

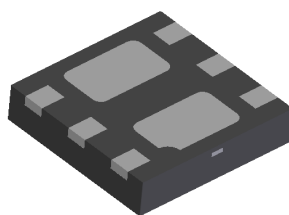
## Features

- $BV_{CEO} > -60V$
- $I_C = -1A$  high Continuous Collector Current
- $R_{CE(sat)} = 200m\Omega$  for a Low Equivalent On-Resistance
- Low Saturation Voltage  $V_{CE(sat)} < 340mV @ 1A$
- $P_D$  up to 2.47W for power demanding applications
- $R_{\theta JA}$  efficient, 40% lower than SOT26
- Low profile 0.6mm high package for thin applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

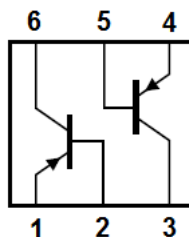
## Application

- Load Switch
- Power Management
- Charging Circuits
- Power Switches (e.g. Motors, Fans)

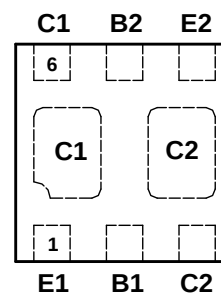
U-DFN2020-6



Bottom View



Device Symbol



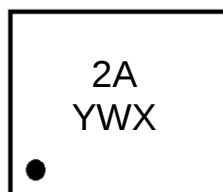
Top View  
Pin-Out

## Ordering Information (Notes 4 )

| Product      | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|---------|--------------------|-----------------|-------------------|
| DSS5160FDB-7 | 2A      | 7                  | 8               | 3,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



- 2A = Product type Marking Code  
Y = Year: 0~9  
W = Week: A~Z : 1~26 week;  
a~z; 27~52 week; z represents  
52 and 53 week  
X = A~Z: Internal code

## Absolute Maximum Ratings – Q1 & Q2 (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic               | Symbol           | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage       | V <sub>CBO</sub> | -60   | V    |
| Collector-Emitter Voltage    | V <sub>CEO</sub> | -60   | V    |
| Emitter-Base Voltage         | V <sub>EBO</sub> | -7    | V    |
| Continuous Collector Current | I <sub>C</sub>   | -1    | A    |
| Peak Pulse Collector Current | I <sub>CM</sub>  | -1.5  | A    |
| Base Current                 | I <sub>B</sub>   | -300  | mA   |
| Peak Base Current            | I <sub>BM</sub>  | -1    | A    |

