



General Description

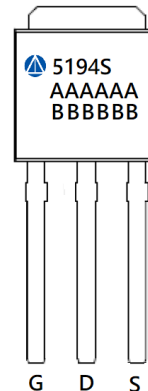
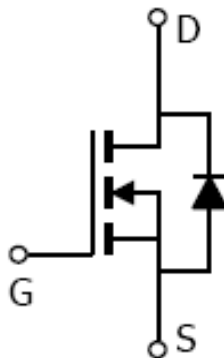
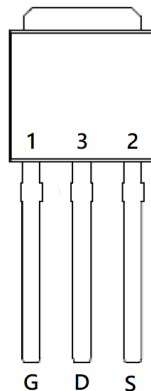
AFN5194S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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/20A, $R_{DS(ON)}=3.2m\Omega@V_{GS}=10V$
- 40V/15A, $R_{DS(ON)}=4.0m\Omega@V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- TO-251-3L package design

Pin Description (TO-251-3L)



Application

- Primary Side Switch
- POL Synchronous buck converter
- LED Backlight for LCD TV

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN5194ST251TG	5194S	TO-251-3L	Tube	80 EA

- ※ A Lot code
- ※ B Date code
- ※ AFN5194ST251TG : Tube ; Pb- Free ; Halogen –Free



Absolute Maximum Ratings

(T_A=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 _{DSM}	T _C =25°C	130
		T _C =70°C	105
Pulsed Drain Current (t=100us)	I _{DM}	T _A =25°C	40
		T _A =70°C	32
Continuous Source Current(Diode Conduction)	I _S	42	A
Single Pulse Avalanche Current	E _{AS}	T _C =25°C	4.2
		T _A =25°C	35
Power Dissipation	P _D	L=0.1mH	60
		T _C =25°C	48
Operating Junction Temperature	T _J	T _C =75°C	30
		T _A =75°C	3.0
Storage Temperature Range	T _{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient	R _{θJA}	22	°C/W
Maximum Junction-to-Case (Drain)	R _{θJA}	1.7	

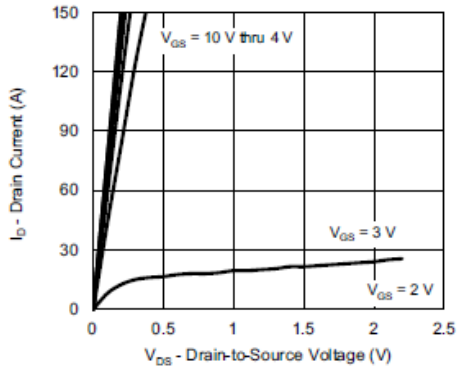
Electrical Characteristics

(T_A=25°C Unless otherwise noted)

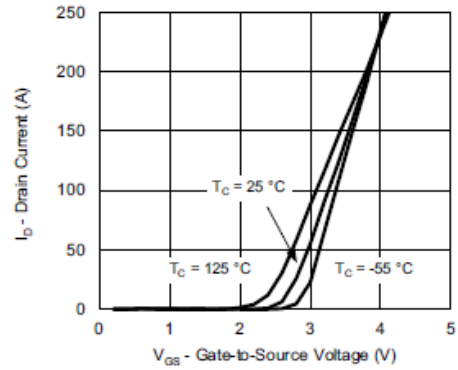
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250uA	40	46		V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0		2.5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =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} ≥ 5V, V _{GS} =10V	30			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		2.7	3.2	mΩ
		V _{GS} =4.5V, I _D =15A		3.4	4.0	
Forward Transconductance	g _{FS}	V _{DS} =10, I _D =15A		95		S
Diode Forward Voltage	V _{SD}	I _S =5A, V _{GS} =0V		0.75	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =4.5V I _D ≧10A		30	60	nC
Gate-Source Charge	Q _{gs}			15		
Gate-Drain Charge	Q _{gd}			5		
Gate Resistance	R _g	f=1MHz	0.4	1.1	20	Ω
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f=1MHz		4850		pF
Output Capacitance	C _{oss}			1100		
Reverse Transfer Capacitance	C _{rss}			75		
Turn-On Time	t _{d(on)}	V _{DD} =20V, R _L =2Ω I _D ≧10A, V _{GEN} =10V R _G =1Ω		20	40	ns
	t _r			6	12	
Turn-Off Time	t _{d(off)}			40	80	
	t _f			6	12	



