Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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**ALPHA & OMEGA**
**SEMICONDUCTOR**

# AON7524

## 30V N-Channel AlphaMOS

## General Description

- Latest Trench Power AlphaMOS (αMOS LV) technology
- Very Low $R_{DS(ON)}$ at 2.5V $V_{GS}$
- Low Gate Charge
- ESD protection
- RoHS and Halogen-Free Compliant

## Application

- DC/DC Converters

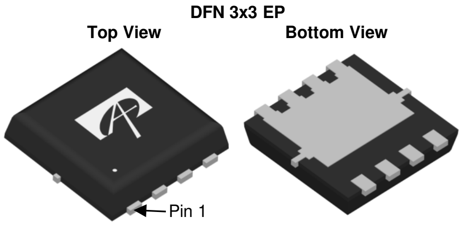
## Product Summary

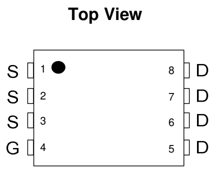
| | |
|---|---|
| $V_{DS}$ | 30V |
| $I_D$ (at $V_{GS}$=10V) | 28A |
| $R_{DS(ON)}$ (at $V_{GS}$=10V) | < 3.3mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$=4.5V) | < 4mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$=2.5V) | < 5.8mΩ |

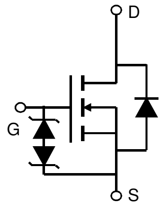
**Typical ESD protection** **HBM Class 3B**

100% UIS Tested
100% $R_g$ Tested

Green Product







**Absolute Maximum Ratings $T_A$=25°C unless otherwise noted**

| Parameter | | Symbol | Maximum | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Continuous Drain Current [G] | $T_C$=25°C | $I_D$ | 28 | A |
| | $T_C$=100°C | | 22 | |
| Pulsed Drain Current [C] | | $I_{DM}$ | 112 | |
| Continuous Drain Current | $T_A$=25°C | $I_{DSM}$ | 25 | A |
| | $T_A$=70°C | | 20 | |
| Avalanche Current [C] | | $I_{AS}$ | 28 | A |
| Avalanche energy L=0.05mH [C] | | $E_{AS}$ | 20 | mJ |
| $V_{DS}$ Spike | 100ns | $V_{SPIKE}$ | 36 | V |
| Power Dissipation [B] | $T_C$=25°C | $P_D$ | 32 | W |
| | $T_C$=100°C | | 12.8 | |
| Power Dissipation [A] | $T_A$=25°C | $P_{DSM}$ | 3.1 | W |
| | $T_A$=70°C | | 2 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | °C |

**Thermal Characteristics**

| Parameter | | Symbol | Typ | Max | Units |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient [A] | t ≤ 10s | $R_{\theta JA}$ | 30 | 40 | °C/W |
| Maximum Junction-to-Ambient [A D] | Steady-State | | 60 | 75 | °C/W |
| Maximum Junction-to-Case | Steady-State | $R_{\theta JC}$ | 3.1 | 3.9 | °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 | ID=250µA, $V_{GS}$=0V | | 30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=30V, $V_{GS}$=0V | | | | 1 | µA |
| | | | $T_J$=125°C | | | 5 | |
| $I_{GSS}$ | Gate-Body leakage current | $V_{DS}$=0V, $V_{GS}$=±10V | | | | ±10 | µA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS,}$ $I_D$=250µA | | 0.4 | 0.8 | 1.2 | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=20A | | | 2.6 | 3.3 | mΩ |
| | | | $T_J$=125°C | | 3.6 | 4.5 | |
| | | $V_{GS}$=4.5V, $I_D$=18A | | | 3 | 4 | mΩ |
| | | $V_{GS}$=2.5V, $I_D$=16A | | | 4.4 | 5.8 | mΩ |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V, $I_D$=20A | | | 103 | | S |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=1A,$V_{GS}$=0V | | | 0.62 | 1 | V |
| $I_S$ | Maximum Body-Diode Continuous Current [G] | | | | | 28 | A |
| **DYNAMIC PARAMETERS** | | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=15V, f=1MHz | | | 2250 | | pF |
| $C_{oss}$ | Output Capacitance | | | | 800 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | | 65 | | pF |
| $R_g$ | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | | 1.5 | 3.0 | 4.5 | Ω |
| **SWITCHING PARAMETERS** | | | | | | | |
| $Q_g$(10V) | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=15V, $I_D$=20A | | | 37 | 50 | nC |
| $Q_g$(4.5V) | Total Gate Charge | | | | 16 | 22 | nC |
| $Q_{gs}$ | Gate Source Charge | | | | 3.2 | | nC |
| $Q_{gd}$ | Gate Drain Charge | | | | 5.2 | | nC |
| $t_{D(on)}$ | Turn-On DelayTime | $V_{GS}$=10V, $V_{DS}$=15V, $R_L$=0.75Ω, $R_{GEN}$=3Ω | | | 5 | | ns |
| $t_r$ | Turn-On Rise Time | | | | 3 | | ns |
| $t_{D(off)}$ | Turn-Off DelayTime | | | | 47.5 | | ns |
| $t_f$ | Turn-Off Fall Time | | | | 11.3 | | ns |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $I_F$=20A, dI/dt=500A/µs | | | 16 | | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | $I_F$=20A, dI/dt=500A/µs | | | 23 | | nC |

