



**Alfa-MOS
Technology**

**AFP3413
20V P-Channel
Enhancement Mode MOSFET**

General Description

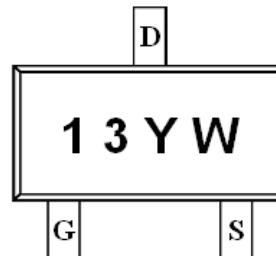
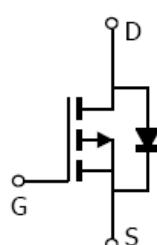
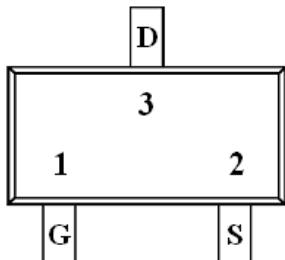
AFP3413, P-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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

- $I_D = -3.2A, R_{DS(ON)} = 95m\Omega @ V_{GS} = -4.5V$
- $I_D = -2.6A, R_{DS(ON)} = 125m\Omega @ V_{GS} = -2.5V$
- $I_D = -1.5A, R_{DS(ON)} = 205m\Omega @ V_{GS} = -1.8V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23-3L package design

Pin Description (SOT-23-3L)



Application

- Power Management in Note book
- 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
AFP3413S23RG	13YW	SOT-23-3L	Tape & Reel	3000 EA

- ※ 13 parts code
- ※ Y year code (0 ~ 9)
- ※ W week code (A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52)
- ※ AFP3413S23RG : 7" Tape & Reel ; Pb- Free ; Halogen -Free



Absolute Maximum Ratings

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-20	V
Gate -Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current($T_J=150^\circ\text{C}$)	I_D	-3.2	A
$T_A=70^\circ\text{C}$		-2.6	
Pulsed Drain Current	I_{DM}	-10	A
Continuous Source Current(Diode Conduction)	I_S	-1.6	A
Power Dissipation	P_D	1.25	W
$T_A=70^\circ\text{C}$		0.8	
Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55/150	$^\circ\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	120	$^\circ\text{C}/\text{W}$