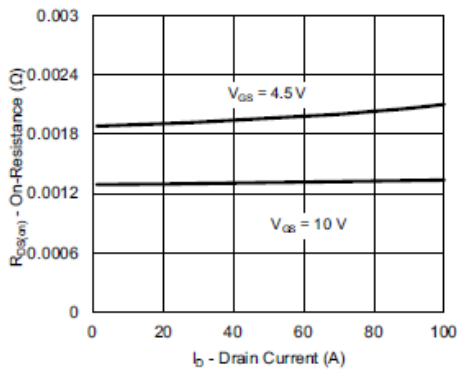
Typical Characteristics



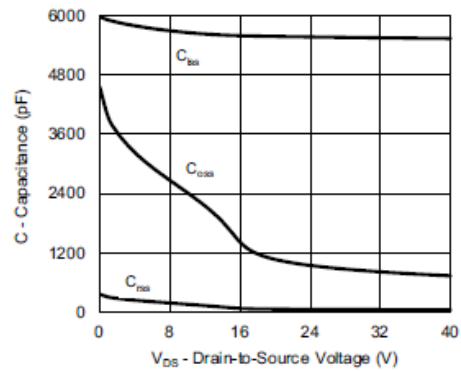
Output Characteristics



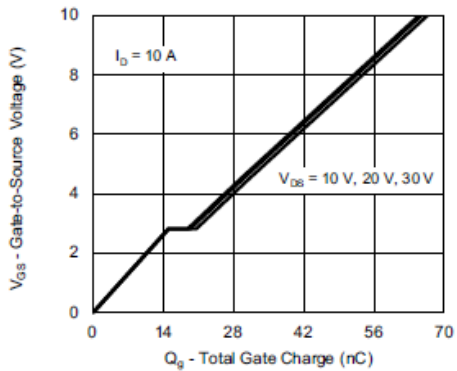
Transfer Characteristics



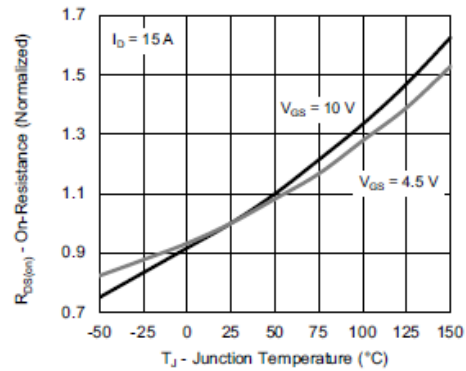
On-Resistance vs. Drain Current



Capacitance



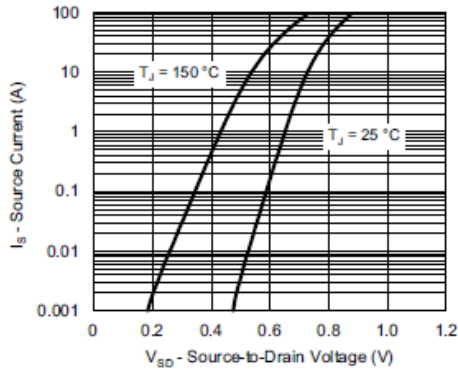
Gate Charge



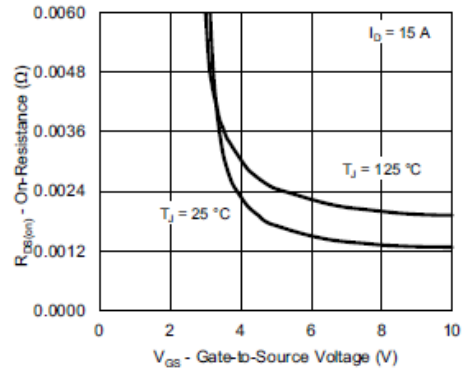
