



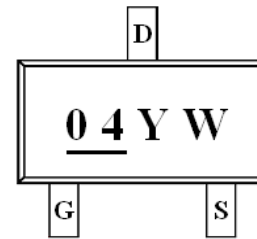
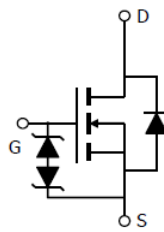
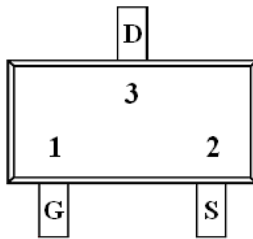
General Description

AFN1304E, 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

- 20V/1.8A, $R_{DS(ON)}=400m\Omega@V_{GS}=4.5V$
- 20V/1.5A, $R_{DS(ON)}=500m\Omega@V_{GS}=2.5V$
- 20V/1.2A, $R_{DS(ON)}=680m\Omega@V_{GS}=1.8V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- **ESD Protected**
- SOT-323 package design

Pin Description (SOT-323)



Application

- Net Working System
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- 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
AFN1304ES32RG	04YW	SOT-323	Tape & Reel	3000 EA

- ※ 04 parts code
- ※ Y year code (0 ~ 9)
- ※ W week code (A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52)
- ※ AFN1304ES32RG : 7" Tape & Reel ; Pb- Free ; Halogen -Free



Absolute Maximum Ratings

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	20	V
Gate –Source Voltage	V _{GSS}	±12	V
Continuous Drain Current(T _J =150°C)	I _D	T _A =25°C	1.8
		T _A =70°C	1.2
Pulsed Drain Current	I _{DM}	6	A
Continuous Source Current(Diode Conduction)	I _S	1	A
Power Dissipation	P _D	T _A =25°C	0.35
		T _A =70°C	0.22
Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient	R _{θJA}	120	°C/W

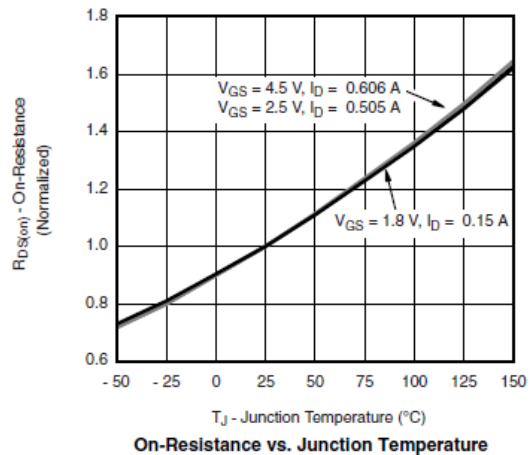
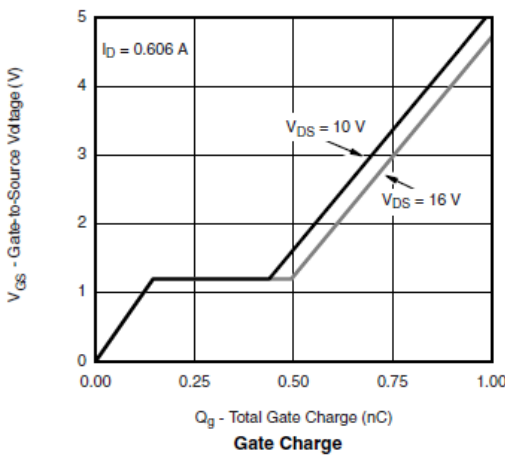
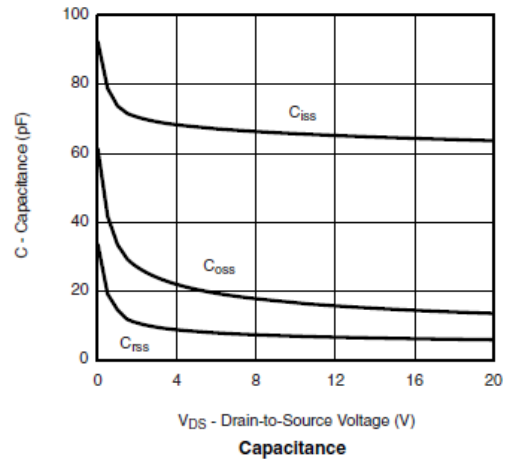
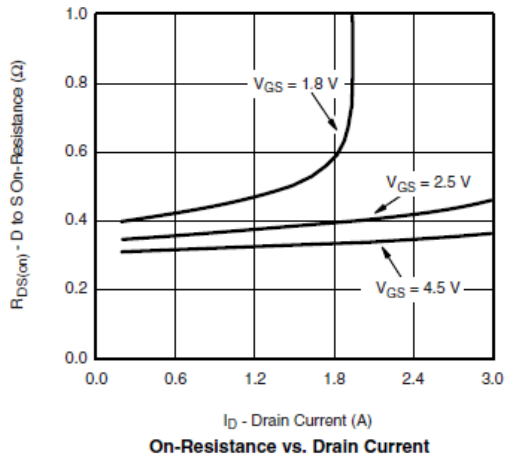
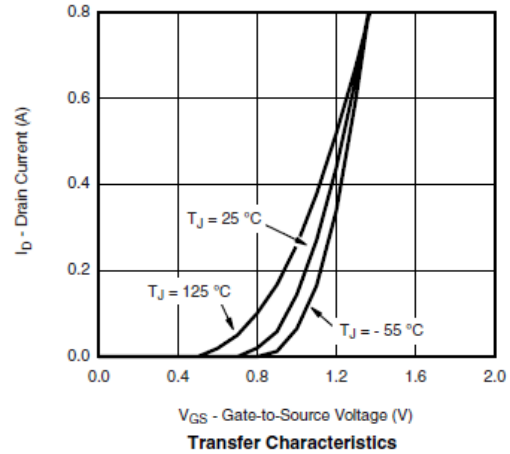
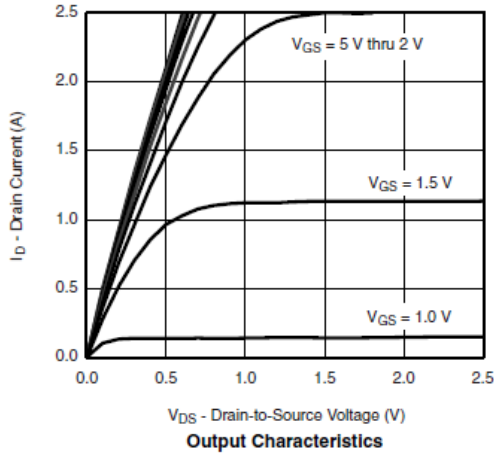
Electrical Characteristics

