

200V PNP HIGH VOLTAGE TRANSISTOR IN POWERDI5

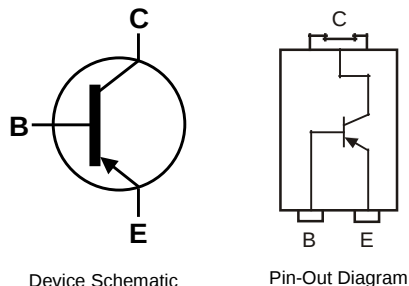
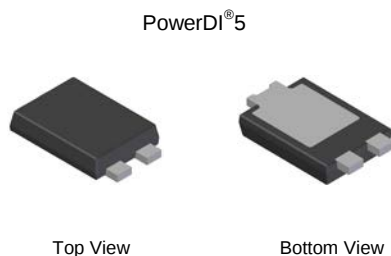
Description

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

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/>



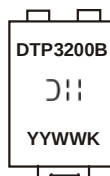
Ordering Information (Note 4)

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)

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

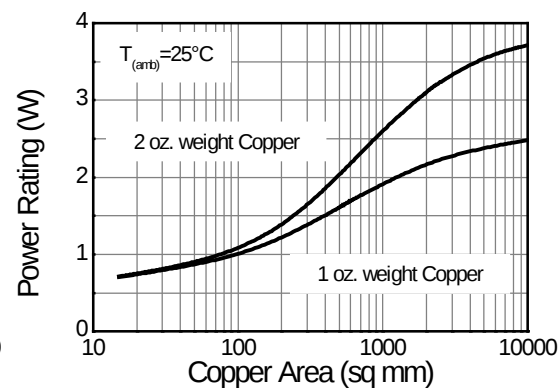
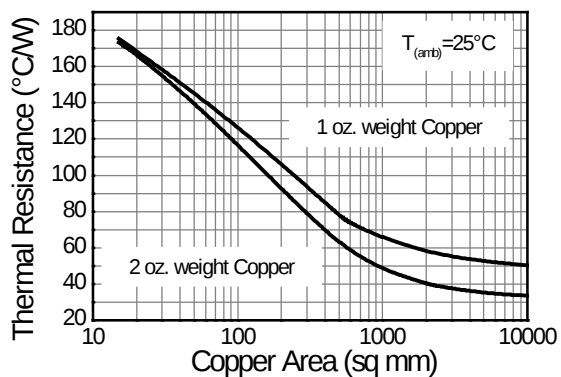
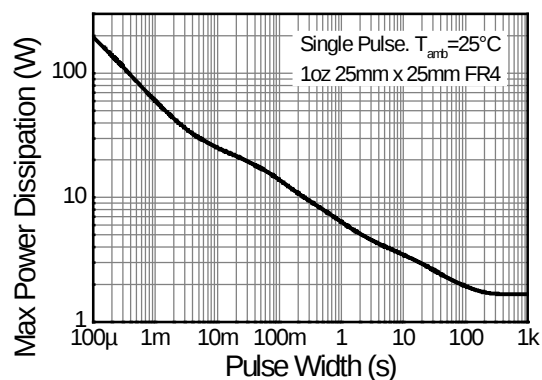
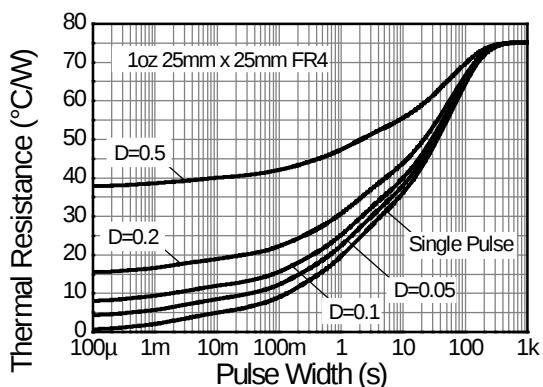
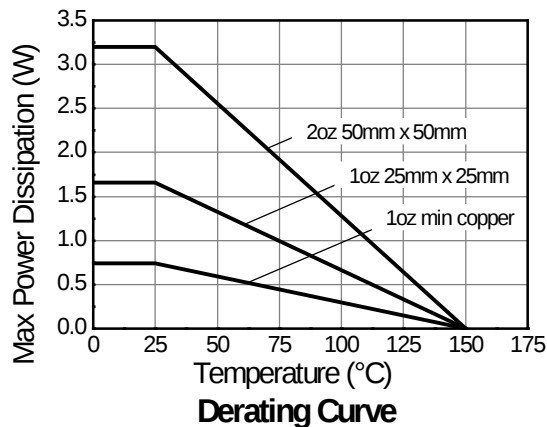
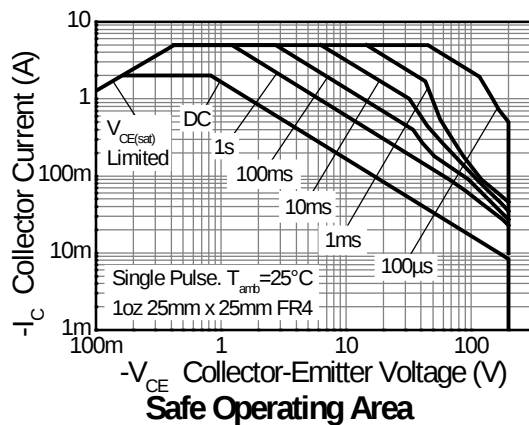
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	3.2	W
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	39	$^{\circ}\text{C/W}$
Power Dissipation (Note 6)	P_D	1.7	W
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	75	$^{\circ}\text{C/W}$
Power Dissipation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

