



**ALPHA & OMEGA**  
SEMICONDUCTOR

**AON6234**

**40V N-Channel MOSFET**

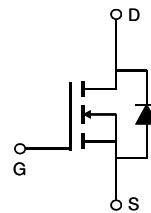
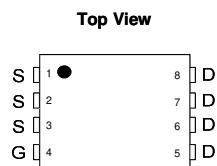
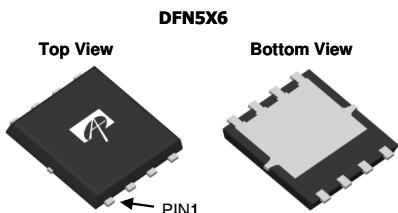
### General Description

The AON6234 uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Power losses are minimized due to an extremely low combination of  $R_{DS(ON)}$  and  $C_{rss}$ . In addition, switching behavior is well controlled with a "Schottky style" soft recovery body diode.

### Product Summary

$V_{DS}$	40V
$I_D$ (at $V_{GS}=10V$ )	85A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 3.4mΩ
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$ )	< 5.0mΩ

100% UIS Tested  
100%  $R_g$  Tested



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>G</sup>	$I_D$	85	A
$T_C=100^\circ C$		67	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	220	
Continuous Drain Current	$I_{DSM}$	20	A
$T_A=70^\circ C$		15	
Avalanche Current <sup>C</sup>	$I_{AS}, I_{AR}$	50	A
Avalanche energy $L=0.1\text{mH}$ <sup>C</sup>	$E_{AS}, E_{AR}$	125	mJ
Power Dissipation <sup>B</sup>	$P_D$	83	W
$T_C=100^\circ C$		33	
Power Dissipation <sup>A</sup>	$P_{DSM}$	2.3	W
$T_A=70^\circ C$		1.4	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C

### Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$R_{θJA}$	14	17	°C/W
Maximum Junction-to-Ambient <sup>A,D</sup>		40	55	°C/W
Maximum Junction-to-Case	$R_{θJC}$	1.1	1.5	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	40			V
$I_{\text{DSS}}$	Zero Gate Voltage Drain Current	$V_{DS}=40\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	$\mu\text{A}$
$I_{\text{GSS}}$	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm20\text{V}$			100	nA
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.4	1.9	2.4	V
$I_{\text{D(ON)}}$	On state drain current	$V_{GS}=10\text{V}, V_{DS}=5\text{V}$	220			A
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=20\text{A}$ $T_J=125^\circ\text{C}$		2.7	3.4	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=20\text{A}$		4.2	5.2	
$g_{\text{FS}}$	Forward Transconductance	$V_{DS}=5\text{V}, I_D=20\text{A}$		90		S
$V_{\text{SD}}$	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.7	1	V
$I_S$	Maximum Body-Diode Continuous Current <sup>G</sup>				85	A
<b>DYNAMIC PARAMETERS</b>						
$C_{\text{iss}}$	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=20\text{V}, f=1\text{MHz}$	1865	2335	2805	pF
$C_{\text{oss}}$	Output Capacitance		425	612	795	pF
$C_{\text{rss}}$	Reverse Transfer Capacitance		13	45	77	pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	0.4	0.8	1.2	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=20\text{V}, I_D=20\text{A}$	25	33.5	41	nC
$Q_g(4.5\text{V})$	Total Gate Charge		10	15	20	nC
$Q_{\text{gs}}$	Gate Source Charge			7		nC
$Q_{\text{gd}}$	Gate Drain Charge			4.5		nC
$t_{\text{D(on)}}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=20\text{V}, R_L=1\Omega, R_{\text{GEN}}=3\Omega$		8		ns
$t_r$	Turn-On Rise Time			3		ns
$t_{\text{D(off)}}$	Turn-Off Delay Time			26		ns
$t_f$	Turn-Off Fall Time			4		ns
$t_{\text{rr}}$	Body Diode Reverse Recovery Time	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$	12	17.5	23	ns
$Q_{\text{rr}}$	Body Diode Reverse Recovery Charge	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$	33	47.5	62	nC

A. The value of  $R_{\text{QJA}}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The Power dissipation  $P_{\text{DSM}}$  is based on  $R_{\text{QJA}}$  and the maximum allowed junction temperature of  $150^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

B. The power dissipation  $P_D$  is based on  $T_{J(\text{MAX})}=150^\circ\text{C}$ , 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  $T_{J(\text{MAX})}=150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$ .

