



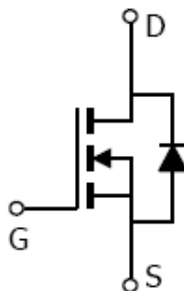
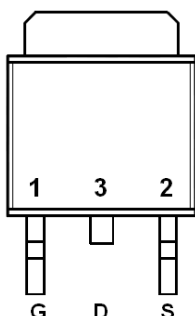
General Description

AFN5002S, 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, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

- 40V/20A, $R_{DS(ON)}=3.2m\Omega@V_{GS}=10V$
- 40V/15A, $R_{DS(ON)}=4.0m\Omega@V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- TO-252-2L package design

Pin Description (TO-252-2L)



Application

- LCD Display Backlight Inverters
- DC/DC Converters

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN5002ST252RG	5002S	TO-252-2L	Tape & Reel	2500 EA

- ※ A Lot code
- ※ B Date code
- ※ AFN5002ST252RG : 13" Tape & Reel ; Pb- Free ; Halogen -Free



※ Absolute Maximum Ratings

※ (T_A=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	40	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (T _J =150°C)	I _{DSM}	T _C =25°C	130
		T _C =70°C	105
Pulsed Drain Current (t=100us)	I _{DM}	T _A =25°C	40
		T _A =70°C	32
Continuous Source Current (Diode Conduction)	I _S	42	A
Single Pulse Avalanche Current	E _{AS}	T _C =25°C	4.2
		T _A =25°C	35
Power Dissipation	P _D	L=0.1mH	60
		T _C =25°C	48
Operating Junction Temperature	T _J	T _C =75°C	30
		T _A =75°C	4.8
Storage Temperature Range	T _{STG}	-55/150	°C
Thermal Resistance-Junction to Ambient	R _{θJA}	22	°C/W
Maximum Junction-to-Case (Drain)	R _{θJA}	1.7	°C/W

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※ Electrical Characteristics

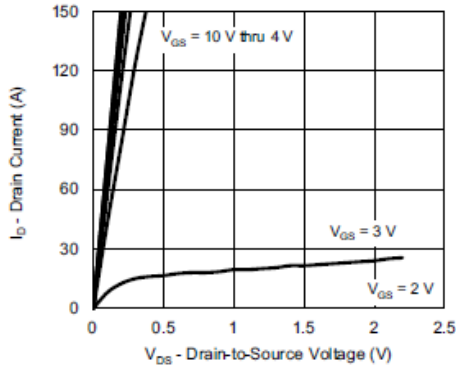
※ (T_A=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250uA	40	46		V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0		2.5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±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°C			10	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 5V, V _{GS} =10V	30			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		2.7	3.2	mΩ
		V _{GS} =4.5V, I _D =15A		3.4	4.0	
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =15A		95		S
Diode Forward Voltage	V _{SD}	I _S =5A, V _{GS} =0V		0.75	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =4.5V I _D ≧10A		30	60	nC
Gate-Source Charge	Q _{gs}			15		
Gate-Drain Charge	Q _{gd}			5		
Gate Resistance	R _g	f=1MHz	0.4	1.1	20	Ω
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f=1MHz		4850		pF
Output Capacitance	C _{oss}			1100		
Reverse Transfer Capacitance	C _{rss}			75		
Turn-On Time	t _{d(on)}	V _{DD} =20V, R _L =2Ω I _D ≧10A, V _{GEN} =10V R _G =1Ω		20	40	ns
	t _r			6	12	
Turn-Off Time	t _{d(off)}			40	80	
	t _f			6	12	

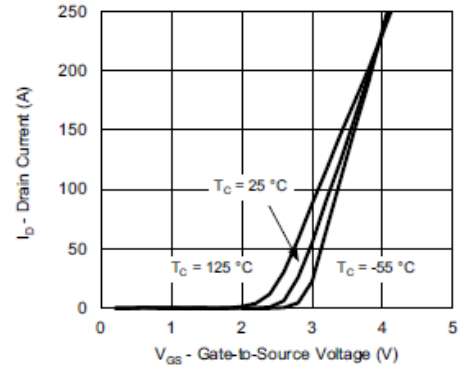


※ Typical Characteristics

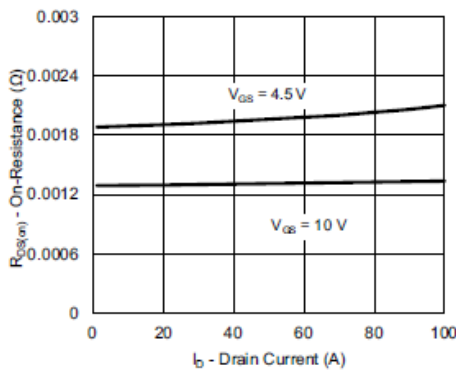
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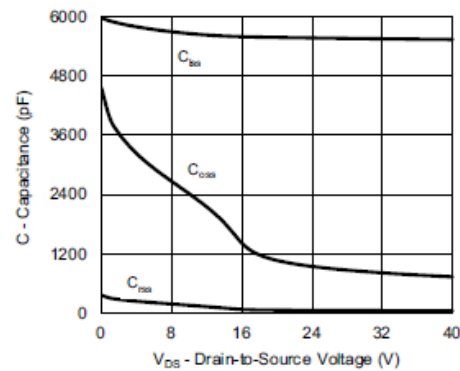
Output Characteristics



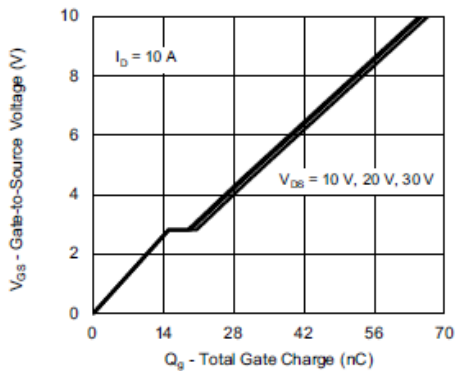
Transfer Characteristics



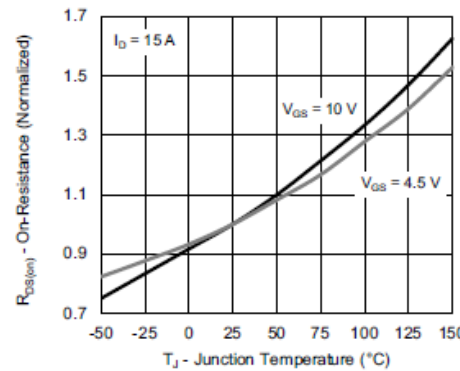
On-Resistance vs. Drain Current



Capacitance



Gate Charge



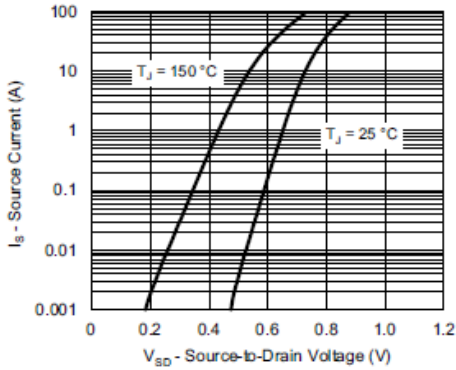
On-Resistance vs. Junction Temperature

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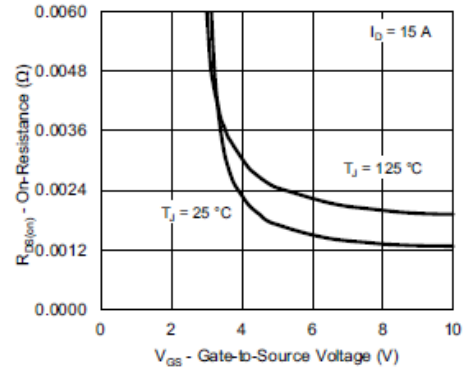


※ Typical Characteristics

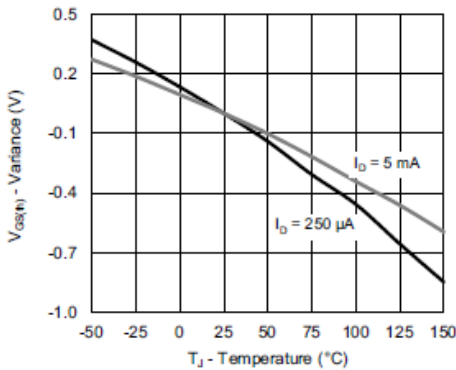
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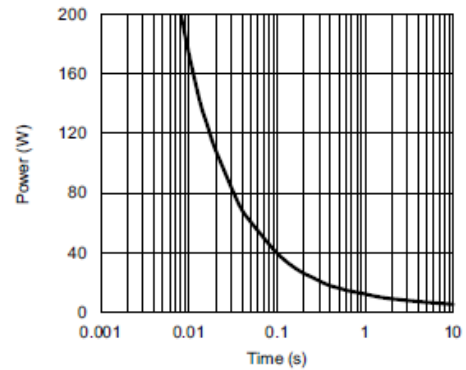
Source-Drain Diode Forward Voltage



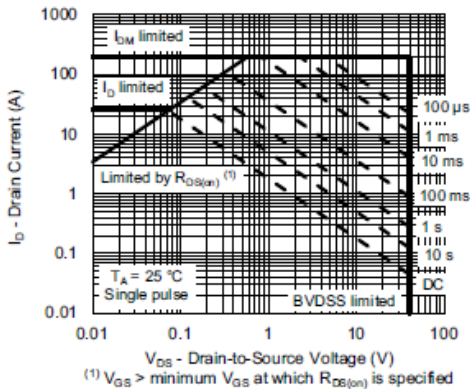
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

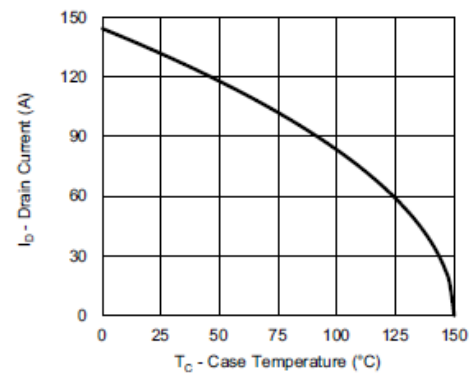


Single Pulse Power, Junction-to-Ambient



(1) $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



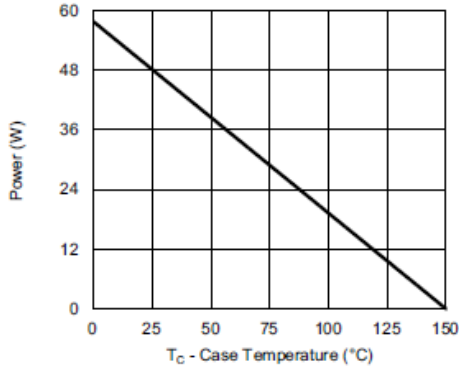
Current Derating ^a

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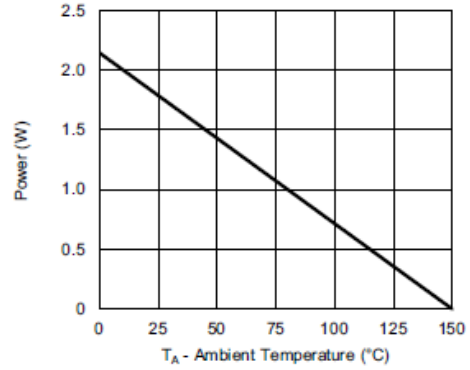


