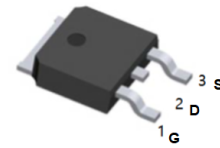
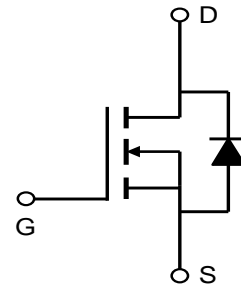


General Description

The AOD4130 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

General Features

| | |
|----------------------------------|----------------|
| V_{DS} | 60V |
| I_D (at $V_{GS}=10V$) | 30A |
| $R_{DS(ON)}$ (at $V_{GS}=10V$) | < 24m Ω |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$) | < 30m Ω |



TO-252(DPAK) top view

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

| Parameter | Symbol | Maximum | Units |
|--|------------------|-------------------------|------------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | I_D | $T_C=25^\circ\text{C}$ | 30 |
| | | $T_C=100^\circ\text{C}$ | 20 |
| Pulsed Drain Current ^C | I_{DM} | 74 | A |
| Continuous Drain Current | I_{DSM} | $T_A=25^\circ\text{C}$ | 6.5 |
| | | $T_A=70^\circ\text{C}$ | 5 |
| Avalanche Current ^C | I_{AS}, I_{AR} | 27 | A |
| Avalanche energy $L=0.1\text{mH}$ ^C | E_{AS}, E_{AR} | 36.5 | mJ |
| Power Dissipation ^B | P_D | $T_C=25^\circ\text{C}$ | 52 |
| | | $T_C=100^\circ\text{C}$ | 25 |
| Power Dissipation ^A | P_{DSM} | $T_A=25^\circ\text{C}$ | 2.5 |
| | | $T_A=70^\circ\text{C}$ | 1.6 |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 175 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Units |
|---|-----------------|------|-----|--------------------|
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | 12.4 | 20 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient ^{A, D} | | | | |
| Maximum Junction-to-Case | $R_{\theta JC}$ | 2.4 | 2.9 | $^\circ\text{C/W}$ |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|--|---|------|------|--------|-------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0V | 60 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =60V, V _{GS} =0V T _J =55°C | | | 1 5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} = ±20V | | | 100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =5V, I _D =250μA | 1.6 | 2.2 | 2.8 | V |
| I _{D(ON)} | On state drain current | V _{GS} =10V, V _{DS} =5V | 74 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =20A | | 19.5 | 24 | mΩ |
| | | V _{GS} =4.5V, I _D =20A | | 24 | 30 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =5V, I _D =20A | | 55 | | S |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | | 0.76 | 1 | V |
| I _S | Maximum Body-Diode Continuous Current ^G | | | | 46 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =30V, f=1MHz | 1265 | 1582 | 1900 | pF |
| C _{oss} | Output Capacitance | | 70 | 100 | 130 | pF |
| C _{rss} | Reverse Transfer Capacitance | | 40 | 67 | 95 | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | 1.8 | 3.6 | 5.4 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _{g(10V)} | Total Gate Charge | V _{GS} =10V, V _{DS} =30V, I _D =20A | 23 | 28.3 | 34 | nC |
| Q _{g(4.5V)} | Total Gate Charge | | 11 | 13.4 | 16 | nC |
| Q _{gs} | Gate Source Charge | | 3.6 | 4.5 | 5.4 | nC |
| Q _{gd} | Gate Drain Charge | | 4.3 | 7.2 | 10 | nC |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =10V, V _{DS} =30V, R _L =1.5Ω, R _{GEN} =3Ω | | 7.5 | | ns |
| t _r | Turn-On Rise Time | | | 6.5 | | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 33 | | ns |
| t _f | Turn-Off Fall Time | | | 7.5 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =20A, dI/dt=500A/μs | 15 | 22 | 30 | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =20A, dI/dt=500A/μs | 53 | 76 | 100 | nC |

A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.

B. The power dissipation P_D is based on T_{J(MAX)}=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=175°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.

