

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



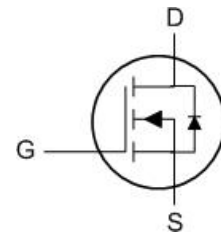
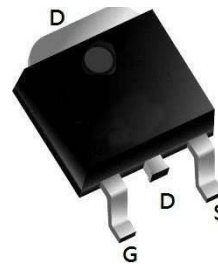
Product Summary

| BVDSS | RDSON | ID |
|-------|-------|-----|
| 40V | 5.4mΩ | 80A |

Description

The XXW80N04B is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The XXW80N04B meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration



Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Value | Units |
|-----------------|--|---------------------------|-------|
| V_{DS} | Drain-to-Source Voltage | 40 | V |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current | $T_C = 25^\circ\text{C}$ | 80 |
| | | $T_C = 100^\circ\text{C}$ | 38 |
| I_{DM} | Pulsed Drain Current ⁽¹⁾ | 240 | A |
| E_{AS} | Single Pulsed Avalanche Energy ⁽²⁾ | 100 | mJ |
| P_D | Power Dissipation | $T_C = 25^\circ\text{C}$ | 114 |
| | | | |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient ⁽³⁾ | 37 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 1.1 | |
| T_J, T_{STG} | Junction & Storage Temperature Range | -55 to 150 | °C |

N-Ch 40V Fast Switching MOSFETs
Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|--|---|------|------|-----------|------------------|
| Off Characteristics | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$ | 40 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 40\text{V}, V_{GS} = 0\text{V}$ | - | - | 1.0 | μA |
| I_{GSS} | Gate-Body Leakage Current | $V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ | 1.3 | 1.9 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source ON-Resistance ⁽⁴⁾ | $V_{GS} = 10\text{V}, I_D = 30\text{A}$ | - | 5.4 | 7.0 | $\text{m}\Omega$ |
| | | $V_{GS} = 4.5\text{V}, I_D = 20\text{A}$ | - | 8.1 | 10.5 | $\text{m}\Omega$ |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS} = 0\text{V}, V_{DS} = 20\text{V}, f = 1\text{MHz}$ | - | 2443 | - | pF |
| C_{oss} | Output Capacitance | | - | 167 | - | pF |
| C_{riss} | Reverse Transfer Capacitance | | - | 138 | - | pF |
| Q_g | Total Gate Charge | $V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 20\text{V}, I_D = 20\text{A}$ | - | 48 | - | nC |
| Q_{gs} | Gate Source Charge | | - | 10 | - | nC |
| Q_{gd} | Gate Drain("Miller") Charge | | - | 10 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-On DelayTime | $V_{GS} = 10\text{V}, V_{DD} = 20\text{V}$ $I_D = 20\text{A}, R_{GEN} = 3\Omega$ | - | 10 | - | ns |
| t_r | Turn-On Rise Time | | - | 28 | - | ns |
| $t_{d(off)}$ | Turn-Off DelayTime | | - | 40 | - | ns |
| t_f | Turn-Off Fall Time | | - | 7 | - | ns |
| Drain-Source Diode Characteristics and Max Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 80 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 240 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS} = 0\text{V}, I_S = 30\text{A}$ | - | - | 1.2 | V |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$ | - | 11 | - | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | | - | 5 | - | nC |

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 20\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 0.5\text{mH}$, $I_{AS} = 20\text{A}$
 3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB
 4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

