AOT266L/AOB266L/AOTF266L

60V N-Channel MOSFET

ALPHA & OMEGA SEMICONDUCTOR

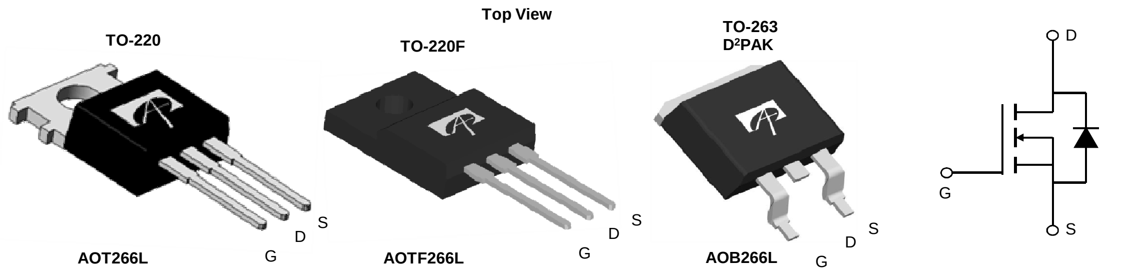
General Description

The AOT266L & AOB266L & AOTF266L 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.

Product Summary

V_{DS}	60V
I_D (at V_{GS}=10V)	140A/78A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 3.5mΩ (< 3.2mΩ*)
$R_{DS(ON)}$ (at V_{GS}=6V)	< 4.0mΩ (< 3.8mΩ*)

100% UIS Tested
100% R_g Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOT266L	TO220 Green	Tube	1000
AOTF266L	TO220F Green	Tube	1000
AOB266L	TO263 Green	Tape & Reel	800

Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	AOT266L/AOB266L	AOTF266L	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	78	A
	T_C=100℃		110	55	
Pulsed Drain Current [C]		I_{DM}	450		
Continuous Drain Current	T_A=25℃	I_{DSM}	18		A
	T_A=70℃		14		
Avalanche Current [C]		I_{AS}	90		A
Avalanche energy L=0.1mH [C]		E_{AS}	405		mJ
Power Dissipation [B]	T_C=25℃	P_D	268	45.5	W
	T_C=100℃		134	22.5	
Power Dissipation [A]	T_A=25℃	P_{DSM}	2.1		W
	T_A=70℃		1.3		
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175		℃

Thermal Characteristics

Parameter		Symbol	AOT266L/AOB266L	AOTF266L	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	15	15	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		60	60	℃/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	0.56	3.3	℃/W

* Surface mount package TO263

Electrical Characteristics (T_J=25°C 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°C			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
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A			2.9	3.5	mΩ
		TO220/TO220F	T_J=125°C		4.9	5.9	
		V_{GS}=6V, I_D=20A TO220/TO220F			3.2	4	mΩ
		V_{GS}=10V, I_D=20A TO263			2.6	3.2	mΩ
		V_{GS}=6V, I_D=20A TO263			3	3.8	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A			80		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			5650		pF
C_{oss}	Output Capacitance				720		pF
C_{rss}	Reverse Transfer Capacitance				20		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.4	0.9	1.4	Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=20A			65	90	nC
Q_{gs}	Gate Source Charge				20		nC
Q_{gd}	Gate Drain Charge				7		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=30V, R_L=1.5Ω, R_{GEN}=3Ω			21		ns
t_r	Turn-On Rise Time				20		ns
$t_{D(off)}$	Turn-Off DelayTime				36		ns
t_f	Turn-Off Fall Time				6		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/µs			27		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/µs			145		nC

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

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

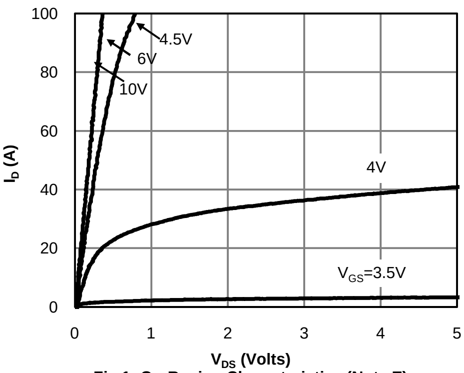


Fig 1: On-Region Characteristics (Note E)

