



General Description

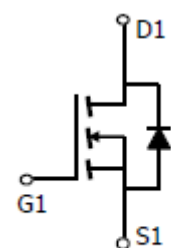
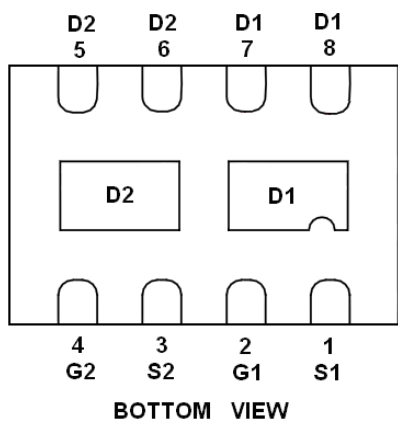
AFC4604W, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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.

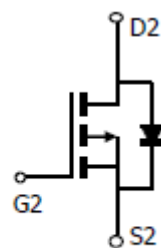
Features

- N-Channel
20V/4.5A, $R_{DS(ON)}=38m\Omega@V_{GS}=4.5V$
20V/3.6A, $R_{DS(ON)}=48m\Omega@V_{GS}=2.5V$
20V/2.4A, $R_{DS(ON)}=68m\Omega@V_{GS}=1.8V$
- P-Channel
-20V/-4.5A, $R_{DS(ON)}=80m\Omega@V_{GS}=-4.5V$
-20V/-3.8A, $R_{DS(ON)}=105m\Omega@V_{GS}=-2.5V$
-20V/-2.5A, $R_{DS(ON)}=145m\Omega@V_{GS}=-1.8V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- DFN3X2-8L package design

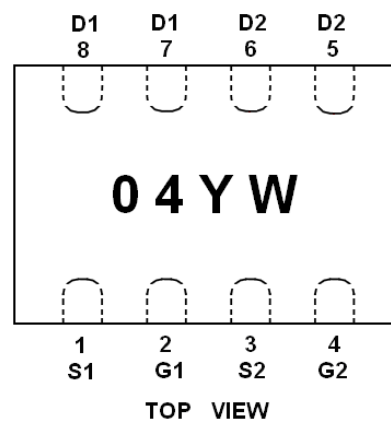
Pin Description (DFN3X2-8L)



n-channel



p-channel



Application

- Load Switch
- Portable Equipment
- Battery Powered System



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
AFC4604WFN328RG	04YW	DFN3X2-8L	Tape & Reel	4000 EA

- ※ Y year code
- ※ W week code
- ※ AFC4604WFN328RG : 7" Tape & Reel ; Pb- Free ; Halogen -Free

Absolute Maximum Ratings

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

Parameter	Symbol	Typical		Unit	
		N-Channel	P-Channel		
Drain-Source Voltage	V_{DSS}	20	-20	V	
Gate -Source Voltage	V_{GSS}	± 12	± 12	V	
Continuous Drain Current($T_J=150^{\circ}\text{C}$)	I_D	$T_A=25^{\circ}\text{C}$	4.5	-4.5	A
		$T_A=70^{\circ}\text{C}$	2.4	-2.4	
Pulsed Drain Current	I_{DM}	20	-15	A	
Continuous Source Current(Diode Conduction)	I_S	2.0	-2.0	A	
Power Dissipation	P_D	$T_A=25^{\circ}\text{C}$	6.5	W	
		$T_A=70^{\circ}\text{C}$	4.2		
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 (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		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°C			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 =4.5A		28	38	mΩ
		V _{GS} =2.5V, I _D =3.6A		35	48	
		V _{GS} =1.8V, I _D =2.4A		50	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 ≒3.6A		4.2	5.0	nC
Gate-Source Charge	Q _{gs}			0.6		
Gate-Drain Charge	Q _{gd}			0.4		
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V f=1MHz		340		pF
Output Capacitance	C _{oss}			115		
Reverse Transfer Capacitance	C _{rss}			33		
Turn-On Time	t _{d(on)}	V _{DD} =10V, R _L =2.8Ω I _D ≒3.6A, V _{GEN} =4.5V		8	15	ns
	t _r			8	15	
Turn-Off Time	t _{d(off)}	R _G =1Ω		25	40	
	t _f			8	15	



