## P-Ch 30V Fast Switching MOSFETs

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

### Product Summary

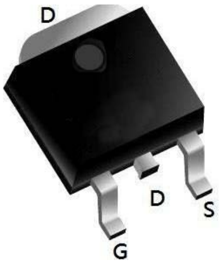
| BVDSS | RDSON | ID |
|---|---|---|
| -30V | 6.0mΩ | -80A |

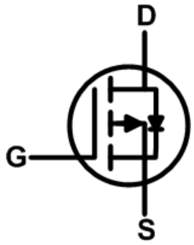
### Description

The XXW80P03 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The XXW80P03 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

### TO252 Pin Configuration





### Absolute Maximum Ratings

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current@-10V[1] | $T_C$=25℃ | $I_D$ | -80 | A |
| | $T_C$=75℃ | | -42 | |
| Pulsed Drain Current[2] | | $I_{DM}$ | -175 | A |
| Single Pulse Avalanche Energy[3] | | EAS | 31 | mJ |
| Avalanche Current | | $I_{AS}$ | -25 | A |
| Total Power Dissipation[4] | $T_C$=25℃ | $P_D$ | 31.2 | W |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to+150 | °C |

### Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance from Junction-to-Ambient[1] | $R_{\theta JA}$ | 43 | °C/W |
| Thermal Resistance from Junction-to-Case[1] | $R_{\theta JC}$ | 4 | °C/W |

## Electrical Characteristics $T_c$ = 25°C, unless otherwise noted

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = -250μA | -30 | - | - | V |
| Gate-body Leakage current | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| Zero Gate Voltage Drain Current $T_J$=25℃ | $I_{DSS}$ | $V_{DS}$ = -24V, $V_{GS}$ = 0V | - | - | -1 | μA |
| $T_J$=55℃ | | | - | - | -5 | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA | -1.0 | -1.6 | -2.5 | V |
| Drain-Source On-Resistance[2] | $R_{DS(on)}$ | $V_{GS}$ = -10V, $I_D$ = -12A | - | 6 | 8.8 | mΩ |
| | | $V_{GS}$ = -4.5V, $I_D$ = -8A | - | 9 | 14 | |
| Forward Transconductance | $g_{fs}$ | $V_{DS}$ = -5V, $I_D$ = -20A | - | 28 | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = -15V, $V_{GS}$ =0V, f =1MHz | - | 4320 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 529 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 487 | - | |
| **Switching Characteristics** | | | | | | |
| Gate Resistance | $R_g$ | $V_{DS}$ = 0V, $V_{GS}$= 0V, f=1.0MHz | - | 4.0 | - | Ω |
| Total Gate Charge | $Q_g$ | $V_{GS}$ = -10V, $V_{DS}$ = -15V, $I_D$= -15A | - | 45 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 8.5 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 12.8 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}$ = -10V, $V_{DD}$ = -15V, $R_G$ = 2.5Ω, $I_D$= -15A | - | 18.9 | - | nS |
| Rise Time | $t_r$ | | - | 15.7 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 64.8 | - | |
| Fall Time | $t_f$ | | - | 36.5 | - | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Diode Forward Voltage[2] | $V_{SD}$ | $I_S$ = -1A, $V_{GS}$ = 0V | - | - | -1 | V |
| Continuous Source Current[1,5] | $I_S$ | $V_G$=$V_D$=0V , Force Current | - | - | -80 | A |

Note :

1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%

3.The EAS data shows Max. rating . The test condition is $V_{DD}$= -25V, $V_{GS}$= -10V, L= 0.1mH, $I_{AS}$= -25A

