ZXT1053AK

75V NPN LOW SATURATION MEDIUM POWER TRANSISTOR

Features

- BV_{CEO} > 75V
- I_C = 5A high Continuous Collector Current
- Up to 10A Peak Current
- R_{SAT} = 70mΩ for a low equivalent On-Resistance
- Low Saturation Voltage
- h_{FE} specified up to 10A for a high gain hold up
- **Lead-Free Finish; RoHS compliant (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

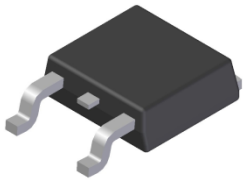
Mechanical Data

- Case: TO252 (DPAK)
- 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: 0.34 grams (approximate)

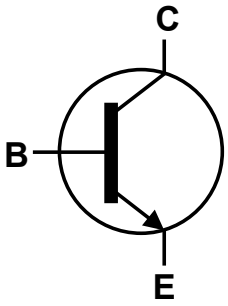
Application

- DC – DC converters
- Power Switches
- Motor Control
- Automotive Circuits
- Inverter Circuits

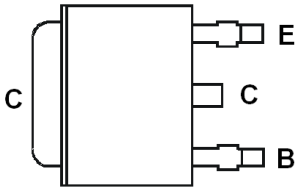
TO252



Top View



Device Symbol



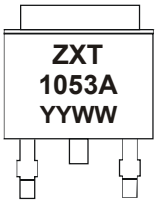
Top View
Pin-Out

Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXT1053AKTC	AEC-Q101	ZXT1053A	13	16	2,500
ZXT1053AKQTC	Automotive	ZXT1053A	13	16	2,500

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
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. Automotive products are AEC-Q10x qualified and are PPAP capable. Automotive, AEC-Q10x and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html

Marking Information



ZXT1053AK = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 09 = 2009)
WW = Week Code (01 – 53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	75	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5	A
Peak Pulse Collector Current	I_{CM}	10	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	2.1	W
	(Note 7)		3.4	
	(Note 8)		4.0	
Thermal Resistance, Junction to Ambient Air	(Note 6)	$R_{\theta JA}$	59	°C/W
	(Note 7)		36	
	(Note 8)		32	
Thermal Resistance, Junction to Leads	(Note 9)	$R_{\theta JL}$	2.97	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 10)

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

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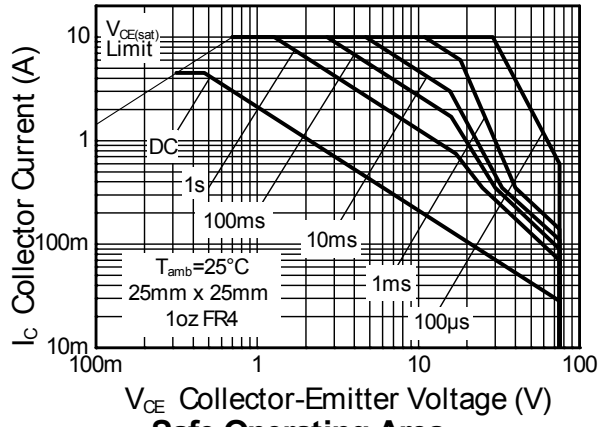
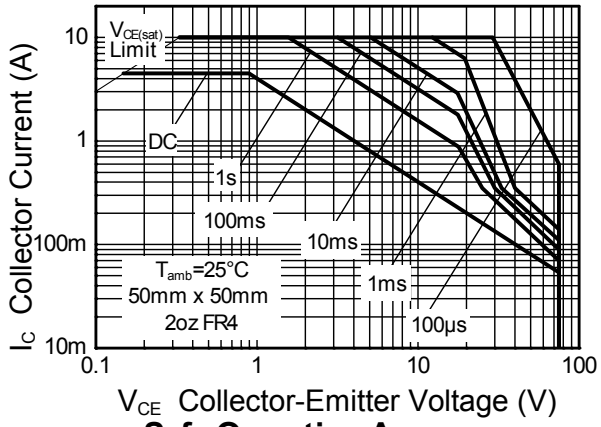
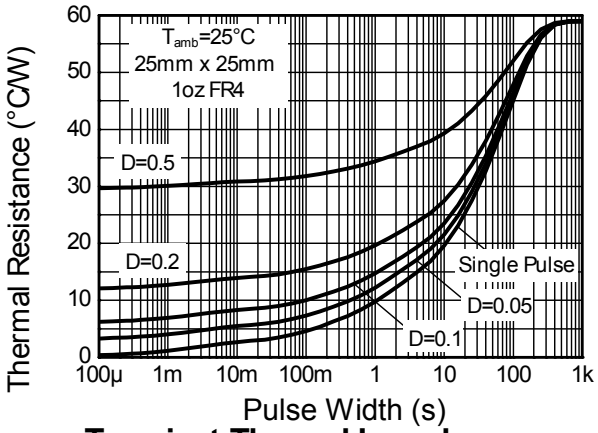
Thermal Characteristics and Derating Information



