


**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**

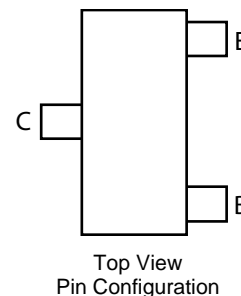
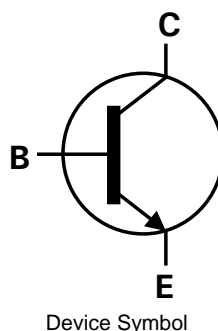
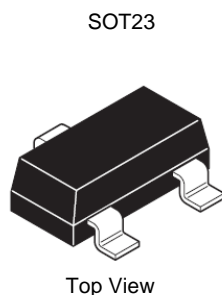
This transistor combines high gain, high current operation and low saturation voltage making it ideal for power MOSFET gate driving and low loss power switching.

**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)

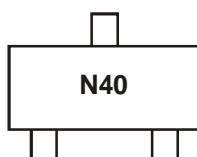
**Applications**

- 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

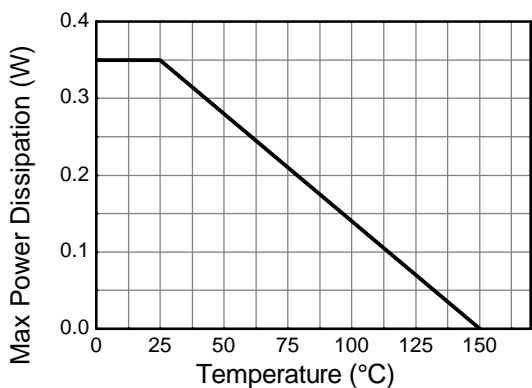
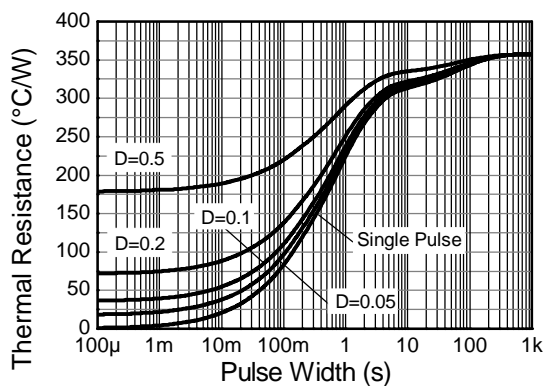
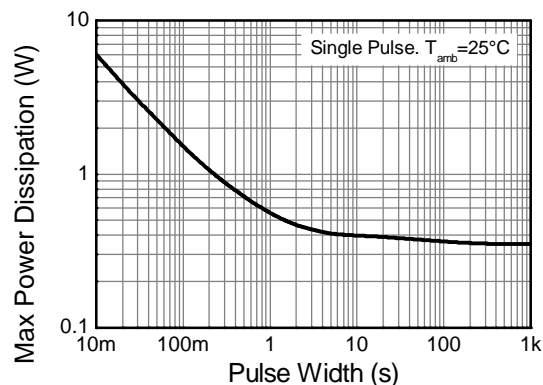
**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	40	V
Collector-Emitter Voltage	$V_{CEO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Continuous Collector Current (Note 5)	$I_C$	1	A
Peak Pulse Current	$I_{CM}$	2	A
Peak Base Current	$I_{BM}$	1	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Collector Power Dissipation (Note 5)	$P_D$	310	mW
(Note 6)		350	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	403	$^\circ\text{C/W}$
(Note 6)		357	
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	350	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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).

