


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)**
- **The DSS4160FDBQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

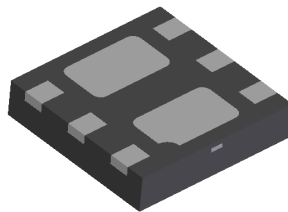
Mechanical Data

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

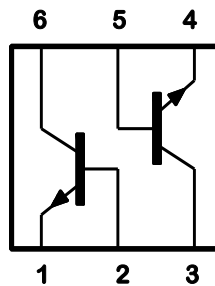
Application

- Load switches
- Power management
- Charging circuits
- Power switches (e.g. motors, fans)

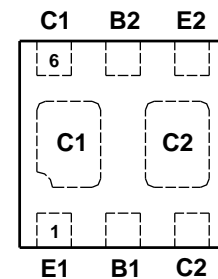
U-DFN2020-6 (Type B)



Bottom View



Device Symbol



Top View
Pin-Out

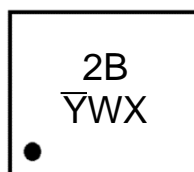
Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DSS4160FDBQ-7	Automotive	2B	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>

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

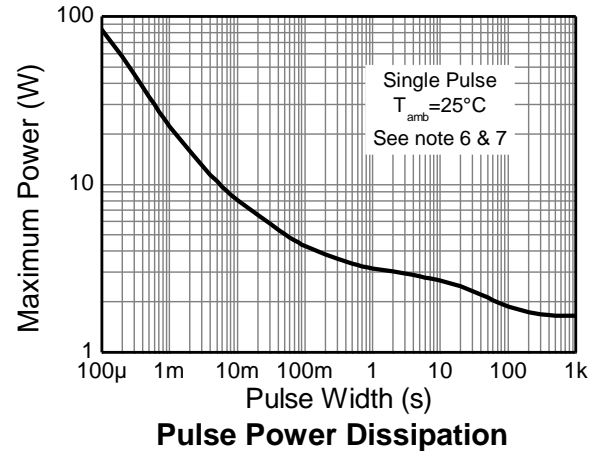
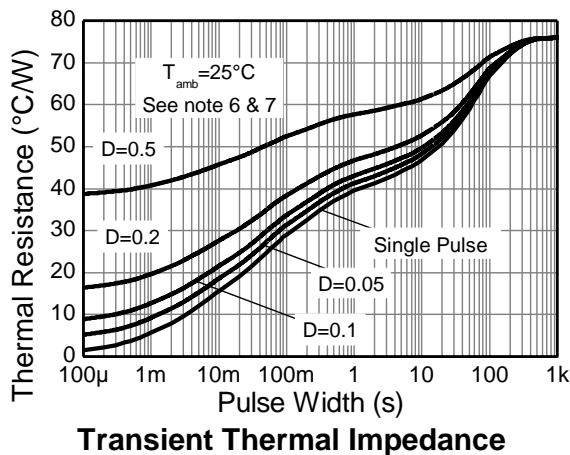
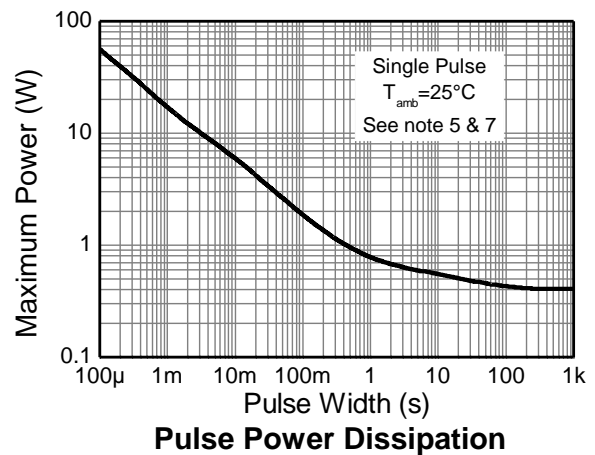
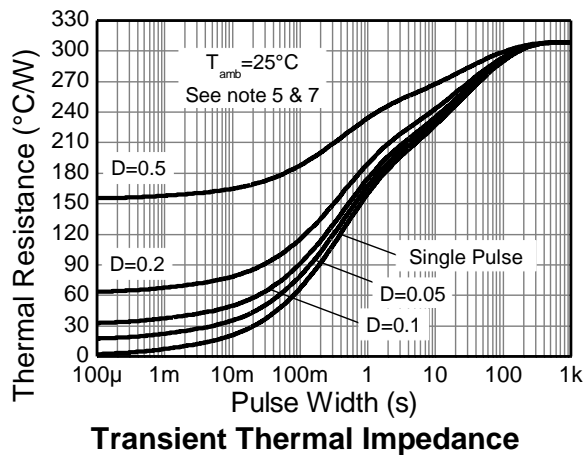
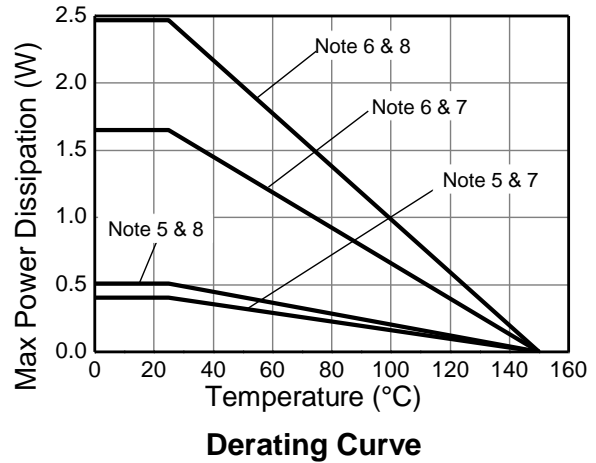
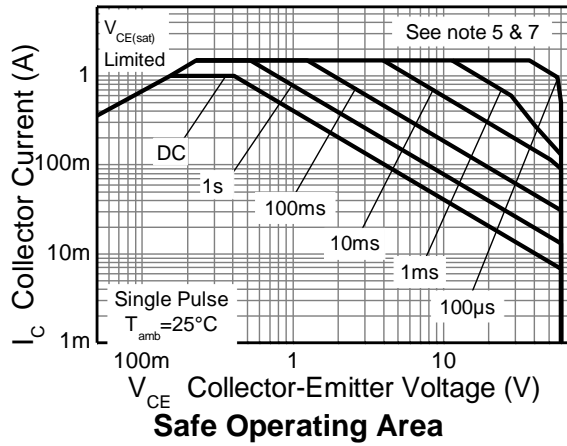
Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	405	mW
		510	
		1650	
		2470	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	308	$^\circ\text{C/W}$
		245	
		76	
		51	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	18	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