Electrical Characteristics

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

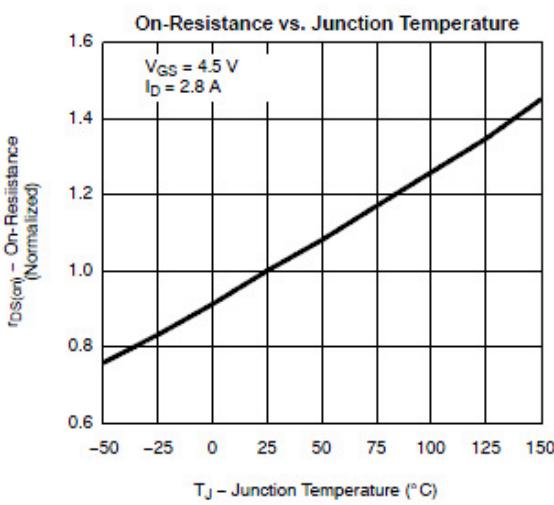
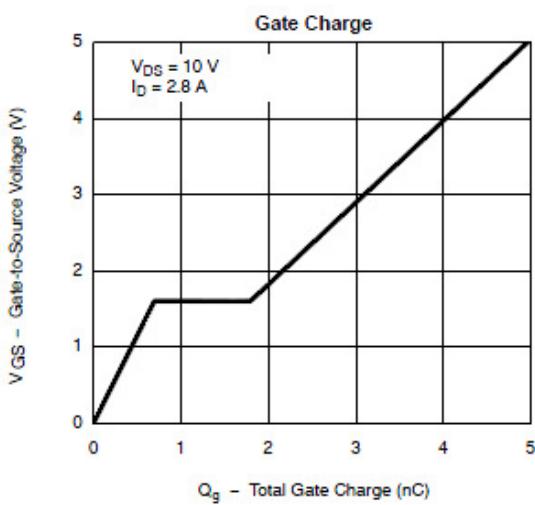
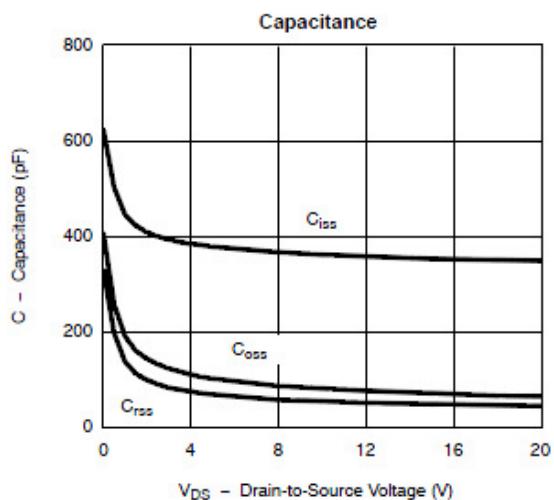
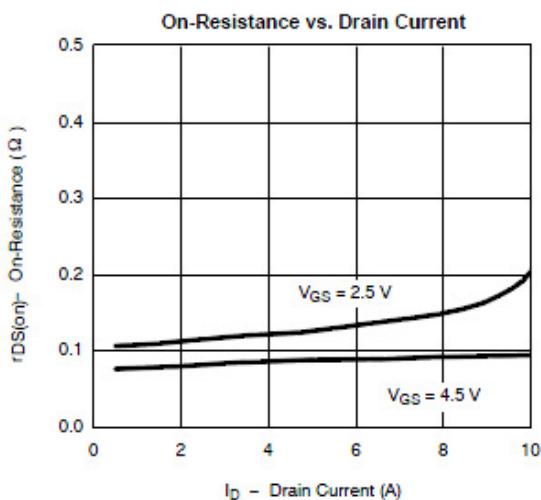
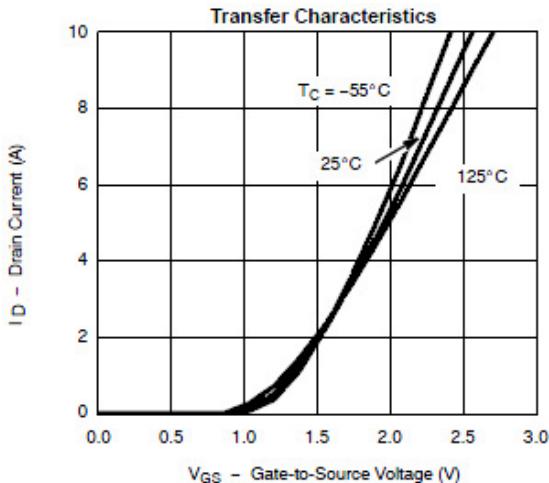
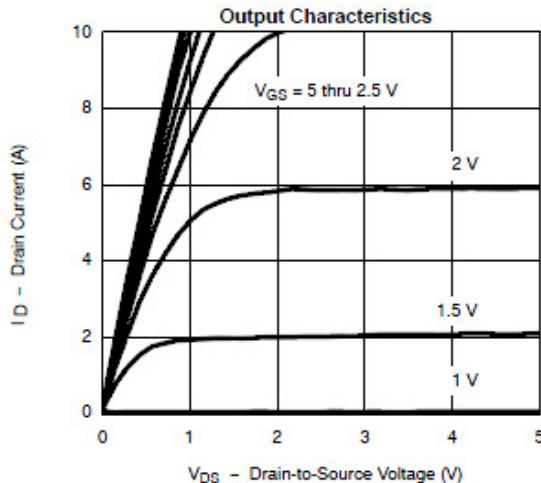
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}, I_D=-250\mu\text{A}$	-20			V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-0.35		-1.0	
Gate Leakage Current	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 12\text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-16\text{V}, V_{GS}=0\text{V}$			-1	uA
		$V_{DS}=-16\text{V}, V_{GS}=0\text{V}$ $T_J=85^\circ\text{C}$			-30	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \leq -5\text{V}, V_{GS}=-4.5\text{V}$	-6			A
		$V_{DS} \leq -5\text{V}, V_{GS}=-2.5\text{V}$	-3			
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5\text{V}, I_D=-3.2\text{A}$		78	95	m Ω
		$V_{GS}=-2.5\text{V}, I_D=-2.6\text{A}$		114	125	
		$V_{GS}=-1.8\text{V}, I_D=-1.5\text{A}$		180	205	
Forward Transconductance	g_{FS}	$V_{DS}=-5\text{V}, I_D=-2.8\text{A}$		6.5		S
Diode Forward Voltage	V_{SD}	$I_S=-1.25\text{A}, V_{GS}=0\text{V}$		-0.75	-1.3	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=-6\text{V}, V_{GS}=-4.5\text{V}$ $I_D=2.8\text{A}$		5.8	10	nC
Gate-Source Charge	Q_{gs}			0.85		
Gate-Drain Charge	Q_{gd}			1.7		
Input Capacitance	C_{iss}	$V_{DS}=-6\text{V}, V_{GS}=0\text{V}$ $f=1\text{MHz}$		415		pF
Output Capacitance	C_{oss}			223		
Reverse Transfer Capacitance	C_{rss}			87		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-6\text{V}, R_L=6\Omega$ $I_D=1.0\text{A}, V_{GEN}=-4.5\text{V}$ $R_G=6\Omega$		13	25	ns
	t_r			36	60	
Turn-Off Time	$t_{d(off)}$			42	70	
	t_f			34	60	