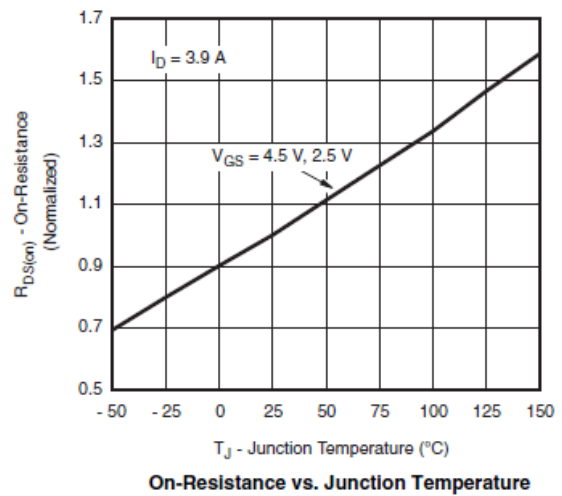
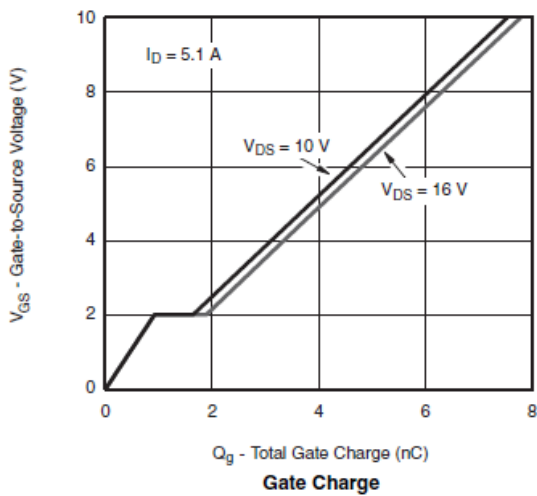
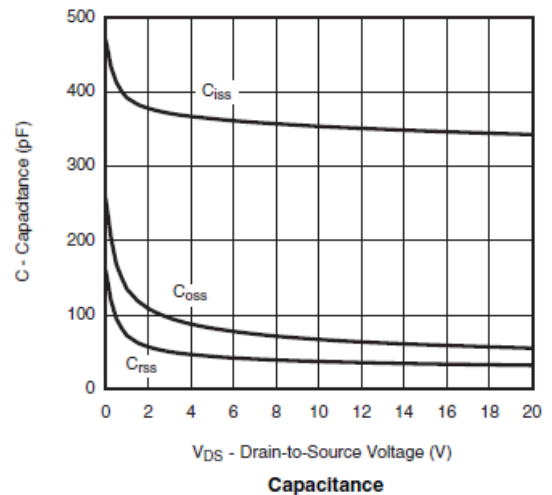
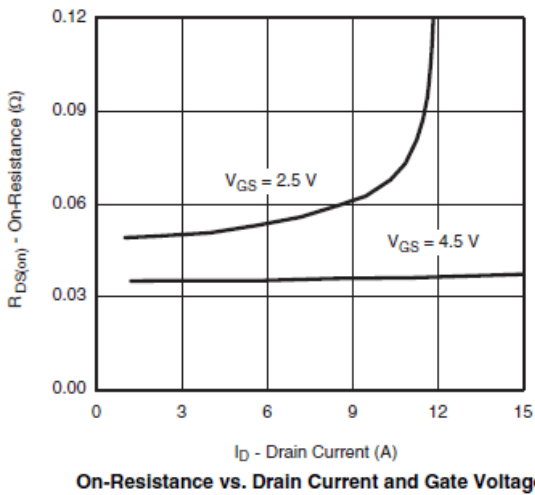
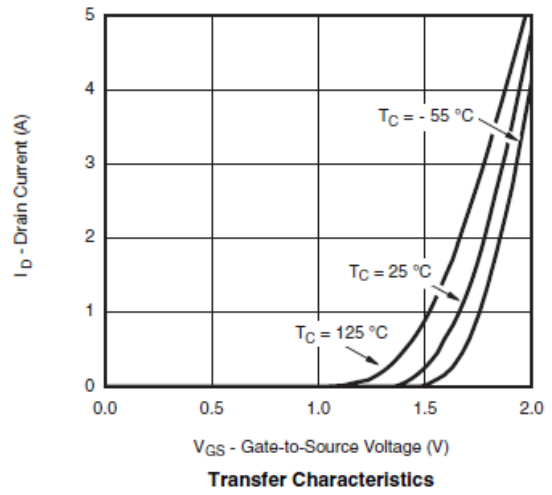
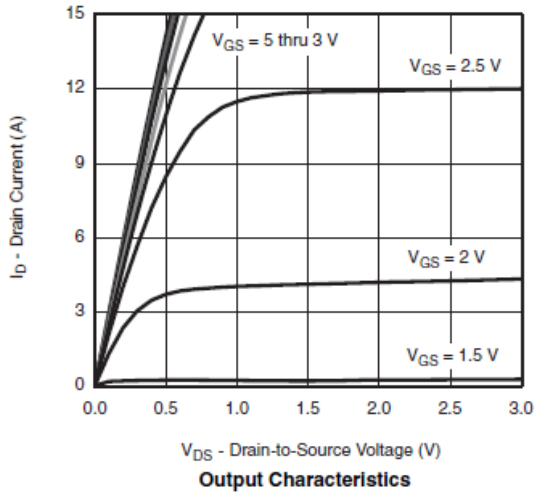
Electrical Characteristics (P-Channel)

