



General Description

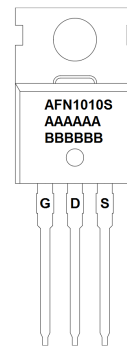
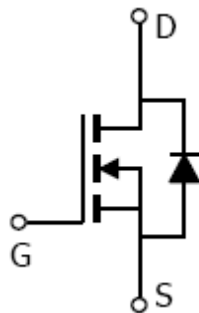
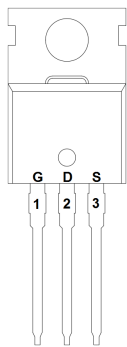
AFN1010S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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

Features

- 100V/15A, $R_{DS(ON)} = 8.8m\Omega @ V_{GS} = 10V$
- 100V/10A, $R_{DS(ON)} = 13m\Omega @ V_{GS} = 4.5V$
- Super high density cell design for low $R_{DS(ON)}$
- TO-220-3L package design

Pin Description (TO-220-3L)



Application

- Power Supply - Secondary Synchronous Rectification
- DC/DC converter
- DC/AV inverter
- Power tools
- Motor drive switch

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN1010ST220TG	AFN1010S AAAAAA BBBBBB	TO-220-3L	Tube	50 EA

- ※ A Lot code
- ※ B Date code
- ※ AFN1010ST220TG : Tube ; Pb- Free ; Halogen –Free



Absolute Maximum Ratings

($T_A=25^\circ\text{C}$ Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current ($T_J=150^\circ\text{C}$)	I_D	$T_c=25^\circ\text{C}$	80
		$T_c=70^\circ\text{C}$	40
Pulsed Drain Current	I_{DM}	135	A
Single Pulse Avalanche Current	I_{AS}	40	
Single Avalanche Energy	E_{AS}	80	mJ
Power Dissipation	P_D	125	W
Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55/150	$^\circ\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	40	$^\circ\text{C/W}$
Thermal Resistance-Junction to Case	$R_{\theta JC}$	1.2	

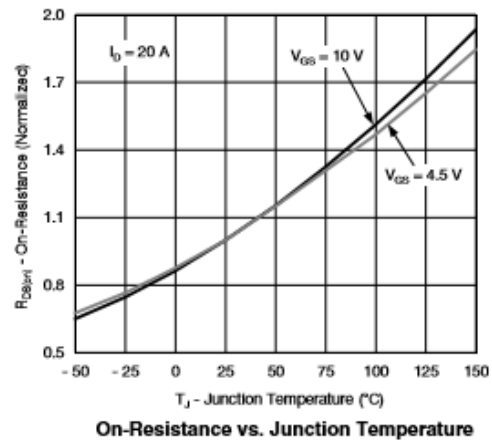
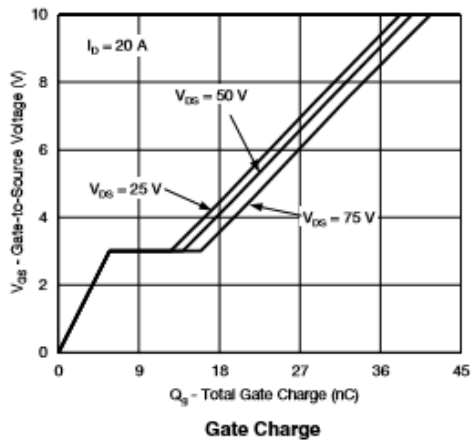
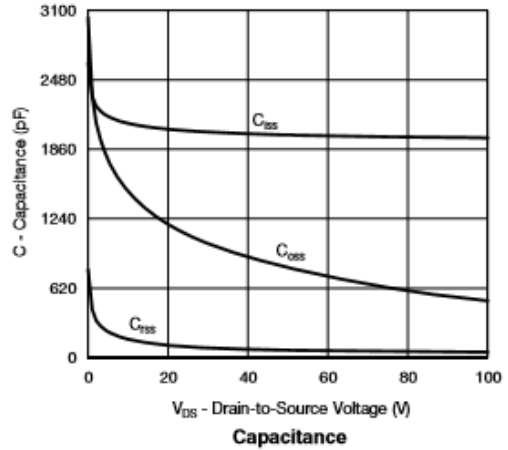
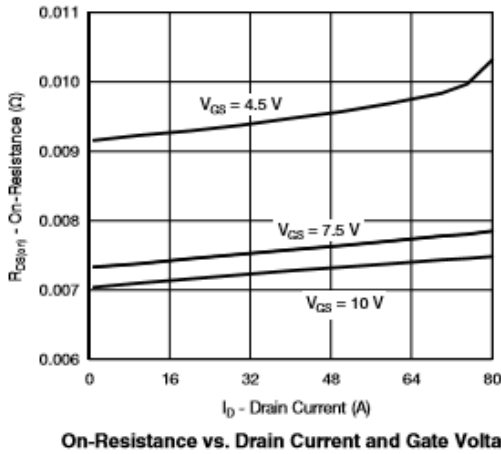
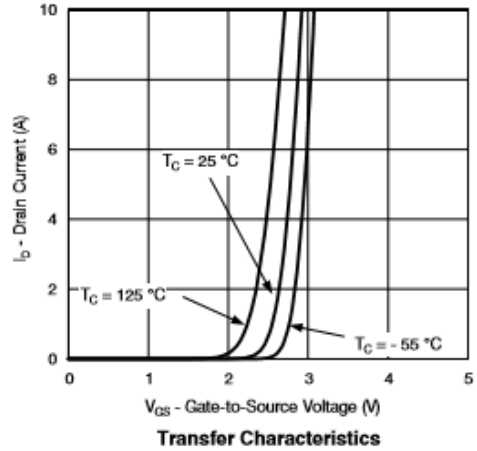
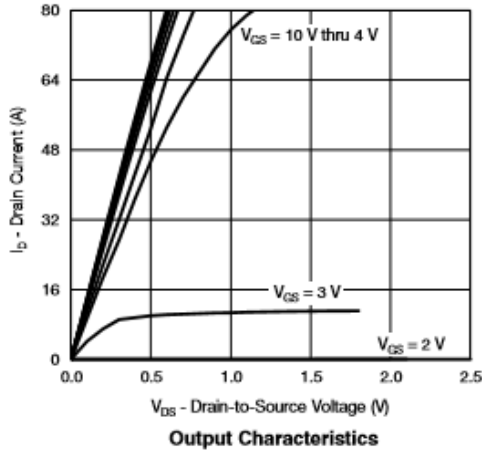
Electrical Characteristics

