



### General Description

AFC3346W, 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

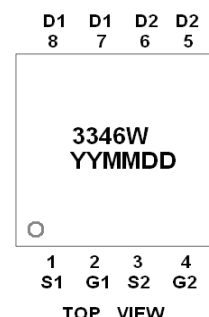
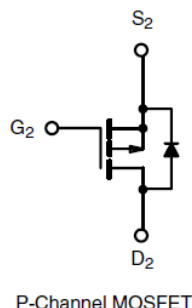
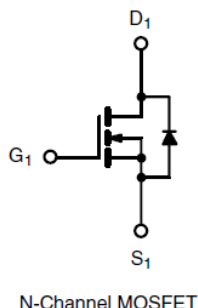
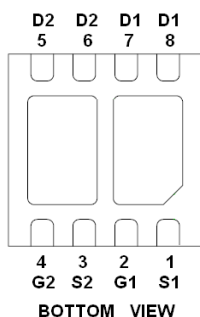
N-Channel

- 40V/15A,  $R_{DS(ON)} = 28m\Omega @ V_{GS} = 10V$
- 40V/12A,  $R_{DS(ON)} = 38m\Omega @ V_{GS} = 4.5V$

P-Channel

- -40V/-12A,  $R_{DS(ON)} = 45m\Omega @ V_{GS} = -10V$
- -40V/-10A,  $R_{DS(ON)} = 62m\Omega @ V_{GS} = -4.5V$

### Pin Description ( DFN3X3-8L )



### Application

- DC/DC Conversion
- Load Switch
- DC FAN

### 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
AFC3346WFN338RG	3346W YYMMDD	DFN3X3-8L	Tape & Reel	5000 EA

- ※ YY year code
- ※ MM month code
- ※ DD date code
- ※ AFC3346WFN338RG : 13" Tape & Reel ; Pb- Free ; Halogen -Free



**Absolute Maximum Ratings ( N-Channel )**

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	40	V
Gate –Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current( $T_J=150^{\circ}\text{C}$ )	$I_D$	$T_A=25^{\circ}\text{C}$	15
		$T_A=70^{\circ}\text{C}$	12
Pulsed Drain Current	$I_{DM}$	40	A
Continuous Source Current(Diode Conduction)	$I_S$	10	A
Power Dissipation	$P_D$	$T_C=25^{\circ}\text{C}$	28
		$T_C=70^{\circ}\text{C}$	15
		$T_A=25^{\circ}\text{C}$	3.2
		$T_A=70^{\circ}\text{C}$	2.0
Operating Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-55/150	$^{\circ}\text{C}$
Thermal Resistance Junction-to-Case (Drain)	$R_{\theta JC}$	5	$^{\circ}\text{C}/\text{W}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	40	

**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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu\text{A}$	40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		3.0	V
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=32V, V_{GS}=0V$			1	uA
		$V_{DS}=32V, V_{GS}=0V$ $T_J=85^{\circ}\text{C}$			10	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq 5V, V_{GS}=10V$	20			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		20	28	m $\Omega$
		$V_{GS}=4.5V, I_D=12A$		30	38	
Forward Transconductance	$g_{FS}$	$V_{DS}=15V, I_D=5.0A$		25		S
Diode Forward Voltage	$V_{SD}$	$I_S=2A, V_{GS}=0V$		0.85	1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=20V, V_{GS}=4.5V$ $I_D=5A$		10	14	nC
Gate-Source Charge	$Q_{gs}$			2.8		
Gate-Drain Charge	$Q_{gd}$			3.2		
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V$ $f=1\text{MHz}$		850		pF
Output Capacitance	$C_{oss}$			110		
Reverse Transfer Capacitance	$C_{rss}$			75		
Turn-On Time	$t_{d(on)}$	$V_{DD}=20V, R_L=4\Omega$ $I_D=5.0A, V_{GEN}=10V$ $R_G=1\Omega$		6	12	ns
	$t_r$			10	20	
Turn-Off Time	$t_{d(off)}$			20	36	
	$t_f$			6	12	



**Absolute Maximum Ratings ( P-Channel )**

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-40	V
Gate –Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	T <sub>A</sub> =25°C	-12.0
		T <sub>A</sub> =70°C	-10.0
Pulsed Drain Current	I <sub>DM</sub>	-40	A
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	-10	A
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	28
		T <sub>C</sub> =70°C	15
Operating Junction Temperature	T <sub>J</sub>	T <sub>A</sub> =25°C	3.2
		T <sub>A</sub> =70°C	2.0
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C
Thermal Resistance Junction-to-Case (Drain)	R <sub>θJC</sub>	5	°C/W
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	40	

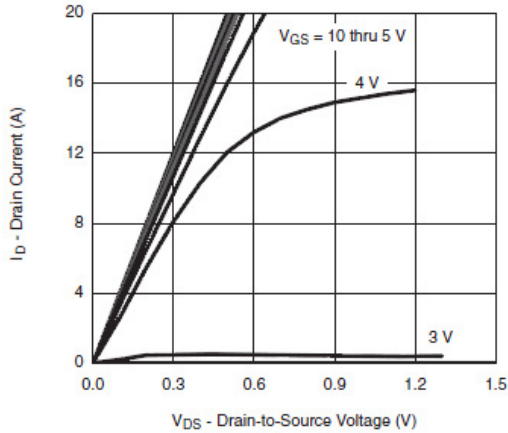
**Electrical Characteristics ( P-Channel )**

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

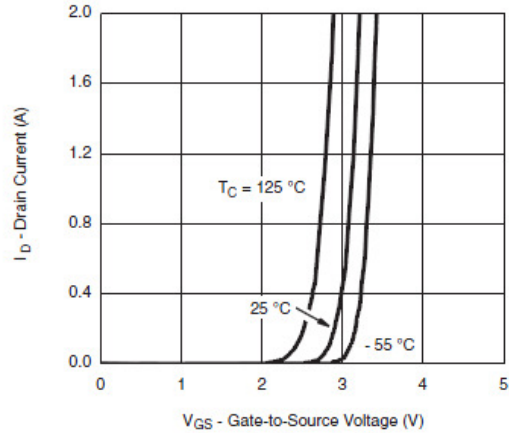
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> = -250uA	-40			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250uA	-1.0		-3.0	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = -32V, V <sub>GS</sub> =0V			-1	uA
		V <sub>DS</sub> = -32V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C			-20	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ -5V, V <sub>GS</sub> = -10V	-20			A
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> =-12A		34	45	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-10A		48	62	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = -15V, I <sub>D</sub> = -5A		20		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = -2A, V <sub>GS</sub> =0V		-0.8	-1.2	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =-4.5V I <sub>D</sub> = -5.0A		13	20	nC
Gate-Source Charge	Q <sub>gs</sub>			4.5		
Gate-Drain Charge	Q <sub>gd</sub>			6.5		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V f=1MHz		1100		pF
Output Capacitance	C <sub>oss</sub>			145		
Reverse Transfer Capacitance	C <sub>rss</sub>			115		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-20V, R <sub>L</sub> =4Ω I <sub>D</sub> ≡-5.0A, V <sub>GEN</sub> =-4.5V R <sub>G</sub> =1Ω		40	80	ns
	t <sub>r</sub>			55	100	
Turn-Off Time	t <sub>d(off)</sub>			30	60	
	t <sub>f</sub>			12	20	



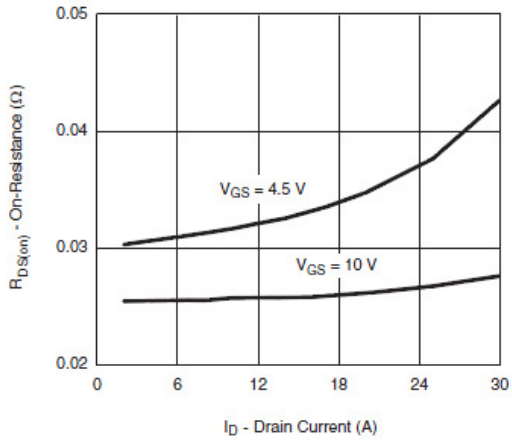
## Typical Characteristics ( N-Channel )



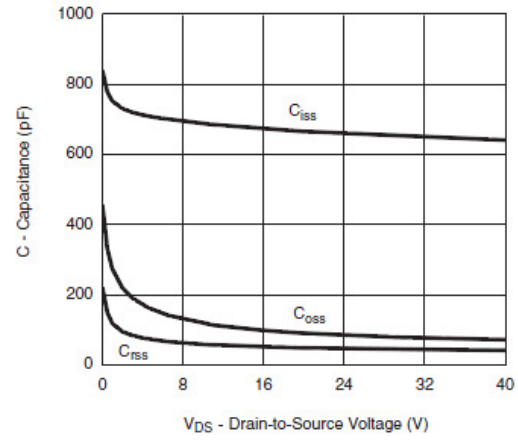
Output Characteristics



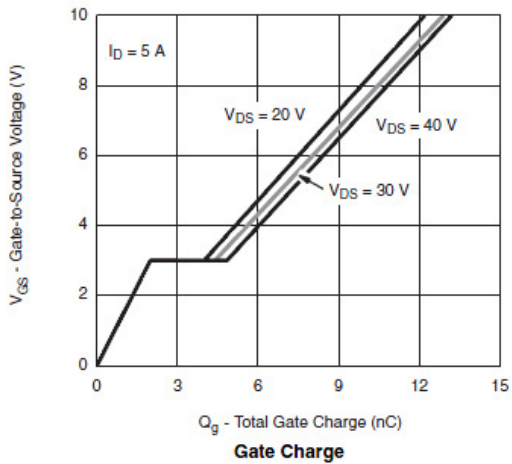
Transfer Characteristics



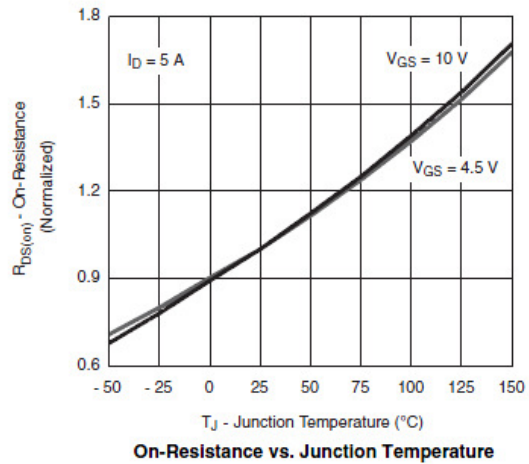
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



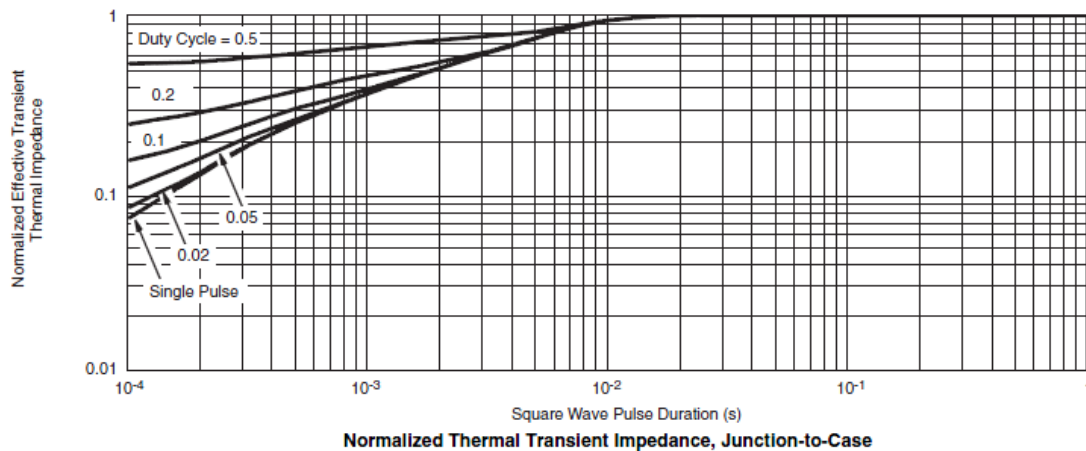
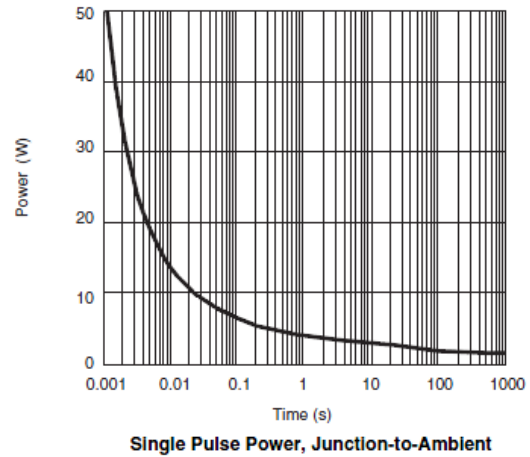
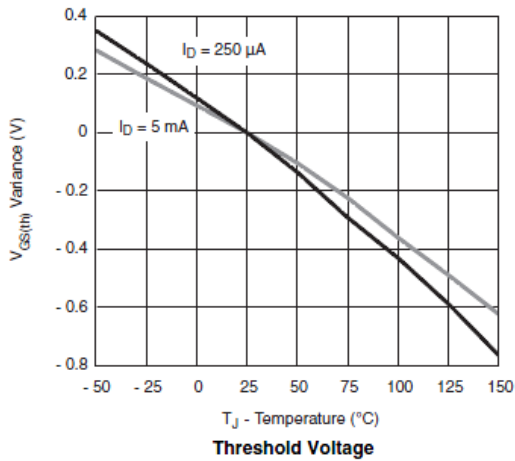
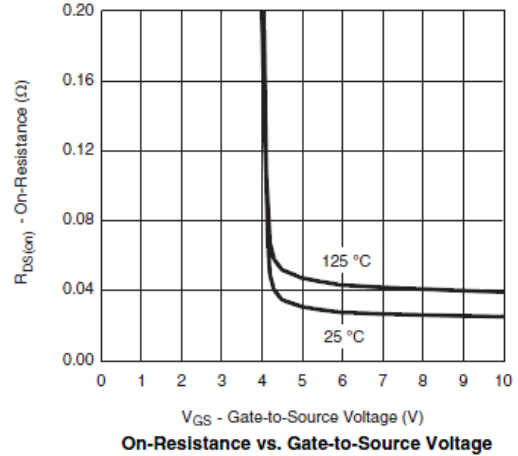
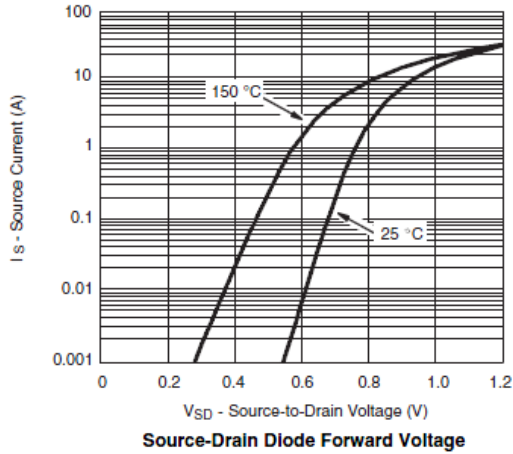
Gate Charge



On-Resistance vs. Junction Temperature

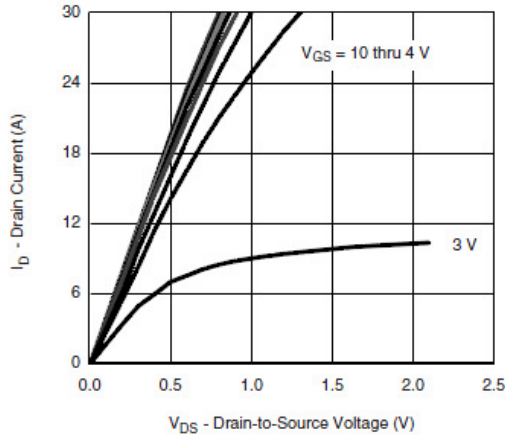


**Typical Characteristics ( N-Channel )**

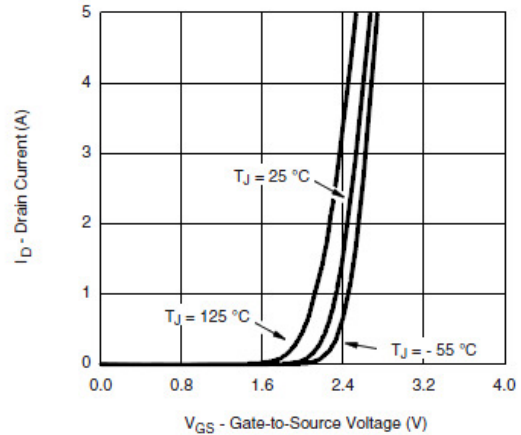




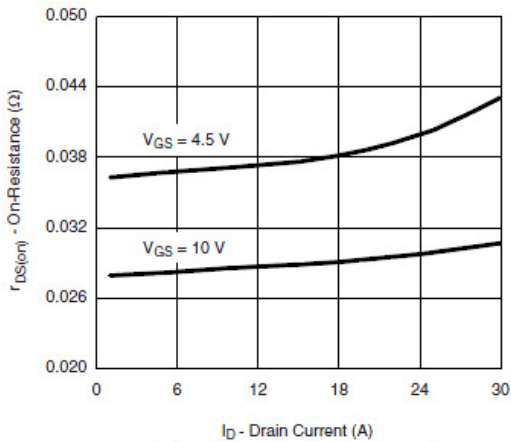
## Typical Characteristics ( P-Channel )



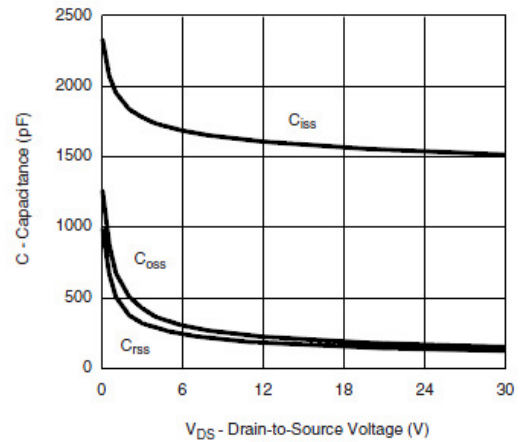
Output Characteristics



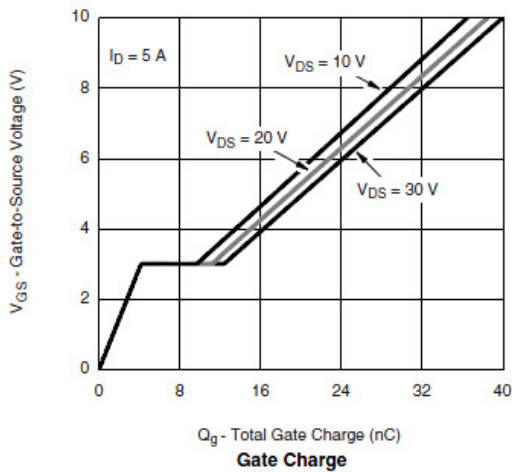
Transfer Characteristics



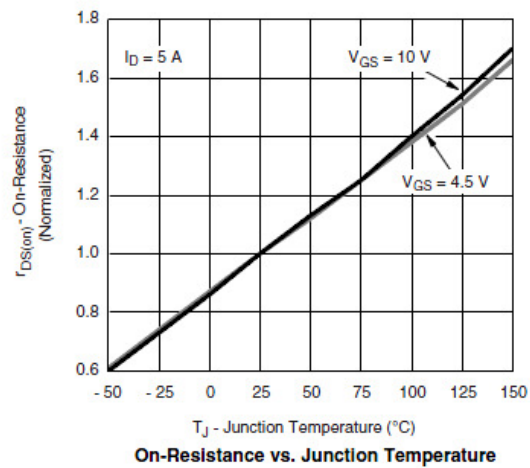
On-Resistance vs. Drain Current



Capacitance



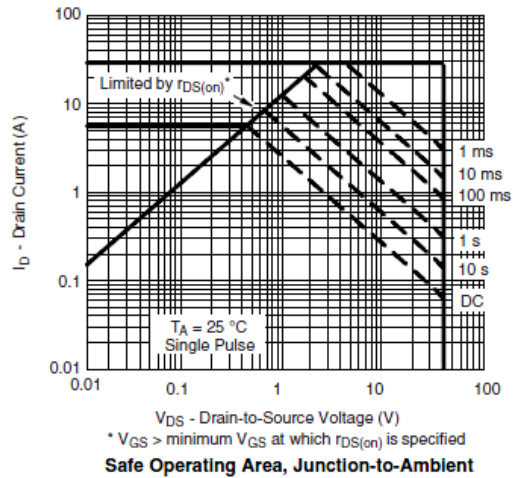
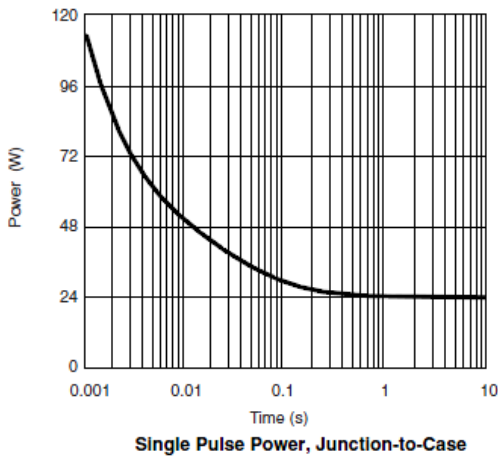
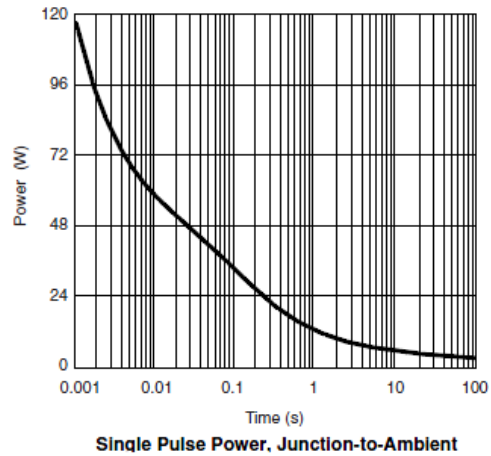
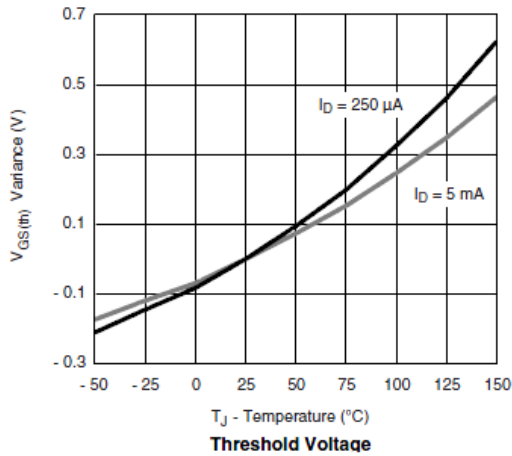
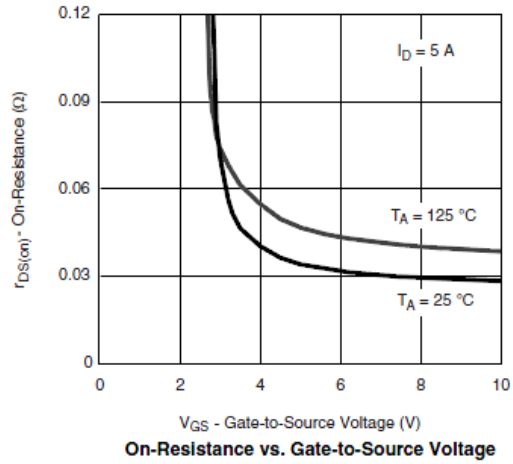
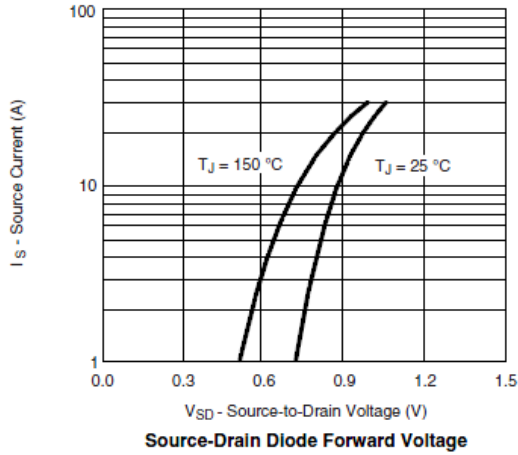
Gate Charge



On-Resistance vs. Junction Temperature



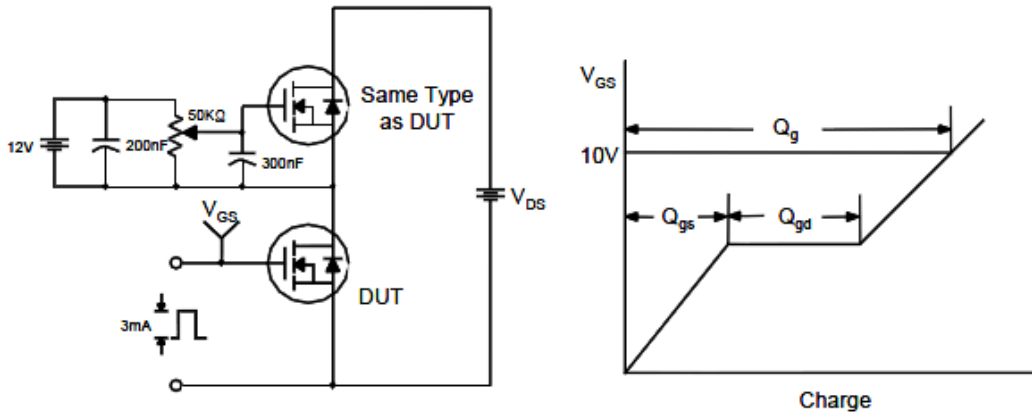
## Typical Characteristics ( P-Channel )



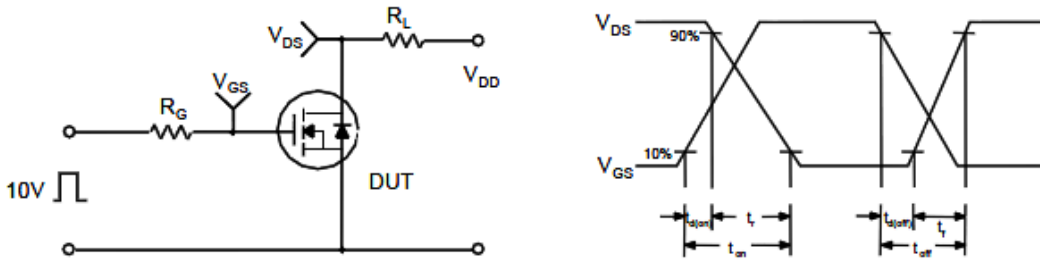


Typical Characteristics

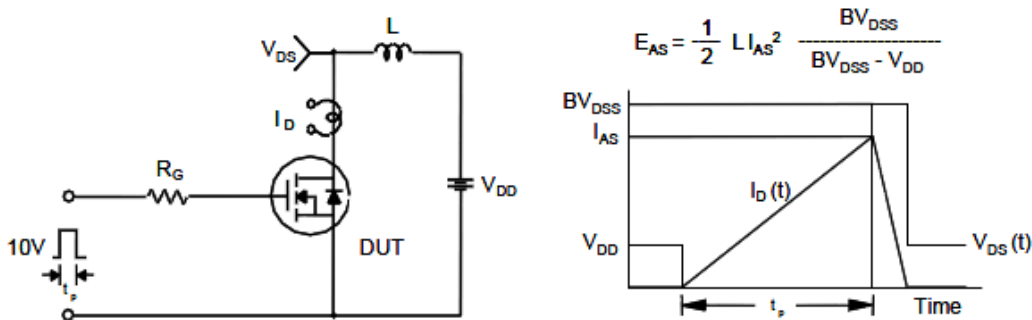
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



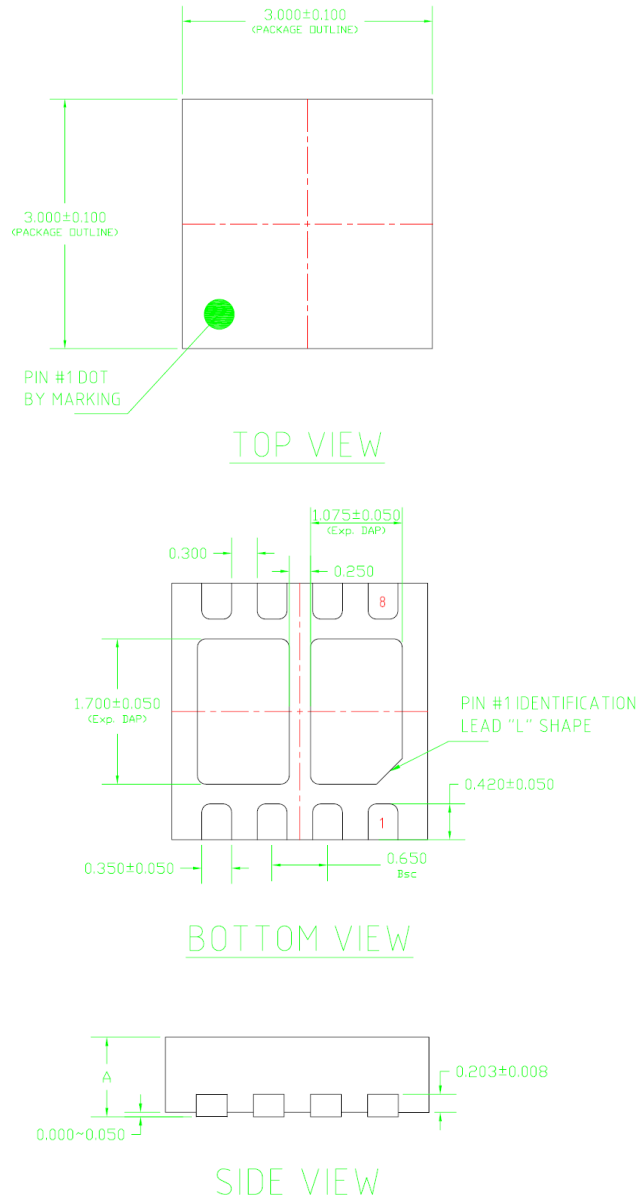
Unclamped Inductive Switching Test Circuit & Waveforms







**Package Information ( DFN3X3-8L )**



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