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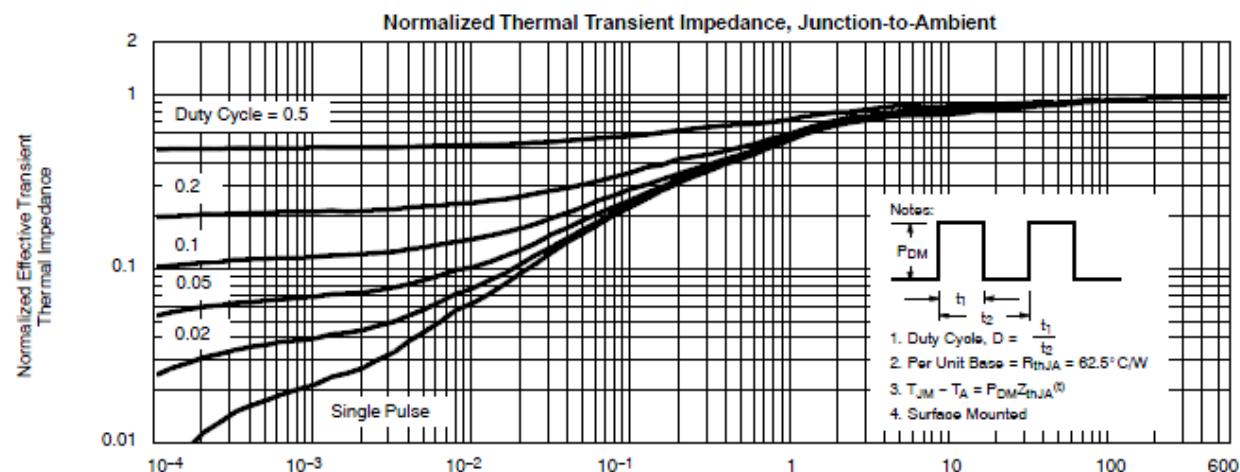
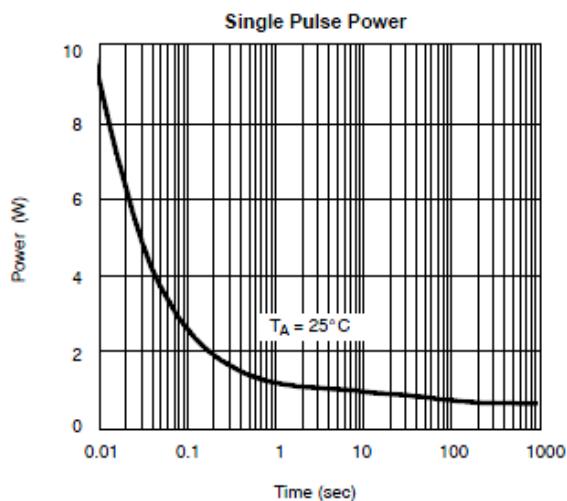
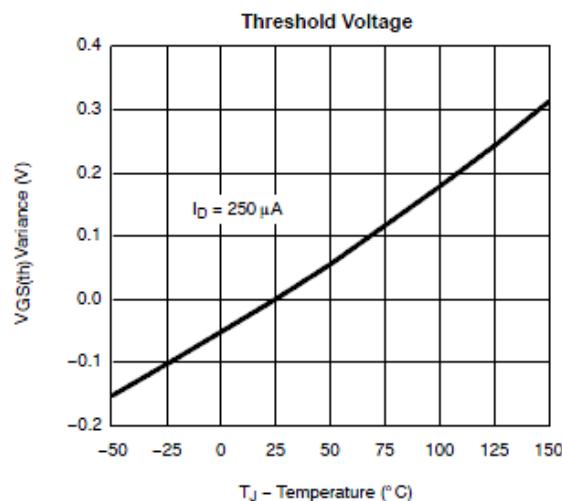
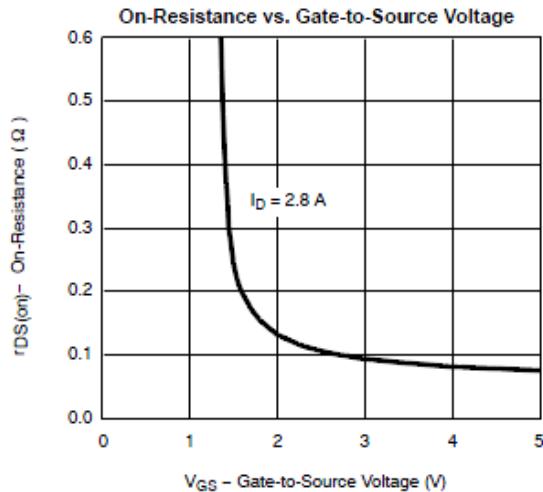
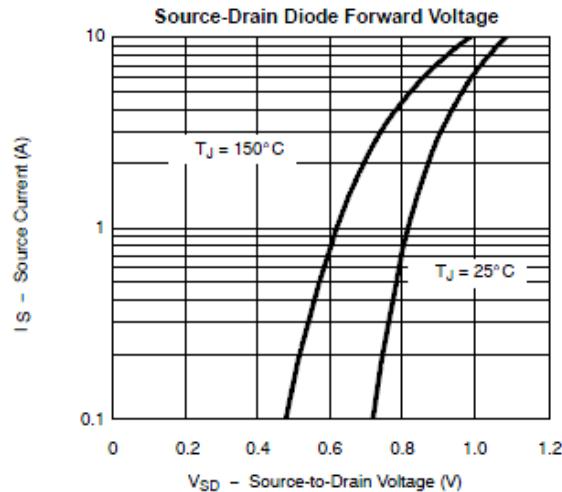




