20V PNP LOW SATURATION TRANSISTOR IN POWERDI5

Features

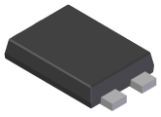
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 1.3W
- V_{CEO} = -20V
- I_C = -8A; I_{CM} = -15A
- Low saturation voltage, high gain transistor
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

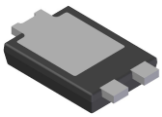
- Package: PowerDI®5
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.093 grams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

Features

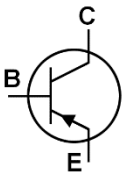
- Load disconnect switches
- Battery charging



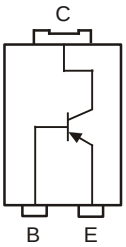
Top View



Bottom View



Device Schematic



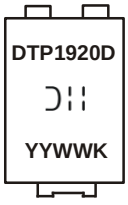
Pin-out diagram

Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Quantity	Carrier
DXTP19020DP5-13	PowerDI5	DTP1920D	13	12	5,000	Reel

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



DTP1920D = Product Type Marking Code
= Manufacturers' Code Marking
K = Factory Designator
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 23 = 2023)
WW = Week code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-25	V
Collector-Emitter Voltage	V_{CEO}	-20	V
Emitter-Collector Voltage (Reverse Blocking)	V_{ECO}	-4	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-8	A
Base Current	I_B	-1	A
Peak Pulse Current	I_{CM}	-15	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1,3	W
Power Dissipation	(Note 6)	P_D	3	W
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	96.1	°C/W
Thermal Resistance, Junction to Ambient Air	(Note 6)	$R_{\theta JA}$	41.7	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

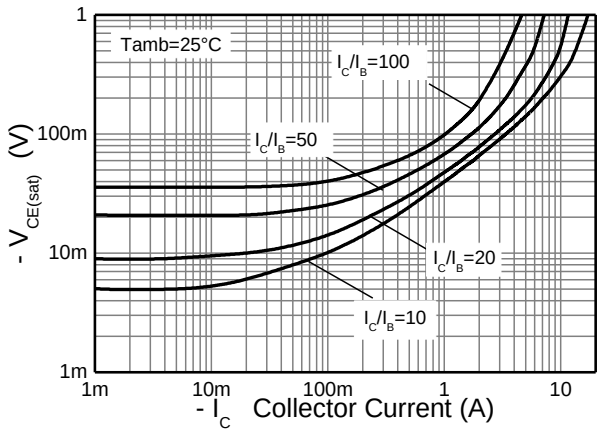
Notes: 5. Device mounted on FR-4 PCB, 2 oz. copper, minimum recommended pad layout.
6. Device mounted on FR-4 PCB, 2 oz. copper, collector pad dimensions 0.42inch^2.

