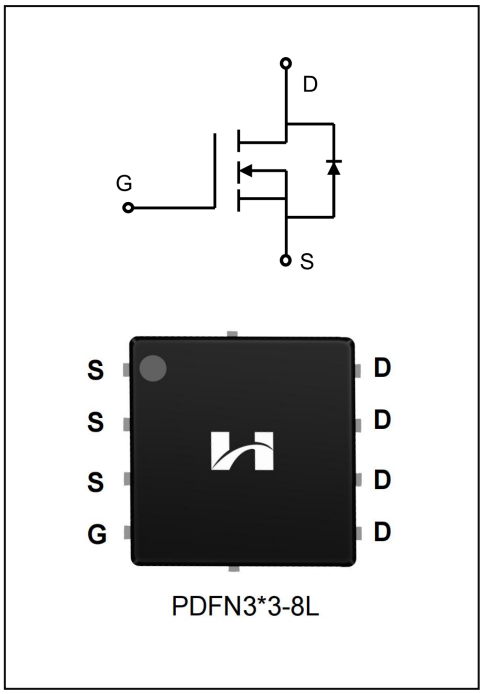
30V, 90A N-CHANNEL POWER MOSFET



PDFN3*3-8L

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=90A
- ◆$R_{DS(on)}$
  TYP:3.5mΩ@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
SFN3009T	PDFN3X3-8L	SFN3009T	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	T_C = 25°C	I_D	90	A
	T_C = 100°C		50	
Drain Current Pulsed(Note 1)		I_{DM}	300	A
Power Dissipation(T_C=25°C) -Derate above 25°C		P_D	46	W
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	240	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	300	℃

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.5	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	30	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	--	--	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V	--	--	-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=250μA	1.0	1.5	2.5	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=30A	--	3.5	4.2	mΩ
		V_{GS}=4.5V, I_D=20A	--	5.4	7.0	
Dynamic Characteristics						
Gate Resistance	Rg	V_{GS}=0V; f=1.0MHZ	1	4.6	10	Ω
Input Capacitance	C_{iss}	V_{DS}=15V V_{GS}=0V f=1.0MHZ	--	1930	--	pF
Output Capacitance	C_{oss}		--	308	--	
Reverse Transfer Capacitance	C_{rss}		--	266	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, V_{GS}=10V R_G=3Ω; I_D=30A (Note 3.4)	--	13.1	--	ns
Turn-on Rise Time	t_r		--	34..5	--	
Turn-off Delay Time	$t_{d(off)}$		--	41.1	--	
Turn-off Fall Time	t_f		--	16.3	--	

Total Gate Charge	Q_g	V_{DS}=15V, I_D=30A	--	41.6	--	nc
Gate-Source Charge	Q_{gs}	V_{GS}=10V	--	4.1	--	
Gate-Drain Charge	Q_{gd}	(Note 3.4)	--	14.5	--	

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	--	--	90	A
Pulsed Source Current	I_{SM}		--	--	300	
Diode Forward Voltage	V_{SD}	I_S=30A,V_{GS}=0V	--	0.83	1.2	V

1.Pluse width limited by maximum junction temperature

2.L=0.5mH, V_{DD}=15V, V_G=10V, R_G=25Ω, starting T_J=25°C

3.Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

4.Essentially independent of operating temperature

Typical Performance Characteristics

Figure1: Output Characteristics

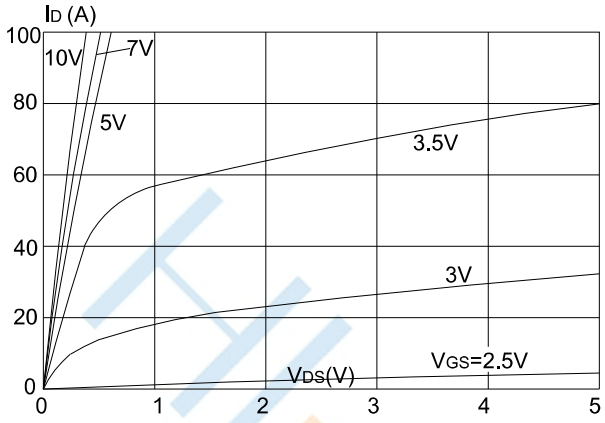


Figure 2: Typical Transfer Characteristics

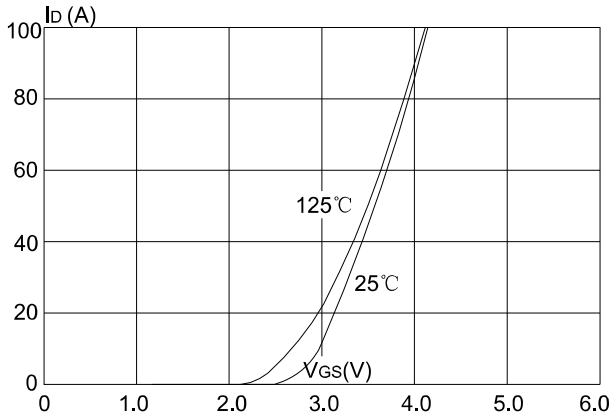


Figure 3: On-resistance vs. Drain Current

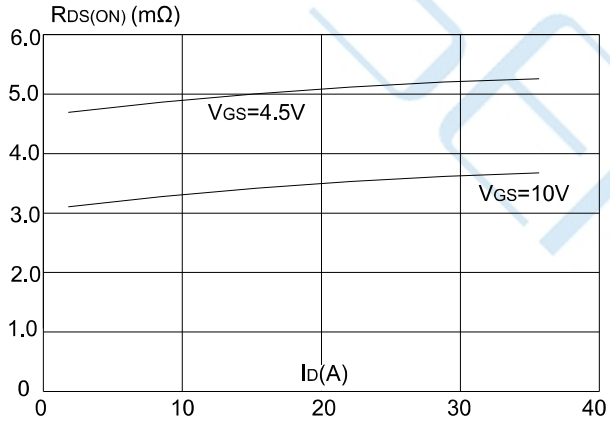


Figure 4: Body Diode Characteristics

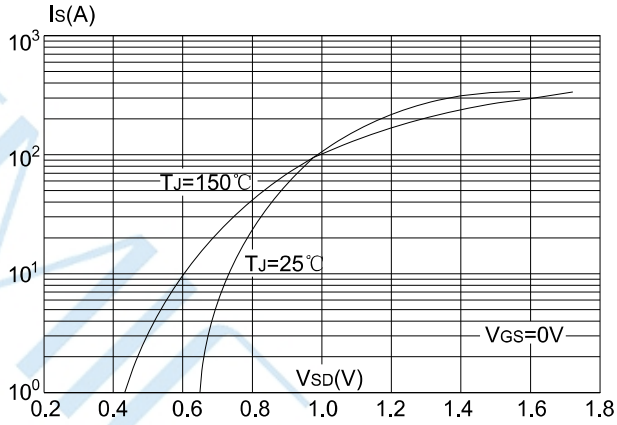


Figure 5: Gate Charge Characteristics

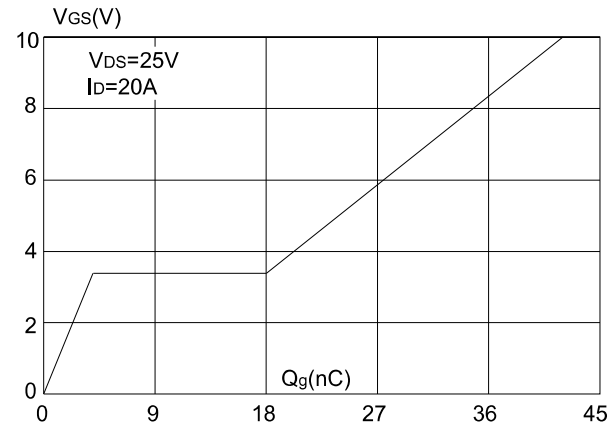
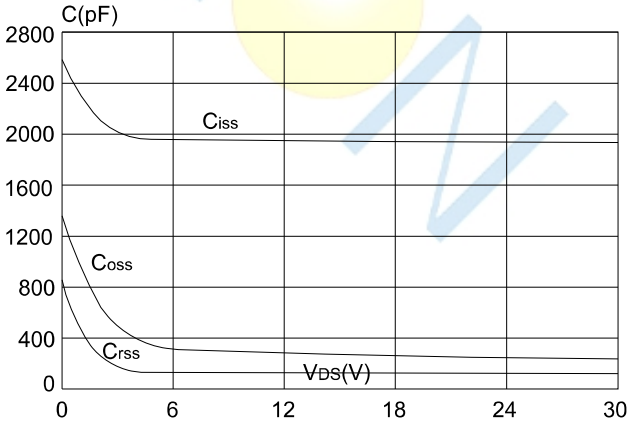


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

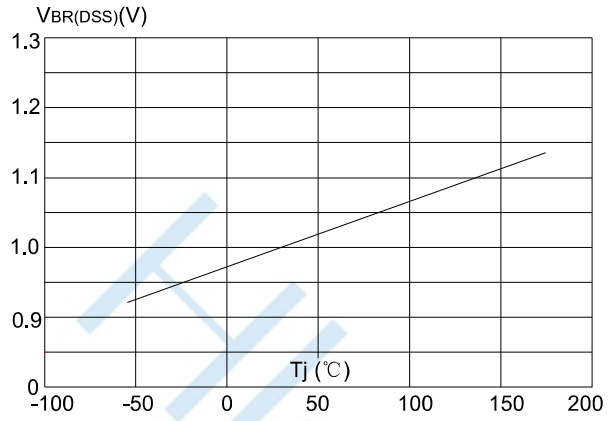


Figure 8: Normalized on Resistance vs. Junction Temperature

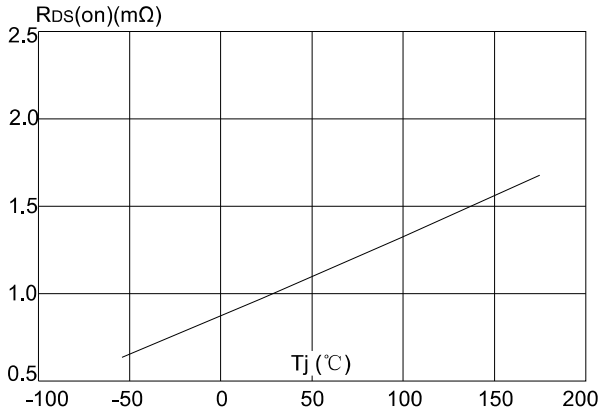


Figure 9: Maximum Safe Operating Area

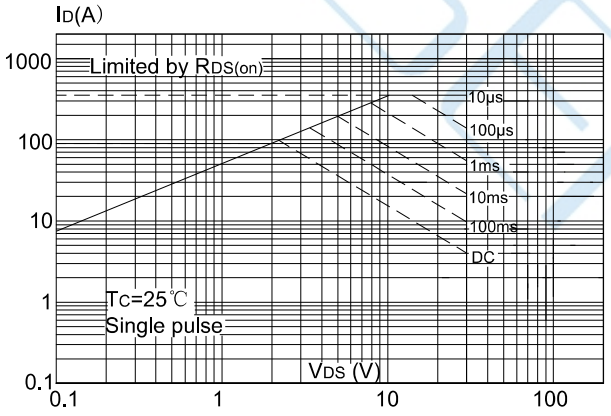


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

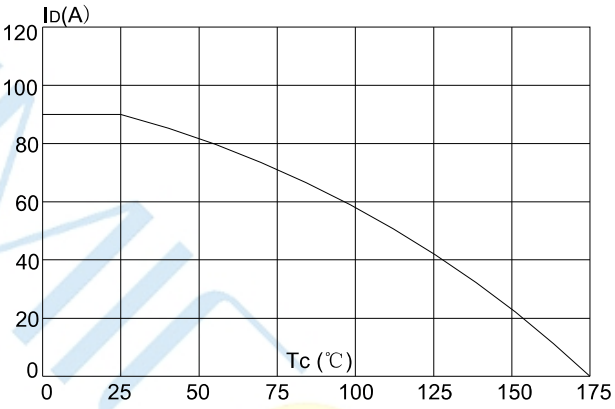
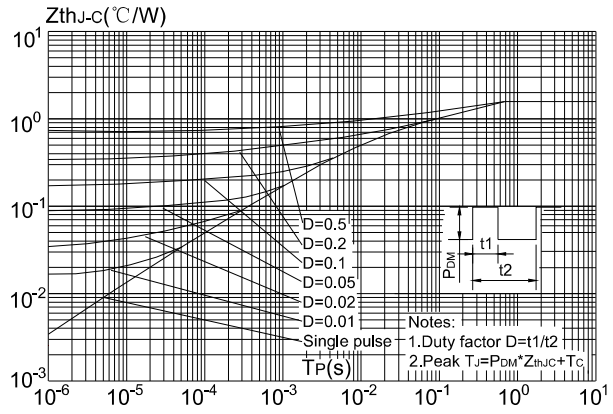
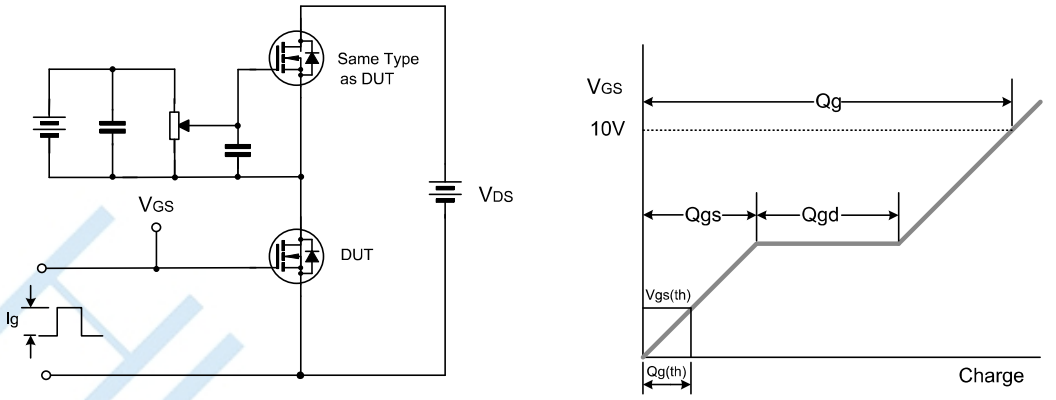


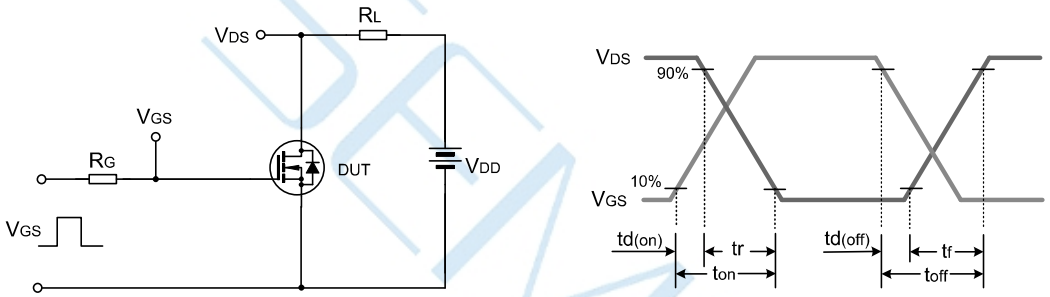
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



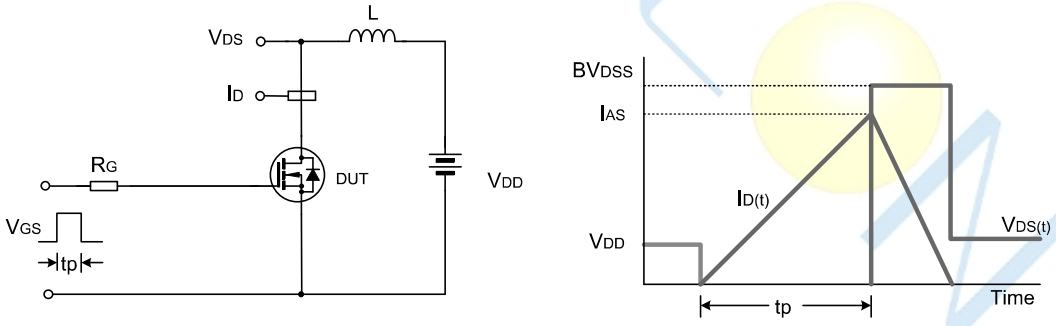
Test Circuit



Gate Charge Test Circuit & Waveform

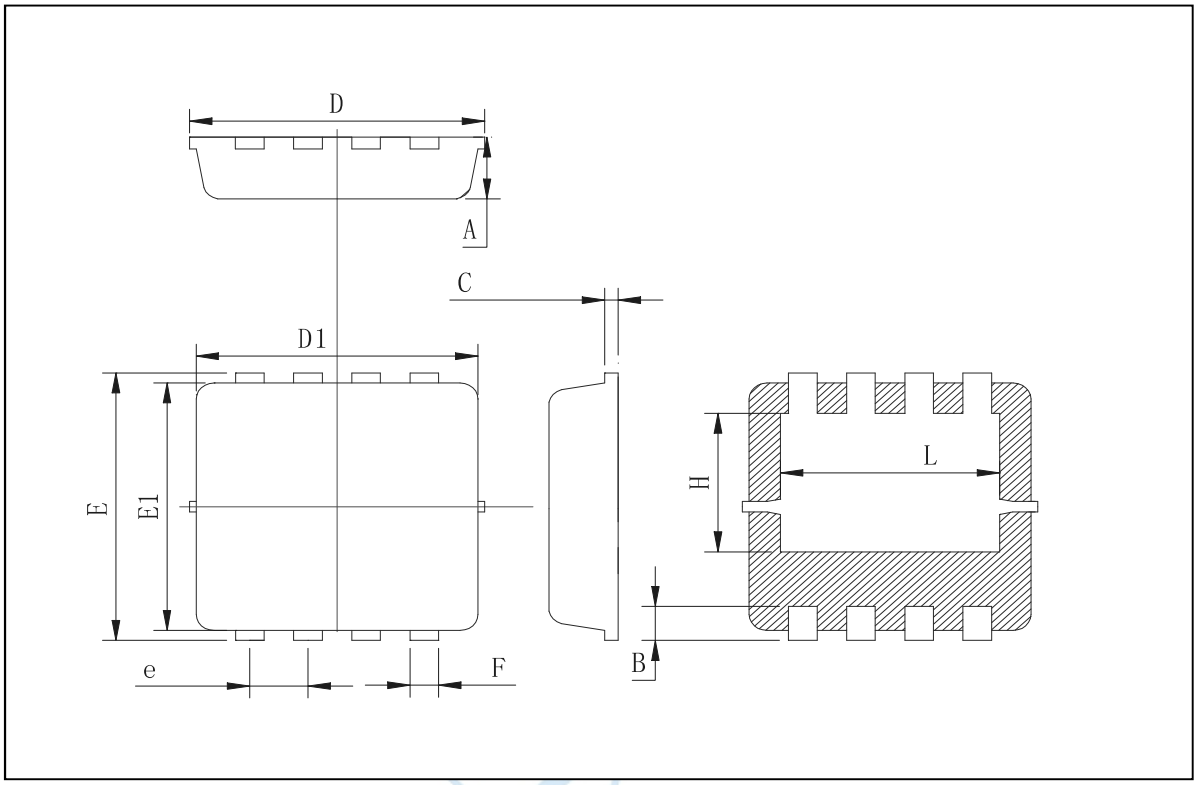


Resistive Switching Test Circuit & Waveform



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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