



### General Description

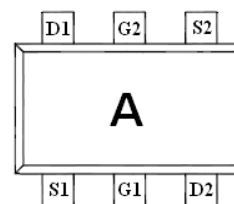
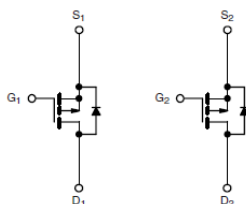
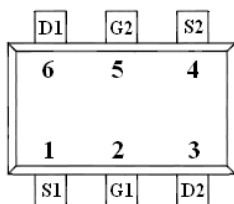
AFP1023, P-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

These devices are particularly suited for low voltage power management, such as smart phone and notebook computer, and low in-line power loss are needed in commercial industrial surface mount applications.

### Features

- -20V/-0.45A,  $R_{DS(ON)} = 620\text{ m}\Omega @ V_{GS} = -4.5\text{V}$
- -20V/-0.35A,  $R_{DS(ON)} = 860\text{ m}\Omega @ V_{GS} = -2.5\text{V}$
- -20V/-0.25A,  $R_{DS(ON)} = 1450\text{ m}\Omega @ V_{GS} = -1.8\text{V}$
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation
- SOT-563 package design

### Pin Description ( SOT-563 )



### Application

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Smart Phones, Paggers

### Pin Define

Pin	Symbol	Description
1	S1	Source 1
2	G1	Gate 1
3	D2	Drain 2
4	S2	Source 2
5	G2	Gate 2
6	D1	Drain1

### Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFP1023S56RG	A	SOT-563	Tape & Reel	3000 EA

※ AFP1023S56RG : 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	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current( $T_J=150^\circ\text{C}$ )	$I_D$	$T_A=25^\circ\text{C}$	-0.45
		$T_A=70^\circ\text{C}$	-0.25
Pulsed Drain Current	$I_{DM}$	-1.0	A
Continuous Source Current(Diode Conduction)	$I_S$	-0.3	A
Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	0.27
		$T_A=70^\circ\text{C}$	0.16
Operating Junction Temperature	$T_J$	-55/150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55/150	$^\circ\text{C}$

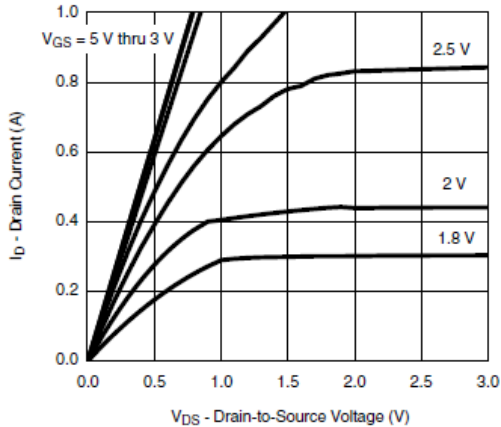
### Electrical Characteristics

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

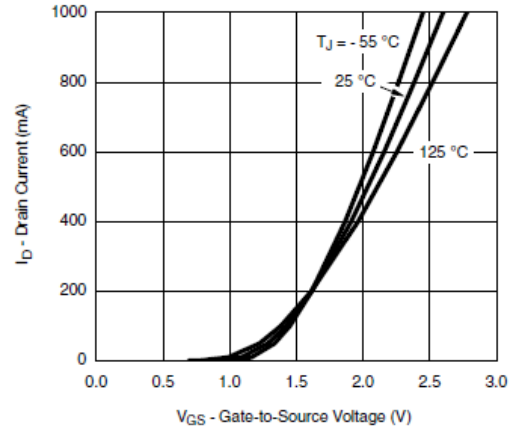
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu\text{A}$	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-0.4		-1.0	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	uA
		$V_{DS}=-20V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			-5	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=4.5V$	0.7			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-0.45A$		500	620	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.35A$		700	860	
		$V_{GS}=-1.8V, I_D=-0.25A$		1000	1450	
Forward Transconductance	$g_{FS}$	$V_{DS}=-10V, I_D=-0.4A$		1		S
Diode Forward Voltage	$V_{SD}$	$I_S=-0.15A, V_{GS}=0V$		0.65	1.2	V
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V$ $f=1\text{MHz}$		70	100	pF
Output Capacitance	$C_{oss}$			20		
Reverse Transfer Capacitance	$C_{rss}$			10		
Total Gate Charge	$Q_g$	$V_{DS}=-10V, V_{GS}=-4.5V$ $I_D \equiv -0.25A$		1.0	1.3	nC
Gate-Source Charge	$Q_{gs}$			0.1		
Gate-Drain Charge	$Q_{gd}$			0.3		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=30\Omega$ $I_D \equiv -0.2A, V_{GEN}=-4.5V$ $R_G=10\Omega$		10	15	ns
	$t_r$			10	15	
Turn-Off Time	$t_{d(off)}$			40	60	
	$t_f$			30	50	