Typical Performance Characteristics

Figure 1: Output Characteristics

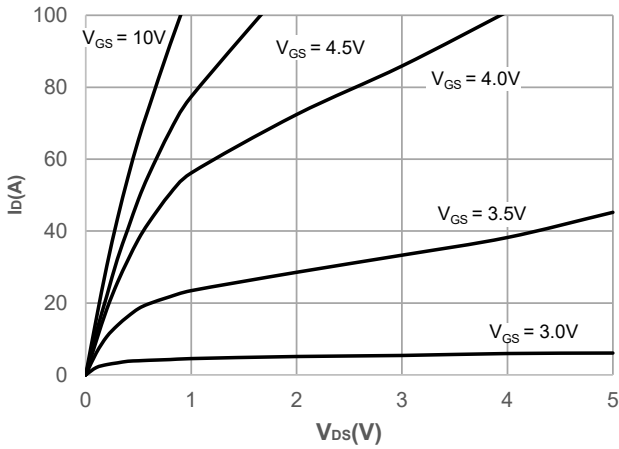


Figure 2: Typical Transfer Characteristics

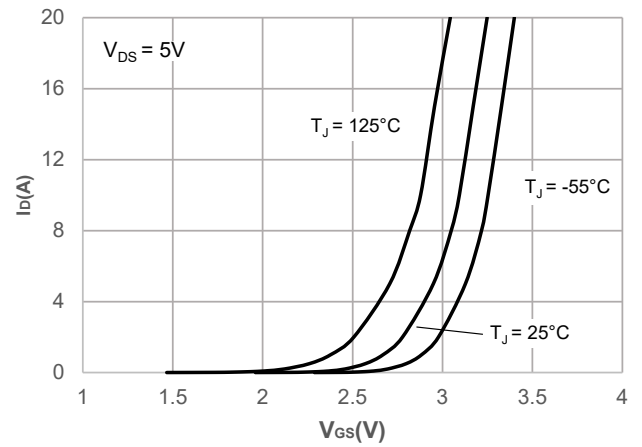


Figure 3: On-resistance vs. Drain Current

