



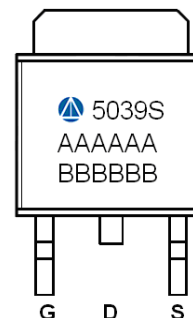
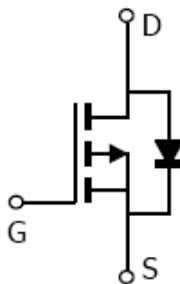
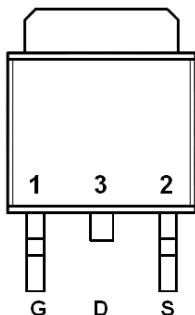
### General Description

AFP5039S, 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, and low in-line power loss are needed in commercial industrial surface mount applications.

### Features

- -100/-12A,  $R_{DS(ON)} = 90m\Omega @ V_{GS} = -10V$
- -100/-8A,  $R_{DS(ON)} = 100m\Omega @ V_{GS} = -4.5V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- TO-252-2L package design

### Pin Description ( TO-252-2L )



### Application

- Power Switch
- DC/DC Converters
- Active Clamp in Intermediate DC/DC Power Supplies

### Pin Define

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

### Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFP5039ST252RG	5039S	TO-252-2L	Tape & Reel	2500 EA

- ※ A Lot code
- ※ B Date code
- ※ AFP5039ST252RG : 13" 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	$V_{DS}$	-100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J=150^\circ\text{C}$ )	$I_D$	$T_C=25^\circ\text{C}$	-25
		$T_C=70^\circ\text{C}$	-15
Pulsed Drain Current	$I_{DM}$	-50	A
Continuous Source-Drain Diode Current	$I_S$	-8	A
Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	40
		$T_A=70^\circ\text{C}$	15
Operating Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55/150	$^\circ\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

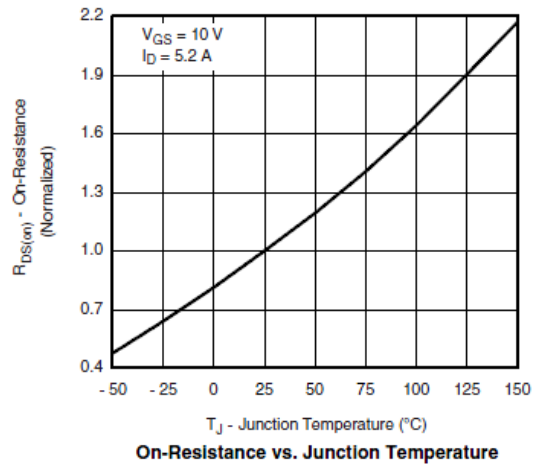
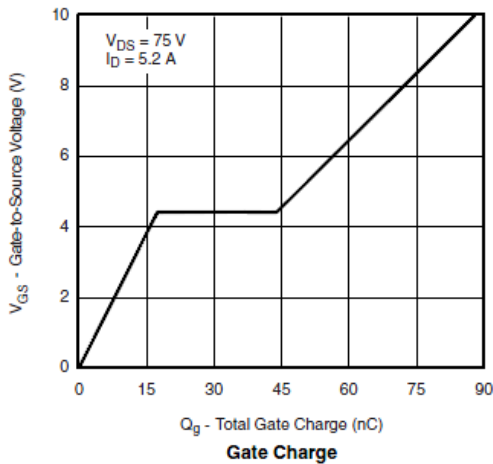
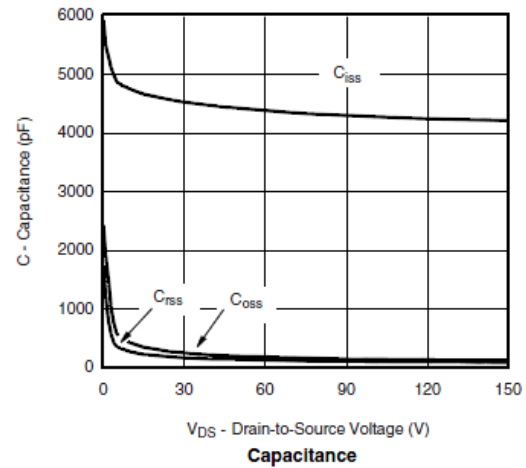
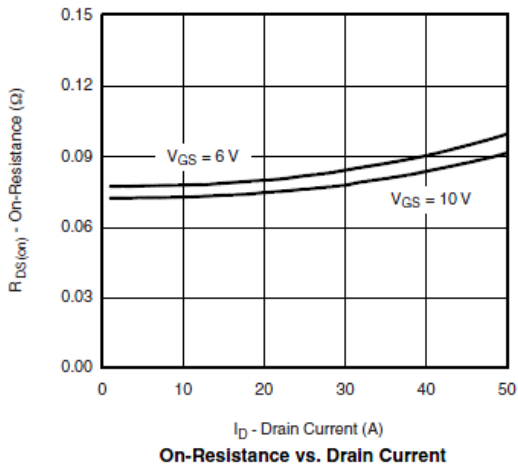
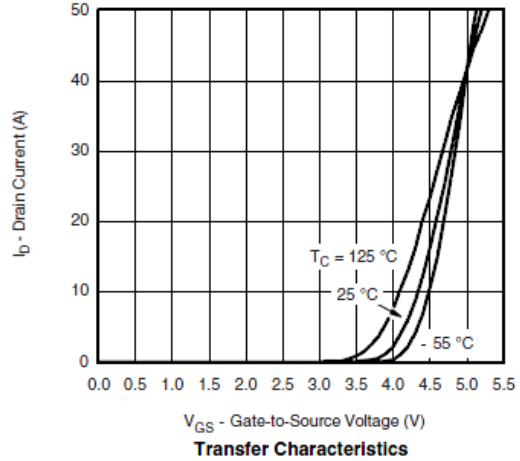
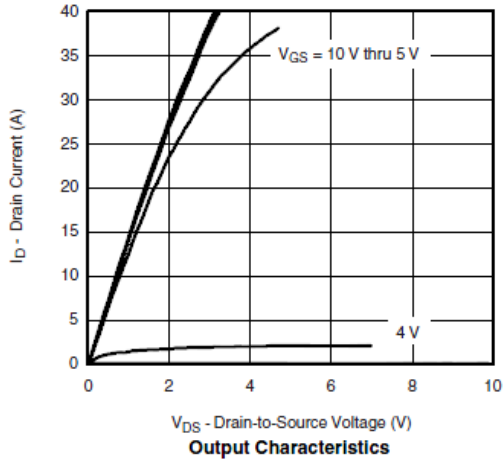
### Electrical Characteristics

