



General Description

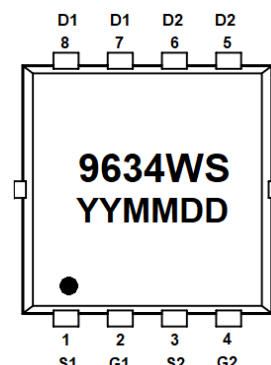
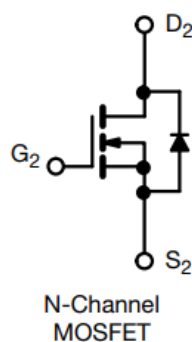
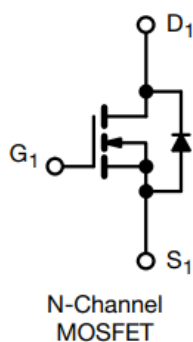
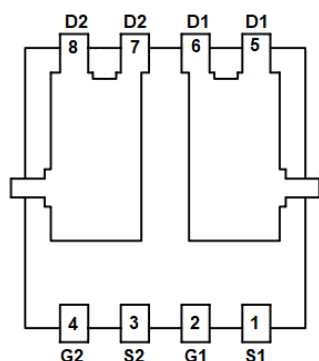
AFN9446WS, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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

- 40V/9A, $R_{DS(ON)} = 11m\Omega @ V_{GS} = 10V$
- 40V/6A, $R_{DS(ON)} = 15m\Omega @ V_{GS} = 4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- ESD Protection
- DFN3.3X3.3-8L package design

Pin Description (DFN3.3X3.3-8L)



Application

- DC/DC Conversion
- Load Switch

Pin Define

Pin	Symbol	Description
1	S1	Source 1
2	G1	Gate 1
3	S2	Source 2
4	G2	Gate 2
5 / 6	D2	Drain 2
7 / 8	D1	Drain 1

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN9446WSFN308RG	9446WS	DFN3.3X3.3-8L	Tape & Reel	5000 EA

※ YY year code

※ MM month code

※ DD date code

※ AFN9446WSFN308RG : 13" Tape & Reel ; Pb- Free ; Halogen -Free



Absolute Maximum Ratings (T_A=25°C Unless otherwise noted)

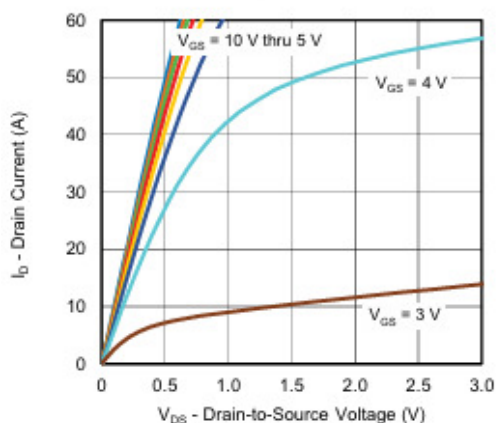
Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	40	V
Gate –Source Voltage	V _{GSS}	±20	V
Continuous Drain Current(T _J =150°C)	I _D	T _C =25°C	A
		T _C =70°C	
		T _A =25°C	
		T _A =70°C	
Pulsed Drain Current	I _{DM}	60	A
Continuous Source Current(Diode Conduction)	I _S	T _C =25°C	A
		T _A =70°C	
Single pulse avalanche current	I _{AS}	12	mJ
Single pulse avalanche energy	E _{AS}	8	
Power Dissipation	P _D	T _C =25°C	W
		T _C =70°C	
		T _A =25°C	
		T _A =70°C	
Operating junction and storage temperature range	T _J , T _{STG}	-55/150	°C
Soldering recommendations (peak temperature)		260	
Thermal Resistance-Junction to Ambient	R _{θJA}	38	°C/W
Maximum junction-to-case (drain)	R _{θJC}	4.3	

Electrical Characteristics (T_A=25°C Unless otherwise noted)

