



**THE DATASHEET OF  
DXT2013P5-13**





**DXT2013P5**

**100V PNP MEDIUM POWER TRANSISTOR**  
**PowerDI<sup>®</sup>5**

**Features**

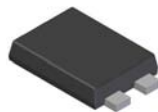
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- Rated up to 3.2W
- $V_{CE0} = -100V$
- $I_C = -5A$ ;  $I_{CM} = -10A$
- Low Saturation voltage
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**

**Applications**

- SLIC DC-DC Converter

**Mechanical Data**

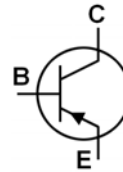
- Case: PowerDI<sup>®</sup>5
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 <sup>Ⓒ</sup>3
- Weight: 0.093 grams (approximate)



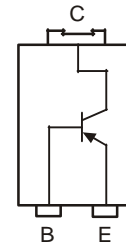
Top View



Bottom View



Device Schematic



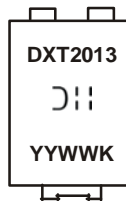
Pin-out diagram

**Ordering Information (Note 3)**

Part Number	Case	Packaging
DXT2013P5-13	PowerDI <sup>®</sup> 5	5000/Tape & Reel

- Notes:
1. No purposefully added lead. Halogen and Antimony Free.
  2. Diodes Inc’s “Green” Policy can be found on our website at <http://www.diodes.com>
  3. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



- DXT2013 = Product Type Marking Code
- ⌋⌋⌋ = Manufacturers’ Code Marking
- K = Factory Designator
- YYWW = Date Code Marking
- YY = Last Two Digits of Year (ex: 09 for 2009)
- WW = Week code (01 to 53)

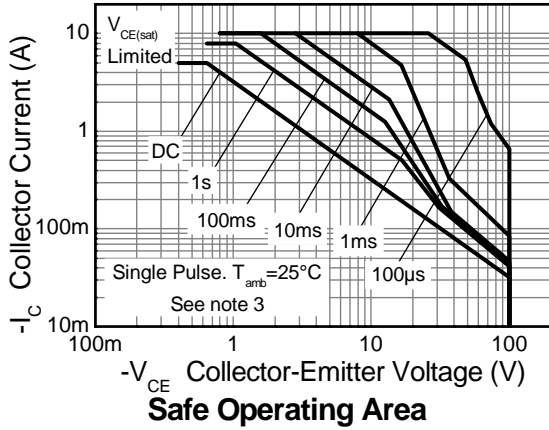
**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-140	V
Collector-Emitter Voltage	$V_{CEO}$	-100	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Continuous Collector Current	$I_C$	-5	A
Peak Pulse Current	$I_{CM}$	-10	A

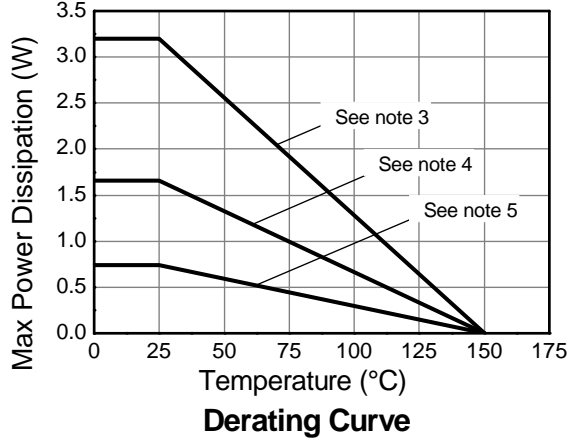
**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 4)	$P_D$	3.2	W
Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	39	$^\circ\text{C/W}$
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 5)	$P_D$	1.7	W
Thermal Resistance, Junction to Ambient Air (Note 5) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	75	$^\circ\text{C/W}$
Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 6)	$P_D$	0.74	W
Thermal Resistance, Junction to Ambient Air (Note 6) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	169	$^\circ\text{C/W}$
Thermal Resistance, Junction to Collector Terminal	$R_{\theta JT}$	5.6	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

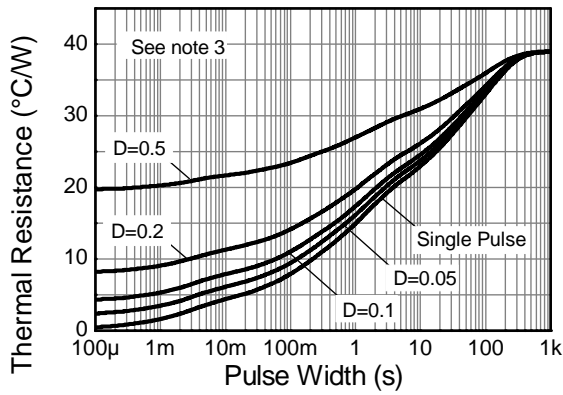
- Notes:
4. Device mounted on FR-4 PCB, single sided 2 oz. copper, collector pad dimensions 50mm x 50mm.
  5. Device mounted on FR-4 PCB, single sided 1 oz. copper, collector pad dimensions 25mm x 25mm.
  6. Device mounted on FR-4 PCB, single sided 1 oz. copper, minimum recommended pad layout.