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ 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 $_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.
B. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150° 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. Single pulse width limited by junction temperature $T_{J(MAX)}$=150° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ 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 $T_{J(MAX)}$=150° 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 in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$=25° C.

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

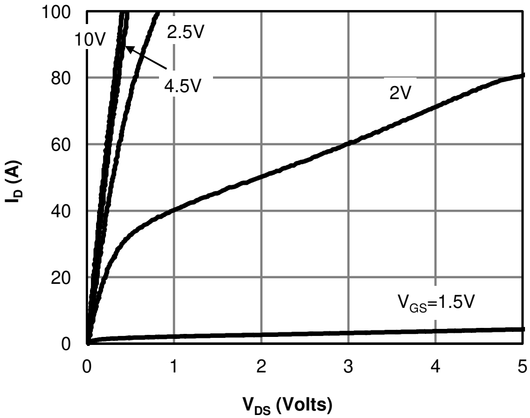


Fig 1: On-Region Characteristics (Note E)

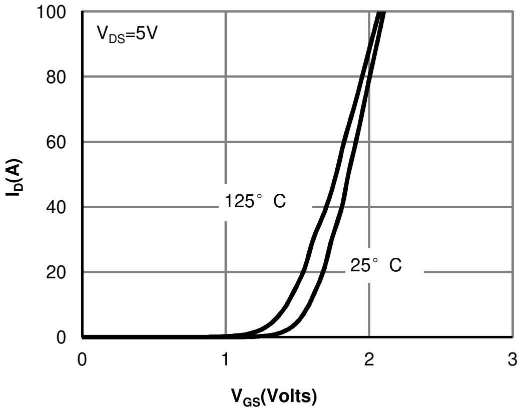


Figure 2: Transfer Characteristics (Note E)

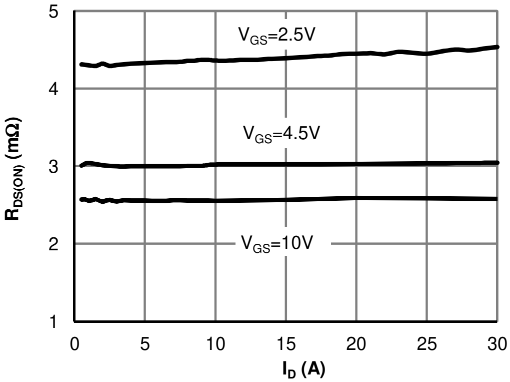


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

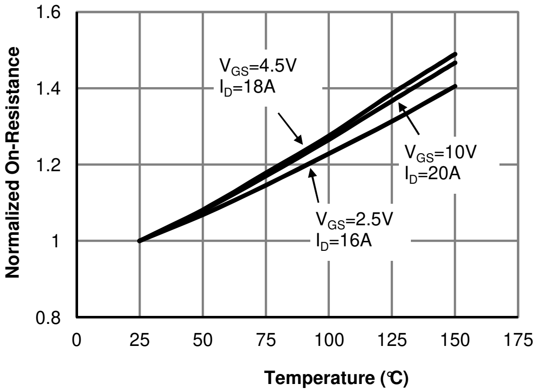


Figure 4: On-Resistance vs. Junction Temperature (Note E)

