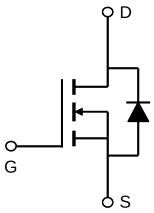
General Description

The AOT(B)260L 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 Crss.In addition, switching behavior is wellcontrolled with a “Schottky style” soft recovery body diode.This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

Features

V_{DS}	60V
I_D (at V_{GS}=10V)	140A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 2.5mΩ
$R_{DS(ON)}$ (at V_{GS} =6V)	< 2.9mΩ

Green
Product



Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [G]	T_C=25℃	I_D	140	A
	T_C=100℃		110	
Pulsed Drain Current [C]		I_{DM}	500	
Continuous Drain Current	T_A=25℃	I_{DSM}	20	A
	T_A=70℃		16	
Avalanche Current [C]		I_{AS}, I_{AR}	128	A
Avalanche energy L=0.1mH [C]		E_{AS}, E_{AR}	819	mJ
Power Dissipation [B]	T_C=25℃	P_D	330	W
	T_C=100℃		165	
Power Dissipation [A]	T_A=25℃	P_{DSM}	1.9	W
	T_A=70℃		1.2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	12	15	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		54	65	℃/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	0.35	0.45	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250µA, V_{GS}=0V	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V			1	µA
		T_J=55℃			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	2.2	2.7	3.2	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	500			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		2	2.5	mΩ
		TO220 T_J=125℃		3.1	3.9	
		V_{GS}=6V, I_D=20A TO220		2.2	2.9	mΩ
		V_{GS}=10V, I_D=20A TO263		1.7	2.2	mΩ
		V_{GS}=6V, I_D=20A TO263		1.9	2.5	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		68		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.65	1	V
I_S	Maximum Body-Diode Continuous Current[G]				140	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz	9400	11800	14200	pF
C_{oss}	Output Capacitance		1090	1360	1770	pF
C_{rss}	Reverse Transfer Capacitance		32	40	68	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.5	1	1.5	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=20A	120	150	180	nC
Q_{gs}	Gate Source Charge		28	40	52	nC
Q_{gd}	Gate Drain Charge		9	15	25	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=30V, R_L=1.5Ω, R_{GEN}=3Ω		30		ns
t_r	Turn-On Rise Time			27		ns
$t_{D(off)}$	Turn-Off DelayTime			74		ns
t_f	Turn-Off Fall Time			12		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/µs	22	32	42	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/µs	140	200	260	nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25℃. The Power dissipation P_{DSM} is based on R $_{\theta JA}$ and the maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design, and the maximum temperature of 175℃ may be used if the PCB allows it.

B. The power dissipation P_D is based on $T_{J(MAX)}$=175℃, 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 $T_{J(MAX)}$=175℃. Ratings are based on low frequency and duty cycles to keep initial T_J =25℃.

D. The $R_{\theta JA}$ is the sum of the thermal impedence 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 impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=175℃. 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^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25℃.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

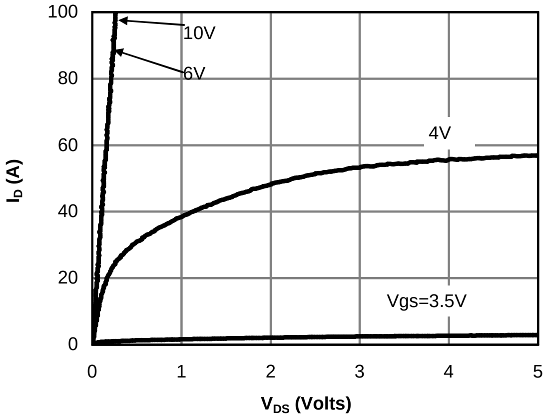


Fig 1: On-Region Characteristics (Note E)

