200V PNP HIGH VOLTAGE TRANSISTOR IN POWERDI5

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of Automotive Applications.

Mechanical Data

- Case: PowerDI®5
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Lead-frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.093 grams (Approximate)

Features

- BV_{CEO} = -200V
- I_C = -2A High Continuous Collector Current
- I_{CM} = -5A Peak Collector Current
- P_D up to 3.2W
- 43% smaller than SOT223; 60% smaller than TO252 (DPAK)
- Maximum height just 1.1mm
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DXTP03200BP5Q 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/

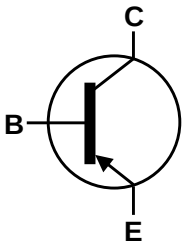
Application

- DC – DC Conversion
- Telecoms
- Power management

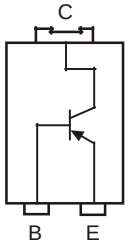
PowerDI®5

Top View

Bottom View



Device Schematic



Pin-Out Diagram

Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DXTP03200BP5Q-13	Automotive	DTP3200B	13	16	5,000

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

PowerDI®5

DTP3200B = Product Type Marking Code
= Manufacturers' Code Marking
K = Factory Designator
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 19 for 2019)
WW = Week Code (01 to 53)

PowerDI is a registered trademark of Diodes Incorporated

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-220	V
Collector-Emitter Voltage	V_{CEO}	-200	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-2	A
Base Current	I_B	-1	A
Peak Pulse Current	I_{CM}	-5	A

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

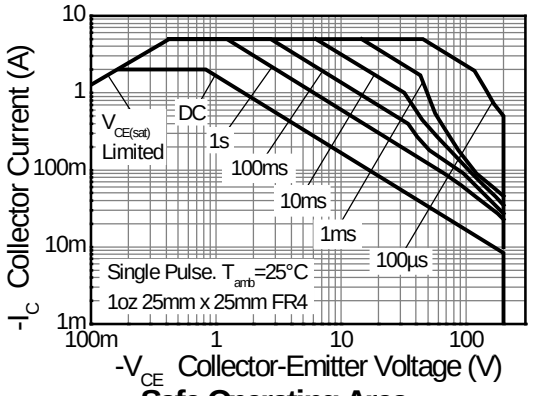
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	3.2	W
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	39	°C/W
Power Dissipation (Note 6)	P_D	1.7	W
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	75	°C/W
Power Dissipation (Note 7)	P_D	0.74	W
Thermal Resistance, Junction to Ambient Air (Note 7)	$R_{\theta JA}$	169	°C/W
Thermal Resistance, Junction to Lead (Note 8)	$R_{\theta JL}$	5.6	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 9)

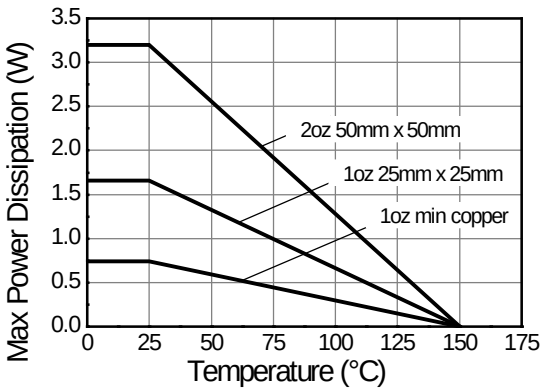
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. Device mounted on FR-4 PCB, single sided 2 oz. copper, collector pad dimensions 50mm x 50mm.
6. Device mounted on FR-4 PCB, single sided 1 oz. copper, collector pad dimensions 25mm x 25mm.
7. Device mounted on FR-4 PCB, single sided 1 oz. copper, minimum recommended pad layout.
8. Thermal resistance from junction to solder-point (on the exposed collector pad).
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

