Alfa-MOS Technology

AFN3316W
60V N-Channel Enhancement Mode MOSFET

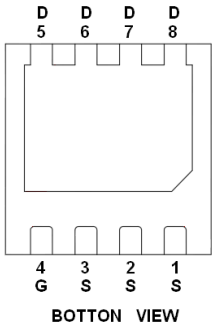
General Description

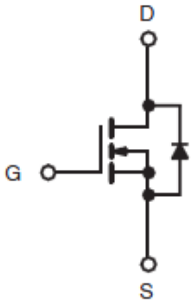
AFN3316W, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.
These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

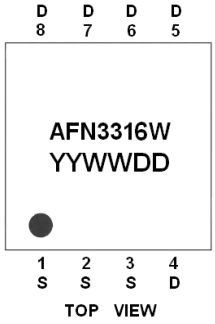
Features

- I_D=8A,$R_{DS(ON)}$=140mΩ@V_{GS}=10V
- I_D=6A,$R_{DS(ON)}$=148mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- DFN3X3-8L package design

Pin Description (DFN3X3-8L)







Application

- DC/DC Converter
- Load Switch
- Power Management in Notebook Computer

Pin Define

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5	D	Drain
6	D	Drain
7	D	Drain
8	D	Drain

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN3316WFN338RG	AFN3316W YYMMDD	DFN3X3-8L	Tape & Reel	5000 EA

※ YY year code
※ MM month code
※ DD date code
※ AFN3316WFN338RG : 13”Tape & Reel ; Pb- Free ; Halogen –Free

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

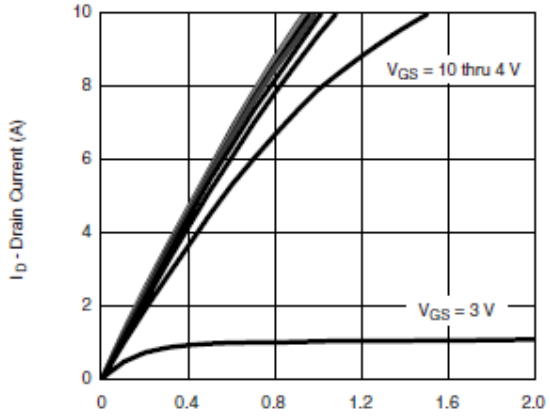
Parameter			Symbol	Value		Unit
Drain-Source Voltage			V_{DSS}	60		V
Gate –Source Voltage			V_{GSS}	±20		V
Continuous Drain Current(T_J=150℃)		T_A=25℃	I_D	8		A
		T_A=70℃		6		
Pulsed Drain Current			I_{DM}	10		A
Continuous Source Current(Diode Conduction)			I_S	1.6		A
Power Dissipation	T_C=25℃	T_C=70℃	P_D	28	15	W
	T_A=25℃	T_A=70℃		3.2	2.0	
Operating Junction Temperature			T_J	150		℃
Storage Temperature Range			T_{STG}	-55/150		℃
Thermal Resistance Junction-to-Case (Drain)			$R_{\theta JC}$	5		℃/W
Thermal Resistance-Junction to Ambient			$R_{\theta JA}$	40		

Electrical Characteristics

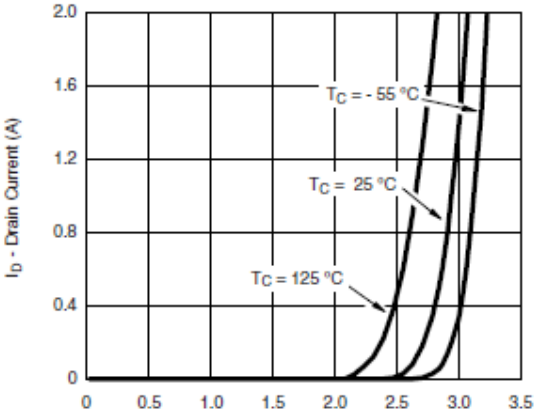
(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	0.7		2.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V			1	uA
		V_{DS}=60V,V_{GS}=0V T_J=85℃			10	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=10V	10			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=8A		128	140	mΩ
		V_{GS}=4.5V,I_D=6A		136	148	
Forward Transconductance	g_{FS}	V_{DS}=15V,I_D=2.0A		12		S
Diode Forward Voltage	V_{SD}	I_S=2.0A,V_{GS}=0V		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=30V,V_{GS}=10V I_D≡3A		6	15	nC
Gate-Source Charge	Q_{gs}			1.5		
Gate-Drain Charge	Q_{gd}			2.0		
Input Capacitance	C_{iss}	V_{DS}=35V,V_{GS}=0V f=1MHz		350		pF
Output Capacitance	C_{oss}			30		
Reverse Transfer Capacitance	C_{rss}			20		
Turn-On Time	$t_{d(on)}$	V_{DD}=30V,R_L=10Ω I_D≡5.0A,V_{GEN}=10V R_G=3.0V		6	12	ns
	t_r			6	12	
Turn-Off Time	$t_{d(off)}$			12	20	
	t_f			4	10	