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

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu\text{A}$	-100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1.0		-2.5	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-80V, V_{GS}=0V$			-1	uA
		$V_{DS}=-80V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			-30	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq -10V, V_{GS}=-10V$	-25			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-12A$		80	90	m $\Omega$
		$V_{GS}=-4.5V, I_D=-8A$		88	100	
Forward Transconductance	$g_{FS}$	$V_{DS}=-15V, I_D=-5.2A$		19		S
Diode Forward Voltage	$V_{SD}$	$I_S=-2A, V_{GS}=0V$		-0.8	-1.3	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=-75V, V_{GS}=-10V$ $I_D=-5.2A$		85	150	nC
Gate-Source Charge	$Q_{gs}$			18		
Gate-Drain Charge	$Q_{gd}$			28		
Input Capacitance	$C_{iss}$	$V_{DS}=-60V, V_{GS}=0V$ $f=1\text{MHz}$		4300		pF
Output Capacitance	$C_{oss}$			280		
Reverse Transfer Capacitance	$C_{rss}$			220		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-75V, R_L=16\Omega$ $I_D=-4.8A, V_{GEN}=-10V$ $R_G=6\Omega$		25	50	ns
	$t_r$			45	85	
Turn-Off Time	$t_{d(off)}$			115	200	
	$t_f$			65	130	