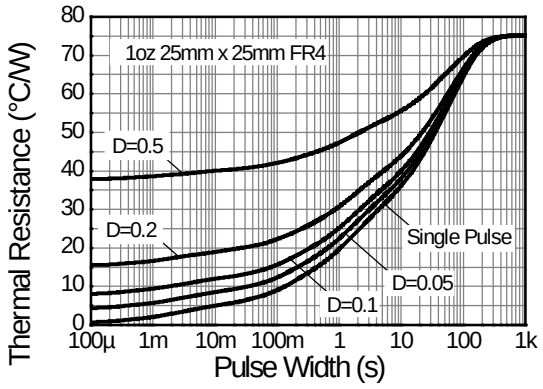
Thermal Characteristics and Derating Information



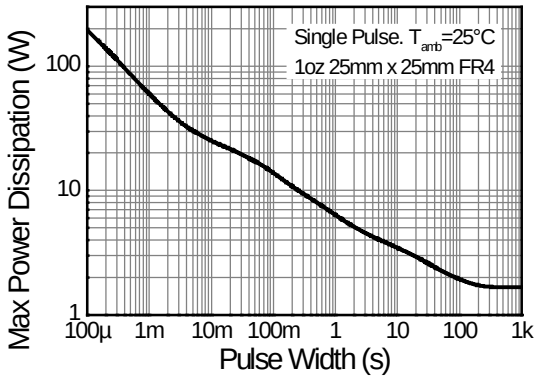
Safe Operating Area



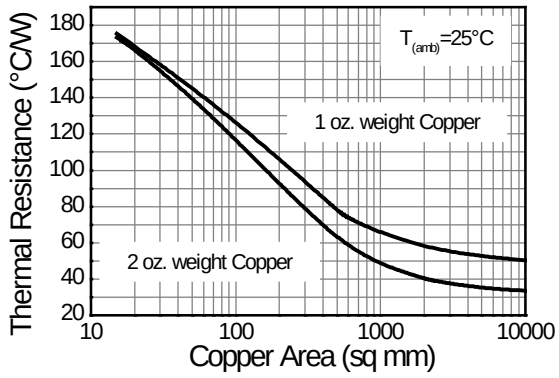
Derating Curve



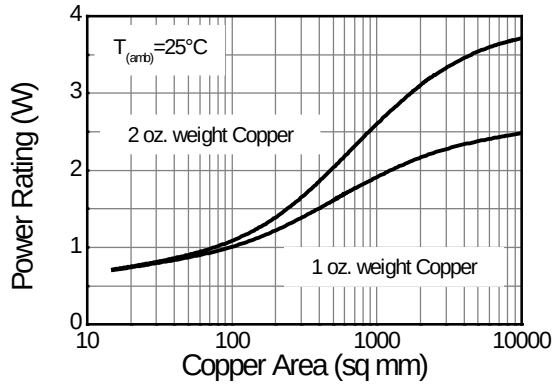
Transient Thermal Impedance



Pulse Power Dissipation



Thermal Resistance vs. Cu Area



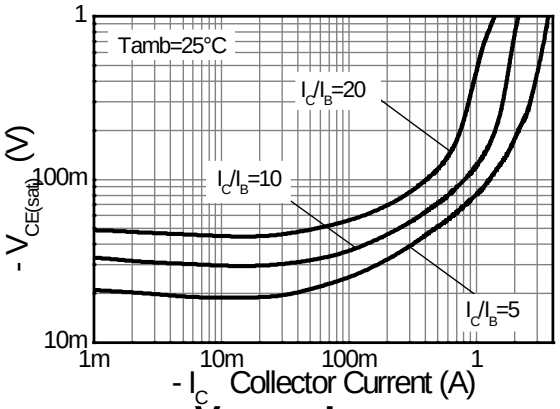
Power Rating vs. Cu Area

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

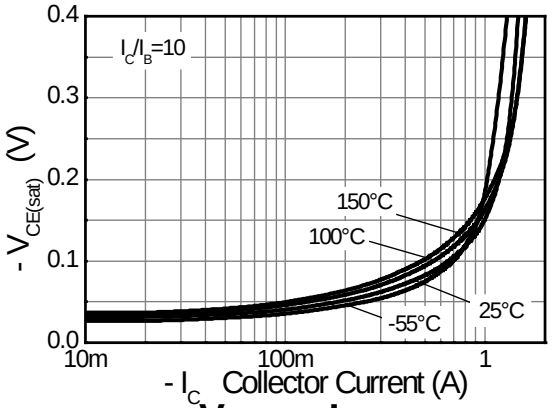
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-220	-245	–	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 10)	$V_{(BR)CEO}$	-200	-225	–	V	I_C = -10mA
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-7	-8.4	–	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	–	<1 –	-50 -0.5	nA µA	V_{CB} = -200V V_{CB} = -200V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	–	<1	-10	nA	V_{EB} = -6V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	