Alfa-MOS Technology

AFC4511W

20V N & P Pair Enhancement Mode MOSFET

General Description

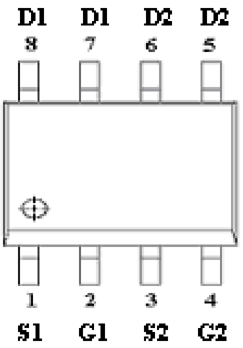
AFC4511W, N & P Pair enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent RDS(ON), low gate charge. These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

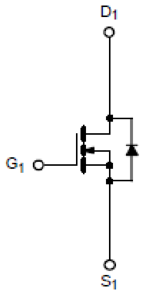
Features

N-Channel
- I_D= 9A,$R_{DS(ON)}$=13mΩ@V_{GS}=4.5V
- I_D= 7A,$R_{DS(ON)}$=15mΩ@V_{GS}=2.5V
- I_D= 5A,$R_{DS(ON)}$=17mΩ@V_{GS}=1.8V

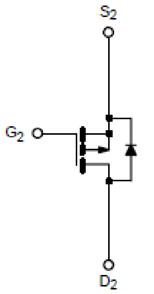
P-Channel
- I_D= -8A,$R_{DS(ON)}$=33mΩ@V_{GS}=-4.5V
- I_D= -6A,$R_{DS(ON)}$=43mΩ@V_{GS}=-2.5V
- I_D= -5A,$R_{DS(ON)}$=63mΩ@V_{GS}=-1.8V

Pin Description (SOP-8P)

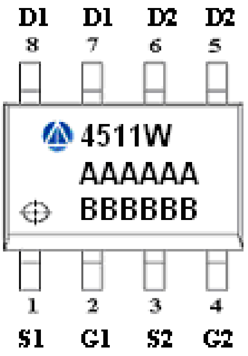




N-Channel MOSFET



P-Channel MOSFET



Application

- Low Current DC/DC Conversion
- Load Switch
- Power Management in Notebook Computer

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFC4511WS8RG	4511W	SOP-8P	Tape & Reel	2500 EA

※ A Lot code
※ B Date code
※ AFC4511WS8RG : 13” Tape & Reel ; Pb- Free ; Halogen –Free

Absolute Maximum Ratings (N-Channel)

(T_A=25°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°C)	T_A=25°C	I_D	9.0	A
	T_A=70°C		7.0	
Pulsed Drain Current		I_{DM}	25	A
Continuous Source Current(Diode Conduction)		I_S	1.5	A
Power Dissipation	T_A=25°C	P_D	2.8	W
	T_A=70°C		1.8	
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	62.5	°C/W

Electrical Characteristics (N-Channel)

(T_A=25°C 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	0.3		1.0	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±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°C			10	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=4.5V	30			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=9A		10	13	mΩ
		V_{GS}=2.5V,I_D=7A		12	15	
		V_{GS}=1.8V,I_D=5A		14	17	
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=7.0A		40		S
Diode Forward Voltage	V_{SD}	I_S=9.0A,V_{GS}=0V		0.8	1.3	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=10V,V_{GS}=4.5V I_D≡9.0A		13	19	nC
Gate-Source Charge	Q_{gs}			2.8		
Gate-Drain Charge	Q_{gd}			2.0		
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V f=1MHz		1450		pF
Output Capacitance	C_{oss}			285		
Reverse Transfer Capacitance	C_{rss}			145		
Turn-On Time	$t_{d(on)}$	V_{DD}=10V,R_L=1.3Ω I_D≡8.0A,V_{GEN}=10V R_G=1Ω		10	20	ns
	t_r			10	20	
Turn-Off Time	$t_{d(off)}$			25	40	
	t_f			10	20	

Absolute Maximum Ratings (P-Channel)

(T_A=25℃ Unless otherwise noted)