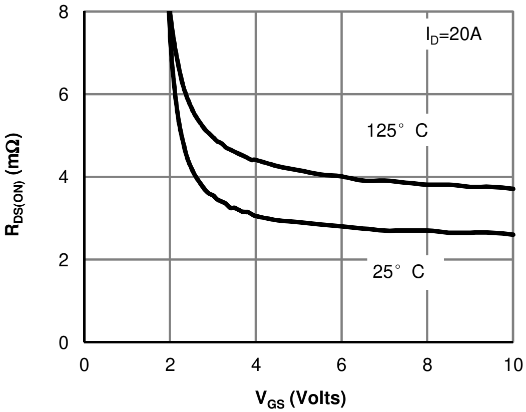


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

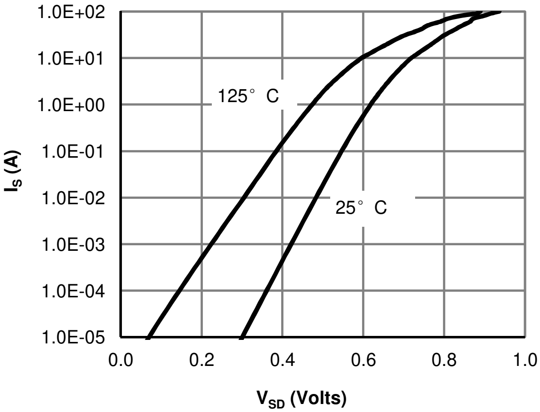


Figure 6: Body-Diode Characteristics (Note E)

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

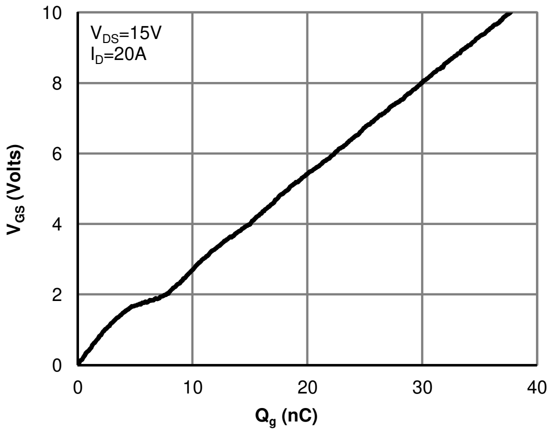


Figure 7: Gate-Charge Characteristics

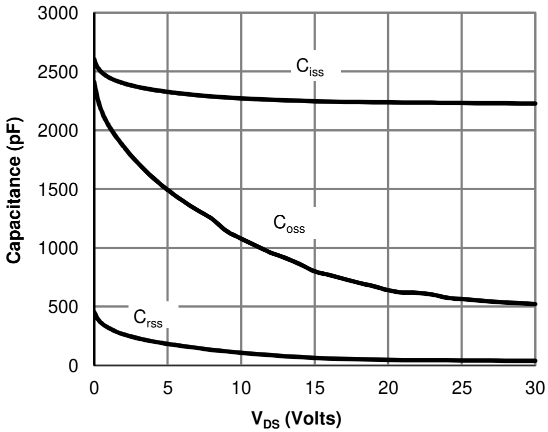
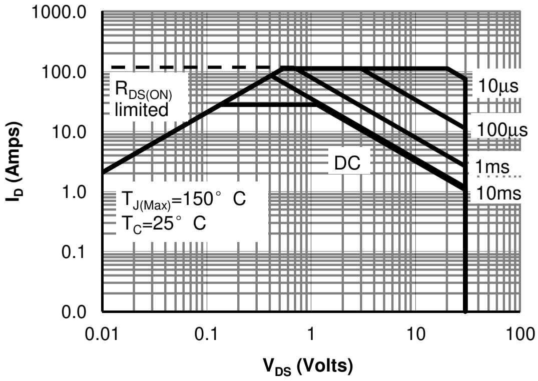