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

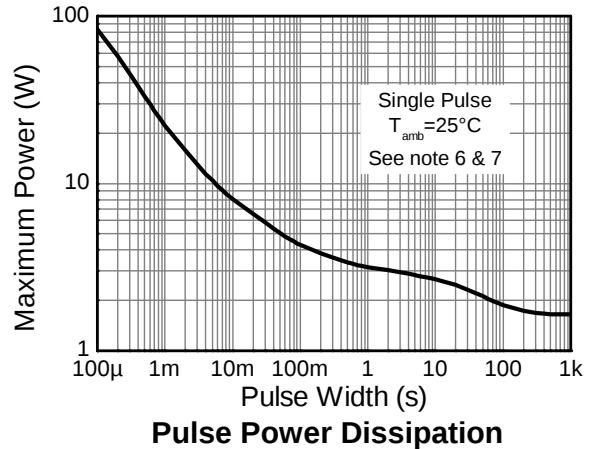
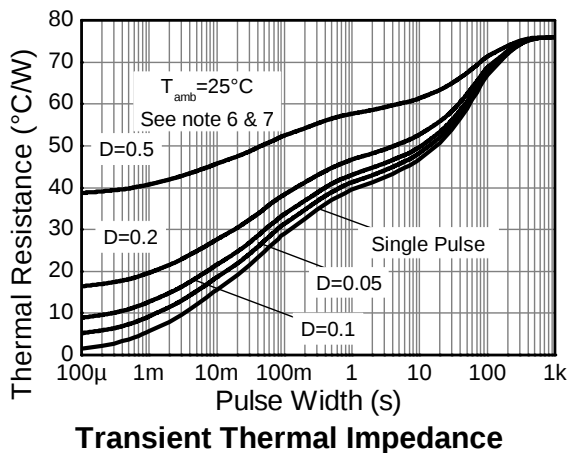
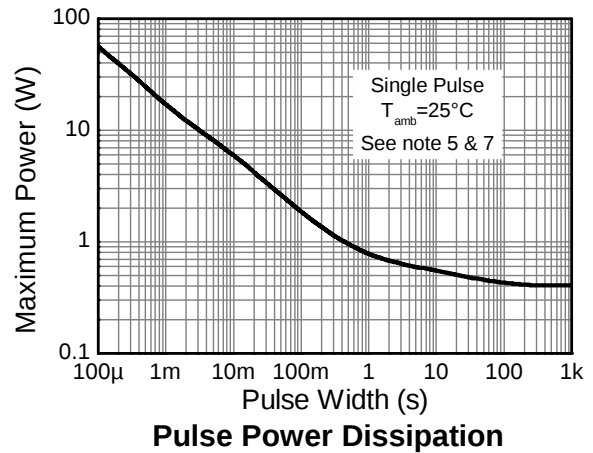
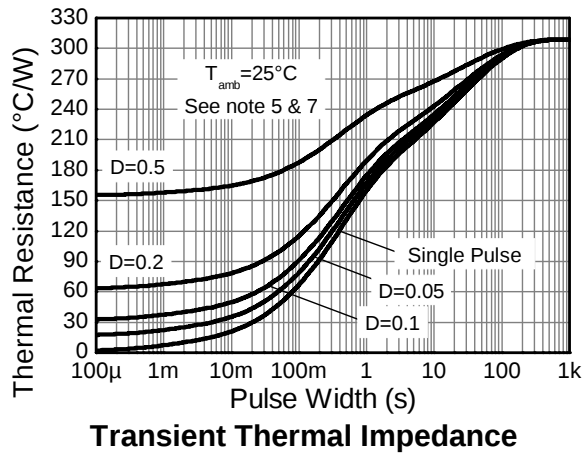
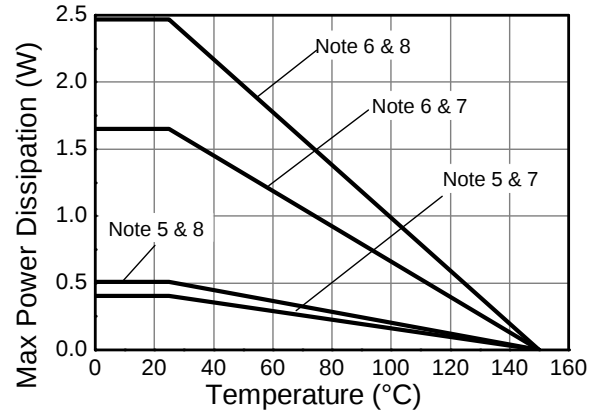
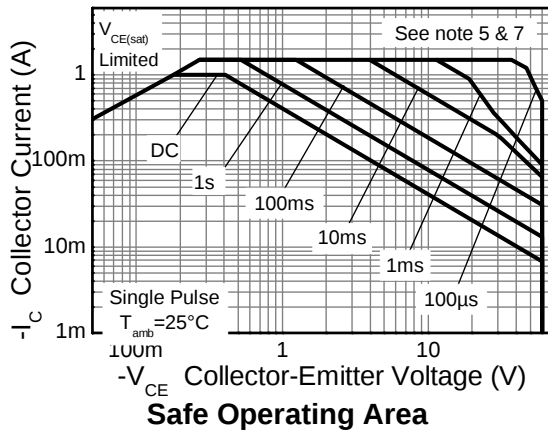
| Characteristic                          |               | Symbol                            | Value       | Unit |
|-----------------------------------------|---------------|-----------------------------------|-------------|------|
| Power Dissipation                       | (Notes 5 & 7) | P <sub>D</sub>                    | 405         | mW   |
|                                         | (Notes 5 & 8) |                                   | 510         |      |
|                                         | (Notes 6 & 7) |                                   | 1650        |      |
|                                         | (Notes 6 & 8) |                                   | 2470        |      |
| Thermal Resistance, Junction to Ambient | (Notes 5 & 7) | R <sub>θJA</sub>                  | 308         | °C/W |
|                                         | (Notes 5 & 8) |                                   | 245         |      |
|                                         | (Notes 6 & 7) |                                   | 76          |      |
|                                         | (Notes 6 & 8) |                                   | 51          |      |
| Thermal Resistance, Junction to Lead    | (Note 9)      | R <sub>θJL</sub>                  | 18          | °C/W |
| Operating and Storage Temperature Range |               | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

