Lead-free Green

100V NPN MEDIUM POWER LOW SATURATION TRANSISTOR
POWERDI®5

Features

- BV_{CEO} > 100V
- I_C = 6A High Continuous Collector Current
- I_{CM} = 10A Peak Collector Current
- P_D up to 3.2W
- 43% smaller than SOT223; 60% smaller than TO252
- Maximum height just 1.1mm
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: PowerDI5
- 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 Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.093 grams (approximate)

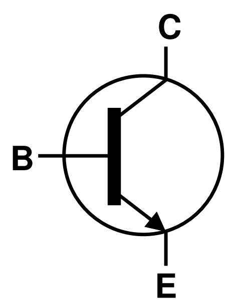
Applications

- Motor Drive
- Voltage Regulator using Emitter-Follower
- DC-DC Converter
- Telecoms
- Power Management

POWERDI5

Top View

Bottom View



Device Schematic

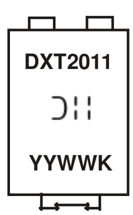
Pin-Out
Top View

Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DXT2011P5-13	AEC-Q101	DXT2011	13	16	5,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/products/packages.html.

Marking Information



DXT2011 = 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)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	200	V
Collector-Emitter Voltage	V_{CEO}	100	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	6	A
Peak Pulse Current	I_{CM}	10	A

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

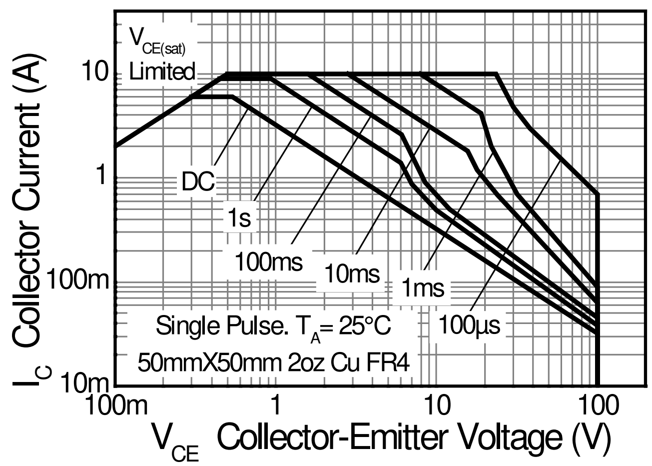
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	3.2	W
	(Note 6)		1.7	
	(Note 7)		0.74	
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	39	°C/W
	(Note 6)		75	
	(Note 7)		169	
Thermal Resistance, Junction to Leads	(Note 8)	$R_{\theta JL}$	5.6	
Operating and Storage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

ESD Ratings (Note 9)

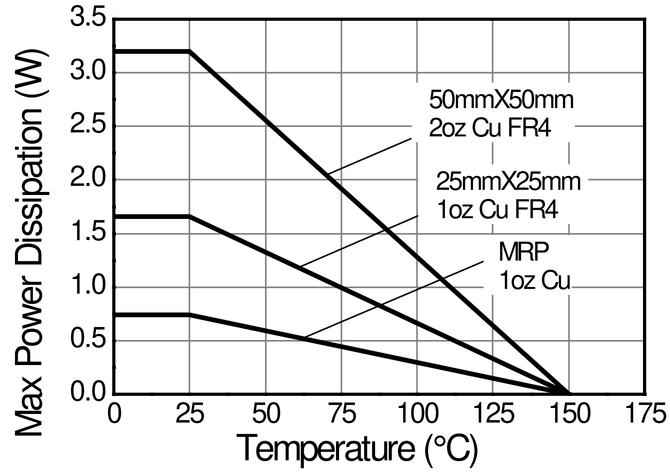
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the exposed collector pad on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as note (5), except mounted on 25mm x 25mm 1oz copper.
7. Same as note (5), except mounted on minimum recommended pad (MRP) layout.
8. Thermal resistance from junction to solder-point (on the exposed collector pad).
9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