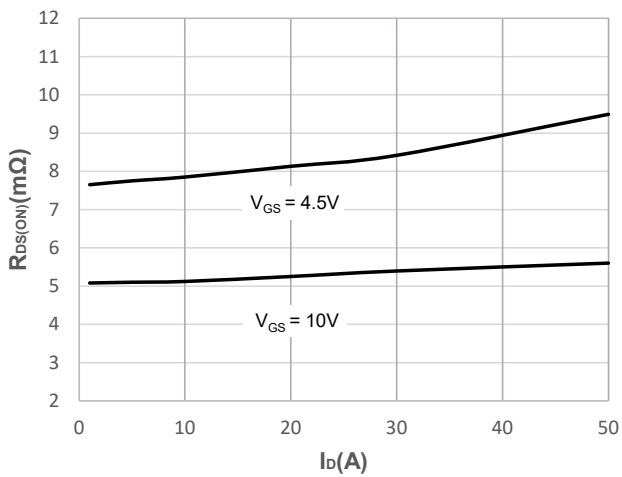


Figure 4: Body Diode Characteristics

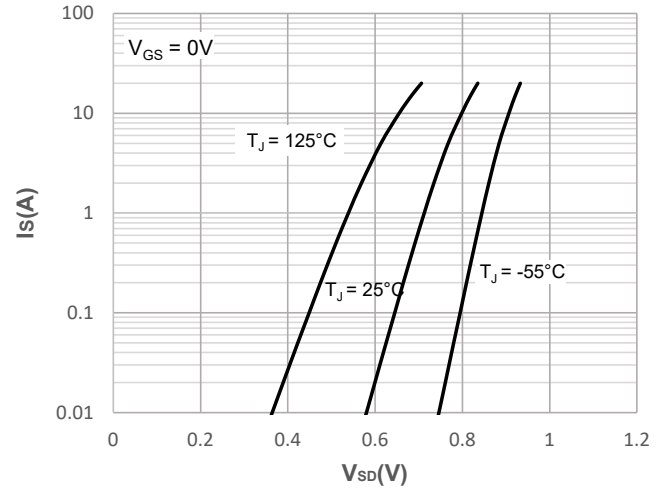


Figure 5: Gate Charge Characteristics

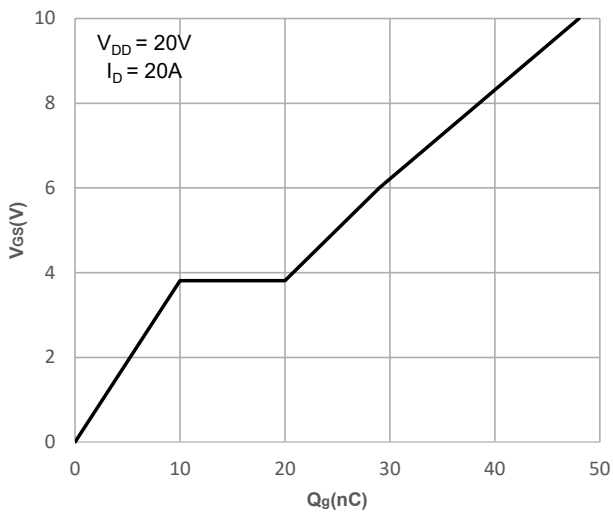
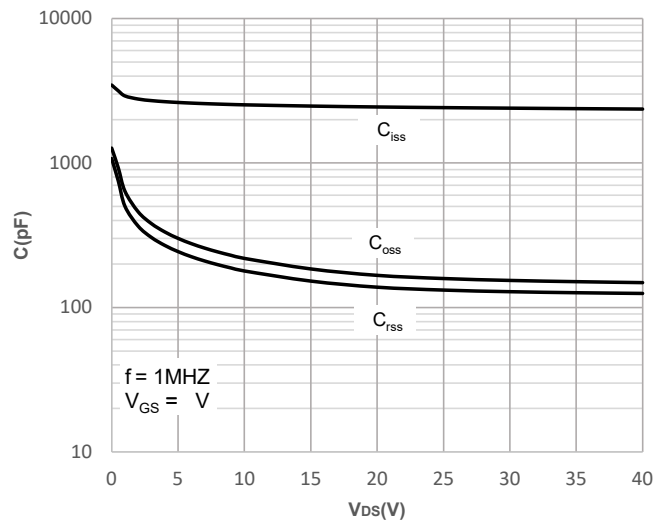


