Alfa-MOS Technology

AFN7412
20V N-Channel Enhancement Mode MOSFET

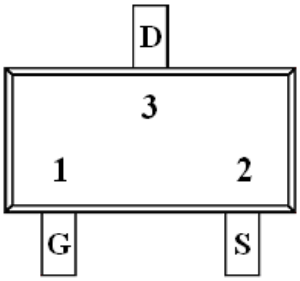
General Description

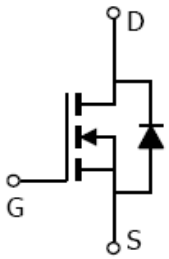
AFN7412, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.
These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

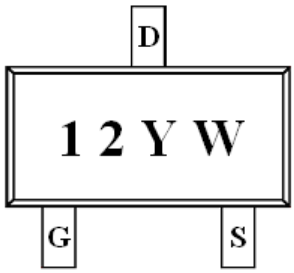
Features

- 20V/3.8A,$R_{DS(ON)}$=52mΩ@V_{GS}=4.5V
- 20V/3.2A,$R_{DS(ON)}$=56mΩ@V_{GS}=2.5V
- 20V/2.8A,$R_{DS(ON)}$=68mΩ@V_{GS}=1.8V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-323 package design

Pin Description (SOT-323)







Application

- Portable Equipment
- Battery Powered System
- Net Working System

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN7412S32RG	12YW	SOT-323	Tape & Reel	3000 EA

※ 12 parts code
※ Y year code (0 ~ 9)
※ W week code (A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52)
※ AFN7412S32RG : 7” Tape & Reel ; Pb- Free ; Halogen- Free

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

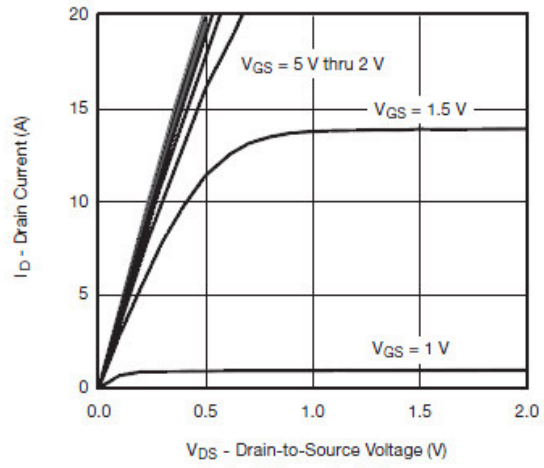
Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate –Source Voltage		V_{GSS}	±12	V
Continuous Drain Current(T_J=150℃)	T_A=25℃	I_D	3.8	A
	T_A=70℃		2.6	
Pulsed Drain Current		I_{DM}	10	A
Continuous Source Current(Diode Conduction)		I_S	1.6	A
Power Dissipation	T_A=25℃	P_D	0.35	W
	T_A=70℃		0.22	
Operating Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	120	℃/W

