

## Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[Alpha & Omega Semiconductor Inc.](#)  
[AOL1422](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)



## AOL1422

### N-Channel Enhancement Mode Field Effect Transistor

#### General Description

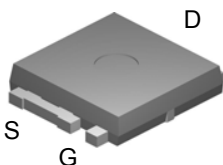
The AOL1422 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. This device is ESD protected and it is suitable for use in load switching and general purpose applications.

- RoHS Compliant
- Halogen and Antimony Free Green Device\*

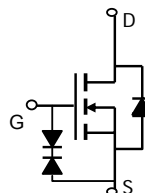
#### Features

$V_{DS}$  (V) = 30V  
 $I_D$  = 85A ( $V_{GS}$  = 10V)  
 $R_{DS(ON)}$  < 3.7m $\Omega$  ( $V_{GS}$  = 10V)  
 $R_{DS(ON)}$  < 5.4m $\Omega$  ( $V_{GS}$  = 4.5V)  
 $R_g, C_{iss}, C_{oss}, C_{rss}$  Tested

Ultra SO-8™ Top View



Bottom tab connected to drain



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>B,H</sup>	$T_C=25^\circ\text{C}$	85	A
	$T_C=100^\circ\text{C}$	85	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	150	
Continuous Drain Current <sup>G</sup>	$T_A=25^\circ\text{C}$	19	
	$T_A=70^\circ\text{C}$	15	
Power Dissipation <sup>B</sup>	$T_C=25^\circ\text{C}$	100	W
	$T_C=100^\circ\text{C}$	50	
Power Dissipation <sup>A</sup>	$T_A=25^\circ\text{C}$	2.08	
	$T_A=70^\circ\text{C}$	1.3	
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 <sup>A</sup>	$R_{\theta JA}$	19.6	25	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	50	60
Maximum Junction-to-Case <sup>D</sup>	$R_{\theta JC}$	0.9	1.5	$^\circ\text{C/W}$

AOL1422

**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	30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			1 5	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±16V			10	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =250μA	1	1.7	3	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =10V, V <sub>DS</sub> =5V	150			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A T <sub>J</sub> =125°C		3 4.2	3.7 5.2	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A		4.4	5.4	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A		71		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.69	1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				85	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz		5450	6800	pF
C <sub>oss</sub>	Output Capacitance			760		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			540		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		1	1.5	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub> (10V)	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =20A		84	112	nC
Q <sub>g</sub> (4.5V)	Total Gate Charge			42	56	nC
Q <sub>gs</sub>	Gate Source Charge			12		nC
Q <sub>gd</sub>	Gate Drain Charge			21		nC
t <sub>D(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =0.75Ω, R <sub>GEN</sub> =3Ω		13		ns
t <sub>r</sub>	Turn-On Rise Time			9.8		ns
t <sub>D(off)</sub>	Turn-Off Delay Time			49		ns
t <sub>f</sub>	Turn-Off Fall Time			16		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, dI/dt=100A/μs		42	56	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =20A, dI/dt=100A/μs		31		nC

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. The power dissipation P<sub>DSM</sub> and current rating I<sub>DSM</sub> are based on T<sub>J(MAX)</sub>=150°C, using steady state junction-to-ambient thermal resistance.

B: The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=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<sub>J(MAX)</sub>=175°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>=175°C. The SOA curve provides a single pulse rating.

G: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.

H: The maximum current rating is limited by bond-wires.

\* This device is guaranteed green after date code 8P11 (June 1<sup>ST</sup> 2008)