Figure 8: Capacitance Characteristics



VGS> or equal to 2.5V
Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

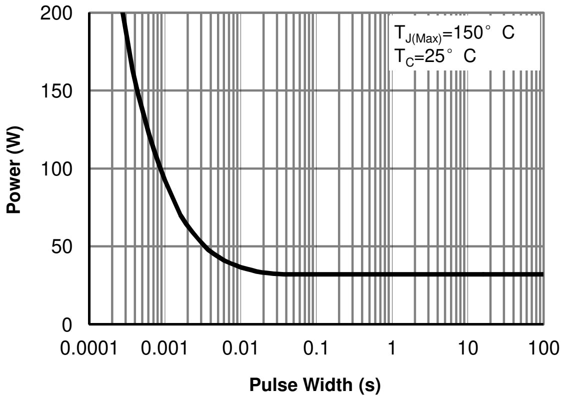


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

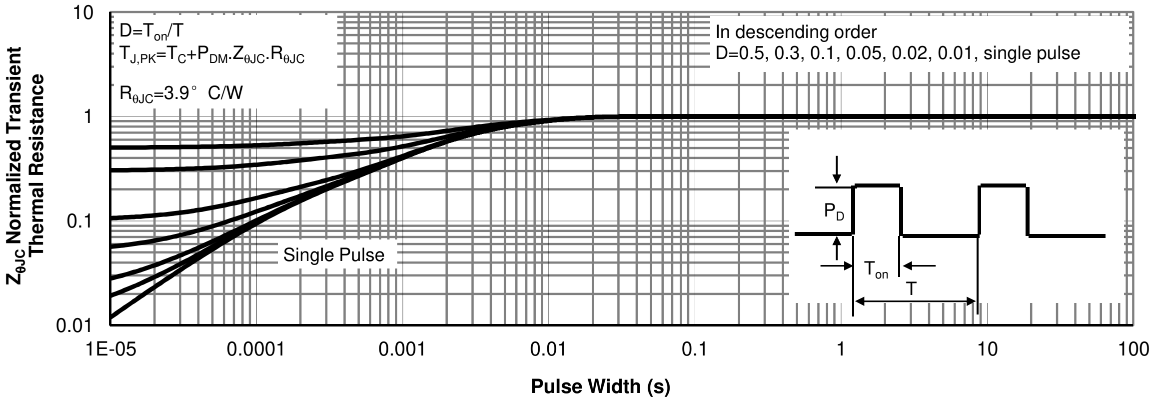


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

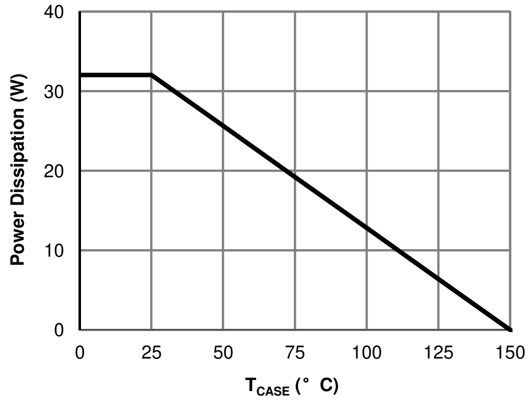


Figure 12: Power De-rating (Note F)

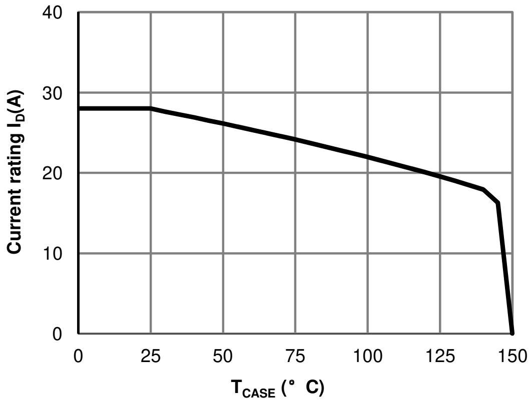


Figure 13: Current De-rating (Note F)