D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=175°C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

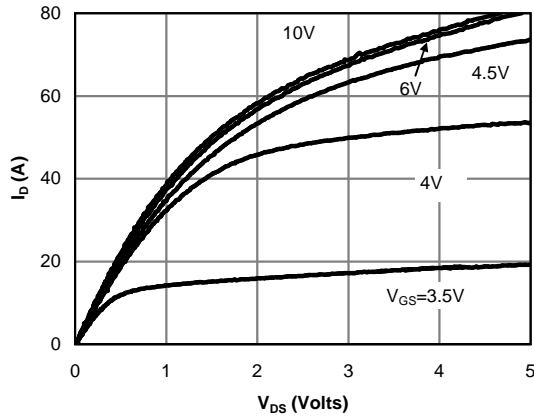


Fig 1: On-Region Characteristics (Note E)

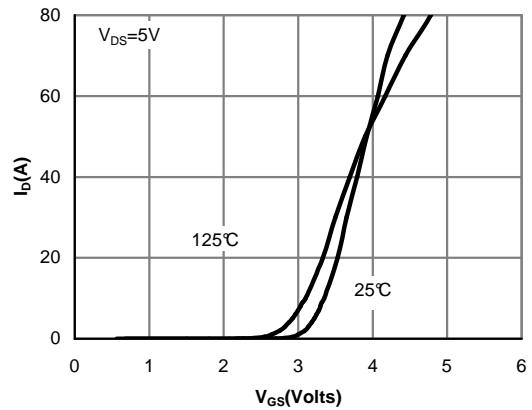


Figure 2: Transfer Characteristics (Note E)

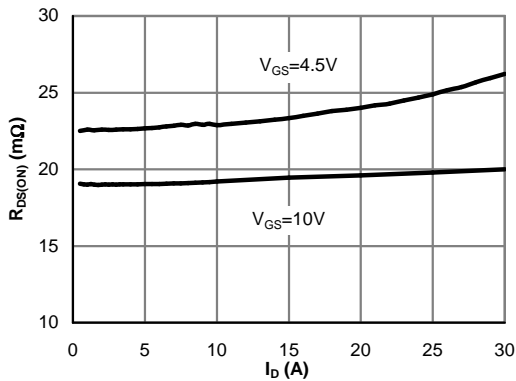


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

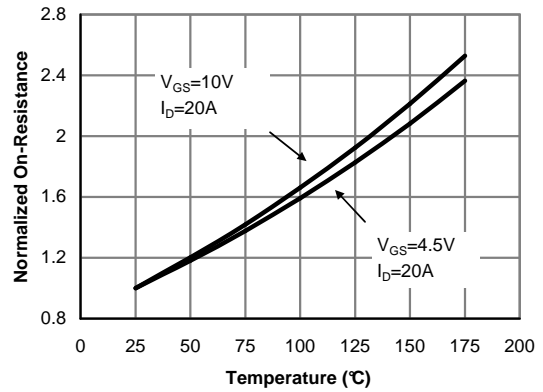


Figure 4: On-Resistance vs. Junction Temperature (Note E)