– – – –	-37 -130 -135 -180	-50 -155 -160 -275	mV	I_C = -0.1A, I_B = -10mA I_C = -0.5A, I_B = -25mA I_C = -1A, I_B = -100mA I_C = -2A, I_B = -400mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	–	-955	-1,100	mV	I_C = -2A, I_B = -400mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	–	-860	-1,000	mV	V_{CE} = -5V, I_C = -2A
DC Current Gain (Note 10)	h_{FE}	100 100 20 –	195 170 50 5	– 300 – –	–	V_{CE} = -5V, I_C = -10mA V_{CE} = -5V, I_C = -1A V_{CE} = -5V, I_C = -2A V_{CE} = -5V, I_C = -5A
Transition Frequency	f_T	–	105	–	MHz	V_{CE} = -10V, I_C = -100mA, f = 50MHz
Output Capacitance	C_{obo}	–	31	–	pF	V_{CB} = -10V, f = 1MHz
Delay Time	t_d	–	21	–	ns	V_{CC} = -50V, I_C = -1A, I_{B1} = -I_{B2} = -100mA
Rise Time	t_r	–	18	–	ns	
Storage Time	t_s	–	680	–	ns	
Fall Time	t_f	–	75	–	ns	

Note: 10. Pulse Test: Pulse width ≤300µs. Duty cycle ≤2.0%.

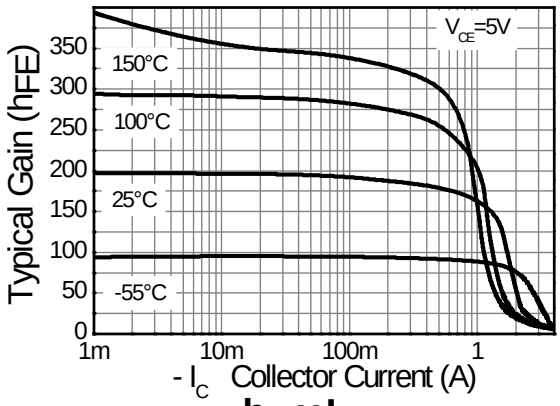
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