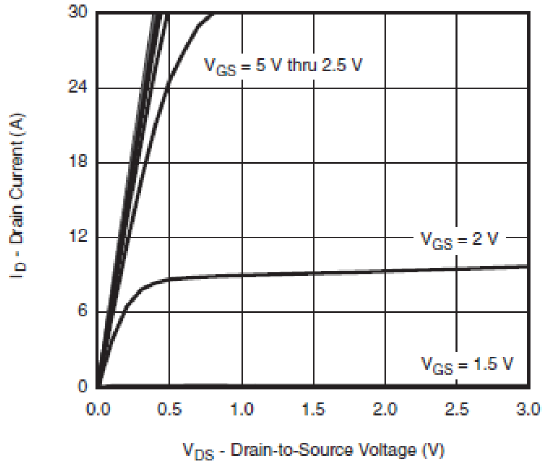
Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-20	V
Gate –Source Voltage		V_{GSS}	±12	V
Continuous Drain Current(TJ=150℃)	T_A=25℃	I_D	-8.0	A
	T_A=70℃		-6.0	
Pulsed Drain Current		I_{DM}	-25	A
Continuous Source Current(Diode Conduction)		I_S	-1.7	A
Power Dissipation	T_A=25℃	P_D	2.8	W
	T_A=70℃		1.8	
Operating Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	62.5	℃/W

Electrical Characteristics (P-Channel)

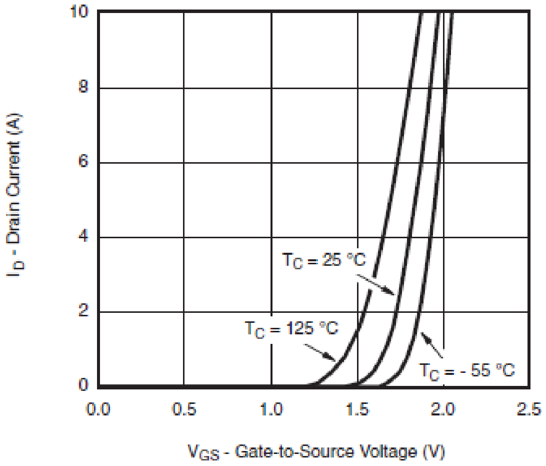
(T_A=25℃ Unless otherwise noted)

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	-0.3		-1.0	
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	-10			A
		V_{DS}≦-5V,V_{GS}=-2.5V	-5			
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-4.5V,I_D=-8A		27	33	mΩ
		V_{GS}=-2.5V,I_D=-6A		36	43	
		V_{GS}=-1.8V,I_D=-5A		52	63	
Forward Transconductance	g_{FS}	V_{DS}=-9V,I_D=-6A		14		S
Diode Forward Voltage	V_{SD}	I_S=-2.5A,V_{GS}=0V		-0.85	-1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=-15V,V_{GS}=-4.5V I_D≡-6.0A		10	18	nC
Gate-Source Charge	Q_{gs}			1.6		
Gate-Drain Charge	Q_{gd}			3.0		
Input Capacitance	C_{iss}	V_{DS}=-15V,V_{GS}=0V f=1MHz		950		pF
Output Capacitance	C_{oss}			200		
Reverse Transfer Capacitance	C_{rss}			175		
Turn-On Time	$t_{d(on)}$	V_{DD}=-15V,R_L=15Ω I_D≡-5.0A,V_{GEN}=-10V R_G=6Ω		8	18	ns
	t_r			8	18	
Turn-Off Time	$t_{d(off)}$			25	50	
	t_f			25	35	

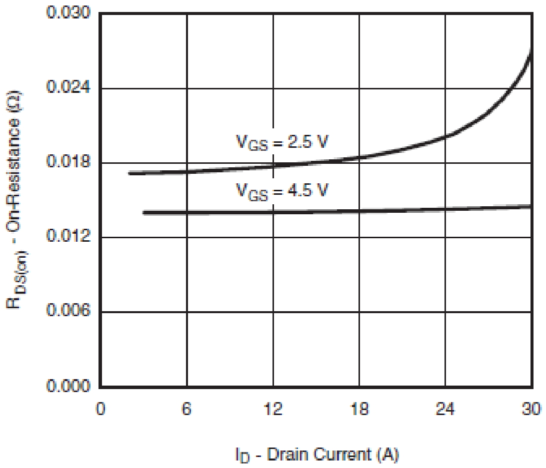
Typical Characteristics (N-Channel)