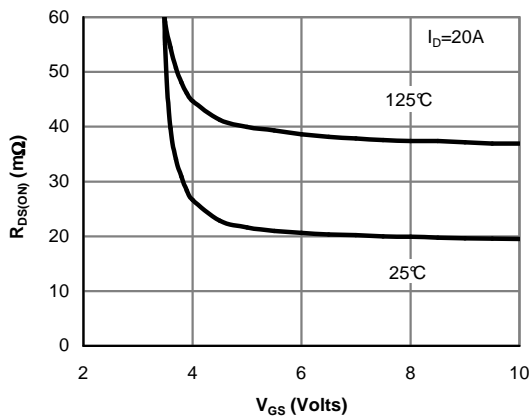


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

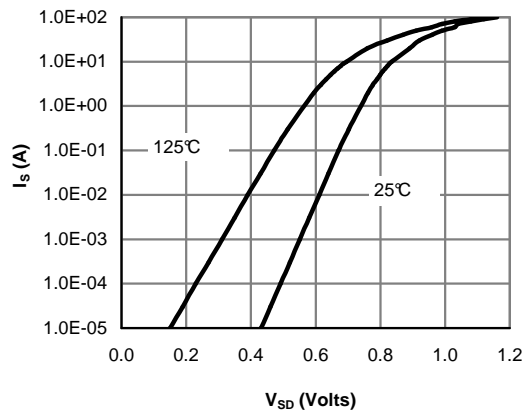


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

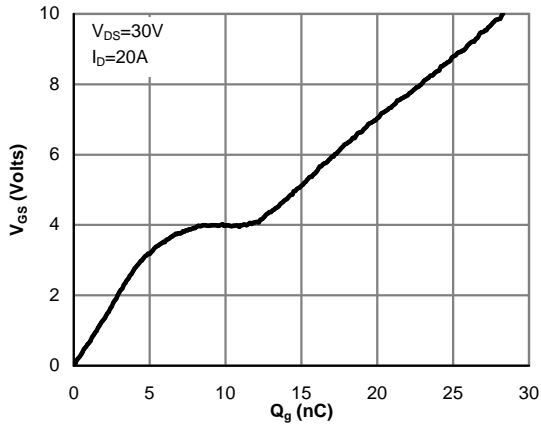


Figure 7: Gate-Charge Characteristics

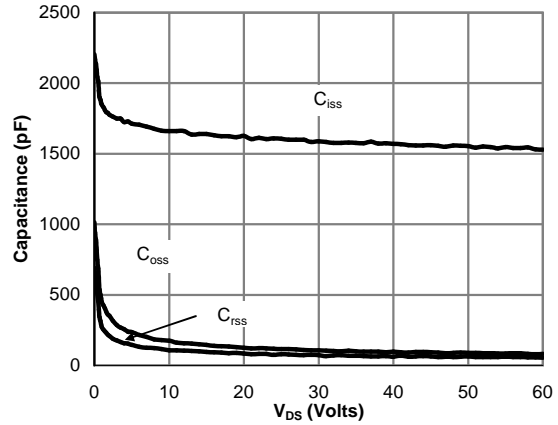


Figure 8: Capacitance Characteristics

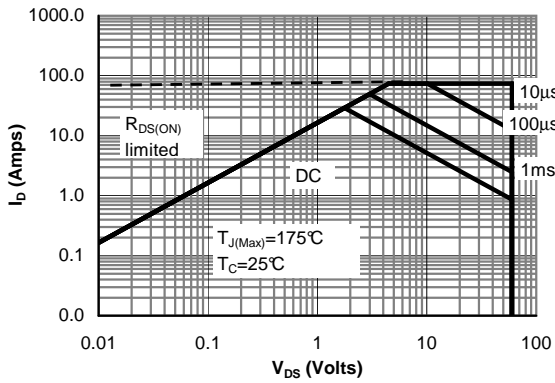


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