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



Thermal Resistance vs. Cu Area

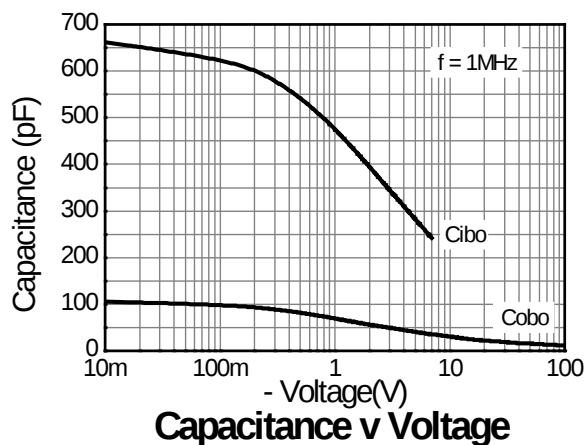
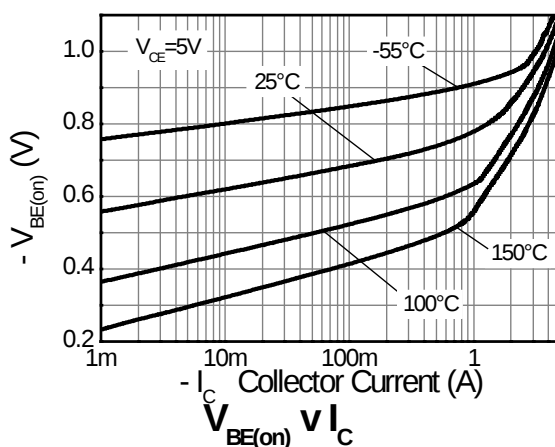
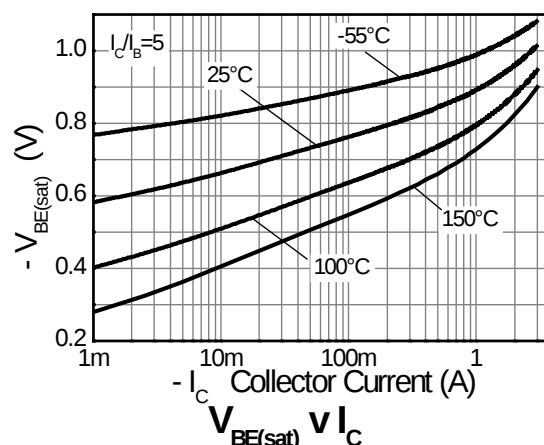
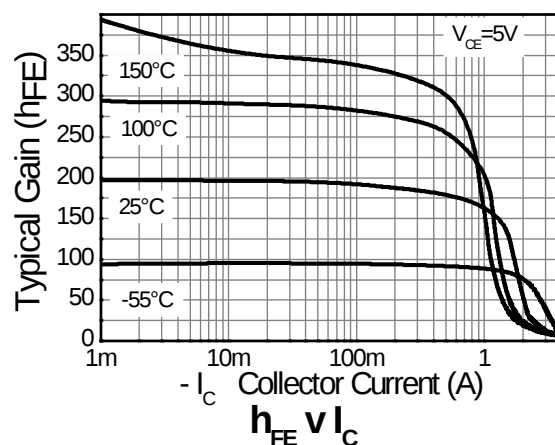
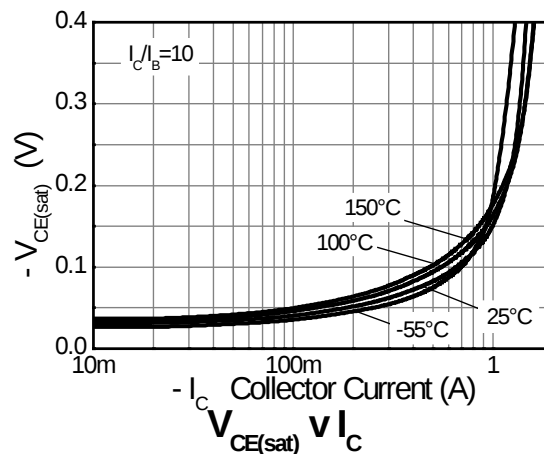
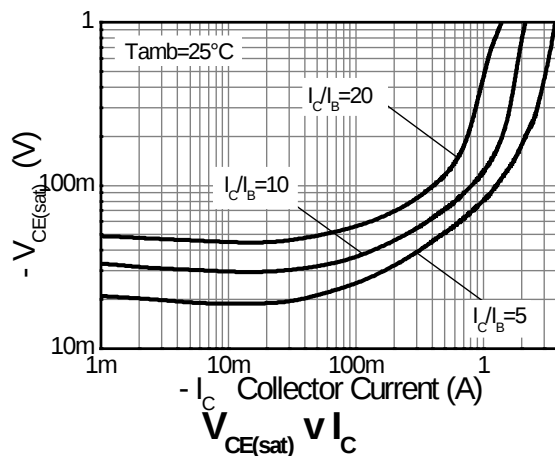
Power Rating vs. Cu Area