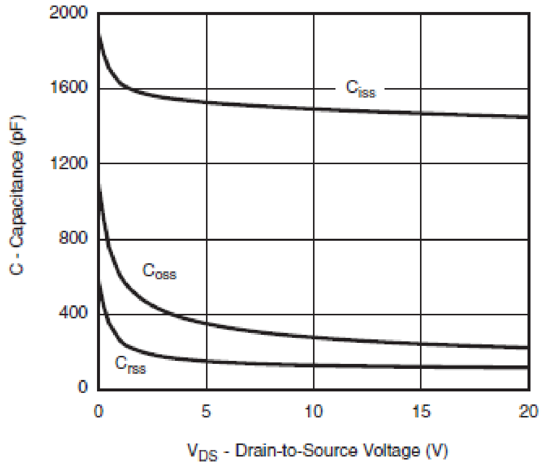
Output Characteristics



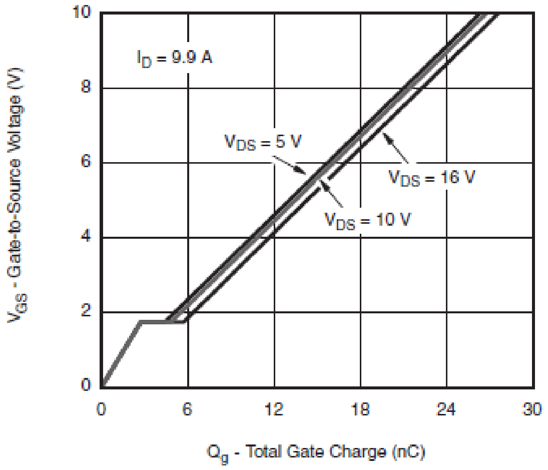
Transfer Characteristics



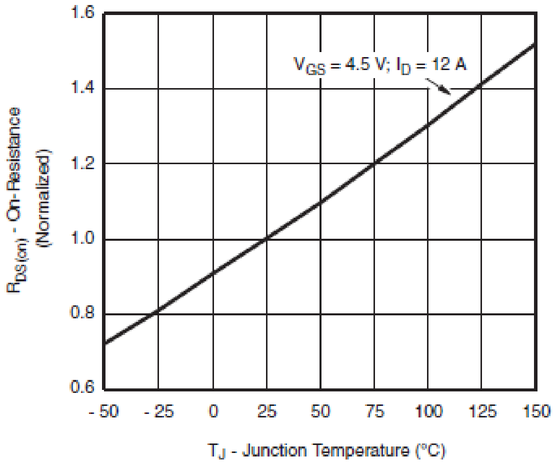
On-Resistance vs. Drain Current



Capacitance

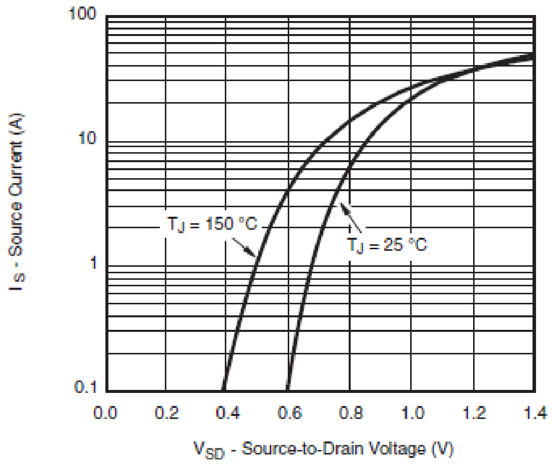


Gate Charge

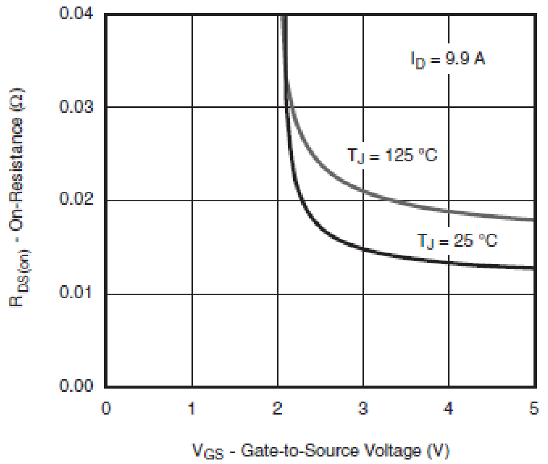


On-Resistance vs. Junction Temperature

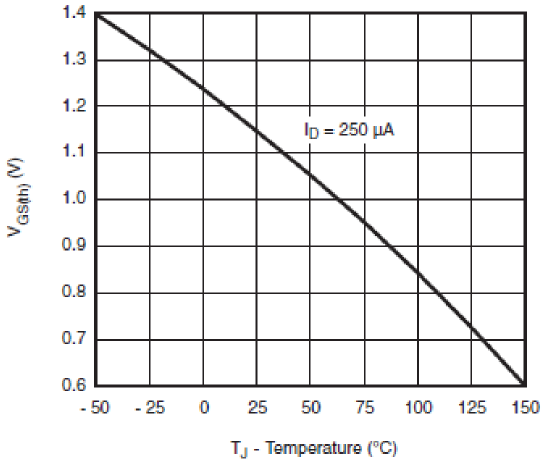
Typical Characteristics (N-Channel)



