



ALPHA & OMEGA
SEMICONDUCTOR

AON7508

30V N-Channel MOSFET

General Description

- Latest Trench Power MOSFET technology
- Very Low RDS(on) at 4.5V_{GS}
- Low Gate Charge
- High Current Capability
- RoHS 2.0 and Halogen-Free Compliant

Product Summary

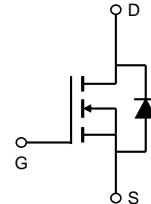
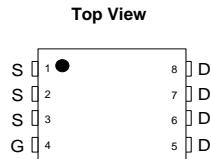
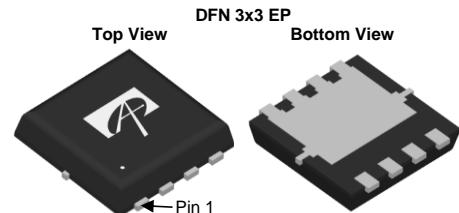
V _{DS}	30V
I _D (at V _{GS} =10V)	32A
R _{DS(ON)} (at V _{GS} =10V)	< 3.0mΩ
R _{DS(ON)} (at V _{GS} =4.5V)	< 4.6mΩ

Application

- DC/DC Converters in Computing, Servers, and POL
- Isolated DC/DC Converters in Telecom and Industrial

100% UIS Tested

100% R_g Tested



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}	±20	V
Continuous Drain Current ^G	I _D	32	A
T _C =100°C		25	
Pulsed Drain Current ^C	I _{DM}	128	
Continuous Drain Current	I _{DSM}	26	A
T _A =70°C		21	
Avalanche Current ^C	I _{AS}	50	A
Avalanche energy L=0.05mH ^C	E _{AS}	63	mJ
V _{DS} Spike	100ns	V _{SPIKE}	V
Power Dissipation ^B	P _D	62.5	W
T _C =100°C		25	
Power Dissipation ^A	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	R _{θJA}	30	40	°C/W
t ≤ 10s		60	75	°C/W
Maximum Junction-to-Ambient ^{A,D}	R _{θJC}	1.5	2	°C/W
Maximum Junction-to-Case	Steady-State			

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	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm20\text{V}$			±100	nA
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.2	1.8	2.2	V
$R_{DS(\text{ON})}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=20\text{A}$ $T_J=125^\circ\text{C}$		2.4 3.3	3	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=20\text{A}$		3.5	4.6	$\text{m}\Omega$
g_{fs}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=20\text{A}$		85		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.68	1	V
I_S	Maximum Body-Diode Continuous Current ^G				32	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=15\text{V}, f=1\text{MHz}$		1835		pF
C_{oss}	Output Capacitance			940		pF
C_{rss}	Reverse Transfer Capacitance			90		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	0.7	1.5	2.3	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, I_D=20\text{A}$		29	40	nC
$Q_g(4.5\text{V})$	Total Gate Charge			13.6	19	nC
Q_{gs}	Gate Source Charge			5.8		nC
Q_{gd}	Gate Drain Charge			5.3		nC
$t_{D(\text{on})}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, R_L=0.75\Omega, R_{\text{GEN}}=3\Omega$		7.9		ns
t_r	Turn-On Rise Time			4.0		ns
$t_{D(\text{off})}$	Turn-Off Delay Time			27.3		ns
t_f	Turn-Off Fall Time			6.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		19		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		36.7		nC

A. The value of R_{0JA} is measured with the device mounted on 1in² 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_{0JA} 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 $T_{J(\text{MAX})}=150^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature $T_{J(\text{MAX})}=150^\circ\text{C}$.