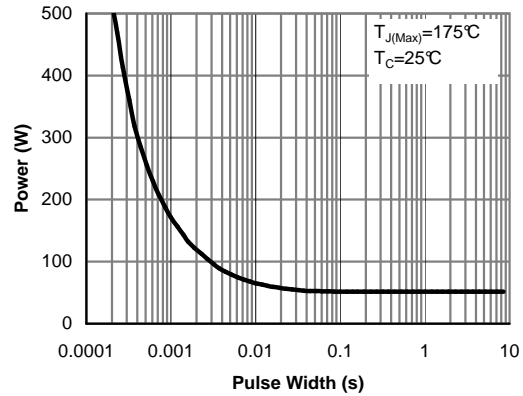


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

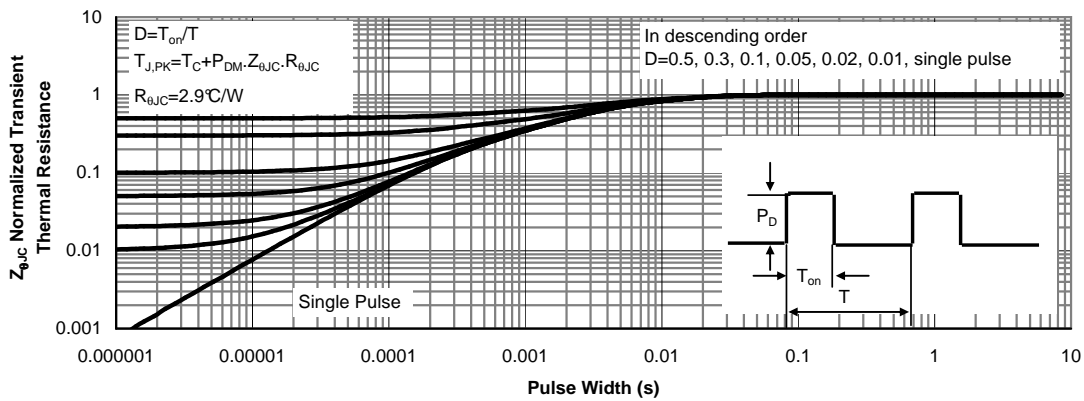


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

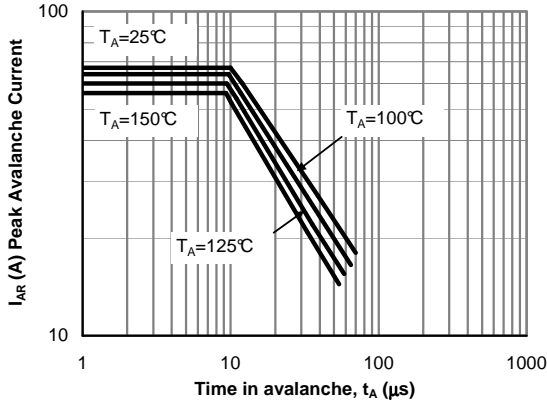


Figure 12: Single Pulse Avalanche capability (Note C)

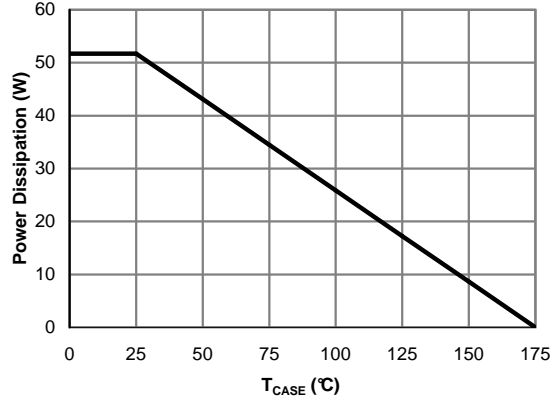


Figure 13: Power De-rating (Note F)

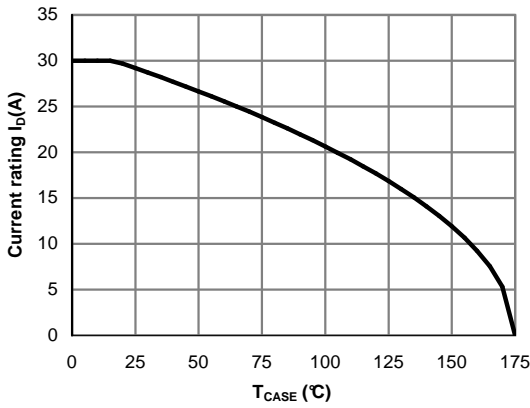


Figure 14: Current De-rating (Note F)