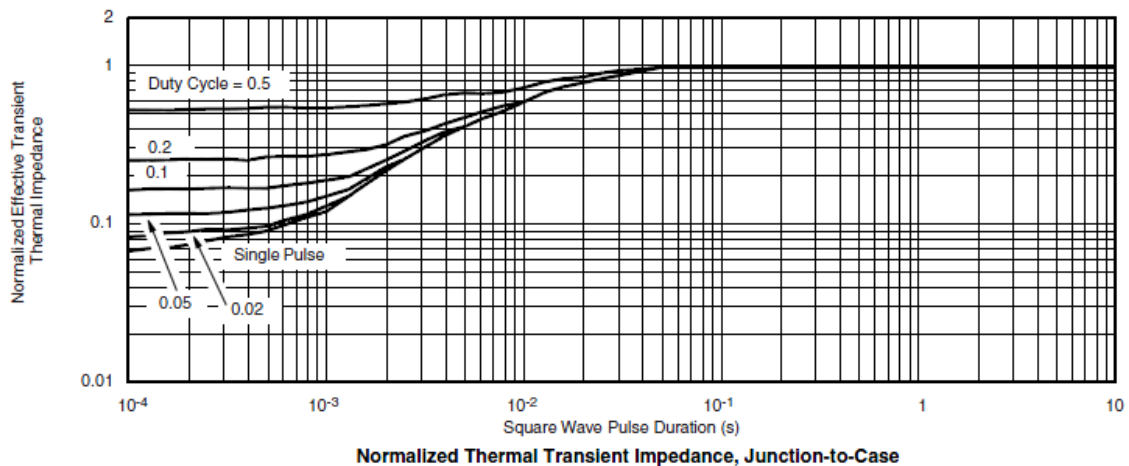
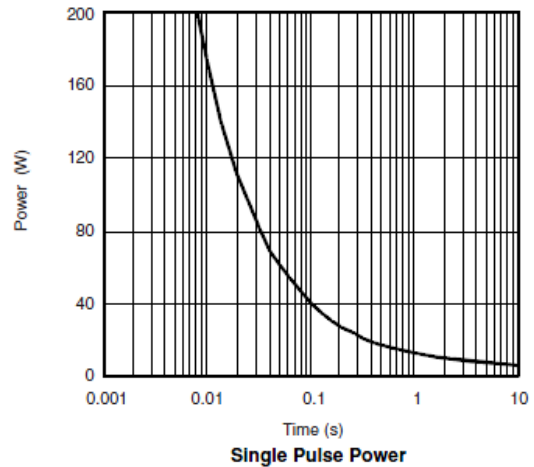
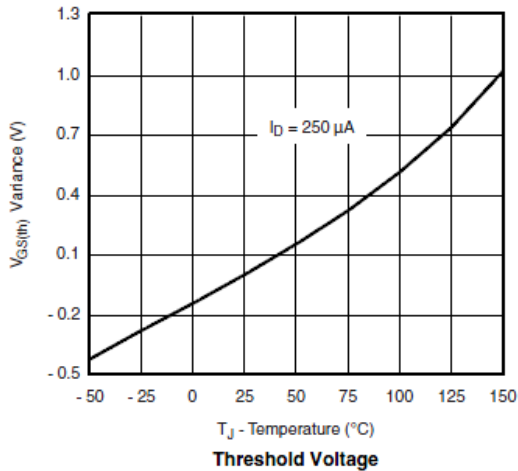
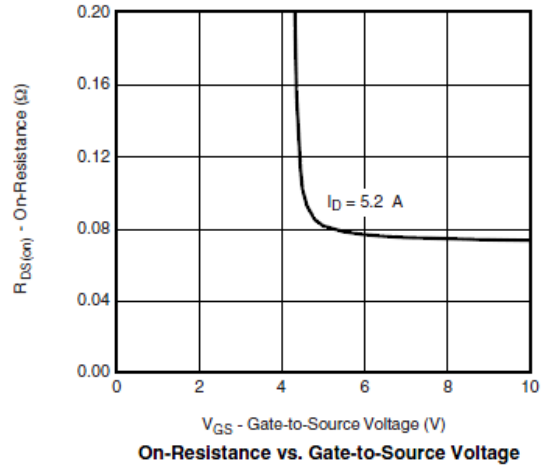
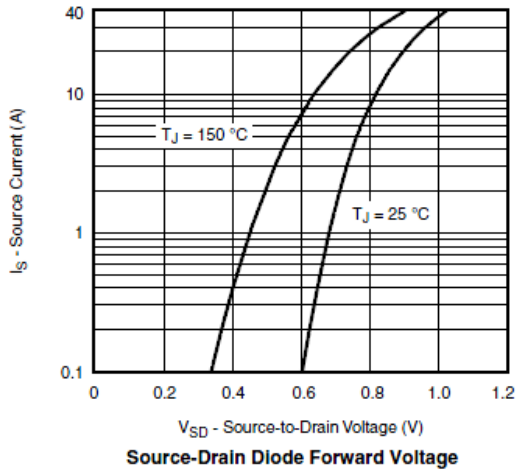