D. The R_{0JA} is the sum of the thermal impedance from junction to case R_{0JC} and case to ambient.

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

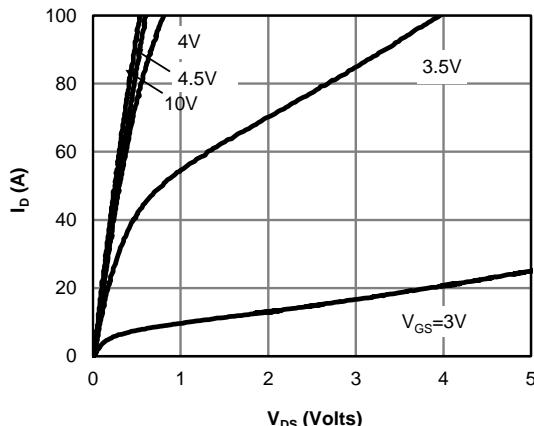
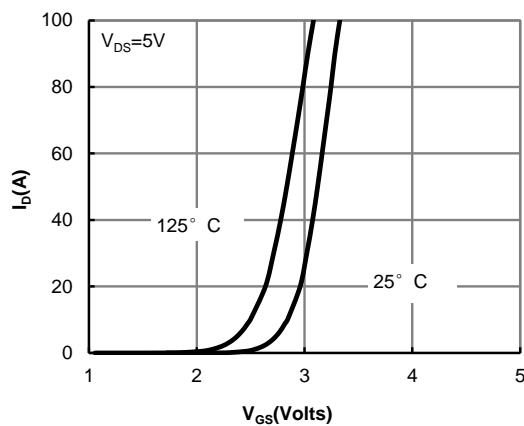
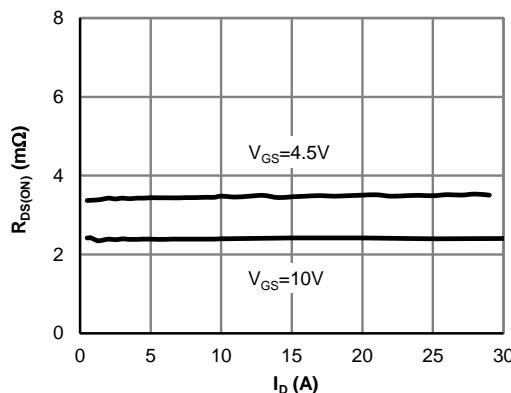
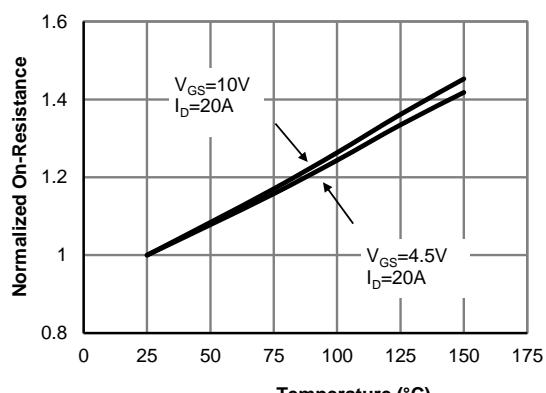
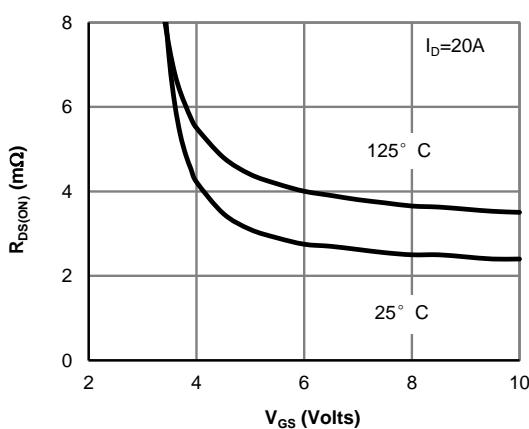
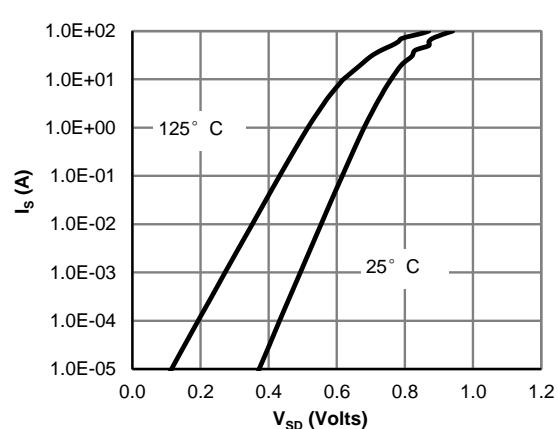
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(\text{MAX})}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