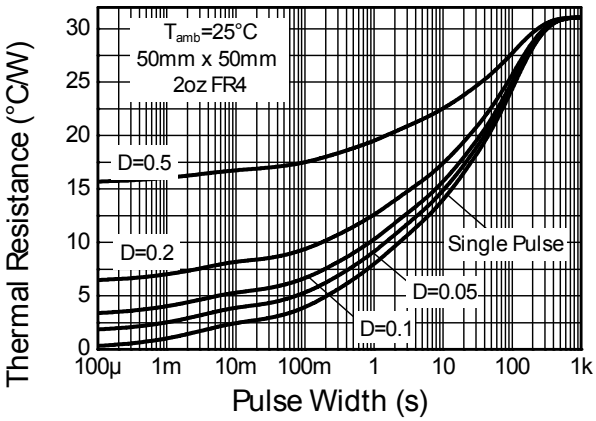
Safe Operating Area



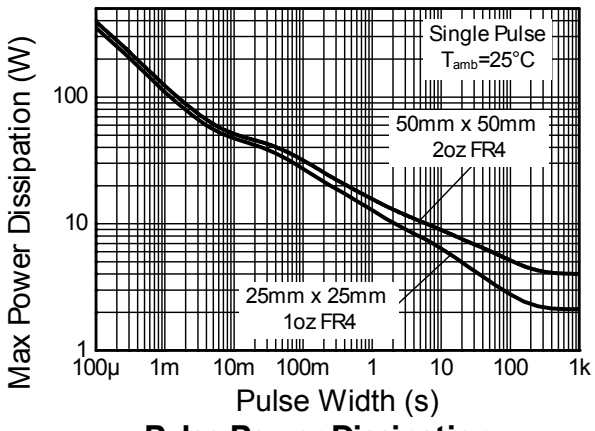
Safe Operating Area



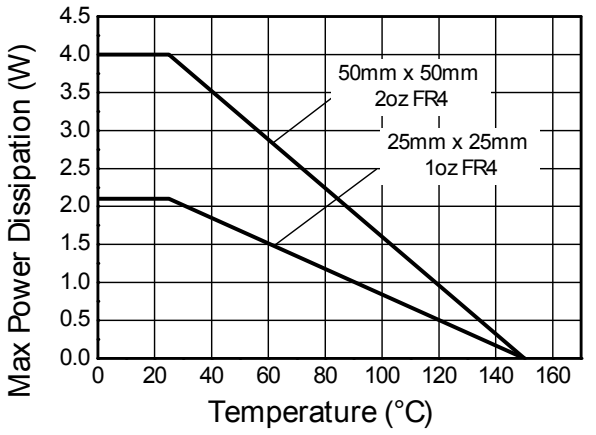
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

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

Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	240	—	V	I_C = 100µA
Collector-Base Breakdown Voltage	BV_{CES}	150	240	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 11)	BV_{CEO}	75	90	—	V	I_C = 10mA
Collector-Emitter Breakdown Voltage	BV_{CEV}	150	240	—	V	I_C = 1µA, V_{EB} = 1V
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.7	—	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	—	<1	10	nA	V_{CB} = 120V
Emitter Cutoff Current	I_{EBO}	—	<1	10	nA	V_{EB} = 6V
Emitter Cutoff Current	I_{CES}	—	<1	10	nA	V_{CE} = 120V
DC current transfer Static ratio (Note 9)	h_{FE}	260 300 50 10	375 450 75 25	— 1200 — —	—	I_C = 10mA, V_{CE} = 2V I_C = 1A, V_{CE} = 2V I_C = 5A, V_{CE} = 2V I_C = 10A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 11)	$V_{CE(sat)}$	— — — — —	19 70 120 140 350	30 95 160 190 460	mV	I_C = 0.2A, I_B = 20mA I_C = 1A, I_B = 100mA I_C = 1A, I_B = 10mA I_C = 2A, I_B = 100mA I_C = 5A, I_B = 200mA
Base-Emitter Saturation Voltage (Note 11)	$V_{BE(sat)}$	—	1.0	1.1	V	I_C = 5A, I_B = 200mA
Base-Emitter Turn-on Voltage (Note 11)	$V_{BE(on)}$	—	0.925	1.05	V	I_C = 5A, V_{CE} = 2V
Transitional Frequency	f_T	—	140	—	MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Output capacitance	C_{OBO}	—	21	30	pF	V_{CB} = 10V, f = 1MHz,
Switching times	t_{ON} t_{OFF}	—	162 900	—	nS	I_C = 2A, V_{CC} = 50V, I_{B1} = I_{B2} = 20mA

Notes: 11. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤2%.