## Typical Characteristics





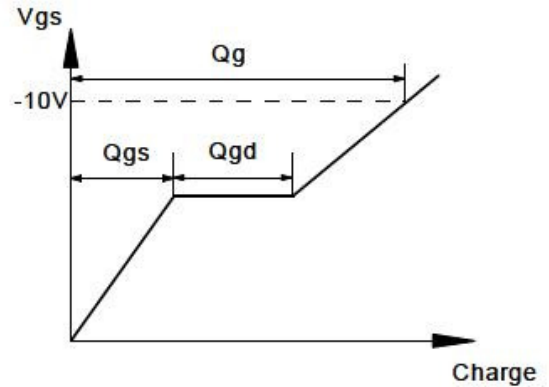
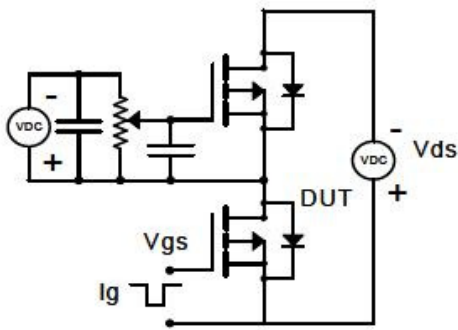
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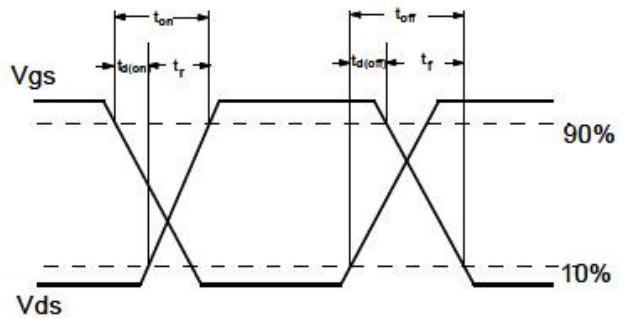
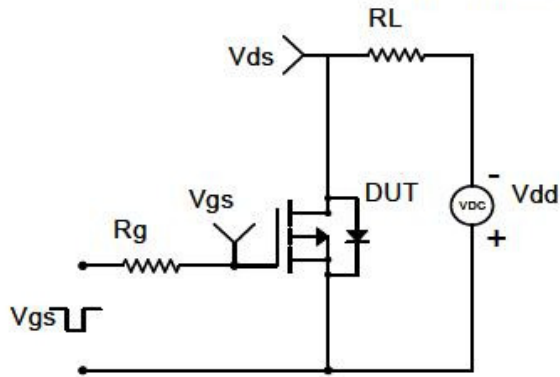


**Typical Characteristics**

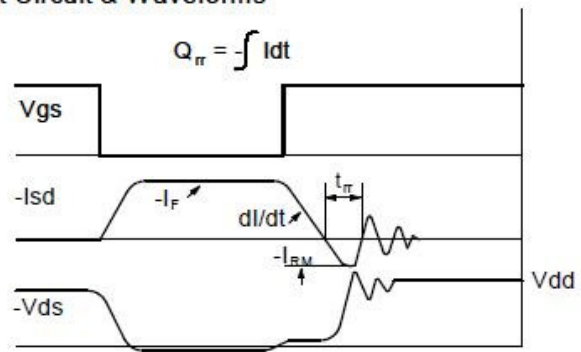
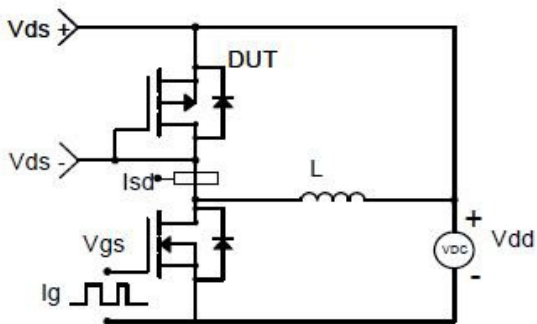
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

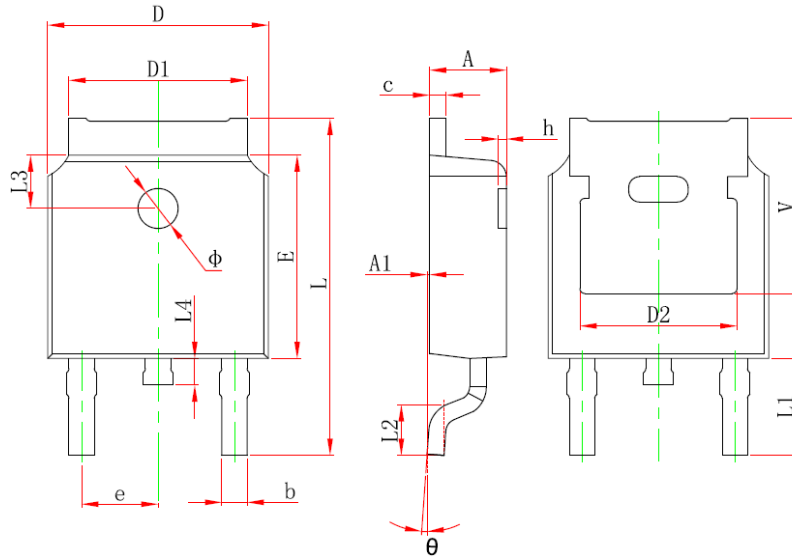


Diode Recovery Test Circuit & Waveforms





**Package Information ( TO-252-2L )**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

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