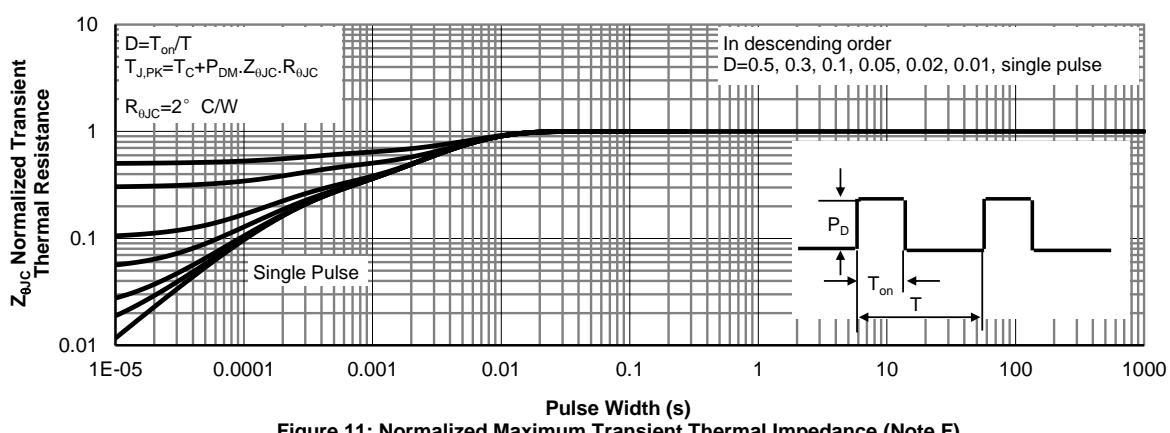
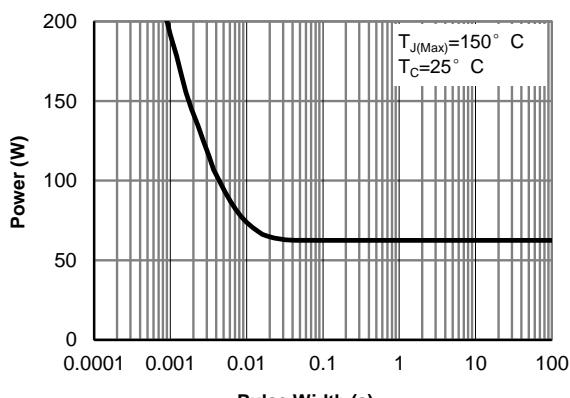
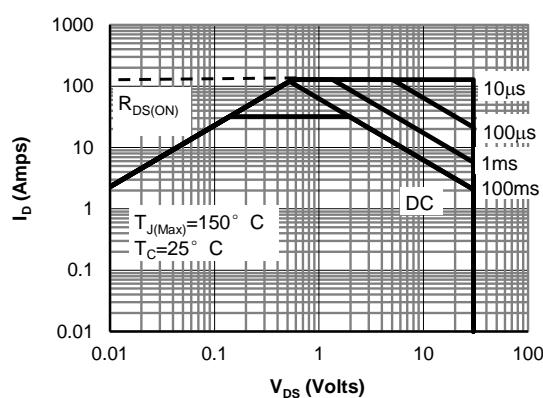
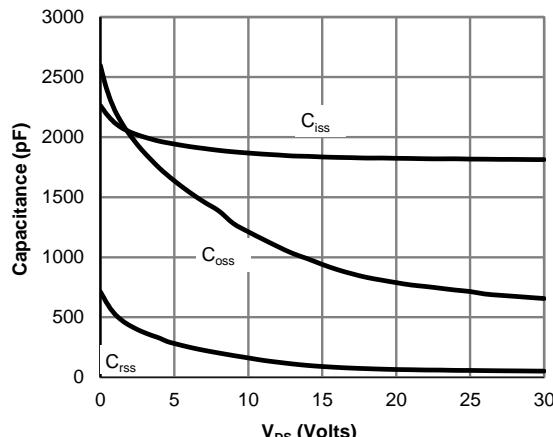
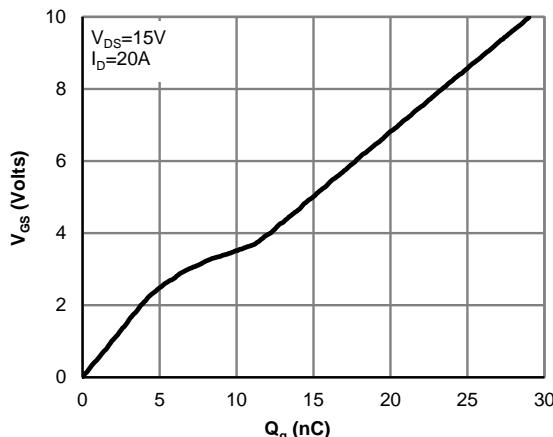
G. The maximum current rating is package limited.