## ESD Ratings (Note 10)

| Characteristic                             | Symbol  | Value | Unit | JEDEC Class |
|--------------------------------------------|---------|-------|------|-------------|
| Electrostatic Discharge – Human Body Model | ESD HBM | 4,000 | V    | 3A          |
| Electrostatic Discharge – Machine Model    | ESD MM  | 400   | V    | C           |

- Notes:
- For a device mounted with the exposed collector pads on minimum recommended pad layout that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as note (5), except the device is mounted with the collector pad on 28mm x 28mm (8cm<sup>2</sup>) 2oz copper.
  - For a dual device with one active die.
  - For dual device with 2 active die running at equal power.
  - Thermal resistance from junction to solder-point (on the exposed collector pads).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

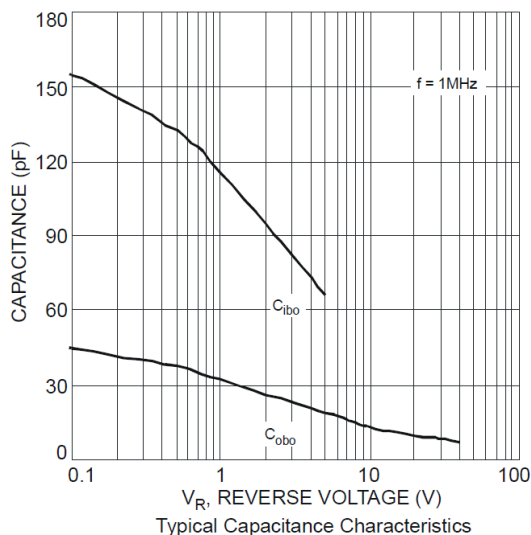
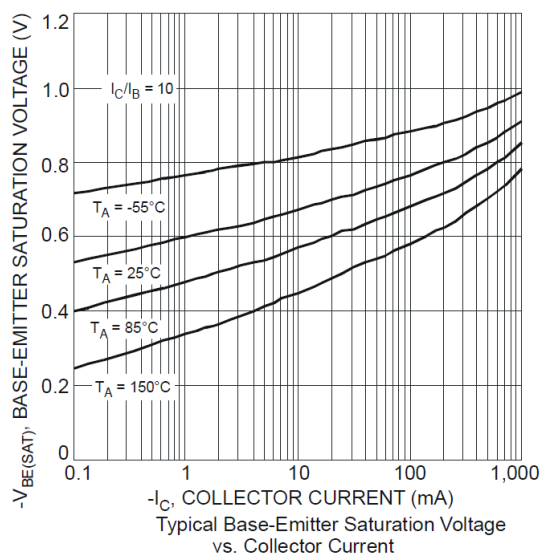
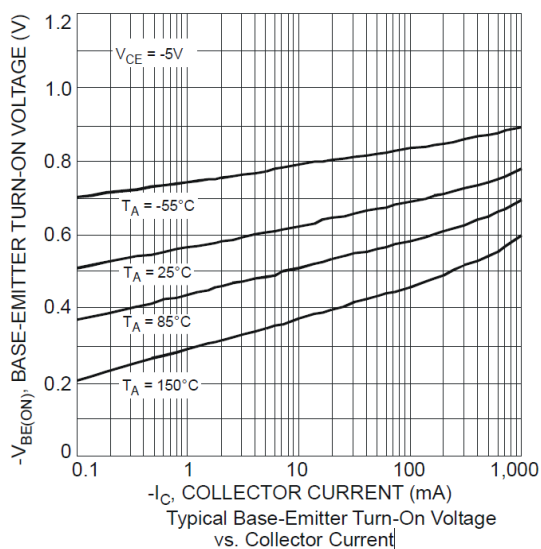
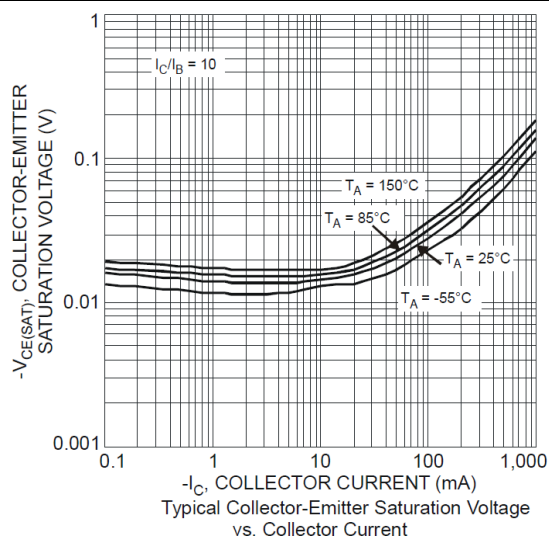
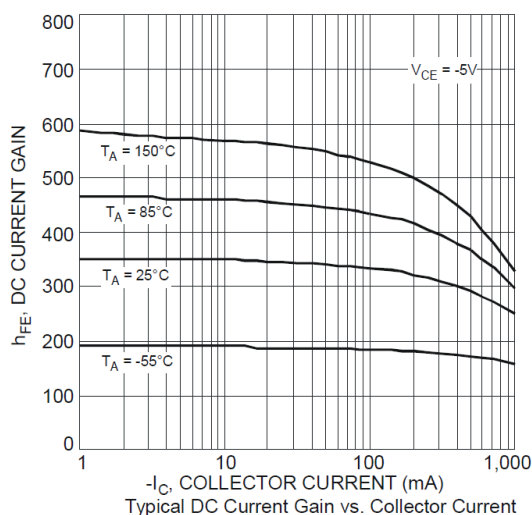