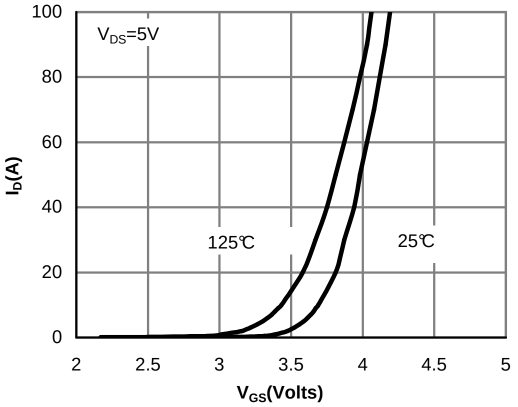


Figure 2: Transfer Characteristics (Note E)

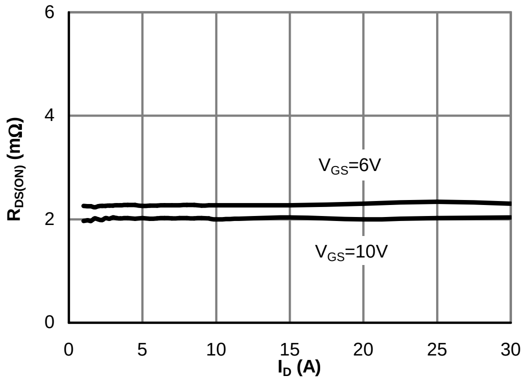


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

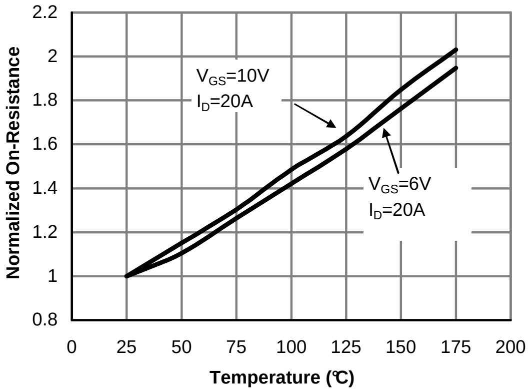


Figure 4: On-Resistance vs. Junction Temperature (Note E)