ESD Ratings (Note 10)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge – Charged Device Model	ESD CDM	1000	V	C3

- 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 (8cm²) 2oz copper.
 - For a dual device with one active die.
 - For dual device with two 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 (@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 _{obc}	—	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.)

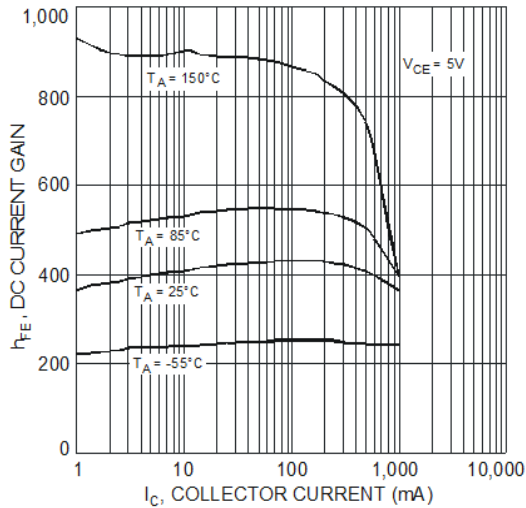


Fig. 1 Typical DC Current Gain vs. Collector Current

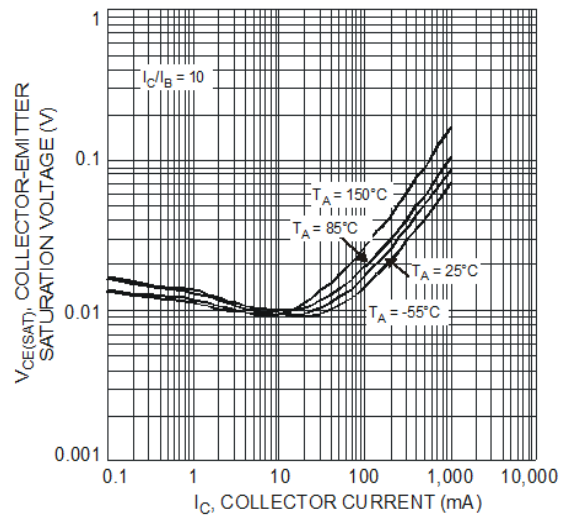


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

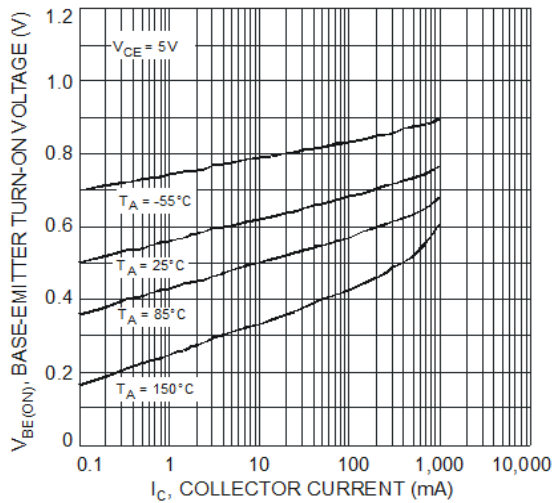


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

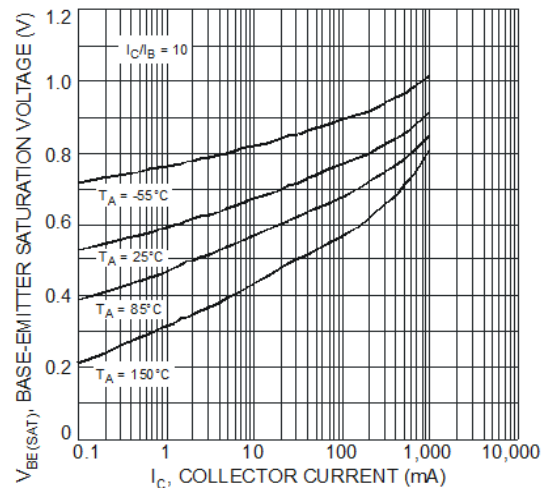


