



General Description

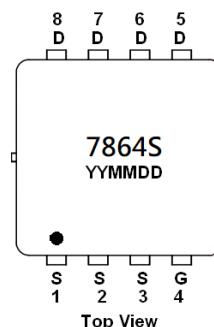
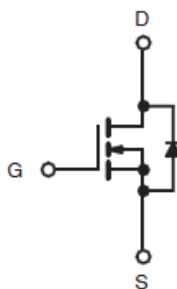
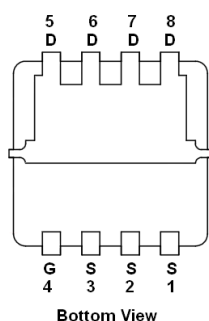
AFN7864S, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

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

- 60V/8A, $R_{DS(ON)}=15m\Omega@V_{GS}=10V$
- 60V/8A, $R_{DS(ON)}=23m\Omega@V_{GS}=4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- DFN3.3X3.3-8L package design

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



Application

- Primary Side Switch
- Synchronous Rectification
- DC/DC Converters
- Boost Converters
- DC/AC Inverters

Pin Define

Pin	Symbol	Description
1 ~ 3	S	Source
4	G	Gate
5 ~ 8	D	Drain

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFN7864SFN308RG	7864S	DFN3.3X3.3-8L	Tape & Reel	5000 EA

※ YY year code

※ MM month code

※ DD date code

※ AFN7864SFN308RG : 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}	60		V
Gate –Source Voltage			V _{GSS}	±20		V
Continuous Drain Current(T _J =150°C)	T _C =25°C	T _C =70°C	I _{DSM}	25	25	A
	T _A =25°C	T _A =70°C		8	6	
Pulsed Drain Current (t=100us)			I _{DM}	40		
Continuous Source Current(Diode Conduction)	T _C =25°C		I _S	15		
	T _A =25°C			3		
Single Pulse Avalanche Current	L=0.1mH		I _{AS}	8		
			E _{AS}	6		mJ
Power Dissipation	T _C =25°C	T _C =75°C	P _D	50	30	W
	T _A =25°C	T _A =75°C		3.7	2.4	
Operating Junction Temperature			T _J	150		°C
Storage Temperature Range			T _{STG}	-55/150		°C
Thermal Resistance-Junction to Ambient	t ≤ 10 s		R _{θJA}	26		°C/W
Maximum Junction-to-Case (Drain)	Steady-State		R _{θJA}	1.9		

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	60			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} =48V, V _{GS} =0V			1	uA
		V _{DS} =48V, V _{GS} =0V T _J =85°C			10	
On-State Drain Current	I _{D(on)}	V _{DS} ≥ 5V, V _{GS} =10V	6			A
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =8A		12	15	mΩ
		V _{GS} =4.5V, I _D =8A		18	23	
Forward Transconductance	g _{FS}	V _{DS} =6V, I _D =8 A		22		S
Diode Forward Voltage	V _{SD}	I _S =2A, V _{GS} =0V		0.8	1.3	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =48V, V _{GS} =10V I _D ≡8A		1	5	nC
Gate-Source Charge	Q _{gs}			2		
Gate-Drain Charge	Q _{gd}			1		
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V f=1MHz		465		pF
Output Capacitance	C _{oss}			250		
Reverse Transfer Capacitance	C _{rss}			10		
Turn-On Time	t _{d(on)}	V _{DD} =48V, R _L =5Ω I _D ≡8A, V _{GEN} =10V R _G =6Ω		8	15	ns
	t _r			5	10	
Turn-Off Time	t _{d(off)}			15	30	
	t _f			5	10	



