Alfa-MOS Technology

AFP9515S
60V P-Channel Enhancement Mode MOSFET

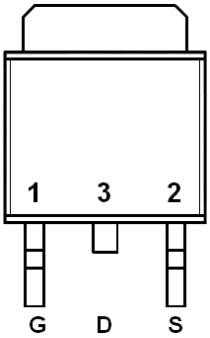
General Description

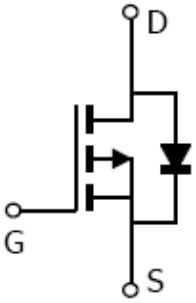
AFP9515S, P-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge. These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

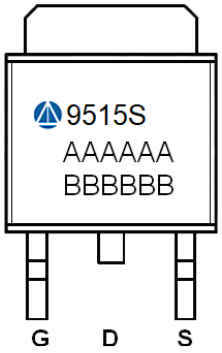
Features

- -60V/-20A,$R_{DS(ON)}$=15mΩ@V_{GS}=-10V
- -60V/-15A,$R_{DS(ON)}$=20mΩ@V_{GS}=-4.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- TO-252-2L package design

Pin Description (TO-252-2L)







Application

- Load Switches
- Half-Bridge Motor Drives
- High Voltage Non-Synchronous Buck Converters

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFP9515ST252RG	9515S	TO-252-2L	Tape & Reel	2500 EA

※ A Lot code
※ B Date code
※ AFP9515ST252RG : 13” Tape & Reel ; Pb- Free ; Halogen –Free

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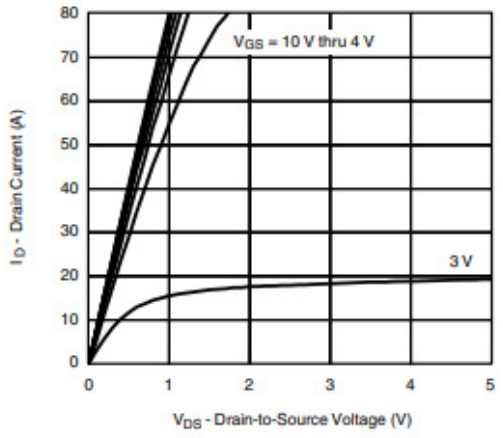
Absolute Maximum Ratings (T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	-60	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current(T_J=150℃)	T_c=25℃	I_{DSM}	-50	A
	T_c=100℃		-35	
	T_A=25℃		-12	
	T_A=70℃		-10	
Pulsed Drain Current		I_{DM}	-80	
Continuous Source Current(Diode Conduction)		I_S	-4.5	
Avalanche Current	L =0.1mH	I_{AS}	-50	
Single Pulse e Avalanche Energy		E_{AS}	125	mJ
Power Dissipation	T_A=25℃	P_{DSM}	135	W
	T_A=70℃		3.0	
Operating Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient	t ≤ 10 s	$R_{\theta JA}$	18	℃/W
Thermal Resistance-Junction to Case	Steady-State	$R_{\theta JC}$	1.1	

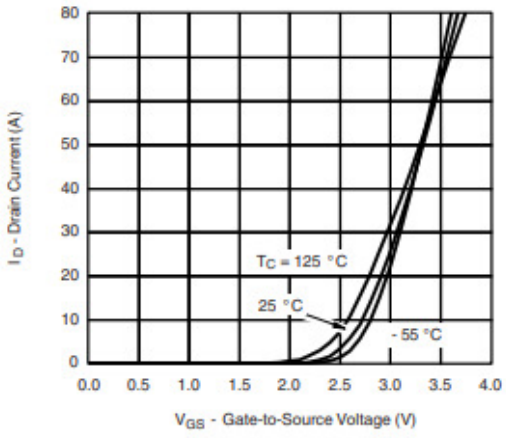
Electrical Characteristics(T_A=25℃ Unless otherwise noted)