D. The  $R_{\text{QJA}}$  is the sum of the thermal impedance from junction to case  $R_{\text{QJC}}$  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  $T_{J(\text{MAX})}=150^\circ\text{C}$ . 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<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL 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.

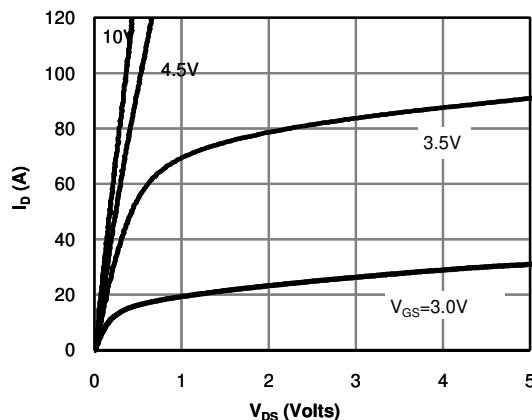
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**


Fig 1: On-Region Characteristics (Note E)

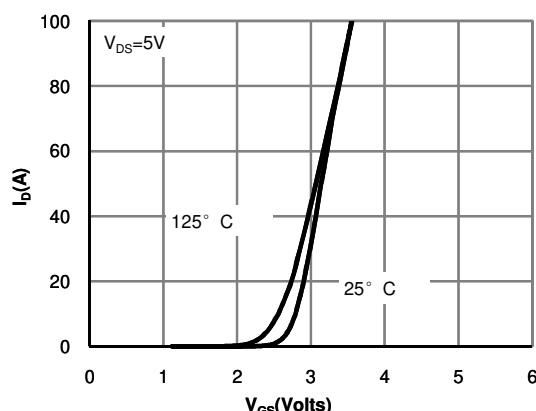


Figure 2: Transfer Characteristics (Note E)

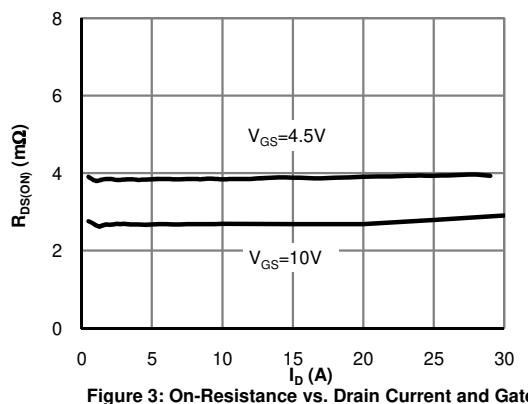


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

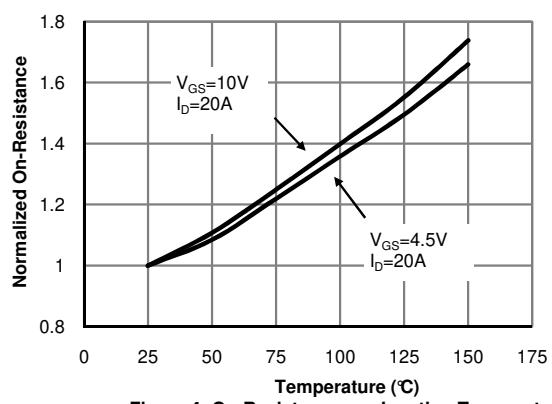


Figure 4: On-Resistance vs. Junction Temperature (Note E)

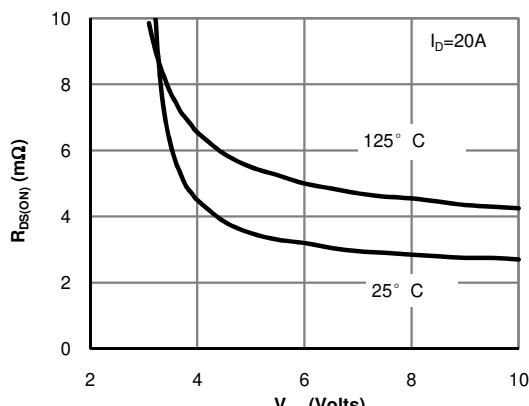


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

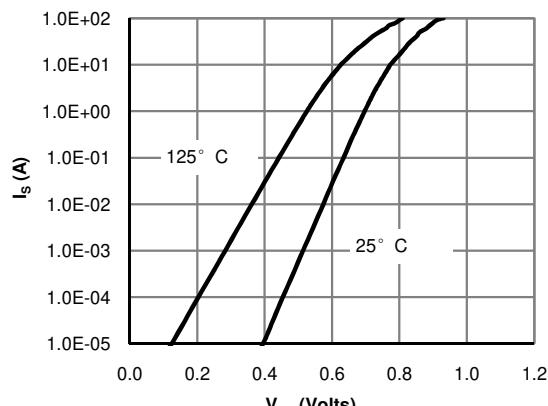


Figure 6: Body-Diode Characteristics (Note E)