Typical Characteristics

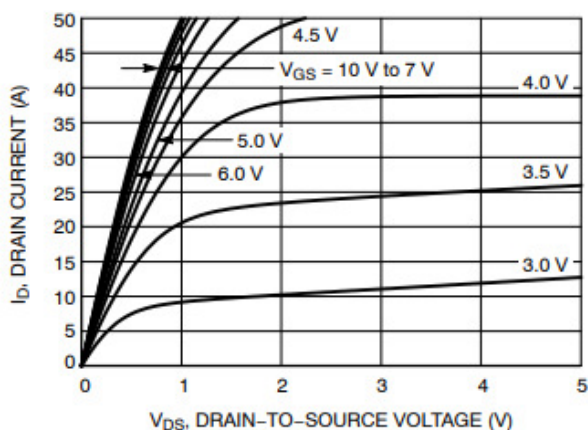


Figure 1. On-Region Characteristics

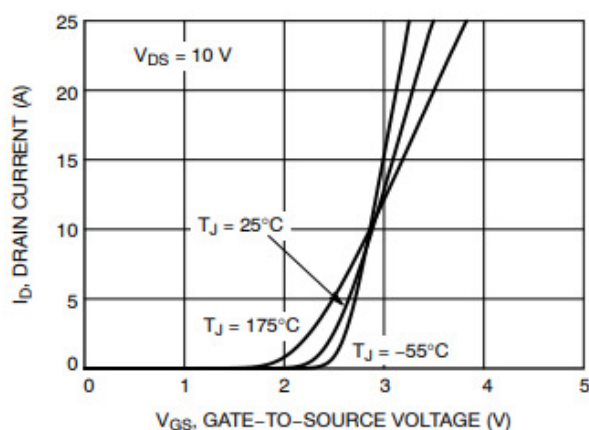


Figure 2. Transfer Characteristics

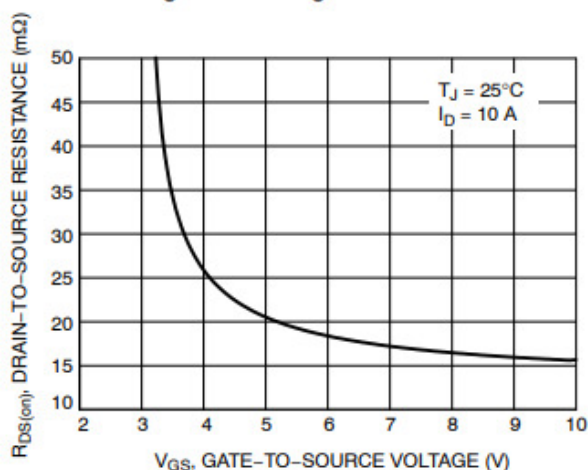


Figure 3. On-Resistance vs. Gate-to-Source Voltage

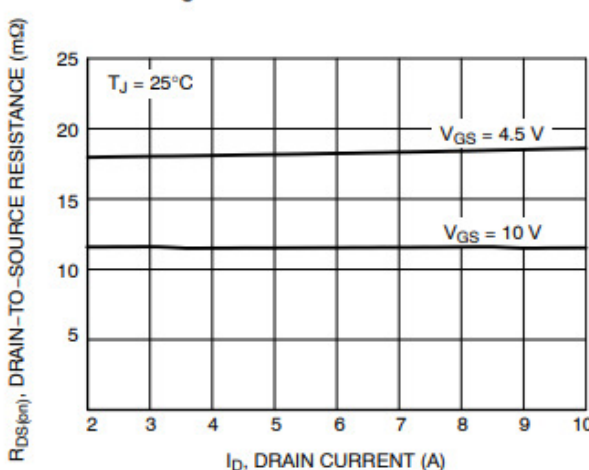


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

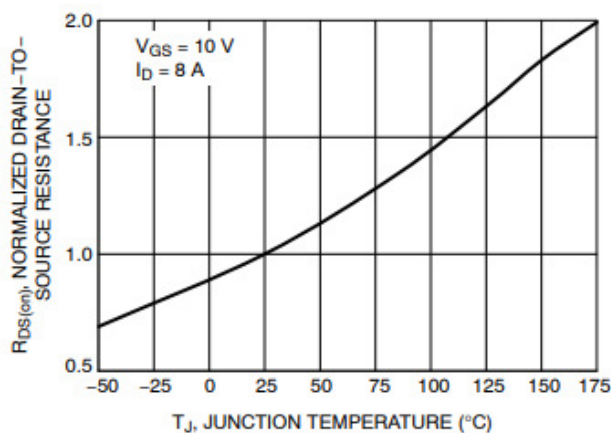