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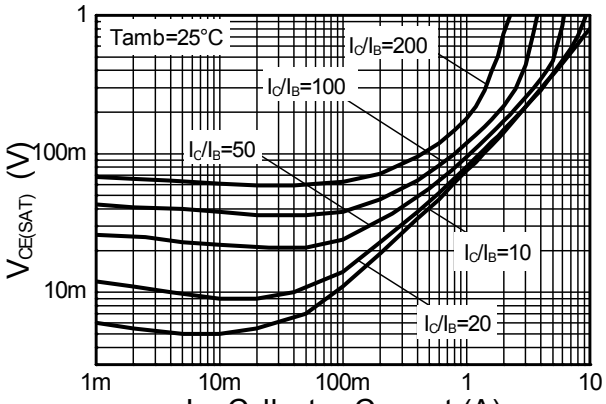
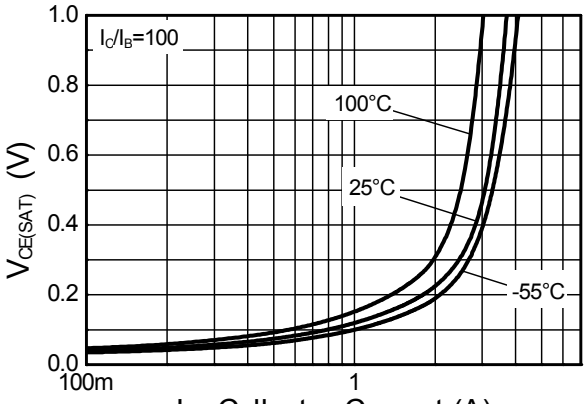
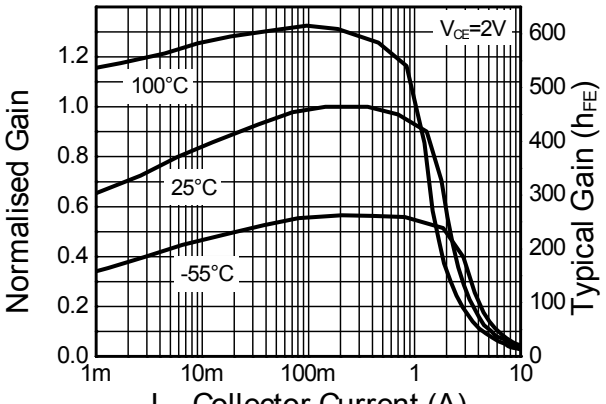
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



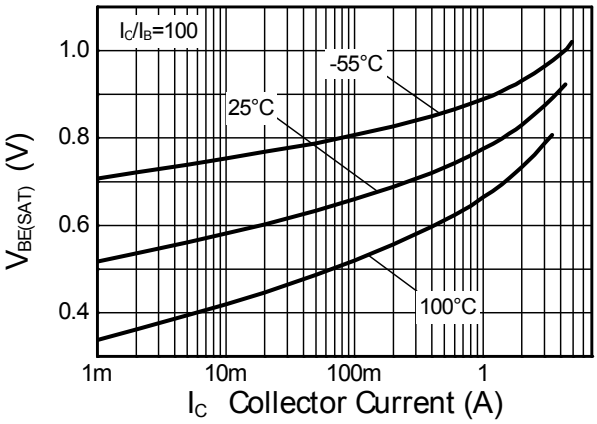
$V_{CE(SAT)}$ v I_C



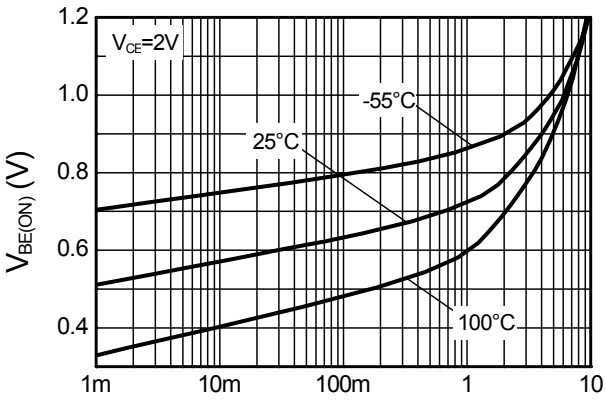
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

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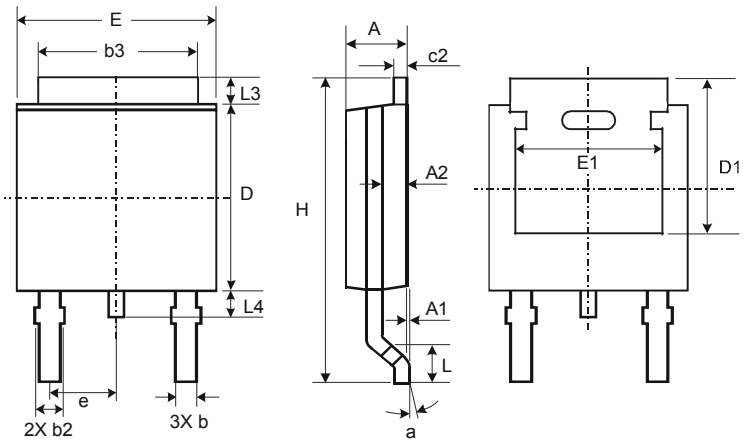
Package Outline Dimensions

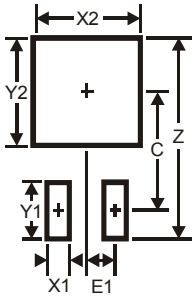
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



TO252			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	–	–
e	–	–	2.286
E	6.45	6.70	6.58
E1	4.32	–	–
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	–
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)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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