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	-1.0		-2.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}= ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= -48V,V_{GS}=0V			-1	uA
		V_{DS}= -48V,V_{GS}=0V T_J=125℃			-50	
On-State Drain Current	$I_{D(on)}$	V_{DS} = -5V,V_{GS} = -10V	-50			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V,I_D= -20A		12	15	mΩ
		V_{GS} = -4.5V,I_D= -15A		15	20	
Forward Transconductance	g_{FS}	V_{DS}= -15V,I_D= -15A		60		S
Diode Forward Voltage	V_{SD}	I_S= -1A,V_{GS}=0V		-0.7	-1.3	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=-30V,V_{GS}=-10V I_D= -50A		120	200	nC
Gate-Source Charge	Q_{gs}			20		
Gate-Drain Charge	Q_{gd}			30		
Input Capacitance	C_{iss}	V_{DS}=-25V,V_{GS}=0V f=1MHz		4950		pF
Output Capacitance	C_{oss}			480		
Reverse Transfer Capacitance	C_{rss}			400		
Gate Resistance	R_g			3		Ω
Turn-On Time	$t_{d(on)}$	V_{DD}=-30V,R_L=0.6Ω I_D≡-50A,V_{GEN}=-10V R_G=6Ω		15	30	ns
	t_r			70	140	
Turn-Off Time	$t_{d(off)}$			175	250	
	t_f			175	250	