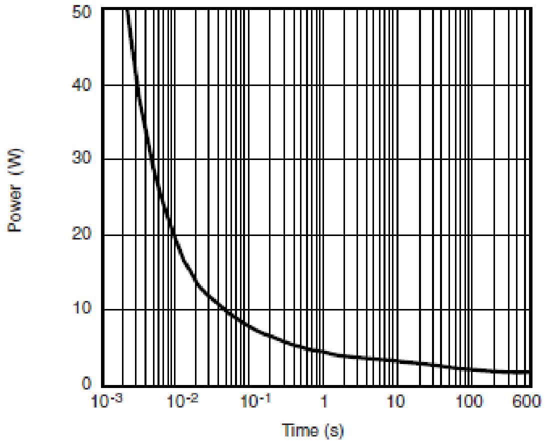
Source-Drain Diode Forward Voltage



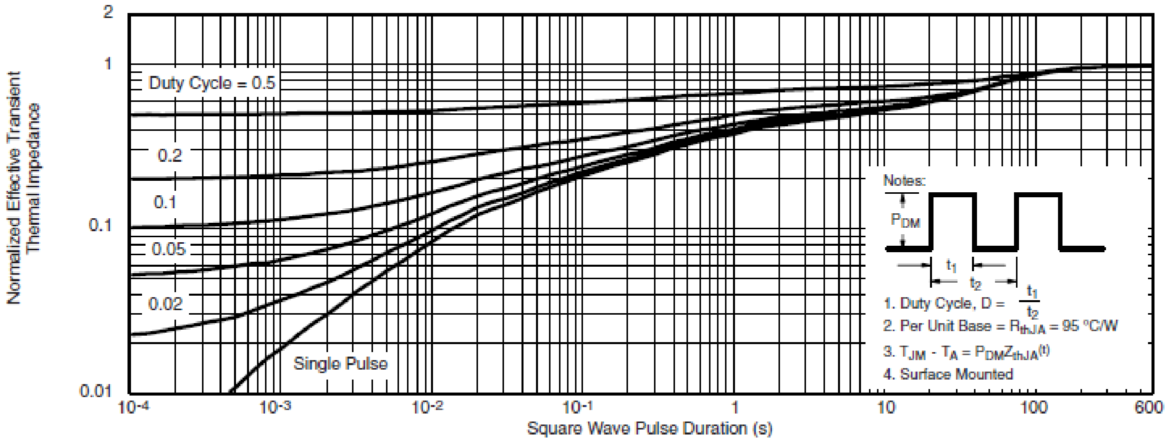
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