On-Resistance vs. Junction Temperature



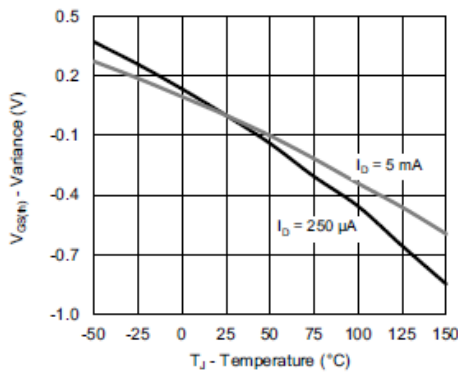
Typical Characteristics



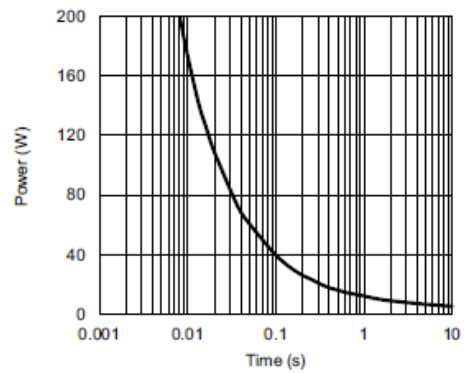
Source-Drain Diode Forward Voltage



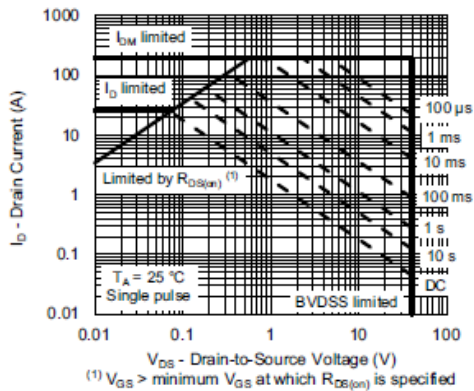
On-Resistance vs. Gate-to-Source Voltage



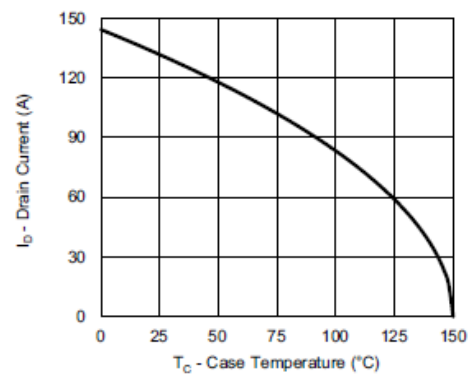
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