※ **Typical Characteristics**

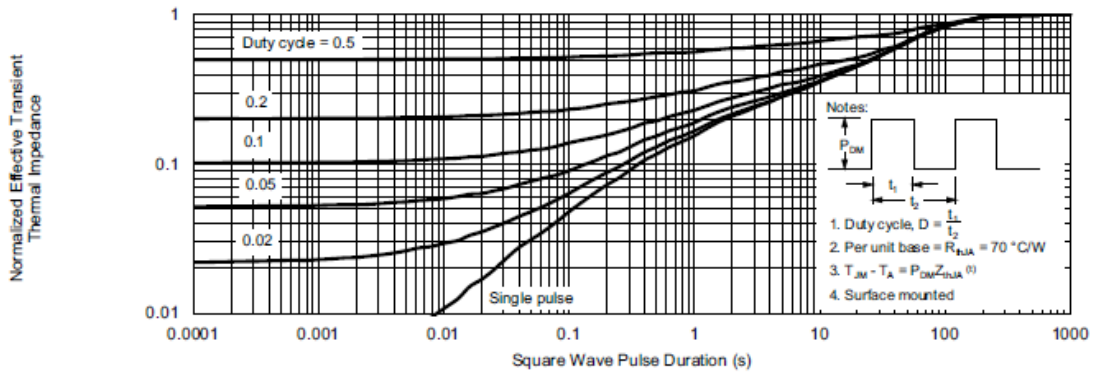
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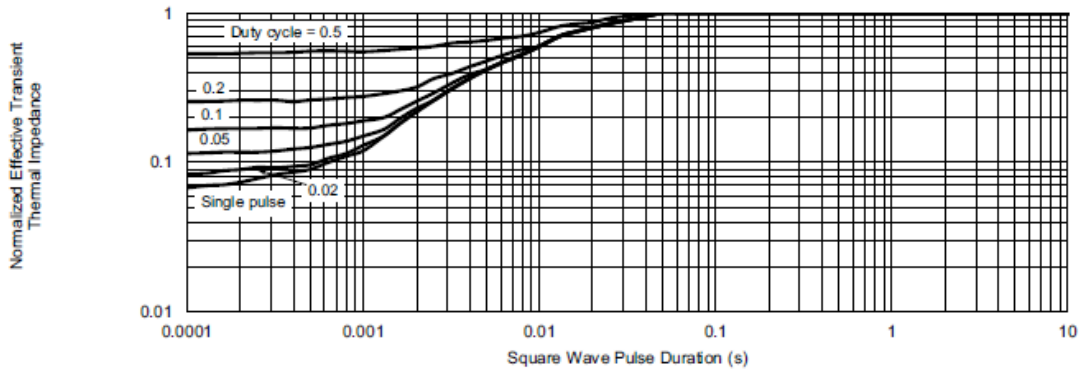
Power, Junction-to-Case



Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



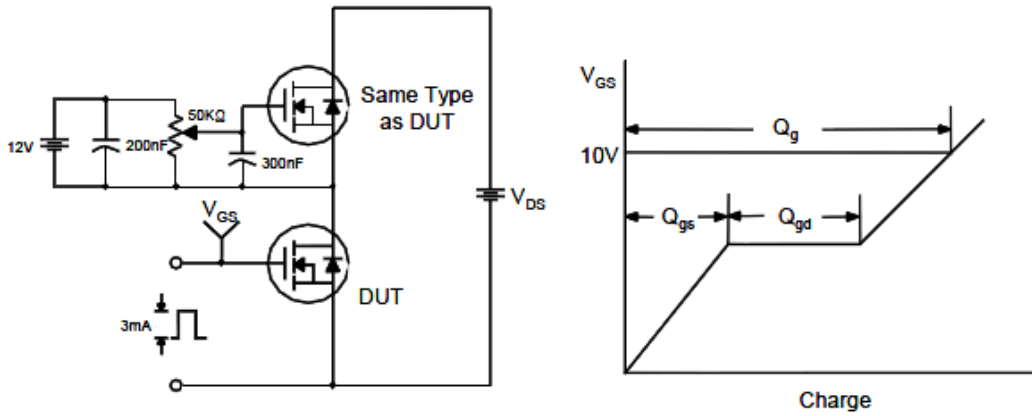
Normalized Thermal Transient Impedance, Junction-to-Case