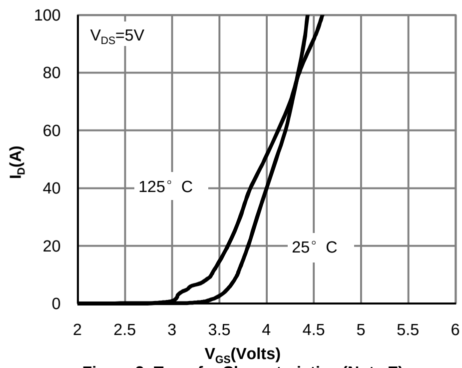


Figure 2: Transfer Characteristics (Note E)

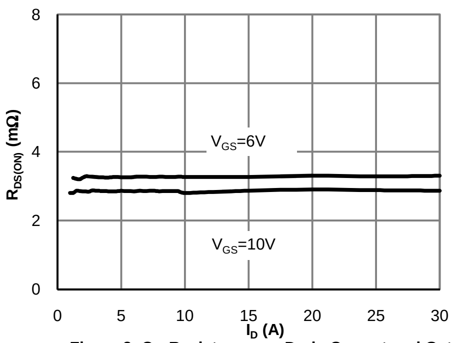


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

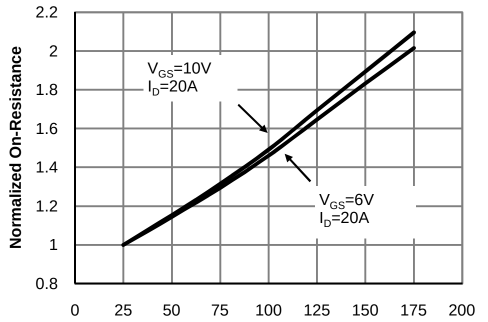


Figure 4: On-Resistance vs. Junction Temperature (Note E)

