40V PNP LOW SATURATION TRANSISTOR IN U-DFN2020-3

Features

- BV_{CEO} > -40V
- h_{FE} Specified up to -3A for High Current Gain Hold Up
- 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)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

- Case: U-DFN2020-3 (Type B)
- Nominal Package Height: 0.6mm
- 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 e4
- Weight: 0.01 grams (Approximate)

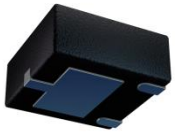
Applications

- DC-DC Converters
- Charging Circuits
- Motor Control
- Power Switches

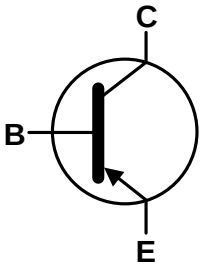
U-DFN2020-3 (Type B)



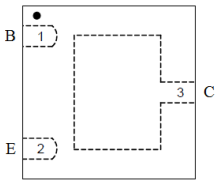
Top View



Bottom View



Device Symbol



Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DXTP5840CFDB-7	2C5	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



2C5 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

Year	2019	2020	2021	2022	2023	2024	2025	2026
Code	G	H	I	J	K	L	M	N

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	
Emitter-Base Voltage	V_{EBO}	-7	
Peak Pulse Current	I_{CM}	-8	A
Continuous Collector Current	I_C	-4.8	

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	0.69	W
	(Note 6)		1.25	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	180	°C/W
	(Note 6)		100	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

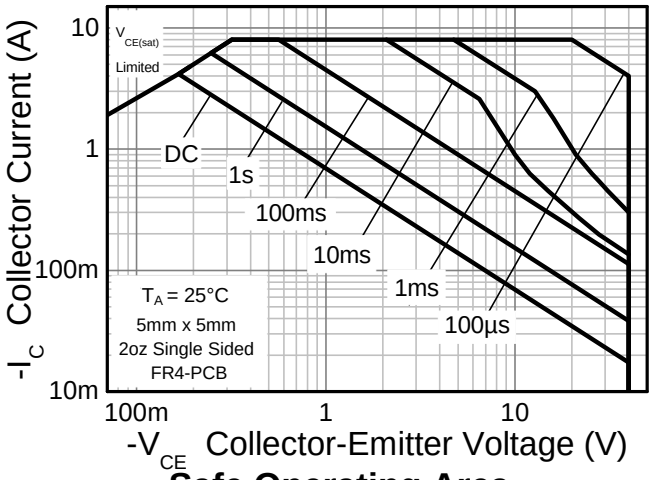
ESD Ratings (Note 7)

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

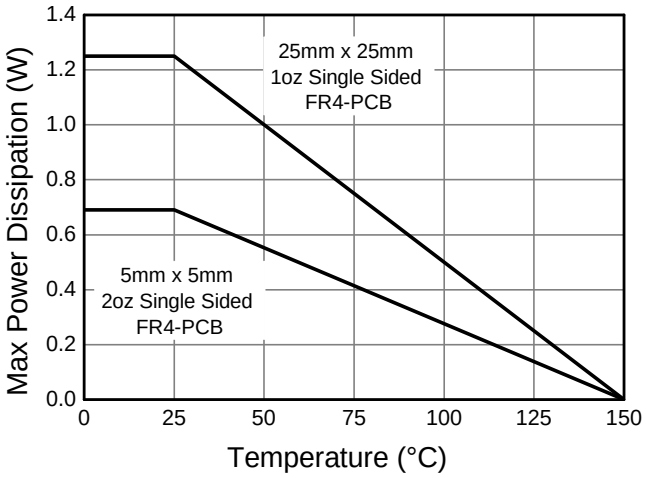
Notes:
5. For a device mounted with the exposed collector on 5mm x 5mm 2oz copper on single sided FR4 PCB; device is measured under still air conditions whilst operating in the steady state.
6. Same as Note (5) except the exposed collector pad is mounted on 25mm x 25mm 1oz copper.
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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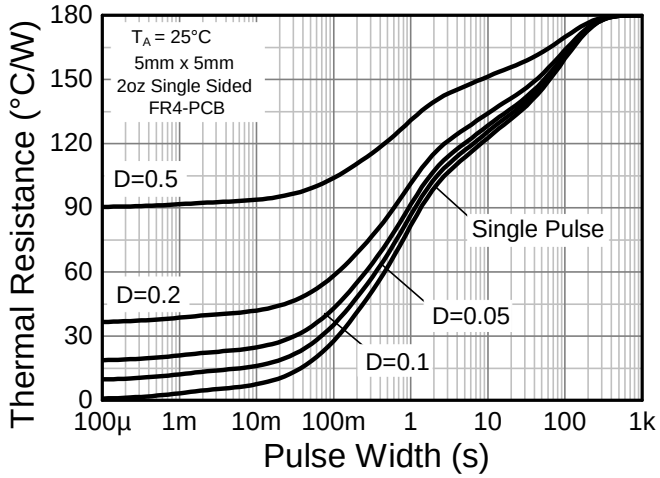
Thermal Characteristics and Derating Information