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

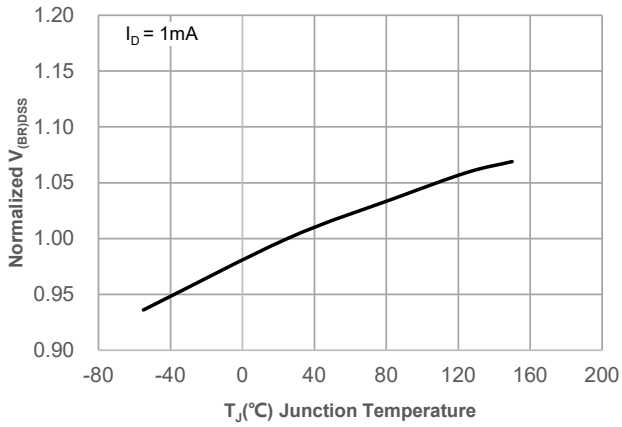


Figure 8: Normalized on Resistance vs. Junction Temperature

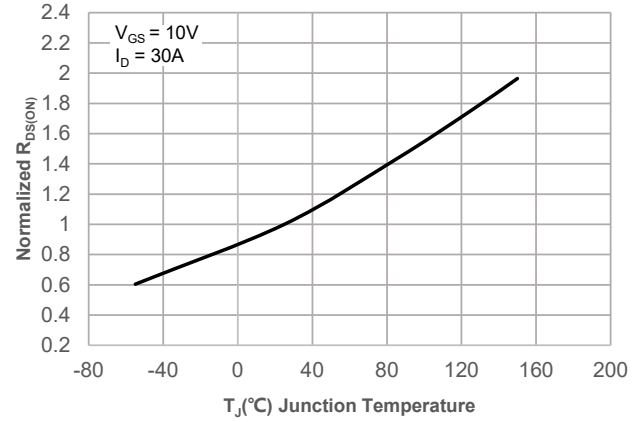


Figure 9: Maximum Safe Operating Area

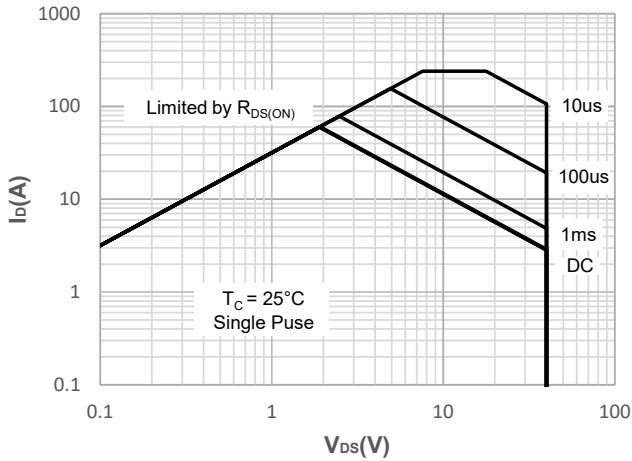


Figure 10: Maximum Continuous Driand Current vs. Case Temperature

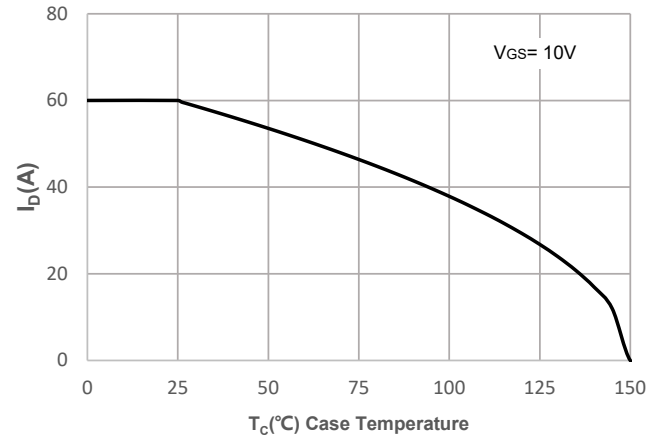


Figure 11: Normalized Maximum Transient Thermal Impedance

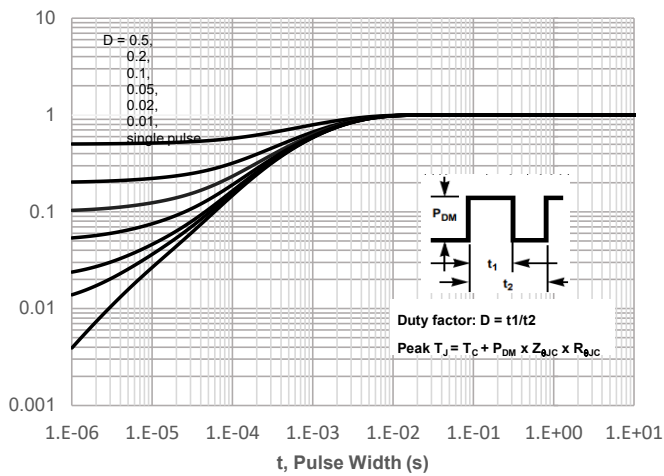
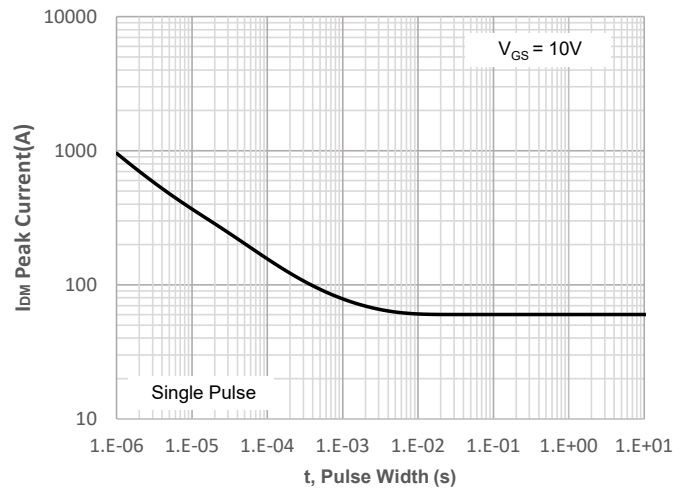