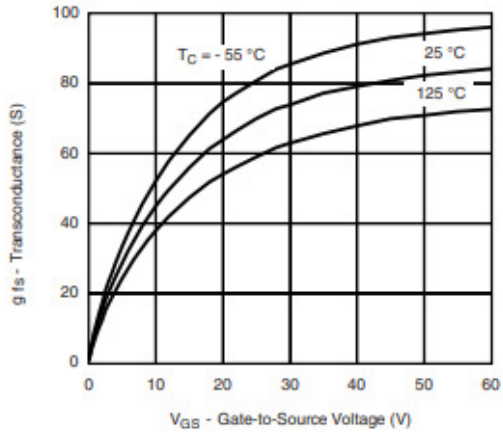
Typical Characteristics



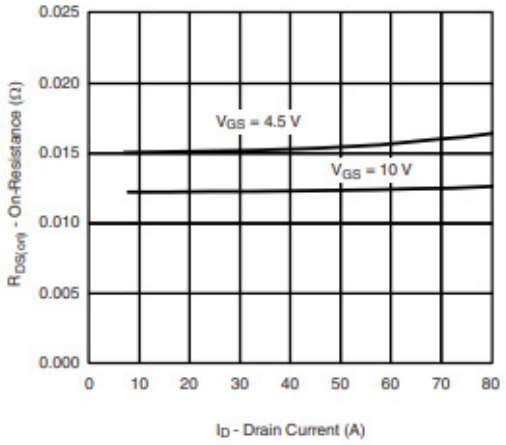
Output Characteristics



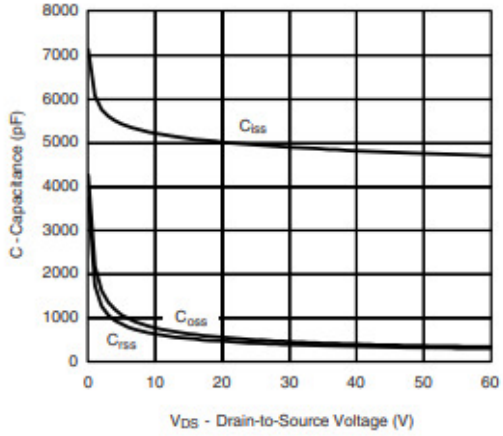
Transfer Characteristics



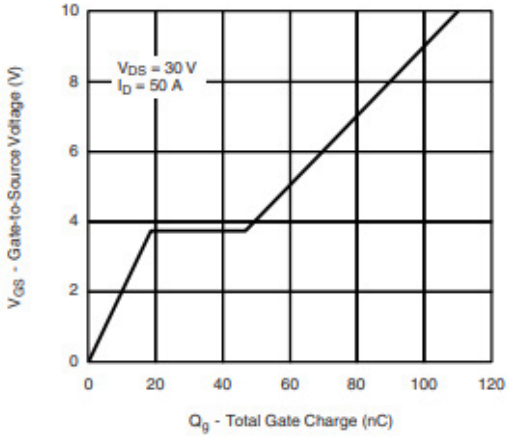
Transconductance



On-Resistance vs. Drain Current

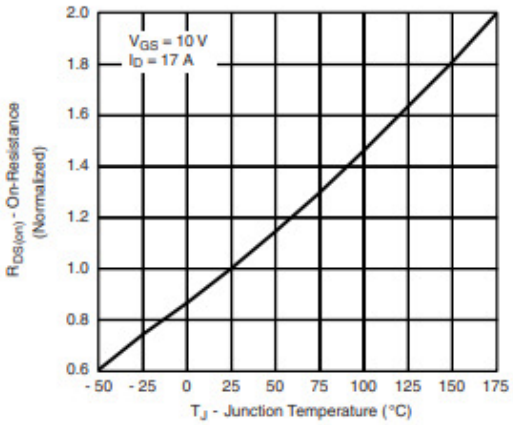


Capacitance

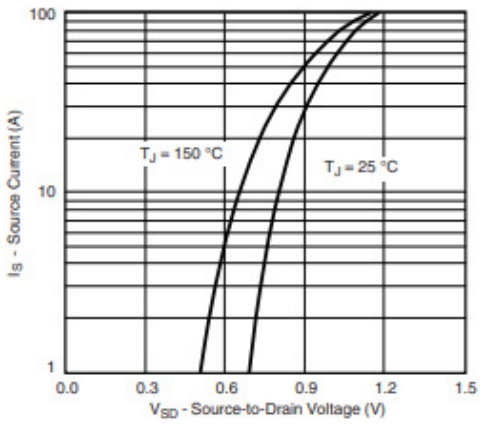


Gate Charge

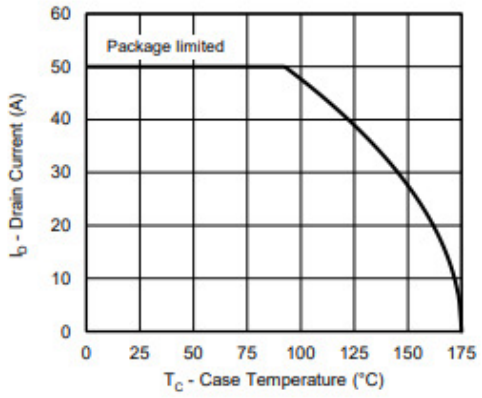