(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		-0.8	V
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°C			-30	
On-State Drain Current	I _{D(on)}	V _{DS} ≤ -5V, V _{GS} =-4.5V	-8			A
		V _{DS} ≤ -5V, V _{GS} =-2.5V	-3			
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-4.5V, I _D =-4.5A		60	80	mΩ
		V _{GS} =-2.5V, I _D =-3.8A		80	105	
		V _{GS} =-1.8V, I _D =-2.5A		115	145	
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-2.8A		6.5		S
Diode Forward Voltage	V _{SD}	I _S =-1.25A, V _{GS} =0V		-0.75	-1.3	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =-10V, V _{GS} =-4.5V I _D ≡-3.5A		5	10	nC
Gate-Source Charge	Q _{gs}			0.85		
Gate-Drain Charge	Q _{gd}			1.5		
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V f=1MHz		375		pF
Output Capacitance	C _{oss}			80		
Reverse Transfer Capacitance	C _{rss}			60		
Turn-On Time	t _{d(on)}	V _{DD} =-10V, R _L =2.85Ω I _D ≡-3.5A, V _{GEN} =-4.5V R _G =1Ω		15	25	ns
	t _r			36	60	
Turn-Off Time	t _{d(off)}			25	50	
	t _f			15	25	

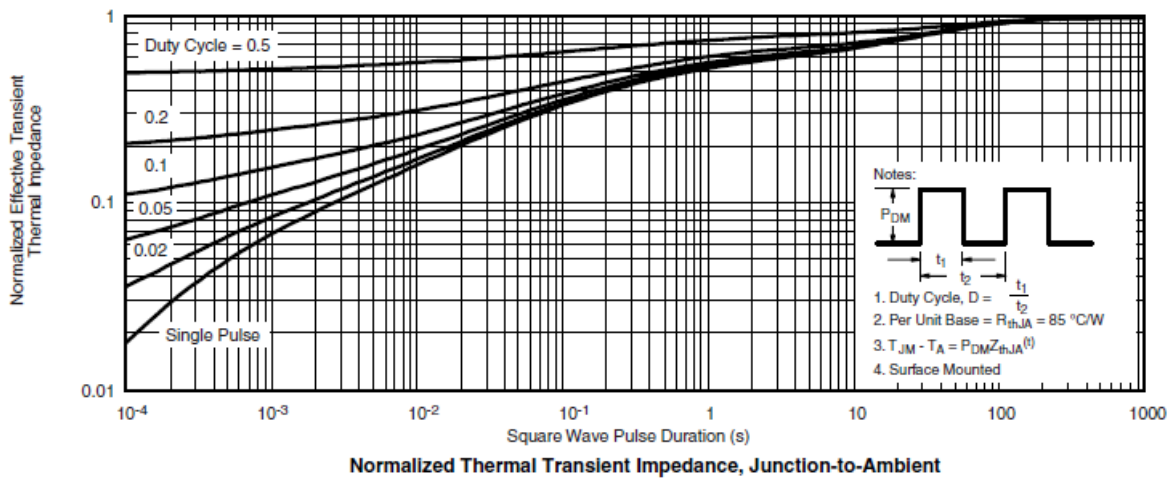
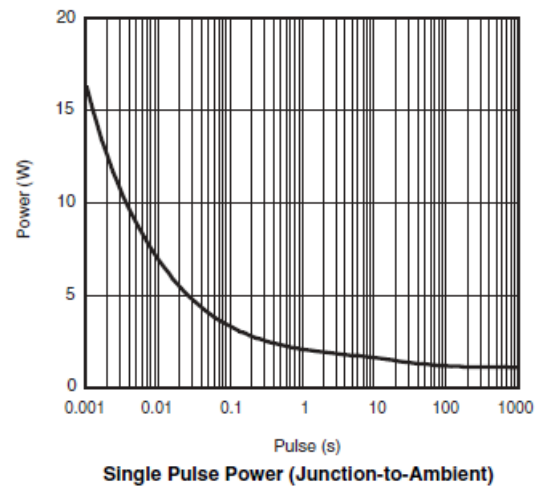
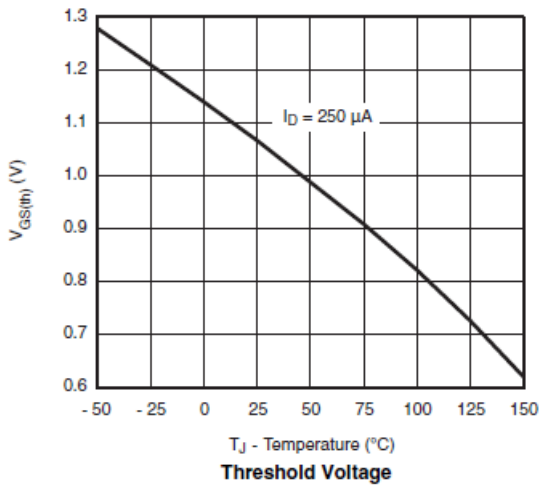
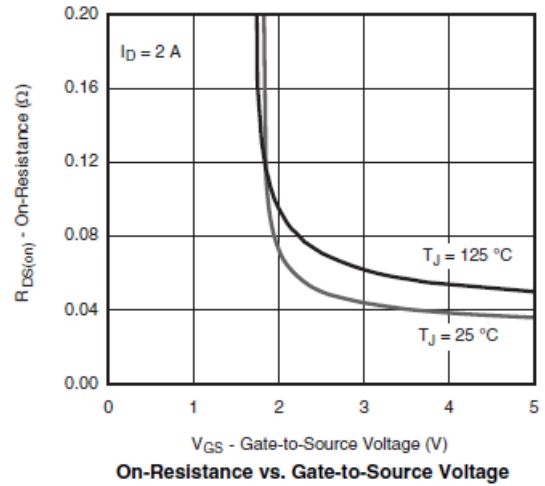
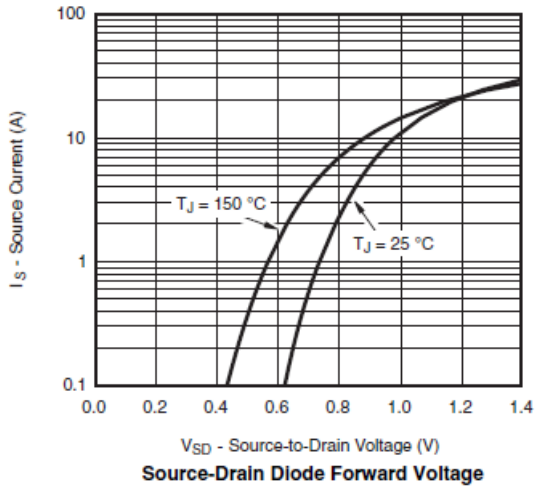


