



General Description

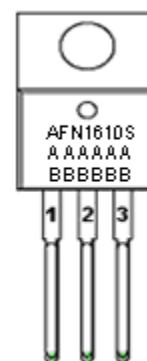
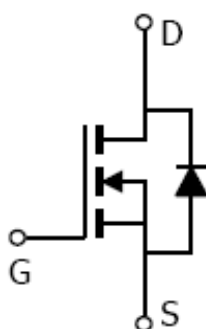
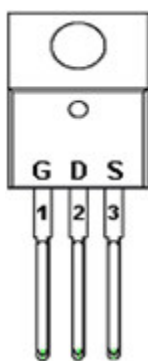
AFN1610S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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

- 100V/10A, $R_{DS(ON)} = 22m\Omega @ V_{GS} = 10V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- TO-220-3L package design

Pin Description (TO-220-3L)



Application

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

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN1610ST220TG	AFN1610S AAAAAA BBBBBB	TO-220-3L	Tube	50 EA

- ※ A Lot code
- ※ B Date code
- ※ AFN1610ST220TG : Tube ; Pb- Free ; Halogen- Free



Absolute Maximum Ratings

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	100	V
Gate –Source Voltage	V _{GSS}	±20	V
Continuous Drain Current(T _J =150°C)	I _D	T _C =25°C	50
		T _C =70°C	40
Pulsed Drain Current	I _{DM}	60	A
Continuous Source Current(Diode Conduction)	I _S	50	
Single Pulse Avalanche Current	I _{AS}	40	
Power Dissipation	P _D	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

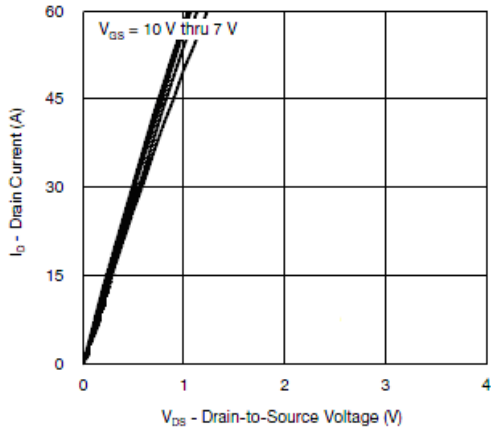
Electrical Characteristics

(T_A=25°C Unless otherwise noted)

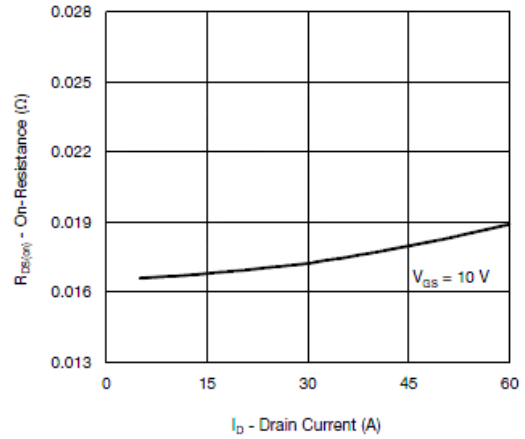
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250uA	100			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2.5		4.5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =80V, V _{GS} =0V			1	uA
		V _{DS} =80V, V _{GS} =0V T _J =85°C			30	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 10V, V _{GS} = 10V	20			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =10A		18.5	22	mΩ
Forward Transconductance	g _{FS}	V _{DS} =20V, I _D =10A		40		S
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V		0.8	1.3	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =50V, V _{GS} =10V I _D ≡10A		45	90	nC
Gate-Source Charge	Q _{gs}			11		
Gate-Drain Charge	Q _{gd}			16		
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V f=1MHz		2100		pF
Output Capacitance	C _{oss}			250		
Reverse Transfer Capacitance	C _{rss}			120		
Turn-On Time	t _{d(on)}	V _{DD} =20V, R _L =2Ω I _D ≡8A, V _{GEN} =10V		10	20	ns
	t _r			10	20	
Turn-Off Time	t _{d(off)}	R _G =1Ω		25	50	
	t _f			8	15	