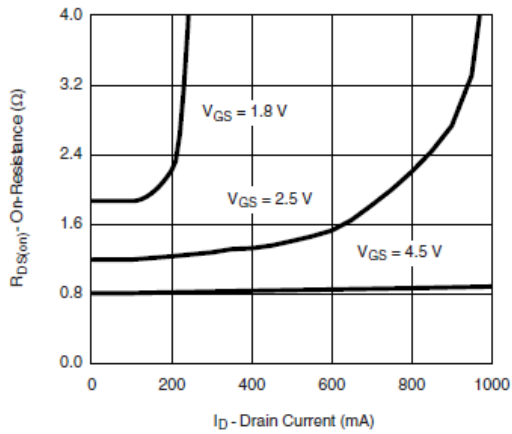
## Typical Characteristics



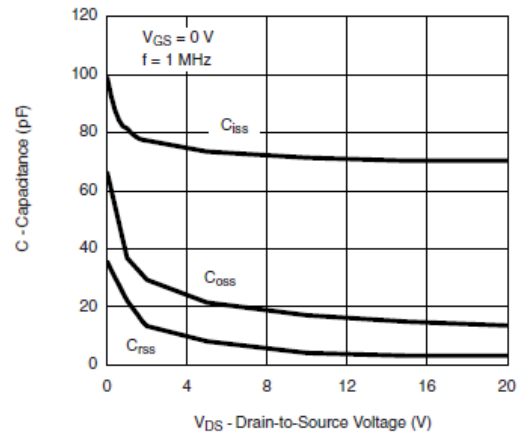
Output Characteristics



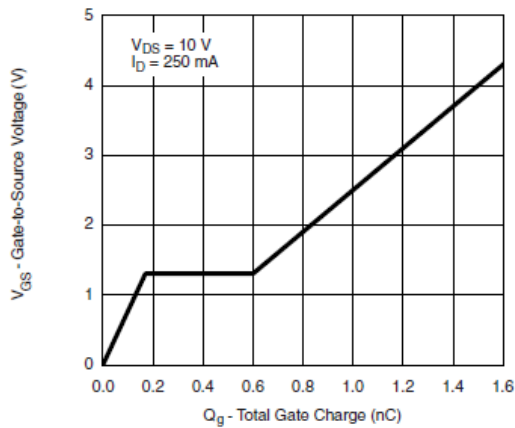
Transfer Characteristics



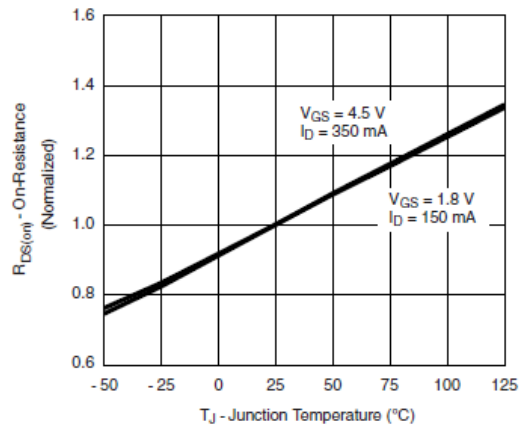
On-Resistance vs. Drain Current



Capacitance



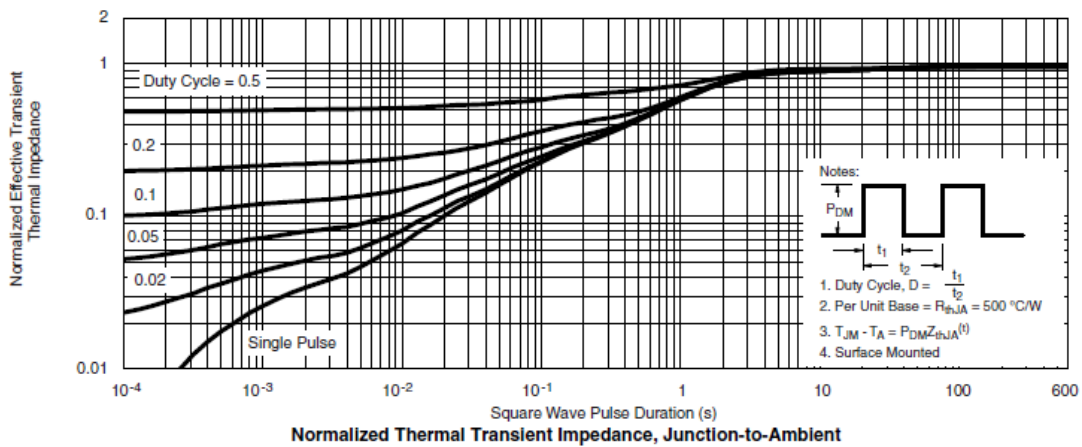
