



**THE DATASHEET OF
DSS4160FDB-7**



Features

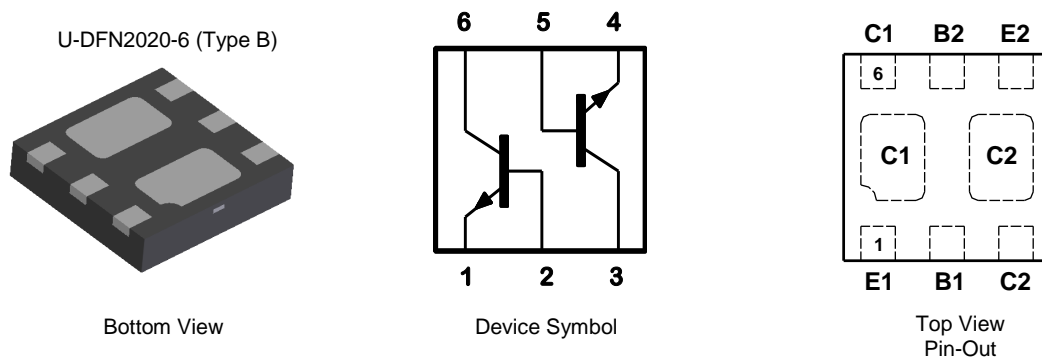
- $BV_{CEO} > 60V$
- $I_C = 1A$ High Continuous Collector Current
- $R_{CE(SAT)} = 180m\Omega$ for a Low Equivalent On-Resistance
- Low Saturation Voltage $V_{CE(SAT)} < 220mV @ 1A$
- P_D up to 2.47W for Power-Demanding Applications
- $R_{\theta JA}$ Efficient, 40% Lower than SOT26
- Low Profile 0.6mm High Package for Thin Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: U-DFN2020-6 (Type B)
- 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 ⁽⁴⁾
- Weight: 0.0065 grams (Approximate)

Application

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



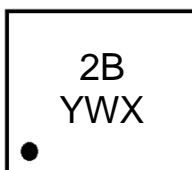
Ordering Information (Note 4)

| Product | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DSS4160FDB-7 | 2B | 7 | 8 | 3,000 |
| DSS4160FDB-7R | 2B | 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 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

U-DFN2020-6 (Type B)



- 2B = 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 (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 60 | V |
| Collector-Emitter Voltage | V _{CEO} | 60 | V |
| Emitter-Base Voltage | V _{EBO} | 7 | V |
| Continuous Collector Current | I _C | 1 | A |
| Peak Pulse Collector Current | I _{CM} | 1.5 | A |
| Base Current | I _B | 300 | mA |
| Peak Base Current | I _{BM} | 1 | A |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