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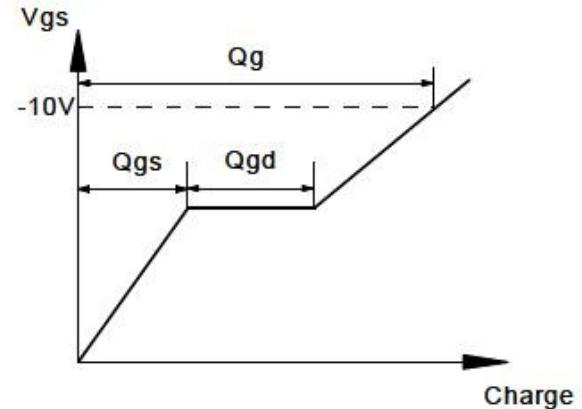
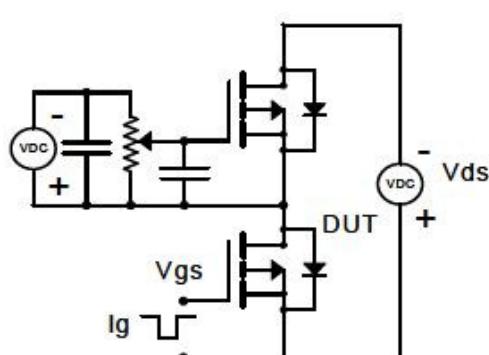