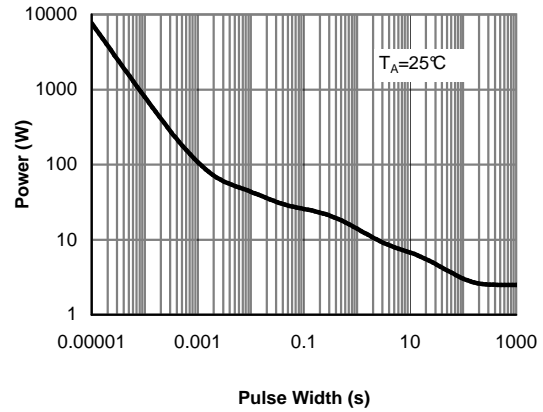


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

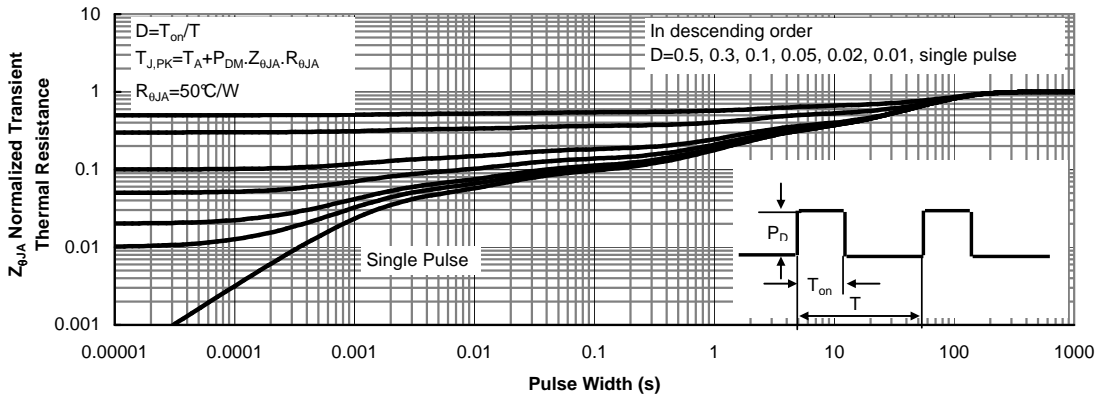
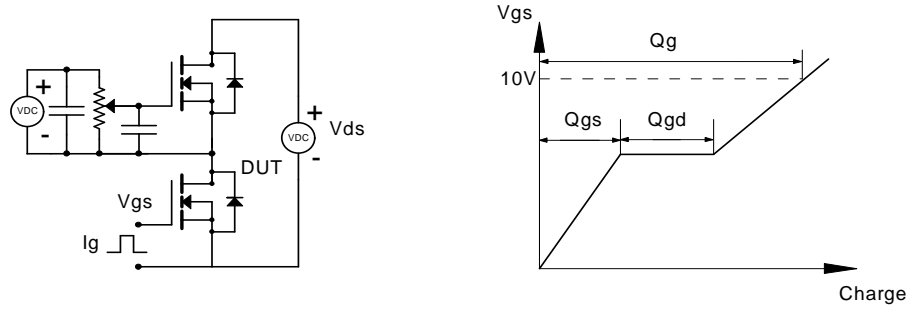
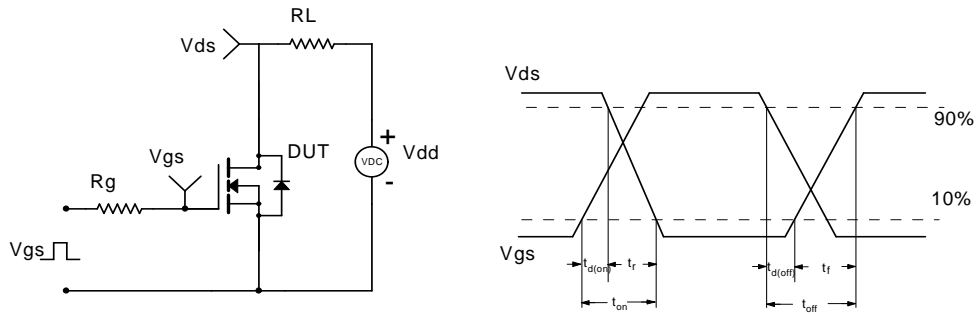