Electrical Characteristics

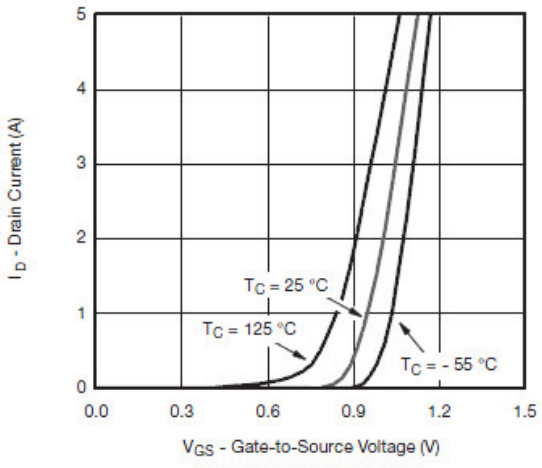
(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	0.4		0.8	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V,V_{GS}=0V			1	uA
		V_{DS}=16V,V_{GS}=0V T_J=85℃			10	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=4.5V	6			A
		V_{DS}≧5V,V_{GS}=2.5V	4			
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=3.8A		48	52	mΩ
		V_{GS}=2.5V,I_D=3.2A		52	56	
		V_{GS}=1.8V,I_D=2.6A		62	68	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=3.6A		10		S
Diode Forward Voltage	V_{SD}	I_S=1.6A,V_{GS}=0V		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=10V,V_{GS}=4.5V I_D≡4.0A		8.2	14	nC
Gate-Source Charge	Q_{gs}			1.2		
Gate-Drain Charge	Q_{gd}			1.0		
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V f=1MHz		850		pF
Output Capacitance	C_{oss}			120		
Reverse Transfer Capacitance	C_{rss}			60		
Turn-On Time	$t_{d(on)}$	V_{DD}=10V,R_L=2.2Ω I_D≡4.0A,V_{GEN}=4.5V R_G=1Ω		10	16	ns
	t_r			16	25	
Turn-Off Time	$t_{d(off)}$			31	45	
	t_f			10	16	