Electrical Characteristics @T_A = 25°C unless otherwise specified

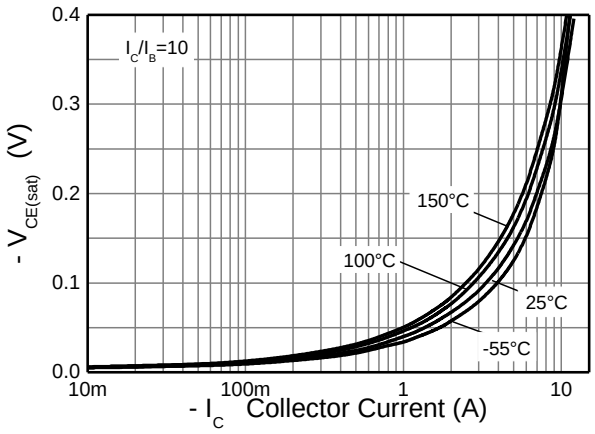
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-25	-55	—	V	I_C = -100μA
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-20	-50	—	V	I_C = -10mA
Emitter-Collector Breakdown Voltage (Reverse Blocking)	BV_{ECX}	-4	-8.6	—	V	I_E = -100μA, R_{BC} < 1kΩ or 0.25V > V_{CB} > -0.25V
Emitter-Base Breakdown Voltage (Reverse Blocking)	BV_{ECO}	-4	-8.6	—	V	I_E = -100μA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.2	—	V	I_E = -100μA
Collector Cutoff Current	I_{CBO}	—	<1 —	50 0.5	nA μA	V_{CB} = -25V V_{CB} = -25V, T_{amb} = 100 °C
Emitter Cutoff Current	I_{EBO}	—	<1	-50	nA	V_{EB} = -5.6V
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(sat)}$	—	-40 -97 -115 -220	-47 -130 -145 -275	mV	I_C = -1A, I_B = -100mA I_C = -1A, I_B = -10mA I_C = -2A, I_B = -40mA I_C = -8A, I_B = -800mA
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(sat)}$	—	-1050	-1150	mV	I_C = -8A, I_B = -800mA
Base-Emitter Turn-On Voltage (Note 7)	$V_{BE(on)}$	—	-930	-1000	mV	I_C = -8A, V_{CE} = -2V
DC Current Gain (Note 7)	h_{FE}	300 200 45 —	450 290 70 25	900 — — —	—	I_C = -100mA, V_{CE} = -2V I_C = -2A, V_{CE} = -2V I_C = -8A, V_{CE} = -2V I_C = -15A, V_{CE} = -2V
Transition Frequency	f_T	—	176	—	MHz	I_C = -50mA, V_{CE} = -10V, f = 50MHz
Input Capacitance (Note 7)	C_{ibo}	—	—	400	pF	V_{EB} = -0.5V, f = 1MHz
Output Capacitance (Note 7)	C_{obo}	—	36	45	pF	V_{CB} = -10V, f = 1MHz
Delay Time	t_d	—	23	—	ns	I_C = -1A, V_{CC} = -10V, I_{B1} = -I_{B2} = -50mA
Rise Time	t_r	—	18.4	—		
Storage Time	t_s	—	266	—		
Fall Time	t_f	—	49.6	—		

Notes: 7. Pulse Test: Pulse width ≤300μs. Duty cycle ≤2.0%.

