



### General Description

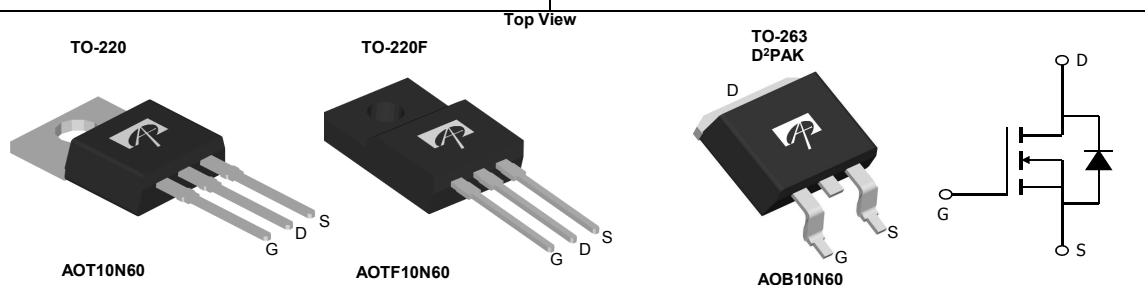
The AOT10N60 & AOB10N60 & AOTF10N60 have been fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications. By providing low  $R_{DS(on)}$ ,  $C_{iss}$  and  $C_{rss}$  along with guaranteed avalanche capability these parts can be adopted quickly into new and existing offline power supply designs.

For Halogen Free add "L" suffix to part number:  
AOT10N60L & AOTF10N60L & AOB10N60L

### Product Summary

|                                 |            |
|---------------------------------|------------|
| $V_{DS}$                        | 700V@150°C |
| $I_D$ (at $V_{GS}=10V$ )        | 10A        |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ ) | < 0.75Ω    |

100% UIS Tested  
100%  $R_g$  Tested



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

| Parameter                                                                    | Symbol                  | AOT10N60/AOB10N60 | AOTF10N60 | Units |
|------------------------------------------------------------------------------|-------------------------|-------------------|-----------|-------|
| Drain-Source Voltage                                                         | $V_{DS}$                | 600               |           | V     |
| Gate-Source Voltage                                                          | $V_{GS}$                | ±30               |           | V     |
| Continuous Drain Current                                                     | $T_C=25^\circ\text{C}$  | 10                | 10*       | A     |
|                                                                              | $T_C=100^\circ\text{C}$ | 7.2               | 7.2*      |       |
| Pulsed Drain Current <sup>C</sup>                                            | $I_{DM}$                | 36                |           |       |
| Avalanche Current <sup>C</sup>                                               | $I_{AR}$                | 4.4               |           | A     |
| Repetitive avalanche energy <sup>C</sup>                                     | $E_{AR}$                | 290               |           | mJ    |
| Single plused avalanche energy <sup>G</sup>                                  | $E_{AS}$                | 580               |           | mJ    |
| MOSFET dv/dt ruggedness                                                      | dv/dt                   | 45                |           | V/ns  |
| Peak diode recovery dv/dt                                                    |                         | 5                 |           |       |
| Power Dissipation <sup>B</sup>                                               | $T_C=25^\circ\text{C}$  | 250               | 50        | W     |
|                                                                              | Derate above 25°C       | 2                 | 0.4       |       |
| Junction and Storage Temperature Range                                       | $T_J, T_{STG}$          | -55 to 150        |           | °C    |
| Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds | $T_L$                   | 300               |           | °C    |

### Thermal Characteristics

| Parameter                                  | Symbol          | AOT10N60/AOB10N60 | AOTF10N60 | Units |
|--------------------------------------------|-----------------|-------------------|-----------|-------|
| Maximum Junction-to-Ambient <sup>A,D</sup> | $R_{\theta JA}$ | 65                | 65        | °C/W  |
| Maximum Case-to-sink <sup>A</sup>          | $R_{\theta CS}$ | 0.5               | --        | °C/W  |
| Maximum Junction-to-Case                   | $R_{\theta JC}$ | 0.5               | 2.5       | °C/W  |

\* Drain current limited by maximum junction temperature.

