



## General Description

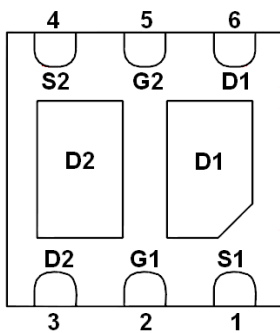
AFC2517W, N & P Pair enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

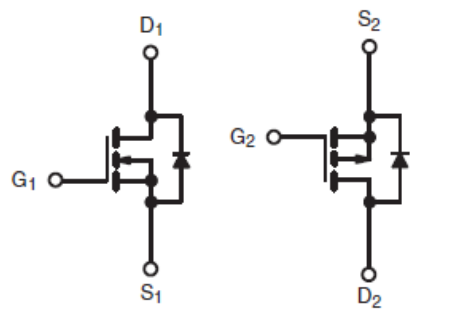
## Features

- N-Channel  
 $I_D=4.6A, R_{DS(ON)}=25m\Omega@V_{GS}=4.5V$   
 $I_D=4.2A, R_{DS(ON)}=30m\Omega@V_{GS}=2.5V$   
 $I_D=3.8A, R_{DS(ON)}=38m\Omega@V_{GS}=1.8V$
- P-Channel  
 $I_D=-3.6A, R_{DS(ON)}=52m\Omega@V_{GS}=4.5V$   
 $I_D=-3.2A, R_{DS(ON)}=65m\Omega@V_{GS}=2.5V$   
 $I_D=-1.2A, R_{DS(ON)}=82m\Omega@V_{GS}=1.8V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- DFN2X2-6L package design

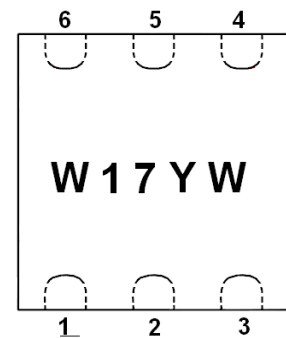
## Pin Description ( DFN2X2-6L )



BOTTOM VIEW



N-Channel MOSFET P-Channel MOSFET



TOP VIEW

## Application

- Portable Devices Such as Smart Phones, Tablet PCs and Mobile Computing
  - Load Switches
  - Power Management
  - DC/DC Converters



**Pin Define**

Pin	Symbol	Description
1	S1	Source1
2	G1	Gate1
3	D2	Drain2
4	S2	Source2
5	G2	Gate2
6	D1	Drain1

**Ordering Information**

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFC2517WFN226RG	W17YW	DFN2X2-6L	Tape & Reel	4000 EA

- ※ W17 parts code
- ※ Y year code
- ※ W week code
- ※ AFC2517WFN226RG : 7" Tape & Reel ; Pb- Free ; Halogen- Free

**Absolute Maximum Ratings**

(T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Value		Unit	
		N-Channel	P-Channel		
Drain-Source Voltage	V <sub>DSS</sub>	20	-20	V	
Gate -Source Voltage	V <sub>GSS</sub>	±12	±12	V	
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	T <sub>C</sub> =25°C	4.2	-4.2	A
		T <sub>C</sub> =70°C	4.2	-4.2	
Pulsed Drain Current	I <sub>DM</sub>	15	-15	A	
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	1.6	-1.6	A	
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	7.8	W	
		T <sub>C</sub> =70°C	5.0		
Operating Junction Temperature	T <sub>J</sub>	150		°C	
Storage Temperature Range	T <sub>STG</sub>	-55/150		°C	
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	52	52	°C/W	
Thermal Resistance-Junction to Case(Drian)	R <sub>θJc</sub>	12.5	12.5		



**Electrical Characteristics ( N-Channel )**

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

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4		1.0	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=16V, V_{GS}=0V$			1	uA
		$V_{DS}=16V, V_{GS}=0V$ $T_J=85^{\circ}\text{C}$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=4.5V$	10			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=4.6A$		16	25	m $\Omega$
		$V_{GS}=2.5V, I_D=4.2A$		20	30	
		$V_{GS}=1.8V, I_D=2.8A$		27	38	
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=4.6A$		21		S
Diode Forward Voltage	$V_{SD}$	$I_S=1.5A, V_{GS}=0V$		0.85	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=10V, V_{GS}=4.5V$ $I_D \equiv 5.9A$		6.0	12	nC
Gate-Source Charge	$Q_{gs}$			0.75		
Gate-Drain Charge	$Q_{gd}$			0.85		
Input Capacitance	$C_{iss}$	$V_{DS}=6V, V_{GS}=0V$ $f=1\text{MHz}$		480		pF
Output Capacitance	$C_{oss}$			120		
Reverse Transfer Capacitance	$C_{rss}$			75		
Turn-On Time	$t_{d(on)}$	$V_{DD}=6V, R_L=1.3\Omega$ $I_D \equiv 4.8A, V_{GEN}=4.5V$		10	20	ns
	$t_r$			10	20	
Turn-Off Time	$t_{d(off)}$	$R_G=1\Omega$		20	40	ns
	$t_f$			10	20	