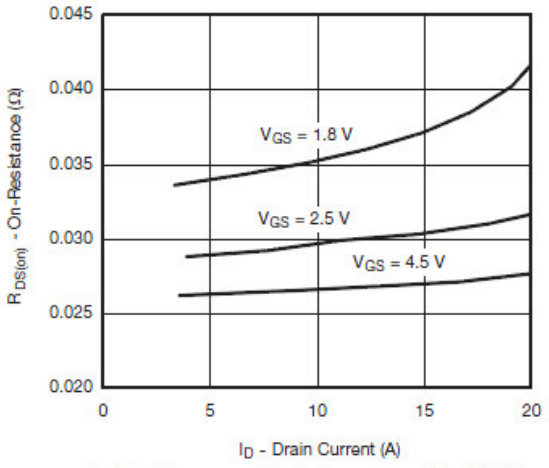
Typical Characteristics



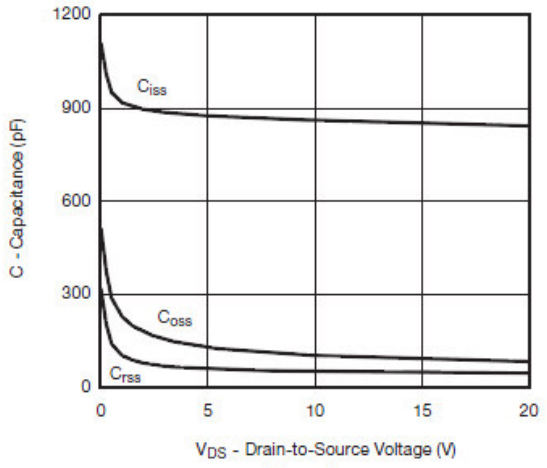
Output Characteristics



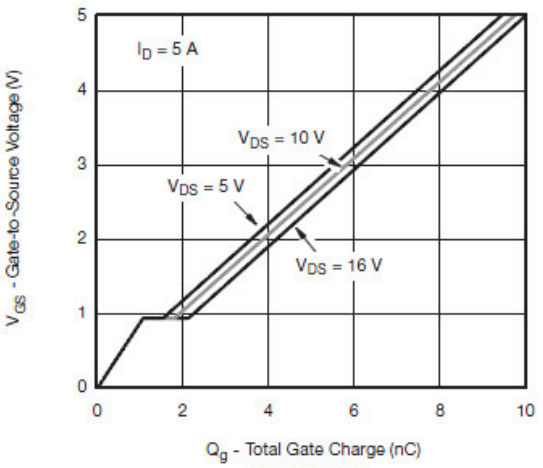
Transfer Characteristics



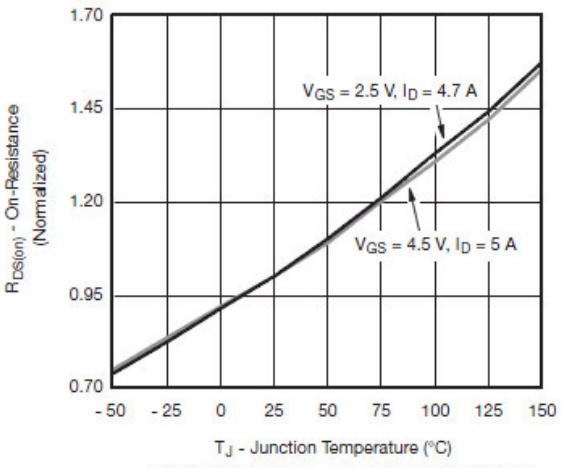
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