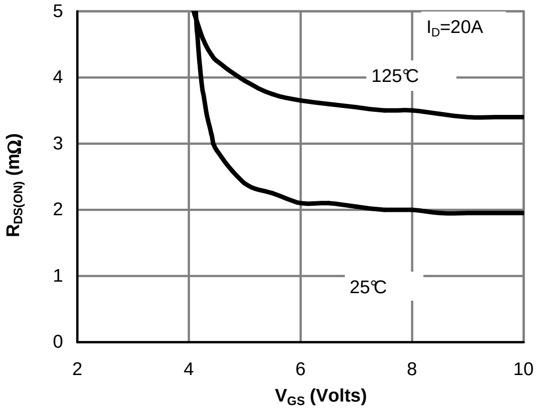


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

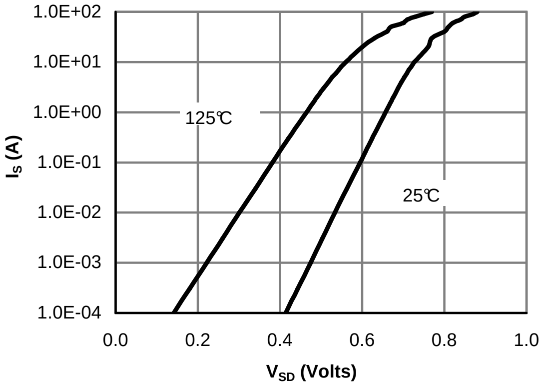


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

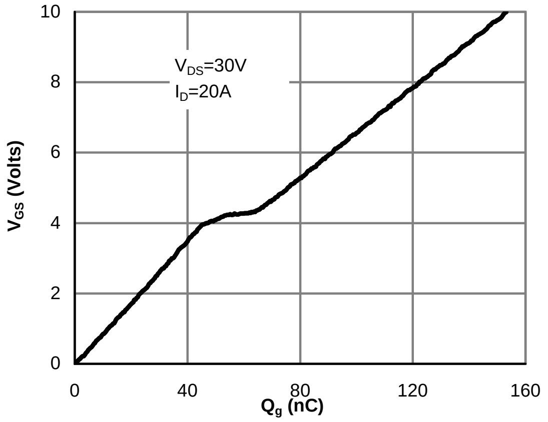


Figure 7: Gate-Charge Characteristics

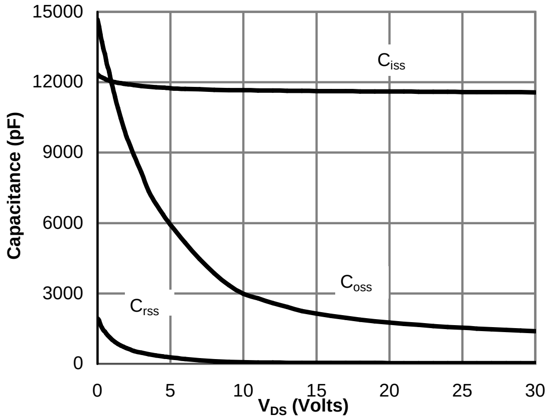


Figure 8: Capacitance Characteristics

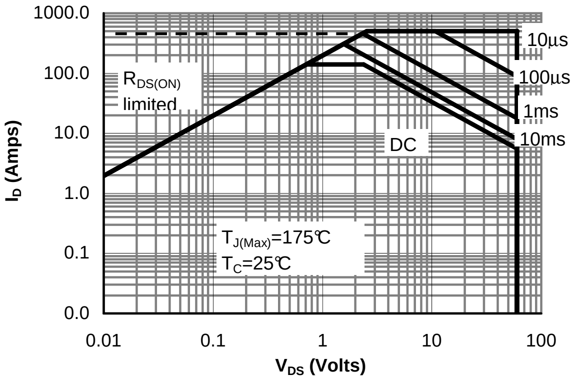


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