Figure 5. On-Resistance Variation with Temperature

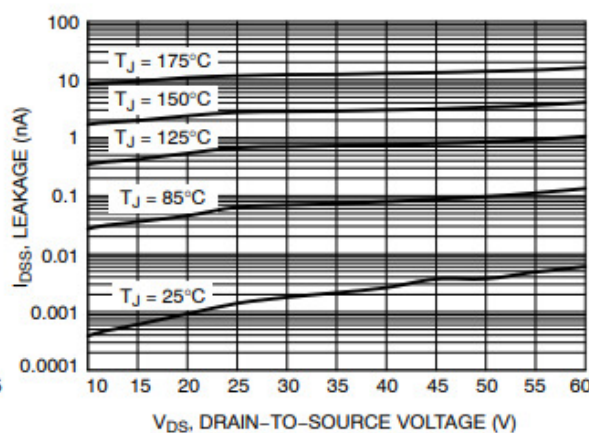


Figure 6. Drain-to-Source Leakage Current vs. Voltage



Typical Characteristics

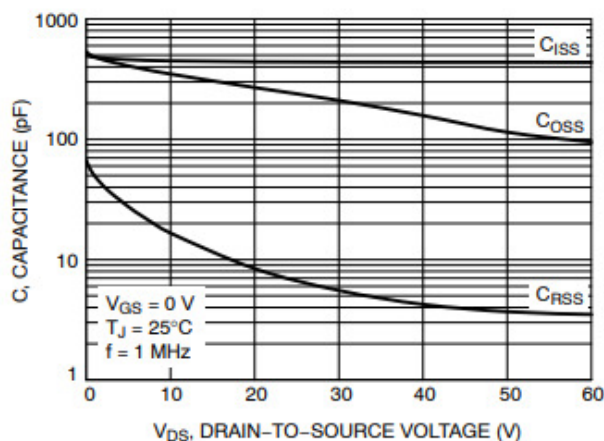


Figure 7. Capacitance Variation

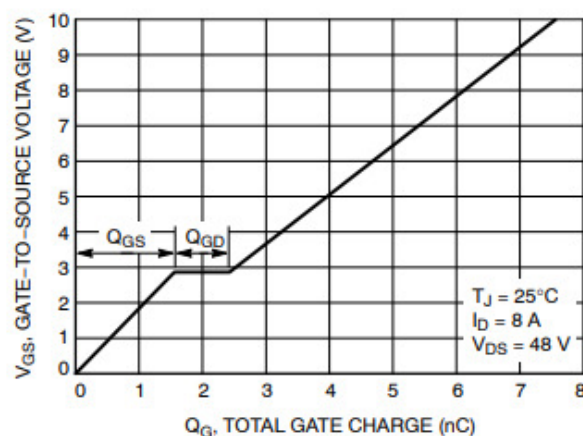


Figure 8. Gate-to-Source Voltage vs. Total Charge

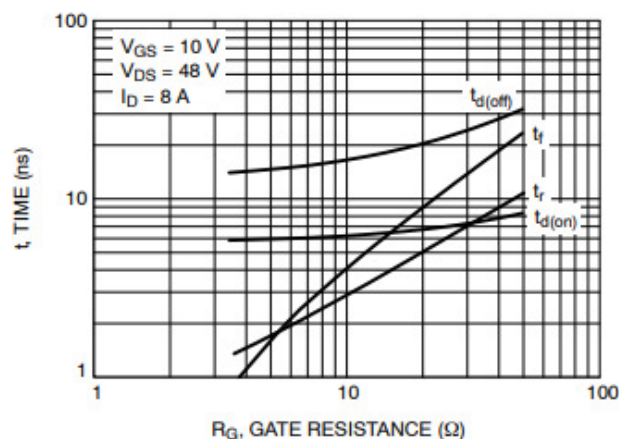


