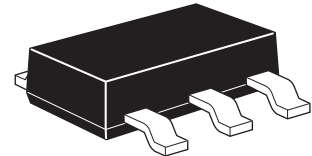


ZXTN25020DG

20V NPN high gain transistor in SOT223

Summary

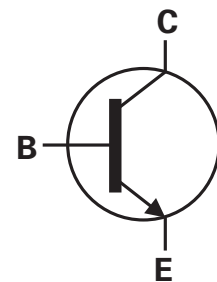
$BV_{CEX} > 100V$
 $BV_{CEO} > 20V$
 $BV_{ECX} > 6V$
 $I_{C(cont)} = 7A$
 $V_{CE(sat)} < 48mV @ 1A$
 $R_{CE(sat)} = 31m\Omega$
 $P_D = 3.0W$



Complementary part number ZXTP25020DG

Description

Packaged in the SOT223 outline this new low saturation NPN transistor offers extremely low on state losses making it ideal for use in DC-DC circuits and various driving and power management functions.



Features

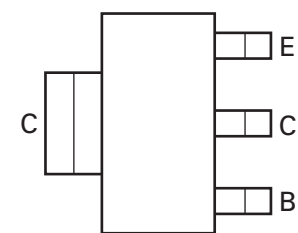
- Higher power dissipation SOT223 package
- High gain
- High peak current
- Low saturation voltage
- 100V forward blocking voltage
- 6V reverse blocking voltage

Applications

- DC - DC converters
- Motor drive
- Relay, lamp and solenoid drive
- Regulator circuits

Ordering information

| Device | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|--------------------|-----------------|-------------------|
| ZXTN25020DGTA | 7 | 12 | 1000 |



Pinout - top view

Device marking

ZXTN25
020D

ZXTN25020DG

Absolute maximum ratings

| Parameter | Symbol | Limit | Unit |
|---|----------------|-------------|------------|
| Collector-Base voltage | V_{CBO} | 100 | V |
| Collector-Emitter voltage (forward blocking) | V_{CEX} | 100 | V |
| Collector-Emitter voltage | V_{CEO} | 20 | V |
| Emitter-Collector voltage (reverse blocking) | V_{ECX} | 6 | V |
| Emitter-Base voltage | V_{EBO} | 7 | V |
| Continuous Collector current ^(c) | I_C | 7 | A |
| Base current | I_B | 1 | A |
| Peak pulse current | I_{CM} | 15 | A |
| Power dissipation at $T_A = 25^\circ\text{C}^{(a)}$ Linear derating factor | P_D | 1.2 9.6 | W mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}^{(b)}$ Linear derating factor | P_D | 1.6 12.8 | W mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}^{(c)}$ Linear derating factor | P_D | 3.0 24 | W mW/°C |
| Power dissipation at $T_A = 25^\circ\text{C}^{(d)}$ Linear derating factor | P_D | 5.3 42 | W mW/°C |
| Power dissipation at $T_C = 25^\circ\text{C}^{(e)}$ Linear derating factor | P_D | 7.3 58 | W mW/°C |
| Operating and storage temperature range | T_j, T_{stg} | -55 to 150 | °C |

Thermal resistance

| Parameter | Symbol | Limit | Unit |
|------------------------------------|-----------------|-------|------|
| Junction to ambient ^(a) | $R_{\theta JA}$ | 104 | °C/W |
| Junction to ambient ^(b) | $R_{\theta JA}$ | 78 | °C/W |
| Junction to ambient ^(c) | $R_{\theta JA}$ | 42 | °C/W |
| Junction to ambient ^(d) | $R_{\theta JA}$ | 23.5 | °C/W |
| Junction to case ^(e) | $R_{\theta JC}$ | 16 | °C/W |

NOTES:

(a) For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

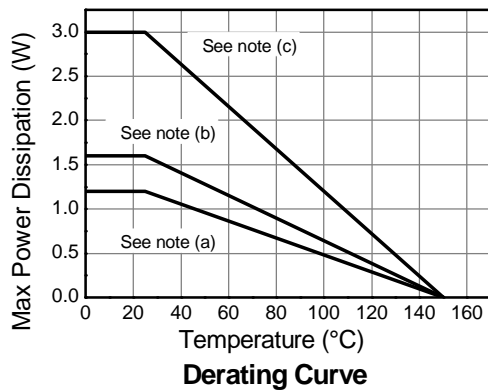
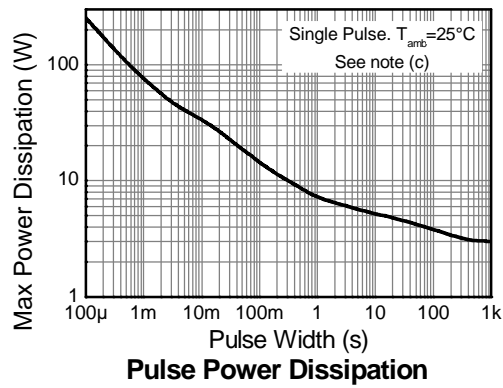
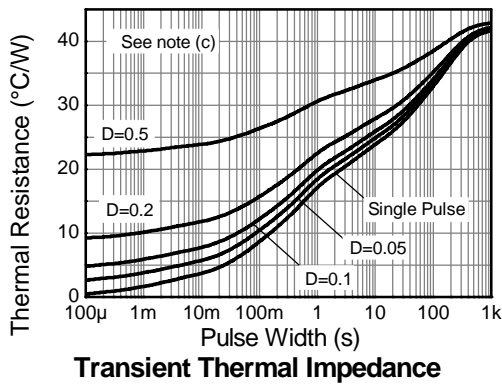
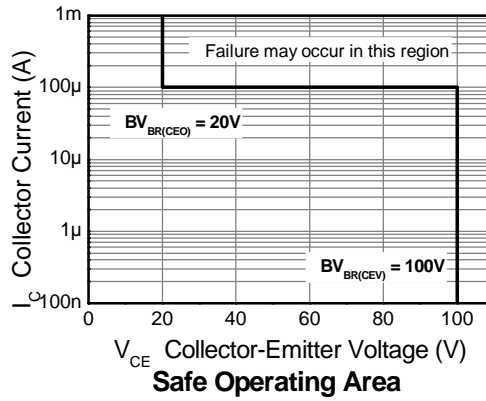
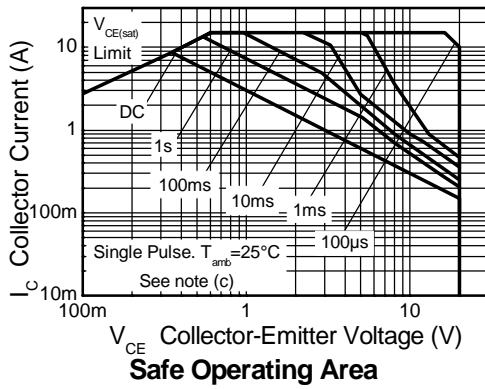
(b) Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(c) Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.

(d) As (c) above measured at $t < 5$ seconds.

(e) Junction to case (collector tab). Typical

Thermal characteristics



ZXTN25020DG

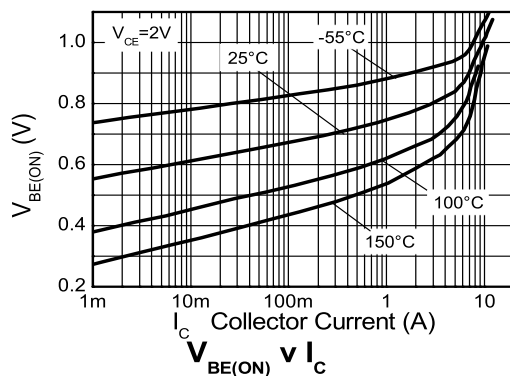
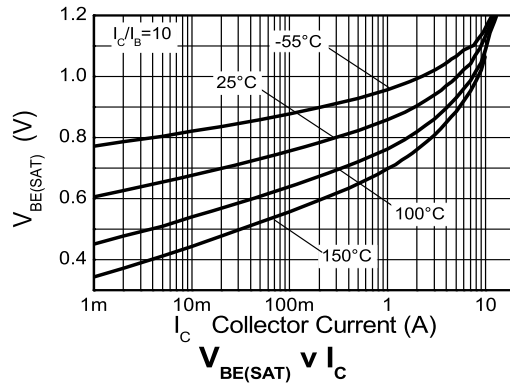
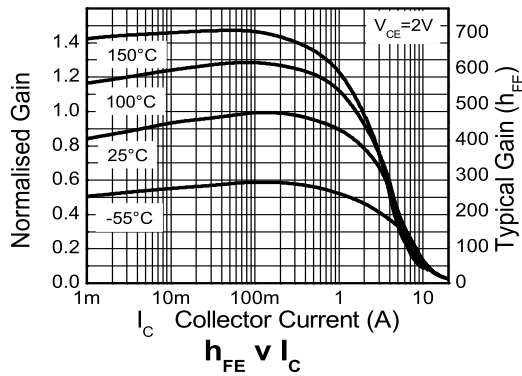
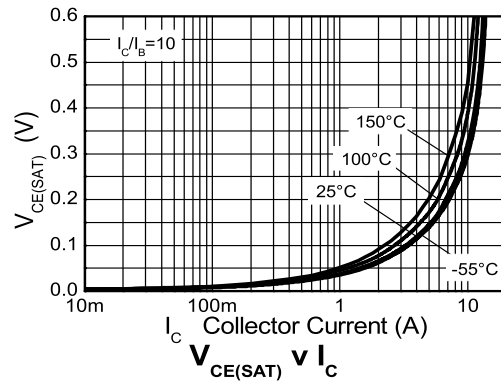
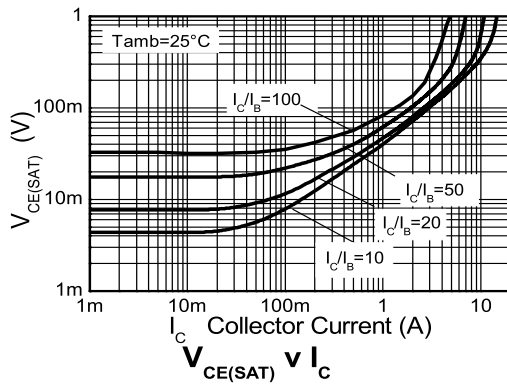
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--|---------------|------------------|-------------------------------|-------------------------------|----------------------------|---|
| Collector-Base breakdown voltage | BV_{CBO} | 100 | 125 | | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter breakdown voltage (forward blocking) | BV_{CEX} | 100 | 120 | | V | $I_C = 100\mu\text{A}$, $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Collector-Emitter breakdown voltage | BV_{CEO} | 20 | 35 | | V | $I_C = 10\text{mA}^{(*)}$ |
| Emitter-Collector breakdown voltage (reverse blocking) | BV_{ECX} | 6 | 8.3 | | V | $I_E = 100\mu\text{A}$, $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$ |
| Emitter-Collector breakdown voltage (reverse blocking) | BV_{ECO} | 5 | 6.1 | | V | $I_E = 100\mu\text{A}$ |
| Emitter-Base breakdown voltage | BV_{EBO} | 7 | 8.35 | | V | $I_E = 100\mu\text{A}$ |
| Collector-Base cut-off current | I_{CBO} | | <1 | 50 0.5 | nA μA | $V_{CB} = 100\text{V}$ $V_{CB} = 100\text{V}$, $T_{amb} = 100^{\circ}\text{C}$ |
| Collector-Emitter cut-off current | I_{CEX} | | | 100 | nA | $V_{CE} = 100\text{V}$, $R_{BE} < 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Emitter cut-off current | I_{EBO} | | <1 | 50 | nA | $V_{EB} = 5.6\text{V}$ |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | | 40 60 100 130 225 | 48 75 120 180 290 | mV mV mV mV mV | $I_C = 1\text{A}$, $I_B = 100\text{mA}^{(*)}$ $I_C = 1\text{A}$, $I_B = 20\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}^{(*)}$ $I_C = 2\text{A}$, $I_B = 20\text{mA}^{(*)}$ $I_C = 7\text{A}$, $I_B = 700\text{mA}^{(*)}$ |
| Base-Emitter saturation voltage | $V_{BE(sat)}$ | | 1090 | 1150 | mV | $I_C = 7\text{A}$, $I_B = 700\text{mA}^{(*)}$ |
| Base-Emitter turn-on voltage | $V_{BE(on)}$ | | 950 | 1050 | mV | $I_C = 7\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ |
| Static forward current transfer ratio | h_{FE} | 300 250 50 | 450 360 85 15 | 900 | | $I_C = 10\text{mA}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 2\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 7\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ $I_C = 15\text{A}$, $V_{CE} = 2\text{V}^{(*)}$ |
| Transition frequency | f_T | | 215 | | MHz | $I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$ $f = 100\text{MHz}$ |
| Input capacitance | C_{ibo} | | 152 | | pF | $V_{EB} = 0.5\text{V}$, $f = 1\text{MHz}^{(*)}$ |
| Output capacitance | C_{obo} | | 16.5 | 25 | pF | $V_{CB} = 10\text{V}$, $f = 1\text{MHz}^{(*)}$ |
| Delay time | t_d | | 67.7 | | ns | $I_C = 1\text{A}$, $V_{CC} = 10\text{V}$, $I_{B1} = -I_{B2} = 10\text{mA}$ |
| Rise time | t_r | | 72.2 | | ns | |
| Storage time | t_s | | 361 | | ns | |
| Fall time | t_f | | 63.9 | | ns | |

NOTES:

(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

Typical characteristics



ZXTN25020DG

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| | |
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| | |
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