

## Features

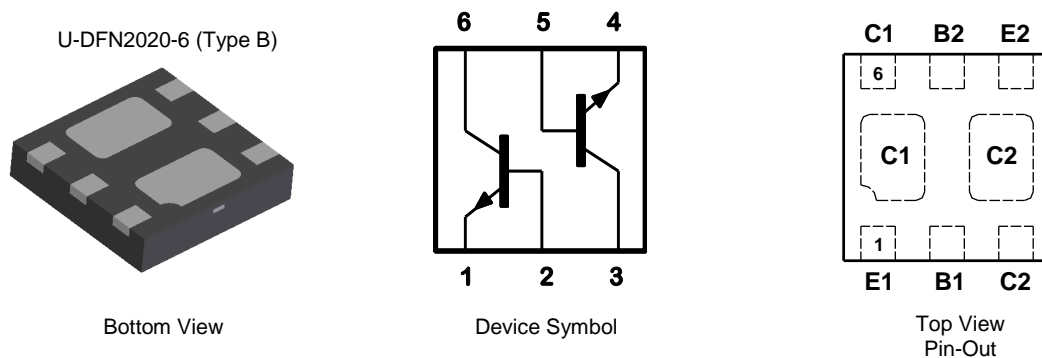
- $BV_{CEO} > 60V$
- $I_C = 1A$  High Continuous Collector Current
- $R_{CE(SAT)} = 180m\Omega$  for a Low Equivalent On-Resistance
- Low Saturation Voltage  $V_{CE(SAT)} < 220mV @ 1A$
- $P_D$  up to 2.47W for Power-Demanding Applications
- $R_{\theta JA}$  Efficient, 40% Lower than SOT26
- Low Profile 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 <sup>(4)</sup>
- Weight: 0.0065 grams (Approximate)

## Application

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



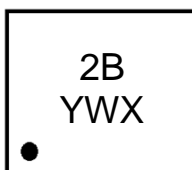
## Ordering Information (Note 4)

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](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<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.)