($T_A=25^\circ\text{C}$ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu\text{A}$	100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.2		2.5	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$			1	uA
		$V_{DS}=80V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=10V$	30			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		8	8.8	m Ω
		$V_{GS}=4.5V, I_D=10A$		11.5	13	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=20A$		60		S
Diode Forward Voltage	V_{SD}	$I_S=5A, V_{GS}=0V$		0.8	1.3	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=50V, V_{GS}=4.5V$ $I_D=10A$		20	40	nC
Gate-Source Charge	Q_{gs}		6			
Gate-Drain Charge	Q_{gd}		9			
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V$ $f=1\text{MHz}$		2050		pF
Output Capacitance	C_{oss}		825			
Reverse Transfer Capacitance	C_{rss}		60			
Turn-On Time	$t_{d(on)}$	$V_{DD}=50V, R_L=5\Omega$ $I_D=10A, V_{GEN}=10V$ $R_G=1\Omega$		12	25	ns
	t_r			10	20	
Turn-Off Time	$t_{d(off)}$			35	70	
	t_f			10	20	

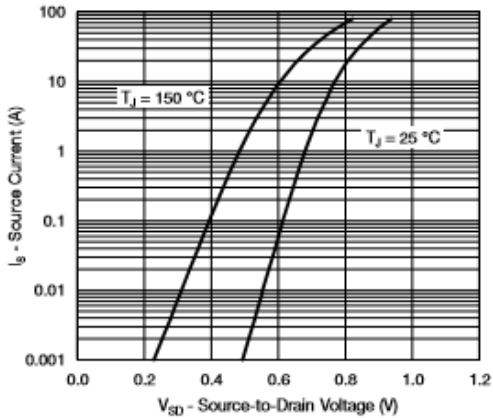


Typical Characteristics

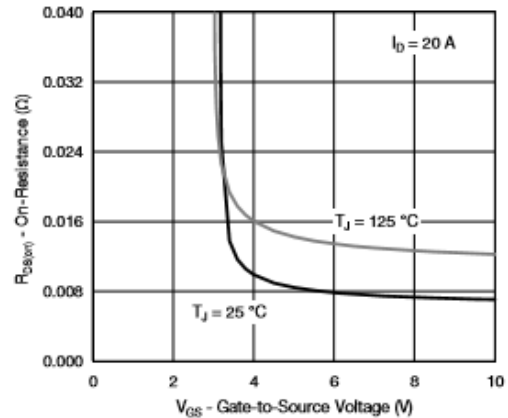




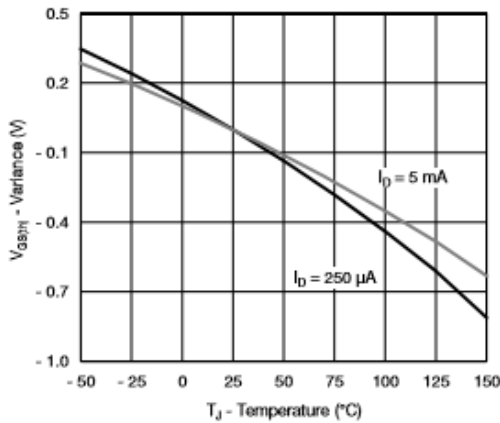
Typical Characteristics



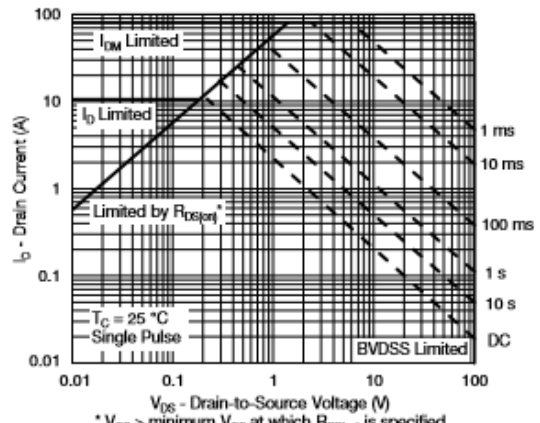
Source-Drain Diode Forward Voltage



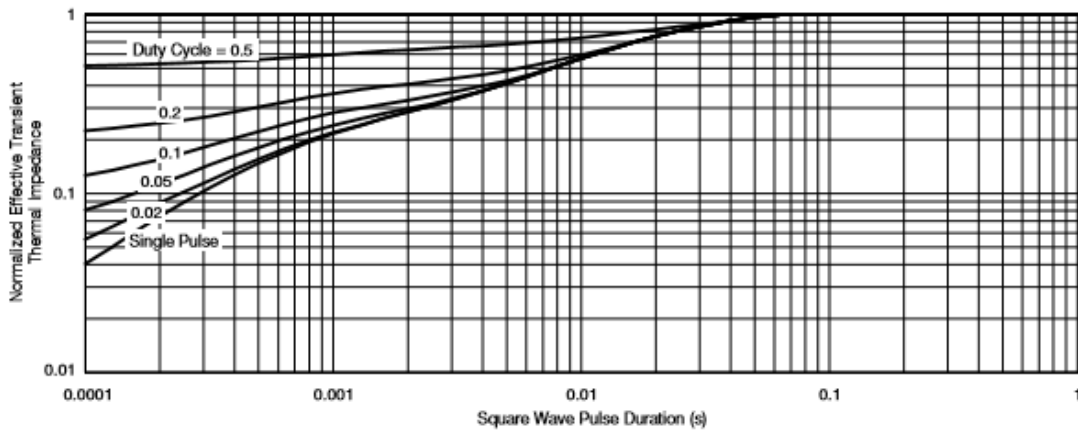
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case



Typical Characteristics

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

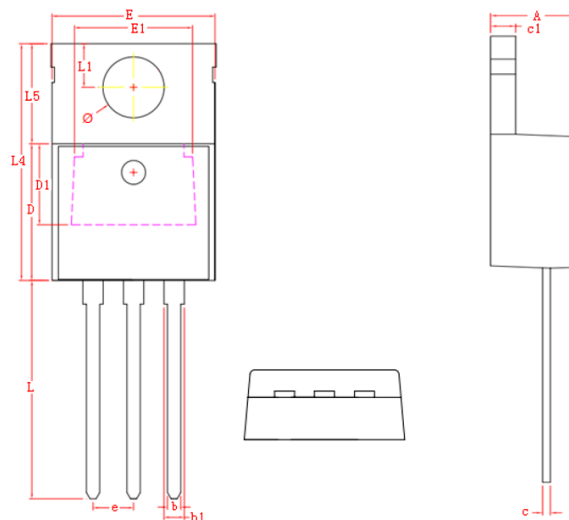


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (TO-220-3L)



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.40	4.60	4.80
b	0.76	0.88	1.00
D	8.60	8.80	9.00
c	0.36	0.43	0.50
E	9.80	10.10	10.40
L4	14.70	15.00	15.30
L5	6.20	6.40	6.60
D1	5.10 REF.		
c1	1.25	1.35	1.45
b1	1.17	1.32	1.47
L	13.25	13.75	14.25
e	2.54 REF.		
L1	2.60	2.75	2.89
Ø	3.71	3.84	3.96
E1	7.40 REF.		

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