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

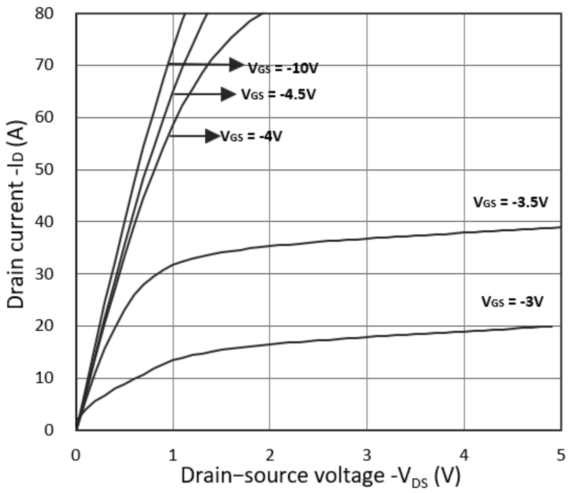


Figure 1. Output Characteristics

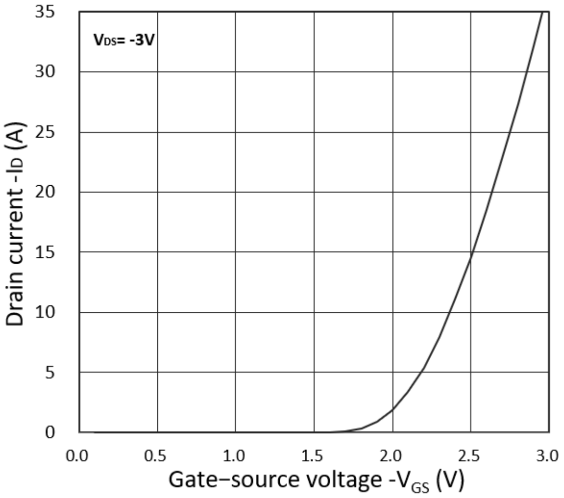


Figure 2. Transfer Characteristics

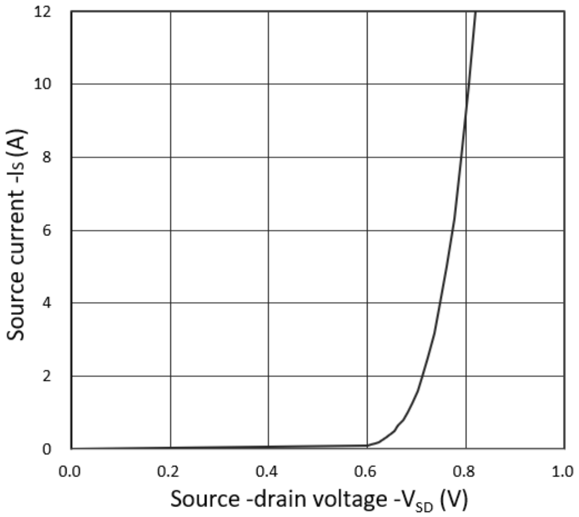