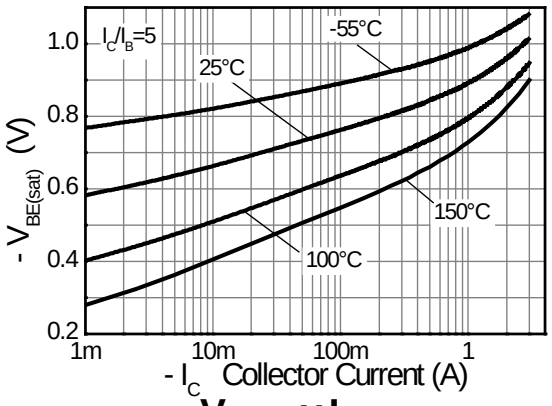
$V_{CE(sat)}$ v I_C



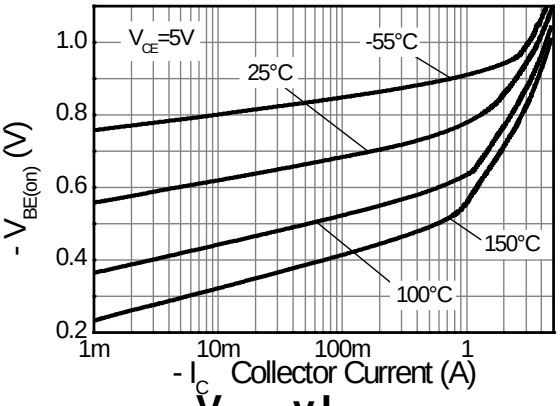
$V_{CE(sat)}$ v I_C



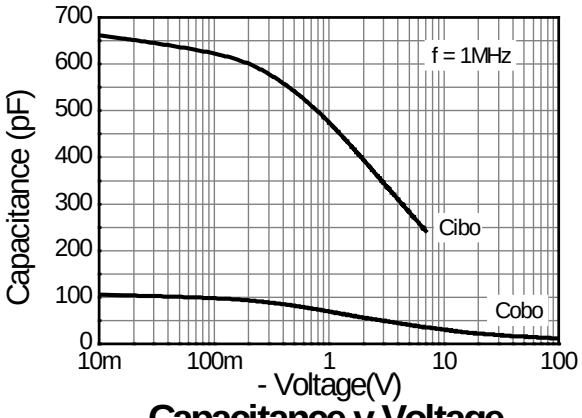
h_{FE} v I_C



$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

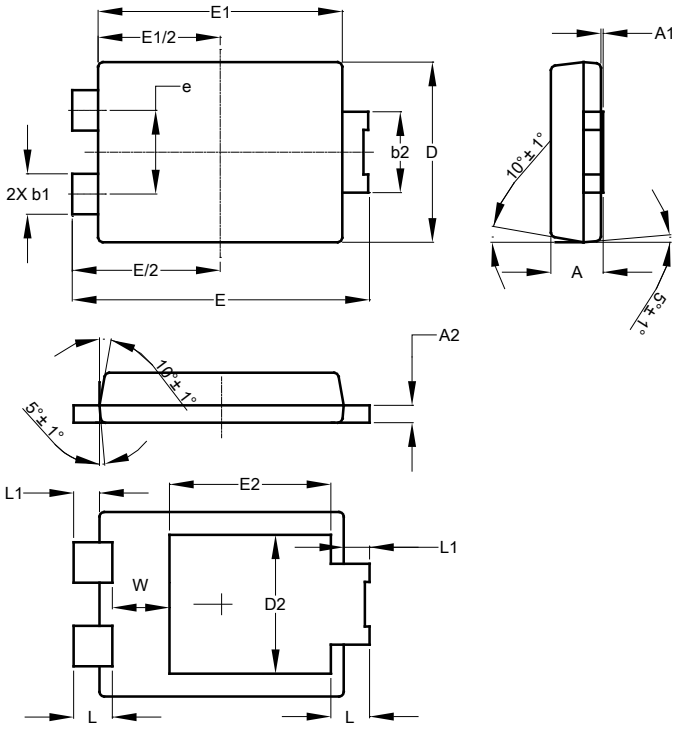


Capacitance v Voltage

Package Outline Dimensions

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

PowerDI5

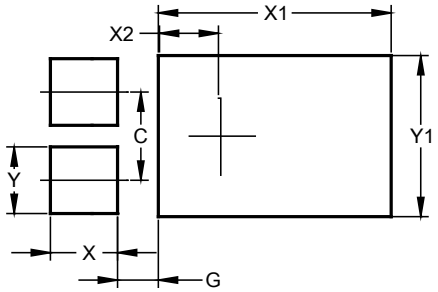


PowerDI5			
Dim	**Min**	**Max**	**Typ**
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI5



Dimensions	Value (in mm)
C	1.840
G	0.852
X	1.400
X1	4.860
X2	1.310
Y	1.390
Y1	3.360

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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