Alfa-MOS Technology

AFN1515S

150V N-Channel Enhancement Mode MOSFET

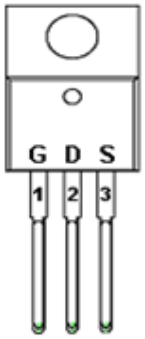
General Description

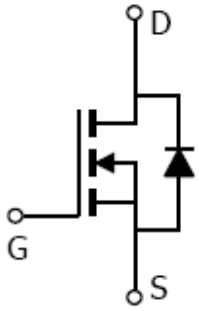
AFN1515S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.
These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

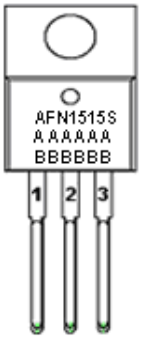
Features

- 150V/20A,$R_{DS(ON)}$=18.5mΩ@V_{GS}=10V
- 150V/15A,$R_{DS(ON)}$=23.5mΩ@V_{GS}=6V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- TO-220-3L package design

Pin Description (TO-220-3L)







Application

- Power Supply - Secondary Synchronous Rectification
- Industrial
- Primary Switch

Pin Define

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN1515ST220TG	AFN1515S AAAAAA BBBBBB	TO-220-3L	Tube	50 EA

※ A Lot code
※ B Date code
※ AFN1515ST220TG : Tube ; Pb- Free ; Halogen –Free

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

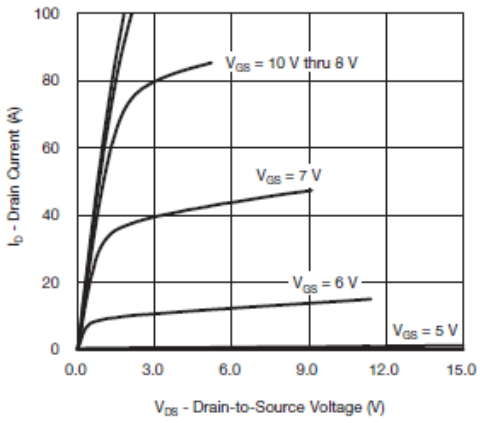
Parameter			Symbol	Typical		Unit
Drain-Source Voltage			V_{DSS}	150		V
Gate –Source Voltage			V_{GSS}	±25		V
Continuous Drain Current(T_J=150℃)	T_C=25℃	T_C=70℃	I_{DSM}	65	45	A
Pulsed Drain Current (t=100us)			I_{DM}	150		
Continuous Source Current(Diode Conduction)	T_C=25℃		I_S	60		
	T_A=25℃			5.6		
Single Pulse Avalanche Current	L=0.1mH		I_{AS}	30		
			E_{AS}	100		mJ
Power Dissipation	T_C=25℃		P_D	200		W
Operating Junction Temperature			T_J	150		℃
Storage Temperature Range			T_{STG}	-55/150		℃
Thermal Resistance-Junction to Ambient			$R_{\theta JA}$	62.5		℃/W
Thermal Junction-to-Case (Drain)			$R_{\theta JA}$	0.4		

Electrical Characteristics

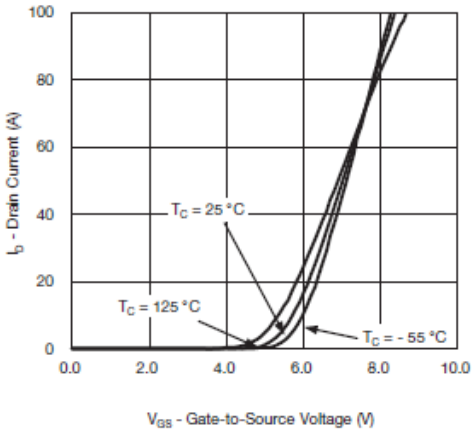
(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	150			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2.0		4.0	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=120V,V_{GS}=0V			1	uA
		V_{DS}=120,V_{GS}=0V T_J=85℃			30	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧10V,V_{GS}=10V	40			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=20A		15	18.5	mΩ
		V_{GS}=6V,I_D=15A		18	23.5	
Forward Transconductance	g_{FS}	V_{DS}=10,I_D=20A		30		S
Diode Forward Voltage	V_{SD}	I_S=8A,V_{GS}=0V		0.75	1.3	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=75V,V_{GS}=7.5V I_D≡20A		24	40	nC
Gate-Source Charge	Q_{gs}			8		
Gate-Drain Charge	Q_{gd}			10		
Gate Resistance	R_g	f=1MHz	0.3	1.0	2.0	Ω
Input Capacitance	C_{iss}	V_{DS}=75V,V_{GS}=0V f=1MHz		1300		pF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			30		
Turn-On Time	$t_{d(on)}$	V_{DD}=75V,R_L=3.75Ω I_D≡20A,V_{GEN}=10V R_G=1Ω		10	20	ns
	t_r			12	24	
Turn-Off Time	$t_{d(off)}$			15	30	
	t_f			7	14	