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

| Symbol                             | Parameter                                 | Conditions                                                                            | Min  | Typ  | Max  | Units |
|------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------|------|------|------|-------|
| <b>STATIC PARAMETERS</b>           |                                           |                                                                                       |      |      |      |       |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage            | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                      | 600  |      |      | V     |
|                                    |                                           | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C                     |      | 700  |      |       |
| BV <sub>DSS</sub> /ΔT <sub>J</sub> | Breakdown Voltage Temperature Coefficient | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V                                            |      | 0.65 |      | V/°C  |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current           | V <sub>DS</sub> =600V, V <sub>GS</sub> =0V                                            |      |      | 1    | μA    |
|                                    |                                           | V <sub>DS</sub> =480V, T <sub>J</sub> =125°C                                          |      |      | 10   |       |
| I <sub>GSS</sub>                   | Gate-Body leakage current                 | V <sub>DS</sub> =0V, V <sub>GS</sub> =±30V                                            |      |      | ±100 | nA    |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage                    | V <sub>DS</sub> =5V, I <sub>D</sub> =250μA                                            | 3    | 4    | 4.5  | V     |
| R <sub>DS(ON)</sub>                | Static Drain-Source On-Resistance         | V <sub>GS</sub> =10V, I <sub>D</sub> =5A                                              |      | 0.6  | 0.75 | Ω     |
| g <sub>FS</sub>                    | Forward Transconductance                  | V <sub>DS</sub> =40V, I <sub>D</sub> =5A                                              |      | 15   |      | S     |
| V <sub>SD</sub>                    | Diode Forward Voltage                     | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                               |      | 0.73 | 1    | V     |
| I <sub>S</sub>                     | Maximum Body-Diode Continuous Current     |                                                                                       |      |      | 10   | A     |
| I <sub>SM</sub>                    | Maximum Body-Diode Pulsed Current         |                                                                                       |      |      | 36   | A     |
| <b>DYNAMIC PARAMETERS</b>          |                                           |                                                                                       |      |      |      |       |
| C <sub>iss</sub>                   | Input Capacitance                         | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz                                     | 1100 | 1320 | 1600 | pF    |
| C <sub>oss</sub>                   | Output Capacitance                        |                                                                                       | 105  | 130  | 160  | pF    |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance              |                                                                                       | 7.5  | 9.3  | 11   | pF    |
| R <sub>g</sub>                     | Gate resistance                           | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                      | 3    | 3.8  | 6    | Ω     |
| <b>SWITCHING PARAMETERS</b>        |                                           |                                                                                       |      |      |      |       |
| Q <sub>g</sub>                     | Total Gate Charge                         | V <sub>GS</sub> =10V, V <sub>DS</sub> =480V, I <sub>D</sub> =10A                      |      | 31   | 40   | nC    |
| Q <sub>gs</sub>                    | Gate Source Charge                        |                                                                                       |      | 6    | 10   | nC    |
| Q <sub>gd</sub>                    | Gate Drain Charge                         |                                                                                       |      | 14.4 | 20   | nC    |
| t <sub>D(on)</sub>                 | Turn-On DelayTime                         | V <sub>GS</sub> =10V, V <sub>DS</sub> =300V, I <sub>D</sub> =10A, R <sub>G</sub> =25Ω |      | 28   | 35   | ns    |
| t <sub>r</sub>                     | Turn-On Rise Time                         |                                                                                       |      | 66   | 80   | ns    |
| t <sub>D(off)</sub>                | Turn-Off DelayTime                        |                                                                                       |      | 76   | 95   | ns    |
| t <sub>f</sub>                     | Turn-Off Fall Time                        |                                                                                       |      | 64   | 80   | ns    |
| t <sub>rr</sub>                    | Body Diode Reverse Recovery Time          | I <sub>F</sub> =10A, dI/dt=100A/μs, V <sub>DS</sub> =100V                             |      | 290  | 350  | ns    |
| Q <sub>rr</sub>                    | Body Diode Reverse Recovery Charge        | I <sub>F</sub> =10A, dI/dt=100A/μs, V <sub>DS</sub> =100V                             |      | 3.9  | 4.7  | μC    |

A. The value of R<sub>θJA</sub> is measured with the device in a still air environment with T<sub>A</sub>=25° C.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=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. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150° C, Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25° C.