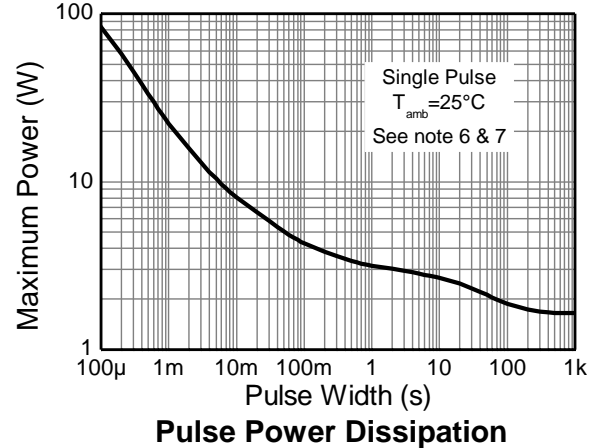
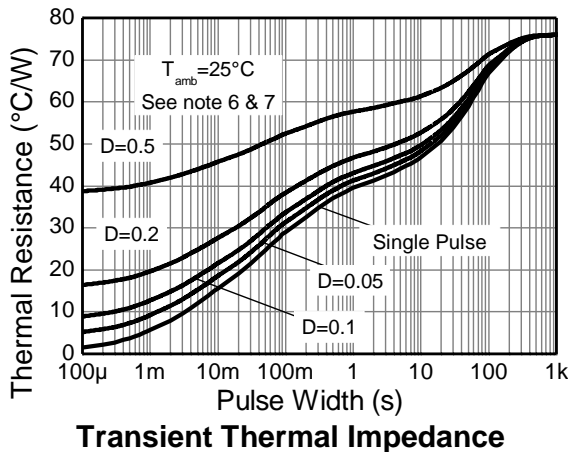
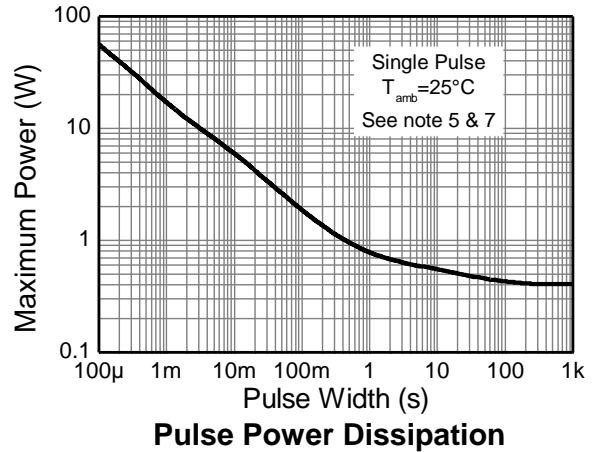
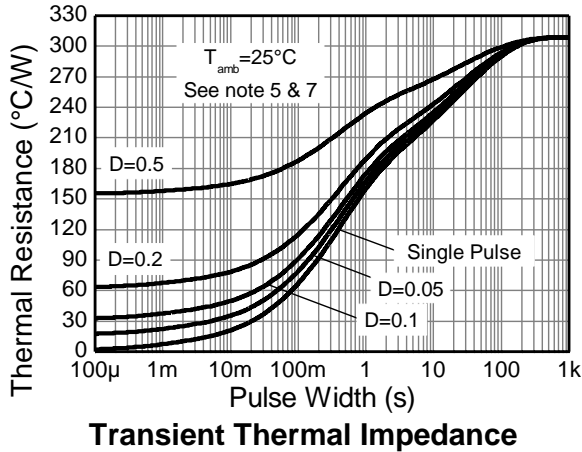
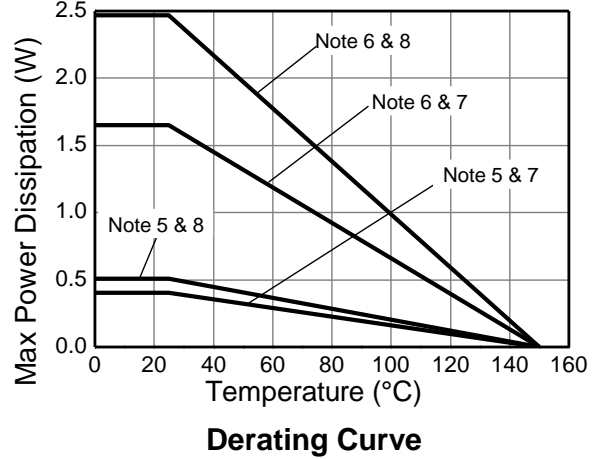
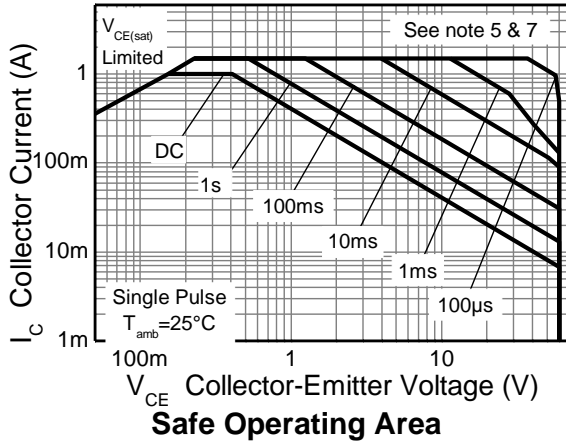
Characteristic		Symbol	Value	Unit
Power Dissipation	(Notes 5 & 7)	P <sub>D</sub>	405	mW
	(Notes 5 & 8)		510	
	(Notes 6 & 7)		1650	
	(Notes 6 & 8)		2470	
Thermal Resistance, Junction to Ambient	(Notes 5 & 7)	R <sub>θJA</sub>	308	°C/W
	(Notes 5 & 8)		245	
	(Notes 6 & 7)		76	
	(Notes 6 & 8)		51	
Thermal 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:
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 (8cm<sup>2</sup>) 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<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
		—	—	50	μA	V <sub>CB</sub> = 48V, I <sub>E</sub> = 0, T <sub>A</sub> = +150°C
Emitter-Base Cutoff Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 5.6V, I <sub>C</sub> = 0
DC Current Gain (Note 11)	h <sub>FE</sub>	290	430	—	—	V <sub>CE</sub> = 2V, I <sub>C</sub> = 100mA
		150	220	—		V <sub>CE</sub> = 2V, I <sub>C</sub> = 500mA
		70	110	—		V <sub>CE</sub> = 2V, I <sub>C</sub> = 1A
Collector-Emitter Saturation Voltage (Note 11)	V <sub>CE(SAT)</sub>	—	90	120	mV	I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
		—	170	220		I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		—	185	240		I <sub>C</sub> = 1A, I <sub>B</sub> = 50mA
Equivalent On-Resistance (Note 11)	R <sub>CE(SAT)</sub>	—	180	240	mΩ	I <sub>C</sub> = 500mA, 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
		—	—	1.1		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>	90	175	—	MHz	V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA, f = 100MHz
Output (Collector) Capacitance	C <sub>OB(C)</sub>	—	4	6	pF	V <sub>CB</sub> = -10V, f = 1MHz
Turn-On Time	t <sub>ON</sub>	—	105	—	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>	—	15	—	ns	
Rise Time	t <sub>R</sub>	—	90	—	ns	
Turn-Off Time	t <sub>OFF</sub>	—	540	—	ns	
Storage Time	t <sub>S</sub>	—	410	—	ns	
Fall Time	t <sub>F</sub>	—	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.)