(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			±1	mA
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			5	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 5V, V _{GS} =4.5V	1.8			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =1.8A		290	400	mΩ
		V _{GS} =2.5V, I _D =1.5A		400	500	
		V _{GS} =1.8V, I _D =1.2A		500	680	
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =1.0A		1		S
Diode Forward Voltage	V _{SD}	I _S =1.0A, 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}			20		
Reverse Transfer Capacitance	C _{rss}			8		
Total Gate Charge	Q _g	V _{DS} =10V, V _{GS} =4.5V I _D ≅1.2A		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 ≅1.2A, V _{GEN} =4.5V R _G =1Ω		18	26	ns
	t _r			20	28	
Turn-Off Time	t _{d(off)}			70	110	
	t _f			25	40	

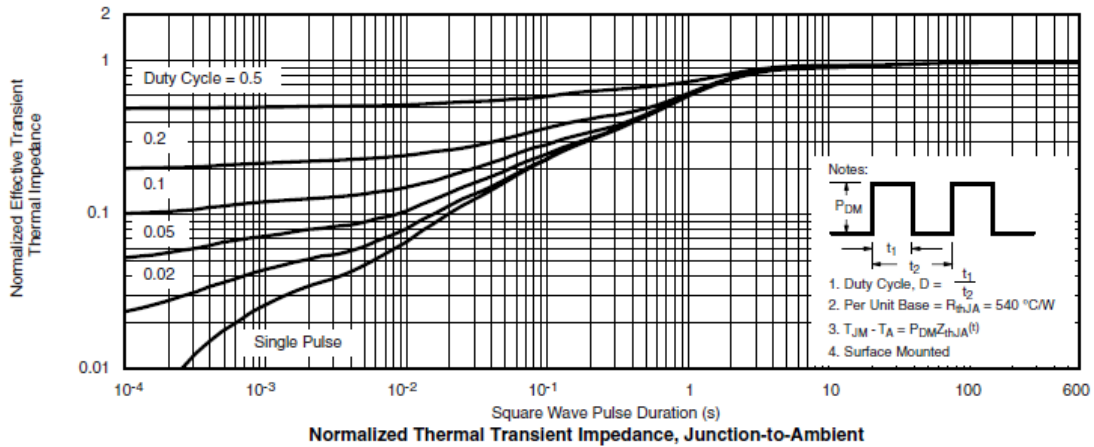
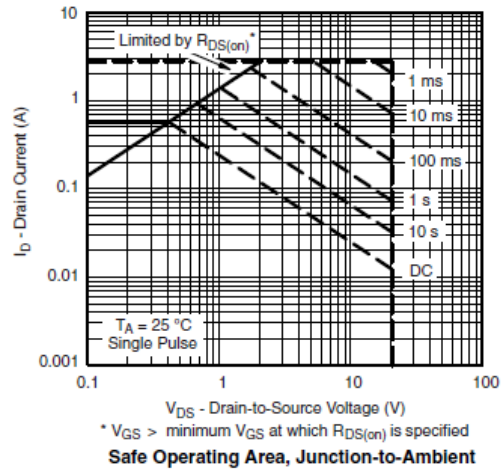
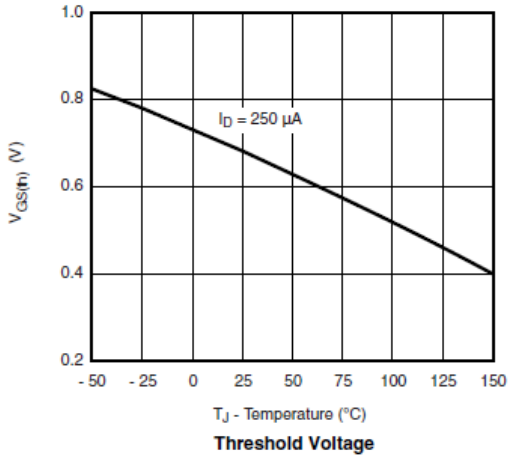
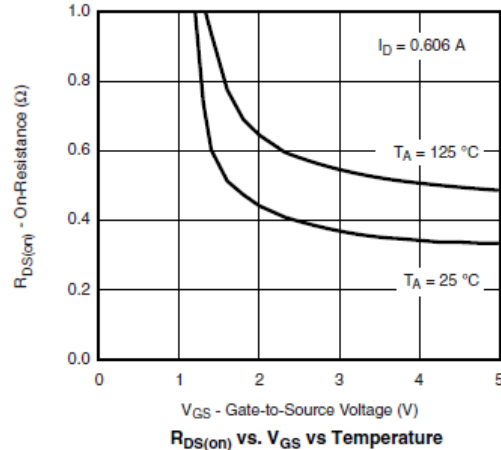
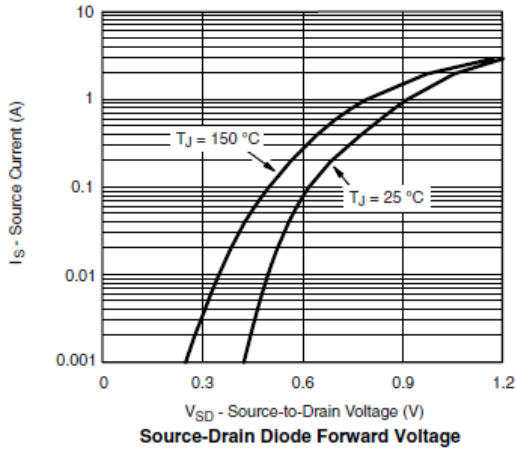


Typical Characteristics





Typical Characteristics





Typical Characteristics

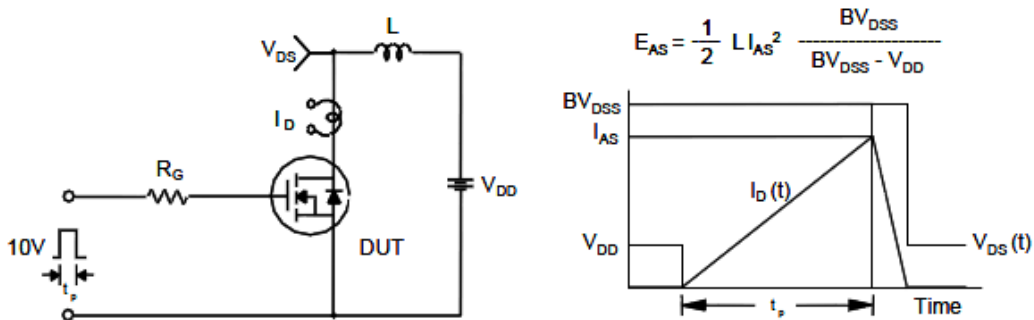
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

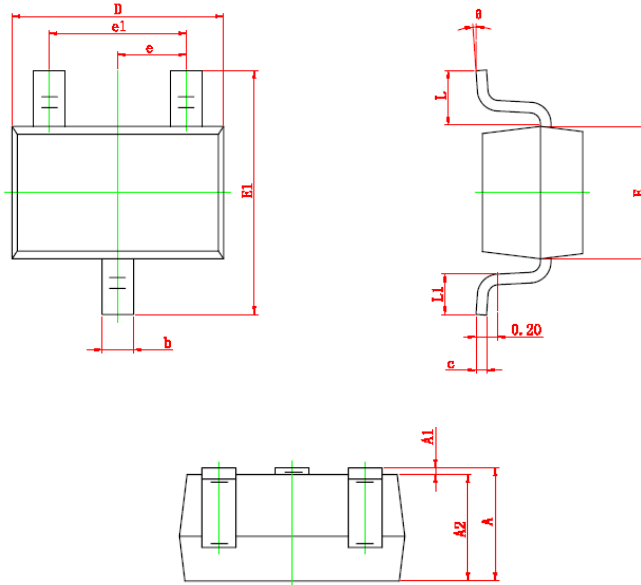


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (SOT-323)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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