Typical Characteristics (N-Channel)





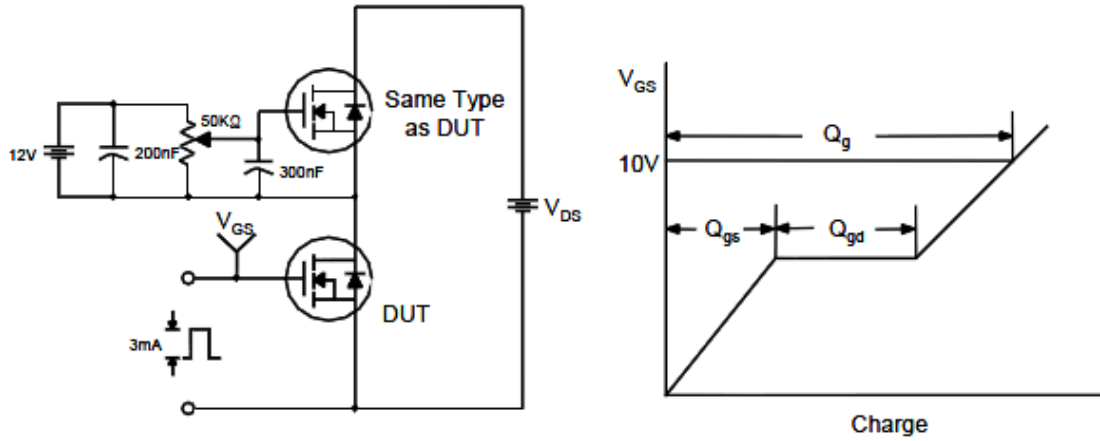
Typical Characteristics (N-Channel)



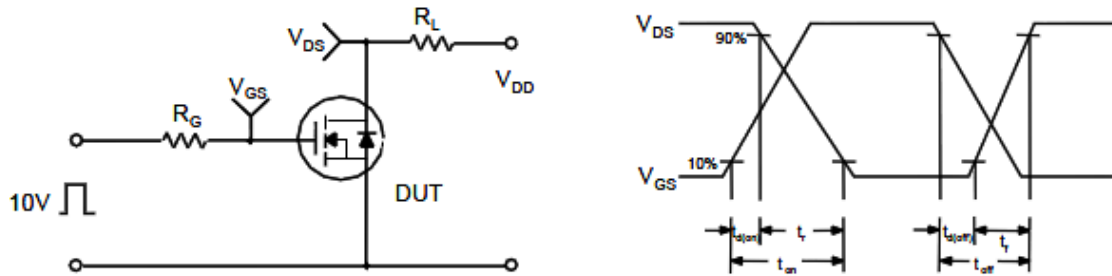


Typical Characteristics (N-Channel)