Figure 3. Forward Characteristics of Reverse

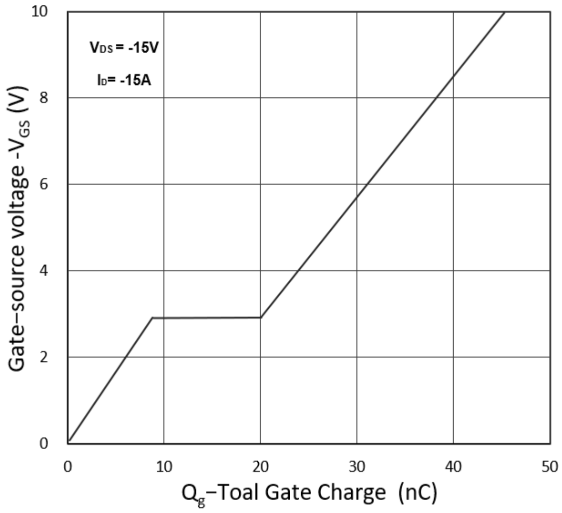


Figure 4. Gate Charge Characteristics

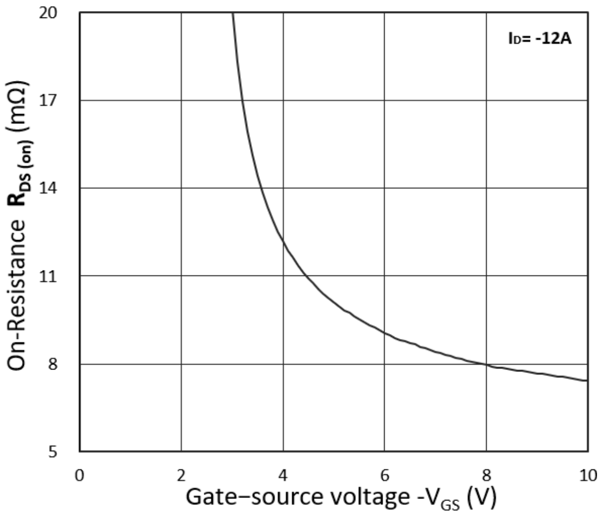


Figure 5. $R_{DS(on)}$ vs. $V_{GS}$

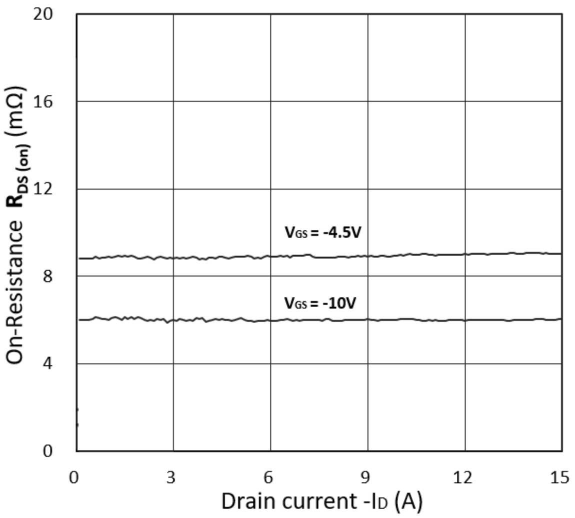
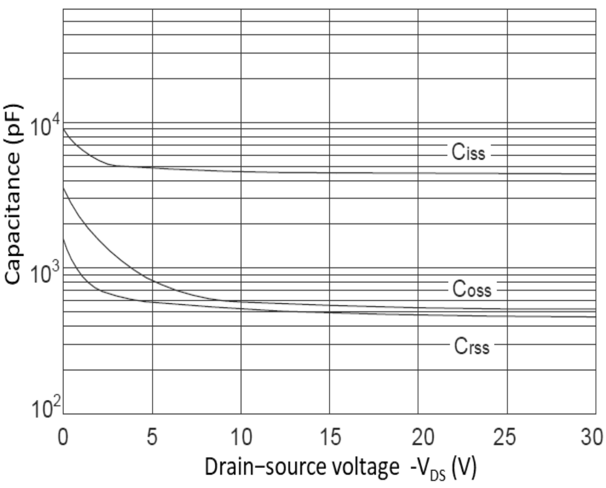