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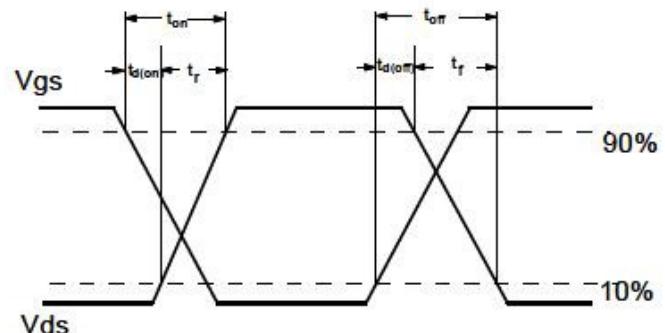
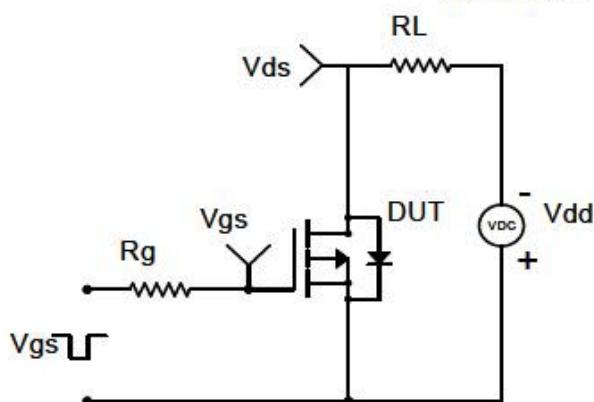
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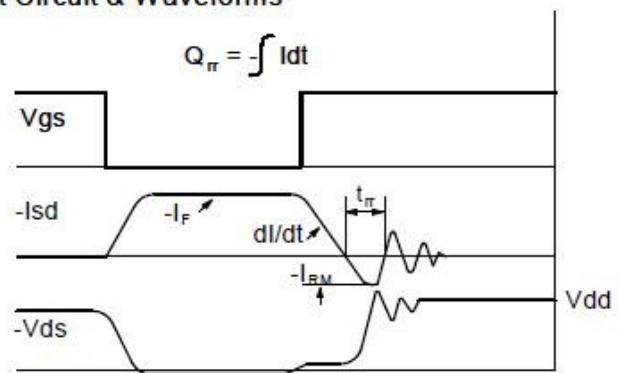
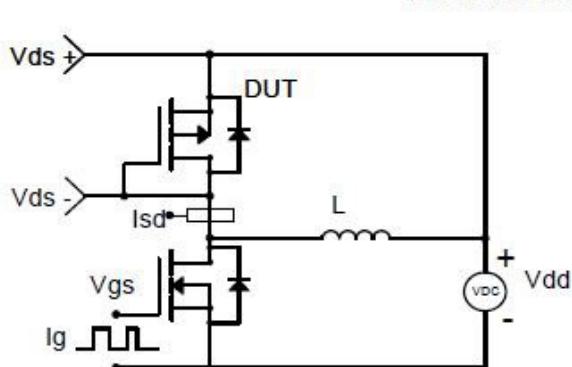
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

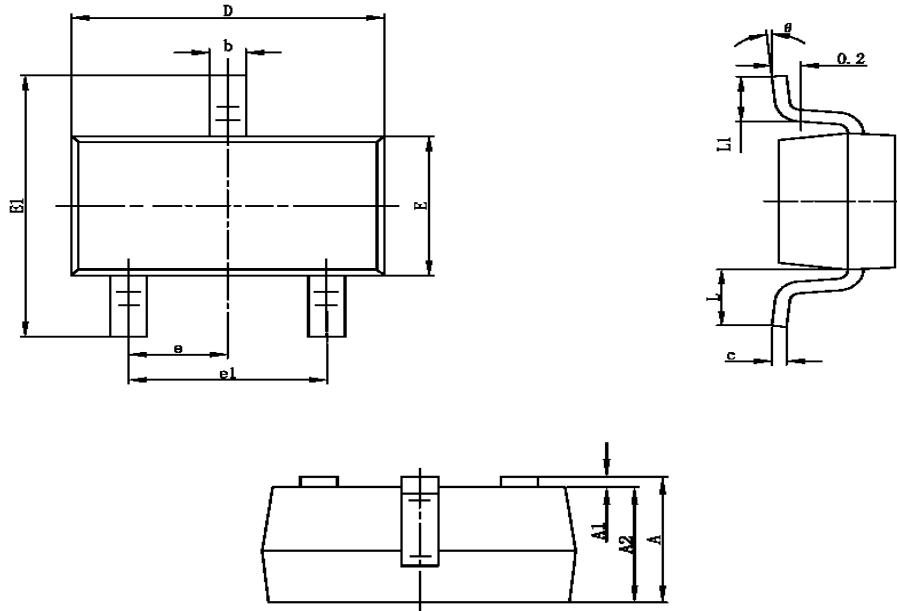




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Package Information (SOT-23-3L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.400	0.012	0.016
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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