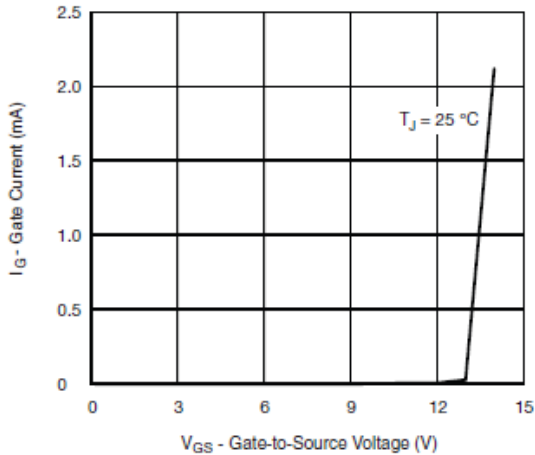
**Electrical Characteristics ( P-Channel )**

(T<sub>A</sub>=25°C Unless otherwise noted)

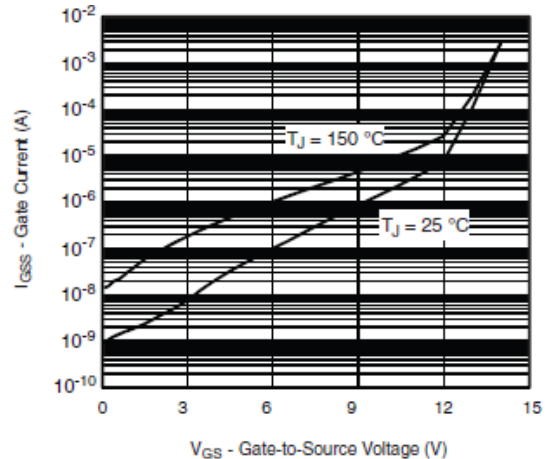
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-0.4		-1.0	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V			±10	uA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V			-1	uA
		V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C			-10	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ -5V, V <sub>GS</sub> =-4.5V	-10			A
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.6A		42	52	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-3.2A		55	65	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-1.2A		69	82	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-3.6A		11		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1.25A, V <sub>GS</sub> =0V		-0.85	-1.2	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V I <sub>D</sub> ≡-4.3A		9	20	nC
Gate-Source Charge	Q <sub>gs</sub>			1.2		
Gate-Drain Charge	Q <sub>gd</sub>			2.8		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-6V, V <sub>GS</sub> =0V f=1MHz		600		pF
Output Capacitance	C <sub>oss</sub>			280		
Reverse Transfer Capacitance	C <sub>rss</sub>			250		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-6V, R <sub>L</sub> =1.6Ω I <sub>D</sub> ≡-3.8A, V <sub>GEN</sub> =-4.5V		30	55	ns
	t <sub>r</sub>			25	45	
Turn-Off Time	t <sub>d(off)</sub>		R <sub>G</sub> =1Ω		30	
	t <sub>f</sub>			20	40	



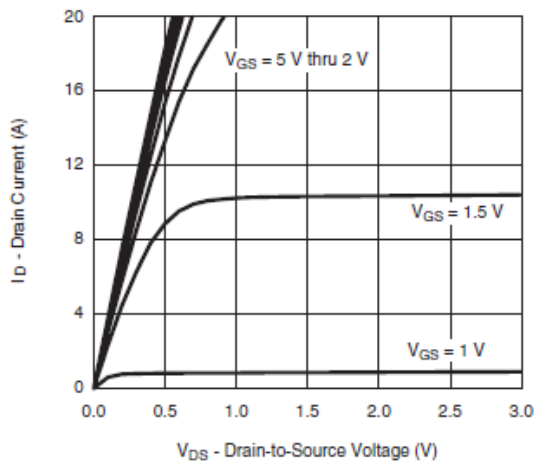
## Typical Characteristics ( N-Channel )