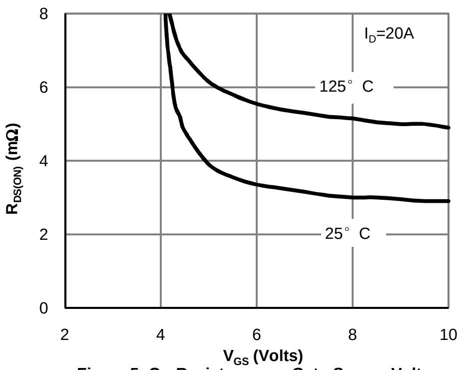


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

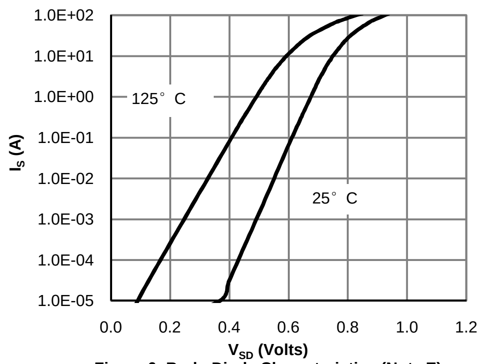


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

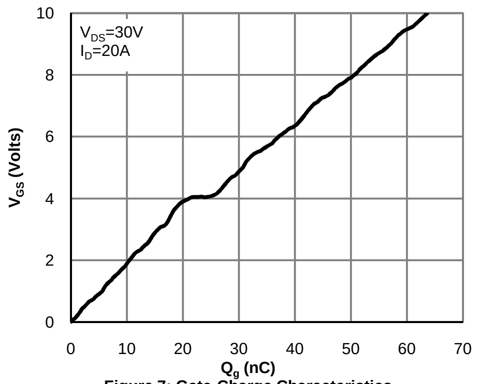


Figure 7: Gate-Charge Characteristics

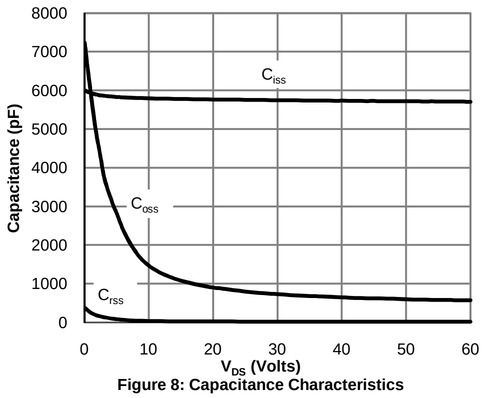


Figure 8: Capacitance Characteristics

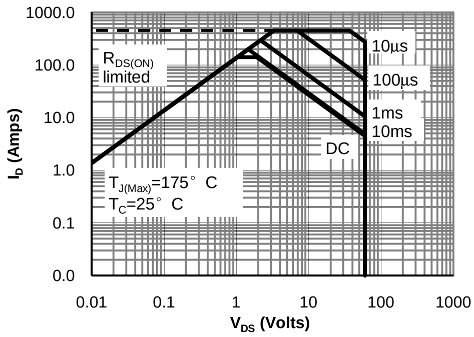


Figure 9: Maximum Forward Biased Safe Operating Area for AOT266L and AOB266L (Note F)

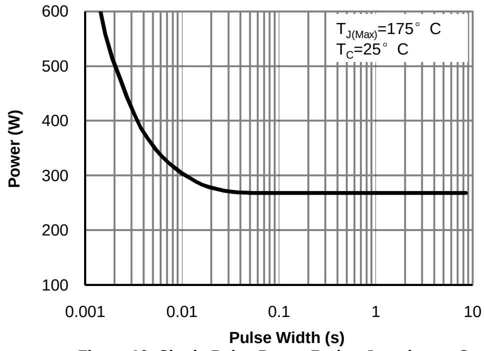


Figure 10: Single Pulse Power Rating Junction-to-Case for AOT266L and AOB266L (Note F)

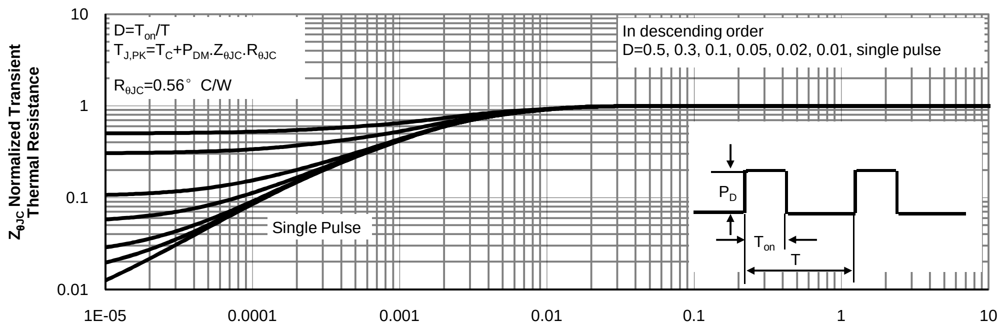


Figure 11: Normalized Maximum Transient Thermal Impedance for AOT266L and AOB266L (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

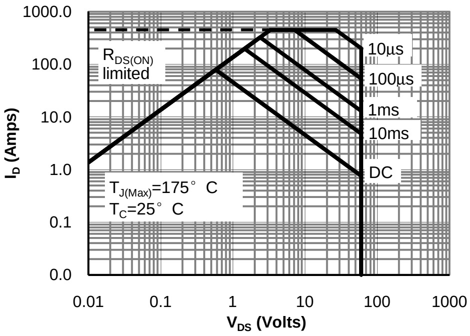


Figure 12: Maximum Forward Biased Safe Operating Area for AOTF266L (Note F)

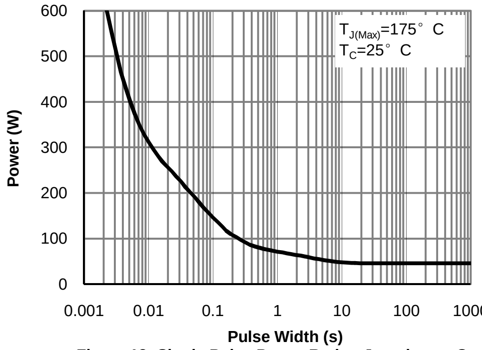


Figure 13: Single Pulse Power Rating Junction-to-Case for AOTF266L (Note F)