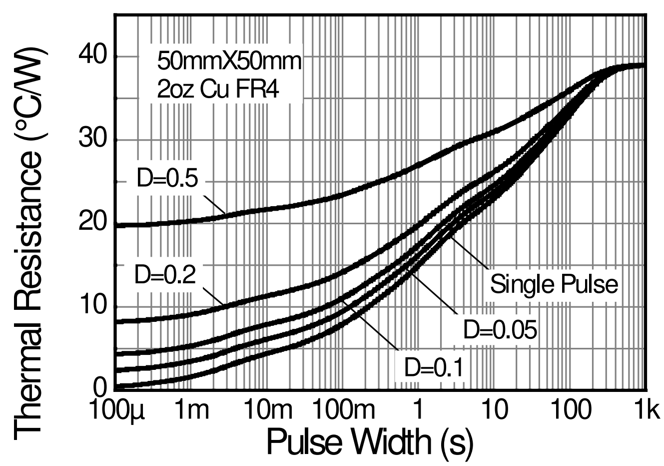
Thermal Characteristics and Derating Information



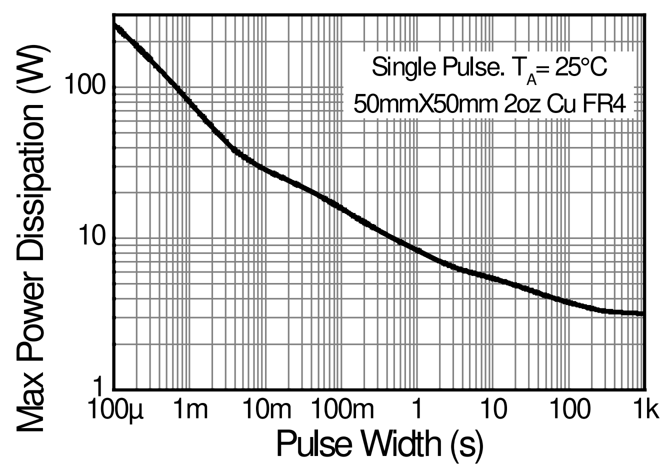
Safe Operating Area



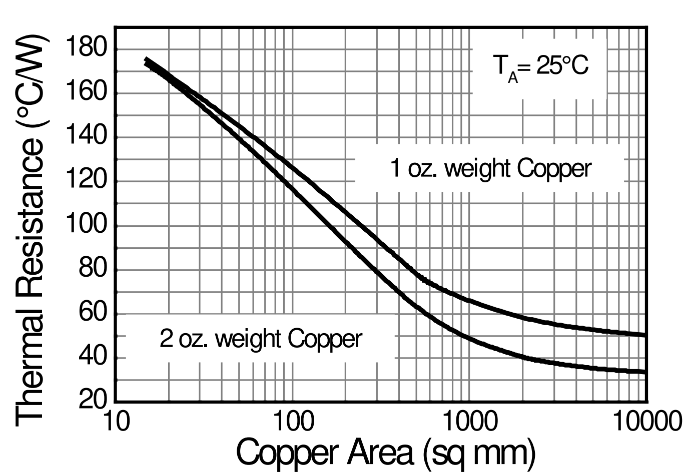
Derating Curve



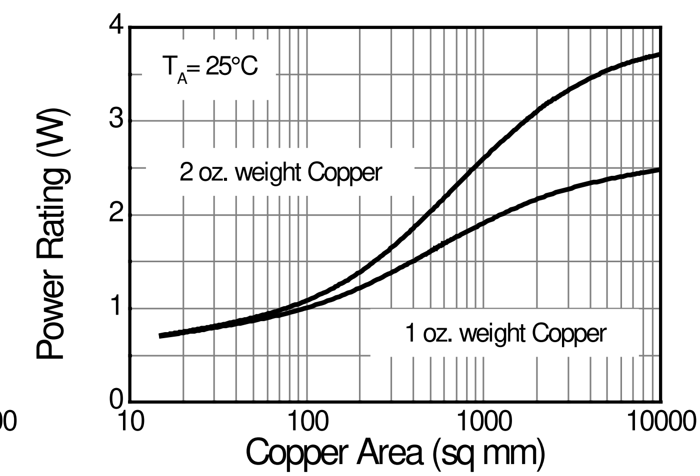
Transient Thermal Impedance



Pulse Power Dissipation



Thermal Resistance vs. Cu Area



Power Rating vs. Cu Area

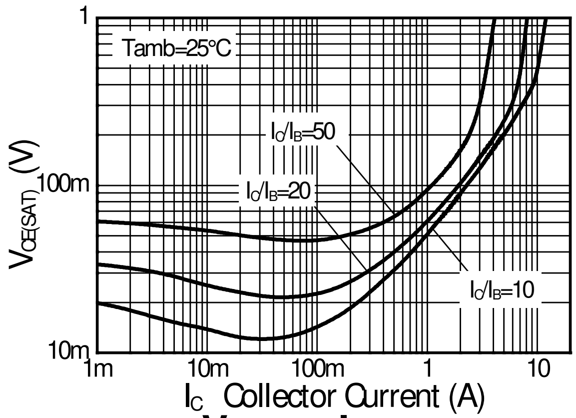
POWERDI is a registered trademark of Diodes Incorporated.

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

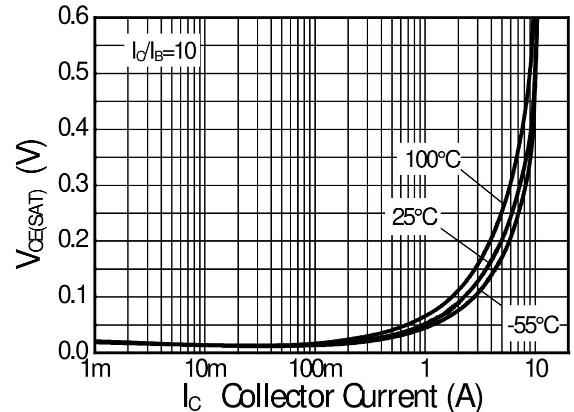
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	200	235	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	100	115	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	I_E = 100 µA
Collector Cutoff Current	I_{CBO}	— —	— —	20 0.5	nA µA	V_{CB} = 150V V_{CB} = 150V, T_{AMB} = 100°C
Collector Cutoff Current	I_{CER} R≤1kΩ	— —	— —	20 0.5	nA µA	V_{CB} = 150V V_{CB} = 150V, T_{AMB} = 100°C
Emitter Cutoff Current	I_{EBO}	—	—	10	nA	V_{EB} = 6V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	— — — —	21 50 95 180	35 65 125 220	mV	I_C = 0.1A, I_B = -5mA I_C = 1A, I_B = 100mA I_C = 2A, I_B = 100mA I_C = 5A, I_B = 500mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	1020	1120	mV	I_C = 5A, I_B = 500mA
Base-Emitter Turn-On Voltage (Note 10)	$V_{BE(on)}$	—	920	1000	mV	V_{CE} = 2V, I_C = 5A
DC Current Gain (Note 10)	h_{FE}	100 100 30 10	— — — —	— 300 — —	— — — —	V_{CE} = 2V, I_C = 10mA V_{CE} = 2V, I_C = 2A V_{CE} = 2V, I_C = 5A V_{CE} = 2V, I_C = 10A
Transition Frequency	f_T	—	130	—	MHz	V_{CE} = 10V, I_C = 100mA, f = 50MHz
Output Capacitance	C_{obo}	—	26	—	pF	V_{CB} = 10V, f = 1MHz
Switching Times	t_{on} t_{off}	— —	41 1010	— —	ns	V_{CC} = 10V, I_C = 1A, I_{B1} = I_{B2} = 100mA