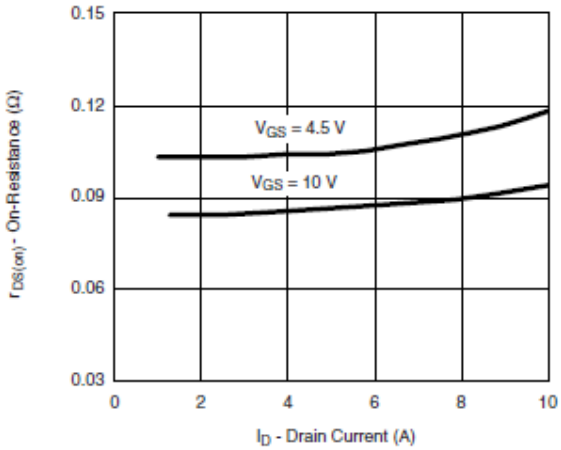
Typical Characteristics



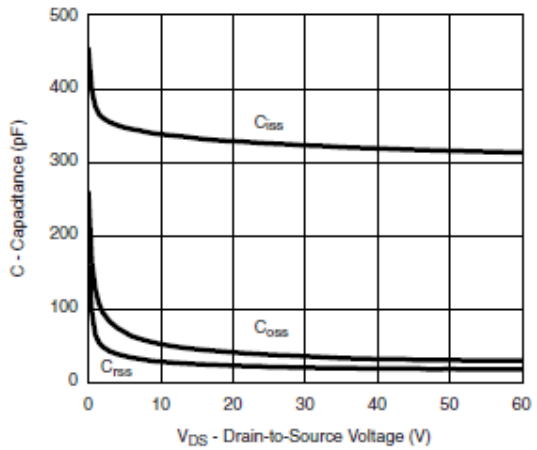
Output Characteristics



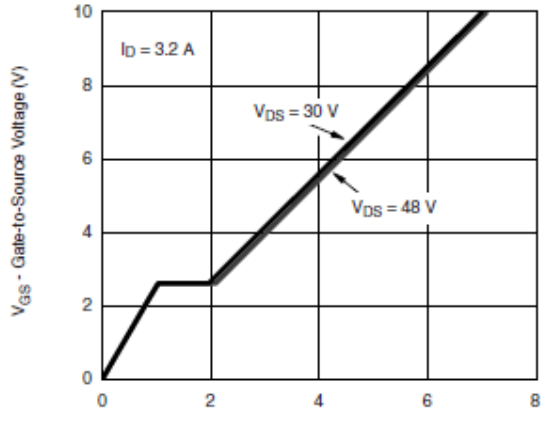
Transfer Characteristics



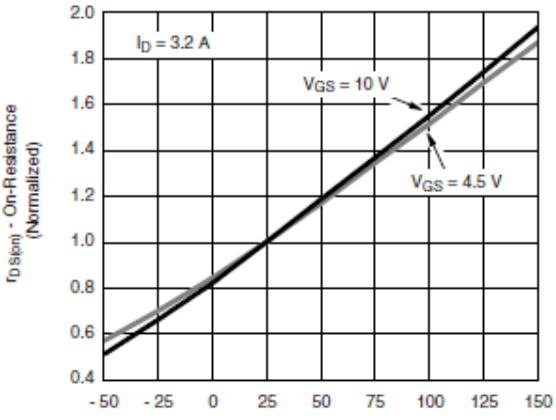
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

