

Excellent Integrated System Limited

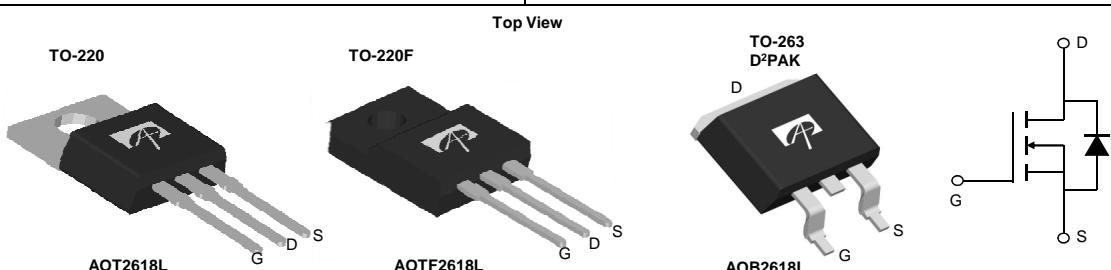
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[AOT2618L](#)

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 ALPHA & OMEGA SEMICONDUCTOR		AOT2618L/AOB2618L/AOTF2618L 60V N-Channel MOSFET					
General Description		Product Summary					
<p>The AOT2618L & AOB2618L & AOTF2618L uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$, Ciss and Coss. This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.</p>		V_{DS} 60V I_D (at $V_{GS}=10V$) 23A $R_{DS(ON)}$ (at $V_{GS}=10V$) $< 19m\Omega$ $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $< 25m\Omega$ 100% UIS Tested 100% R_g Tested					
							
Top View 							
Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted							
Parameter	Symbol	AOT2618L/AOB2618L	AOTF2618L	Units			
Drain-Source Voltage	V_{DS}	60		V			
Gate-Source Voltage	V_{GS}	± 20		V			
Continuous Drain Current ^G	I_D	23	22	A			
$T_C=100^\circ C$		18	16				
Pulsed Drain Current ^C	I_{DM}	70					
Continuous Drain Current ^G	I_{DSM}	7		A			
$T_A=70^\circ C$		5.5					
Avalanche Current ^C	I_{AS}	23		A			
Avalanche energy $L=0.1mH$ ^C	E_{AS}	26		mJ			
Power Dissipation ^B	P_D	41.5	23.5	W			
$T_C=100^\circ C$		20.5	11.5				
Power Dissipation ^A	P_{DSM}	2.1		W			
$T_A=70^\circ C$		1.3					
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175		°C			
Thermal Characteristics							
Parameter	Symbol	AOT2618L/AOB2618L	AOTF2618L	Units			
Maximum Junction-to-Ambient ^A $t \leq 10s$	$R_{\theta JA}$	15	15	°C/W			
Maximum Junction-to-Ambient ^{A,D} Steady-State		60	60	°C/W			
Maximum Junction-to-Case	$R_{\theta JC}$	3.6	6.4	°C/W			



AOT2618L/AOB2618L/AOTF2618L

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	60			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			5	nA
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.4	1.95	2.5	V
$I_{\text{D(ON)}}$	On state drain current	$V_{GS}=10\text{V}, V_{DS}=5\text{V}$	70			A
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=20\text{A}$ $T_J=125^\circ\text{C}$	15.8	19	35.5	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=20\text{A}$	29.3			
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=20\text{A}$	19.5	25		$\text{m}\Omega$
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$	0.72	1		V
I_S	Maximum Body-Diode Continuous Current ^G				23	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=30\text{V}, f=1\text{MHz}$		950		pF
C_{oss}	Output Capacitance			108		pF
C_{rss}	Reverse Transfer Capacitance			7		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	1	2	3	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, I_D=20\text{A}$		14	20	nC
$Q_g(4.5\text{V})$	Total Gate Charge			6	10	nC
Q_{gs}	Gate Source Charge			3		nC
Q_{gd}	Gate Drain Charge			1.6		nC
$t_{\text{D(on)}}$	Turn-On DelayTime	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, R_L=1.5\Omega, R_{\text{GEN}}=3\Omega$		7.5		ns
t_r	Turn-On Rise Time			31		ns
$t_{\text{D(off)}}$	Turn-Off DelayTime			18		ns
t_f	Turn-Off Fall Time			40		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		20		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		70		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ 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 $T_{J(\text{MAX})}=175^\circ\text{C}$, 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 $T_{J(\text{MAX})}=175^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

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 $T_{J(\text{MAX})}=175^\circ\text{C}$. The SOA curve provides a single pulse rating.