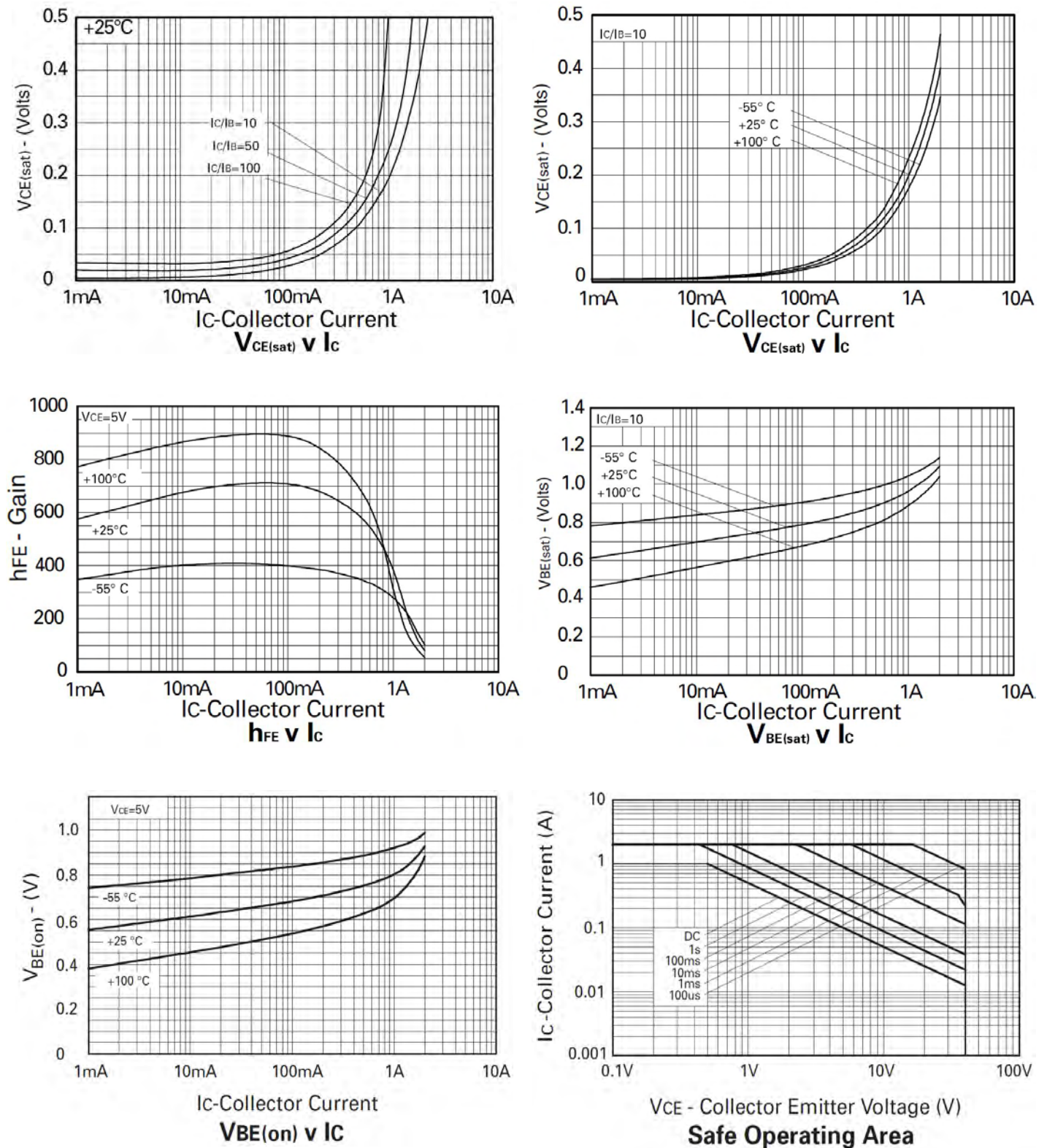

**Derating Curve**

**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>CBO</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

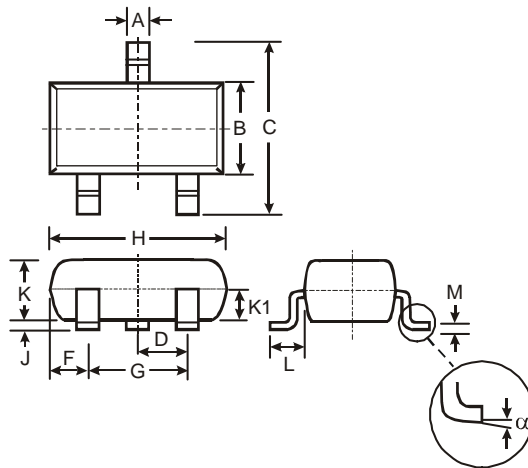
Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

## Typical Electrical Characteristics



## Package Outline Dimensions

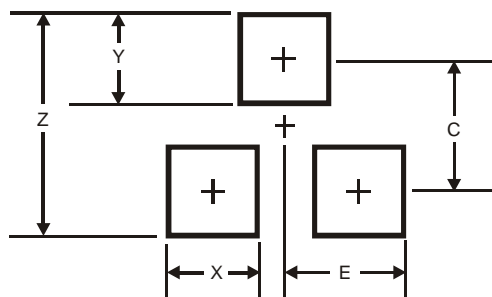
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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
$\alpha$	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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