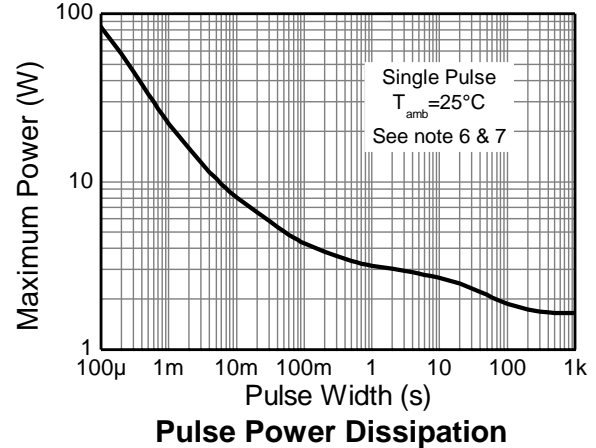
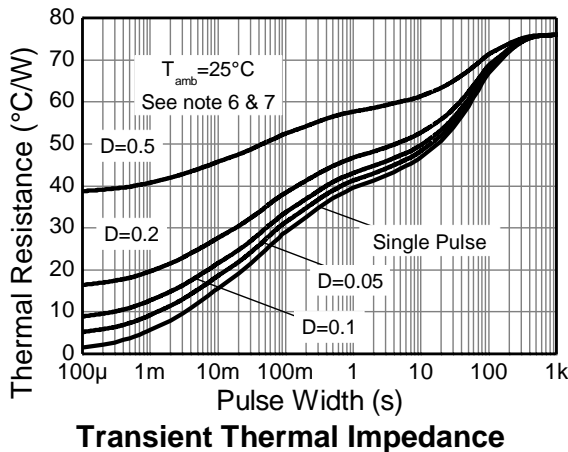
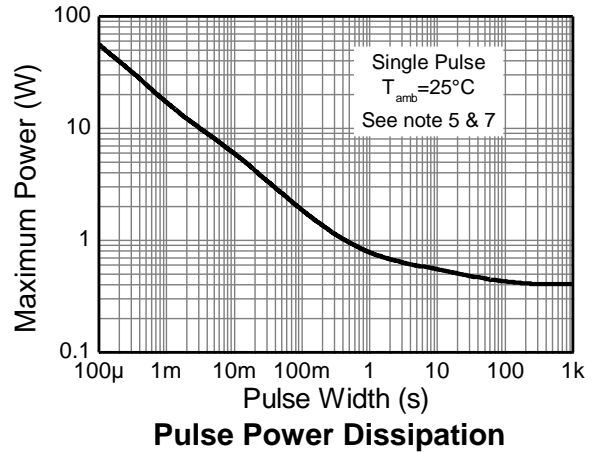
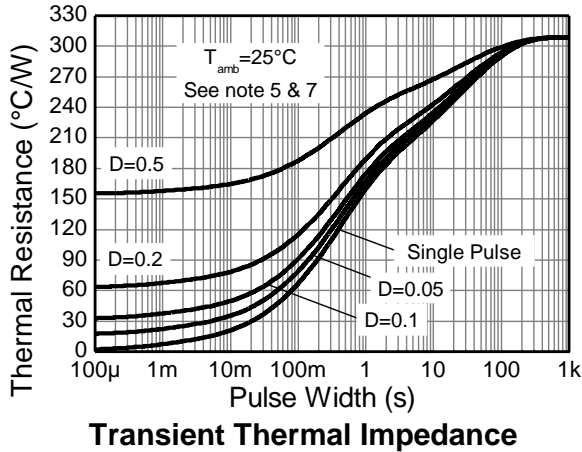
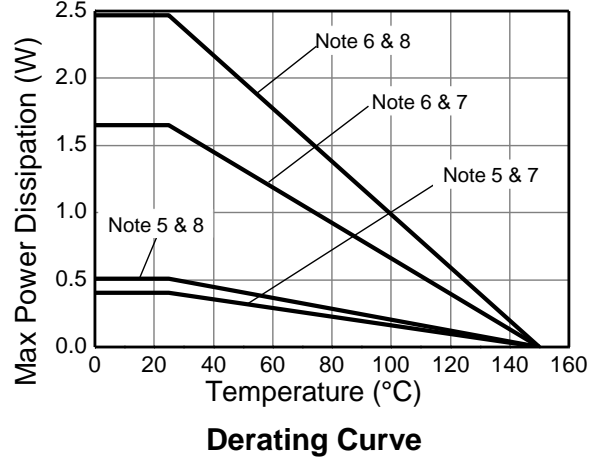
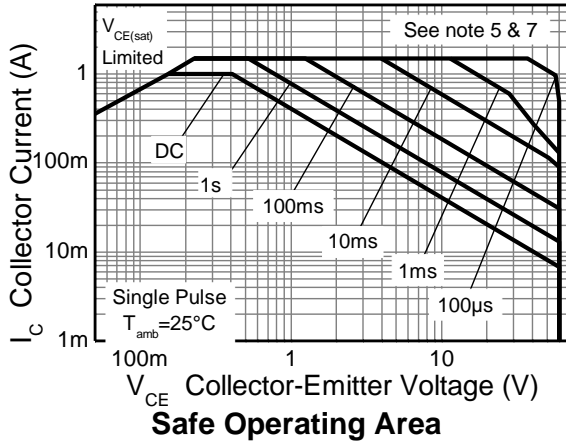
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Power Dissipation | (Notes 5 & 7) | 405 | mW |
| | (Notes 5 & 8) | 510 | |
| | (Notes 6 & 7) | 1650 | |
| | (Notes 6 & 8) | 2470 | |
| Thermal Resistance, Junction to Ambient | (Notes 5 & 7) | 308 | °C/W |
| | (Notes 5 & 8) | 245 | |
| | (Notes 6 & 7) | 76 | |
| | (Notes 6 & 8) | 51 | |
| Thermal Resistance, Junction to Lead | R _{θJL} | 18 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -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:
5. 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.
 6. Same as Note (5), except the device is mounted with the collector pad on 28mm x 28mm (8cm²) 2oz 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 (on the exposed collector pads).
 10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information



Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Conditions |
|--|----------------------|-----|-----|-----|------|--|
| Collector-Base Breakdown Voltage | BV _{CBO} | 60 | — | — | V | I _C = 100μA |
| Collector-Emitter Breakdown Voltage (Note 11) | BV _{CEO} | 60 | — | — | V | I _C = 10mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | — | — | V | I _E = 100μA |
| Collector-Base Cutoff Current | I _{CBO} | — | — | 100 | nA | V _{CB} = 48V, I _E = 0 |
| | | — | — | 50 | μA | V _{CB} = 48V, I _E = 0, T _A = +150°C |
| Emitter-Base Cutoff Current | I _{EBO} | — | — | 100 | nA | V _{EB} = 5.6V, I _C = 0 |
| DC Current Gain (Note 11) | h _{FE} | 290 | 430 | — | — | V _{CE} = 2V, I _C = 100mA |
| | | 150 | 220 | — | | V _{CE} = 2V, I _C = 500mA |
| | | 70 | 110 | — | | V _{CE} = 2V, I _C = 1A |
| Collector-Emitter Saturation Voltage (Note 11) | V _{CE(SAT)} | — | 90 | 120 | mV | I _C = 500mA, I _B = 50mA |
| | | — | 170 | 220 | | I _C = 1A, I _B = 100mA |
| | | — | 185 | 240 | | I _C = 1A, I _B = 50mA |
| Equivalent On-Resistance (Note 11) | R _{CE(SAT)} | — | 180 | 240 | mΩ | I _C = 500mA, I _B = 50mA |
| Base-Emitter Saturation Voltage (Note 11) | V _{BE(SAT)} | — | — | 1 | V | I _C = 0.5A, I _B = 50mA |
| | | — | — | 1.1 | | I _C = 1A, I _B = 50mA |
| | | — | — | 1.1 | | I _C = 1A, I _B = 100mA |
| Base-Emitter Turn-on Voltage (Note 11) | V _{BE(ON)} | — | — | 0.9 | V | V _{CE} = 2V, I _C = 0.5A |
| Transition Frequency | f _T | 90 | 175 | — | MHz | V _{CE} = 10V, I _C = 50mA, f = 100MHz |
| Output (Collector) Capacitance | C _{OB(C)} | — | 4 | 6 | pF | V _{CB} = -10V, f = 1MHz |
| Turn-On Time | t _{ON} | — | 105 | — | ns | V _{CC} = -10V, I _C = -0.5A, I _{B1} = -I _{B2} = 25mA |
| Delay Time | t _D | — | 15 | — | ns | |
| Rise Time | t _R | — | 90 | — | ns | |
| Turn-Off Time | t _{OFF} | — | 540 | — | ns | |
| Storage Time | t _S | — | 410 | — | ns | |
| Fall Time | t _F | — | 130 | — | 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.)