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

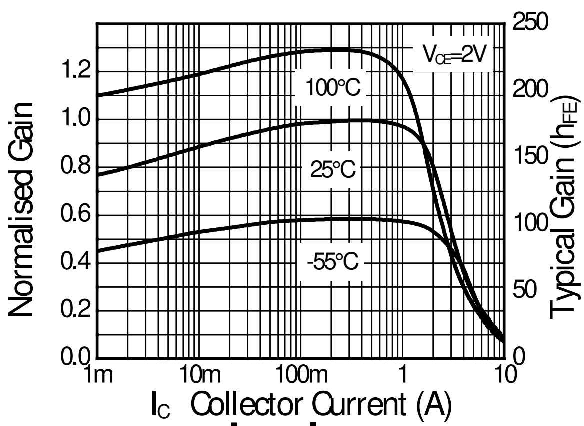
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



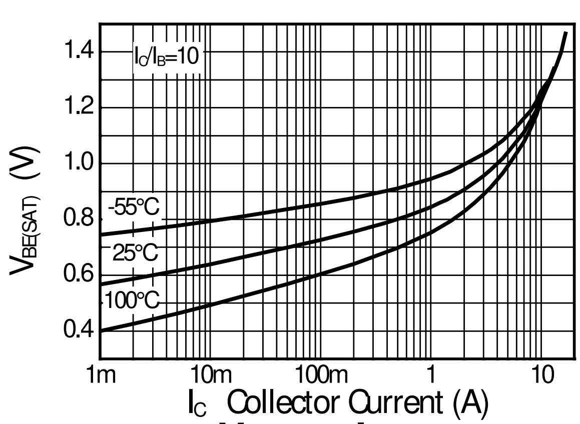
$V_{CE(SAT)}$ v I_C



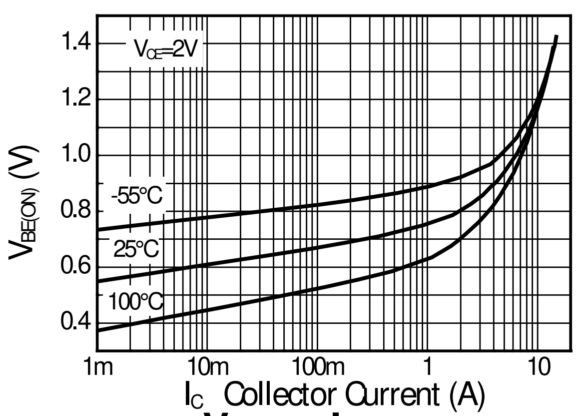
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



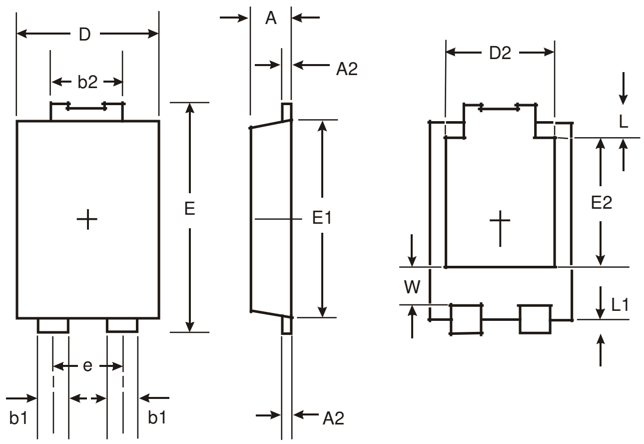
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

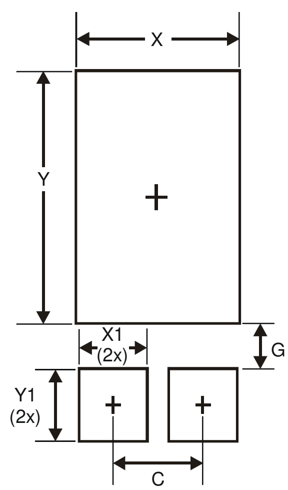
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



POWERDI5		
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

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



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

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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