Typical Characteristics



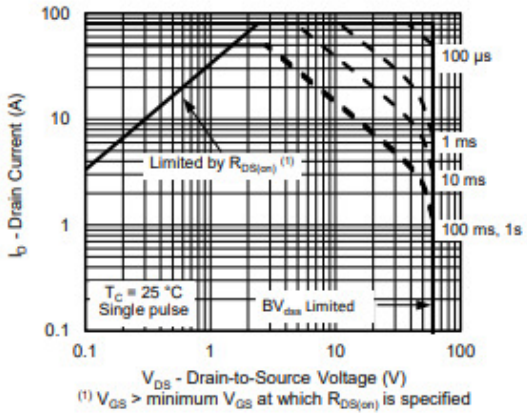
On-Resistance vs. Junction Temperature



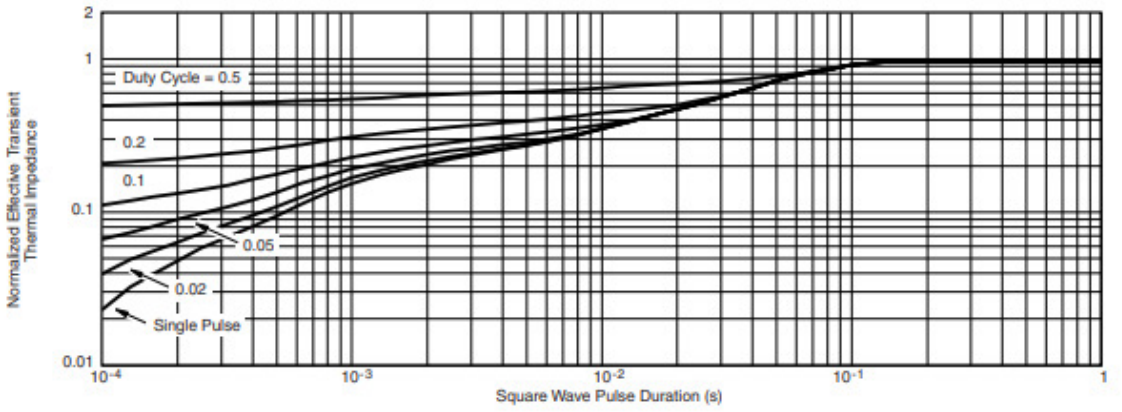
Source-Drain Diode Forward Voltage



Max. Avalanche and Drain Current vs. Case Temperature



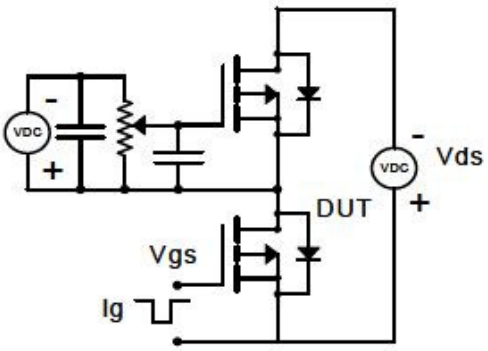
Safe Operating Area

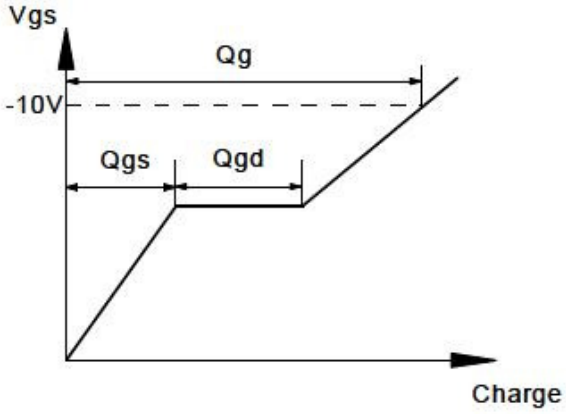


Normalized Thermal Transient Impedance, Junction-to-Case

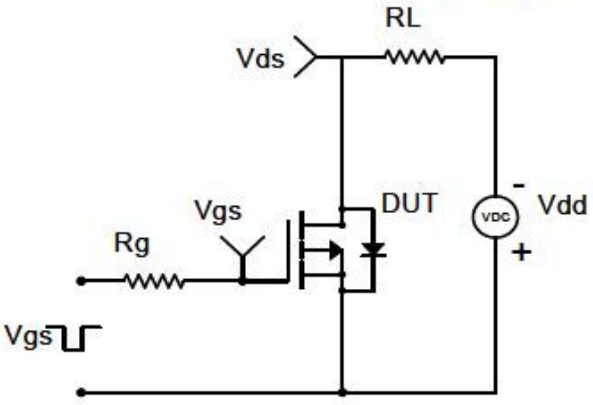