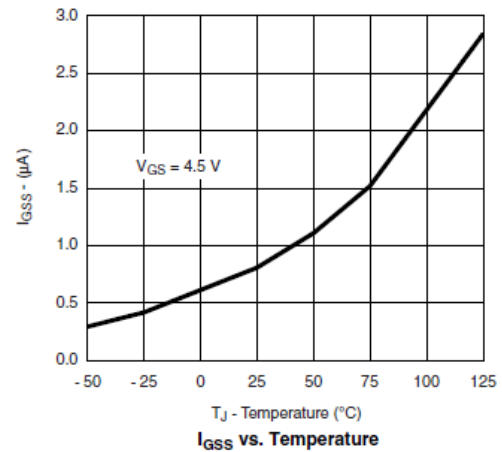
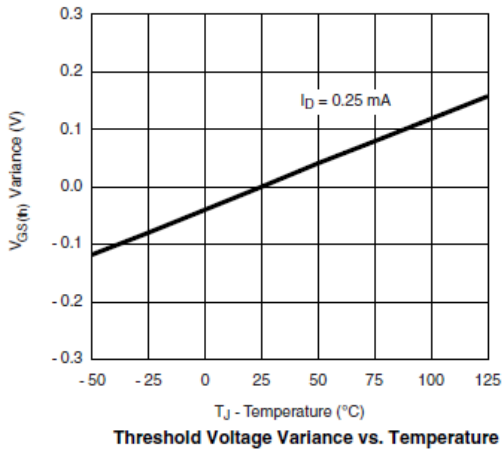
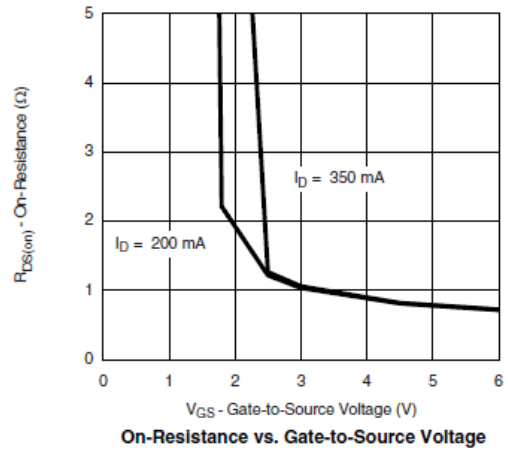
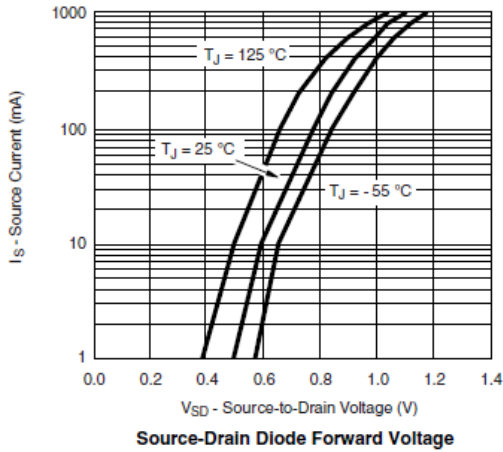
Gate Charge



On-Resistance vs. Junction Temperature



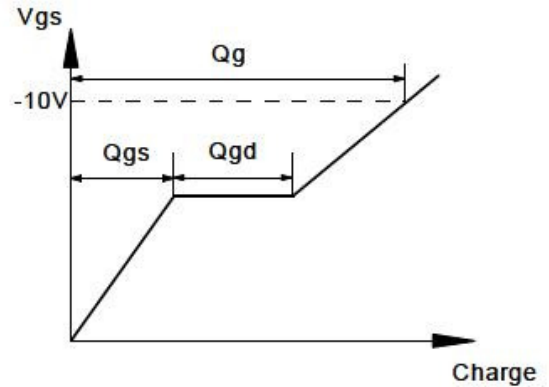
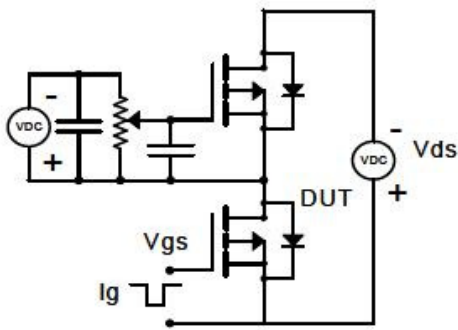
## Typical Characteristics



