Alfa-MOS
Technology

AFN9004S

40V N-Channel
Enhancement Mode MOSFET

General Description

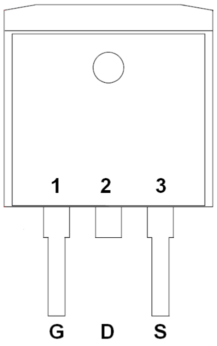
AFN9004S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

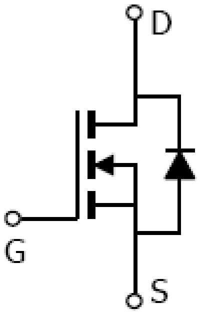
These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

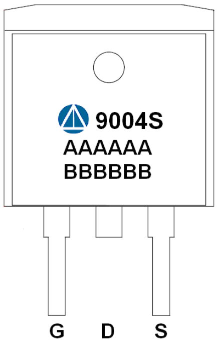
Features

- 40V/25A,$R_{DS(ON)}$= 3.3mΩ@V_{GS}=10V
- 40V/20A,$R_{DS(ON)}$= 4.1mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low $R_{DS(ON)}$
- TO-263-2L package design

Pin Description (TO-263-2L)







Application

- Power supply
  --- Secondary synchronous rectification
- DC/DC converter
- Power tools

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN9004ST263RG	9004S AAAAAA BBBBBB	TO-263-2L	Tape & Reel	800 EA

※ A Lot code
※ B Date code
※ AFN9004ST263RG : Tube ; Pb- Free ; Halogen –Free

Absolute Maximum Ratings

(T_C=25℃ Unless otherwise noted)

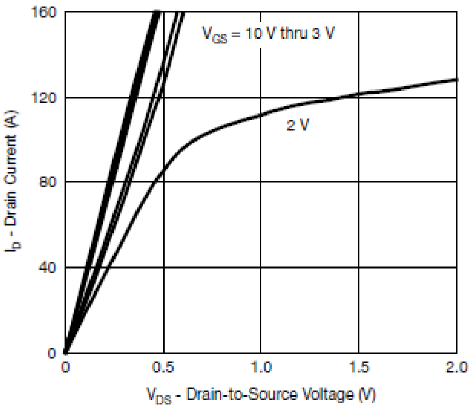
Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	40	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current(T_J=150℃)	T_C=25℃	I_D	90	A
	T_C=70℃		90	
Pulsed Drain Current		I_{DM}	160	
Continuous Source Current(Diode Conduction)		I_S	80	
Single Pulse Avalanche Current		I_{AS}	40	
Power Dissipation	T_C=25℃	P_D	250	W
	T_A=25℃		3.75	
Operating Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	62.5	℃/W

Electrical Characteristics

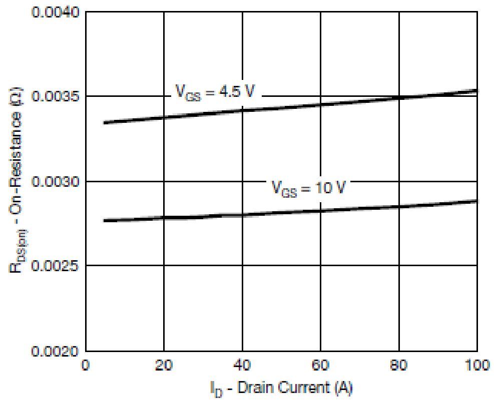
(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	1.0		2.0	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=32V,V_{GS}=0V			1	uA
		V_{DS}=32V,V_{GS}=0V T_J=85℃			10	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧10V,V_{GS}=10V	50			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=25A		2.78	3.3	mΩ
		V_{GS}=4.5V,I_D=20A		3.58	4.1	
Forward Transconductance	g_{FS}	V_{DS}=15V,I_D=15A		75		S
Diode Forward Voltage	V_{SD}	I_S=10A,V_{GS}=0V		0.85	1.3	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=20V,V_{GS}=10V I_D= 20A		60	100	nC
Gate-Source Charge	Q_{gs}			12		
Gate-Drain Charge	Q_{gd}			10		
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V f=1MHz		4500		pF
Output Capacitance	C_{oss}			520		
Reverse Transfer Capacitance	C_{rss}			180		
Turn-On Time	$t_{d(on)}$	V_{DD}=20V,R_L=2Ω I_D=10A,V_{GEN}=10V R_G=1Ω		10	20	ns
	t_r			8	18	
Turn-Off Time	$t_{d(off)}$			40	75	
	t_f			8	18	