D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> and case to ambient.

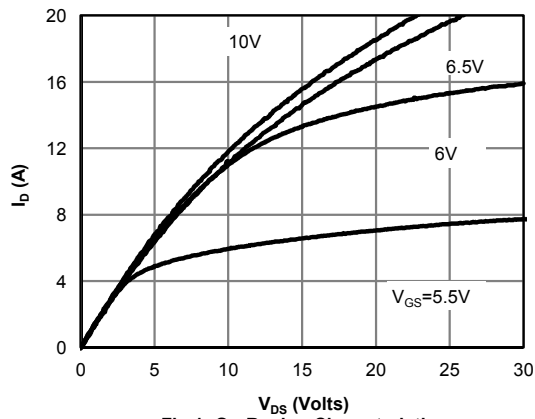
E. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

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<sub>J(MAX)</sub>=150° C. The SOA curve provides a single pulse rating.

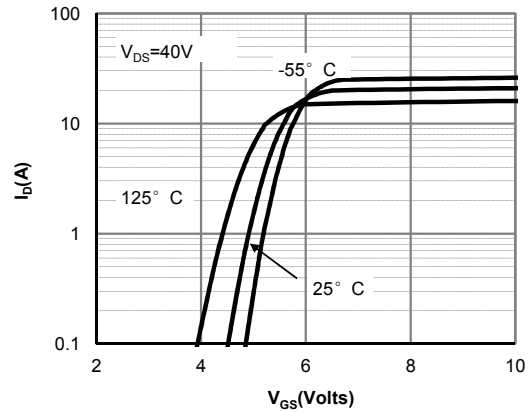
G. L=60mH, I<sub>AS</sub>=4.4A, V<sub>DD</sub>=150V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25° C

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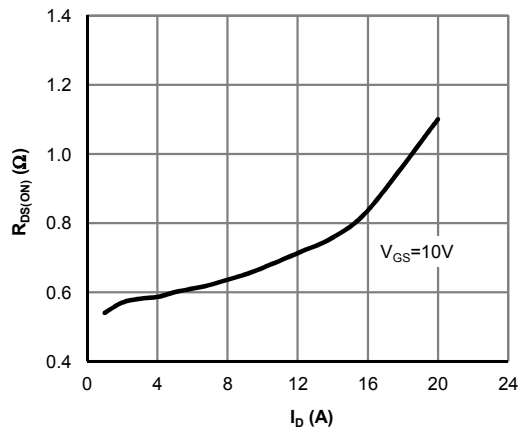
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