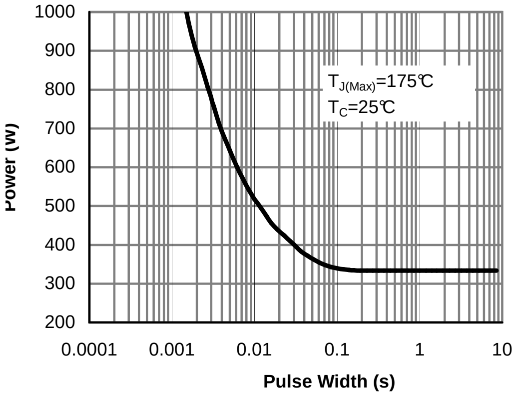


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

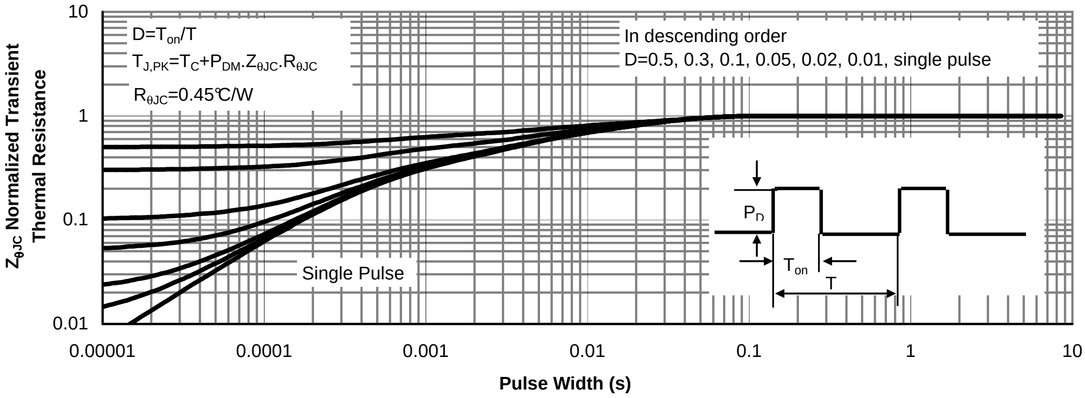


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

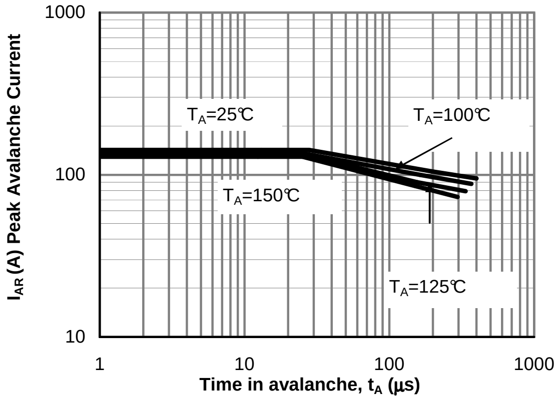


Figure 12: Single Pulse Avalanche capability (Note C)

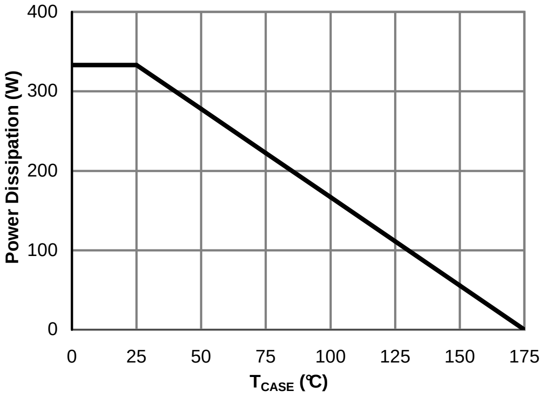


Figure 13: Power De-rating (Note F)

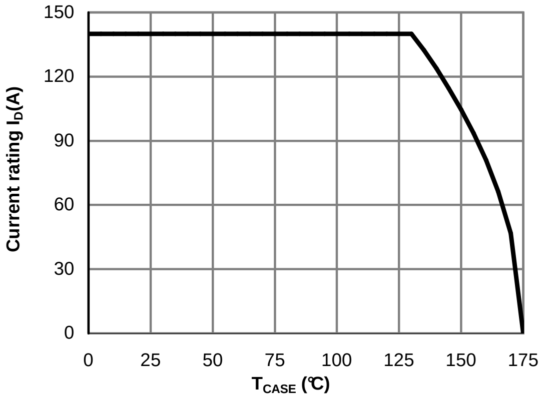


Figure 14: Current De-rating (Note F)

