

**ZXTN2040F**

**40V NPN MEDIUM POWER PLANAR TRANSISTOR IN SOT23**

**Features**

- $BV_{CEO} > 40V$
- $I_C = 1A$  Continuous Collector Current
- Low Saturation Voltage  $V_{CE(sat)} < 500mV @ 1A$
- Complementary Part Number ZXTP2041F
- **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**

**Description**

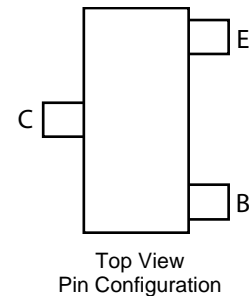
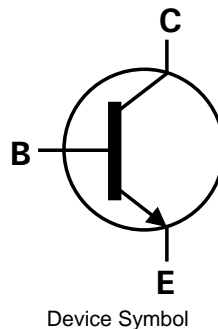
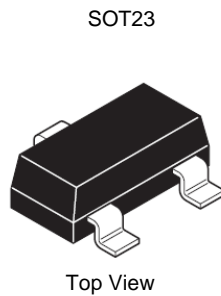
This transistor combines high gain, high current operation and low saturation voltage making it ideal for power MOSFET gate driving and low loss power switching.

**Mechanical Data**

- Case: SOT23
- Case material: Molded Plastic. "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

**Applications**

- Power MOSFET gate driving
- Low loss power switching

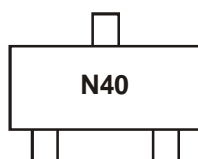


**Ordering Information** (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2040FTA	N40	7	8	3,000

- 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> 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>.

**Marking Information**



N40 = Product Type Marking Code

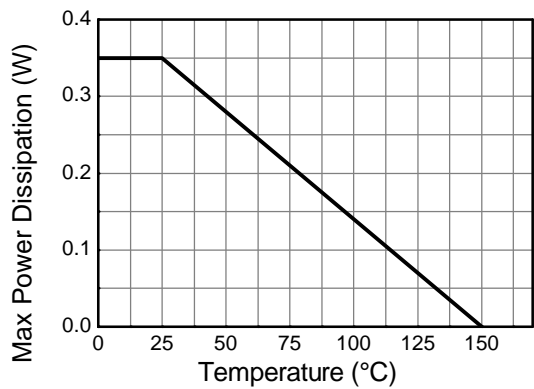
**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Continuous Collector Current (Note 5)	I <sub>C</sub>	1	A
Peak Pulse Current	I <sub>CM</sub>	2	A
Peak Base Current	I <sub>BM</sub>	1	A

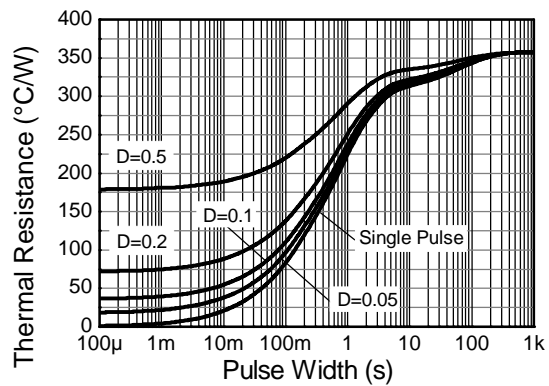
**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Collector Power Dissipation	P <sub>D</sub>	(Note 5)	310
		(Note 6)	350
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5)	403
		(Note 6)	357
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	350	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

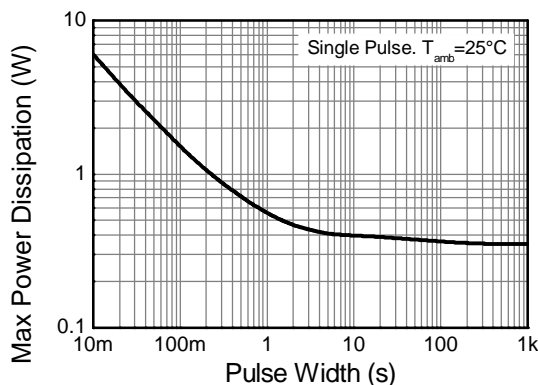
- Notes:
- 5. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper in still air condition.
  - 6. Same as Note 5, expect the device is mounted on 15mm X 15mm X 1.6mm FR4 PCB.
  - 7. Thermal resistance from junction to solder-point (at the end of the collector lead).