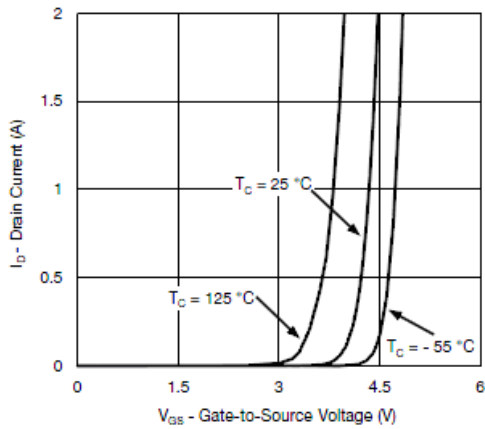
Typical Characteristics



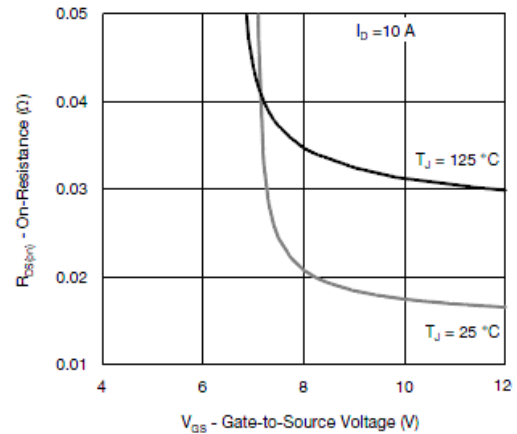
Output Characteristics



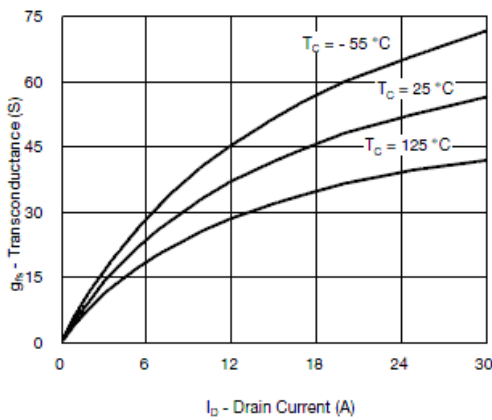
On-Resistance vs. Drain Current



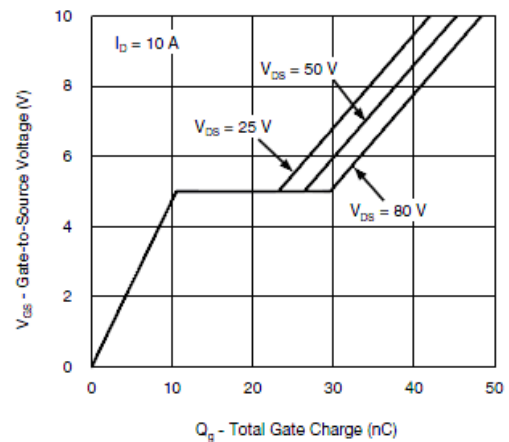
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage



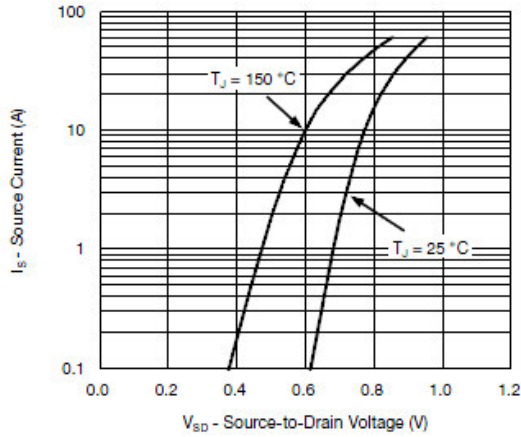
Transconductance



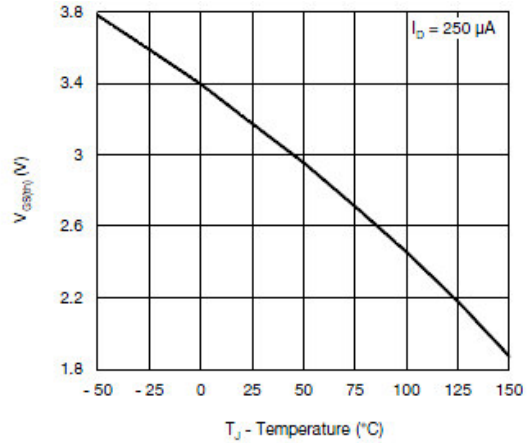
Gate Charge



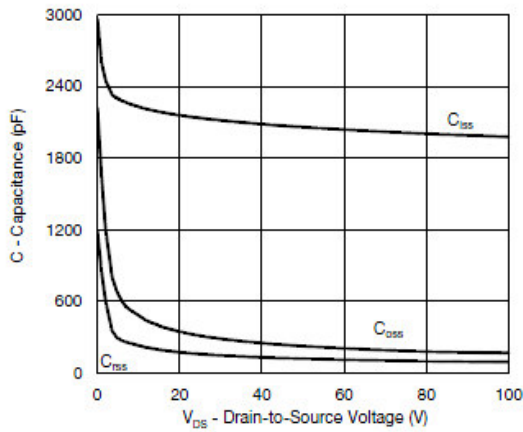
Typical Characteristics



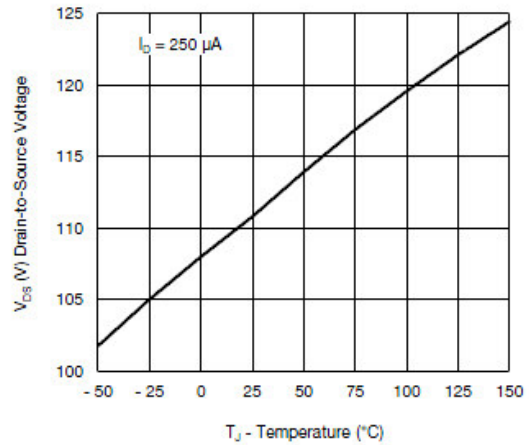
Source-Drain Diode Forward Voltage



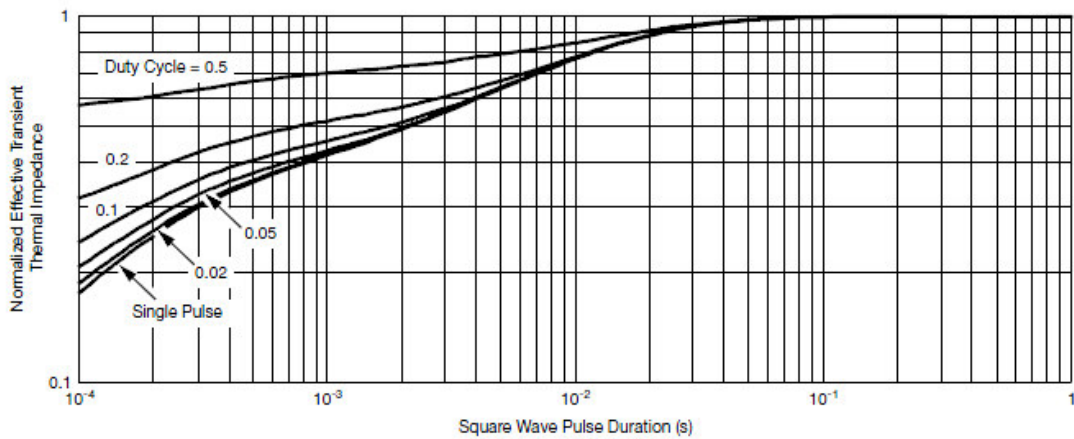
Threshold Voltage



Capacitance



Drain Source Breakdown vs. Junction Temperature



Normalized Thermal Transient Impedance, Junction-to-Case