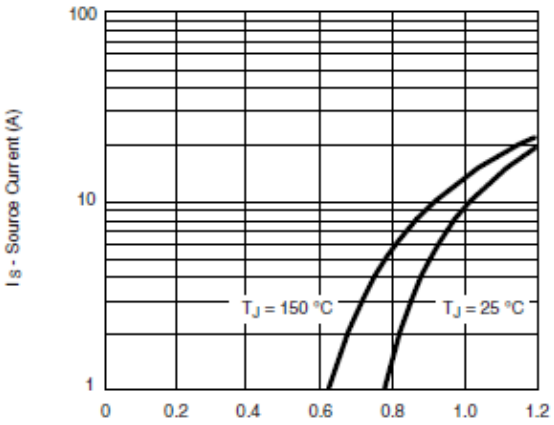


Gate Charge

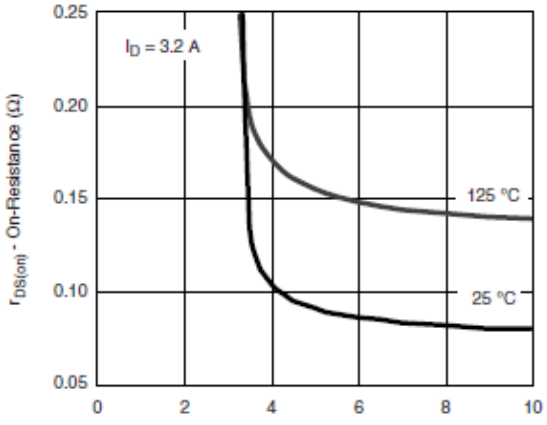


On-Resistance vs. Junction Temperature

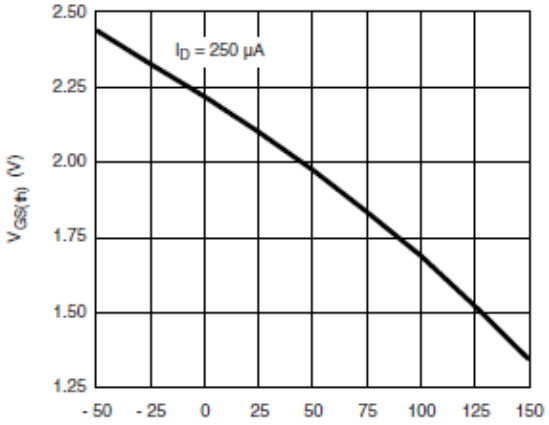
Typical Characteristics



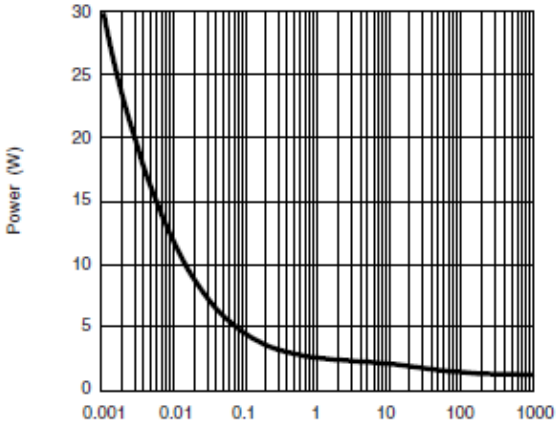
Source-Drain Diode Forward Voltage



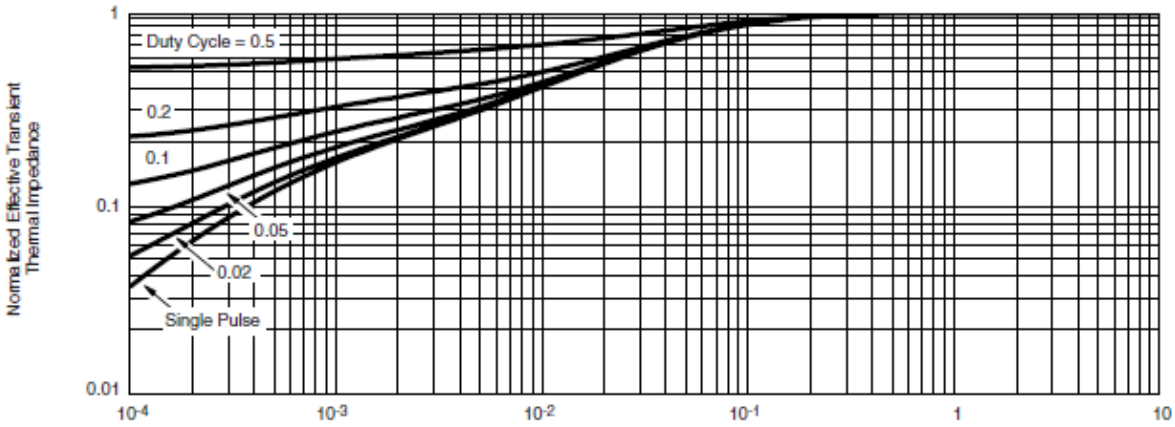
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



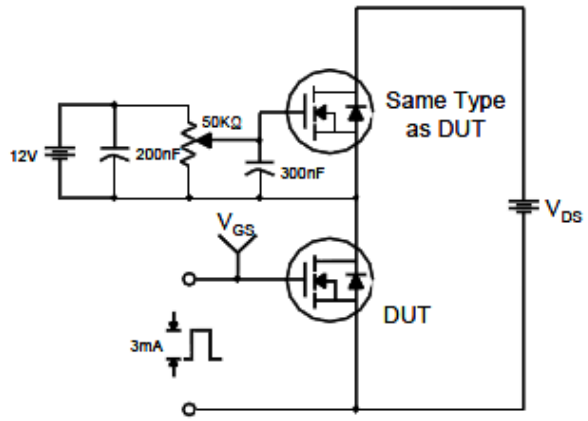
Single Pulse Power (Junction-to-Ambient)