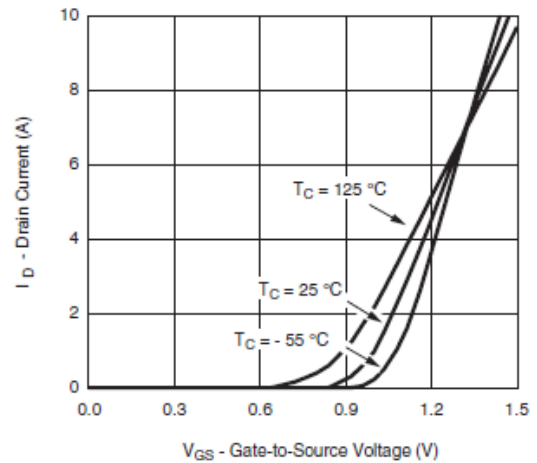
Gate Current vs. Gate-Source Voltage



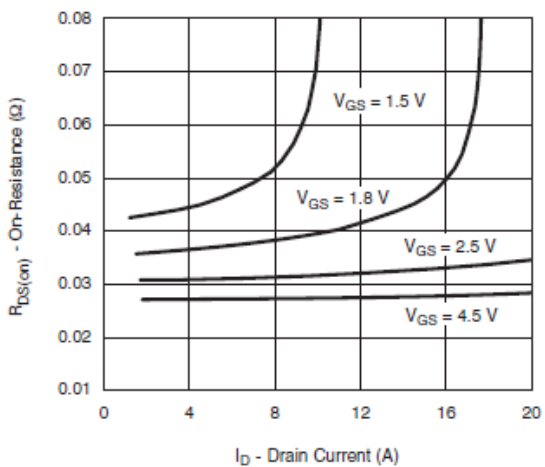
Gate Current vs. Gate-Source Voltage



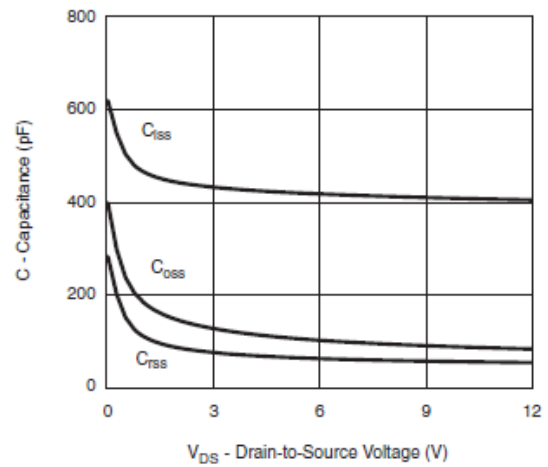
Output Characteristics



Transfer Characteristics



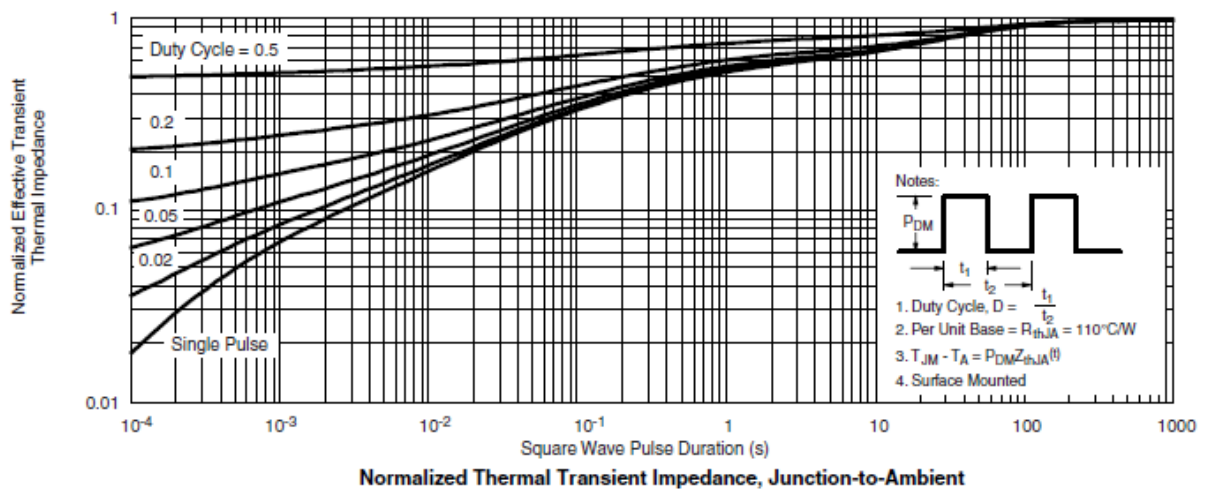
