I_F$ = 1500mA<br>$I_F$ = 1000mA, $T_A$ = 100°C |
| Reverse Current | $I_R$ | - | 50 | 100 | µA | $V_R$ = 30V |
| Diode Capacitance | $C_D$ | - | 25 | - | pF | $V_R$ = 25V, f = 1MHz |
| Reverse Recovery Time | $t_{rr}$ | - | 12 | - | ns | switched from $I_F$ = 500mA to $I_R$ = 500mA Measured at $I_R$ = 50mA |

Notes: 3 . Measured under pulsed conditions.

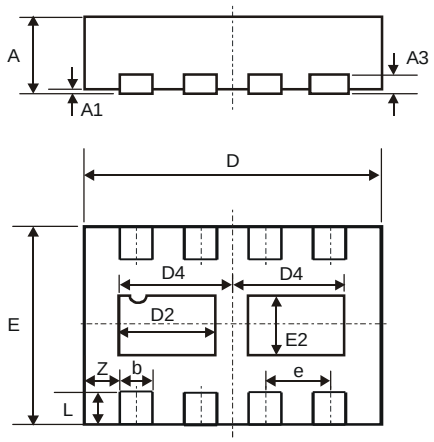
## Typical Characteristics, Transistor



## Typical Characteristics, Schottky Diode

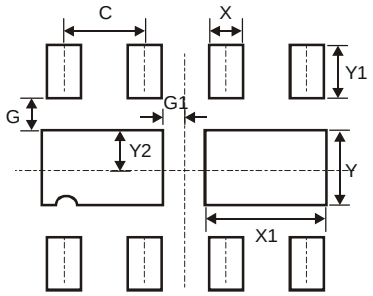


## Package Outline Dimensions




| 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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