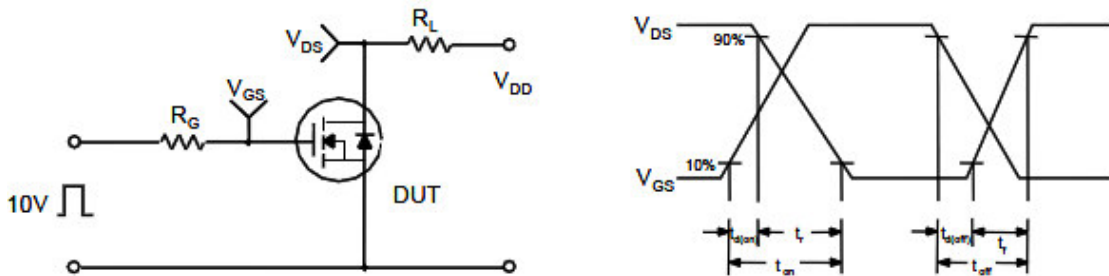


Typical Characteristics

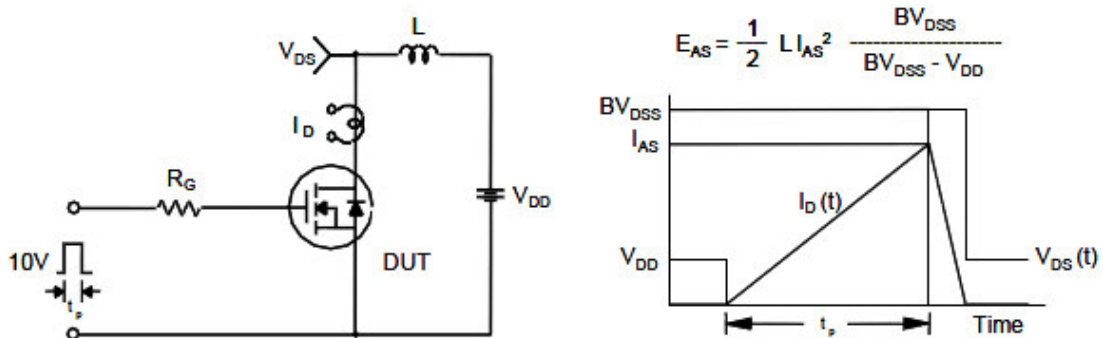
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

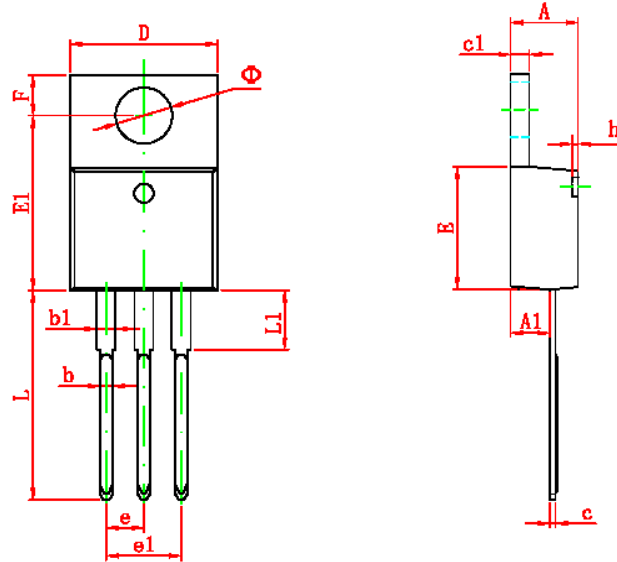


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (TO-220-3L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
• •	3.735	3.935	0.147	0.155

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