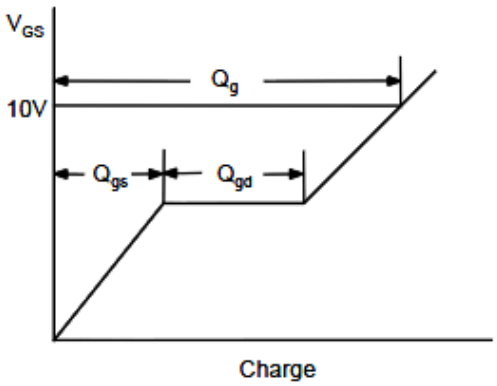


Normalized Thermal Transient Impedance, Junction-to-Foot

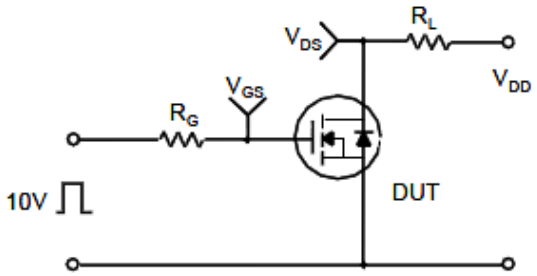
Typical Characteristics

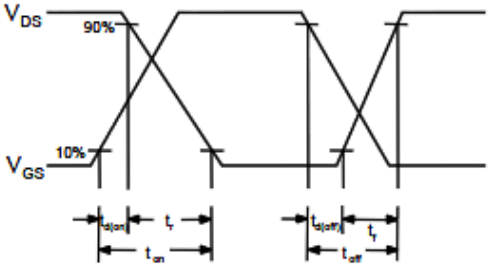
Gate Charge Test Circuit & Waveform



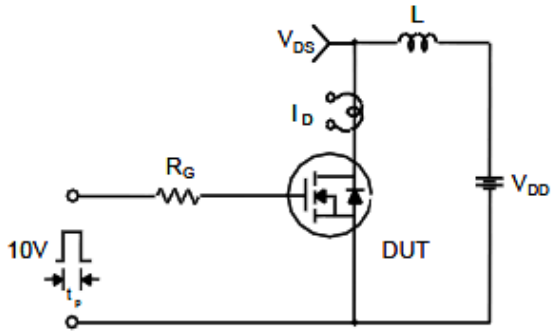


Resistive Switching Test Circuit & Waveforms

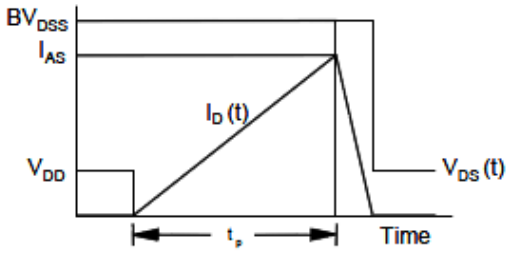




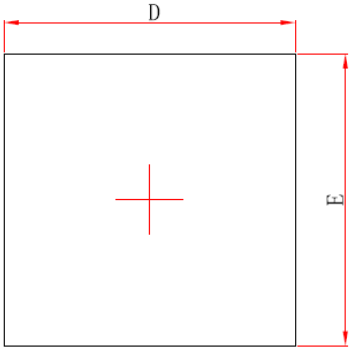
Unclamped Inductive Switching Test Circuit & Waveforms



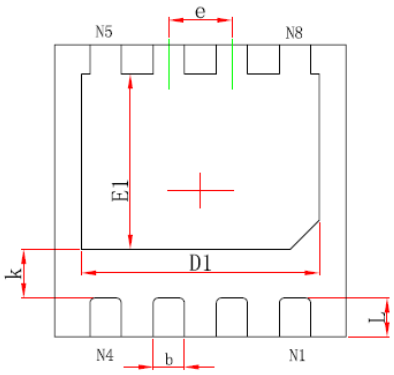
$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



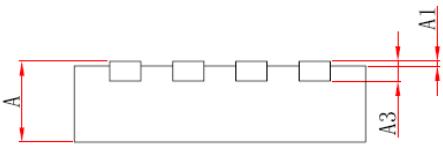
Package Information (DFN3X3-8L)



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.800	0.900	0.031	0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	2.924	3.076	0.115	0.121
E	2.924	3.076	0.115	0.121
D1	2.350	2.550	0.093	0.100
E1	1.700	1.900	0.067	0.075
k	0.450	0.550	0.018	0.022
b	0.270	0.370	0.011	0.015
e	0.650TYP.		0.026TYP.	
L	0.324	0.476	0.013	0.019

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