**Derating Curve**



**Transient Thermal Impedance**



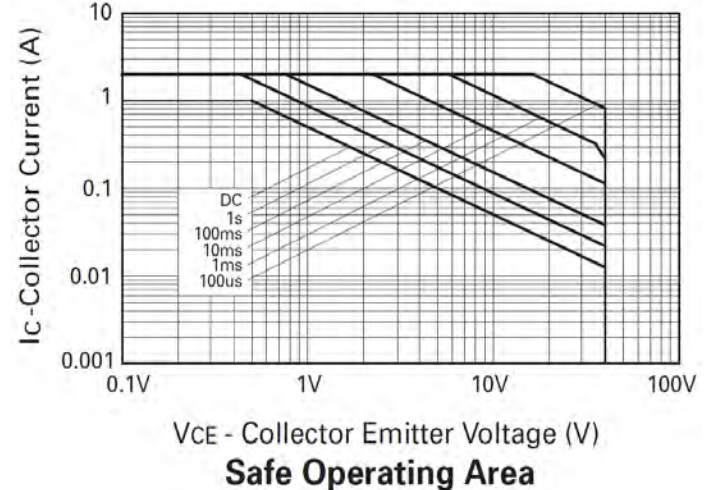
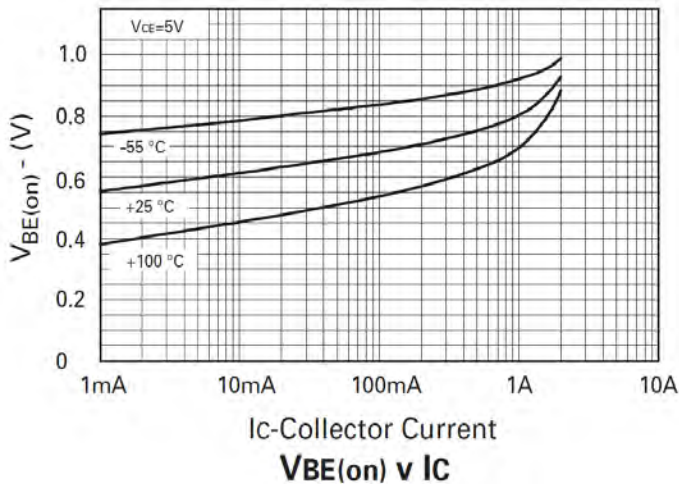
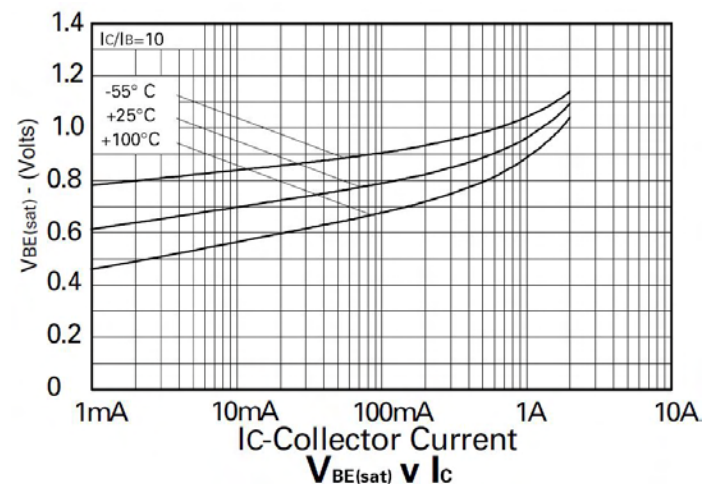
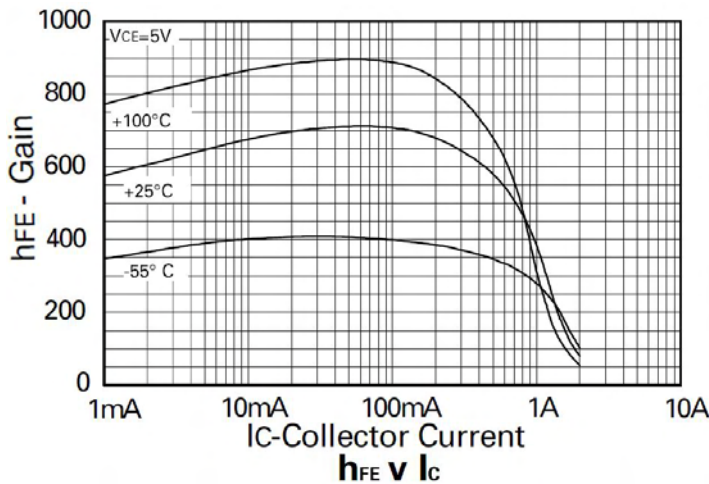
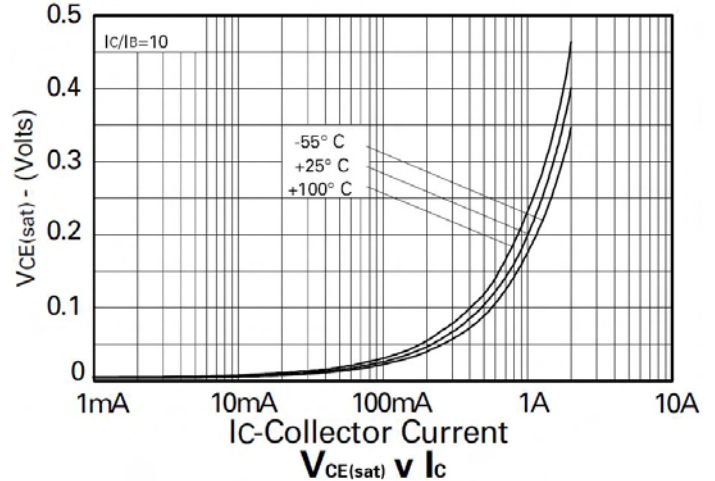
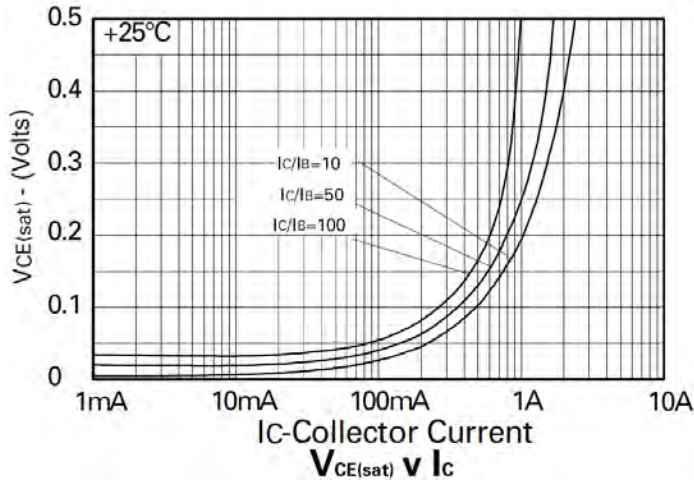
**Pulse Power Dissipation**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	40	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (base open) (Note 8)	BV <sub>CEO</sub>	40	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 100μA
Collector-emitter cut-off current	I <sub>CES</sub>	—	—	100	nA	V <sub>CE</sub> = 30V
Collector-base Cut-off Current	I <sub>CB0</sub>	—	—	100	nA	V <sub>CB</sub> = 30V
Emitter-base Cut-off Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 5V
<b>ON CHARACTERISTICS (Note 8)</b>						
Static Forward Current Transfer Ratio	h <sub>FE</sub>	300 300 200 35	—	— 900 — —	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 500mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V I <sub>C</sub> = 2A, V <sub>CE</sub> = 5V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	200 300 500	mV	I <sub>C</sub> = 100mA, I <sub>B</sub> = 1mA I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	—	1.1	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter On Voltage	V <sub>BE(on)</sub>	—	—	1.0	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V
<b>SMALL SIGNAL CHARACTERISTICS (Note 8)</b>						
Transition Frequency	f <sub>T</sub>	150	—	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V, f = 100MHz
Output Capacitance	C <sub>obo</sub>	—	—	10	pF	V <sub>CB</sub> = 10V, f = 1MHz