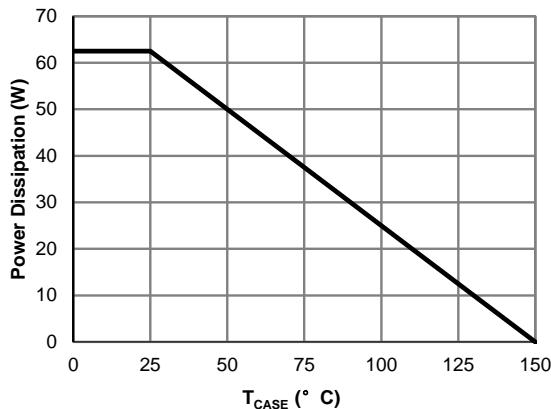
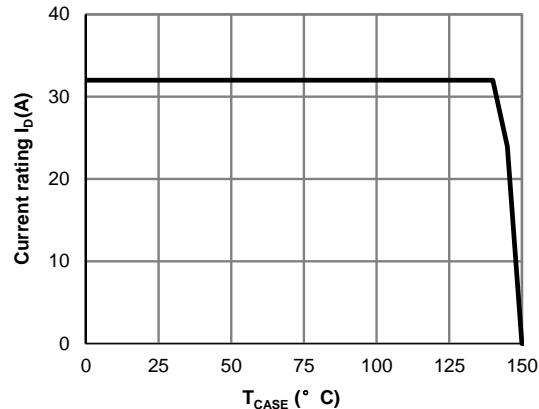
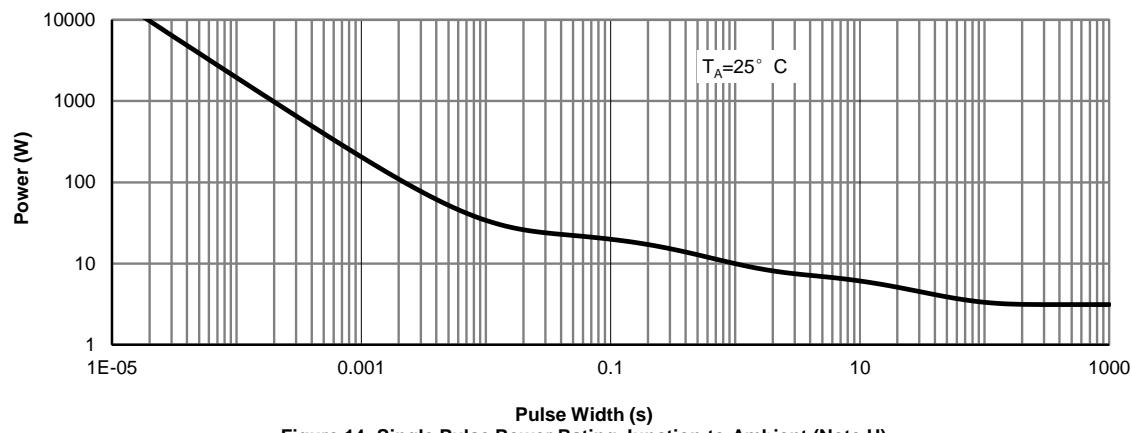
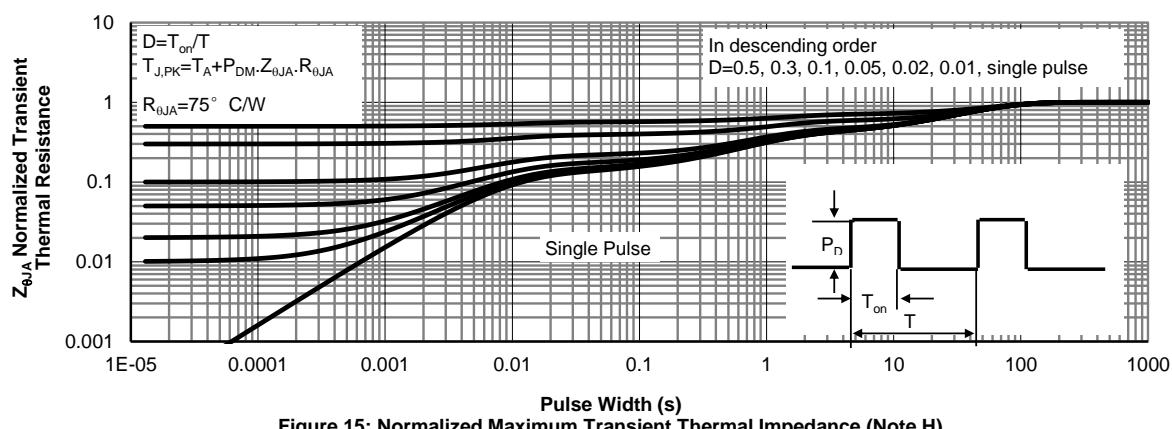
H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.