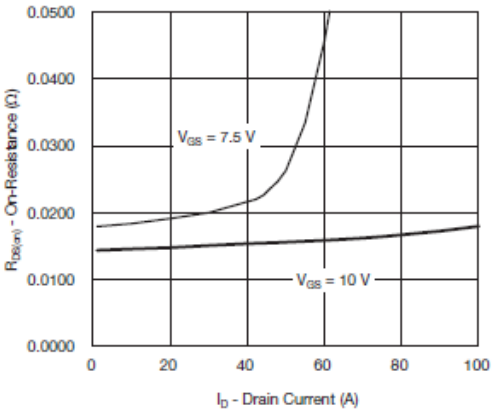
Typical Characteristics



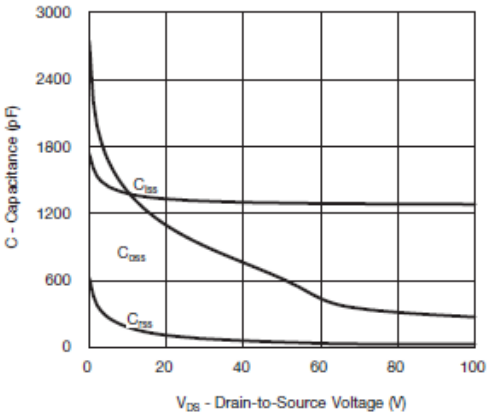
Output Characteristics



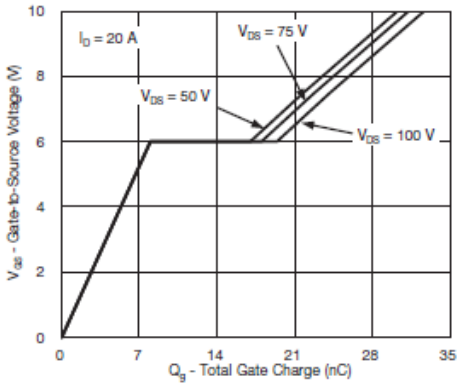
Transfer Characteristics



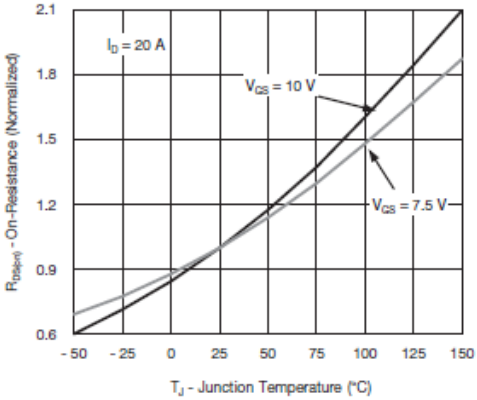
On-Resistance vs. Drain Current



Capacitance

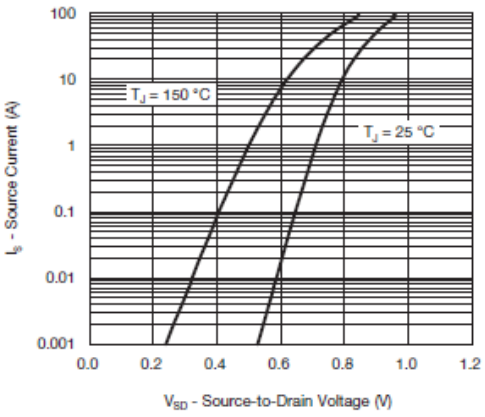


Gate Charge

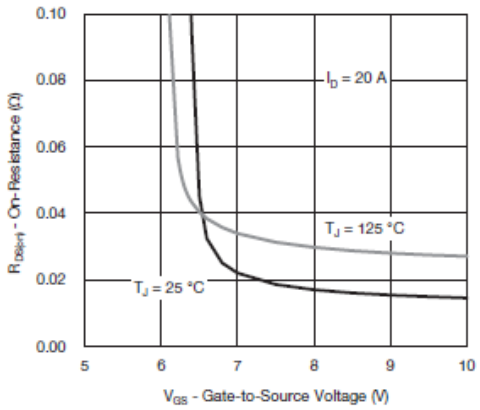