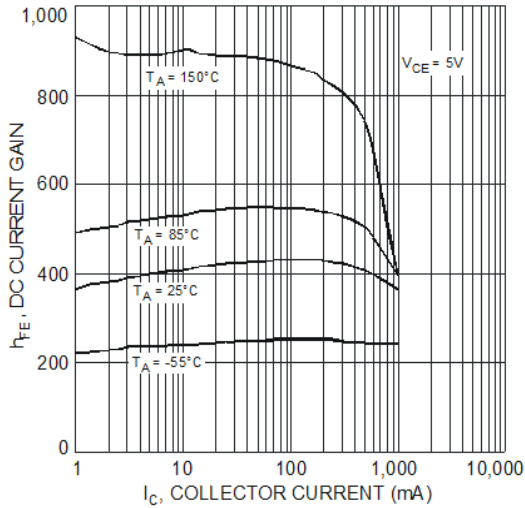


Fig. 1 Typical DC Current Gain vs. Collector Current

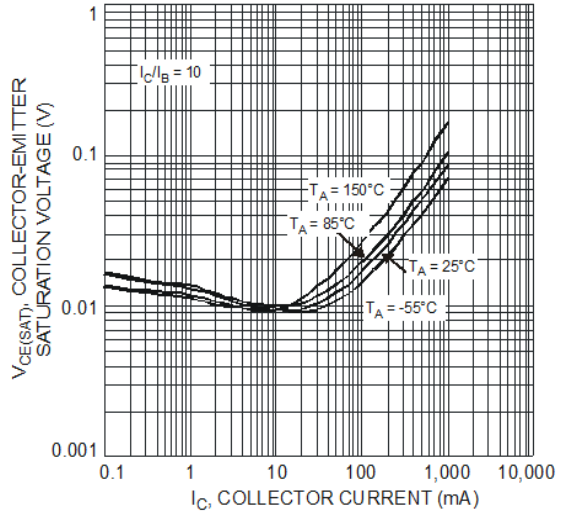


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

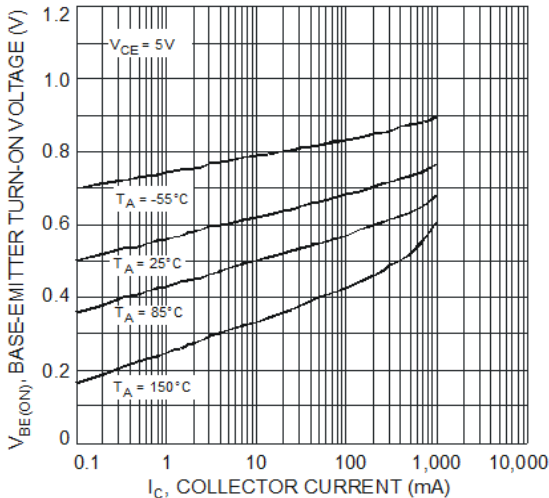


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

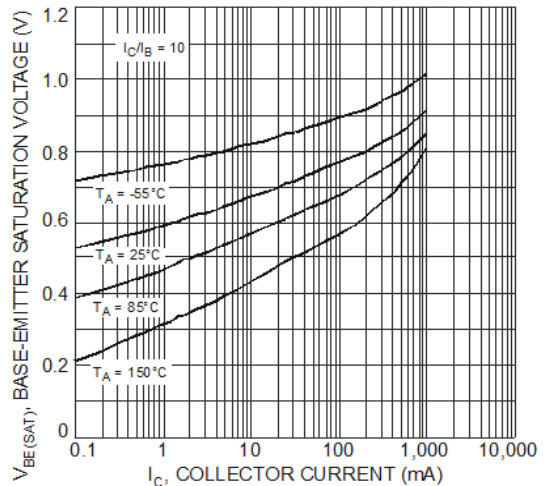


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

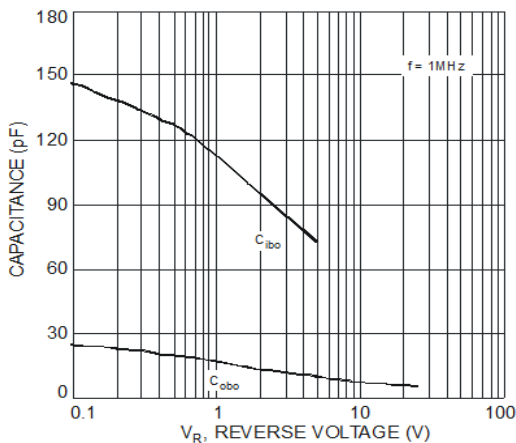
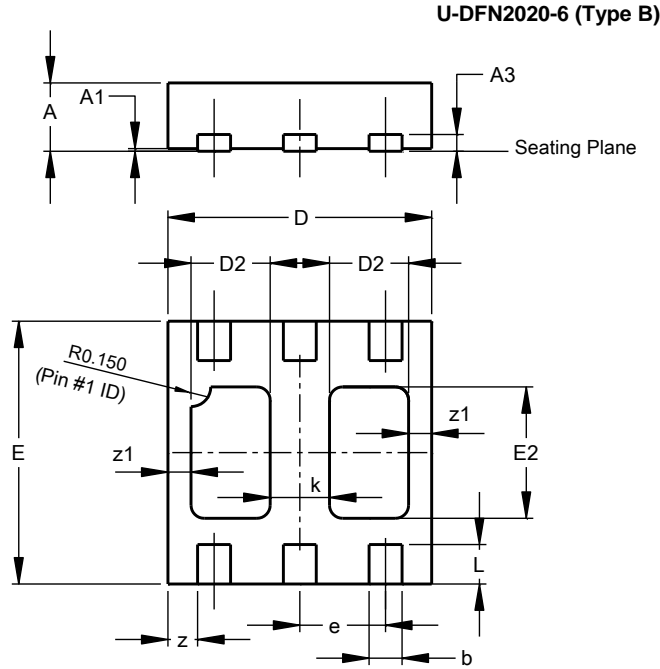


Fig. 5 Typical Capacitance Characteristics

Package Outline Dimensions

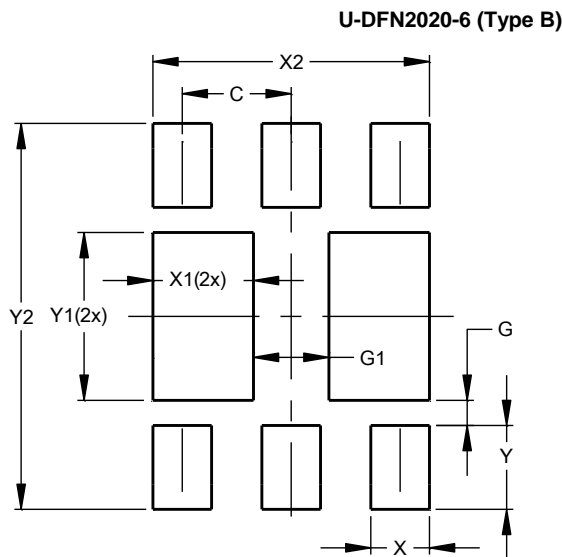
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| U-DFN2020-6 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 <http://www.diodes.com/package-outlines.html> 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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