



General Description

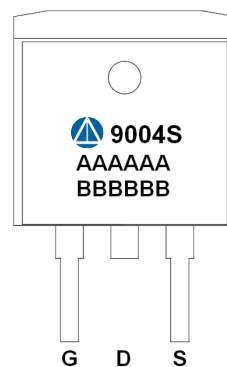
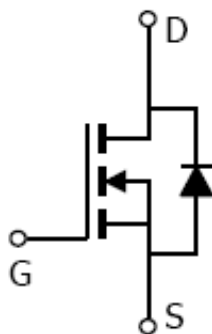
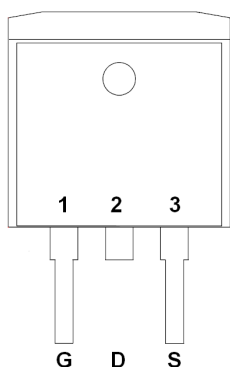
AFN9004S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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, $R_{DS(ON)} = 3.3m\Omega @ V_{GS} = 10V$
- 40V/20A, $R_{DS(ON)} = 4.1m\Omega @ V_{GS} = 4.5V$
- 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 BBBBB	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°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	40	V
Gate –Source Voltage	V _{GSS}	±20	V
Continuous Drain Current(T _J =150°C)	I _D	T _C =25°C	90
		T _C =70°C	90
Pulsed Drain Current	I _{DM}	160	A
Continuous Source Current(Diode Conduction)	I _S	80	
Single Pulse Avalanche Current	I _{AS}	40	
Power Dissipation	P _D	T _C =25°C	250
		T _A =25°C	3.75
Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient	R _{θJA}	62.5	°C/W

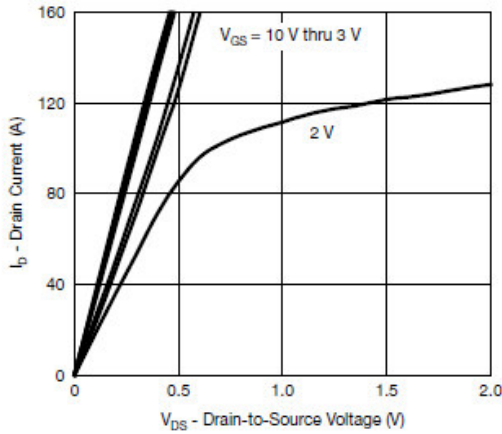
Electrical Characteristics

(T_A=25°C Unless otherwise noted)

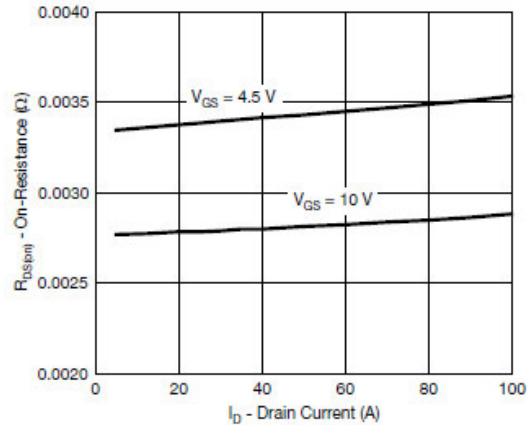
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250uA	40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0		2.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V, V _{GS} =0V			1	uA
		V _{DS} =32V, V _{GS} =0V T _J =85°C			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	