Figure 12: Peak Current Capacity



Test Circuit

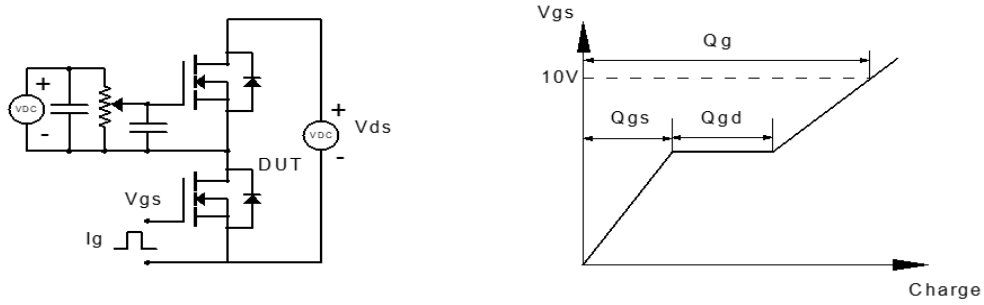


Figure 1: Gate Charge Test Circuit & Waveform

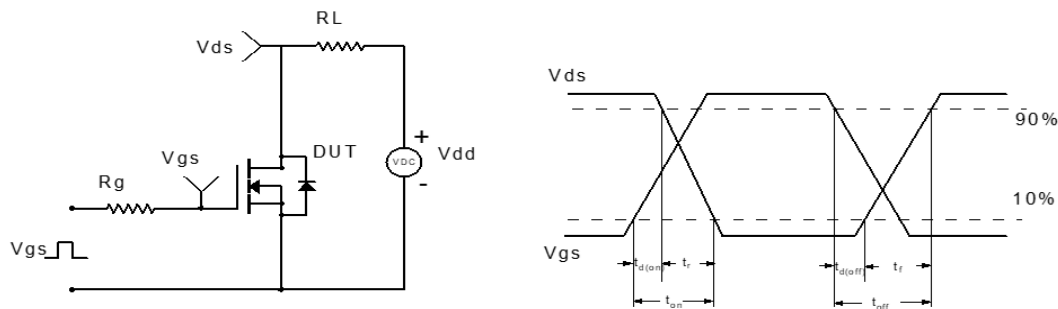


Figure 2: Resistive Switching Test Circuit & Waveform

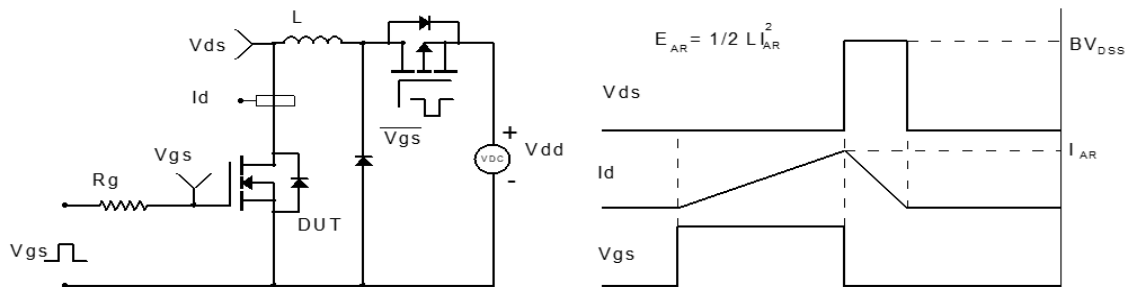


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