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

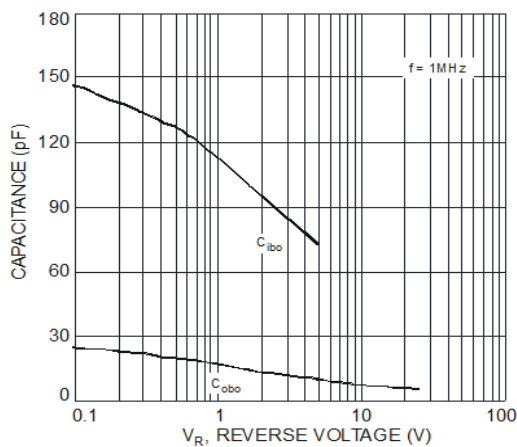
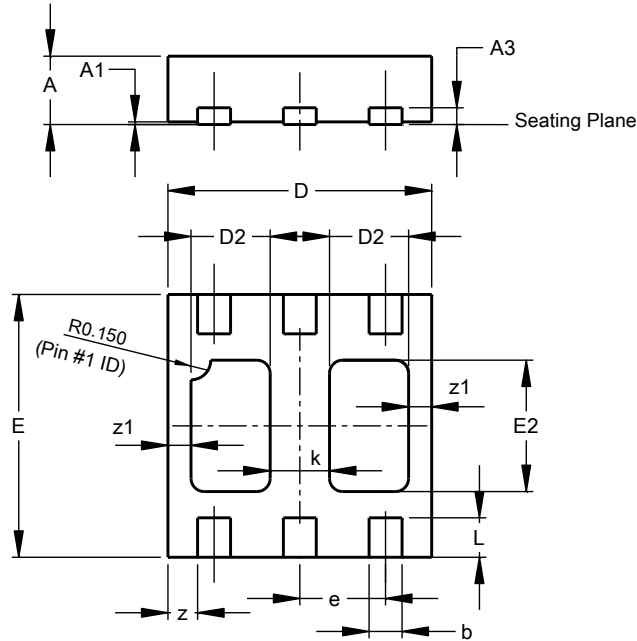


Fig. 5 Typical Capacitance Characteristics

Package Outline Dimensions

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

U-DFN2020-6 (Type B)

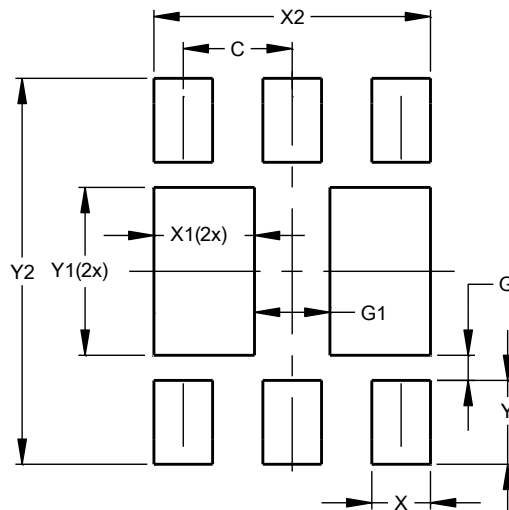


U-DFN2020-6 Type B			
Dim	Min	Max	Typ
A	0.545	0.605	0.575
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	0.50	0.70	0.60
e	—	—	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
k	—	—	0.45
L	0.25	0.35	0.30
z	—	—	0.225
z1	—	—	0.175
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type B)



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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