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

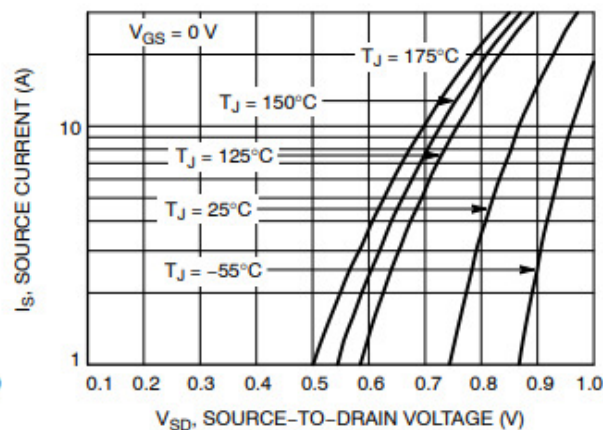


Figure 10. Diode Forward Voltage vs. Current

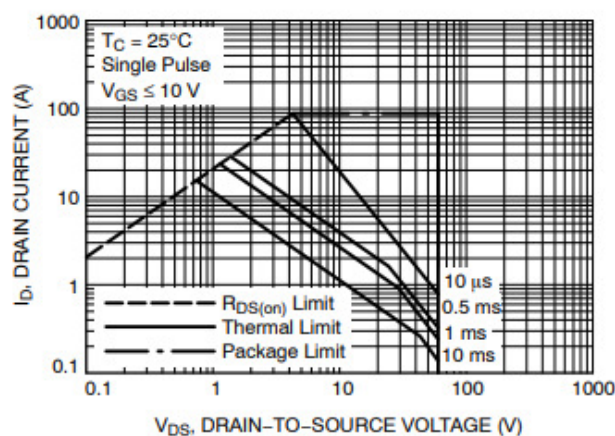


Figure 11. Maximum Rated Forward Biased Safe Operating Area

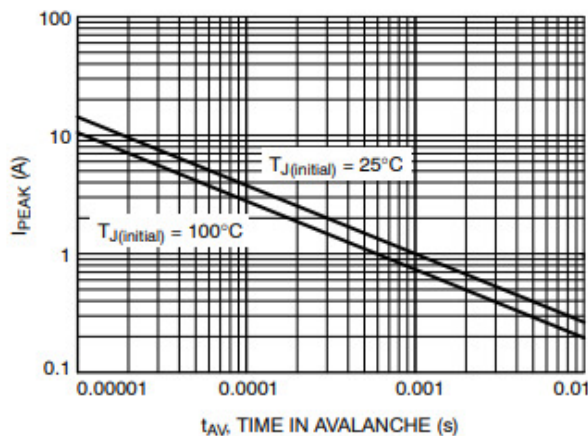
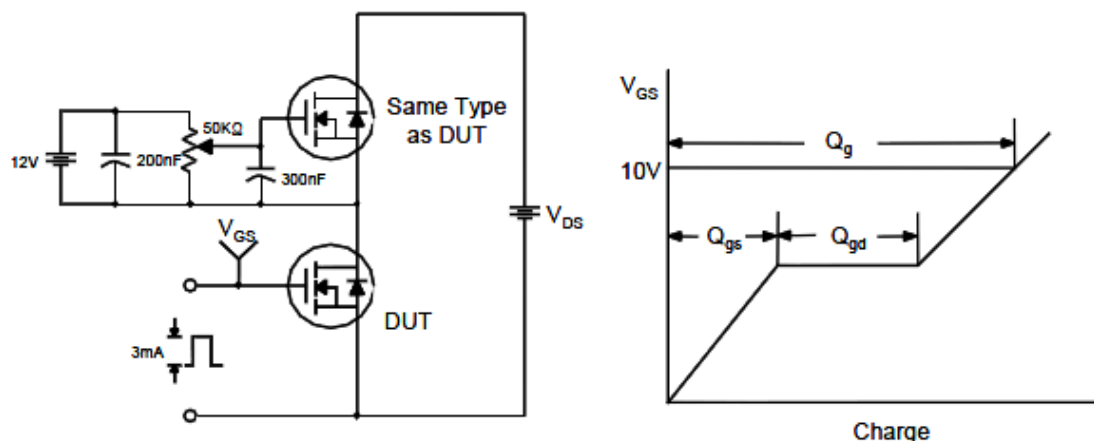


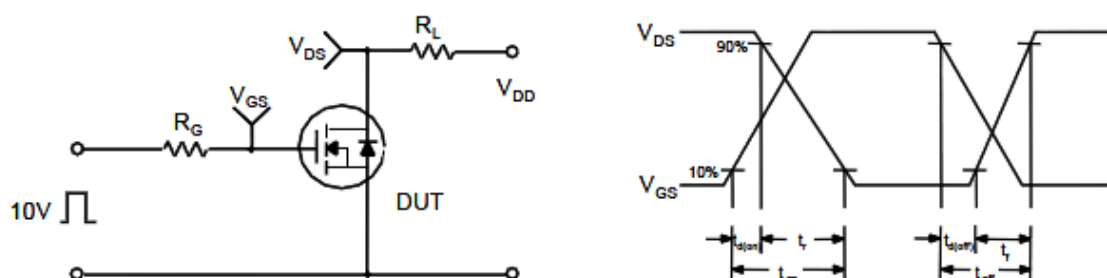
Figure 12. Maximum Drain Current vs. Time in Avalanche