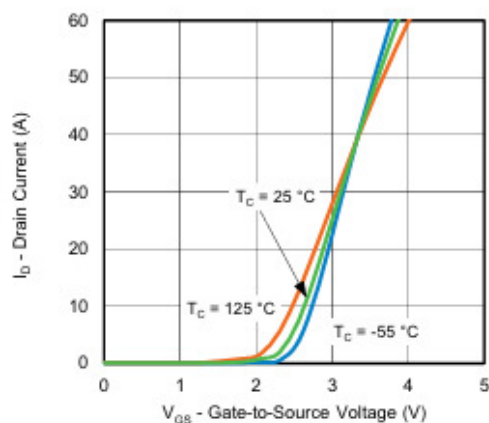
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250uA	40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.0		2.5	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±10	uA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V, V _{GS} =0V			1	uA
		V _{DS} =32V, V _{GS} =0V			10	
		T _J =85°C				
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =9A		9.5	11	mΩ
		V _{GS} =4.5V, I _D =6A		12	15	
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =20A		40		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		4.7	7.1	nC
Gate-Source Charge	Q _{gs}			2.7		
Gate-Drain Charge	Q _{gd}			0.7		
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f=1MHz		720		pF
Output Capacitance	C _{oss}			160		
Reverse Transfer Capacitance	C _{rss}			20		
Turn-On Time	t _{d(on)}	V _{DD} =20V, R _L =2Ω I _D ≧10A, V _{GEN} =10V R _G =1Ω		10	20	ns
	t _r			5	10	
Turn-Off Time	t _{d(off)}			15	30	
	t _f			5	10	



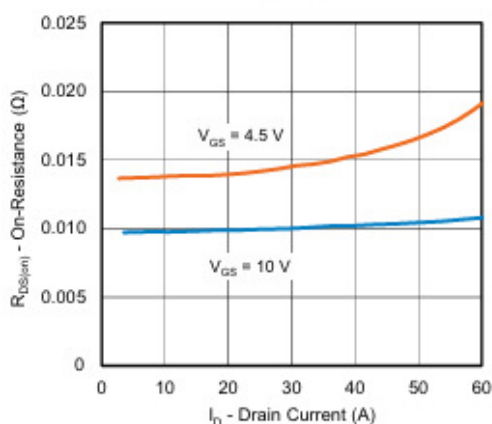
Typical Characteristics



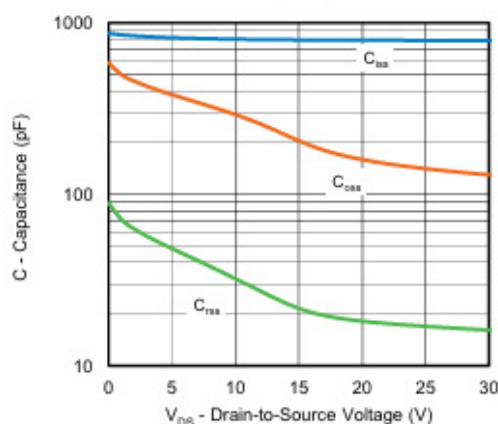
Output Characteristics



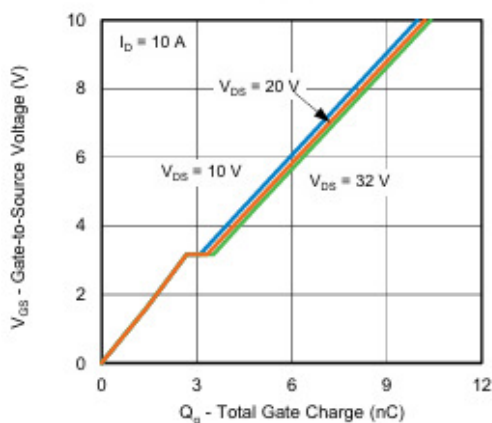
Transfer Characteristics



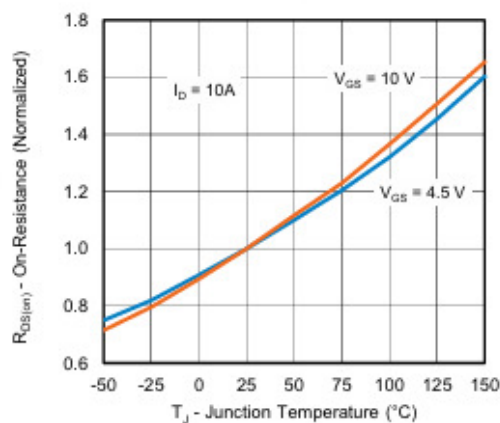
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