Figure 6. $R_{DS(on)}$ vs. $I_D$



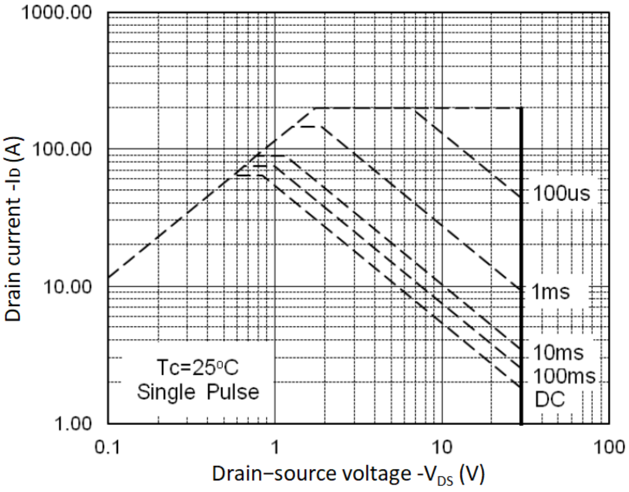


Figure 7. Capacitance Characteristics

Figure 8. Safe Operating Area

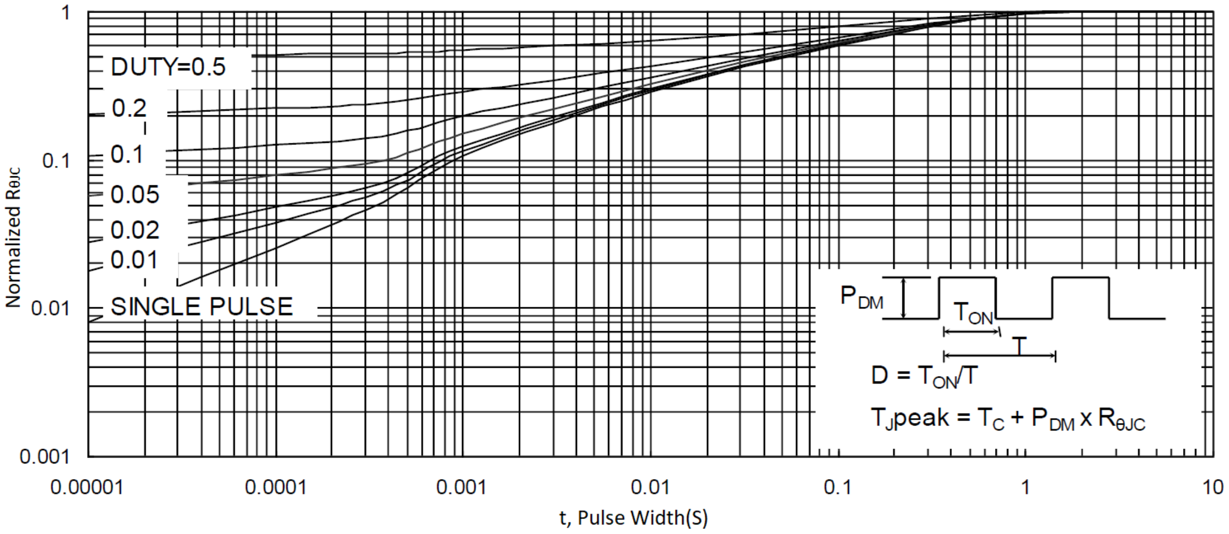
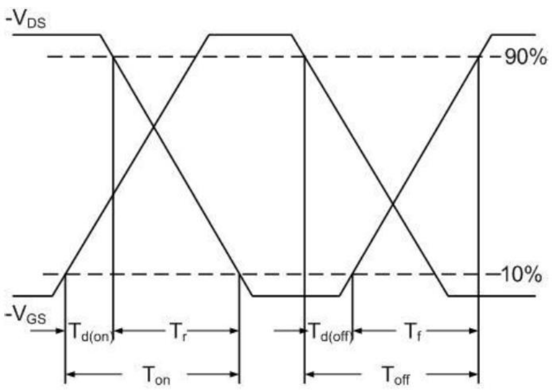