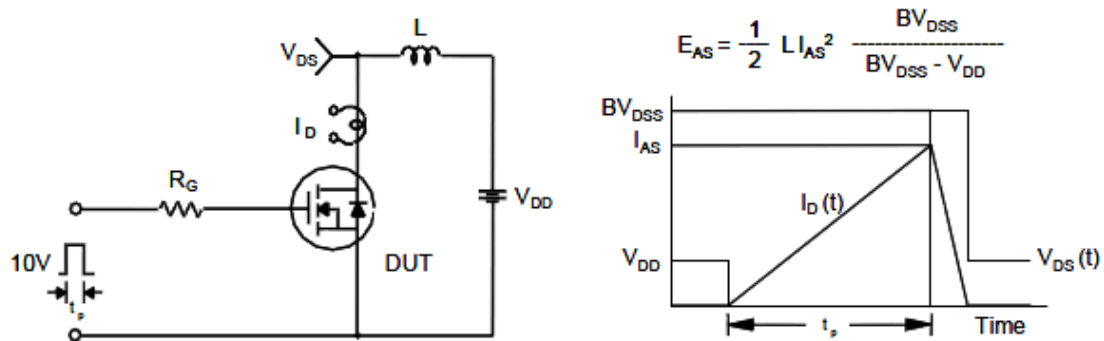
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

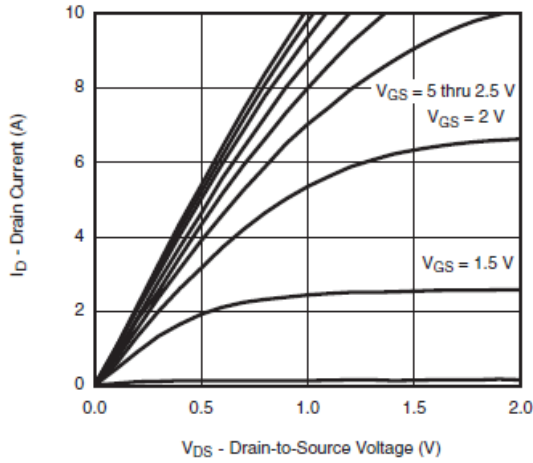


Unclamped Inductive Switching Test Circuit & Waveforms

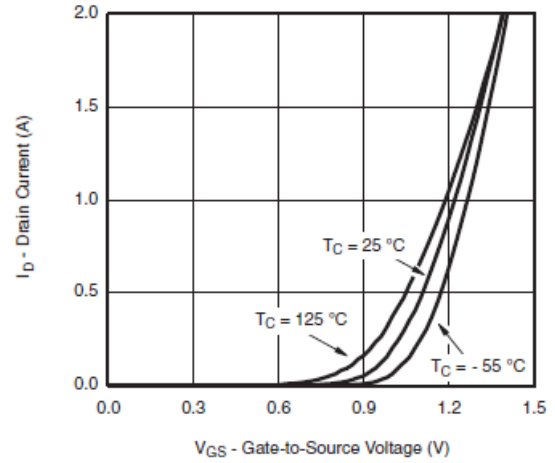




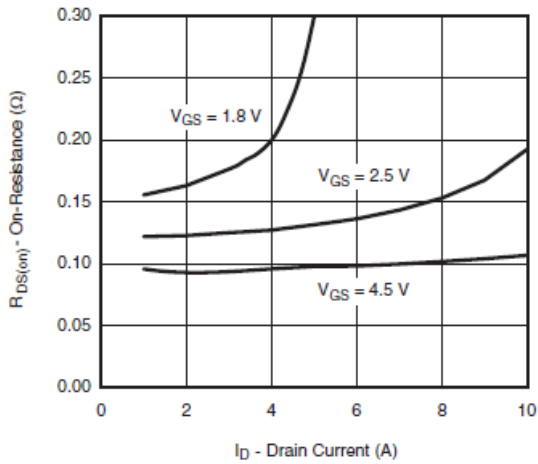
Typical Characteristics (P-Channel)



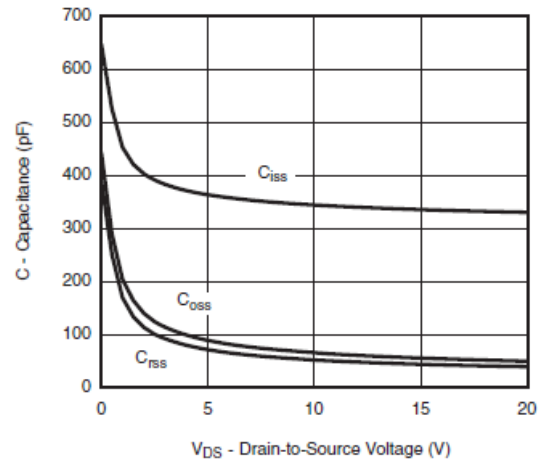
Output Characteristics



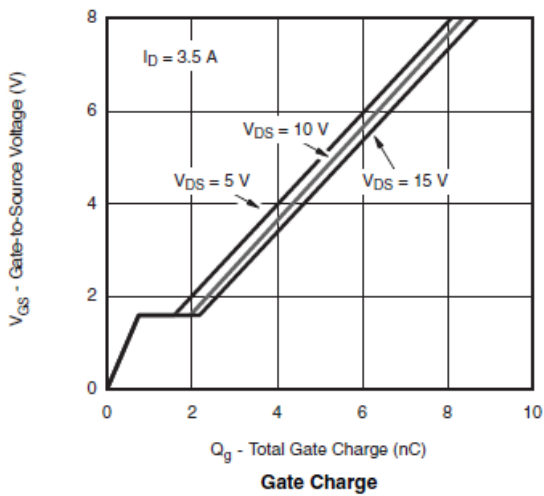
Transfer Characteristics



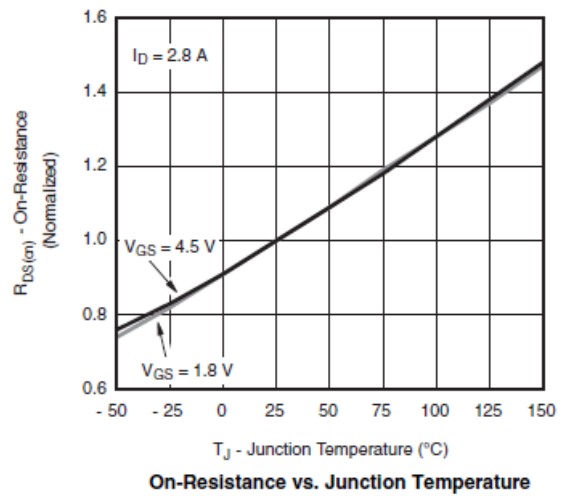
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



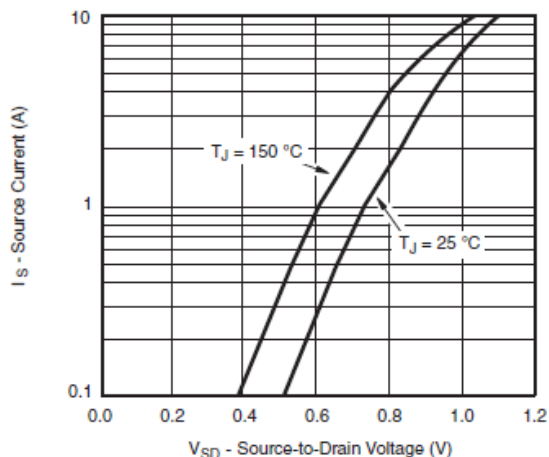
Gate Charge



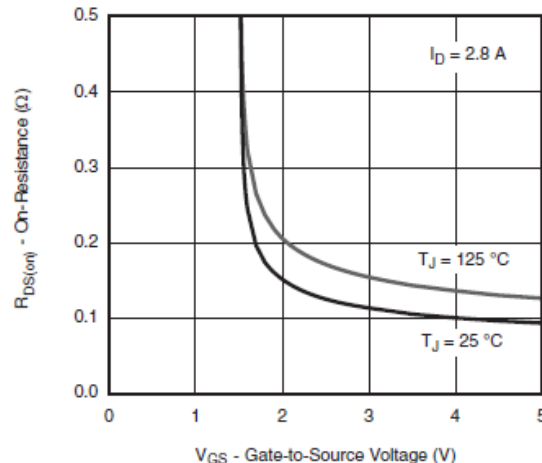
On-Resistance vs. Junction Temperature



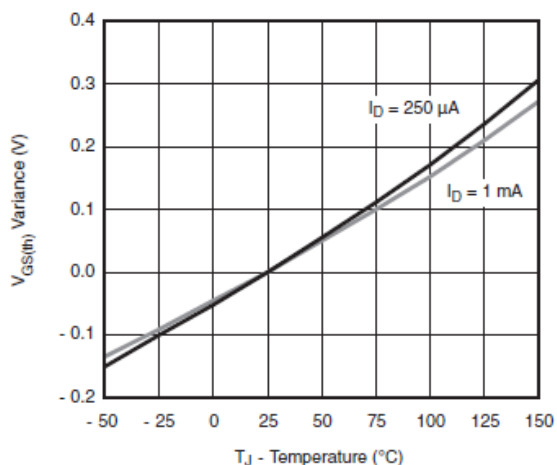
Typical Characteristics (P-Channel)



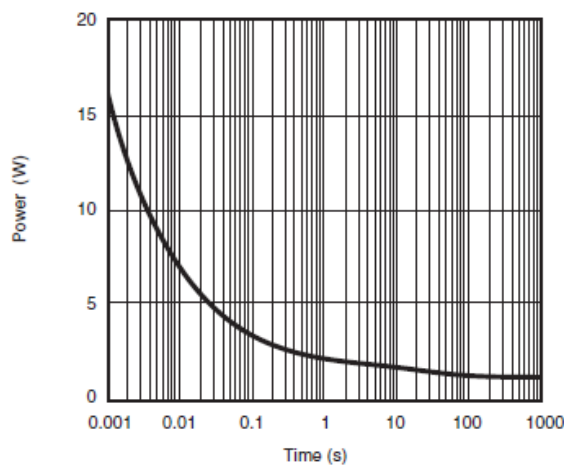
Source-Drain Diode Forward Voltage



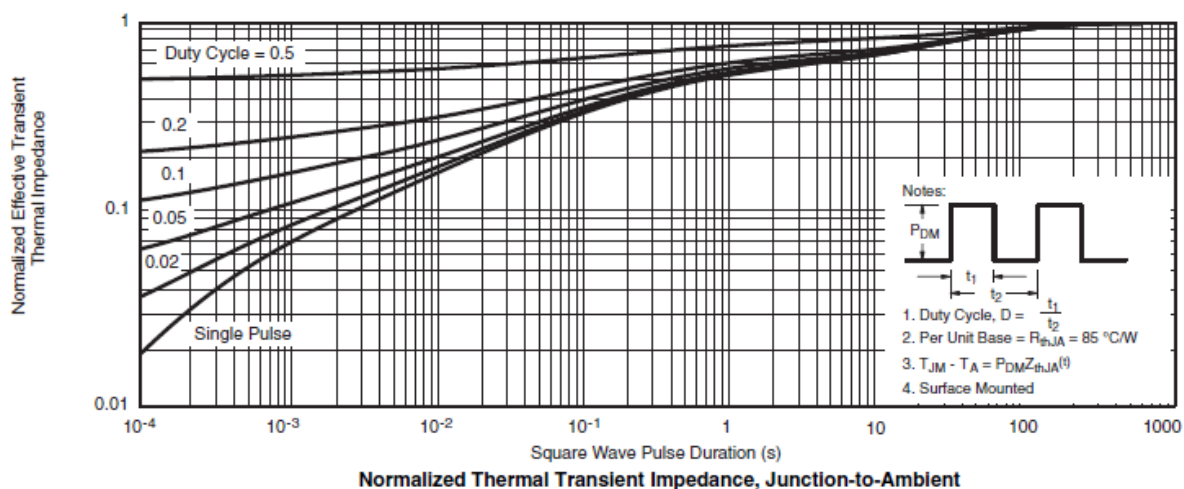
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



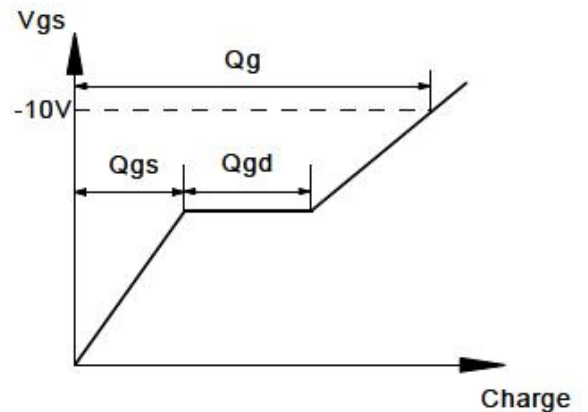
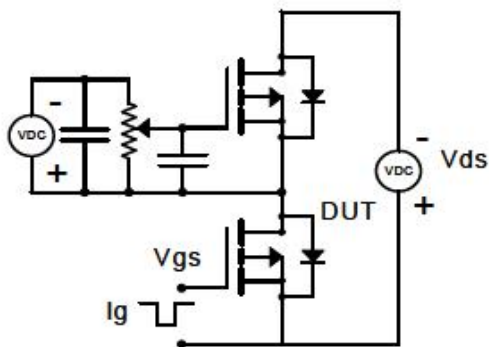
Single Pulse Power, Junction-to-Ambient



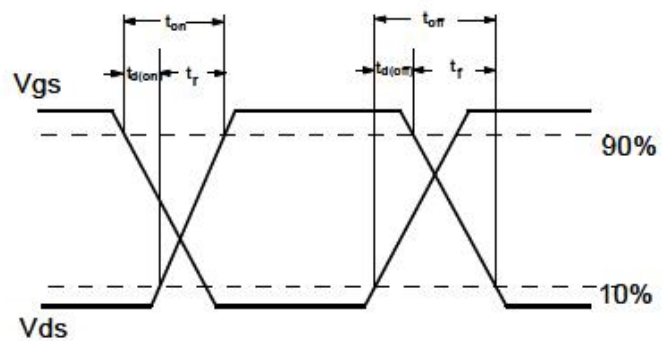
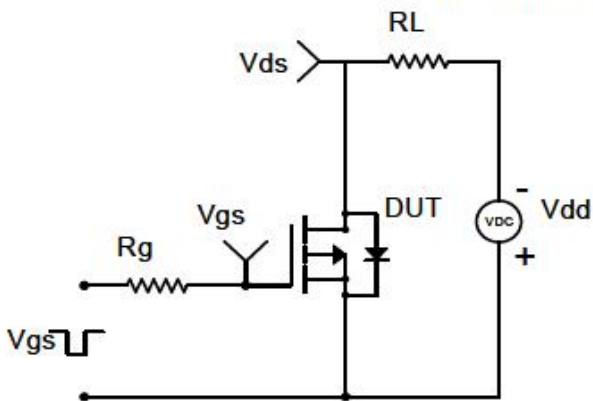


Typical Characteristics (P-Channel)

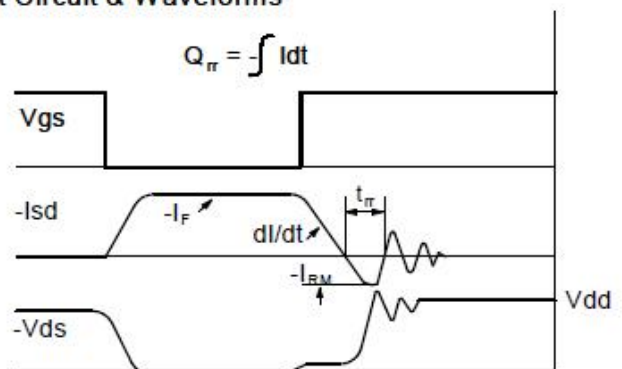
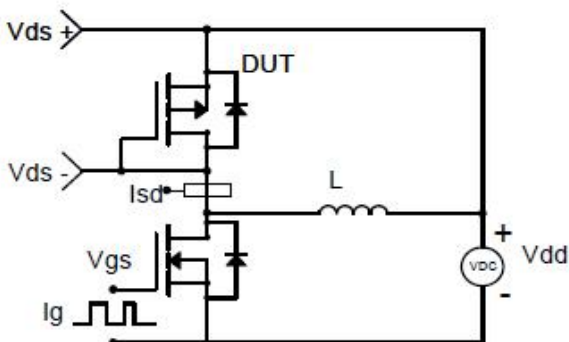
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

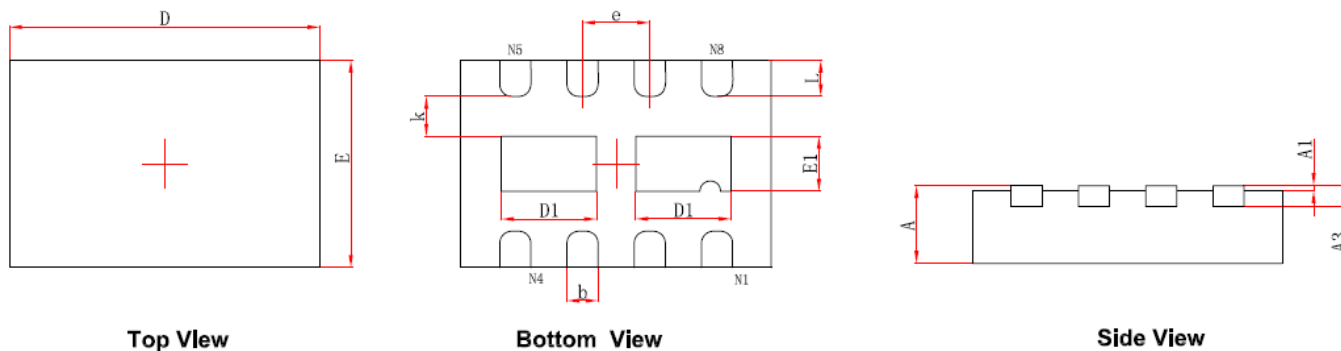


Diode Recovery Test Circuit & Waveforms





Package Information (DFN3X2-8L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	2.924	3.076	0.115	0.121
E	1.924	2.076	0.076	0.082
D1	0.820	1.020	0.032	0.040
E1	0.430	0.630	0.017	0.025
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.274	0.426	0.011	0.017

©2010 Alfa-MOS Technology Corp.
 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