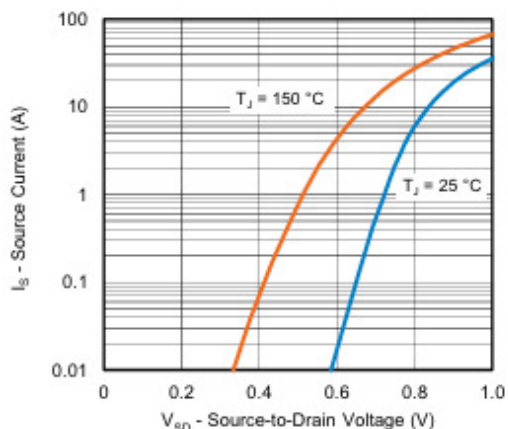
Gate Charge



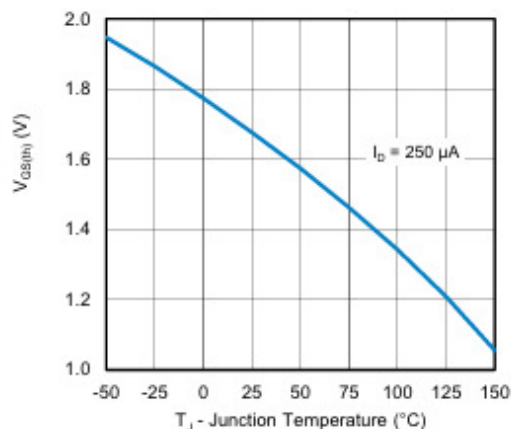
On-Resistance vs. Junction Temperature



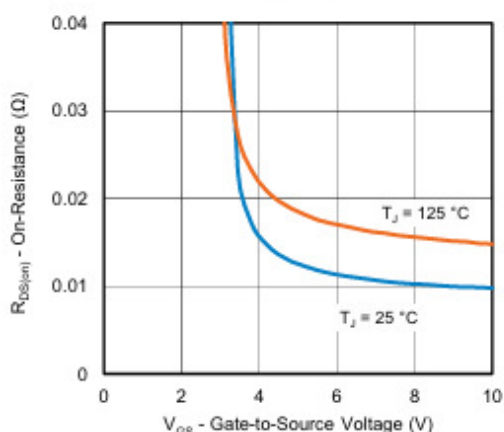
Typical Characteristics



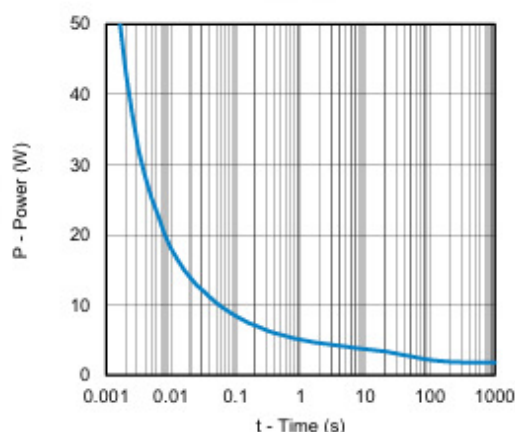
Source-Drain Diode Forward Voltage



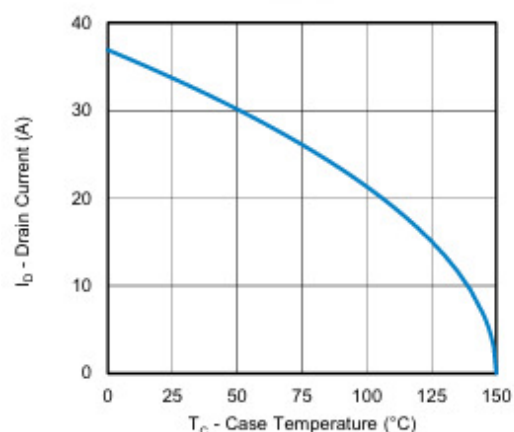
Threshold Voltage



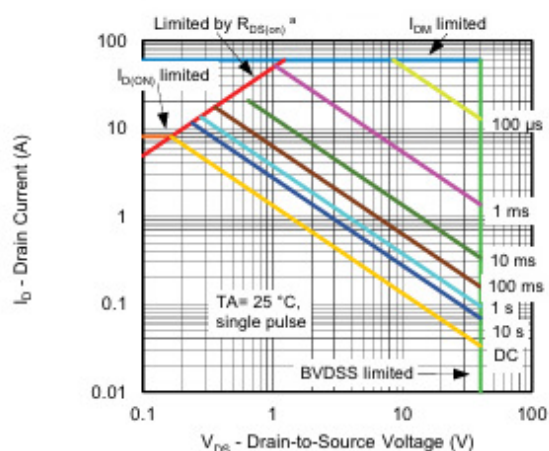
On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient



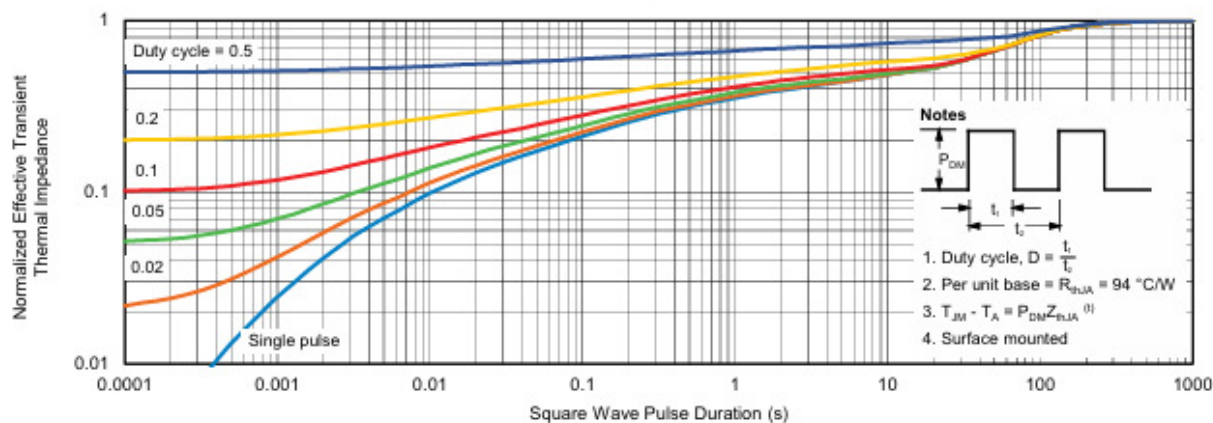
Current Derating ^a



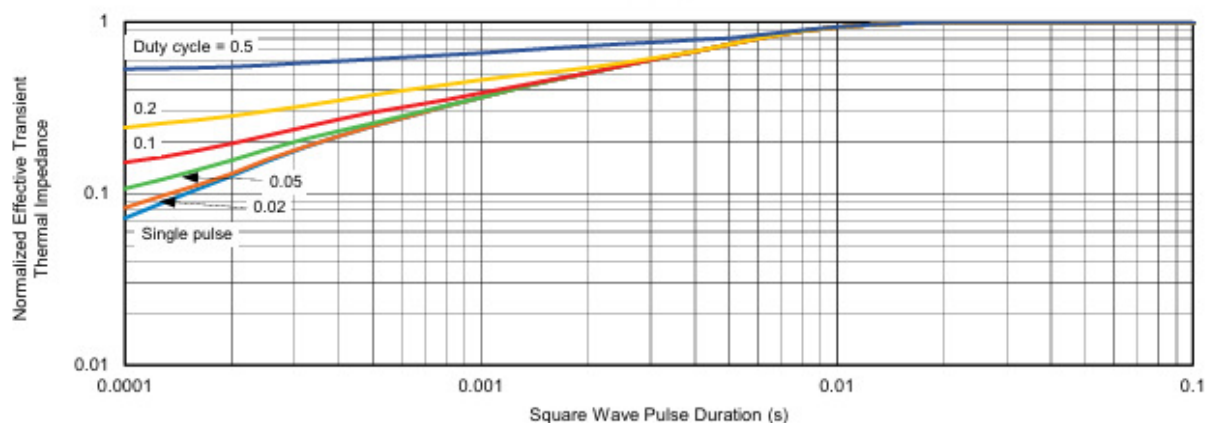
Safe Operating Area, Junction-to-Ambient



Typical Characteristics



Normalized Thermal Transient Impedance, Junction-to-Ambient

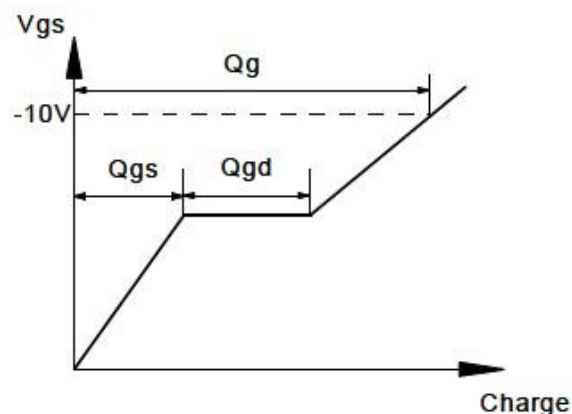
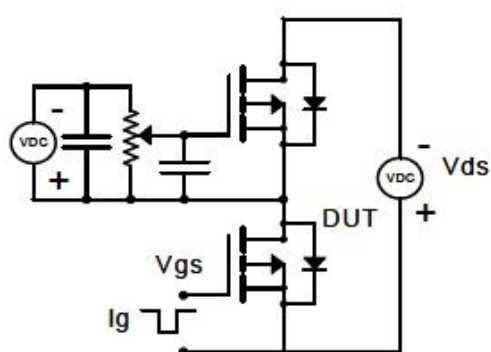