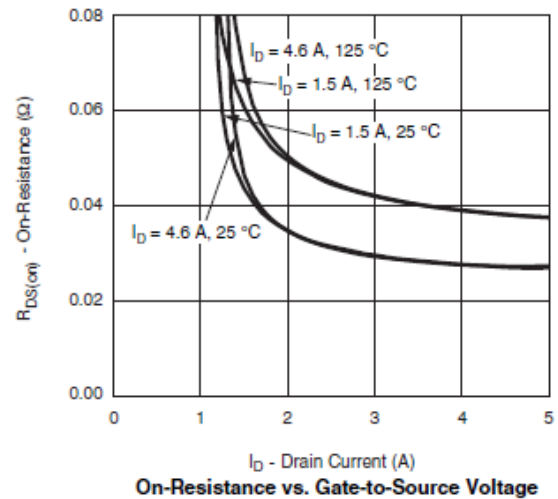
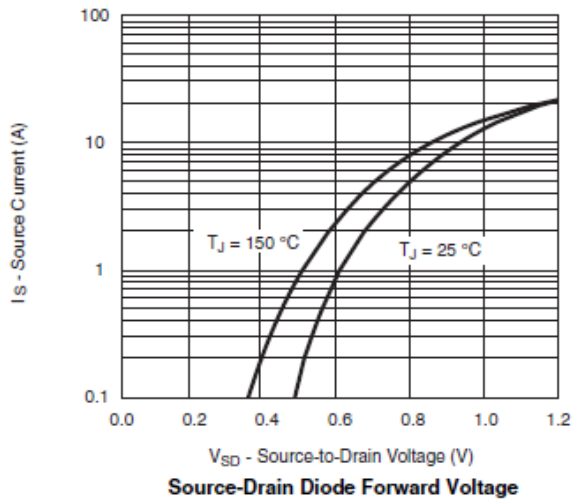
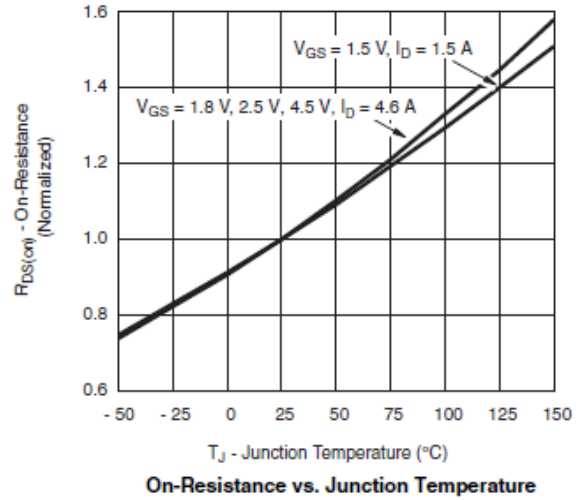
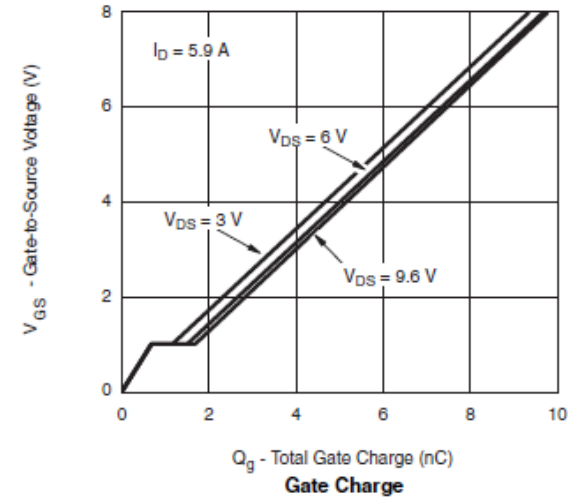
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



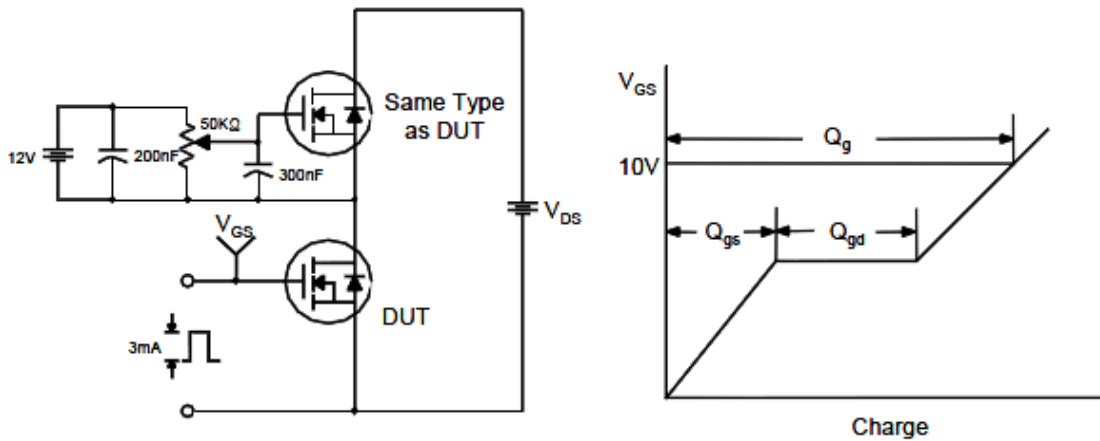
## Typical Characteristics ( N-Channel )



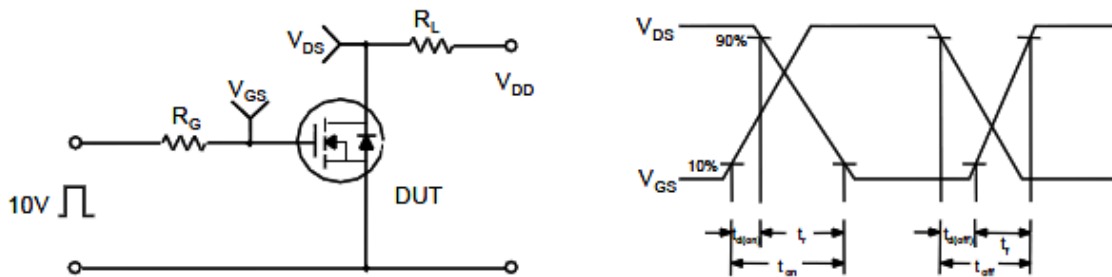


**Typical Characteristics ( N-Channel )**

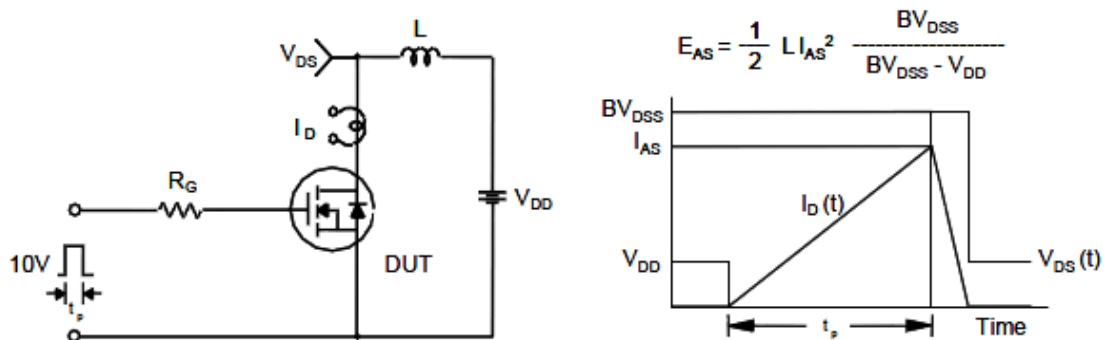
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

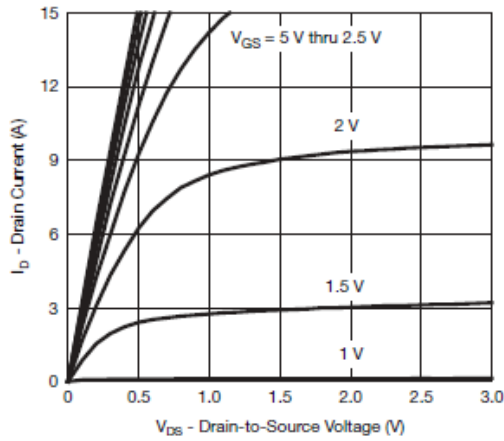


Unclamped Inductive Switching Test Circuit & Waveforms

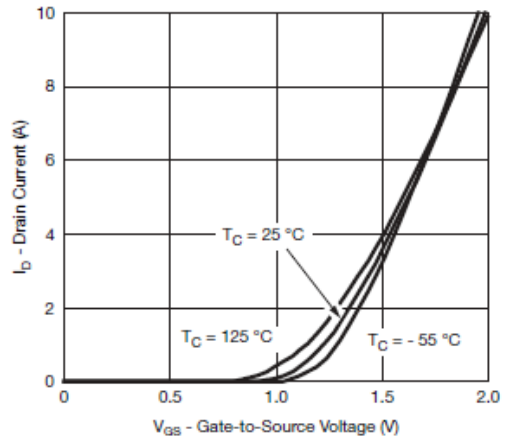




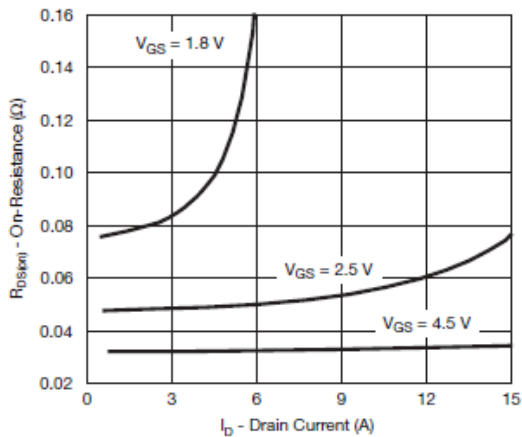
## Typical Characteristics ( P-Channel )



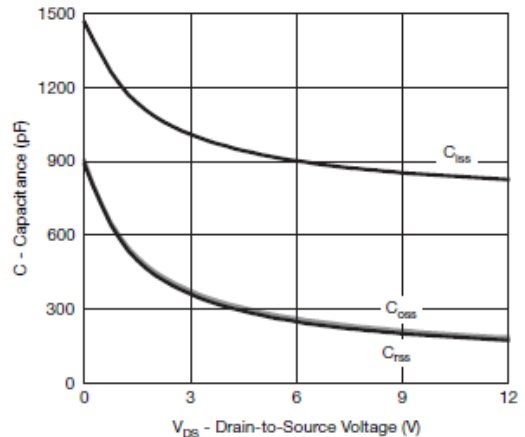
Output Characteristics



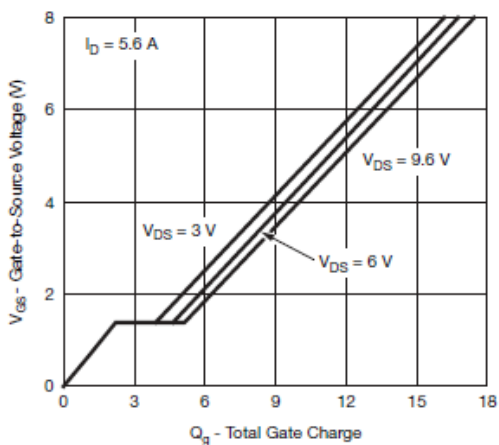
Transfer Characteristics



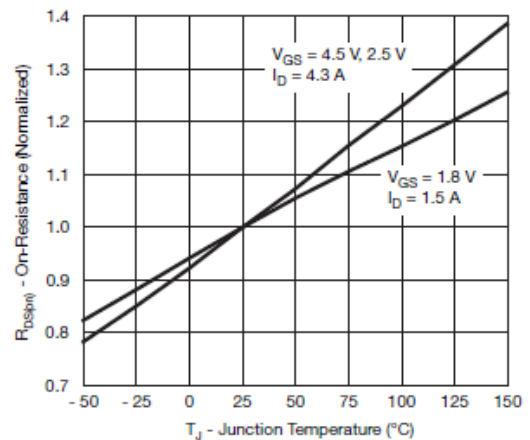
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

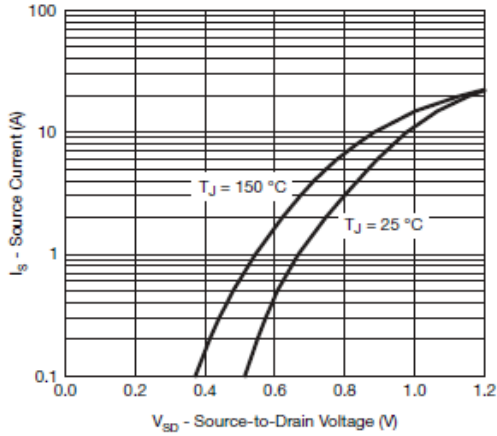


On-Resistance vs. Junction Temperature

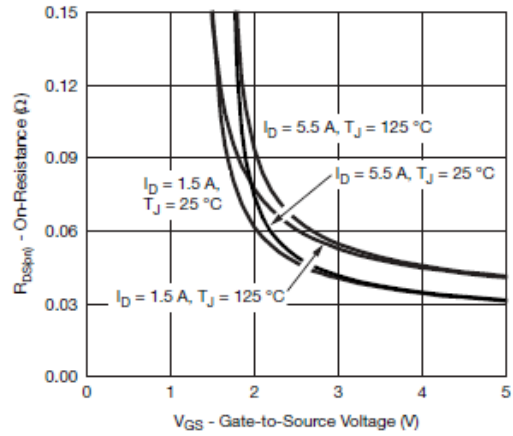




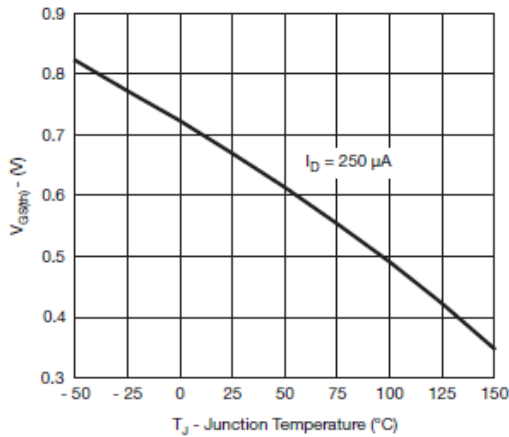
## Typical Characteristics ( P-Channel )



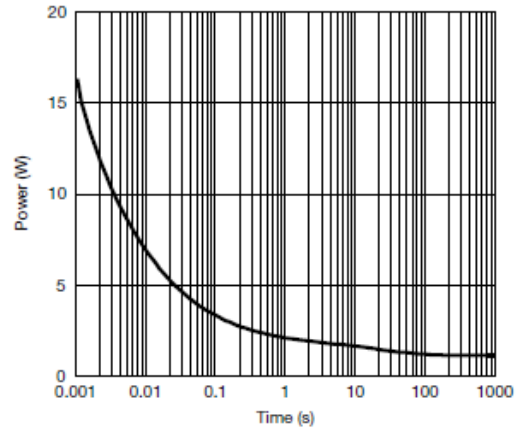
Source-Drain Diode Forward Voltage



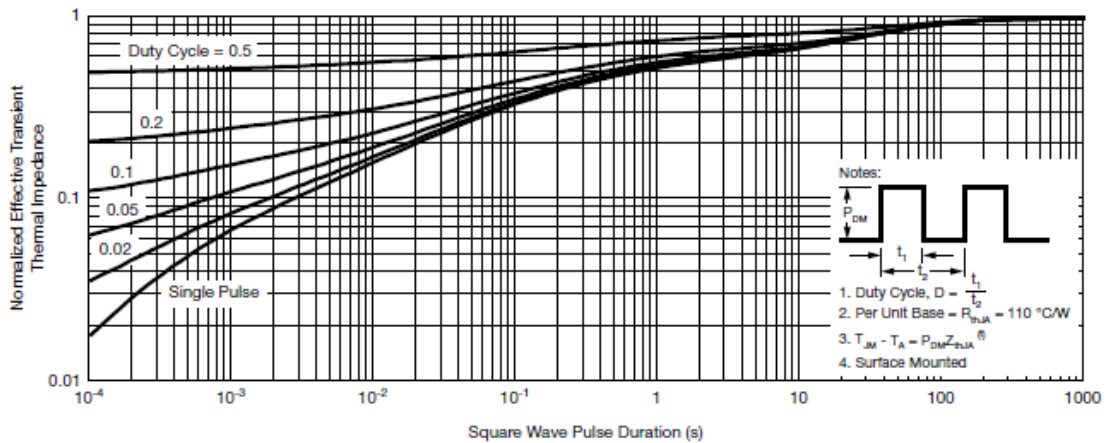
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient

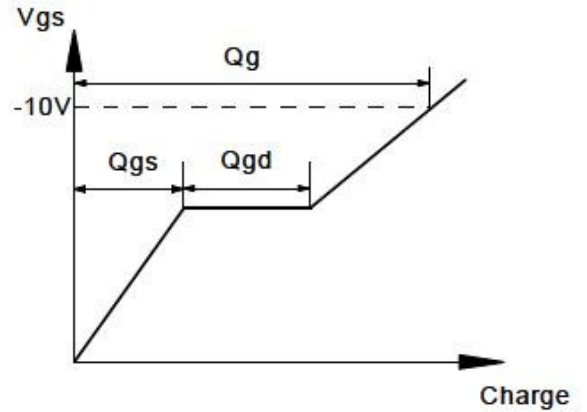
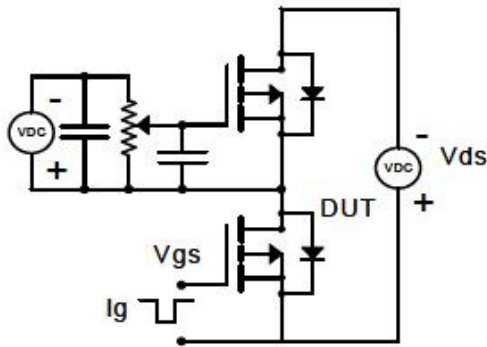


Normalized Thermal Transient Impedance, Junction-to-Ambient

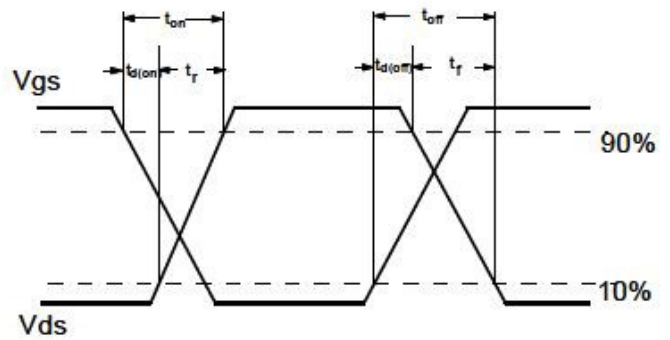
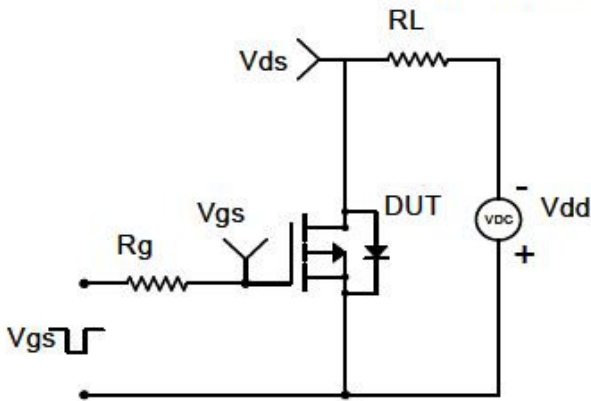


**Typical Characteristics ( P-Channel )**

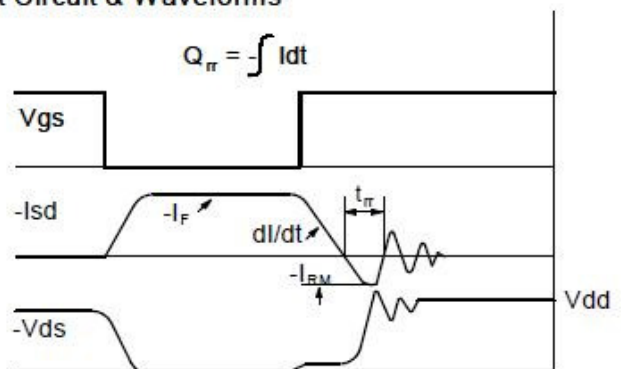
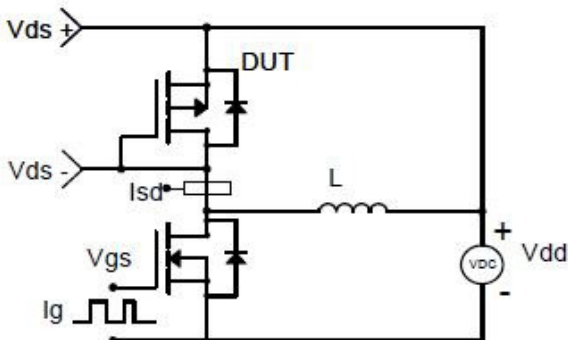
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

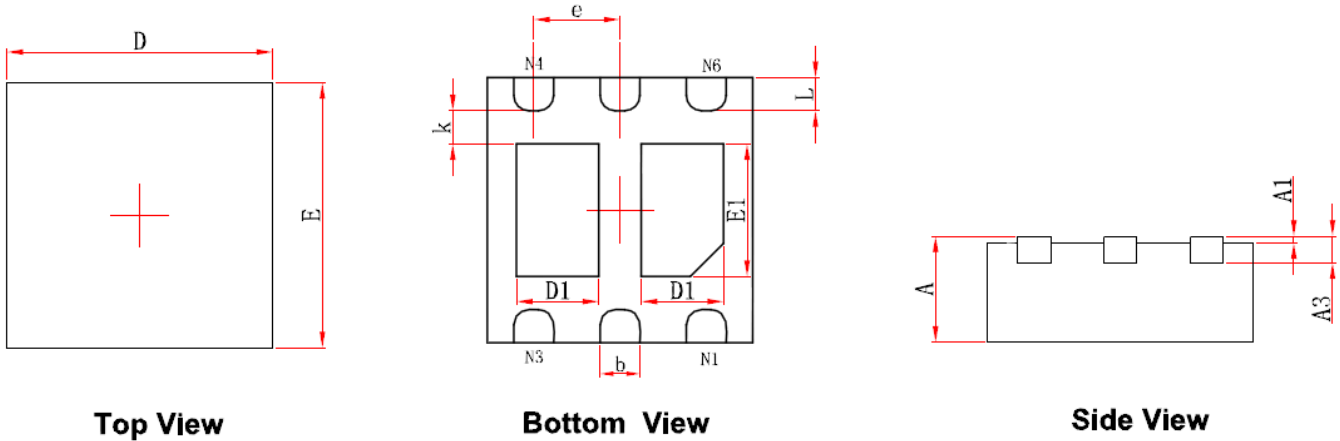


Diode Recovery Test Circuit & Waveforms





**Package Information ( DFN2X2-6L )**



**Top View**

**Bottom View**

**Side View**

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	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.520	0.720	0.020	0.028
E1	0.900	1.100	0.035	0.043
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013

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