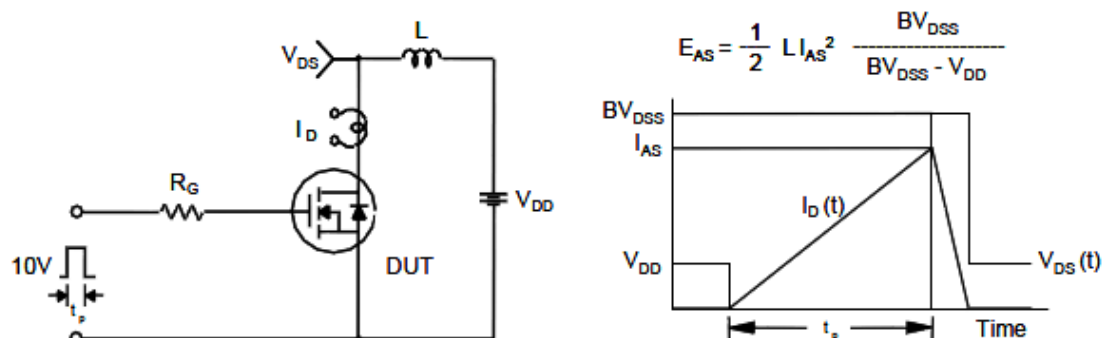
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

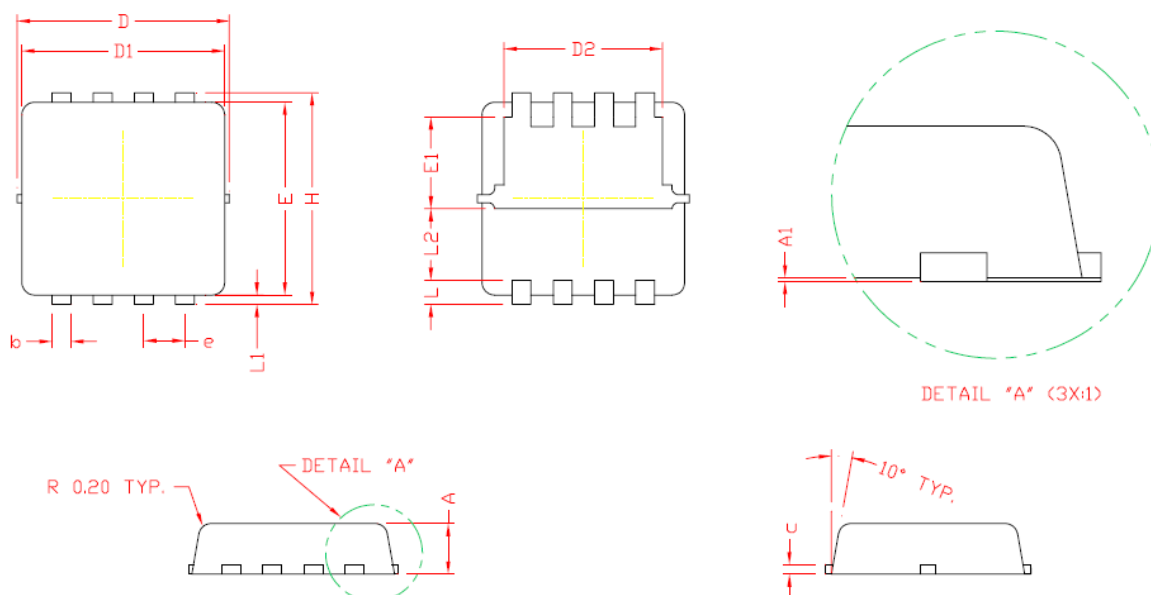


Unclamped Inductive Switching Test Circuit & Waveforms





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



DIMENSIONS

REF.	Millimeters		REF.	Millimeters	
	Min.	Max.		Min.	Max.
A	0.70	0.90	E	3.00	3.20
A1	0.00	0.05	E1	1.35	1.55
b	0.24	0.35	e	0.65 BSC.	
c	0.10	0.20	H	3.20	3.40
D	3.25	3.40	L	0.30	0.50
D1	3.05	3.25	L1	0.10	0.20
D2	2.40	2.60	L2	1.13 Ref.	

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