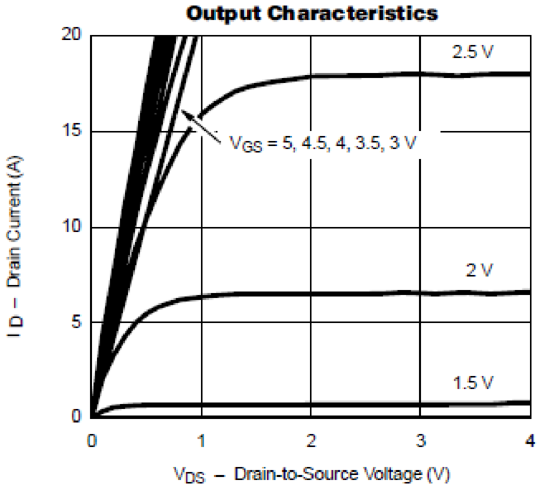


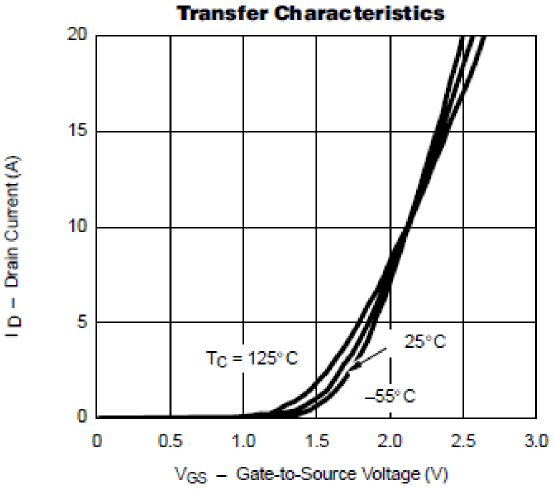
Single Pulse Power

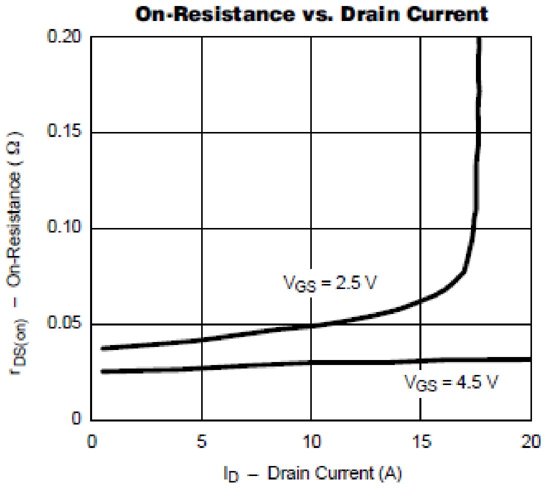


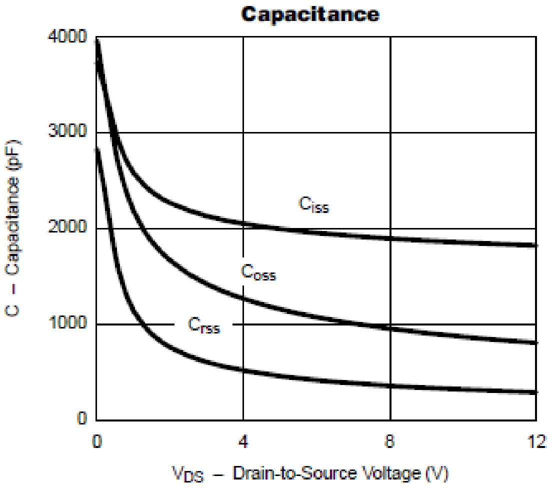
Normalized Thermal Transient Impedance, Junction-to-Ambient

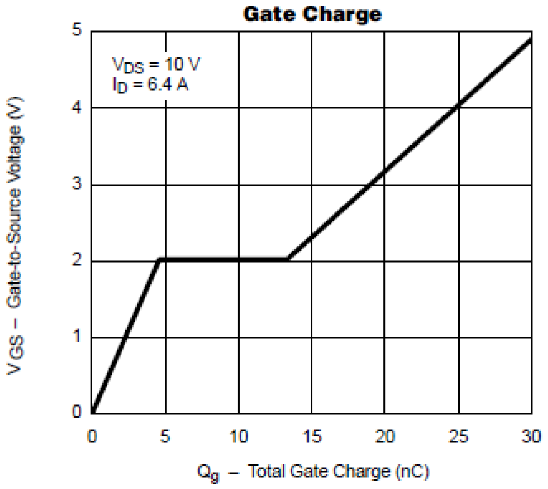
Typical Characteristics (P-Channel)

