Alfa-MOS Technology

AFN501DEA

600V N-Channel Enhancement Mode MOSFET

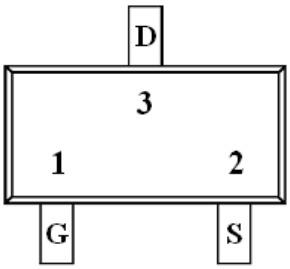
General Description

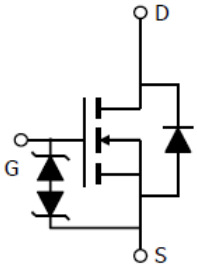
AFN501DEA is an N-channel depletion-mode Power MOSEFT which is produced using VDMOS technology. The improved planar stripe cell have been especially tailored to minimize on-state resistance, provide superior switching performance.

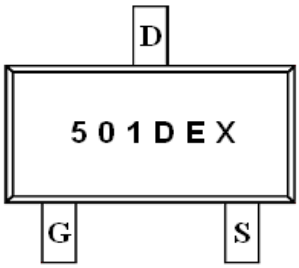
Features

- 600V/16mA,$R_{DS(ON)}$=700Ω@V_{GS}=10V
- 600V/3mA,$R_{DS(ON)}$=700Ω@V_{GS}=4.5V
- Depletion-mode (Normally-on)
- Improved ESD ability Fast switching
- Improved dv/dt capability
- SOT-23 package design

Pin Description (SOT-23)







Application

- Desk PC Power Supply
- AC adapter
- LCD TC Power Supply

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN501DEAS23RG	501DEX	SOT-23	Tape & Reel	3000 EA

※ 501DE Parts Code
※ X Monthly Code
※ AFN501DEAS23RG : 7" Tape & Reel ; Pb- Free ; Halogen –Free

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	600	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current(T_J=150℃)	T_c=25℃	I_D	30	mA
	T_c=100℃		27	
Pulsed Drain Current		I_{DM}	120	mA
Continuous Source Current		I_S	30	mA
Power Dissipation	T_A=25℃	P_D	0.5	W
Power Dissipation Derate	T_A=25℃		0.004	W/℃
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Case		$R_{\theta JC}$	50	℃/W
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	250	℃/W

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}=-5V,I_D=250uA	600			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=3V,I_D=8uA	-2.7		-1.0	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±10	uA
Drain-Source Leakage Current	$I_{D(off)}$	V_{DS}=600V,V_{GS}=-5V			0.1	uA
On-state drain current	I_{DSS}	V_{GS}=0V, V_{DS}=25V	12			mA
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=16mA		310	700	Ω
		V_{GS}=0V,I_D=3mA		330	700	
Diode Forward Voltage	V_{SD}	I_S=16mA,V_{GS}=-5V		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=400V,V_{GS}=-5V to 5V			1.8	nC
Gate-Source Charge	Q_{gs}	I_D≡0.01A			0.75	
Gate-Drain Charge	Q_{gd}	(Note 1,2)			0.56	
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=-5V f=1MHz			99	pF
Output Capacitance	C_{oss}				9.1	
Reverse Transfer Capacitance	C_{rss}				5	
Turn-On Time	$t_{d(on)}$	V_{DD}=300V			18	ns
	t_r	I_D≡0.01A,V_{GEN}=-5….7V			90	
Turn-Off Time	$t_{d(off)}$	R_G=6Ω			93	
	t_f	(Note 1,2)			210	

Notes:

1. Pulse Test: Pulse width ≤300μs,Duty cycle≤2%
2. Essentially independent of operating temperature

Typical Characteristics

Figure 1. On-Region Characteristics

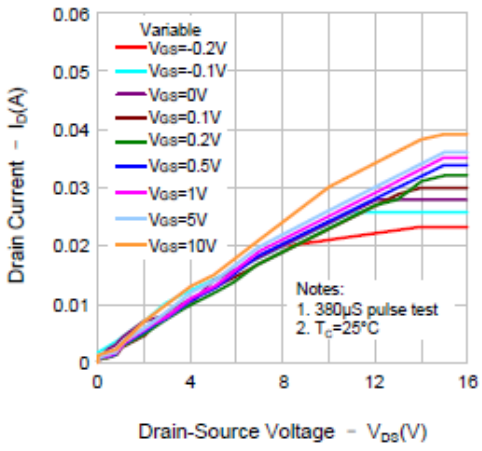


Figure 2. Transfer Characteristics

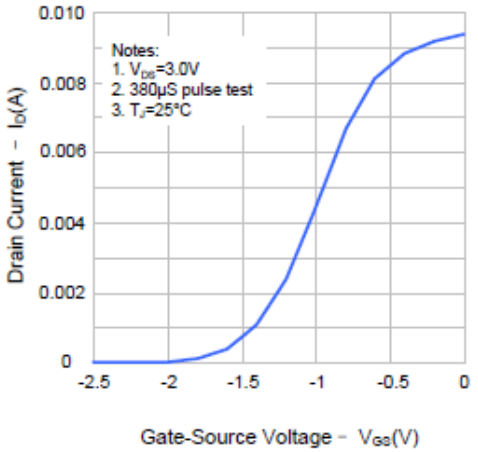


Figure 3. On-Resitance Variation vs. Drain Current and Gate Voltage

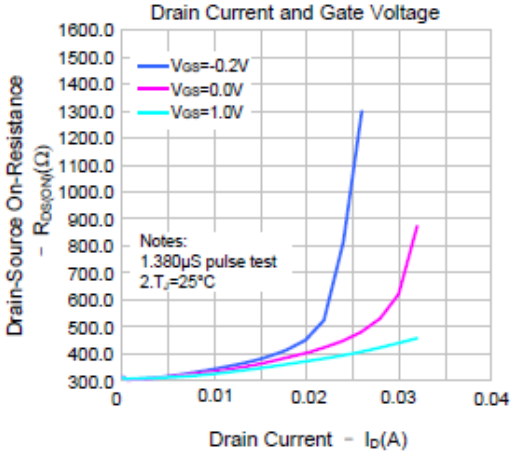


Figure 4. Forward characteristics of reverse diode

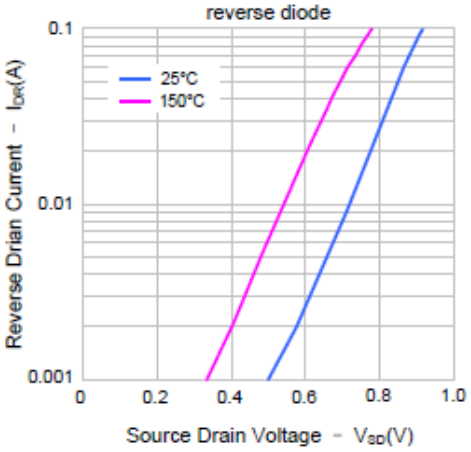


Figure 5. Breakdown Voltage Variation vs. Temperature

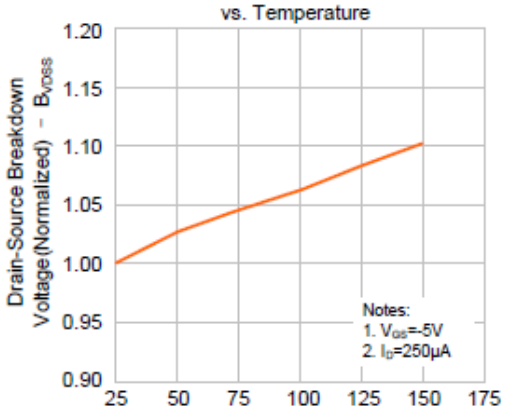
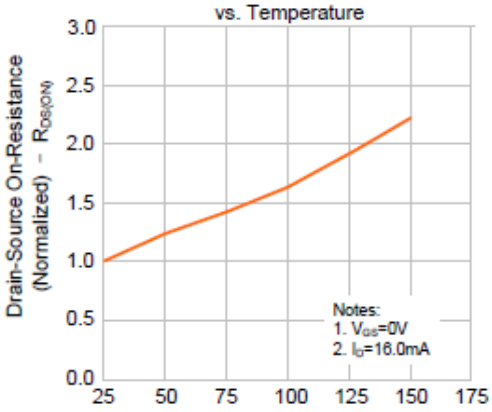