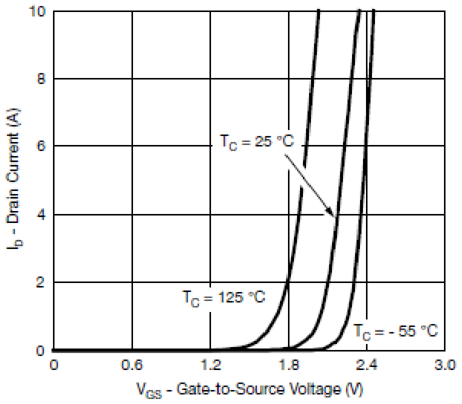
Typical Characteristics



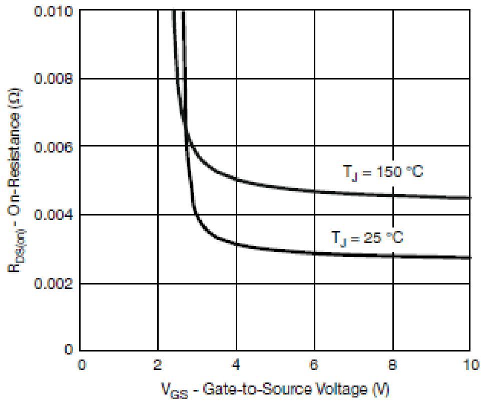
Output Characteristics



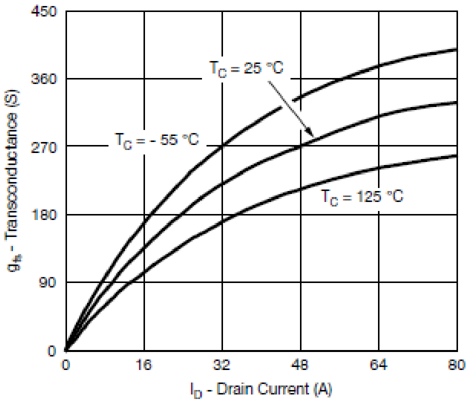
On-Resistance vs. Drain Current



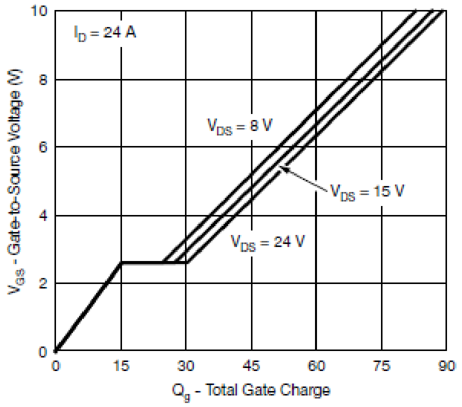
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage

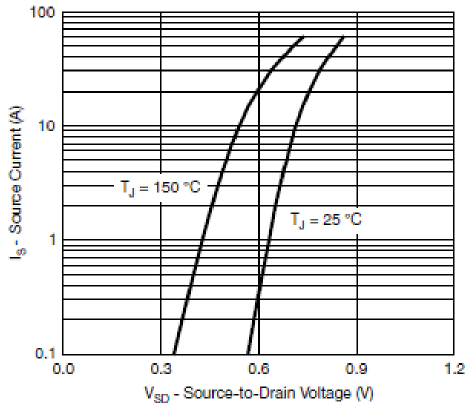


Transconductance

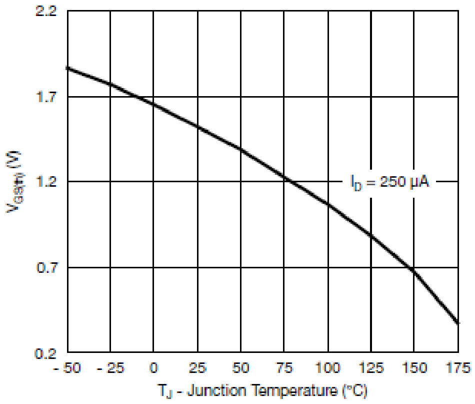


Gate Charge

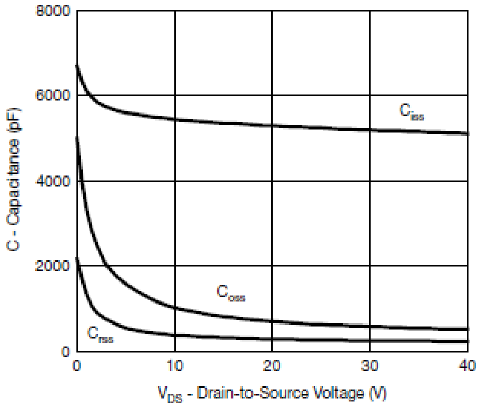
Typical Characteristics



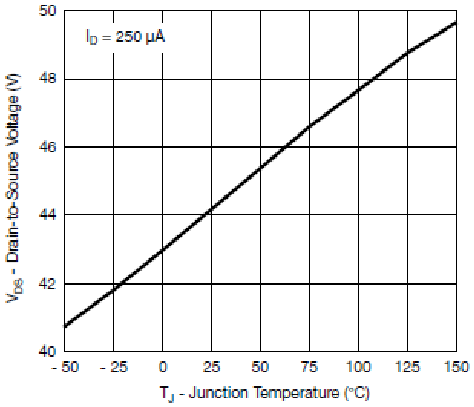
Source-Drain Diode Forward Voltage



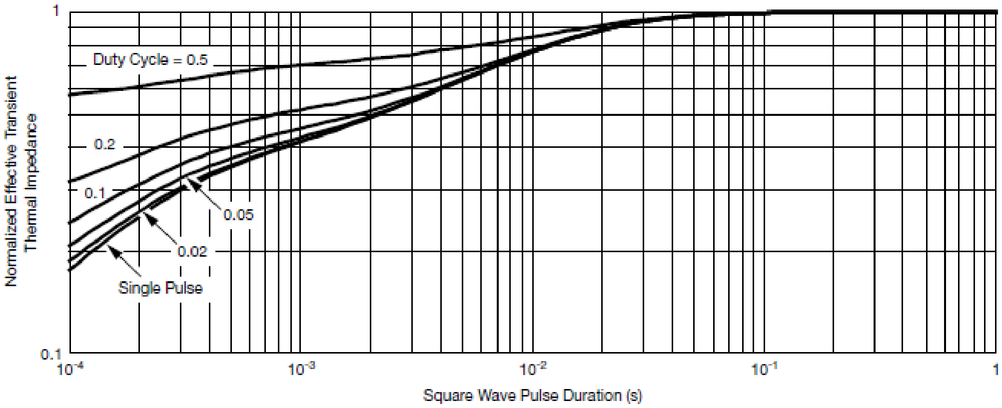
Threshold Voltage



Capacitance



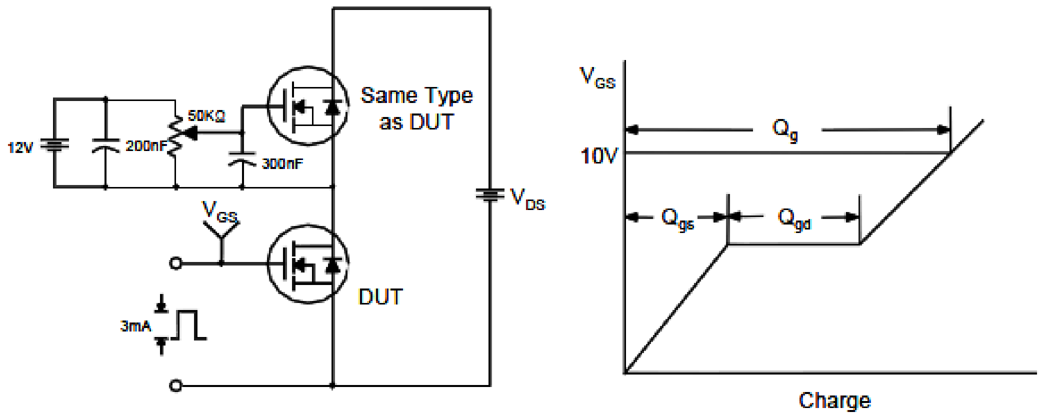
Drain Source Breakdown vs. Junction Temperature



