- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

## Product Summary

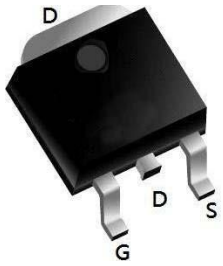
| BVDSS | RDSON | ID |
|---|---|---|
| -30V | 36mΩ | -20 A |

## Description

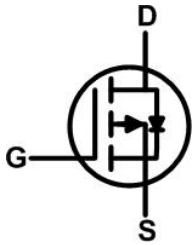
The ZX 20P03 is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The ZX 20P03 meet the RoHS and Green Product requirement with full function reliability approved.

## TO252 Pin Configuration




pin assignment




Schematic diagram

## Package Marking and Ordering Information

| Product | Package | Marking | Packing | Min Unit Quantity |
|---|---|---|---|---|
| ZX 20P03 | TO252 | * | 2500PCS/Reel | 2500PCS |

## Absolute Maximum Ratings ($T_C$=25℃ unless otherwise specified)

| Symbol | Parameter | | Max. | Units |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | -30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current | $T_C$ = 25℃ | -20 | A |
| | | $T_C$ = 100℃ | -13 | A |
| $I_{DM}$ | Pulsed Drain Current note1 | | -30 | A |
| EAS | Single Pulsed Avalanche Energy note2 | | 15 | mJ |
| $P_D$ | Power Dissipation | $T_C$ = 25℃ | 19 | W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | | 5.2 | ℃/W |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature Range | | -55 to +175 | ℃ |

## Electrical Characteristics ($T_J$=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$= 0V, $I_D$= -250μA | -30 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$= -30V, $V_{GS}$= 0V | - | - | -1 | μA |
| Gate-Source Leakage | $I_{GSS}$ | $V_{DS}$= 0V, $V_{GS}$= ±20V | - | - | ±100 | nA |
| Gate-Source Threshold voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$= -250μA | -1 | -1.5 | -2.5 | V |
| Drain-Source on-State Resistance[3] | $R_{DS(on)}$ | $V_{GS}$= -10V, $I_D$= -4.1A | - | 36 | 50 | mΩ |
| | | $V_{GS}$= -4.5V, $I_D$= -3A | - | 49 | 75 | |
| **Dynamic Characteristics**[4] | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V , $V_{DS}$ = -15V, f = 1.0MHz | - | 530 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 70 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 56 | - | |
| **Switching Characteristics**[4] | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$ = -10V, $V_{DS}$ = -15V, $I_D$ = -4.1A | - | 6.8 | - | nC |
| Gate−Source Charge | $Q_{gs}$ | | - | 1.0 | - | |
| Gate−Drain Charge | $Q_{gd}$ | | - | 1.4 | - | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS}$= -10V, $V_{DS}$= -15V , $R_L$= 15Ω,$R_{GEN}$= 2.5Ω | - | 14 | - | ns |
| Rise Time | $t_r$ | | - | 61 | - | |
| Turn-off Delay time | $t_{d(off)}$ | | - | 19 | - | |
| Fall Time | $t_f$ | | - | 10 | - | |
| **Source-Drain Body Diode Characteristics** | | | | | | |
| Diode Forward Voltage[3] | $V_{SD}$ | $I_S$ = -4.1A, $V_{GS}$ = 0V | - | - | -1.2 | V |
| Continuous Source Current | $I_S$ | | - | - | -20 | A |

**Notes:**

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.

## Typical Characteristics

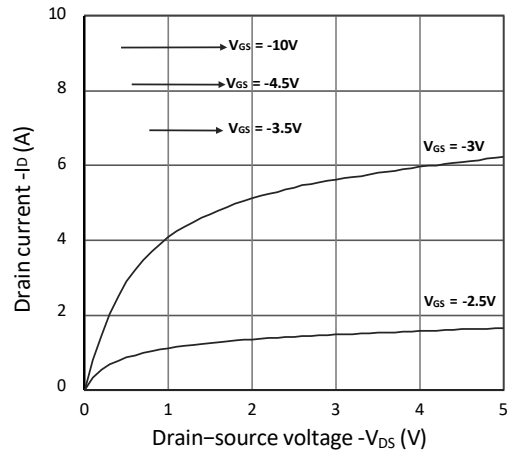



Figure 1. Output Characteristics

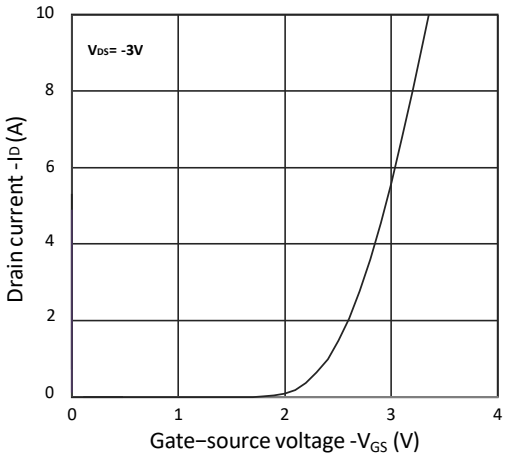



Figure 2. Transfer Characteristics

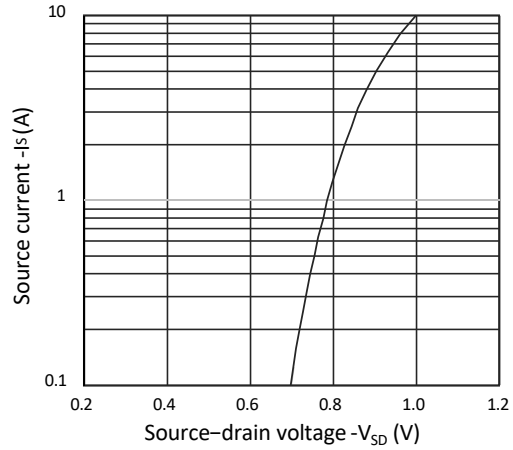



Figure 3. Forward Characteristics of Reverse

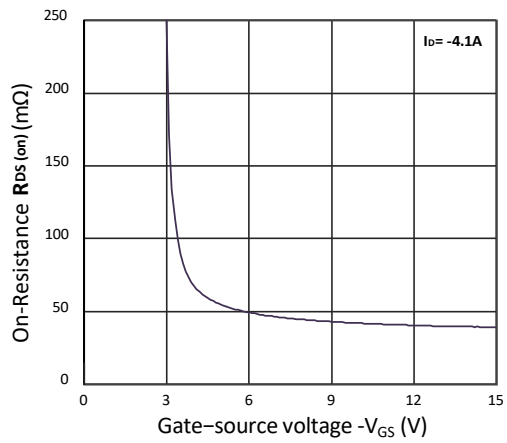



Figure 4. $R_{DS(ON)}$ vs. $V_{GS}$

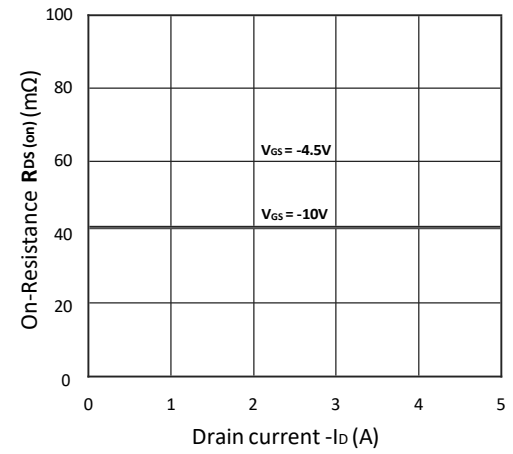



Figure 5. $R_{DS(ON)}$ vs. $I_D$

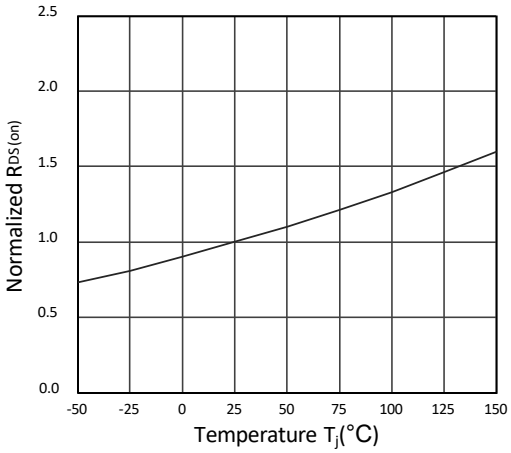



Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

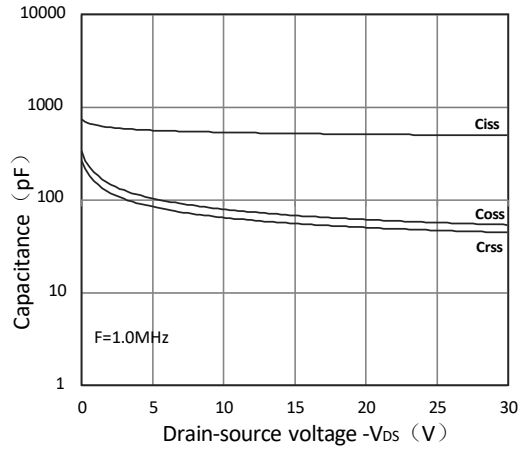



Figure 7. Capacitance Characteristics

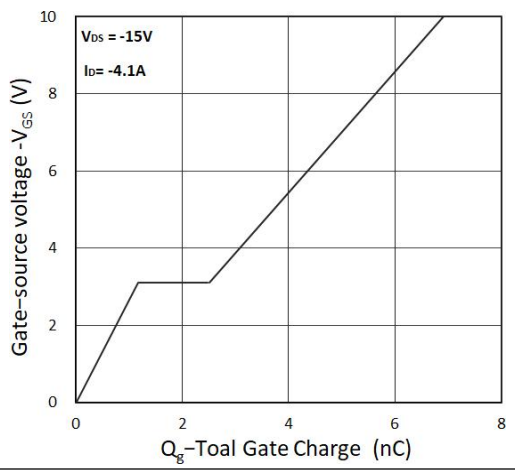
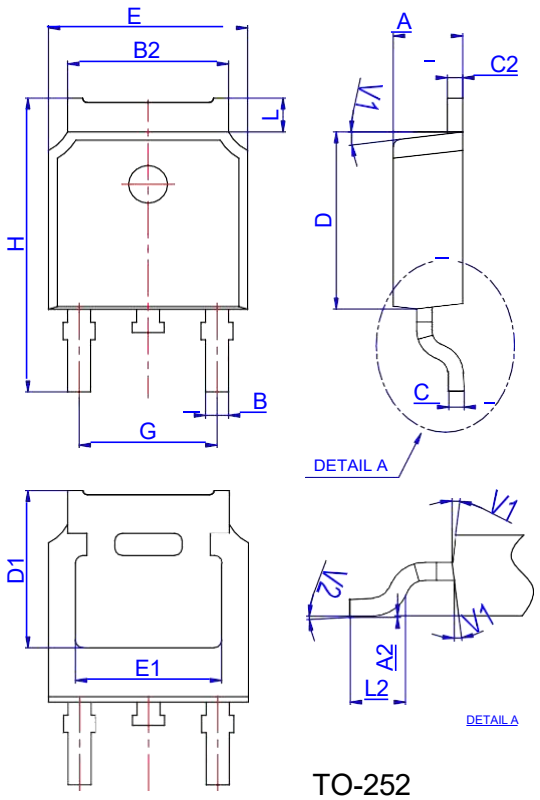



Figure 8. Gate Charge Characteristics

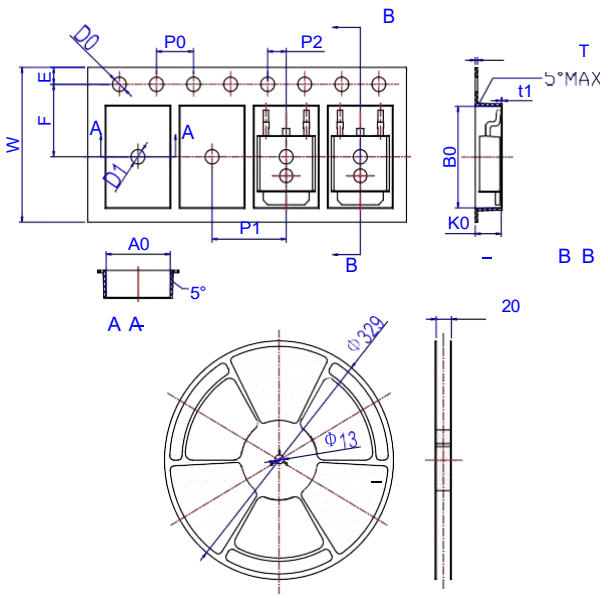
## Package Mechanical Data TO 252




TO-252

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0 | | 0.10 | 0 | | 0.004 |
| B | 0.66 | | 0.86 | 0.026 | | 0.034 |
| B2 | 5.18 | | 5.48 | 0.202 | | 0.216 |
| C | 0.40 | | 0.60 | 0.016 | | 0.024 |
| C2 | 0.44 | | 0.58 | 0.017 | | 0.023 |
| D | 5.90 | | 6.30 | 0.232 | | 0.248 |
| D1 | 5.30REF | | | 0.209REF | | |
| E | 6.40 | | 6.80 | 0.252 | | 0.268 |
| E1 | 4.63 | | | 0.182 | | |
| G | 4.47 | | 4.67 | 0.176 | | 0.184 |
| H | 9.50 | | 10.70 | 0.374 | | 0.421 |
| L | 1.09 | | 1.21 | 0.043 | | 0.048 |
| L2 | 1.35 | | 1.65 | 0.053 | | 0.065 |
| V1 | | 7° | | | 7° | |
| V2 | 0° | | 6° | 0° | | 6° |

## Reel Spectification-TO-252-4R




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| W | 15.90 | 16.00 | 16.10 | 0.626 | 0.630 | 0.634 |
| E | 1.65 | 1.75 | 1.85 | 0.065 | 0.069 | 0.073 |
| F | 7.40 | 7.50 | 7.60 | 0.291 | 0.295 | 0.299 |
| D0 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| D1 | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| P0 | 3.90 | 4.00 | 4.10 | 0.154 | 0.157 | 0.161 |
| P1 | 7.90 | 8.00 | 8.10 | 0.311 | 0.315 | 0.319 |
| P2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| A0 | 6.85 | 6.90 | 7.00 | 0.270 | 0.271 | 0.276 |
| B0 | 10.45 | 10.50 | 10.60 | 0.411 | 0.413 | 0.417 |
| K0 | 2.68 | 2.78 | 2.88 | 0.105 | 0.109 | 0.113 |
| T | 0.24 | | 0.27 | 0.009 | | 0.011 |
| t1 | 0.10 | | | 0.004 | | |
| 10P0 | 39.80 | 40.00 | 40.20 | 1.567 | 1.575 | 1.583 |