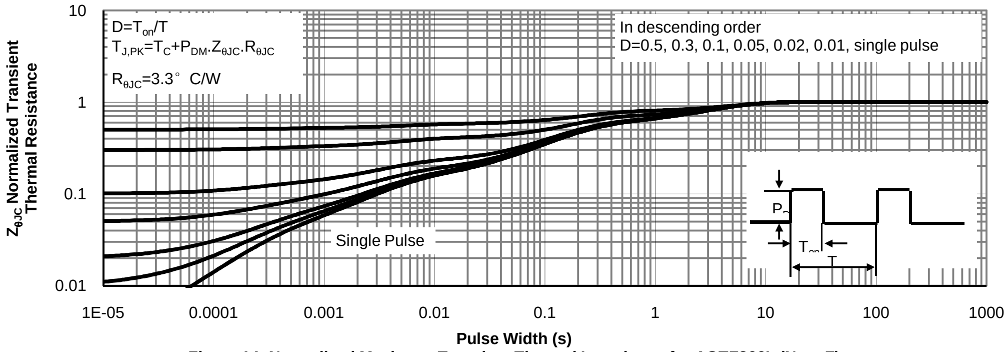


Figure 14: Normalized Maximum Transient Thermal Impedance for AOTF266L (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

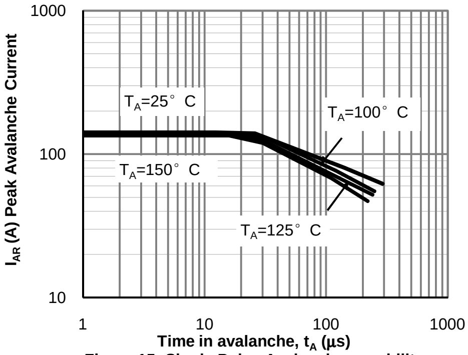


Figure 15: Single Pulse Avalanche capability (Note C)

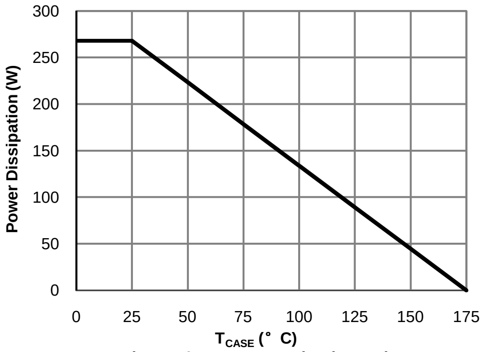


Figure 16: Power De-rating (Note F)

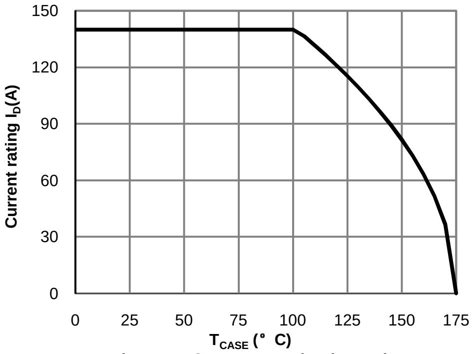


Figure 17: Current De-rating (Note F)

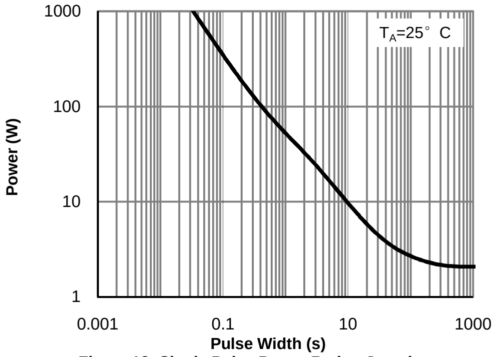


Figure 18: Single Pulse Power Rating Junction-to-Ambient (Note H)