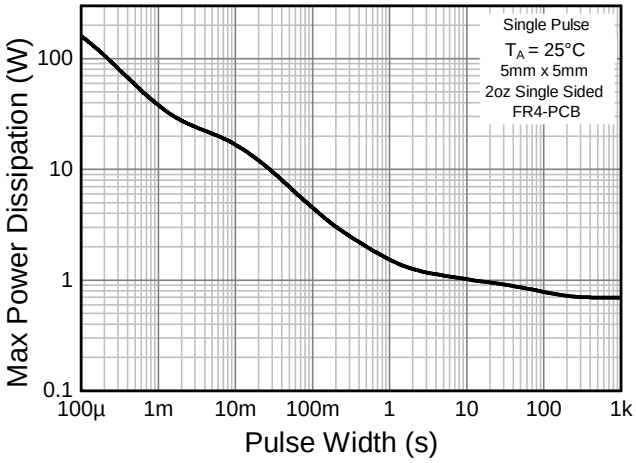
Safe Operating Area



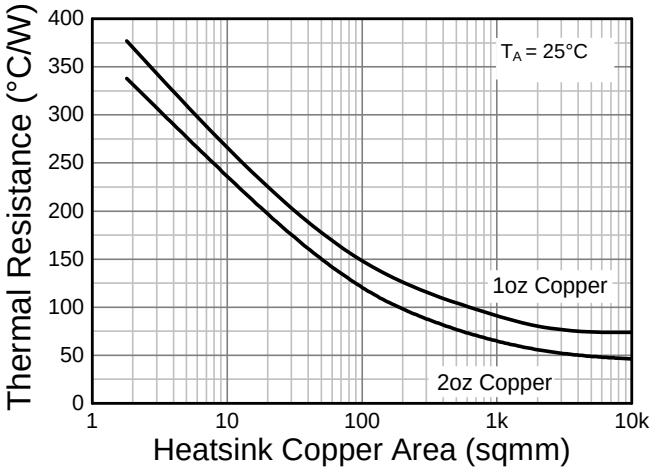
Derating Curve



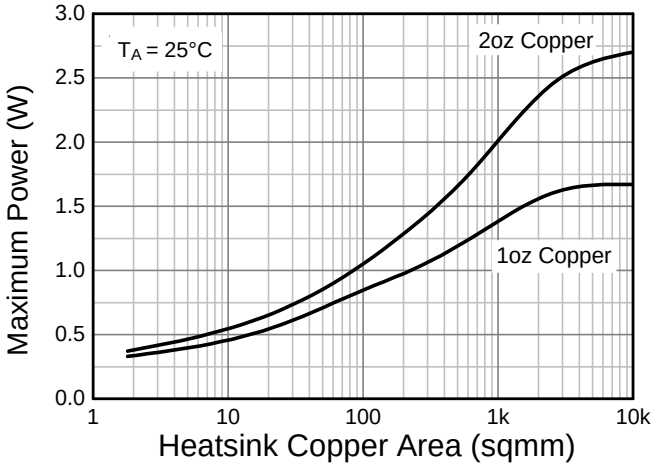
Transient Thermal Impedance



Pulse Power Dissipation



Thermal Resistance vs. Copper Area



Max Power Dissipation vs. Copper Area

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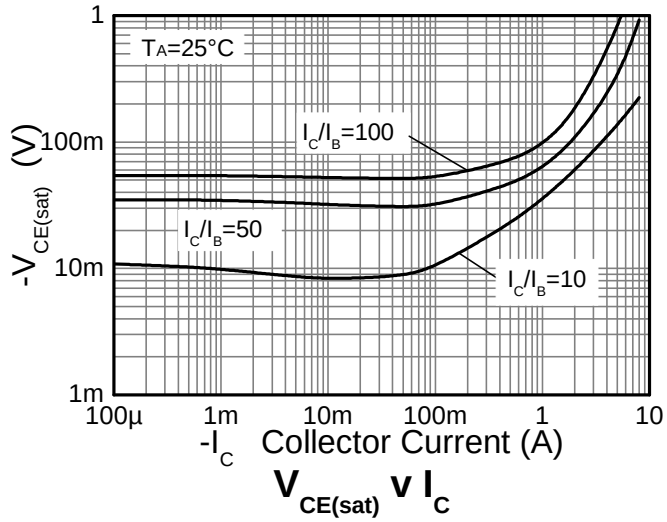
Electrical Characteristics (@T_A = +25°C, unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-40	—	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	-40	—	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	—	—	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	—	—	-100	nA	V_{CB} = -32V
Emitter Cutoff Current	I_{EBO}	—	—	-100	nA	V_{EB} = -7V
Collector Emitter Cutoff Current	I_{CES}	—	—	-100	nA	V_{CES} = -32V
Static Forward Current Transfer Ratio (Note 8)	h_{FE}	250	400	—	—	I_C = -10mA, V_{CE} = -2V
		240	350	—		I_C = -500mA, V_{CE} = -2V
		220	330	—		I_C = -1A, V_{CE} = -2V
		180	280	—		I_C = -2A, V_{CE} = -2V
		150	240	—		I_C = -3A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	-10	-15	mV	I_C = -0.1A, I_B = -10mA
		—	-37	-80		I_C = -1A, I_B = -100mA
		—	-100	-130		I_C = -1A, I_B = -10mA
		—	-190	-230		I_C = -2A, I_B = -20mA
		—	-310	-370		I_C = -3A, I_B = -30mA
		—	-115	-260		I_C = -4A, I_B = -400mA
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(on)}$	—	-0.8	-0.9	V	I_C = -2A, V_{CE} = -2V
Base-Emitter Saturation Voltage (Note 8)	$V_{BE(sat)}$	—	-0.76	-0.9	V	I_C = -1A, I_B = -10mA
Output Capacitance	C_{obo}	—	65	—	pF	V_{CB} = -3V, f = 1MHz
Transition Frequency	f_T	—	135	—	MHz	V_{CE} = -5V, I_C = -100mA, f = 100MHz
Delay Time	t_d	—	105	—	ns	V_{CC} = -30V, I_C = -750mA I_{B1} = -I_{B2} = -15mA
Rise Time	t_r	—	125	—		
Turn-On Time	t_{on}	—	230	—		
Storage Time	t_s	—	265	—		
Fall Time	t_f	—	95	—		
Turn-Off Time	t_{off}	—	360	—		

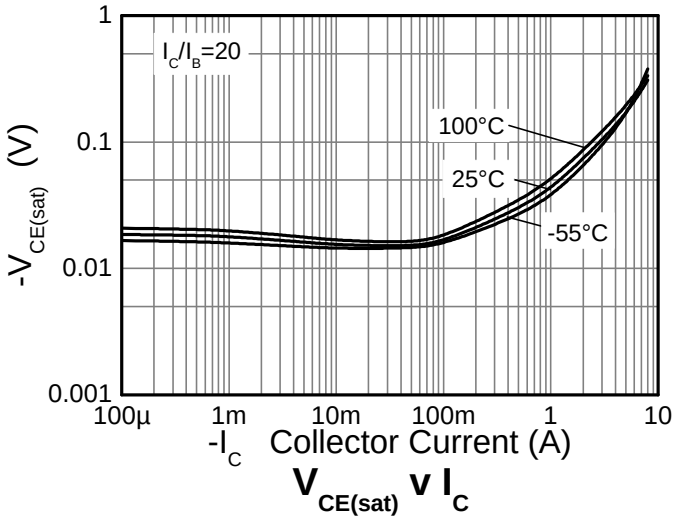
Note: 8. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

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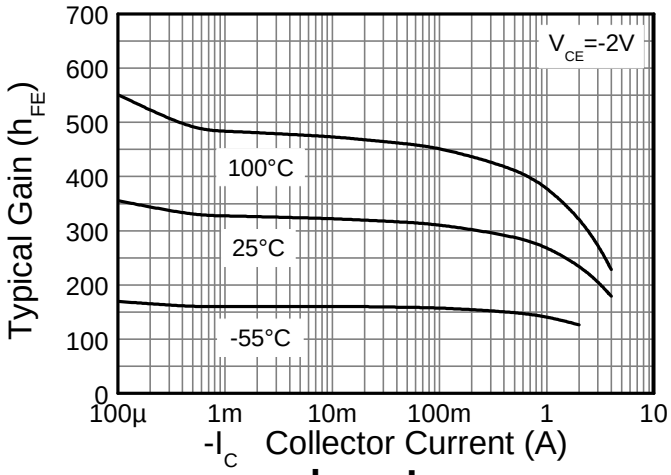
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



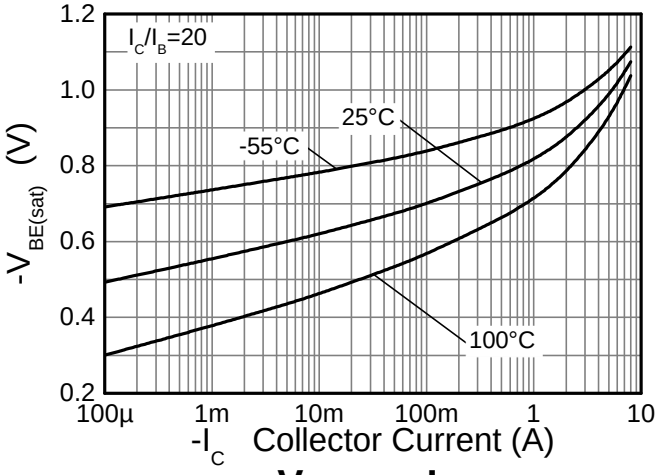
$V_{CE(sat)}$ v I_C



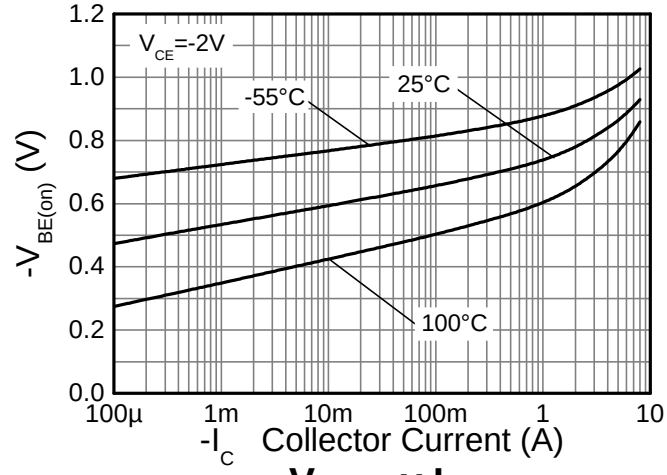
$V_{CE(sat)}$ v I_C



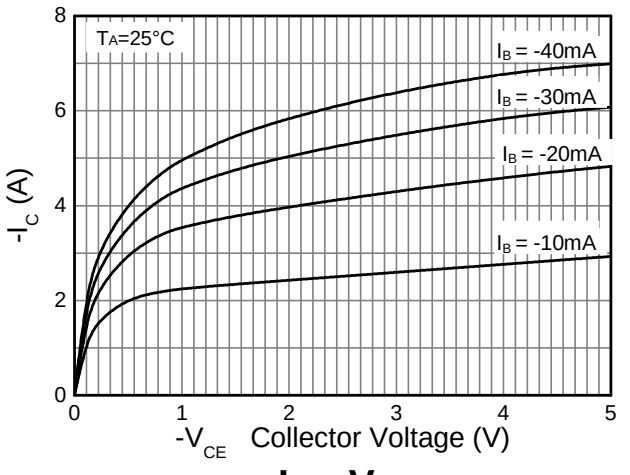
h_{FE} v I_C



$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C



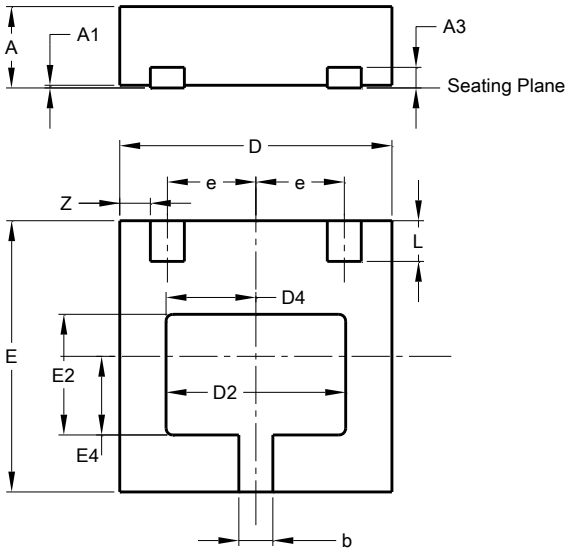
I_C v V_{CE}

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Package Outline Dimensions

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

U-DFN2020-3 (Type B)

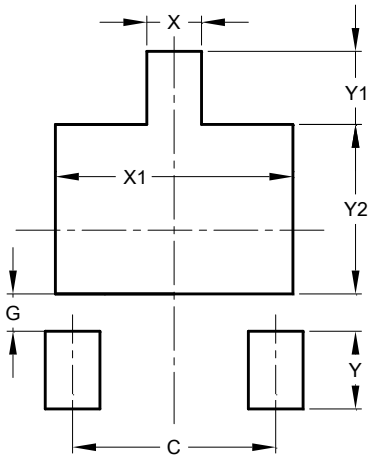


U-DFN2020-3 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0.00	0.05	0.02
A3	—	—	0.152
b	0.20	0.30	0.25
D	1.950	2.075	2.00
D2	1.22	1.42	1.32
D4	0.56	0.76	0.66
E	1.950	2.075	2.00
E2	0.79	0.99	0.89
E4	0.48	0.68	0.58
e	—	—	0.65
L	0.25	0.35	0.30
Z	—	—	0.225
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-3 (Type B)



Dimensions	Value (in mm)
C	1.300
G	0.240
X	0.350
X1	1.520
Y	0.500
Y1	0.470
Y2	1.090

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