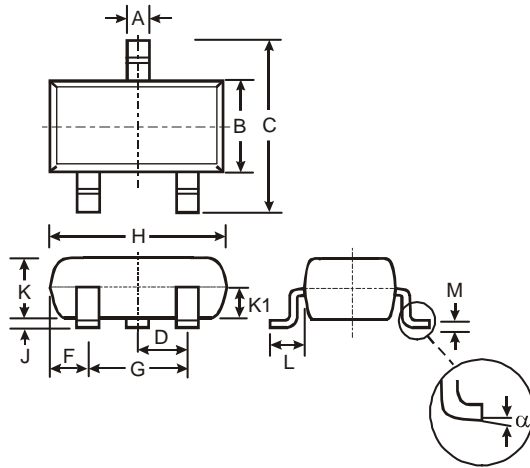
Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

**Typical Electrical Characteristics**



**Package Outline Dimensions**

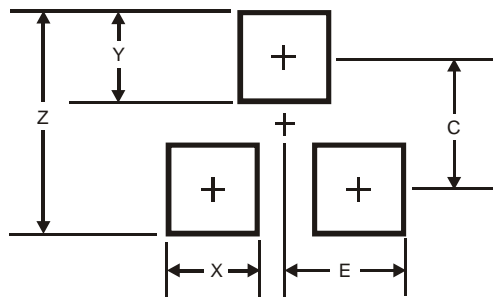
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
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	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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