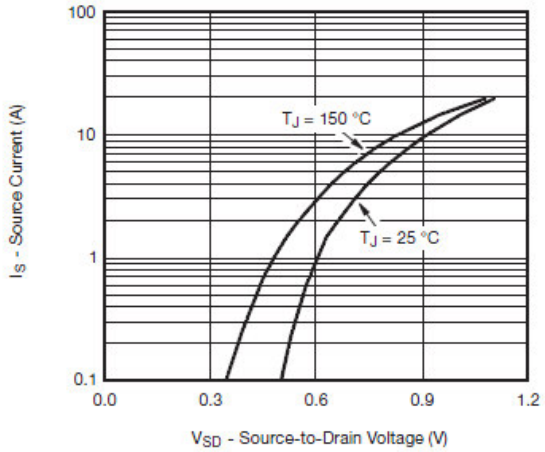


Gate Charge

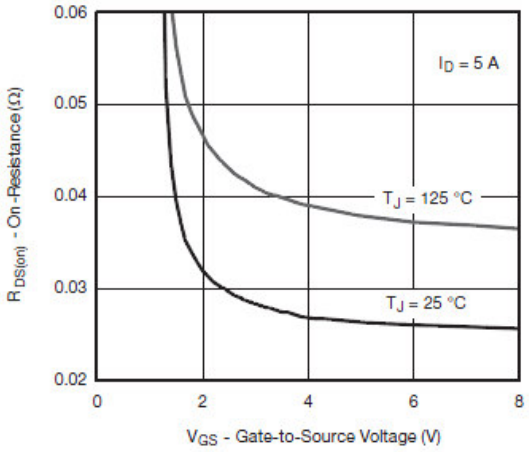


On-Resistance vs. Junction Temperature

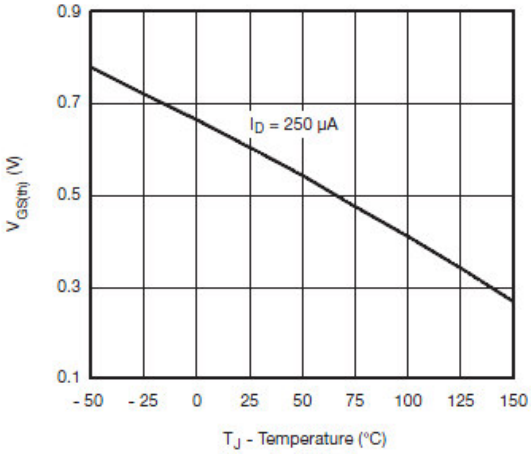
Typical Characteristics



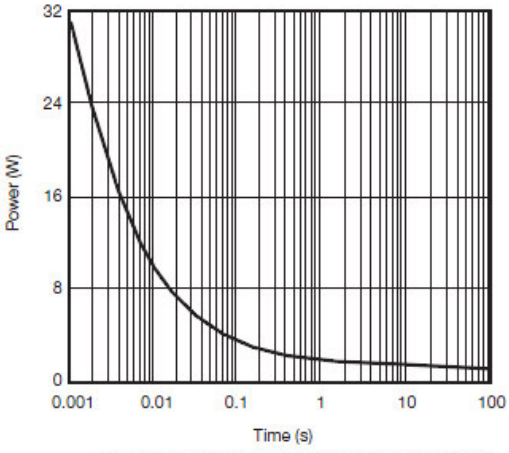
Source-Drain Diode Forward Voltage



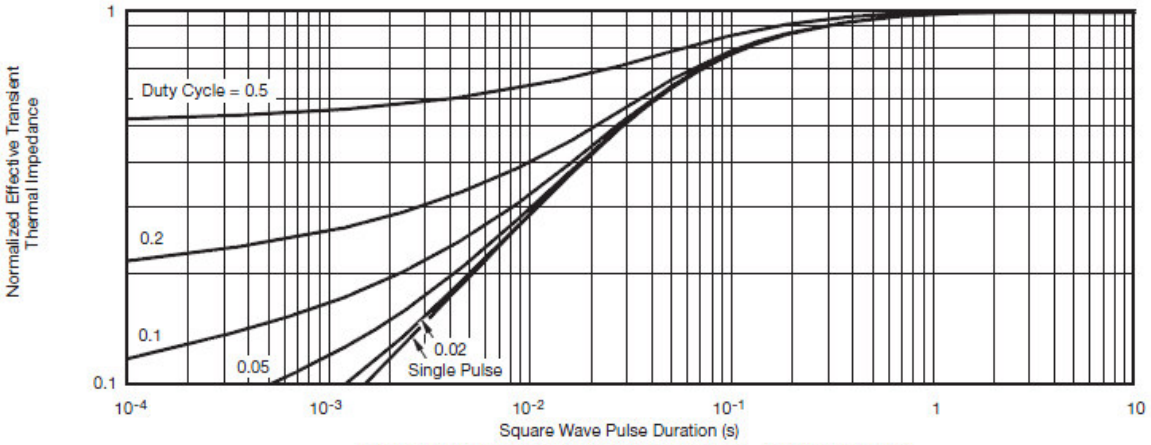
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



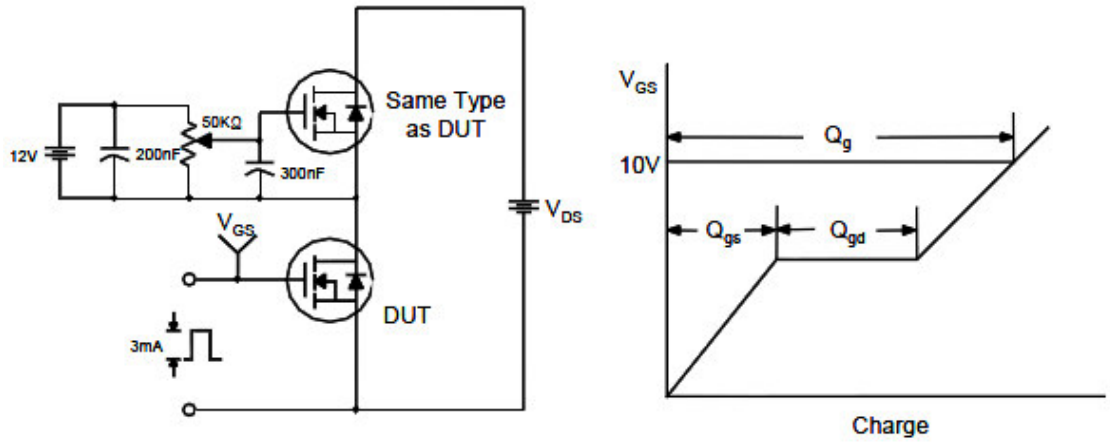
Single Pulse Power (Junction-to-Ambient)