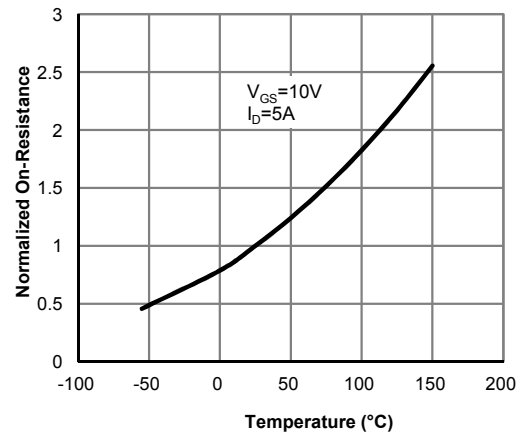
**Fig 1: On-Region Characteristics**



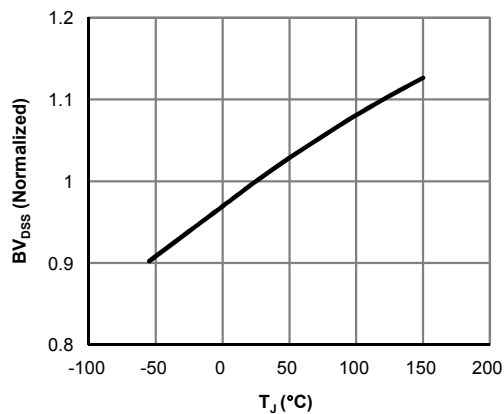
**Figure 2: Transfer Characteristics**



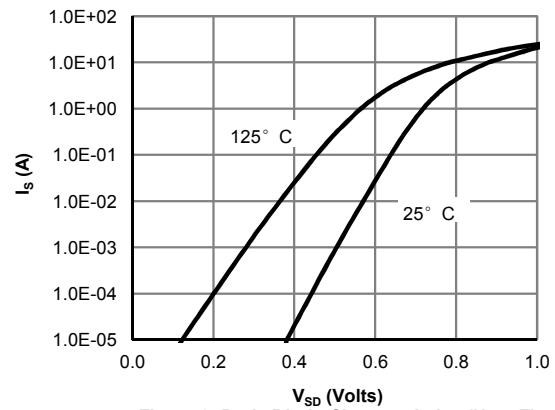
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



**Figure 5: Break Down vs. Junction Temperature**



**Figure 6: Body-Diode Characteristics (Note E)**

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

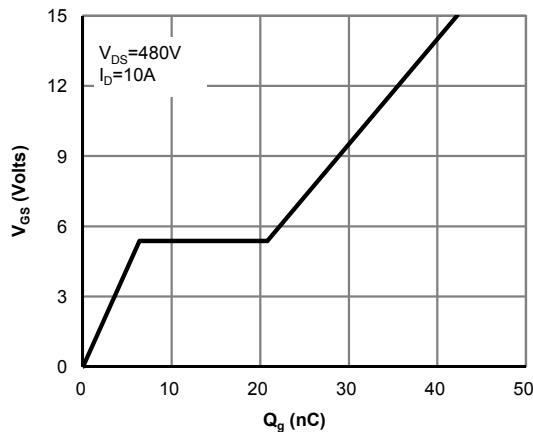


Figure 7: Gate-Charge Characteristics

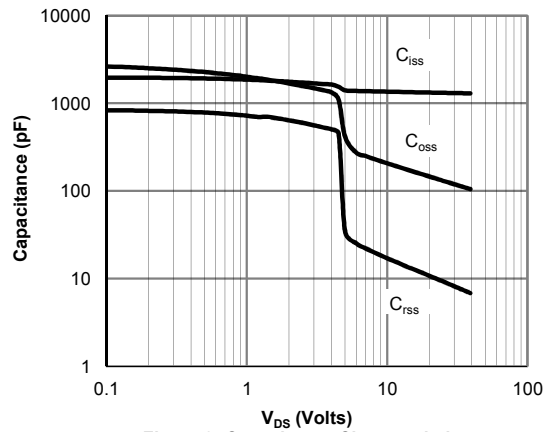


Figure 8: Capacitance Characteristics

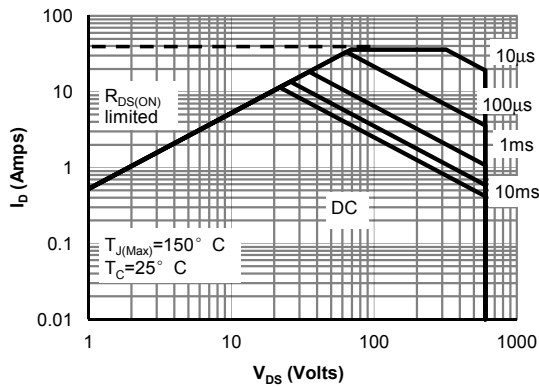


Figure 9: Maximum Forward Biased Safe Operating Area for AOT10N60/AOB10N60 (Note F)

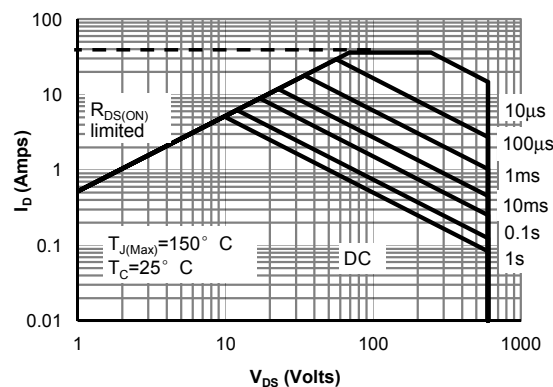


Figure 10: Maximum Forward Biased Safe Operating Area for AOTF10N60 (Note F)