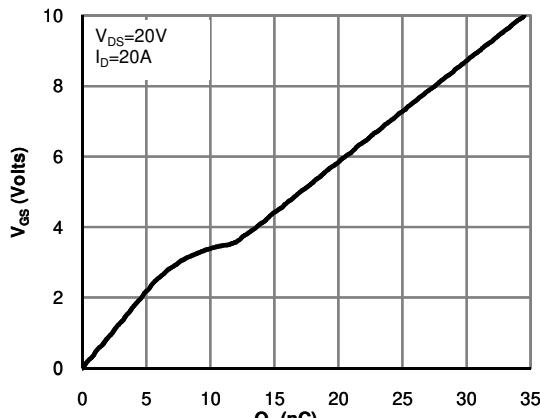
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**


Figure 7: Gate-Charge Characteristics

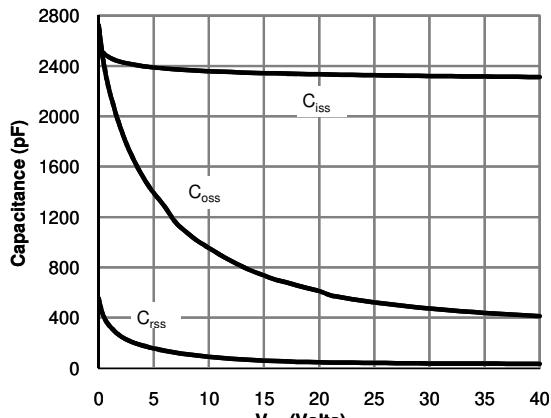


Figure 8: Capacitance Characteristics

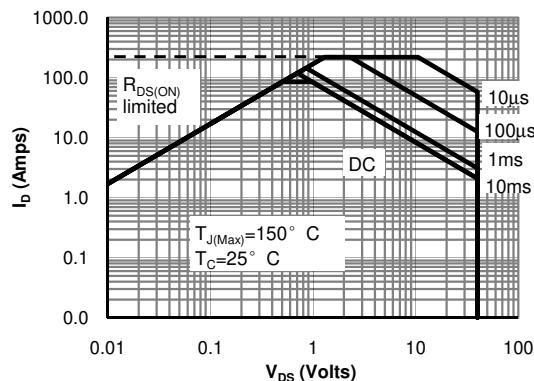


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

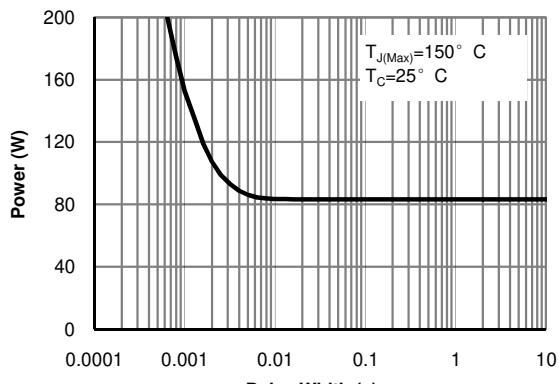