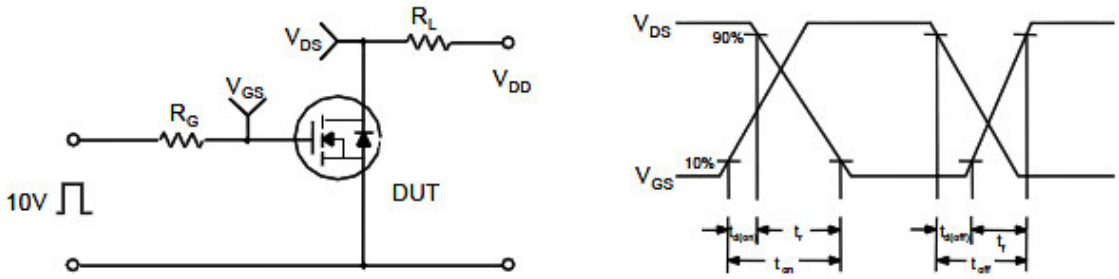
Normalized Thermal Transient Impedance, Junction-to-Foot

Typical Characteristics

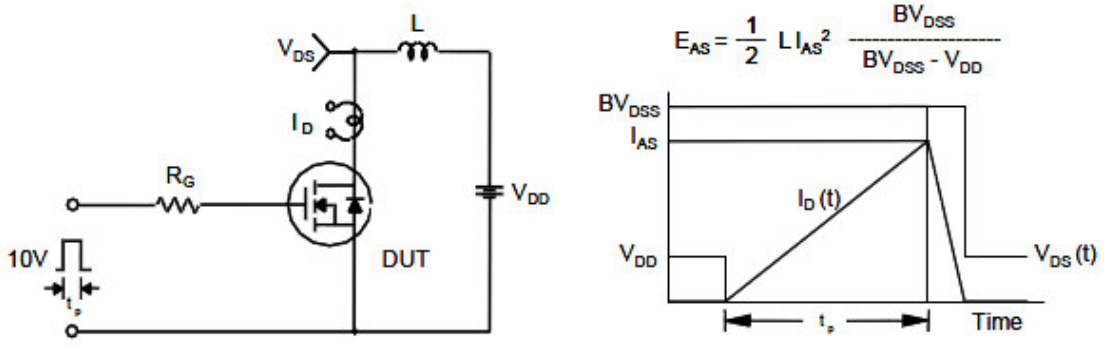
Gate Charge Test Circuit & Waveform



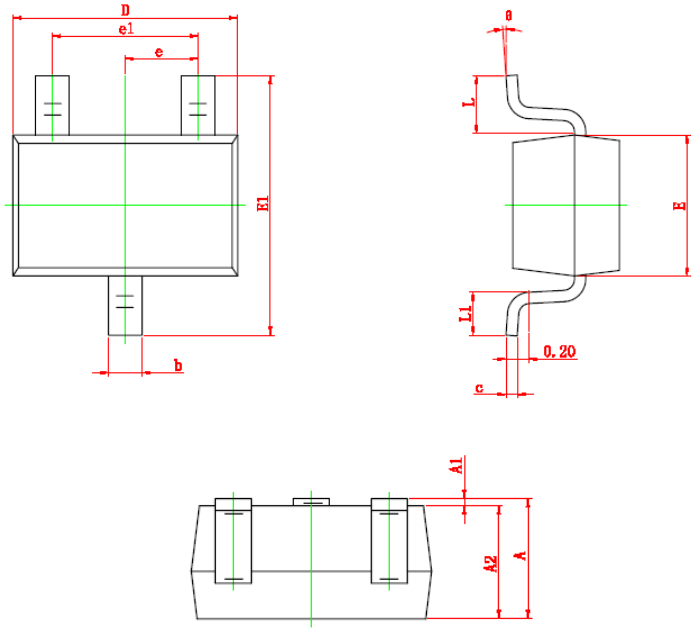
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Package Information (SOT-323)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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