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

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

Note: 10. Pulse Test: Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2.0\%$.

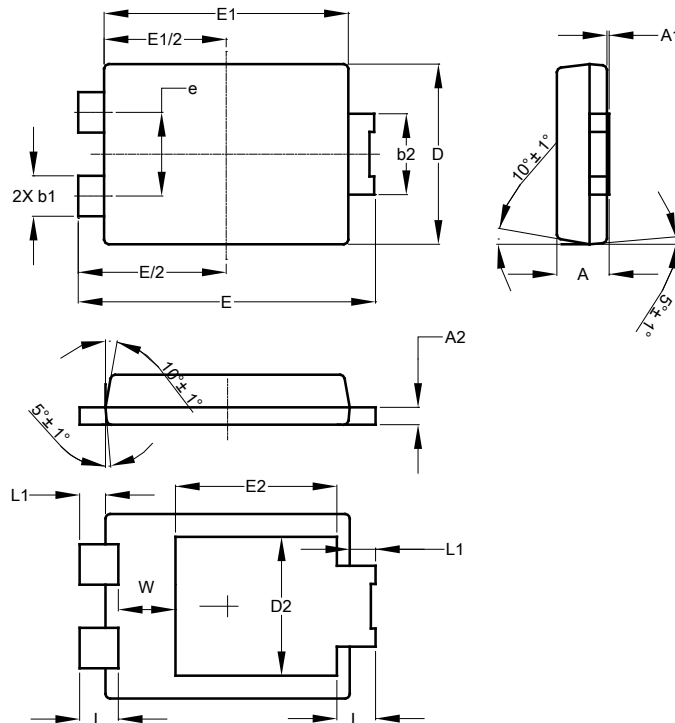
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

PowerDI5

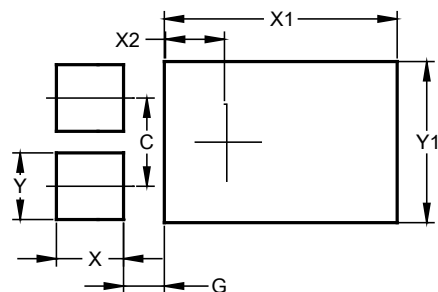


PowerDI5			
Dim	Min	Max	Typ
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

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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