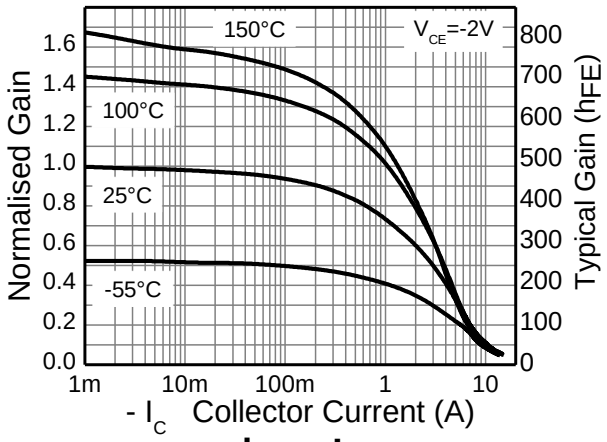
Typical Characteristic



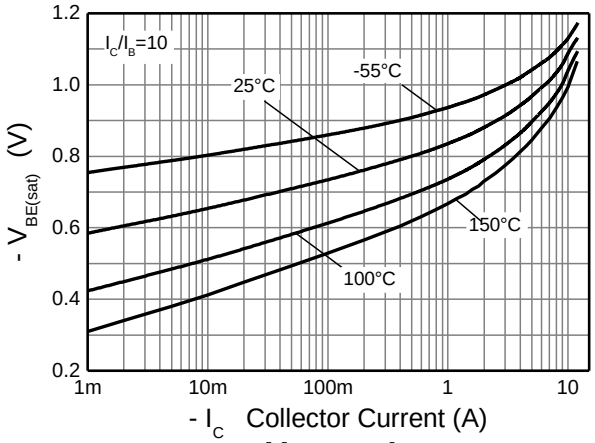
$V_{CE(sat)}$ v I_C



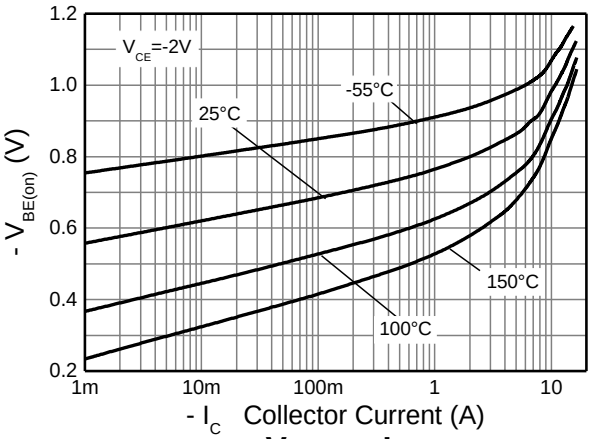
$V_{CE(sat)}$ v I_C



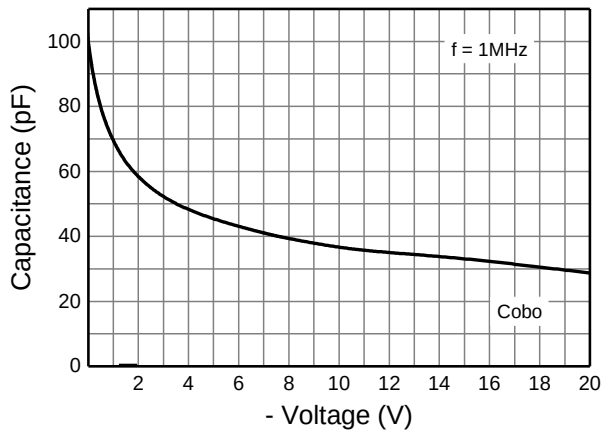
h_{FE} v I_C



$V_{BE(sat)}$ v I_C



$V_{BE(on)}$ v I_C

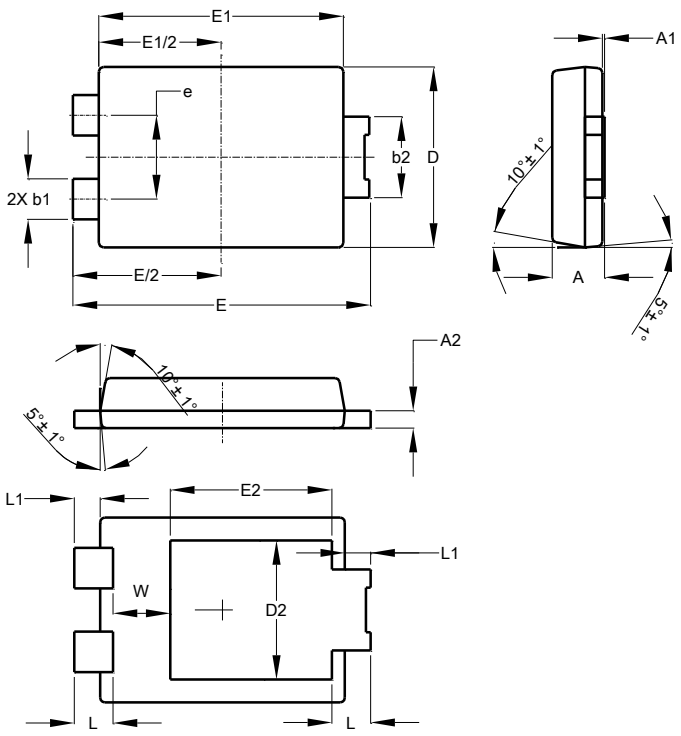


Capacitance v Voltage

Package Outline Dimensions

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

PowerDI5

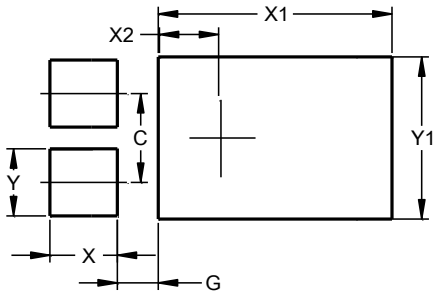


PowerDI5			
Dim	**Min**	**Max**	**Typ**
A	1.05	1.15	1.10
A1	0.00	0.05	--
A2	0.33	0.43	0.381
b1	0.80	0.99	0.89
b2	1.70	1.88	1.78
D	3.90	4.05	3.966
D2	--	--	3.054
E	6.40	6.60	6.51
e	--	--	1.84
E1	5.30	5.45	5.37
E2	--	--	3.549
L	0.75	0.95	0.85
L1	0.50	0.65	0.57
W	1.10	1.41	1.255
All Dimensions in mm			

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

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