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

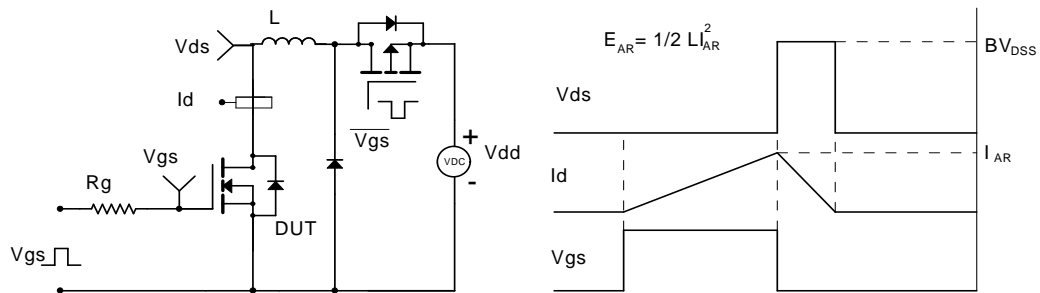
Gate Charge Test Circuit & Waveform



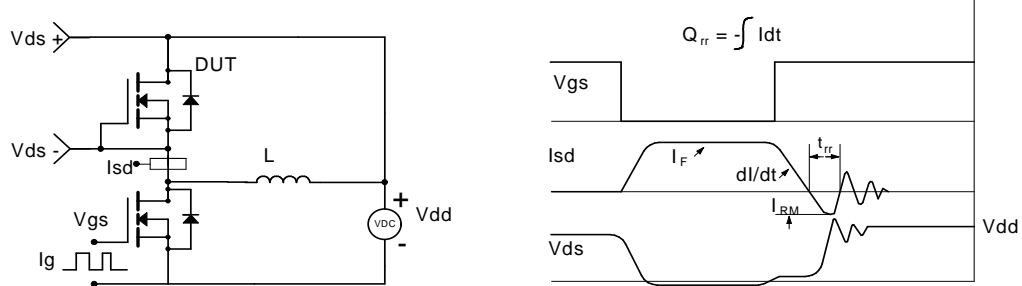
Resistive Switching Test Circuit & Waveforms



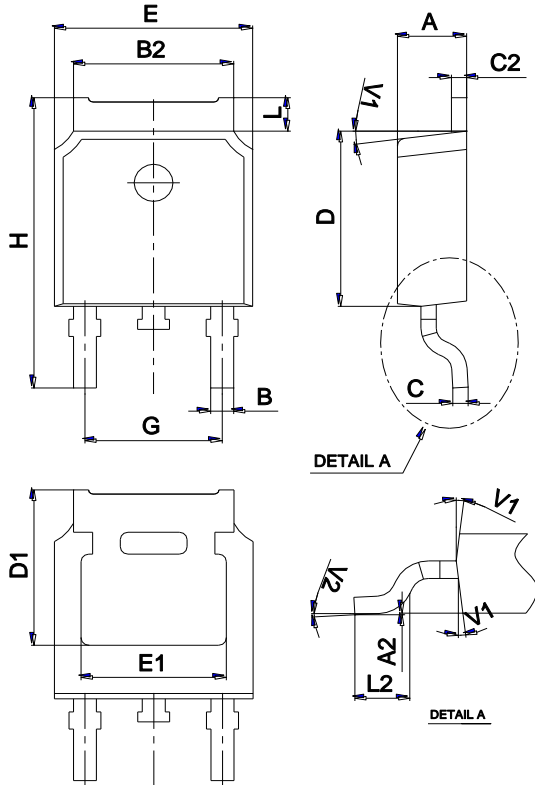
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Mechanical Data TO-252



| 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° |

Ordering information

| Order code | Package | Base qty | Delivery mode |
|-------------|---------|----------|---------------|
| UMW AOD4130 | TO-252 | 2500 | Tape and reel |