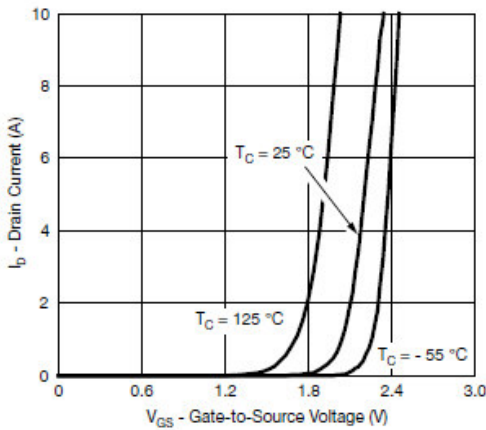
Typical Characteristics



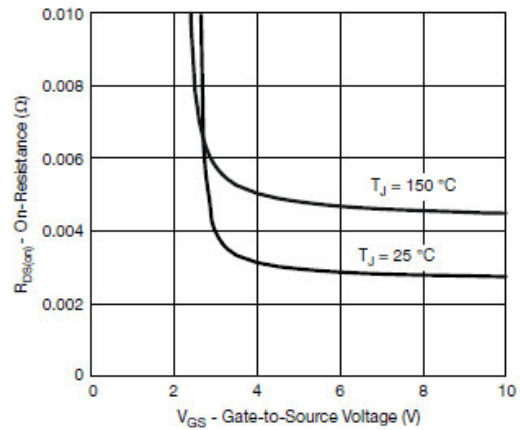
Output Characteristics



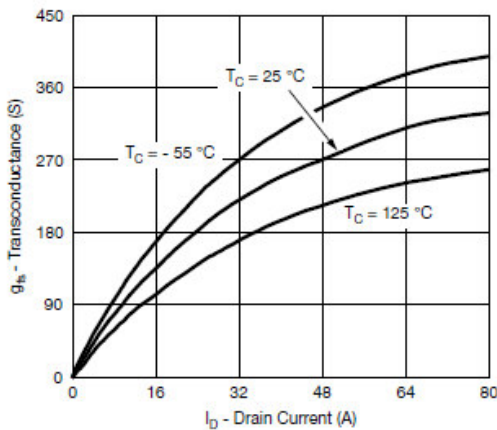
On-Resistance vs. Drain Current



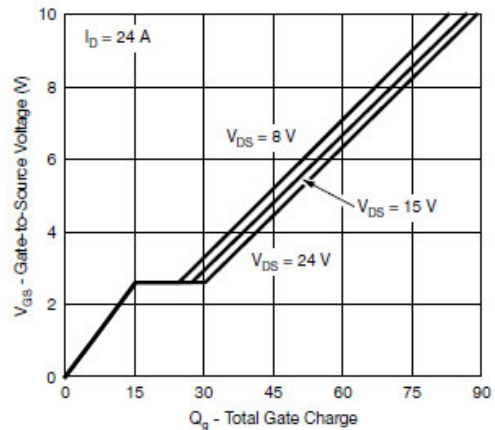
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage



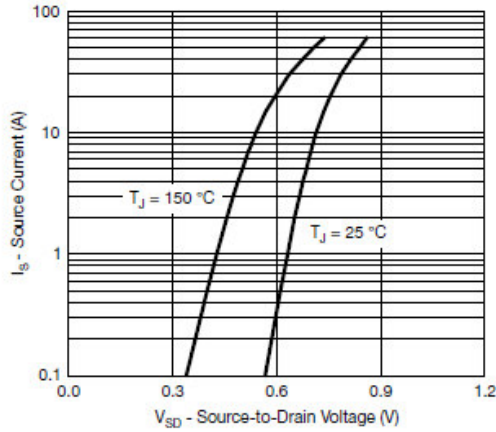
Transconductance



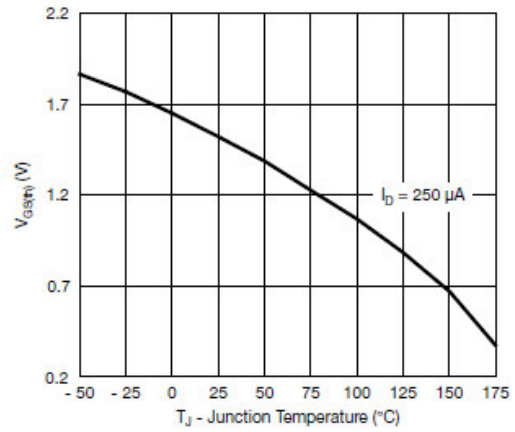
Gate Charge



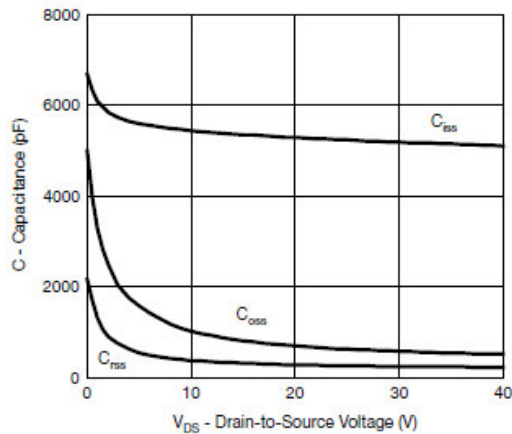
Typical Characteristics



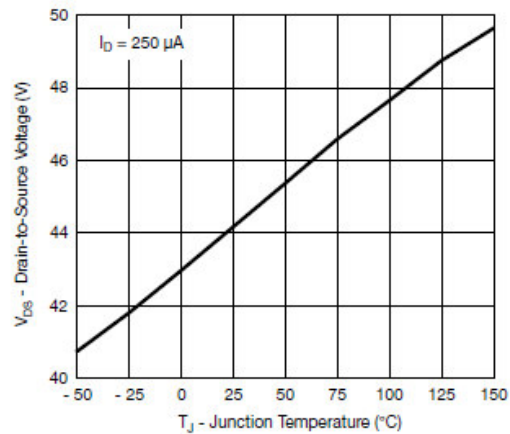
Source-Drain Diode Forward Voltage



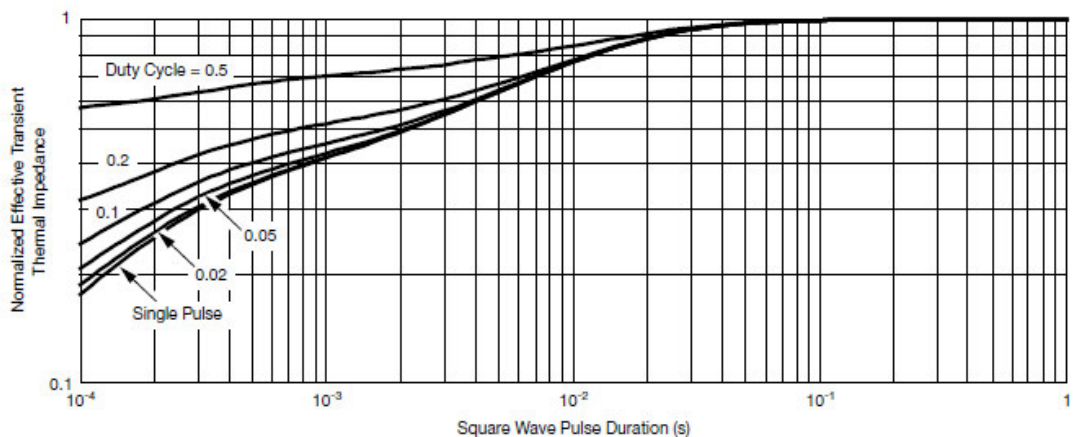
Threshold Voltage



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

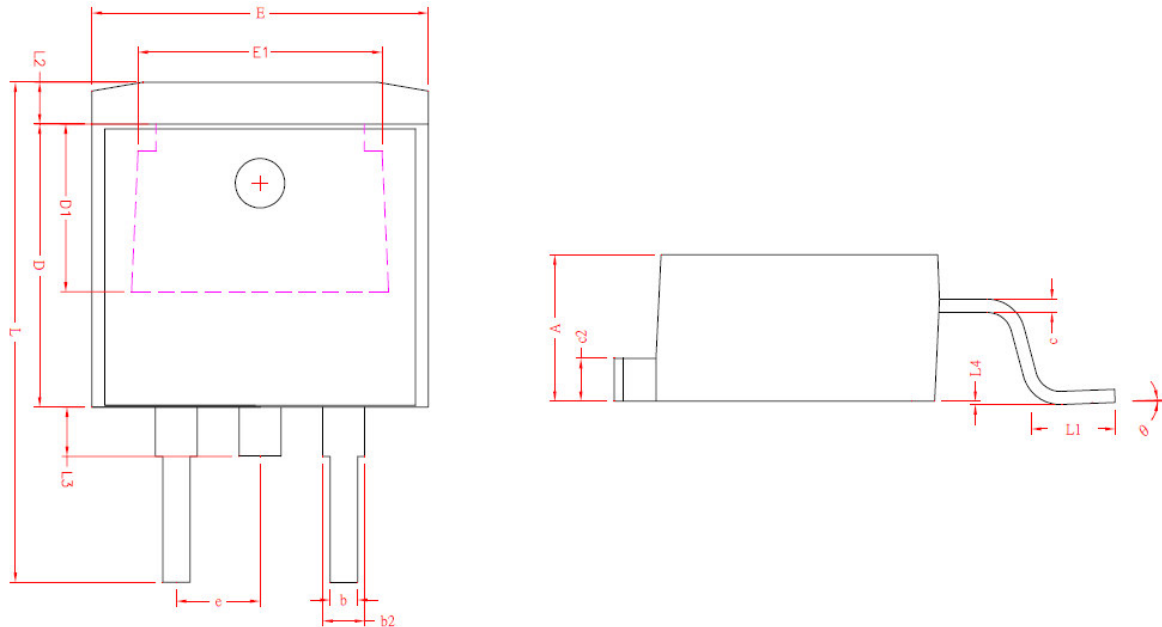


Unclamped Inductive Switching Test Circuit & Waveforms





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	$0^\circ \pm 3^\circ$	
E1	7.40 REF.		L2	1.27 REF.	

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