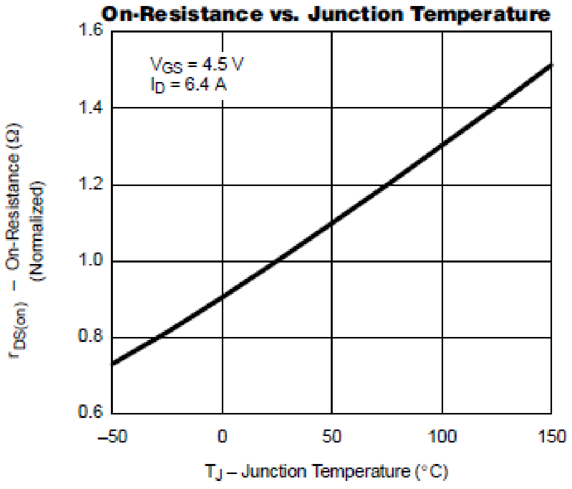

Output Characteristics


Transfer Characteristics

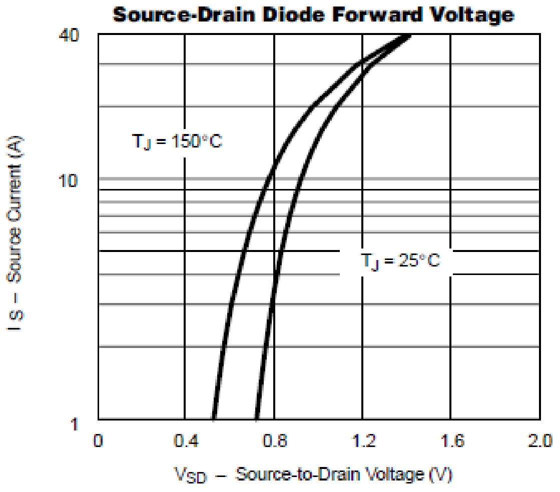

On-Resistance vs. Drain Current

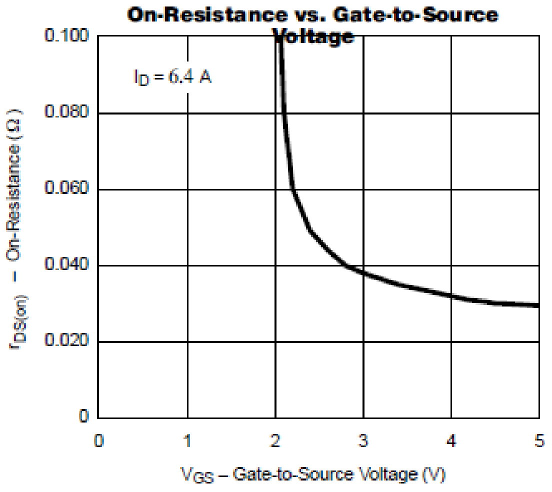

Capacitance

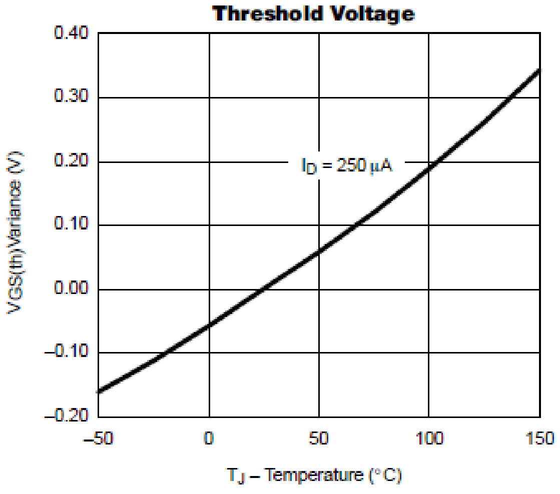

Gate Charge

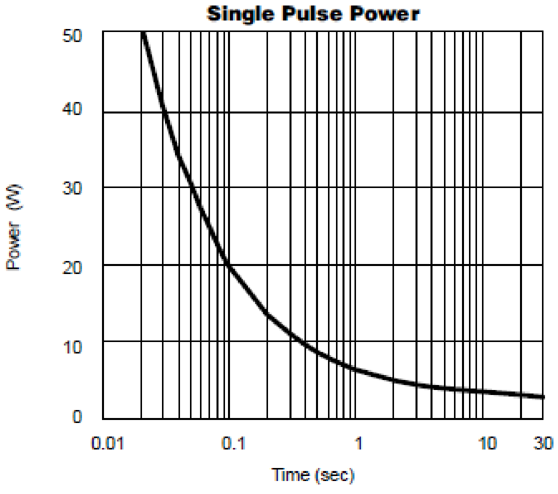

On-Resistance vs. Junction Temperature

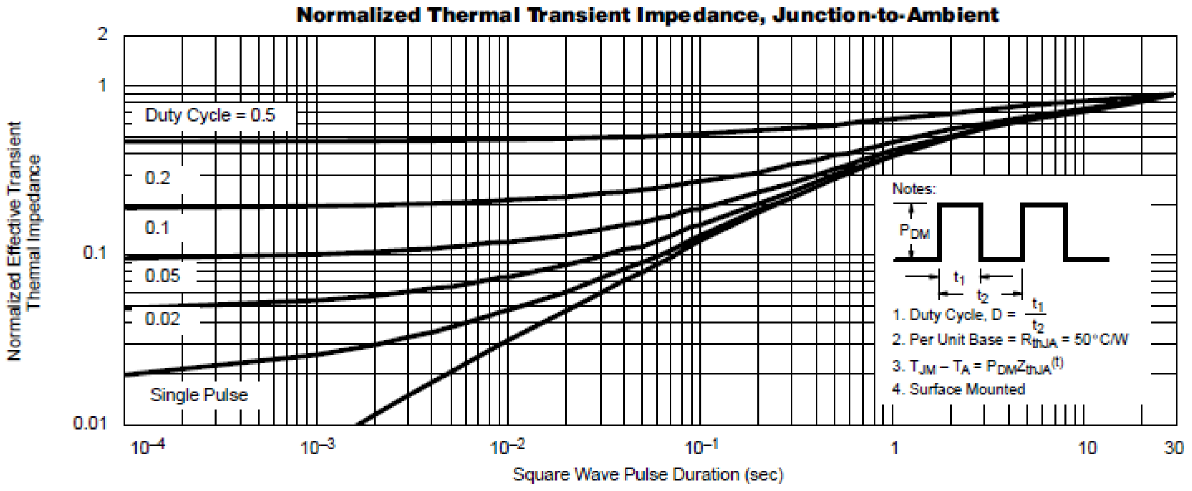
Typical Characteristics (P-Channel)