On-Resistance vs. Junction Temperature

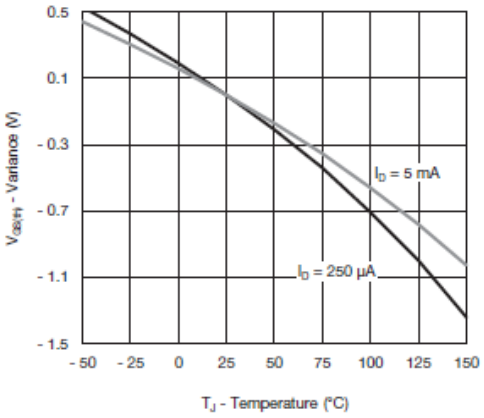
Typical Characteristics



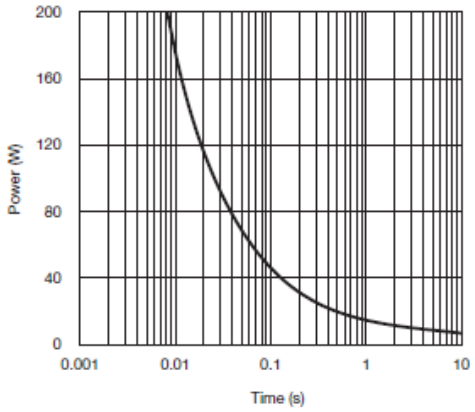
Source-Drain Diode Forward Voltage



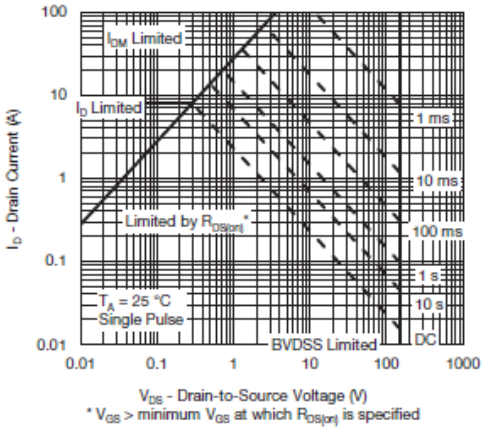
On-Resistance vs. Gate-to-Source Voltage



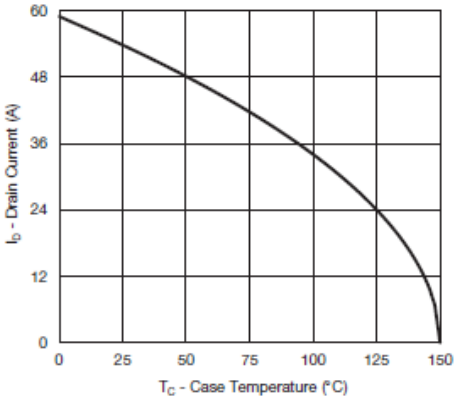
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

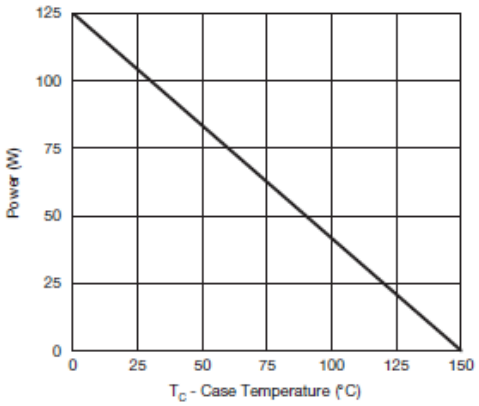


Safe Operating Area, Junction-to-Ambient

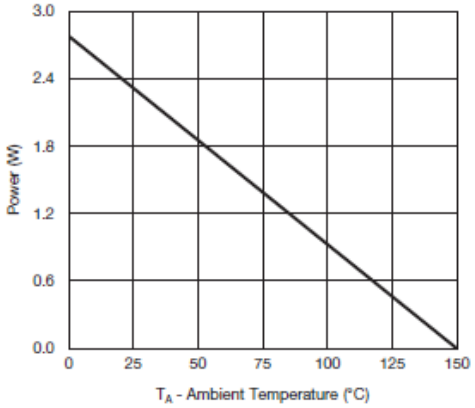


Current Derating*

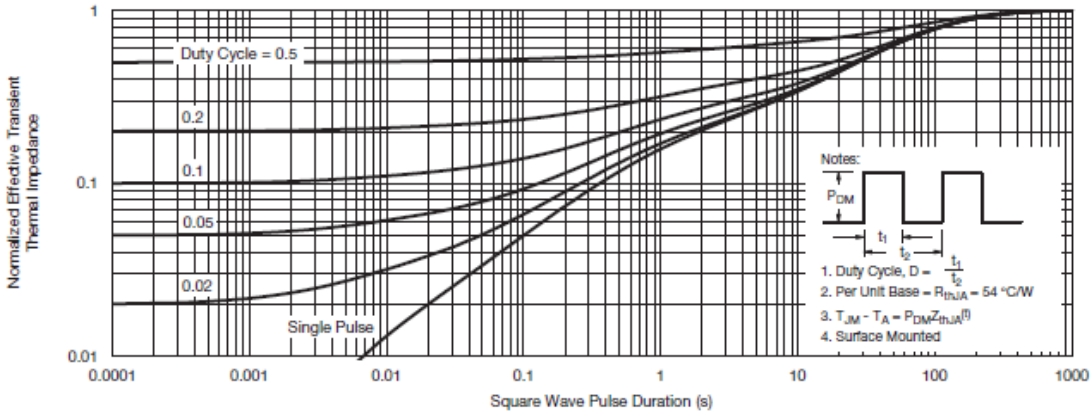
Typical Characteristics



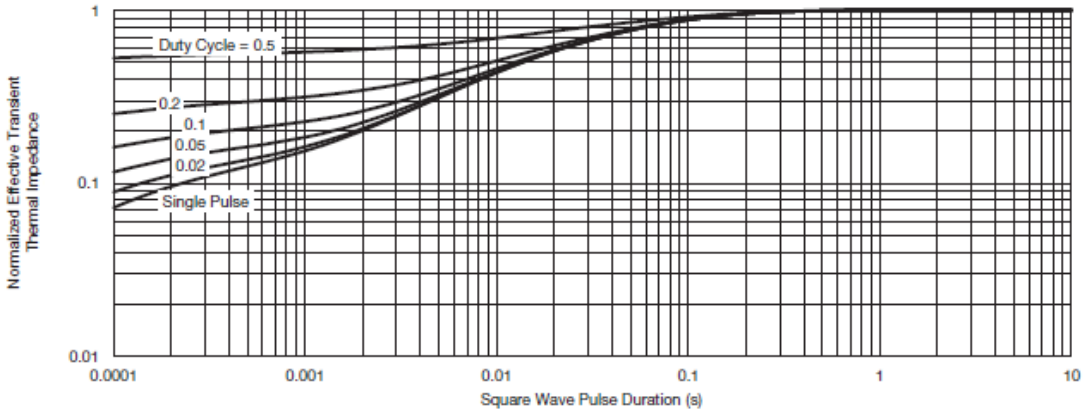
Power, Junction-to-Case



Power, Junction-to-Ambient



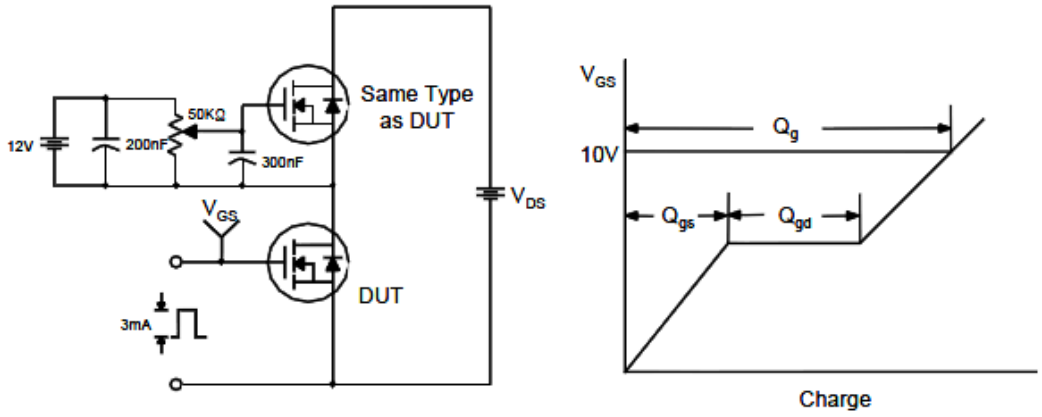
Normalized Thermal Transient Impedance, Junction-to-Ambient