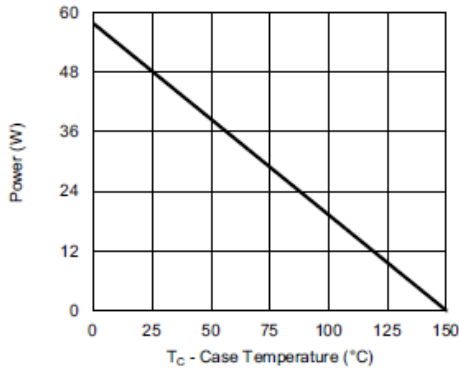
Safe Operating Area



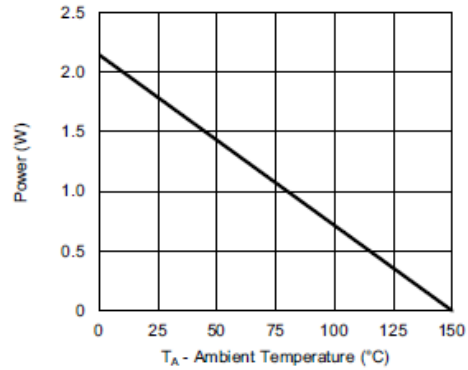
Current Derating ^a



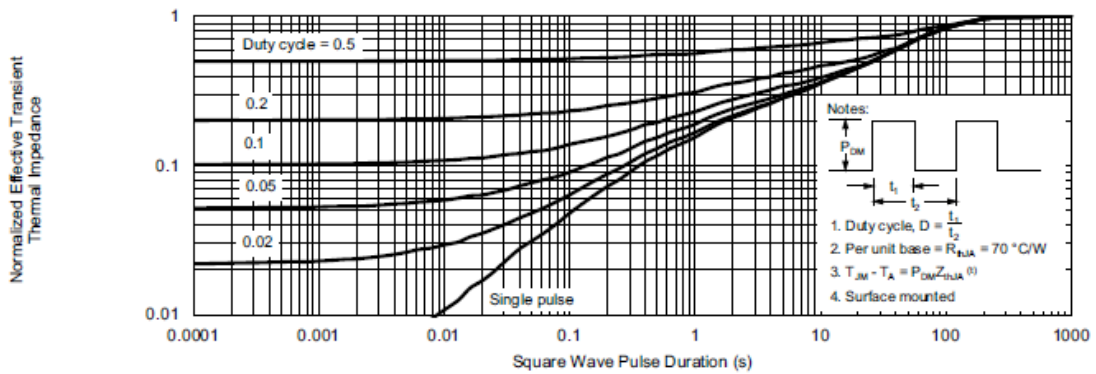
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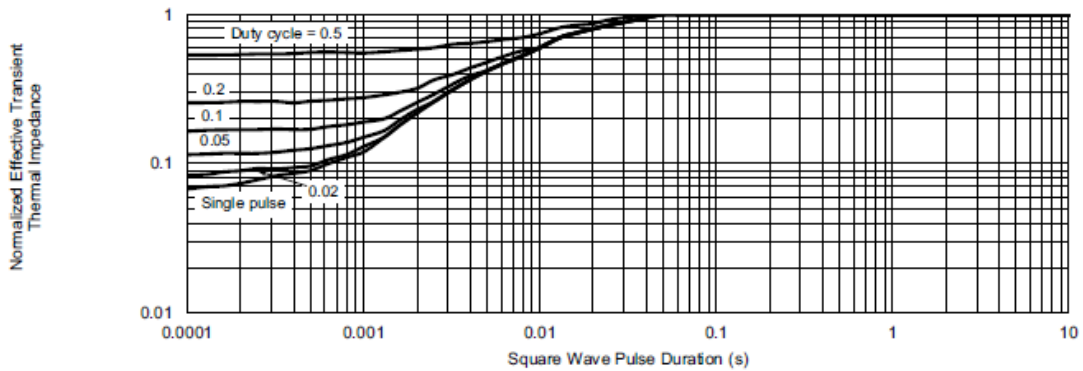
Power, Junction-to-Case



Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

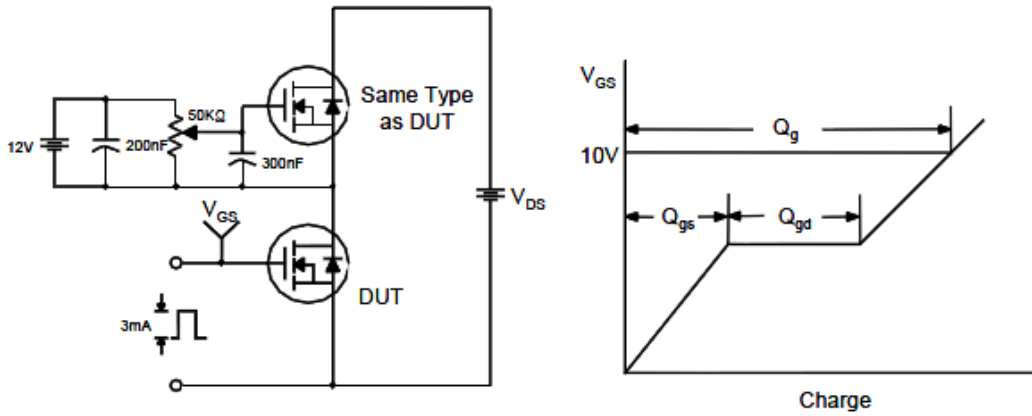


Normalized Thermal Transient Impedance, Junction-to-Case

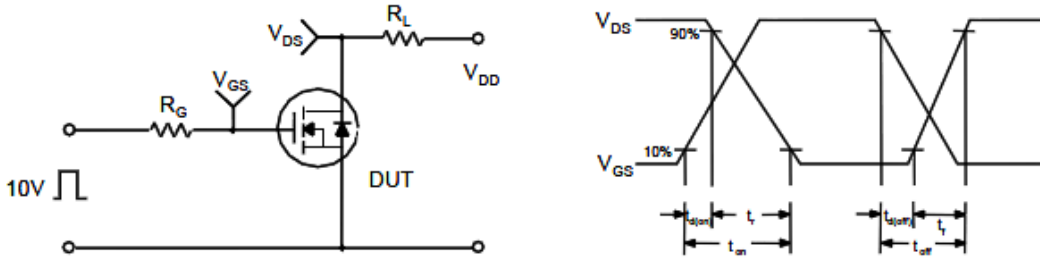


Typical Characteristics

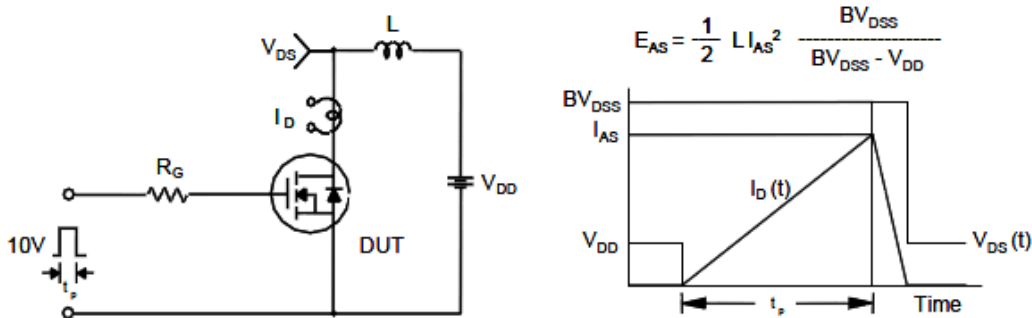
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

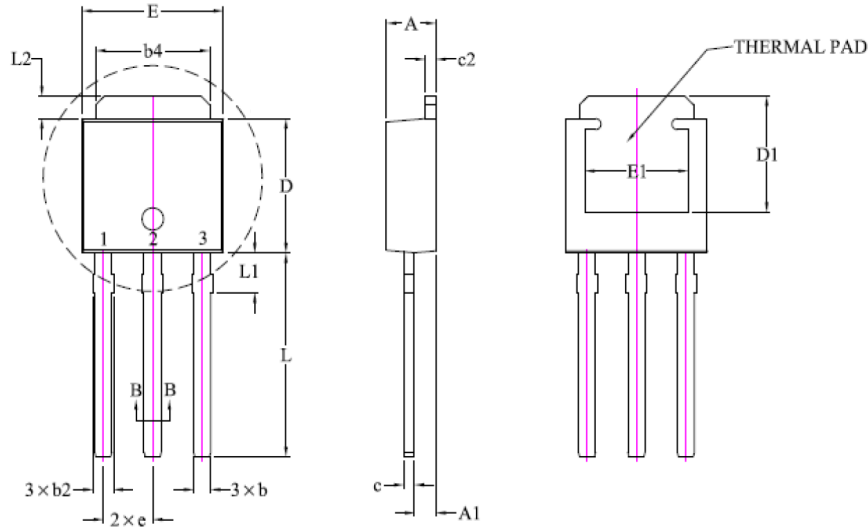


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (TO-251-3L)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	2.220	2.420	0.087	0.095
A1	0.890	1.140	0.035	0.045
b	0.550	0.670	0.022	0.026
b1	0.550	0.650	0.022	0.025
b2	0.760	0.960	0.030	0.038
b4	5.200	5.400	0.205	0.213
c	0.460	0.570	0.018	0.023
c1	0.450	0.550	0.018	0.022
c2	0.450	0.550	0.018	0.022
D	5.950	6.250	0.234	0.246
D1	4.200	4.500	0.165	0.177
E	6.400	6.700	0.252	0.264
E1	4.750	4.850	0.187	0.191
e	2.28 REF		0.090 REF	
L	8.900	9.500	0.350	0.374
L1	1.900	2.290	0.075	0.090
L2	0.900	1.000	0.035	0.039

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