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

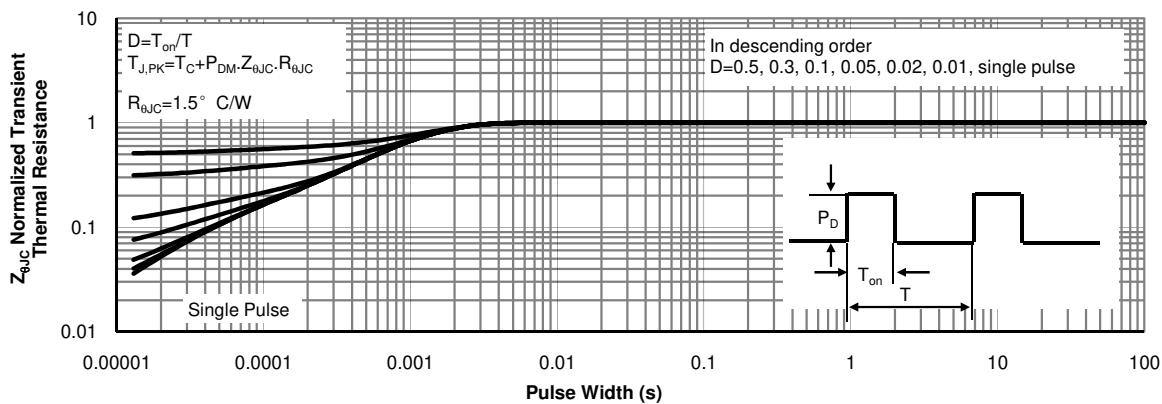
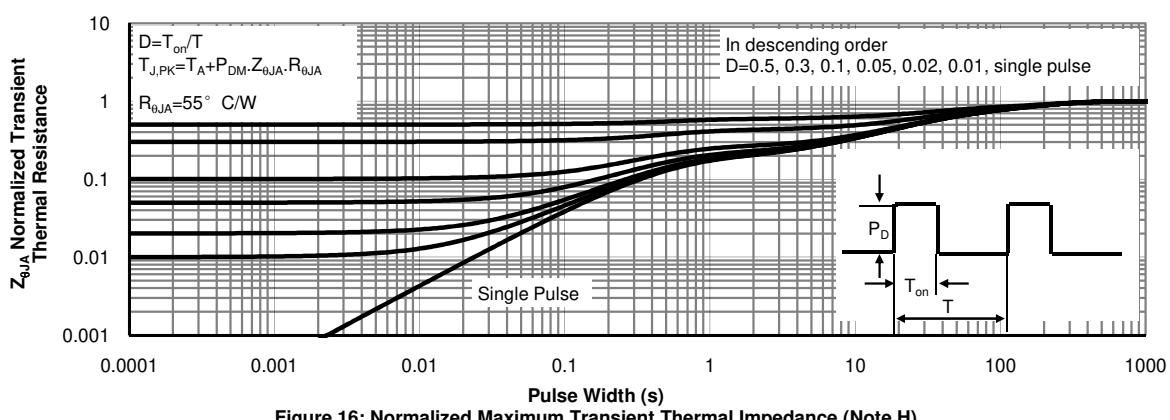
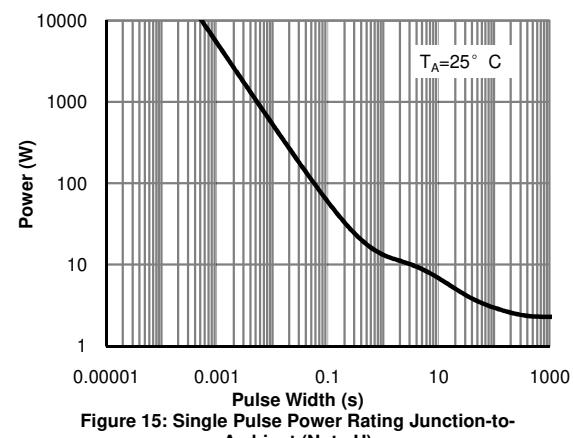
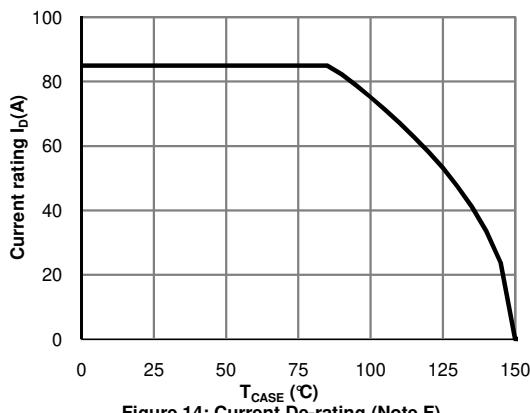
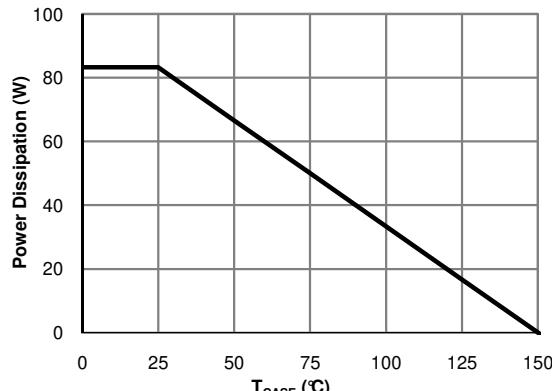
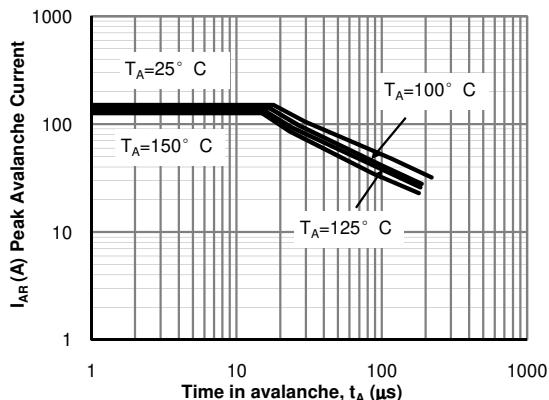
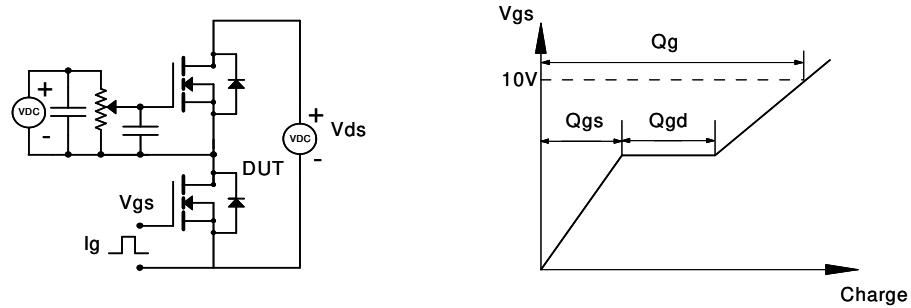
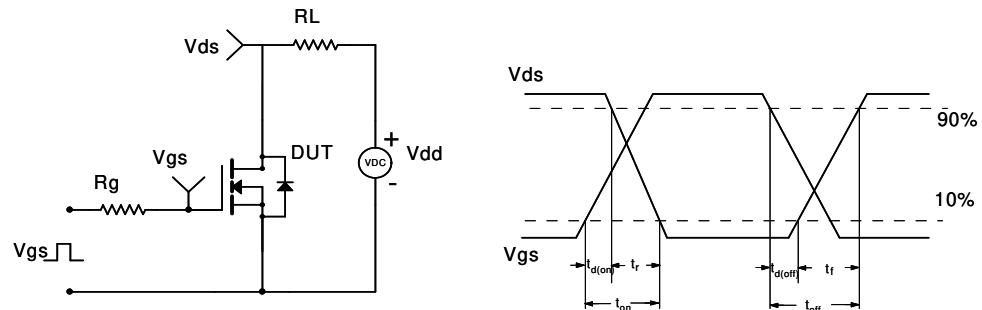
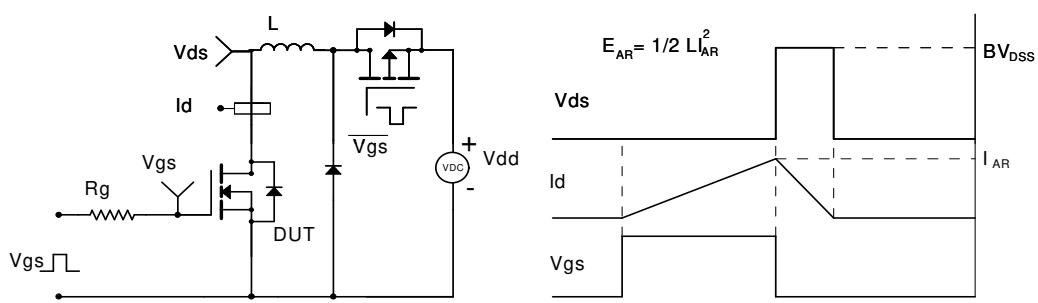


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**


**Gate Charge Test Circuit & Waveform**

**Resistive Switching Test Circuit & Waveforms**

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

**Diode Recovery Test Circuit & Waveforms**