Figure 6. On-resistance Variation vs. Temperature



Typical Characteristics

Figure 7. Gate Threshold Voltage vs.Temperature

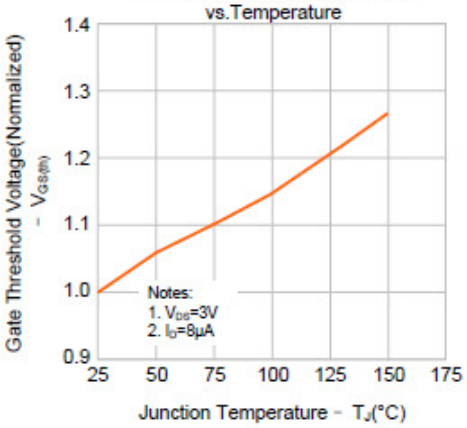


Figure 8. Typ. Forward Transconductance

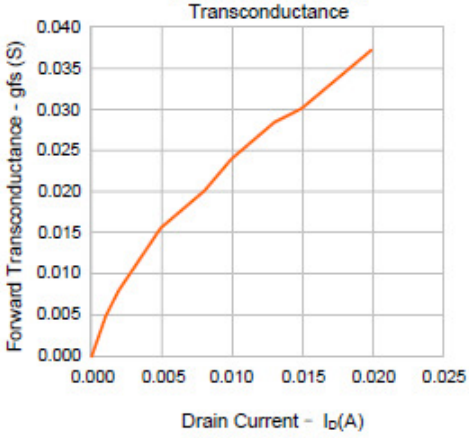


Figure 9. Power Dissipation vs. Case Temperature

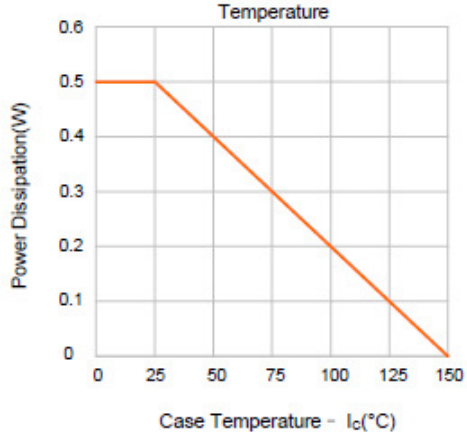


Figure 10. Max. Safe Operating Area

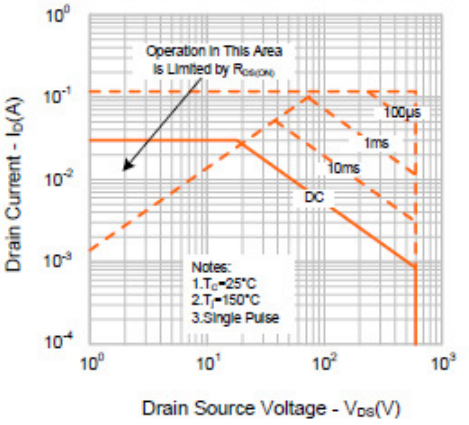
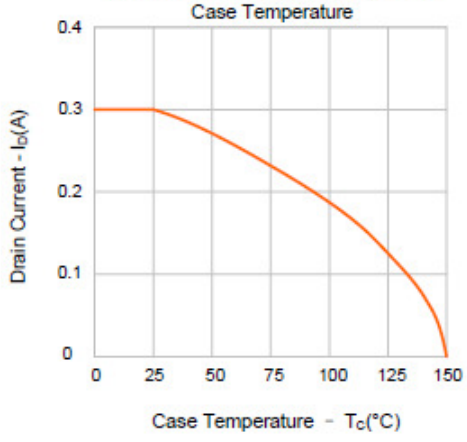
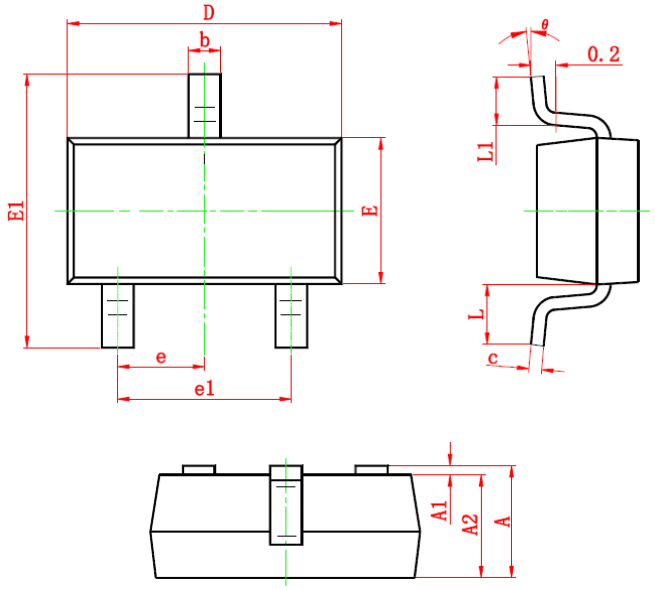


Figure 11. Maximum Drain Current vs. Case Temperature



Package Information (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

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