Figure 9. Normalized Maximum Transient Thermal Impedance



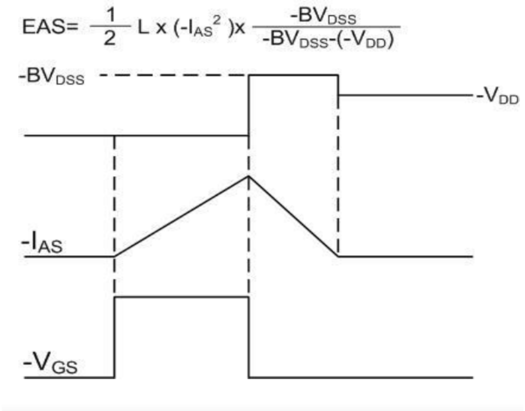


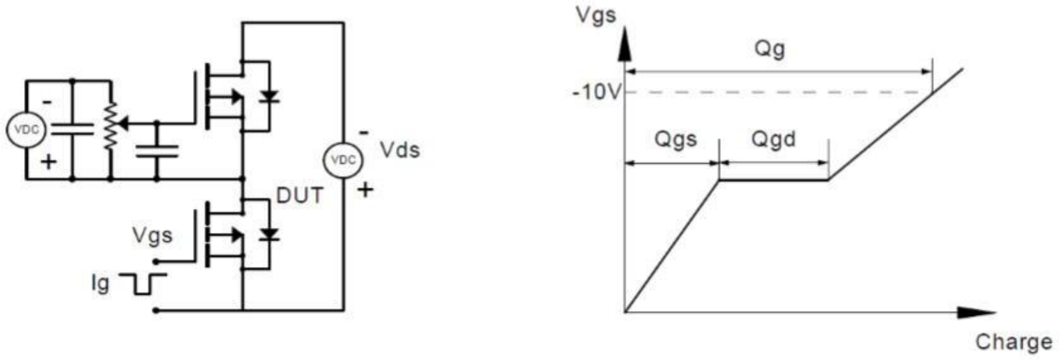
Figure 10. Switching Time Waveform

Figure 11. Unclamped Inductive Switching

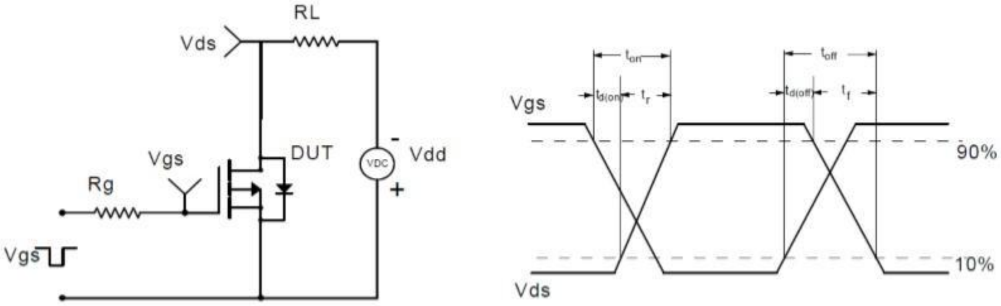
Waveform

## Test Circuit

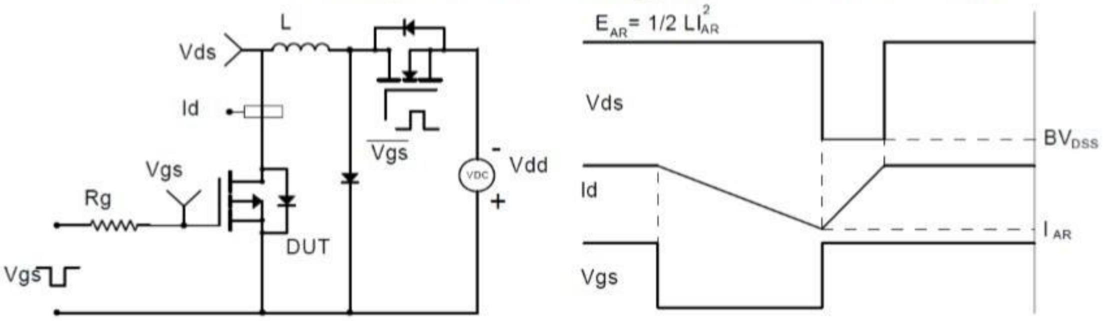
Gate Charge Test Circuit & Waveform



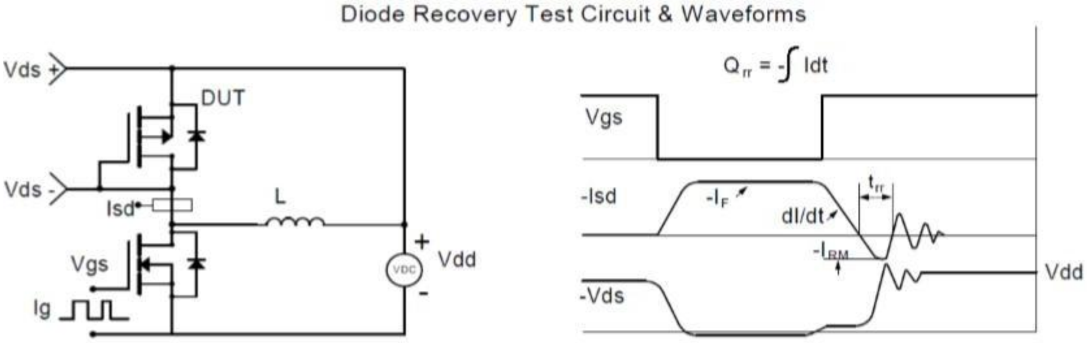
Resistive Switching Test Circuit & Waveforms



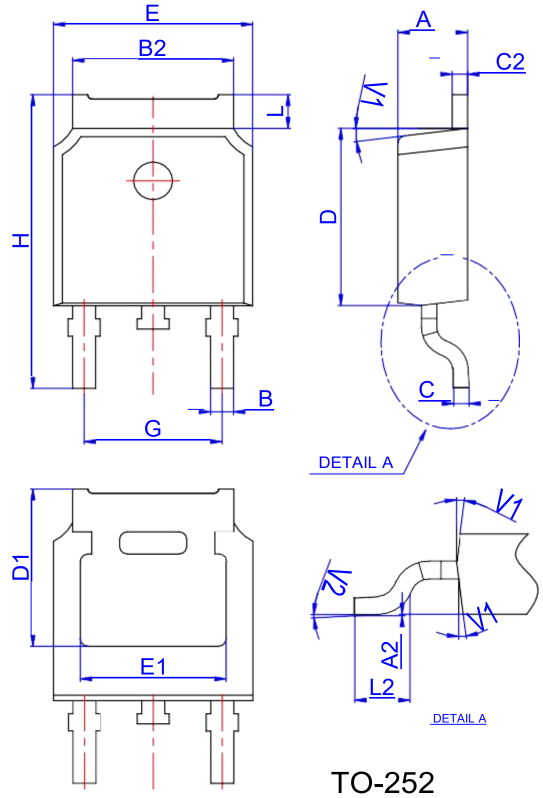
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



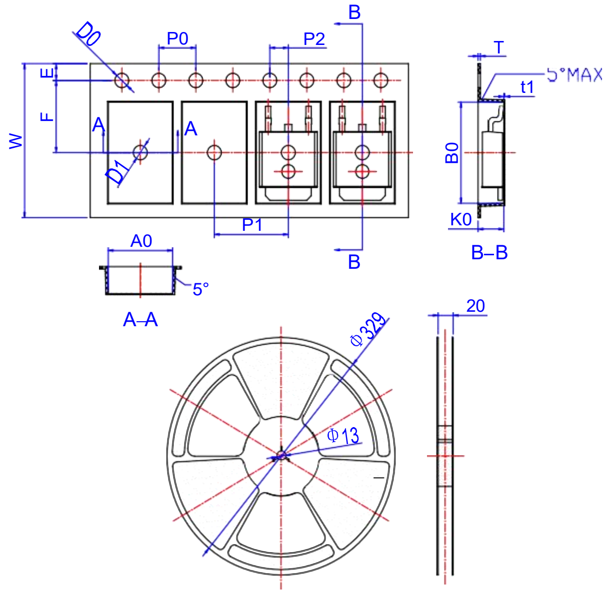
## Package Mechanical Data TO 252



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 Specification-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 |