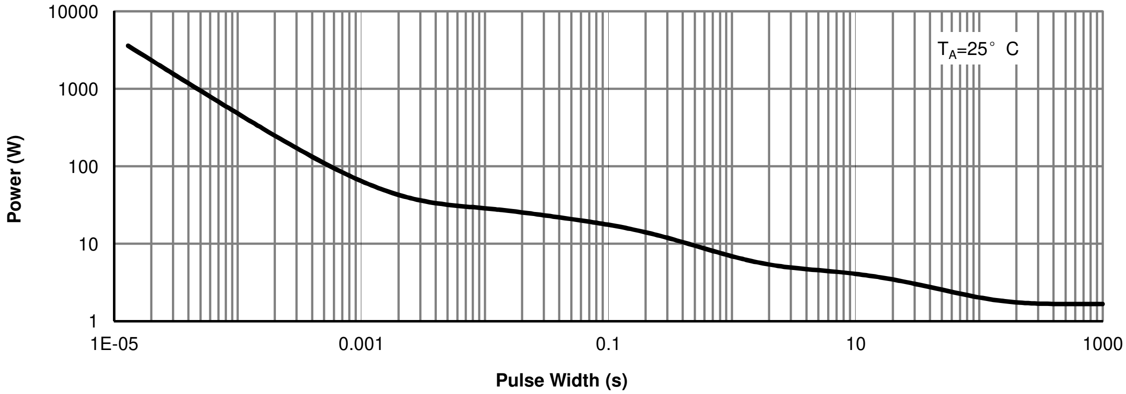


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

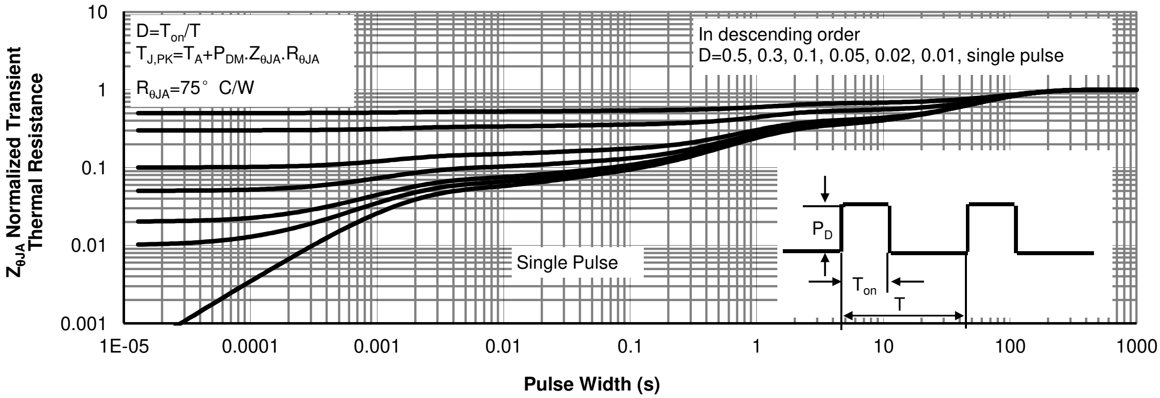
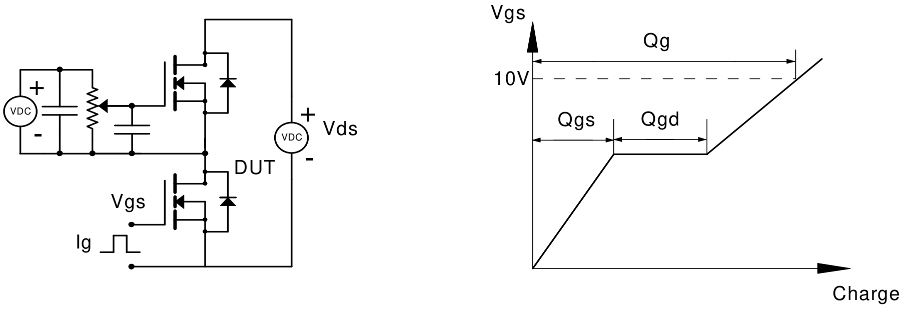
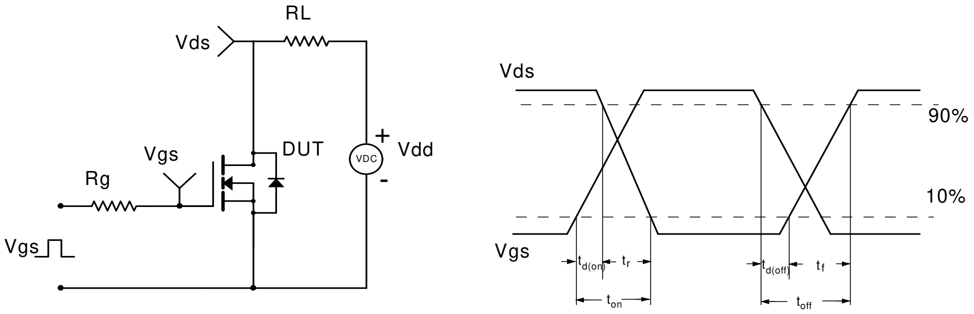


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

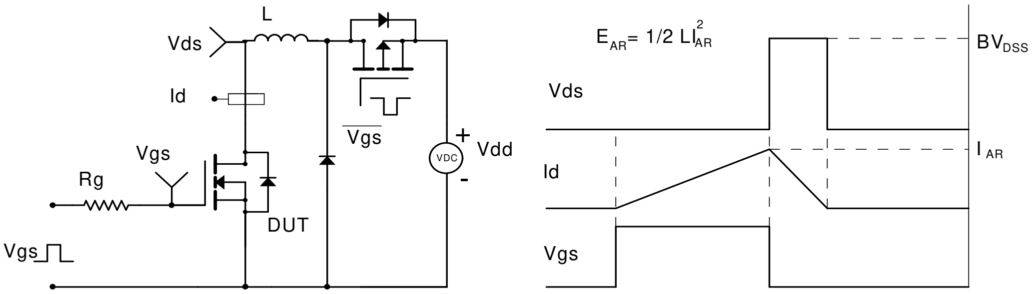
### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms



### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



### Diode Recovery Test Circuit & Waveforms