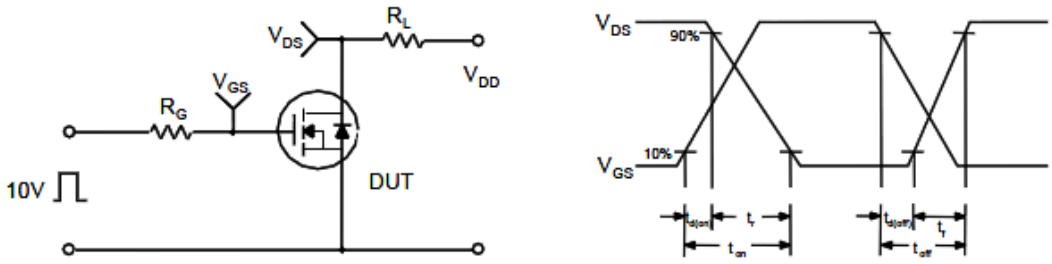
Normalized Thermal Transient Impedance, Junction-to-Case

Typical Characteristics

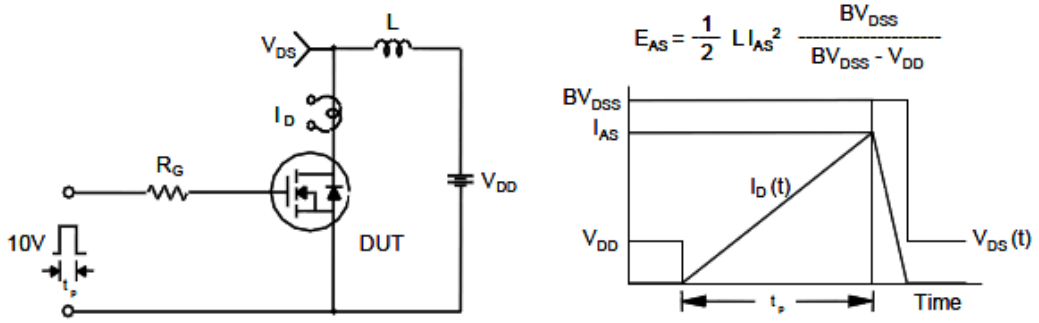
Gate Charge Test Circuit & Waveform



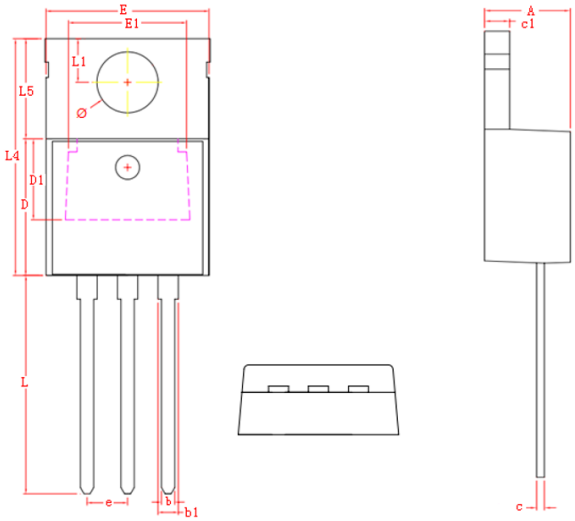
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Package Information (TO-220-3L)



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.40	4.60	4.80
b	0.76	0.88	1.00
D	8.60	8.80	9.00
c	0.36	0.43	0.50
E	9.80	10.10	10.40
L4	14.70	15.00	15.30
L5	6.20	6.40	6.60
D1	5.10 REF.		
c1	1.25	1.35	1.45
b1	1.17	1.32	1.47
L	13.25	13.75	14.25
e	2.54 REF.		
L1	2.60	2.75	2.89
Ø	3.71	3.84	3.96
E1	7.40 REF.		

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