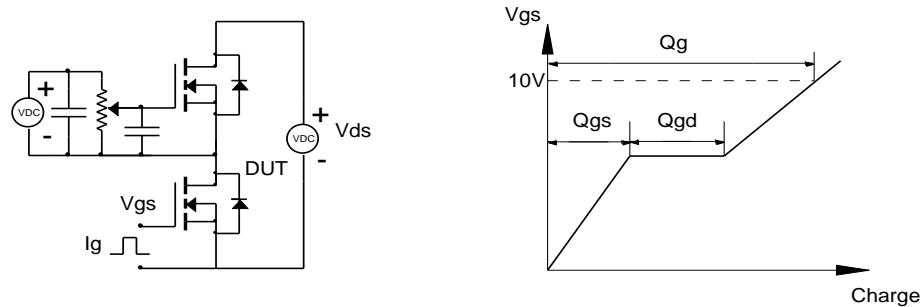
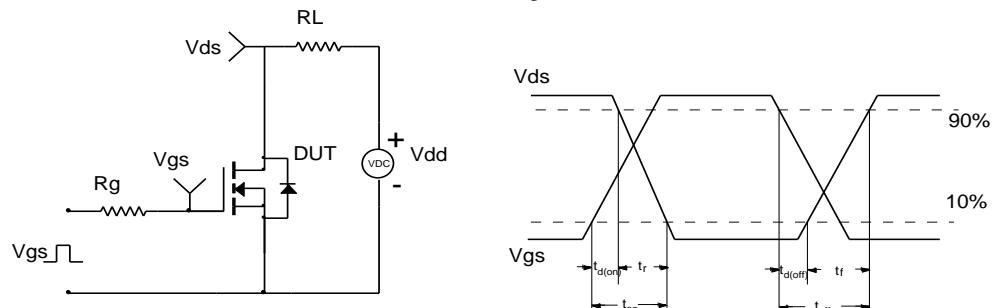
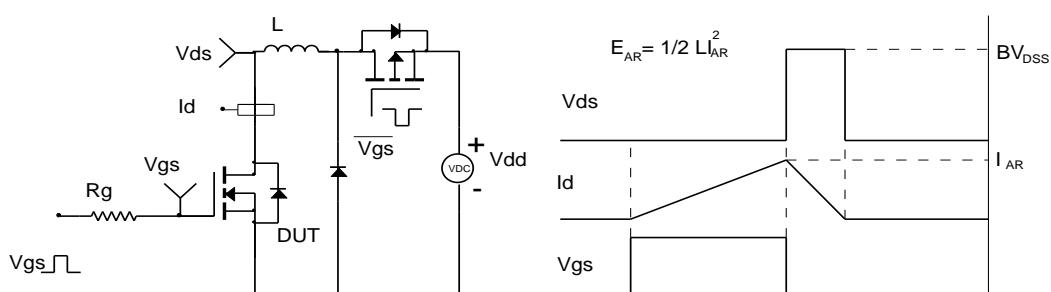
APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO MAKE CHANGES TO PRODUCT SPECIFICATIONS WITHOUT NOTICE. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO EVALUATE SUITABILITY OF THE PRODUCT FOR THEIR INTENDED APPLICATION. CUSTOMER SHALL COMPLY WITH APPLICABLE LEGAL REQUIREMENTS, INCLUDING ALL APPLICABLE EXPORT CONTROL RULES, REGULATIONS AND LIMITATIONS.

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at:
http://www.aosmd.com/terms_and_conditions_of_sale

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 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


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