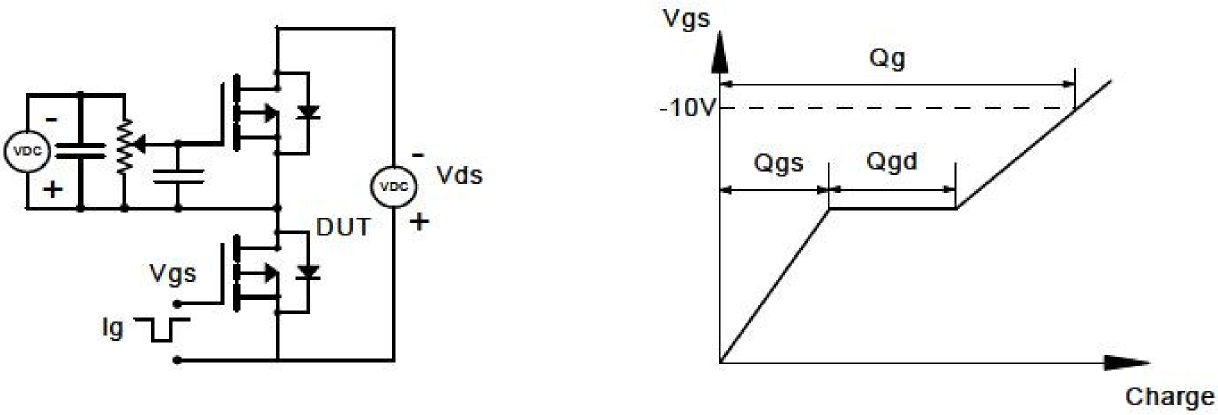




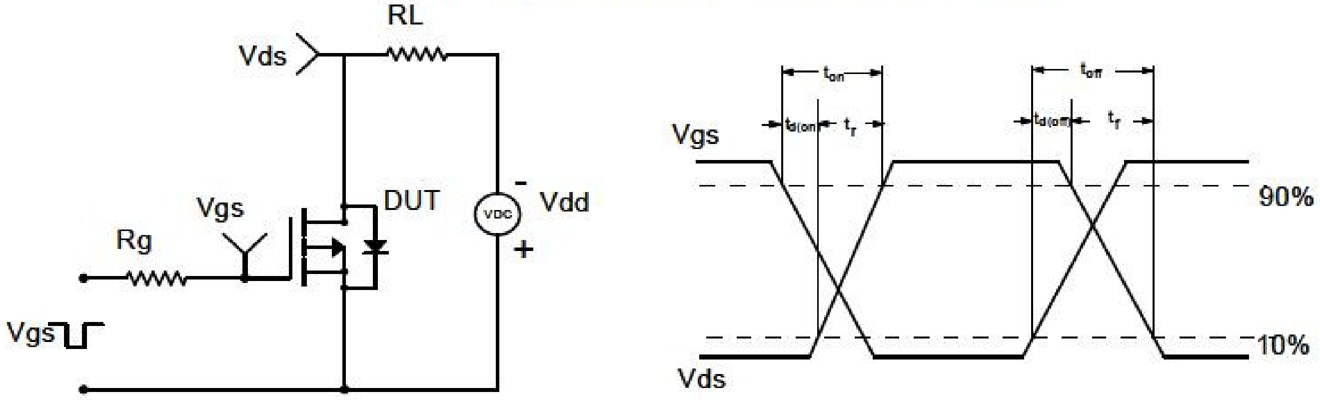


Typical Characteristics

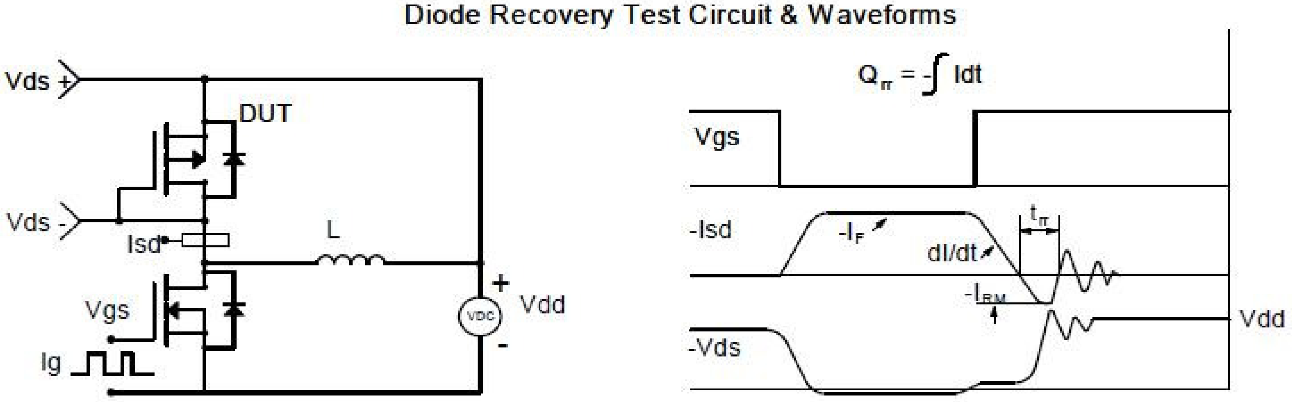
Gate Charge Test Circuit & Waveform



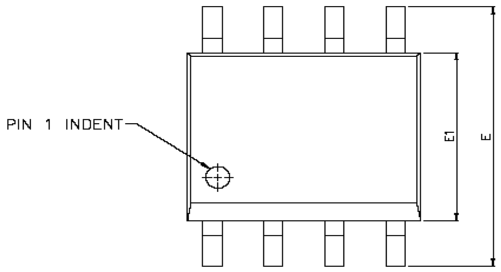
Resistive Switching Test Circuit & Waveforms

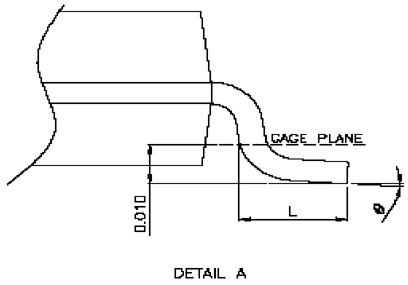


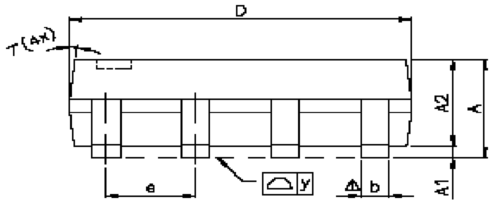
Diode Recovery Test Circuit & Waveforms

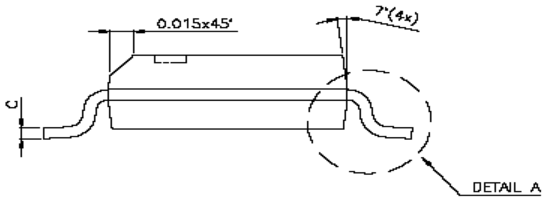


Package Information (SOP-8P)









SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.47	1.60	1.73	0.058	0.063	0.068
A1	0.10	——	0.25	0.004	——	0.010
A2	——	1.45	——	——	0.057	——
b	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.0098
D	4.80	4.85	4.95	0.189	0.191	0.195
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	——	1.27	——	——	0.050	——
L	0.38	0.71	1.27	0.015	0.028	0.050
△2 y	——	——	0.076	——	——	0.003
θ	0°	——	8°	0°	——	8°

2F, No.80, Sec.1, Cheng Kung Rd., Nan Kang Dist., Taipei City 115, Taiwan (R.O.C.)
Tel : 886 2) 2651 3928
Fax : 886 2) 2786 8483
©http://www.alfa-mos.com