Normalized Thermal Transient Impedance, Junction-to-Case

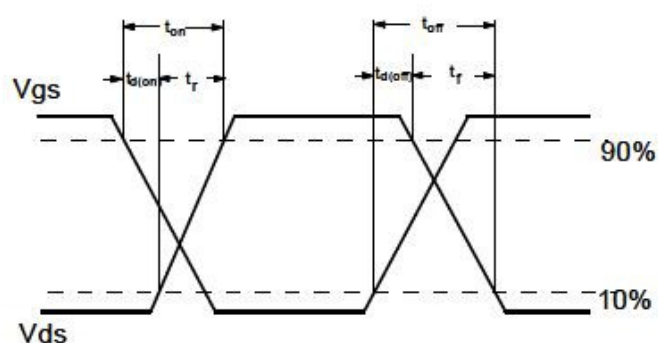
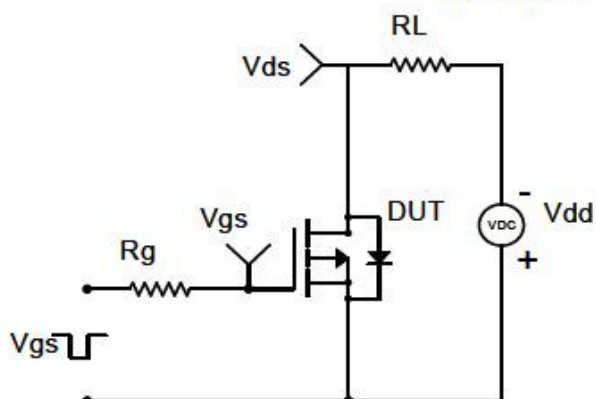


Typical Characteristics

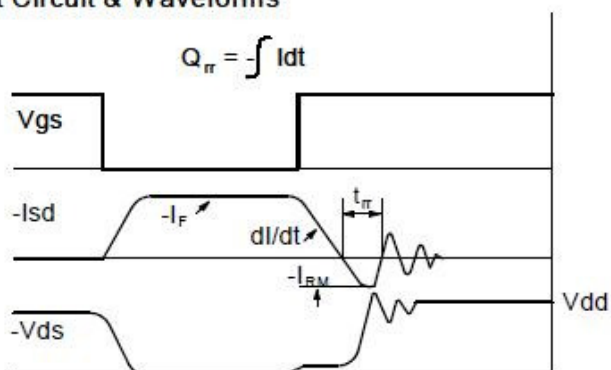
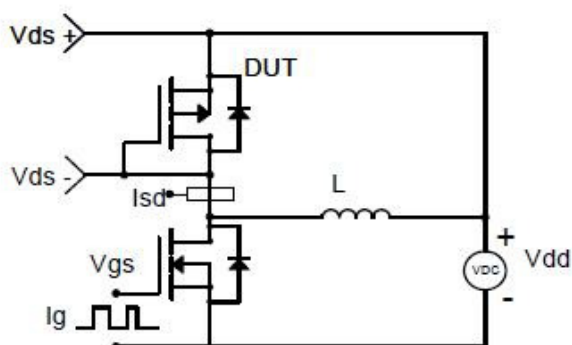
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

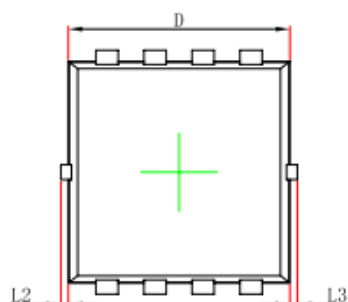


Diode Recovery Test Circuit & Waveforms

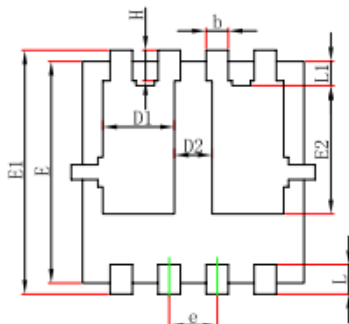




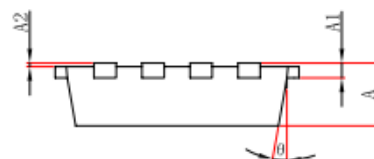
Package Information (DFN3.3X3.3-8L)



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	0.935	1.135	0.037	0.045
D2	0.280	0.480	0.011	0.019
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

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