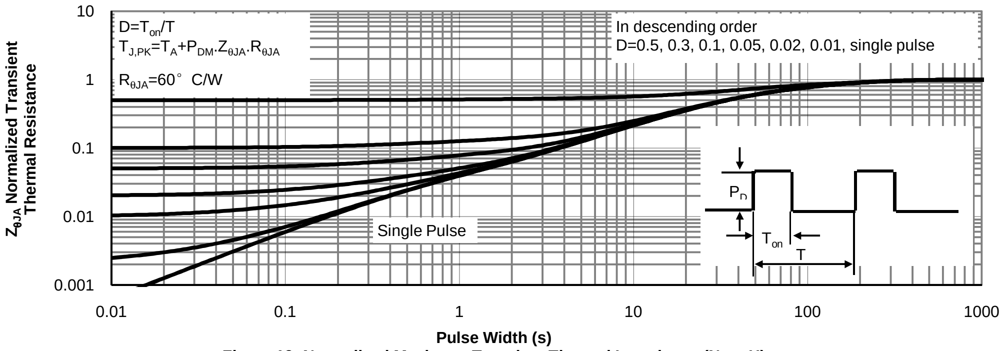
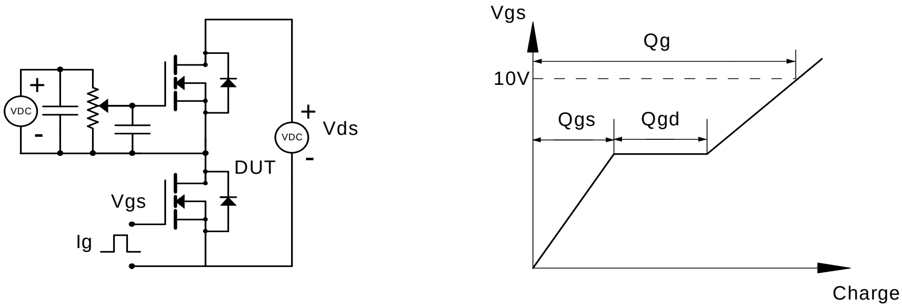
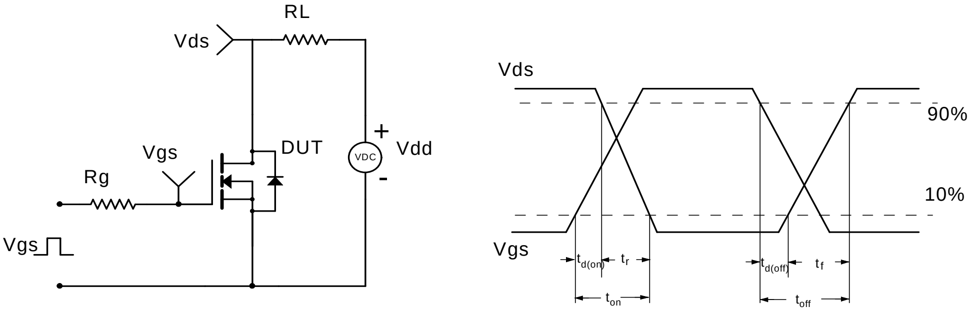


Figure 19: Normalized Maximum Transient Thermal Impedance (Note H)

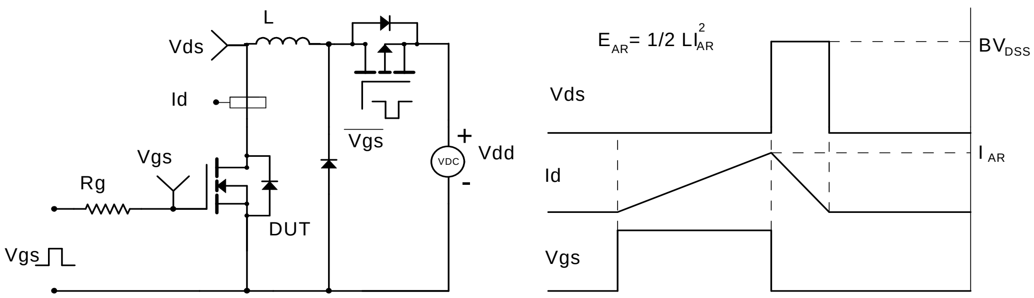
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms