Alfa-MOS Technology

AFN1602E
20V N-Channel Enhancement Mode MOSFET

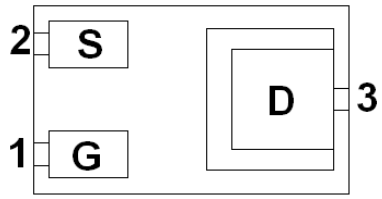
General Description

AFN1602E, 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 low in-line power loss are needed in commercial industrial surface mount applications.

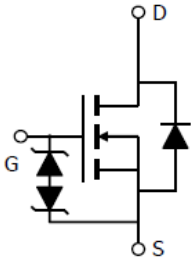
Features

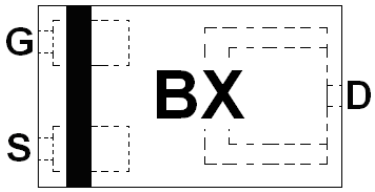
- 20V/0.8A,$R_{DS(ON)}$=360mΩ@V_{GS}=4.5V
- 20V/0.7A,$R_{DS(ON)}$=420mΩ@V_{GS}=2.5V
- 20V/0.5A,$R_{DS(ON)}$=560mΩ@V_{GS}=1.8V
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation
- ESD Protected
- DFN1.0X0.6-3L package design

Pin Description (DFN1.0X0.6-3L)



BOTTOM VIEW





TOP VIEW

Application

- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Smart Phones, Pagers

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN1602EFN106RG	BX	DFN1.0X0.6-3L	Tape & Reel	10000 EA

※ B Product Code
※ X Monthly Code
(even year : A , B~ L)
(odd year : N, M~X)
※ AFN1602EFN106RG : 7” Tape & Reel ; Pb- Free ; Halogen- Free
※

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

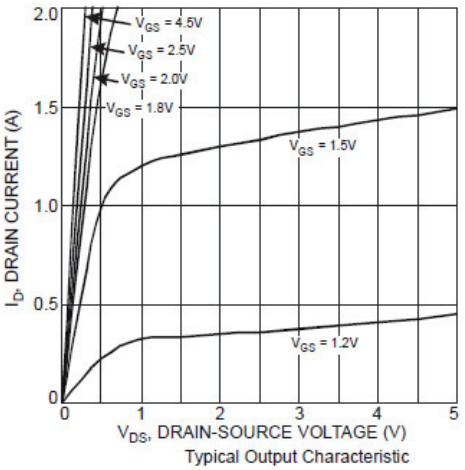
Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate –Source Voltage		V_{GSS}	±12	V
Continuous Drain Current(T_J=150℃)	T_A=25℃	I_D	0.7	A
	T_A=70℃		0.4	
Pulsed Drain Current		I_{DM}	1.0	A
Continuous Source Current(Diode Conduction)		I_S	0.3	A
Power Dissipation	T_A=25℃	P_D	0.27	W
	T_A=70℃		0.16	
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃

Electrical Characteristics

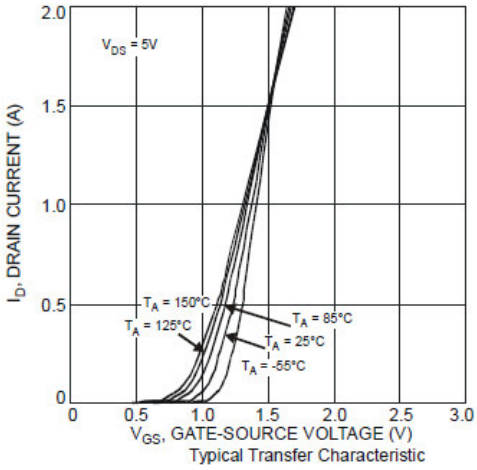
(T_A=25℃ Unless otherwise noted)

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			±1	mA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V			1	uA
		V_{DS}=20V,V_{GS}=0V T_J=85℃			5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=4.5V	0.7			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=0.8A		240	360	mΩ
		V_{GS}=2.5V,I_D=0.7A		300	420	
		V_{GS}=1.8V,I_D=0.5A		420	560	
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=0.4A		1		S
Diode Forward Voltage	V_{SD}	I_S=0.15A,V_{GS}=0V		0.65	1.2	V
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V f=1MHz		70		pF
Output Capacitance	C_{oss}			8		
Reverse Transfer Capacitance	C_{rss}			6		
Total Gate Charge	Q_g	V_{DS}=10V,V_{GS}=4.5V I_D≡0.6A		1.06	1.38	nC
Gate-Source Charge	Q_{gs}			0.18		
Gate-Drain Charge	Q_{gd}			0.32		
Turn-On Time	$t_{d(on)}$	V_{DD}=10V,R_L=20Ω I_D≡0.8A,V_{GEN}=10V R_G=6Ω		5	10	ns
	t_r			5	10	
Turn-Off Time	$t_{d(off)}$			35	70	
	t_f			15	30	

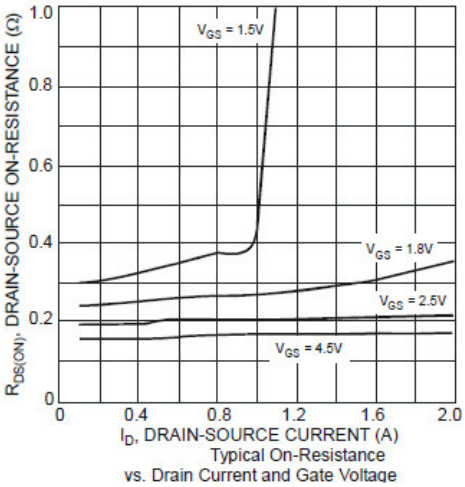
Typical Characteristics



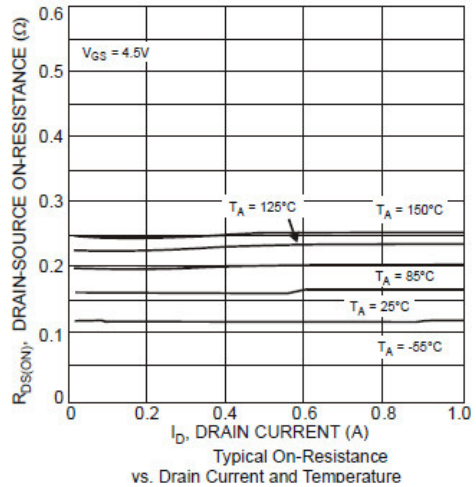
Typical Output Characteristic



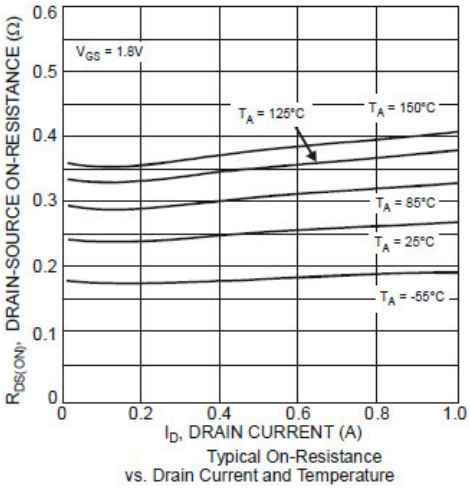
Typical Transfer Characteristic



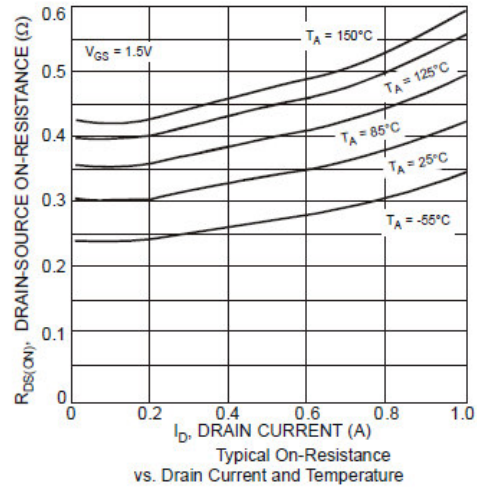
Typical On-Resistance
vs. Drain Current and Gate Voltage



Typical On-Resistance
vs. Drain Current and Temperature

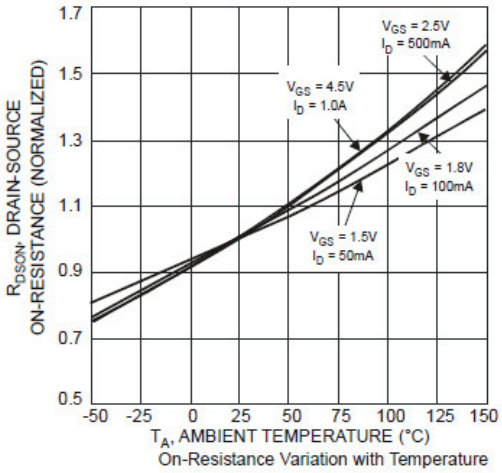


Typical On-Resistance
vs. Drain Current and Temperature

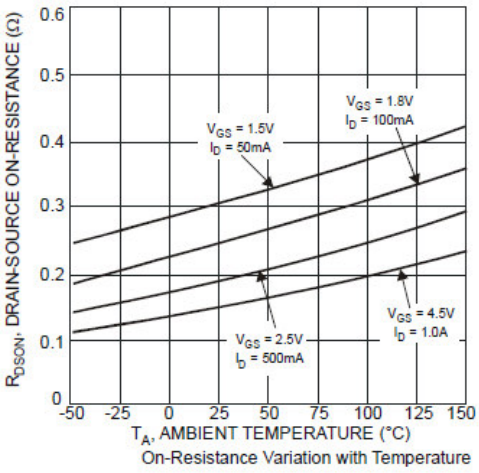


Typical On-Resistance
vs. Drain Current and Temperature

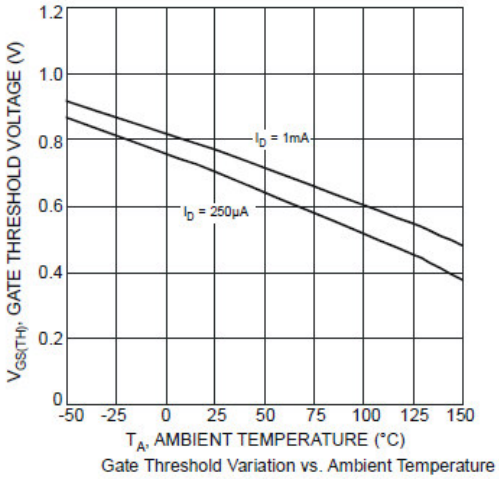
Typical Characteristics



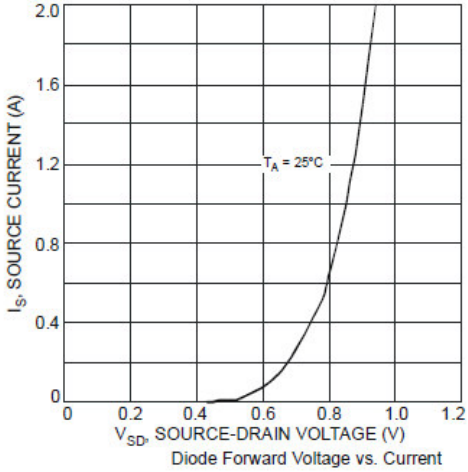
On-Resistance Variation with Temperature



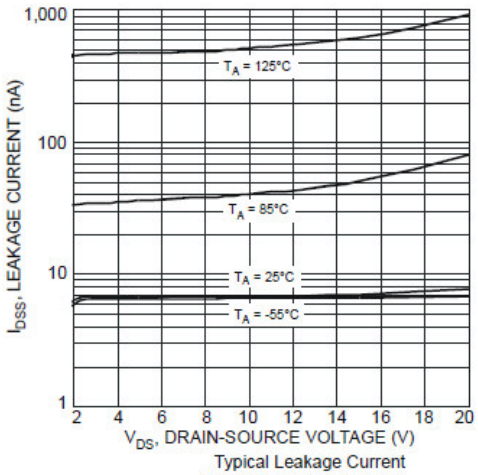
On-Resistance Variation with Temperature



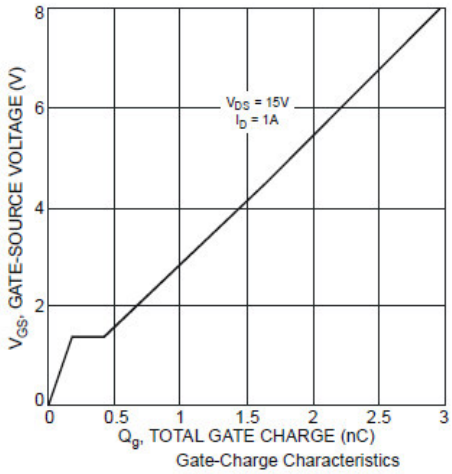
Gate Threshold Variation vs. Ambient Temperature



Diode Forward Voltage vs. Current



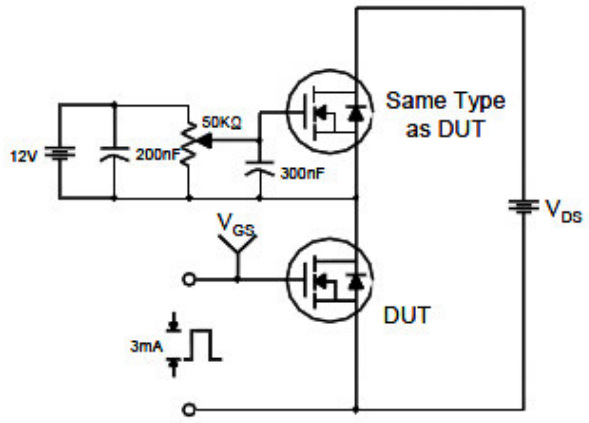
Typical Leakage Current
vs. Drain-Source Voltage

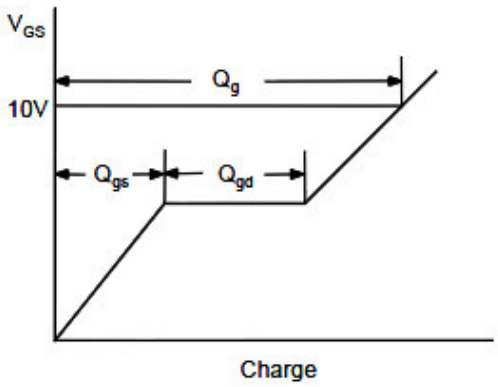


Gate-Charge Characteristics

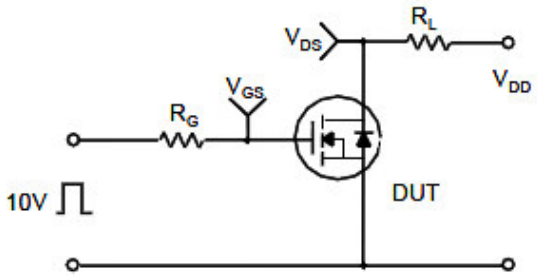
Typical Characteristics

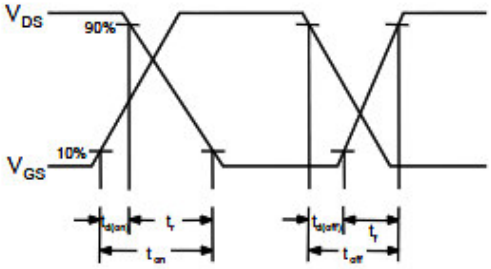
Gate Charge Test Circuit & Waveform



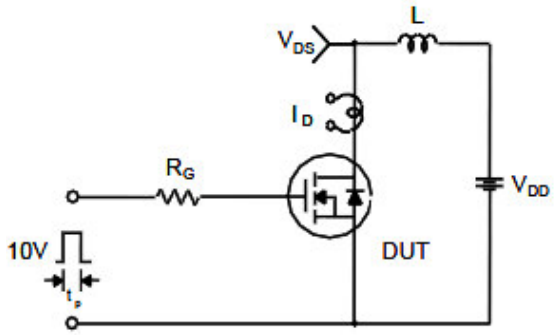


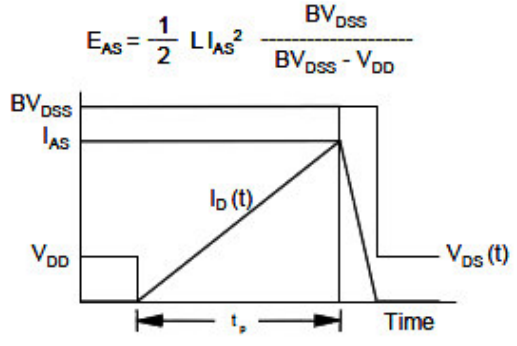
Resistive Switching Test Circuit & Waveforms



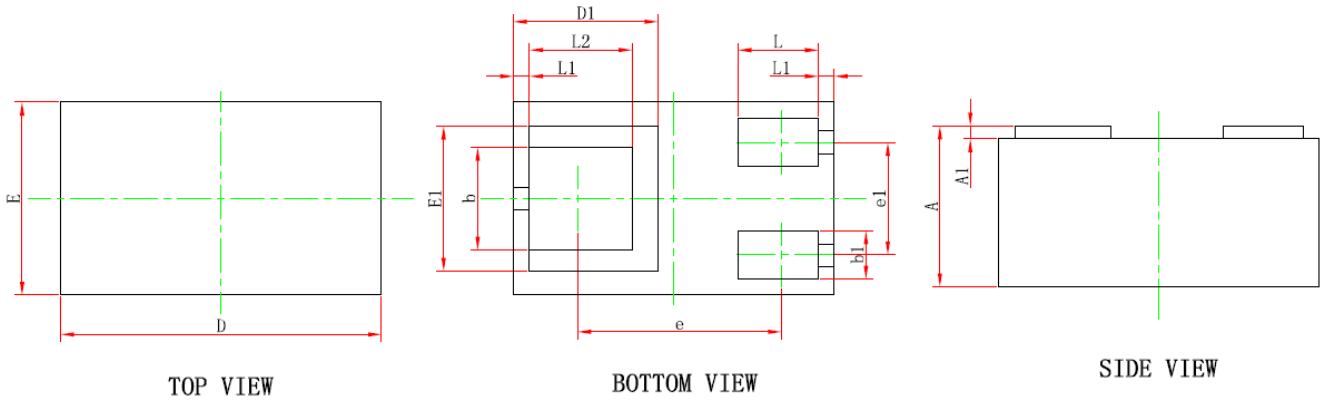


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (DFN1.0X0.6-3L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.010	0.100	0.000	0.004
D	0.950	1.050	0.037	0.041
E	0.550	0.650	0.022	0.026
D1	0.450REF.		0.018REF.	
E1	0.450REF.		0.018REF.	
b	0.270	0.370	0.011	0.015
b1	0.100	0.200	0.004	0.008
e	0.635REF.		0.025REF.	
e1	0.300	0.400	0.012	0.016
L	0.200	0.300	0.008	0.012
L1	0.050REF.		0.002REF.	
L2	0.270	0.370	0.011	0.015

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