Typical Characteristics

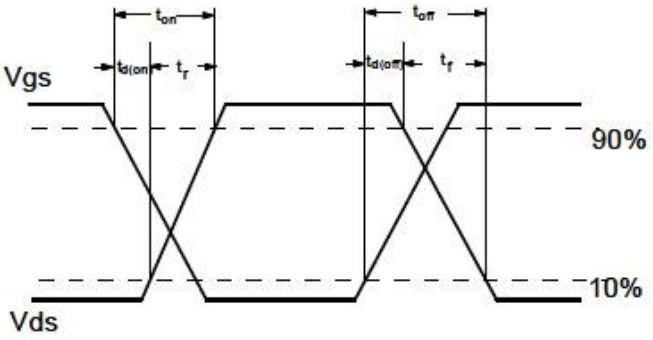
Gate Charge Test Circuit & Waveform



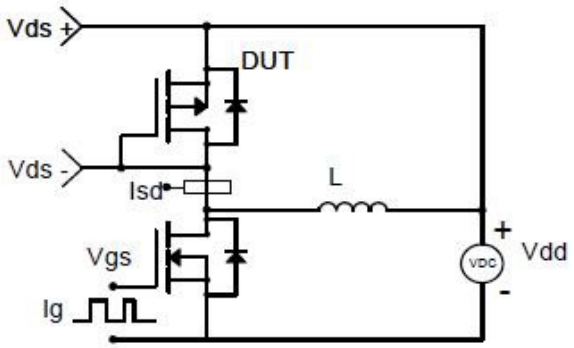


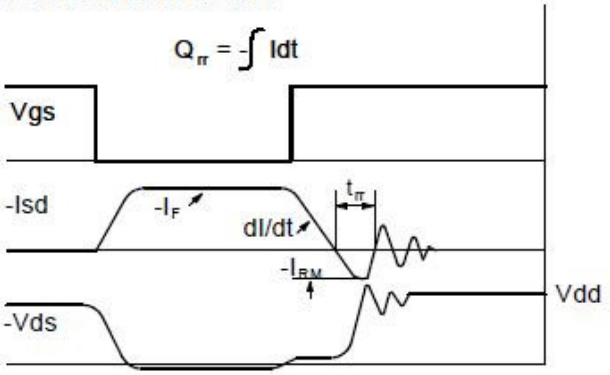
Resistive Switching Test Circuit & Waveforms



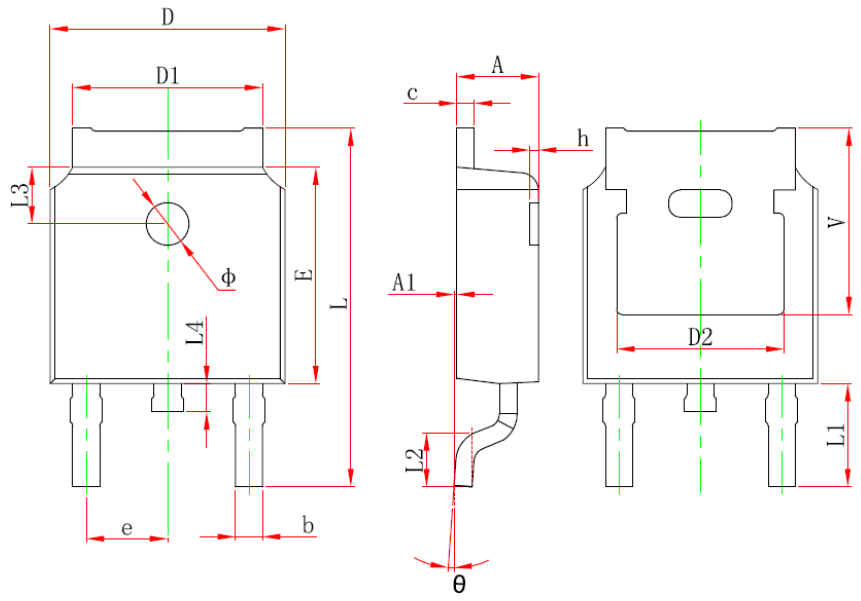


Diode Recovery Test Circuit & Waveforms





Package Information (TO-252-2L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

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