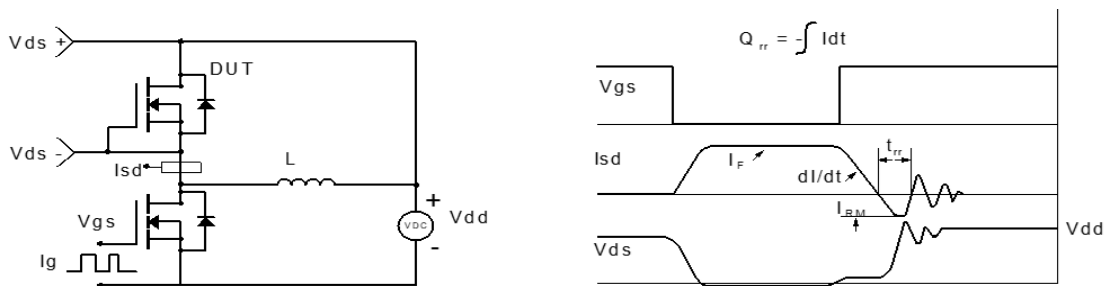
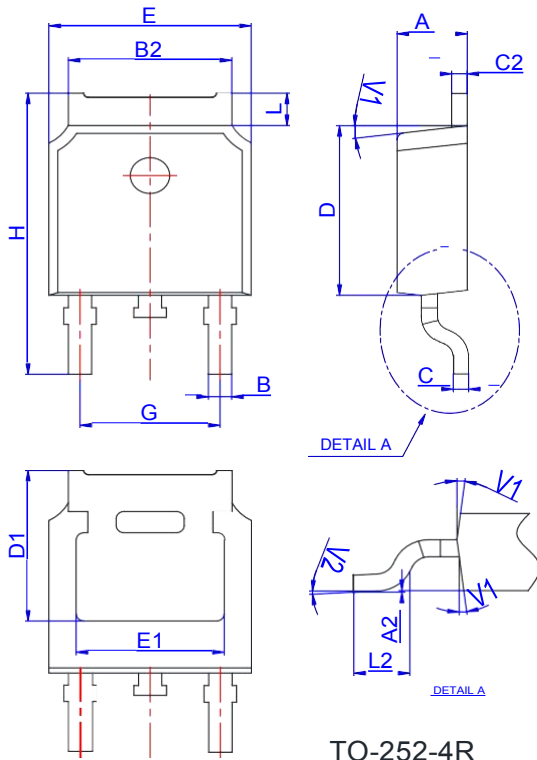
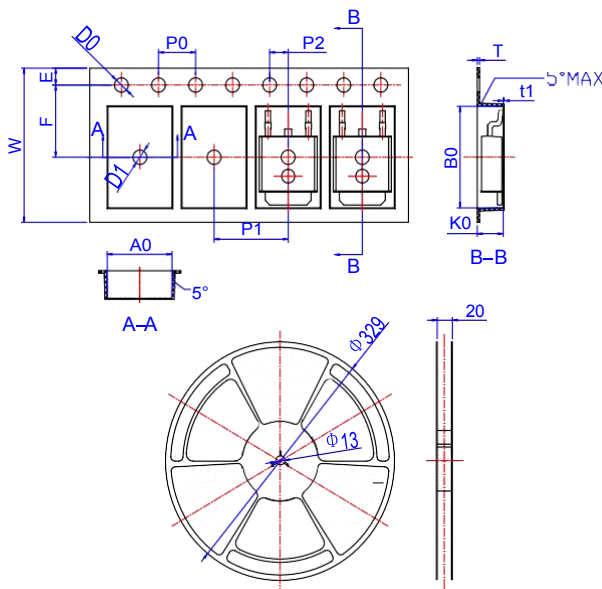


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data-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


| 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 |