Rev3: Jul 2008

COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

AOL1422

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

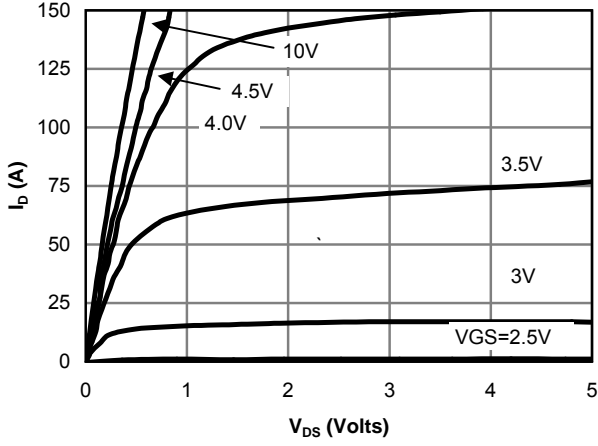


Figure 1: On-Region Characteristics

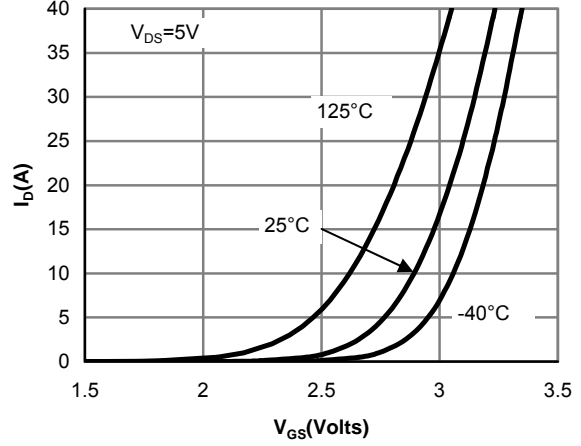


Figure 2: Transfer Characteristics

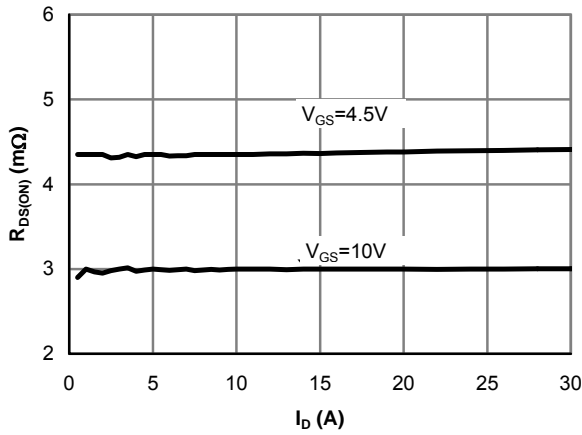


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

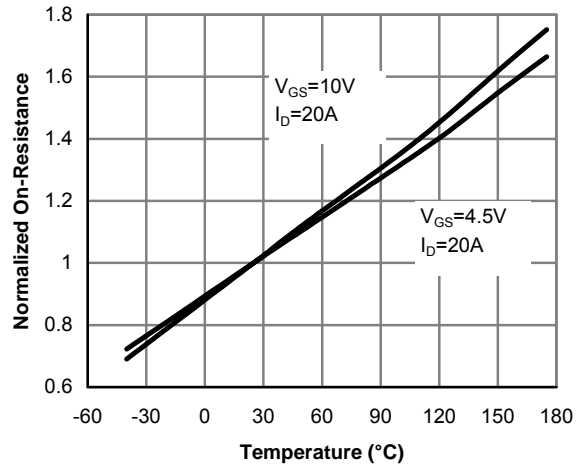


Figure 4: On-Resistance vs. Junction Temperature

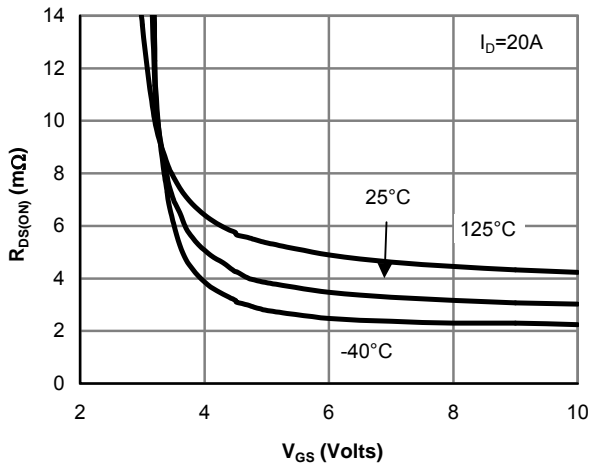


Figure 5: On-Resistance vs. Gate-Source Voltage

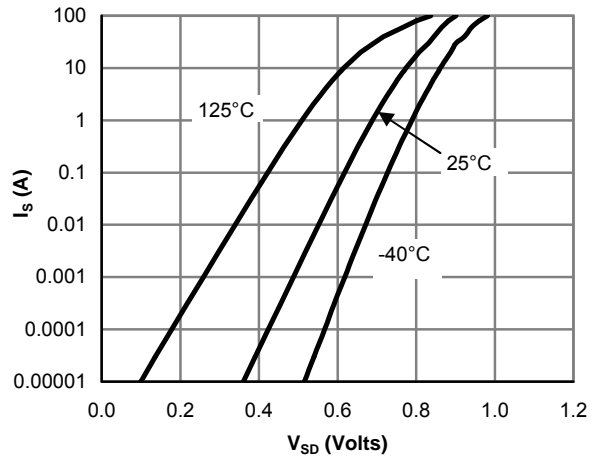


Figure 6: Body-Diode Characteristics

AOL1422

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

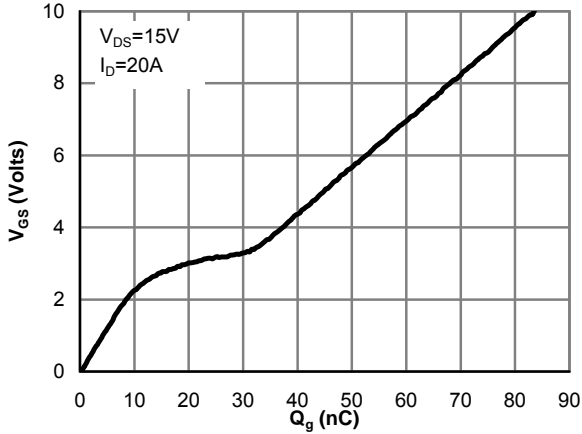


Figure 7: Gate-Charge Characteristics

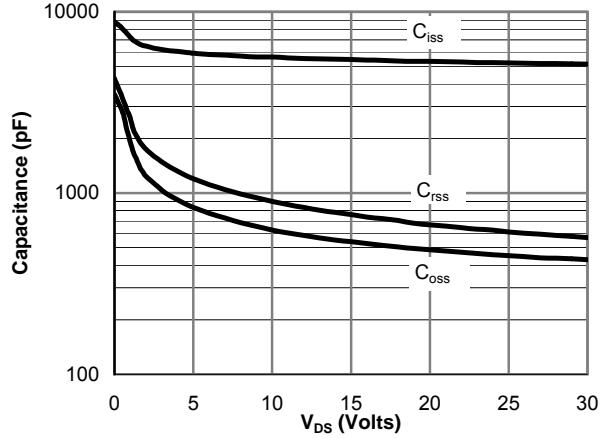


Figure 8: Capacitance Characteristics

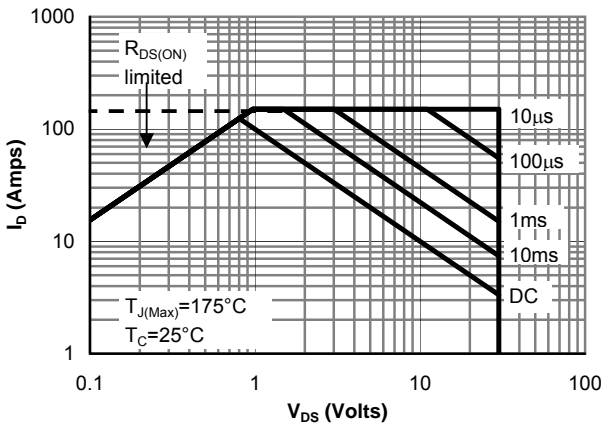


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

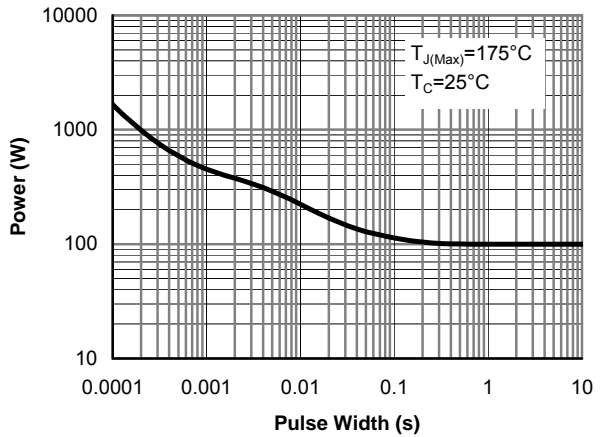


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

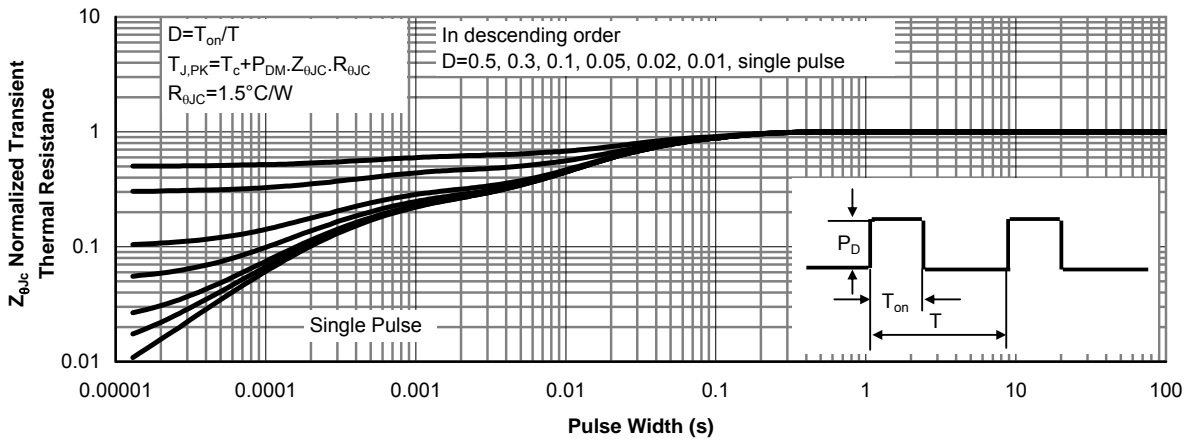


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

AOL1422

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

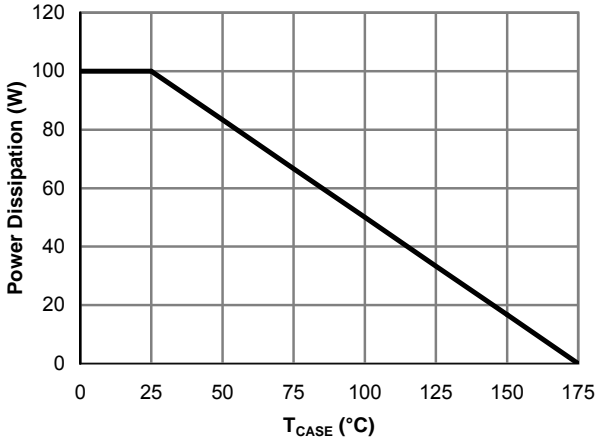


Figure 12: Power De-rating (Note B)

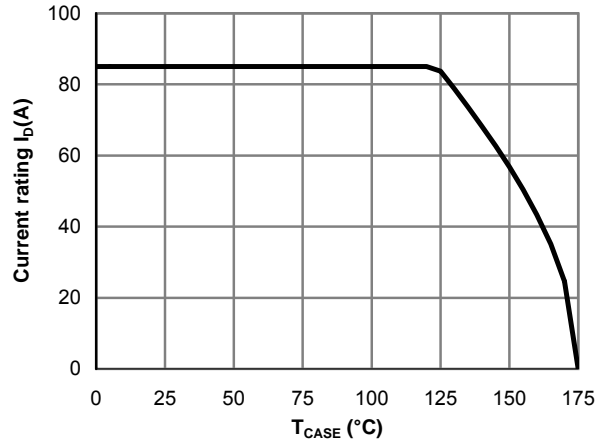


Figure 13: Current De-rating (Note B)

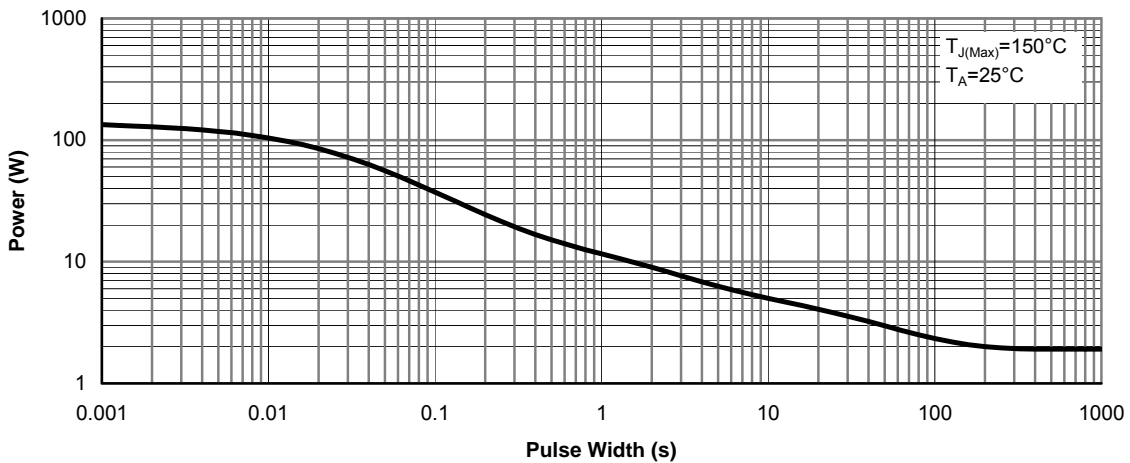


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note G)

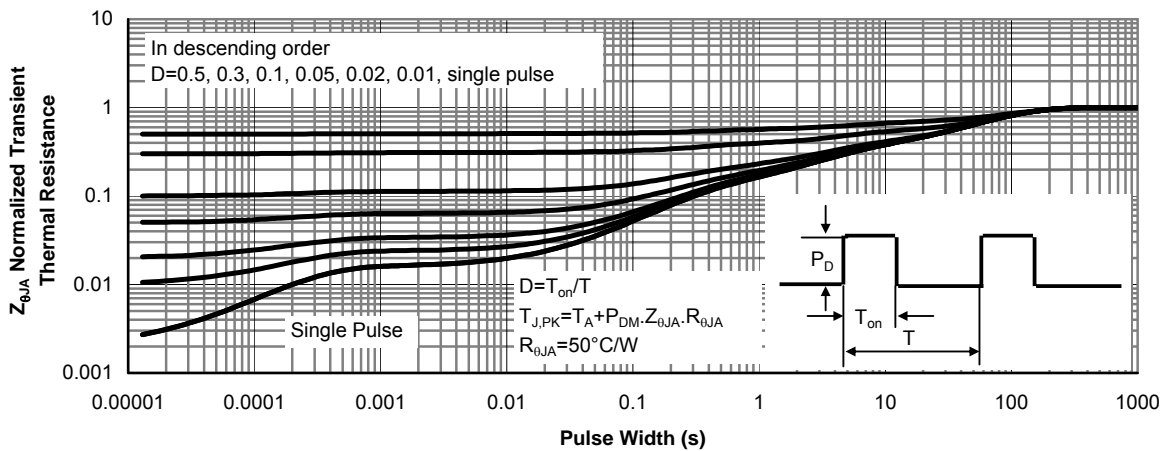
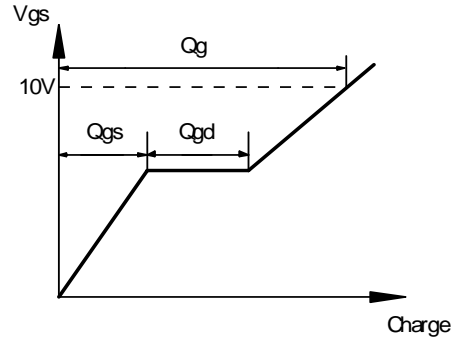
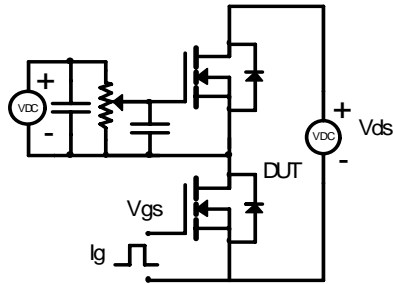


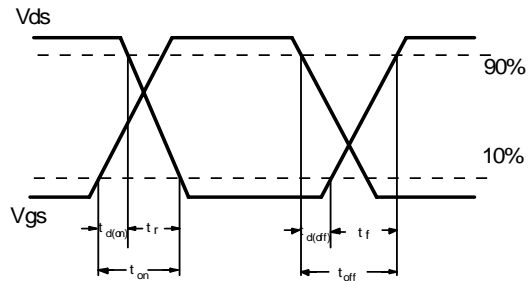
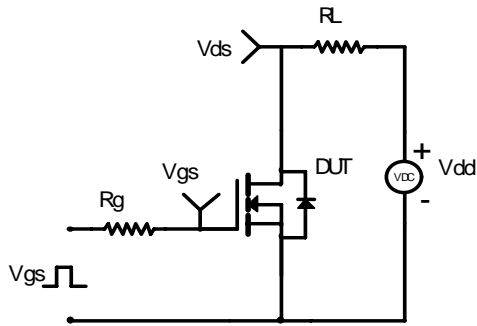
Figure 15: Normalized Maximum Transient Thermal Impedance (Note G)

AOL1422

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