**Electrical Characteristics – Q1 & Q2** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                 | Symbol               | Min | Typ | Max  | Unit | Test Conditions                                                                           |
|------------------------------------------------|----------------------|-----|-----|------|------|-------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage               | BV <sub>CBO</sub>    | -60 | —   | —    | V    | I <sub>C</sub> = -100μA                                                                   |
| Collector-Emitter Breakdown Voltage (Note 11)  | BV <sub>CEO</sub>    | -60 | —   | —    | V    | I <sub>C</sub> = -10mA                                                                    |
| Emitter-Base Breakdown Voltage                 | BV <sub>EBO</sub>    | -7  | —   | —    | V    | I <sub>E</sub> = -100μA                                                                   |
| Collector-Base Cutoff Current                  | I <sub>CBO</sub>     | —   | —   | -100 | nA   | V <sub>CB</sub> = -48V, I <sub>E</sub> = 0                                                |
| Emitter-Base Cutoff Current                    | I <sub>EBO</sub>     | —   | —   | -50  | μA   | V <sub>CB</sub> = -48V, I <sub>E</sub> = 0, T <sub>A</sub> = +150°C                       |
| DC Current Gain (Note 11)                      | h <sub>FE</sub>      | —   | —   | -100 | nA   | V <sub>EB</sub> = -5.6V, I <sub>C</sub> = 0                                               |
| DC Current Gain (Note 11)                      | h <sub>FE</sub>      | 170 | —   | —    | —    | V <sub>CE</sub> = -2V, I <sub>C</sub> = -100mA                                            |
|                                                |                      | 120 | —   | —    |      | V <sub>CE</sub> = -2V, I <sub>C</sub> = -500mA                                            |
|                                                |                      | 70  | —   | —    |      | V <sub>CE</sub> = -2V, I <sub>C</sub> = -1A                                               |
| Collector-Emitter Saturation Voltage (Note 11) | V <sub>CE(sat)</sub> | —   | —   | -180 | mV   | I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA                                           |
|                                                |                      | —   | —   | -340 |      | I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA                                             |
|                                                |                      | —   | —   | -550 |      | I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA                                              |
| Equivalent On-Resistance (Note 11)             | R <sub>CE(sat)</sub> | —   | —   | 360  | mΩ   | I <sub>E</sub> = -0.5A, I <sub>B</sub> = -50mA                                            |
| Base-Emitter Saturation Voltage (Note 11)      | V <sub>BE(sat)</sub> | —   | —   | -1   | V    | I <sub>C</sub> = -0.5A, I <sub>B</sub> = -50mA                                            |
|                                                |                      | —   | —   | -1.0 |      | I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA                                              |
|                                                |                      | —   | —   | -1.1 |      | I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA                                             |
| Base-Emitter Turn-on Voltage (Note 11)         | V <sub>BE(on)</sub>  | —   | —   | -0.9 | V    | V <sub>CE</sub> = -2V, I <sub>C</sub> = -0.5A                                             |
| Transition Frequency                           | f <sub>T</sub>       | 65  | —   | —    | MHz  | V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz                                |
| Output Capacitance                             | C <sub>obo</sub>     | —   | —   | 15   | pF   | V <sub>CB</sub> = -10V, f = 1MHz                                                          |
| Turn-On Time                                   | t <sub>on</sub>      | —   | 75  | —    | ns   | V <sub>CC</sub> = -10V, I <sub>C</sub> = -0.5A, I <sub>B1</sub> = -I <sub>B2</sub> = 25mA |
| Delay Time                                     | t <sub>d</sub>       | —   | 35  | —    | ns   |                                                                                           |
| Rise Time                                      | t <sub>r</sub>       | —   | 40  | —    | ns   |                                                                                           |
| Turn-Off Time                                  | t <sub>off</sub>     | —   | 265 | —    | ns   |                                                                                           |
| Storage Time                                   | t <sub>s</sub>       | —   | 230 | —    | ns   |                                                                                           |
| Fall Time                                      | t <sub>f</sub>       | —   | 35  | —    | ns   |                                                                                           |