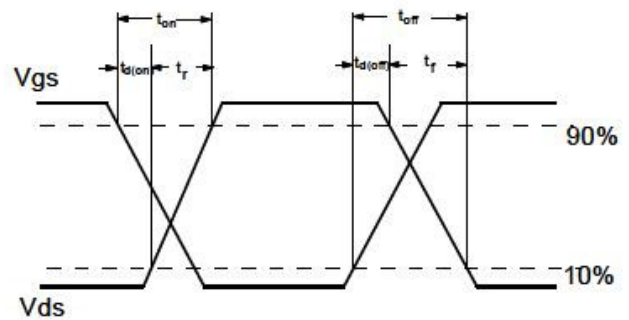
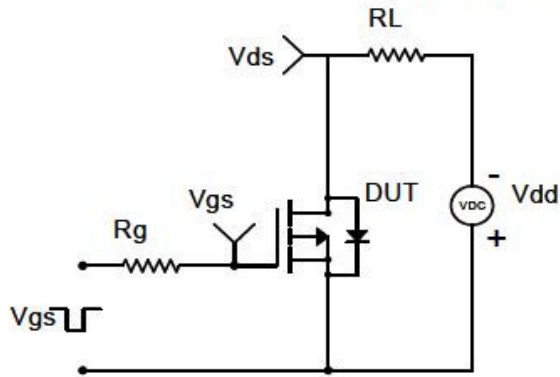


Typical Characteristics

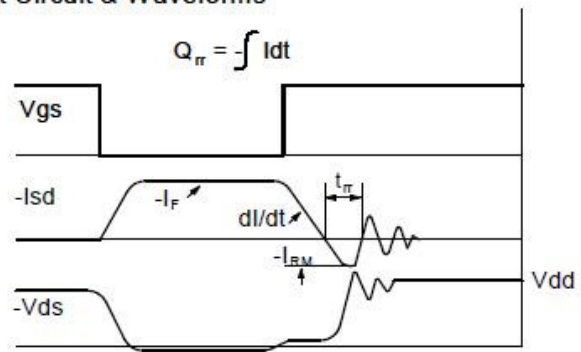
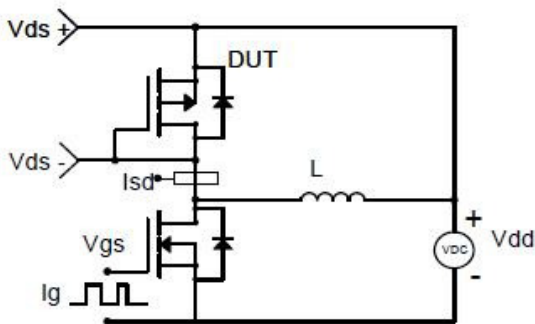
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

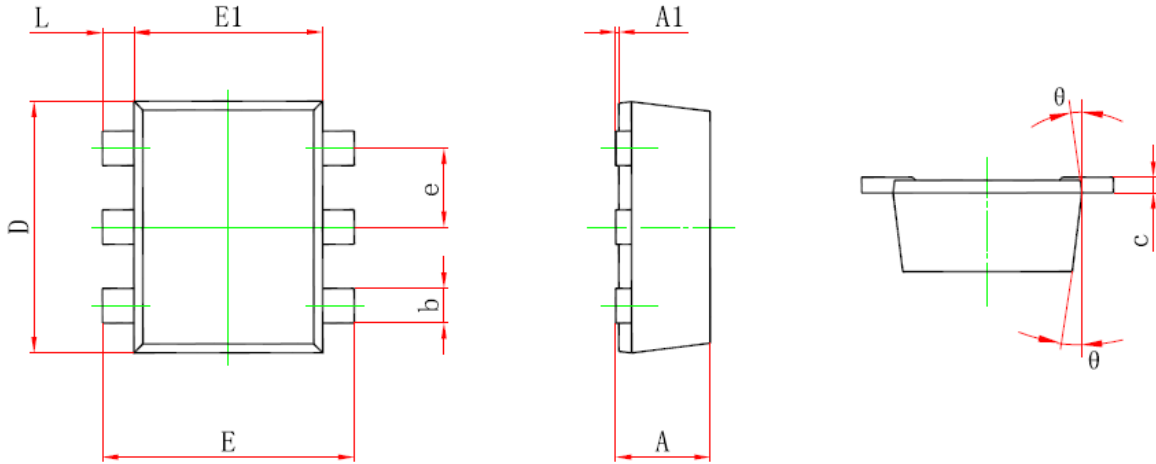


Diode Recovery Test Circuit & Waveforms





**Package Information ( SOT-563 )**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.525	0.600	0.021	0.024
A1	0.000	0.050	0.000	0.002
e	0.450	0.550	0.018	0.022
c	0.090	0.160	0.004	0.006
D	1.500	1.700	0.059	0.067
b	0.170	0.270	0.007	0.011
E1	1.100	1.300	0.043	0.051
E	1.500	1.700	0.059	0.067
L	0.100	0.300	0.004	0.012
θ	7° REF.		7° REF.	

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