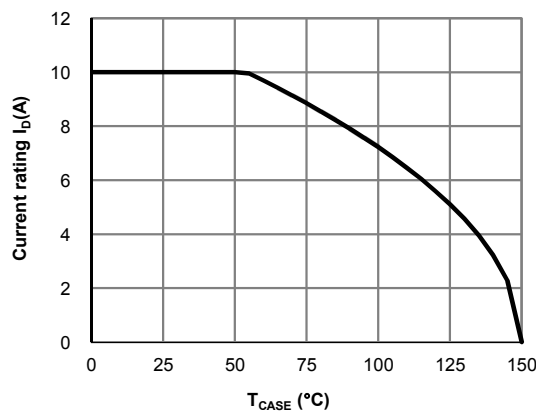
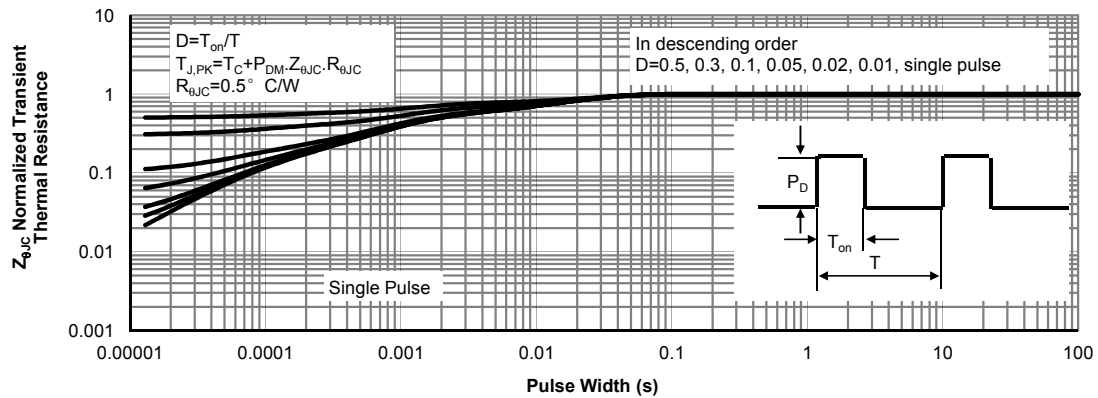
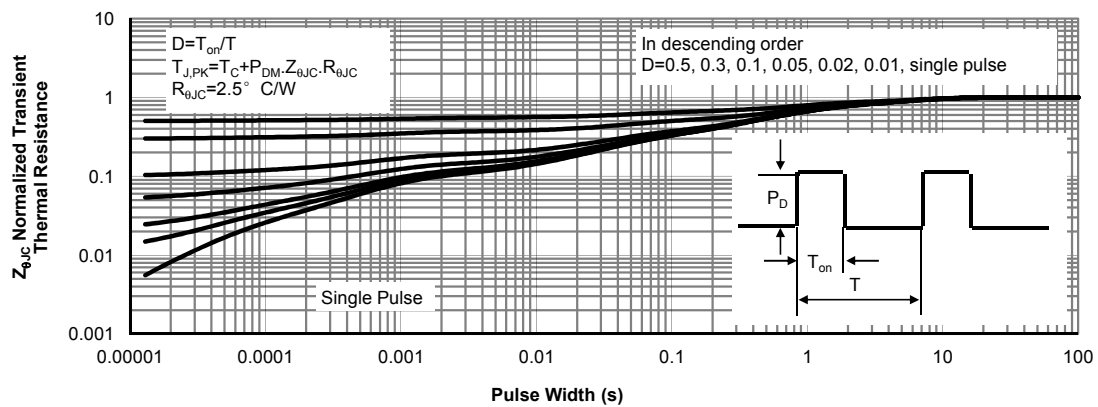