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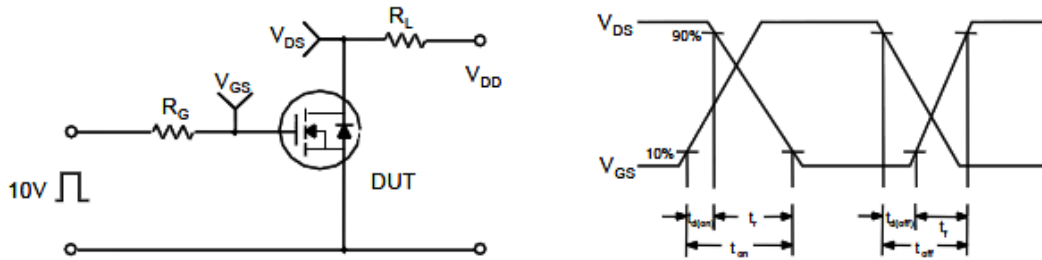


Typical Characteristics

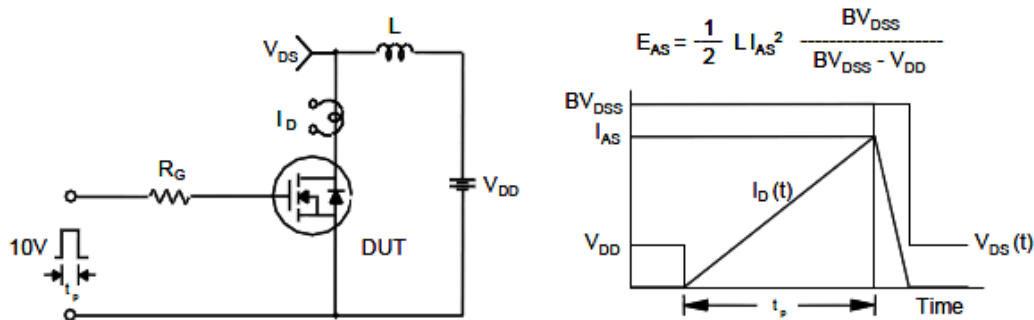
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

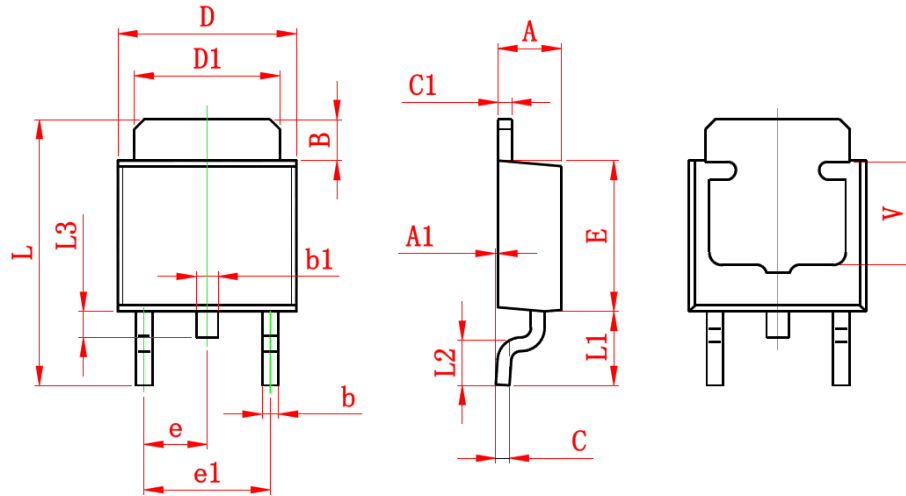


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (TO-252-2L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	

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