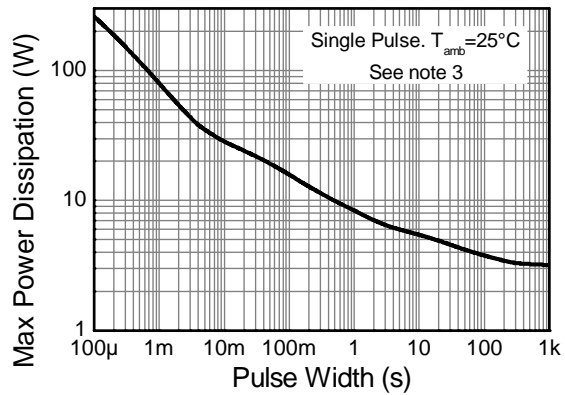
**Safe Operating Area**



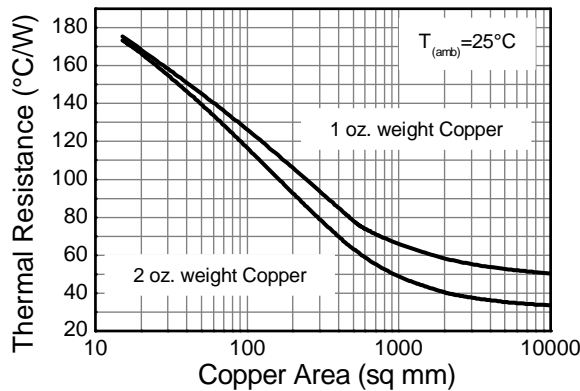
**Derating Curve**



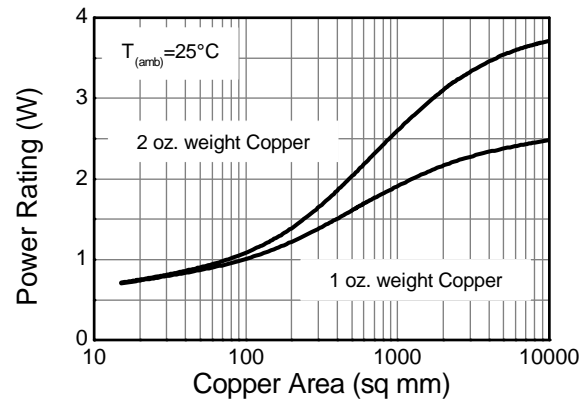
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Thermal Resistance vs. Cu Area**



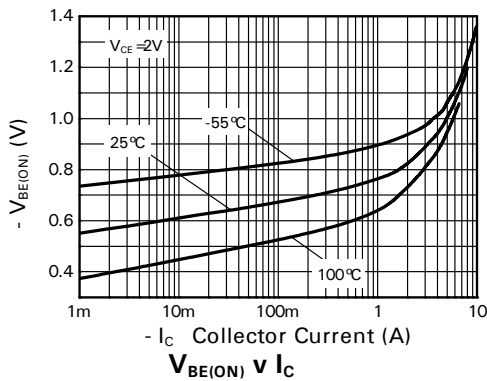
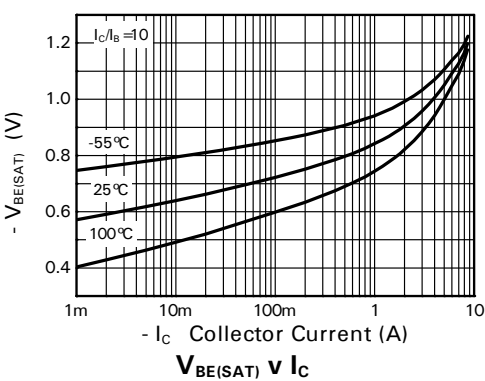
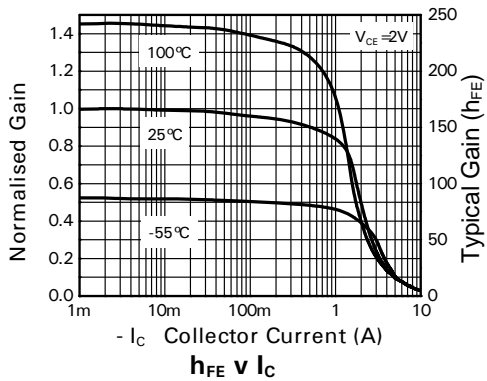
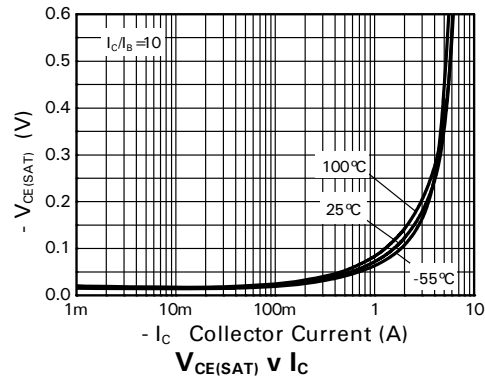
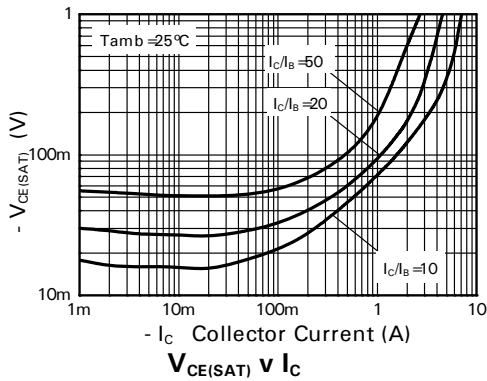
**Power Rating vs. Cu Area**