G. The maximum current limited by package.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.

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AOT2618L/AOB2618L/AOTF2618L

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

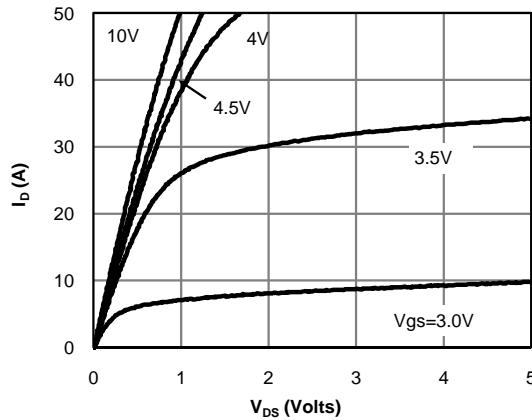


Fig 1: On-Region Characteristics (Note E)

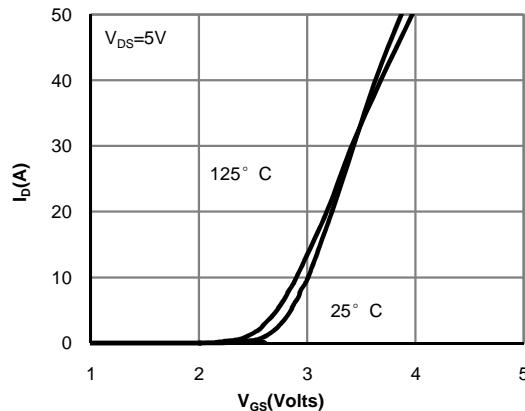


Figure 2: Transfer Characteristics (Note E)

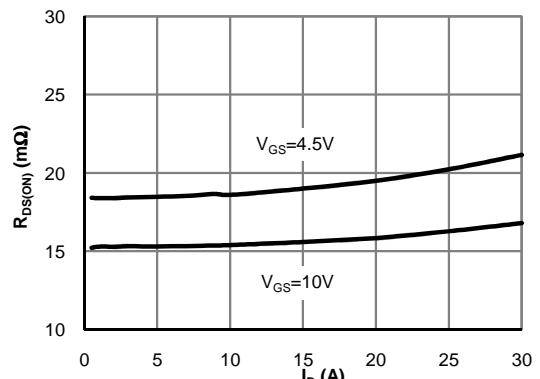


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

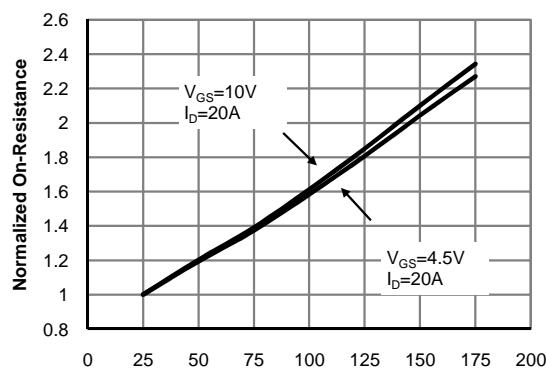


Figure 4: On-Resistance vs. Junction Temperature (Note E)

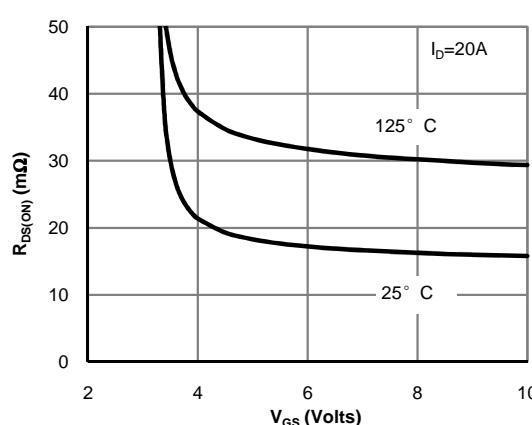


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

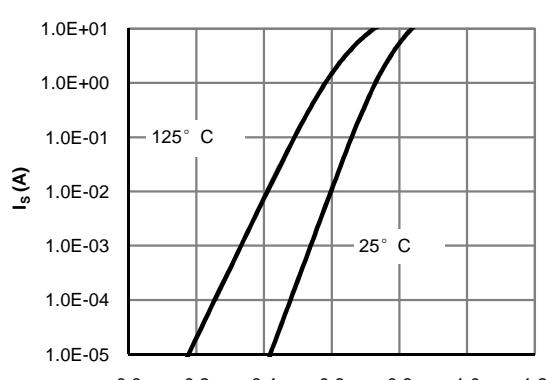


Figure 6: Body-Diode Characteristics (Note E)



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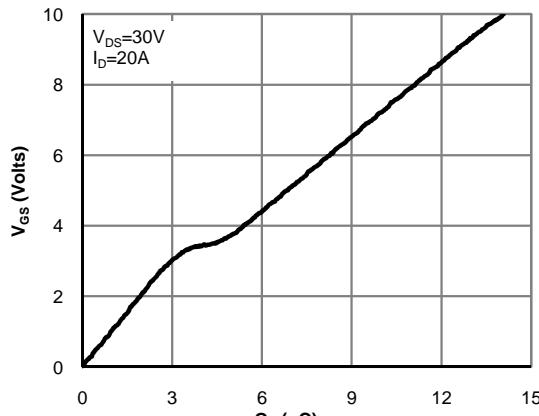


Figure 7: Gate-Charge Characteristics

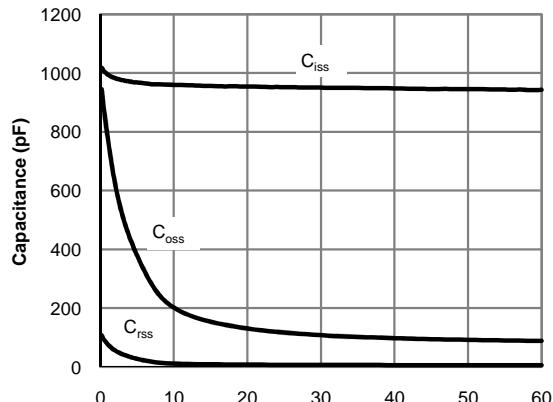


Figure 8: Capacitance Characteristics

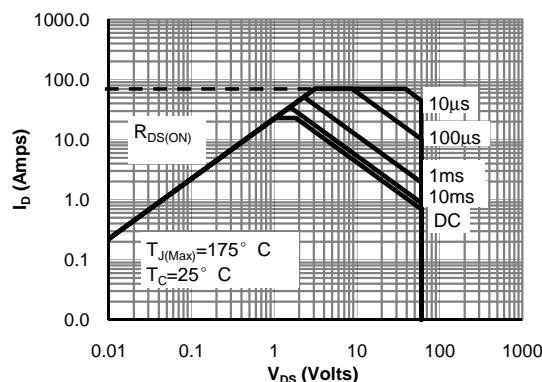


Figure 9: Maximum Forward Biased Safe Operating Area for AOT2618L and AOB2618L (Note F)

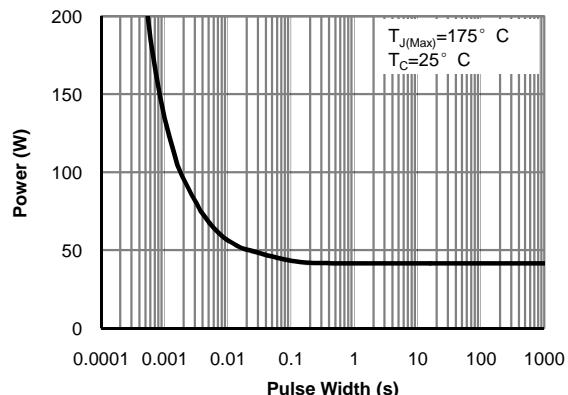


Figure 10: Single Pulse Power Rating Junction-to-Case for AOT2618L and AOB2618L (Note F)

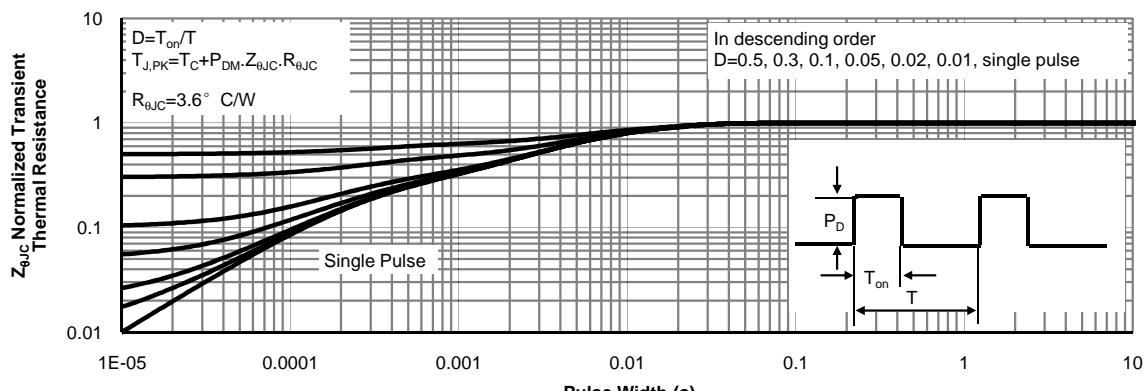


Figure 11: Normalized Maximum Transient Thermal Impedance for AOT2618L and AOB2618L (Note F)



AOT2618L/AOB2618L/AOTF2618L

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

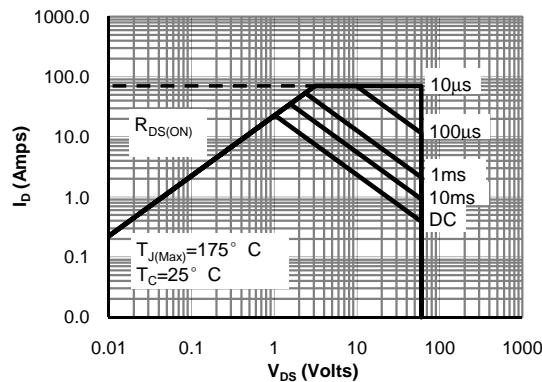


Figure 12: Maximum Forward Biased Safe Operating Area for AOTF2618L

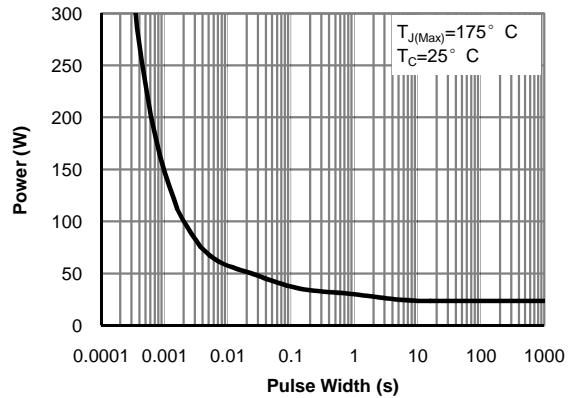


Figure 13: Single Pulse Power Rating Junction-to-Case for AOTF2618L (Note F)

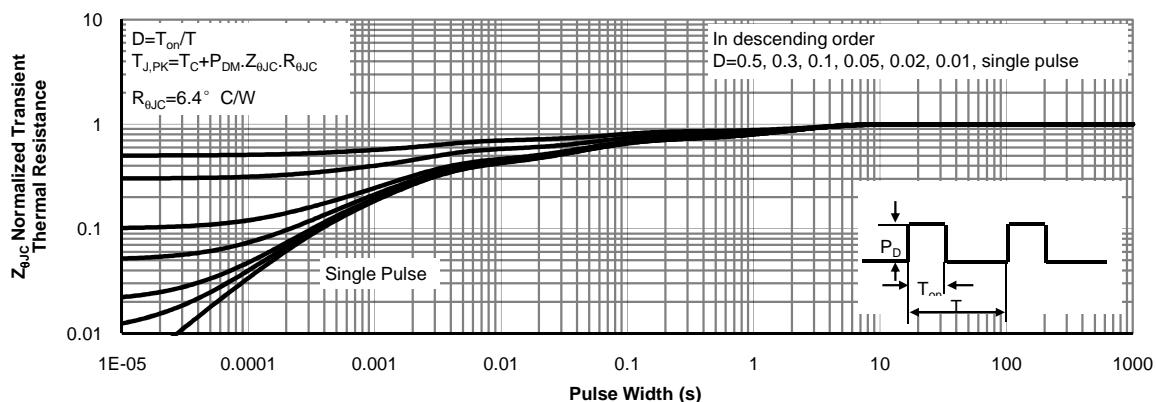
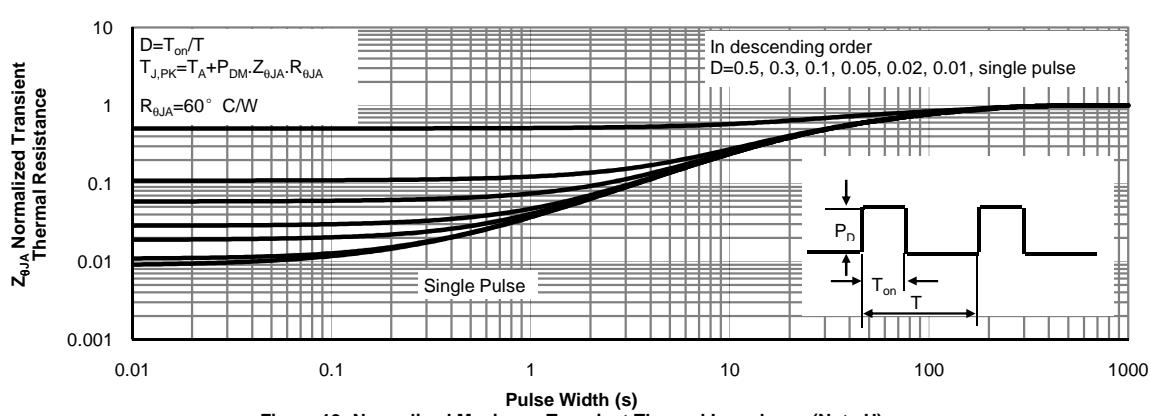
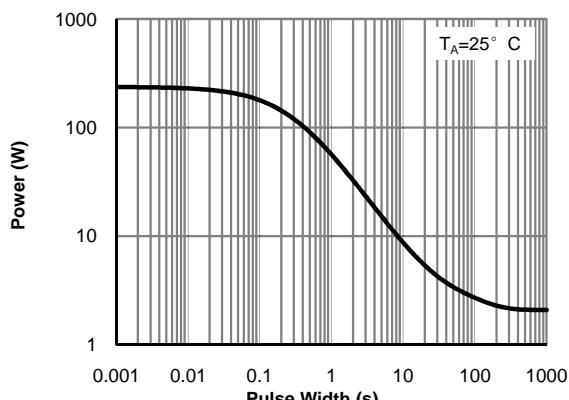
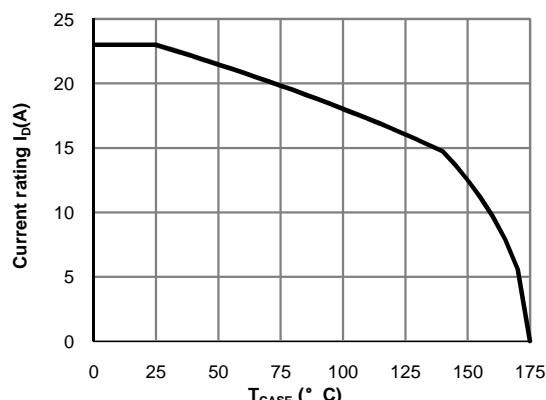
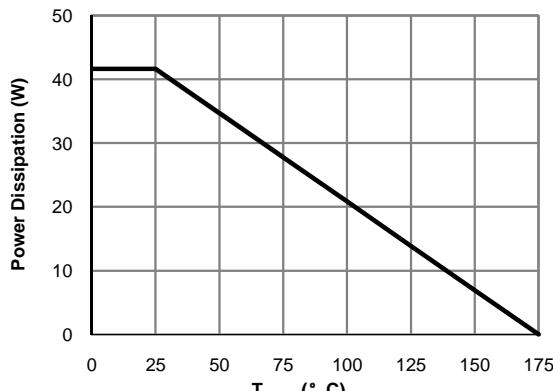
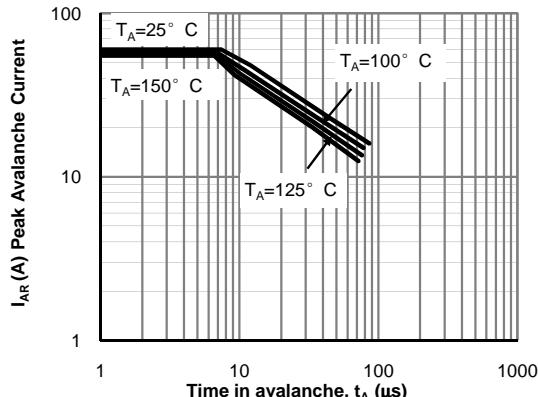


Figure 14: Normalized Maximum Transient Thermal Impedance for AOTF2618L (Note F)



AOT2618L/AOB2618L/AOTF2618L

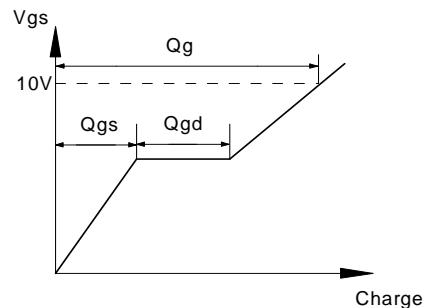
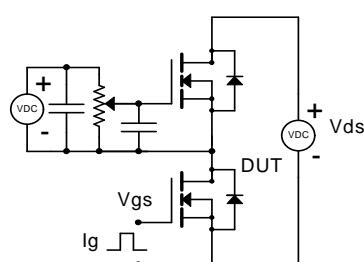
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



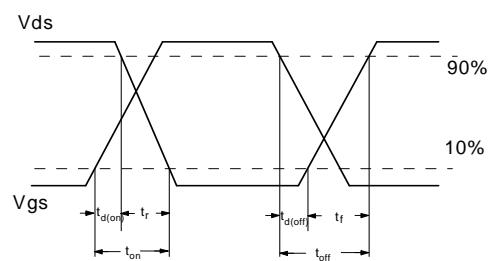
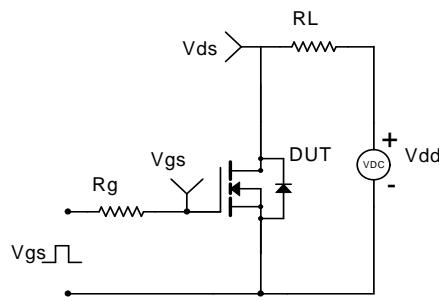


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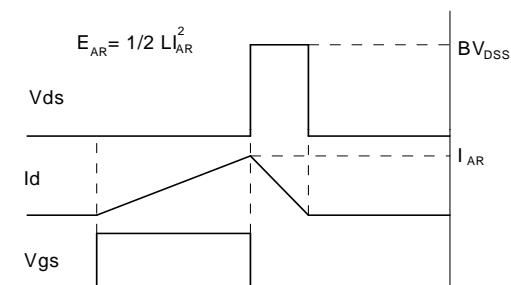
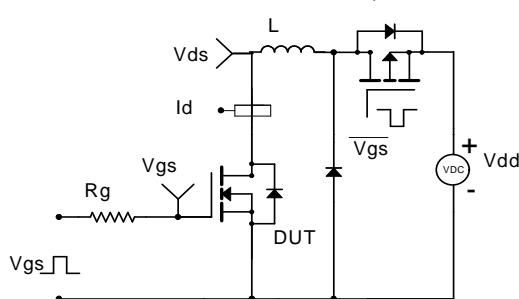
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