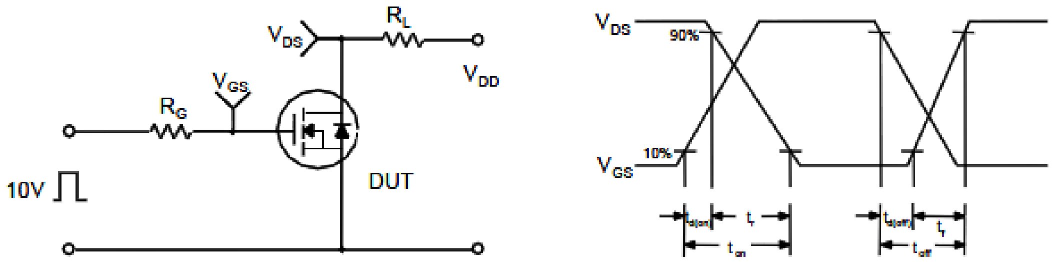
Normalized Thermal Transient Impedance, Junction-to-Case

Typical Characteristics

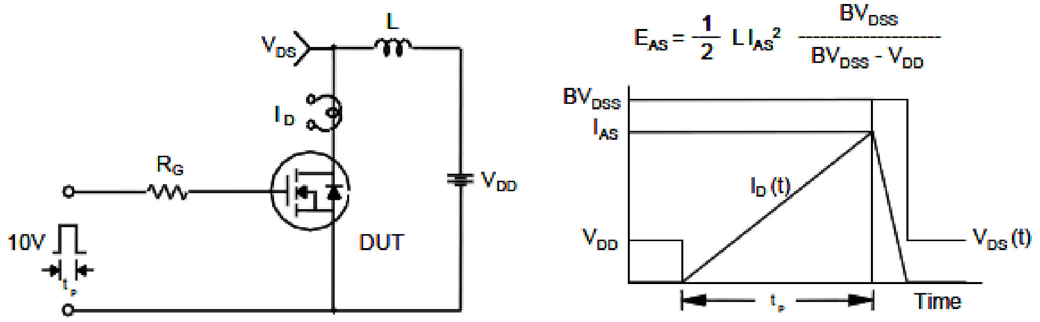
Gate Charge Test Circuit & Waveform



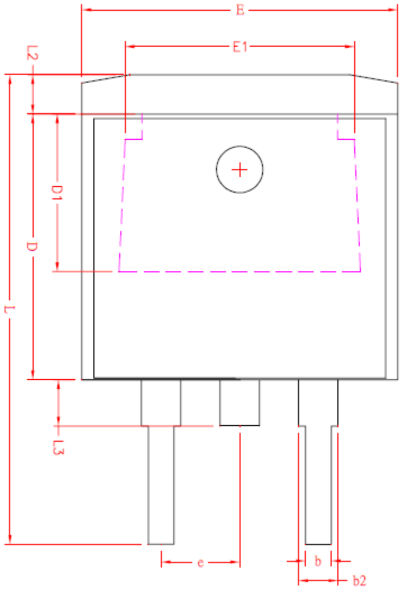
Resistive Switching Test Circuit & Waveforms

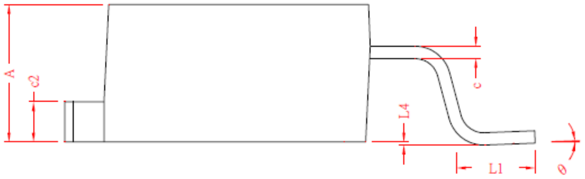


Unclamped Inductive Switching Test Circuit & Waveforms



Package Information (TO-263-2L)





REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.80	c2	1.25	1.45
b	0.76	1.0	b2	1.17	1.47
L4	0.00	0.254	D	8.6	9.0
c	0.36	0.50	D1	5.10 REF.	
L3	1.50 REF.		e	2.54 REF.	
L1	2.29	2.79	L	14.6	15.8
E	9.80	10.4	θ	0° ± 3°	
E1	7.40 REF.		L2	1.27 REF.	

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