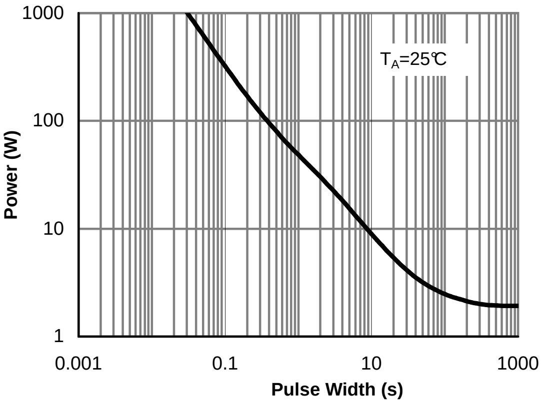


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

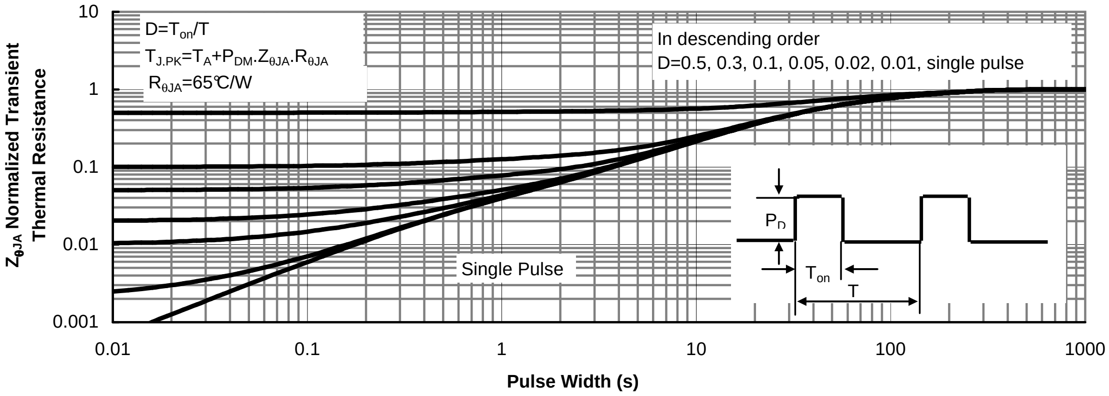
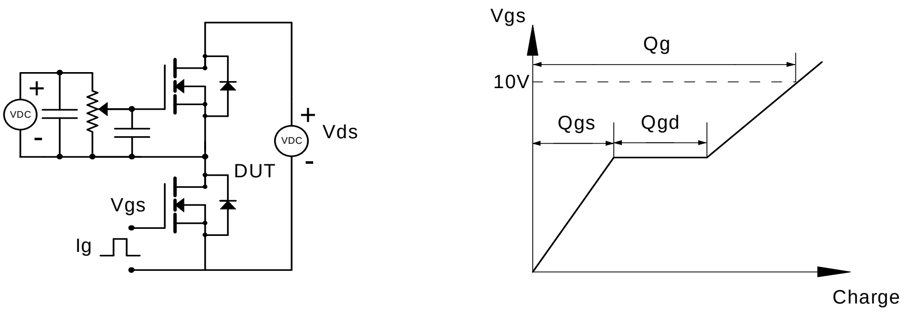
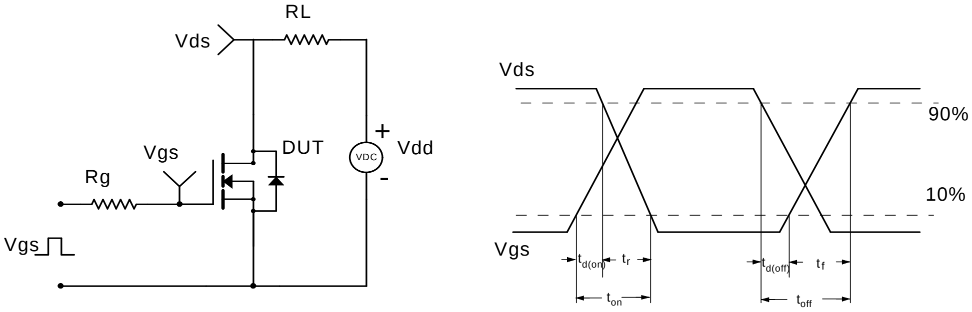


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

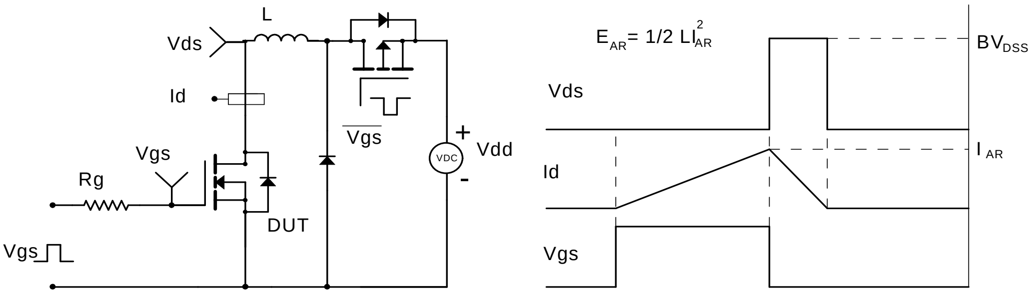
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms