

30V, 95A N-CHANNEL POWER MOSFET

GENERAL DESCRIPTION

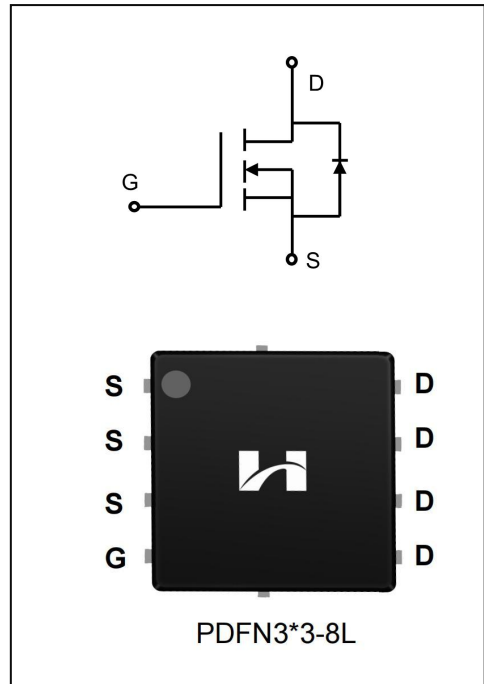
The SFN3009T uses advanced Trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. It can be used in a wide variety applications.

Features

- ◆  $V_{DS}=30V, I_D=95A$
- ◆  $R_{DS(on)}$   
TYP:  $3.9m\Omega @ V_{GS}=10V, I_D=30A$

Applications

- ◆ Power faction correction (PFC)
- ◆ Switched mode power supplies (SMPS)
- ◆ Uninterruptible power supply (UPS)
- ◆ LED lighting power



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFN3009T5	PDFN3X3-8L	SFN3009T5	Pb Free	Reel

### ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V <sub>DS</sub>	30	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Drain Current	T <sub>C</sub> = 25°C	I <sub>D</sub>	95	A
	T <sub>C</sub> = 100°C		52	
Drain Current Pulsed(Note 1)		I <sub>DM</sub>	300	A
Power Dissipation(T <sub>C</sub> =25°C) -Derate above 25°C		P <sub>D</sub>	46	W
Single Pulsed Avalanche Energy (Note 2)		E <sub>AS</sub>	144	mJ
Operation Junction Temperature Range		T <sub>J</sub>	-55~+150	°C
Storage Temperature Range		T <sub>stg</sub>	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	300	°C

### THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	2.5	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62.5	°C/W

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B <sub>VDS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	--	--	1.0	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	--	--	100	nA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V	--	--	-100	nA
On Characteristics						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =250μA	1.0	1.4	2.0	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10 V, I <sub>D</sub> =30A	--	3.9	4.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	--	6.5	8.0	
Dynamic Characteristics						
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V; f=1.0MHZ	--	2.5	--	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V V <sub>GS</sub> =0V f=1.0MHZ	--	1560	--	pF
Output Capacitance	C <sub>oss</sub>		--	187	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	177	--	
Switching Characteristics						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V R <sub>G</sub> =3Ω; I <sub>D</sub> =30A (Note 3.4)	--	13.1	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	34.5	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	41.1	--	
Turn-off Fall Time	t <sub>f</sub>		--	16.3	--	

Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=30A$ $V_{GS}=10V$ (Note 3.4)	--	41.6	--	nc
Gate-Source Charge	$Q_{gs}$		--	5.7	--	
Gate-Drain Charge	$Q_{gd}$		--	18.5	--	

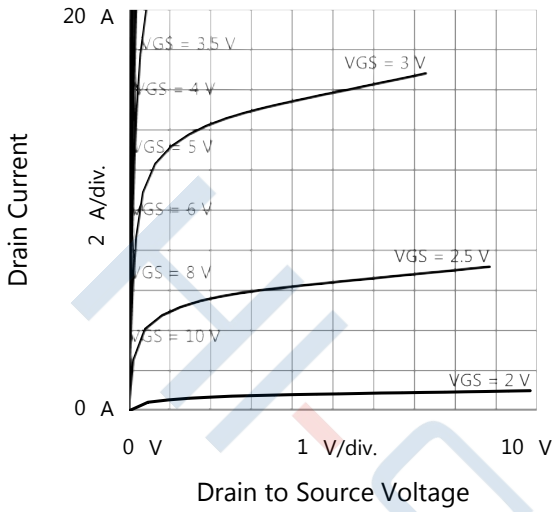
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	Integral Reverse P-N Junction Diode in the MOSFET	--	--	95	A
Pulsed Source Current	$I_{SM}$		--	--	300	
Diode Forward Voltage	$V_{SD}$	$I_S=30A, V_{GS}=0V$	--	0.85	1.2	V

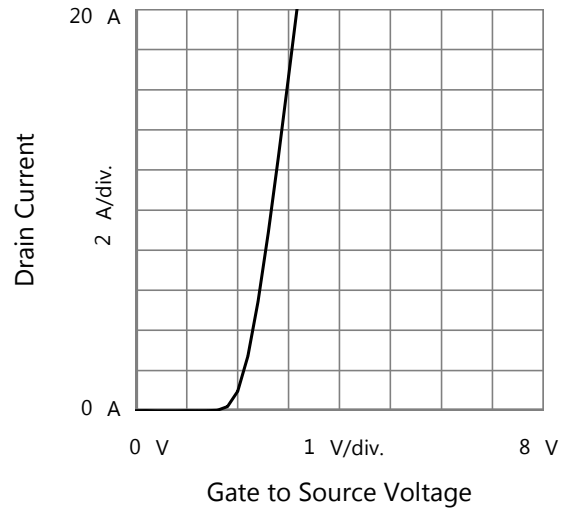
1. Pulse width limited by maximum junction temperature
2.  $L=0.5mH, V_{DD}=15V, V_G=10V, R_G=25\Omega$ , starting  $T_J=25^\circ C$
3. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
4. Essentially independent of operating temperature

Typical Performance Characteristics

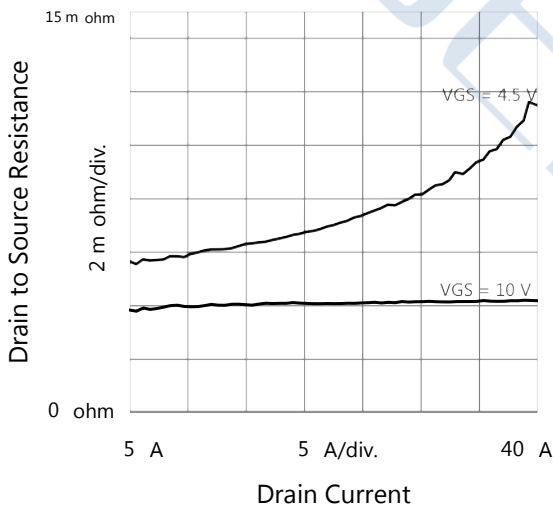
Output Characteristics



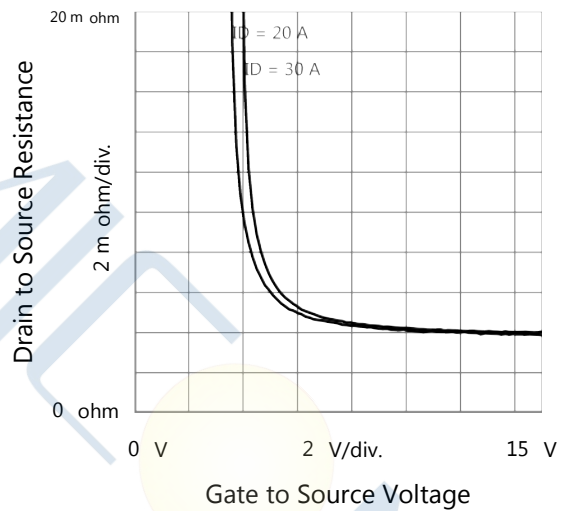
Transfer Characteristics



Drain to Source Resistance vs. Drain Current

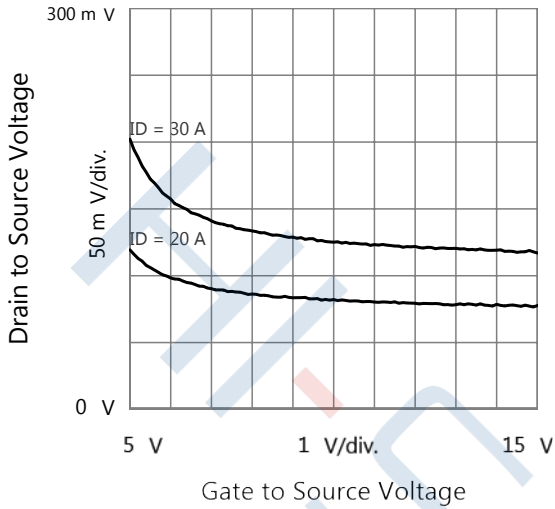


Drain to Source Resistance vs. Gate to Source Voltage

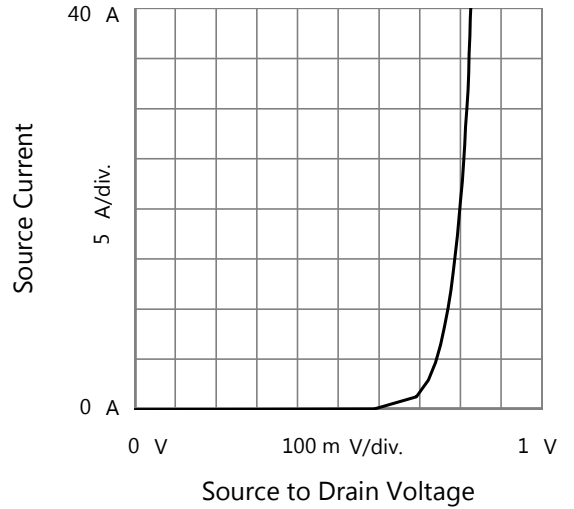


Typical Performance Characteristics

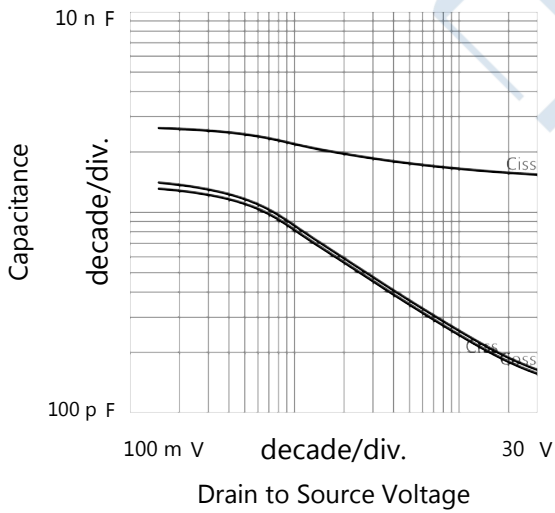
Drain to Source Voltage vs. Gate to Source Voltage



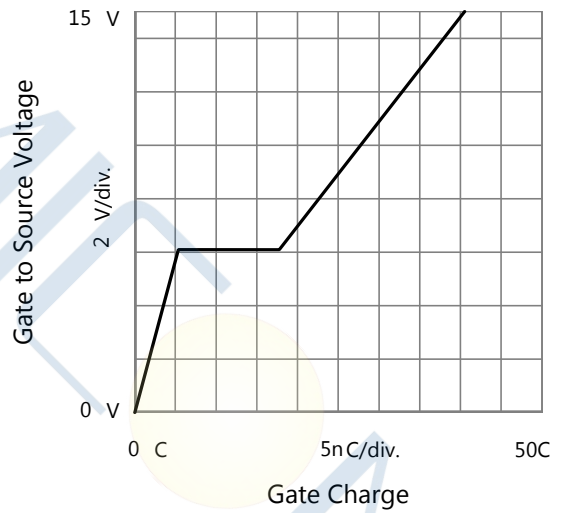
Body Diode Forward Characteristics



Capacitances

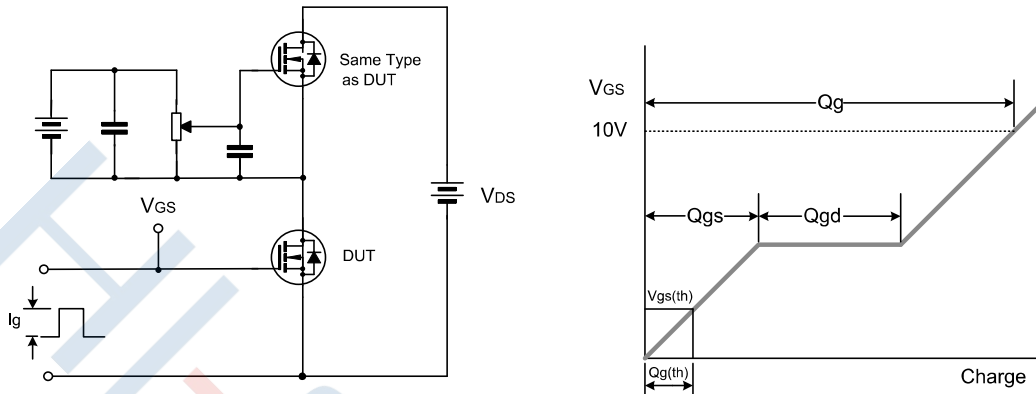


Gate Charge

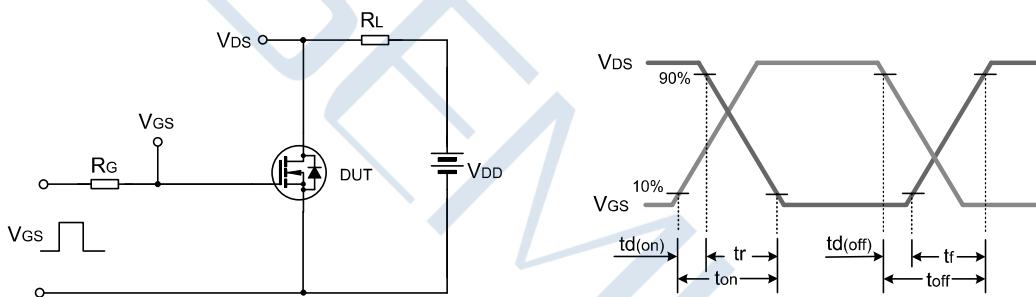


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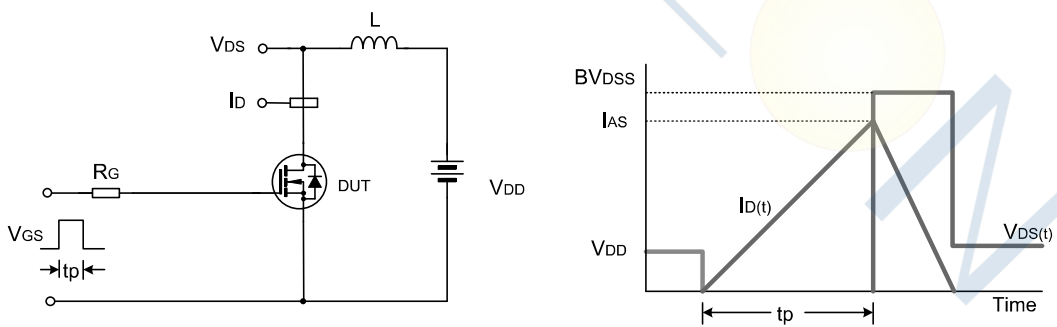
Test Circuit



Gate Charge Test Circuit & Waveform

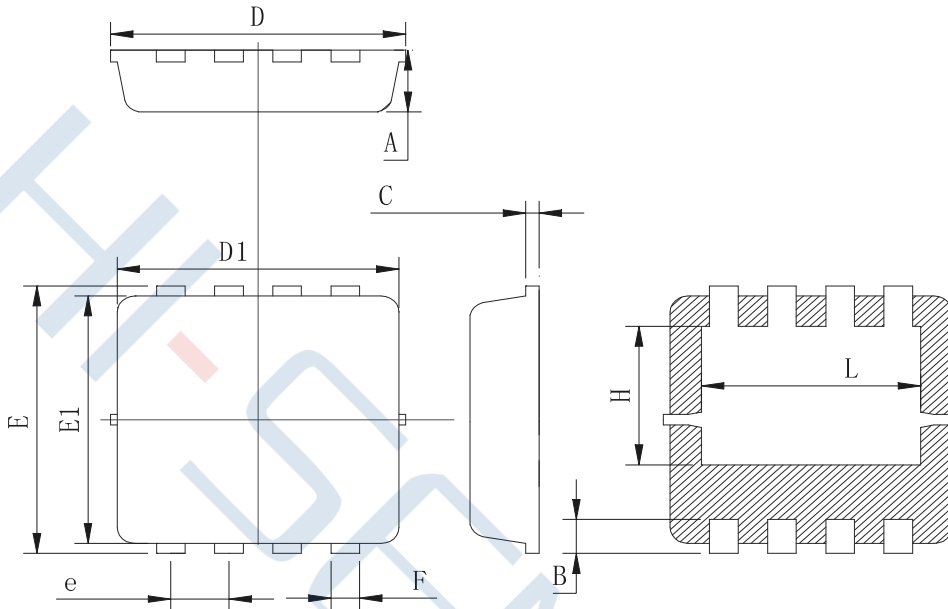


Resistive Switching Test Circuit & Waveform



EAS Test Circuit & Waveform

Package Dimensions of PDFN3X3-8L



Symbol	Min	Typ	Max
A	0.725	0.775	0.825
B	0.28	0.38	0.48
C	0.13	0.15	0.20
D	3.20	3.30	3.35
D1	3.05	3.15	3.25
E	3.25	3.35	3.45
E1	3.0	3.1	3.2
e	0.60	0.65	0.70
F	0.27	0.32	0.37
H	1.63	1.73	1.83
L	2.35	2.45	2.55

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