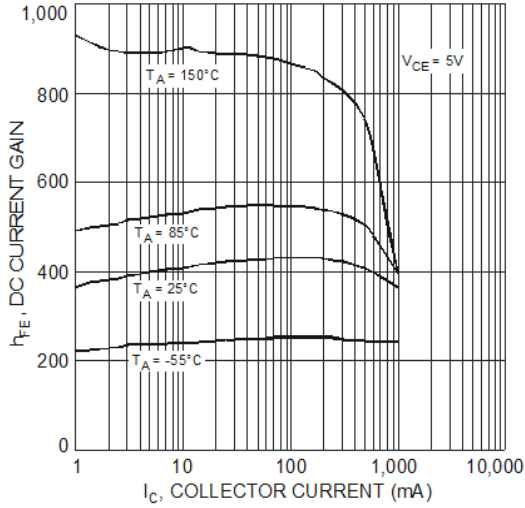


Fig. 1 Typical DC Current Gain vs. Collector Current

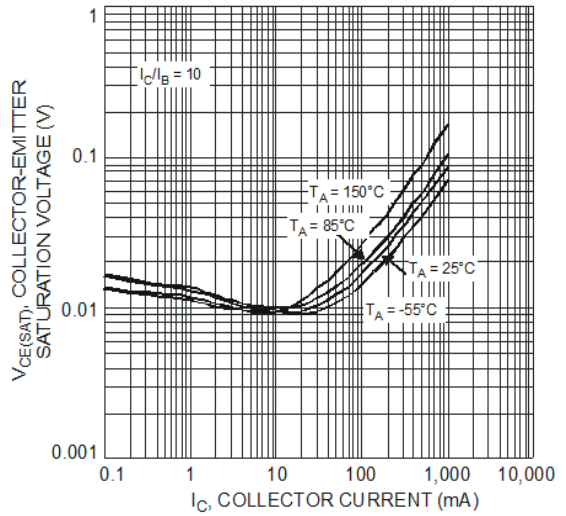


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

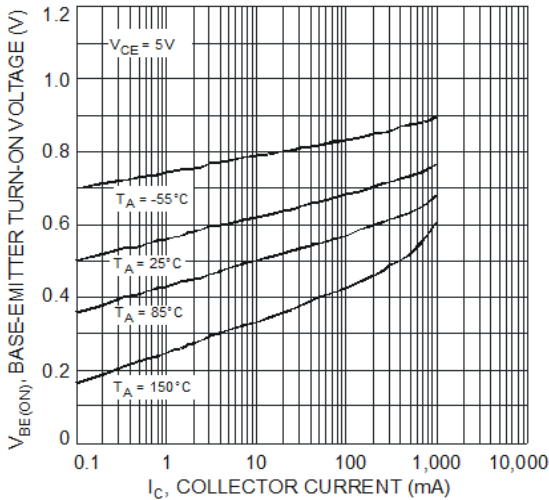


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

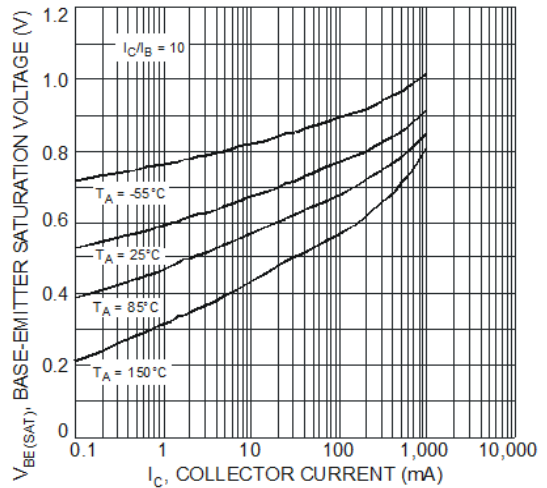


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

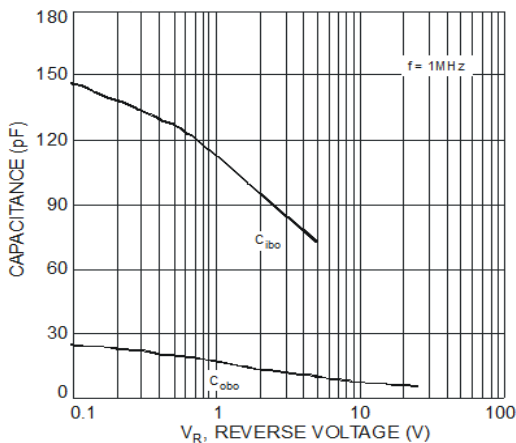
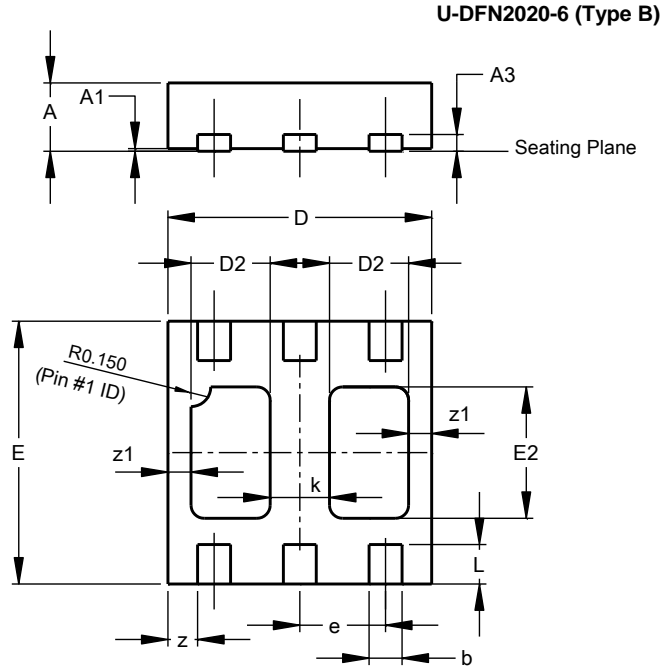


Fig. 5 Typical Capacitance Characteristics

**Package Outline Dimensions**

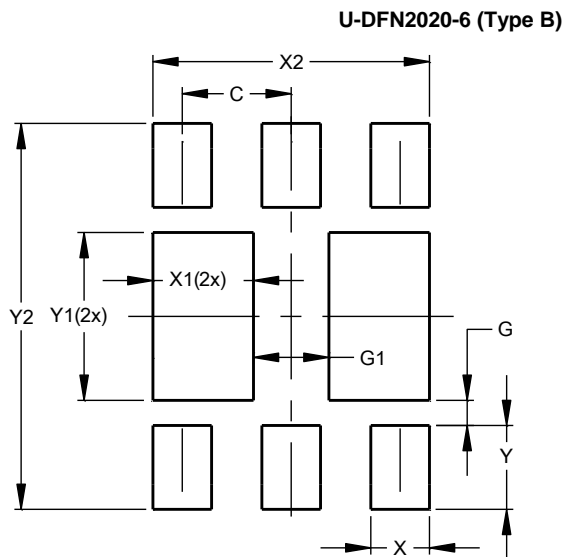
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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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