Figure 11: Current De-rating (Note B)

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

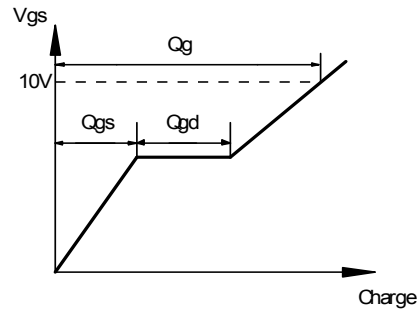
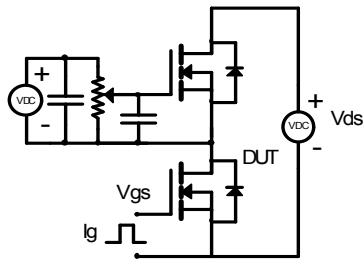


**Figure 12: Normalized Maximum Transient Thermal Impedance for AOT10N60/AOB10N60 (Note F)**

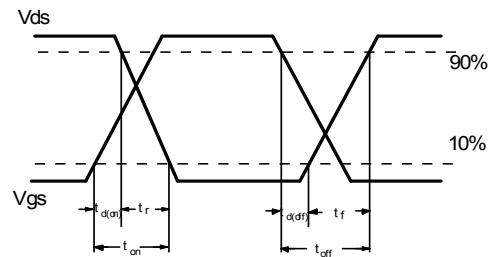
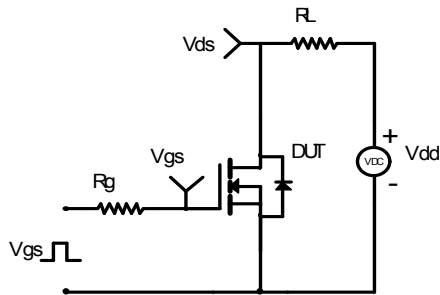


**Figure 13: Normalized Maximum Transient Thermal Impedance for AOTF10N60 (Note F)**

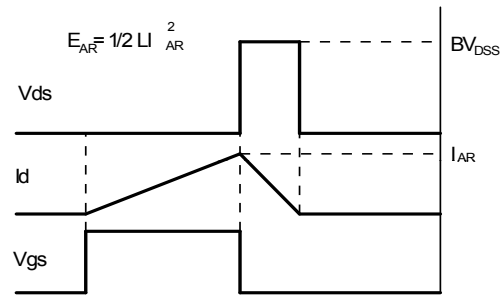
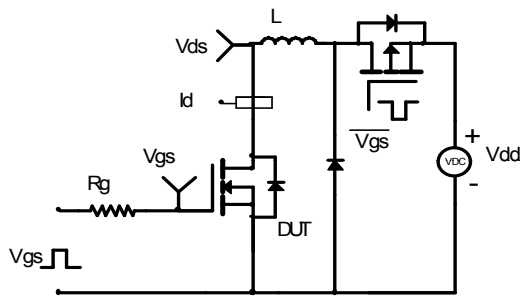
Gate Charge Test Circuit & Waveform



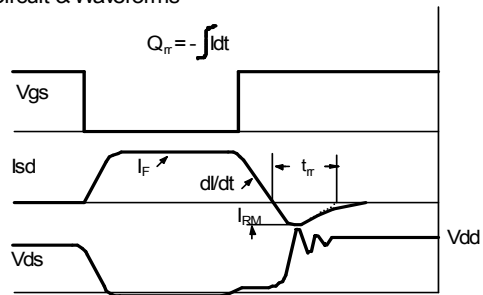
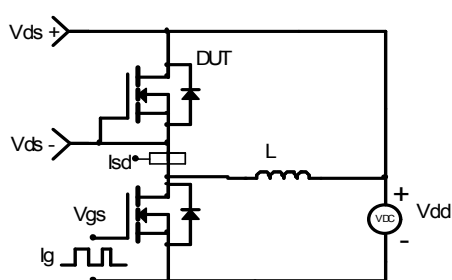
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