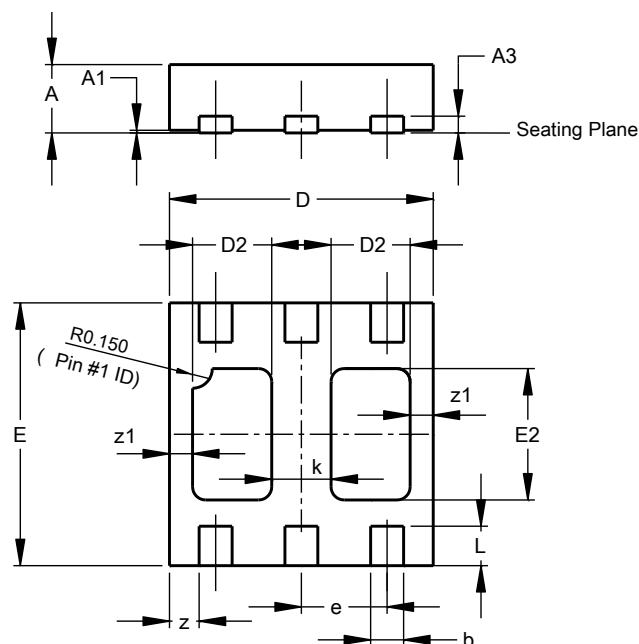
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



## Package Outline Dimensions

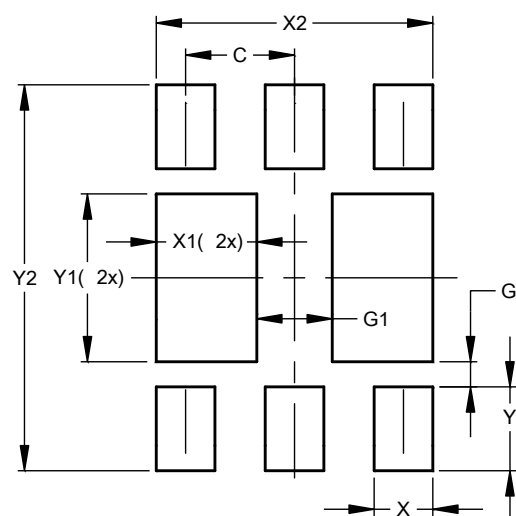
Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.



| U-DFN2020-6<br>Type B |       |       |       |
|-----------------------|-------|-------|-------|
| Dim                   | Min   | Max   | Typ   |
| A                     | 0.545 | 0.605 | 0.575 |
| A1                    | 0.00  | 0.05  | 0.02  |
| A3                    | -     | -     | 0.13  |
| b                     | 0.20  | 0.30  | 0.25  |
| D                     | 1.95  | 2.075 | 2.00  |
| D2                    | 0.50  | 0.70  | 0.60  |
| e                     | -     | -     | 0.65  |
| E                     | 1.95  | 2.075 | 2.00  |
| E2                    | 0.90  | 1.10  | 1.00  |
| k                     | -     | -     | 0.45  |
| L                     | 0.25  | 0.35  | 0.30  |
| z                     | -     | -     | 0.225 |
| z1                    | -     | -     | 0.175 |
| All Dimensions in mm  |       |       |       |

## Suggested Pad Layout

Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| G          | 0.150         |
| G1         | 0.450         |
| X          | 0.350         |
| X1         | 0.600         |
| X2         | 1.650         |
| Y          | 0.500         |
| Y1         | 1.000         |
| Y2         | 2.300         |

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