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

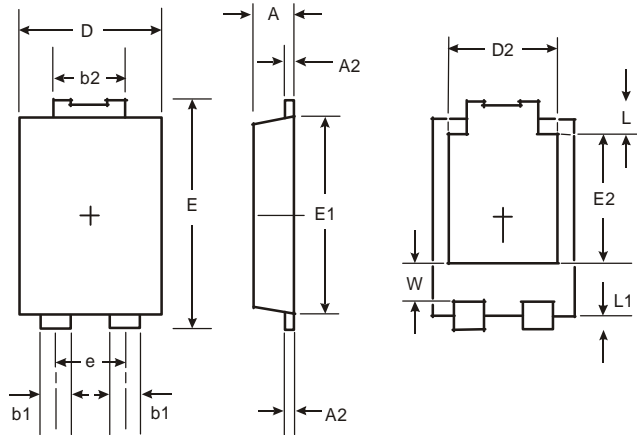
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	-140	-160	—	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 7)	V <sub>(BR)CEO</sub>	-100	-115	—	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	-7.0	-8.1	—	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	<1	-20 -0.5	nA μA	V <sub>CB</sub> = -100V V <sub>CB</sub> = -100V, T <sub>amb</sub> = 100 °C
Collector Cutoff Current	I <sub>CER</sub> R ≤ 1kΩ	—	<1	-20 -0.5	nA μA	V <sub>CB</sub> = -100V V <sub>CB</sub> = -100V, T <sub>amb</sub> = 100 °C
Emitter Cutoff Current	I <sub>EBO</sub>	—	<1	-10	nA	V <sub>EB</sub> = -6V
Collector-Emitter Saturation Voltage (Note 7)	V <sub>CE(sat)</sub>	—	-20 -70 -120 -240	-30 -90 -150 -340	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA I <sub>C</sub> = -4A, I <sub>B</sub> = -400mA
Base-Emitter Saturation Voltage (Note 7)	V <sub>BE(sat)</sub>	—	-985	-1100	mV	I <sub>C</sub> = -4A, I <sub>B</sub> = -400mA
Base-Emitter Turn-On Voltage (Note 7)	V <sub>BE(on)</sub>	—	-920	-1050	mV	V <sub>CE</sub> = -4V, I <sub>C</sub> = -2A
DC Current Gain (Note 7)	h <sub>FE</sub>	100 100 25 15 —	250 200 50 30 5	— 300 — — —	—	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V I <sub>C</sub> = -1A, V <sub>CE</sub> = -1V I <sub>C</sub> = -3A, V <sub>CE</sub> = -1V I <sub>C</sub> = -4A, V <sub>CE</sub> = -1V I <sub>C</sub> = -10A, V <sub>CE</sub> = -1V
Transition Frequency	f <sub>T</sub>	—	125	—	MHz	I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V, f = 50MHz
Output Capacitance	C <sub>obo</sub>	—	42	—	pF	V <sub>CB</sub> = -10V, f = 1MHz
Switching Times	t <sub>on</sub> t <sub>off</sub>	— —	42 540	— —	ns ns	I <sub>C</sub> = -1A, V <sub>CC</sub> = -10V, I <sub>B1</sub> = I <sub>B2</sub> = -100mA

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

**Typical Characteristic**

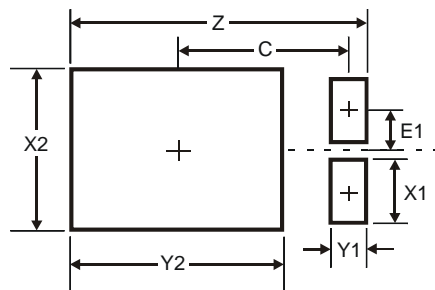


**Package Outline Dimensions**



PowerDI <sup>5</sup>		
Dim	Min	Max
A	1.05	1.15
A2	0.33	0.43
b1	0.80	0.99
b2	1.70	1.88
D	3.90	4.05
D2	3.054 Typ	
E	6.40	6.60
e	1.84 Typ	
E1	5.30	5.45
E2	3.549 Typ	
L	0.75	0.95
L1	0.50	0.65
W	1.10	1.41
All Dimensions in mm		

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	6.6
X1	1.4
X2	3.6
Y1	0.8
Y2	4.7
C	3.87
E1	0.9

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